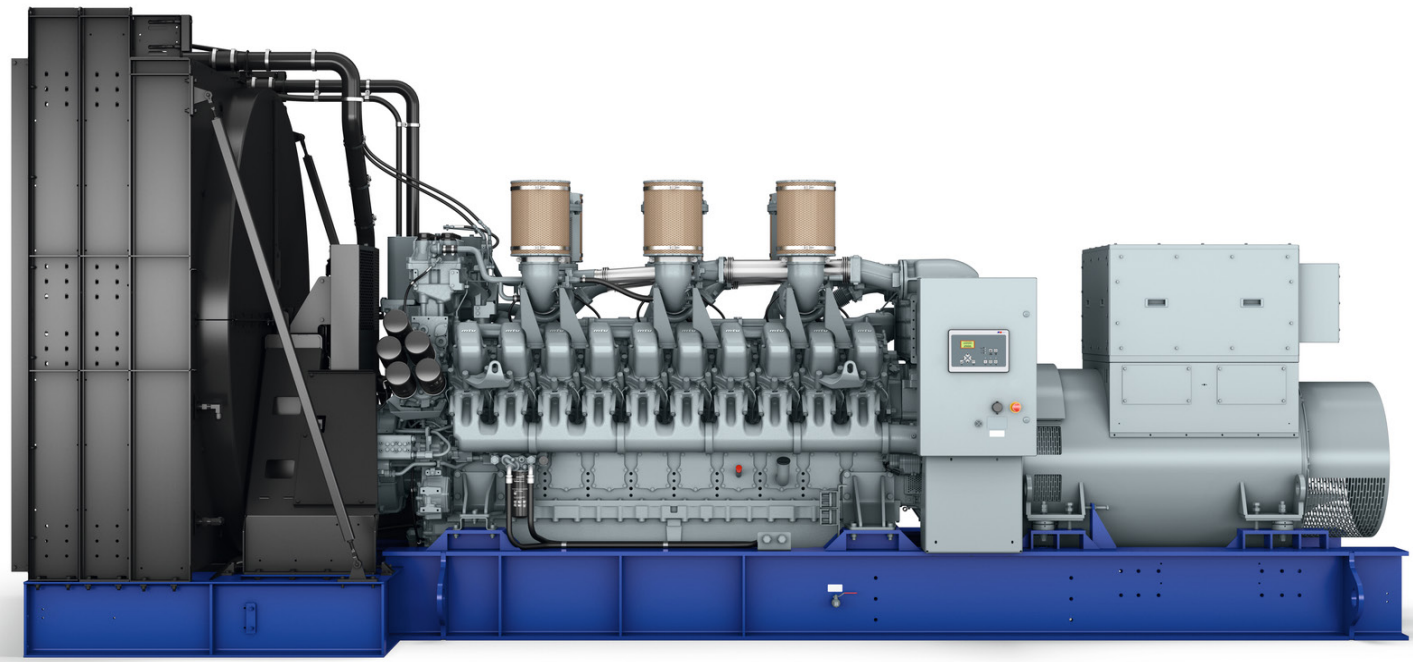

A complete product listing

ENGINEER'S GUIDEBOOK

This resource is intended for use within North and Latin America and may not represent all products available.

A Rolls-Royce solution

Table of Contents

60 Hz Generator Sets – Gas Standby (continued)

60 Hz Generator Sets – Gas Prime

60 Hz Generator Sets – Diesel Standby

60 Hz Generator Sets – Diesel Standby, continued

60 Hz Generator Sets – Diesel Standby, continued

mtu 20V4000 DS2800 G04 (2,790 kW Standby) 50C T2 SCAQMD
mtu 20V4000 DS2800 G04 (2,800 kW Standby) 48C T2 SCAQMD
mtu 20V4000 DS3000 G04 (3,000 kW Standby) 45C T2 SCAQMD
mtu 20V4000 DS3000 G04 (3,000 kW Standby) 50C T2 SCAQMD
mtu 20V4000 DS3250 G04 (3,250 kW Standby) 43C T2 SCAQMD

60 Hz Generator Sets – Diesel Data Center Continuous Power

mtu 12V1600 DS750 (690 kW DCCP) T2
mtu 12V1600 DS800 (730 kW DCCP) T2
mtu 12V1600 DS900 (820 kW DCCP) T2
mtu 16V2000 DS1000 (900 kW DCCP) T2
mtu 12V4000 DS1250 G04 (1,135 kW DCCP) 50C T2 SCAQMD
mtu 12V4000 DS1500 G04 (1,400 kW DCCP) 40C T2 SCAQMD
mtu 12V4000 DS1500 G04 (1,400 kW DCCP) 50C T2 SCAQMD
mtu 12V4000 DS1750 G04 (1,600 kW DCCP) 40C T2 SCAQMD
mtu 12V4000 DS1750 G04 (1,600 kW DCCP) 50C T2 SCAQMD
mtu 16V4000 DS2000 G04 (1,825 kW DCCP) 45C T2 SCAQMD
mtu 16V4000 DS2000 G04 (1,825 kW DCCP) 50C T2 SCAQMD
mtu 16V4000 DS2250 G04 (2,045 kW DCCP) 40C T2 SCAQMD
mtu 16V4000 DS2250 G04 (2,045 kW DCCP) 50C T2 SCAQMD
mtu 20V4000 DS2500 G04 (2,275 kW DCCP) 50C T2 SCAQMD
mtu 20V4000 DS2800 G04 (2,500 kW DCCP) 48C T2 SCAQMD
mtu 20V4000 DS2800 G04 (2,500 kW DCCP) 50C T2 SCAQMD
mtu 20V4000 DS3000 G04 (2,790 kW DCCP) 50C T2 SCAQMD
mtu 20V4000 DS3000 G04 (2,800 kW DCCP) 45C T2 SCAQMD

60 Hz Generator Sets – Diesel Prime

mtu 4R0120 DS80 (72 kW Prime) T3 SCAQMD
mtu 4R0120 DS100 (90 kW Prime) T3 SCAQMD
mtu 4R0120 DS125 (111 kW Prime) T3 SCAQMD
mtu 6R0120 DS150 (135 kW Prime) T3 SCAQMD

60 Hz Generator Sets – Diesel Prime, continued

60 Hz Generator Sets – Diesel Prime Power for Stationary Emergency

Circuit Breakers

Controllers and Annunciators

Controllers and Annunciators, continued

Cooling and Heating Systems

Distribution Panels

Enclosures and Sound Data

Enclosures and Sound Data, continued

Engine

Exhaust System

Fuel Systems and Tanks

Generators and Regulators

Lubrication System

Paralleling

Starting Systems

Warranty Information

ENGINEER'S GUIDEBOOK

How to Download Your Copy

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A Rolls-Royce solution

Overview

The *Engineer's Guidebook* is a portfolio of ***mtu*** 60 Hz diesel and gas products and accessories. It includes associated specification sheets, component data sheets, and warranty information, giving the reader a well-rounded view of the ***mtu*** product line. This publication is offered at no cost to our Distribution Network.

Downloading via the Web

The *Engineer's Guidebook* is available for download from the ***mtu*** Business Portal or the ***mtu*** public website at any time.

To download from the *mtu* Business Portal (for *mtu* Distributors only)

1. Access the ***mtu*** Business Portal at http://partner.mtu-online.com/irj/portal.
2. Select *Applications & Products > Powergen.* Select either *Diesel Generator Sets* or *Gas Generator Sets.* Select *60 Hz > North and Latin America,* and click on a product.
3. From the menu on the right, select **Engineer's Guidebook.**
4. A list of links appears. Click **Engineer's Guidebook**.
5. When the document is displayed, you can save it by clicking *File > Save As* in the toolbar.
6. In the **Save As PDF** dialog box, select the location where you wish to save the document.
7. Click **Save**. The document will be saved in the chosen location.

To download from the *mtu* Website

NOTE: You will be asked to log in or register before downloading the *Engineer's Guidebook*.

1. Access the website at http://www.mtu-solutions.com.
2. From the main menu, select *Power Generation > Power Generation Resources > Tools and Downloads.*
3. Scroll down to the **Engineer's Guidebook** and click **Download Engineer's Guidebook.**
4. Follow the directions displayed on the screen.
5. When the document is displayed, you can save it by clicking *File > Save As* in the toolbar.
6. In the **Save As PDF** dialog box, select the location where you wish to save the document.
7. Click **Save**. The document will be saved in your chosen location.

ENGINEER'S GUIDEBOOK – How to Download Your Copy

Keeping the Guidebook Up to Date Between Releases

With each new version of the *Engineer's Guidebook*, a list of updates is provided in the *Engineer's Guidebook Version History* section of the publication.

Documents contained within the *Engineer's Guidebook* are updated intermittently between releases. Please refer to the following resources to stay informed of changes.

Document	Purpose	Where to Find It
Spec Sheet Change List	Provides a list of all spec sheet updates for the specified year. Check the version ID of the spec sheet in your *Engineer's Guidebook* to determine whether you have the latest version (found on the last page of each spec sheet).	***mtu*** Business Portal: Select *Applications & Products > Powergen.* Select either *Diesel Generator Sets* or *Gas Generator Sets.* Then select *60 Hz > North and Latin America* and click on a product. From the menu on the right, select *PowerGen Dashboard US*. In the *Technical Data* column, select *Specification Sheets > Spec Sheet Change History.*
Document Change History	Provides a list of data sheets, drawings, and other relevant documents that were updated.	***mtu*** Business Portal: Select *Applications & Products > Powergen.* Select either *Diesel Generator Sets* or *Gas Generator Sets.* Then select *60 Hz > North and Latin America* and click on a product. From the menu on the right, select *PowerGen Dashboard US*. In the *Support* column, select *Document Change History.*

Printing

Printing the Electronic Version of the *Engineer's Guidebook*

Should you wish to print the *Engineer's Guidebook,* the following table provides paper specifications for each section.

Document to Print	Paper Size
Cover	8.5" x 11" cardstock
History/Enclosures/Accessories and Components/Warranty Information	8.5" X 11", duplexed
Spec Sheets	11 X 17, duplexed, saddle fold booklet

Assistance

For any questions regarding the *Engineer's Guidebook*, please contact your ***mtu*** Account Manager.

ENGINEER'S GUIDEBOOK

Version History

Changes that occurred with the current release of the Engineer's Guidebook are shown below.

Version
2023-10
Release Date
October 2023
New Additions
Spec Sheet ***mtu*** 8V0078 GS100 (100 kW Standby)
Spec Sheet ***mtu*** 12V1600 DS750 (690 kW DCCP) T2
Spec Sheet ***mtu*** 12V1600 DS750 (690 kW PPSE) T2
Spec Sheet ***mtu*** 12V1600 DS750 (750 kW Standby) T2
Spec Sheet ***mtu*** 12V1600 DS800 (730 kW DCCP) T2
Spec Sheet ***mtu*** 12V1600 DS800 (730 kW PPSE) T2
Spec Sheet ***mtu*** 12V1600 DS800 (800 kW Standby) T2
Spec Sheet ***mtu*** 12V1600 DS900 (820 kW DCCP) T2
Spec Sheet ***mtu*** 12V1600 DS900 (820 kW PPSE) T2
Spec Sheet ***mtu*** 12V1600 DS900 (900 kW Standby) T2
Circuit Breaker Enclosure Data Gas 100 kW (0078)
Enclosure and Sound Data Gas 100 kW (0078) Open Field
Origin Gaseous Fuel System Data Sheet
Strip Heater Data Sheet (Marelli)
Mark VX_XX Voltage Regulator Data Sheet
mtu Series 4000 After-Treatment ERT Data Sheet
Updated Documents
Engineer's Guidebook Version History
Existing Spec Sheet changes: Please refer to the Spec Sheet Change List on the ***mtu*** Business Portal (Distributor use only).
Master Control Panel Data Sheet
Enclosure and Sound Data Diesel 27-60 kW_30-55 kVA (0096_0113) Infinite Exhaust
Enclosure and Sound Data Diesel 27-60 kW_30-55 kVA (0096_0113) Open Field
Enclosure and Sound Data Diesel 72-200 kW (0120) Infinite Exhaust

Updated Documents, continued
Enclosure and Sound Data Diesel 72-200 kW (0120) Open Field
Enclosure and Sound Data Diesel 80-200 kW (0113) Infinite Exhaust
Enclosure and Sound Data Diesel 210-400 kW (0150_0225) Open Field
Enclosure and Sound Data Diesel 210-400 kW (0150_0225) Open Field T4
Enclosure and Sound Data Diesel 400-600 kW (1600) Infinite Exhaust
Enclosure and Sound Data Diesel 400-600 kW (1600) Open Field
Enclosure and Sound Data Gas 30-40 kW (0063) Open Field
Enclosure and Sound Data Gas 50-60 kW (0071) Open Field
Enclosure and Sound Data Gas 150 kW (0110) Open Field
MicroGenius Battery Charger Data Sheet
Generator Set Nameplate Data Sheet
Single Valve Gas Solenoid Data Sheet
AREP Excitation System Data Sheet (renamed to Auxiliary Winding Excitation System Data Sheet)
Permanent Magnet Generator (PMG) Data Sheet
Removed
Spec Sheet ***mtu*** 12V2000 DS750 (680 kW Prime) T2 SCAQMD
Spec Sheet ***mtu*** 12V2000 DS750 (750 kW Standby) T2 SCAQMD
Spec Sheet ***mtu*** 12V2000 DS800 (725 kW Prime) T2 SCAQMD
Spec Sheet ***mtu*** 12V2000 DS800 (800 kW Standby) T2 SCAQMD
Spec Sheet ***mtu*** 12V4000 DS1500 G05 (1500 kW Standby) - 40C
Spec Sheet ***mtu*** 12V4000 DS1750 G05 (1750 kW Standby) - 50C FCO
Spec Sheet ***mtu*** 12V4000 DS1500 G05 (1350 kW DCCP) - 40C
Spec Sheet ***mtu*** 12V4000 DS1750 G05 (1600 kW DCCP) - 50C
All Fuel Consumption Optimized (FCO) Spec Sheets for ***mtu*** 18V2000 and ***mtu*** Series 4000
ASCO 300 Series ATS Brochure
KASSEC Engine Controller Data Sheet
SM124 Speed Monitor Data Sheet
Five (5) Year 3000 Hour Basic Extended Standby Limited Warranty_SYS-M-GEN-E-001
Ten (10) Year 3000 Hour Major Component Extended Standby Limited Warranty_SYS-M-GEN-E-004

POWER GENERATION SYSTEMS BASED ON MORE THAN A CENTURY OF EXPERIENCE

The name Rolls-Royce is synonymous with premium quality – the best of the best. And ***mtu*** power generation systems from Rolls-Royce live up to that reputation with quality, reliability and lifecycle support that is trusted in mission-critical applications around the globe.

Industry legends such as Maybach, Daimler-Benz, Detroit Diesel, Katolight and Rolls-Royce are all integral parts of our heritage. ***mtu*** power generation systems reflect the great strength and innovation of these storied companies.

Rolls-Royce is one of the leaders in the power generation industry, with a comprehensive ***mtu*** power generation product portfolio and unmatched customer service. Our network of nearly 300 North American service locations ensures you're never far from an authorized distributor with a knowledgeable sales staff and EGSA-certified technicians to address all your power needs.

Complete power generation solutions

mtu power generation systems from Rolls-Royce are ideal for ensuring mission-critical standby and prime power in the most demanding commercial and industrial applications. As a single-source supplier, Rolls-Royce provides generator sets, automatic transfer switches, digital paralleling switchgear, fuel tanks and enclosures for complete onsite power solutions. With ***mtu*** engines powering gensets of 450 kW and above, Rolls-Royce delivers the benefits of vertical integration to its power generation customers.

Quality and compliance you can trust

mtu generator sets are compliant with many different codes and standards. Our validation philosophy and performance are regularly reviewed to ensure continuity with these codes and standards: UL2200, CSA, EPA, NFPA 99–Health Care Facilities, NFPA 70-National Electrical Code, NFPA 110 – Standard for Emergency and Standby Power Systems, Department of Labor and Industry, NEMA MG1-Motors and Generators, and MIL-STD-705-c.

Product portfolio

- Diesel-powered generator sets 30 kW to 3,250 kW
- Gas-powered generator sets 30 kW to 650 kW
- Natural gas cogeneration systems
- Automatic transfer switches 30 amps to 4,000 amps
- Paralleling switchgear and digital master control systems
- Demand response and load management programs
- Microgrids, battery storage and hybrid power systems

Features

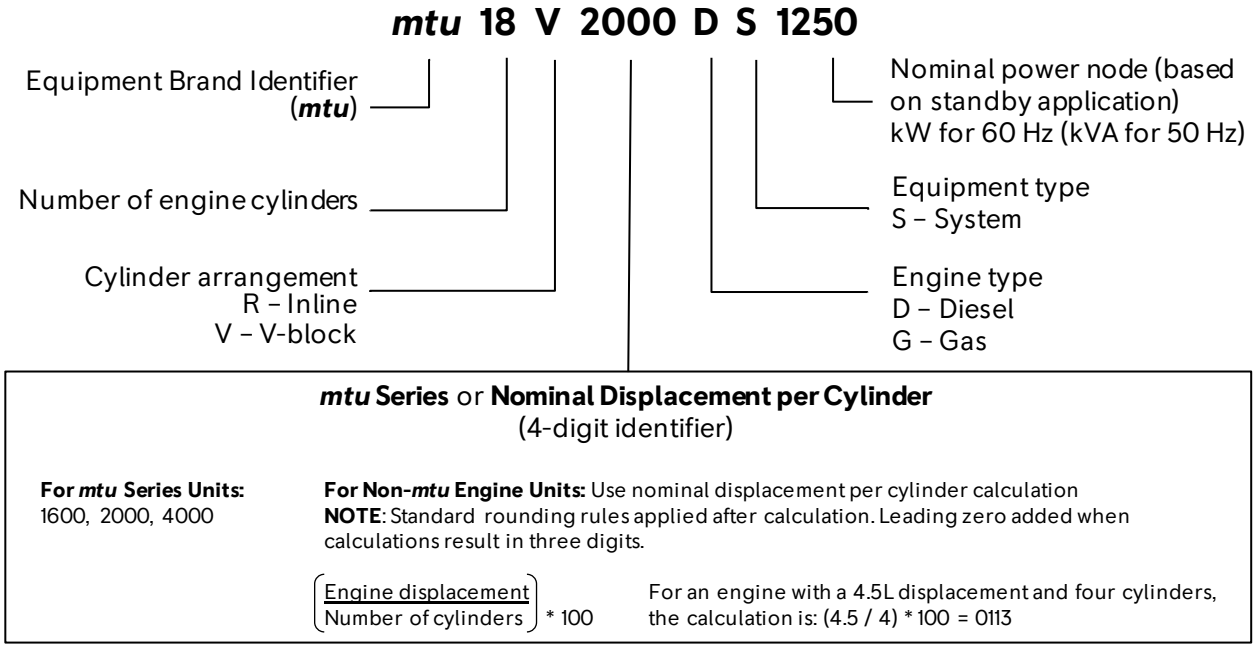
- 50 Hz and 60 Hz models
- UL2200 listing available on most models
- Leading emissions technology
- Advanced monitoring and communications technology
- Digital engine controls and remote monitoring
- Proven reliability and durability
- Excellent transient response and one-step load acceptance
- 85 percent 24-hour average load factor
- IBC seismic certification and OSHPD approval available

Our history

1909 Karl and Wilhelm Maybach form Maybach Engines in Germany to power the first Zeppelin airships, eventually producing automobiles and off-highway engines.
1960s Maybach merges with the off-highway division of Daimler-Benz to form ***mtu***, originally an acronym for "Motor and Turbine Union."
1994 ***mtu*** and Detroit Diesel form a partnership to develop the Series 2000 and Series 4000 engine families.
2000 ***mtu*** merges with the off-highway operations of Detroit Diesel, under the name of ***mtu*** Detroit Diesel.
2006 Tognum GmbH is formed as the parent company of ***mtu*** and ***mtu*** Detroit Diesel; the Tognum Group holding company is headquartered in Friedrichshafen, Germany.
2007 Tognum acquires Katolight Corporation, a generator set manufacturer and packager founded in 1952 and based in Mankato, Minnesota.
2008 ***mtu*** Onsite Energy is formed as the global power generation brand for Tognum, and Katolight Corporation is renamed ***mtu*** Onsite Energy Corporation.
2011 Daimler AG and Rolls-Royce Holdings PLC become majority shareholders of Tognum AG.
2014 Tognum America becomes ***mtu*** America, a wholly owned subsidiary of Rolls-Royce Power Systems AG.
2019 Rolls-Royce aligns power generation under the ***mtu*** brand; ***mtu*** – A Rolls-Royce solution.

SALES NOMENCLATURE – Generator Sets Structure Definition

Effective August 1, 2014, the following sales nomenclature replaces all previous ***mtu*** generator set model number definitions. Example: ***mtu*** 18V2000 DS1250



Nameplate Data Sheet

Generator Set

DESCRIPTION

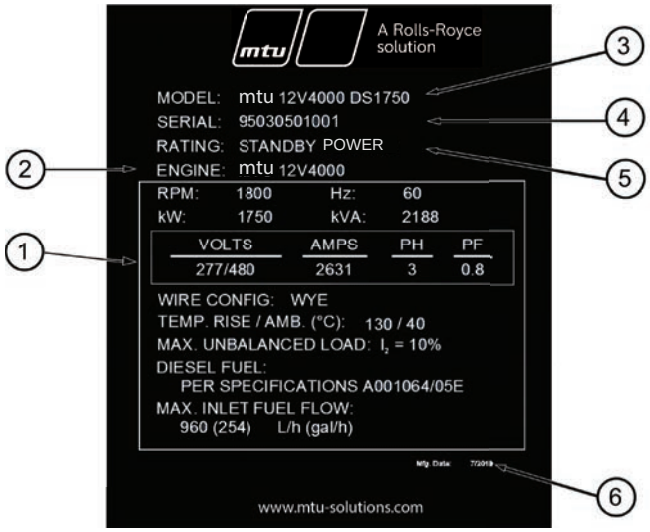
The nameplate is a label attached to the generator set that provides important product information. This information is necessary for service, maintenance, and factory communication. The engine, the generator, and the generator set each have a nameplate. The engine nameplate can be found on the engine, while the generator and generator set nameplates are both found on the generator. The generator set nameplate is clearly labeled at the top with the ***mtu*** logo.

Nameplate on Diesel Generator

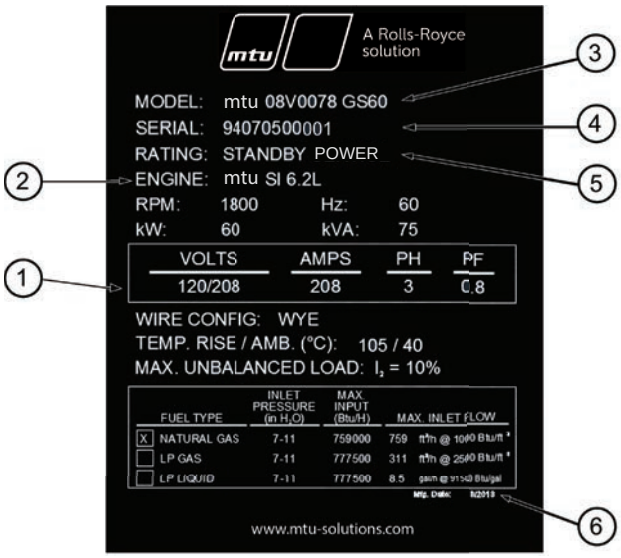
Nameplate on Gas Generator

FEATURES

The following graphic shows an example of a generator set nameplate.



Generator Set Nameplate Example: Diesel



Generator Set Nameplate Example: Gas

1. Technical data
2. Engine model number
3. Generator set model number
4. Serial number
5. Rating
6. Date of manufacture

A Rolls-Royce solution

Nameplate Data Sheet
Generator Set

Explanation of generator set model number

Example: ***mtu*** 12V4000 DS1750	
mtu	Manufacturer: ***mtu***
12	Number of cylinders in engine: 12
V	Arrangement of cylinders in engine: Vee
4000	Series: ***mtu*** Series 4000
D	Engine type: Diesel engine
S	Product type: System
1750	Power rating: Rated power in kW

Explanation of generator set serial number

Digits 1 and 2: Product Type	Digits 3 and 4: Engine type	Digits 5 and 6: Location of Manufacture	Digits 7 through 11: Counter (Unique to each unit)
94: Gas system product line	01: ***mtu*** Series 1600	05: Mankato P1 (Power Drive)	00001-99999
95: Diesel system product line	02: ***mtu*** Series 2000		
	03: ***mtu*** Series 4000		
	07: ***mtu*** SI		
	09: John Deere		
	10: PSI 5.7L-31.8L		
	11: GM		
	13: Mercedes-Benz		
	17: Origin		

Example: 95030501001	
95	Product type: Diesel system product line
03	Engine type: ***mtu*** Series 4000
05	Location of manufacture: Mankato P1 (Power Drive)
01001	Counter: One thousand and one
Example: 94070500001	
94	Product type: Gas system product line
07	Engine type: ***mtu*** SI
05	Location of manufacture: Mankato P1 (Power Drive)
00001	Counter: One

Power Generation

PERFORMANCE ASSURANCE CERTIFICATION

A Rolls-Royce solution

TESTING PROCEDURES

Prototype

We have been producing superior generator sets for more than six decades. Understanding the importance of reliable, cost-effective products, we have developed industry-leading test procedures to ensure we exceed this criteria. Our testing program confirms that our customers will receive products of the highest quality.

Our Performance Assurance Certification (PAC) certifies that every ***mtu*** generator set undergoes rigorous prototype testing including the following:

Prototype Test Procedures

- **Rated Load (NFPA 110)**
  All generator set models will produce the nameplate-rated load within the design tolerance of the generator set.
- **Extended-run Testing**
  All generator set prototypes have been subjected to extended run-time testing.
- **Transient Response Analysis (ISO 8528-5)**
  All new generator set models have undergone transient response analysis per ISO 8528-5.
- **Torsional Analysis**
  All generator set models have undergone torsional stress analysis.
- **Engine Cooling System**
  All generator set models will cool sufficiently within the ambient design conditions per each model.
- **Anticipatory Alarms and Shutdowns**
  The pre-alarms and alarms function appropriately to protect the generator set from any foreseen unnecessary failures.
- **Vibrational Analysis (ISO 8528-9)**
  All new generator set models have undergone vibration analysis to ensure that each engine-generator coupling is balanced and that there is no destructive resonant vibration.
- **Noise Analysis (ISO 8528-10)**
  All generator sets undergo airborne noise analysis using the enveloping surface method.

Prototype Test Standards

mtu generator sets are compliant with many different codes and standards. Our validation philosophy and performance are regularly reviewed to ensure continuity with these codes and standards: *UL2200, CSA, EPA, NFPA 99—Health Care Facilities, NFPA 70—National Electrical Code, NFPA 110—Standard for Emergency and Standby Power Systems, Department of Labor and Industry, NEMA MG 1—Motors and Generators, and MIL-STD-705-c.*

Factory Acceptance

Our factory testing is performed with the same extreme diligence and attention to detail that is given to the prototype testing process. Every *mtu* generator set receives a complete factory acceptance test that certifies and ensures the system will function in accordance to every specific application.

Test metering has an accuracy of 1.3% or better. This metering is calibrated a minimum of once per year and is directly traceable to the Bureau of Standards.

Factory acceptance testing procedures

- **Insulation Resistance Inspection** (301.1c)*
- **High Potential Test** (302.1b)*
- **Alternator Overspeed** (1 min.)*
- **Engine Inspection**
- **Generator Inspection**
- **Resistances Inspection** (401.1b)
  - Exciter Field Stator
  - Alternator Armatures
- **Mounting and Coupling Inspection**
- **Engine Fuel Oil System Inspection**
- **Engine Lube Oil System Inspection**
- **Engine Cooling System Inspection**
- **DC Charging System Inspection**
- **Circuit Breaker Inspection**
- **Anticipatory Alarms and Shutdowns Inspection** (505.2b, 515.1b, 515.2b)
- **Optional Equipment Inspection** (513.2a)
- **Load Test Inspection**
  - Full Nameplate-Rated Load
  - No-Load Inspection
  - MAX Load @ 1.0 P.F. (640.1d)
  - MAX Load @ 0.8 P.F.
  - Block Loads @ 0–25%, 0–50%, 0–75%, 0–100%
- **Phase Balance and Sequence Inspection** (507.1d, 508.1d, 516.1a)

** Performed by Alternator OEM*

OPTIONAL TESTING

Factory Acceptance

Extended-run factory acceptance testing

In some cases, extended-run testing may be requested. Unless specified otherwise, extended-run testing will be performed in the following manner:

- Full nameplate-rated load
- Standard readings taken every 15 or 30 minutes

Standard readings recorded during load test inspection

- Run Time
- AC Voltage
- AC Amperage
- kVA
- kWe
- Power Factor
- Frequency
- Exciter Field Voltage
- Exciter Field Current
- Lube Oil Pressure
- Engine Coolant Temperature
- Ambient Temperature

Witnessed factory acceptance testing

Witnessed factory tests must be scheduled and approved at least four weeks prior to the generator set's scheduled shipping date. Any requests for witnessed factory testing after this four-week period must be approved by the Regional Sales Manager and are subject to additional fees.

Witnessed extended-run factory acceptance testing

Witnessed extended-run tests must be scheduled and approved at least four weeks prior to the generator set's scheduled ship date. Any requests for witnessed extended-run testing after this four-week period must be approved by the Regional Sales Manager and are subject to additional fees.

Additional factory acceptance testing

Additional testing is available upon request. The following is a list of supplementary tests which can be performed on ***mtu*** generator sets. Non-standard testing is subject to additional charges.

Additional testing procedures

- **Start and Stop Test** (MIL-STD-705c 503.1c)
- **Remote Start and Stop Test** (MIL-STD-705c 503.2c)
- **Overspeed Protective Device Test** (MIL-STD-705c 505.2b)
- **Insulation Resistance Test** (MIL-STD-705c 301.1c)*
- **Open Circuit Saturation Curve Test** (MIL-STD-705c 410.1b)
- **Temperature Rise Test** (MIL-STD-705c 680.1c)
- **Frequency Range Adjust Test** (MIL-STD-705c 511.2c)
- **Low Oil Pressure Protective Device Test** (MIL-STD-705c 515.1b)
- **Over-temperature Protective Device Test** (MIL-STD-705c 515.2b)
- **Controls, Direction, and Rotation Test** (MIL-STD-705c 516.1a)
- **Frequency and Voltage Regulation, Stability, and Transient Response** (MIL-STD-705c 608.1b)
- **Voltage and Frequency Regulation** (MIL-STD-705c 614.1b)
- **Voltage Dip and Rise for Rated Load Test** (MIL-STD-705c 619.2c)
- **Regulator Range Test** (511.1d)
- **Maximum Power Test** (MIL-STD-705c 640.1d)
- **Fuel Consumption Test**
- **Vibration and Mechanical Balance Test** (ISO 8528-9)
- **Sound Test** (ISO 8528-10)

** Testing conducted by generator OEM*

Subject to change. | Edition 02/22

Rolls-Royce Group
www.mtu-solutions.com

Software Tools Data Sheet

MASTERSPEC® Customized Specifications

MasterSpec®, a product of the American Institute of Architects (AIA), is the ultimate resource for producing customized specifications. With MasterSpec®, customizations and project-specific details can easily be applied.

We continually work with MasterSpec® to provide the most up-to-date specifications on ***mtu*** product with current codes, standards, and regulations.

ProductMasterSpec®
a product of The American Institute of Architects

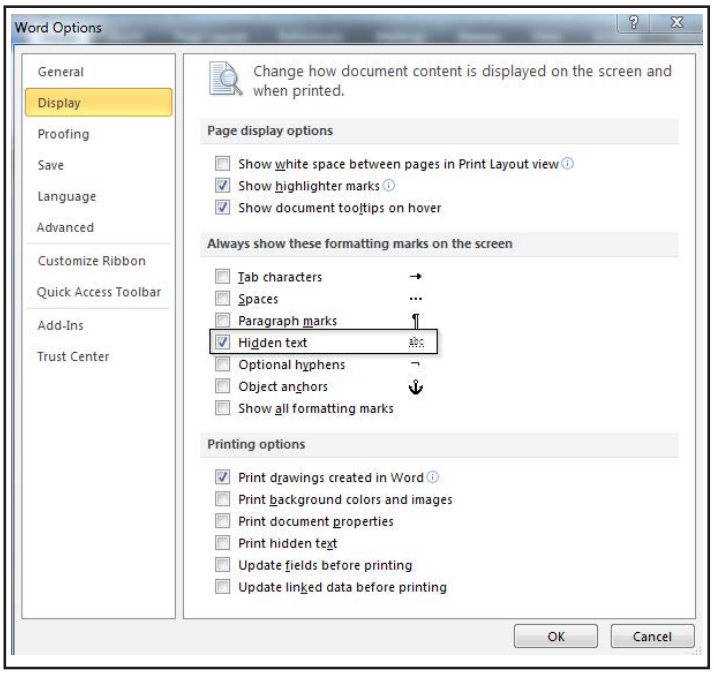
Rolls-Royce Solutions America Inc.
100 Power Drive
Mankato,MN 56001

FEATURES

- MasterSpec free specifications for ***mtu*** product are available for download at: https://productmasterspec.com/Profile/Rolls-Royce_Solutions_America_Inc/66916
- Customizable to customer's requirements
- Diesel and gas specifications available
- Additional product information available (such as spec sheets and drawings)
- Saves spec writing time
- Contains notes on different options
- Editing notes and instructions are included in the downloadable file
- Reporting capabilities
- Adjust settings to view hidden text in Microsoft Word® (appearance in other programs may vary)

CERTIFICATIONS AND STANDARDS

- Specification is AIA Certified



Setting Adjustment Dialog Box

Subject to change. 2021-10

Software Tools Data Sheet

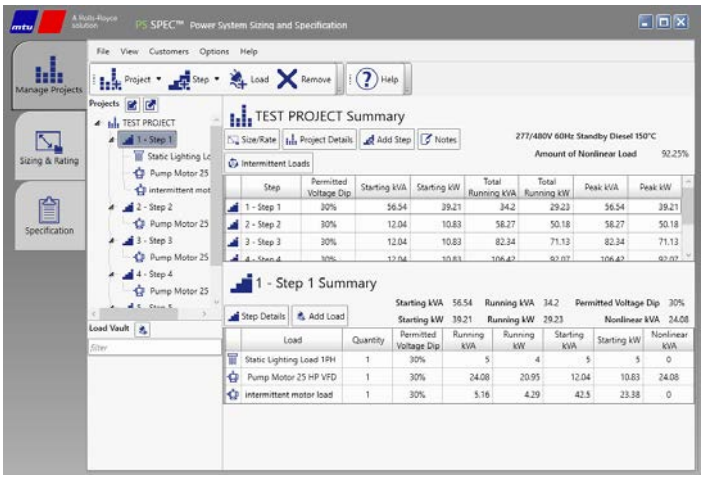
PS-SPEC™ Sizing and Specification

Power System Sizing and Specification Software (PS-SPEC™) is a powerful, fully-featured generator set sizing and specification tool. It is provided for use by consulting engineers, contractors, and other professionals involved in the design, application load analysis, and installation of generator sets. PS-SPEC™ provides the information needed to assist in determining the requirements for appropriate equipment selection.

FEATURES

- PS-SPEC™ is available for free download from the ***mtu*** website at www.mtu-solutions.com under *Power Generation > Power Generation Resources > Tools and Downloads*.
- Create and view sizing and specifications that are formatted to American Institute of Architects (AIA) in one stand-alone application
- Dynamic, accurate sizing calculations for load analysis
- Engine, alternator, and cooling package calculations based on site conditions such as altitude, temperature, or airflow limitations, as well as a voltage dip prediction calculator
- Quick access to:
  - User-defined site ratings with or without load entries
  - Load information on all projects
  - Project summary details
- Easy entry of load parameters
- Calculate generator set performance at user- or customer-specific site conditions
- Export and save sizing reports and specification documents in multiple formats
- Can easily create hypothetical scenarios by adding, moving, copying, pasting, or deleting loads and steps within a project

PS-SPEC Opening Screen



Manage Projects Tab

Subject to change. 2021-10

Gas Generator Set

mtu 4R0063 GS30

30 kWe/60 Hz/Standby/208 - 600V

System ratings

Voltage (L-L)	240V †	240V †	208V †	240V †	380V †	480V †	600V
Phase	1	1	3	3	3	3	3
PF	1	1	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60	60
Natural Gas (NG)							
Amps	117	121	104	90	57	45	35
kW/kVA	28/28	29/29	30/37.5	30/37.5	30/37.5	30/37.5	29/36.3
Liquid Propane (LP)							
Amps	125	125	104	90	57	45	36
kW/kVA	30/30	30/30	30/37.5	30/37.5	30/37.5	30/37.5	30/37.5
NG and LP							
skVA@30% voltage dip	66	102	141	188	130	188	123
Generator model	285PSL1700	284PSL1750	285PSL1700	285PSL1700	285PSL1700	285PSL1700	284PSL5252
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	12 LEAD DOUBLE DELTA	4 LEAD	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 – optional (refer to *System ratings* for availability)
- CSA – optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 2.5L engine
  - 2.5 liter displacement
  - 4-cycle
- Optional fuels: LP liquid and dual fuel
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with optional Permanent Magnet Generator (PMG)
- Digital control panel(s)
  - UL recognized, CSA Certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaner
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Jacket water pump
- Thermostat
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 12V
- Governor - electronic isochronous
- Base - formed steel
- Industrial flywheel and bell housing
- Charging alternator - 12V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Self-ventilated and drip-proof
- Superior voltage waveform
- Solid state, volts-per-hertz regulator
- ± 1% voltage regulation no load to full load
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- SAE J1939 engine ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	***mtu***
Model	2.5L
Type	4-cycle
Arrangement	4-inline
Displacement: L (in^3)	2.5 (153)
Bore: cm (in)	8.9 (3.5)
Stroke: cm (in)	10 (3.94)
Compression ratio	9.7:1
Rated rpm	1,800
Engine governor	***mtu***
Maximum power (NG): kWm (bhp)	34.8 (46.6)
Maximum power (LP): kWm (bhp)	35.8 (48)
Steady state frequency band	± 0.75%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	6.62 (1.75)
Engine jacket water capacity: L (gal)	1.65 (0.44)
System coolant capacity: L (gal)	8.8 (2.33)

Electrical

Electric volts DC	12
Cold cranking amps under -17.8 °C (0 °F)	675
Batteries: group size	24
Batteries: quantity	1

Fuel inlet - vaporous supply

Fuel supply connection size	3/4" NPT
Fuel supply pressure: mm H_20 (in. H_20)	178–279 (7–11)

Fuel inlet - liquid supply

Fuel supply connection size	#6 (3/8") female JIC 37° flare
Maximum fuel supply pressure: kPa (PSI)	2,150 (312)

Fuel consumption (NG-1000 BTU/ft^3 / LP-2500 BTU/ft^3)

	NG	LPG
At 100% of power rating: m^3/hr (ft^3/hr)	11.1 (391)	4.17 (147)
At 75% of power rating: m^3/hr (ft^3/hr)	8.6 (304)	3.2 (114)
At 50% of power rating: m^3/hr (ft^3/hr)	6.4 (227)	2.4 (85)

Cooling - radiator system

	NG and LPG
Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.12 (0.5)
Water pump capacity: L/min (gpm)	71.9 (19)
Heat rejection to coolant: kW (BTUM)	23 (1,328)
Heat radiated to ambient: kW (BTUM)	10.2 (580)
Fan power: kW (hp)	0.39 (0.53)

Air requirements

	NG and LPG
Aspirating: *m^3/min (SCFM)	1.6 (56.7)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	44.4 (1,558)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	50.6 (1,785)

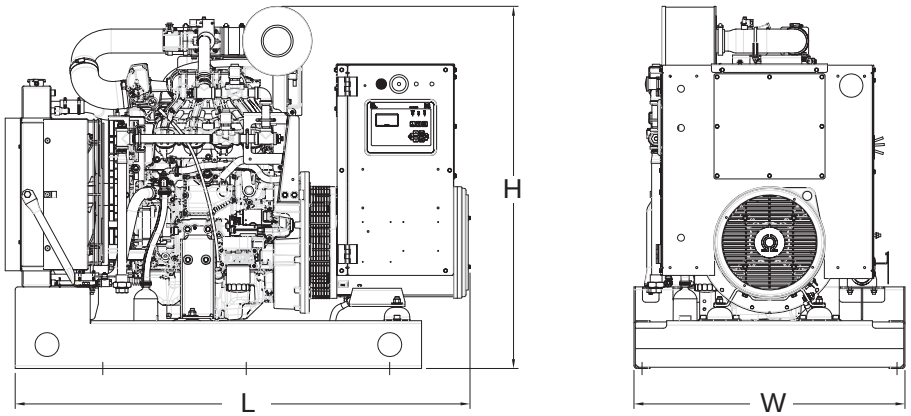
* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

	NG and LPG
Gas temperature (stack): °C (°F)	695 (1,283)
Gas volume at stack temperature: m^3/min (CFM)	5.9 (209)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	10 (40)

* Represents standard product only. Consult your local ***mtu*** Distributor for additional configurations.

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	1,448 x 864 x 1,156 mm (57 x 34 x 45.5 in)	544–907 kg (1,200–2,000 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load
Level 0 (OPU): dB(A)	71.7

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

Fuel type	THC + NO_x	CO
Natural gas	4.98	7.13
Liquid propane	6.54	9.02

- All units are in g/hp-hr and are EPA weighted cycle values. Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations.

Rating definitions and conditions

- Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Gas Generator Set

mtu 4R0063 GS40

40 kWe/60 Hz/Standby/208 - 600V

System ratings

Voltage (L-L)	240V †	240V †	208V †	240V †	380V †	480V †	600V
Phase	1	1	3	3	3	3	3
PF	1	1	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60	60
Natural Gas (NG)							
Amps	167	167	139	120	76	60	48
kW/kVA	40/40	40/40	40/50	40/50	40/50	40/50	40/50
Liquid Propane (LP)							
Amps	167	167	139	120	76	60	48
kW/kVA	40/40	40/40	40/50	40/50	40/50	40/50	40/50
NG and LP							
skVA@30% voltage dip	101	102	141	188	130	188	167
Generator model	286PSL1701	284PSL1750	285PSL1700	285PSL1700	285PSL1700	285PSL1700	284PSL5253
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	12 LEAD DOUBLE DELTA	4 LEAD	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 – optional (refer to *System ratings* for availability)
- CSA – optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 2.5L engine
  - 2.5 liter displacement
  - 4-cycle
- Optional fuels: LP liquid and dual fuel
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with optional Permanent Magnet Generator (PMG)
- Digital control panel(s)
  - UL recognized, CSA Certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaner
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Jacket water pump
- Thermostat
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 12V
- Governor - electronic isochronous
- Base - formed steel
- Industrial flywheel and bell housing
- Charging alternator - 12V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine
- Liquid cooled turbocharger

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Self-ventilated and drip-proof
- Superior voltage waveform
- Solid state, volts-per-hertz regulator
- ± 1% voltage regulation no load to full load
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- SAE J1939 engine ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	***mtu***
Model	2.5L
Type	4-cycle
Arrangement	4-inline
Aspiration	turbocharged
Displacement: L (in^3)	2.5 (153)
Bore: cm (in)	8.9 (3.5)
Stroke: cm (in)	10 (3.94)
Compression ratio	9.7:1
Rated rpm	1,800
Engine governor	***mtu***
Maximum power (NG): kWm (bhp)	47 (63)
Maximum power (LP): kWm (bhp)	47 (63)
Steady state frequency band	± 0.75%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	6.62 (1.75)
Engine jacket water capacity: L (gal)	1.65 (0.44)
System coolant capacity: L (gal)	12.3 (3.24)

Electrical

Electric volts DC	12
Cold cranking amps under -17.8 °C (0 °F)	675
Batteries: group size	24
Batteries: quantity	1

Fuel inlet - vaporous supply

Fuel supply connection size	3/4" NPT
Fuel supply pressure: mm H_20 (in. H_20)	178–279 (7–11)

Fuel inlet - liquid supply

Fuel supply connection size	#6 (3/8") female JIC 37° flare
Maximum fuel supply pressure: kPa (PSI)	2,150 (312)

Fuel consumption (NG-1000 BTU/ft^3 / LP-2500 BTU/ft^3)

	NG	LPG
At 100% of power rating: m^3/hr (ft^3/hr)	12.42 (439)	5.95 (210)
At 75% of power rating: m^3/hr (ft^3/hr)	9.65 (341)	4.62 (163)
At 50% of power rating: m^3/hr (ft^3/hr)	6.88 (243)	3.29 (116)

Cooling - radiator system

	NG and LPG
Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.12 (0.5)
Water pump capacity: L/min (gpm)	71.9 (19)
Heat rejection to coolant: kW (BTUM)	36 (2,047)
Heat radiated to ambient: kW (BTUM)	17.6 (1,002)
Fan power: kW (hp)	1.4 (1.8)

Air requirements

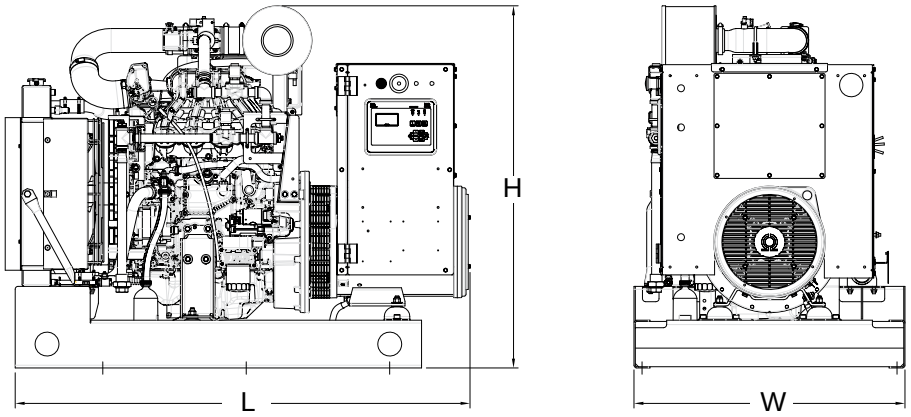
	NG and LPG
Aspirating: *m^3/min (SCFM)	2.3 (79.4)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	51 (1,801)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	83.8 (2,958)

* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

	NG and LPG
Gas temperature (stack): °C (°F)	613 (1,135)
Gas volume at stack temperature: m^3/min (CFM)	7.84 (277)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	10 (40)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	1,448 x 864 x 1,156 mm (57 x 34 x 45.5 in)	570–1,011 kg (1,255–2,225 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load
Level 0 (OPU): dB(A)	69.9

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

Fuel type	THC + NO_x	CO
Natural gas	4.98	28.53
Liquid propane	5.41	37.26

- All units are in g/hp-hr and are EPA weighted cycle values. Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations.

Rating definitions and conditions

- Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Gas Generator Set

mtu 8V0071 GS50

50 kWe/60 Hz/Standby/208 - 600V

System ratings

Voltage (L-L)	240V †	240V †	208V †	240V †	380V †	480V †	600V
Phase	1	1	3	3	3	3	3
PF	1	1	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60	60
Natural Gas (NG)							
Amps	208	208	174	150	95	75	60
kW/kVA	50/50	50/50	50/62.5	50/62.5	50/62.5	50/62.5	50/62.5
Liquid Propane (LP)							
Amps	208	208	174	150	95	75	60
kW/kVA	50/50	50/50	50/62.5	50/62.5	50/62.5	50/62.5	50/62.5
NG and LP							
skVA@30% voltage dip	95	118	129	129	116	172	138
Generator model	361CSL1602	361CSL1612	361CSL1601	361CSL1601	361CSL1601	361CSL1601	361PSL1633
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	12 LEAD DOUBLE DELTA	4 LEAD	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 – optional (refer to *System ratings* for availability)
- CSA – optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 5.7L NA engine
  - 5.7 liter displacement
  - 4-cycle
- Optional fuels: LP liquid and dual fuel
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with optional Permanent Magnet Generator (PMG)
- Digital control panel(s)
  - UL recognized, CSA Certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaner
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Jacket water pump
- Thermostat
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 12V
- Governor - electronic isochronous
- Base - formed steel
- Industrial flywheel and bell housing
- Charging alternator - 12V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Self-ventilated and drip-proof
- Superior voltage waveform
- Solid state, volts-per-hertz regulator
- ± 1% voltage regulation no load to full load
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- SAE J1939 engine ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	PSI
Model	5.7L NA
Type	4-cycle
Arrangement	8-V
Displacement: L (in^3)	5.7 (350)
Bore: cm (in)	10.2 (4)
Stroke: cm (in)	8.8 (3.5)
Compression ratio	9.4:1
Rated rpm	1,800
Engine governor	Bosch
Maximum power (NG): kWm (bhp)	78.1 (104.7)
Maximum power (LP): kWm (bhp)	84.4 (113.2)
Steady state frequency band	± 0.75%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	4.73 (1.25)
Engine jacket water capacity: L (gal)	7.8 (2)
System coolant capacity: L (gal)	22.7 (6)

Electrical

Electric volts DC	12
Cold cranking amps under -17.8 °C (0 °F)	925
Batteries: group size	31
Batteries: quantity	1

Fuel inlet - vaporous supply

Fuel supply connection size	**NG**: 1-1/2" NPT	**LP**: 3/4" NPT
Fuel supply pressure: mm H_2O (in. H_2O)		178–279 (7–11)

Fuel inlet - liquid supply

Fuel supply connection size	#6 (3/8") female JIC 37° flare
Maximum fuel supply pressure: kPa (PSI)	2,150 (312)

Fuel consumption (NG-1000 BTU/ft^3 / LP-2500 BTU/ft^3)

	NG	LPG
At 100% of power rating: m^3/hr (ft^3/hr)	23.2 (818)	10 (355)
At 75% of power rating: m^3/hr (ft^3/hr)	19.3 (680)	8.3 (293)
At 50% of power rating: m^3/hr (ft^3/hr)	15.5 (547)	6.6 (235)

Cooling - radiator system

	NG and LPG
Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_2O)	0.12 (0.5)
Water pump capacity: L/min (gpm)	132.5 (35)
Heat rejection to coolant: kW (BTUM)	54.9 (3,120)
Heat radiated to ambient: kW (BTUM)	17.5 (993.2)
Fan power: kW (hp)	3.2 (4.3)

Air requirements

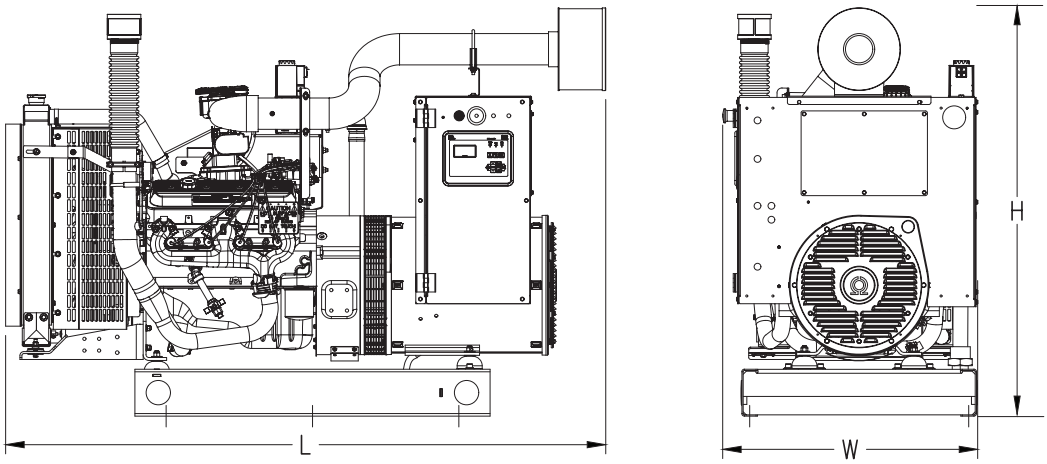
	NG and LPG
Aspirating: *m^3/min (SCFM)	4.9 (173)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	138.4 (4,888)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	90 (3,199)

* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

	NG and LPG
Gas temperature (stack): °C (°F)	745 (1,373)
Gas volume at stack temperature: m^3/min (CFM)	15.8 (552.7)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_2O)	10 (40)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	1,949 x 829 x 1,326 mm (76.7 x 32.6 x 52.2 in)	819-1,053 kg (1,806-2,322 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load
Level 0 (OPU): dB(A)	72.7

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

Fuel type	THC + NO_x	NMHC + NOx	CO
Natural gas	N/A	4.89	19.93
Liquid propane	7.20	N/A	22.08

- All units are in g/hp-hr and are EPA weighted cycle values. Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations.

Rating definitions and conditions

- Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Gas Generator Set

mtu 8V0071 GS60

60 kWe/60 Hz/Standby/208 - 600V

System ratings

Voltage (L-L)	240V †	240V †	208V †	240V †	380V †	480V †	600V
Phase	1	1	3	3	3	3	3
PF	1	1	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60	60
Natural Gas (NG)							
Amps	250	250	208	180	114	90	72
kW/kVA	60/60	60/60	60/75	60/75	60/75	60/75	60/75
Liquid Propane (LP)							
Amps	250	250	208	180	114	90	72
kW/kVA	60/60	60/60	60/75	60/75	60/75	60/75	60/75
NG and LP							
skVA@30% voltage dip	133	233	200	200	187	266	201
Generator model	362CSL1606	362CSL1615	361CSL1602	361CSL1602	362CSL1604	361CSL1602	361PSL1634
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	12 LEAD DOUBLE DELTA	4 LEAD	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 – optional (refer to *System ratings* for availability)
- CSA – optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 5.7L engine
  - 5.7 liter displacement
  - 4-cycle
- Optional fuels: LP liquid and dual fuel
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with optional Permanent Magnet Generator (PMG)
- Digital control panel(s)
  - UL recognized, CSA Certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaner
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Jacket water pump
- Thermostat
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 12V
- Governor - electronic isochronous
- Base - formed steel
- Industrial flywheel and bell housing
- Charging alternator - 12V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Self-ventilated and drip-proof
- Superior voltage waveform
- Solid state, volts-per-hertz regulator
- ± 1 % voltage regulation no load to full load
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- SAE J1939 engine ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	PSI
Model	5.7L NA
Type	4-cycle
Arrangement	8-V
Displacement: L (in^3)	5.7 (350)
Bore: cm (in)	10.2 (4)
Stroke: cm (in)	8.8 (3.5)
Compression ratio	9.4:1
Rated rpm	1,800
Engine governor	Bosch
Maximum power (NG): kWm (bhp)	78.1 (104.7)
Maximum power (LP): kWm (bhp)	84.4 (113.2)
Steady state frequency band	± 0.75%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	4.73 (1.25)
Engine jacket water capacity: L (gal)	7.8 (2)
System coolant capacity: L (gal)	22.7 (6)

Electrical

Electric volts DC	12
Cold cranking amps under -17.8 °C (0 °F)	925
Batteries: group size	31
Batteries: quantity	1

Fuel inlet - vaporous supply

Fuel supply connection size	**NG**: 1-1/2" NPT	**LP**: 3/4" NPT
Fuel supply pressure: mm H_2O (in. H_2O)		178–279 (7–11)

Fuel inlet - liquid supply

Fuel supply connection size	#6 (3/8") female JIC 37° flare
Maximum fuel supply pressure: kPa (PSI)	2,150 (312)

Fuel consumption (NG-1000 BTU/ft^3 / LP-2500 BTU/ft^3)

	NG	LPG
At 100% of power rating: m^3/hr (ft^3/hr)	23.2 (818)	10 (355)
At 75% of power rating: m^3/hr (ft^3/hr)	19.3 (680)	8.3 (293)
At 50% of power rating: m^3/hr (ft^3/hr)	15.5 (547)	6.6 (235)

Cooling - radiator system

	NG and LPG
Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_2O)	0.12 (0.5)
Water pump capacity: L/min (gpm)	132.5 (35)
Heat rejection to coolant: kW (BTUM)	54.9 (3,120)
Heat radiated to ambient: kW (BTUM)	17.5 (993.2)
Fan power: kW (hp)	3.2 (4.3)

Air requirements

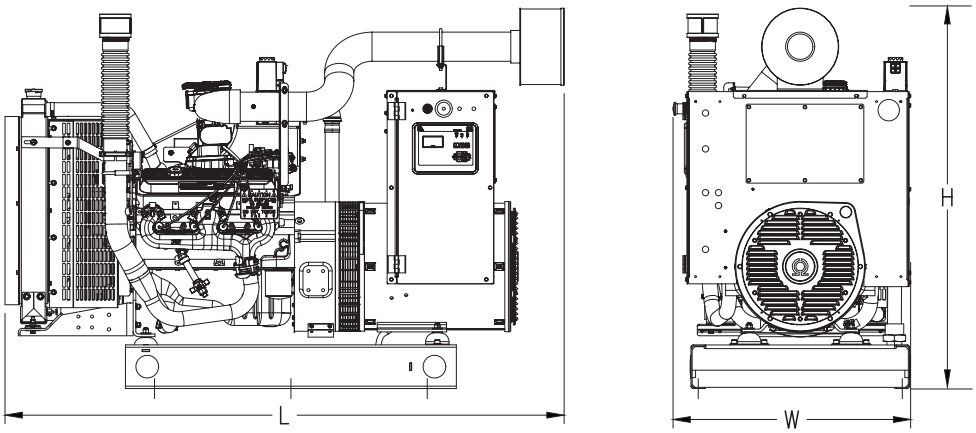
	NG and LPG
Aspirating: *m^3/min (SCFM)	4.9 (173)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	138.4 (4,888)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	90 (3,199)

* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

	NG and LPG
Gas temperature (stack): °C (°F)	745 (1,373)
Gas volume at stack temperature: m^3/min (CFM)	15.8 (552.7)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_2O)	10 (40)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	1,949 x 829 x 1,326 mm (76.7 x 32.6 x 52.2 in)	819-1,053 kg (1,806-2,322 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load
Level 0 (OPU): dB(A)	73.3

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

Fuel type	THC + NO_x	NMHC + NOx	CO
Natural gas	N/A	4.89	19.93
Liquid propane	7.20	N/A	22.08

- All units are in g/hp-hr and are EPA weighted cycle values. Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations.

Rating definitions and conditions

- Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature deration

Gas Generator Set

mtu 8V0078 GS100

100 kWe/60 Hz/Standby/208 - 600V

System ratings

Voltage (L-L)	240V †	208V †	240V †	480V †	600V
Phase	1	3	3	3	3
PF	1	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60
Natural Gas (NG)					
Amps	417	347	301	151	120
kW/kVA	100/100	100/125	100/125	100/125	100/125
Liquid Propane (LP)					
Amps	333	278	241	120	96
kW/kVA	80/80	80/100	80/100	80/100	80/100
NG and LP					
skVA@30% voltage Dip	188	166	166	179	155
Generator model	MXB-E 225 LB4	MXB-E 225 MA4	MXB-E 225 MA4	MXB-E 225 SB4	MXB-E 225 MA4
Temp rise	125 °C/40 °C	125 °C/40 °C	125 °C/40 °C	125 °C/40 °C	125 °C/40 °C
Connection	12 LEAD DOUBLE DELTA	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	6 LEAD WYE

† UL 2200 offered

Certifications and standards

- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- UL Listing (UL 2200) – optional (refer to *System ratings* for availability)
- CSA certification (CSA C22.2 No. 100-14) – optional (refer to *System ratings* for availability)
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 6.2L TCAC engine
  - 6.2 liter displacement
  - 4-cycle
- 3-way catalyst
- Optional fuels: LP liquid and dual fuel
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability
- Digital control panel(s)
  - UL recognized, CSA Certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaner
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Jacket water pump
- Thermostat
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 12V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 12V
- Battery rack and cables
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1 and IEC standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip proof
- Superior voltage waveform
- Analog regulator
- ± 1% voltage regulation no load to full load
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 125 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- Balancing in accordance with IEC60034-14
- Single phase voltage sensing
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- SAE J1939 engine ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	Origin
Model	6.2L TCAC
Type	4-cycle
Aspiration	turbocharged, intercooled
Arrangement	8-V
Displacement: L (in³)	6.2 (377)
Bore: cm (in)	10.16 (4)
Stroke: cm (in)	9.53 (3.75)
Compression ratio	9.8:1
Rated rpm	1,800
Engine governor	Bosch
Maximum power (NG): kWm (bhp)	120 (160.9)
Maximum power (LP): kWm (bhp)	100.8 (134.1)
Steady state frequency band	± 0.75%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	7 (1.9)
Engine jacket water capacity: L (gal)	7.35 (1.94)
System coolant capacity: L (gal)	20.7 (5.5)

Electrical

Electric volts DC	12
Cold cranking amps under -17.8 °C (0 °F)	925
Batteries: group size	31
Batteries: quantity	1

Fuel inlet - vaporous supply

Fuel supply connection size	1-1/2" NPT
Fuel supply pressure: mm H_20 (in. H_20)	178–279 (7–11)

Fuel inlet - liquid supply

Fuel supply connection size	#6 (3/8") female JIC 37° flare
Maximum fuel supply pressure: kPa (PSI)	2,150 (312)

Fuel consumption (NG-1000 BTU/ft³ / LP-2500 BTU/ft³)

	NG	LPG
At 100% of power rating: m³/hr (ft³/hr)	38.73 (1,367.8)	13.4 (473.2)
At 75% of power rating: m³/hr (ft³/hr)	29.79 (1,051.9)	10.22 (361)
At 50% of power rating: m³/hr (ft³/hr)	21.78 (769.2)	7.37 (260.1)

Cooling - radiator system

	NG and LPG
Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.12 (0.5)
Water pump capacity: L/min (gpm)	112.5 (29.7)
Heat rejection to coolant: kW (BTUM)	71.5 (4,066)
Heat radiated to ambient: kW (BTUM)	43.4 (2,468)
Heat rejected to charge air cooler: kW (BTUM)	15 (853)
Heat rejected to oil cooler: kW (BTUM)	17.9 (1,018)
Fan power: kW (hp)	8.76 (11.75)

Air requirements

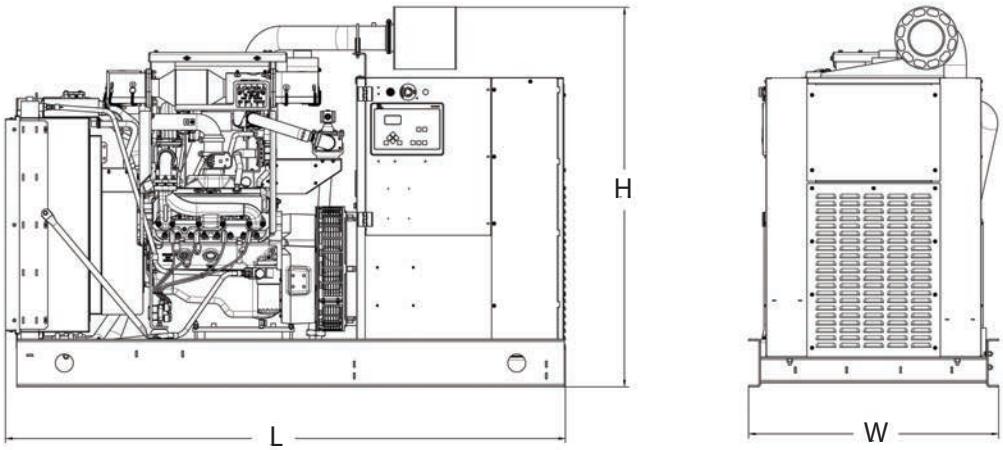
	NG and LPG
Aspirating: *m³/min (SCFM)	6.2 (219)
Air flow required for radiator cooled unit: *m³/min (SCFM)	398.4 (14,069.4)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m³/min (SCFM)	199 (7,028)

* Air density = 1.184 kg/m³ (0.0739 lbm/ft³)

Exhaust system

	NG and LPG
Gas temperature (stack): °C (°F)	741 (1,366)
Gas volume at stack temperature: m³/min (CFM)	24.5 (865.2)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	15 (60)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	2,389.3 x 1,066.8 x 1,617.3 mm (94.1 x 42.0 x 63.7 in)	1,400–1,900 kg (3,100–4,190 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load (NG)	Standby full load (LP)
Level 0 (OPU): dB(A)	89.3	88.8

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

Fuel type	THC + NO_x	CO
Natural gas	0.23	0.314
Liquid propane	0.081	0.461

— All units are in g/kW-hr and are EPA weighted cycle values. Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations.

Rating definitions and conditions

— Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.
— Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
— Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Gas Generator Set

mtu 8V0110 GS150

150 kWe/60 Hz/Standby/208 - 600V

System ratings

Voltage (L-L)	240V †	240V †	208V †	240V †	480V †	600V	380V †
Phase	1	1	3	3	3	3	3
PF	1	1	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60	60
Natural Gas (NG)							
Amps	625	625	520	451	226	180	285
kW/kVA	150/150	150/150	150/187.5	150/187.5	150/187.5	150/187.5	150/187.5
Liquid Propane (LP)							
Amps	542	542	451	391	195	156	247
kW/kVA	130/130	130/130	130/162.5	130/162.5	130/162.5	130/162.5	130/162.5
NG and LP							
skVA@30% voltage Dip	196	187	296	296	394	315	282
Generator model	431PSL6224	431CSL6206	431PSL6202	431PSL6202	431PSL6202	431CSL6240	431PSL6204
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	4 LEAD	12 LEAD DOUBLE DELTA	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	4 LEAD WYE	12 LEAD WYE

† UL 2200 offered

Note: This unit is available with a dual fuel configuration.

Certifications and standards

- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 – optional (refer to *System ratings* for availability)
- CSA – optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- PSI 8.8L TCAC engine
  - 8.8 liter displacement
  - 4-cycle
- 3-way catalyst
- Optional fuels: LP liquid and dual fuel
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability
- Digital control panel(s)
  - UL recognized, CSA Certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaner
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Jacket water pump
- Thermostat
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 12V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 12V
- Battery rack and cables
- Flexible exhaust connection
- Liquid cooled, ball bearing turbcharger
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated
- Superior voltage waveform
- Solid state, volts-per-hertz regulator
- ± 1% voltage regulation no load to full load
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- SAE J1939 engine ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult your local ***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	PSI
Model	8.8L TCAC
Type	4-cycle
Aspiration	turbocharged, intercooled
Arrangement	8-V
Displacement: L (in^3)	8.8 (535)
Bore: cm (in)	11.05 (4.35)
Stroke: cm (in)	11.43 (4.5)
Compression ratio	10:1
Rated rpm	1,800
Engine governor	Bosch
Maximum power (NG): kWm (bhp)	195.0 (261.5)
Maximum power (LP): kWm (bhp)	171.6 (230.1)
Steady state frequency band	± 0.75%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	9.0 (2.38)
Engine jacket water capacity: L (gal)	13.4 (3.5)
System coolant capacity: L (gal)	25.5 (6.7)

Electrical

Electric volts DC	12
Cold cranking amps under -17.8 °C (0 °F)	925
Batteries: group size	31
Batteries: quantity	1

Fuel inlet - vaporous supply

Fuel supply connection size	2” NPT
Fuel supply pressure: mm H_20 (in. H_20)	178–279 (7–11)

Fuel inlet - liquid supply

Fuel supply connection size	#6 (3/8”) female JIC 37° flare
Maximum fuel supply pressure: kPa (PSI)	2,150 (312)

Fuel consumption (NG-1000 BTU/ft^3 / LP-2500 BTU/ft^3)

	NG	LPG
At 100% of power rating: m^3/hr (ft^3/hr)	56.2 (1,986)	19.7 (695)
At 75% of power rating: m^3/hr (ft^3/hr)	43.9 (1,549)	15.1 (534)
At 50% of power rating: m^3/hr (ft^3/hr)	31.8 (1,121)	11.0 (389)

Cooling - radiator system

	NG and LPG
Ambient capacity of radiator: °C (°F)	48 (118.4)*
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.12 (0.5)
Water pump capacity: L/min (gpm)	125 (33.0)
Heat rejection to coolant: kW (BTUM)	88.3 (5,021)
Heat radiated to ambient: kW (BTUM)	41.1 (2,337)
Heat rejected to charge air cooler: kW (BTUM)	13.8 (782)
Fan power: kW (hp)	11.9 (16.0)

* Installation of gravity exhaust louvers reduces the ambient capacity of the cooling system by an additional 3 °C (5.5 °F).

Air requirements

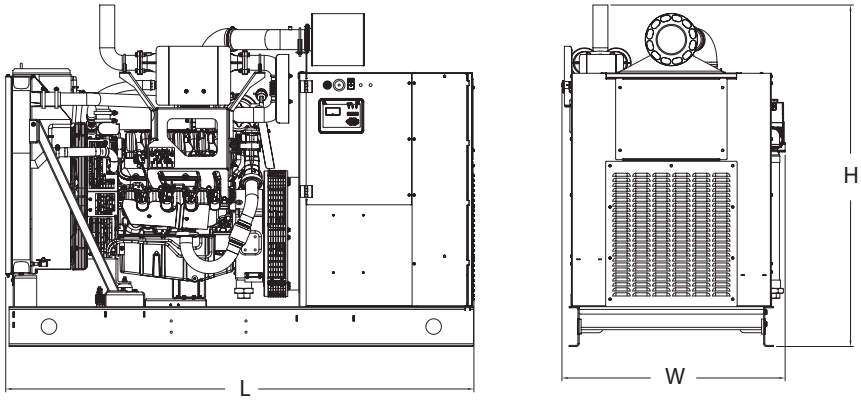
	NG and LPG
Aspirating: *m^3/min (SCFM)	10.33 (365)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	229.8 (8,115)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	211.6 (7,473)

* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

	NG and LPG
Gas temperature (stack): °C (°F)	649 (1,200)
Gas volume at stack temperature: m^3/min (CFM)	33.3 (1,176)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	10.2 (41)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	2,388 x 1,137 x 1,740 mm (94 x 44.8 x 68.5 in)	1,520–1,800 kg (3,350–3,950 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load (NG)	Standby full load (LP)
Level 0 (OPU): dB(A)	86.5	86.6

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

Fuel type	THC + NO_x	CO
Natural gas	N/A	0.22
Liquid propane	0.035	0.95

— All units are in g/hp-hr and are EPA weighted cycle values. Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations.

Rating definitions and conditions

— Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.
— Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
— Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

C/F = Consult Factory/***mtu*** Distributor

Gas Generator Set

mtu 6R0185 GS200

200 kWe/60 Hz/Standby/208 - 600V
Reference *mtu* 6R0185 GS200 (175 kWe) for Prime Rating Technical Data

System ratings

Voltage (L-L)	240V †	240V †	208V †	240V †	480V †	600V
Phase	1	1	3	3	3	3
PF	1	1	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60
Natural Gas (NG)						
Amps	750	750	694	601	300	240
kW/kVA	180/180	180/180	200/250	200/250	200/250	200/250
Liquid Propane (LP)						
Amps	541	541	451	390	195	156
kW/kVA	130/130	130/130	130/162	130/162	130/162	130/162
NG and LP						
skVA@30% voltage dip	425	370	608	608	809	720
Generator model *	433CSL6216	432PSL6228	432CSL6210	432CSL6210	432CSL6210	432PSL6246
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	12 LEAD DOUBLE DELTA	4 LEAD	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	4 LEAD WYE

* Consult the factory for alternate configuration.
† UL 2200 offered

Certifications and standards

- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 11.1L turbo engine charge air cooling
  - 11.1 liter displacement
  - 4-cycle
- 3-way catalyst
- Optional fuel system: NG and LP vapor dual fuel
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with optional Permanent Magnet Generator (PMG)
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaner
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Jacket water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Self-ventilated and drip-proof
- Superior voltage waveform
- Solid state, volts-per-hertz regulator
- ± 1% voltage regulation no load to full load
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- SAE J1939 engine ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	PSI
Model	11.1L CAC
Type	4-cycle
Arrangement	6-inline
Displacement: L (in³)	11.1 (673)
Bore: cm (in)	12.3 (4.84)
Stroke: cm (in)	15.5 (6.1)
Compression ratio	10.5:1
Rated rpm	1,800
Engine governor	Bosch
Maximum power (NG): kWm (bhp)	225 (302)
Maximum power (LP): kWm (bhp)	155 (208)
Steady state frequency band	± 0.5%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	28.5 (8)
Engine jacket water capacity: L (gal)	25 (5.5)
System coolant capacity: L (gal)	149 (32.8)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	1,050
Batteries: group size	4D
Batteries: quantity	2

Fuel inlet

Fuel supply connection size	2” NPT
Fuel supply pressure: mm H_20 (in. H_20)	178–279 (7–11)

Fuel consumption (NG-1000 BTU/ft³ / LP-2500 BTU/ft³)

	NG	LPG
At 100% of power rating: m³/hr (ft³/hr)	59.9 (2,115)	19.9 (704)
At 75% of power rating: m³/hr (ft³/hr)	46.7 (1,648)	17 (600)
At 50% of power rating: m³/hr (ft³/hr)	32.8 (1,157)	11.5 (404)

Cooling - radiator system

	NG and LPG
Ambient capacity of radiator: °C (°F)	50 (122)*
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.12 (0.5)
Water pump capacity: L/min (gpm)	310 (82)
Heat rejection to coolant: kW (BTUM)	194.6 (11,071)
Heat radiated to ambient: kW (BTUM)	40.4 (2,295)
Fan power: kW (hp)	10.4 (13.9)

* Installation of enclosures reduces the ambient capacity of the cooling system by 1 °C (1.8 °F). Gravity exhaust louvers reduce ambient capacity of the cooling system by an additional 3 °C (5.5 °F).

Air requirements

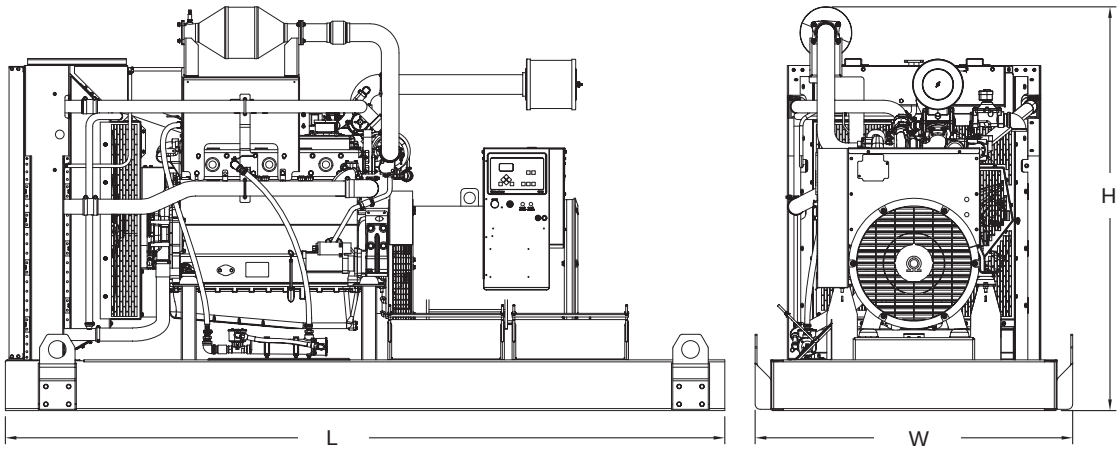
	NG and LPG
Aspirating: *m³/min (SCFM)	11.7 (400)
Air flow required for radiator cooled unit: **m³/min (SCFM)	631 (22,300)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m³/min (SCFM)	237 (8,365)

* Air density = 1.184 kg/m³ (0.0739 lbm/ft³)
** At 0.25 kPa (1 in. H_20) static pressure and 52 °C (125 °F) at radiator

Exhaust system

	NG and LPG
Gas temperature (stack): °C (°F)	694 (1,281)
Gas volume at stack temperature: m³/min (CFM)	38.8 (1,371)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	2.5 (10.25)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	3,607 x 1,591 x 2,026 mm (142 x 62.6 x 79.8 in)	3,096 kg (6,258 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load (NG)	Standby full load (LP)
Level 0 (OPU): dB(A)	86.3	86.1

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

Fuel type	THC + NO_x	CO
Natural gas	2.25	0.26
Liquid propane	0.08	0.25

— All units are in g/hp-hr and are EPA weighted cycle values. Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations.

Rating definitions and conditions

— Ambient capability factor at 984 ft (300 m). Consult your local ***mtu*** Distributor for other altitudes.
— Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.
— Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
— Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Gas Generator Set

mtu 8V0183 GS260

260 kWe/60 Hz/Standby/208 - 600V
Reference ***mtu*** 8V0183 GS260 (235 kWe) for Prime Rating Technical Data

System ratings

Voltage (L-L)	240V †	208V †	240V †	480V †	600V
Phase	1	3	3	3	3
PF	1	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60
Natural Gas (NG)					
Amps	1,063	902	782	391	313
kW/kVA	255/255	260/325	260/325	260/325	260/325
Liquid Propane (LP)					
Amps	625	555	481	241	192
kW/kVA	150/150	160/200	160/200	160/200	160/200
NG and LP					
skVA@30% voltage dip	520	608	608	809	740
Generator model	572RSL4031	432PSL6210	432PSL6210	432PSL6210	432PSL6246
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	12 LEAD DOUBLE DELTA	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 14.6L turbo engine charge air cooling
  - 14.6 liter displacement
  - 4-cycle
- 3-way catalyst
- Optional fuel System: NG and LP vapor dual fuel
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with Permanent Magnet Generator (PMG)
    - ◊ PMG standard for 570 frame and larger
    - ◊ PMG optional for 430 frame and smaller
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaner
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Jacket water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds (with PMG only)
- Self-ventilated and drip-proof
- Superior voltage waveform
- Solid state, volts-per-hertz regulator (digital when PMG is standard)
- ± 1 % voltage regulation no load to full load
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- SAE J1939 engine ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	PSI
Model	14.6L CAC
Type	4-cycle
Arrangement	8-V
Displacement: L (in³)	14.6 (892)
Bore: cm (in)	12.8 (5.04)
Stroke: cm (in)	14.2 (5.59)
Compression ratio	10.5:1
Rated RPM	1,800
Engine governor	Bosch
Maximum power (NG): kWm (bhp)	300 (402)
Maximum power (LP): kWm (bhp)	189 (253)
Steady state frequency band	± 0.5%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	38.1 (10.1)
Engine jacket water capacity: L (gal)	43.2 (9.5)
System coolant capacity: L (gal)	227 (50)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	1,050
Batteries: group size	4D
Batteries: quantity	2

Fuel inlet

Fuel supply connection size	2" NPT
Fuel supply pressure: mm H_2O (in. H_2O)	178–279 (7–11)

Fuel consumption (NG-1000 BTU/ft³ / LP-2500 BTU/ft³)

	NG	LPG
At 100% of power rating: m³/hr (ft³/hr)	85 (3,000)	24.3 (858)
At 75% of power rating: m³/hr (ft³/hr)	64.6 (2,280)	17.9 (633)
At 50% of power rating: m³/hr (ft³/hr)	44.7 (1,580)	13.3 (468)

Cooling - radiator system

	NG and LPG
Ambient capacity of radiator: °C (°F)	50 (122)*
Maximum restriction of cooling air, intake, and discharge side of radiator: kPa (in. H_2O)	0.12 (0.5)
Water pump capacity: L/min (gpm)	680 (180)
Heat rejection to coolant: kW (BTUM)	285 (16,189)
Heat radiated to ambient: kW (BTUM)	80.5 (4,580)
Fan power: kW (hp)	16.4 (22)

* Installation of enclosures reduces the ambient capacity of the cooling system by 1 °C (1.8 °F). Gravity exhaust louvers reduce ambient capacity of the cooling system by an additional 3 °C (5.5 °F).

Air requirements

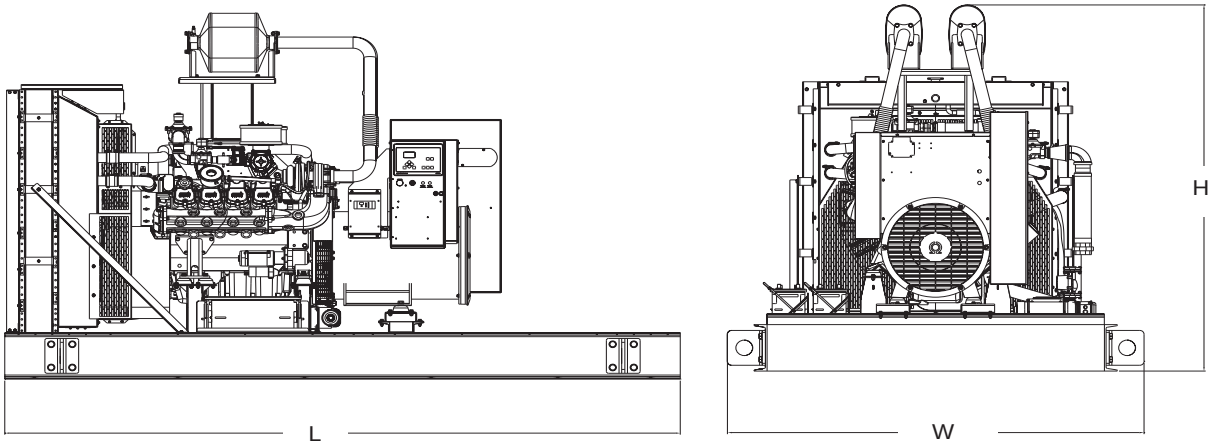
	NG and LPG
Aspirating: *m³/min (SCFM)	15.6 (532)
Air flow required for radiator Cooled unit: **m³/min (SCFM)	849 (30,000)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m³/min (SCFM)	293 (10,330)

* Air density = 1.184 kg/m³ (0.0739 lbm/ft³)
** At 0.25 kPa (1 in. H_2O) static pressure and 52 °C (125 °F) at radiator

Exhaust system

	NG and LPG
Gas temperature (stack): °C (°F)	554 (1,030)
Gas volume at stack temperature: m³/min (CFM)	44.2 (1,560)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_2O)	2.5 (10.25)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	4,064 x 2,506 x 2,404 mm (160 x 98.6 x 94.6 in)	4,055 kg (8,939 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load (NG)	Standby full load (LP)
Level 0 (OPU): dB(A)	83.1	83

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

Fuel type	THC + NO_x	CO
Natural gas	0.22	0.06
Liquid propane	0.07	0.11

- All units are in g/hp-hr and are EPA weighted cycle values. Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations.

Rating definitions and conditions

- Ambient capability factor at 984 ft (300 m). Consult your local ***mtu*** Distributor for other altitudes.
- Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Gas Generator Set

mtu 10V0183 GS350

350 kWe/60 Hz/Standby/208 - 600V
Reference *mtu* 10V0183 GS350 (300 kWe) for Prime Rating Technical Data

System ratings

Voltage (L-L)	240V †	208V †	240V †	480V †	600V
Phase	1	3	3	3	3
PF	1	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60
Natural Gas (NG)					
Amps	1,438	1,214	1,052	526	421
kW/kVA	345/345	350/437	350/437	350/437	350/437
Liquid Propane (LP)					
Amps	1,000	850	737	368	295
kW/kVA	240/240	245/306	245/306	245/306	245/306
NG and LP					
skVA@30% voltage dip	700	930	930	1,238	1,100
Generator model *	573RSL4035	433CSL6216	433CSL6216	433CSL6216	433PSL6248
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	12 LEAD DOUBLE DELTA	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	4 LEAD WYE

* Consult the factory for alternate configuration.
† UL 2200 offered

Certifications and standards

- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 18.3L turbo engine charge air cooling
  - 18.3 liter displacement
  - 4-cycle
- 3-way catalyst
- Optional fuel system: NG and LP vapor dual fuel
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with Permanent Magnet Generator (PMG)
    - ◊ PMG Standard for 570 frame and larger
    - ◊ PMG Optional for 430 frame and smaller
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaner
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Jacket water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds (with PMG only)
- Self-ventilated and drip-proof
- Superior voltage waveform
- Solid state, volts-per-hertz regulator (Digital when PMG is standard)
- ± 1% voltage regulation no load to full load
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- SAE J1939 engine ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	PSI
Model	18.3L CAC
Type	4-cycle
Arrangement	10-V
Displacement: L (in³)	18.3 (1,115)
Bore: cm (in)	12.8 (5.04)
Stroke: cm (in)	14.2 (5.59)
Compression ratio	10.5:1
Rated rpm	1,800
Engine governor	Bosch
Maximum power (NG): kWm (bhp)	400 (536)
Maximum power (LP): kWm (bhp)	297 (398)
Steady state frequency band	± 0.5%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	42.1 (11.1)
Engine jacket water capacity: L (gal)	50 (11)
System coolant capacity: L (gal)	289 (63.5)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	1,050
Batteries: group size	4D
Batteries: quantity	2

Fuel inlet

Fuel supply connection size	3" NPT
Fuel supply pressure: mm H_20 (in. H_20)	178–279 (7–11)

Fuel consumption (NG-1000 BTU/ft³ / LP-2500 BTU/ft³)

	NG	LPG
At 100% of power rating: m³/hr (ft³/hr)	99.1 (3,498.8)	32.5 (1,145.9)
At 75% of power rating: m³/hr (ft³/hr)	77.2 (2,726.7)	27.7 (977.1)
At 50% of power rating: m³/hr (ft³/hr)	54.2 (1,913.7)	18.7 (658.5)

Cooling - radiator system

	NG and LPG
Ambient capacity of radiator: °C (°F)	50 (122)*
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.12 (0.5)
Water pump capacity: L/min (gpm)	660 (174)
Heat rejection to coolant: kW (BTUM)	365 (20,784)
Heat radiated to ambient: kW (BTUM)	88.5 (5,030)
Fan power: kW (hp)	20.9 (28)

* Installation of enclosures reduces the ambient capacity of the cooling system by 1 °C (1.8 °F). Gravity exhaust louvers reduce ambient capacity of the cooling system by an additional 3 °C (5.5 °F).

Air requirements

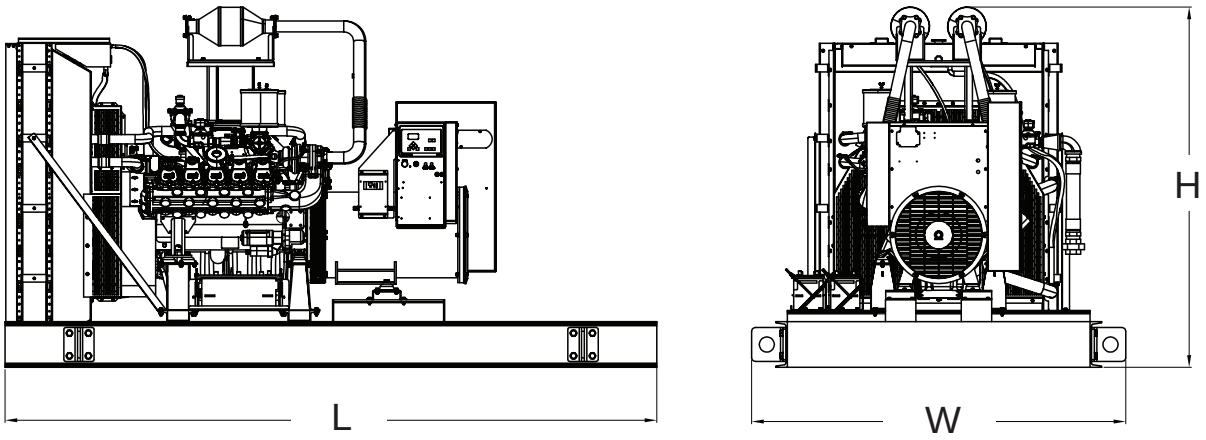
	NG and LPG
Aspirating: *m³/min (SCFM)	19.4 (664)
Air flow required for radiator cooled unit: **m³/min (SCFM)	1,019 (36,000)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m³/min (SCFM)	321 (11,350)

* Air density = 1.184 kg/m³ (0.0739 lbm/ft³)
** At 0.25 kPa (1 in. H_20) static pressure and 52 °C (125 °F) at radiator

Exhaust system

	NG and LPG
Gas temperature (stack): °C (°F)	607 (1,125)
Gas volume at stack temperature: m³/min (CFM)	58.6 (2,070)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	2.5 (10.25)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	4,369 x 2,506 x 2,413 mm (172 x 98.6 x 95 in)	4,741 kg (10,452 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load (NG)	Standby full load (LP)
Level 0 (OPU): dB(A)	85.1	84.8

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

Fuel type	THC + NO_x	CO
Natural gas	0.59	0.21
Liquid propane	0.07	0.15

- All units are in g/hp-hr and are EPA weighted cycle values. Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations.

Rating definitions and conditions

- Ambient capability factor at 984 ft (300 m). Consult your local ***mtu*** Distributor for other altitudes.
- Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Gas Generator Set

mtu 12V0183 GS400

400 kWe/60 Hz/Standby 208 - 600V
Reference *mtu* 12V0183 GS400 (355 kWe) for Prime Rating Technical Data

System ratings

Voltage (L-L)	240V †	208V †	240V †	480V †	600V
Phase	1	3	3	3	3
PF	1	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60
Natural Gas (NG)					
Amps	1,604	1,388	1,203	601	481
kW/kVA	385/385	400/500	400/500	400/500	400/500
Liquid Propane (LP)					
Amps	1,187	1,023	887	443	355
kW/kVA	285/285	295/368	295/368	295/368	295/368
NG and LP					
skVA@30% voltage dip	760	1,500	1,500	1,500	1,080
Generator model *	574RSL4037	572RSL4029	572RSL4029	572RSL4029	433RSS4266
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	12 LEAD DOUBLE DELTA	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	4 LEAD WYE

* Consult the factory for alternate configuration.

† UL 2200 offered

Certifications and standards

- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 21.9L turbo engine charge air cooling
  - 21.9 liter displacement
  - 4-cycle
- 3-way catalyst
- Optional fuel system: NG and LP vapor dual fuel
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - Permanent Magnet Generator (PMG) supply to regulator
  - 300% short circuit capability
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaner
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Jacket water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, volts-per-hertz regulator
- ± 1% voltage regulation no load to full load
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- SAE J1939 engine ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	PSI
Model	21.9L CAC
Type	4-cycle
Arrangement	12-V
Displacement: L (in³)	21.9 (1,338)
Bore: cm (in)	12.8 (5.04)
Stroke: cm (in)	14.2 (5.59)
Compression ratio	10.5:1
Rated rpm	1,800
Engine governor	Bosch
Maximum power (NG): kWm (bhp)	456 (612)
Maximum power (LP): kWm (bhp)	351 (471)
Steady state frequency band	± 0.5%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	47.1 (12.4)
Engine jacket water capacity: L (gal)	52.3 (11.5)
System coolant capacity: L (gal)	291 (64)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	1,050
Batteries: group size	4D
Batteries: quantity	2

Fuel inlet

Fuel supply connection size	3" NPT
Fuel supply pressure: mm H_2O (in. H_2O)	178–279 (7–11)

Fuel consumption (NG-1000 BTU/ft³ / LP-2500 BTU/ft³)

	NG	LPG
At 100% of power rating: m³/hr (ft³/hr)	119.8 (4,230)	39.9 (1,407)
At 75% of power rating: m³/hr (ft³/hr)	93.4 (3,297)	34 (1,200)
At 50% of power rating: m³/hr (ft³/hr)	65.5 (2,314)	22.9 (808)

Cooling - radiator system

	NG and LPG
Ambient capacity of radiator: °C (°F)	50 (122)*
Maximum restriction of cooling air, intake, and discharge side of radiator: kPa (in. H_2O)	0.12 (0.5)
Water pump capacity: L/min (gpm)	660 (174)
Heat rejection to coolant: kW (BTUM)	453 (25,760)
Heat radiated to ambient: kW (BTUM)	118.2 (6,720)
Fan power: kW (hp)	31.3 (42)

* Installation of enclosures reduces the ambient capacity of the cooling system by 1 °C (1.8 °F). Gravity exhaust louvers reduce ambient capacity of the cooling system by an additional 3 °C (5.5 °F).

Air requirements

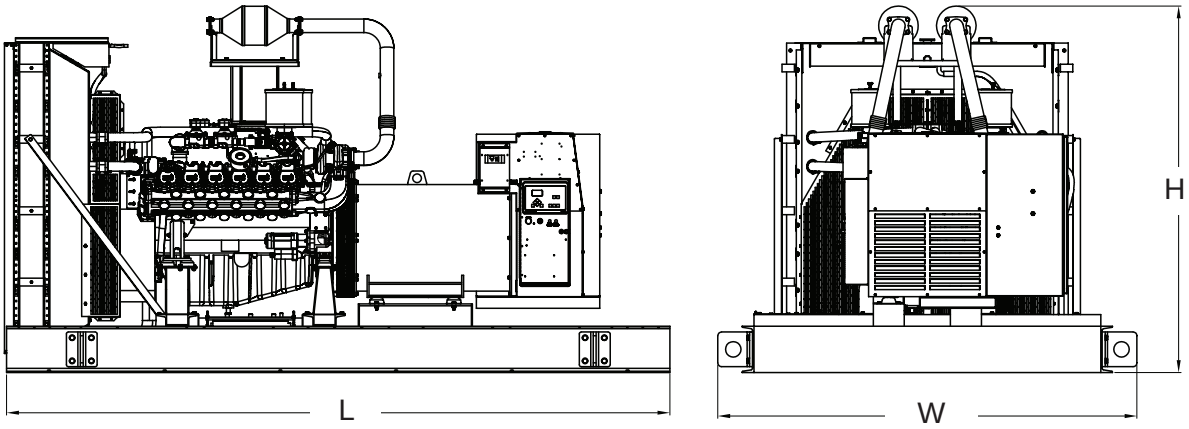
	NG and LPG
Aspirating: *m³/min (SCFM)	24.6 (841)
Air flow required for radiator cooled unit: **m³/min (SCFM)	1,333 (40,000)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m³/min (SCFM)	429 (15,160)

* Air density = 1.184 kg/m³ (0.0739 lbm/ft³)
** At 0.25 kPa (1 in. H_2O) static pressure and 52 °C (125 °F) at radiator

Exhaust system

	NG and LPG
Gas temperature (stack): °C (°F)	582 (1,080)
Gas volume at stack temperature: m³/min (CFM)	72.2 (2,550)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_2O)	2.5 (10.25)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	4,369 x 2,760 x 2,413 mm (172 x 108.6 x 95 in)	5,228 kg (11,500 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load (NG)	Standby full load (LP)
Level 0 (OPU): dB(A)	86.2	85.3

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

Fuel type	THC + NO_x	CO
Natural gas	0.39	0.1
Liquid propane	0.06	0.25

— All units are in g/hp-hr and are EPA weighted cycle values. Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations.

Rating definitions and conditions

— Ambient capability factor at 984 ft (300 m). Consult your local ***mtu*** Distributor for other altitudes.
— Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.
— Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
— Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Gas Generator Set

mtu 12V0265 GS500

500 kWe/60 Hz/Standby/208 - 4,160V

System ratings

Voltage (L-L)	208V † ‡	240V † ‡	380V † ‡	480V † ‡	600V ‡	4,160V
Phase	3	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60
Natural Gas (NG)						
Amps	1,735	1,504	950	752	601	87
kW	500	500	500	500	500	500
kVA	625	625	625	625	625	625
Liquid Propane (LP)						
Amps	1,214	1,052	665	526	421	61
kW	350	350	350	350	350	350
kVA	438	438	438	438	438	438
NG and LP						
skVA@30% voltage dip	1,625	1,625	2,022	1,989	2,304	2,028
Generator model *	LSA 49.1 M5	LSA 49.1 M5	LSA 49.1 S4	LSA 49.1 S4	LSA 49.1 S4	LS 50.2 L5
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	12 LEAD WYE	12 LEAD DELTA	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE

* Consult the factory for alternate configuration.
† UL 2200 offered
‡ CSA offered

Certifications and standards

- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional (refer to *System ratings* for availability)
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 31.8L turbo charge-air cooled gas engine
  - 31.8 liter displacement
  - 4-cycle
  - 3-way catalyst
- Complete range of accessories
- Engine-generator resilient marked
- Cooling system
  - Integral set-mounted
  - Engine driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - AREP supply to regulator
  - 300% short circuit capability
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Closed crankcase ventilation
- Jacket water pump
- Inter cooler water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - structural steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery rack and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- ± 0.25% voltage regulation no load to full load
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- SAE J1939 ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 Compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	PSI
Model	31.8L CAC
Type	4-cycle
Arrangement	12-V
Displacement: L (in³)	31.8 (1,941)
Bore: cm (in)	15 (5.9)
Stroke: cm (in)	15 (5.9)
Compression ratio	10.5:1
Rated rpm	1,800
Engine governor	Bosch
Maximum power (NG): kWm (bhp)	720 (966)
Maximum power (LPG): kWm (bhp)	475 (637)
Steady state frequency band	± 0.5%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	122 (32.2)
Engine jacket water capacity: L (gal)	88.1 (23.3)
System coolant capacity: L (gal)	236 (62.3)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	2,800
Batteries: group size	8D
Batteries: quantity	4

Fuel system

Fuel supply connection size	3” NPT
Fuel supply pressure: mm H_20 (in. H_20)	178–279 (7–11)

Fuel consumption (NG-1000 BTU/ft³ / LP-2500 BTU/ft³)

	NG	LPG
At 100% of power rating: m³/hr (ft³/hr)	172 (6,072)	57.6 (2,033)
At 75% of power rating: m³/hr (ft³/hr)	141 (4,972)	46.6 (1,645)
At 50% of power rating: m³/hr (ft³/hr)	108 (3,823)	36 (1,273)

Cooling - radiator system

	NG and LPG
Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air, intake, and discharge side of radiator: kPa (in. H_20)	0.12 (0.5)
Water pump capacity: L/min (gpm)	1,368 (361)
Heat rejection to coolant: kW (BTUM)	503 (28,631)
Heat rejection to after cooler: kW (BTUM)	53 (3,017)
Heat radiated to ambient: kW (BTUM)	281 (15,994)
Fan power: kW (hp)	24 (32)

Air requirements

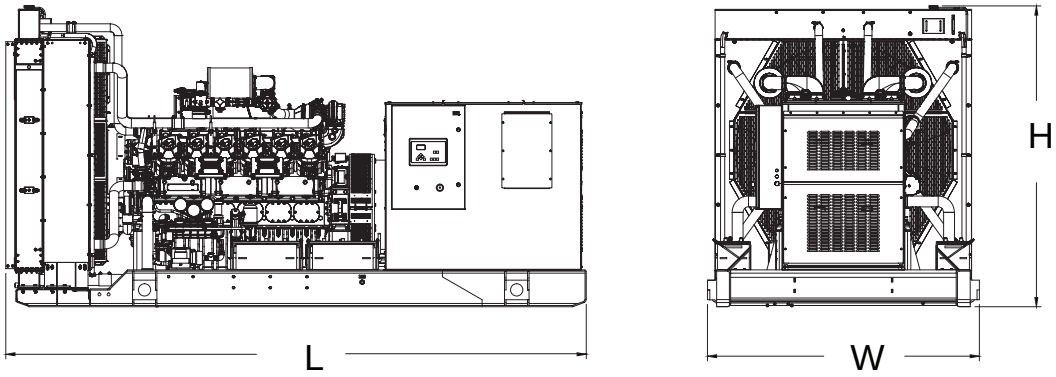
	NG and LPG
Aspirating: *m³/min (SCFM)	30.5 (1,064)
Air flow required for radiator cooled unit: *m³/min (SCFM)	1,167 (41,200)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m³/min (SCFM)	1,236 (43,906)

* Air density = 1.184 kg/m³ (0.0739 lbm/ft³)

Exhaust system

	NG and LPG
Gas temperature (stack): °C (°F)	609 (1,128)
Gas volume at stack temperature: m³/min (CFM)	94 (3,281)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	10.2 (41)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	4,742 x 2,222 x 2,457 mm (186.8 x 87.5 x 96.8 in)	8,500 kg (18,740 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load (NG)	Standby full load (LP)
Level 0 (OPU): dB(A)	94.3	93.7

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

Fuel type	THC + NO_x	CO
Natural gas	0.05	0.54
Liquid propane	0.23	0.22

— All units are in g/hp-hr and are EPA weighted cycle values. Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations.

Rating definitions and conditions

— Ambient capability factor at 984 ft (300 m). Consult your local ***mtu*** Distributor for other altitudes.
— Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.
— Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
— Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Gas Generator Set

mtu 12V0265 GS550

550 kWe/60 Hz/Standby/208 - 4,160V

System ratings

Voltage (L-L)	208V † ‡	240V † ‡	380V † ‡	480V † ‡	600V ‡	4,160V
Phase	3	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60
Natural Gas (NG)						
Amps	1,908	1,654	1,045	827	662	95
kW	550	550	550	550	550	550
kVA	688	688	688	688	688	688
Liquid Propane (LP)						
Amps	1,388	1,203	760	601	481	69
kW	400	400	400	400	400	400
kVA	500	500	500	500	500	500
NG and LP						
skVA@30% voltage dip	1,625	1,625	2,022	1,989	2,304	2,028
Generator model*	LSA 49.1 M5	LSA 49.1 M5	LSA 49.1 S4	LSA 49.1 S4	LSA 49.1 S4	LS 50.2 L5
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	12 LEAD WYE	12 LEAD DELTA	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE

* Consult the factory for alternate configuration.
† UL 2200 offered
‡ CSA offered

Certifications and standards

- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional (refer to *System ratings* for availability)
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 31.8L turbo charge-air cooled gas engine
  - 31.8 liter displacement
  - 4-cycle
  - 3-way catalyst
- Complete range of accessories
- Engine-generator resilient marked
- Cooling system
  - Integral set-mounted
  - Engine driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - AREP supply to regulator
  - 300% short circuit capability
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Closed crankcase ventilation
- Jacket water pump
- Inter cooler water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - structural steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery rack and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- ± 0.25% voltage regulation no load to full load
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- SAE J1939 ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** distributor for additional configurations.

Application data

Engine

Manufacturer	PSI
Model	31.8L CAC
Type	4-cycle
Arrangement	12-V
Displacement: L (in³)	31.8 (1,941)
Bore: cm (in)	15 (5.9)
Stroke: cm (in)	15 (5.9)
Compression ratio	10.5:1
Rated rpm	1,800
Engine governor	Bosch
Maximum power (NG): kWm (bhp)	720 (966)
Maximum power (LPG): kWm (bhp)	475 (637)
Steady state frequency band	± 0.5%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	122 (32.2)
Engine jacket water capacity: L (gal)	88.1 (23.3)
System coolant capacity: L (gal)	236 (62.3)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	2,800
Batteries: group size	8D
Batteries: quantity	4

Fuel system

Fuel supply connection size	3” NPT
Fuel supply pressure: mm H_2O (in. H_2O)	178–279 (7–11)

Fuel consumption (NG-1000 BTU/ft³)

	NG	LPG
At 100% of power rating: m³/hr (ft³/hr)	185 (6,543)	66 (2,335)
At 75% of power rating: m³/hr (ft³/hr)	151 (5,332)	49 (1,733)
At 50% of power rating: m³/hr (ft³/hr)	115 (4,068)	34.9 (1,231)

Cooling - radiator system

	NG and LPG
Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air, intake, and discharge side of radiator: kPa (in. H_2O)	0.12 (0.5)
Water pump capacity: L/min (gpm)	1,368 (361)
Heat rejection to coolant: kW (BTUM)	535 (30,452)
Heat rejection to after cooler: kW (BTUM)	59 (3,358)
Heat radiated to ambient: kW (BTUM)	288 (16,393)
Fan power: kW (hp)	24 (32)

Air requirements

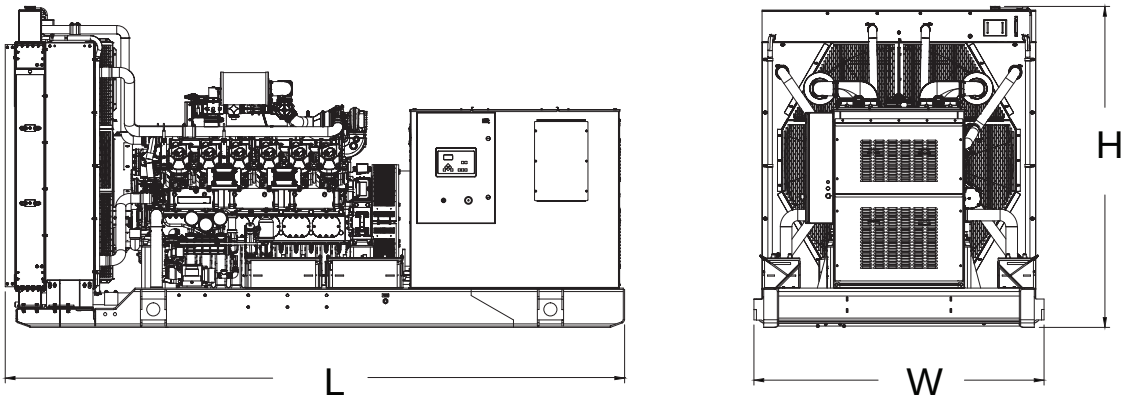
	NG and LPG
Aspirating: *m³/min (SCFM)	33 (1,152)
Air flow required for radiator cooled unit: *m³/min (SCFM)	1,167 (41,200)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m³/min (SCFM)	1,236 (43,906)

* Air density = 1.184 kg/m³ (0.0739 lbm/ft³)

Exhaust system

	NG and LPG
Gas temperature (stack): °C (°F)	619 (1,146)
Gas volume at stack temperature: m³/min (CFM)	101 (3,525)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_2O)	10.2 (41)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	4,742 x 2,222 x 2,457 mm (186.8 x 87.5 x 96.8 in)	8,500 kg (18,740 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load (NG)	Standby full load (LP)
Level 0 (OPU): dB(A)	94.3	93.7

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

Fuel type	THC + NO_x	CO
Natural gas	0.05	0.54
Liquid propane	0.23	0.22

- All units are in g/hp-hr and are EPA weighted cycle values. Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations.

Rating definitions and conditions

- Ambient capability factor at 984 ft (300 m). Consult your local ***mtu*** Distributor for other altitudes.
- Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Gas Generator Set

mtu 12V0265 GS600

600 kWe / 60 Hz / Standby/208 - 4,160V

System ratings

Voltage (L-L)	208V † ‡	240V † ‡	380V † ‡	480V † ‡	600V ‡	4,160V
Phase	3	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60
Amps	2,082	1,804	1,140	902	722	104
kW	600	600	600	600	600	600
kVA	750	750	750	750	750	750
skVA@30% voltage dip	1,625	1,625	2,022	1,989	2,304	2,028
Generator model *	LSA 49.1 M5	LSA 49.1 M5	LSA 49.1 S4	LSA 49.1 S4	LSA 49.1 S4	LS 50.2 L5
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	12 LEAD WYE	12 LEAD DELTA	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE

* Consult the factory for alternate configuration.
† UL 2200 offered
‡ CSA offered

Certifications and standards

- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional (refer to *System ratings* for availability)
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 31.8L turbo charge-air cooled gas engine
  - 31.8 liter displacement
  - 4-cycle
  - 3-way catalyst
- Complete range of accessories
- Engine-generator resilient marked
- Cooling system
  - Integral set-mounted
  - Engine driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - AREP supply to regulator
  - 300% short circuit capability
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Closed crankcase ventilation
- Jacket water pump
- Inter cooler water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - structural steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery rack and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- ± 0.25% voltage regulation no load to full load
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- SAE J1939 ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	PSI
Model	31.8L CAC
Type	4-cycle
Arrangement	12-V
Displacement: L (in³)	31.8 (1,941)
Bore: cm (in)	15 (5.9)
Stroke: cm (in)	15 (5.9)
Compression ratio	10.5:1
Rated RPM	1,800
Engine governor	Bosch
Maximum power: kWm (bhp)	720 (966)
Steady state frequency band	± 0.5%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	122 (32.2)
Engine jacket water capacity: L (gal)	88.1 (23.3)
System coolant capacity: L (gal)	236 (62.3)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	2,800
Batteries: group size	8D
Batteries: quantity	4

Fuel system

Fuel supply connection size	3” NPT
Fuel supply pressure: mm H_2O (in. H_2O)	178–279 (7–11)

Fuel consumption (NG-1000 BTU/ft³)

At 100% of power rating: m³/hr (ft³/hr)	199 (7,014)
At 75% of power rating: m³/hr (ft³/hr)	161 (5,693)
At 50% of power rating: m³/hr (ft³/hr)	122 (4,314)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air, intake, and discharge side of radiator: kPa (in. H_2O)	0.12 (0.5)
Water pump capacity: L/min (gpm)	1,368 (361)
Heat rejection to coolant: kW (BTUM)	567 (32,273)
Heat rejection to after cooler: kW (BTUM)	66 (3,757)
Heat radiated to ambient: kW (BTUM)	293 (16,677)
Fan power: kW (hp)	24 (32)

Air requirements

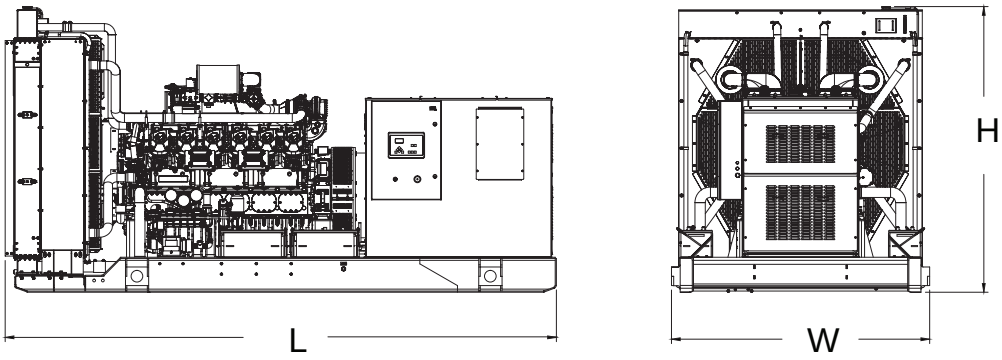
Aspirating: *m³/min (SCFM)	35 (1,222)
Air flow required for radiator cooled unit: *m³/min (SCFM)	1,167 (41,200)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m³/min (SCFM)	1,236 (43,906)

* Air density = 1.184 kg/m³ (0.0739 lbm/ft³)

Exhaust system

Gas temperature (stack): °C (°F)	628 (1,162)
Gas volume at stack temperature: m³/min (CFM)	109 (3,804)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_2O)	10.2 (41)

Weights and dimensions



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System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	4,742 x 2,222 x 2,457 mm (186.8 x 87.5 x 96.8 in)	8,500 kg (18,740 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load (NG)
Level 0 (OPU): dB(A)	94.3

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

Fuel type	THC + NO_x	CO
Natural gas	0.05	0.54

— All units are in g/hp-hr and are EPA weighted cycle values. Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations.

Rating definitions and conditions

— Ambient capability factor at 984 ft (300 m). Consult your local ***mtu*** Distributor for other altitudes.
— Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.
— Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
— Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Gas Generator Set

mtu 12V0265 GS650

650 kWe/60 Hz/Standby/208 - 4,160V

System ratings

Voltage (L-L)	208V † ‡	240V † ‡	380V † ‡	480V † ‡	600V ‡	4,160V
Phase	3	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60
Amps	2,255	1,955	1,234	977	782	113
kW	650	650	650	650	650	650
kVA	813	813	813	813	813	813
skVA@30% voltage dip	2,050	2,050	2,430	2,630	2,745	2,028
Generator model *	LSA 49.1 M7	LSA 49.1 M7	LSA 49.1 M75	LSA 49.1 M6	LSA 49.1 M6	LS 50.2 L5
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	12 LEAD WYE	12 LEAD DELTA	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE

* Consult the factory for alternate configuration.
† UL 2200 offered
‡ CSA offered

Certifications and standards

- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional (refer to *System ratings* for availability)
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 31.8L turbo charge-air cooled gas engine
  - 31.8 liter displacement
  - 4-cycle
  - 3-way catalyst
- Complete range of accessories
- Engine-generator resilient marked
- Cooling system
  - Integral set-mounted
  - Engine driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - AREP supply to regulator
  - 300% short circuit capability
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Closed crankcase ventilation
- Jacket water pump
- Inter cooler water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - structural steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery rack and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- ± 0.25% voltage regulation no load to full load
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- SAE J1939 ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	PSI
Model	31.8L CAC
Type	4-cycle
Arrangement	12-V
Displacement: L (in³)	31.8 (1,941)
Bore: cm (in)	15 (5.9)
Stroke: cm (in)	15 (5.9)
Compression ratio	10.5:1
Rated RPM	1,800
Engine governor	Bosch
Maximum power (NG): kWm (bhp)	720 (966)
Steady state frequency band	± 0.5%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	122 (32.2)
Engine jacket water capacity: L (gal)	88.1 (23.3)
System coolant capacity: L (gal)	236 (62.3)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	2,800
Batteries: group size	8D
Batteries: quantity	4

Fuel system

Fuel supply connection size	3” NPT
Fuel supply pressure: mm H_20 (in. H_20)	178–279 (7–11)

Fuel consumption (NG-1000 BTU/ft³)

At 100% of power rating: m³/hr (ft³/hr)	209 (7,404)
At 75% of power rating: m³/hr (ft³/hr)	171 (6,053)
At 50% of power rating: m³/hr (ft³/hr)	127 (4,491)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air, intake, and discharge side of radiator: kPa (in. H_20)	0.12 (0.5)
Water pump capacity: L/min (gpm)	1,368 (361)
Heat rejection to coolant: kW (BTUM)	599 (34,095)
Heat rejection to after cooler: kW (BTUM)	73 (4,155)
Heat radiated to ambient: kW (BTUM)	297 (16,905)
Fan power: kW (hp)	24 (32)

Air requirements

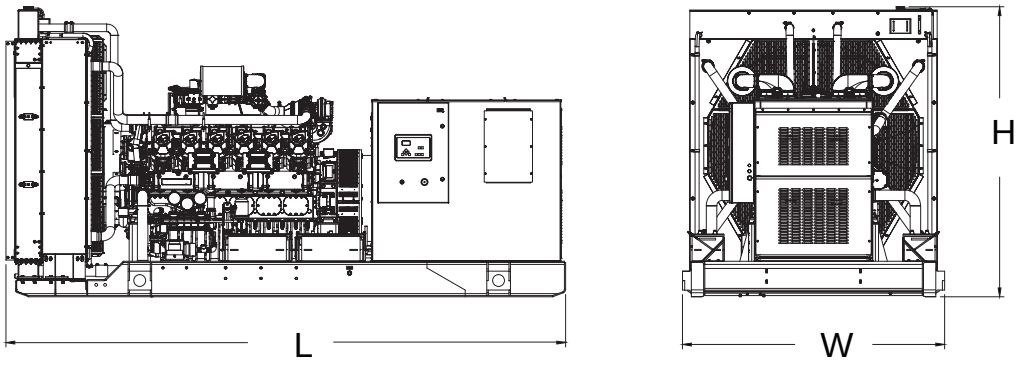
Aspirating: *m³/min (SCFM)	37 (1,320)
Air flow required for radiator cooled unit: *m³/min (SCFM)	1,167 (41,200)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m³/min (SCFM)	1,236 (43,906)

* Air density = 1.184 kg/m³ (0.0739 lbm/ft³)

Exhaust system

Gas temperature (stack): °C (°F)	639 (1,183)
Gas volume at stack temperature: m³/min (CFM)	115 (4,079)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	10.2 (41)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	4,742 x 2,222 x 2,457 mm (186.8 x 87.5 x 96.8 in)	8,500 kg (18,740 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load (NG)
Level 0 (OPU): dB(A)	94.3

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

Fuel type	THC + NO_x	CO
Natural gas	0.05	0.54

— All units are in g/hp-hr and are EPA weighted cycle values. Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations.

Rating definitions and conditions

— Ambient capability factor at 984 ft (300 m). Consult your local ***mtu*** Distributor for other altitudes.
— Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.
— Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
— Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Gas Generator Set

mtu 6R0185 GS200

175 kWe/60 Hz/Prime/208 - 600V
Reference *mtu* 6R0185 GS200 (200 kWe) for Standby Rating Technical Data

System ratings

Voltage (L-L)	240V †	240V †	208V †	240V †	480V †	600V
Phase	1	1	3	3	3	3
PF	1	1	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60
Amps	C/F	C/F	600	520	261	210
kW/kVA	C/F	C/F	173/216	173/216	174/217	175/218
skVA@30% voltage dip	425	370	608	608	809	720
Generator model	433CSL6216	432PSL6228	432CSL6210	432CSL6210	432CSL6210	432PSL6246
Temp rise	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C
Connection	12 LEAD DOUBLE DELTA	4 LEAD	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 11.1L turbo engine charge air cooling
  - 11.1 liter displacement
  - 4-cycle
- 3-way catalyst
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with optional Permanent Magnet Generator (PMG)
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaner
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Jacket water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Self-ventilated and drip-proof
- Superior voltage waveform
- Solid state, volts-per-hertz regulator
- ± 1% voltage regulation no load to full load
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 105 °C maximum prime temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- SAE J1939 engine ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	PSI
Model	11.1L CAC
Type	4-cycle
Arrangement	6-inline
Displacement: L (in^3)	11.1 (673)
Bore: cm (in)	12.3 (4.84)
Stroke: cm (in)	15.5 (6.1)
Compression ratio	10.5:1
Rated rpm	1,800
Engine governor	Bosch
Maximum power: kWm (bhp)	203 (272)
Steady state frequency band	± 0.5%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	28.5 (8)
Engine jacket water capacity: L (gal)	25 (5.5)
System coolant capacity: L (gal)	149 (32.8)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	1,050
Batteries: group size	4D
Batteries: quantity	2

Fuel inlet

Fuel supply connection size	2” NPT
Fuel supply pressure: mm H_2O (in. H_2O)	178–279 (7–11)

Fuel consumption (NG-1000 BTU/ft^3)

At 100% of power rating: m^3/hr (ft^3/hr)	56.1 (1,980)
At 75% of power rating: m^3/hr (ft^3/hr)	42.5 (1,500)
At 50% of power rating: m^3/hr (ft^3/hr)	30.4 (1,075)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)*
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_2O)	0.12 (0.5)
Water pump capacity: L/min (gpm)	310 (82)
Heat rejection to coolant: kW (BTUM)	194.6 (11,071)
Heat radiated to ambient: kW (BTUM)	40.4 (2,295)
Fan power: kW (hp)	10.4 (13.9)

* Installation of enclosures reduces the ambient capacity of the cooling system by 1 °C (1.8 °F). Gravity exhaust louvers reduce ambient capacity of the cooling system by an additional 3 °C (5.5 °F).

Air requirements

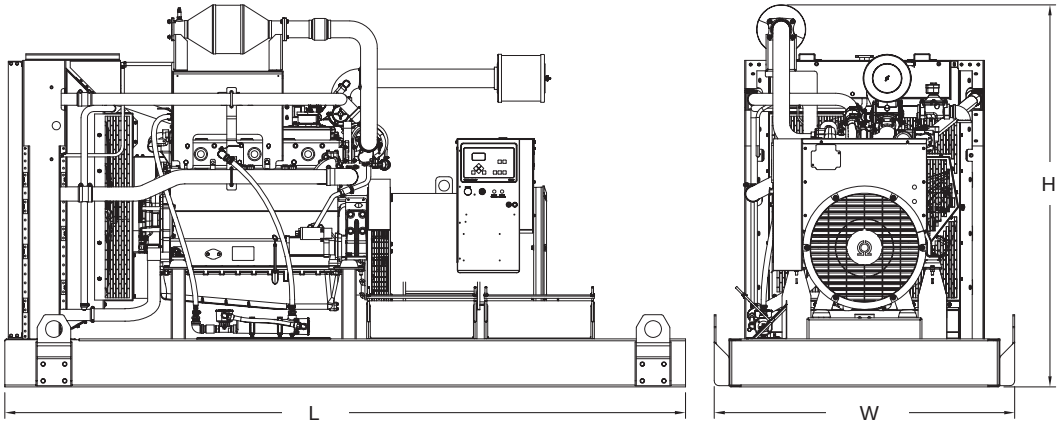
Aspirating: *m^3/min (SCFM)	11.7 (400)
Air flow required for radiator cooled unit: **m^3/min (SCFM)	631 (22,300)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	237 (8,365)

* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)
** At 0.25 kPa (1 in. H_2O) static pressure and 52 °C (125 °F) at radiator

Exhaust system

Gas temperature (stack): °C (°F)	694 (1,281)
Gas volume at stack temperature: m^3/min (CFM)	38.8 (1,371)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_2O)	2.5 (10.25)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	3,607 x 1,591 x 2,026 mm (142 x 62.6 x 79.8 in)	3,096 kg (6,258 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Prime full load (NG)	Prime full load (LP)
Level 0 (OPU): dB(A)	86.3	C/F

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

Fuel type	THC + NO_x	CO
Natural gas	2.25	0.26

— All units are in g/hp-hr and are EPA weighted cycle values. Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations.

Rating definitions and conditions

— Ambient capability factor at 984 ft (300 m). Consult your local ***mtu*** Distributor for other altitudes.
— Prime power ratings apply to installations where utility power is unavailable or unreliable. At varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 75%. For limited running time and base load ratings, consult the factory.
— Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
— Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

C/F = Consult Factory/***mtu*** Distributor

Gas Generator Set

mtu 8V0183 GS260

235 kWe/60 Hz/Prime/208 - 600V
Reference *mtu* 8V0183 GS260 (260 kWe) for Standby Rating Technical Data

System ratings

Voltage (L-L)	240V †	208V †	240V †	480V †	600V
Phase	1	3	3	3	3
PF	1	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60
Amps	958	815	707	353	283
kW/kVA	230/230	235/293	235/293	235/293	235/293
skVA@30% voltage dip	520	608	608	809	740
Generator model	572RSL4031	432PSL6210	432PSL6210	432PSL6210	432PSL6246
Temp rise	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C
Connection	12 LEAD DOUBLE DELTA	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 14.6L turbo engine charge air cooling
  - 14.6 liter displacement
  - 4-cycle
- 3-way catalyst
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with Permanent Magnet Generator (PMG)
    - ◊ PMG standard for 570 frame and larger
    - ◊ PMG optional for 430 frame and smaller
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaner
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Jacket water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor – electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds (with PMG only)
- Self-ventilated and drip-proof
- Superior voltage waveform
- Solid state, volts-per-hertz regulator (digital when PMG is standard)
- ± 1% voltage regulation no load to full load
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 105 °C maximum prime temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- SAE J1939 engine ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	PSI
Model	14.6L CAC
Type	4-cycle
Arrangement	8-V
Displacement: L (in³)	14.6 (892)
Bore: cm (in)	12.8 (5.04)
Stroke: cm (in)	14.2 (5.59)
Compression ratio	10.5:1
Rated rpm	1,800
Engine governor	Bosch
Maximum power (NG): kWm (bhp)	270 (302)
Steady state frequency band	± 0.5%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	38.1 (10.1)
Engine jacket water capacity: L (gal)	43.2 (9.5)
System coolant capacity: L (gal)	227 (50)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	1,050
Batteries: group size	4D
Batteries: quantity	2

Fuel inlet

Fuel supply connection size	2” NPT
Fuel supply pressure: mm H_2O (in. H_2O)	178–279 (7–11)

Fuel consumption (NG-1000 BTU/ft³)

At 100% of power rating: m³/hr (ft³/hr)	78.2 (2,760)
At 75% of power rating: m³/hr (ft³/hr)	58 (2,050)
At 50% of power rating: m³/hr (ft³/hr)	40.8 (1,440)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)*
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_2O)	0.12 (0.5)
Water pump capacity: L/min (gpm)	680 (180)
Heat rejection to coolant: kW (BTUM)	285 (16,189)
Heat radiated to ambient: kW (BTUM)	80.5 (4,580)
Fan power: kW (hp)	16.4 (22)

* Installation of enclosures reduces the ambient capacity of the cooling system by 1 °C (1.8 °F). Gravity exhaust louvers reduce ambient capacity of the cooling system by an additional 3 °C (5.5 °F).

Air requirements

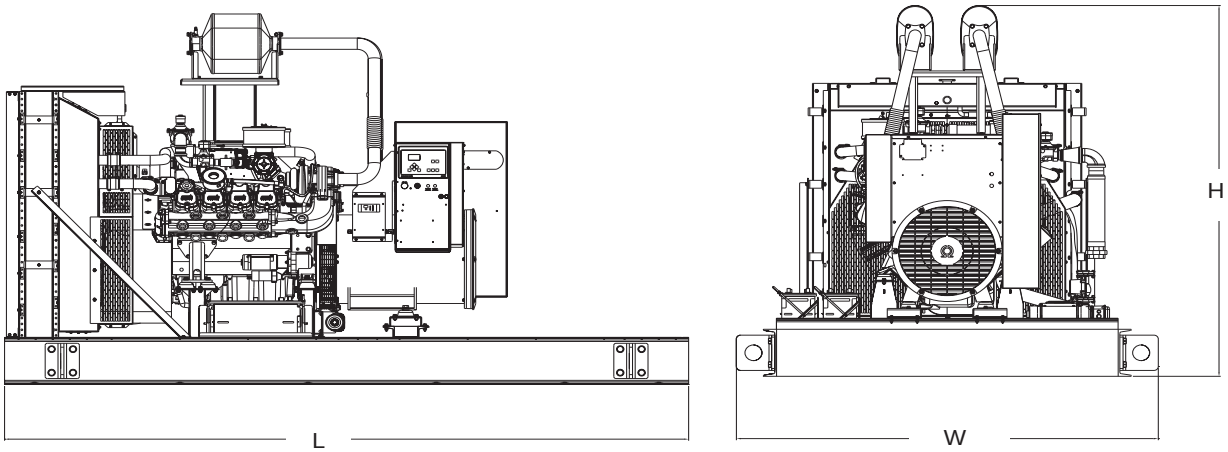
Aspirating: *m³/min (SCFM)	15.6 (532)
Air flow required for radiator cooled unit: **m³/min (SCFM)	849 (30,000)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m³/min (SCFM)	293 (10,330)

* Air density = 1.184 kg/m³ (0.0739 lbm/ft³)
** At 0.25 kPa (1 in. H_2O) static pressure and 52 °C (125 °F) at radiator

Exhaust system

Gas temperature (stack): °C (°F)	554 (1,030)
Gas volume at stack temperature: m³/min (CFM)	44.2 (1,560)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_2O)	2.5 (10.25)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	4,064 x 2,506 x 2,404 mm (160 x 98.6 x 94.6 in)	4,055 kg (8,939 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Prime full load (NG)	Prime full load (LP)
Level 0 (OPU): dB(A)	83.1	C/F

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

Fuel type	THC + NO_x	CO
Natural gas	0.22	0.06

— All units are in g/hp-hr and are EPA weighted cycle values. Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations.

Rating definitions and conditions

— Ambient capability factor at 984 ft (300 m). Consult your local ***mtu*** Distributor for other altitudes.
— Prime power ratings apply to installations where utility power is unavailable or unreliable. At varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO-8528/1, ISO-3046/1, BS 5514, and AS 2789. Average load factor: ≤ 75%. For limited running time and base load ratings, consult the factory.
— Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
— Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

C/F = Consult Factory/***mtu*** Distributor

Gas Generator Set

mtu 12V0183 GS400

355 kWe/60 Hz/Prime/208 - 600V
Reference *mtu* 12V0183 GS400 (400 kWe) for Standby Rating Technical Data

System ratings

Voltage (L-L)	240V †	208V †	240V †	480V †	600V
Phase	1	3	3	3	3
PF	1	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60
Amps	1,458	1,232	1,068	534	427
kW/kVA	350/350	355/443	355/443	355/443	355/443
skVA@30% voltage dip	760	1,500	1,500	1,500	1,450
Generator model	574RSL4037	572RSL4029	572RSL4029	572RSL4029	572RSS4272
Temp rise	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C
Connection	12 LEAD DOUBLE DELTA	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 21.9L turbo engine charge air cooling
  - 21.9 liter displacement
  - 4-cycle
- 3-way catalyst
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - Permanent Magnet Generator (PMG) supply to regulator
  - 300% short circuit capability
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaner
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Jacket water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit of up to 300% of rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, volts-per-hertz regulator
- ± 1% voltage regulation no load to full load
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 105 °C maximum prime temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- SAE J1939 engine ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	PSI
Model	21.9L CAC
Type	4-cycle
Arrangement	12-V
Displacement: L (in³)	21.9 (1,338)
Bore: cm (in)	12.8 (5.04)
Stroke: cm (in)	14.2 (5.59)
Compression ratio	10.5:1
Rated RPM	1,800
Engine governor	Bosch
Maximum power (NG): kWm (bhp)	410 (550)
Steady state frequency band	± 0.5%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	47.1 (12.4)
Engine jacket water capacity: L (gal)	52.3 (11.5)
System coolant capacity: L (gal)	291 (64)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	1,050
Batteries: group size	4D
Batteries: quantity	2

Fuel inlet

Fuel supply connection size	3” NPT
Fuel supply pressure: mm H_2O (in. H_2O)	178–279 (7–11)

Fuel consumption (NG-1000 BTU/ft³)

At 100% of power rating: m³/hr (ft³/hr)	109.3 (3,861)
At 75% of power rating: m³/hr (ft³/hr)	84.1 (2,970)
At 50% of power rating: m³/hr (ft³/hr)	61.7 (2,178)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)*
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_2O)	0.12 (0.5)
Water pump capacity: L/min (gpm)	660 (174)
Heat rejection to coolant: kW (BTUM)	453 (25,760)
Heat radiated to ambient: kW (BTUM)	118.2 (6,720)
Fan power: kW (hp)	31.3 (42)

* Installation of enclosures reduces the ambient capacity of the cooling system by 1 °C (1.8 °F). Gravity exhaust louvers reduce ambient capacity of the cooling system by an additional 3 °C (5.5 °F).

Air requirements

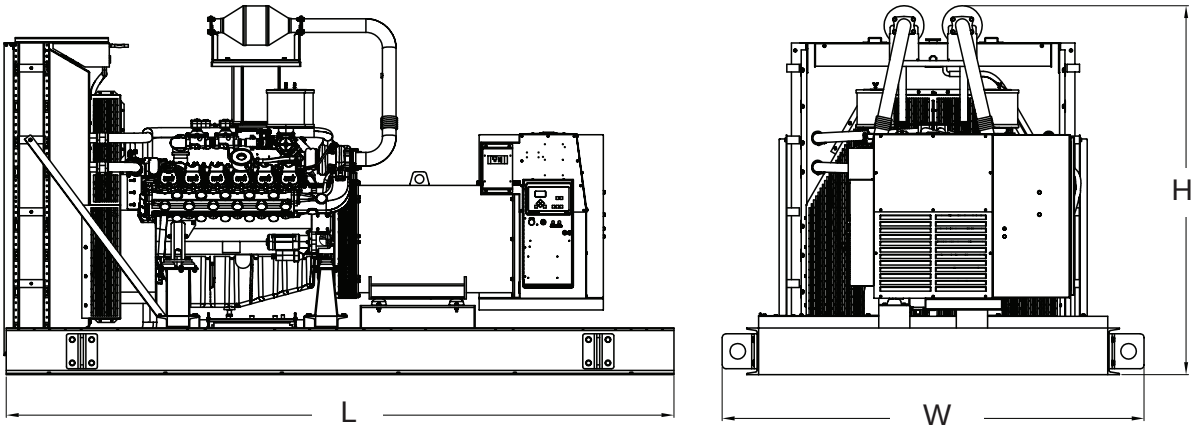
Aspirating: *m³/min (SCFM)	24.6 (841)
Air flow required for radiator cooled unit: **m³/min (SCFM)	1,133 (40,000)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m³/min (SCFM)	429 (15,160)

* Air density = 1.184 kg/m³ (0.0739 lbm/ft³)
** At 0.25 kPa (1 in. H_2O) static pressure and 52 °C (125 °F) at radiator

Exhaust system

Gas temperature (stack): °C (°F)	582 (1,080)
Gas volume at stack temperature: m³/min (CFM)	72.2 (2,550)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_2O)	2.5 (10.25)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	4,369 x 2,760 x 2,413 mm (172 x 108.6 x 95 in)	5,228 kg (11,500 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Prime full load (NG)	Prime full load (LP)
Level 0 (OPU): dB(A)	85.5	C/F

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

Fuel type	THC + NO_x	CO
Natural gas	0.39	0.1

— All units are in g/hp-hr and are EPA weighted cycle values. Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations.

Rating definitions and conditions

— Ambient capability factor at 984 ft (300 m). Consult your local ***mtu*** Distributor for other altitudes.
— Prime power ratings apply to installations where utility power is unavailable or unreliable. At varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO-8528/1, ISO-3046/1, BS 5514, and AS 2789. Average load factor: ≤ 75%. For limited running time and base load ratings, consult the factory.
— Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
— Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

C/F = Consult Factory/***mtu*** Distributor

Diesel Generator Set

mtu 3R0096 DS30

30 kWe/60 Hz/Standby/208 - 600V

Reference *mtu* 3R0096 DS30 (27 kWe) for Prime Power for Stationary Emergency Rating Technical Data

System ratings

Voltage (L-L)	240V †	208V †	240V †	380V †	480V †	600V
Phase	1	3	3	3	3	3
PF	1	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60
kW	30	30	30	30	30	30
kVA	30	37	37	37	37	37
Amps	125	104	90	57	45	36
skVA@30% voltage dip	65	142	142	187	187	142
Generator model	285PSL1700	285PSL1700	285PSL1700	285PSL1700	285PSL1700	284PSL5252
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	12 LEAD DOUBLE DELTA	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA certified – 40 CFR Part 60 IIII NSPS for Stationary Compression Ignition Internal Combustion Engines – stationary emergency engine emissions standards 60.4202(a)(1)(ii) 2008 and later model years
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
- UL 2200 – optional (refer to *System ratings* for availability)
- CSA – optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 3029TFG89 diesel engine
  - 2.9 liter displacement
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with optional Permanent Magnet Generator (PMG)
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Fuel filter with water seperator
- Jacket water pump
- Thermostat
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 12V
- Governor - mechanical droop
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 12V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Self-ventilated and drip-proof
- Superior voltage waveform
- Solid state, volts-per-hertz regulator
- ± 1% voltage regulation no load to full load
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	John Deere
Model	3029TFG89
Type	4-cycle
Arrangement	3-inline
Displacement: L (in^3)	2.9 (177)
Bore: cm (in)	10.6 (4.2)
Stroke: cm (in)	11 (4.3)
Compression ratio	17.2:1
Rated rpm	1,800
Engine governor	mechanical droop
Maximum power: kWm (bhp)	35 (47)
Steady state frequency band	± 1%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	8 (2.1)
Engine jacket water capacity: L (gal)	5.7 (1.5)
System coolant capacity: L (gal)	11.4 (3)

Electrical

Electric volts DC	12
Cold cranking amps under -17.8 °C (0 °F)	925
Batteries: group size	31
Batteries: quantity	1

Fuel system

Fuel supply connection size	5/16” ID/-6 JIC
Fuel return connection size	5/16” ID/-6 JIC
Maximum fuel lift: m (ft)	2 (6.6)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	111.3 (29.4)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	9.9 (2.6)
At 75% of power rating: L/hr (gal/hr)	7.5 (2)
At 50% of power rating: L/hr (gal/hr)	5.2 (1.4)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)*
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.12 (0.5)
Water pump capacity: L/min (gpm)	110 (29)
Heat rejection to coolant: kW (BTUM)	20.1 (1,144)
Heat radiated to ambient: kW (BTUM)	4.3 (245)
Fan power: kW (hp)	0.7 (0.94)

* Installation of a gravity exhaust louver in a Level 3 enclosure will reduce the ambient capacity of the cooling system by 5 °C (9 °F).

Air requirements

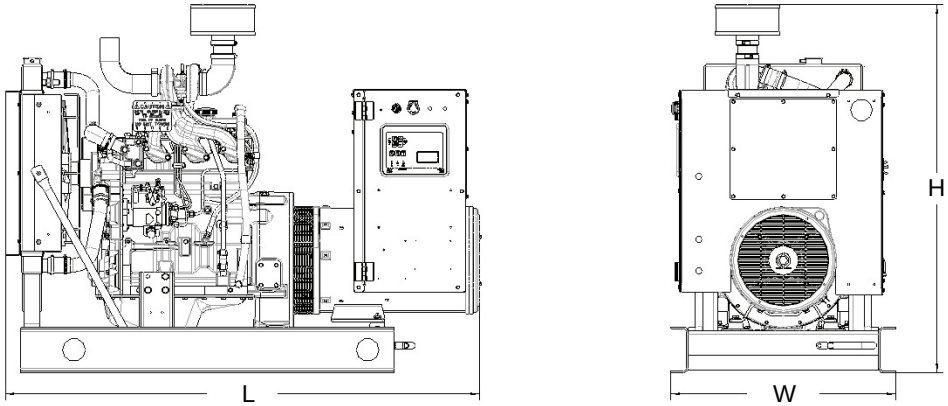
Aspirating: *m^3/min (SCFM)	3.6 (127)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	46.7 (1,636)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	15.8 (553)

* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

Gas temperature (stack): °C (°F)	580 (1,076)
Gas volume at stack temperature: m^3/min (CFM)	8.3 (293)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	7.5 (30)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	1,581 x 749 x 1,226 mm (62.3 x 29.5 x 48.3 in)	736-995 kg (1,623-2,194 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load
Level 0 (OPU): dB(A)	72.2

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
4.41	0.44	0.11

All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards. 5-mode emission data per 40 CFR 89 or 40 CFR 1039 (as applicable) is available upon request.

Rating definitions and conditions

- Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 3046-1, BS 5514, and AS 2789. Average loadfactor: ≤ 85%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 4R0113 DS40

40 kWe/60 Hz/Standby/208 - 600V

Reference *mtu* 4R0113 DS40 (40 kWe) for Prime Power for Stationary Emergency Rating Technical Data

System ratings

Voltage (L-L)	240V †	208V †	240V †	380V †	480V †	600V
Phase	1	3	3	3	3	3
PF	1	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60
kW	40	40	40	40	40	40
kVA	40	50	50	50	50	50
Amps	166	138	120	76	60	48
skVA@30% voltage dip	63	129	129	112	172	92
Generator model	361CSL1601	361CSL1601	361CSL1601	361CSL1601	361CSL1601	361PSL1632
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	12 LEAD DOUBLE DELTA	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 3 certified
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
- UL 2200 – optional (refer to *System ratings* for availability)
- CSA – optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 4045TF280 diesel engine
  - 4.5 liter displacement
  - Mechanical injection pump
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with optional Permanent Magnet Generator (PMG)
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Fuel filter with water seperator
- Jacket water pump
- Thermostat
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 12V
- Governor - mechanical droop
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 12V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Self-ventilated and drip-proof
- Superior voltage waveform
- Solid state, volts-per-hertz regulator
- ± 1% voltage regulation no load to full load
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	John Deere
Model	4045TF280
Type	4-cycle
Arrangement	4-inline
Displacement: L (in^3)	4.5 (275)
Bore: cm (in)	10.6 (4.19)
Stroke: cm (in)	12.7 (5)
Compression ratio	19:1
Rated rpm	1,800
Engine governor	mechanical droop
Maximum power: kWm (bhp)	63 (85)
Steady state frequency band	± 0.5%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	13 (3.4)
Engine jacket water capacity: L (gal)	8.5 (2.3)
System coolant capacity: L (gal)	18.9 (5)

Electrical

Electric volts DC	12
Cold cranking amps under -17.8 °C (0 °F)	925
Batteries: group size	31
Batteries: quantity	1

Fuel system

Fuel supply connection size	3/8” NPT
Fuel return connection size	3/8” NPT
Maximum fuel lift: m (ft)	1.8 (6)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	62.5 (16.5)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	17.4 (4.6)
At 75% of power rating: L/hr (gal/hr)	13.6 (3.6)
At 50% of power rating: L/hr (gal/hr)	9.5 (2.5)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.12 (0.5)
Water pump capacity: L/min (gpm)	144 (38)
Heat rejection to coolant: kW (BTUM)	36 (2,049)
Heat radiated to ambient: kW (BTUM)	6.8 (384)
Fan power: kW (hp)	1.6 (2.2)

Air requirements

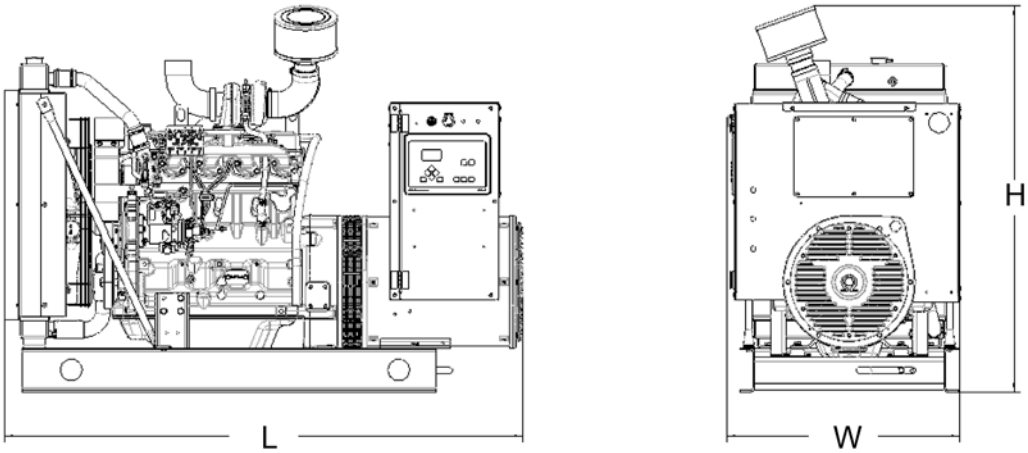
Aspirating: *m^3/min (SCFM)	5.3 (187)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	117 (4,088)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	25 (867)

* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

Gas temperature (stack): °C (°F)	579 (1,074)
Gas volume at stack temperature: m^3/min (CFM)	19.2 (679)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	7.5 (30)
Minimum allowable back pressure: kPa (in H_20)	N/A

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	1,781 x 800 x 1,321 mm (70.1 x 31.5 x 52 in)	943-1,404 kg (2,078-3,095 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load
Level 0 (OPU): dB(A)	80.5

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
3.8	0.69	0.22

— All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards. 5-mode emission data per 40 CFR 89 or 40 CFR 1039 (as applicable) is available upon request.

Rating definitions and conditions

— Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 3046-1, BS 5514, and AS 2789. Average loadfactor: ≤ 85%.
— Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
— Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

N/A = Not Available

Diesel Generator Set

mtu 4R0113 DS40

40 kWe/60 Hz/Standby (SCAQMD)/208 - 600V
Reference *mtu* 4R0113 DS40 (40 kWe SCAQMD) for Prime Power for Stationary Emergency Rating Technical Data

System ratings

Voltage (L-L)	240V †	208V †	240V †	380V †	480V †	600V
Phase	1	3	3	3	3	3
PF	1	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60
kW	40	40	40	40	40	40
kVA	40	50	50	50	50	50
Amps	166	138	120	76	60	48
skVA@30% voltage dip	63	129	129	112	172	92
Generator model	361CSL1601	361CSL1601	361CSL1601	361CSL1601	361CSL1601	361PSL1632
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	12 LEAD DOUBLE DELTA	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 3 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
- UL 2200 – optional (refer to *System ratings* for availability)
- CSA – optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 4045TF290J diesel engine
  - 4.5 liter displacement
  - Mechanical injection pump
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with optional Permanent Magnet Generator (PMG)
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Fuel filter with water seperator
- Jacket water pump
- Thermostat
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 12V
- Governor - mechanical droop
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 12V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Self-ventilated and drip-proof
- Superior voltage waveform
- Solid state, volts-per-hertz regulator
- ± 1% voltage regulation no load to full load
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	John Deere
Model	4045TF290J
Type	4-cycle
Arrangement	4-inline
Displacement: L (in^3)	4.5 (275)
Bore: cm (in)	10.6 (4.19)
Stroke: cm (in)	12.7 (5)
Compression ratio	19:1
Rated rpm	1,800
Engine governor	mechanical droop
Maximum power: kWm (bhp)	55 (74)
Steady state frequency band	± 0.5%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	13 (3.4)
Engine jacket water capacity: L (gal)	8.5 (2.3)
System coolant capacity: L (gal)	18.9 (5)

Electrical

Electric volts DC	12
Cold cranking amps under -17.8 °C (0 °F)	925
Batteries: group size	31
Batteries: quantity	1

Fuel system

Fuel supply connection size	3/8” NPT
Fuel return connection size	3/8” NPT
Maximum fuel lift: m (ft)	1.8 (6)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	112.8 (29.8)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	15.8 (4.2)
At 75% of power rating: L/hr (gal/hr)	12.3 (3.3)
At 50% of power rating: L/hr (gal/hr)	8.1 (2.1)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.12 (0.5)
Water pump capacity: L/min (gpm)	144 (38)
Heat rejection to coolant: kW (BTUM)	31 (1,765)
Heat radiated to ambient: kW (BTUM)	6.8 (384)
Fan power: kW (hp)	1.6 (2.2)

Air requirements

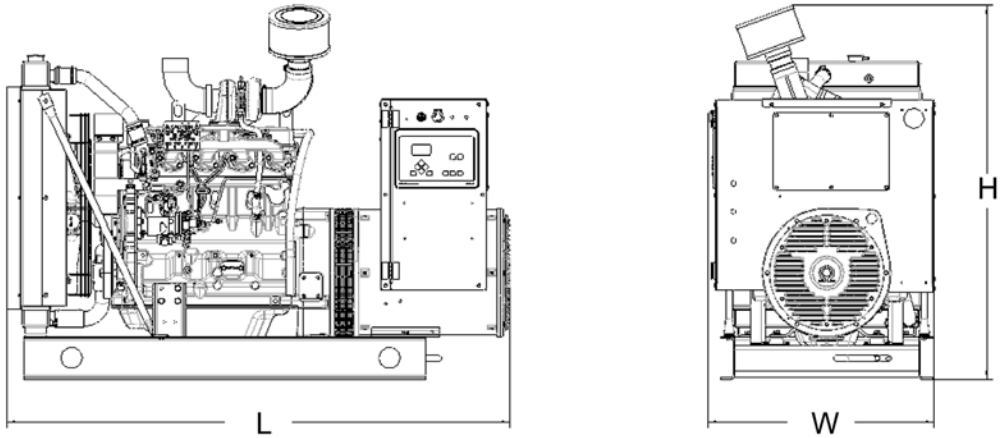
Aspirating: *m^3/min (SCFM)	4.5 (159)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	117 (4,088)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	25 (867)

* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

Gas temperature (stack): °C (°F)	537 (999)
Gas volume at stack temperature: m^3/min (CFM)	12.7 (448)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	7.5 (30)
Minimum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	N/A

Weights and dimensions



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System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	1,781 x 800 x 1,321 mm (70.1 x 31.5 x 52 in)	943-1,404 kg (2,078-3,095 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load
Level 0 (OPU): dB(A)	80.5

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
3.3	N/A	0.12

All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards. 5-mode emission data per 40 CFR 89 or 40 CFR 1039 (as applicable) is available upon request.

Rating definitions and conditions

- Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

N/A = Not Available

Diesel Generator Set

mtu 4R0113 DS50

50 kWe/60 Hz/Standby/208 - 600V
Reference *mtu* 4R0113 DS50 (45 kWe) for Prime Power for Stationary Emergency Rating Technical Data

System ratings

Voltage (L-L)	240V †	240V †	208V †	240V †	380V †	480V †	600V
Phase	1	1	3	3	3	3	3
PF	1	1	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60	60
kW	50	50	50	50	50	50	50
kVA	50	50	62	62	62	62	62
Amps	208	208	173	150	95	75	60
skVA@30% voltage dip	127	130	129	129	112	172	138
Generator model	362CSL1604	361CSL1613	361CSL1601	361CSL1601	361CSL1601	361CSL1601	361PSL1633
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	12 LEAD DOUBLE DELTA	4 LEAD	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 3 certified
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality, and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110

A Rolls-Royce solution

Standard features *

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 4045TF280 diesel engine
  - 4.5 liter displacement
  - Mechanical injection pump
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with optional Permanent Magnet Generator (PMG)
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment *

Engine

- Air cleaner
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Fuel filter with water seperator
- Jacket water pump
- Thermostat
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 12V
- Governor - mechanical droop
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 12V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Self-ventilated and drip-proof
- Superior voltage waveform
- Solid state, volts-per-hertz regulator
- ± 1% voltage regulation no load to full load
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	John Deere
Model	4045TF280
Type	4-cycle
Arrangement	4-inline
Displacement: L (in^3)	4.5 (275)
Bore: cm (in)	10.6 (4.19)
Stroke: cm (in)	12.7 (5)
Compression ratio	19:1
Rated rpm	1,800
Engine governor	mechanical droop
Maximum power: kWm (bhp)	63 (85)
Steady state frequency band	± 0.5%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	13 (3.4)
Engine jacket water capacity: L (gal)	8.5 (2.3)
System coolant capacity: L (gal)	18.9 (5)

Electrical

Electric volts DC	12
Cold cranking amps under -17.8 °C (0 °F)	925
Batteries: group size	31
Batteries: quantity	1

Fuel system

Fuel supply connection size	3/8” NPT
Fuel return connection size	3/8” NPT
Maximum fuel lift: m (ft)	1.8 (6)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	62.5 (16.5)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	17.4 (4.6)
At 75% of power rating: L/hr (gal/hr)	13.6 (3.6)
At 50% of power rating: L/hr (gal/hr)	9.5 (2.5)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.12 (0.5)
Water pump capacity: L/min (gpm)	144 (38)
Heat rejection to coolant: kW (BTUM)	36 (2,049)
Heat radiated to ambient: kW (BTUM)	8.7 (495)
Fan power: kW (hp)	1.6 (2.2)

Air requirements

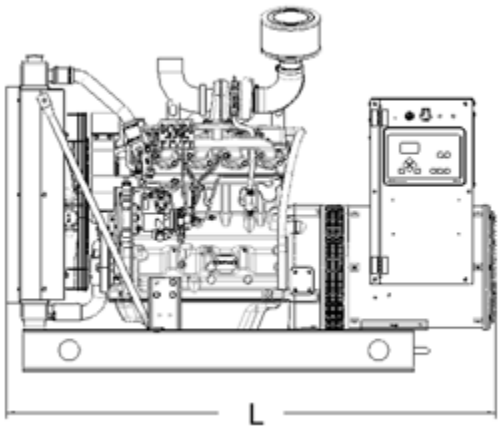
Aspirating: *m^3/min (SCFM)	5.3 (187)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	117 (4,088)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	32 (1,117)

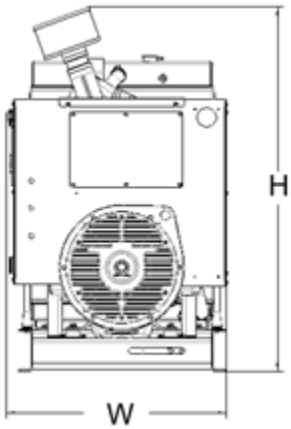
* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

Gas temperature (stack): °C (°F)	579 (1,074)
Gas volume at stack temperature: m^3/min (CFM)	19.2 (679)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	7.5 (30)
Minimum allowable back pressure: kPa (in H_20)	N/A

Weights and dimensions





Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	1,781 x 800 x 1,321 mm (70.1 x 31.5 x 52 in)	943-1,404 kg (2,078-3,095 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load
Level 0 (OPU): dB(A)	80.5

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
3.8	0.69	0.22

All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards. 5-mode emission data per 40 CFR 89 or 40 CFR 1039 (as applicable) is available upon request.

Rating definitions and conditions

- Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 3046-1, BS 5514, and AS 2789. Average loadfactor: ≤ 85%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 4R0113 DS50

50 kWe/60 Hz/Standby (SCAQMD)/208 - 600V
Reference *mtu* 4R0113 DS50 (45 kWe SCAQMD) for Prime Power for Stationary Emergency Rating Technical Data

System ratings

Voltage (L-L)	240V †	240V †	208V †	240V †	380V †	480V †	600V
Phase	1	1	3	3	3	3	3
PF	1	1	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60	60
kW	50	50	50	50	50	50	50
kVA	50	50	62	62	62	62	62
Amps	208	208	173	150	95	75	60
skVA@30% voltage dip	127	130	129	129	112	172	138
Generator model	362CSL1604	361CSL1613	361CSL1601	361CSL1601	361CSL1601	361CSL1601	361PSL1633
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	12 LEAD DOUBLE DELTA	4 LEAD	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 3 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 4045TF290J diesel engine
  - 4.5 liter displacement
  - Mechanical injection pump
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with optional Permanent Magnet Generator (PMG)
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaner
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Fuel filter with water seperator
- Jacket water pump
- Thermostat
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 12V
- Governor - mechanical droop
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 12V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Self-ventilated and drip-proof
- Superior voltage waveform
- Solid state, volts-per-hertz regulator
- ± 1% voltage regulation no load to full load
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	John Deere
Model	4045TF290J
Type	4-cycle
Arrangement	4-inline
Displacement: L (in^3)	4.5 (275)
Bore: cm (in)	10.6 (4.19)
Stroke: cm (in)	12.7 (5)
Compression ratio	19:1
Rated rpm	1,800
Engine governor	mechanical droop
Maximum power: kWm (bhp)	55 (74)
Steady state frequency band	± 0.5%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	13 (3.4)
Engine jacket water capacity: L (gal)	8.5 (2.3)
System coolant capacity: L (gal)	18.9 (5)

Electrical

Electric volts DC	12
Cold cranking amps under -17.8 °C (0 °F)	925
Batteries: group size	31
Batteries: quantity	1

Fuel system

Fuel supply connection size	3/8” NPT
Fuel return connection size	3/8” NPT
Maximum fuel lift: m (ft)	1.8 (6)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	112.8 (29.8)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	15.8 (4.2)
At 75% of power rating: L/hr (gal/hr)	12.3 (3.3)
At 50% of power rating: L/hr (gal/hr)	8.1 (2.1)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H20)	0.12 (0.5)
Water pump capacity: L/min (gpm)	144 (38)
Heat rejection to coolant: kW (BTUM)	31 (1,765)
Heat radiated to ambient: kW (BTUM)	6.8 (384)
Fan power: kW (hp)	1.6 (2.2)

Air requirements

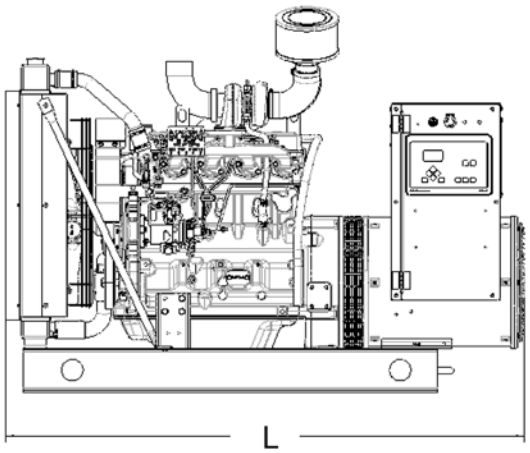
Aspirating: *m^3/min (SCFM)	4.5 (159)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	117 (4,088)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	25 (867)

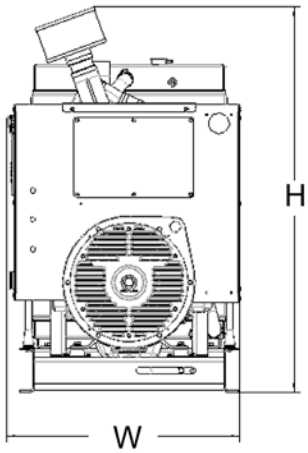
* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

Gas temperature (stack): °C (°F)	537 (999)
Gas volume at stack temperature: m^3/min (CFM)	12.7 (448)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	7.5 (30)
Minimum allowable back pressure: kPa (in. H_20)	N/A

Weights and dimensions





Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	1,781 x 800 x 1,321 mm (70.1 x 31.5 x 52 in)	943 - 1,404 kg (2,078-3,095 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load
Level 0 (OPU): dB(A)	80.5

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
3.3	N/A	0.12

All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards. 5-mode emission data per 40 CFR 89 or 40 CFR 1039 (as applicable) is available upon request.

Rating definitions and conditions

- Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

N/A = Not Available

Diesel Generator Set

mtu 4R0113 DS60

60 kWe/60 Hz/Standby/208 - 600V
Reference *mtu* 4R0113 DS60 (55 kWe) for Prime Power for Stationary Emergency Rating Technical Data

System ratings

Voltage (L-L)	240V †	240V †	208V †	240V †	380V †	480V †	600V
Phase	1	1	3	3	3	3	3
PF	1	1	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60	60
kW	60	60	60	60	60	60	60
kVA	60	60	75	75	75	75	75
Amps	250	250	208	180	114	90	72
skVA@30% voltage dip	127	130	200	200	172	172	172
Generator model	362CSL1604	361CSL1613	361CSL1602	361CSL1602	361CSL1602	361CSL1601	361PSL1633
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	12 LEAD DOUBLE DELTA	4 LEAD	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 3 certified
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
- UL 2200 – optional (refer to *System ratings* for availability)
- CSA – optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality, and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 4045HF280 diesel engine
  - 4.5 liter displacement
  - Mechanical injection pump
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with optional Permanent Magnet Generator (PMG)
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaner
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Fuel filter with water seperator
- Jacket water pump
- Thermostat
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 12V
- Governor - mechanical droop
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 12V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Self-ventilated and drip-proof
- Superior voltage waveform
- Solid state, volts-per-hertz regulator
- ± 1% voltage regulation no load to full load
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	John Deere
Model	4045HF280
Type	4-cycle
Arrangement	4-inline
Displacement: L (in^3)	4.5 (275)
Bore: cm (in)	10.6 (4.19)
Stroke: cm (in)	12.7 (5)
Compression ratio	19:1
Rated rpm	1,800
Engine governor	mechanical droop
Maximum power: kWm (bhp)	74 (99)
Steady state frequency band	± 0.5%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	13 (3.4)
Engine jacket water capacity: L (gal)	8.5 (2.3)
System coolant capacity: L (gal)	16.7 (4.4)

Electrical

Electric volts DC	12
Cold cranking amps under -17.8 °C (0 °F)	925
Batteries: group size	31
Batteries: quantity	1

Fuel system

Fuel supply connection size	3/8” NPT
Fuel return connection size	3/8” NPT
Maximum fuel lift: m (ft)	1.8 (6)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	113 (29.9)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	19.3 (5.1)
At 75% of power rating: L/hr (gal/hr)	14.8 (3.9)
At 50% of power rating: L/hr (gal/hr)	10.6 (2.8)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.12 (0.5)
Water pump capacity: L/min (gpm)	144 (38)
Heat rejection to coolant: kW (BTUM)	35 (1,979)
Heat rejection to air to air: kW (BTUM)	5 (278)
Heat radiated to ambient: kW (BTUM)	10.9 (619)
Fan power: kW (hp)	1.16 (1.55)

Air requirements

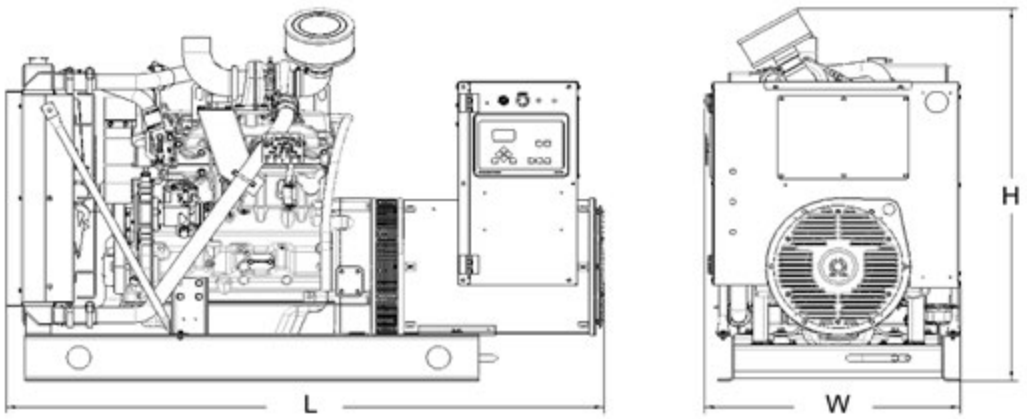
Aspirating: *m^3/min (SCFM)	5.4 (191)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	91 (3,162)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	40 (1,396)

* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

Gas temperature (stack): °C (°F)	545 (1,013)
Gas volume at stack temperature: m^3/min (CFM)	14.4 (508)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	7.5 (30)
Minimum allowable back pressure: kPa (in H_20)	N/A

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	1,873 x 800 x 1,232 mm (73.8 x 31.5 x 48.5 in)	943-1,404 kg (2,078-3,095 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load
Level 0 (OPU): dB(A)	77

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
3.5	0.97	0.32

All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards. 5-mode emission data per 40 CFR 89 or 40 CFR 1039 (as applicable) is available upon request.

Rating definitions and conditions

- Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 4R0113 DS80

80 kWe/60 Hz/Standby/208 - 600V

Reference *mtu* 4R0113 DS80 (80 kWe) for Prime Power for Stationary Emergency Rating Technical Data

System ratings

Voltage (L-L)	240V †	240V †	208V †	240V †	480V †	600V
Phase	1	1	3	3	3	3
PF	1	1	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60
kW	80	80	80	80	80	80
kVA	80	80	100	100	100	100
Amps	333	333	278	241	120	96
skVA@30% voltage dip	157	310	216	216	288	235
Generator model	363CSL1607	363CSL1617	362CSL1604	362CSL1604	362CSL1604	362PSL1635
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	12 LEAD DOUBLE DELTA	4 LEAD	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 3 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 4045HF285 diesel engine
  - 4.5 liter displacement
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with optional Permanent Magnet Generator (PMG)
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Fuel filter with water seperator
- Jacket water pump
- Thermostat
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 12V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 12V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Self-ventilated and drip-proof
- Superior voltage waveform
- Solid state, volts-per-hertz regulator
- ± 1% voltage regulation no load to full load
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- SAE J1939 Engine ECU Communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	John Deere
Model	4045HF285
Type	4-cycle
Arrangement	4-inline
Displacement: L (in^3)	4.5 (275)
Bore: cm (in)	10.6 (4.19)
Stroke: cm (in)	12.7 (5)
Compression ratio	19:1
Rated speed: rpm	1,800
Engine governor	JDEC
Maximum power: kWm (bhp)	118 (158)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	12 (3.2)
Engine jacket water capacity: L (gal)	12.5 (3.3)
System coolant capacity: L (gal)	20.1 (5.3)

Electrical

Electric volts DC	12
Cold cranking amps under -17.8 °C (0 °F)	925
Batteries: group size	31
Batteries: quantity	1

Fuel system

Fuel supply connection size	-6 JIC 37° female
Fuel return connection size	-6 JIC 37° female
Maximum fuel lift: m (ft)	2 (6.7)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	74.6 (19.7)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	23.1 (6.1)
At 75% of power rating: L/hr (gal/hr)	18.5 (4.9)
At 50% of power rating: L/hr (gal/hr)	13.2 (3.5)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.12 (0.5)
Water pump capacity: L/min (gpm)	180 (48)
Heat rejection to coolant: kW (BTUM)	56 (3,190)
Heat rejection to air to air: kW (BTUM)	17.6 (1,002)
Heat radiated to ambient: kW (BTUM)	10.5 (596)
Fan power: kW (hp)	6.5 (8.7)

Air requirements

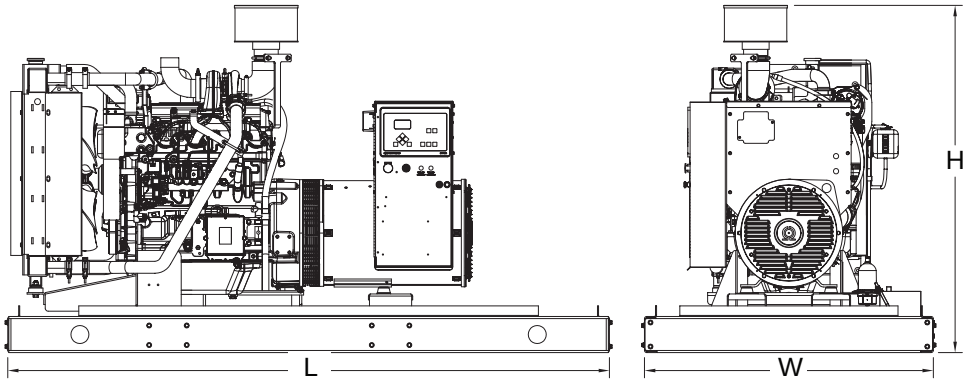
Aspirating: *m^3/min (SCFM)	7.7 (273)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	187 (6,587)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	38 (1,343)

* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

Gas temperature (stack): °C (°F)	560 (1,040)
Gas volume at stack temperature: m^3/min (CFM)	21.2 (750)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	7.5 (30)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	2,540 x 1,219 x 1,467 mm (100 x 48 x 57.8 in)	1,196-1,839 kg (2,637-4,054 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load
Level 0 (OPU): dB(A)	83.6

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
3.97	0.72	0.08

All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards. 5-mode emission data per 40 CFR 89 or 40 CFR 1039 (as applicable) is available upon request.

Rating definitions and conditions

- Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 3046-1, BS 5514, and AS 2789. Average loadfactor: ≤ 85%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 4R0120 DS80

80 kWe / 60 Hz / Standby/208 - 600V
Reference *mtu* 4R0120 DS80 (72 kWe) for Prime Rating Technical Data

System ratings

Voltage (L-L)	240V †	240V †	208V †	240V †	380V †	480V †	600V
Phase	1	1	3	3	3	3	3
PF	1	1	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60	60
kW	80	80	80	80	80	80	80
kVA	80	80	100	100	100	100	100
Amps	333	333	278	241	151	120	96
skVA@30% voltage dip	145	311	216	216	165	288	236
Generator model	363CSL1607	363CSL1617	362CSL1604	362CSL1604	362CSL1606	362CSL1604	362PSL1635
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	12 LEAD DOUBLE DELTA	4 LEAD	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 3 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- Power rating
  - Accepts rated load in one step per NFPA 110
- UL 2200 – optional (refer to *System ratings* for availability)
- CSA – optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- CE marking provided
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- OM924LA diesel engine
  - 4.8 liter displacement
  - 4-cycle
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with optional Permanent Magnet Generator (PMG)
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Fuel filter with water separator
- Jacket water pump
- Thermostat
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 12V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 12V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Self-ventilated and drip-proof
- Superior voltage waveform
- Solid state, volts-per-hertz regulator
- ± 1% voltage regulation no load to full load
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- SAE J1939 engine ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	Mercedes-Benz
Model	OM924LA
Type	4-cycle
Arrangement	4-inline
Displacement: L (in³)	4.8 (293)
Bore: cm (in)	10.6 (4.17)
Stroke: cm (in)	13.6 (5.35)
Compression ratio	17.5:1
Rated rpm	1,800
Engine governor	MR2 / CPC4-ECAN
Maximum power: kWm (bhp)	147 (197)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	15.8 (4.2)
Engine jacket water capacity: L (gal)	7 (1.8)
System coolant capacity: L (gal)	20.8 (5.5)

Electrical

Electric volts DC	12
Cold cranking amps under -17.8 °C (0 °F)	950
Batteries: group size	31
Batteries: quantity	1

Fuel system

Fuel supply connection size	-6 JIC
Fuel supply hose size	3/8” ID
Fuel return connection size	-6 JIC
Fuel return hose size	3/8” ID
Maximum fuel lift: m (ft)	2.7 (9)
Recommended fuel	diesel #2
Total fuel flow: L/hr (gal/hr)	328.2 (86.7)

Fuel consumption*

At 100% of power rating: L/hr (gal/hr)	23.1 (6.1)
At 75% of power rating: L/hr (gal/hr)	17.9 (4.7)
At 50% of power rating: L/hr (gal/hr)	12.6 (3.3)

* Based on 362CSL1604 480 volt generator set

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.12 (0.5)
Water pump capacity: L/min (gpm)	143 (37)
Heat rejection to coolant: kW (BTUM)	37.5 (2,133)
Heat rejection to air to air: kW (BTUM)	23.6 (1,342)
Heat radiated to ambient: kW (BTUM)	24.8 (1,410)
Fan power: kW (hp)	3.3 (4.4)

Air requirements

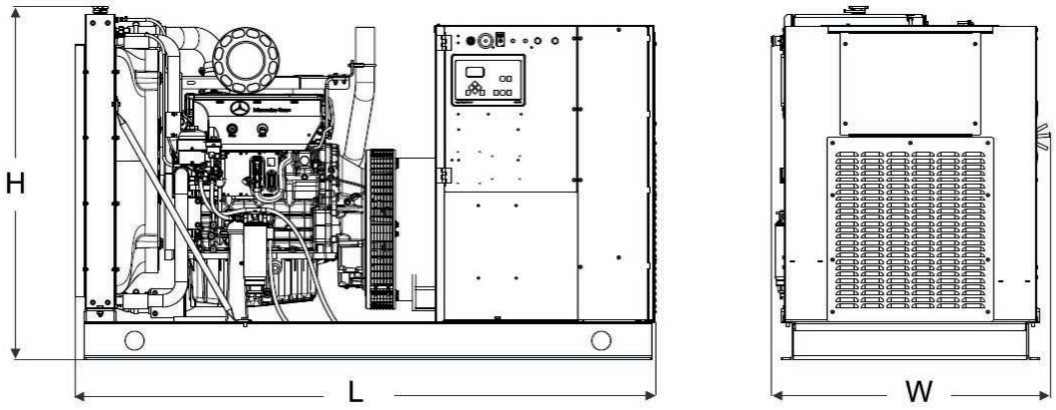
Aspirating: *m³/min (SCFM)	8.6 (304)
Air flow required for radiator cooled unit: *m³/min (SCFM)	209 (7,381)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m³/min (SCFM)	90.7 (3,203)

* Air density = 1.184 kg/m³ (0.0739 lbm/ft³)

Exhaust system

Gas temperature (stack): °C (°F)	354 (669)
Gas volume at stack temperature: m³/min (CFM)	21.6 (763)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	6.5 (26)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	2,336 x 1,121 x 1,422 mm (92 x 44.1 x 56 in)	1,216-1,830 kg (2,682-4,034 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load
Level 0 (OPU): dB(A)	83

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
3.61	1.42	0.08

— All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

— Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 3046-1, BS 5514, and AS 2789. Average loadfactor: ≤ 85%.
— Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
— Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 4R0113 DS100

100 kWe/60 Hz/Standby/208 - 600V
Reference *mtu* 4R0113 DS100 (90 kWe) for Prime Power for Stationary Emergency Rating Technical Data

System ratings

Voltage (L-L)	240V †	240V †	208V †	240V †	480V †	600V
Phase	1	1	3	3	3	3
PF	1	1	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60
kW	100	100	100	100	100	100
kVA	100	100	125	125	125	125
Amps	417	417	347	301	150	120
skVA@30% voltage dip	136	311	258	258	344	270
Generator model	431CSL6204	363CSL1617	362CSL1606	362CSL1606	362CSL1606	362PSL1636
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	12 LEAD DOUBLE DELTA	4 LEAD	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 3 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 4045HF285 diesel engine
  - 4.5 liter displacement
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with optional Permanent Magnet Generator (PMG)
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaner
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Fuel filter with water seperator
- Jacket water pump
- Thermostat
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 12V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 12V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Self-ventilated and drip-proof
- Superior voltage waveform
- Solid state, volts-per-hertz regulator
- ± 1% voltage regulation no load to full load
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- SAE J1939 Engine ECU Communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	John Deere
Model	4045HF285
Type	4-cycle
Arrangement	4-inline
Displacement: L (in^3)	4.5 (275)
Bore: cm (in)	10.6 (4.19)
Stroke: cm (in)	12.7 (5)
Compression ratio	19:1
Rated rpm	1,800
Engine governor	JDEC
Maximum power: kWm (bhp)	118 (158)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	12 (3.2)
Engine jacket water capacity: L (gal)	12.5 (3.3)
System coolant capacity: L (gal)	20.1 (5.3)

Electrical

Electric volts DC	12
Cold cranking amps under -17.8 °C (0 °F)	925
Batteries: group size	31
Batteries: quantity	1

Fuel system

Fuel supply connection size	-6 JIC 37° female
Fuel return connection size	-6 JIC 37° female
Maximum fuel lift: m (ft)	2 (6.7)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	74.6 (19.7)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	31 (8.2)
At 75% of power rating: L/hr (gal/hr)	25 (6.6)
At 50% of power rating: L/hr (gal/hr)	17.8 (4.7)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.12 (0.5)
Water pump capacity: L/min (gpm)	180 (48)
Heat rejection to coolant: kW (BTUM)	62 (3,544)
Heat rejection to air to air: kW (BTUM)	19.8 (1,127)
Heat radiated to ambient: kW (BTUM)	16.2 (919)
Fan power: kW (hp)	6.5 (8.7)

Air requirements

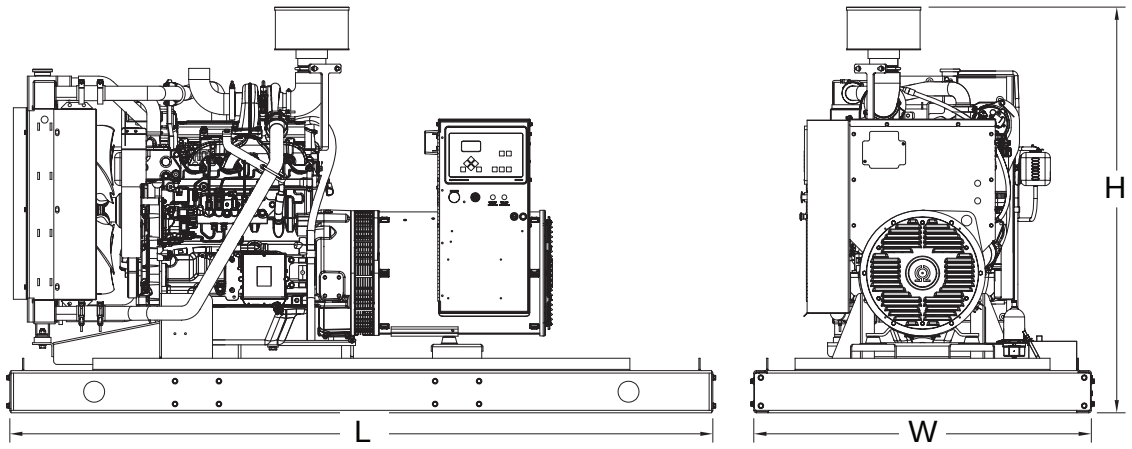
Aspirating: *m^3/min (SCFM)	8.2 (288)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	187 (6,587)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	59 (2,074)

* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

Gas temperature (stack): °C (°F)	580 (1,076)
Gas volume at stack temperature: m^3/min (CFM)	22.8 (805)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	7.5 (30)

Weights and dimensions



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System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	2,540 x 1,219 x 1,473 mm (100 x 48 x 58 in)	1,196-1,839 kg (2,637-4,054 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load
Level 0 (OPU): dB(A)	83.6

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
3.97	0.72	0.08

All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards. 5-mode emission data per 40 CFR 89 or 40 CFR 1039 (as applicable) is available upon request.

Rating definitions and conditions

- Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 3046-1, BS 5514, and AS 2789. Average loadfactor: ≤ 85%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 4R0120 DS100

100 kWe/60 Hz/Standby/208 - 600V
Reference ***mtu*** 4R0120 DS100 (90 kWe) for Prime Rating Technical Data

System ratings

Voltage (L-L)	240V †	240V †	208V †	240V †	380V †	480V †	600V
Phase	1	1	3	3	3	3	3
PF	1	1	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60	60
kW	100	100	100	100	100	100	100
kVA	100	100	125	125	125	125	125
Amps	417	417	347	301	190	150	120
skVA@30% voltage dip	107	311	258	258	268	344	272
Generator model	431CSL6202	363CSL1617	362CSL1606	362CSL1606	363CSL1607	362CSL1606	362PSL1636
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	12 LEAD DOUBLE DELTA	4 LEAD	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 3 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- Power rating
  - Accepts rated load in one step per NFPA 110
- UL 2200 – optional (refer to *System ratings* for availability)
- CSA – optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- CE marking provided
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- OM924LA diesel engine
  - 4.8 liter displacement
  - 4-cycle
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with optional Permanent Magnet Generator (PMG)
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaner
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Fuel filter with water separator
- Jacket water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 12V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 12V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Self-ventilated and drip-proof
- Superior voltage waveform
- Solid state, volts-per-hertz regulator
- ± 1% voltage regulation no load to full load
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- SAE J1939 Engine ECU Communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	Mercedes-Benz
Model	OM924LA
Type	4-cycle
Arrangement	4-inline
Displacement: L (in^3)	4.8 (293)
Bore: cm (in)	10.6 (4.17)
Stroke: cm (in)	13.6 (5.35)
Compression ratio	17.5:1
Rated rpm	1,800
Engine governor	MR2 / CPC4-ECAN
Maximum power: kWm (bhp)	147 (197)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	15.8 (4.2)
Engine jacket water capacity: L (gal)	7 (1.8)
System coolant capacity: L (gal)	20.8 (5.5)

Electrical

Electric volts DC	12
Cold cranking amps under -17.8 °C (0 °F)	950
Batteries: group size	31
Batteries: quantity	1

Fuel system

Fuel supply connection size	-6 JIC
Fuel supply hose size	3/8” ID
Fuel return connection size	-6 JIC
Fuel return hose size	3/8” ID
Maximum fuel lift: m (ft)	2.7 (9)
Recommended fuel	diesel #2
Total fuel flow: L/hr (gal/hr)	328.2 (86.7)

Fuel consumption*

At 100% of power rating: L/hr (gal/hr)	28.4 (7.5)
At 75% of power rating: L/hr (gal/hr)	21.3 (5.6)
At 50% of power rating: L/hr (gal/hr)	15.5 (4.1)

* Based on 362CSL1606 480 volt generator set

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.12 (0.5)
Water pump capacity: L/min (gpm)	143 (37)
Heat rejection to coolant: kW (BTUM)	46.3 (2,633)
Heat rejection to air to air: kW (BTUM)	26.9 (1,530)
Heat radiated to ambient: kW (BTUM)	27.1 (1,541)
Fan power: kW (hp)	3.3 (4.4)

Air requirements

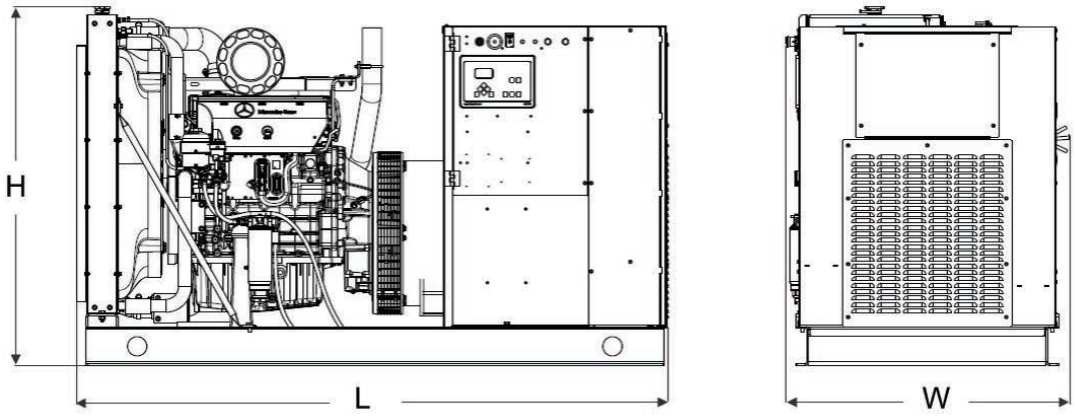
Aspirating: *m^3/min (SCFM)	9.1 (321)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	209 (7,381)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	99.1 (3,500)

* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

Gas temperature (stack): °C (°F)	404 (759)
Gas volume at stack temperature: m^3/min (CFM)	24.1 (851)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	6.5 (26)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	2,336 x 1,121 x 1,422 mm (92 x 44.1 x 56 in)	1,216-1,830 kg (2,682-4,034 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load
Level 0 (OPU): dB(A)	83

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
3.61	1.42	0.08

— All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

— Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 3046-1, BS 5514, and AS 2789. Average loadfactor: ≤ 85%.
— Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
— Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 4R0113 DS125

125 kWe/60 Hz/Standby/208 - 600V
Reference *mtu* 4R0113 DS125 (111 kWe) for Prime Power for Stationary Emergency Rating Technical Data

System ratings

Voltage (L-L)	240V †	240V †	208V †	240V †	480V †	600V
Phase	1	1	3	3	3	3
PF	1	1	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60
kW	125	125	125	125	125	125
kVA	125	125	156	156	156	156
Amps	521	521	434	376	188	150
skVA@30% voltage dip	187	192	323	323	430	333
Generator model	431PSL6206	431PSL6224	363CSL1607	363CSL1607	363CSL1607	363PSL1658
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	12 LEAD DOUBLE DELTA	4 LEAD	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 3 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 4045HF285 diesel engine
  - 4.58 liter displacement
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with optional Permanent Magnet Generator (PMG)
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Fuel filter with water seperator
- Jacket water pump
- Thermostat
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 12V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 12V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Self-ventilated and drip-proof
- Superior voltage waveform
- Solid state, volts-per-hertz regulator
- ± 1% voltage regulation no load to full load
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- SAE J1939 Engine ECU Communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	John Deere
Model	4045HF285
Type	4-cycle
Arrangement	4-inline
Displacement: L (in^3)	4.5 (275)
Bore: cm (in)	10.6 (4.19)
Stroke: cm (in)	12.7 (5)
Compression ratio	19:1
Rated rpm	1,800
Engine governor	JDEC
Maximum power: kWm (bhp)	147 (197)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	13 (3.4)
Engine jacket water capacity: L (gal)	8.5 (2.2)
System coolant capacity: L (gal)	24 (6.2)

Electrical

Electric volts DC	12
Cold cranking amps under -17.8 °C (0 °F)	925
Batteries: group size	31
Batteries: quantity	1

Fuel system

Fuel supply connection size	-6 JIC 37° female
Fuel return connection size	-6 JIC 37° female
Maximum fuel lift: m (ft)	2 (6.7)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	90.1 (23.8)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	37.3 (9.9)
At 75% of power rating: L/hr (gal/hr)	28.8 (7.6)
At 50% of power rating: L/hr (gal/hr)	19.3 (5.1)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.12 (0.5)
Water pump capacity: L/min (gpm)	180 (48)
Heat rejection to coolant: kW (BTUM)	72.1 (4,098)
Heat rejection to air to air: kW (BTUM)	26.5 (1,508)
Heat radiated to ambient: kW (BTUM)	19.9 (1,134)
Fan power: kW (hp)	10.6 (14.2)

Air requirements

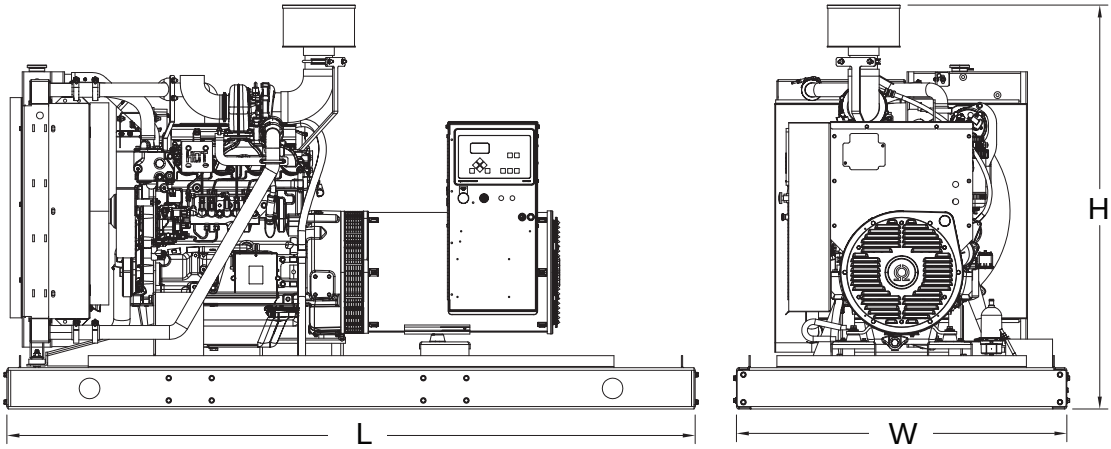
Aspirating: *m^3/min (SCFM)	9.7 (341)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	433 (15,303)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	71 (2,520)

* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

Gas temperature (stack): °C (°F)	580 (1,076)
Gas volume at stack temperature: m^3/min (CFM)	27 (953)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	7.5 (30)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	2,540 x 1,219 x 1,499 mm (100 x 48 x 59 in)	1,196-1,839 kg (2,637-4,054 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load
Level 0 (OPU): dB(A)	86.8

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
5.02	0.16	0.01

All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards. 5-mode emission data per 40 CFR 89 or 40 CFR 1039 (as applicable) is available upon request.

Rating definitions and conditions

- Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 3046-1, BS 5514, and AS 2789. Average loadfactor: ≤ 85%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 4R0120 DS125

125 kWe/60 Hz/Standby/208 - 600V

Reference *mtu* 4R0120 DS125 (111 kWe) for Prime Rating Technical Data

System ratings

Voltage (L-L)	240V †	240V †	208V †	240V †	380V †	480V †	600V
Phase	1	1	3	3	3	3	3
PF	1	1	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60	60
kW	125	125	125	125	125	125	125
kVA	125	125	156	156	156	156	156
Amps	521	521	434	376	237	188	150
skVA@30% voltage dip	184	196	323	323	191	430	334
Generator model	431PSL6208	431PSL6224	363CSL1607	363CSL1607	431CSL6202	363CSL1607	363PSL1658
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	12 LEAD DOUBLE DELTA	4 LEAD	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 3 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- Power rating
  - Accepts rated load in one step per NFPA 110
- UL 2200 – optional (refer to *System ratings* for availability)
- CSA – optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- CE marking provided
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- OM924LA diesel engine
  - 4.8 liter displacement
  - 4-cycle
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with optional Permanent Magnet Generator (PMG)
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Fuel filter with water separator
- Jacket water pump
- Thermostat
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 12V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 12V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Self-ventilated and drip-proof
- Superior voltage waveform
- Solid state, volts-per-hertz regulator
- ± 1% voltage regulation no load to full load
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- SAE J1939 Engine ECU Communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	Mercedes-Benz
Model	OM924LA
Type	4-cycle
Arrangement	4-inline
Displacement: L (in³)	4.8 (293)
Bore: cm (in)	10.6 (4.17)
Stroke: cm (in)	13.6 (5.35)
Compression ratio	17.5:1
Rated rpm	1,800
Engine governor	MR2 / CPC4-ECAN
Maximum power: kWm (bhp)	147 (197)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	15.8 (4.2)
Engine jacket water capacity: L (gal)	7 (1.8)
System coolant capacity: L (gal)	20.8 (5.5)

Electrical

Electric volts DC	12
Cold cranking amps under -17.8 °C (0 °F)	950
Batteries: group size	31
Batteries: quantity	1

Fuel system

Fuel supply connection size	-6 JIC
Fuel supply hose size	3/8” ID
Fuel return connection size	-6 JIC
Fuel return hose size	3/8” ID
Maximum fuel lift: m (ft)	2.7 (9)
Recommended fuel	diesel #2
Total fuel flow: L/hr (gal/hr)	328.2 (86.7)

Fuel consumption*

At 100% of power rating: L/hr (gal/hr)	34.4 (9.1)
At 75% of power rating: L/hr (gal/hr)	25.7 (6.8)
At 50% of power rating: L/hr (gal/hr)	18.2 (4.8)

* Based on 363CSL1607 480 volt generator set

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.12 (0.5)
Water pump capacity: L/min (gpm)	143 (37)
Heat rejection to coolant: kW (BTUM)	54 (3,071)
Heat rejection to air to air: kW (BTUM)	28.5 (1,621)
Heat radiated to ambient: kW (BTUM)	29.3 (1,666)
Fan power: kW (hp)	3.3 (4.4)

Air requirements

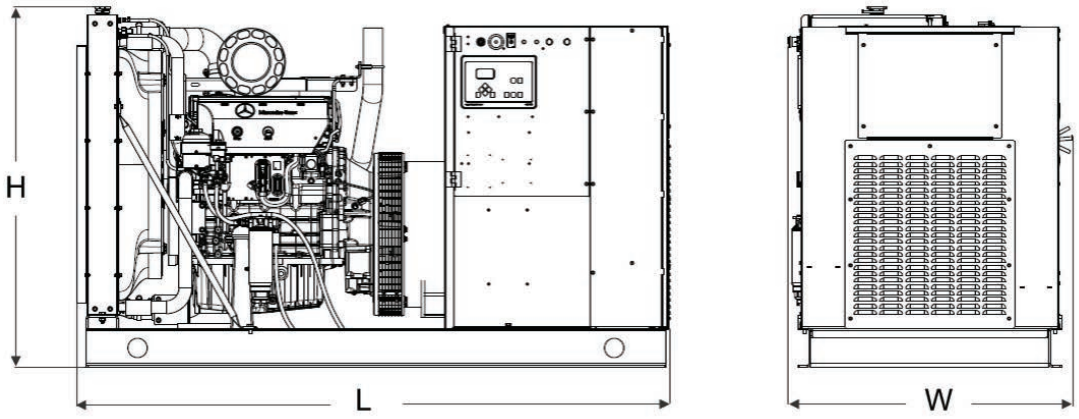
Aspirating: *m³/min (SCFM)	9.3 (328)
Air flow required for radiator cooled unit: *m³/min (SCFM)	209 (7,381)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m³/min (SCFM)	107 (3,779)

* Air density = 1.184 kg/m³ (0.0739 lbm/ft³)

Exhaust system

Gas temperature (stack): °C (°F)	470 (877)
Gas volume at stack temperature: m³/min (CFM)	26.3 (929)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	6.5 (26)

Weights and dimensions



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System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	2,336 x 1,121 x 1,422 mm (92 x 44.1 x 56 in)	1,216-1,830 kg (2,682-4,034 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load
Level 0 (OPU): dB(A)	83.1

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
3.61	1.42	0.08

- All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

- Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 3046-1, BS 5514, and AS 2789. Average loadfactor: ≤ 85%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 6R0113 DS150

150 kWe/60 Hz/Standby/208 - 600V

Reference *mtu* 6R0113 DS150 (135 kWe) for Prime Power for Stationary Emergency Rating Technical Data

System ratings

Voltage (L-L)	240V †	240V †	208V †	240V †	480V †	600V
Phase	1	1	3	3	3	3
PF	1	1	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60
kW	150	150	150	150	150	150
kVA	150	150	187	187	187	187
Amps	625	625	520	451	226	180
skVA@30% voltage dip	182	195	296	296	394	315
Generator model	431CSL6208	431PSL6224	431CSL6202	431CSL6202	431CSL6202	431PSL6240
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	12 LEAD DOUBLE DELTA	4 LEAD	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 3 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 6068HF285 diesel engine
  - 6.8 liter displacement
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with optional Permanent Magnet Generator (PMG)
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaner
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Fuel filter with water seperator
- Jacket water pump
- Thermostat
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 12V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 12V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Self-ventilated and drip-proof
- Superior voltage waveform
- Solid state, volts-per-hertz regulator
- ± 1% voltage regulation no load to full load
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- SAE J1939 Engine ECU Communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	John Deere
Model	6068HF285
Type	4-cycle
Arrangement	6-inline
Displacement: L (in^3)	6.8 (415)
Bore: cm (in)	10.6 (4.19)
Stroke: cm (in)	12.7 (5)
Compression ratio	19:1
Rated rpm	1,800
Engine governor	JDEC
Maximum power: kWm (bhp)	177 (237)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	20 (5.28)
Engine jacket water capacity: L (gal)	12.3 (3.25)
System coolant capacity: L (gal)	22.7 (6)

Electrical

Electric volts DC	12
Cold cranking amps under -17.8 °C (0 °F)	925
Batteries: group size	4D
Batteries: quantity	1

Fuel system

Fuel supply connection size	-6 JIC 37° female
Fuel return connection size	-6 JIC 37° female
Maximum fuel lift: m (ft)	2 (6.7)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	107.2 (28.3)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	44.7 (11.8)
At 75% of power rating: L/hr (gal/hr)	34.8 (9.2)
At 50% of power rating: L/hr (gal/hr)	25.4 (6.7)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.12 (0.5)
Water pump capacity: L/min (gpm)	180 (48)
Heat rejection to coolant: kW (BTUM)	93.5 (5,324)
Heat rejection to air to air: kW (BTUM)	32 (1,821)
Heat radiated to ambient: kW (BTUM)	25.7 (1,461)
Fan power: kW (hp)	10.7 (14.3)

Air requirements

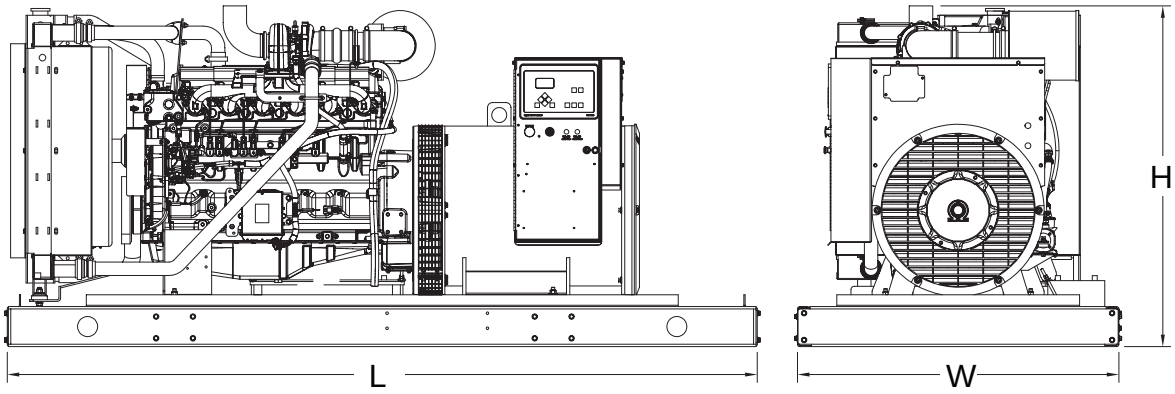
Aspirating: *m^3/min (SCFM)	13.6 (480)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	304 (10,732)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	94 (3,295)

* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

Gas temperature (stack): °C (°F)	505 (941)
Gas volume at stack temperature: m^3/min (CFM)	34 (1,201)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	7.5 (30)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	2,845 x 1,219 x 1,283 mm (112 x 48 x 50.5 in)	1,573-2,262 kg (3,496-4,986 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load
Level 0 (OPU): dB(A)	85.1

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
3.77	0.4	0.06

All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards. 5-mode emission data per 40 CFR 89 or 40 CFR 1039 (as applicable) is available upon request.

Rating definitions and conditions

- Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 6R0120 DS150

150 kWe/60 Hz/Standby/208 - 600V

Reference *mtu* 6R0120 DS150 (135 kWe) for Prime Rating Technical Data

System ratings

Voltage (L-L)	240V †	240V †	208V †	240V †	380V †	480V †	600V
Phase	1	1	3	3	3	3	3
PF	1	1	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60	60
kW	150	150	150	150	150	150	150
kVA	150	150	187	187	187	187	187
Amps	625	625	520	451	285	226	180
skVA@30% voltage dip	188	196	296	296	282	394	316
Generator model	431CSL6206	431PSL6224	431CSL6202	431CSL6202	431CSL6204	431CSL6202	431PSL6240
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	12 LEAD DOUBLE DELTA	4 LEAD	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 3 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- Power rating
  - Accepts rated load in one step per NFPA 110
- UL 2200 – optional (refer to *System ratings* for availability)
- CSA – optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- CE marking provided
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- OM926LA diesel engine
  - 7.2 liter displacement
  - 4-cycle
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with optional Permanent Magnet Generator (PMG)
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaner
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Fuel filter with water separator
- Jacket water pump
- Thermostat
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 12V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 12V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Self-ventilated and drip-proof
- Superior voltage waveform
- Solid state, volts-per-hertz regulator
- ± 1% voltage regulation no load to full load
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- SAE J1939 Engine ECU Communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	Mercedes-Benz
Model	OM926LA
Type	4-cycle
Arrangement	6-inline
Displacement: L (in^3)	7.2 (439)
Bore: cm (in)	10.6 (4.17)
Stroke: cm (in)	13.6 (5.35)
Compression ratio	17.5:1
Rated rpm	1,800
Engine governor	MR2 / CPC4-ECAN
Maximum power: kWm (bhp)	247 (331)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	29 (7.7)
Engine jacket water capacity: L (gal)	10 (2.6)
System coolant capacity: L (gal)	24.1 (6.4)

Electrical

Electric volts DC	12
Cold cranking amps under -17.8 °C (0 °F)	950
Batteries: group size	31
Batteries: quantity	1

Fuel system

Fuel supply connection size	-6 JIC
Fuel supply hose size	3/8” ID
Fuel return connection size	-6 JIC
Fuel return hose size	3/8” ID
Maximum fuel lift: m (ft)	2.6 (8.5)
Recommended fuel	diesel #2
Total fuel flow: L/hr (gal/hr)	330.5 (87.3)

Fuel consumption*

At 100% of power rating: L/hr (gal/hr)	40.5 (10.7)
At 75% of power rating: L/hr (gal/hr)	30 (7.9)
At 50% of power rating: L/hr (gal/hr)	20.4 (5.4)

* Based on 431CSL6202 480 volt generator set

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.12 (0.5)
Water pump capacity: L/min (gpm)	143 (37)
Heat rejection to coolant: kW (BTUM)	77.8 (4,424)
Heat rejection to air to air: kW (BTUM)	50.8 (2,889)
Heat radiated to ambient: kW (BTUM)	29.4 (1,672)
Fan power: kW (hp)	15.6 (22.1)

Air requirements

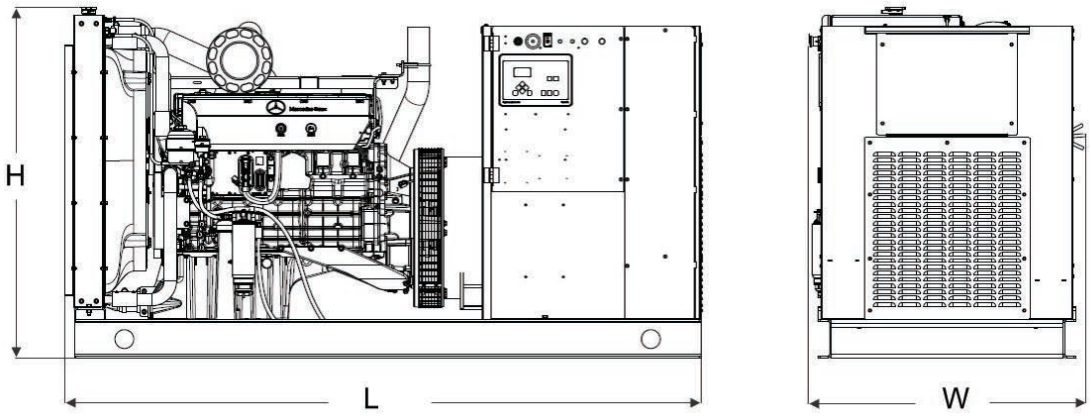
Aspirating: *m^3/min (SCFM)	13.4 (473)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	408 (14,408)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	107 (3,779)

* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

Gas temperature (stack): °C (°F)	434 (813)
Gas volume at stack temperature: m^3/min (CFM)	39.1 (1,381)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	10.5 (42)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	2,580 x 1,121 x 1,422 mm (101.6 x 44.1 x 56 in)	1,632-2,120 kg (3,598-4,674 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load
Level 0 (OPU): dB(A)	88.7

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
3.93	1.2	0.06

— All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

— Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 3046-1, BS 5514, and AS 2789. Average loadfactor: ≤ 85%.
— Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
— Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 6R0113 DS180

180 kWe/60 Hz/Standby/208 - 600V

Reference *mtu* 6R0113 DS180 (180 kWe) for Prime Power for Stationary Emergency Rating Technical Data

System ratings

Voltage (L-L)	240V †	240V †	208V †	240V †	480V †	600V
Phase	1	1	3	3	3	3
PF	1	1	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60
kW	180	180	180	180	180	180
kVA	180	180	225	225	225	225
Amps	750	750	625	541	271	217
skVA@30% voltage dip	267	370	433	433	451	510
Generator model	432CSL6210	432PSL6228	431CSL6206	431CSL6206	431CSL6204	431PSL6243
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	12 LEAD DOUBLE DELTA	4 LEAD	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 3 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110

A Rolls-Royce solution

Standard features *

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 6068HFG285 diesel engine
  - 6.8 liter displacement
  - Electronic unit pump injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with optional Permanent Magnet Generator (PMG)
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment *

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Fuel filter with water seperator
- Jacket water pump
- Thermostat
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 12V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 12V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Self-ventilated and drip-proof
- Superior voltage waveform
- Solid state, volts-per-hertz regulator
- ± 1% voltage regulation no load to full load
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- SAE J1939 Engine ECU Communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	John Deere
Model	6068HFG85
Type	4-cycle
Arrangement	6-inline
Displacement: L (in^3)	6.8 (415)
Bore: cm (in)	10.6 (4.2)
Stroke: cm (in)	12.7 (5)
Compression ratio	17:1
Rated rpm	1,800
Engine governor	JDEC
Maximum power: kWm (bhp)	235 (315)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	32.2 (8.5)
Engine jacket water capacity: L (gal)	11.9 (3.3)
System coolant capacity: L (gal)	29.3 (7.75)

Electrical

Electric volts DC	12
Cold cranking amps under -17.8 °C (0 °F)	925
Batteries: group size	4D
Batteries: quantity	1

Fuel system

Fuel supply connection size	-6 JIC 37° female
Fuel return connection size	-6 JIC 37° female
Maximum fuel lift: m (ft)	2 (6.7)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	93 (24.5)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	51.9 (13.5)
At 75% of power rating: L/hr (gal/hr)	40.5 (10.7)
At 50% of power rating: L/hr (gal/hr)	27.6 (7.3)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.12 (0.5)
Water pump capacity: L/min (gpm)	265 (70)
Heat rejection to coolant: kW (BTUM)	83.7 (4,766)
Heat rejection to air to air: kW (BTUM)	40 (2,298)
Heat radiated to ambient: kW (BTUM)	24.2 (1,378)
Fan power: kW (hp)	8.6 (11.5)

Air requirements

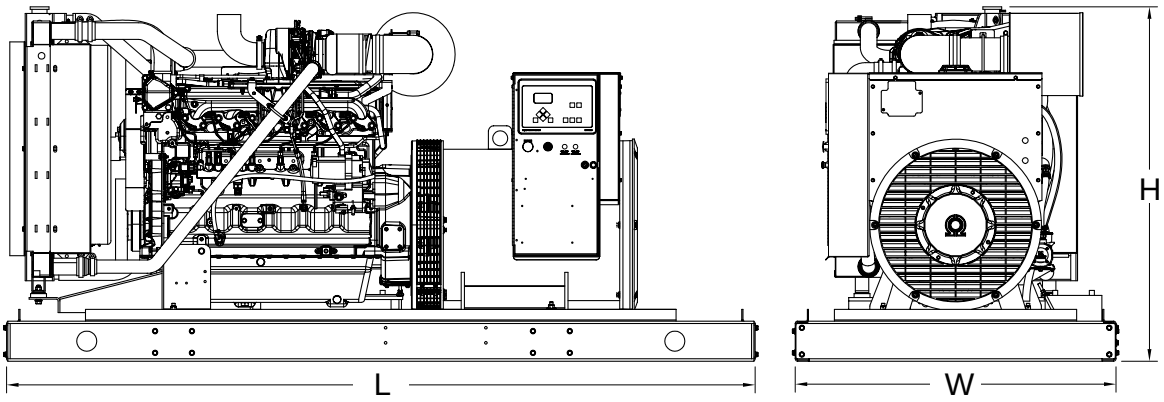
Aspirating: *m^3/min (SCFM)	14.7 (520)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	412 (14,537)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	89 (3,108)

* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

Gas temperature (stack): °C (°F)	528 (982)
Gas volume at stack temperature: m^3/min (CFM)	38.8 (1,371)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	10 (40)

Weights and dimensions



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System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	2,845 x 1,219 x 1,346 mm (112 x 48 x 53 in)	1,573-2,262 kg (3,496-4,986 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load
Level 0 (OPU): dB(A)	87.2

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
4.63	0.49	0.09

All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards. 5-mode emission data per 40 CFR 89 or 40 CFR 1039 (as applicable) is available upon request.

Rating definitions and conditions

- Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 6R0120 DS180

180 kWe/60 Hz/Standby/208 - 600V
Reference *mtu* 6R0120 DS180 (163 kWe) for Prime Rating Technical Data

System ratings

Voltage (L-L)	240V †	240V †	208V †	240V †	380V †	480V †	600V
Phase	1	1	3	3	3	3	3
PF	1	1	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60	60
kW	180	180	180	180	180	180	180
kVA	180	180	225	225	225	225	225
Amps	750	750	625	541	342	271	217
skVA@30% voltage dip	268	366	433	433	362	451	375
Generator model	432CSL6210	432PSL6228	431CSL6206	431CSL6206	431CSL6206	431CSL6204	431PSL6242
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	12 LEAD DOUBLE DELTA	4 LEAD	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 3 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- Power rating
  - Accepts rated load in one step per NFPA 110
- UL 2200 – optional (refer to *System ratings* for availability)
- CSA – optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- CE marking provided
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- OM926LA diesel engine
  - 7.2 liter displacement
  - 4-cycle
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with optional Permanent Magnet Generator (PMG)
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Fuel filter with water separator
- Jacket water pump
- Thermostat
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 12V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 12V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Self-ventilated and drip-proof
- Superior voltage waveform
- Solid state, volts-per-hertz regulator
- ± 1% voltage regulation no load to full load
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- SAE J1939 Engine ECU Communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	Mercedes-Benz
Model	OM926LA
Type	4-cycle
Arrangement	6-inline
Displacement: L (in^3)	7.2 (439)
Bore: cm (in)	10.6 (4.17)
Stroke: cm (in)	13.6 (5.35)
Compression ratio	17.5:1
Rated rpm	1,800
Engine governor	MR2 / CPC4-ECAN
Maximum power: kWm (bhp)	247 (331)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	29 (7.7)
Engine jacket water capacity: L (gal)	10 (2.6)
System coolant capacity: L (gal)	24.1 (6.4)

Electrical

Electric volts DC	12
Cold cranking amps under -17.8 °C (0 °F)	950
Batteries: group size	31
Batteries: quantity	1

Fuel system

Fuel supply connection size	-6 JIC
Fuel supply hose size	3/8” ID
Fuel return connection size	-6 JIC
Fuel return hose size	3/8” ID
Maximum fuel lift: m (ft)	2.6 (8.5)
Recommended fuel	diesel #2
Total fuel flow: L/hr (gal/hr)	330.5 (87.3)

Fuel consumption*

At 100% of power rating: L/hr (gal/hr)	50 (13.2)
At 75% of power rating: L/hr (gal/hr)	36 (9.5)
At 50% of power rating: L/hr (gal/hr)	23.9 (6.3)

* Based on 431CSL6204 480 volt generator set

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.12 (0.5)
Water pump capacity: L/min (gpm)	143 (37)
Heat rejection to coolant: kW (BTUM)	88.8 (5,430)
Heat rejection to air to air: kW (BTUM)	54 (3,071)
Heat radiated to ambient: kW (BTUM)	38.3 (2,178)
Fan power: kW (hp)	15.6 (22.1)

Air requirements

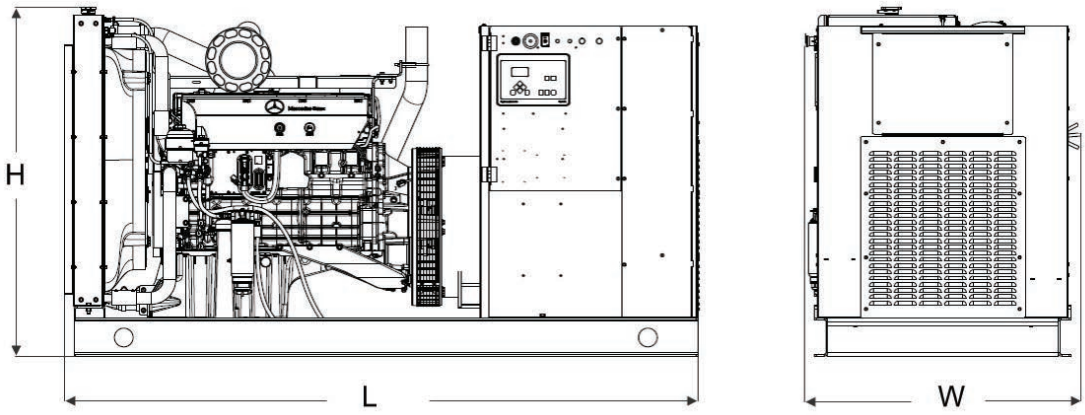
Aspirating: *m^3/min (SCFM)	14.3 (505)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	408 (14,408)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	139.9 (4,941)

* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

Gas temperature (stack): °C (°F)	491 (916)
Gas volume at stack temperature: m^3/min (CFM)	43 (1,519)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	10.5 (42)

Weights and dimensions



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System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	2,580 x 1,121 x 1,422 mm (101.6 x 44.1 x 56 in)	1,632-2,120 kg (3,598-4,674 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load
Level 0 (OPU): dB(A)	88.8

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
3.93	1.2	0.06

— All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

— Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 3046-1, BS 5514, and AS 2789. Average loadfactor: ≤ 85%.
— Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
— Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 6R0113 DS200

200 kWe/60 Hz/Standby/208 - 600V

System ratings

Voltage (L-L)	240V †	240V †	208V †	240V †	480V †	600V
Phase	1	1	3	3	3	3
PF	1	1	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60
kW	200	200	200	200	200	200
kVA	200	200	250	250	250	250
Amps	833	833	694	601	301	241
skVA@30% voltage dip	265	370	433	433	577	510
Generator model	432CSL6210	432PSL6228	431CSL6206	431CSL6206	431CSL6206	431PSL6243
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	12 LEAD DOUBLE DELTA	4 LEAD	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 3 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 6068HFG85 diesel engine
  - 6.8 liter displacement
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with optional Permanent Magnet Generator (PMG)
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Fuel filter with water seperator
- Jacket water pump
- Thermostat
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 12V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 12V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Self-ventilated and drip-proof
- Superior voltage waveform
- Solid state, volts-per-hertz regulator
- ± 1% voltage regulation no load to full load
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- SAE J1939 Engine ECU Communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	John Deere
Model	6068HFG85
Type	4-cycle
Arrangement	6-inline
Displacement: L (in^3)	6.8 (415)
Bore: cm (in)	10.6 (4.2)
Stroke: cm (in)	12.7 (5)
Compression ratio	17:1
Rated rpm	1,800
Engine governor	JDEC
Maximum power: kWm (bhp)	235 (315)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	32.2 (8.5)
Engine jacket water capacity: L (gal)	11.9 (3.3)
System coolant capacity: L (gal)	29.3 (7.75)

Electrical

Electric volts DC	12
Cold cranking amps under -17.8 °C (0 °F)	925
Batteries: group size	4D
Batteries: quantity	1

Fuel system

Fuel supply connection size	-6 JIC 37° female
Fuel return connection size	-6 JIC 37° female
Maximum fuel lift: m (ft)	2 (6.7)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	93 (24.5)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	58.6 (15.5)
At 75% of power rating: L/hr (gal/hr)	42.9 (11.3)
At 50% of power rating: L/hr (gal/hr)	30 (7.9)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.12 (0.5)
Water pump capacity: L/min (gpm)	265 (70)
Heat rejection to coolant: kW (BTUM)	94.9 (5,404)
Heat rejection to air to air: kW (BTUM)	57 (3,264)
Heat radiated to ambient: kW (BTUM)	30 (1,703)
Fan power: kW (hp)	8.6 (11.5)

Air requirements

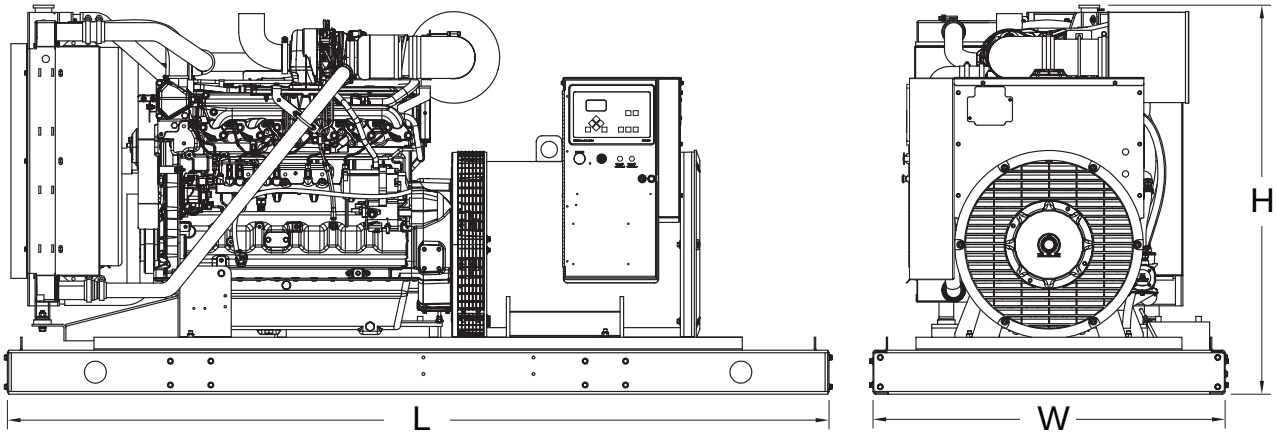
Aspirating: *m^3/min (SCFM)	17.5 (619)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	412 (14,537)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	109 (3,842)

* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

Gas temperature (stack): °C (°F)	485 (905)
Gas volume at stack temperature: m^3/min (CFM)	42.9 (1,514)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	10 (40)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	2,845 x 1,219 x 1,346 mm (112 x 48 x 53 in)	1,573-2,262 kg (3,496-4,986 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load
Level 0 (OPU): dB(A)	87.2

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
4.63	0.49	0.09

All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards. 5-mode emission data per 40 CFR 89 or 40 CFR 1039 (as applicable) is available upon request.

Rating definitions and conditions

- Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 6R0120 DS200

200 kWe/60 Hz/Standby/208 - 600V
Reference *mtu* 6R0120 DS200 (180 kWe) for Prime Rating Technical Data

System ratings

Voltage (L-L)	240V †	240V †	208V †	240V †	380V †	480V †	600V
Phase	1	1	3	3	3	3	3
PF	1	1	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60	60
kW	200	200	200	200	200	200	200
kVA	200	200	250	250	250	250	250
Amps	833	833	694	601	380	301	241
skVA@30% voltage dip	268	366	433	433	373	577	512
Generator model	432CSL6210	432PSL6228	431CSL6206	431CSL6206	431CSL6208	431CSL6206	431PSL6243
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	12 LEAD DOUBLE DELTA	4 LEAD	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 3 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- Power rating
  - Accepts rated load in one step per NFPA 110
- UL 2200 – optional (refer to *System ratings* for availability)
- CSA – optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- CE marking provided
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- OM926LA diesel engine
  - 7.2 liter displacement
  - 4-cycle
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with optional Permanent Magnet Generator (PMG)
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Fuel filter with water separator
- Jacket water pump
- Thermostat
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 12V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 12V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Self-ventilated and drip-proof
- Superior voltage waveform
- Solid state, volts-per-hertz regulator
- ± 1% voltage regulation no load to full load
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- SAE J1939 Engine ECU Communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	Mercedes-Benz
Model	OM926LA
Type	4-cycle
Arrangement	6-inline
Displacement: L (in³)	7.2 (439)
Bore: cm (in)	10.6 (4.17)
Stroke: cm (in)	13.6 (5.35)
Compression ratio	17.5:1
Rated rpm	1,800
Engine governor	MR2 / CPC4-ECAN
Maximum power: kWm (bhp)	247 (331)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	29 (7.7)
Engine jacket water capacity: L (gal)	10 (2.6)
System coolant capacity: L (gal)	24.1 (6.4)

Electrical

Electric volts DC	12
Cold cranking amps under -17.8 °C (0 °F)	950
Batteries: group size	31
Batteries: quantity	1

Fuel system

Fuel supply connection size	-6 JIC
Fuel supply hose size	3/8” ID
Fuel return connection size	-6 JIC
Fuel return hose size	3/8” ID
Maximum fuel lift: m (ft)	2.6 (8.5)
Recommended fuel	diesel #2
Total fuel flow: L/hr (gal/hr)	330.5 (87.3)

Fuel consumption*

At 100% of power rating: L/hr (gal/hr)	55.3 (14.6)
At 75% of power rating: L/hr (gal/hr)	40.5 (10.7)
At 50% of power rating: L/hr (gal/hr)	26.5 (7)

* Based on 431CSL6206 480 volt generator set

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_2O)	0.12 (0.5)
Water pump capacity: L/min (gpm)	143 (37)
Heat rejection to coolant: kW (BTUM)	95.5 (5,431)
Heat rejection to air to air: kW (BTUM)	55.3 (3,145)
Heat radiated to ambient: kW (BTUM)	40.8 (2,322)
Fan power: kW (hp)	15.6 (22.1)

Air requirements

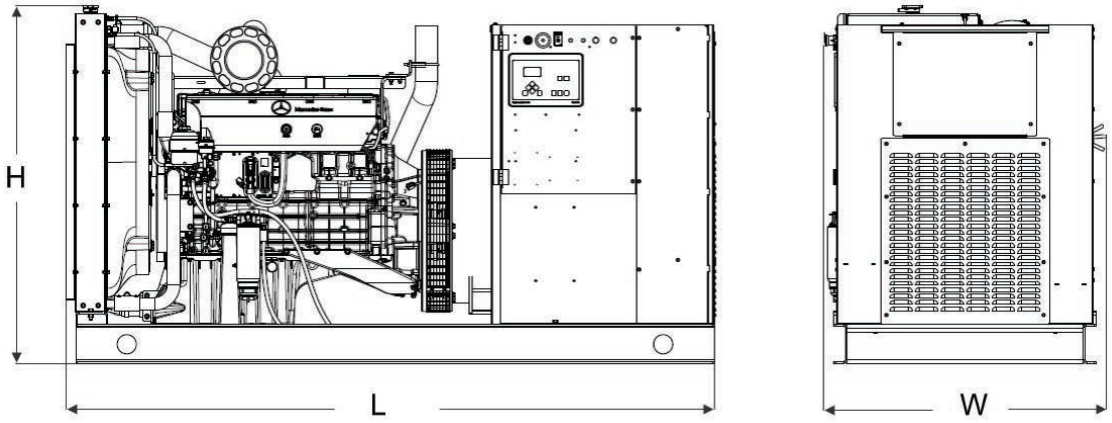
Aspirating: *m³/min (SCFM)	14.8 (523)
Air flow required for radiator cooled unit: *m³/min (SCFM)	408 (14,408)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m³/min (SCFM)	149.2 (5,269)

* Air density = 1.184 kg/m³ (0.0739 lbm/ft³)

Exhaust system

Gas temperature (stack): °C (°F)	520 (968)
Gas volume at stack temperature: m³/min (CFM)	44.8 (1,582)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_2O)	10.5 (42)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	2,580 x 1,121 x 1,422 mm (101.6 x 44.1 x 56 in)	1,632-2,120 kg (3,598-4,674 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load
Level 0 (OPU): dB(A)	88.9

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
3.93	1.2	0.06

- All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

- Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 3046-1, BS 5514, and AS 2789. Average loadfactor: ≤ 85%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 6R0150 DS230

230 kWe/60 Hz/Standby/208 - 600V
Reference *mtu* 6R0150 DS230 (210 kWe) for Prime Power for Stationary Emergency Rating Technical Data

System ratings

Voltage (L-L)	240V	208V	240V	380V	480V	600V
Phase	1	3	3	3	3	3
PF	1	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60
kW	230	230	230	230	230	230
kVA	230	288	288	288	288	288
Amps	958	798	692	437	346	277
skVA@30% voltage dip	430	608	608	430	605	510
Generator model	432CSL6216	432CSL6210	432CSL6210	432CSL6210	431CSL6208	431PSL6243
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	DOUBLE DELTA	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	12 LEAD WYE	4 LEAD WYE

Certifications and standards

- Emissions
  - EPA Tier 3 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification - optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional
- CSA - optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110
  - Permissible average power output during 24 hours of operation is approved up to 85%

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 6090HF484 diesel engine
  - 9.0 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with optional Permanent Magnet Generator (PMG)
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaner
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Open crankcase ventilation
- Jacket water pump
- Thermostat
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery rack and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 1% voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital Control Panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	John Deere
Model	6090HF484
Type	4-cycle
Arrangement	6-inline
Displacement: L (in^3)	9.0 (549)
Bore: cm (in)	11.84 (4.7)
Stroke: cm (in)	13.6 (5.4)
Compression ratio	16:1
Rated rpm	1,800
Engine governor	JDEC
Maximum power: kWm (bhp)	315 (422)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	31 (8.19)
Engine jacket water capacity: L (gal)	16 (4.23)
System coolant capacity: L (gal)	53.5 (14.13)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	950
Batteries: group size	31
Batteries: quantity	2

Fuel system

Fuel supply connection size	-10 JIC 37° female
Fuel return Connection size	-6 JIC 37° female
Max. fuel Lift: m (ft)	1.3 (4.4)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	239.92 (63.38)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	74.3 (19.6)
At 75% of power rating: L/hr (gal/hr)	64.2 (16.96)
At 50% of power rating: L/hr (gal/hr)	45.5 (12.01)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.124 (0.5)
Water pump capacity: L/min (gpm)	280 (74)
Heat rejection to coolant: kW (BTUM)	104 (5,920)
Heat rejection to air to air: kW (BTUM)	88 (5,009)
Heat radiated to ambient: kW (BTUM)	34.1 (1,939)
Fan power: kW (hp)	13.9 (18.6)

Air requirements

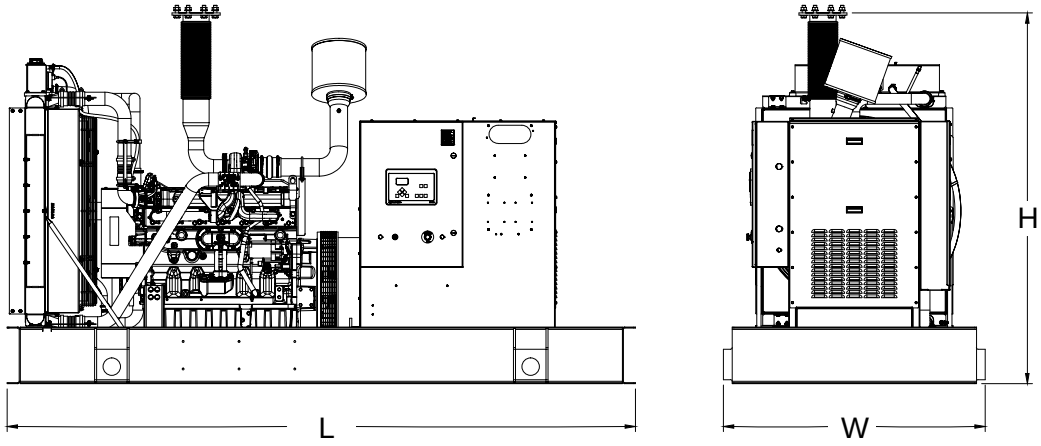
Aspirating: *m^3/min (SCFM)	25.5 (901)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	507.6 (17,926)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	123.8 (4,374)

* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

Gas temperature (stack): °C (°F)	638 (1,180)
Gas volume at stack temperature: m^3/min (CFM)	59 (2,084)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	7.5 (30)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	3,658 x 1,524 x 2,159 mm (144 x 60 x 85 in)	3,080 kg (6,790 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load
Level 0 (OPU): dB(A)	84.5

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
4.14	0.32	0.03

All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

- Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 6R0150 DS230

230 kWe/60 Hz/Standby/208 - 600V
Reference *mtu* 6R0150 DS230 (210 kWe) for Prime Power for Stationary Emergency Rating Technical Data

System ratings

Voltage (L-L)	240V †	208V †	240V †	380V †	480V †	600V †
Phase	1	3	3	3	3	3
PF	1	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60
kW	230	230	230	230	230	230
kVA	230	288	288	288	288	288
Amps	958	798	692	437	346	277
skVA@30% voltage dip	430	608	608	430	605	510
Generator model	432CSL6216	432CSL6210	432CSL6210	432CSL6210	431CSL6208	431PSL6243
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	DOUBLE DELTA	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 4 Final certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification - optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional
- CSA - optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110
  - Permissible average power output during 24 hours of operation is approved up to 85%

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 6090HFG06 diesel engine
  - 9.0 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with optional Permanent Magnet Generator (PMG)
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaner
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filters
- Open crankcase ventilation
- Jacket water pump
- Thermostat
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery rack and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 1% voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital Control Panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	John Deere
Model	6090HFG06
Type	4-cycle
Arrangement	6-inline
Displacement: L (in^3)	9.0 (549)
Bore: cm (in)	11.84 (4.7)
Stroke: cm (in)	13.6 (5.4)
Compression ratio	16:1
Rated rpm	1,800
Engine governor	JDEC
Maximum power: kWm (bhp)	345 (463)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	40 (10.6)
Engine jacket water capacity: L (gal)	17 (4.49)
System coolant capacity: L (gal)	41.37(10.93)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	950
Batteries: group size	31
Batteries: quantity	2

Fuel system

Fuel supply connection size	-10 JIC 37° female
Fuel return Connection size	-6 JIC 37° female
Maximum fuel Lift: m (ft)	2.4 (7.9)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	167.94 (44.37)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	84.6 (22.4)
At 75% of power rating: L/hr (gal/hr)	61.1 (16.1)
At 50% of power rating: L/hr (gal/hr)	41.2 (10.9)

DEF consumption

At 100% of power rating: L/hr (gal/hr)	2.62 (0.69)
At 75% of power rating: L/hr (gal/hr)	1.59 (0.42)
At 50% of power rating: L/hr (gal/hr)	1.36 (0.36)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.124 (0.5)
Water pump capacity: L/min (gpm)	385 (102)
Heat rejection to coolant: kW (BTUM)	185 (10,530)
Heat rejection to after cooler: kW (BTUM)	86 (4,895)
Heat radiated to ambient: kW (BTUM)	36.9 (2,099)
Fan power: kW (hp)	18 (24.1)

Air requirements

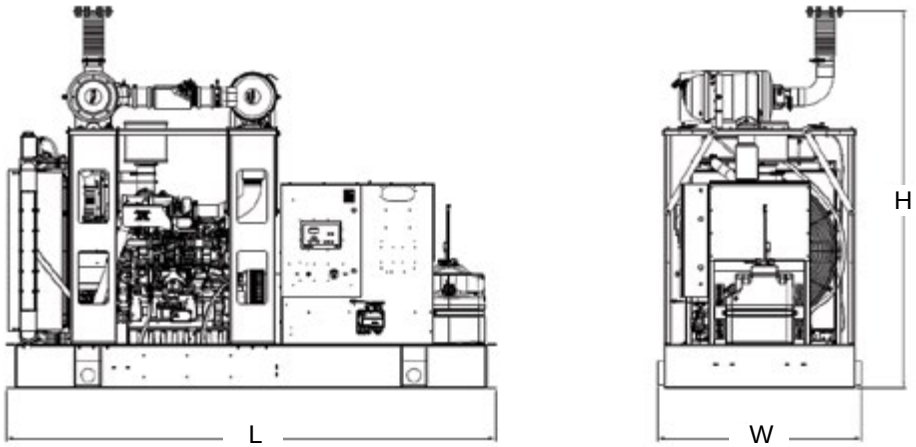
Aspirating: *m^3/min (SCFM)	23 (812)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	517.7 (18,281)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	N/A

* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

Gas temperature (stack): °C (°F)	447 (837)
Maximum gas temperature during regeneration: °C (°F)	647 (1,197)
Gas volume at stack temperature: m^3/min (CFM)	45 (1,589)
Maximum allowable back pressure at outlet of aftertreatment: kPa (in. H_20)	19.2 (77)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	3,658 x 1,524 x 2,516 mm (144 x 60 x 111 in)	4,140 kg (9,137 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load
Level 0 (OPU): dB(A)	83.6

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
0.03	0.002	0.003

All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

- Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

C/F = Consult Factory/***mtu*** Distributor
N/A = Not Available

Diesel Generator Set

mtu 6R0150 DS250

250 kWe/60 Hz/Standby/208 - 600V
Reference *mtu* 6R0150 DS250 (230 kWe) for Prime Power for Stationary Emergency Rating Technical Data

System ratings

Voltage (L-L)	240V	208V †	240V †	380V †	480V †	600V †
Phase	1	3	3	3	3	3
PF	1	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60
kW	250	250	250	250	250	250
kVA	250	313	313	313	313	313
Amps	1,042	867	752	475	376	301
skVA@30% voltage dip	430	608	608	430	809	720
Generator model	433PSL6216	432CSL6210	432CSL6210	432CSL6210	432CSL6210	432PSL6246
Temp rise	150 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	12 LEAD DOUBLE DELTA	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 3 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification - optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110
  - Permissible average power output during 24 hours of operation is approved up to 85%.

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 6090HF484 diesel engine
  - 9.0 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with optional Permanent Magnet Generator (PMG)
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaner
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Open crankcase ventilation
- Jacket water pump
- Thermostat
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery rack and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 1% voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	John Deere
Model	6090HF484
Type	4-cycle
Arrangement	6-inline
Displacement: L (in^3)	9.0 (549)
Bore: cm (in)	11.84 (4.7)
Stroke: cm (in)	13.6 (5.4)
Compression ratio	16:1
Rated rpm	1,800
Engine governor	JDEC
Maximum power: kWm (bhp)	315 (422)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	31 (8.19)
Engine jacket water capacity: L (gal)	16 (4.23)
System coolant capacity: L (gal)	53.5 (14.13)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	950
Batteries: group size	31
Batteries: quantity	2

Fuel system

Fuel supply connection size	-10 JIC 37° female
Fuel return Connection size	-6 JIC 37° female
Maximum fuel Lift: m (ft)	1.3 (4.4)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	239.92 (63.38)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	74.3 (19.6)
At 75% of power rating: L/hr (gal/hr)	64.2 (16.96)
At 50% of power rating: L/hr (gal/hr)	45.5 (12.01)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.124 (0.5)
Water pump capacity: L/min (gpm)	280 (74)
Heat rejection to coolant: kW (BTUM)	104 (5,920)
Heat rejection to air to air: kW (BTUM)	88 (5,009)
Heat radiated to ambient: kW (BTUM)	34.1 (1,939)
Fan power: kW (hp)	13.9 (18.6)

Air requirements

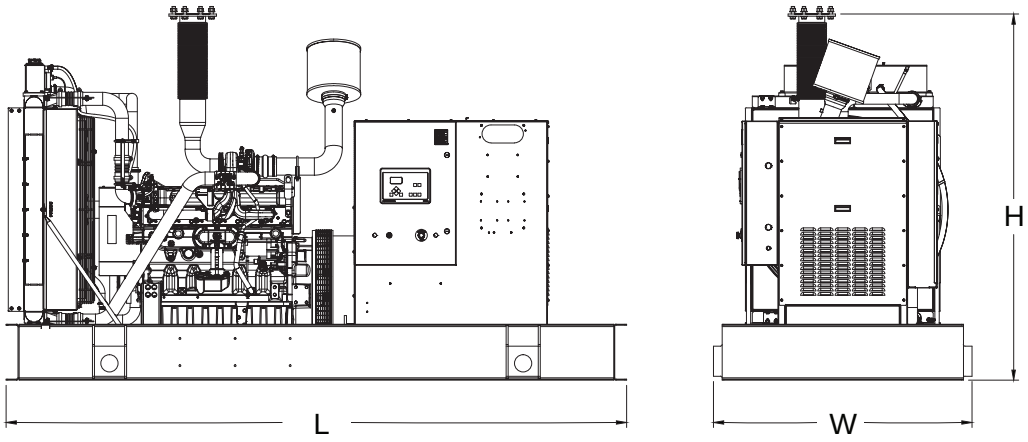
Aspirating: *m^3/min (SCFM)	25.5 (901)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	507.6 (17,926)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	123.8 (4,374)

* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

Gas temperature (stack): °C (°F)	638 (1,180)
Gas volume at stack temperature: m^3/min (CFM)	59 (2,084)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	7.5 (30)

Weights and dimensions



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System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	3,658 x 1,524 x 2,159 mm (144 x 60 x 85 in)	3,080 kg (6,790 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load
Level 0 (OPU): dB(A)	84.3

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
4.14	0.32	0.03

All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

- Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 6R0150 DS250

250 kWe/60 Hz/Standby/208 - 600V
Reference *mtu* 6R0150 DS250 (230 kWe) for Prime Power for Stationary Emergency Rating Technical Data

System ratings

Voltage (L-L)	240V	208V †	240V †	380V †	480V †	600V †
Phase	1	3	3	3	3	3
PF	1	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60
kW	250	250	250	250	250	250
kVA	250	313	313	313	313	313
Amps	1,042	867	752	475	376	301
skVA@30% voltage dip	430	608	608	430	809	720
Generator model	433PSL6216	432CSL6210	432CSL6210	432CSL6210	432CSL6210	432PSL6246
Temp rise	150 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	12 LEAD DOUBLE DELTA	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 4 Final certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification - optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110
  - Permissible average power output during 24 hours of operation is approved up to 85%.

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 6090HFG06 diesel engine
  - 9.0 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with optional Permanent Magnet Generator (PMG)
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaner
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filters
- Open crankcase ventilation
- Jacket water pump
- Thermostat
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery rack and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 1% voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	John Deere
Model	6090HFG06
Type	4-cycle
Arrangement	6-inline
Displacement: L (in^3)	9.0 (549)
Bore: cm (in)	11.84 (4.7)
Stroke: cm (in)	13.6 (5.4)
Compression ratio	16:1
Rated rpm	1,800
Engine governor	JDEC
Maximum power: kWm (bhp)	345 (463)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	40 (10.6)
Engine jacket water capacity: L (gal)	17 (4.49)
System coolant capacity: L (gal)	41.37 (10.93)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	950
Batteries: group size	31
Batteries: quantity	2

Fuel system

Fuel supply connection size	-10 JIC 37° female
Fuel return connection size	-6 JIC 37° female
Maximum fuel Lift: m (ft)	2.4 (7.9)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	167.94 (44.37)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	84.6 (22.4)
At 75% of power rating: L/hr (gal/hr)	61.1 (16.1)
At 50% of power rating: L/hr (gal/hr)	41.2 (10.9)

DEF consumption

At 100% of power rating: L/hr (gal/hr)	2.62 (0.69)
At 75% of power rating: L/hr (gal/hr)	1.59 (0.42)
At 50% of power rating: L/hr (gal/hr)	1.36 (0.36)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.124 (0.5)
Water pump capacity: L/min (gpm)	385 (102)
Heat rejection to coolant: kW (BTUM)	185 (10,530)
Heat rejection to air to air: kW (BTUM)	86 (4,895)
Heat radiated to ambient: kW (BTUM)	36.9 (2,099)
Fan power: kW (hp)	18 (24.1)

Air requirements

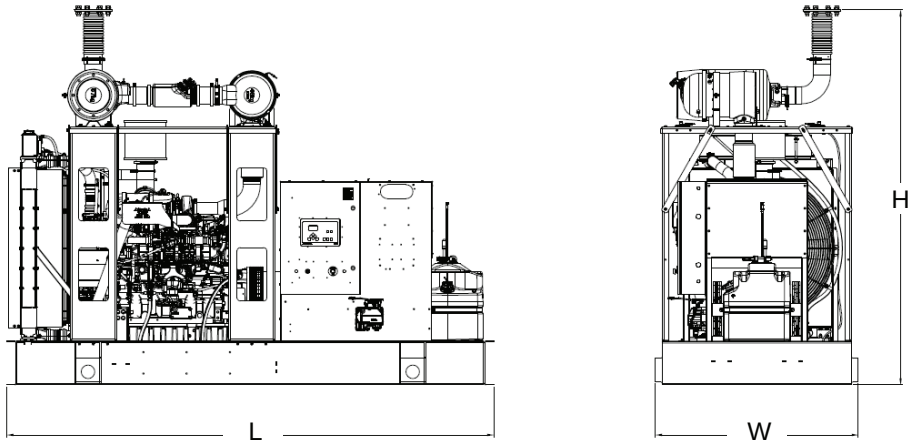
Aspirating: *m^3/min (SCFM)	23 (812)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	517.7 (18,281)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	N/A

* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

Gas temperature (stack): °C (°F)	447 (837)
Maximum gas temperature during regeneration: °C (°F)	647 (1,197)
Gas volume at stack temperature: m^3/min (CFM)	45 (1,589)
Maximum allowable back pressure at outlet of aftertreatment: kPa (in. H_20)	19.2 (77)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	3,658 x 1,524 x 2,516 mm (144 x 60 x 111 in)	4,140 kg (9,137 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load
Level 0 (OPU): dB(A)	83.7

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
0.03	0.002	0.003

All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

- Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

C/F = Consult Factory/***mtu*** Distributor
N/A = Not Available

Diesel Generator Set

mtu 6R0150 DS275

275 kWe/60 Hz/Standby/208 - 600V
Reference *mtu* 6R0150 DS275 (250 kWe) for Prime Power for Stationary Emergency Rating Technical Data

System ratings

Voltage (L-L)	208V	240V	380V	480V	600V
Phase	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60
kW	275	275	275	275	275
kVA	344	344	344	344	344
Amps	954	827	522	413	331
skVA@30% voltage dip	608	608	640	809	720
Generator model	432CSL6210	432CSL6210	433CSL6216	432CSL6210	432PSL6246
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	12 LEAD WYE	4 LEAD WYE

Certifications and standards

- Emissions
  - EPA Tier 3 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification - optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional
- CSA - optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110
  - Permissible average power output during 24 hours of operation is approved up to 85%.

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 6090HF484 diesel engine
  - 9.0 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with optional Permanent Magnet Generator (PMG)
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaner
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Open crankcase ventilation
- Jacket water pump
- Thermostat
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery rack and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 1% voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	John Deere
Model	6090HF484
Type	4-cycle
Arrangement	6-inline
Displacement: L (in^3)	9.0 (549)
Bore: cm (in)	11.84 (4.7)
Stroke: cm (in)	13.6 (5.4)
Compression ratio	16:1
Rated rpm	1,800
Engine governor	JDEC
Maximum power: kWm (bhp)	315 (422)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	31 (8.19)
Engine jacket water capacity: L (gal)	16 (4.23)
System coolant capacity: L (gal)	53.5 (14.13)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	950
Batteries: group size	31
Batteries: quantity	2

Fuel system

Fuel supply connection size	-10 JIC 37° female
Fuel return Connection size	-6 JIC 37° female
Maximum fuel Lift: m (ft)	1.3 (4.4)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	239.92 (63.38)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	74.3 (19.6)
At 75% of power rating: L/hr (gal/hr)	64.2 (16.96)
At 50% of power rating: L/hr (gal/hr)	45.5 (12.01)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: Intake and discharge side of radiator: kPa (in. H_20)	0.124 (0.5)
Water pump capacity: L/min (gpm)	280 (74)
Heat rejection to coolant: kW (BTUM)	104 (5,920)
Heat rejection to air to air: kW (BTUM)	88 (5,009)
Heat radiated to ambient: kW (BTUM)	34.1 (1,939)
Fan power: kW (hp)	13.9 (18.6)

Air requirements

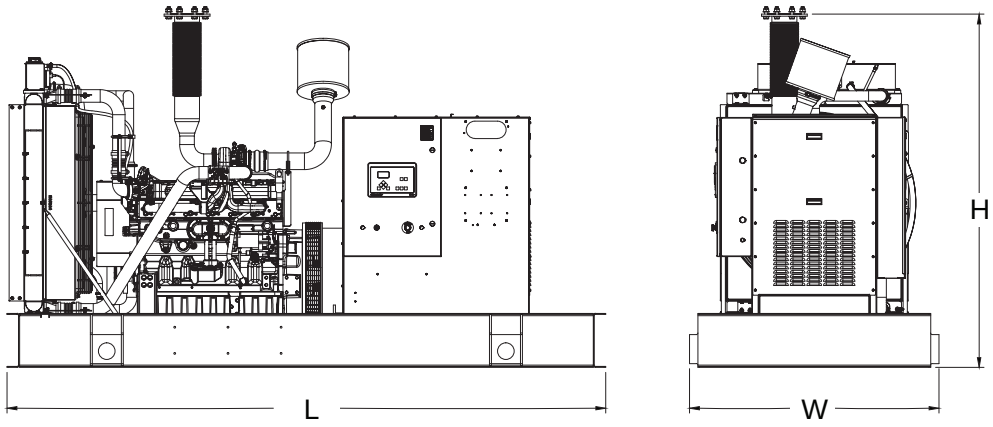
Aspirating: *m^3/min (SCFM)	25.5 (901)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	507.6 (17,926)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	123.8 (4,374)

* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

Gas temperature (stack): °C (°F)	638 (1,180)
Gas volume at stack temperature: m^3/min (CFM)	59 (2,084)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	7.5 (30)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	3,658 x 1,524 x 2,159 mm (144 x 60 x 85 in)	3,080 kg (6,790 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load
Level 0 (OPU): dB(A)	84.3

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
4.14	0.32	0.03

All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

- Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 6R0150 DS275

275 kWe/60 Hz/Standby/208 - 600V
Reference *mtu* 6R0150 DS275 (250 kWe) for Prime Power for Stationary Emergency Rating Technical Data

System ratings

Voltage (L-L)	208V †	240V †	380V †	480V †	600V †
Phase	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60
kW	275	275	275	275	275
kVA	344	344	344	344	344
Amps	954	827	522	413	331
skVA@30% voltage dip	608	608	640	809	720
Generator model	432CSL6210	432CSL6210	433CSL6216	432CSL6210	432PSL6246
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 4 Final certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification - optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional
- CSA - optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110
  - Permissible average power output during 24 hours of operation is approved up to 85%.

Standard features *

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 6090HFG06 diesel engine
  - 9.0 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with optional Permanent Magnet Generator (PMG)
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment *

Engine

- Air cleaner
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filters
- Open crankcase ventilation
- Jacket water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery rack and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 1% voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	John Deere
Model	6090HFG06
Type	4-cycle
Arrangement	6-inline
Displacement: L (in³)	9.0 (549)
Bore: cm (in)	11.84 (4.7)
Stroke: cm (in)	13.6 (5.4)
Compression ratio	16:1
Rated rpm	1,800
Engine governor	JDEC
Maximum power: kWm (bhp)	345 (463)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	40 (10.6)
Engine jacket water capacity: L (gal)	17 (4.49)
System coolant capacity: L (gal)	41.37 (10.93)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	950
Batteries: group size	31
Batteries: quantity	2

Fuel system

Fuel supply connection size	-10 JIC 37° female
Fuel return Connection size	-6 JIC 37° female
Maximum fuel Lift: m (ft)	2.4 (7.9)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	167.94 (44.37)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	84.6 (22.4)
At 75% of power rating: L/hr (gal/hr)	61.1 (16.1)
At 50% of power rating: L/hr (gal/hr)	41.2 (10.9)

DEF consumption

At 100% of power rating: L/hr (gal/hr)	2.62 (0.69)
At 75% of power rating: L/hr (gal/hr)	1.59 (0.42)
At 50% of power rating: L/hr (gal/hr)	1.36 (0.36)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: Intake and discharge side of radiator: kPa (in. H_2O)	0.124 (0.5)
Water pump capacity: L/min (gpm)	385 (102)
Heat rejection to coolant: kW (BTUM)	185 (10,530)
Heat rejection to air to air: kW (BTUM)	86 (4,895)
Heat radiated to ambient: kW (BTUM)	36.9 (2,099)
Fan power: kW (hp)	18 (24.1)

Air requirements

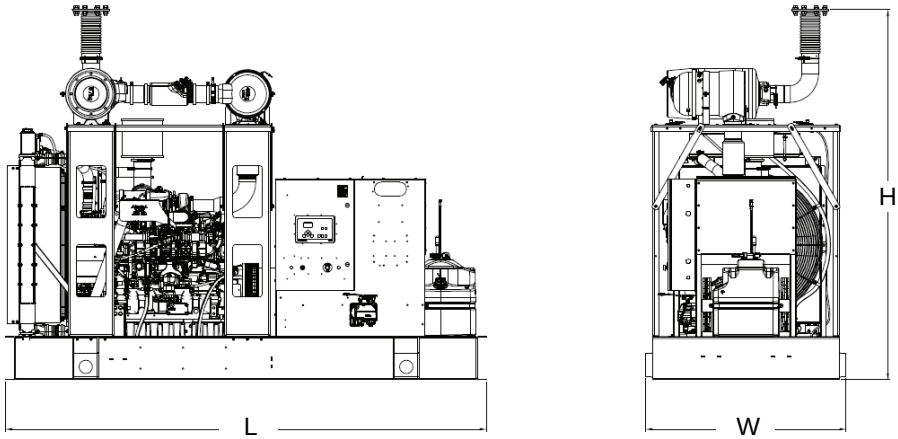
Aspirating: *m³/min (SCFM)	23 (812)
Air flow required for radiator cooled unit: *m³/min (SCFM)	517.7 (18,281)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m³/min (SCFM)	N/A

* Air density = 1.184 kg/m³ (0.0739 lbm/ft³)

Exhaust system

Gas temperature (stack): °C (°F)	447 (837)
Maximum gas temperature during regeneration: °C (°F)	647 (1,197)
Gas volume at stack temperature: m³/min (CFM)	45 (1,589)
Maximum allowable back pressure at outlet of aftertreatment: kPa (in. H_2O)	19.2 (77)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	3,658 x 1,524 x 2,516 mm (144 x 60 x 111 in)	4,140 kg (9,137 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load
Level 0 (OPU): dB(A)	83.7

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
0.03	0.002	0.003

All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

- Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

C/F = Consult Factory/***mtu*** Distributor
N/A = Not Available

Diesel Generator Set

mtu 6R0150 DS300

300 kWe/60 Hz/Standby/208 - 600V
Reference *mtu* 6R0150 DS300 (275 kWe) for Prime Power for Stationary Emergency Rating Technical Data

System ratings

Voltage (L-L)	208V	240V	380V	480V	600V
Phase	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60
kW	300	300	300	300	300
kVA	375	375	375	375	375
Amps	1,041	902	570	451	361
skVA@30% voltage dip	930	930	640	820	720
Generator model	433CSL6216	433CSL6216	433CSL6216	432CSL6212	432PSL6246
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	12 LEAD WYE	4 LEAD WYE

Certifications and standards

- Emissions
  - EPA Tier 3 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification - optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional
- CSA - optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110
  - Permissible average power output during 24 hours of operation is approved up to 85%.

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 6090HFG86 diesel engine
  - 9.0 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with optional Permanent Magnet Generator (PMG)
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaner
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Open crankcase ventilation
- Jacket water pump
- Thermostat
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery rack and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 1% voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	John Deere
Model	6090HFG86
Type	4-cycle
Arrangement	6-inline
Displacement: L (in^3)	9.0 (549)
Bore: cm (in)	11.84 (4.7)
Stroke: cm (in)	13.6 (5.4)
Compression ratio	16:1
Rated rpm	1,800
Engine governor	JDEC
Maximum power: kWm (bhp)	345 (463)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	31 (8.19)
Engine jacket water capacity: L (gal)	16 (4.23)
System coolant capacity: L (gal)	53.5 (14.13)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	950
Batteries: group size	31
Batteries: quantity	2

Fuel system

Fuel supply connection size	-10 JIC 37° female
Fuel return Connection size	-6 JIC 37° female
Maximum fuel Lift: m (ft)	2.4 (7.9)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	239.92 (63.38)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	83.71 (22.11)
At 75% of power rating: L/hr (gal/hr)	67.34 (17.79)
At 50% of power rating: L/hr (gal/hr)	49.48 (13.07)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: Intake and discharge side of radiator: kPa (in. H_20)	0.124 (0.5)
Water pump capacity: L/min (gpm)	294.6 (78)
Heat rejection to coolant: kW (BTUM)	114 (6,489)
Heat rejection to air to air: kW (BTUM)	99.1 (5,641)
Heat radiated to ambient: kW (BTUM)	36.9 (2,099)
Fan power: kW (hp)	13.9 (18.6)

Air requirements

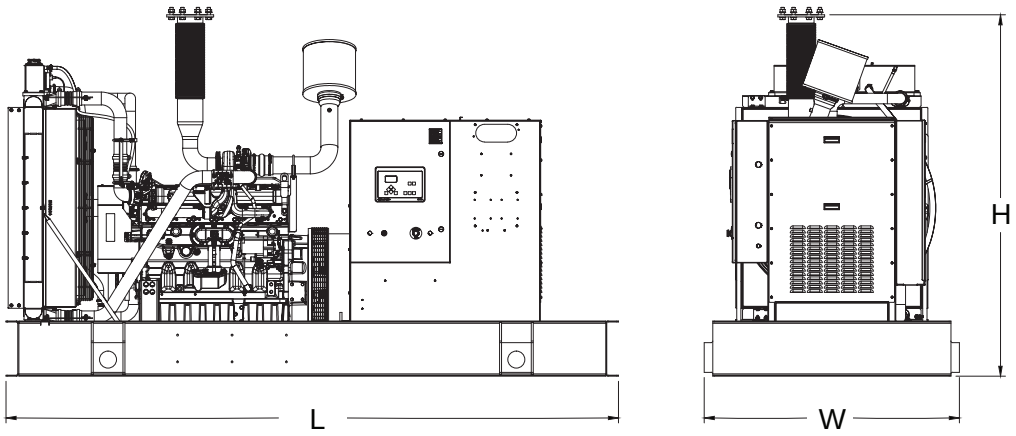
Aspirating: *m^3/min (SCFM)	26.5 (936)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	507.6 (17,926)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	134 (4,733)

* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

Gas temperature (stack): °C (°F)	497 (927)
Gas volume at stack temperature: m^3/min (CFM)	63.6 (2,246)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	7.5 (30)

Weights and dimensions



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System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	3,658 x 1,524 x 2,159 mm (144 x 60 x 85 in)	3,080 kg (6,790 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load
Level 0 (OPU): dB(A)	85.6

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
4.25	0.25	0.02

All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

- Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 6R0150 DS300

300 kWe/60 Hz/Standby/208 - 600V
Reference *mtu* 6R0150 DS300 (265 kWe) for Prime Rating Technical Data

System ratings

Voltage (L-L)	208V †	240V †	380V †	480V †	600V †
Phase	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60
kW	300	300	300	300	300
kVA	375	375	375	375	375
Amps	1,041	902	570	451	361
skVA@30% voltage dip	930	930	640	820	720
Generator model	433CSL6216	433CSL6216	433CSL6216	432CSL6212	432PSL6246
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 4 Final certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification - optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional
- CSA - optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110
  - Permissible average power output during 24 hours of operation is approved up to 85%.

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 6090HFG06 diesel engine
  - 9.0 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with optional Permanent Magnet Generator (PMG)
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaner
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filters
- Open crankcase ventilation
- Jacket water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery rack and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 1% voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	John Deere
Model	6090HFG06
Type	4-cycle
Arrangement	6-inline
Displacement: L (in^3)	9.0 (549)
Bore: cm (in)	11.84 (4.7)
Stroke: cm (in)	13.6 (5.4)
Compression ratio	16:1
Rated rpm	1,800
Engine governor	JDEC
Maximum power: kWm (bhp)	345 (463)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	40 (10.6)
Engine jacket water capacity: L (gal)	17 (4.49)
System coolant capacity: L (gal)	41.37 (10.93)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	950
Batteries: group size	31
Batteries: quantity	2

Fuel system

Fuel supply connection size	-10 JIC 37° female
Fuel return Connection size	-6 JIC 37° female
Maximum fuel Lift: m (ft)	2.4 (7.9)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	167.94 (44.37)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	84.6 (22.4)
At 75% of power rating: L/hr (gal/hr)	61.1 (16.1)
At 50% of power rating: L/hr (gal/hr)	41.2 (10.9)

DEF consumption

At 100% of power rating: L/hr (gal/hr)	2.62 (0.69)
At 75% of power rating: L/hr (gal/hr)	1.59 (0.42)
At 50% of power rating: L/hr (gal/hr)	1.36 (0.36)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: Intake and discharge side of radiator: kPa (in. H_20)	0.124 (0.5)
Water pump capacity: L/min (gpm)	385 (102)
Heat rejection to coolant: kW (BTUM)	185 (10,530)
Heat rejection to air to air: kW (BTUM)	86 (4,895)
Heat radiated to ambient: kW (BTUM)	36.9 (2,099)
Fan power: kW (hp)	18 (24.1)

Air requirements

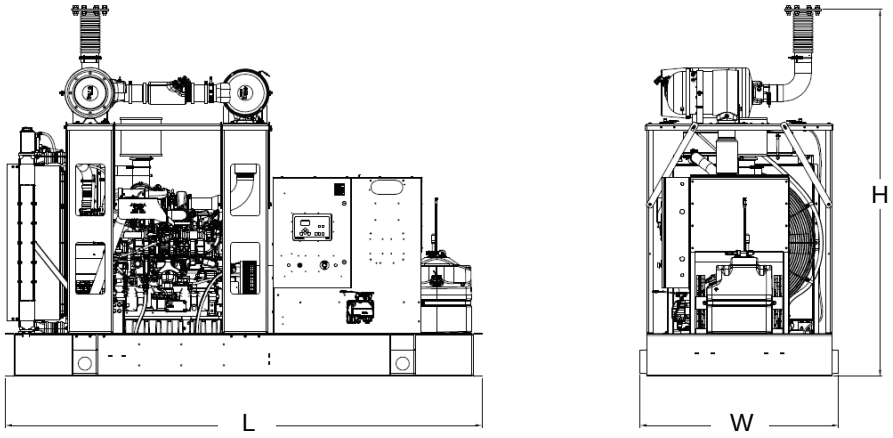
Aspirating: *m^3/min (SCFM)	23 (812)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	517.7 (18,281)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	N/A

* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

Gas temperature (stack): °C (°F)	447 (837)
Maximum gas temperature during regeneration: °C (°F)	647 (1,197)
Gas volume at stack temperature: m^3/min (CFM)	45 (1,589)
Maximum allowable back pressure at outlet of aftertreatment: kPa (in. H_20)	19.2 (77)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	3,658 x 1,524 x 2,516 mm (144 x 60 x 111 in)	4,140 kg (9,137 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load
Level 0 (OPU): dB(A)	83.3

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
0.03	0.002	0.003

All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

- Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

C/F = Consult Factory/***mtu*** Distributor
N/A = Not Available

Diesel Generator Set

mtu 6R0225 DS350

350 kWe/60 Hz/Standby/208 - 600V

System ratings

Voltage (L-L)	240V †	240V	208V †	240V †	380V †	480V †	600V †
Phase	1	1	3	3	3	3	3
PF	1	1	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60	60
kW	275	300	350	350	350	350	350
kVA	275	300	438	438	438	438	438
Amps	1,146	1,250	1,214	1,053	665	526	421
skVA@30% voltage dip	584	584	930	930	767	1,238	1,102
Generator model	572RSL4027	572RSL4027	433CSL6216	433CSL6216	433CSL6216	433CSL6216	433PSL6248
Temp rise	130 °C/40 °C	150 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	12 LEAD DOUBLE DELTA	12 LEAD DOUBLE DELTA	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 3 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification - optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110
  - Permissible average power output during 24 hours of operation is approved up to 85%.

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 6135HFG84 diesel engine
  - 13.5 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with Permanent Magnet Generator (PMG)
    - ◊ PMG standard for 570 frame and larger
    - ◊ PMG optional for 430 frame and smaller
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaner
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Open crankcase ventilation
- Jacket water pump
- Thermostat
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery rack and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 0.25% voltage regulation (570 frame) no load to full load
- ± 1% voltage regulation (430 frame) no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	John Deere
Model	6135HFG84
Type	4-cycle
Arrangement	6-inline
Displacement: L (in^3)	13.5 (824)
Bore: cm (in)	13.2 (5.2)
Stroke: cm (in)	16.5 (6.5)
Compression ratio	16:1
Rated rpm	1,800
Engine governor	JDEC
Maximum power: kWm (bhp)	460 (617)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	40 (10.57)
Engine jacket water capacity: L (gal)	18 (4.76)
System coolant capacity: L (gal)	47.7 (12.6)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	950
Batteries: group size	31
Batteries: quantity	2

Fuel system

Fuel supply connection size	-10 JIC 37° female
Fuel return Connection size	-6 JIC 37° female
Maximum fuel Lift: m (ft)	2.4 (8)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	190 (50)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	110 (29)
At 75% of power rating: L/hr (gal/hr)	91 (24)
At 50% of power rating: L/hr (gal/hr)	63 (17)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.124 (0.5)
Water pump capacity: L/min (gpm)	400 (106)
Heat rejection to coolant: kW (BTUM)	208 (11,839)
Heat rejection to air to air: kW (BTUM)	94 (5,350)
Heat radiated to ambient: kW (BTUM)	48.1 (2,735)
Fan power: kW (hp)	24 (32.2)

Air requirements

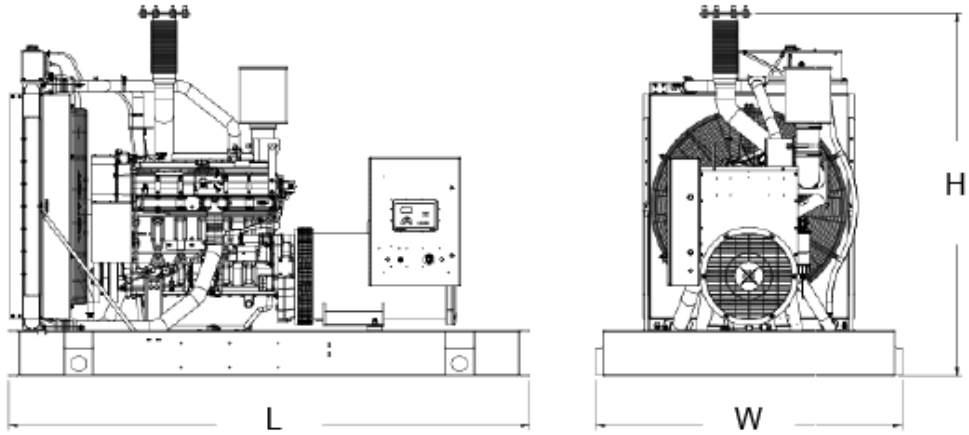
Aspirating: *m^3/min (SCFM)	28.2 (996)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	833 (29,433)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	164.4 (5,842)

* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

Gas temperature (stack): °C (°F)	527 (981)
Gas volume at stack temperature: m^3/min (CFM)	73.8 (2,606)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	7.5 (30)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	3,480 x 2,045 x 2,418 mm (137 x 80.5 x 95.2 in)	3,464-4,105 kg (7,637-9,050 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load
275 kW (Single-Phase Only) Level 0 (OPU): dB(A)	88.5
300 kW (Single-Phase Only) Level 0 (OPU): dB(A)	88.3
350 kW Level 0 (OPU): dB(A)	89.1

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
3.8	0.51	0.03

All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

- Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 8528-1, ISO-3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 6R0225 DS350

350 kWe/60 Hz/Standby/208 - 600V
Reference *mtu* 6R0225 DS350 (325 kWe) for Prime Rating Technical Data

System ratings

Voltage (L-L)	240V †	240V †	208V †	240V †	380V †	480V †	600V †
Phase	1	1	3	3	3	3	3
PF	1	1	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60	60
kW	275	300	350	350	350	350	350
kVA	275	300	438	438	438	438	438
Amps	1,146	1,250	1,214	1,053	665	526	421
skVA@30% voltage dip	584	602	930	930	767	1,238	1,102
Generator model	572RSL4027	572RSL4029	433CSL6216	433CSL6216	433CSL6216	433CSL6216	433PSL6248
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	12 LEAD DOUBLE DELTA	12 LEAD DOUBLE DELTA	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 4 Final certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification - optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110
  - Permissible average power output during 24 hours of operation is approved up to 85%.

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 6135HFG06 diesel engine
  - 13.5 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with Permanent Magnet Generator (PMG)
    - ◊ PMG standard for 570 frame and larger
    - ◊ PMG optional for 430 frame and smaller
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaner
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filters
- Open crankcase ventilation
- Jacket water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery rack and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 0.25% voltage regulation (570 frame) no load to full load
- ± 1% voltage regulation (430 frame) no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	John Deere
Model	6135HFG06
Type	4-cycle
Arrangement	6-inline
Displacement: L (in^3)	13.5 (824)
Bore: cm (in)	13.2 (5.2)
Stroke: cm (in)	16.5 (6.5)
Compression ratio	15.3:1
Rated rpm	1,800
Engine governor	JDEC
Maximum power: kWm (bhp)	473 (634)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	48 (12.7)
Engine jacket water capacity: L (gal)	25 (6.6)
System coolant capacity: L (gal)	67.3 (17.8)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	950
Batteries: group size	31
Batteries: quantity	2

Fuel system

Fuel supply connection size	-10 JIC 37° female
Fuel return Connection size	-6 JIC 37° female
Maximum fuel Lift: m (ft)	2.4 (7.9)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	213.8 (56.48)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	115.8 (30.6)
At 75% of power rating: L/hr (gal/hr)	85 (22.5)
At 50% of power rating: L/hr (gal/hr)	58.4 (15.4)

DEF consumption

At 100% of power rating: L/hr (gal/hr)	3.59 (0.95)
At 75% of power rating: L/hr (gal/hr)	2.55 (0.67)
At 50% of power rating: L/hr (gal/hr)	1.69 (0.45)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.124 (0.5)
Water pump capacity: L/min (gpm)	727 (192)
Heat rejection to coolant: kW (BTUM)	279 (15,881)
Heat rejection to air to air: kW (BTUM)	144 (8,196)
Heat radiated to ambient: kW (BTUM)	48.1 (2,735)
Fan power: kW (hp) †	19.9 (26.7)

† Open power unit

Air requirements

Aspirating: *m^3/min (SCFM)	36 (1,271)
Air flow required for radiator cooled unit: *m^3/min (SCFM) †	669.9 (23,658)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	N/A

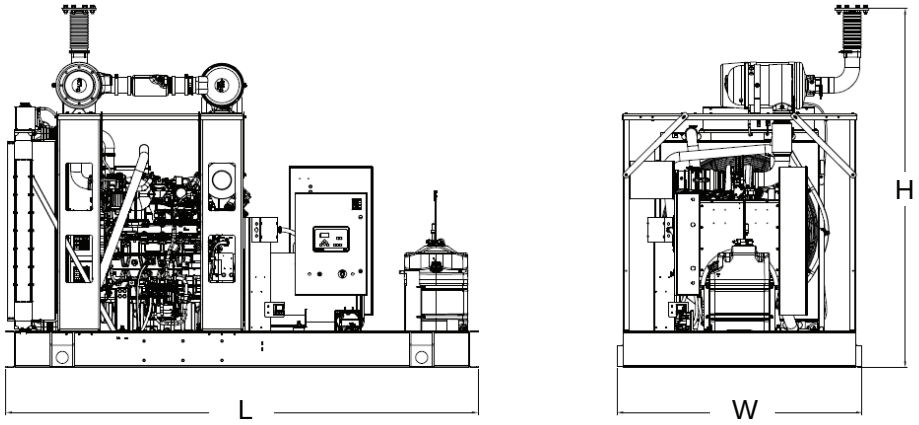
* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

† Open power unit

Exhaust system

Gas temperature (stack): °C (°F)	527 (981)
Maximum gas temperature during regeneration: °C (°F)	727 (1,341)
Gas volume at stack temperature: m^3/min (CFM)	60 (2,119)
Maximum allowable back pressure at outlet of aftertreatment: kPa (in. H_20)	2.6 (10.5)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	3,397 x 2,045 x 2,992 mm (155 x 80.5 x 118 in)	4,700 kg (10,362 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load
275 kW (Single-Phase Only) Level 0 (OPU): dB(A)	91
300 kW (Single-Phase Only) Level 0 (OPU): dB(A)	91
350 kW Level 0 (OPU): dB(A)	91.3

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
0.11	0.023	0.008

All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

- Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 8528-1, ISO-3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

C/F = Consult Factory/***mtu*** Distributor
N/A = Not Available

Diesel Generator Set

mtu 6R0225 DS400

400 kWe/60 Hz/Standby/208 - 600V

System ratings

Voltage (L-L)	208V	240V	380V	480V	600V
Phase	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60
kW	400	400	400	400	400
kVA	500	500	500	500	500
Amps	1,388	1,203	760	601	481
skVA@30% voltage dip	1,119	959	934	1,277	1,100
Generator model	572RSL4025	433CSL6220	572RSL4025	433CSL6220	433PSL6248
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	12 LEAD WYE	4 LEAD WYE

Certifications and standards

- Emissions
  - EPA Tier 3 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification - optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional
- CSA - optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110
  - Permissible average power output during 24 hours of operation is approved up to 75%.

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 6135HFG84 diesel engine
  - 13.5 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with Permanent Magnet Generator (PMG)
    - ◊ PMG standard for 570 frame and larger
    - ◊ PMG optional for 430 frame and smaller
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaner
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Open crankcase ventilation
- Jacket water pump
- Thermostat
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery rack and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 0.25% voltage regulation (570 frame) no load to full load
- ± 1% voltage regulation (430 frame) no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	John Deere
Model	6135HFG84
Type	4-cycle
Arrangement	6-inline
Displacement: L (in^3)	13.5 (824)
Bore: cm (in)	13.2 (5.2)
Stroke: cm (in)	16.5 (6.5)
Compression ratio	16:1
Rated rpm	1,800
Engine governor	JDEC
Maximum power: kWm (bhp)	460 (617)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	40 (10.57)
Engine jacket water capacity: L (gal)	18 (4.76)
System coolant capacity: L (gal)	47.7 (12.6)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	950
Batteries: group size	31
Batteries: quantity	2

Fuel system

Fuel supply connection size	-10 JIC 37° female
Fuel return Connection size	-6 JIC 37° female
Maximum fuel Lift: m (ft)	2.4 (8)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	190 (50)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	110 (29)
At 75% of power rating: L/hr (gal/hr)	91 (24)
At 50% of power rating: L/hr (gal/hr)	63 (17)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.124 (0.5)
Water pump capacity: L/min (gpm)	400 (106)
Heat rejection to coolant: kW (BTUM)	208 (11,839)
Heat rejection to air to air: kW (BTUM)	94 (5,350)
Heat radiated to ambient: kW (BTUM)	48.1 (2,735)
Fan power: kW (hp)	24 (32.2)

Air requirements

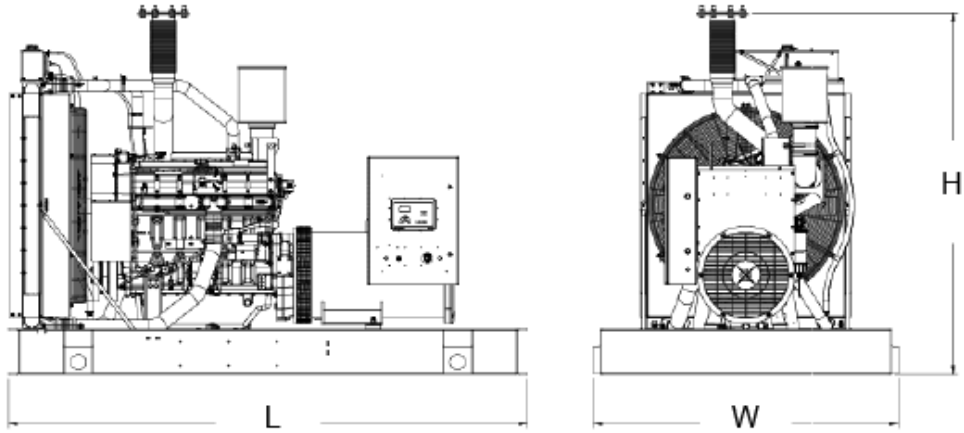
Aspirating: *m^3/min (SCFM)	28.2 (996)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	833 (29,433)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	164.4 (5,842)

* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

Gas temperature (stack): °C (°F)	527 (981)
Gas volume at stack temperature: m^3/min (CFM)	73.8 (2,606)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	7.5 (30)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	3,480 x 2,045 x 2,418 mm (137 x 80.5 x 95.2 in)	3,464-4,105 kg (7,637-9,050 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load
Level 0 (OPU): dB(A)	89.2

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
3.8	0.51	0.03

All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

- Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 8528-1, ISO-3046-1, BS 5514, and AS 2789. Average load factor: ≤ 75%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 6R0225 DS400

400 kWe/60 Hz/Standby/208 - 600V
Reference *mtu* 6R0225 DS400 (365 kWe) for Prime Rating Technical Data

System ratings

Voltage (L-L)	208V †	240V †	380V †	480V †	600V †
Phase	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60
kW	400	400	400	400	400
kVA	500	500	500	500	500
Amps	1,388	1,203	760	601	481
skVA@30% voltage dip	1,119	959	934	1,277	1,100
Generator model	572RSL4025	433CSL6220	572RSL4025	433CSL6220	433PSL6248
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 4 Final certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification - optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional
- CSA - optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110
  - Permissible average power output during 24 hours of operation is approved up to 85%.

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 6135HFG06 diesel engine
  - 13.5 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with Permanent Magnet Generator (PMG)
    - ◊ PMG standard for 570 frame and larger
    - ◊ PMG optional for 430 frame and smaller
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaner
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filters
- Open crankcase ventilation
- Jacket water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery rack and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 0.25% voltage regulation (570 frame) no load to full load
- ± 1% voltage regulation (430 frame) no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	John Deere
Model	6135HFG06
Type	4-cycle
Arrangement	6-inline
Displacement: L (in^3)	13.5 (824)
Bore: cm (in)	13.2 (5.2)
Stroke: cm (in)	16.5 (6.5)
Compression ratio	15.3:1
Rated rpm	1,800
Engine governor	JDEC
Maximum power: kWm (bhp)	473 (634)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	48 (12.7)
Engine jacket water capacity: L (gal)	25 (6.6)
System coolant capacity: L (gal)	67.3 (17.8)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	950
Batteries: group size	31
Batteries: quantity	2

Fuel system

Fuel supply connection size	-10 JIC 37° female
Fuel return Connection size	-6 JIC 37° female
Maximum fuel Lift: m (ft)	2.4 (7.9)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	213.8 (56.48)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	115.8 (30.6)
At 75% of power rating: L/hr (gal/hr)	85 (22.5)
At 50% of power rating: L/hr (gal/hr)	58.4 (15.4)

DEF consumption

At 100% of power rating: L/hr (gal/hr)	3.59 (0.95)
At 75% of power rating: L/hr (gal/hr)	2.55 (0.67)
At 50% of power rating: L/hr (gal/hr)	1.69 (0.45)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.124 (0.5)
Water pump capacity: L/min (gpm)	727 (192)
Heat rejection to coolant: kW (BTUM)	279 (15,881)
Heat rejection to air to air: kW (BTUM)	144 (8,196)
Heat radiated to ambient: kW (BTUM)	48.1 (2,735)
Fan power: kW (hp) †	19.9 (26.7)

† Open power unit

Air requirements

Aspirating: *m^3/min (SCFM)	36 (1,271)
Air flow required for radiator cooled unit: *m^3/min (SCFM) †	669.9 (23,658)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	N/A

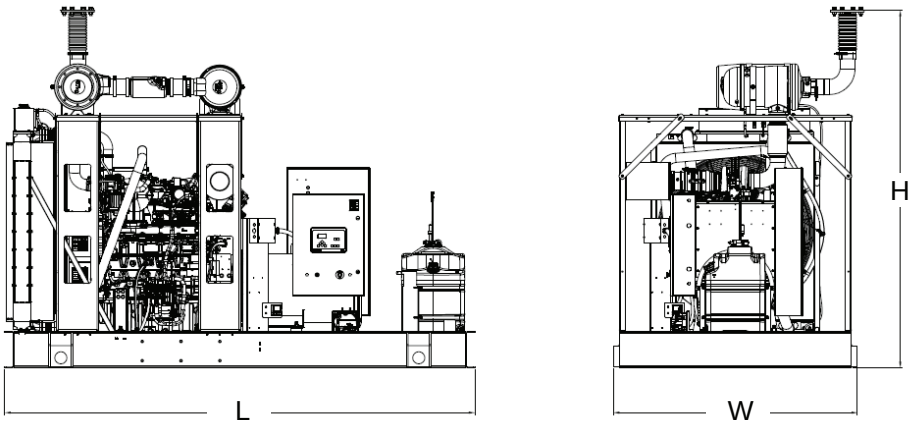
* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

† Open power unit

Exhaust system

Gas temperature (stack): °C (°F)	527 (981)
Maximum gas temperature during regeneration: °C (°F)	727 (1,341)
Gas volume at stack temperature: m^3/min (CFM)	60 (2,119)
Maximum allowable back pressure at outlet of aftertreatment: kPa (in. H_20)	2.6 (10.5)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	3,937 x 2,045 x 2,992 mm (155 x 80.5 x 118 in)	4,700 kg (10,362 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load
Level 0 (OPU): dB(A)	91.7

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
0.11	0.023	0.008

All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

- Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 8528-1, ISO-3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

C/F = Consult Factory/***mtu*** Distributor
N/A = Not Available

Diesel Generator Set

mtu 10V1600 DS450

450 kWe/60 Hz/Standby/208 - 600V
Reference ***mtu*** 10V1600 DS450 (400 kWe) for Prime Rating Technical Data

System ratings

Voltage (L-L)	208V †	240V †	380V	440V	480V †	600V
Phase	3	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60
kW	450	450	450	450	450	450
kVA	563	563	563	563	563	563
Amps	1,561	1,353	855	738	677	541
skVA@30% voltage dip	780	586	843	900	1,490	1,041
Generator model	572RSL4027	572RSL4027	572RSL4029	572RSL4025	572RSL4025	572RSS4270
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	12 LEAD WYE	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 3 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality, and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110
  - Permissible average power output during 24 hours of operation is approved up to 85%.

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 10V1600 diesel engine
  - 17.5 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - Permanent Magnet Generator (PMG) supply to regulator
  - 300% short circuit capability
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Closed crankcase ventilation
- Jacket water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 0.25% voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	***mtu***
Model	10V1600G70S
Type	4-cycle
Arrangement	10-V
Displacement: L (cu in)	17.5 (1,068)
Bore: cm (in)	12.2 (4.8)
Stroke: cm (in)	15 (5.91)
Compression ratio	17.5:1
Rated rpm	1,800
Engine governor	electronic isochronous (ADEC)
Maximum power: kWm (bhp)	511 (685)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	61 (16)
Engine jacket water capacity: L (gal)	60 (15.9)
System coolant capacity: L (gal)	99.3 (26.2)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	1,050
Batteries: group size	4D
Batteries: quantity	2

Fuel system

Fuel supply connection size	-10 JIC 37° female M20 x 1.5 male adapter provided
Fuel return connection size	-6 JIC 37° female M14 x 1.5 male adapter provided
Maximum fuel lift: m (ft)	5 (16)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	401.3 (106)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	127 (34)
At 75% of power rating: L/hr (gal/hr)	98 (26)
At 50% of power rating: L/hr (gal/hr)	73 (19)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_2O)	0.2 (0.8)
Water pump capacity: L/min (gpm)	466 (123)
Heat rejection to coolant: kW (BTUM)	235 (13,364)
Heat rejection to after cooler: kW (BTUM)	118 (6,710)
Heat radiated to ambient: kW (BTUM)	58.6 (3,332)
Fan power: kW (hp)	17.1 (22.9)

Air requirements

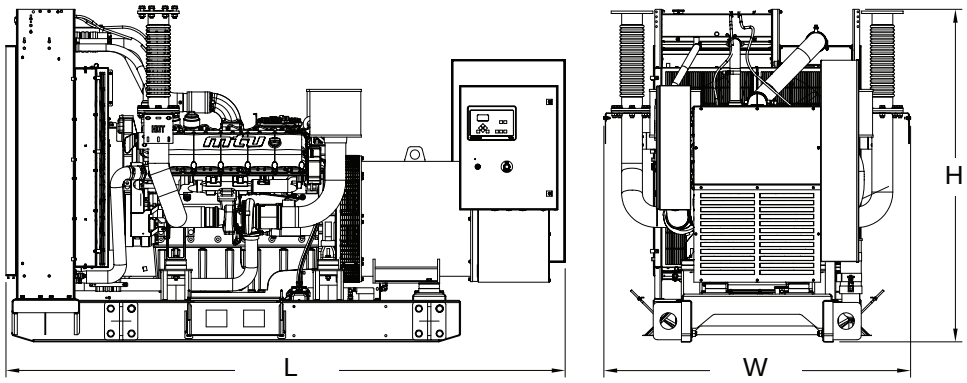
Aspirating: *m^3/min (SCFM)	35 (1,250)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	642 (22,672)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	213 (7,516)

* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

Gas temperature (stack): °C (°F)	461 (862)
Gas volume at stack temperature: m^3/min (CFM)	103 (3,623)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_2O)	8.5 (34.1)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	3,416 x 1,873 x 2,032 mm (134.5 x 73.8 x 80 in)	4,175-5,129 kg (9,205-11,308 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load
Level 0 (OPU): dB(A)	93.4

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
3.31	0.37	0.03

- All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

- Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 8528-1, ISO-3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 10V1600 DS500

500 kWe/60 Hz/Standby/208 - 600V
Reference *mtu* 10V1600 DS500 (450 kWe) for Prime Rating Technical Data

System ratings

Voltage (L-L)	208V †	240V †	380V	440V	480V †	600V
Phase	3	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60
kW	500	500	500	500	500	500
kVA	625	625	625	625	625	625
Amps	1,735	1,504	950	820	752	601
skVA@30% voltage dip	805	605	947	1,040	1,890	1,041
Generator model	572RSL4029	572RSL4029	573RSL4033	572RSL4027	572RSL4027	572RSS4270
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	12 LEAD WYE	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 2 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality, and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110
  - Permissible average power output during 24 hours of operation is approved up to 85%.

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 10V1600 diesel engine
  - 17.5 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - Permanent Magnet Generator (PMG) supply to regulator
  - 300% short circuit capability
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Closed crankcase ventilation
- Jacket water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 0.25% voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	***mtu***
Model	10V1600G80S
Type	4-cycle
Arrangement	10-V
Displacement: L (cu in)	17.5 (1,068)
Bore: cm (in)	12.2 (4.8)
Stroke: cm (in)	15 (5.91)
Compression ratio	17.5:1
Rated rpm	1,800
Engine governor	electronic isochronous (ADEC)
Maximum power: kWm (bhp)	561 (752)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	61 (16)
Engine jacket water capacity: L (gal)	60 (15.9)
System coolant capacity: L (gal)	99.3 (26.2)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	1,050
Batteries: group size	4D
Batteries: quantity	2

Fuel system

Fuel supply connection size	-10 JIC 37° female M20 x 1.5 male adapter provided
Fuel return connection size	-6 JIC 37° female M14 x 1.5 male adapter provided
Maximum fuel lift: m (ft)	5 (16)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	401.3 (106)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	125 (33.1)
At 75% of power rating: L/hr (gal/hr)	97 (25.6)
At 50% of power rating: L/hr (gal/hr)	74 (19.5)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_2O)	0.2 (0.8)
Water pump capacity: L/min (gpm)	466 (123)
Heat rejection to coolant: kW (BTUM)	235 (13,364)
Heat rejection to after cooler: kW (BTUM)	118 (6,710)
Heat radiated to ambient: kW (BTUM)	58.6 (3,332)
Fan power: kW (hp)	17.1 (22.9)

Air requirements

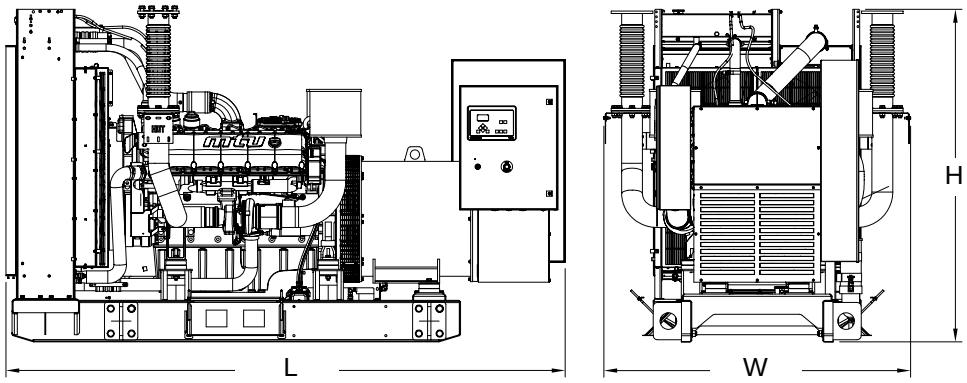
Aspirating: *m^3/min (SCFM)	35 (1,250)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	642 (22,672)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	213 (7,516)

* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

Gas temperature (stack): °C (°F)	461 (862)
Gas volume at stack temperature: m^3/min (CFM)	103 (3,623)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_2O)	8.5 (34.1)

Weights and dimensions



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System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	3,416 x 1,873 x 2,032 mm (134.5 x 73.8 x 80 in)	4,175-5,129 kg (9,205-11,308 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load
Level 0 (OPU): dB(A)	93.5

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
6.9	0.45	0.03

- All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

- Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 8528-1, ISO-3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 12V1600 DS550

550 kWe/60 Hz/Standby/208 - 600V
Reference ***mtu*** 12V1600 DS550 (500 kWe) for Prime Rating Technical Data

System ratings

Voltage (L-L)	208V †	240V †	380V	440V	480V †	600V
Phase	3	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60
kW	550	550	550	550	550	550
kVA	687	687	687	687	687	687
Amps	1,908	1,654	1,045	902	827	662
skVA@30% voltage dip	908	682	947	1,750	2,190	1,438
Generator model	573RSL4033	573RSL4033	573RSL4033	573RSL4033	572RSL4031	572RSS4272
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	12 LEAD WYE	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 2 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality, and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110
  - Permissible average power output during 24 hours of operation is approved up to 85%.

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 12V1600 diesel engine
  - 21.0 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - Permanent Magnet Generator (PMG) supply to regulator
  - 300% short circuit capability
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filters
- Closed crankcase ventilation
- Jacket water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 0.25% voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	***mtu***
Model	12V1600G70S
Type	4-cycle
Arrangement	12-V
Displacement: L (cu in)	21.0 (1,281)
Bore: cm (in)	12 (4.72)
Stroke: cm (in)	15 (5.91)
Compression ratio	17.5:1
Rated rpm	1,800
Engine governor	electronic isochronous (ADEC)
Maximum. power: kWm (bhp)	613 (822)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	73 (19.3)
Engine jacket water capacity: L (gal)	65 (17.2)
System coolant capacity: L (gal)	106 (28.1)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	1,050
Batteries: group size	4D
Batteries: quantity	2

Fuel system

Fuel supply connection size	-10 JIC 37° female M20 x 1.5 male adapter provided
Fuel return connection size	-6 JIC 37° female M14 x 1.5 male adapter provided
Maximum fuel lift: m (ft)	5 (16)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	402 (106.2)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	140.4 (37.1)
At 75% of power rating: L/hr (gal/hr)	106 (28)
At 50% of power rating: L/hr (gal/hr)	75.3 (19.9)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_2O)	0.2 (0.8)
Water pump capacity: L/min (gpm)	517 (137)
Heat rejection to coolant: kW (BTUM)	242 (13,762)
Heat rejection to after cooler: kW (BTUM)	150 (8,530)
Heat radiated to ambient: kW (BTUM)	62.2 (3,537)
Fan power: kW (hp)	23.1 (31)

Air requirements

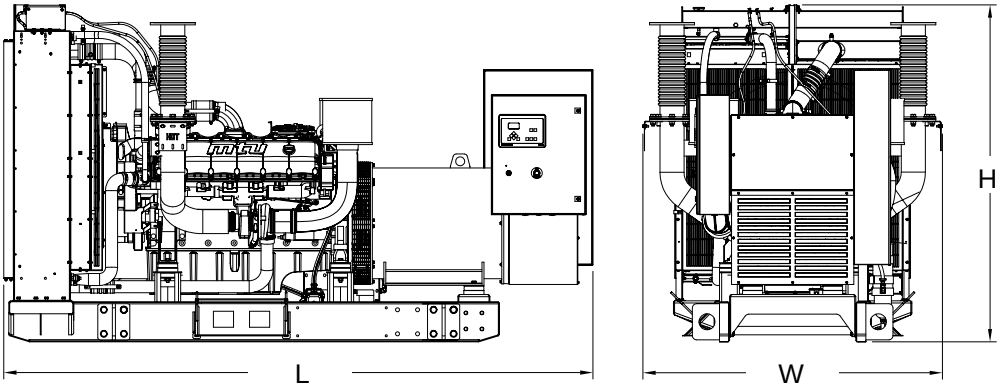
Aspirating: *m^3/min (SCFM)	52 (1,844)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	756 (26,700)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	226 (7,977)

* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

Gas temperature (stack): °C (°F)	413 (775)
Gas volume at stack temperature: m^3/min (CFM)	126 (4,450)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_2O)	8.5 (34.1)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	3,737 x 1,899 x 2,137 mm (147.1 x 74.8 x 84.1 in)	4,774-5,829 kg (10,524-12,850 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load
Level 0 (OPU): dB(A)	91.9

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
5.12	0.3	0.02

- All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

- Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 12V1600 DS600

600 kWe/60 Hz/Standby/208 - 600V
Reference *mtu* 12V1600 DS600 (550 kWe) for Prime Rating Technical Data

System ratings

Voltage (L-L)	208V †	240V †	380V	440V	480V †	600V
Phase	3	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60
kW	600	600	600	600	600	600
kVA	750	750	750	750	750	750
Amps	2,082	1,804	1,140	984	902	722
skVA@30% voltage dip	908	682	1,232	1,400	2,190	1,438
Generator model	573RSL4033	573RSL4033	573RSL4035	573RSL4033	572RSL4031	572RSS4272
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	12 LEAD WYE	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 2 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality, and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110
  - Permissible average power output during 24 hours of operation is approved up to 85%.

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 12V1600 diesel engine
  - 21.0 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - Permanent Magnet Generator (PMG) supply to regulator
  - 300% short circuit capability
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Closed crankcase ventilation
- Jacket water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 0.25% voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
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- Engine protection
- CANBus ECU communications
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- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	***mtu***
Model	12V1600G80S
Type	4-cycle
Arrangement	12-V
Displacement: L (cu in)	21.0 (1,281)
Bore: cm (in)	12 (4.72)
Stroke: cm (in)	15 (5.91)
Compression ratio	17.5:1
Rated rpm	1,800
Engine governor	electronic isochronous (ADEC)
Maximum power: kWm (bhp)	668 (896)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	73 (19.3)
Engine jacket water capacity: L (gal)	65 (17.2)
System coolant capacity: L (gal)	106 (28.1)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	1,050
Batteries: group size	4D
Batteries: quantity	2

Fuel system

Fuel supply connection size	-10 JIC 37° female M20 x 1.5 male adapter provided
Fuel return connection size	-6 JIC 37° female M14 x 1.5 male adapter provided
Maximum fuel lift: m (ft)	5 (16)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	402 (106.2)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	151.4 (40)
At 75% of power rating: L/hr (gal/hr)	114.3 (30.2)
At 50% of power rating: L/hr (gal/hr)	80.2 (21.2)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_2O)	0.2 (0.8)
Water pump capacity: L/min (gpm)	517 (137)
Heat rejection to coolant: kW (BTUM)	270 (15,354)
Heat rejection to after cooler: kW (BTUM)	170 (9,667)
Heat radiated to ambient: kW (BTUM)	67.1 (3,816)
Fan power: kW (hp)	23.1 (31)

Air requirements

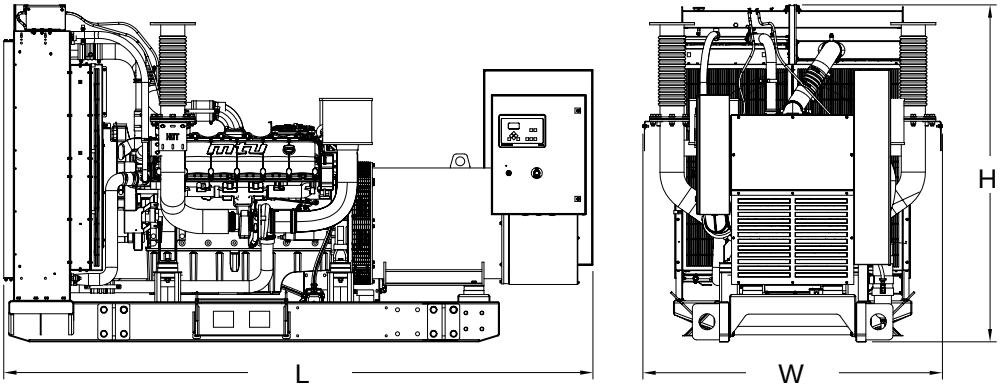
Aspirating: *m^3/min (SCFM)	54 (1,907)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	756 (26,700)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	244 (8,606)

* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

Gas temperature (stack): °C (°F)	425 (797)
Gas volume at stack temperature: m^3/min (CFM)	132 (4,662)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_2O)	8.5 (34.1)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	3,737 x 1,899 x 2,137 mm (147.1 x 74.8 x 84.1 in)	4,774-5,829 kg (10,524-12,850 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load
Level 0 (OPU): dB(A)	91.1

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
5.36	0.3	0.03

- All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

- Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 12V1600 DS750

750 kWe/60 Hz/Standby/208 - 600V

Reference *mtu* 12V1600 DS750 (690 kWe) for Prime Power for Stationary Emergency Rating Technical Data

System ratings

Voltage (L-L)	208V †	240V †	380V †	480V †	600V
Phase	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60
kW	750	750	750	750	750
kVA	937	937	937	937	937
Amps	2,602	2,255	1,424	1,127	902
skVA@30% voltage dip	2,450	2,450	2,310	2,575	2,525
Generator model	LSA 49.3 L9	LSA 49.3 L9	LSA 49.3 M8	LSA 49.3 M8	LSA 49.3 M8
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	12 LEAD WYE	12 LEAD DELTA	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 2 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality, and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110
  - Permissible average power output during 24 hours of operation is approved up to 85%.

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 12V1600 diesel engine
  - 22.44 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - Permanent Magnet Generator (PMG) supply to regulator
  - 300% short circuit capability
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Closed crankcase ventilation
- Jacket water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 0.25% voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	***mtu***
Model	12V1600G71S
Type	4-cycle
Arrangement	12-V
Displacement: L (cu in)	22.44 (1,369)
Bore: cm (in)	12.6 (4.96)
Stroke: cm (in)	15 (5.91)
Compression ratio	15.89:1
Rated rpm	1,800
Engine governor	electronic isochronous (ADEC)
Maximum power: kWm (bhp)	836 (1,121)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	73 (19.3)
Engine jacket water capacity: L (gal)	65 (17.2)
System coolant capacity: L (gal)	109 (28.8)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	1,050
Batteries: group size	4D
Batteries: quantity	2

Fuel system

Fuel supply connection size	-10 JIC 37° female
Fuel return connection size	-6 JIC 37° female
Maximum fuel lift: m (ft)	3 (10)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	328 (86.7)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	193.3 (51.1)
At 75% of power rating: L/hr (gal/hr)	144.1 (38.1)
At 50% of power rating: L/hr (gal/hr)	107.3 (28.3)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.2 (0.8)
Water pump capacity: L/min (gpm)	517 (137)
Heat rejection to coolant: kW (BTUM)	285 (16,208)
Heat rejection to after cooler: kW (BTUM)	215 (12,227)
Heat radiated to ambient: kW (BTUM)	71.2 (4,049)
Fan power: kW (hp)	29 (38.9)

Air requirements

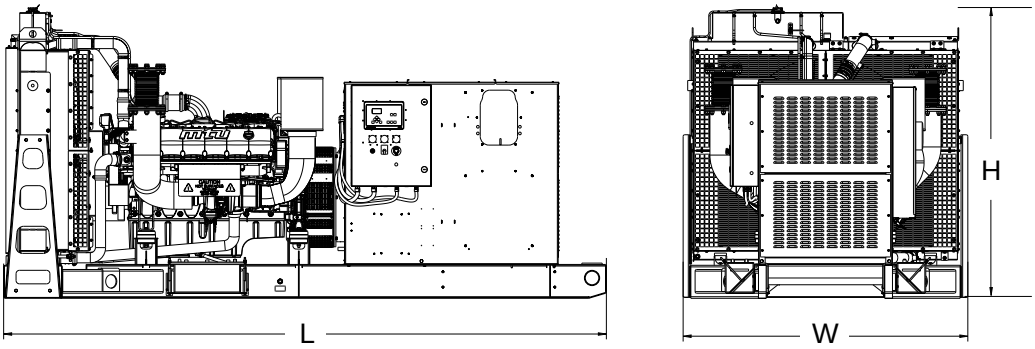
Aspirating: *m^3/min (SCFM)	68.4 (2,416)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	1,007 (35,579)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	260 (9,244)

* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

Gas temperature (stack): °C (°F)	481 (898)
Gas volume at stack temperature: m^3/min (CFM)	161 (5,686)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	8.5 (34.1)

Weights and dimensions



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System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	4,521 x 2,135 x 2,179 mm (178 x 84.1 x 85.8in)	4,774-5,829 kg (10,524-12,850 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load
Level 0 (OPU): dB(A)	94.9

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
8.07	0.83	0.04

- All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

- Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

C/F = Consult Factory/***mtu*** Distributor

Diesel Generator Set

mtu 12V1600 DS800

800 kWe/60 Hz/Standby/208 - 600V
Reference *mtu* 12V1600 DS800 (730 kWe) for Prime Power for Stationary Emergency Rating Technical Data

System ratings

Voltage (L-L)	208V †	240V †	380V †	480V †	600V
Phase	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60
kW	800	800	800	800	800
kVA	1,000	1,000	1,000	1,000	1,000
Amps	2,775	2,405	1,519	1,202	962
skVA@30% voltage dip	2,375	2,375	2,675	2,575	3,600
Generator model	LSA 49.3 L10	LSA 49.3 L10	LSA 49.3 L9	LSA 49.3 M8	LSA 49.3 L9
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	12 LEAD WYE	12 LEAD DELTA	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 2 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality, and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110
  - Permissible average power output during 24 hours of operation is approved up to 85%.

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 12V1600 diesel engine
  - 22.44 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - Permanent Magnet Generator (PMG) supply to regulator
  - 300% short circuit capability
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Closed crankcase ventilation
- Jacket water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 0.25% voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	***mtu***
Model	12V1600G81S
Type	4-cycle
Arrangement	12-V
Displacement: L (cu in)	22.44 (1,369)
Bore: cm (in)	12.6 (4.96)
Stroke: cm (in)	15 (5.91)
Compression ratio	15.89:1
Rated rpm	1,800
Engine governor	electronic isochronous (ADEC)
Maximum power: kWm (bhp)	890 (1,193)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	73 (19.3)
Engine jacket water capacity: L (gal)	65 (17.2)
System coolant capacity: L (gal)	109 (28.8)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	1,050
Batteries: group size	4D
Batteries: quantity	2

Fuel system

Fuel supply connection size	-10 JIC 37° female
Fuel return connection size	-6 JIC 37° female
Maximum fuel lift: m (ft)	3 (10)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	344.1 (90.9)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	206.7 (54.6)
At 75% of power rating: L/hr (gal/hr)	153 (40.4)
At 50% of power rating: L/hr (gal/hr)	108.8 (28.7)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.2 (0.8)
Water pump capacity: L/min (gpm)	517 (137)
Heat rejection to coolant: kW (BTUM)	305 (17,345)
Heat rejection to after cooler: kW (BTUM)	235 (13,364)
Heat radiated to ambient: kW (BTUM)	75.4 (4,290)
Fan power: kW (hp)	29 (38.9)

Air requirements

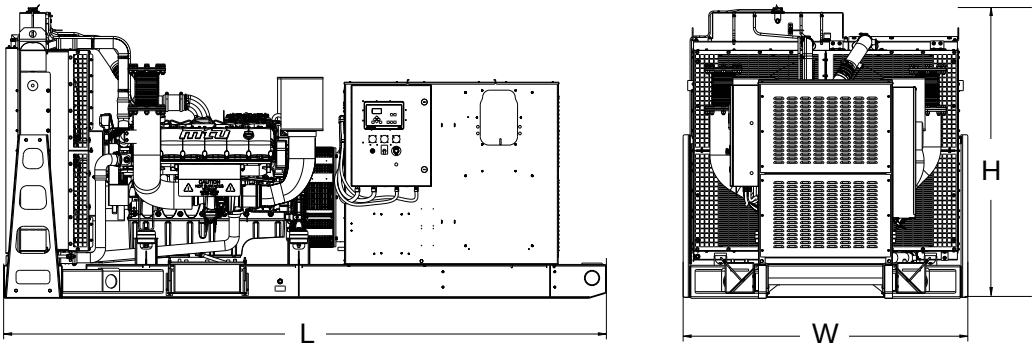
Aspirating: *m^3/min (SCFM)	70.8 (2,500)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	1,007 (35,579)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	276 (9,796)

* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

Gas temperature (stack): °C (°F)	497 (927)
Gas volume at stack temperature: m^3/min (CFM)	171 (6,039)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	8.5 (34.1)

Weights and dimensions



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System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	4,521 x 2,135 x 2,179 mm (178 x 84.1 x 85.8 in)	4,774-5,829 kg (10,524-12,850 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load
Level 0 (OPU): dB(A)	94.2

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
8.01	0.95	0.04

- All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

- Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

C/F = Consult Factory/***mtu*** Distributor

Diesel Generator Set

mtu 12V1600 DS900

900 kWe/60 Hz/Standby/208 - 600V
Reference *mtu* 12V1600 DS900 (820 kWe) for Prime Power for Stationary Emergency Rating Technical Data

System ratings

Voltage (L-L)	208V †	240V †	380V †	480V †	600V
Phase	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60
kW	900	900	900	900	900
kVA	1,125	1,125	1,125	1,125	1,125
Amps	3,122	2,706	1,709	1,353	1,082
skVA@30% voltage dip	1,660	1,660	1,550	3,310	2,050
Generator model	LSA 50.2 M6	LSA 50.2 M6	LSA 50.2 S4	LSA 49.3 L9	LSA 50.2 M6
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	12 LEAD WYE	12 LEAD DELTA	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 2 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality, and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110
  - Permissible average power output during 24 hours of operation is approved up to 85%.

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 12V1600 diesel engine
  - 22.44 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - Permanent Magnet Generator (PMG) supply to regulator
  - 300% short circuit capability
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Closed crankcase ventilation
- Jacket water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
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- 100% of rated load - one step
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Digital control panel(s)

- Digital metering
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- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	***mtu***
Model	12V1600G91S
Type	4-cycle
Arrangement	12-V
Displacement: L (cu in)	22.44 (1,369)
Bore: cm (in)	12.6 (4.96)
Stroke: cm (in)	15 (5.91)
Compression ratio	15.89:1
Rated rpm	1,800
Engine governor	electronic isochronous (ADEC)
Maximum power: kWm (bhp)	996 (1,335)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	73 (19.3)
Engine jacket water capacity: L (gal)	65 (17.2)
System coolant capacity: L (gal)	109 (28.8)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	1,050
Batteries: group size	4D
Batteries: quantity	2

Fuel system

Fuel supply connection size	-10 JIC 37° female
Fuel return connection size	-6 JIC 37° female
Maximum fuel lift: m (ft)	3 (10)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	375.6 (99.2)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	234.2 (61.9)
At 75% of power rating: L/hr (gal/hr)	171.6 (45.3)
At 50% of power rating: L/hr (gal/hr)	120.2 (31.8)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	40 (104)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.2 (0.8)
Water pump capacity: L/min (gpm)	517 (137)
Heat rejection to coolant: kW (BTUM)	350 (19,905)
Heat rejection to after cooler: kW (BTUM)	250 (14,218)
Heat radiated to ambient: kW (BTUM)	81.2 (4,615)
Fan power: kW (hp)	29 (38.9)

Air requirements

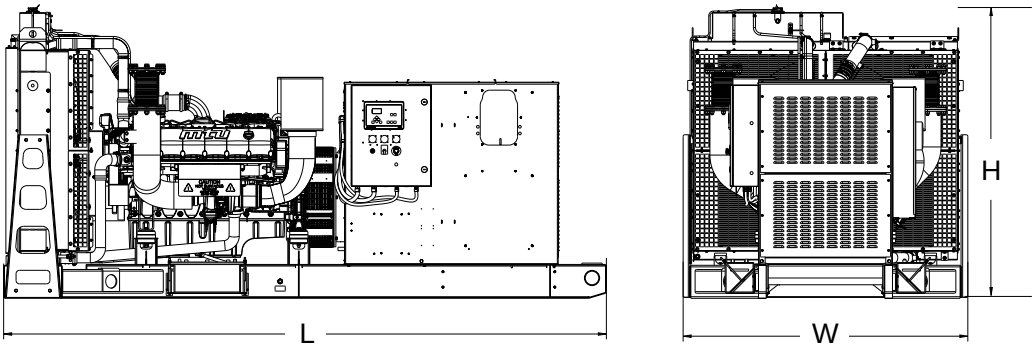
Aspirating: *m^3/min (SCFM)	73.2 (2,585)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	1,007 (35,579)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	297 10,537)

* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

Gas temperature (stack): °C (°F)	551 (1,024)
Gas volume at stack temperature: m^3/min (CFM)	196 (6,922)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	5 (20.1)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	4,521 x 2,135 x 2,179 mm (178 x 84.1 x 85.8 in)	4,774-5,829 kg (10,524-12,850 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load
Level 0 (OPU): dB(A)	94.5

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
8.01	1.31	0.04

- All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

- Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

C/F = Consult Factory/***mtu*** Distributor

Diesel Generator Set

mtu 16V2000 DS1000

1,000 kWe/60 Hz/Standby/208 - 4,160V
Reference *mtu* 16V2000 DS1000 (900 kWe) for Prime Rating Technical Data

System ratings

Voltage (L-L)	208V † ‡	240V † ‡	380V † ‡	480V † ‡	600V ‡	4,160V
Phase	3	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60
kW	1,000	1,000	1,000	1,000	1,000	1,000
kVA	1,250	1,250	1,250	1,250	1,250	1,250
Amps	3,470	3,007	1,899	1,504	1,203	173
skVA@30% voltage dip	2,475	2,475	2,310	2,830	3,625	2,270
Generator model*	LSA 50.2 M6	LSA 50.2 M6	LSA 50.2 M6	LSA 49.1 L11	LSA 50.2 M6	LS 50.2 VL7
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	12 LEAD WYE	12 LEAD DELTA	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE

* Consult the factory for alternate configuration.
† UL 2200 offered
‡ CSA offered

Certifications and standards

- Emissions
  - EPA Tier 2 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional (refer to *System ratings* for availability)
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality, and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110
  - Permissible average power output during 24 hours of operation is approved up to 85%.

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 16V2000 diesel engine
  - 35.7 liter displacement
  - Common rail fuel injection
  - 4-cycle
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - AREP supply to regulator
  - 300% short circuit capability
- Digital control panel(s)
  - UL recognized, CSA Certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Closed crankcase ventilation
- Jacket water pump
- Inter cooler water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - structural steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery rack and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 0.25% voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU Communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	***mtu***
Model	16V2000G86S
Type	4-cycle
Arrangement	16-V
Displacement: L (in³)	35.7 (2,179)
Bore: cm (in)	13.5 (5.3)
Stroke: cm (in)	15.6 (6.1)
Compression ratio	16:1
Rated rpm	1,800
Engine governor	electronic isochronous (ADEC)
Maximum power: kWm (bhp)	1,371 (1,839)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	114 (30.1)
Engine jacket water capacity: L (gal)	70 (18.5)
After cooler water capacity: L (gal)	25 (6.6)
System coolant capacity: L (gal)	188 (50)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	2,800
Batteries: group size	8D
Batteries: quantity	4

Fuel system

Fuel supply connection size	#12 JIC 37° male
Fuel return connection size	#12 JIC 37° male
Maximum fuel lift: m (ft)	5 (16)
Recommended fuel	diesel #2
Total fuel flow: L/hr (gal/hr)	1,500 (396)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	276 (73)
At 75% of power rating: L/hr (gal/hr)	211 (56)
At 50% of power rating: L/hr (gal/hr)	146 (38)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_2O)	0.12 (0.5)
Water pump capacity: L/min (gpm)	783 (207)
After cooler pump capacity: L/min (gpm)	258 (68)
Heat rejection to coolant: kW (BTUM)	444 (25,272)
Heat rejection to after cooler: kW (BTUM)	293 (16,677)
Heat radiated to ambient: kW (BTUM)	91 (5,289)
Fan power: kW (hp)	49 (65.7)

Air requirements

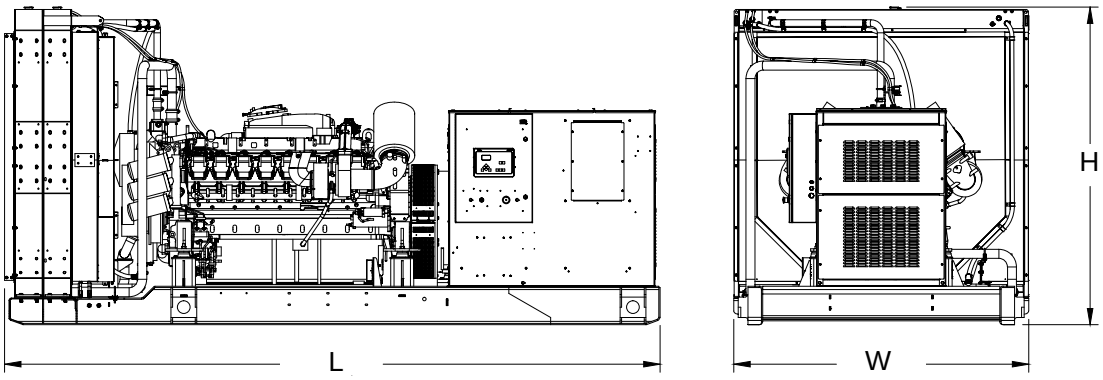
Aspirating: *m³/min (SCFM)	102 (3,602)
Air flow required for radiator cooled unit: *m³/min (SCFM)	1,709 (60,350)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m³/min (SCFM)	338 (11,925)

* Air density = 1.184 kg/m³ (0.0739 lbm/ft³)

Exhaust system

Gas temperature (stack): °C (°F)	505 (941)
Gas volume at stack temperature: m³/min (CFM)	270 (9,535)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_2O)	8.5 (34.1)

Weights and dimensions



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System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	5,093 x 2,292 x 2,477 mm (200.5 x 90.3 x 97.5 in)	8,525 kg (18,795 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load
Level 0 (OPU): dB(A)	95.1

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
5.88	0.01	0.01

- All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA Standards.

Rating definitions and conditions

- Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 16V2000 DS1250

1,250 kWe/60 Hz/Standby/380 - 4,160V

System ratings

Voltage (L-L)	380V † ‡	480V † ‡	600V ‡	4,160V
Phase	3	3	3	3
PF	0.8	0.8	0.8	0.8
Hz	60	60	60	60
kW	1,250	1,250	1,250	1,250
kVA	1,562	1,562	1,562	1,562
Amps	2,374	1,879	1,503	216
skVA@30% voltage dip	3,625	4,440	4,420	2,800
Generator model*	LSA 50.2 L8	LSA 50.2 L8	LSA 50.2 L8	LSA 50.2 UL8
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE

* Consult the factory for alternate configuration.
† UL 2200 offered
‡ CSA offered

Certifications and standards

- Emissions
  - EPA Tier 2 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional (refer to *System ratings* for availability)
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality, and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110
  - Permissible average power output during 24 hours of operation is approved up to 85%.

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 16V2000 diesel engine
  - 35.7 liter displacement
  - Common rail fuel injection
  - 4-cycle
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - AREP supply to regulator
  - 300% short circuit capability
- Digital control panel(s)
  - UL recognized, CSA Certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Closed crankcase ventilation
- Jacket water pump
- Inter cooler water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - structural steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery rack and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 0.25% voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU Communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	***mtu***
Model	16V2000G86S
Type	4-cycle
Arrangement	16-V
Displacement: L (in³)	35.7 (2,179)
Bore: cm (in)	13.5 (5.3)
Stroke: cm (in)	15.6 (6.1)
Compression ratio	16:1
Rated rpm	1,800
Engine governor	electronic isochronous (ADEC)
Maximum power: kWm (bhp)	1,371 (1,839)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	114 (30.1)
Engine jacket water capacity: L (gal)	70 (18.5)
After cooler water capacity: L (gal)	25 (6.6)
System coolant capacity: L (gal)	188 (50)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	2,800
Batteries: group size	8D
Batteries: quantity	4

Fuel system

Fuel supply connection size	#12 JIC 37° male
Fuel return connection size	#12 JIC 37° male
Maximum fuel lift: m (ft)	5 (16)
Recommended fuel	diesel #2
Total fuel flow: L/hr (gal/hr)	1,500 (396)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	333 (88)
At 75% of power rating: L/hr (gal/hr)	261 (69)
At 50% of power rating: L/hr (gal/hr)	173 (46)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	40 (104)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_2O)	0.12 (0.5)
Water pump capacity: L/min (gpm)	783 (207)
After cooler pump capacity: L/min (gpm)	258 (68)
Heat rejection to coolant: kW (BTUM)	510 (29,003)
Heat rejection to after cooler: kW (BTUM)	345 (19,620)
Heat radiated to ambient: kW (BTUM)	100 (5,687)
Fan power: kW (hp)	49 (66)

Air requirements

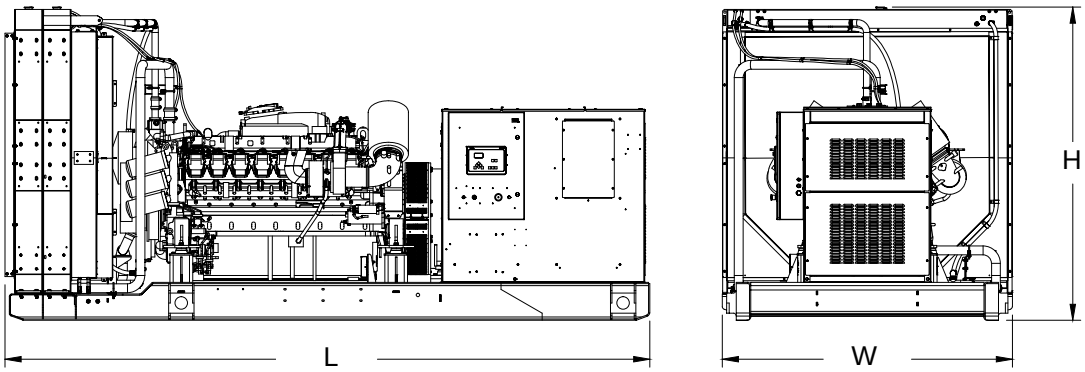
Aspirating: *m³/min (SCFM)	108 (3,814)
Air flow required for radiator cooled unit: *m³/min (SCFM)	1,709 (60,350)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m³/min (SCFM)	363 (12,822)

* Air density = 1.184 kg/m³ (0.0739 lbm/ft³)

Exhaust system

Gas temperature (stack): °C (°F)	535 (995)
Gas volume at stack temperature: m³/min (CFM)	312 (11,018)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_2O)	8.5 (34.1)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	5,093 x 2,292 x 2,477 mm (200.5 x 90.3 x 97.5 in)	9,525 kg (21,000 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load
Level 0 (OPU): dB(A)	96.3

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
5.88	0.01	0.01

- All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA Standards.

Rating definitions and conditions

- Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 18V2000 DS1250

1,250 kWe/60 Hz/Standby/380 - 4,160V
Reference *mtu* 18V2000 DS1250 (1,000 kWe) for Prime Rating Technical Data

System ratings

Voltage (L-L)	380V † ‡	480V † ‡	600V ‡	4,160V
Phase	3	3	3	3
PF	0.8	0.8	0.8	0.8
Hz	60	60	60	60
kW	1,250	1,250	1,250	1,250
kVA	1,562	1,562	1,562	1,562
Amps	2,374	1,879	1,503	216
skVA@30% voltage dip	2,700	3,100	4,650	3,100
Generator model*	743RSL4052	742RSL4048	743RSS4288	742FSM4366
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	4 LEAD WYE	4 LEAD WYE	4 LEAD WYE	6 LEAD WYE

* Consult the factory for alternate configuration.
† UL 2200 offered
‡ CSA offered

Certifications and standards

- Emissions
  - EPA Tier 2 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional (refer to *System ratings* for availability)
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality, and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110
  - Permissible average power output during 24 hours of operation is approved up to 85%.

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 18V2000 diesel engine
  - 40.2 liter displacement
  - Common rail fuel injection
  - 4-cycle
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - Permanent Magnet Generator (PMG) supply to regulator
  - 300% short circuit capability
- Digital control panel(s)
  - UL recognized, CSA Certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Closed crankcase ventilation
- Jacket water pump
- Thermostat
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery rack and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 0.25% voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
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- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	***mtu***
Model	18V2000G76S
Type	4-cycle
Arrangement	18-V
Displacement: L (in³)	40.2 (2,448)
Bore: cm (in)	13.5 (5.3)
Stroke: cm (in)	15.6 (6.15)
Compression ratio	17.5:1
Rated speed: rpm	1,800
Engine governor	electronic isochronous (ADEC)
Maximum power: kWm (bhp)	1,371 (1,838)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	122 (32.2)
Engine jacket water capacity: L (gal)	73 (19.3)
System coolant capacity: L (gal)	185 (48.9)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	2,800
Batteries: group size	8D
Batteries: quantity	4

Fuel system

Fuel supply connection size	#12 JIC 37° female 1" NPT adapter provided
Fuel return connection size	#12 JIC 37° female 1" NPT adapter provided
Maximum fuel lift: m (ft)	5 (16)
Recommended fuel	diesel #2
Total fuel flow: L/hr (gal/hr)	1,500 (396)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	329 (87)
At 75% of power rating: L/hr (gal/hr)	251 (66)
At 50% of power rating: L/hr (gal/hr)	171 (45)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_2O)	0.12 (0.5)
Water pump capacity: L/min (gpm)	950 (251)
Heat rejection to coolant: kW (BTUM)	515 (29,288)
Heat rejection to after cooler: kW (BTUM)	340 (19,335)
Heat radiated to ambient: kW (BTUM)	117.3 (6,671)
Fan power: kW (hp)	33.5 (44.9)

Air requirements

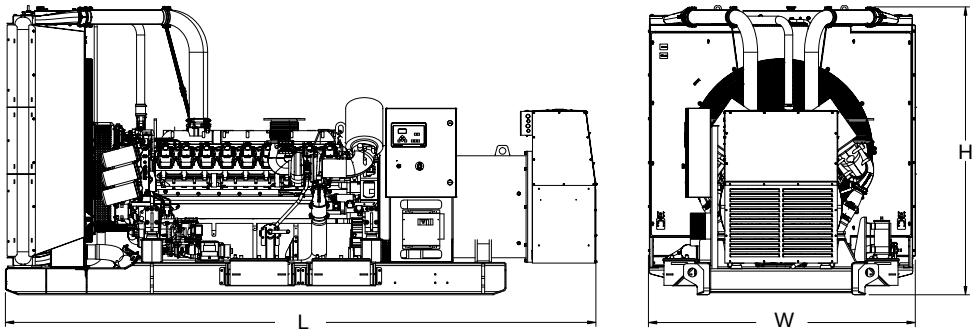
Aspirating: *m³/min (SCFM)	102 (3,602)
Air flow required for radiator cooled unit: *m³/min (SCFM)	1,512 (53,396)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m³/min (SCFM)	428 (15,224)

* Air density = 1.184 kg/m³ (0.0739 lbm/ft³)

Exhaust system

Gas temperature (stack): °C (°F)	480 (896)
Gas volume at stack temperature: m³/min (CFM)	252 (8,899)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_2O)	8.5 (34.1)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	5,036 x 2,275 x 2,454 mm (198.3 x 89.6 x 96.6 in)	9,525 kg (21,000 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load
Level 0 (OPU): dB(A)	88.4

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
4.77	0.15	0.01

— All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA Standards.

Rating definitions and conditions

— Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.
— Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
— Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 12V4000 DS1250 50 °C

1,250 kWe/60 Hz/Standby/380 - 13,800V

WAY TO NET ZERO Renew-able fuel

System ratings

Voltage (L-L)	380V † ‡	416V † ‡	440V † ‡	480V † ‡	600V ‡	4,160V	12,470V
Phase	3	3	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60	60
kW	1,250	1,250	1,250	1,250	1,250	1,250	1,250
kVA	1,562	1,562	1,562	1,562	1,562	1,562	1,562
Amps	2,374	2,169	2,050	1,879	1,503	216	72
skVA@30% voltage dip	2,122	2,939	3,288	3,913	2,601	2,877	2,912
Generator model*	50.2 L8	50.2 L8	50.2 L8	50.2 L8	50.2 L8	641-M55	4P6.6-2050
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE

Voltage (L-L)	13,200V	13,800V
Phase	3	3
PF	0.8	0.8
Hz	60	60
kW	1,250	1,250
kVA	1,562	1,562
Amps	68	65
skVA@30% voltage dip	2,869	3,135
Generator model*	4P6.6-2050	4P6.6-2050
Temp rise	130 °C/40 °C	130 °C/40 °C
Connection	6 LEAD WYE	6 LEAD WYE

* Consult the factory for alternate configuration. Generator model may end with -M or -R, depending on selection.
† UL 2200 offered
‡ CSA offered

A Rolls-Royce solution

Certifications and standards

- Emissions
  - EPA Tier 2 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional (refer to *System ratings* for availability)
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality, and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110
  - Permissible average power output during 24 hours of operation is approved up to 85%

Standard features *

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 12V4000 diesel engine
  - 57.2 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - Permanent Magnet Generator (PMG) supply to regulator
  - 300% short circuit capability
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment *

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Closed crankcase ventilation
- Jacket water pump
- Inter cooler water pump
- Thermostat
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - structural steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 0.25% voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	***mtu***
Model	12V4000G74S
Type	4-cycle
Arrangement	12-V
Displacement: L (in³)	57.2 (3,491)
Bore: cm (in)	17 (6.69)
Stroke: cm (in)	21 (8.27)
Compression ratio	16.5:1
Rated rpm	1,800
Engine governor	electronic isochronous (ADEC)
Maximum power: kWm (bhp)	1,736 (2,328)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	260 (68.7)
Engine jacket water capacity: L (gal)	160 (42.3)
After cooler water capacity: L (gal)	40 (10.6)
System coolant capacity: L (gal)	583 (154)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	2,800
Batteries: group size	8D
Batteries: quantity	4

Fuel system

Fuel supply connection size	#16 JIC 37° female 1" NPT adapter provided
Fuel return connection size	#16 JIC 37° female 1" NPT adapter provided
Maximum fuel lift: m (ft)	1 (3)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	960 (254)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	341 (90)
At 75% of power rating: L/hr (gal/hr)	268 (70.8)
At 50% of power rating: L/hr (gal/hr)	192 (50.7)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_2O)	0.12 (0.5)
Water pump capacity: L/min (gpm)	1,117 (295)
After cooler pump capacity: L/min (gpm)	583 (154)
Heat rejection to coolant: kW (BTUM)	576 (32,757)
Heat rejection to after cooler: kW (BTUM)	396 (22,520)
Heat radiated to ambient: kW (BTUM)	152.9 (8,696)
Fan power: kW (hp)	36.7 (49.2)

Air requirements

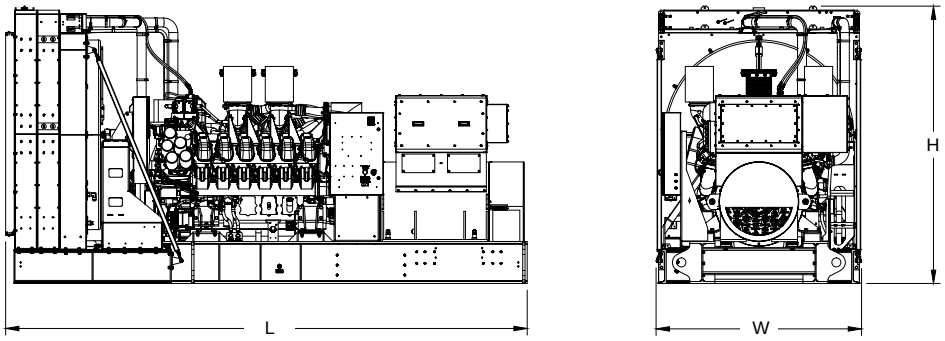
Aspirating: *m³/min (SCFM)	138 (4,873)
Air flow required for radiator cooled unit: *m³/min (SCFM)	1,416 (49,997)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m³/min (SCFM)	559 (19,854)

* Air density = 1.184 kg/m³ (0.0739 lbm/ft³)

Exhaust system

Gas temperature (stack): °C (°F)	425 (797)
Gas volume at stack temperature: m³/min (CFM)	336 (11,866)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_2O)	8.5 (34.1)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	5,876 x 2,314 x 2,977 mm (231.4 x 91.1 x 117.2 in)	16,413 kg (36,190 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load
Level 0 (OPU): dB(A)	91.9

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
5.34	0.52	0.05

- All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

- Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration Factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 12V4000 DS1500 40 °C

1,500 kWe/60 Hz/Standby/380 - 13,800V

System ratings

Voltage (L-L)	380V † ‡	416V † ‡	440V † ‡	480V † ‡	600V ‡	4,160V	12,470V
Phase	3	3	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60	60
kW	1,500	1,500	1,500	1,500	1,500	1,500	1,500
kVA	1,875	1,875	1,875	1,875	1,875	1,875	1,875
Amps	2,849	2,602	2,460	2,255	1,804	260	87
skVA@30% voltage dip	2,647	2,275	2,545	3,029	3,132	2,877	2,912
Generator model*	641-S55	641-S55	641-S55	50.2 L8	641-S55	641-M55	4P6.6-2050
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE

Voltage (L-L)	13,200V	13,800V
Phase	3	3
PF	0.8	0.8
Hz	60	60
kW	1,500	1,500
kVA	1,875	1,875
Amps	82	78
skVA@30% voltage dip	2,869	3,135
Generator model*	4P6.6-2050	4P6.6-2050
Temp rise	130 °C/40 °C	130 °C/40 °C
Connection	6 LEAD WYE	6 LEAD WYE

* Consult the factory for alternate configuration. Generator model may end with -M or -R, depending on selection.
† UL 2200 offered
‡ CSA offered

A Rolls-Royce solution

Certifications and standards

- Emissions
  - EPA Tier 2 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional (refer to *System ratings* for availability)
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality, and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110
  - Permissible average power output during 24 hours of operation is approved up to 85%

Standard features *

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 12V4000 diesel engine
  - 57.2 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - Permanent Magnet Generator (PMG) supply to regulator
  - 300% short circuit capability
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment *

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Closed crankcase ventilation
- Jacket water pump
- Inter cooler water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - structural steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 0.25% voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	***mtu***
Model	12V4000G74S
Type	4-cycle
Arrangement	12-V
Displacement: L (in³)	57.2 (3,491)
Bore: cm (in)	17 (6.69)
Stroke: cm (in)	21 (8.27)
Compression ratio	16.5:1
Rated rpm	1,800
Engine governor	electronic isochronous (ADEC)
Maximum power: kWm (bhp)	1,736 (2,328)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	260 (68.7)
Engine jacket water capacity: L (gal)	160 (42.3)
After cooler water capacity: L (gal)	40 (10.6)
System coolant capacity: L (gal)	583 (154)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	2,800
Batteries: group size	8D
Batteries: quantity	4

Fuel system

Fuel supply connection size	#16 JIC 37° female 1" NPT adapter provided
Fuel return connection size	#16 JIC 37° female 1" NPT adapter provided
Maximum fuel lift: m (ft)	1 (3)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	960 (254)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	420 (111)
At 75% of power rating: L/hr (gal/hr)	323 (85.3)
At 50% of power rating: L/hr (gal/hr)	226 (59.6)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	40 (104)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_2O)	0.12 (0.5)
Water pump capacity: L/min (gpm)	1,117 (295)
After cooler pump capacity: L/min (gpm)	583 (154)
Heat rejection to coolant: kW (BTUM)	640 (36,396)
Heat rejection to after cooler: kW (BTUM)	440 (25,022)
Heat radiated to ambient: kW (BTUM)	167 (9,504)
Fan power: kW (hp)	36.7 (49.2)

Air requirements

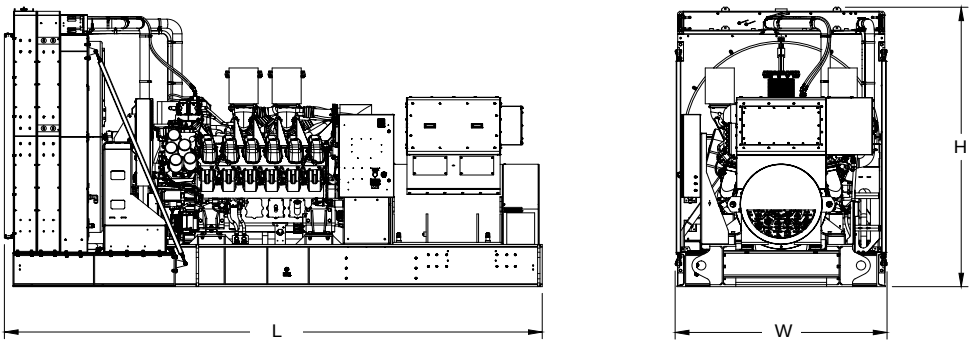
Aspirating: *m³/min (SCFM)	144 (5,085)
Air flow required for radiator cooled unit: *m³/min (SCFM)	1,416 (49,997)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m³/min (SCFM)	611 (21,698)

* Air density = 1.184 kg/m³ (0.0739 lbm/ft³)

Exhaust system

Gas temperature (stack): °C (°F)	435 (815)
Gas volume at stack temperature: m³/min (CFM)	342 (12,078)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_2O)	8.5 (34.1)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	5,876 x 2,314 x 2,977 mm (231.4 x 91.1 x 117.2 in)	16,413 kg (36,190 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load
Level 0 (OPU): dB(A)	92.2

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
5.34	0.52	0.05

- All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

- Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration Factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 12V4000 DS1500 50 °C

1,500 kWe/60 Hz/Standby/380 - 13,800V

System ratings

Voltage (L-L)	380V † ‡	416V † ‡	440V † ‡	480V † ‡	600V ‡	4,160V	12,470V
Phase	3	3	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60	60
kW	1,500	1,500	1,500	1,500	1,500	1,500	1,500
kVA	1,875	1,875	1,875	1,875	1,875	1,875	1,875
Amps	2,849	2,602	2,460	2,255	1,804	260	87
skVA@30% voltage dip	2,647	2,275	2,545	3,029	3,132	2,877	2,912
Generator model*	641-S55	641-S55	641-S55	50.2 L8	641-S55	641-M55	4P6.6-2050
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE

Voltage (L-L)	13,200V	13,800V
Phase	3	3
PF	0.8	0.8
Hz	60	60
kW	1,500	1,500
kVA	1,875	1,875
Amps	82	78
skVA@30% voltage dip	2,869	3,135
Generator model*	4P6.6-2050	4P6.6-2050
Temp rise	130 °C/40 °C	130 °C/40 °C
Connection	6 LEAD WYE	6 LEAD WYE

* Consult the factory for alternate configuration. Generator model may end with -M or -R, depending on selection.
† UL 2200 offered
‡ CSA offered

A Rolls-Royce solution

Certifications and standards

- Emissions
  - EPA Tier 2 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional (refer to *System ratings* for availability)
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality, and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110
  - Permissible average power output during 24 hours of operation is approved up to 85%

Standard features *

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 12V4000 diesel engine
  - 57.2 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - Permanent Magnet Generator (PMG) supply to regulator
  - 300% short circuit capability
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment *

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Closed crankcase ventilation
- Jacket water pump
- Inter cooler water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - structural steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 0.25 voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	***mtu***
Model	12V4000G74S
Type	4-cycle
Arrangement	12-V
Displacement: L (in³)	57.2 (3,491)
Bore: cm (in)	17 (6.69)
Stroke: cm (in)	21 (8.27)
Compression ratio	16.5:1
Rated rpm	1,800
Engine governor	electronic isochronous (ADEC)
Maximum power: kWm (bhp)	1,736 (2,328)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	260 (68.7)
Engine jacket water capacity: L (gal)	160 (42.3)
After cooler water capacity: L (gal)	40 (10.6)
System coolant capacity: L (gal)	583 (154)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	2,800
Batteries: group size	8D
Batteries: quantity	4

Fuel system

Fuel supply connection size	#16 JIC 37° female 1" NPT adapter provided
Fuel return connection size	#16 JIC 37° female 1" NPT adapter provided
Maximum fuel lift: m (ft)	1 (3)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	960 (254)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	420 (111)
At 75% of power rating: L/hr (gal/hr)	323 (85.3)
At 50% of power rating: L/hr (gal/hr)	226 (59.6)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_2O)	0.12 (0.5)
Water pump capacity: L/min (gpm)	1,117 (295)
After cooler pump capacity: L/min (gpm)	583 (154)
Heat rejection to coolant: kW (BTUM)	640 (36,396)
Heat rejection to after cooler: kW (BTUM)	440 (25,022)
Heat radiated to ambient: kW (BTUM)	167 (9,504)
Fan power: kW (hp)	82.4 (110.5)

Air requirements

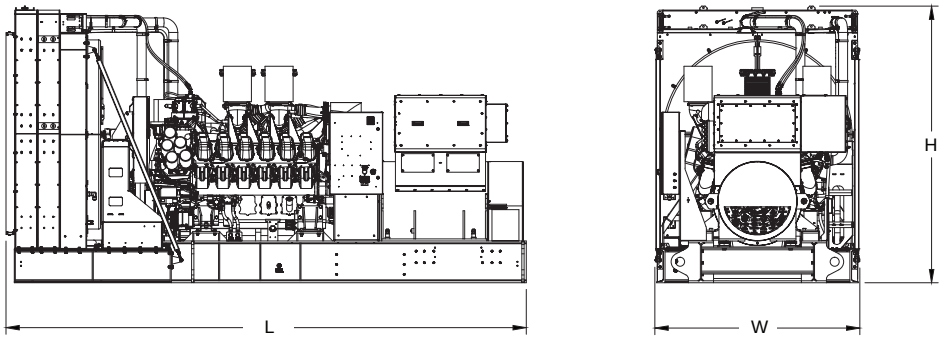
Aspirating: *m³/min (SCFM)	144 (5,085)
Air flow required for radiator cooled unit: *m³/min (SCFM)	2,074 (73,238)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m³/min (SCFM)	611 (21,698)

* Air density = 1.184 kg/m³ (0.0739 lbm/ft³)

Exhaust system

Gas temperature (stack): °C (°F)	435 (815)
Gas volume at stack temperature: m³/min (CFM)	342 (12,078)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_2O)	8.5 (34.1)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	5,876 x 2,314 x 2,977 mm (231.4 x 91.1 x 117.2 in)	16,413 kg (36,190 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load
Level 0 (OPU): dB(A)	92.2

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
5.34	0.52	0.05

- All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

- Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration Factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 12V4000 DS1750 40 °C

1,750 kWe/60 Hz/Standby/380 - 13,800V

WAY TO NET ZERO Renew-able fuel

System ratings

Voltage (L-L)	380V † ‡	416V † ‡	440V † ‡	480V † ‡	600V ‡	4,160V	12,470V
Phase	3	3	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60	60
kW	1,750	1,750	1,750	1,750	1,750	1,750	1,750
kVA	2,187	2,187	2,187	2,187	2,187	2,187	2,187
Amps	3,323	3,036	2,870	2,631	2,105	303	101
skVA@30% voltage dip	3,284	2,649	2,964	3,029	3,346	4,303	3,243
Generator model*	641-M60	641-M60	641-M60	641-S55	641-M60	641-VL75	4P6.6-2600
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE

Voltage (L-L)	13,200V	13,800V
Phase	3	3
PF	0.8	0.8
Hz	60	60
kW	1,750	1,750
kVA	2,187	2,187
Amps	96	92
skVA@30% voltage dip	3,633	3,971
Generator model*	4P6.6-2600	4P6.6-2600
Temp rise	130 °C/40 °C	130 °C/40 °C
Connection	6 LEAD WYE	6 LEAD WYE

* Consult the factory for alternate configuration. Generator model may end with -M or -R, depending on selection.
† UL 2200 offered
‡ CSA offered

A Rolls-Royce solution

Certifications and standards

- Emissions
  - EPA Tier 2 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional (refer to *System ratings* for availability)
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality, and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110
  - Permissible average power output during 24 hours of operation is approved up to 85%

Standard features *

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 12V4000 diesel engine
  - 57.2 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - Permanent Magnet Generator (PMG) supply to regulator
  - 300% short circuit capability
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment *

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Closed crankcase ventilation
- Jacket water pump
- Inter cooler water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - structural steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 0.25% voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	***mtu***
Model	12V4000G84S
Type	4-cycle
Arrangement	12-V
Displacement: L (in³)	57.2 (3,491)
Bore: cm (in)	17 (6.69)
Stroke: cm (in)	21 (8.27)
Compression ratio	16.5:1
Rated rpm	1,800
Engine governor	electronic isochronous (ADEC)
Maximum power: kWm (bhp)	1,910 (2,561)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	260 (68.7)
Engine jacket water capacity: L (gal)	160 (42.3)
After cooler water capacity: L (gal)	40 (10.6)
System coolant capacity: L (gal)	583 (154)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	2,800
Batteries: group size	8D
Batteries: quantity	4

Fuel system

Fuel supply connection size	#16 JIC 37° female 1" NPT adapter provided
Fuel return connection size	#16 JIC 37° female 1" NPT adapter provided
Maximum fuel lift: m (ft)	1 (3)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	960 (254)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	466 (123)
At 75% of power rating: L/hr (gal/hr)	352 (93)
At 50% of power rating: L/hr (gal/hr)	246 (65)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	40 (104)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.12 (0.5)
Water pump capacity: L/min (gpm)	1,117 (295)
After cooler pump capacity: L/min (gpm)	583 (154)
Heat rejection to coolant: kW (BTUM)	700 (39,808)
Heat rejection to after cooler: kW (BTUM)	500 (28,435)
Heat radiated to ambient: kW (BTUM)	168 (9,564)
Fan power: kW (hp)	48.7 (65.3)

Air requirements

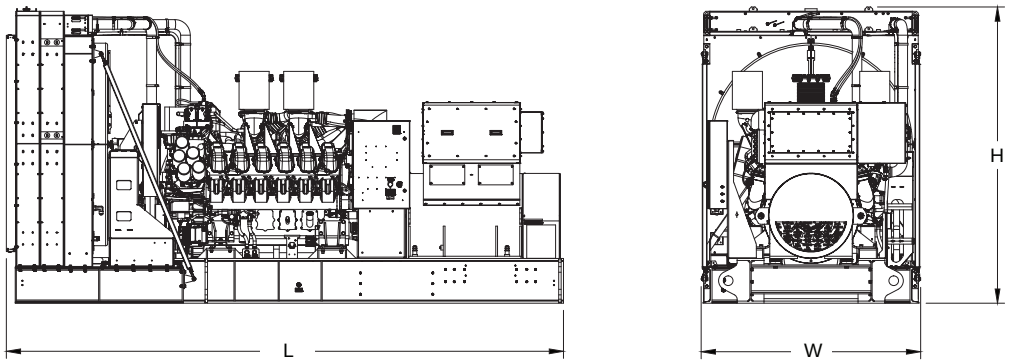
Aspirating: *m³/min (SCFM)	144 (5,085)
Air flow required for radiator cooled unit: *m³/min (SCFM)	1,722 (60,800)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m³/min (SCFM)	615 (21,835)

* Air density = 1.184 kg/m³ (0.0739 lbm/ft³)

Exhaust system

Gas temperature (stack): °C (°F)	465 (869)
Gas volume at stack temperature: m³/min (CFM)	366 (12,925)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	8.5 (34.1)

Weights and dimensions



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System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	5,876 x 2,314 x 3,125 mm (231.4 x 91.1 x 123 in)	16,987 kg (37,457 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load
Level 0 (OPU): dB(A)	93.2

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
5.16	0.67	0.05

- All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

- Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration Factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 12V4000 DS1750 50 °C

1,750 kWe/60 Hz/Standby/380 - 13,800V

System ratings

Voltage (L-L)	380V † ‡	416V † ‡	440V † ‡	480V † ‡	600V ‡	4,160V	12,470V
Phase	3	3	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60	60
kW	1,750	1,750	1,750	1,750	1,750	1,750	1,750
kVA	2,187	2,187	2,187	2,187	2,187	2,187	2,187
Amps	3,323	3,036	2,870	2,631	2,105	303	101
skVA@30% voltage dip	3,284	2,649	2,964	3,029	3,346	4,303	3,243
Generator model*	641-M60	641-M60	641-M60	641-S55	641-M60	641-VL75	4P6.6-2600
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE

Voltage (L-L)	13,200V	13,800V
Phase	3	3
PF	0.8	0.8
Hz	60	60
kW	1,750	1,750
kVA	2,187	2,187
Amps	96	92
skVA@30% voltage dip	3,633	3,971
Generator model*	4P6.6-2600	4P6.6-2600
Temp rise	130 °C/40 °C	130 °C/40 °C
Connection	6 LEAD WYE	6 LEAD WYE

* Consult the factory for alternate configuration. Generator model may end with -M or -R, depending on selection.
† UL 2200 offered
‡ CSA offered

A Rolls-Royce solution

Certifications and standards

- Emissions
  - EPA Tier 2 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional (refer to *System ratings* for availability)
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110
  - Permissible average power output during 24 hours of operation is approved up to 85%

Standard features *

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 12V4000 diesel engine
  - 57.2 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - Permanent Magnet Generator (PMG) supply to regulator
  - 300% short circuit capability
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment *

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Closed crankcase ventilation
- Jacket water pump
- Inter cooler water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - structural steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 0.25% voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	***mtu***
Model	12V4000G84S
Type	4-cycle
Arrangement	12-V
Displacement: L (in³)	57.2 (3,491)
Bore: cm (in)	17 (6.69)
Stroke: cm (in)	21 (8.27)
Compression ratio	16.5:1
Rated rpm	1,800
Engine governor	electronic isochronous (ADEC)
Maximum power: kWm (bhp)	1,910 (2,561)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	260 (68.7)
Engine jacket water capacity: L (gal)	160 (42.3)
After cooler water capacity: L (gal)	40 (10.6)
System coolant capacity: L (gal)	583 (154)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	2,800
Batteries: group size	8D
Batteries: quantity	4

Fuel system

Fuel supply connection size	#16 JIC 37° female 1" NPT adapter provided
Fuel return connection size	#16 JIC 37° female 1" NPT adapter provided
Maximum fuel lift: m (ft)	1 (3)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	960 (254)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	466 (123)
At 75% of power rating: L/hr (gal/hr)	352 (93)
At 50% of power rating: L/hr (gal/hr)	246 (65)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_2O)	0.12 (0.5)
Water pump capacity: L/min (gpm)	1,117 (295)
After cooler pump capacity: L/min (gpm)	583 (154)
Heat rejection to coolant: kW (BTUM)	700 (39,808)
Heat rejection to after cooler: kW (BTUM)	500 (28,435)
Heat radiated to ambient: kW (BTUM)	168 (9,564)
Fan power: kW (hp)	76.2 (102.2)

Air requirements

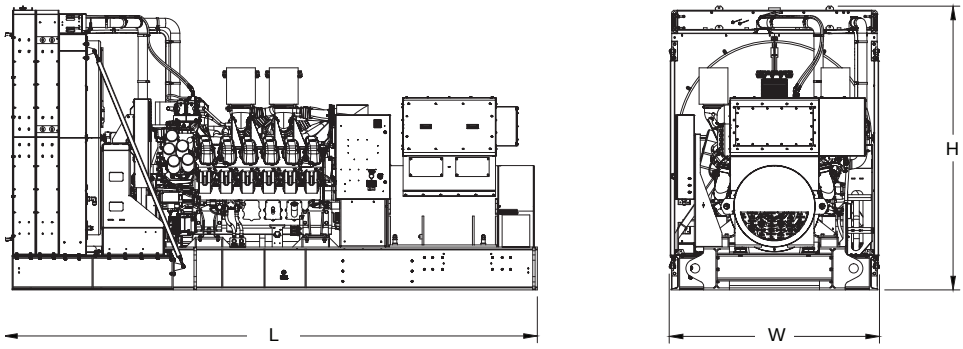
Aspirating: *m³/min (SCFM)	144 (5,085)
Air flow required for radiator cooled unit: *m³/min (SCFM)	2,027 (71,579)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m³/min (SCFM)	615 (21,835)

* Air density = 1.184 kg/m³ (0.0739 lbm/ft³)

Exhaust system

Gas temperature (stack): °C (°F)	465 (869)
Gas volume at stack temperature: m³/min (CFM)	366 (12,925)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_2O)	8.5 (34.1)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	5,876 x 2,314 x 2,977 mm (231.4 x 91.1 x 117.2 in)	16,917 kg (37,303 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load
Level 0 (OPU): dB(A)	93.2

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
5.16	0.67	0.05

- All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

- Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 16V4000 DS2000 45 °C

2,000 kWe/60 Hz/Standby/380 - 13,800V

System ratings

Voltage (L-L)	380V † ‡	416V † ‡	440V † ‡	480V † ‡	600V ‡	4,160V	12,470V
Phase	3	3	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60	60
kW	2,000	2,000	2,000	2,000	2,000	2,000	2,000
kVA	2,500	2,500	2,500	2,500	2,500	2,500	2,500
Amps	3,798	3,470	3,280	3,007	2,406	347	116
skVA@30% voltage dip	6,899	6,030	6,745	4,914	4,575	4,303	3,243
Generator model*	841-M70	841-M70	841-M70	641-VL90	641-VL85	641-VL75	4P6.6-2600
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE

Voltage (L-L)	13,200V	13,800V
Phase	3	3
PF	0.8	0.8
Hz	60	60
kW	2,000	2,000
kVA	2,500	2,500
Amps	109	105
skVA@30% voltage dip	3,633	3,971
Generator model*	4P6.6-2600	4P6.6-2600
Temp rise	130 °C/40 °C	130 °C/40 °C
Connection	6 LEAD WYE	6 LEAD WYE

* Consult the factory for alternate configuration. Generator model may end with -M or -R, depending on selection.
† UL 2200 offered
‡ CSA offered

A Rolls-Royce solution

Certifications and standards

- Emissions
  - EPA Tier 2 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional (refer to *System ratings* for availability)
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality, and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110
  - Permissible average power output during 24 hours of operation is approved up to 85%

Standard features *

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 16V4000 diesel engine
  - 76.3 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - Permanent Magnet Generator (PMG) supply to regulator
  - 300% short circuit capability
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment *

Engine

- Air cleaner
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Closed crankcase ventilation
- Jacket water pump
- Inter cooler water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - structural steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 0.25% voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	***mtu***
Model	16V4000G74S
Type	4-cycle
Arrangement	16-V
Displacement: L (in³)	76.3 (4,656)
Bore: cm (in)	17 (6.69)
Stroke: cm (in)	21 (8.27)
Compression ratio	16.5:1
Rated rpm	1,800
Engine governor	electronic isochronous (ADEC)
Maximum power: kWm (bhp)	2,280 (3,058)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	300 (79.3)
Engine jacket water capacity: L (gal)	175 (46.2)
After cooler water capacity: L (gal)	50 (13.2)
System coolant capacity: L (gal)	547 (145)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	2,800
Batteries: group size	8D
Batteries: quantity	4

Fuel system

Fuel supply connection size	-16 JIC 37° female 1" NPT adapter provided
Fuel return connection size	-16 JIC 37° female 1" NPT adapter provided
Maximum fuel lift: m (ft)	1 (3)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	1,200 (317)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	558 (147.3)
At 75% of power rating: L/hr (gal/hr)	426 (112.6)
At 50% of power rating: L/hr (gal/hr)	299 (78.9)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	45 (113)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_2O)	0.12 (0.5)
Water pump capacity: L/min (gpm)	1,350 (357)
After cooler pump capacity: L/min (gpm)	583 (154)
Heat rejection to coolant: kW (BTUM)	840 (47,770)
Heat rejection to after cooler: kW (BTUM)	610 (34,690)
Heat radiated to ambient: kW (BTUM)	190 (10,809)
Fan power: kW (hp)	95.4 (128)

Air requirements

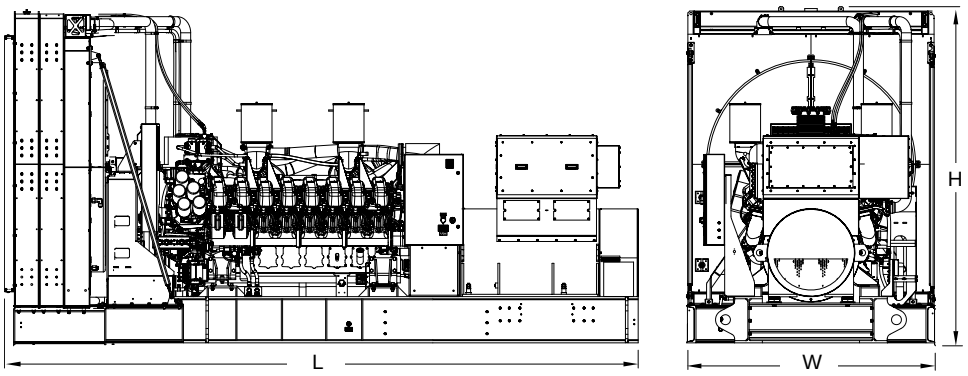
Aspirating: *m³/min (SCFM)	186 (6,569)
Air flow required for radiator cooled unit: *m³/min (SCFM)	2,053 (72,500)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m³/min (SCFM)	689 (24,492)

* Air density = 1.184 kg/m³ (0.0739 lbm/ft³)

Exhaust system

Gas temperature (stack): °C (°F)	480 (896)
Gas volume at stack temperature: m³/min (CFM)	456 (16,103)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_2O)	8.5 (34.1)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight (less tank)
Open Power Unit (OPU)	6,432 x 2,338 x 3,191 mm (253.2 x 92 x 125.6 in)	20,720 kg (45,687 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load
Level 0 (OPO): dB(A)	98.7

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
5.38	0.45	0.04

— All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

— Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.
— Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
— Deration Factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 16V4000 DS2000 50 °C

2,000 kWe/60 Hz/Standby/380 - 13,800V

WAY TO NET ZERO Renew-able fuel

System ratings

Voltage (L-L)	380V † ‡	416V † ‡	440V † ‡	480V † ‡	600V ‡	4,160V	12,470V
Phase	3	3	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60	60
kW	2,000	2,000	2,000	2,000	2,000	2,000	2,000
kVA	2,500	2,500	2,500	2,500	2,500	2,500	2,500
Amps	3,798	3,470	3,280	3,007	2,406	347	116
skVA@30% voltage dip	6,899	6,030	6,745	4,914	4,575	4,303	3,243
Generator model*	841-M70	841-M70	841-M70	641-VL90	641-VL85	641-VL75	4P6.6-2600
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE

Voltage (L-L)	13,200V	13,800V
Phase	3	3
PF	0.8	0.8
Hz	60	60
kW	2,000	2,000
kVA	2,500	2,500
Amps	109	105
skVA@30% voltage dip	3,633	3,971
Generator model*	4P6.6-2600	4P6.6-2600
Temp rise	130 °C/40 °C	130 °C/40 °C
Connection	6 LEAD WYE	6 LEAD WYE

* Consult the factory for alternate configuration. Generator model may end with -M or -R, depending on selection.
† UL 2200 offered
‡ CSA offered

A Rolls-Royce solution

Certifications and standards

- Emissions
  - EPA Tier 2 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional (refer to *System ratings* for availability)
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality, and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110
  - Permissible average power output during 24 hours of operation is approved up to 85%

Standard features *

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 16V4000 diesel engine
  - 76.3 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - Permanent Magnet Generator (PMG) supply to regulator
  - 300% short circuit capability
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment *

Engine

- Air cleaner
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Closed crankcase ventilation
- Jacket water pump
- Inter cooler water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - structural steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 0.25% voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	***mtu***
Model	16V4000G74S
Type	4-cycle
Arrangement	16-V
Displacement: L (in³)	76.3 (4,656)
Bore: cm (in)	17 (6.69)
Stroke: cm (in)	21 (8.27)
Compression ratio	16.5:1
Rated rpm	1,800
Engine governor	electronic isochronous (ADEC)
Maximum power: kWm (bhp)	2,280 (3,058)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	300 (79.3)
Engine jacket water capacity: L (gal)	175 (46.2)
After cooler water capacity: L (gal)	50 (13.2)
System coolant capacity: L (gal)	719 (189.9)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	2,800
Batteries: group size	8D
Batteries: quantity	4

Fuel system

Fuel supply connection size	-16 JIC 37° female 1" NPT adapter provided
Fuel return connection size	-16 JIC 37° female 1" NPT adapter provided
Maximum fuel lift: m (ft)	1 (3)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	1,200 (317)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	558 (147.3)
At 75% of power rating: L/hr (gal/hr)	426 (112.6)
At 50% of power rating: L/hr (gal/hr)	299 (78.9)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_2O)	0.12 (0.5)
Water pump capacity: L/min (gpm)	1,350 (357)
After cooler pump capacity: L/min (gpm)	583 (154)
Heat rejection to coolant: kW (BTUM)	840 (47,770)
Heat rejection to after cooler: kW (BTUM)	610 (34,690)
Heat radiated to ambient: kW (BTUM)	190 (10,809)
Fan power: kW (hp)	105.9 (142)

Air requirements

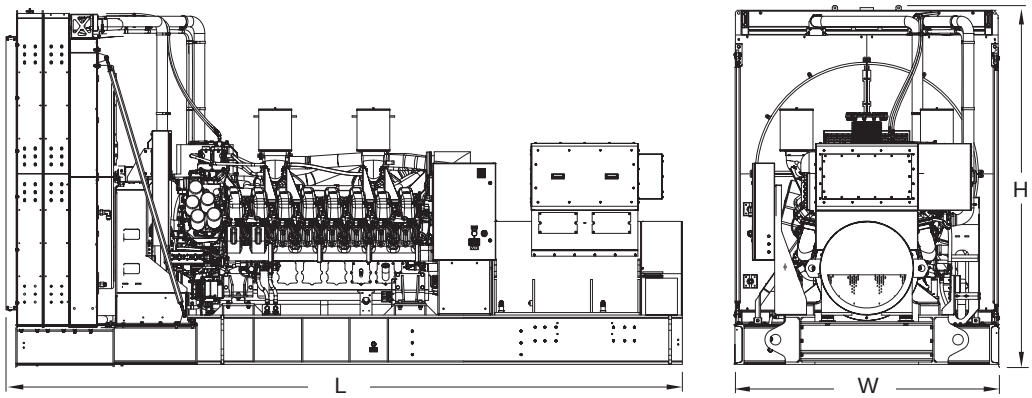
Aspirating: *m³/min (SCFM)	186 (6,569)
Air flow required for radiator cooled unit: *m³/min (SCFM)	3,089 (109,080)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m³/min (SCFM)	689 (24,492)

* Air density = 1.184 kg/m³ (0.0739 lbm/ft³)

Exhaust system

Gas temperature (stack): °C (°F)	480 (896)
Gas volume at stack temperature: m³/min (CFM)	456 (16,103)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_2O)	8.5 (34.1)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	6,474 x 2,539 x 3,434 mm (254.9 x 99.9 x 135.2 in)	21,554 kg (47,523 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load
Level 0 (OPU): dB(A)	98.7

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
5.38	0.45	0.04

- All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

- Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration Factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 16V4000 DS2250 40 °C

2,250 kWe/60 Hz/Standby/380 - 13,800V

WAY TO NET ZERO Renew-able fuel

System ratings

Voltage (L-L)	380V † ‡	416V † ‡	440V † ‡	480V † ‡	600V ‡	4,160V	12,470V
Phase	3	3	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60	60
kW	2,250	2,250	2,250	2,250	2,250	2,250	2,250
kVA	2,812	2,812	2,812	2,812	2,812	2,812	2,812
Amps	4,273	3,903	3,691	3,383	2,706	390	130
skVA@30% voltage dip	6,885	5,573	4,047	4,914	6,271	5,852	4,266
Generator model*	841-L75	841-L75	641-VL95	641-VL90	841-S60	841-S60	4P6.6-2800
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE

Voltage (L-L)	13,200V	13,800V
Phase	3	3
PF	0.8	0.8
Hz	60	60
kW	2,250	2,250
kVA	2,812	2,812
Amps	123	117
skVA@30% voltage dip	4,017	4,390
Generator model*	4P6.6-2800	4P6.6-2800
Temp rise	130 °C/40 °C	130 °C/40 °C
Connection	6 LEAD WYE	6 LEAD WYE

* Consult the factory for alternate configuration. Generator model may end with -M or -R, depending on selection.
† UL 2200 offered
‡ CSA offered

A Rolls-Royce solution

Certifications and standards

- Emissions
  - EPA Tier 2 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional (refer to *System ratings* for availability)
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality, and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110
  - Permissible average power output during 24 hours of operation is approved up to 85%

Standard features *

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 16V4000 diesel engine
  - 76.3 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - Permanent Magnet Generator (PMG) supply to regulator
  - 300% short circuit capability
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment *

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Closed crankcase ventilation
- Jacket water pump
- Inter cooler water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - structural steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 0.25% voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	***mtu***
Model	16V4000G84S
Type	4-cycle
Arrangement	16-V
Displacement: L (in³)	76.3 (4,656)
Bore: cm (in)	17 (6.69)
Stroke: cm (in)	21 (8.27)
Compression ratio	16.5:1
Rated rpm	1,800
Engine governor	electronic isochronous (ADEC)
Maximum power: kWm (bhp)	2,500 (3,353)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	300 (79.3)
Engine jacket water capacity: L (gal)	175 (46.2)
After cooler water capacity: L (gal)	50 (13.2)
System coolant capacity: L (gal)	547 (145)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	2,800
Batteries: group size	8D
Batteries: quantity	4

Fuel system

Fuel supply connection size	-16 JIC 37° female 1" NPT adapter provided
Fuel return connection size	-16 JIC 37° female 1" NPT adapter provided
Maximum fuel lift: m (ft)	1 (3)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	1,200 (317)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	617 (163)
At 75% of power rating: L/hr (gal/hr)	467 (123)
At 50% of power rating: L/hr (gal/hr)	325 (86)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	40 (104)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.12 (0.5)
Water pump capacity: L/min (gpm)	1,350 (357)
After cooler pump capacity: L/min (gpm)	583 (154)
Heat rejection to coolant: kW (BTUM)	930 (52,888)
Heat rejection to after cooler: kW (BTUM)	680 (38,671)
Heat radiated to ambient: kW (BTUM)	202.1 (11,493)
Fan power: kW (hp)	95.4 (128)

Air requirements

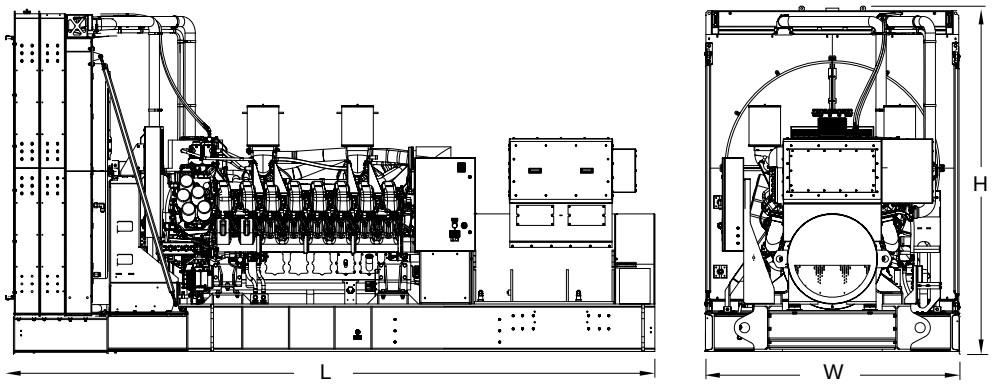
Aspirating: *m³/min (SCFM)	192 (6,780)
Air flow required for radiator cooled unit: *m³/min (SCFM)	2,053 (72,500)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m³/min (SCFM)	739 (26,241)

* Air density = 1.184 kg/m³ (0.0739 lbm/ft³)

Exhaust system

Gas temperature (stack): °C (°F)	505 (941)
Gas volume at stack temperature: m³/min (CFM)	504 (17,799)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	8.5 (34.1)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	6,432 x 2,338 x 3,191 mm (253.2 x 92 x 125.6 in)	20,720 kg (45,687 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load
Level 0 (OPU): dB(A)	98.7

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
5.07	0.52	0.04

- All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

- Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration Factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 16V4000 DS2250 50 °C

2,250 kWe/60 Hz/Standby/380 - 13,800V

WAY TO NET ZERO Renew-able fuel

System ratings

Voltage (L-L)	380V † ‡	416V † ‡	440V † ‡	480V † ‡	600V ‡	4,160V	12,470V
Phase	3	3	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60	60
kW	2,250	2,250	2,250	2,250	2,250	2,250	2,250
kVA	2,812	2,812	2,812	2,812	2,812	2,812	2,812
Amps	4,273	3,903	3,691	3,383	2,706	390	130
skVA@30% voltage dip	6,885	5,573	4,047	4,914	6,271	5,852	4,266
Generator model*	841-L75	841-L75	641-VL95	641-VL90	841-S60	841-S60	4P6.6-2800
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE

Voltage (L-L)	13,200V	13,800V
Phase	3	3
PF	0.8	0.8
Hz	60	60
kW	2,250	2,250
kVA	2,812	2,812
Amps	123	117
skVA@30% voltage dip	4,017	4,390
Generator model*	4P6.6-2800	4P6.6-2800
Temp rise	130 °C/40 °C	130 °C/40 °C
Connection	6 LEAD WYE	6 LEAD WYE

* Consult the factory for alternate configuration. Generator model may end with -M or -R, depending on selection.
† UL 2200 offered
‡ CSA offered

A Rolls-Royce solution

Certifications and standards

- Emissions
  - EPA Tier 2 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification - optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional (refer to *System ratings* for availability)
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality, and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110
  - Permissible average power output during 24 hours of operation is approved up to 85%

Standard features *

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 16V4000 diesel engine
  - 76.3 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - Permanent Magnet Generator (PMG) supply to regulator
  - 300% short circuit capability
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment *

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Closed crankcase ventilation
- Jacket water pump
- Inter cooler water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - structural steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 0.25% voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	***mtu***
Model	16V4000G84S
Type	4-cycle
Arrangement	16-V
Displacement: L (in³)	76.3 (4,656)
Bore: cm (in)	17 (6.69)
Stroke: cm (in)	21 (8.27)
Compression ratio	16.5:1
Rated rpm	1,800
Engine governor	electronic isochronous (ADEC)
Maximum power: kWm (bhp)	2,500 (3,353)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	300 (79.3)
Engine jacket water capacity: L (gal)	175 (46.2)
After cooler water capacity: L (gal)	50 (13.2)
System coolant capacity: L (gal)	719 (190)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	2,800
Batteries: group size	8D
Batteries: quantity	4

Fuel system

Fuel supply connection size	-16 JIC 37° female 1" NPT adapter provided
Fuel return connection size	-16 JIC 37° female 1" NPT adapter provided
Maximum fuel lift: m (ft)	1 (3)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	1,200 (317)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	617 (163)
At 75% of power rating: L/hr (gal/hr)	467 (123)
At 50% of power rating: L/hr (gal/hr)	325 (86)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.12 (0.5)
Water pump capacity: L/min (gpm)	1,350 (357)
After cooler pump capacity: L/min (gpm)	583 (154)
Heat rejection to coolant: kW (BTUM)	930 (52,888)
Heat rejection to after cooler: kW (BTUM)	680 (38,671)
Heat radiated to ambient: kW (BTUM)	202.1 (11,493)
Fan power: kW (hp)	101.4 (136)

Air requirements

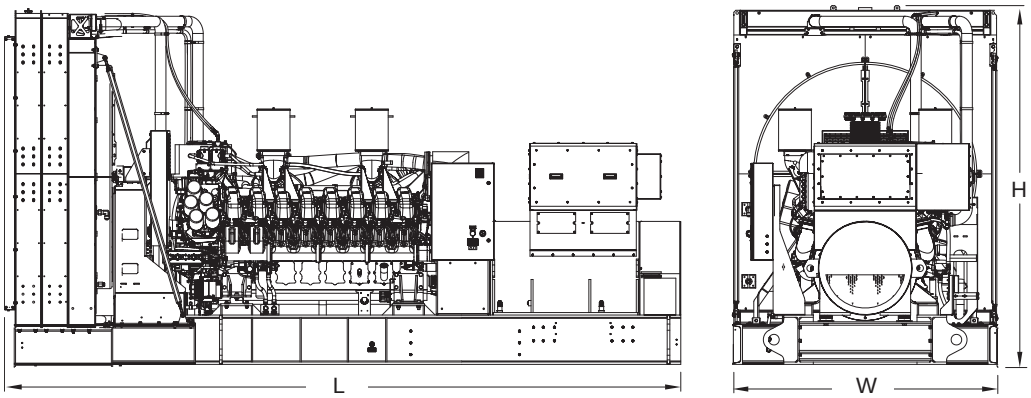
Aspirating: *m³/min (SCFM)	192 (6,780)
Air flow required for radiator cooled unit: *m³/min (SCFM)	3,168 (111,890)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m³/min (SCFM)	739 (26,241)

* Air density = 1.184 kg/m³ (0.0739 lbm/ft³)

Exhaust system

Gas temperature (stack): °C (°F)	505 (941)
Gas volume at stack temperature: m³/min (CFM)	504 (17,799)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	8.5 (34.1)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	6,474 x 2,539 x 3,434 mm (254.9 x 99.9 x 135.2 in)	21,554 kg (47,523 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load
Level 0 (OPU): dB(A)	98.7

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
5.07	0.52	0.04

- All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

- Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration Factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 16V4000 DS2500 45 °C

2,500 kWe/60 Hz/Standby/380 - 13,800V

System ratings

Voltage (L-L)	380V † ‡	416V † ‡	440V † ‡	480V † ‡	600V ‡	4,160V	12,470V
Phase	3	3	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60	60
kW	2,500	2,500	2,500	2,500	2,500	2,500	2,500
kVA	3,125	3,125	3,125	3,125	3,125	3,125	3,125
Amps	4,754	4,337	4,101	3,759	3,007	434	145
skVA@30% voltage dip	6,885	7,803	8,729	4,816	7,058	7,086	4,060
Generator model*	841-L75	841-VL85	841-VL85	641-VL95	841-S70	841-S70	4P6.6-2975
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE

Voltage (L-L)	13,200V	13,800V
Phase	3	3
PF	0.8	0.8
Hz	60	60
kW	2,500	2,500
kVA	3,125	3,125
Amps	137	131
skVA@30% voltage dip	3,823	4,178
Generator model*	4P6.6-2975	4P6.6-2975
Temp rise	130 °C/40 °C	130 °C/40 °C
Connection	6 LEAD WYE	6 LEAD WYE

* Consult the factory for alternate configuration. Generator model may end with -M or -R, depending on selection.
† UL 2200 offered
‡ CSA offered

A Rolls-Royce solution

Certifications and standards

- Emissions
  - EPA Tier 2 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional (refer to *System ratings* for availability)
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality, and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110
  - Permissible average power output during 24 hours of operation is approved up to 85%

Standard features *

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 16V4000 diesel engine
  - 76.3 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - Permanent Magnet Generator (PMG) supply to regulator
  - 300% short circuit capability
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment *

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filters
- Closed crankcase ventilation
- Jacket water pump
- Inter cooler water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - structural steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 2-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 0.25% voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	***mtu***
Model	16V4000G94S
Type	4-cycle
Arrangement	16-V
Displacement: L (in³)	76.3 (4,656)
Bore: cm (in)	17 (6.69)
Stroke: cm (in)	21 (8.27)
Compression ratio	16.4:1
Rated rpm	1,800
Engine governor	electronic isochronous (ADEC)
Maximum power: kWm (bhp)	2,740 (3,674)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	300 (79.3)
Engine jacket water capacity: L (gal)	175 (46.2)
After cooler water capacity: L (gal)	50 (13.2)
System coolant capacity: L (gal)	712 (188)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	2,800
Batteries: group size	8D
Batteries: quantity	4

Fuel system

Fuel supply connection size	-16 JIC 37° female 1" NPT adapter provided
Fuel return connection size	-16 JIC 37° female 1" NPT adapter provided
Maximum fuel lift: m (ft)	1 (3)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	1,200 (317)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	693 (183)
At 75% of power rating: L/hr (gal/hr)	515 (136)
At 50% of power rating: L/hr (gal/hr)	356 (94)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	45 (113)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_2O)	0.12 (0.5)
Water pump capacity: L/min (gpm)	1,350 (357)
After cooler pump capacity: L/min (gpm)	583 (154)
Heat rejection to coolant: kW (BTUM)	1,115 (63,408)
Heat rejection to after cooler: kW (BTUM)	750 (42,653)
Heat radiated to ambient: kW (BTUM)	221 (12,591)
Fan power: kW (hp)	104.4 (140)

Air requirements

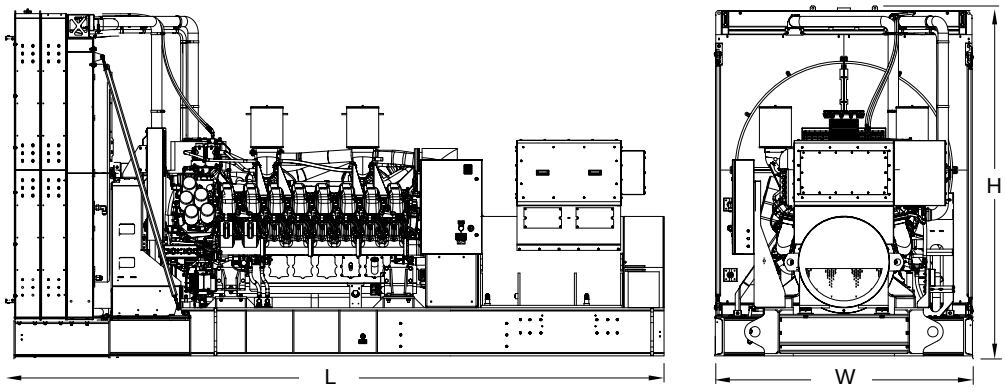
Aspirating: *m³/min (SCFM)	222 (7,840)
Air flow required for radiator cooled unit: *m³/min (SCFM)	2,407 (85,013)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m³/min (SCFM)	809 (28,747)

* Air density = 1.184 kg/m³ (0.0739 lbm/ft³)

Exhaust system

Gas temperature (stack): °C (°F)	515 (959)
Gas volume at stack temperature: m³/min (CFM)	600 (21,189)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_2O)	8.5 (34.1)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	6,595 x 2,446 x 3,390 mm (259.6 x 96.3 x 133.5 in)	21,385 kg (47,154 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load
Level 0 (OPU): dB(A)	93.6

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
4.95	0.67	0.03

- All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

- Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration Factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 20V4000 DS2500 50 °C

2,500 kWe/60 Hz/Standby/380 - 13,800V

System ratings

Voltage (L-L)	380V † ‡	416V † ‡	440V † ‡	480V † ‡	600V ‡	4,160V	12,470V
Phase	3	3	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60	60
kW	2,500	2,500	2,500	2,500	2,500	2,500	2,500
kVA	3,125	3,125	3,125	3,125	3,125	3,125	3,125
Amps	4,748	4,337	4,100	3,759	3,007	434	145
skVA@30% voltage dip	6,899	7,803	8,729	8,028	7,058	7,086	4,060
Generator model*	841-M70	841-VL85	841-VL85	841-M70	841-M70	841-M70	4P6.6-2975
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE

Voltage (L-L)	13,200V	13,800V
Phase	3	3
PF	0.8	0.8
Hz	60	60
kW	2,500	2,500
kVA	3,125	3,125
Amps	137	131
skVA@30% voltage dip	4,549	4,973
Generator model*	4P6.6-2975	4P6.6-2975
Temp rise	130 °C/40 °C	130 °C/40 °C
Connection	6 LEAD WYE	6 LEAD WYE

* Consult the factory for alternate configuration. Generator model may end with -M or -R, depending on selection.
† UL 2200 offered
‡ CSA offered

A Rolls-Royce solution

Certifications and standards

- Emissions
  - EPA Tier 2 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional (refer to *System ratings* for availability)
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality, and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110
  - Permissible average power output during 24 hours of operation is approved up to 85%.

Standard features *

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 20V4000 diesel engine
  - 95.4 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - Permanent Magnet Generator (PMG) supply to regulator
  - 300% short circuit capability
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment *

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Closed crankcase ventilation
- Jacket water pump
- Inter cooler water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - structural steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery box and cables
- Bulkhead fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 2-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 0.25% voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	***mtu***
Model	20V4000G64S
Type	4-cycle
Arrangement	20-V
Displacement: L (in³)	95.4 (5,822)
Bore: cm (in)	17 (6.69)
Stroke: cm (in)	21 (8.27)
Compression ratio	16.4:1
Rated rpm	1,800
Engine governor	electronic isochronous (ADEC)
Maximum power: kWm (bhp)	2,740 (3,674)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	390 (103)
Engine jacket water capacity: L (gal)	205 (54.2)
After cooler water capacity: L (gal)	50 (13.2)
System coolant capacity: L (gal)	814 (215)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	4,200
Batteries: group size	8D
Batteries: quantity	6

Fuel system

Fuel supply connection size	-16 JIC 37° female 1" NPT adapter provided
Fuel return connection size	-16 JIC 37° female 1" NPT adapter provided
Maximum fuel lift - cranking: m (ft)	1 (3.3)*
Maximum fuel lift - running: m (ft)	3.1 (10)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	1,620 (428)

* Fuel lift pump for cranking increases lift to: m (ft) 3.1 (10)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	636 (168)
At 75% of power rating: L/hr (gal/hr)	507 (134)
At 50% of power rating: L/hr (gal/hr)	363 (96)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_2O)	0.12 (0.5)
Water pump capacity: L/min (gpm)	1,567 (414)
After cooler pump capacity: L/min (gpm)	567 (150)
Heat rejection to coolant: kW (BTUM)	940 (53,456)
Heat rejection to after cooler: kW (BTUM)	630 (35,827)
Heat radiated to ambient: kW (BTUM)	225 (12,776)
Fan power: kW (hp)	87.5 (117.3)

Air requirements

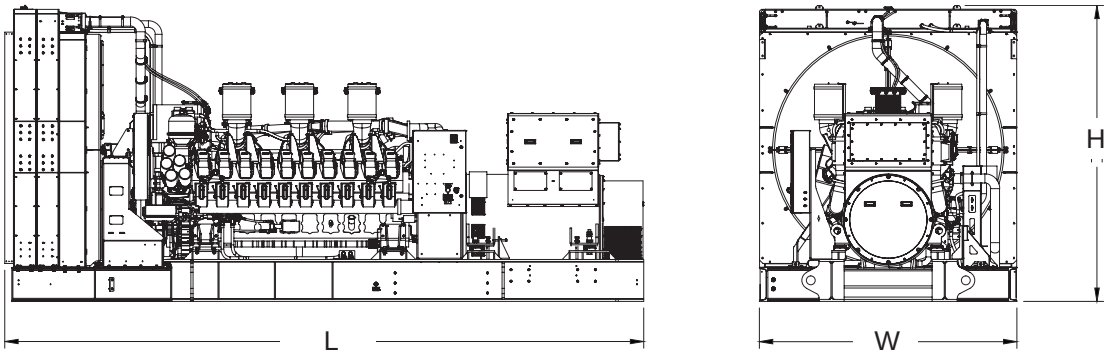
Aspirating: *m³/min (SCFM)	225 (7,946)
Air flow required for radiator cooled unit: *m³/min (SCFM)	2,895 (102,247)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m³/min (SCFM)	816 (28,818)

* Air density = 1.184 kg/m³ (0.0739 lbm/ft³)

Exhaust system

Gas temperature (stack): °C (°F)	455 (851)
Gas volume at stack temperature: m³/min (CFM)	540 (19,070)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_2O)	8.5 (34.1)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	7,197 x 2,900 x 3,335 mm (283.4 x 114.2 x 131.3 in)	23,490 kg (51,795 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load
Level 0 (OPU): dB(A)	97.5

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
6.12	0.37	0.04

- All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

- Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration Factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 20V4000 DS2800 50 °C

2,790 kWe/60 Hz/Standby/480 - 13,800V

System ratings

Voltage (L-L)	480V † ‡	600V ‡	4,160V	12,470V	13,200V	13,800V
Phase	3	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60
kW	2,790	2,790	2,790	2,790	2,790	2,790
kVA	3,487	3,487	3,487	3,487	3,487	3,487
Amps	4,195	3,356	484	161	153	146
skVA@30% voltage dip	10,389	8,298	8,506	7,482	8,384	9,163
Generator model*	841-VL85	841-VL85	841-VL85	4P9.6-2950	4P9.6-2950	4P9.6-2950
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE

* Consult the factory for alternate configuration. Generator model may end with -M or -R, depending on selection.
† UL 2200 offered
‡ CSA offered

Certifications and standards

- Emissions
  - EPA Tier 2 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional (refer to *System ratings* for availability)
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality, and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110
  - Permissible average power output during 24 hours of operation is approved up to 85%.

Standard features *

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 20V4000 diesel engine
  - 95.4 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - Permanent Magnet Generator (PMG) supply to regulator
  - 300% short circuit capability
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment *

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Closed crankcase ventilation
- Jacket water pump
- Inter cooler water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - structural steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery box and cables
- Bulkhead fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 2-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 0.25 voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	***mtu***
Model	20V4000G74S
Type	4-cycle
Arrangement	20-V
Displacement: L (in³)	95.4 (5,822)
Bore: cm (in)	17 (6.69)
Stroke: cm (in)	21 (8.27)
Compression ratio	16.4:1
Rated rpm	1,800
Engine governor	electronic isochronous (ADEC)
Maximum power: kWm (bhp)	3,010 (4,036)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	390 (103)
Engine jacket water capacity: L (gal)	205 (54.2)
After cooler water capacity: L (gal)	50 (13.2)
System coolant capacity: L (gal)	1,049 (227)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	4,200
Batteries: group size	8D
Batteries: quantity	6

Fuel system

Fuel supply connection size	-16 JIC 37° female 1" NPT adapter provided
Fuel return connection size	-16 JIC 37° female 1" NPT adapter provided
Maximum fuel lift - cranking: m (ft)	1 (3.3)*
Maximum fuel lift - running: m (ft)	3.1 (10)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	1,620 (428)

* Fuel lift pump for cranking increases lift to: m (ft) 3.1 (10)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	704 (186)
At 75% of power rating: L/hr (gal/hr)	553 (146)
At 50% of power rating: L/hr (gal/hr)	394 (104)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_2O)	0.12 (0.5)
Water pump capacity: L/min (gpm)	1,567 (414)
After cooler pump capacity: L/min (gpm)	567 (150)
Heat rejection to coolant: kW (BTUM)	1,040 (59,143)
Heat rejection to after cooler: kW (BTUM)	740 (42,083)
Heat radiated to ambient: kW (BTUM)	248 (14,116)
Fan power: kW (hp)	115 (154.2)

Air requirements

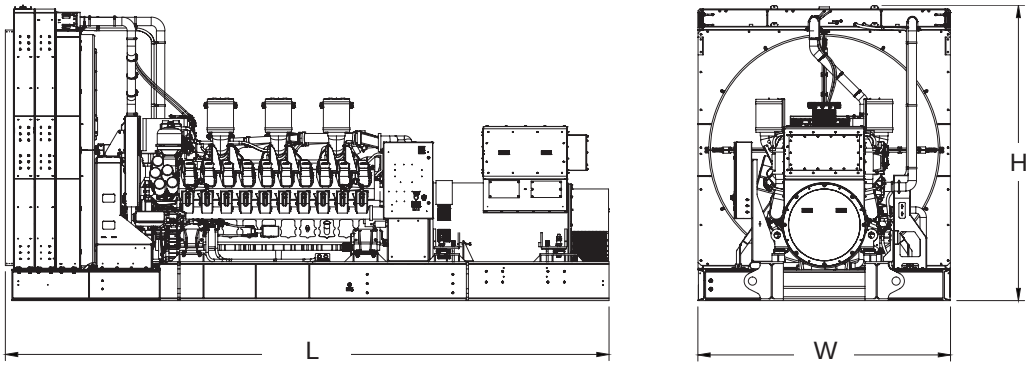
Aspirating: *m³/min (SCFM)	240 (8,476)
Air flow required for radiator cooled unit: *m³/min (SCFM)	3,453 (121,926)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m³/min (SCFM)	899 (31,764)

* Air density = 1.184 kg/m³ (0.0739 lbm/ft³)

Exhaust system

Gas temperature (stack): °C (°F)	470 (878)
Gas volume at stack temperature: m³/min (CFM)	594 (20,977)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_2O)	8.5 (34.1)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	7,335 x 3,345 x 3,807 mm (288.8 x 131.7 x 149.9 in)	25,498kg (56,224 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load
Level 0 (OPU): dB(A)	97.5

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
5.95	0.37	0.04

- All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

- Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration Factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 20V4000 DS2800 48 °C

2,800 kWe/60 Hz/Standby/380 - 13,800V

System ratings

Voltage (L-L)	380V † ‡	416V † ‡	440V † ‡	480V † ‡	600V ‡	4,160V	12,470V
Phase	3	3	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60	60
kW	2,800	2,800	2,800	2,800	2,800	2,800	2,800
kVA	3,500	3,500	3,500	3,500	3,500	3,500	3,500
Amps	5,318	4,858	4,593	4,210	3,368	486	162
skVA@30% voltage dip	4,148	5,304	5,933	7,420	8,607	8,777	4,791
Generator model*	841-VL85	941-VL60	941-VL60	841-L75	841-L75	841-L75	4P9.6-2100
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE

Voltage (L-L)	13,200V	13,800V
Phase	3	3
PF	0.8	0.8
Hz	60	60
kW	2,800	2,800
kVA	3,500	3,500
Amps	153	146
skVA@30% voltage dip	5,369	5,868
Generator model*	4P9.6-2100	4P9.6-2100
Temp rise	130 °C/40 °C	130 °C/40 °C
Connection	6 LEAD WYE	6 LEAD WYE

* Consult the factory for alternate configuration. Generator model may end with -M or -R, depending on selection.
† UL 2200 offered
‡ CSA offered

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Certifications and standards

- Emissions
  - EPA Tier 2 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional (refer to *System ratings* for availability)
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality, and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110
  - Permissible average power output during 24 hours of operation is approved up to 85%.

Standard features *

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 20V4000 diesel engine
  - 95.4 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - Permanent Magnet Generator (PMG) supply to regulator
  - 300% short circuit capability
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment *

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Closed crankcase ventilation
- Jacket water pump
- Inter cooler water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - structural steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery box and cables
- Bulkhead fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 2-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 0.25% voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	***mtu***
Model	20V4000G74S
Type	4-cycle
Arrangement	20-V
Displacement: L (in³)	95.4 (5,822)
Bore: cm (in)	17 (6.69)
Stroke: cm (in)	21 (8.27)
Compression ratio	16.4:1
Rated rpm	1,800
Engine governor	electronic isochronous (ADEC)
Maximum power: kWm (bhp)	3,010 (4,036)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	390 (103)
Engine jacket water capacity: L (gal)	205 (54.2)
After cooler water capacity: L (gal)	50 (13.2)
System coolant capacity: L (gal)	860 (227)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	4,200
Batteries: group size	8D
Batteries: quantity	6

Fuel system

Fuel supply connection size	-16 JIC 37° female 1" NPT adapter provided
Fuel return connection size	-16 JIC 37° female 1" NPT adapter provided
Maximum fuel lift - cranking: m (ft)	1 (3.3)*
Maximum fuel lift - running: m (ft)	3.1 (10)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	1,620 (428)

* Fuel lift pump for cranking increases lift to: m (ft) 3.1 (10)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	704 (186)
At 75% of power rating: L/hr (gal/hr)	553 (146)
At 50% of power rating: L/hr (gal/hr)	394 (104)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	48 (118)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_2O)	0.12 (0.5)
Water pump capacity: L/min (gpm)	1,567 (414)
After cooler pump capacity: L/min (gpm)	567 (150)
Heat rejection to coolant: kW (BTUM)	1,040 (59,143)
Heat rejection to after cooler: kW (BTUM)	740 (42,083)
Heat radiated to ambient: kW (BTUM)	248 (14,116)
Fan power: kW (hp)	60.6 (81.3)

Air requirements

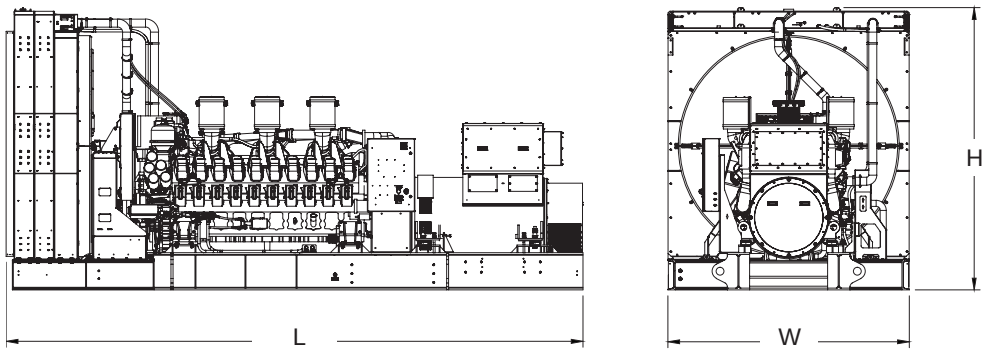
Aspirating: *m³/min (SCFM)	240 (8,476)
Air flow required for radiator cooled unit: *m³/min (SCFM)	3,082 (108,843)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m³/min (SCFM)	899 (31,764)

* Air density = 1.184 kg/m³ (0.0739 lbm/ft³)

Exhaust system

Gas temperature (stack): °C (°F)	470 (878)
Gas volume at stack temperature: m³/min (CFM)	594 (20,977)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_2O)	8.5 (34.1)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	7,335 x 3,072 x 3,590 mm (288.8 x 120.9 x 141.3 in)	24,341 kg (53,673 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load
Level 0 (OPU): dB(A)	97.5

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
5.95	0.37	0.04

- All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

- Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration Factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 20V4000 DS3000 45 °C

3,000 kWe/60 Hz/Standby/480 - 13,800V

System ratings

Voltage (L-L)	480V † ‡	600V ‡	4,160V	12,470V	13,200V	13,800V
Phase	3	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60
kW	3,000	3,000	3,000	3,000	3,000	3,000
kVA	3,750	3,750	3,750	3,750	3,750	3,750
Amps	4,511	3,608	520	174	164	157
skVA@30% voltage dip	10,389	8,298	8,506	4,792	5,369	5,868
Generator model*	841-VL85	841-VL85	841-VL85	4P9.6-2100	4P9.6-2100	4P9.6-2100
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE

* Consult the factory for alternate configuration. Generator model may end with -M or -R, depending on selection.
† UL 2200 offered
‡ CSA offered

Certifications and standards

- Emissions
  - EPA Tier 2 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional (refer to *System ratings* for availability)
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality, and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110
  - Permissible average power output during 24 hours of operation is approved up to 85%.

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 20V4000 diesel engine
  - 95.4 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - Permanent Magnet Generator (PMG) supply to regulator
  - 300% short circuit capability
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Closed crankcase ventilation
- Jacket water pump
- Inter cooler water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - structural steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery box and cables
- Bulkhead fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 2-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 0.25% voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	***mtu***
Model	20V4000G94S
Type	4-cycle
Arrangement	20-V
Displacement: L (in³)	95.4 (5,822)
Bore: cm (in)	17 (6.69)
Stroke: cm (in)	21 (8.27)
Compression ratio	16.4:1
Rated rpm	1,800
Engine governor	electronic isochronous (ADEC)
Maximum power: kWm (bhp)	3,490 (4,680)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	390 (103)
Engine jacket water capacity: L (gal)	205 (54.2)
After cooler water capacity: L (gal)	50 (13.2)
System coolant capacity: L (gal)	860 (227)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	4,200
Batteries: group size	8D
Batteries: quantity	6

Fuel system

Fuel supply connection size	-16 JIC 37° female 1" NPT adapter provided
Fuel return connection size	-16 JIC 37° female 1" NPT adapter provided
Maximum fuel lift - cranking: m (ft)	1 (3.3)*
Maximum fuel lift - running: m (ft)	3.1 (10)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	1,620 (428)

* Fuel lift pump for cranking increases lift to: m (ft) 3.1 (10)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	784 (207)
At 75% of power rating: L/hr (gal/hr)	594 (157)
At 50% of power rating: L/hr (gal/hr)	413 (109)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	45 (113)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_2O)	0.12 (0.5)
Water pump capacity: L/min (gpm)	1,567 (414)
After cooler pump capacity: L/min (gpm)	567 (150)
Heat rejection to coolant: kW (BTUM)	1,300 (73,929)
Heat rejection to after cooler: kW (BTUM)	970 (55,162)
Heat radiated to ambient: kW (BTUM)	258 (14,698)
Fan power: kW (hp)	60.6 (81.3)

Air requirements

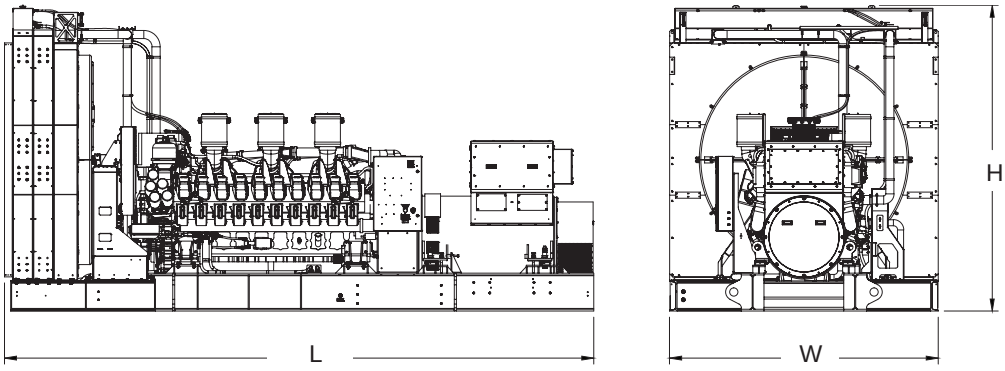
Aspirating: *m³/min (SCFM)	264 (9,323)
Air flow required for radiator cooled unit: *m³/min (SCFM)	3,082 (108,843)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m³/min (SCFM)	936 (33,045)

* Air density = 1.184 kg/m³ (0.0739 lbm/ft³)

Exhaust system

Gas temperature (stack): °C (°F)	525 (977)
Gas volume at stack temperature: m³/min (CFM)	702 (24,791)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_2O)	8.5 (34.1)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	7,335 x 3,072 x 3,590 mm (288.77 x 120.93 x 141.34 in)	24,634 kg (54,318 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load
Level 0 (OPU): dB(A)	94.6

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
5.1	0.6	0.03

- All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

- Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration Factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 20V4000 DS3000 50 °C

3,000 kWe/60 Hz/Standby/480 - 13,800V

System ratings

Voltage (L-L)	480V † ‡	600V ‡	4,160V	12,470V	13,200V	13,800V
Phase	3	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60
kW	3,000	3,000	3,000	3,000	3,000	3,000
kVA	3,750	3,750	3,750	3,750	3,750	3,750
Amps	4,511	3,608	520	174	164	157
skVA@30% voltage dip	10,389	8,298	8,506	4,792	5,369	5,868
Generator model*	841-VL85	841-VL85	841-VL85	4P9.6-2100	4P9.6-2100	4P9.6-2100
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE

* Consult the factory for alternate configuration. Generator model may end with -M or -R, depending on selection.
† UL 2200 offered
‡ CSA offered

Certifications and standards

- Emissions
  - EPA Tier 2 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional (refer to *System ratings* for availability)
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality, and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110
  - Permissible average power output during 24 hours of operation is approved up to 85%.

Standard features*

- Single source provider
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 20V4000 diesel engine
  - 95.4 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - Permanent Magnet Generator (PMG) supply to regulator
  - 300% short circuit capability
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Closed crankcase ventilation
- Jacket water pump
- Inter cooler water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - structural steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery box and cables
- Bulkhead fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 2-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 0.25% voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	***mtu***
Model	20V4000G94S
Type	4-cycle
Arrangement	20-V
Displacement: L (in³)	95.4 (5,822)
Bore: cm (in)	17 (6.69)
Stroke: cm (in)	21 (8.27)
Compression ratio	16.4:1
Rated rpm	1,800
Engine governor	electronic isochronous (ADEC)
Maximum power: kWm (bhp)	3,490 (4,680)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	390 (103)
Engine jacket water capacity: L (gal)	205 (54.2)
After cooler water capacity: L (gal)	50 (13.2)
System coolant capacity: L (gal)	1,049 (277)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	4,200
Batteries: group size	8D
Batteries: quantity	6

Fuel system

Fuel supply connection size	-16 JIC 37° female 1" NPT adapter provided
Fuel return connection size	-16 JIC 37° female 1" NPT adapter provided
Maximum fuel lift - cranking: m (ft)	1 (3.3)*
Maximum fuel lift - running: m (ft)	3.1 (10)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	1,620 (428)

* Fuel lift pump for cranking increases lift to: m (ft) 3.1 (10)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	784 (207)
At 75% of power rating: L/hr (gal/hr)	594 (157)
At 50% of power rating: L/hr (gal/hr)	413 (109)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_2O)	0.12 (0.5)
Water pump capacity: L/min (gpm)	1,567 (414)
After cooler pump capacity: L/min (gpm)	567 (150)
Heat rejection to coolant: kW (BTUM)	1,300 (73,929)
Heat rejection to after cooler: kW (BTUM)	970 (55,162)
Heat radiated to ambient: kW (BTUM)	258 (14,698)
Fan power: kW (hp)	115 (154.2)

Air requirements

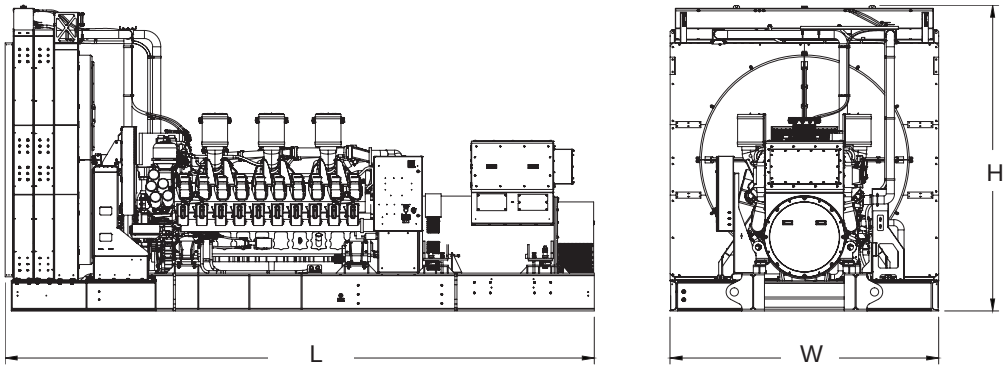
Aspirating: *m³/min (SCFM)	264 (9,323)
Air flow required for radiator cooled unit: *m³/min (SCFM)	3,453 (121,926)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m³/min (SCFM)	936 (33,045)

* Air density = 1.184 kg/m³ (0.0739 lbm/ft³)

Exhaust system

Gas temperature (stack): °C (°F)	525 (977)
Gas volume at stack temperature: m³/min (CFM)	702 (24,791)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_2O)	8.5 (34.1)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	7,335 x 3,345 x 3,807 mm (288.8 x 131.7 x 149.9 in)	25,498 kg (56,224 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load
Level 0 (OPU): dB(A)	94.6

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
5.1	0.6	0.03

- All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

- Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration Factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 20V4000 DS3250 43 °C

3,250 kWe/60 Hz/Standby/480 - 13,800V

System ratings

Voltage (L-L)	480V † ‡	600V ‡	4,160V	12,470V	13,200V	13,800V
Phase	3	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60
kW	3,250	3,250	3,250	3,250	3,250	3,250
kVA	4,062	4,062	4,062	4,062	4,062	4,062
Amps	4,886	3,909	563	188	177	170
skVA@30% voltage dip	7,061	1,028	8,171	5,297	5,936	6,488
Generator model*	941-VL60	941-VL70	941-M60	4P9.6-2400	4P9.6-2400	4P9.6-2400
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE

* Consult the factory for alternate configuration. Generator model may end with -M or -R, depending on selection.
† UL 2200 offered
‡ CSA offered

Certifications and standards

- Emissions
  - EPA Tier 2 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional (refer to *System ratings* for availability)
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality, and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110
  - Permissible average power output during 24 hours of operation is approved up to 85%.

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 20V4000 diesel engine
  - 95.4 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - Permanent Magnet Generator (PMG) supply to regulator
  - 300% short circuit capability
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Closed crankcase ventilation
- Jacket water pump
- Inter cooler water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - structural steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery box and cables
- Bulkhead fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum standby temperature rise
- 2-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 0.25% voltage regulation no load to full load
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	***mtu***
Model	20V4000G94S
Type	4-cycle
Arrangement	20-V
Displacement: L (in³)	95.4 (5,822)
Bore: cm (in)	17 (6.69)
Stroke: cm (in)	21 (8.27)
Compression ratio	16.4:1
Rated rpm	1,800
Engine governor	electronic isochronous (ADEC)
Maximum power: kWm (bhp)	3,490 (4,680)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	390 (103)
Engine jacket water capacity: L (gal)	205 (54.2)
After cooler water capacity: L (gal)	50 (13.2)
System coolant capacity: L (gal)	860 (227)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	4,200
Batteries: group size	8D
Batteries: quantity	6

Fuel system

Fuel supply connection size	-16 JIC 37° female 1" NPT adapter provided
Fuel return connection size	-16 JIC 37° female 1" NPT adapter provided
Maximum fuel lift - cranking: m (ft)	1 (3.3)*
Maximum fuel lift - running: m (ft)	3.1 (10)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	1,620 (428)

* Fuel lift pump for cranking increases lift to: m (ft) 3.1 (10)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	844 (223)
At 75% of power rating: L/hr (gal/hr)	644 (170)
At 50% of power rating: L/hr (gal/hr)	447 (118)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	43 (108)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_2O)	0.12 (0.5)
Water pump capacity: L/min (gpm)	1,567 (414)
After cooler pump capacity: L/min (gpm)	567 (150)
Heat rejection to coolant: kW (BTUM)	1,300 (73,929)
Heat rejection to after cooler: kW (BTUM)	970 (55,163)
Heat radiated to ambient: kW (BTUM)	237 (13,472)
Fan power: kW (hp)	60.6 (81.3)

Air requirements

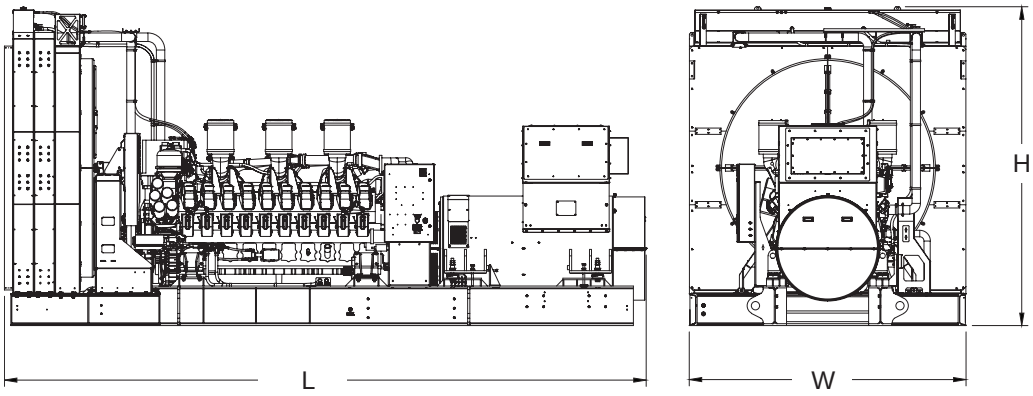
Aspirating: *m³/min (SCFM)	264 (9,323)
Air flow required for radiator cooled unit: *m³/min (SCFM)	3,082 (108,843)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m³/min (SCFM)	866 (30,384)

* Air density = 1.184 kg/m³ (0.0739 lbm/ft³)

Exhaust system

Gas temperature (stack): °C (°F)	525 (977)
Gas volume at stack temperature: m³/min (CFM)	702 (24,791)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_2O)	8.5 (34.1)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	7,756 x 3,072 x 3,590 mm (305.4 x 120.9 x 141.3 in)	27,340 kg (60,284 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Standby full load
Level 0 (OPU): dB(A)	95.1

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
5.1	0.6	0.03

— All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

— Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. No overload capability for this rating. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.
— Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
— Deration Factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 12V1600 DS750

690 kWe/60 Hz/Data Center Continuous Power/208 - 600V
Reference *mtu* 12V1600 DS750 (750 kWe) for Standby Rating Technical Data

System ratings

Voltage (L-L)	208V †	240V †	380V †	480V †	600V
Phase	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60
kW	690	690	690	690	690
kVA	862	862	862	862	862
Amps	2,394	2,074	1,310	1,037	829
skVA@30% voltage dip	2,450	2,450	2,310	2,575	2,525
Generator model	LSA 49.3 L9	LSA 49.3 L9	LSA 49.3 L9	LSA 49.3 M8	LSA 49.3 M8
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	12 LEAD WYE	12 LEAD DELTA	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 2 certified
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality, and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Data Center Continuous Power (DCCP) rating is optimized for data center applications
  - Uptime Institute compliant for Tier III and IV data centers
  - No runtime limitation
  - 100% load factor
  - 10% overload available
  - Accepts rated load in one step per NFPA 110

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 12V1600 diesel engine
  - 22.44 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - Permanent Magnet Generator (PMG) supply to regulator
  - 300% short circuit capability
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filters
- Closed crankcase ventilation
- Jacket water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 105 °C maximum prime temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 0.25% voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	***mtu***
Model	12V1600G21S
Type	4-cycle
Arrangement	12-V
Displacement: L (cu in)	22.44 (1,369)
Bore: cm (in)	12.6 (4.96)
Stroke: cm (in)	15 (5.91)
Compression ratio	15.89:1
Rated rpm	1,800
Engine governor	electronic isochronous (ADEC)
Maximum power: kWm (bhp)	836 (1,121)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	73 (19.3)
Engine jacket water capacity: L (gal)	65 (17.2)
System coolant capacity: L (gal)	109 (28.8)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	1,050
Batteries: group size	4D
Batteries: quantity	2

Fuel system

Fuel supply connection size	-10 JIC 37° female
Fuel return connection size	-6 JIC 37° female
Maximum fuel lift: m (ft)	3 (10)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	328 (86.7)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	174.8 (46.2)
At 75% of power rating: L/hr (gal/hr)	131.9 (34.8)
At 50% of power rating: L/hr (gal/hr)	98.3 (26)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.2 (0.8)
Water pump capacity: L/min (gpm)	517 (136.5)
Heat rejection to coolant: kW (BTUM)	285 (16,208)
Heat rejection to after cooler: kW (BTUM)	215 (12,227)
Heat radiated to ambient: kW (BTUM)	71.2 (4,049)
Fan power: kW (hp)	29 (38.9)

Air requirements

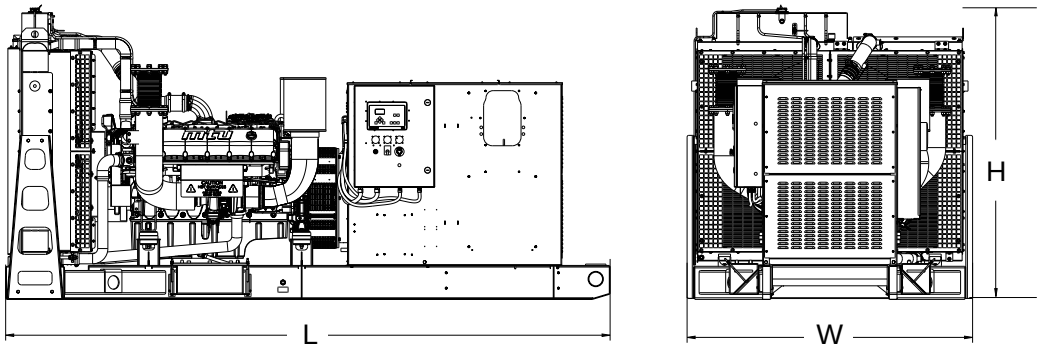
Aspirating: *m^3/min (SCFM)	68.4 (2,416)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	1,007 (35,579)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	260 (9,244)

* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

Gas temperature (stack): °C (°F)	481 (898)
Gas volume at stack temperature: m^3/min (CFM)	161.4 (5,700)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	8.5 (34.1)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	4,521 x 2,135 x 2,179 mm (178 x 84.1 x 85.8 in)	4,774-5,829 kg (10,524-12,850 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	DCCP full load
Level 0 (OPU): dB(A)	94.9

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
8.07	0.8	0.04

- All units are in g/hp-hr and shown at 110% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

- Data Center Continuous Power (DCCP) ratings apply to data center installations where a utility power is available and comply with Uptime Institute Tier III and IV requirements. At constant or varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 100%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

C/F = Consult Factory/***mtu*** Distributor
N/A = Not Available

Diesel Generator Set

mtu 12V1600 DS800

730 kWe/60 Hz/Data Center Continuous Power/208 - 600V
Reference mtu 12V1600 DS800 (800 kWe) for Standby Rating Technical Data

System ratings

Voltage (L-L)	208V †	240V †	380V †	480V †	600V
Phase	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60
kW	730	730	730	730	730
kVA	912	912	912	912	912
Amps	2,532	2,195	1,386	1,097	878
skVA@30% voltage dip	2,450	2,450	2,310	2,575	2,525
Generator model	LSA 49.3 L10	LSA 49.3 L10	LSA 49.3 L9	LSA 49.3 M8	LSA 49.3 L10
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	12 LEAD WYE	12 LEAD DELTA	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 2 certified
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality, and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Data Center Continuous Power (DCCP) rating is optimized for data center applications
  - Uptime Institute compliant for Tier III and IV data centers
  - No runtime limitation
  - 100% load factor
  - 10% overload available
  - Accepts rated load in one step per NFPA 110

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 12V1600 diesel engine
  - 22.44 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - Permanent Magnet Generator (PMG) supply to regulator
  - 300% short circuit capability
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filters
- Closed crankcase ventilation
- Jacket water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 105 °C maximum prime temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 0.25% voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	***mtu***
Model	12V1600G31S
Type	4-cycle
Arrangement	12-V
Displacement: L (cu in)	22.44 (1,369)
Bore: cm (in)	12.6 (4.96)
Stroke: cm (in)	15 (5.91)
Compression ratio	15.89:1
Rated rpm	1,800
Engine governor	electronic isochronous (ADEC)
Maximum power: kWm (bhp)	890 (1,193)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	73 (19.3)
Engine jacket water capacity: L (gal)	65 (17.2)
System coolant capacity: L (gal)	109 (28.8)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	1,050
Batteries: group size	4D
Batteries: quantity	2

Fuel system

Fuel supply connection size	-10 JIC 37° female
Fuel return connection size	-6 JIC 37° female
Maximum fuel lift: m (ft)	3 (10)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	344.1 (90.9)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	186.7 (49.3)
At 75% of power rating: L/hr (gal/hr)	139.7 (36.9)
At 50% of power rating: L/hr (gal/hr)	104.1 (27.5)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.2 (0.8)
Water pump capacity: L/min (gpm)	517 (136.5)
Heat rejection to coolant: kW (BTUM)	305 (17,345)
Heat rejection to after cooler: kW (BTUM)	235 (13,364)
Heat radiated to ambient: kW (BTUM)	75.4 (4,290)
Fan power: kW (hp)	29 (38.9)

Air requirements

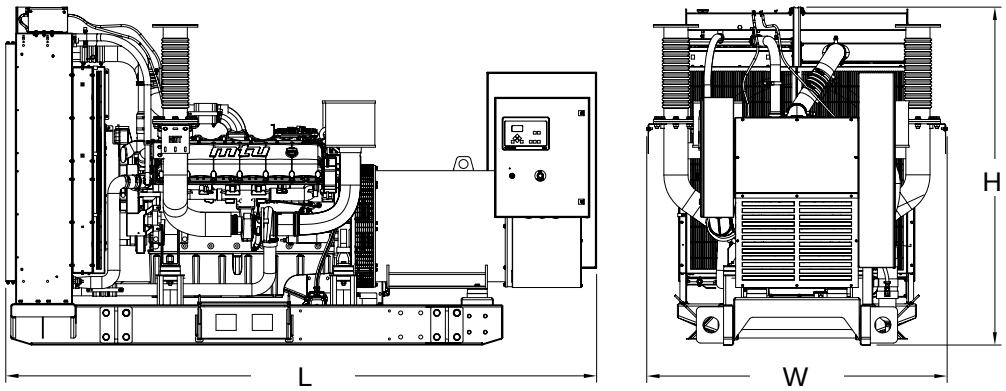
Aspirating: *m^3/min (SCFM)	70.8 (2,500)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	1,007 (35,579)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	276 (9,796)

* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

Gas temperature (stack): °C (°F)	497 (927)
Gas volume at stack temperature: m^3/min (CFM)	171 (6,039)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	8.5 (34.1)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	4,521 x 2,135 x 2,179 mm (178 x 84.1 x 85.8 in)	4,774-5,829 kg (10,524-12,850 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	DCCP full load
Level 0 (OPU): dB(A)	95.3

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
8.01	0.95	0.04

— All units are in g/hp-hr and shown at 110% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

— Data Center Continuous Power (DCCP) ratings apply to data center installations where a utility power is available and comply with Uptime Institute Tier III and IV requirements. At constant or varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 100%.
— Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
— Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

C/F = Consult Factory/***mtu*** Distributor
N/A = Not Available

Diesel Generator Set

mtu 12V1600 DS900

820 kWe/60 Hz/Data Center Continuous Power/208 - 600V
Reference ***mtu*** 12V1600 DS900 (900 kWe) for Standby Rating Technical Data

System ratings

Voltage (L-L)	208V †	240V †	380V †	480V †	600V
Phase	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60
kW	820	820	820	820	820
kVA	1,025	1,025	1,025	1,025	1,025
Amps	2,845	2,465	1,557	1,232	986
skVA@30% voltage dip	2,450	2,450	2,310	2,575	2,525
Generator model	LSA 50.2 M6	LSA 50.2 M6	LSA 50.2 S4	LSA 49.3 L9	LSA 50.2 M6
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	12 LEAD WYE	12 LEAD DELTA	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 2 certified
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality, and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Data Center Continuous Power (DCCP) rating is optimized for data center applications
  - Uptime Institute compliant for Tier III and IV data centers
  - No runtime limitation
  - 100% load factor
  - 10% overload available
  - Accepts rated load in one step per NFPA 110

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 12V1600 diesel engine
  - 22.44 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - Permanent Magnet Generator (PMG) supply to regulator
  - 300% short circuit capability
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filters
- Closed crankcase ventilation
- Jacket water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 105 °C maximum prime temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 0.25% voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	***mtu***
Model	12V1600G41S
Type	4-cycle
Arrangement	12-V
Displacement: L (cu in)	22.44 (1,369)
Bore: cm (in)	12.6 (4.96)
Stroke: cm (in)	15 (5.91)
Compression ratio	15.89:1
Rated rpm	1,800
Engine governor	electronic isochronous (ADEC)
Maximum power: kWm (bhp)	996 (1,335)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	73 (19.3)
Engine jacket water capacity: L (gal)	65 (17.2)
System coolant capacity: L (gal)	109 (28.8)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	1,050
Batteries: group size	4D
Batteries: quantity	2

Fuel system

Fuel supply connection size	-10 JIC 37° female
Fuel return connection size	-6 JIC 37° female
Maximum fuel lift: m (ft)	3 (10)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	375.6 (99.2)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	207.5 (54.8)
At 75% of power rating: L/hr (gal/hr)	155.5 (41.1)
At 50% of power rating: L/hr (gal/hr)	110.5 (29.2)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	40 (104)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.2 (0.8)
Water pump capacity: L/min (gpm)	517 (136.5)
Heat rejection to coolant: kW (BTUM)	350 (19,905)
Heat rejection to after cooler: kW (BTUM)	250 (14,218)
Heat radiated to ambient: kW (BTUM)	81.2 (4,615)
Fan power: kW (hp)	29 (38.9)

Air requirements

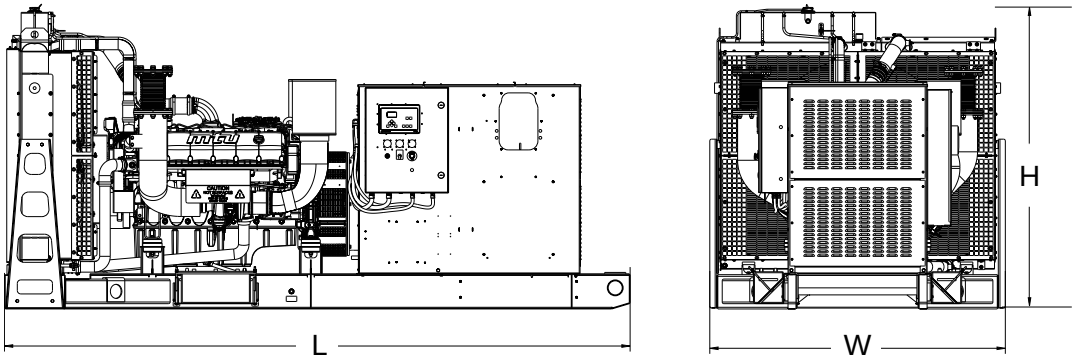
Aspirating: *m^3/min (SCFM)	73.2 (2,585)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	1,007 (35,579)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	297 (10,537)

* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

Gas temperature (stack): °C (°F)	551 (1,024)
Gas volume at stack temperature: m^3/min (CFM)	195.6 (6,908)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	5 (20.1)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	4,521 x 2,135 x 2,179 mm (178 x 84.1 x 85.8 in)	4,774-5,829 kg (10,524-12,850 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	DCCP full load
Level 0 (OPU): dB(A)	94.7

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
8.01	1.31	0.43

— All units are in g/hp-hr and shown at 110% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

— Data Center Continuous Power (DCCP) ratings apply to data center installations where a utility power is available and comply with Uptime Institute Tier III and IV requirements. At constant or varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 100%.
— Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
— Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

C/F = Consult Factory/***mtu*** Distributor
N/A = Not Available

Diesel Generator Set

mtu 16V2000 DS1000

900 kWe/60 Hz/Data Center Continuous Power/208-4,160V
Reference *mtu* 16V2000 DS1000 (1,000 kWe) for Standby Rating Technical Data
Reference *mtu* 16V2000 DS1000 (900 kWe) for Prime Rating Technical Data

System ratings

Voltage (L-L)	208V † ‡	240V † ‡	380V † ‡	480V † ‡	600V ‡	4,160V
Phase	3	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60
kW	900	900	900	900	900	900
kVA	1,125	1,125	1,125	1,125	1,125	1,125
Amps	3,123	2,706	1,709	1,353	1,083	156
skVA@30% voltage dip	2,475	2,475	3,205	2,830	3,590	2,800
Generator model*	LSA 50.2 M6	LSA 50.2 M6	LSA 50.2 M6	LSA 49.1 L11	LSA 49.1 L11	LSA 50.2 UL8
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	12 LEAD WYE	12 LEAD DELTA	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE

* Consult the factory for alternate configuration.
† UL 2200 offered
‡ CSA offered

Certifications and standards

- Emissions
  - EPA Tier 2
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality, and performance integrity
  - All engine systems are prototype and factory tested
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional (refer to *System ratings* for availability)
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Power rating
  - Data Center Continuous Power (DCCP) rating is optimized for data center applications
  - Uptime Institute compliant for Tier III and IV data centers
  - No runtime limitation
  - 100% load factor
  - 10% overload available
  - Accepts load in one step per NFPA 110

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 16V2000 diesel engine
  - 35.7 liter displacement
  - Common rail fuel injection
  - 4-cycle
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - AREP supply to regulator
  - 300% short circuit capability
- Digital control panel(s)
  - UL recognized, CSA Certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Closed crankcase ventilation
- Jacket water pump
- Inter cooler water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - structural steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery rack and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 0.25% voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU Communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	***mtu***
Model	16V2000G26S
Type	4-cycle
Arrangement	16-V
Displacement: L (in³)	35.7 (2,179)
Bore: cm (in)	13.5 (5.3)
Stroke: cm (in)	15.6 (6.1)
Compression ratio	16:1
Rated rpm	1,800
Engine governor	electronic isochronous (ADEC)
Maximum power: kWm (bhp)	998 (1,338)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	114 (30.1)
Engine jacket water capacity: L (gal)	70 (18.5)
After cooler water capacity: L (gal)	25 (6.6)
System coolant capacity: L (gal)	188 (50)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	2,800
Batteries: group size	8D
Batteries: quantity	4

Fuel system

Fuel supply connection size	#12 JIC 37° male
Fuel return connection size	#12 JIC 37° male
Maximum fuel lift: m (ft)	5 (16)
Recommended fuel	diesel #2
Total fuel flow: L/hr (gal/hr)	1,500 (396)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	252 (66.6)
At 75% of power rating: L/hr (gal/hr)	186 (49.2)
At 50% of power rating: L/hr (gal/hr)	132 (34.9)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_2O)	0.12 (0.5)
Water pump capacity: L/min (gpm)	783 (207)
After cooler pump capacity: L/min (gpm)	258 (68)
Heat rejection to coolant: kW (BTUM)	390 (22,179)
Heat rejection to after cooler: kW (BTUM)	250 (14,217)
Heat radiated to ambient: kW (BTUM)	93 (5,289)
Fan power: kW (hp)	49 (66)

Air requirements

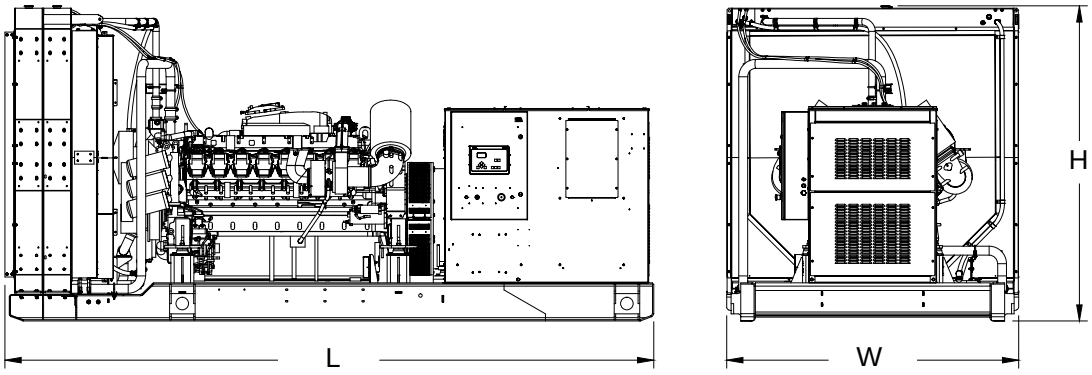
Aspirating: *m³/min (SCFM)	96 (3,390)
Air flow required for radiator cooled unit: *m³/min (SCFM)	1,709 (60,350)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m³/min (SCFM)	338 (11,925)

* Air density = 1.184 kg/m³ (0.0739 lbm/ft³)

Exhaust system

Gas temperature (stack): °C (°F)	495 (923)
Gas volume at stack temperature: m³/min (CFM)	252 (8,899)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_2O)	8.5 (34.1)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	5,093 x 2,292 x 2,477 mm (200.5 x 90.3 x 97.5 in)	8,525 kg (18,795 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	DCCP
Level 0 (OPU): dB(A)	95.1

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
4.2	0.02	0.01

- All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA Standards.

Rating definitions and conditions

- Data Center Continuous Power (DCCP) ratings apply to data center installations where a utility power is available and comply with Uptime Institute Tier III and IV requirements. At constant or varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 100%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 12V4000 DS1250 50 °C

1,135 kWe/60 Hz/Data Center Continuous Power/380 - 13,800V
Reference: *mtu* 12V4000 DS1250 (1,250 kWe) 50 °C for Standby Rating Technical Data

System ratings

Voltage (L-L)	380V † ‡	416V † ‡	440V † ‡	480V † ‡	600V ‡	4,160V	12,470V
Phase	3	3	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60	60
kW	1,135	1,135	1,135	1,135	1,135	1,135	1,135
kVA	1,419	1,419	1,419	1,419	1,419	1,419	1,419
Amps	2,156	1,969	1,862	1,707	1,365	197	66
skVA@30% voltage dip	2,122	2,939	3,288	3,913	2,601	2,877	2,912
Generator model*	50.2 L8	50.2 L8	50.2 L8	50.2 L8	50.2 L8	641-M55	4P6.6-2050
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE

Voltage (L-L)	13,200V	13,800V
Phase	3	3
PF	0.8	0.8
Hz	60	60
kW	1,135	1,135
kVA	1,419	1,419
Amps	62	59
skVA@30% voltage dip	2,869	3,135
Generator model*	4P6.6-2050	4P6.6-2050
Temp rise	130 °C/40 °C	130 °C/40 °C
Connection	6 LEAD WYE	6 LEAD WYE

* Consult the factory for alternate configuration. Generator model may end with -M or -R, depending on selection.
† UL 2200 offered
‡ CSA offered

A Rolls-Royce solution

Certifications and standards

- Emissions
  - EPA Tier 2 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional (refer to *System ratings* for availability)
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Data Center Continuous Power (DCCP) rating is optimized for data center applications
  - Uptime Institute compliant for Tier III and IV data centers
  - No runtime limitation
  - 100% load factor
  - 10% overload available
  - Accepts rated load in one step per NFPA 110

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 12V4000 diesel engine
  - 57.2 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - Permanent Magnet Generator (PMG) supply to regulator
  - 300% short circuit capability
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Centrifugal oil filtration
- Closed crankcase ventilation
- Jacket water pump
- Inter cooler water pump
- Thermostat
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - structural steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 0.25% voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	***mtu***
Model	12V4000G14S
Type	4-cycle
Arrangement	12-V
Displacement: L (in³)	57.2 (3,491)
Bore: cm (in)	17 (6.69)
Stroke: cm (in)	21 (8.27)
Compression ratio	16.5:1
Rated rpm	1,800
Engine governor	electronic isochronous (ADEC)
Maximum power: kWm (bhp)	1,520 (2,038)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	260 (68.7)
Engine jacket water capacity: L (gal)	160 (42.3)
After cooler water capacity: L (gal)	40 (10.6)
System coolant capacity: L (gal)	583 (154)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	2,800
Batteries: group size	8D
Batteries: quantity	4

Fuel system

Fuel supply connection size	#16 JIC 37° female 1" NPT adapter provided
Fuel return connection size	#16 JIC 37° female 1" NPT adapter provided
Maximum fuel lift: m (ft)	1 (3)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	960 (254)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	309 (81.5)
At 75% of power rating: L/hr (gal/hr)	238 (62.9)
At 50% of power rating: L/hr (gal/hr)	176 (46.4)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_2O)	0.12 (0.5)
Water pump capacity: L/min (gpm)	1,117 (295)
After cooler pump capacity: L/min (gpm)	583 (154)
Heat rejection to coolant: kW (BTUM)	504 (28,662)
Heat rejection to after cooler: kW (BTUM)	333 (18,937)
Heat radiated to ambient: kW (BTUM)	149 (8,450)
Fan power: kW (hp)	36.7 (49.2)

Air requirements

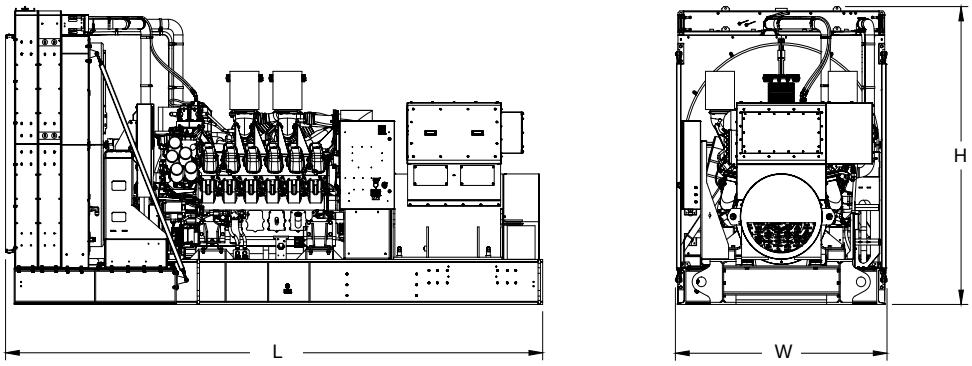
Aspirating: *m³/min (SCFM)	126 (4,450)
Air flow required for radiator cooled unit: *m³/min (SCFM)	1,416 (49,997)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m³/min (SCFM)	543 (19,293)

* Air density = 1.184 kg/m³ (0.0739 lbm/ft³)

Exhaust system

Gas temperature (stack): °C (°F)	400 (752)
Gas volume at stack temperature: m³/min (CFM)	306 (10,806)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_2O)	8.5 (34.1)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	5,876 x 2,314 x 2,977 mm (231.4 x 91.1 x 117.2 in)	16,413 kg (36,190 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	DCCP full load
Level 0 (OPU): dB(A)	91.8

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
5.26	0.45	0.06

- All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

- Data Center Continuous Power (DCCP) ratings apply to data center installations where a utility power is available and comply with Uptime Institute Tier III and IV requirements. At constant or varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 100%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration Factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 12V4000 DS1500 40 °C

1,400 kWe/60 Hz/Data Center Continuous Power/380 - 13,800V
Reference: *mtu* 12V4000 DS1500 (1,500 kWe) 40 °C for Standby Rating Technical Data

System ratings

Voltage (L-L)	380V † ‡	416V † ‡	440V † ‡	480V † ‡	600V ‡	4,160V	12,470V
Phase	3	3	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60	60
kW	1,400	1,400	1,400	1,400	1,400	1,400	1,400
kVA	1,750	1,750	1,750	1,750	1,750	1,750	1,750
Amps	2,659	2,429	2,296	2,105	1,684	243	81
skVA@30% voltage dip	2,647	2,275	2,545	4,622	3,132	3,432	2,912
Generator model*	641-S55	641-S55	641-S55	50.2 VL10	641-S55	641-L65	4P6.6-2050
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE

Voltage (L-L)	13,200V	13,800V
Phase	3	3
PF	0.8	0.8
Hz	60	60
kW	1,400	1,400
kVA	1,750	1,750
Amps	77	73
skVA@30% voltage dip	2,869	3,135
Generator model*	4P6.6-2050	4P6.6-2050
Temp rise	130 °C/40 °C	130 °C/40 °C
Connection	6 LEAD WYE	6 LEAD WYE

* Consult the factory for alternate configuration. Generator model may end with -M or -R, depending on selection.
† UL 2200 offered
‡ CSA offered

A Rolls-Royce solution

Certifications and standards

- Emissions
  - EPA Tier 2 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional (refer to *System ratings* for availability)
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Data Center Continuous Power (DCCP) rating is optimized for data center applications
  - Uptime Institute compliant for Tier III and IV data centers
  - No runtime limitation
  - 100% load factor
  - 10% overload available
  - Accepts rated load in one step per NFPA 110

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 12V4000 diesel engine
  - 57.2 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - Permanent Magnet Generator (PMG) supply to regulator
  - 300% short circuit capability
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Centrifugal oil filtration
- Closed crankcase ventilation
- Jacket water pump
- Inter cooler water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - structural steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 0.25% voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	***mtu***
Model	12V4000G14S
Type	4-cycle
Arrangement	12-V
Displacement: L (in³)	57.2 (3,491)
Bore: cm (in)	17 (6.69)
Stroke: cm (in)	21 (8.27)
Compression ratio	16.5:1
Rated rpm	1,800
Engine governor	electronic isochronous (ADEC)
Maximum power: kWm (bhp)	1,520 (2,038)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	260 (68.7)
Engine jacket water capacity: L (gal)	160 (42.3)
After cooler water capacity: L (gal)	40 (10.6)
System coolant capacity: L (gal)	583 (154)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	2,800
Batteries: group size	8D
Batteries: quantity	4

Fuel system

Fuel supply connection size	#16 JIC 37° female 1" NPT adapter provided
Fuel return connection size	#16 JIC 37° female 1" NPT adapter provided
Maximum fuel lift: m (ft)	1 (3)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	960 (254)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	372 (98.2)
At 75% of power rating: L/hr (gal/hr)	285 (75.4)
At 50% of power rating: L/hr (gal/hr)	200 (52.9)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	40 (104)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.12 (0.5)
Water pump capacity: L/min (gpm)	1,117 (295)
After cooler pump capacity: L/min (gpm)	583 (154)
Heat rejection to coolant: kW (BTUM)	560 (31,847)
Heat rejection to after cooler: kW (BTUM)	370 (21,042)
Heat radiated to ambient: kW (BTUM)	161 (9,141)
Fan power: kW (hp)	36.7 (49.2)

Air requirements

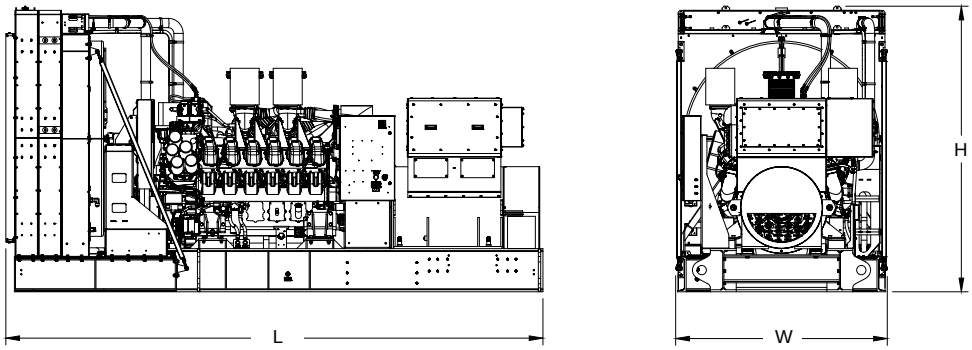
Aspirating: *m³/min (SCFM)	132 (4,662)
Air flow required for radiator cooled unit: *m³/min (SCFM)	1,416 (49,997)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m³/min (SCFM)	587 (20,870)

* Air density = 1.184 kg/m³ (0.0739 lbm/ft³)

Exhaust system

Gas temperature (stack): °C (°F)	410 (770)
Gas volume at stack temperature: m³/min (CFM)	312 (11,018)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	8.5 (34.1)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	5,876 x 2,314 x 2,977 mm (231.4 x 91.1 x 117.2 in)	16,413 kg (36,190 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	DCCP full load
Level 0 (OPU): dB(A)	92.2

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
5.26	0.45	0.06

- All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

- Data Center Continuous Power (DCCP) ratings apply to data center installations where a utility power is available and comply with Uptime Institute Tier III and IV requirements. At constant or varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 100%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration Factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 12V4000 DS1500 50 °C

1,400 kWe/60 Hz/Data Center Continuous Power/380 - 13,800V
Reference: *mtu* 12V4000 DS1500 (1,500 kWe) 50 °C for Standby Rating Technical Data

System ratings

Voltage (L-L)	380V † ‡	416V † ‡	440V † ‡	480V † ‡	600V ‡	4,160V	12,470V
Phase	3	3	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60	60
kW	1,374	1,368	1,375	1,374	1,372	1,364	1,356
kVA	1,718	1,710	1,719	1,718	1,715	1,705	1,695
Amps	2,609	2,373	2,255	2,065	1,650	236	78
skVA@30% voltage dip	2,647	2,275	2,545	4,622	3,132	3,432	2,912
Generator model*	641-S55	641-S55	641-S55	50.2 VL10	641-S55	641-L65	4P6.6-2050
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE

Voltage (L-L)	13,200V	13,800V
Phase	3	3
PF	0.8	0.8
Hz	60	60
kW	1,356	1,355
kVA	1,695	1,694
Amps	74	70
skVA@30% voltage dip	2,869	3,135
Generator model*	4P6.6-2050	4P6.6-2050
Temp rise	130 °C/40 °C	130 °C/40 °C
Connection	6 LEAD WYE	6 LEAD WYE

* Consult the factory for alternate configuration. Generator model may end with -M or -R, depending on selection.
† UL 2200 offered
‡ CSA offered

A Rolls-Royce solution

Certifications and standards

- Emissions
  - EPA Tier 2 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional (refer to *System ratings* for availability)
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality, and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Data Center Continuous Power (DCCP) rating is optimized for data center applications
  - Uptime Institute compliant for Tier III and IV data centers
  - No runtime limitation
  - 100% load factor
  - 10% overload available
  - Accepts rated load in one step per NFPA 110

Standard features *

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 12V4000 diesel engine
  - 57.2 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - Permanent Magnet Generator (PMG) supply to regulator
  - 300% short circuit capability
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment *

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Centrifugal oil filtration
- Closed crankcase ventilation
- Jacket water pump
- Inter cooler water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic Isochronous
- Base - structural steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 0.25% voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	***mtu***
Model	12V4000G14S
Type	4-cycle
Arrangement	12-V
Displacement: L (in³)	57.2 (3,491)
Bore: cm (in)	17 (6.69)
Stroke: cm (in)	21 (8.27)
Compression ratio	16.5:1
Rated rpm	1,800
Engine governor	electronic isochronous (ADEC)
Maximum power: kWm (bhp)	1,520 (2,038)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	260 (68.7)
Engine jacket water capacity: L (gal)	160 (42.3)
After cooler water capacity: L (gal)	40 (10.6)
System coolant capacity: L (gal)	583 (154)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	2,800
Batteries: group size	8D
Batteries: quantity	4

Fuel system

Fuel supply connection size	#16 JIC 37° female 1" NPT adapter provided
Fuel return connection size	#16 JIC 37° female 1" NPT adapter provided
Maximum fuel lift: m (ft)	1 (3)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	960 (254)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	372 (98.2)
At 75% of power rating: L/hr (gal/hr)	285 (75.4)
At 50% of power rating: L/hr (gal/hr)	200 (52.9)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.12 (0.5)
Water pump capacity: L/min (gpm)	1,117 (295)
After cooler pump capacity: L/min (gpm)	583 (154)
Heat rejection to coolant: kW (BTUM)	560 (31,847)
Heat rejection to after cooler: kW (BTUM)	370 (21,042)
Heat radiated to ambient: kW (BTUM)	161 (9,141)
Fan power: kW (hp)	82.4 (110.5)

Air requirements

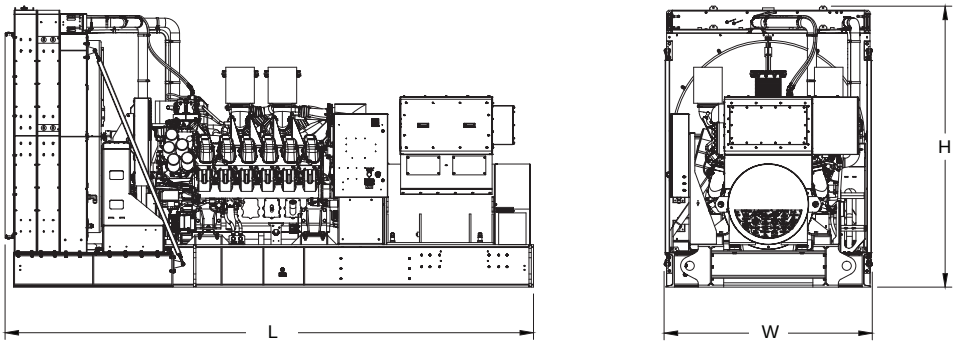
Aspirating: *m³/min (SCFM)	132 (4,662)
Air flow required for radiator cooled unit: *m³/min (SCFM)	2,074 (73,238)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m³/min (SCFM)	587 (20,870)

* Air density = 1.184 kg/m³ (0.0739 lbm/ft³)

Exhaust system

Gas tempderature (stack): °C (°F)	410 (770)
Gas volume at stack temperature: m³/min (CFM)	312 (11,018)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	8.5 (34.1)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	5,876 x 2,314 x 2,977 mm (231.4 x 91.1 x 117.2 in)	16,413 kg (36,190 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	DCCP full load
Level 0 (OPU): dB(A)	92.2

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
5.26	0.45	0.06

— All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

— Data Center Continuous Power (DCCP) ratings apply to data center installations where a utility power is available and comply with Uptime Institute Tier III and IV requirements. At constant or varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 100%.
— Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
— Deration Factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 12V4000 DS1750 40 °C

1,600 kWe/60 Hz/Data Center Continuous Power/380 - 13,800V
Reference: *mtu* 12V4000 DS1750 (1,750 kWe) 40 °C for Standby Rating Technical Data

System ratings

Voltage (L-L)	380V † ‡	416V † ‡	440V † ‡	480V † ‡	600V ‡	4,160V	12,470V
Phase	3	3	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60	60
kW	1,600	1,600	1,600	1,600	1,600	1,600	1,598
kVA	2,000	2,000	2,000	2,000	2,000	2,000	1,997
Amps	3,039	2,776	2,624	2,406	1,925	278	92
skVA@30% voltage dip	3,284	2,649	2,964	3,029	3,346	4,303	2,692
Generator model*	641-M60	641-M60	641-M60	641-S55	641-M60	641-VL75	4P6.6-2300
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE

Voltage (L-L)	13,200V	13,800V
Phase	3	3
PF	0.8	0.8
Hz	60	60
kW	1,598	1,598
kVA	1,998	1,997
Amps	87	84
skVA@30% voltage dip	3,017	3,297
Generator model*	4P6.6-2300	4P6.6-2300
Temp rise	130 °C/40 °C	130 °C/40 °C
Connection	6 LEAD WYE	6 LEAD WYE

* Consult the factory for alternate configuration. Generator model may end with -M or -R, depending on selection.
† UL 2200 offered
‡ CSA offered

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Certifications and standards

- Emissions
  - EPA Tier 2 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional (refer to *System ratings* for availability)
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality, and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Data Center Continuous Power (DCCP) rating is optimized for data center applications
  - Uptime Institute compliant for Tier III and IV data centers
  - No runtime limitation
  - 100% load factor
  - 10% overload available
  - Accepts rated load in one step per NFPA 110

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 12V4000 diesel engine
  - 57.2 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - Permanent Magnet Generator (PMG) supply to regulator
  - 300% short circuit capability
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Centrifugal oil filtration
- Closed crankcase ventilation
- Jacket water pump
- Inter cooler water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - structural steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 0.25% voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	***mtu***
Model	12V4000G24S
Type	4-cycle
Arrangement	12-V
Displacement: L (in³)	57.2 (3,491)
Bore: cm (in)	17 (6.69)
Stroke: cm (in)	21 (8.27)
Compression ratio	16.5:1
Rated rpm	1,800
Engine governor	electronic isochronous (ADEC)
Maximum power: kWm (bhp)	1,736 (2,328)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	260 (68.7)
Engine jacket water capacity: L (gal)	160 (42.3)
After cooler water capacity: L (gal)	40 (10.6)
System coolant capacity: L (gal)	583 (154)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	2,800
Batteries: group size	8D
Batteries: quantity	4

Fuel system

Fuel supply connection size	#16 JIC 37° female 1" NPT adapter provided
Fuel return connection size	#16 JIC 37° female 1" NPT adapter provided
Maximum fuel lift: m (ft)	1 (3)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	960 (254)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	420 (111)
At 75% of power rating: L/hr (gal/hr)	322 (85)
At 50% of power rating: L/hr (gal/hr)	227 (60)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	40 (104)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_2O)	0.12 (0.5)
Water pump capacity: L/min (gpm)	1,117 (295)
After cooler pump capacity: L/min (gpm)	583 (154)
Heat rejection to coolant: kW (BTUM)	640 (36,396)
Heat rejection to after cooler: kW (BTUM)	440 (25,022)
Heat radiated to ambient: kW (BTUM)	160 (9,124)
Fan power: kW (hp)	48.7 (65.3)

Air requirements

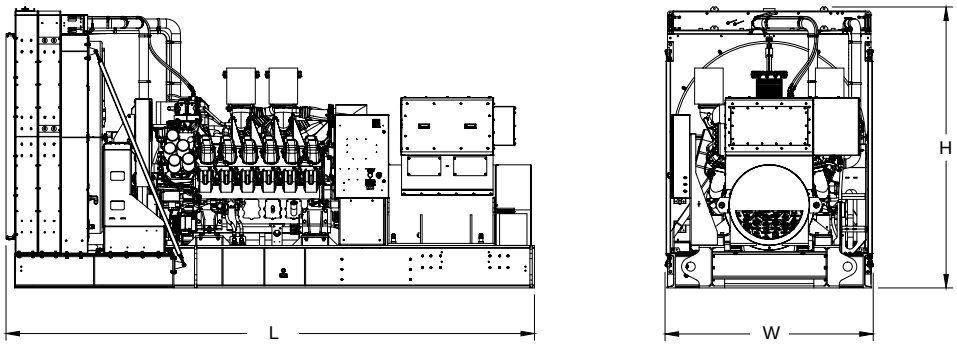
Aspirating: *m³/min (SCFM)	138 (4,873)
Air flow required for radiator cooled unit: *m³/min (SCFM)	1,574 (55,587)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m³/min (SCFM)	586 (20,830)

* Air density = 1.184 kg/m³ (0.0739 lbm/ft³)

Exhaust system

Gas temperature (stack): °C (°F)	435 (815)
Gas volume at stack temperature: m³/min (CFM)	342 (12,078)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_2O)	8.5 (34.1)

Weights and dimensions



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System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	5,876 x 2,314 x 3,125 mm (231.4 x 91.1 x 123 in)	16,987 kg (37,457 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	DCCP full load
Level 0 (OPU): dB(A)	92.8

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
5.34	0.52	0.05

- All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

- Data Center Continuous Power (DCCP) ratings apply to data center installations where a utility power is available and comply with Uptime Institute Tier III and IV requirements. At constant or varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 100%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration Factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 12V4000 DS1750 50 °C

1,600 kWe/60 Hz/Data Center Continuous Power/380 - 13,800V
Reference: *mtu* 12V4000 DS1750 (1,750 kWe) 50 °C for Standby Rating Technical Data

System ratings

Voltage (L-L)	380V † ‡	416V † ‡	440V † ‡	480V † ‡	600V ‡	4,160V	12,470V
Phase	3	3	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60	60
kW	1,583	1,587	1,590	1,588	1,588	1,581	1,572
kVA	1,978	1,983	1,987	1,985	1,985	1,976	1,965
Amps	3,006	2,753	2,607	2,387	1,910	274	91
skVA@30% voltage dip	2,647	2,649	2,964	3,029	3,346	4,303	2,692
Generator model*	641-S55	641-M60	641-M60	641-S55	641-M60	641-VL75	4P6.6-2300
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE

Voltage (L-L)	13,200V	13,800V
Phase	3	3
PF	0.8	0.8
Hz	60	60
kW	1,573	1,572
kVA	1,966	1,965
Amps	86	82
skVA@30% voltage dip	3,017	3,297
Generator model*	4P6.6-2300	4P6.6-2300
Temp rise	130 °C/40 °C	130 °C/40 °C
Connection	6 LEAD WYE	6 LEAD WYE

* Consult the factory for alternate configuration. Generator model may end with -M or -R, depending on selection.
† UL 2200 offered
‡ CSA offered

A Rolls-Royce solution

Certifications and standards

- Emissions
  - EPA Tier 2 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional (refer to *System ratings* for availability)
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality, and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Data Center Continuous Power (DCCP) rating is optimized for data center applications
  - Uptime Institute compliant for Tier III and IV data centers
  - No runtime limitation
  - 100% load factor
  - 10% overload available
  - Accepts rated load in one step per NFPA 110

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limted Warranty
- 12V4000 diesel engine
  - 57.2 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - Permanent Magnet Generator (PMG) supply to regulator
  - 300% short circuit capability
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Centrifugal oil filtration
- Closed crankcase ventilation
- Jacket water pump
- Inter cooler water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic Isochronous
- Base - structural steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 0.25% voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	***mtu***
Model	12V4000G24S
Type	4-cycle
Arrangement	12-V
Displacement: L (in³)	57.2 (3,491)
Bore: cm (in)	17 (6.69)
Stroke: cm (in)	21 (8.27)
Compression ratio	16.5:1
Rated rpm	1,800
Engine governor	electronic isochronous (ADEC)
Maximum power: kWm (bhp)	1,736 (2,328)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	260 (68.7)
Engine jacket water capacity: L (gal)	160 (42.3)
After cooler water capacity: L (gal)	40 (10.6)
System coolant capacity: L (gal)	583 (154)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	2,800
Batteries: group size	8D
Batteries: quantity	4

Fuel system

Fuel supply connection size	#16 JIC 37° female 1" NPT adapter provided
Fuel return connection size	#16 JIC 37° female 1" NPT adapter provided
Maximum fuel lift: m (ft)	1 (3)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	960 (254)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	420 (111)
At 75% of power rating: L/hr (gal/hr)	322 (85)
At 50% of power rating: L/hr (gal/hr)	227 (60)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.12 (0.5)
Water pump capacity: L/min (gpm)	1,117 (295)
After cooler pump capacity: L/min (gpm)	583 (154)
Heat rejection to coolant: kW (BTUM)	640 (36,396)
Heat rejection to after cooler: kW (BTUM)	440 (25,022)
Heat radiated to ambient: kW (BTUM)	160 (9,124)
Fan power: kW (hp)	76.2 (102.2)

Air requirements

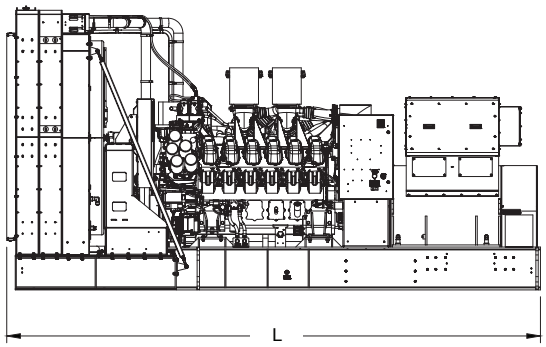
Aspirating: *m³/min (SCFM)	138 (4,873)
Air flow required for radiator cooled unit: *m³/min (SCFM)	2,027 (71,579)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m³/min (SCFM)	586 (20,830)

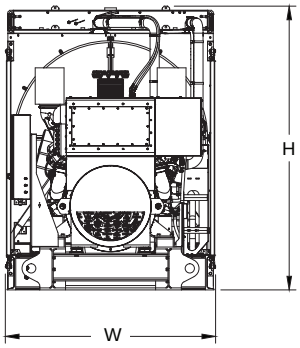
* Air density = 1.184 kg/m³ (0.0739 lbm/ft³)

Exhaust system

Gas temperature (stack): °C (°F)	435 (815)
Gas volume at stack temperature: m³/min (CFM)	342 (12,078)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	8.5 (34.1)

Weights and dimensions





Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	5,876 x 2,314 x 2,977 mm (231.4 x 91.1 x 117.2 in)	16,917 kg (37,303 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	DCCP full load
Level 0 (OPU): dB(A)	92.8

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
5.34	0.52	0.05

— All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

— Data Center Continuous Power (DCCP) ratings apply to data center installations where a utility power is available and comply with Uptime Institute Tier III and IV requirements. At constant or varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 100%.
— Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
— Deration Factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 16V4000 DS2000 45 °C

1,825 kWe/60 Hz/Data Center Continuous Power/380 - 13,800V
Reference: *mtu* 16V4000 DS2000 (2,000 kWe) 45 °C for Standby Rating Technical Data

System ratings

Voltage (L-L)	380V † ‡	416V † ‡	440V † ‡	480V † ‡	600V ‡	4,160V	12,470V
Phase	3	3	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60	60
kW	1,825	1,825	1,825	1,825	1,825	1,825	1,825
kVA	2,281	2,281	2,281	2,281	2,281	2,281	2,281
Amps	3,466	3,166	2,993	2,744	2,195	317	106
skVA@30% voltage dip	6,899	6,030	5,480	4,914	4,575	5,852	3,243
Generator model*	841-M70	841-M70	841-S60	641-VL90	641-VL85	841-S60	4P6.6-2600
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE

Voltage (L-L)	13,200V	13,800V
Phase	3	3
PF	0.8	0.8
Hz	60	60
kW	1,825	1,825
kVA	2,281	2,281
Amps	100	95
skVA@30% voltage dip	3,633	3,971
Generator model*	4P6.6-2600	4P6.6-2600
Temp rise	130 °C/40 °C	130 °C/40 °C
Connection	6 LEAD WYE	6 LEAD WYE

* Consult the factory for alternate configuration. Generator model may end with -M or -R, depending on selection.
† UL 2200 offered
‡ CSA offered

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Certifications and standards

- Emissions
  - EPA Tier 2 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional (refer to *System ratings* for availability)
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality, and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Data Center Continuous Power (DCCP) rating is optimized for data center applications
  - Uptime Institute compliant for Tier III and IV data centers
  - No runtime limitation
  - 100% load factor
  - 10% overload available
  - Accepts rated load in one step per NFPA 110

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 16V4000 diesel engine
  - 76.3 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - Permanent Magnet Generator (PMG) supply to regulator
  - 300% short circuit capability
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaner
- Oil pump
- Oil drain extension and shut-off valve
- Centrifugal oil filtration
- Closed crankcase ventilation
- Jacket water pump
- Inter cooler water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic Isochronous
- Base - structural steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 0.25% voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	***mtu***
Model	16V4000G14S
Type	4-cycle
Arrangement	16-V
Displacement: L (in³)	76.3 (4,656)
Bore: cm (in)	17 (6.69)
Stroke: cm (in)	21 (8.27)
Compression ratio	16.5:1
Rated rpm	1,800
Engine governor	electronic isochronous (ADEC)
Maximum power: kWm (bhp)	2,020 (2,709)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	300 (79.3)
Engine jacket water capacity: L (gal)	175 (46.2)
After cooler water capacity: L (gal)	50 (13.2)
System coolant capacity: L (gal)	547 (145)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	2,800
Batteries: group size	8D
Batteries: quantity	4

Fuel system

Fuel supply connection size	-16 JIC 37° female 1" NPT adapter provided
Fuel return connection size	-16 JIC 37° female 1" NPT adapter provided
Maximum fuel lift: m (ft)	1 (3)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	1,200 (317)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	487 (128.6)
At 75% of power rating: L/hr (gal/hr)	381 (100.7)
At 50% of power rating: L/hr (gal/hr)	265 (69.9)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	45 (113)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.12 (0.5)
Water pump capacity: L/min (gpm)	1,350 (357)
After cooler pump capacity: L/min (gpm)	583 (154)
Heat rejection to coolant: kW (BTUM)	740 (42,083)
Heat rejection to after cooler: kW (BTUM)	520 (29,572)
Heat radiated to ambient: kW (BTUM)	190 (10,809)
Fan power: kW (hp)	95.4 (128)

Air requirements

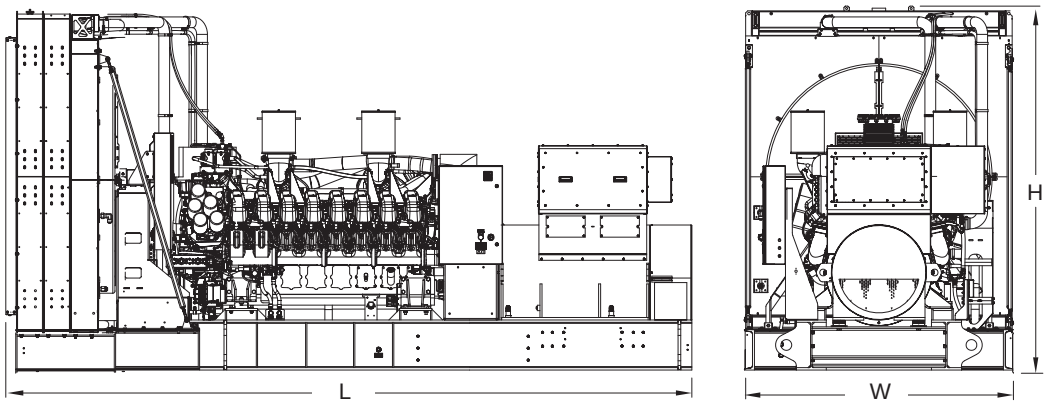
Aspirating: *m³/min (SCFM)	180 (6,357)
Air flow required for radiator cooled unit: *m³/min (SCFM)	2,053 (72,500)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m³/min (SCFM)	689 (24,492)

* Air density = 1.184 kg/m³ (0.0739 lbm/ft³)

Exhaust system

Gas temperature (stack): °C (°F)	435 (815)
Gas volume at stack temperature: m³/min (CFM)	426 (15,044)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	8.5 (34.1)

Weights and dimensions



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System	Dimensions (L x W x H)	Weight
Open power unit (OPU)	6,432 x 2,338 x 3,191 mm (253.2 x 92 x 125.6 in)	20,720 kg (45,687 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	DCCP full load
Level 0 (OPU): dB(A)	98.6

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
5.26	0.67	0.05

- All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

- Data Center Continuous Power (DCCP) ratings apply to data center installations where a utility power is available and comply with Uptime Institute Tier III and IV requirements. At constant or varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 100%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration Factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 16V4000 DS2000 50 °C

1,825 kWe/60 Hz/Data Center Continuous Power/380 - 13,800V
Reference: *mtu* 16V4000 DS2000 (2,000 kWe) 50 °C for Standby Rating Technical Data

System ratings

Voltage (L-L)	380V † ‡	416V † ‡	440V † ‡	480V † ‡	600V ‡	4,160V	12,470V
Phase	3	3	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60	60
kW	1,825	1,825	1,825	1,825	1,825	1,825	1,825
kVA	2,281	2,281	2,281	2,281	2,281	2,281	2,281
Amps	3,466	3,166	2,993	2,744	2,195	317	106
skVA@30% voltage dip	6,899	6,030	5,480	4,914	4,575	5,852	3,243
Generator model*	841-M70	841-M70	841-S60	641-VL90	641-VL85	841-S60	4P6.6-2600
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE

Voltage (L-L)	13,200V	13,800V
Phase	3	3
PF	0.8	0.8
Hz	60	60
kW	1,825	1,825
kVA	2,281	2,281
Amps	100	95
skVA@30% voltage dip	3,633	3,971
Generator model*	4P6.6-2600	4P6.6-2600
Temp rise	130 °C/40 °C	130 °C/40 °C
Connection	6 LEAD WYE	6 LEAD WYE

* Consult the factory for alternate configuration. Generator model may end with -M or -R, depending on selection.
† UL 2200 offered
‡ CSA offered

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Certifications and standards

- Emissions
  - EPA Tier 2 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional (refer to *System ratings* for availability)
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality, and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Data Center Continuous Power (DCCP) rating is optimized for data center applications
  - Uptime Institute compliant for Tier III and IV data centers
  - No runtime limitation
  - 100% load factor
  - 10% overload available
  - Accepts rated load in one step per NFPA 110

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 16V4000 diesel engine
  - 76.3 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - Permanent Magnet Generator (PMG) supply to regulator
  - 300% short circuit capability
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaner
- Oil pump
- Oil drain extension and shut-off valve
- Centrifugal oil filtration
- Closed crankcase ventilation
- Jacket water pump
- Inter cooler water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic Isochronous
- Base - structural steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 0.25% voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	***mtu***
Model	16V4000G14S
Type	4-cycle
Arrangement	16-V
Displacement: L (in³)	76.3 (4,656)
Bore: cm (in)	17 (6.69)
Stroke: cm (in)	21 (8.27)
Compression ratio	16.5:1
Rated rpm	1,800
Engine governor	electronic isochronous (ADEC)
Maximum power: kWm (bhp)	2,020 (2,709)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	300 (79.3)
Engine jacket water capacity: L (gal)	175 (46.2)
After cooler water capacity: L (gal)	50 (13.2)
System coolant capacity: L (gal)	719 (189.9)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	2,800
Batteries: group size	8D
Batteries: quantity	4

Fuel system

Fuel supply connection size	-16 JIC 37° female 1" NPT adapter provided
Fuel return connection size	-16 JIC 37° female 1" NPT adapter provided
Maximum fuel lift: m (ft)	1 (3)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	1,200 (317)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	487 (128.6)
At 75% of power rating: L/hr (gal/hr)	381 (100.7)
At 50% of power rating: L/hr (gal/hr)	265 (69.9)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_2O)	0.12 (0.5)
Water pump capacity: L/min (gpm)	1,350 (357)
After cooler pump capacity: L/min (gpm)	583 (154)
Heat rejection to coolant: kW (BTUM)	740 (42,083)
Heat rejection to after cooler: kW (BTUM)	520 (29,572)
Heat radiated to ambient: kW (BTUM)	190 (10,809)
Fan power: kW (hp)	105.9 (142)

Air requirements

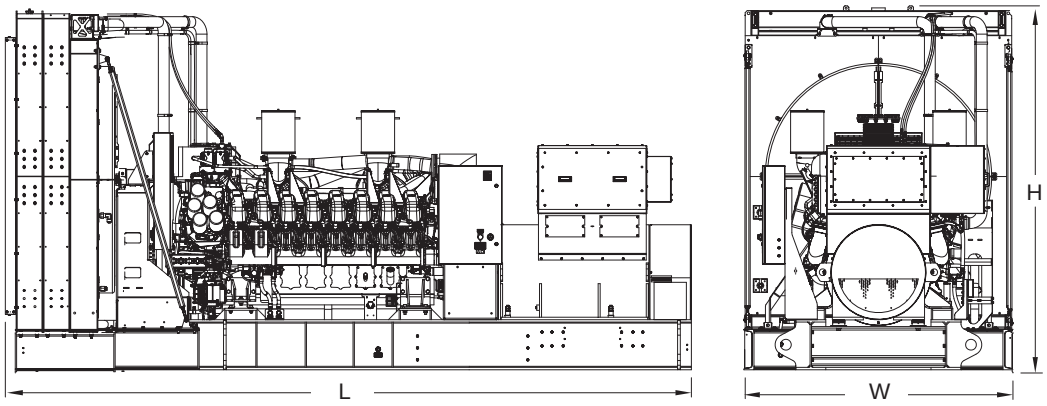
Aspirating: *m³/min (SCFM)	180 (6,357)
Air flow required for radiator cooled unit: *m³/min (SCFM)	3,089 (109,080)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m³/min (SCFM)	689 (24,492)

* Air density = 1.184 kg/m³ (0.0739 lbm/ft³)

Exhaust system

Gas temperature (stack): °C (°F)	435 (815)
Gas volume at stack temperature: m³/min (CFM)	426 (15,044)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_2O)	8.5 (34.1)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	6,474 x 2,539 x 3,434 mm (254.9 x 99.9 x 135.2 in)	21,554 kg (47,523 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	DCCP full load
Level 0 (OPU): dB(A)	98.6

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
5.26	0.67	0.05

- All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

- Data Center Continuous Power (DCCP) ratings apply to data center installations where a utility power is available and comply with Uptime Institute Tier III and IV requirements. At constant or varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 100%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration Factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 16V4000 DS2250 40 °C

2,045 kWe/60 Hz/Data Center Continuous Power/380 - 13,800V
Reference: *mtu* 16V4000 DS2250 (2,250 kWe) 40 °C for Standby Rating Technical Data

System ratings

Voltage (L-L)	380V † ‡	416V † ‡	440V † ‡	480V † ‡	600V ‡	4,160V	12,470V
Phase	3	3	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60	60
kW	2,045	2,045	2,045	2,045	2,045	2,045	2,045
kVA	2,556	2,556	2,556	2,556	2,556	2,556	2,556
Amps	3,884	3,548	3,354	3,075	2,460	355	118
skVA@30% voltage dip	6,899	5,573	4,047	4,816	6,271	5,852	4,266
Generator model*	841-M70	841-L75	641-VL95	641-VL95	841-S60	841-S60	4P6.6-2800
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE

Voltage (L-L)	13,200V	13,800V
Phase	3	3
PF	0.8	0.8
Hz	60	60
kW	2,045	2,045
kVA	2,556	2,556
Amps	112	107
skVA@30% voltage dip	4,017	4,390
Generator model*	4P6.6-2800	4P6.6-2800
Temp rise	130 °C/40 °C	130 °C/40 °C
Connection	6 LEAD WYE	6 LEAD WYE

* Consult the factory for alternate configuration. Generator model may end with -M or -R, depending on selection.
† UL 2200 offered
‡ CSA offered

A Rolls-Royce solution

Certifications and standards

- Emissions
  - EPA Tier 2 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional (refer to *System ratings* for availability)
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality, and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Data Center Continuous Power (DCCP) rating is optimized for data center applications
  - Uptime Institute compliant for Tier III and IV data centers
  - No runtime limitation
  - 100% load factor
  - 10% overload available
  - Accepts rated load in one step per NFPA 110

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 16V4000 diesel engine
  - 76.3 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - Permanent Magnet Generator (PMG) supply to regulator
  - 300% short circuit capability
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Centrifugal oil filtration
- Closed crankcase ventilation
- Jacket water pump
- Inter cooler water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic Isochronous
- Base - structural steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 0.25% voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	***mtu***
Model	16V4000G24S
Type	4-cycle
Arrangement	16-V
Displacement: L (in³)	76.3 (4,656)
Bore: cm (in)	17 (6.69)
Stroke: cm (in)	21 (8.27)
Compression ratio	16.5:1
Rated rpm	1,800
Engine governor	electronic isochronous (ADEC)
Maximum power: kWm (bhp)	2,280 (3,058)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	300 (79.3)
Engine jacket water capacity: L (gal)	175 (46.2)
After cooler water capacity: L (gal)	50 (13.2)
System coolant capacity: L (gal)	547 (145)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	2,800
Batteries: group size	8D
Batteries: quantity	4

Fuel system

Fuel supply connection size	-16 JIC 37° female 1" NPT adapter provided
Fuel return connection size	-16 JIC 37° female 1" NPT adapter provided
Maximum fuel lift: m (ft)	1 (3)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	1,200 (317)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	558 (147)
At 75% of power rating: L/hr (gal/hr)	426 (113)
At 50% of power rating: L/hr (gal/hr)	299 (79)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	40 (104)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_2O)	0.12 (0.5)
Water pump capacity: L/min (gpm)	1,350 (357)
After cooler pump capacity: L/min (gpm)	583 (154)
Heat rejection to coolant: kW (BTUM)	840 (47,770)
Heat rejection to after cooler: kW (BTUM)	610 (34,690)
Heat radiated to ambient: kW (BTUM)	202.1 (11,493)
Fan power: kW (hp)	95.4 (128)

Air requirements

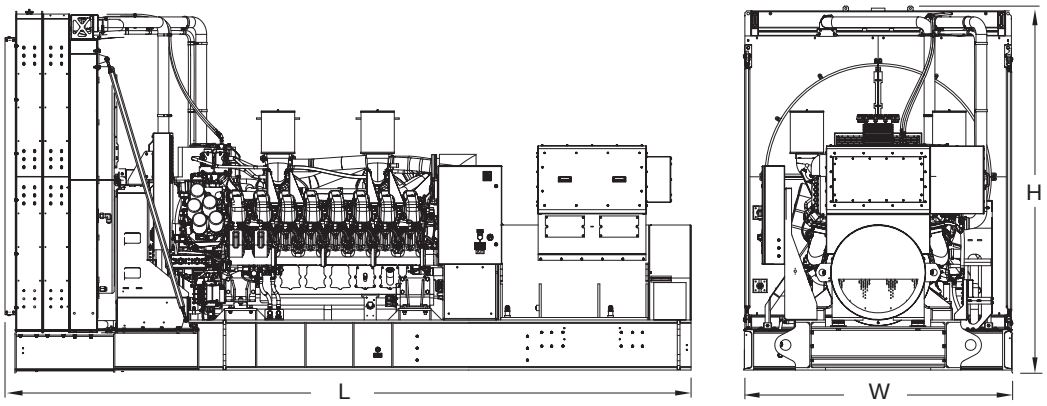
Aspirating: *m³/min (SCFM)	180 (6,357)
Air flow required for radiator cooled unit: *m³/min (SCFM)	2,053 (72,500)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m³/min (SCFM)	739 (26,241)

* Air density = 1.184 kg/m³ (0.0739 lbm/ft³)

Exhaust system

Gas temperature (stack): °C (°F)	480 (896)
Gas volume at stack temperature: m³/min (CFM)	456 (16,103)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_2O)	8.5 (34.1)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	6,432 x 2,338 x 3,191 mm (253.2 x 92 x 125.6 in)	20,720 kg (45,687 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	DCCP full load
Level 0 (OPU): dB(A)	98.6

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
5.38	0.45	0.04

- All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

- Data Center Continuous Power (DCCP) ratings apply to data center installations where a utility power is available and comply with Uptime Institute Tier III and IV requirements. At constant or varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 100%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration Factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 16V4000 DS2250 50 °C

2,045 kWe/60 Hz/Data Center Continuous Power/380 - 13,800V
Reference: *mtu* 16V4000 DS2250 (2,250 kWe) 50 °C for Standby Rating Technical Data

System ratings

Voltage (L-L)	380V † ‡	416V † ‡	440V † ‡	480V † ‡	600V ‡	4,160V	12,470V
Phase	3	3	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60	60
kW	2,045	2,045	2,045	2,045	2,045	2,045	2,045
kVA	2,556	2,556	2,556	2,556	2,556	2,556	2,556
Amps	3,884	3,548	3,354	3,075	2,460	355	118
skVA@30% voltage dip	6,899	5,573	4,047	4,816	6,271	5,852	4,266
Generator model*	841-M70	841-L75	641-VL95	641-VL95	841-S60	841-S60	4P6.6-2800
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE

Voltage (L-L)	13,200V	13,800V
Phase	3	3
PF	0.8	0.8
Hz	60	60
kW	2,045	2,045
kVA	2,556	2,556
Amps	112	107
skVA@30% voltage dip	4,017	4,390
Generator model*	4P6.6-2800	4P6.6-2800
Temp rise	130 °C/40 °C	130 °C/40 °C
Connection	6 LEAD WYE	6 LEAD WYE

* Consult the factory for alternate configuration. Generator model may end with -M or -R, depending on selection.
† UL 2200 offered
‡ CSA offered

A Rolls-Royce solution

Certifications and standards

- Emissions
  - EPA Tier 2 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional (refer to *System ratings* for availability)
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality, and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Data Center Continuous Power (DCCP) rating is optimized for data center applications
  - Uptime Institute compliant for Tier III and IV data centers
  - No runtime limitation
  - 100% load factor
  - 10% overload available
  - Accepts rated load in one step per NFPA 110

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 16V4000 diesel engine
  - 76.3 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - Permanent Magnet Generator (PMG) supply to regulator
  - 300% short circuit capability
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Centrifugal oil filtration
- Closed crankcase ventilation
- Jacket water pump
- Inter cooler water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic Isochronous
- Base - structural steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 1 bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 0.25% voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	***mtu***
Model	16V4000G24S
Type	4-cycle
Arrangement	16-V
Displacement: L (in³)	76.3 (4,656)
Bore: cm (in)	17 (6.69)
Stroke: cm (in)	21 (8.27)
Compression ratio	16.5:1
Rated rpm	1,800
Engine governor	electronic isochronous (ADEC)
Maximum power: kWm (bhp)	2,280 (3,058)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	300 (79.3)
Engine jacket water capacity: L (gal)	175 (46.2)
After cooler water capacity: L (gal)	50 (13.2)
System coolant capacity: L (gal)	719 (190)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	2,800
Batteries: group size	8D
Batteries: quantity	4

Fuel system

Fuel supply connection size	-16 JIC 37° female 1" NPT adapter provided
Fuel return connection size	-16 JIC 37° female 1" NPT adapter provided
Maximum fuel lift: m (ft)	1 (3)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	1,200 (317)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	558 (147)
At 75% of power rating: L/hr (gal/hr)	426 (113)
At 50% of power rating: L/hr (gal/hr)	299 (79)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_2O)	0.12 (0.5)
Water pump capacity: L/min (gpm)	1,350 (357)
After cooler pump capacity: L/min (gpm)	583 (154)
Heat rejection to coolant: kW (BTUM)	840 (47,770)
Heat rejection to after cooler: kW (BTUM)	610 (34,690)
Heat radiated to ambient: kW (BTUM)	202.1 (11,493)
Fan power: kW (hp)	101.4 (136)

Air requirements

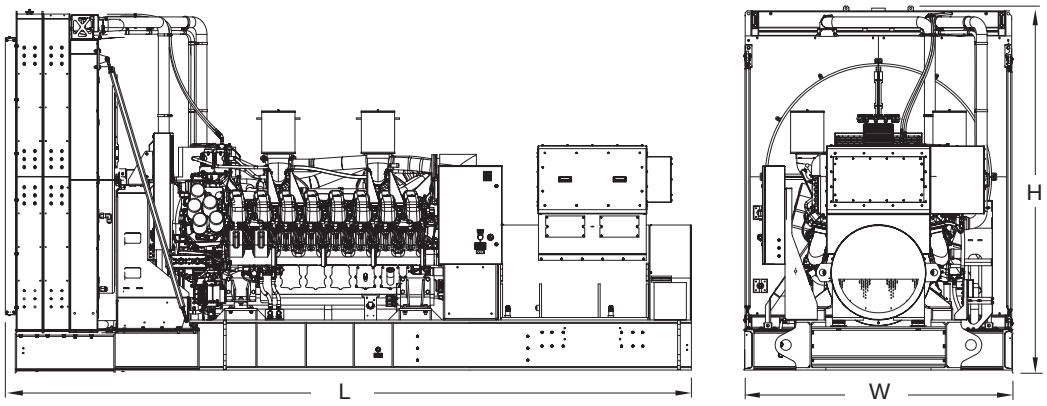
Aspirating: *m³/min (SCFM)	180 (6,357)
Air flow required for radiator cooled unit: *m³/min (SCFM)	3,168 (111,890)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m³/min (SCFM)	739 (26,241)

* Air density = 1.184 kg/m3 (0.0739 lbm/ft³)

Exhaust system

Gas temperature (stack): °C (°F)	480 (896)
Gas volume at stack temperature: m³/min (CFM)	456 (16,103)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_2O)	8.5 (34.1)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	6,474 x 2,539 x 3,434 mm (254.9 x 99.9 x 135.2 in)	21,554 kg (47,523 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	DCCP full load
Level 0 (OPU): dB(A)	98.6

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
5.38	0.45	0.04

- All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

- Data Center Continuous Power (DCCP) ratings apply to data center installations where a utility power is available and comply with Uptime Institute Tier III and IV requirements. At constant or varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 100%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration Factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 20V4000 DS2500 50 °C

2,275 kWe/60 Hz/Data Center Continuous Power/380 - 13,800V
Reference: *mtu* 20V4000 DS2500 (2,500 kWe) 50 °C for Standby Rating Technical Data

System ratings

Voltage (L-L)	380V † ‡	416V † ‡	440V † ‡	480V † ‡	600V ‡	4,160V	12,470V
Phase	3	3	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60	60
kW	2,275	2,275	2,275	2,275	2,275	2,275	2,275
kVA	2,843	2,843	2,843	2,843	2,843	2,843	2,843
Amps	4,320	3,947	3,732	3,420	2,736	394	131
skVA@30% voltage dip	6,899	7,803	7,803	8,028	7,058	7,086	4,398
Generator model*	841-M70	841-VL85	841-VL85	841-M70	841-M70	841-M70	4P6.6-3400
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE

Voltage (L-L)	13,200V	13,800V
Phase	3	3
PF	0.8	0.8
Hz	60	60
kW	2,275	2,275
kVA	2,843	2,843
Amps	124	119
skVA@30% voltage dip	4,928	5,386
Generator model*	4P6.6-3400	4P6.6-3400
Temp rise	130 °C/40 °C	130 °C/40 °C
Connection	6 LEAD WYE	6 LEAD WYE

* Consult the factory for alternate configuration. Generator model may end with -M or -R, depending on selection.
† UL 2200 offered
‡ CSA offered

A Rolls-Royce solution

Certifications and standards

- Emissions
  - EPA Tier 2 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional (refer to *System ratings* for availability)
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality, and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Data Center Continuous Power (DCCP) rating is optimized for data center applications
  - Uptime Institute compliant for Tier III and IV data centers
  - No runtime limitation
  - 100% load factor
  - 10% overload available
  - Accepts rated load in one step per NFPA 110

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 20V4000 diesel engine
  - 95.4 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - Permanent Magnet Generator (PMG) supply to regulator
  - 300% short circuit capability
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Centrifugal oil filtration
- Closed crankcase ventilation
- Jacket water pump
- Inter cooler water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic Isochronous
- Base - structural steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery box and cables
- Bulkhead fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 2-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 0.25% voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	***mtu***
Model	20V4000G14S
Type	4-cycle
Arrangement	20-V
Displacement: L (in³)	95.4 (5,822)
Bore: cm (in)	17 (6.69)
Stroke: cm (in)	21 (8.27)
Compression ratio	16.4:1
Rated rpm	1,800
Engine governor	electronic isochronous (ADEC)
Maximum power: kWm (bhp)	2,490 (3,339)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	390 (103)
Engine jacket water capacity: L (gal)	205 (54.2)
After cooler water capacity: L (gal)	50 (13.2)
System coolant capacity: L (gal)	814 (215)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	4,200
Batteries: group size	8D
Batteries: quantity	6

Fuel system

Fuel supply connection size	-16 JIC 37° female 1" NPT adapter provided
Fuel return connection size	-16 JIC 37° female 1" NPT adapter provided
Maximum fuel lift - cranking: m (ft)	1 (3.3)*
Maximum fuel lift - running: m (ft)	3.1 (10)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	1,620 (428)

* Fuel lift pump for cranking increases lift to: m (ft) 3.1 (10)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	587 (155)
At 75% of power rating: L/hr (gal/hr)	462 (122)
At 50% of power rating: L/hr (gal/hr)	337 (89)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_2O)	0.12 (0.5)
Water pump capacity: L/min (gpm)	1,567 (414)
After cooler pump capacity: L/min (gpm)	567 (150)
Heat rejection to coolant: kW (BTUM)	890 (50,613)
Heat rejection to after cooler: kW (BTUM)	580 (32,984)
Heat radiated to ambient: kW (BTUM)	214 (12,164)
Fan power: kW (hp)	87.5 (117.3)

Air requirements

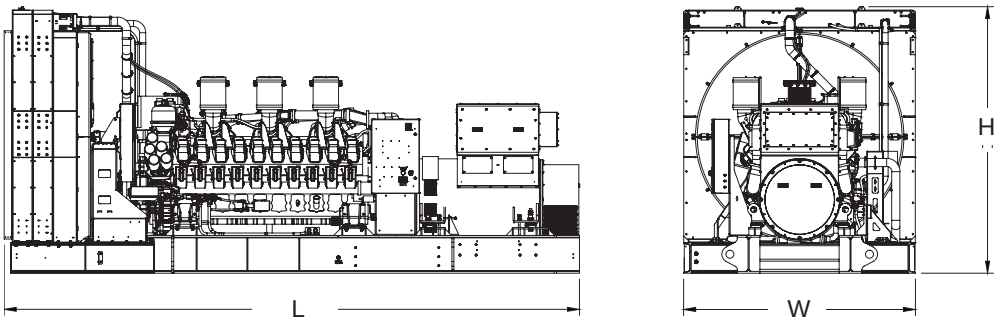
Aspirating: *m³/min (SCFM)	228 (8,052)
Air flow required for radiator cooled unit: *m³/min (SCFM)	2,895 (102,247)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m³/min (SCFM)	776 (27,410)

* Air density = 1.184 kg/m³ (0.0739 lbm/ft³)

Exhaust system

Gas temperature (stack): °C (°F)	455 (851)
Gas volume at stack temperature: m³/min (CFM)	534 (18,858)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_2O)	8.5 (34.1)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	7,197 x 2,900 x 3,335 mm (283.4 x 114.2 x 131.3 in)	23,490 kg (51,795 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	DCCP full load
Level 0 (OPU): dB(A)	97.5

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
6.12	0.37	0.04

- All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

- Data Center Continuous Power (DCCP) ratings apply to data center installations where a utility power is available and comply with Uptime Institute Tier III and IV requirements. At constant or varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 100%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration Factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 20V4000 DS2800 48 °C

2,500 kWe/60 Hz/Data Center Continuous Power/380 - 13,800V
Reference: *mtu* 20V4000 DS2800 (2,800 kWe) 48 °C for Standby Rating Technical Data

System ratings

Voltage (L-L)	380V † ‡	416V † ‡	440V † ‡	480V † ‡	600V ‡	4,160V	12,470V
Phase	3	3	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60	60
kW	2,500	2,500	2,500	2,500	2,500	2,500	2,500
kVA	3,125	3,125	3,125	3,125	3,125	3,125	3,125
Amps	4,748	4,337	4,101	3,759	3,007	434	145
skVA@30% voltage dip	6,454	5,303	8,729	7,420	8,607	8,777	4,791
Generator model*	841-L75	941-VL60	841-VL85	841-L75	841-L75	841-L75	4P9.6-2100
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE

Voltage (L-L)	13,200V	13,800V
Phase	3	3
PF	0.8	0.8
Hz	60	60
kW	2,500	2,500
kVA	3,125	3,125
Amps	137	131
skVA@30% voltage dip	5,369	5,868
Generator model*	4P9.6-2100	4P9.6-2100
Temp rise	130 °C/40 °C	130 °C/40 °C
Connection	6 LEAD WYE	6 LEAD WYE

* Consult the factory for alternate configuration. Generator model may end with -M or -R, depending on selection.
† UL 2200 offered
‡ CSA offered

A Rolls-Royce solution

Certifications and standards

- Emissions
  - EPA Tier 2 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional (refer to *System ratings* for availability)
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality, and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Data Center Continuous Power (DCCP) rating is optimized for data center applications
  - Uptime Institute compliant for Tier III and IV data centers
  - No runtime limitation
  - 100% load factor
  - 10% overload available
  - Accepts rated load in one step per NFPA 110

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 20V4000 diesel engine
  - 95.4 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - Permanent Magnet Generator (PMG) supply to regulator
  - 300% short circuit capability
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Centrifugal oil filtration
- Closed crankcase ventilation
- Jacket water pump
- Inter cooler water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic Isochronous
- Base - structural steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery box and cables
- Bulkhead fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 2-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 0.25% voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	***mtu***
Model	20V4000G24S
Type	4-cycle
Arrangement	20-V
Displacement: L (in³)	95.4 (5,822)
Bore: cm (in)	17 (6.69)
Stroke: cm (in)	21 (8.27)
Compression ratio	16.4:1
Rated rpm	1,800
Engine governor	electronic isochronous (ADEC)
Maximum power: kWm (bhp)	2,740 (3,674)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	390 (103)
Engine jacket water capacity: L (gal)	205 (54.2)
After cooler water capacity: L (gal)	50 (13.2)
System coolant capacity: L (gal)	860 (227)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	4,200
Batteries: group size	8D
Batteries: quantity	6

Fuel system

Fuel supply connection size	-16 JIC 37° female 1" NPT adapter provided
Fuel return connection size	-16 JIC 37° female 1" NPT adapter provided
Maximum fuel lift - cranking: m (ft)	1 (3.3)*
Maximum fuel lift - running: m (ft)	3.1 (10)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	1,620 (428)

* Fuel lift pump for cranking increases lift to: m (ft) 3.1 (10)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	647 (171)
At 75% of power rating: L/hr (gal/hr)	511 (135)
At 50% of power rating: L/hr (gal/hr)	367 (97)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	48 (110)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_2O)	0.12 (0.5)
Water pump capacity: L/min (gpm)	1,567 (414)
After cooler pump capacity: L/min (gpm)	567 (150)
Heat rejection to coolant: kW (BTUM)	970 (55,162)
Heat rejection to after cooler: kW (BTUM)	670 (38,102)
Heat radiated to ambient: kW (BTUM)	233 (13,244)
Fan power: kW (hp)	60.6 (81.3)

Air requirements

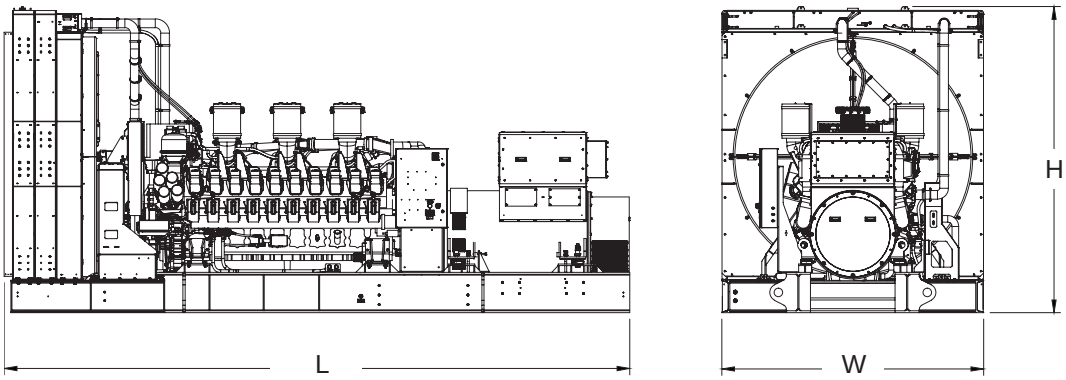
Aspirating: *m³/min (SCFM)	240 (8,476)
Air flow required for radiator cooled unit: *m³/min (SCFM)	3,082 (108,843)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m³/min (SCFM)	845 (29,843)

* Air density = 1.184 kg/m³ (0.0739 lbm/ft³)

Exhaust system

Gas temperature (stack): °C (°F)	465 (869)
Gas volume at stack temperature: m³/min (CFM)	576 (20,341)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_2O)	8.5 (34.1)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	7,335 x 3,072 x 3,590 mm (288.8 x 120.9 x 141.3 in)	23,341 kg (53,673 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	DCCP full load
Level 0 (OPU): dB(A)	97.5

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
5.95	0.37	0.04

- All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

- Data Center Continuous Power (DCCP) ratings apply to data center installations where a utility power is available and comply with Uptime Institute Tier III and IV requirements. At constant or varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 100%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration Factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 20V4000 DS2800 50 °C

2,500 kWe/60 Hz/Data Center Continuous Power/380 - 13,800V
Reference: *mtu* 20V4000 DS2800 (2,800 kWe) 50°C for Standby Rating Technical Data

System ratings

Voltage (L-L)	380V † ‡	416V † ‡	440V † ‡	480V † ‡	600V ‡	4,160V	12,470V
Phase	3	3	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60	60
kW	2,500	2,500	2,500	2,500	2,500	2,500	2,500
kVA	3,125	3,125	3,125	3,125	3,125	3,125	3,125
Amps	4,748	4,337	4,101	3,759	3,007	434	145
skVA@30% voltage dip	6,454	5,303	8,729	7,420	8,607	8,777	4,791
Generator model*	841-L75	941-VL60	841-VL85	841-L75	841-L75	841-L75	4P9.6-2100
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE

Voltage (L-L)	13,200V	13,800V
Phase	3	3
PF	0.8	0.8
Hz	60	60
kW	2,500	2,500
kVA	3,125	3,125
Amps	137	131
skVA@30% voltage dip	5,369	5,868
Generator model*	4P9.6-2100	4P9.6-2100
Temp rise	130 °C/40 °C	130 °C/40 °C
Connection	6 LEAD WYE	6 LEAD WYE

* Consult the factory for alternate configuration. Generator model may end with -M or -R, depending on selection.
† UL 2200 offered
‡ CSA offered

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Certifications and standards

- Emissions
  - EPA Tier 2 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional (refer to *System ratings* for availability)
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality, and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Data Center Continuous Power (DCCP) rating is optimized for data center applications
  - Uptime Institute compliant for Tier III and IV data centers
  - No runtime limitation
  - 100% load factor
  - 10% overload available
  - Accepts rated load in one step per NFPA 110

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 20V4000 diesel engine
  - 95.4 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - Permanent Magnet Generator (PMG) supply to regulator
  - 300% short circuit capability
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Centrifugal oil filtration
- Closed crankcase ventilation
- Jacket water pump
- Inter cooler water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic Isochronous
- Base - structural steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery box and cables
- Bulkhead fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 2-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 0.25% voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	***mtu***
Model	20V4000G24S
Type	4-cycle
Arrangement	20-V
Displacement: L (in³)	95.4 (5,822)
Bore: cm (in)	17 (6.69)
Stroke: cm (in)	21 (8.27)
Compression ratio	16.4:1
Rated rpm	1,800
Engine governor	electronic isochronous (ADEC)
Maximum power: kWm (bhp)	2,740 (3,674)
Steady state freqency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	390 (103)
Engine jacket water capacity: L (gal)	205 (54.2)
After cooler water capacity: L (gal)	50 (13.2)
System coolant capacity: L (gal)	1,049 (277)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	4,200
Batteries: group size	8D
Batteries: quantity	6

Fuel system

Fuel supply connection size	-16 JIC 37° female 1" NPT adapter provided
Fuel return connection size	-16 JIC 37° female 1" NPT adapter provided
Maximum fuel lift: m (ft)	1 (3)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	1,620 (428)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	647 (171)
At 75% of power rating: L/hr (gal/hr)	511 (135)
At 50% of power rating: L/hr (gal/hr)	367 (97)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_2O)	0.12 (0.5)
Water pump capacity: L/min (gpm)	1,567 (414)
After cooler pump capacity: L/min (gpm)	567 (150)
Heat rejection to coolant: kW (BTUM)	970 (55,162)
Heat rejection to after cooler: kW (BTUM)	670 (38,102)
Heat radiated to ambient: kW (BTUM)	233 (13,244)
Fan power: kW (hp)	115 (154.2)

Air requirements

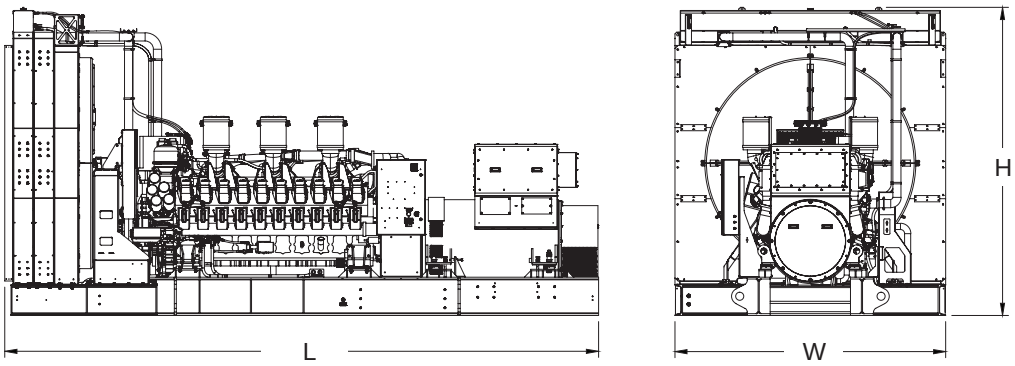
Aspirating: *m³/min (SCFM)	240 (8,476)
Air flow required for radiator cooled unit: *m³/min (SCFM)	3,453 (121,926)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m³/min (SCFM)	845 (29,843)

* Air density = 1.184 kg/m³ (0.0739 lbm/ft³)

Exhaust system

Gas temperature (stack): °C (°F)	465 (869)
Gas volume at stack temperature: m³/min (CFM)	576 (20,341)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_2O)	8.5 (34.1)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	7,335 x 3,345 x 3,807 mm (288.8 x 131.7 x 149.9 in)	25,498 kg (56,224 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	DCCP full load
Level 0 (OPU): dB(A)	97.5

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
5.95	0.37	0.04

— All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

— Data Center Continuous Power (DCCP) ratings apply to data center installations where a utility power is available and comply with Uptime Institute Tier III and IV requirements. At constant or varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 100%.
— Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
— Deration Factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 20V4000 DS3000 50 °C

2,790 kWe/60 Hz/Data Center Continuous Power/480 - 13,800V
Reference: *mtu* 20V4000 DS3000 (3,000 kWe) 50 °C for Standby Rating Technical Data

System ratings

Voltage (L-L)	480V † ‡	600V ‡	4,160V	12,470V	13,200V	13,800V
Phase	3	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60
kW	2,790	2,790	2,790	2,790	2,790	2,790
kVA	3,487	3,487	3,487	3,487	3,487	3,487
Amps	4,195	3,356	484	161	153	146
skVA@30% voltage dip	10,389	9,323	7,445	7,482	8,384	9,163
Generator model*	841-VL85	941-XL80	941-M70	4P9.6-2950	4P9.6-2950	4P9.6-2950
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE

* Consult the factory for alternate configuration. Generator model may end with -M or -R, depending on selection.
† UL 2200 offered
‡ CSA offered

Certifications and standards

- Emissions
  - EPA Tier 2 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional (refer to *System ratings* for availability)
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality, and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Data Center Continuous Power (DCCP) rating is optimized for data center applications
  - Uptime Institute compliant for Tier III and IV data centers
  - No runtime limitation
  - 100% load factor
  - 10% overload available
  - Accepts rated load in one step per NFPA 110

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 20V4000 diesel engine
  - 95.4 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - Permanent Magnet Generator (PMG) supply to regulator
  - 300% short circuit capability
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Centrifugal oil filtration
- Closed crankcase ventilation
- Jacket water pump
- Inter cooler water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic Isochronous
- Base - structural steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery box and cables
- Bulkhead fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 2-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 0.25% voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	***mtu***
Model	20V4000G44S
Type	4-cycle
Arrangement	20-V
Displacement: L (in^3)	95.4 (5,822)
Bore: cm (in)	17 (6.69)
Stroke: cm (in)	21 (8.27)
Compression ratio	16.4:1
Rated rpm	1,800
Engine governor	electronic isochronous (ADEC)
Maximum power: kWm (bhp)	3,010 (4,036)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	390 (103)
Engine jacket water capacity: L (gal)	205 (54.2)
After cooler water capacity: L (gal)	50 (13.2)
System coolant capacity: L (gal)	1,049 (277)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	4,200
Batteries: group size	8D
Batteries: quantity	6

Fuel system

Fuel supply connection size	-16 JIC 37° female 1" NPT adapter provided
Fuel return connection size	-16 JIC 37° female 1" NPT adapter provided
Maximum fuel lift - cranking: m (ft)	1 (3.3)*
Maximum fuel lift - running: m (ft)	3.1 (10)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	1,620 (428)

* Fuel lift pump for cranking increases lift to: m (ft) 3.1 (10)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	712 (188)
At 75% of power rating: L/hr (gal/hr)	553 (146)
At 50% of power rating: L/hr (gal/hr)	390 (103)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_2O)	0.12 (0.5)
Water pump capacity: L/min (gpm)	1,567 (414)
After cooler pump capacity: L/min (gpm)	567 (150)
Heat rejection to coolant: kW (BTUM)	1,040 (59,143)
Heat rejection to after cooler: kW (BTUM)	770 (43,789)
Heat radiated to ambient: kW (BTUM)	253 (14,372)
Fan power: kW (hp)	115 (154.2)

Air requirements

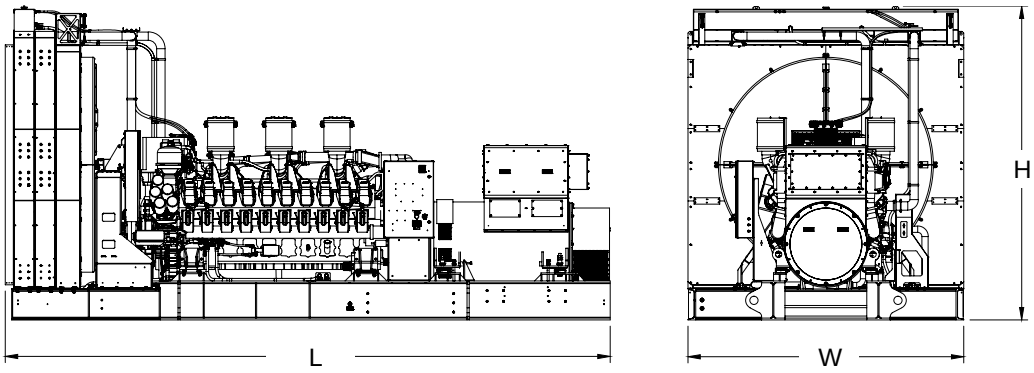
Aspirating: *m^3/min (SCFM)	252 (8,900)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	3,453 (121,926)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	918 (32,405)

* Air density = 1.184 kg/m3 (0.0739 lbm/ft3)

Exhaust system

Gas temperature (stack): °C (°F)	480 (896)
Gas volume at stack temperature: m^3/min (CFM)	624 (22,036)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_2O)	8.5 (34.1)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	7,335 x 3,345 x 3,807 mm (288.8 x 131.7 x 149.9 in)	25,498 kg (56,224 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	DCCP full load
Level 0 (OPU): dB(A)	97.5

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
5.57	0.52	0.04

- All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

- Data Center Continuous Power (DCCP) ratings apply to data center installations where a utility power is available and comply with Uptime Institute Tier III and IV requirements. At constant or varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 100%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration Factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 20V4000 DS3000 45 °C

2,800 kWe/60 Hz/Data Center Continuous Power/380 - 13,800V
Reference: *mtu* 20V4000 DS3000 (3,000 kWe) 45 °C for Standby Rating Technical Data

System ratings

Voltage (L-L)	380V † ‡	416V † ‡	440V † ‡	480V † ‡	600V ‡	4,160V	12,470V
Phase	3	3	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60	60
kW	2,800	2,800	2,800	2,800	2,800	2,800	2,800
kVA	3,500	3,500	3,500	3,500	3,500	3,500	3,500
Amps	5,318	4,858	4,593	4,210	3,368	486	162
skVA@30% voltage dip	6,587	4,752	5,316	10,389	8,298	7,445	5,297
Generator model*	841-VL85	941-VL70	941-VL70	841-VL85	841-VL85	941-M70	4P9.6-2400
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE

Voltage (L-L)	13,200V	13,800V
Phase	3	3
PF	0.8	0.8
Hz	60	60
kW	2,800	2,800
kVA	3,500	3,500
Amps	153	146
skVA@30% voltage dip	5,936	6,488
Generator model*	4P9.6-2400	4P9.6-2400
Temp rise	130 °C/40 °C	130 °C/40 °C
Connection	6 LEAD WYE	6 LEAD WYE

* Consult the factory for alternate configuration. Generator model may end with -M or -R, depending on selection.
† UL 2200 offered
‡ CSA offered

A Rolls-Royce solution

Certifications and standards

- Emissions
  - EPA Tier 2 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional (refer to *System ratings* for availability)
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality, and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Data Center Continuous Power (DCCP) rating is optimized for data center applications
  - Uptime Institute compliant for Tier III and IV data centers
  - No runtime limitation
  - 100% load factor
  - 10% overload available
  - Accepts rated load in one step per NFPA 110

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 20V4000 diesel engine
  - 95.4 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - Permanent Magnet Generator (PMG) supply to regulator
  - 300% short circuit capability
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Centrifugal oil filtration
- Closed crankcase ventilation
- Jacket water pump
- Inter cooler water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic Isochronous
- Base - structural steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery box and cables
- Bulkhead fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 2-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 0.25% voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	***mtu***
Model	20V4000G44S
Type	4-cycle
Arrangement	20-V
Displacement: L (in³)	95.4 (5,822)
Bore: cm (in)	17 (6.69)
Stroke: cm (in)	21 (8.27)
Compression ratio	16.4:1
Rated rpm	1,800
Engine governor	electronic isochronous (ADEC)
Maximum power: kWm (bhp)	3,010 (4,036)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	390 (103)
Engine jacket water capacity: L (gal)	205 (54.2)
After cooler water capacity: L (gal)	50 (13.2)
System coolant capacity: L (gal)	860 (227)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	4,200
Batteries: group size	8D
Batteries: quantity	6

Fuel system

Fuel supply connection size	-16 JIC 37° female 1" NPT adapter provided
Fuel return connection size	-16 JIC 37° female 1" NPT adapter provided
Maximum fuel lift - cranking: m (ft)	1 (3.3)*
Maximum fuel lift - running: m (ft)	3.1 (10)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	1,620 (428)

* Fuel lift pump for cranking increases lift to: m (ft) 3.1 (10)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	712 (188)
At 75% of power rating: L/hr (gal/hr)	553 (146)
At 50% of power rating: L/hr (gal/hr)	390 (103)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	45 (113)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_2O)	0.12 (0.5)
Water pump capacity: L/min (gpm)	1,567 (414)
After cooler pump capacity: L/min (gpm)	567 (150)
Heat rejection to coolant: kW (BTUM)	1,040 (59,143)
Heat rejection to after cooler: kW (BTUM)	770 (43,789)
Heat radiated to ambient: kW (BTUM)	253 (14,372)
Fan power: kW (hp)	60.6 (81.3)

Air requirements

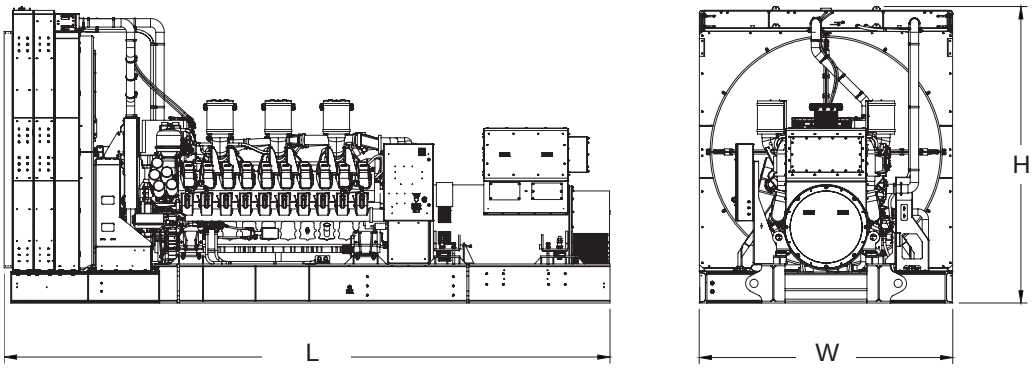
Aspirating: *m³/min (SCFM)	252 (8,900)
Air flow required for radiator cooled unit: *m³/min (SCFM)	3,082 (108,843)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m³/min (SCFM)	918 (32,405)

* Air density = 1.184 kg/m³ (0.0739 lbm/ft³)

Exhaust system

Gas temperature (stack): °C (°F)	480 (896)
Gas volume at stack temperature: m³/min (CFM)	624 (22,036)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_2O)	8.5 (34.1)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	7,335 x 3,072 x 3,590 mm (288.8 x 120.9 x 141.3 in)	24,634 kg (54,318 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	DCCP full load
Level 0 (OPU): dB(A)	97.5

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
5.57	0.52	0.04

- All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

- Data Center Continuous Power (DCCP) ratings apply to data center installations where a utility power is available and comply with Uptime Institute Tier III and IV requirements. At constant or varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 100%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration Factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 4R0120 DS80

72 kWe/60 Hz/Prime/208 - 600V
Reference *mtu* 4R0120 DS80 (80 kWe) for Standby Rating Technical Data

System ratings

Voltage (L-L)	240V †	240V †	208V †	240V †	380V †	480V †	600V
Phase	1	1	3	3	3	3	3
PF	1	1	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60	60
kW	72	72	72	72	72	72	72
kVA	72	72	90	90	90	90	90
Amps	300	300	250	217	137	108	87
skVA@30% voltage dip	133	311	216	216	165	288	236
Generator model	362CSL1606	363CSL1617	362CSL1604	362CSL1604	362CSL1606	362CSL1604	362PSL1635
Temp rise	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C
Connection	12 LEAD DOUBLE DELTA	4 LEAD	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 3 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- Power rating
  - Accepts rated load in one step per NFPA 110
- UL 2200 – optional (refer to *System ratings* for availability)
- CSA – optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- CE marking provided
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- OM924LA diesel engine
  - 4.8 liter displacement
  - 4-cycle
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with optional Permanent Magnet Generator (PMG)
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Fuel filter with water separator
- Jacket water pump
- Thermostat
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 12V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 12V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Self-ventilated and drip-proof
- Superior voltage waveform
- Solid state, volts-per-hertz regulator
- ± 1% voltage regulation no load to full load
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 105 °C maximum prime temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- SAE J1939 engine ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	Mercedes-Benz
Model	OM924LA
Type	4-cycle
Arrangement	4-inline
Displacement: L (in³)	4.8 (293)
Bore: cm (in)	10.6 (4.17)
Stroke: cm (in)	13.6 (5.35)
Compression ratio	17.5:1
Rated rpm	1,800
Engine governor	MR2 / CPC4-ECAN
Maximum power: kWm (bhp)	134 (180)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	15.8 (4.2)
Engine jacket water capacity: L (gal)	7 (1.8)
System coolant capacity: L (gal)	20.8 (5.5)

Electrical

Electric volts DC	12
Cold cranking amps under -17.8 °C (0 °F)	950
Batteries: group size	31
Batteries: quantity	1

Fuel system

Fuel supply connection size	-6 JIC
Fuel supply hose size	3/8” ID
Fuel return connection size	-6 JIC
Fuel return hose size	3/8” ID
Maximum fuel lift: m (ft)	2.7 (9)
Recommended fuel	diesel #2
Total fuel flow: L/hr (gal/hr)	328.2 (86.7)

Fuel consumption*

At 100% of power rating: L/hr (gal/hr)	20.9 (5.5)
At 75% of power rating: L/hr (gal/hr)	16.5 (4.4)
At 50% of power rating: L/hr (gal/hr)	11.3 (3)

* Based on 362CSL1604 480 volt generator set

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_2O)	0.12 (0.5)
Water pump capacity: L/min (gpm)	143 (37)
Heat rejection to coolant: kW (BTUM)	33.6 (1,911)
Heat rejection to air to air: kW (BTUM)	21.3 (1,211)
Heat radiated to ambient: kW (BTUM)	22.2 (1,263)
Fan power: kW (hp)	3.3 (4.4)

Air requirements

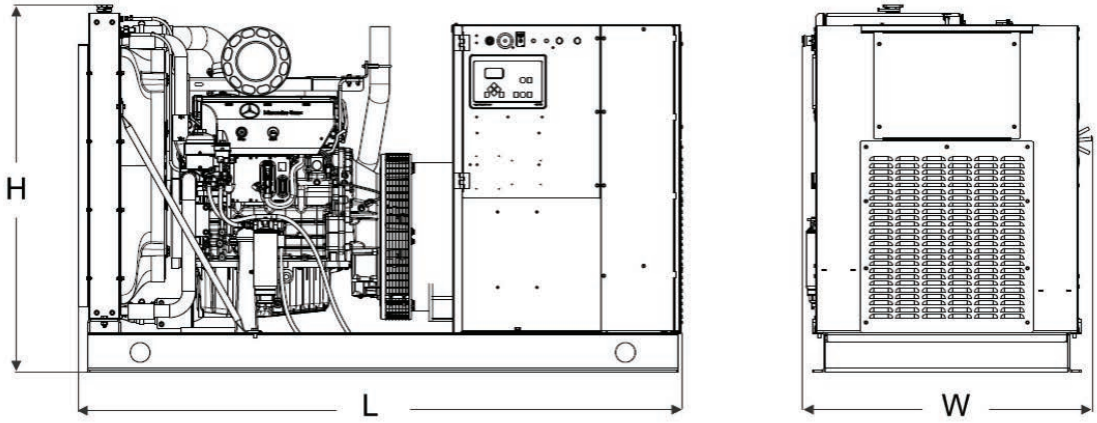
Aspirating: *m³/min (SCFM)	8.2 (290)
Air flow required for radiator cooled unit: *m³/min (SCFM)	209 (7,381)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m³/min (SCFM)	81 (2,860)

* Air density = 1.184 kg/m³ (0.0739 lbm/ft³)

Exhaust system

Gas temperature (stack): °C (°F)	334 (634)
Gas volume at stack temperature: m³/min (CFM)	20.3 (717)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_2O)	6.5 (26)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	2,336 x 1,121 x 1,422 mm (92 x 44.1 x 56 in)	1,216-1,830 kg (2,682-4,034 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Prime full load
Level 0 (OPU): dB(A)	83

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
3.61	1.42	0.08

— All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

— Prime power ratings apply to installations where utility power is unavailable or unreliable. At varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO 8528-1, overload power in accordance with ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 75%.
— Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
— Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 4R0120 DS100

90 kWe/60 Hz/Prime/208 - 600V
Reference *mtu* 4R0120 DS100 (100 kWe) for Standby Rating Technical Data

System ratings

Voltage (L-L)	240V †	240V †	208V †	240V †	380V †	480V †	600V
Phase	1	1	3	3	3	3	3
PF	1	1	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60	60
kW	90	90	90	90	90	90	90
kVA	90	90	113	113	113	113	113
Amps	375	375	312	271	171	135	108
skVA@30% voltage dip	145	311	258	258	269	344	272
Generator model	363CSL1607	363CSL1617	362CSL1606	362CSL1606	363CSL1607	362CSL1606	362PSL1636
Temp rise	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C
Connection	12 LEAD DOUBLE DELTA	4 LEAD	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 3 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- Power rating
  - Accepts rated load in one step per NFPA 110
- UL 2200 – optional (refer to *System ratings* for availability)
- CSA – optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- CE marking provided
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- OM924LA diesel engine
  - 4.8 liter displacement
  - 4-cycle
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with optional Permanent Magnet Generator (PMG)
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaner
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Fuel filter with water separator
- Jacket water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 12V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 12V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Self-ventilated and drip-proof
- Superior voltage waveform
- Solid state, volts-per-hertz regulator
- ± 1% voltage regulation no load to full load
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 105 °C maximum prime temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- SAE J1939 Engine ECU Communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu***Distributor for additional configurations.

Application data

Engine

Manufacturer	Mercedes-Benz
Model	OM924LA
Type	4-cycle
Arrangement	4-inline
Displacement: L (in^3)	4.8 (293)
Bore: cm (in)	10.6 (4.17)
Stroke: cm (in)	13.6 (5.35)
Compression ratio	17.5:1
Rated rpm	1,800
Engine governor	MR2 / CPC4-ECAN
Maximum power: kWm (bhp)	134 (180)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	15.8 (4.2)
Engine jacket water capacity: L (gal)	7 (1.8)
System coolant capacity: L (gal)	20.8 (5.5)

Electrical

Electric volts DC	12
Cold cranking amps under -17.8 °C (0 °F)	950
Batteries: group size	31
Batteries: quantity	1

Fuel system

Fuel supply connection size	-6 JIC
Fuel supply hose size	3/8” ID
Fuel return connection size	-6 JIC
Fuel return hose size	3/8” ID
Maximum fuel lift: m (ft)	2.7 (9)
Recommended fuel	diesel #2
Total fuel flow: L/hr (gal/hr)	328.2 (86.7)

Fuel consumption*

At 100% of power rating: L/hr (gal/hr)	25.3 (6.7)
At 75% of power rating: L/hr (gal/hr)	19.6 (5.2)
At 50% of power rating: L/hr (gal/hr)	14.2 (3.7)

* Based on 362CSL1606 480 volt generator set

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.12 (0.5)
Water pump capacity: L/min (gpm)	143 (37)
Heat rejection to coolant: kW (BTUM)	41.4 (2,354)
Heat rejection to air to air: kW (BTUM)	25.3 (1,439)
Heat radiated to ambient: kW (BTUM)	24.7 (1,405)
Fan power: kW (hp)	3.3 (4.4)

Air requirements

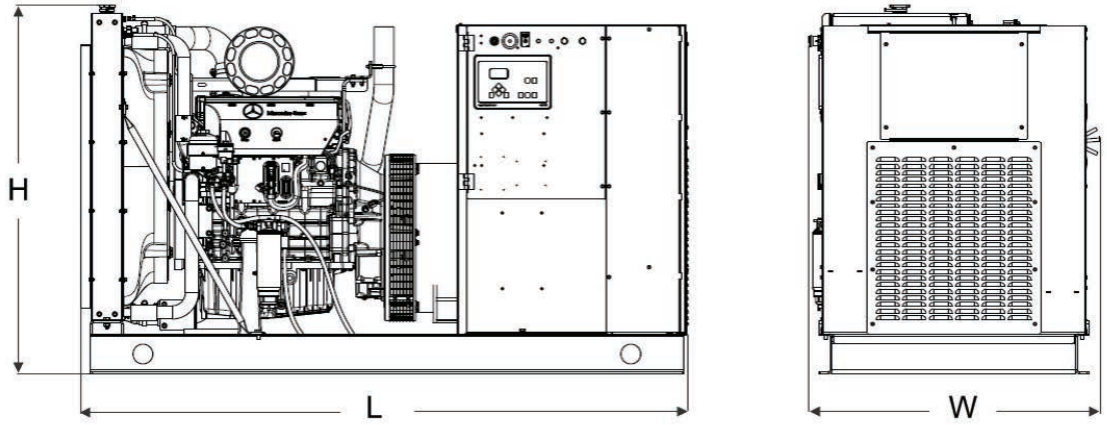
Aspirating: *m^3/min (SCFM)	8.9 (314)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	209 (7,381)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	90.2 (3,185)

* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

Gas temperature (stack): °C (°F)	374 (706)
Gas volume at stack temperature: m^3/min (CFM)	22.8 (805)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	6.5 (26)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	2,336 x 1,121 x 1,422 mm (92 x 44.1 x 56 in)	1,216-1,830 kg (2,682-4,034 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Prime full load
Level 0 (OPU): dB(A)	83.3

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
3.61	1.42	0.08

— All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

— Prime power ratings apply to installations where utility power is unavailable or unreliable. At varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO 8528-1, overload power in accordance with ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 75%.
— Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
— Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 4R0120 DS125

111 kWe/60 Hz/Prime/208 - 600V

Reference *mtu* 4R0120 DS125 (125 kWe) for Standby Rating Technical Data

System ratings

Voltage (L-L)	240V †	240V †	208V †	240V †	380V †	480V †	600V
Phase	1	1	3	3	3	3	3
PF	1	1	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60	60
kW	111	111	111	111	111	111	111
kVA	111	111	139	139	139	139	139
Amps	463	463	385	334	211	167	134
skVA@30% voltage dip	184	196	296	296	191	430	334
Generator model	431CSL6208	431PSL6224	431CSL6202	431CSL6202	431CSL6202	363CSL1607	363PSL1658
Temp rise	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C
Connection	12 LEAD DOUBLE DELTA	4 LEAD	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 3 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- Power rating
  - Accepts rated load in one step per NFPA 110
- UL 2200 – optional (refer to *System ratings* for availability)
- CSA – optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- CE marking provided
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- OM924LA diesel engine
  - 4.8 liter displacement
  - 4-cycle
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with optional Permanent Magnet Generator (PMG)
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Fuel filter with water separator
- Jacket water pump
- Thermostat
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 12V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 12V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Self-ventilated and drip-proof
- Superior voltage waveform
- Solid state, volts-per-hertz regulator
- ± 1% voltage regulation no load to full load
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 105 °C maximum prime temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- SAE J1939 engine ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	Mercedes-Benz
Model	OM924LA
Type	4-cycle
Arrangement	4-inline
Displacement: L (in^3)	4.8 (293)
Bore: cm (in)	10.6 (4.17)
Stroke: cm (in)	13.6 (5.35)
Compression ratio	17.5:1
Rated rpm	1,800
Engine governor	MR2 / CPC4-ECAN
Maximum power: kWm (bhp)	134 (180)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	15.8 (4.2)
Engine jacket water capacity: L (gal)	7 (1.8)
System coolant capacity: L (gal)	20.8 (5.5)

Electrical

Electric volts DC	12
Cold cranking amps under -17.8 °C (0 °F)	950
Batteries: group size	31
Batteries: quantity	1

Fuel system

Fuel supply connection size	-6 JIC
Fuel supply hose size	3/8” ID
Fuel return connection size	-6 JIC
Fuel return hose size	3/8” ID
Maximum fuel lift: m (ft)	2.7 (9)
Recommended fuel	diesel #2
Total fuel flow: L/hr (gal/hr)	328.2 (86.7)

Fuel consumption*

At 100% of power rating: L/hr (gal/hr)	30.6 (8.1)
At 75% of power rating: L/hr (gal/hr)	23 (6.1)
At 50% of power rating: L/hr (gal/hr)	16.6 (4.4)

* Based on 363CSL1607 480 volt generator set

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.12 (0.5)
Water pump capacity: L/min (gpm)	143 (37)
Heat rejection to coolant: kW (BTUM)	49.5 (2,815)
Heat rejection to air to air: kW (BTUM)	27.7 (1,575)
Heat radiated to ambient: kW (BTUM)	25.2 (1,433)
Fan power: kW (hp)	3.3 (4.4)

Air requirements

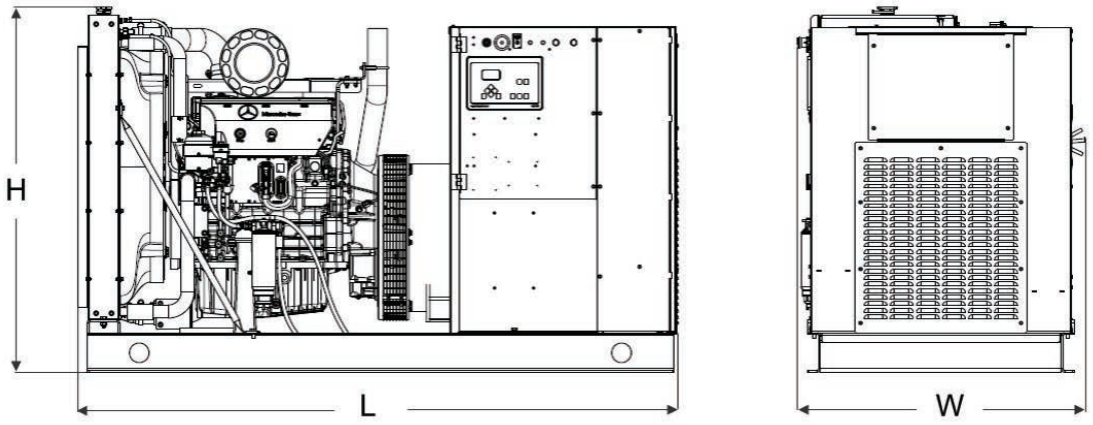
Aspirating: *m^3/min (SCFM)	9.2 (325)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	209 (7,381)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	92 (3,249)

* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

Gas temperature (stack): °C (°F)	426 (799)
Gas volume at stack temperature: m^3/min (CFM)	24.9 (879)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	6.5 (26)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	2,336 x 1,121 x 1,422 mm (92 x 44.1 x 56 in)	1,216-1,830 kg (2,682-4,034 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Prime full load
Level 0 (OPU): dB(A)	83.3

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
3.61	1.42	0.08

- All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

- Prime power ratings apply to installations where utility power is unavailable or unreliable. At varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO 8528-1, overload power in accordance with ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 75%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 6R0120 DS150

135 kWe/60 Hz/Prime/208 - 600V

Reference *mtu* 6R0120 DS150 (150 kWe) for Standby Rating Technical Data

System ratings

Voltage (L-L)	240V †	240V †	208V †	240V †	380V †	480V †	600V
Phase	1	1	3	3	3	3	3
PF	1	1	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60	60
kW	135	135	135	135	135	135	135
kVA	135	135	169	169	169	169	169
Amps	563	563	468	406	256	203	162
skVA@30% voltage dip	188	196	296	296	282	394	394
Generator model	431CSL6206	431PSL6224	431CSL6202	431CSL6202	431CSL6204	431CSL6202	431PSL6240
Temp rise	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C
Connection	12 LEAD DOUBLE DELTA	4 LEAD	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 3 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- Power rating
  - Accepts rated load in one step per NFPA 110
- UL 2200 – optional (refer to *System ratings* for availability)
- CSA – optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- CE marking provided
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- OM926LA diesel engine
  - 7.2 liter displacement
  - 4-cycle
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with optional Permanent Magnet Generator (PMG)
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaner
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Fuel filter with water separator
- Jacket water pump
- Thermostat
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 12V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 12V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Self-ventilated and drip-proof
- Superior voltage waveform
- Solid state, volts-per-hertz regulator
- ± 1% voltage regulation no load to full load
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 105 °C maximum prime temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- SAE J1939 Engine ECU Communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	Mercedes-Benz
Model	OM926LA
Type	4-cycle
Arrangement	6-inline
Displacement: L (in^3)	7.2 (439)
Bore: cm (in)	10.6 (4.17)
Stroke: cm (in)	13.6 (5.35)
Compression ratio	17.5:1
Rated rpm	1,800
Engine governor	MR2 / CPC4-ECAN
Maximum power: kWm (bhp)	225 (302)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	29 (7.7)
Engine jacket water capacity: L (gal)	10 (2.6)
System coolant capacity: L (gal)	24.1 (6.4)

Electrical

Electric volts DC	12
Cold cranking amps under -17.8 °C (0 °F)	950
Batteries: group size	31
Batteries: quantity	1

Fuel system

Fuel supply connection size	-6 JIC
Fuel supply hose size	3/8” ID
Fuel return connection size	-6 JIC
Fuel return hose size	3/8” ID
Maximum fuel lift: m (ft)	2.6 (8.5)
Recommended fuel	diesel #2
Total fuel flow: L/hr (gal/hr)	330.5 (87.3)

Fuel consumption*

At 100% of power rating: L/hr (gal/hr)	36 (9.5)
At 75% of power rating: L/hr (gal/hr)	26.9 (7.1)
At 50% of power rating: L/hr (gal/hr)	18.5 (4.9)

* Based on 431CSL6202 480 volt generator set

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.12 (0.5)
Water pump capacity: L/min (gpm)	143 (37)
Heat rejection to coolant: kW (BTUM)	72.7 (4,134)
Heat rejection to air to air: kW (BTUM)	47.4 (2,696)
Heat radiated to ambient: kW (BTUM)	28.7 (1,632)
Fan power: kW (hp)	15.6 (22.1)

Air requirements

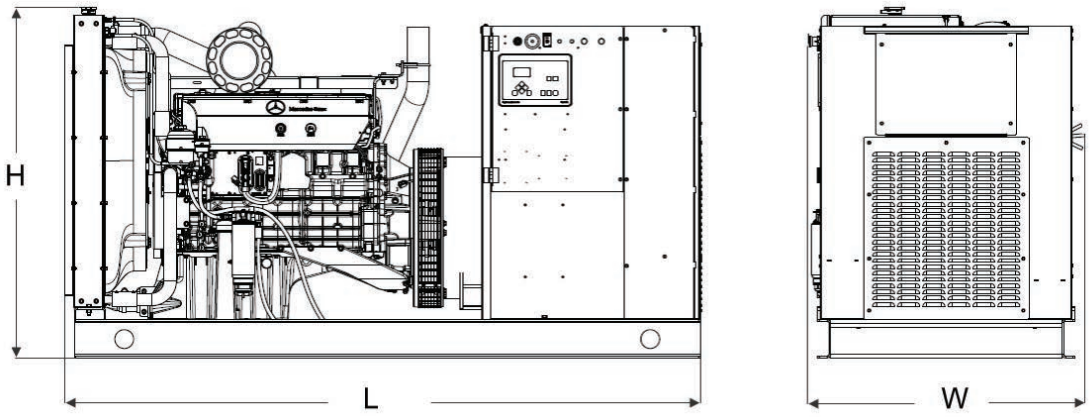
Aspirating: *m^3/min (SCFM)	12.8 (452)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	408 (14,408)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	104.9 (3,705)

* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

Gas temperature (stack): °C (°F)	410 (770)
Gas volume at stack temperature: m^3/min (CFM)	36.8 (1,300)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	10.5 (42)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	2,580 x 1,121 x 1,422 mm (101.6 x 44.1 x 56 in)	1,632-2,120 kg (3,598-4,674 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Prime full load
Level 0 (OPU): dB(A)	88.7

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
3.93	1.2	0.06

- All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

- Prime power ratings apply to installations where utility power is unavailable or unreliable. At varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO 8528-1, overload power in accordance with ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 75%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 6R0120 DS180

163 kWe/60 Hz/Prime/208 - 600V

Reference *mtu* 6R0120 DS180 (180 kWe) for Standby Rating Technical Data

System ratings

Voltage (L-L)	240V †	240V †	208V †	240V †	380V †	480V †	600V
Phase	1	1	3	3	3	3	3
PF	1	1	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60	60
kW	163	163	163	163	163	163	163
kVA	163	163	204	204	204	204	204
Amps	679	679	566	490	310	246	196
skVA@30% voltage dip	268	366	339	339	362	451	375
Generator model	432CSL6210	432PSL6228	431CSL6204	431CSL6204	431CSL6206	431CSL6204	431PSL6242
Temp rise	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C
Connection	12 LEAD DOUBLE DELTA	4 LEAD	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 3 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- Power rating
  - Accepts rated load in one step per NFPA 110
- UL 2200 – optional (refer to *System ratings* for availability)
- CSA – optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- CE marking provided
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- OM926LA diesel engine
  - 7.2 liter displacement
  - 4-cycle
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with optional Permanent Magnet Generator (PMG)
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Fuel filter with water separator
- Jacket water pump
- Thermostat
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 12V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 12V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Self-ventilated and drip-proof
- Superior voltage waveform
- Solid state, volts-per-hertz regulator
- ± 1% voltage regulation no load to full load
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 105 °C maximum prime temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- SAE J1939 Engine ECU Communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	Mercedes-Benz
Model	OM926LA
Type	4-cycle
Arrangement	6-inline
Displacement: L (in^3)	7.2 (439)
Bore: cm (in)	10.6 (4.17)
Stroke: cm (in)	13.6 (5.35)
Compression ratio	17.5:1
Rated rpm	1,800
Engine governor	MR2 / CPC4-ECAN
Maximum power: kWm (bhp)	225 (302)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	29 (7.7)
Engine jacket water capacity: L (gal)	10 (2.6)
System coolant capacity: L (gal)	24.1 (6.4)

Electrical

Electric volts DC	12
Cold cranking amps under -17.8 °C (0 °F)	950
Batteries: group size	31
Batteries: quantity	1

Fuel system

Fuel supply connection size	-6 JIC
Fuel supply hose size	3/8” ID
Fuel return connection size	-6 JIC
Fuel return hose size	3/8” ID
Maximum fuel lift: m (ft)	2.6 (8.5)
Recommended fuel	diesel #2
Total fuel flow: L/hr (gal/hr)	330.5 (87.3)

Fuel consumption*

At 100% of power rating: L/hr (gal/hr)	44.7 (11.8)
At 75% of power rating: L/hr (gal/hr)	32.2 (8.5)
At 50% of power rating: L/hr (gal/hr)	22 (5.8)

* Based on 431CSL6204 480 volt generator set

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.12 (0.5)
Water pump capacity: L/min (gpm)	143 (37)
Heat rejection to coolant: kW (BTUM)	82.4 (4,686)
Heat rejection to air to air: kW (BTUM)	52.7 (2,997)
Heat radiated to ambient: kW (BTUM)	32.9 (1,871)
Fan power: kW (hp)	15.6 (22.1)

Air requirements

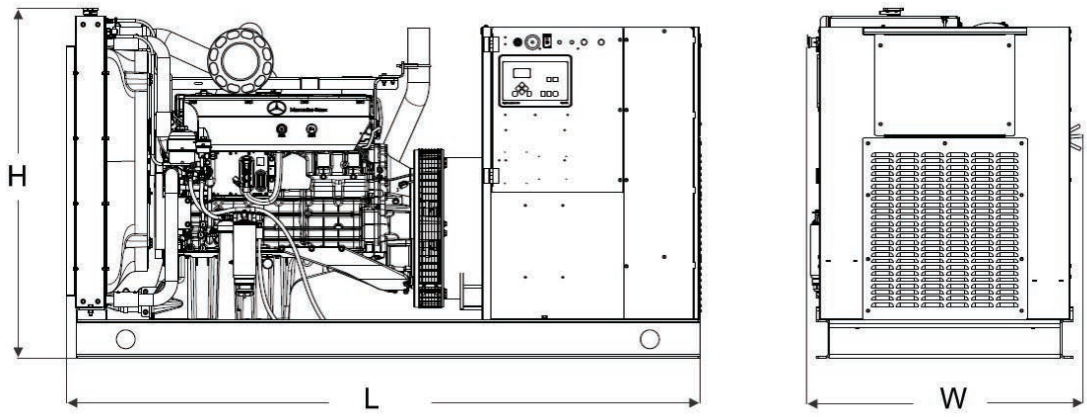
Aspirating: *m^3/min (SCFM)	13.9 (491)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	408 (14,408)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	120.2 (4,245)

* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

Gas temperature (stack): °C (°F)	457 (855)
Gas volume at stack temperature: m^3/min (CFM)	40.9 (1,444)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	10.5 (42)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	2,580 x 1,121 x 1,422 mm (101.6 x 44.1 x 56 in)	1,632-2,120 kg (3,598-4,674 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Prime full load
Level 0 (OPU): dB(A)	88.8

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
3.93	1.2	0.06

- All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

- Prime power ratings apply to installations where utility power is unavailable or unreliable. At varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO 8528-1, overload power in accordance with ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 75%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 6R0120 DS200

180 kWe/60 Hz/Prime/208 - 600V
Reference *mtu* 6R0120 DS200 (200 kWe) for Standby Rating Technical Data

System ratings

Voltage (L-L)	240V †	240V †	208V †	240V †	380V †	480V †	600V
Phase	1	1	3	3	3	3	3
PF	1	1	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60	60
kW	180	180	180	180	180	180	180
kVA	180	180	225	225	225	225	225
Amps	750	750	625	541	342	271	217
skVA@30% voltage dip	268	366	433	433	373	577	510
Generator model	432CSL6210	432PSL6228	431CSL6206	431CSL6206	431CSL6208	431CSL6206	431PSL6243
Temp rise	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C
Connection	12 LEAD DOUBLE DELTA	4 LEAD	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 3 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- Power rating
  - Accepts rated load in one step per NFPA 110
- UL 2200 – optional (refer to *System ratings* for availability)
- CSA – optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- CE marking provided
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- OM926LA diesel engine
  - 7.2 liter displacement
  - 4-cycle
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with optional Permanent Magnet Generator (PMG)
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Fuel filter with water separator
- Jacket water pump
- Thermostat
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 12V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 12V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Self-ventilated and drip-proof
- Superior voltage waveform
- Solid state, volts-per-hertz regulator
- ± 1% voltage regulation no load to full load
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 105 °C maximum prime temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- SAE J1939 Engine ECU Communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	Mercedes-Benz
Model	OM926LA
Type	4-cycle
Arrangement	6-inline
Displacement: L (in^3)	7.2 (439)
Bore: cm (in)	10.6 (4.17)
Stroke: cm (in)	13.6 (5.35)
Compression ratio	17.5:1
Rated rpm	1,800
Engine governor	MR2 / CPC4-ECAN
Maximum power: kWm (bhp)	225 (302)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity (Lubrication)

Total oil system: L (gal)	29 (7.7)
Engine jacket water capacity: L (gal)	10 (2.6)
System coolant capacity: L (gal)	24.1 (6.4)

Electrical

Electric volts DC	12
Cold cranking amps under -17.8 °C (0 °F)	950
Batteries: group size	31
Batteries: quantity	1

Fuel system

Fuel supply connection size	-6 JIC
Fuel supply hose size	3/8” ID
Fuel return connection size	-6 JIC
Fuel return hose size	3/8” ID
Maximum fuel lift: m (ft)	2.6 (8.5)
Recommended fuel	diesel #2
Total fuel flow: L/hr (gal/hr)	330.5 (87.3)

Fuel consumption*

At 100% of power rating: L/hr (gal/hr)	49.6 (13.1)
At 75% of power rating: L/hr (gal/hr)	36 (9.5)
At 50% of power rating: L/hr (gal/hr)	24.2 (6.4)

* Based on 431CSL6206 480 volt generator set

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.12 (0.5)
Water pump capacity: L/min (gpm)	143 (37)
Heat rejection to coolant: kW (BTUM)	88 (5,004)
Heat rejection to air to air: kW (BTUM)	54 (3,071)
Heat radiated to ambient: kW (BTUM)	35.4 (2,013)
Fan power: kW (hp)	15.6 (22.1)

Air requirements

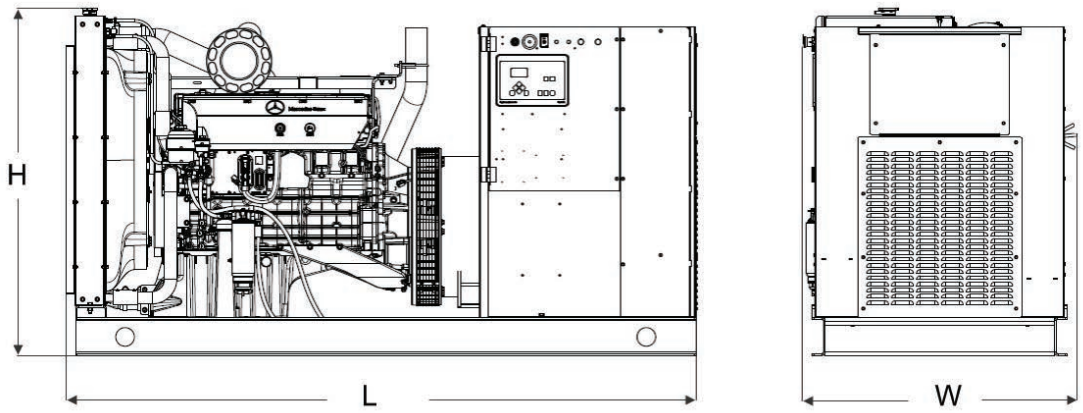
Aspirating: *m^3/min (SCFM)	14.3 (505)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	408 (14,408)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	129.4 (4,570)

* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

Gas temperature (stack): °C (°F)	487 (908)
Gas volume at stack temperature: m^3/min (CFM)	42.8 (1,511)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	10.5 (42)

Weights and dimensions



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System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	2,580 x 1,121 x 1,422 mm (101.6 x 44.1 x 56 in)	1,632-2,120 kg (3,598-4,674 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Prime full load
Level 0 (OPU): dB(A)	88.8

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
3.93	1.2	0.06

— All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

— Prime power ratings apply to installations where utility power is unavailable or unreliable. At varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO 8528-1, overload power in accordance with ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 75%.
— Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
— Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 6R0150 DS230

210 kWe/60 Hz/Prime/208 - 600V
Reference *mtu* 6R0150 DS230 (230 kWe) for Standby Rating Technical Data

System ratings

Voltage (L-L)	240V †	208V †	240V †	380V †	480V †	600V †
Phase	1	3	3	3	3	3
PF	1	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60
kW	210	210	210	210	210	210
kVA	210	263	263	263	263	263
Amps	875	729	631	399	316	253
skVA@30% voltage dip	430	608	608	430	604	510
Generator model	433PSL6216	432CSL6210	432CSL6210	432CSL6210	431CSL6208	431PSL6243
Temp rise	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C
Connection	DOUBLE DELTA	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	12 LEAD YWE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 4 Final certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification - optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional
- CSA - optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110
  - Permissible average power output during 24 hours of operation is approved up to 75%.

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 6090HFG06 diesel engine
  - 9.0 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with optional Permanent Magnet Generator (PMG)
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaner
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filters
- Open crankcase ventilation
- Jacket water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery rack and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 105 °C maximum prime temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 1% voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	John Deere
Model	6090HFG06
Type	4-cycle
Arrangement	6-inline
Displacement: L (in^3)	9.0 (549)
Bore: cm (in)	11.84 (4.7)
Stroke: cm (in)	13.6 (5.4)
Compression ratio	16:1
Rated rpm	1,800
Engine governor	JDEC
Maximum power: kWm (bhp)	298 (399)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	40 (10.6)
Engine jacket water capacity: L (gal)	17 (4.49)
System coolant capacity: L (gal)	41.37 (10.93)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	950
Batteries: group size	31
Batteries: quantity	2

Fuel system

Fuel supply connection size	-10 JIC 37° female
Fuel return connection size	-6 JIC 37° female
Maximum fuel Lift: m (ft)	2.4 (7.9)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	167.94 (44.37)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	71.7 (18.9)
At 75% of power rating: L/hr (gal/hr)	52.9 (14)
At 50% of power rating: L/hr (gal/hr)	36.4 (9.6)

DEF consumption

At 100% of power rating: L/hr (gal/hr)	1.65 (0.44)
At 75% of power rating: L/hr (gal/hr)	1.53 (0.41)
At 50% of power rating: L/hr (gal/hr)	1.17 (0.31)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.124 (0.5)
Water pump capacity: L/min (gpm)	385 (102)
Heat rejection to coolant: kW (BTUM)	185 (10,530)
Heat rejection to after cooler: kW (BTUM)	86 (4,895)
Heat radiated to ambient: kW (BTUM)	36.9 (2,099)
Fan power: kW (hp)	18 (24.1)

Air requirements

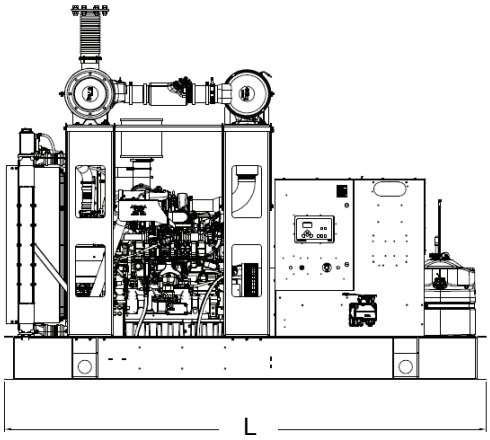
Aspirating: *m^3/min (SCFM)	23 (812)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	517.7 (178,281)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	N/A

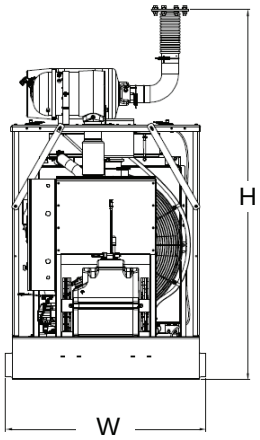
* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

Gas temperature (stack): °C (°F)	447 (837)
Maximum gas temperature during regeneration: °C (°F)	647 (1,197)
Gas volume at stack temperature: m^3/min (CFM)	45 (1,589)
Maximum allowable back pressure at outlet of aftertreatment: kPa (in. H_20)	19.2 (77)

Weights and dimensions





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System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	3,658 x 1,524 x 2,516 mm (144 x 60 x 111 in)	4,140 (9,137 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Prime full load
Level 0 (OPU): dB(A)	83.5

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
0.03	0.002	0.003

All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

- Prime power ratings apply to installations where utility power is unavailable or unreliable. At varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 75%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

C/F = Consult Factory/***mtu*** Distributor
N/A = Not Available

Diesel Generator Set

mtu 6R0150 DS250

230 kWe/60 Hz/Prime/208 - 600V

Reference *mtu* 6R0150 DS250 (250 kWe) for Standby Rating Technical Data

System ratings

Voltage (L-L)	208V †	240V †	380V †	480V †	600V †
Phase	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60
kW	230	230	230	230	230
kVA	288	288	288	288	288
Amps	798	692	437	346	277
skVA@30% voltage dip	608	608	430	809	720
Generator model	432CSL6210	432CSL6210	432CSL6210	432CSL6210	432PSL6246
Temp rise	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C
Connection	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 4 Final certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification - optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110
  - Permissible average power output during 24 hours of operation is approved up to 75%.

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 6090HFG06 diesel engine
  - 9.0 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with optional Permanent Magnet Generator (PMG)
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaner
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filters
- Open crankcase ventilation
- Jacket water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery rack and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 105 °C maximum prime temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 1% voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	John Deere
Model	6090HFG06
Type	4-cycle
Arrangement	6-inline
Displacement: L (in^3)	9.0 (549)
Bore: cm (in)	11.84 (4.7)
Stroke: cm (in)	13.6 (5.4)
Compression ratio	16:1
Rated rpm	1,800
Engine governor	JDEC
Maximum power: kWm (bhp)	298 (399)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	40 (10.6)
Engine jacket water capacity: L (gal)	17 (4.49)
System coolant capacity: L (gal)	41.37 (10.93)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	950
Batteries: group size	31
Batteries: quantity	2

Fuel system

Fuel supply connection size	-10 JIC 37° female
Fuel return Connection size	-6 JIC 37° female
Maximum fuel Lift: m (ft)	2.4 (7.9)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	167.94 (44.37)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	71.7 (18.9)
At 75% of power rating: L/hr (gal/hr)	52.9 (14)
At 50% of power rating: L/hr (gal/hr)	36.4 (9.6)

DEF consumption

At 100% of power rating: L/hr (gal/hr)	1.65 (0.44)
At 75% of power rating: L/hr (gal/hr)	1.53 (0.41)
At 50% of power rating: L/hr (gal/hr)	1.17 (0.31)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.124 (0.5)
Water pump capacity: L/min (gpm)	385 (102)
Heat rejection to coolant: kW (BTUM)	185 (10,530)
Heat rejection to air to air: kW (BTUM)	86 (4,895)
Heat radiated to ambient: kW (BTUM)	36.9 (2,099)
Fan power: kW (hp)	18 (24.1)

Air requirements

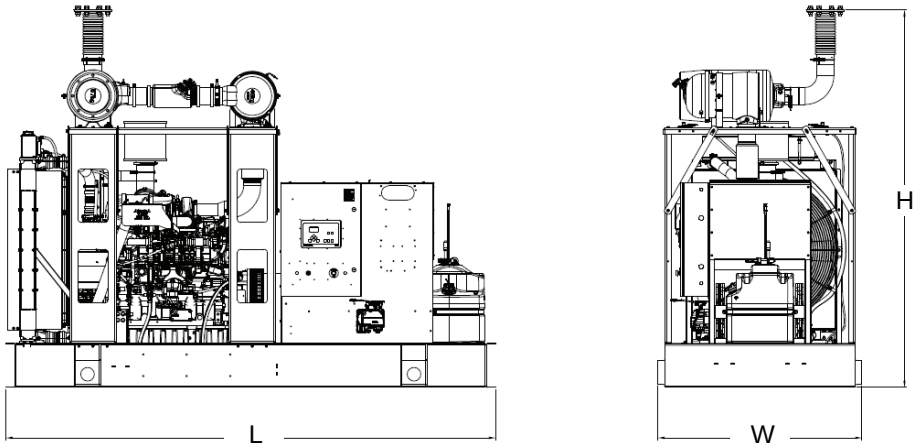
Aspirating: *m^3/min (SCFM)	23 (812)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	517.7 (18,281)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	N/A

* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

Gas temperature (stack): °C (°F)	447 (837)
Maximum gas temperature during regeneration: °C (°F)	647 (1,197)
Gas volume at stack temperature: m^3/min (CFM)	45 (1,589)
Maximum allowable back pressure at outlet of aftertreatment: kPa (in. H_20)	19.2 (77)

Weights and dimensions



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System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	3,658 x 1,524 x 2,516 mm (144 x 60 x 111 in)	4,140 (9,137 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Prime full load
Level 0 (OPU): dB(A)	83.6

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
0.03	0.002	0.003

All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

- Prime power ratings apply to installations where utility power is unavailable or unreliable. At varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 75%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

C/F = Consult Factory/***mtu*** Distributor
N/A = Not Available

Diesel Generator Set

mtu 6R0150 DS275

250 kWe/60 Hz/Prime/208 - 600V

Reference *mtu* 6R0150 DS275 (275 kWe) for Standby Rating Technical Data

System ratings

Voltage (L-L)	208V †	240V †	380V †	480V †	600V †
Phase	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60
kW	250	250	250	250	250
kVA	313	313	313	313	313
Amps	867	752	475	376	301
skVA@30% voltage dip	608	608	767	809	720
Generator model	432CSL6210	432CSL6210	433CSL6216	432CSL6210	432PSL6246
Temp rise	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C
Connection	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 4 Final certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification - optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional
- CSA - optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110
  - Permissible average power output during 24 hours of operation is approved up to 75%

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 6090HFG06 diesel engine
  - 9.0 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with optional Permanent Magnet Generator (PMG)
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaner
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filters
- Open crankcase ventilation
- Jacket water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery rack and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 105 °C maximum prime temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 1% voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	John Deere
Model	6090HFG06
Type	4-cycle
Arrangement	6-inline
Displacement: L (in^3)	9.0 (549)
Bore: cm (in)	11.84 (4.7)
Stroke: cm (in)	13.6 (5.4)
Compression ratio	16:1
Rated rpm	1,800
Engine governor	JDEC
Maximum power: kWm (bhp)	298 (399)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	40 (10.6)
Engine jacket water capacity: L (gal)	17 (4.49)
System coolant capacity: L (gal)	41.37 (10.93)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	950
Batteries: group size	31
Batteries: quantity	2

Fuel system

Fuel supply connection size	-10 JIC 37° female
Fuel return Connection size	-6 JIC 37° female
Maximum fuel Lift: m (ft)	2.4 (7.9)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	167.94 (44.37)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	71.7 (18.9)
At 75% of power rating: L/hr (gal/hr)	52.9 (14)
At 50% of power rating: L/hr (gal/hr)	36.4 (9.6)

DEF consumption

At 100% of power rating: L/hr (gal/hr)	1.65 (0.44)
At 75% of power rating: L/hr (gal/hr)	1.53 (0.41)
At 50% of power rating: L/hr (gal/hr)	1.17 (0.31)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.124 (0.5)
Water pump capacity: L/min (gpm)	385 (102)
Heat rejection to coolant: kW (BTUM)	185 (10,530)
Heat rejection to air to air: kW (BTUM)	86 (4,895)
Heat radiated to ambient: kW (BTUM)	36.9 (2,099)
Fan power: kW (hp)	18 (24.1)

Air requirements

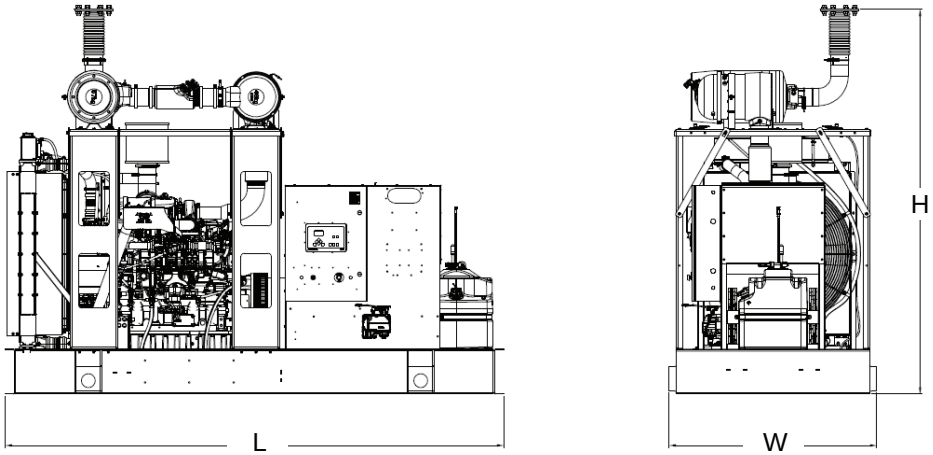
Aspirating: *m^3/min (SCFM)	23 (812)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	517.7 (18,281)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	N/A

* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

Gas temperature (stack): °C (°F)	447 (837)
Maximum gas temperature during regeneration: °C (°F)	647 (1,197)
Gas volume at stack temperature: m^3/min (CFM)	45 (1,589)
Maximum allowable back pressure at outlet of aftertreatment: kPa (in. H_20)	19.2 (77)

Weights and dimensions



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System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	3,658 x 1,524 x 2,516 mm (144 x 60 x 111 in)	4,140 (9,137 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Prime full load
Level 0 (OPU): dB(A)	83.7

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
0.03	0.002	0.003

All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

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- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

C/F = Consult Factory/***mtu*** Distributor
N/A = Not Available

Diesel Generator Set

mtu 6R0150 DS300

265 kWe/60 Hz/Prime/208 - 600V
Reference *mtu* 6R0150 DS300 (300 kWe) for Standby Rating Technical Data

System ratings

Voltage (L-L)	208V †	240V †	380V †	480V †	600V †
Phase	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60
kW	265	265	265	265	265
kVA	331	331	331	331	331
Amps	919	797	503	398	319
skVA@30% voltage dip	930	930	767	1,238	1,102
Generator model	433CSL6216	433CSL6216	433CSL6216	433CSL6216	432PSL6248
Temp rise	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C
Connection	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 4 Final certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification - optional
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- UL 2200 - optional
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  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110
  - Permissible average power output during 24 hours of operation is approved up to 75%.

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 6090HFG06 diesel engine
  - 9.0 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with optional Permanent Magnet Generator (PMG)
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaner
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filters
- Open crankcase ventilation
- Jacket water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery rack and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
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- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	John Deere
Model	6090HFG06
Type	4-cycle
Arrangement	6-inline
Displacement: L (in^3)	9.0 (549)
Bore: cm (in)	11.84 (4.7)
Stroke: cm (in)	13.6 (5.4)
Compression ratio	16:1
Rated rpm	1,800
Engine governor	JDEC
Maximum power: kWm (bhp)	298 (399)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	40 (10.6)
Engine jacket water capacity: L (gal)	17 (4.49)
System coolant capacity: L (gal)	41.37 (10.93)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	950
Batteries: group size	31
Batteries: quantity	2

Fuel system

Fuel supply connection size	-10 JIC 37° female
Fuel return Connection size	-6 JIC 37° female
Maximum fuel Lift: m (ft)	2.4 (7.9)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	167.94 (44.37)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	71.7 (18.9)
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Cooling - radiator system

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Maximum restriction of cooling air: Intake and discharge side of radiator: kPa (in. H_20)	0.124 (0.5)
Water pump capacity: L/min (gpm)	385 (102)
Heat rejection to coolant: kW (BTUM)	185 (10,530)
Heat rejection to air to air: kW (BTUM)	86 (4,895)
Heat radiated to ambient: kW (BTUM)	36.9 (2,099)
Fan power: kW (hp)	18 (24.1)

Air requirements

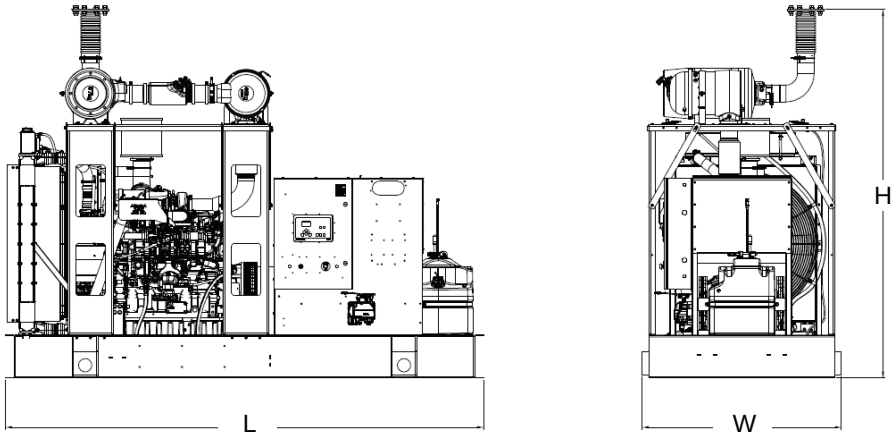
Aspirating: *m^3/min (SCFM)	23 (812)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	517.7 (18,281)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	N/A

* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

Gas temperature (stack): °C (°F)	447 (837)
Maximum gas temperature during regeneration: °C (°F)	647 (1,197)
Gas volume at stack temperature: m^3/min (CFM)	45 (1,589)
Maximum allowable back pressure at outlet of aftertreatment: kPa (in. H_20)	19.2 (77)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	3,658 x 1,524 x 2,516 mm (144 x 60 x 111 in)	4,140 kg (9,137 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Prime full load
Level 0 (OPU): dB(A)	83.3

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
0.03	0.002	0.003

All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

- Prime power ratings apply to installations where utility power is unavailable or unreliable. At varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 75%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

C/F = Consult Factory/***mtu*** Distributor
N/A = Not Available

Diesel Generator Set

mtu 6R0225 DS350

325 kWe/60 Hz/Prime/208 - 600V
Reference *mtu* 6R0225 DS350 (350 kWe) for Standby Rating Technical Data

System ratings

Voltage (L-L)	240V †	240V †	208V †	240V †	380V †	480V †	600V †
Phase	1	1	3	3	3	3	3
PF	1	1	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60	60
kW	250	275	325	325	325	325	325
kVA	250	275	406	406	406	406	406
Amps	1,042	1,146	1,128	977	617	489	391
skVA@30% voltage dip	584	584	930	930	767	1,238	1,102
Generator model	572RSL4027	572RSL4027	433CSL6216	433CSL6216	433CSL6216	433CSL6216	433PSL6248
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	12 LEAD DOUBLE DELTA	12 LEAD DOUBLE DELTA	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 4 Final certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification - optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110
  - Permissible average power output during 24 hours of operation is approved up to 75%.

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 6135HFG06 diesel engine
  - 13.5 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with Permanent Magnet Generator (PMG)
    - ◊ PMG standard for 570 frame and larger
    - ◊ PMG optional for 430 frame and smaller
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaner
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filters
- Open crankcase ventilation
- Jacket water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery rack and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum prime temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 0.25% voltage regulation (570 frame) no load to full load
- ± 1% voltage regulation (430 frame) no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	John Deere
Model	6135HFG06
Type	4-cycle
Arrangement	6-inline
Displacement: L (in^3)	13.5 (824)
Bore: cm (in)	13.2 (5.2)
Stroke: cm (in)	16.5 (6.5)
Compression ratio	15.3:1
Rated rpm	1,800
Engine governor	JDEC
Maximum power: kWm (bhp)	433 (580)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	48 (12.7)
Engine jacket water capacity: L (gal)	25 (6.6)
System coolant capacity: L (gal)	67.3 (17.8)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	950
Batteries: group size	31
Batteries: quantity	2

Fuel system

Fuel supply connection size	-10 JIC 37° female
Fuel return Connection size	-6 JIC 37° female
Maximum fuel Lift: m (ft)	2.4 (7.9)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	213.8 (56.48)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	104.1 (27.5)
At 75% of power rating: L/hr (gal/hr)	77.9 (20.6)
At 50% of power rating: L/hr (gal/hr)	54 (14.3)

DEF consumption

At 100% of power rating: L/hr (gal/hr)	2.92 (0.77)
At 75% of power rating: L/hr (gal/hr)	2.34 (0.62)
At 50% of power rating: L/hr (gal/hr)	1.78 (0.47)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.124 (0.5)
Water pump capacity: L/min (gpm)	727 (192)
Heat rejection to coolant: kW (BTUM)	279 (15,881)
Heat rejection to air to air: kW (BTUM)	144 (8,196)
Heat radiated to ambient: kW (BTUM)	48.1 (2,735)
Fan power: kW (hp) †	19.9 (26.7)

† Open power unit

Air requirements

Aspirating: *m^3/min (SCFM)	36 (1,271)
Air flow required for radiator cooled unit: *m^3/min (SCFM) †	669.9 (23,658)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	N/A

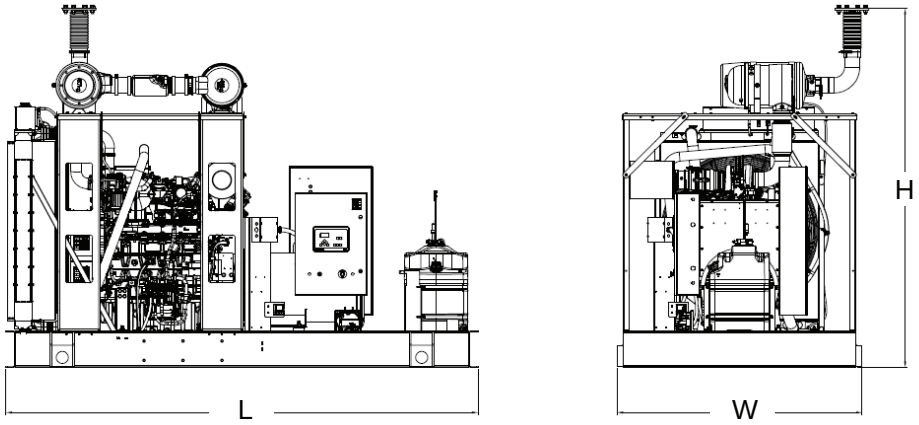
* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

† Open power unit

Exhaust system

Gas temperature (stack): °C (°F)	527 (981)
Maximum gas temperature during regeneration: °C (°F)	727 (1,341)
Gas volume at stack temp: m^3/min (CFM)	60 (2,119)
Maximum allowable back pressure at outlet of aftertreatment: kPa (in. H_20)	2.6 (10.5)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	3,397 x 2,045 x 2,992 mm (155 x 80.5 x 118 in)	4,700 kg (10,362 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Prime full load
250 kW (Single-Phase Only) Level 0 (OPU): dB(A)	91.3
275 kW (Single-Phase Only) Level 0 (OPU): dB(A)	91.2
325 kW Level 0 (OPU): dB(A)	91.2

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
0.11	0.023	0.008

All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

- Prime power ratings apply to installations where utility power is unavailable or unreliable. At varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 75%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

C/F = Consult Factory/***mtu*** Distributor
N/A = Not Available

Diesel Generator Set

mtu 6R0225 DS400

365 kWe/60 Hz/Prime/208 - 600V
Reference *mtu* 6R0225 DS400 (400 kWe) for Standby Rating Technical Data

System ratings

Voltage (L-L)	208V †	240V †	380V †	480V †	600V †
Phase	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60
kW	365	365	365	365	365
kVA	456	456	456	456	456
Amps	1,266	1,098	693	549	439
skVA@30% voltage dip	1,119	1,119	934	1,277	1,102
Generator model	572RSL4025	572RSL4025	572RSL4025	433CSL6220	433PSL6248
Temp rise	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C	130 °C/40 °C
Connection	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 4 Final certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification - optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional
- CSA - optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110
  - Permissible average power output during 24 hours of operation is approved up to 75%.

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 6135HFG06 diesel engine
  - 13.5 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with Permanent Magnet Generator (PMG)
    - ◊ PMG standard for 570 frame and larger
    - ◊ PMG optional for 430 frame and smaller
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaner
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filters
- Open crankcase ventilation
- Jacket water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery rack and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 130 °C maximum prime temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 0.25% voltage regulation (570 frame) no load to full load
- ± 1% voltage regulation (430 frame) no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	John Deere
Model	6135HFG06
Type	4-cycle
Arrangement	6-inline
Displacement: L (in^3)	13.5 (824)
Bore: cm (in)	13.2 (5.2)
Stroke: cm (in)	16.5 (6.5)
Compression ratio	15.3:1
Rated rpm	1,800
Engine governor	JDEC
Maximum power: kWm (bhp)	473 (634)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	48 (12.7)
Engine jacket water capacity: L (gal)	25 (6.6)
System coolant capacity: L (gal)	67.3 (17.8)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	950
Batteries: group size	31
Batteries: quantity	2

Fuel system

Fuel supply connection size	-10 JIC 37° female
Fuel return Connection size	-6 JIC 37° female
Maximum fuel Lift: m (ft)	2.4 (7.9)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	213.8 (56.48)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	104.1 (27.5)
At 75% of power rating: L/hr (gal/hr)	77.9 (20.6)
At 50% of power rating: L/hr (gal/hr)	54 (14.3)

DEF consumption

At 100% of power rating: L/hr (gal/hr)	2.92 (0.77)
At 75% of power rating: L/hr (gal/hr)	2.34 (0.62)
At 50% of power rating: L/hr (gal/hr)	1.78 (0.47)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.124 (0.5)
Water pump capacity: L/min (gpm)	727 (192)
Heat rejection to coolant: kW (BTUM)	279 (15,881)
Heat rejection to air to air: kW (BTUM)	144 (8,196)
Heat radiated to ambient: kW (BTUM)	48.1 (2,735)
Fan power: kW (hp) †	19.9 (26.7)

† Open power unit

Air requirements

Aspirating: *m^3/min (SCFM)	36 (1,271)
Air flow required for radiator cooled unit: *m^3/min (SCFM) †	669.9 (23,658)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	N/A

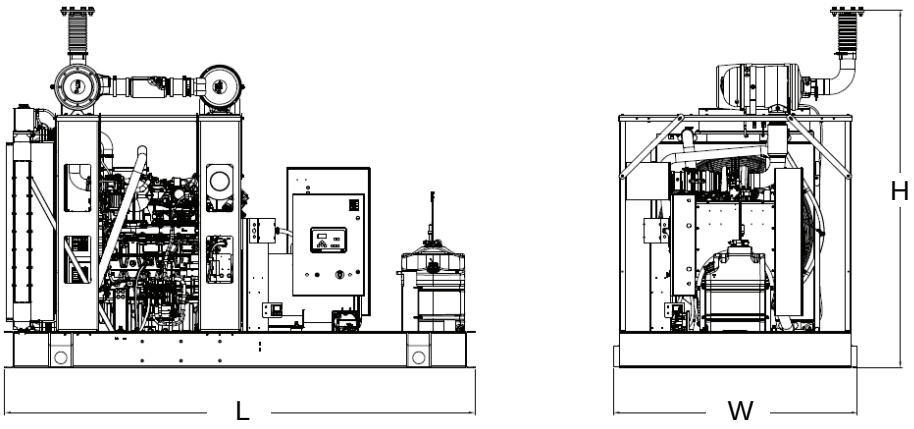
* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

† Open power unit

Exhaust system

Gas temperature (stack): °C (°F)	527 (981)
Maximum gas temperature during regeneration: °C (°F)	727 (1,341)
Gas volume at stack temperature: m^3/min (CFM)	60 (2,119)
Maximum allowable back pressure at outlet of aftertreatment: kPa (in. H_20)	2.6 (10.5)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	3,937 x 2,045 x 2,992 mm (155 x 80.5 x 118 in)	4,700 kg (10,362 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Prime full load
Level 0 (OPU): dB(A)	91.5

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
0.11	0.023	0.008

All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

- Prime power ratings apply to installations where utility power is unavailable or unreliable. At varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 75%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

C/F = Consult Factory/***mtu*** Distributor
N/A = Not Available

Diesel Generator Set

mtu 10V1600 DS450

400 kWe/60 Hz/Prime/208 - 600V
Reference *mtu* 10V1600 DS450 (450 kWe) for Standby Rating Technical Data

System ratings

Voltage (L-L)	208V †	240V †	380V	440V	480V †	600V
Phase	3	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60
kW	400	400	400	400	400	400
kVA	500	500	500	500	500	500
Amps	1,388	1,203	760	656	601	481
skVA@30% voltage dip	745	560	655	900	1,490	1,041
Generator model	572RSL4025	572RSL4025	572RSL4025	572RSL4025	572RSL4025	572RSS4270
Temp rise	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C
Connection	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	12 LEAD WYE	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 3 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality, and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110
  - Permissible average power output during 24 hours of operation is approved up to 75%.

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 10V1600 diesel engine
  - 17.5 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - Permanent Magnet Generator (PMG) supply to regulator
  - 300% short circuit capability
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Closed crankcase ventilation
- Jacket water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 105 °C maximum prime temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 0.25% voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	***mtu***
Model	10V1600G70S
Type	4-cycle
Arrangement	10-V
Displacement: L (cu in)	17.5 (1,068)
Bore: cm (in)	12.2 (4.8)
Stroke: cm (in)	15 (5.91)
Compression ratio	17.5:1
Rated rpm	1,800
Engine governor	electronic isochronous (ADEC)
Maximum power: kWm (bhp)	511 (685)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	61 (16)
Engine jacket water capacity: L (gal)	60 (15.9)
System coolant capacity: L (gal)	99.3 (26.2)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	1,050
Batteries: group size	4D
Batteries: quantity	2

Fuel system

Fuel supply connection size	-10 JIC 37° female M20 x 1.5 male adapter provided
Fuel return connection size	-6 JIC 37° female M14 x 1.5 male adapter provided
Maximum fuel lift: m (ft)	5 (16)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	401.3 (106)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	102 (27)
At 75% of power rating: L/hr (gal/hr)	82 (21.7)
At 50% of power rating: L/hr (gal/hr)	59 (15.7)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.2 (0.8)
Water pump capacity: L/min (gpm)	466 (123)
Heat rejection to coolant: kW (BTUM)	225 (12,795)
Heat rejection to after cooler: kW (BTUM)	101 (5,744)
Heat radiated to ambient: kW (BTUM)	51.8 (2,946)
Fan power: kW (hp)	17.9 (24)

Air requirements

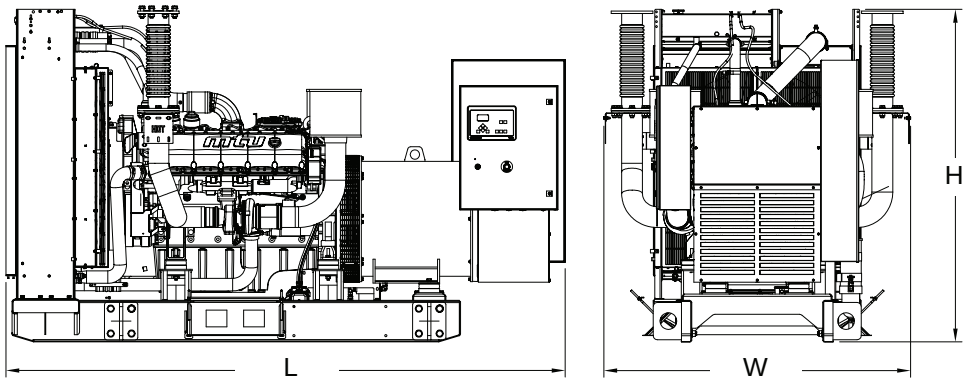
Aspirating: *m^3/min (SCFM)	34 (1,187)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	642 (22,672)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	188 (6,643)

* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

Gas temperature (stack): °C (°F)	459 (858)
Gas volume at stack temperature: m^3/min (CFM)	95 (3,369)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	8.5 (34.1)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	3,416 x 1,873 x 2,032 mm (134.5 x 73.8 x 80 in)	4,175-5,129 kg (9,205-11,308 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Prime full load
Level 0 (OPU): dB(A)	91.9

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
3.31	0.37	0.03

- All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

- Prime power ratings apply to installations where utility power is unavailable or unreliable. At varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 10V1600 DS500

450 kWe/60 Hz/Prime/208 - 600V

Reference *mtu* 10V1600 DS500 (500 kWe) for Standby Rating Technical Data

System ratings

Voltage (L-L)	208V †	240V †	380V	440V	480V †	600V
Phase	3	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60
kW	450	450	450	450	450	450
kVA	563	563	563	563	563	563
Amps	1,561	1,353	855	738	677	541
skVA@30% voltage dip	805	605	843	900	1,490	1,041
Generator model	572RSL4029	572RSL4029	572RSL4029	572RSL4025	572RSL4025	572RSS4270
Temp rise	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C
Connection	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	12 LEAD WYE	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions – EPA Tier 2 certified
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110
  - Permissible average power output during 24 hours of operation is approved up to 75%.

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 10V1600 diesel engine
  - 17.5 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - Permanent Magnet Generator (PMG) supply to regulator
  - 300% short circuit capability
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filters
- Closed crankcase ventilation
- Jacket water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 105 °C maximum prime temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 0.25% voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	***mtu***
Model	10V1600G20S
Type	4-cycle
Arrangement	10-V
Displacement: L (cu in)	17.5 (1,068)
Bore: cm (in)	12.2 (4.8)
Stroke: cm (in)	15 (5.91)
Compression ratio	17.5:1
Rated rpm	1,800
Engine governor	electronic isochronous (ADEC)
Maximum power: kWm (bhp)	511 (685)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	61 (16)
Engine jacket water capacity: L (gal)	60 (15.9)
System coolant capacity: L (gal)	99.3 (26.2)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	1,050
Batteries: group size	4D
Batteries: quantity	2

Fuel system

Fuel supply connection size	-10 JIC 37° female M20 x 1.5 male adapter provided
Fuel return connection size	-6 JIC 37° female M14 x 1.5 male adapter provided
Maximum fuel lift: m (ft)	5 (16)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	401.3 (106)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	115 (30.5)
At 75% of power rating: L/hr (gal/hr)	91 (24)
At 50% of power rating: L/hr (gal/hr)	68 (17.9)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_2O)	0.2 (0.8)
Water pump capacity: L/min (gpm)	466 (123)
Heat rejection to coolant: kW (BTUM)	225 (12,795)
Heat rejection to after cooler: kW (BTUM)	101 (5,744)
Heat radiated to ambient: kW (BTUM)	51.8 (2,946)
Fan power: kW (hp)	17.9 (24)

Air requirements

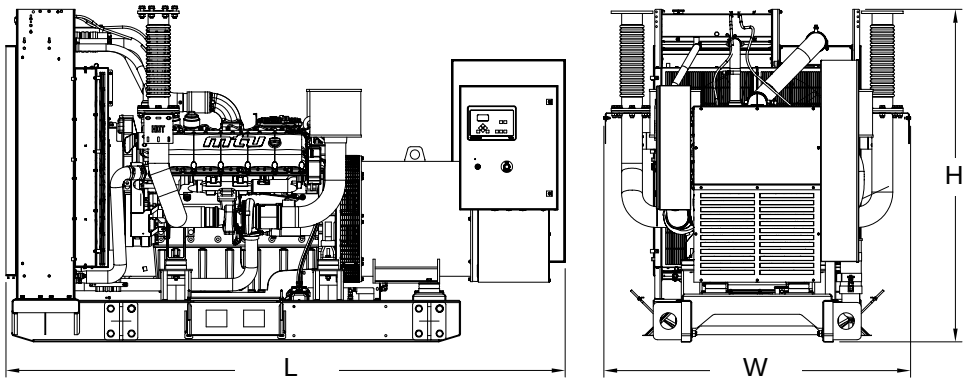
Aspirating: *m^3/min (SCFM)	34 (1,187)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	642 (22,672)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	188 (6,643)

* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

Gas temperature (stack): °C (°F)	459 (858)
Gas volume at stack temperature: m^3/min (CFM)	95 (3,369)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_2O)	8.5 (34.1)

Weights and dimensions



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System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	3,416 x 1,873 x 2,032 mm (134.5 x 73.8 x 80 in)	4,175-5,129 kg (9,205-11,308 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Prime full load
Level 0 (OPU): dB(A)	93.4

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
6.9	0.45	0.03

- All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

- Prime power ratings apply to installations where utility power is unavailable or unreliable. At varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 75%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 12V1600 DS550

500 kWe/60 Hz/Prime/208 - 600V
Reference *mtu* 12V1600 DS550 (550 kWe) for Standby Rating Technical Data

System ratings

Voltage (L-L)	208V †	240V †	380V	440V	480V †	600V
Phase	3	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60
kW	500	500	500	500	500	500
kVA	625	625	625	625	625	625
Amps	1,735	1,504	950	820	752	601
skVA@30% voltage dip	908	682	947	1,160	2,190	1,438
Generator model	573RSL4033	573RSL4033	573RSL4033	572RSL4031	572RSL4029	572RSS4272
Temp rise	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C
Connection	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	12 LEAD WYE	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 2 certified
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality, and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110
  - Permissible average power output during 24 hours of operation is approved up to 75%.

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 12V1600 diesel engine
  - 21.0 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - Permanent Magnet Generator (PMG) supply to regulator
  - 300% short circuit capability
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filters
- Closed crankcase ventilation
- Jacket water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 105 °C maximum prime temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 0.25% voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	***mtu***
Model	12V1600G10S
Type	4-cycle
Arrangement	12-V
Displacement: L (cu in)	21.0 (1,281)
Bore: cm (in)	12 (4.72)
Stroke: cm (in)	15 (5.91)
Compression ratio	17.5:1
Rated rpm	1,800
Engine governor	electronic isochronous (ADEC)
Maximum power: kWm (bhp)	561 (752)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	73 (19.3)
Engine jacket water capacity: L (gal)	65 (17.2)
System coolant capacity: L (gal)	106 (28.1)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	1,050
Batteries: group size	4D
Batteries: quantity	2

Fuel system

Fuel supply connection size	-10 JIC 37° female M20 x 1.5 male adapter provided
Fuel return connection size	-6 JIC 37° female M14 x 1.5 male adapter provided
Maximum fuel lift: m (ft)	5 (16)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	402 (106.2)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	132.5 (35)
At 75% of power rating: L/hr (gal/hr)	101.8 (26.9)
At 50% of power rating: L/hr (gal/hr)	70.4 (18.6)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_2O)	0.2 (0.8)
Water pump capacity: L/min (gpm)	517 (137)
Heat rejection to coolant: kW (BTUM)	223 (12,681)
Heat rejection to after cooler: kW (BTUM)	124 (7,051)
Heat radiated to ambient: kW (BTUM)	56.9 (3,236)
Fan power: kW (hp)	23.1 (31)

Air requirements

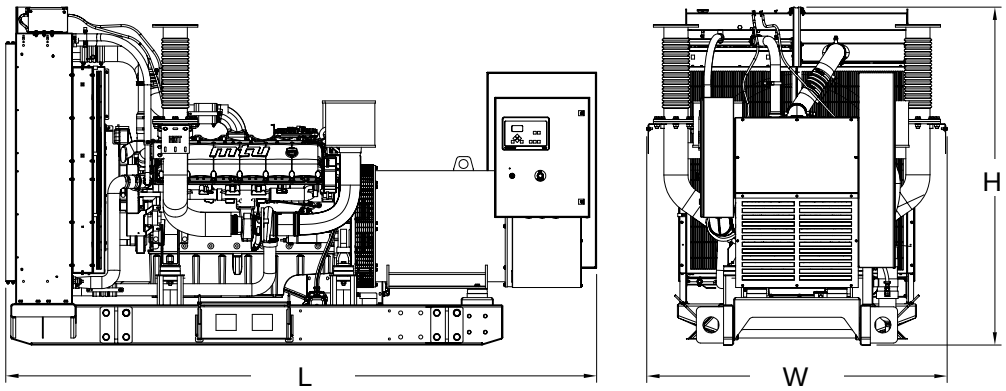
Aspirating: *m^3/min (SCFM)	47 (1,653)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	756 (26,700)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	207 (7,298)

* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

Gas temperature (stack): °C (°F)	401 (754)
Gas volume at stack temperature: m^3/min (CFM)	114 (4,026)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_2O)	8.5 (34.1)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	3,737 x 1,899 x 2,137 mm (147.1 x 74.8 x 84.1 in)	4,774-5,829 kg (10,524-12,850 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Prime full load
Level 0 (OPU): dB(A)	90.1

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
5.12	0.3	0.02

- All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

- Prime power ratings apply to installations where utility power is unavailable or unreliable. At varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 75%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 12V1600 DS600

550 kWe/60 Hz/Prime/208 - 600V
Reference *mtu* 12V1600 DS600 (600 kWe) for Standby Rating Technical Data

System ratings

Voltage (L-L)	208V †	240V †	380V	440V	480V †	600V
Phase	3	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60
kW	550	550	550	550	550	550
kVA	687	687	687	687	687	687
Amps	1,908	1,654	1,045	902	827	662
skVA@30% voltage dip	908	682	1,232	1,400	2,330	1,337
Generator model	573RSL4033	573RSL4033	573RSL4035	573RSL4033	573RSL4033	573RSS4274
Temp rise	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C
Connection	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	12 LEAD WYE	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 2 certified
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality, and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110
  - Permissible average power output during 24 hours of operation is approved up to 75%.

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 12V1600 diesel engine
  - 21.0 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - Permanent Magnet Generator (PMG) supply to regulator
  - 300% short circuit capability
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filters
- Closed crankcase ventilation
- Jacket water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 105 °C maximum prime temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 0.25% voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	***mtu***
Model	12V1600G20S
Type	4-cycle
Arrangement	12-V
Displacement: L (cu in)	21.0 (1,281)
Bore: cm (in)	12 (4.72)
Stroke: cm (in)	15 (5.91)
Compression ratio	17.5:1
Rated rpm	1,800
Engine governor	electronic isochronous (ADEC)
Maximum power: kWm (bhp)	608 (815)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	73 (19.3)
Engine jacket water capacity: L (gal)	65 (17.2)
System coolant capacity: L (gal)	106 (28.1)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	1,050
Batteries: group size	4D
Batteries: quantity	2

Fuel system

Fuel supply connection size	-10 JIC 37° female M20 x 1.5 male adapter provided
Fuel return connection size	-6 JIC 37° female M14 x 1.5 male adapter provided
Maximum fuel lift: m (ft)	5 (16)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	402 (106.2)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	140 (37)
At 75% of power rating: L/hr (gal/hr)	106 (28)
At 50% of power rating: L/hr (gal/hr)	75 (19.9)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_2O)	0.2 (0.8)
Water pump capacity: L/min (gpm)	517 (136.5)
Heat rejection to coolant: kW (BTUM)	242 (13,762)
Heat rejection to after cooler: kW (BTUM)	150 (8,530)
Heat radiated to ambient: kW (BTUM)	59.7 (3,395)
Fan power: kW (hp)	23.1 (31)

Air requirements

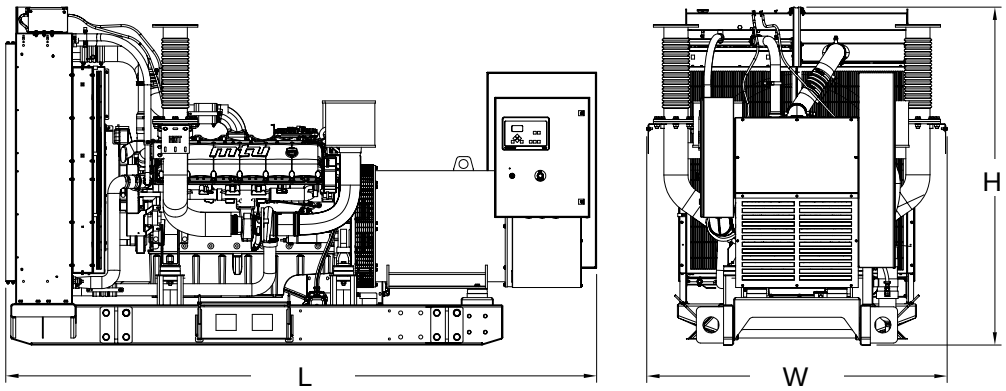
Aspirating: *m^3/min (SCFM)	53 (1,865)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	756 (26,700)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	217 (7,657)

* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

Gas temperature (stack): °C (°F)	414 (777)
Gas volume at stack temperature: m^3/min (CFM)	126 (4,450)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_2O)	8.5 (34.1)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	3,737 x 1,899 x 2,137 mm (147.1 x 74.8 x 84.1 in)	4,774-5,829 kg (10,524-12,850 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Prime full load
Level 0 (OPU): dB(A)	91.9

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
5.36	0.3	0.03

— All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

— Prime power ratings apply to installations where utility power is unavailable or unreliable. At varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 75%.
— Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
— Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 16V2000 DS1000

900 kWe/60 Hz/Prime/208 - 4,160V
Reference *mtu* 16V2000 DS1000 (1,000 kWe) for Standby Rating Technical Data

System ratings

Voltage (L-L)	208V † ‡	240V † ‡	380V † ‡	480V † ‡	600V ‡	4,160V
Phase	3	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60
kW	900	900	900	900	900	900
kVA	1,125	1,125	1,125	1,125	1,125	1,125
Amps	3,123	2,706	1,709	1,353	1,083	156
skVA@30% voltage dip	2,475	2,475	3,205	2,830	3,625	2,800
Generator model*	LSA 50.2 M6	LSA 50.2 M6	LSA 50.2 M6	LSA 49.1 L11	LSA 50.2 M6	LSA 50.2 UL8
Temp rise	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C
Connection	12 LEAD WYE	12 LEAD DELTA	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE

* Consult the factory for alternate configuration.
† UL 2200 offered
‡ CSA offered

Certifications and standards

- Emissions
  - EPA Tier 2 compliant
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional (refer to *System ratings* for availability)
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality, and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110
  - Permissible average power output during 24 hours of operation is approved up to 75%.

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 16V2000 diesel engine
  - 35.7 liter displacement
  - Common rail fuel injection
  - 4-cycle
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - AREP supply to regulator
  - 300% short circuit capability
- Digital control panel(s)
  - UL recognized, CSA Certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Closed crankcase ventilation
- Jacket water pump
- Inter cooler water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - structural steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery rack and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 105 °C maximum prime temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 0.25% voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU Communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	***mtu***
Model	16V2000G26S
Type	4-cycle
Arrangement	16-V
Displacement: L (in³)	35.7 (2,179)
Bore: cm (in)	13.5 (5.3)
Stroke: cm (in)	15.6 (6.1)
Compression ratio	16:1
Rated rpm	1,800
Engine governor	electronic isochronous (ADEC)
Maximum power: kWm (bhp)	998 (1,338)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	114 (30.1)
Engine jacket water capacity: L (gal)	70 (18.5)
After cooler water capacity: L (gal)	25 (6.6)
System coolant capacity: L (gal)	188 (50)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	2,800
Batteries: group size	8D
Batteries: quantity	4

Fuel system

Fuel supply connection size	#12 JIC 37° male
Fuel return connection size	#12 JIC 37°male
Maximum fuel lift: m (ft)	5 (16)
Recommended fuel	diesel #2
Total fuel flow: L/hr (gal/hr)	1,500 (396)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	252 (66.6)
At 75% of power rating: L/hr (gal/hr)	186 (49.2)
At 50% of power rating: L/hr (gal/hr)	132 (34.9)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_2O)	0.12 (0.5)
Water pump capacity: L/min (gpm)	783 (207)
After cooler pump capacity: L/min (gpm)	258 (68)
Heat rejection to coolant: kW (BTUM)	390 (22,179)
Heat rejection to after cooler: kW (BTUM)	250 (14,217)
Heat radiated to ambient: kW (BTUM)	93 (5,289)
Fan power: kW (hp)	49 (66)

Air requirements

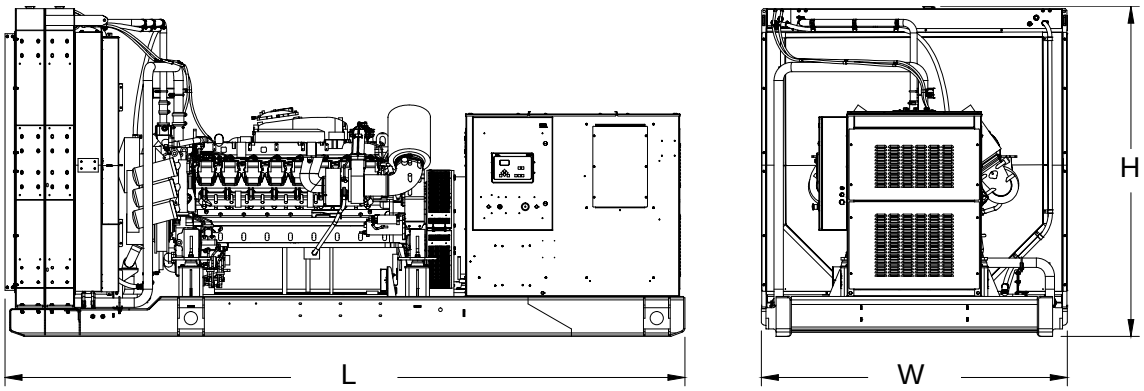
Aspirating: *m³/min (SCFM)	96 (3,390)
Air flow required for radiator cooled unit: *m³/min (SCFM)	1,709 (60,350)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m³/min (SCFM)	338 (11,925)

* Air density = 1.184 kg/m³ (0.0739 lbm/ft³)

Exhaust system

Gas temperature (stack): °C (°F)	495 (923)
Gas volume at stack temperature: m³/min (CFM)	252 (8,899)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_2O)	8.5 (34.1)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	5,093 x 2,292 x 2,477 mm (200.5 x 90.3 x 97.5 in)	8,525 kg (18,795 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Prime full load
Level 0 (OPU): dB(A)	95.1

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
4.2	0.02	0.01

— All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA Standards.

Rating definitions and conditions

— Prime power ratings apply to installations where utility power is unavailable or unreliable. At varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 75%.
— Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
— Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 3R0096 DS30

27 kWe/60 Hz/Prime Power for Stationary Emergency/208 - 600V
Reference *mtu* 3R0096 DS30 (30 kWe) for Standby Rating Technical Data

System ratings

Voltage (L-L)	240V †	208V †	240V †	380V †	480V †	600V
Phase	1	3	3	3	3	3
PF	1	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60
kW	27	27	27	27	27	27
kVA	27	33	33	33	33	33
Amps	112.5	94	81	51	40	32
skVA@30% voltage dip	65	142	142	187	187	142
Generator model	284PSL1700	284PSL1700	284PSL1700	284PSL1700	284PSL1700	284PSL5252
Temp rise	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C
Connection	12 LEAD DOUBLE DELTA	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA certified – 40 CFR Part 60 IIII NSPS for Stationary Compression Ignition Internal Combustion Engines – stationary emergency engine emissions standards 60.4202(a)(1)(ii) 2008 and later model years
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
- UL 2200 – optional (refer to *System ratings* for availability)
- CSA – optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 3029TFG89 diesel engine
  - 2.9 liter displacement
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with optional Permanent Magnet Generator (PMG)
- Digital control panel(s)
  - UL recognized, CSA Certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Fuel filter with water seperator
- Jacket water pump
- Thermostat
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 12V
- Governor - mechanical droop
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 12V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Self-ventilated and drip-proof
- Superior voltage waveform
- Solid state, volts-per-hertz regulator
- ± 1% voltage regulation no load to full load
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 105 °C maximum prime temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	John Deere
Model	3029TFG89
Type	4-cycle
Arrangement	3-inline
Displacement: L (in^3)	2.9 (177)
Bore: cm (in)	10.6 (4.2)
Stroke: cm (in)	11 (4.3)
Compression ratio	17.2:1
Rated rpm	1,800
Engine governor	mechanical droop
Maximum power: kWm (bhp)	31 (42)
Steady state frequency band	± 1%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	8 (2.1)
Engine jacket water capacity: L (gal)	5.7 (1.5)
System coolant capacity: L (gal)	11.4 (3)

Electrical

Electric volts DC	12
Cold cranking amps under -17.8 °C (0 °F)	925
Batteries: group size	31
Batteries: quantity	1

Fuel system

Fuel supply connection size	3/8” ID/-6 JIC
Fuel return connection size	1/4” ID/-6 JIC
Maximum fuel lift: m (ft)	2 (6.6)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	111.3 (29.4)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	9.1 (2.4)
At 75% of power rating: L/hr (gal/hr)	6.8 (1.8)
At 50% of power rating: L/hr (gal/hr)	4.9 (1.3)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)*
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.12 (0.5)
Water pump capacity: L/min (gpm)	110 (29)
Heat rejection to coolant: kW (BTUM)	20.1 (1,144)
Heat radiated to ambient: kW (BTUM)	4.3 (245)
Fan power: kW (hp)	0.7 (0.94)

* Installation of a gravity exhaust louver in a Level 3 enclosure will reduce the ambient capacity of the cooling system by 5 °C (9 °F).

Air requirements

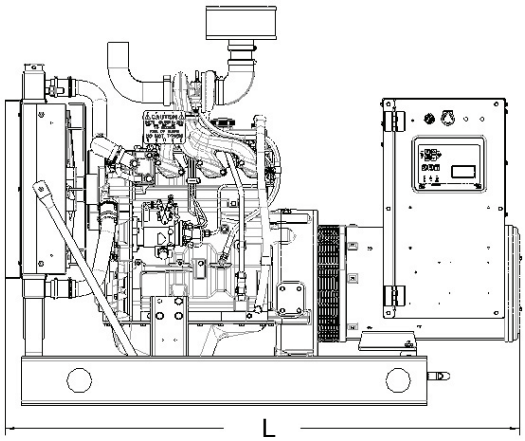
Aspirating: *m^3/min (SCFM)	3.6 (127)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	46.7 (1,636)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	15.8 (553)

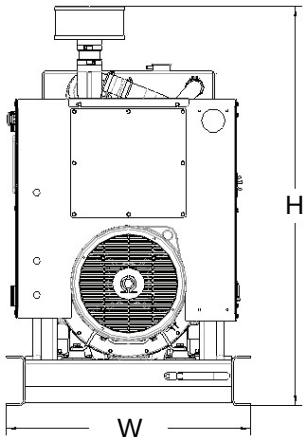
* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

Gas temperature (stack): °C (°F)	580 (1,076)
Gas volume at stack temperature: m^3/min (CFM)	8.3 (293)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	7.5 (30)

Weights and dimensions





Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open power unit (OPU)	1,581 x 749 x 1,226 mm (62.3 x 29.5 x 48.3 in)	736-995 kg (1,623-2,194 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Prime full load
Level 0 (OPU): dB(A)	71.3

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
4.41	0.44	0.11

All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards. 5-mode emission data per 40 CFR 89 or 40 CFR 1039 (as applicable) is available upon request.

Rating definitions and conditions

- Prime Power for Stationary Emergency ratings apply to installations served by a reliable utility source. At varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO 8528-1, overload power in accordance with ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 75%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 4R0113 DS40

40 kWe/60 Hz/Prime Power for Stationary Emergency/208 - 600V
Reference *mtu* 4R0113 DS40 (40 kWe) for Standby Rating Technical Data

System ratings

Voltage (L-L)	240V †	208V †	240V †	380V †	480V †	600V
Phase	1	3	3	3	3	3
PF	1	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60
kW	40	40	40	40	40	40
kVA	40	50	50	50	50	50
Amps	167	139	120	76	60	48
skVA@30% voltage dip	63	128	128	128	172	92
Generator model	361CSL1601	361CSL1601	361CSL1601	361CSL1601	361CSL1601	361PSL1632
Temp rise	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C
Connection	12 LEAD DOUBLE DELTA	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 3 certified
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
- UL 2200 – optional (refer to *System ratings* for availability)
- CSA – optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 4045TF280 diesel engine
  - 4.5 liter displacement
  - Mechanical injection pump
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with optional Permanent Magnet Generator (PMG)
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Fuel filter with water seperator
- Jacket water pump
- Thermostat
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 12V
- Governor - mechanical droop
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 12V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Self-ventilated and drip-proof
- Superior voltage waveform
- Solid state, volts-per-hertz regulator
- ± 1% voltage regulation no load to full load
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 105 °C maximum prime temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	John Deere
Model	4045TF280
Type	4-cycle
Arrangement	4-inline
Displacement: L (in^3)	4.5 (275)
Bore: cm (in)	10.6 (4.19)
Stroke: cm (in)	12.7 (5)
Compression ratio	19:1
Rated rpm	1,800
Engine governor	mechanical droop
Maximum power: kWm (bhp)	57 (76)
Steady state frequency band	± 0.5%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	13 (3.4)
Engine jacket water capacity: L (gal)	8.5 (2.3)
System coolant capacity: L (gal)	18.9 (5)

Electrical

Electric volts DC	12
Cold cranking amps under -17.8 °C (0 °F)	925
Batteries: group size	31
Batteries: quantity	1

Fuel system

Fuel supply connection size	3/8” NPT
Fuel return connection size	3/8” NPT
Maximum fuel lift: m (ft)	1.8 (6)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	56.4 (14.9)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	15.9 (4.2)
At 75% of power rating: L/hr (gal/hr)	12.5 (3.3)
At 50% of power rating: L/hr (gal/hr)	9.1 (2.4)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.12 (0.5)
Water pump capacity: L/min (gpm)	144 (38)
Heat rejection to coolant: kW (BTUM)	33 (1,878)
Heat radiated to ambient: kW (BTUM)	5.8 (327)
Fan power: kW (hp)	1.6 (2.2)

Air requirements

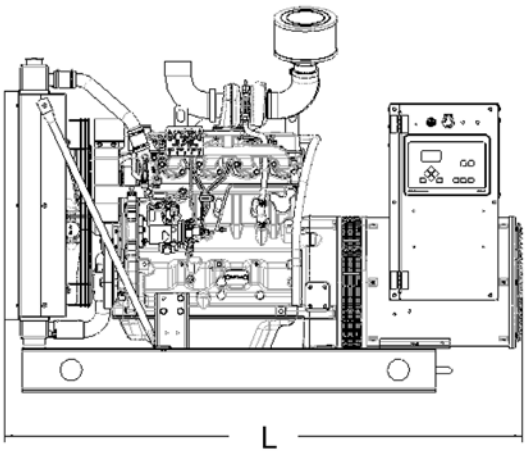
Aspirating: *m^3/min (SCFM)	5.1 (180)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	117 (4,088)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	21 (738)

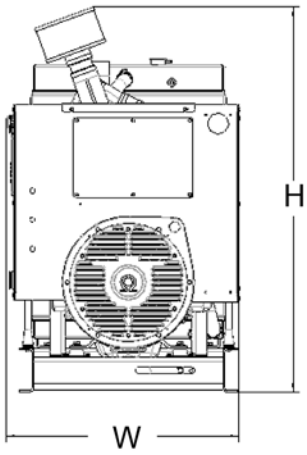
* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

Gas temperature (stack): °C (°F)	551 (1,024)
Gas volume at stack temperature: m^3/min (CFM)	18.3 (645)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	7.5 (30)
Minimum allowable back pressure: kPa (in. H_20)	N/A

Weights and dimensions





Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	1,781 x 800 x 1,321 mm (70.1 x 31.5 x 52 in)	943-1,404 kg (2,078-3,095 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Prime full load
Level 0 (OPU): dB(A)	80.2

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
3.8	0.69	0.22

All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards. 5-mode emission data per 40 CFR 89 or 40 CFR 1039 (as applicable) is available upon request.

Rating definitions and conditions

- Prime Power for Stationary Emergency ratings apply to installations served by a reliable utility source. At varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO 8528-1, overload power in accordance with ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 75%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 4R0113 DS40

40 kWe/60 Hz/Prime Power for Stationary Emergency (SCAQMD)/208 - 600V Reference *mtu* 4R0113 DS40 (40 kWe SCAQMD) for Standby Rating Technical Data

System ratings

Voltage (L-L)	240V †	208V †	240V †	380V †	480V †	600V
Phase	1	3	3	3	3	3
PF	1	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60
kW	40	40	40	40	40	40
kVA	40	50	50	50	50	50
Amps	167	139	120	76	60	48
skVA@30% voltage dip	63	128	128	128	172	92
Generator model	361CSL1601	361CSL1601	361CSL1601	361CSL1601	361CSL1601	361PSL1632
Temp rise	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C
Connection	12 LEAD DOUBLE DELTA	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 3 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
- UL 2200 – optional (refer to *System ratings* for availability)
- CSA – optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 4045TF290J diesel engine
  - 4.5 liter displacement
  - Mechanical injection pump
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with optional Permanent Magnet Generator (PMG)
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Fuel filter with water seperator
- Jacket water pump
- Thermostat
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 12V
- Governor - mechanical droop
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 12V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Self-ventilated and drip-proof
- Superior voltage waveform
- Solid state, volts-per-hertz regulator
- ± 1% voltage regulation no load to full load
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 105 °C maximum prime temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	John Deere
Model	4045TF290J
Type	4-cycle
Arrangement	4-inline
Displacement: L (in^3)	4.5 (275)
Bore: cm (in)	10.6 (4.19)
Stroke: cm (in)	12.7 (5)
Compression ratio	19:1
Rated rpm	1,800
Engine governor	mechanical droop
Maximum power: kWm (bhp)	50 (67)
Steady state frequency band	± 0.5%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	13 (3.4)
Engine jacket water capacity: L (gal)	8.5 (2.3)
System coolant capacity: L (gal)	18.9 (5)

Electrical

Electric volts DC	12
Cold cranking amps under -17.8 °C (0 °F)	925
Batteries: group size	31
Batteries: quantity	1

Fuel system

Fuel supply connection size	3/8” NPT
Fuel return connection size	3/8” NPT
Maximum fuel lift: m (ft)	1.8 (6)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	112.8 (29.8)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	14.2 (3.8)
At 75% of power rating: L/hr (gal/hr)	10.9 (2.9)
At 50% of power rating: L/hr (gal/hr)	7.4 (2)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.12 (0.5)
Water pump capacity: L/min (gpm)	144 (38)
Heat rejection to coolant: kW (BTUM)	29 (1,651)
Heat radiated to ambient: kW (BTUM)	5.8 (327)
Fan power: kW (hp)	1.6 (2.2)

Air requirements

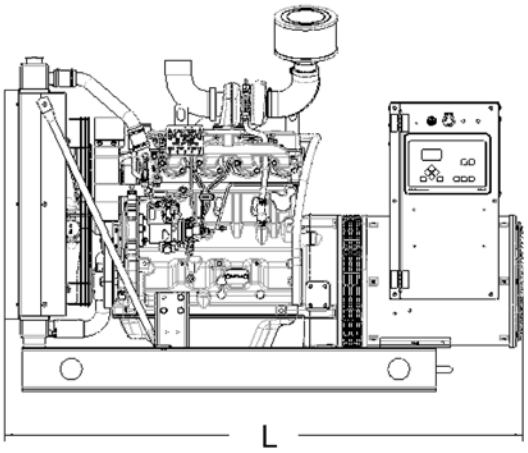
Aspirating: *m^3/min (SCFM)	4.3 (152)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	117 (4,088)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	21 (738)

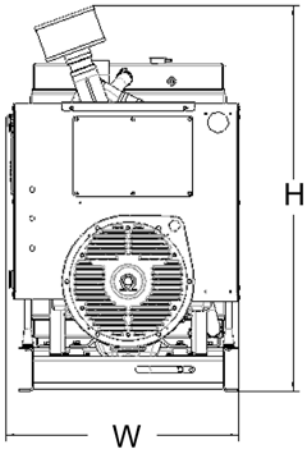
* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

Gas temperature (stack): °C (°F)	506 (943)
Gas volume at stack temperature: m^3/min (CFM)	12 (424)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	7.5 (30)
Minimum allowable back pressure: kPa (in H_20)	N/A

Weights and dimensions





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System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	1,781 x 800 x 1,321 mm (70.1 x 31.5 x 52 in)	943-1,404 kg (2,078-3,095 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Prime full load
Level 0 (OPU): dB(A)	80.2

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
3.3	N/A	0.12

All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards. 5-mode emission data per 40 CFR 89 or 40 CFR 1039 (as applicable) is available upon request.

Rating definitions and conditions

- Prime Power for Stationary Emergency ratings apply to installations served by a reliable utility source. At varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO 8528-1, overload power in accordance with ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 75%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

N/A = Not Available

Subject to change. | 231040 | 2023-09

Diesel Generator Set

mtu 4R0113 DS50

45 kWe/60 Hz/Prime Power for Stationary Emergency/208 - 600V
Reference *mtu* 4R0113 DS50 (50 kWe) for Standby Rating Technical Data

System ratings

Voltage (L-L)	240V †	240V †	208V †	240V †	380V †	480V †	600V
Phase	1	1	3	3	3	3	3
PF	1	1	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60	60
kW	45	45	45	45	45	45	45
kVA	45	45	56	56	56	56	56
Amps	187	187	156	135	85	67	54
skVA@30% voltage dip	127	117	129	129	172	172	92
Generator model	362CSL1604	361CSL1612	361CSL1601	361CSL1601	361CSL1602	361CSL1601	361PSL1632
Temp rise	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C
Connection	12 LEAD DOUBLE DELTA	4 LEAD	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 3 certified
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
- UL 2200 – optional (refer to *System ratings* for availability)
- CSA – optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 4045TF280 diesel engine
  - 4.5 liter displacement
  - Mechanical injection pump
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with optional Permanent Magnet Generator (PMG)
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaner
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Fuel filter with water seperator
- Jacket water pump
- Thermostat
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 12V
- Governor - mechanical droop
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 12V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Self-ventilated and drip-proof
- Superior voltage waveform
- Solid state, volts-per-hertz regulator
- ± 1% voltage regulation no load to full load
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 105 °C maximum prime temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	John Deere
Model	4045TF280
Type	4-cycle
Arrangement	4-inline
Displacement: L (in³)	4.5 (275)
Bore: cm (in)	10.6 (4.19)
Stroke: cm (in)	12.7 (5)
Compression ratio	19:1
Rated rpm	1,800
Engine governor	mechanical droop
Maximum power: kWm (bhp)	57 (76)
Steady state frequency band	± 0.5%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	13 (3.4)
Engine jacket water capacity: L (gal)	8.5 (2.3)
System coolant capacity: L (gal)	18.9 (5)

Electrical

Electric volts DC	12
Cold cranking amps under -17.8 °C (0 °F)	925
Batteries: group size	31
Batteries: quantity	1

Fuel system

Fuel supply connection size	3/8” NPT
Fuel return connection size	3/8” NPT
Maximum fuel lift: m (ft)	1.8 (6)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	56.4 (14.9)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	15.9 (4.2)
At 75% of power rating: L/hr (gal/hr)	12.5 (3.3)
At 50% of power rating: L/hr (gal/hr)	9.1 (2.4)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_2O)	0.12 (0.5)
Water pump capacity: L/min (gpm)	144 (38)
Heat rejection to coolant: kW (BTUM)	33 (1,878)
Heat radiated to ambient: kW (BTUM)	7.3 (415)
Fan power: kW (hp)	1.6 (2.2)

Air requirements

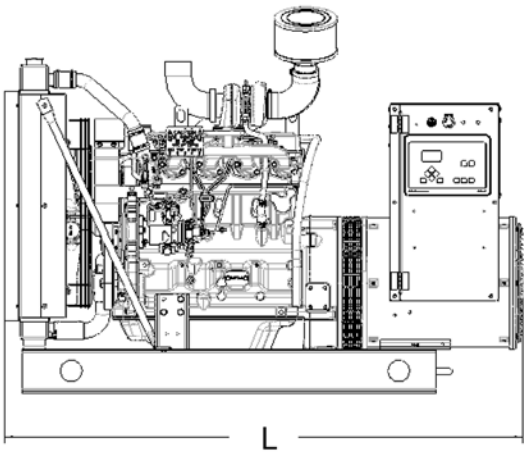
Aspirating: *m³/min (SCFM)	5.1 (180)
Air flow required for radiator cooled unit: *m³/min (SCFM)	117 (4,088)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m³/min (SCFM)	27 (937)

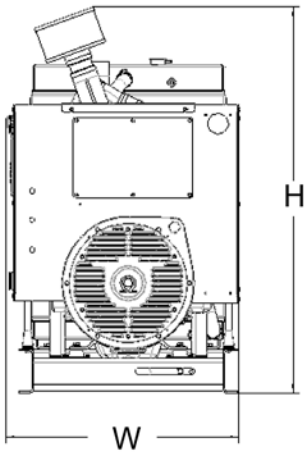
* Air density = 1.184 kg/m³ (0.0739 lbm/ft³)

Exhaust system

Gas temperature (stack): °C (°F)	551 (1,024)
Gas volume at stack temperature: m³/min (CFM)	18.3 (645)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_2O)	7.5 (30)
Minimum allowable back pressure: kPa (in. H_2O)	N/A

Weights and dimensions





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System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	1,781 x 800 x 1,321 mm (70.1 x 31.5 x 52 in)	943-1,404 kg (2,078-3,095 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Prime full load
Level 0 (OPU): dB(A)	80.2

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
3.8	0.69	0.22

All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards. 5-mode emission data per 40 CFR 89 or 40 CFR 1039 (as applicable) is available upon request.

Rating definitions and conditions

- Prime Power for Stationary Emergency ratings apply to installations served by a reliable utility source. At varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO 8528-1, overload power in accordance with ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 75%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
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  - Consult your local ***mtu*** Distributor for temperature derations..

Diesel Generator Set

mtu 4R0113 DS50

WAY TO NET ZERO Renew-able fuel

45 kWe/60 Hz/Prime Power for Stationary Emergency (SCAQMD)/208 - 600V Reference *mtu* 4R0113 DS50 (50 kWe SCAQMD) for Standby Rating Technical Data

System ratings

Voltage (L-L)	240V †	240V †	208V †	240V †	380V †	480V †	600V
Phase	1	1	3	3	3	3	3
PF	1	1	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60	60
kW	45	45	45	45	45	45	45
kVA	45	45	56	56	56	56	56
Amps	187	187	156	135	85	67	54
skVA@30% voltage dip	127	117	129	129	172	172	92
Generator model	362CSL1604	361CSL1612	361CSL1601	361CSL1601	361CSL1602	361CSL1601	361PSL1632
Temp rise	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C
Connection	12 LEAD DOUBLE DELTA	4 LEAD	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 3 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
- UL 2200 – optional (refer to *System ratings* for availability)
- CSA – optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 4045TF290J diesel engine
  - 4.5 liter displacement
  - Mechanical injection pump
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with optional Permanent Magnet Generator (PMG)
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaner
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Fuel filter with water seperator
- Jacket water pump
- Thermostat
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 12V
- Governor - mechanical droop
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 12V
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- Flexible exhaust connection
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- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	John Deere
Model	4045TF290J
Type	4-cycle
Arrangement	4-inline
Displacement: L (in^3)	4.5 (275)
Bore: cm (in)	10.6 (4.19)
Stroke: cm (in)	12.7 (5)
Compression ratio	19:1
Rated rpm	1,800
Engine governor	mechanical droop
Maximum power: kWm (bhp)	50 (67)
Steady state frequency band	± 0.5%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	13 (3.4)
Engine jacket water capacity: L (gal)	8.5 (2.3)
System coolant capacity: L (gal)	18.9 (5)

Electrical

Electric volts DC	12
Cold cranking amps under -17.8 °C (0 °F)	925
Batteries: group size	31
Batteries: quantity	1

Fuel system

Fuel supply connection size	3/8” NPT
Fuel return connection size	3/8” NPT
Maximum fuel lift: m (ft)	1.8 (6)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	112.8 (29.8)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	14.2 (3.8)
At 75% of power rating: L/hr (gal/hr)	10.9 (2.9)
At 50% of power rating: L/hr (gal/hr)	7.4 (2)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.12 (0.5)
Water pump capacity: L/min (gpm)	144 (38)
Heat rejection to coolant: kW (BTUM)	29 (1,651)
Heat radiated to ambient: kW (BTUM)	5.8 (327)
Fan power: kW (hp)	1.6 (2.2)

Air requirements

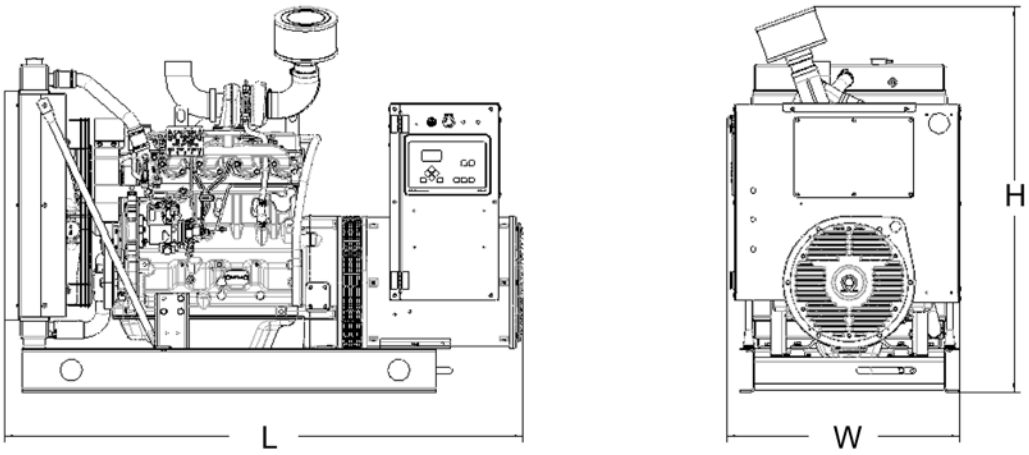
Aspirating: *m^3/min (SCFM)	4.3 (152)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	117 (4,088)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	21 (738)

* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

Gas temperature (stack): °C (°F)	506 (943)
Gas volume at stack temperature: m^3/min (CFM)	12 (424)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	7.5 (30)
Minimum allowable back pressure: kPa (in. H_20)	N/A

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	1,781 x 800 x 1,321 mm (70.1 x 31.5 x 52 in)	943-1,404 kg (2,078-3,095 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Prime full load
Level 0 (OPU): dB(A)	80.2

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
3.3	N/A	0.12

All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards. 5-mode emission data per 40 CFR 89 or 40 CFR 1039 (as applicable) is available upon request.

Rating definitions and conditions

- Prime Power for Stationary Emergency ratings apply to installations served by a reliable utility source. At varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO 8528-1, overload power in accordance with ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 75%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

N/A = Not Available

Diesel Generator Set

mtu 4R0113 DS60

55 kWe/60 Hz/Prime Power for Stationary Emergency/208 - 600V
Reference *mtu* 4R0113 DS60 (60 kWe) for Standby Rating Technical Data

System ratings

Voltage (L-L)	240V †	240V †	208V †	240V †	380V †	480V †	600V
Phase	1	1	3	3	3	3	3
PF	1	1	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60	60
kW	55	55	55	55	55	55	55
kVA	55	55	68	68	68	68	68
Amps	229	229	190	165	104	82	66
skVA@30% voltage dip	127	130	200	200	172	172	172
Generator model	362CSL1604	361CSL1613	361CSL1602	361CSL1602	361CSL1602	361CSL1601	361PSL1633
Temp rise	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C
Connection	12 LEAD DOUBLE DELTA	4 LEAD	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 3 certified
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 4045HF280 diesel engine
  - 4.5 liter displacement
  - Mechanical injection pump
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with optional Permanent Magnet Generator (PMG)
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaner
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Fuel filter with water seperator
- Jacket water pump
- Thermostat
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 12V
- Governor - mechanical droop
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 12V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Self-ventilated and drip-proof
- Superior voltage waveform
- Solid state, volts-per-hertz regulator
- ± 1% voltage regulation no load to full load
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 105 °C maximum prime temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	John Deere
Model	4045HF280
Type	4-cycle
Arrangement	4-inline
Displacement: L (in³)	4.5 (275)
Bore: cm (in)	10.6 (4.19)
Stroke: cm (in)	12.7 (5)
Compression ratio	19:1
Rated rpm	1,800
Engine governor	mechanical droop
Maximum power: kWm (bhp)	67 (90)
Steady state frequency band	± 0.5%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	13 (3.4)
Engine jacket water capacity: L (gal)	8.5 (2.3)
System coolant capacity: L (gal)	16.7 (4.4)

Electrical

Electric volts DC	12
Cold cranking amps under -17.8 °C (0 °F)	925
Batteries: group size	31
Batteries: quantity	1

Fuel system

Fuel supply connection size	3/8” NPT
Fuel return connection size	3/8” NPT
Maximum fuel lift: m (ft)	1.8 (6)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	113 (29.9)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	17.8 (4.7)
At 75% of power rating: L/hr (gal/hr)	13.6 (3.6)
At 50% of power rating: L/hr (gal/hr)	9.5 (2.5)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.12 (0.5)
Water pump capacity: L/min (gpm)	144 (38)
Heat rejection to coolant: kW (BTUM)	33 (1,849)
Heat rejection to air to air: kW (BTUM)	4 (233)
Heat radiated to ambient: kW (BTUM)	9.2 (522)
Fan power: kW (hp)	1.16 (1.55)

Air requirements

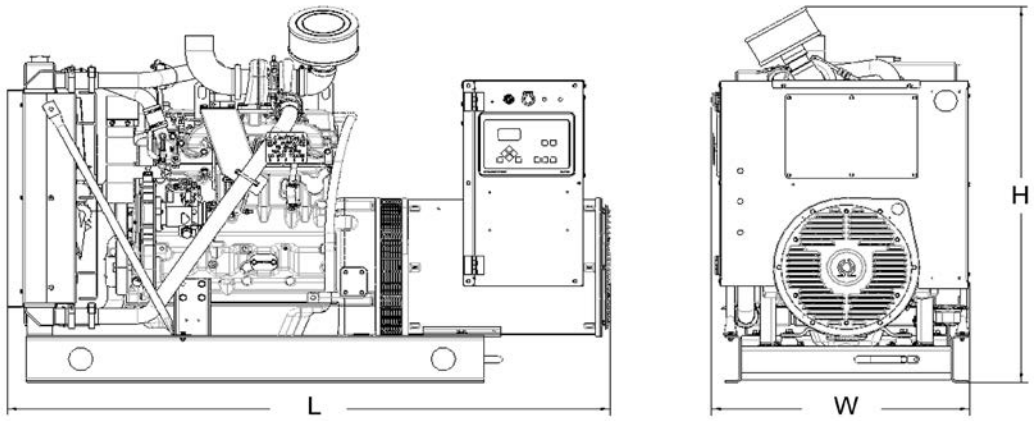
Aspirating: *m³/min (SCFM)	5.3 (187)
Air flow required for radiator cooled unit: *m³/min (SCFM)	91 (3,162)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m³/min (SCFM)	34 (1,176)

* Air density = 1.184 kg/m³ (0.0739 lbm/ft³)

Exhaust system

Gas temperature (stack): °C (°F)	515 (959)
Gas volume at stack temperature: m³/min (CFM)	13.5 (477)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	7.5 (30)
Minimum allowable back pressure: kPa (in H_20)	N/A

Weights and dimensions



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System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	1,873 x 800 x 1,232 mm (73.8 x 31.5 x 48.5 in)	943-1,404 kg (2,078-3,095 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Prime full load
Level 0 (OPU): dB(A)	76.1

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
3.5	0.97	0.32

All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards. 5-mode emission data per 40 CFR 89 or 40 CFR 1039 (as applicable) is available upon request.

Rating definitions and conditions

- Prime Power for Stationary Emergency ratings apply to installations served by a reliable utility source. At varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO 8528-1, overload power in accordance with ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 75%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

N/A = Not Available

Diesel Generator Set

mtu 4R0113 DS80

80 kWe/60 Hz/Prime Power for Stationary Emergency/208 - 600V
Reference *mtu* 4R0113 DS80 (80 kWe) for Standby Rating Technical Data

System ratings

Voltage (L-L)	240V †	240V †	208V †	240V †	480V †	600V
Phase	1	1	3	3	3	3
PF	1	1	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60
kW	80	80	80	80	80	80
kVA	80	80	100	100	100	100
Amps	333	333	278	241	120	96
skVA@30% voltage dip	157	310	258	258	288	235
Generator model	363CSL1607	363CSL1617	362CSL1606	362CSL1606	362CSL1604	362PSL1635
Temp rise	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C
Connection	12 LEAD DOUBLE DELTA	4 LEAD	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 3 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 4045HF285 diesel engine
  - 4.5 liter displacement
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with optional Permanent Magnet Generator (PMG)
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaner
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Fuel filter with water seperator
- Jacket water pump
- Thermostat
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 12V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 12V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Self-ventilated and drip-proof
- Superior voltage waveform
- Solid state, volts-per-hertz regulator
- ± 1% voltage regulation no load to full load
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 105 °C maximum prime temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- SAE J1939 Engine ECU Communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	John Deere
Model	4045HF285
Type	4-cycle
Arrangement	4-inline
Displacement: L (in^3)	4.5 (275)
Bore: cm (in)	10.6 (4.19)
Stroke: cm (in)	12.7 (5)
Compression ratio	19:1
Rated rpm	1,800
Engine governor	JDEC
Maximum power: kWm (bhp)	107 (144)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	12 (3.2)
Engine jacket water capacity: L (gal)	12.5 (3.3)
System coolant capacity: L (gal)	20.1 (5.3)

Electrical

Electric volts DC	12
Cold cranking amps under -17.8 °C (0 °F)	925
Batteries: group size	31
Batteries: quantity	1

Fuel system

Fuel supply connection size	-6 JIC 37° female
Fuel return connection size	-6 JIC 37° female
Maximum fuel lift: m (ft)	2 (6.7)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	74.6 (19.7)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	23.1 (6.1)
At 75% of power rating: L/hr (gal/hr)	18.5 (4.9)
At 50% of power rating: L/hr (gal/hr)	13.2 (3.5)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.12 (0.5)
Water pump capacity: L/min (gpm)	180 (48)
Heat rejection to coolant: kW (BTUM)	56 (3,190)
Heat rejection to air to air: kW (BTUM)	17.6 (1,002)
Heat radiated to ambient: kW (BTUM)	10.5 (596)
Fan power: kW (hp)	6.5 (8.7)

Air requirements

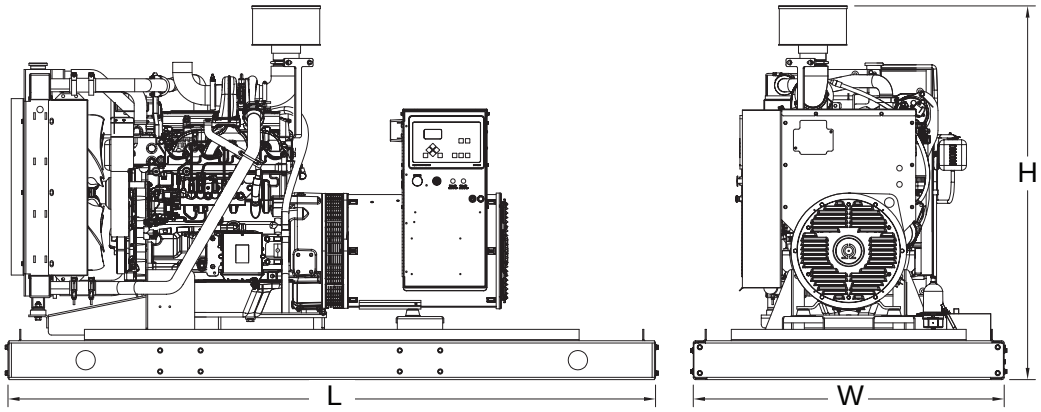
Aspirating: *m^3/min (SCFM)	7.7 (273)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	187 (6,587)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	38 (1,343)

* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

Gas temperature (stack): °C (°F)	560 (1,040)
Gas volume at stack temperature: m^3/min (CFM)	21.2 (750)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	7.5 (30)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	2,540 x 1,219 x 1,467 mm (100 x 48 x 57.8 in)	1,196-1,839 kg (2,637-4,054 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Prime full load
Level 0 (OPU): dB(A)	83.3

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
3.97	0.72	0.08

All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards. 5-mode emission data per 40 CFR 89 or 40 CFR 1039 (as applicable) is available upon request.

Rating definitions and conditions

- Prime Power for Stationary Emergency ratings apply to installations served by a reliable utility source. At varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO 8528-1, overload power in accordance with ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 75%
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 4R0113 DS100

90 kWe/60 Hz/Prime Power for Stationary Emergency/208 - 600V
Reference *mtu* 4R0113 DS100 (100 kWe) for Standby Rating Technical Data

System ratings

Voltage (L-L)	240V †	240V †	208V †	240V †	480V †	600V
Phase	1	1	3	3	3	3
PF	1	1	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60
kW	90	90	90	90	90	90
kVA	90	90	113	113	113	113
Amps	375	375	312	271	135	108
skVA@30% voltage dip	136	193	323	323	430	333
Generator model	431CSL6204	431PSL6224	363CSL1607	363CSL1607	363CSL1607	363PSL1658
Temp rise	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C
Connection	12 LEAD DOUBLE DELTA	4 LEAD	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 3 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 4045HF285 diesel engine
  - 4.5 liter displacement
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with optional Permanent Magnet Generator (PMG)
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaner
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Fuel filter with water seperator
- Jacket water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 12V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 12V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Self-ventilated and drip-proof
- Superior voltage waveform
- Solid state, volts-per-hertz regulator
- ± 1% voltage regulation no load to full load
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 105 °C maximum prime temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- SAE J1939 Engine ECU Communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	John Deere
Model	4045HF285
Type	4-cycle
Arrangement	4-inline
Displacement: L (in^3)	4.5 (275)
Bore: cm (in)	10.6 (4.19)
Stroke: cm (in)	12.7 (8)
Compression ratio	19:1
Rated rpm	1,800
Engine governor	JDEC
Maximum power: kWm (bhp)	107 (144)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	12 (3.2)
Engine jacket water capacity: L (gal)	12.5 (3.3)
System coolant capacity: L (gal)	20.1 (5.3)

Electrical

Electric volts DC	12
Cold cranking amps under -17.8 °C (0 °F)	925
Batteries: group size	31
Batteries: quantity	1

Fuel system

Fuel supply connection size	-6 JIC 37° female
Fuel return connection size	-6 JIC 37° female
Maximum fuel lift: m (ft)	2 (6.7)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	74.6 (19.7)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	28 (7.4)
At 75% of power rating: L/hr (gal/hr)	22.3 (5.9)
At 50% of power rating: L/hr (gal/hr)	15.9 (4.2)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.12 (0.5)
Water pump capacity: L/min (gpm)	180 (48)
Heat rejection to coolant: kW (BTUM)	56 (3,190)
Heat rejection to air to air: kW (BTUM)	17.6 (1,002)
Heat radiated to ambient: kW (BTUM)	13.8 (785)
Fan power: kW (hp)	6.5 (8.7)

Air requirements

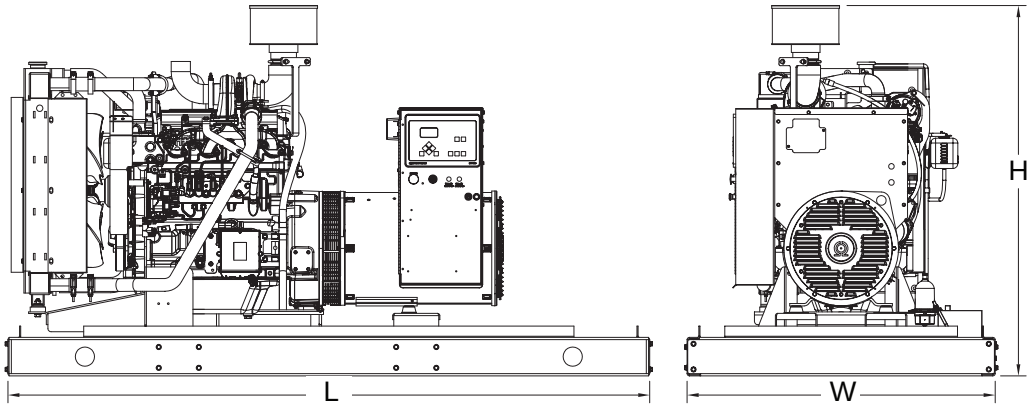
Aspirating: *m^3/min (SCFM)	7.7 (273)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	187 (6,587)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	50 (1,771)

* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

Gas temperature (stack): °C (°F)	560 (1,040)
Gas volume at stack temperature: m^3/min (CFM)	21.2 (750)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	7.5 (30)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	2,540 x 1,219 x 1,473 mm (100 x 48 x 58 in)	1,196-1,839 kg (2,637-4,054 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Prime full load
Level 0 (OPU): dB(A)	83.3

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
3.97	0.72	0.08

All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards. 5-mode emission data per 40 CFR 89 or 40 CFR 1039 (as applicable) is available upon request.

Rating definitions and conditions

- Prime Power for Stationary Emergency ratings apply to installations served by a reliable utility source. At varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO 8528-1, overload power in accordance with ISO 3046-1, BS 5514 and AS 2789. Average load factor: ≤ 75%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 4R0113 DS125

111 kWe/60 Hz/Prime Power for Stationary Emergency/208 - 600V
Reference *mtu* 4R0113 DS125 (125 kWe) for Standby Rating Technical Data

System ratings

Voltage (L-L)	240V †	240V †	208V †	240V †	480V †	600V
Phase	1	1	3	3	3	3
PF	1	1	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60
kW	111	111	111	111	111	111
kVA	111	111	139	139	139	139
Amps	463	463	385	334	167	134
skVA@30% voltage dip	187	192	296	296	430	333
Generator model	431PSL6206	431PSL6224	431CSL6202	431CSL6202	363PSL1607	363PSL1658
Temp rise	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C
Connection	12 LEAD DOUBLE DELTA	4 LEAD	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 3 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 4045HF285 diesel engine
  - 4.58 liter displacement
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with optional Permanent Magnet Generator (PMG)
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Fuel filter with water seperator
- Jacket water pump
- Thermostat
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 12V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 12V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Self-ventilated and drip-proof
- Superior voltage waveform
- Solid state, volts-per-hertz regulator
- ± 1% voltage regulation no load to full load
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 105 °C maximum prime temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- SAE J1939 Engine ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	John Deere
Model	4045HF285
Type	4-cycle
Arrangement	4-inline
Displacement: L (in³)	4.5 (275)
Bore: cm (in)	10.6 (4.19)
Stroke: cm (in)	12.7 (5)
Compression ratio	19:1
Rated rpm	1,800
Engine governor	JDEC
Maximum power: kWm (bhp)	134 (180)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	13 (3.4)
Engine jacket water capacity: L (gal)	8.5 (2.2)
System coolant capacity: L (gal)	24 (6.2)

Electrical

Electric volts DC	12
Cold cranking amps under -17.8 °C (0 °F)	925
Batteries: group size	31
Batteries: quantity	1

Fuel system

Fuel supply connection size	-6 JIC 37° female
Fuel return connection size	-6 JIC 37° female
Maximum fuel lift: m (ft)	2 (6.7)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	90.1 (23.8)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	34.6 (9.2)
At 75% of power rating: L/hr (gal/hr)	26.9 (7.1)
At 50% of power rating: L/hr (gal/hr)	21.2 (5.6)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_2O)	0.12 (0.5)
Water pump capacity: L/min (gpm)	180 (48)
Heat rejection to coolant: kW (BTUM)	64.1 (3,643)
Heat rejection to air to air: kW (BTUM)	22.8 (1,295)
Heat radiated to ambient: kW (BTUM)	17.1 (972)
Fan power: kW (hp)	10.6 (14.2)

Air requirements

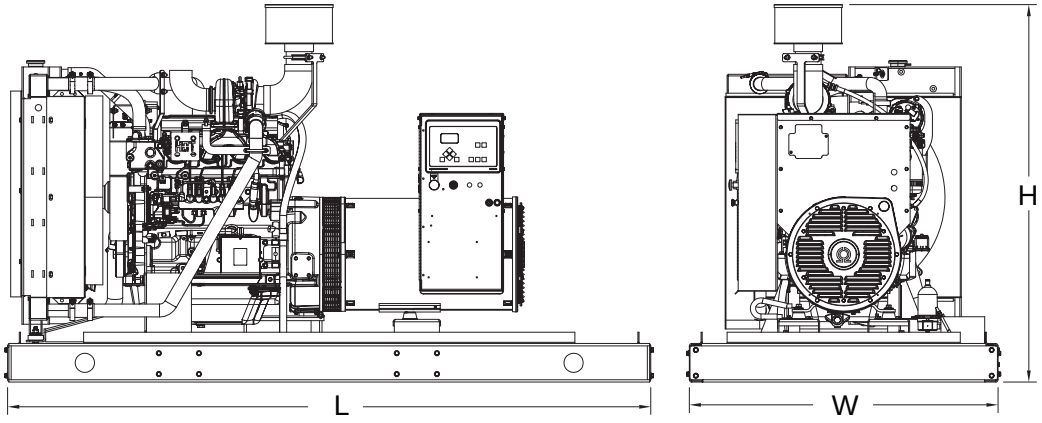
Aspirating: *m³/min (SCFM)	8.8 (311)
Air flow required for radiator cooled unit: *m³/min (SCFM)	433 (15,303)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m³/min (SCFM)	61 (2,159)

* Air density = 1.184 kg/m³ (0.0739 lbm/ft³)

Exhaust system

Gas temperature (stack): °C (°F)	572 (1,062)
Gas volume at stack temperature: m³/min (CFM)	24.6 (869)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_2O)	7.5 (30)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	2,540 x 1,219 x 1,499 mm (100 x 48 x 59 in)	1,196-1,839 kg (2,637-4,054 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Prime full load
Level 0 (OPU): dB(A)	86.8

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
5.02	0.16	0.01

All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards. 5-mode emission data per 40 CFR 89 or 40 CFR 1039 (as applicable) is available upon request.

Rating definitions and conditions

- Prime Power for Stationary Emergency ratings apply to installations served by a reliable utility source. At varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO 8528-1, overload power in accordance with ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 75%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 6R0113 DS150

135 kWe/60 Hz/Prime Power for Stationary Emergency/208 - 600V
Reference *mtu* 6R0113 DS150 (150 kWe) for Standby Rating Technical Data

System ratings

Voltage (L-L)	240V †	240V †	208V †	240V †	480V †	600V
Phase	1	1	3	3	3	3
PF	1	1	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60
kW	135	135	135	135	135	135
kVA	135	135	169	169	169	169
Amps	563	563	468	406	203	162
skVA@30% voltage dip	267	310	339	339	451	375
Generator model	432CSL6210	431PSL6226	431CSL6204	431CSL6204	431CSL6204	431PSL6242
Temp rise	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C
Connection	12 LEAD DOUBLE DELTA	4 LEAD	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 3 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 6068HF285 diesel engine
  - 6.8 liter displacement
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with optional Permanent Magnet Generator (PMG)
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaner
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Fuel filter with water seperator
- Jacket water pump
- Thermostat
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 12V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 12V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Self-ventilated and drip-proof
- Superior voltage waveform
- Solid state, volts-per-hertz regulator
- ± 1% voltage regulation no load to full load
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 105 °C maximum prime temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- SAE J1939 Engine ECU Communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	John Deere
Model	6068HF285
Type	4-cycle
Arrangement	6-inline
Displacement: L (in^3)	6.8 (415)
Bore: cm (in)	10.6 (4.19)
Stroke: cm (in)	12.7 (5)
Compression ratio	19:1
Rated rpm	1,800
Engine governor	JDEC
Maximum power: kWm (bhp)	161 (216)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	20 (5.28)
Engine jacket water capacity: L (gal)	12.3 (3.25)
System coolant capacity: L (gal)	22.7 (6)

Electrical

Electric volts DC	12
Cold cranking amps under -17.8 °C (0 °F)	925
Batteries: group size	4D
Batteries: quantity	1

Fuel system

Fuel supply connection size	-6 JIC 37° female
Fuel return connection size	-6 JIC 37° female
Maximum fuel lift: m (ft)	2 (6.7)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	107.2 (28.3)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	40.1 (10.6)
At 75% of power rating: L/hr (gal/hr)	31.4 (8.3)
At 50% of power rating: L/hr (gal/hr)	22.7 (6)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.12 (0.5)
Water pump capacity: L/min (gpm)	180 (48)
Heat rejection to coolant: kW (BTUM)	84.3 (4,792)
Heat rejection to air to air: kW (BTUM)	30 (1,702)
Heat radiated to ambient: kW (BTUM)	21.8 (1,239)
Fan power: kW (hp)	10.7 (14.3)

Air requirements

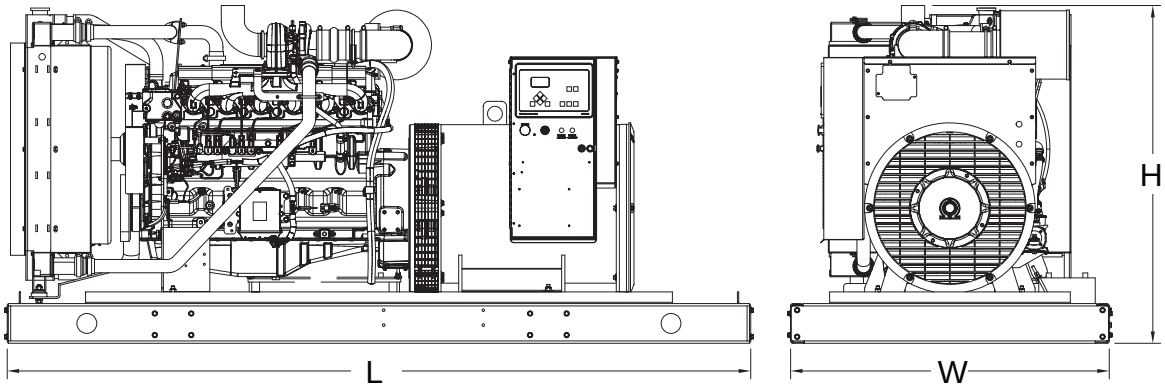
Aspirating: *m^3/min (SCFM)	13.3 (470)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	304 (10,732)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	80 (2,794)

* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

Gas temperature (stack): °C (°F)	491 (916)
Gas volume at stack temperature: m^3/min (CFM)	33 (1,165)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	7.5 (30)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	2,845 x 1,219 x 1,283 mm (112 x 48 x 50.5 in)	1,573-2,262 kg (3,469-4,986 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Prime full load
Level 0 (OPU): dB(A)	86.2

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
3.77	0.4	0.06

All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards. 5-mode emission data per 40 CFR 89 or 40 CFR 1039 (as applicable) is available upon request.

Rating definitions and conditions

- Prime Power for Stationary Emergency ratings apply to installations served by a reliable utility source. At varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO 8528-1, overload power in accordance with ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 75%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 6R0113 DS180

180 kWe/60 Hz/Prime Power for Stationary Emergency/208 - 600V
Reference *mtu* 6R0113 DS180 (180 kWe) for Standby Rating Technical Data

System ratings

Voltage (L-L)	240V †	240V †	208V †	240V †	480V †	600V
Phase	C/F	C/F	3	3	3	3
PF	C/F	C/F	0.8	0.8	0.8	0.8
Hz	C/F	C/F	60	60	60	60
kW	C/F	C/F	180	180	180	180
kVA	C/F	C/F	225	225	225	225
Amps	C/F	C/F	625	541	271	217
skVA@30% voltage dip	C/F	C/F	454	454	577	510
Generator model	C/F	C/F	431CSL6208	431CSL6208	431CSL6206	431PSL6243
Temp rise	C/F	C/F	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C
Connection	C/F	C/F	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 3 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110

A Rolls-Royce solution

Standard features *

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 6068HFG85 diesel engine
  - 6.8 liter displacement
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with optional Permanent Magnet Generator (PMG)
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment *

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Fuel filter with water seperator
- Jacket water pump
- Thermostat
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 12V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 12V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Self-ventilated and drip-proof
- Superior voltage waveform
- Solid state, volts-per-hertz regulator
- ± 1% voltage regulation no load to full load
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 105 °C maximum prime temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- SAE J1939 Engine ECU Communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	John Deere
Model	6068HFG85
Type	4-cycle
Arrangement	6-inline
Displacement: L (in^3)	6.8 (415)
Bore: cm (in)	10.6 (4.2)
Stroke: cm (in)	12.7 (5)
Compression ratio	17:1
Rated rpm	1,800
Engine governor	JDEC
Maximum power: kWm (bhp)	214 (286)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	32.2 (8.5)
Engine jacket water capacity: L (gal)	11.9 (3.3)
System coolant capacity: L (gal)	29.3 (7.75)

Electrical

Electric volts DC	12
Cold cranking amps under -17.8 °C (0 °F)	925
Batteries: group size	4D
Batteries: quantity	1

Fuel system

Fuel supply connection size	-6 JIC 37° female
Fuel return connection size	-6 JIC 37° female
Maximum fuel lift: m (ft)	2 (6.7)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	93 (24.5)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	51.9 (13.5)
At 75% of power rating: L/hr (gal/hr)	40.5 (10.7)
At 50% of power rating: L/hr (gal/hr)	27.6 (7.3)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: Intake and discharge side of radiator: kPa (in. H_20)	0.12 (0.5)
Water pump capacity: L/min (gpm)	265 (70)
Heat rejection to coolant: kW (BTUM)	83.7 (4,766)
Heat rejection to air to air: kW (BTUM)	40 (2,298)
Heat radiated to ambient: kW (BTUM)	25.5 (1,453)
Fan power: kW (hp)	8.6 (11.5)

Air requirements

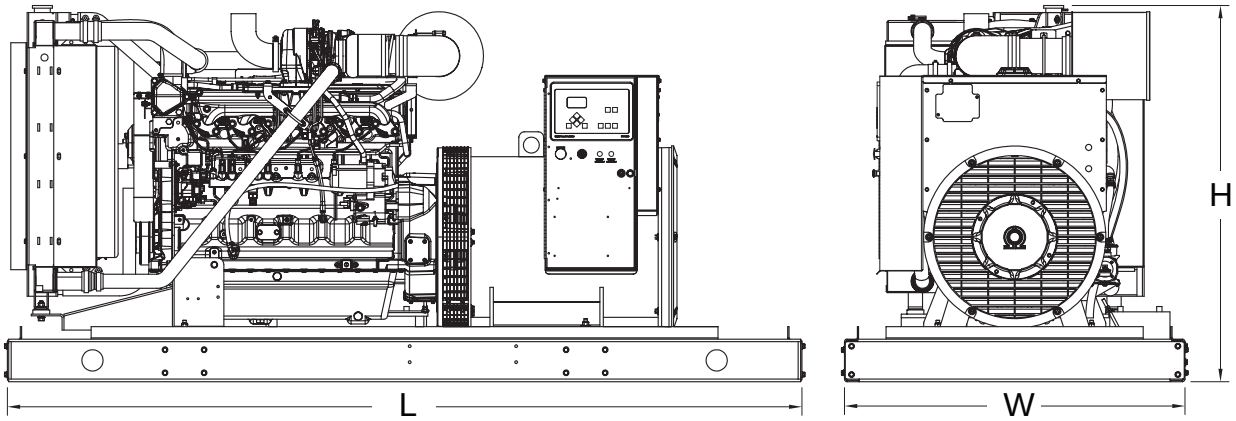
Aspirating: *m^3/min (SCFM)	14.7 (520)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	412 (14,537)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	93 (3,277)

* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

Gas temperature (stack): °C (°F)	528 (982)
Gas volume at stack temperature: m^3/min (CFM)	38.8 (1,371)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	10 (40)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	2,845 x 1,219 x 1,346 mm (112 x 48 x 53 in)	1,573-2,262 kg (3,469-4,986 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Prime full load
Level 0 (OPU): dB(A)	87.2

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
4.63	0.49	0.09

All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards. 5-mode emission data per 40 CFR 89 or 40 CFR 1039 (as applicable) is available upon request.

Rating definitions and conditions

- Prime Power for Stationary Emergency ratings apply to installations served by a reliable utility source. At varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO 8528-1, overload power in accordance with ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 75%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

C/F = Consult Factory/***mtu*** Distributor

Diesel Generator Set

mtu 6R0150 DS230

210 kWe/60 Hz/Prime Power for Stationary Emergency/208 - 600V
Reference *mtu* 6R0150 DS230 (230 kWe) for Standby Rating Technical Data

System ratings

Voltage (L-L)	240V †	208V †	240V †	380V †	480V †	600V †
Phase	1	3	3	3	3	3
PF	1	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60	60
kW	210	210	210	210	210	210
kVA	210	263	263	263	263	263
Amps	875	729	631	399	316	253
skVA@30% voltage dip	430	608	608	430	604	510
Generator model	433PSL6216	432CSL6210	432CSL6210	432CSL6210	431CSL6208	431PSL6243
Temp rise	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C
Connection	DOUBLE DELTA	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	12 LEAD YWE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 3 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification - optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional
- CSA - optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110
  - Permissible average power output during 24 hours of operation is approved up to 75%.

Standard features *

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 6090HF484 diesel engine
  - 9.0 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with optional Permanent Magnet Generator (PMG)
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment *

Engine

- Air cleaner
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Open crankcase ventilation
- Jacket water pump
- Thermostat
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery rack and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 105 °C maximum prime temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 1% voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	John Deere
Model	6090HF484
Type	4-cycle
Arrangement	6-inline
Displacement: L (in^3)	9.0 (549)
Bore: cm (in)	11.84 (4.7)
Stroke: cm (in)	13.6 (5.4)
Compression ratio	16:1
Rated rpm	1,800
Engine governor	JDEC
Maximum power: kWm (bhp)	284 (381)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	31 (8.19)
Engine jacket water capacity: L (gal)	16 (4.23)
System coolant capacity: L (gal)	53.5 (14.13)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	950
Batteries: group size	31
Batteries: quantity	2

Fuel system

Fuel supply connection size	-10 JIC 37° female
Fuel return connection size	-6 JIC 37° female
Maximum fuel Lift: m (ft)	1.3 (4.4)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	239.92 (63.38)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	69.7 (18.4)
At 75% of power rating: L/hr (gal/hr)	60.2 (15.9)
At 50% of power rating: L/hr (gal/hr)	42.7 (11.3)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.124 (0.5)
Water pump capacity: L/min (gpm)	280 (74)
Heat rejection to coolant: kW (BTUM)	94 (5,350)
Heat rejection to after cooler: kW (BTUM)	87 (4,924)
Heat radiated to ambient: kW (BTUM)	30.2 (1,717)
Fan power: kW (hp)	13.9 (18.6)

Air requirements

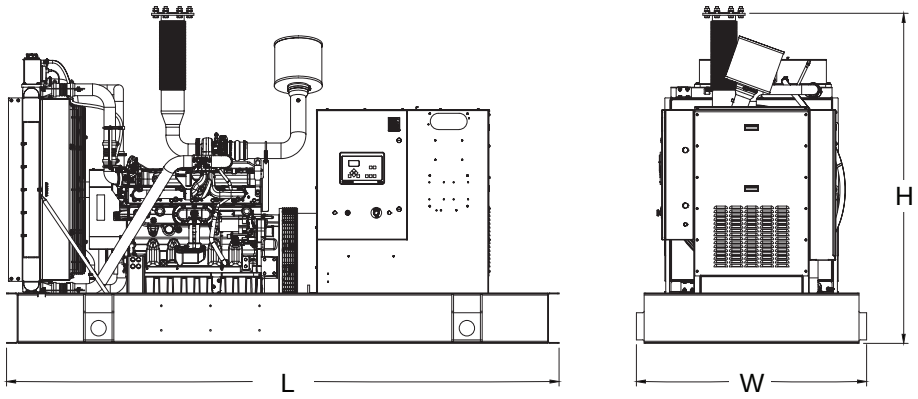
Aspirating: *m^3/min (SCFM)	25.5 (901)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	507.6 (17,926)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	109.7 (3,873)

* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

Gas temperature (stack): °C (°F)	638 (1,180)
Gas volume at stack temperature: m^3/min (CFM)	58.5 (2,066)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	7.5 (30)

Weights and dimensions



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System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	3,658 x 1,524 x 2,159 mm (144 x 60 x 85 in)	3,080 (6,790 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Prime full load
Level 0 (OPU): dB(A)	83.7

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
4.14	0.32	0.03

All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

- Prime Power for Stationary Emergency ratings apply to installations served by a reliable utility source. At varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 75%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 6R0150 DS250

230 kWe/60 Hz/Prime Power for Stationary Emergency/208 - 600V
Reference *mtu* 6R0150 DS250 (250 kWe) for Standby Rating Technical Data

System ratings

Voltage (L-L)	208V †	240V †	380V †	480V †	600V †
Phase	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60
kW	230	230	230	230	230
kVA	288	288	288	288	288
Amps	798	692	437	346	277
skVA@30% voltage dip	608	608	430	809	720
Generator model	432CSL6210	432CSL6210	432CSL6210	432CSL6210	432PSL6246
Temp rise	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C
Connection	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	12 LEAD WYE	4 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 3 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification - optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110
  - Permissible average power output during 24 hours of operation is approved up to 75%.

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 6090HF484 diesel engine
  - 9.0 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with optional Permanent Magnet Generator (PMG)
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaner
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Open crankcase ventilation
- Jacket water pump
- Thermostat
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery rack and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 105 °C maximum prime temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 1% voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	John Deere
Model	6090HF484
Type	4-cycle
Arrangement	6-inline
Displacement: L (in^3)	9.0 (549)
Bore: cm (in)	11.84 (4.7)
Stroke: cm (in)	13.6 (5.4)
Compression ratio	16:1
Rated rpm	1,800
Engine governor	JDEC
Maximum power: kWm (bhp)	284 (381)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	31 (8.19)
Engine jacket water capacity: L (gal)	16 (4.23)
System coolant capacity: L (gal)	53.5 (14.13)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	950
Batteries: group size	31
Batteries: quantity	2

Fuel system

Fuel supply connection size	-10 JIC 37° female
Fuel return Connection size	-6 JIC 37° female
Maximum fuel Lift: m (ft)	1.3 (4.4)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	239.92 (63.38)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	69.7 (18.4)
At 75% of power rating: L/hr (gal/hr)	60.2 (15.9)
At 50% of power rating: L/hr (gal/hr)	42.7 (11.3)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.124 (0.5)
Water pump capacity: L/min (gpm)	280 (74)
Heat rejection to coolant: kW (BTUM)	94 (5,350)
Heat rejection to air to air: kW (BTUM)	87 (4,924)
Heat radiated to ambient: kW (BTUM)	30.2 (1,717)
Fan power: kW (hp)	13.9 (18.6)

Air requirements

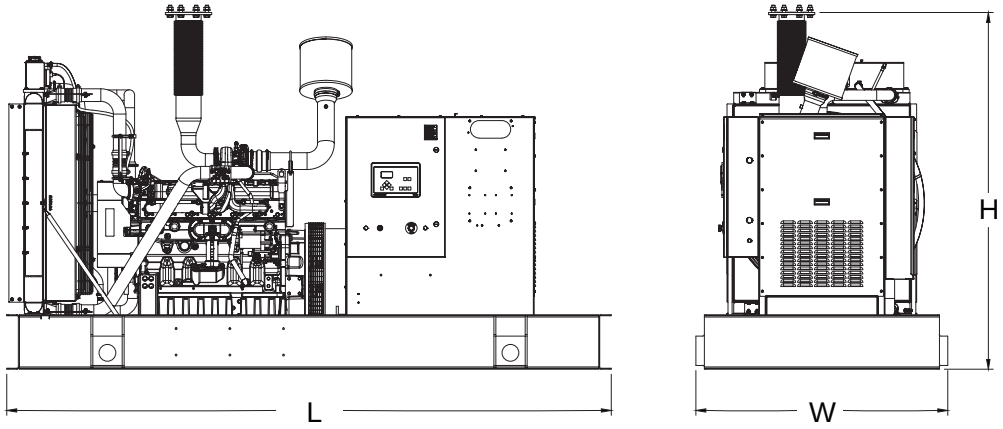
Aspirating: *m^3/min (SCFM)	25.5 (901)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	507.6 (17,926)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	109.7 (3,873)

* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

Gas temperature (stack): °C (°F)	638 (1,180)
Gas volume at stack temperature: m^3/min (CFM)	58.5 (2,066)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	7.5 (30)

Weights and dimensions



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System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	3,658 x 1,524 x 2,159 mm (144 x 60 x 85 in)	3,080 (6,790 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Prime full load
Level 0 (OPU): dB(A)	84.5

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
4.14	0.32	0.03

All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

- Prime Power for Stationary Emergency ratings apply to installations served by a reliable utility source. At varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 75%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 6R0150 DS275

250 kWe/60 Hz/Prime Power for Stationary Emergency/208 - 600V
Reference *mtu* 6R0150 DS275 (275 kWe) for Standby Rating Technical Data

System ratings

Voltage (L-L)	208V	240V	380V	480V	600V
Phase	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60
kW	250	250	250	250	250
kVA	313	313	313	313	313
Amps	867	752	475	376	301
skVA@30% voltage dip	608	608	640	809	720
Generator model	432CSL6210	432CSL6210	433CSL6216	432CSL6210	432PSL6246
Temp rise	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C
Connection	12 LEAD WYE	12 LEAD DELTA	12 LEAD WYE	12 LEAD WYE	4 LEAD WYE

Certifications and standards

- Emissions
  - EPA Tier 3 certified
  - South Coast Air Quality Management District (SCAQMD)
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification - optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional
- CSA - optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110
  - Permissible average power output during 24 hours of operation is approved up to 75%

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 6090HF484 diesel engine
  - 9.0 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - 300% short circuit capability with optional Permanent Magnet Generator (PMG)
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaner
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filter
- Open crankcase ventilation
- Jacket water pump
- Thermostat
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery rack and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 105 °C maximum prime temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 1% voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	John Deere
Model	6090HF484
Type	4-cycle
Arrangement	6-inline
Displacement: L (in^3)	9.0 (549)
Bore: cm (in)	11.84 (4.7)
Stroke: cm (in)	13.6 (5.4)
Compression ratio	16:1
Rated rpm	1,800
Engine governor	JDEC
Maximum power: kWm (bhp)	284 (381)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	31 (8.19)
Engine jacket water capacity: L (gal)	16 (4.23)
System coolant capacity: L (gal)	53.5 (14.13)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	950
Batteries: group size	31
Batteries: quantity	2

Fuel system

Fuel supply connection size	-10 JIC 37° female
Fuel return Connection size	-6 JIC 37° female
Maximum fuel Lift: m (ft)	1.3 (4.4)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	239.92 (63.38)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	69.7 (18.4)
At 75% of power rating: L/hr (gal/hr)	60.2 (15.9)
At 50% of power rating: L/hr (gal/hr)	42.7 (11.3)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.124 (0.5)
Water pump capacity: L/min (gpm)	280 (74)
Heat rejection to coolant: kW (BTUM)	94 (5,350)
Heat rejection to air to air: kW (BTUM)	87 (4,924)
Heat radiated to ambient: kW (BTUM)	30.2 (1,717)
Fan power: kW (hp)	13.9 (18.6)

Air requirements

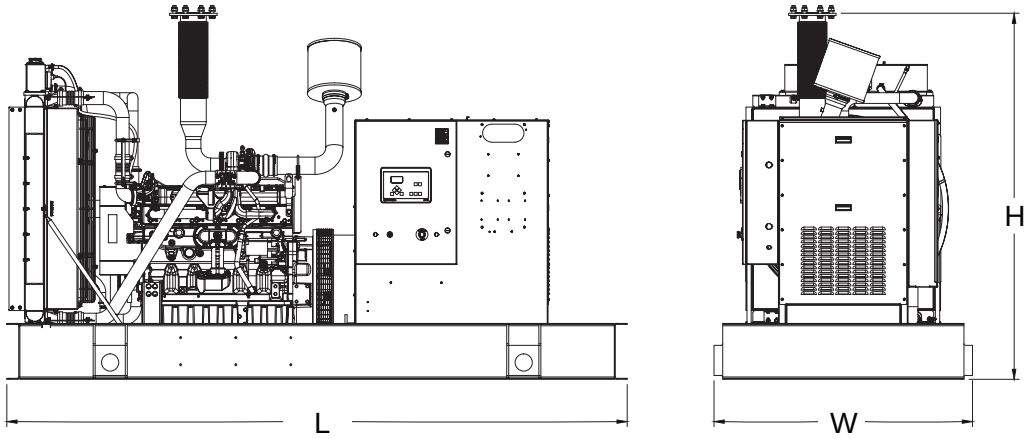
Aspirating: *m^3/min (SCFM)	25.5 (901)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	507.6 (17,926)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	109.7 (3,873)

* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

Gas temperature (stack): °C (°F)	638 (1,180)
Gas volume at stack temperature: m^3/min (CFM)	58.5 (2,066)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	7.5 (30)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	3,658 x 1,524 x 2,159 mm (144 x 60 x 85 in)	3,080 (6,790 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Prime full load
Level 0 (OPU): dB(A)	84.3

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
4.14	0.32	0.03

All units are in g/hp-hr and shown at 100% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

- Prime Power for Stationary Emergency ratings apply to installations served by a reliable utility source. At varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 75%.
- Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
- Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 12V1600 DS750

690 kWe/60 Hz/Prime Power for Stationary Emergency/208 - 600V
Reference *mtu* 12V1600 DS750 (750 kWe) for Standby Rating Technical Data

System ratings

Voltage (L-L)	208V †	240V †	380V †	480V †	600V
Phase	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60
kW	690	690	690	690	690
kVA	862	862	862	862	862
Amps	2,394	2,074	1,310	1,037	829
skVA@30% voltage dip	2,450	2,450	2,310	2,575	2,525
Generator model	LSA 49.3 L9	LSA 49.3 L9	LSA 49.3 L9	LSA 49.3 M8	LSA 49.3 M8
Temp rise	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C
Connection	12 LEAD WYE	12 LEAD DELTA	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 2 certified
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality, and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110
  - Permissible average power output during 24 hours of operation is approved up to 85%.

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 12V1600 diesel engine
  - 22.44 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - Permanent Magnet Generator (PMG) supply to regulator
  - 300% short circuit capability
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filters
- Closed crankcase ventilation
- Jacket water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 105 °C maximum prime temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 0.25% voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	***mtu***
Model	12V1600G21S
Type	4-cycle
Arrangement	12-V
Displacement: L (cu in)	22.44 (1,369)
Bore: cm (in)	12.6 (4.96)
Stroke: cm (in)	15 (5.91)
Compression ratio	15.89:1
Rated rpm	1,800
Engine governor	electronic isochronous (ADEC)
Maximum power: kWm (bhp)	836 (1,121)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	73 (19.3)
Engine jacket water capacity: L (gal)	65 (17.2)
System coolant capacity: L (gal)	109 (28.8)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	1,050
Batteries: group size	4D
Batteries: quantity	2

Fuel system

Fuel supply connection size	-10 JIC 37° female
Fuel return connection size	-6 JIC 37° female
Maximum fuel lift: m (ft)	3 (10)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	328 (86.7)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	174.8 (46.2)
At 75% of power rating: L/hr (gal/hr)	131.9 (34.8)
At 50% of power rating: L/hr (gal/hr)	98.3 (26)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_20)	0.2 (0.8)
Water pump capacity: L/min (gpm)	517 (136.5)
Heat rejection to coolant: kW (BTUM)	285 (16,208)
Heat rejection to after cooler: kW (BTUM)	215 (12,227)
Heat radiated to ambient: kW (BTUM)	71.2 (4,049)
Fan power: kW (hp)	29 (38.9)

Air requirements

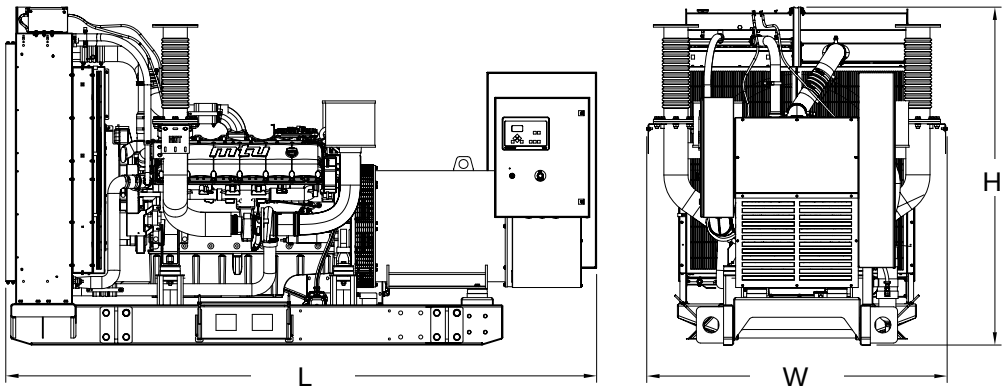
Aspirating: *m^3/min (SCFM)	68.4 (2,416)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	1,007 (35,579)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	260 (9,244)

* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

Gas temperature (stack): °C (°F)	481 (898)
Gas volume at stack temperature: m^3/min (CFM)	161.4 (5,700)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_20)	8.5 (34.1)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	4,521 x 2,135 x 2,179 mm (178 x 84.1 x 85.8 in)	4,774-5,829 kg (10,524-12,850 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Prime full load
Level 0 (OPU): dB(A)	94.9

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
8.07	0.8	0.04

— All units are in g/hp-hr and shown at 110% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

— Prime Power for Stationary Emergency ratings apply to installations served by a reliable utility source. At varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.
— Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
— Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 12V1600 DS800

730 kWe/60 Hz/Prime Power for Stationary Emergency/208 - 600V
Reference *mtu* 12V1600 DS800 (800 kWe) for Standby Rating Technical Data

System ratings

Voltage (L-L)	208V †	240V †	380V †	480V †	600V
Phase	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60
kW	730	730	730	730	730
kVA	912	912	912	912	912
Amps	2,532	2,195	1,386	1,097	878
skVA@30% voltage dip	2,450	2,450	2,310	2,575	2,525
Generator model	LSA 49.3 L10	LSA 49.3 L10	LSA 49.3 L9	LSA 49.3 M8	LSA 49.3 L10
Temp rise	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C
Connection	12 LEAD WYE	12 LEAD DELTA	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 2 certified
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality, and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110
  - Permissible average power output during 24 hours of operation is approved up to 85%.

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 12V1600 diesel engine
  - 22.44 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - Permanent Magnet Generator (PMG) supply to regulator
  - 300% short circuit capability
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filters
- Closed crankcase ventilation
- Jacket water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 105 °C maximum prime temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 0.25% voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	***mtu***
Model	12V1600G31S
Type	4-cycle
Arrangement	12-V
Displacement: L (cu in)	22.44 (1,369)
Bore: cm (in)	12.6 (4.96)
Stroke: cm (in)	15 (5.91)
Compression ratio	15.89:1
Rated rpm	1,800
Engine governor	electronic isochronous (ADEC)
Maximum power: kWm (bhp)	890 (1,193)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	73 (19.3)
Engine jacket water capacity: L (gal)	65 (17.2)
System coolant capacity: L (gal)	109 (28.8)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	1,050
Batteries: group size	4D
Batteries: quantity	2

Fuel system

Fuel supply connection size	-10 JIC 37° female
Fuel return connection size	-6 JIC 37° female
Maximum fuel lift: m (ft)	3 (10)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	344.1 (90.9)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	186.7 (49.3)
At 75% of power rating: L/hr (gal/hr)	139.7 (36.9)
At 50% of power rating: L/hr (gal/hr)	104.1 (27.5)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	50 (122)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_2O)	0.2 (0.8)
Water pump capacity: L/min (gpm)	517 (136.5)
Heat rejection to coolant: kW (BTUM)	305 (17,345)
Heat rejection to after cooler: kW (BTUM)	235 (13,364)
Heat radiated to ambient: kW (BTUM)	75.4 (4,290)
Fan power: kW (hp)	29 (38.9)

Air requirements

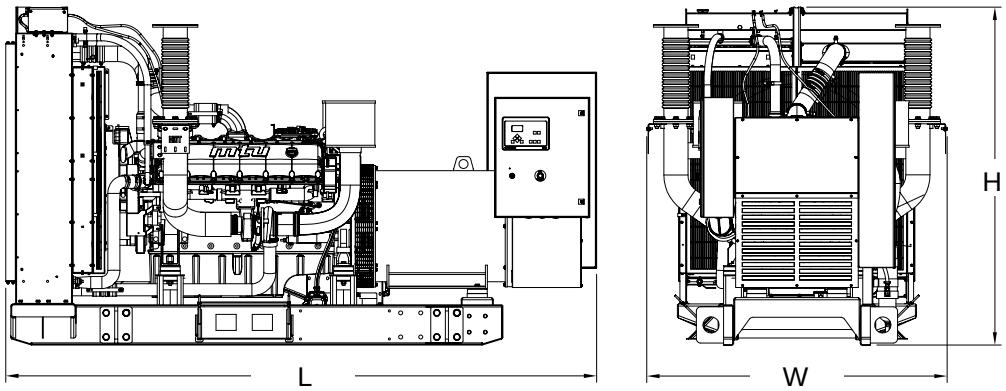
Aspirating: *m^3/min (SCFM)	70.8 (2,500)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	1,007 (35,579)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	276 (9,796)

* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

Gas temperature (stack): °C (°F)	497 (927)
Gas volume at stack temperature: m^3/min (CFM)	171 (6,039)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_2O)	8.5 (34.1)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	4,521 x 2,135 x 2,179 mm (178 x 84.1 x 85.8 in)	4,774-5,829 kg (10,524-12,850 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Prime full load
Level 0 (OPU): dB(A)	95.3

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
8.01	0.95	0.04

— All units are in g/hp-hr and shown at 110% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

— Prime Power for Stationary Emergency ratings apply to installations served by a reliable utility source. At varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.
— Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
— Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Diesel Generator Set

mtu 12V1600 DS900

820 kWe/60 Hz/Prime Power for Stationary Emergency/208 - 600V
Reference *mtu* 12V1600 DS900 (900 kWe) for Standby Rating Technical Data

System ratings

Voltage (L-L)	208V †	240V †	380V †	480V †	600V
Phase	3	3	3	3	3
PF	0.8	0.8	0.8	0.8	0.8
Hz	60	60	60	60	60
kW	820	820	820	820	820
kVA	1,025	1,025	1,025	1,025	1,025
Amps	2,845	2,465	1,557	1,232	986
skVA@30% voltage dip	2,450	2,450	2,310	2,575	2,525
Generator model	LSA 50.2 M6	LSA 50.2 M6	LSA 50.2 S4	LSA 49.3 L9	LSA 50.2 M6
Temp rise	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C	105 °C/40 °C
Connection	12 LEAD WYE	12 LEAD DELTA	6 LEAD WYE	6 LEAD WYE	6 LEAD WYE

† UL 2200 offered

Certifications and standards

- Emissions
  - EPA Tier 2 certified
- Generator set is designed and manufactured in facilities certified to standards ISO 9001:2008 and ISO 14001:2004
- Seismic certification – optional
  - 2021 IBC certification
  - HCAI pre-approval
- UL 2200 - optional (refer to *System ratings* for availability)
- CSA - optional
  - CSA C22.2 No. 100
  - CSA C22.2 No. 14
- Performance Assurance Certification (PAC)
  - Generator set tested to ISO 8528-5 for transient response
  - Verified product design, quality, and performance integrity
  - All engine systems are prototype and factory tested
- Power rating
  - Accepts rated load in one step per NFPA 110
  - Permissible average power output during 24 hours of operation is approved up to 85%.

A Rolls-Royce solution

Standard features*

- Single source supplier
- Global product support
- Two (2) Year/3,000 Hour Basic Limited Warranty
- 12V1600 diesel engine
  - 22.44 liter displacement
  - Common rail fuel injection
  - 4-cycle
- HVO and GtL fuels meeting fuel specification EN15940
- Engine-generator resilient mounted
- Complete range of accessories
- Cooling system
  - Integral set-mounted
  - Engine-driven fan
- Generator
  - Brushless, rotating field generator
  - 2/3 pitch windings
  - Permanent Magnet Generator (PMG) supply to regulator
  - 300% short circuit capability
- Digital control panel(s)
  - UL recognized, CSA certified, NFPA 110
  - Complete system metering
  - LCD display

Standard equipment*

Engine

- Air cleaners
- Oil pump
- Oil drain extension and shut-off valve
- Full flow oil filters
- Closed crankcase ventilation
- Jacket water pump
- Thermostats
- Blower fan and fan drive
- Radiator - unit mounted
- Electric starting motor - 24V
- Governor - electronic isochronous
- Base - formed steel
- SAE flywheel and bell housing
- Charging alternator - 24V
- Battery box and cables
- Flexible fuel connectors
- Flexible exhaust connection
- EPA certified engine

Generator

- NEMA MG1, IEEE, and ANSI standards compliance for temperature rise and motor starting
- Sustained short circuit current of up to 300% of the rated current for up to 10 seconds
- Self-ventilated and drip-proof
- Superior voltage waveform
- Digital, solid state, volts-per-hertz regulator
- Brushless alternator with brushless pilot exciter
- 4 pole, rotating field
- 105 °C maximum prime temperature rise
- 1-bearing, sealed
- Flexible coupling
- Full amortisseur windings
- 125% rotor balancing
- 3-phase voltage sensing
- ± 0.25% voltage regulation no load to full load
- 100% of rated load - one step
- 5% maximum total harmonic distortion

Digital control panel(s)

- Digital metering
- Engine parameters
- Generator protection functions
- Engine protection
- CANBus ECU communications
- Windows®-based software
- Multilingual capability
- Communications to remote annunciator
- Programmable input and output contacts
- UL recognized, CSA certified, CE approved
- Event recording
- IP 54 front panel rating with integrated gasket
- NFPA 110 compatible

* Represents standard product only. Consult the factory/***mtu*** Distributor for additional configurations.

Application data

Engine

Manufacturer	***mtu***
Model	12V1600G41S
Type	4-cycle
Arrangement	12-V
Displacement: L (cu in)	22.44 (1,369)
Bore: cm (in)	12.6 (4.96)
Stroke: cm (in)	15 (5.91)
Compression ratio	15.89:1
Rated rpm	1,800
Engine governor	electronic isochronous (ADEC)
Maximum power: kWm (bhp)	996 (1,335)
Steady state frequency band	± 0.25%
Air cleaner	dry

Liquid capacity

Total oil system: L (gal)	73 (19.3)
Engine jacket water capacity: L (gal)	65 (17.2)
System coolant capacity: L (gal)	109 (28.8)

Electrical

Electric volts DC	24
Cold cranking amps under -17.8 °C (0 °F)	1,050
Batteries: group size	4D
Batteries: quantity	2

Fuel system

Fuel supply connection size	-10 JIC 37° female
Fuel return connection size	-6 JIC 37° female
Maximum fuel lift: m (ft)	3 (10)
Recommended fuel	diesel #2/HVO
Total fuel flow: L/hr (gal/hr)	375.6 (99.2)

Fuel consumption

At 100% of power rating: L/hr (gal/hr)	207.5 (54.8)
At 75% of power rating: L/hr (gal/hr)	155.5 (41.1)
At 50% of power rating: L/hr (gal/hr)	110.5 (29.2)

Cooling - radiator system

Ambient capacity of radiator: °C (°F)	40 (104)
Maximum restriction of cooling air: intake and discharge side of radiator: kPa (in. H_2O)	0.2 (0.8)
Water pump capacity: L/min (gpm)	517 (136.5)
Heat rejection to coolant: kW (BTUM)	350 (19,905)
Heat rejection to after cooler: kW (BTUM)	250 (14,218)
Heat radiated to ambient: kW (BTUM)	81.2 (4,615)
Fan power: kW (hp)	29 (38.9)

Air requirements

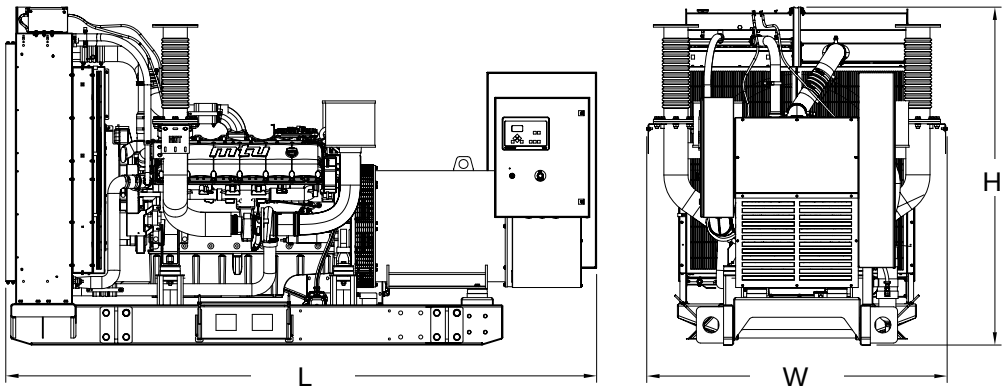
Aspirating: *m^3/min (SCFM)	73.2 (2,585)
Air flow required for radiator cooled unit: *m^3/min (SCFM)	1,007 (35,579)
Remote cooled applications; air flow required for dissipation of radiated generator set heat for a maximum of 25 °F rise: *m^3/min (SCFM)	297 (10,537)

* Air density = 1.184 kg/m^3 (0.0739 lbm/ft^3)

Exhaust system

Gas temperature (stack): °C (°F)	551 (1,024)
Gas volume at stack temperature: m^3/min (CFM)	195.6 (6,908)
Maximum allowable back pressure at outlet of engine, before piping: kPa (in. H_2O)	5 (20.1)

Weights and dimensions



Drawing above for illustration purposes only, based on standard open power 480 volt generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

System	Dimensions (L x W x H)	Weight
Open Power Unit (OPU)	4,521 x 2,135 x 2,179 mm (178 x 84.1 x 85.8 in)	4,774-5,829 kg (10,524-12,850 lb)

Weights and dimensions are based on open power units and are estimates only. Consult the factory for accurate weights and dimensions for your specific generator set.

Sound data

Unit type	Prime full load
Level 0 (OPU): dB(A)	94.7

Sound data is provided at 7 m (23 ft). Generator set tested in accordance with ISO 8528-10 and with infinite exhaust.

Emissions data

NO_x + NMHC	CO	PM
8.01	1.31	0.43

— All units are in g/hp-hr and shown at 110% load (not comparable to EPA weighted cycle values). Emission levels of the engine may vary with ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data was obtained in compliance with US EPA regulations. The weighted cycle value (not shown) from each engine is guaranteed to be within the US EPA standards.

Rating definitions and conditions

— Prime Power for Stationary Emergency ratings apply to installations served by a reliable utility source. At varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO 8528-1, ISO 3046-1, BS 5514, and AS 2789. Average load factor: ≤ 85%.
— Nominal ratings at standard conditions: 25 °C and 300 meters (77 °F and 1,000 feet).
— Deration factor:
  - Consult your local ***mtu*** Distributor for altitude derations.
  - Consult your local ***mtu*** Distributor for temperature derations.

Circuit Breaker Enclosure Data Sheet - Diesel

27-30 KW / 30-34 KVA

DESCRIPTION

This circuit breaker enclosure data sheet is used in conjunction with dimensional drawings to assist with submittal documentation, specification requirements, and installation. This document summarizes the enclosure dimensions and mounting positions for the ***mtu*** 3R0096 DS30 and ***mtu*** 3R0096 DS34 circuit breakers. The dimensional drawings will govern and should be referenced for installation.

280 FRAME ENCLOSURE

- Supplied with all 280 frame alternator applications.
- Right side breakers shown. Left side breakers optional.
- Reference Figure 2 for breaker mounting positions.

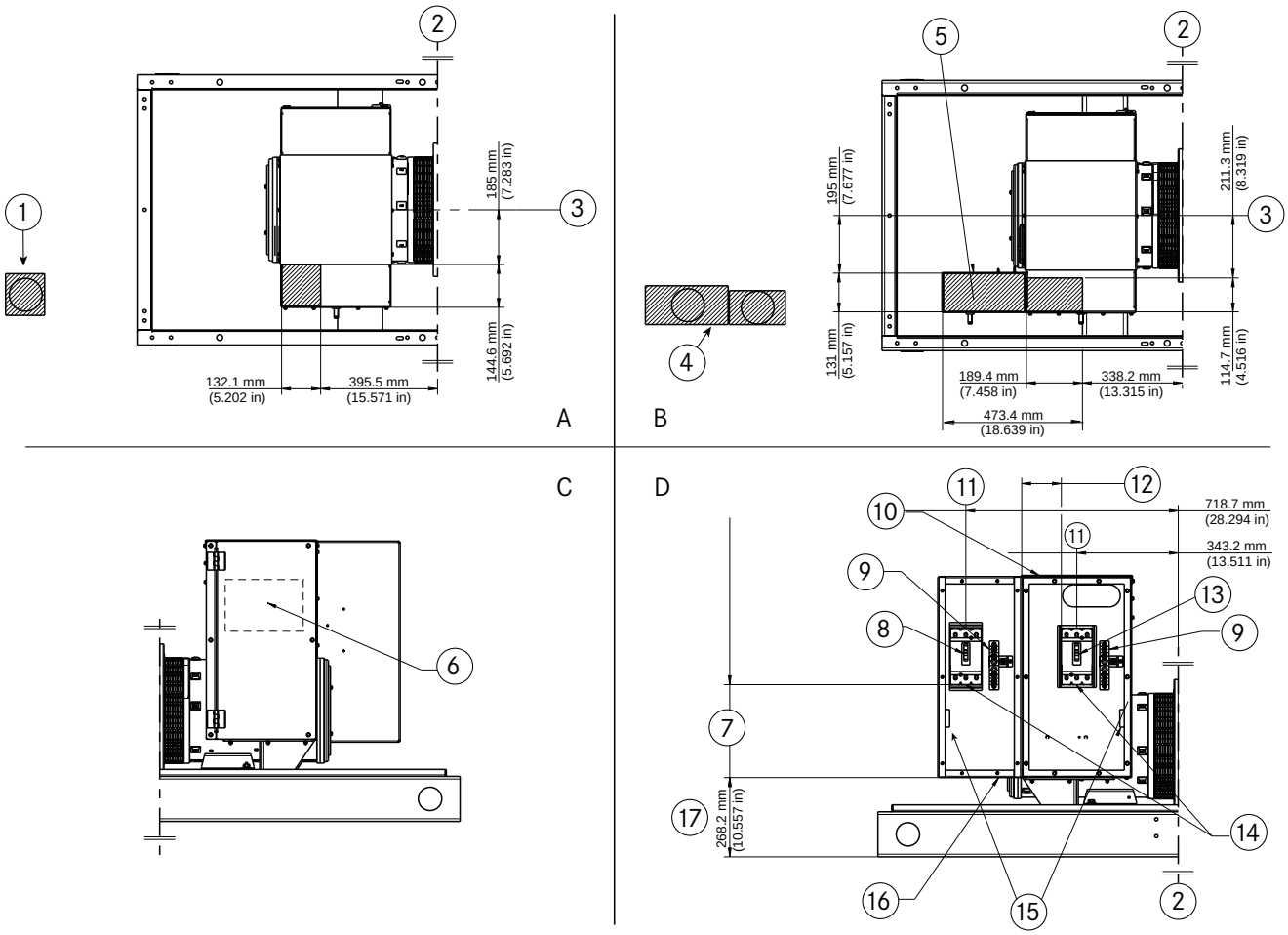


Figure 1: 280 Frame Enclosure

A. Top view, top entry conduit area
B. Top view, bottom entry conduit area
C. Left view, breaker enclosure detail
D. Right view, breaker enclosure detail (enclosure cover not shown)

1. Possible top entry conduit locations
2. Rear face of flywheel housing
3. Generator centerline
4. Possible bottom entry conduit locations
5. Optional secondary breaker enclosure
6. Optional control panel location
7. Dimension A
8. Optional second breaker
9. Neutral ASM (torque to 275 in/lbs)
10. Top entry conduit area
11. Breaker center line
12. Dimension B
13. Primary breaker
14. Customer connect end (recommended torque on label)
15. Equipment ground terminal (torque to 275 in/lbs)
16. Bottom entry conduit area
17. Add 177.8 mm (7 in) for bases with integrated single wall fuel tank

A Rolls-Royce solution

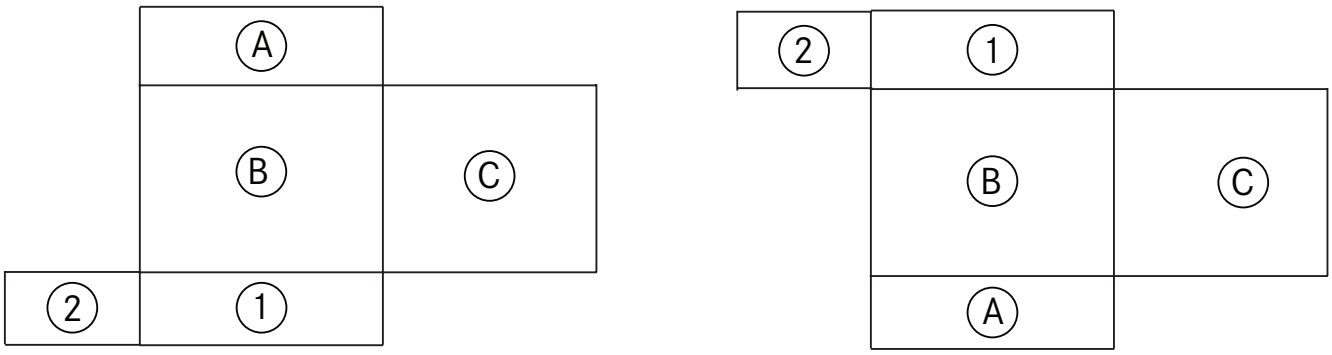
Circuit Breaker Enclosure Data Sheet - Diesel
27-30 kW / 30-34 kVA

Available Circuit Breakers		Enclosure Data				
Breaker Frame	Amperage	Output Wire Range 90 °C Cu (wires per lug)	Wire Bending Space[1] Dimension A mm (in)	Wire Gutter Space[1,2] Dimension B mm (in)	Conduit Quantity	Conduit Size[3] in
H-Frame	20-150	(1) 8-3/0	329 (12.95)	134 (5.27)	1	2.5
J-Frame	175	(1) 4-4/0	314 (12.36)	134 (5.27)	1	2.5
J-Frame	200-250	(1) 3/0-350	314 (12.36)	134 (5.27)	1	3

(1) Meets or exceeds NFPA 70, NEC 312.6(A), and NEC 312.6(B)
(2) Top entry only available for single breaker applications
(3) Based on flexible metal conduit at 40% fill using THHN wire

NOTE: Equipment grounding terminal wire range: 6 AWG - 3/0 AWG.

Table 1: 280 Frame Enclosure Data



Top View - Right Side Breaker **Top View - Left Side Breaker**

Figure 2: 280 Frame Enclosure Breaker Mounting Positions

A. Controls
B. Outlet box
C. 280 frame alternator

1. Position 1 (Primary)
2. Position 2

Circuit Breaker Enclosure Data Sheet - Diesel

40-50 KW / 40-44 KVA

DESCRIPTION

This circuit breaker enclosure data sheet is used in conjunction with dimensional drawings to assist with submittal documentation, specification requirements, and installation. This document summarizes the enclosure dimensions and mounting positions for the ***mtu*** 4R0113 DS40, ***mtu*** 4R0113 DS44, and ***mtu*** 4R0113 DS50 circuit breakers, including 280 and 360 frame size enclosures. The dimensional drawings will govern and should be referenced for installation.

280 FRAME ENCLOSURE

- Supplied with all 280 frame alternator applications.
- Right side breakers shown. Left side breakers optional.
- Reference Figure 2 for breaker mounting positions.

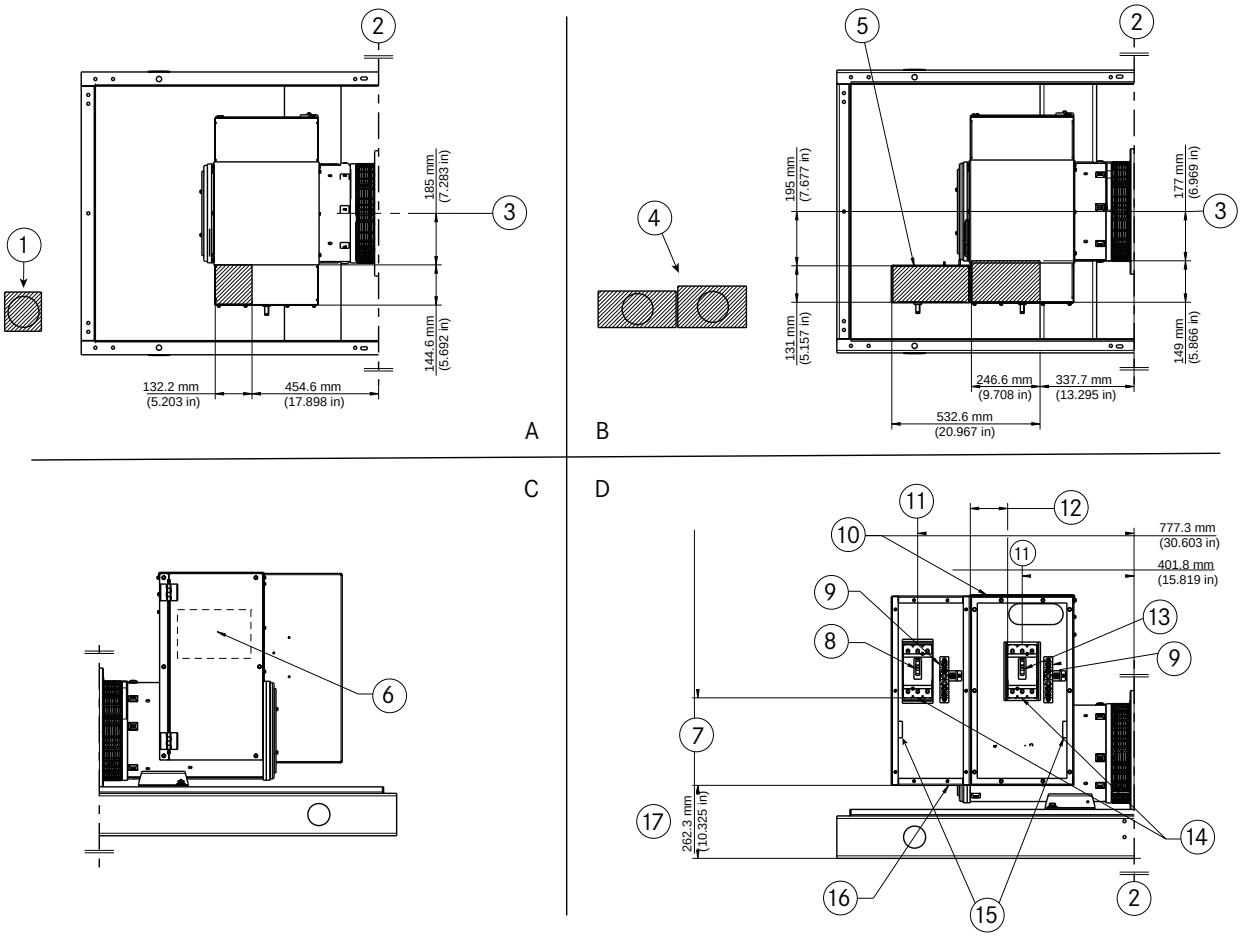


Figure 1: 280 Frame Enclosure

A. Top view, top entry conduit area
B. Top view, bottom entry conduit area
C. Left view, breaker enclosure detail
D. Right view, breaker enclosure detail (enclosure cover not shown)

1. Possible top entry conduit locations
2. Rear face of flywheel housing
3. Generator centerline
4. Possible bottom entry conduit locations
5. Optional secondary breaker enclosure
6. Optional control panel location
7. Dimension A
8. Optional second breaker
9. Neutral ASM (torque to 275 in/lbs)
10. Top entry conduit area
11. Breaker centerline
12. Dimension B
13. Primary breaker
14. Customer connect end (recommended torque on label)
15. Equipment ground terminal (torque to 275 in/lbs)
16. Bottom entry conduit area
17. Add 177.8 mm (7 in) for bases with integrated single wall fuel tank

A Rolls-Royce solution

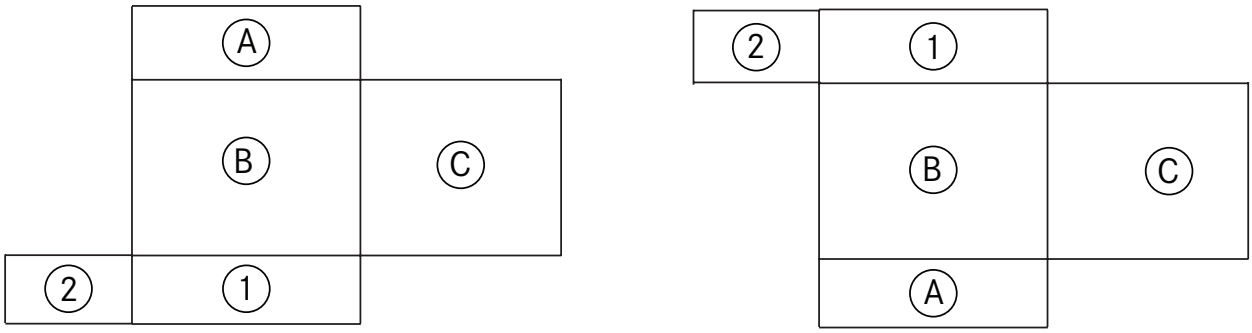
Circuit Breaker Enclosure Data Sheet - Diesel
40-50 kW / 40-44 kVA

Available Circuit Breakers		Enclosure Data				
Breaker Frame	Amperage	Output Wire Range 90 °C Cu (wires per lug)	Wire Bending Space[1] Dimension A mm (in)	Wire Gutter Space[1,2] Dimension B mm (in)	Conduit Quantity	Conduit Size[3] in
H-Frame	20-150	(1) 8-3/0	329 (12.95)	134 (5.27)	1	2.5
J-Frame	175	(1) 4-4/0	314 (12.36)	134 (5.27)	1	2.5
J-Frame	200-250	(1) 3/0-350	314 (12.36)	134 (5.27)	1	3

(1) Meets or exceeds NFPA 70, NEC 312.6(A), and NEC 312.6(B)
(2) Top entry only available for single breaker applications
(3) Based on flexible metal conduit at 40% fill using THHN wire

NOTE: Equipment grounding terminal wire range: 6 AWG - 3/0 AWG.

Table 1: 280 Frame Enclosure Data



Top View - Right Side Breaker

Top View - Left Side Breaker

Figure 2: 280 Frame Enclosure Breaker Mounting Positions

A. Controls
B. Outlet box
C. 280 frame alternator

1. Position 1 (Primary)
2. Position 2

360 FRAME ENCLOSURE

- Supplied with all 360 frame alternator applications.
- Right side breakers shown. Left side breakers optional.
- Reference Figure 4 for breaker mounting positions.

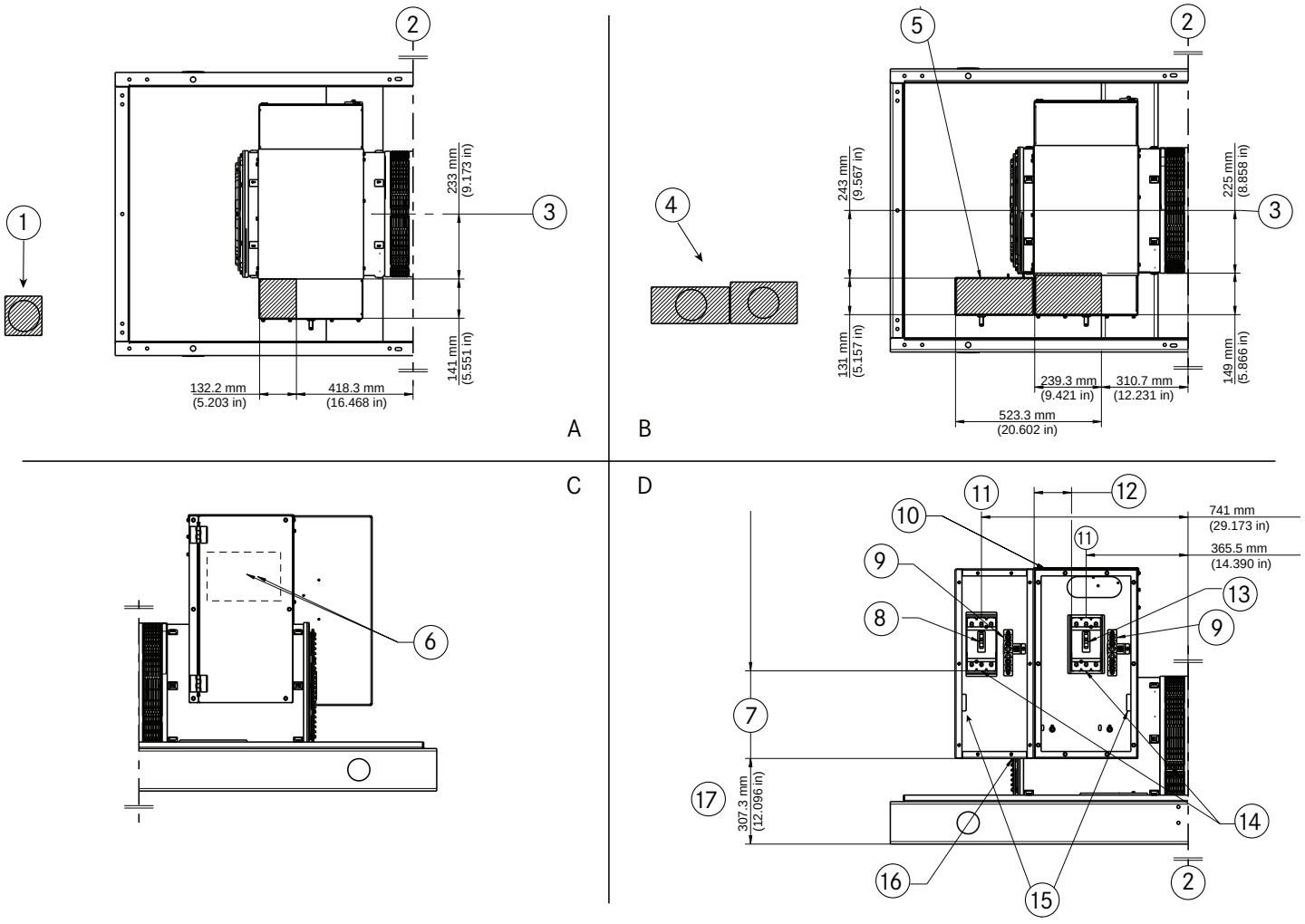


Figure 3: 360 Frame Enclosure

A. Top view, top entry conduit area
B. Top view, bottom entry conduit area
C. Left view, breaker enclosure detail
D. Right view, breaker enclosure detail (enclosure cover not shown)

1. Possible top entry conduit locations
2. Rear face of flywheel housing
3. Generator centerline
4. Possible bottom entry conduit locations
5. Optional secondary breaker enclosure
6. Optional control panel location
7. Dimension A
8. Optional second breaker
9. Neutral ASM (torque to 275 in/lbs)
10. Top entry conduit area
11. Breaker centerline
12. Dimension B
13. Primary breaker
14. Customer connect end (recommended torque on label)
15. Equipment ground terminal (torque to 275 in/lbs)
16. Bottom entry conduit area
17. Add 177.8 mm (7 in) for bases with integrated single wall fuel tank

Circuit Breaker Enclosure Data Sheet - Diesel
40-50 kW / 40-44 kVA

Available Circuit Breakers		Enclosure Data				
Breaker Frame	Amperage	Output Wire Range 90 °C Cu (wires per lug)	Wire Bending Space[1] Dimension A mm (in)	Wire Gutter Space[1,2] Dimension B mm (in)	Conduit Quantity	Conduit Size[3] in
H-Frame	20-150	(1) 8-3/0	329 (12.95)	134 (5.27)	1	2.5
J-Frame	175	(1) 4-4/0	314 (12.36)	134 (5.27)	1	2.5
J-Frame	200-250	(1) 3/0-350	314 (12.36)	134 (5.27)	1	3

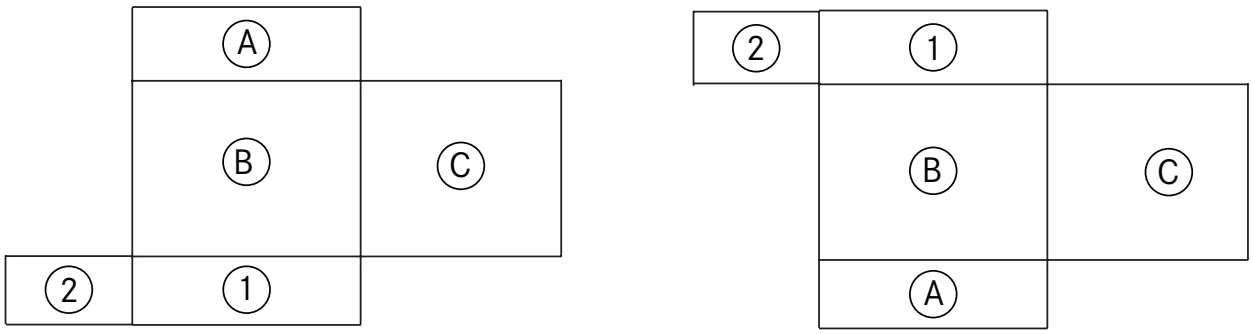
[1] Meets or exceeds NFPA 70, NEC 312.6(A), and NEC 312.6(B)

[2] Top entry only available for single breaker applications

[3] Based on flexible metal conduit at 40% fill using THHN wire

NOTE: Equipment grounding terminal wire range: 6 AWG - 3/0 AWG .

Table 2: 360 Frame Enclosure Data



Top View - Right Side Breaker

Top View - Left Side Breaker

Figure 4: 360 Frame Enclosure Breaker Mounting Positions

A. Controls
B. Outlet box
C. 360 frame alternator

1. Position 1 (Primary)
2. Position 2

Circuit Breaker Enclosure Data Sheet - Diesel

55-60 kW / 50-55 kVA

DESCRIPTION

This circuit breaker enclosure data sheet is used in conjunction with dimensional drawings to assist with submittal documentation, specification requirements, and installation. This document summarizes the enclosure dimensions and mounting positions for the ***mtu*** 4R0113 DS55 and ***mtu*** 4R0113 DS60 circuit breakers. The dimensional drawings will govern and should be referenced for installation.

360 FRAME ENCLOSURE

- Supplied with all 360 frame alternator applications.
- Right side breakers shown. Left side breakers optional.
- Reference Figure 2 for breaker mounting positions.

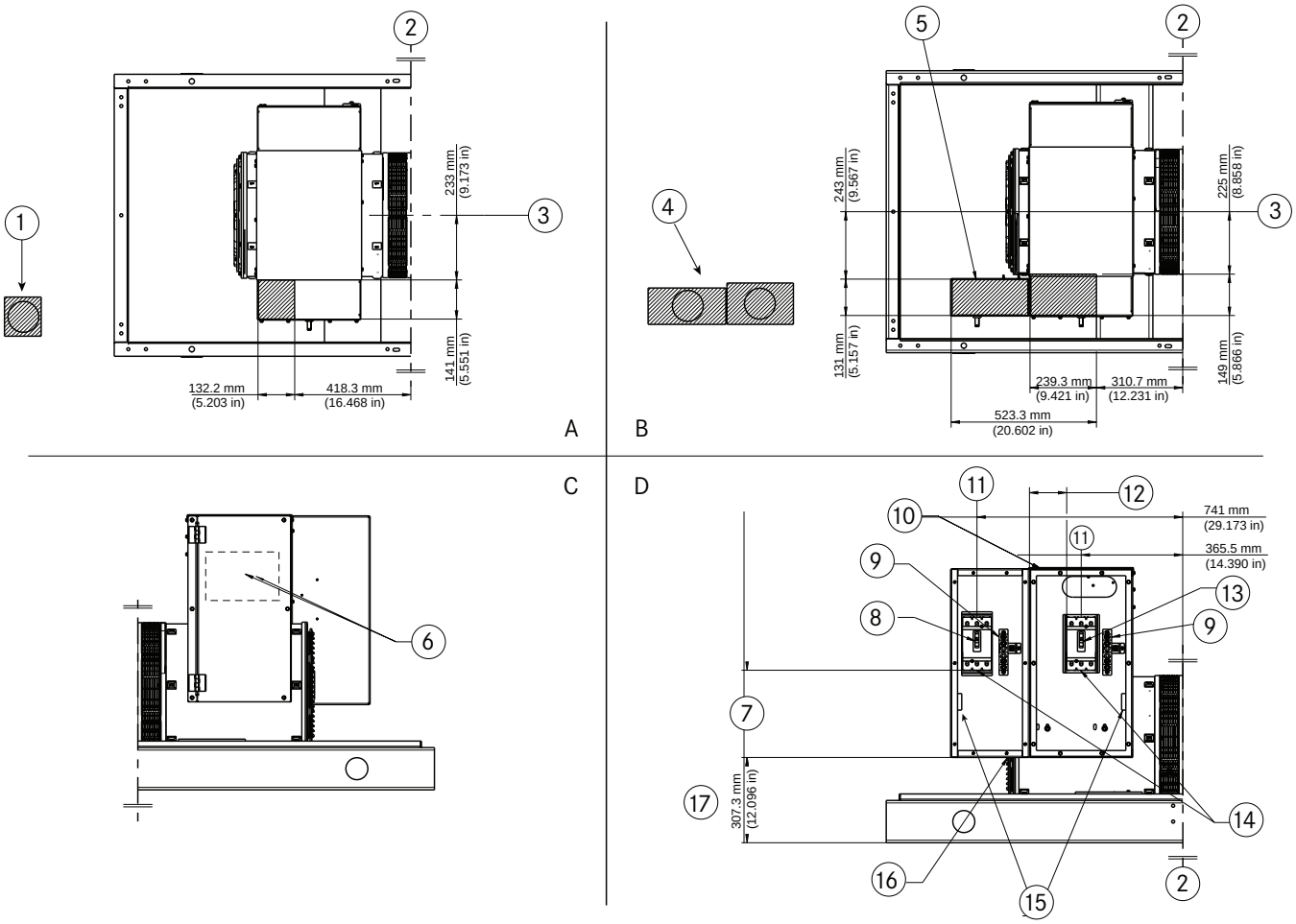


Figure 1: 360 Frame Enclosure

A. Top view, top entry conduit area
B. Top view, bottom entry conduit area
C. Left view, breaker enclosure detail
D. Right view, breaker enclosure detail (enclosure cover not shown)

1. Possible top entry conduit locations
2. Rear face of flywheel housing
3. Generator centerline
4. Possible bottom entry conduit locations
5. Optional secondary breaker enclosure
6. Optional control panel location
7. Dimension A
8. Optional second breaker
9. Neutral ASM (torque to 275 in/lbs)
10. Top entry conduit area
11. Breaker centerline
12. Dimension B
13. Primary breaker
14. Customer connect end (recommended torque on label)
15. Equipment ground terminal (torque to 275 in/lbs)
16. Bottom entry conduit area
17. Add 177.8 mm (7 in) for bases with integrated single wall fuel tank

A Rolls-Royce solution

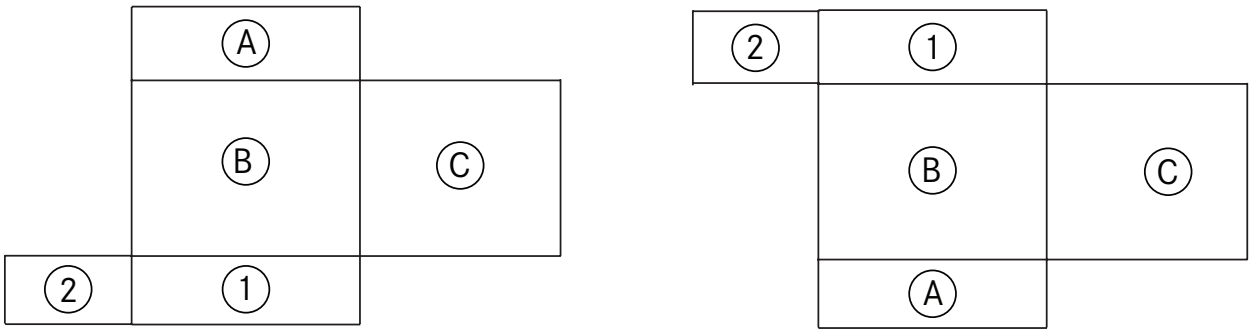
Circuit Breaker Enclosure Data Sheet - Diesel
55-60 kW / 50-55 kVA

Available Circuit Breakers		Enclosure Data				
Breaker Frame	Amperage	Output Wire Range 90 °C Cu (wires per lug)	Wire Bending Space[1] Dimension A mm (in)	Wire Gutter Space[1,2] Dimension B mm (in)	Conduit Quantity	Conduit Size[3] in
H-Frame	20-150	(1) 8-3/0	329 (12.95)	134 (5.27)	1	2.5
J-Frame	175	(1) 4-4/0	314 (12.36)	134 (5.27)	1	2.5
J-Frame	200-250	(1) 3/0-350	314 (12.36)	134 (5.27)	1	3

[1] Meets or exceeds NFPA 70, NEC 312.6(A), and NEC 312.6(B)
[2] Top entry only available for single breaker applications
[3] Based on flexible metal conduit at 40% fill using THHN wire

NOTE: Equipment grounding terminal wire range: 6 AWG - 3/0 AWG

Table 1: 360 Frame Enclosure Data



Top View - Right Side Breaker **Top View - Left Side Breaker**

Figure 2: 360 Frame Enclosure Breaker Mounting Positions

A. Controls
B. Outlet box
C. Alternator

1. Position 1 (Primary)
2. Position 2

Circuit Breaker Enclosure Data Sheet - Diesel

80-125 kW Standby / 72-111 kW Prime

DESCRIPTION

This circuit breaker enclosure data sheet is used in conjunction with dimensional drawings to assist with submittal documentation, specification requirements, and installation. This document summarizes the enclosure dimensions and mounting positions for the ***mtu*** 4R0120 DS80, ***mtu*** 4R0120 DS100, and ***mtu*** 4R0120 DS125 circuit breakers, including small and large size enclosures. The dimensional drawings will govern and should be referenced for installation.

SMALL ENCLOSURE

- Small enclosure supplied with select 360 frame alternator applications.
- Right side breakers shown. Left side breakers optional.
- Reference Figure 2 for breaker mounting positions.

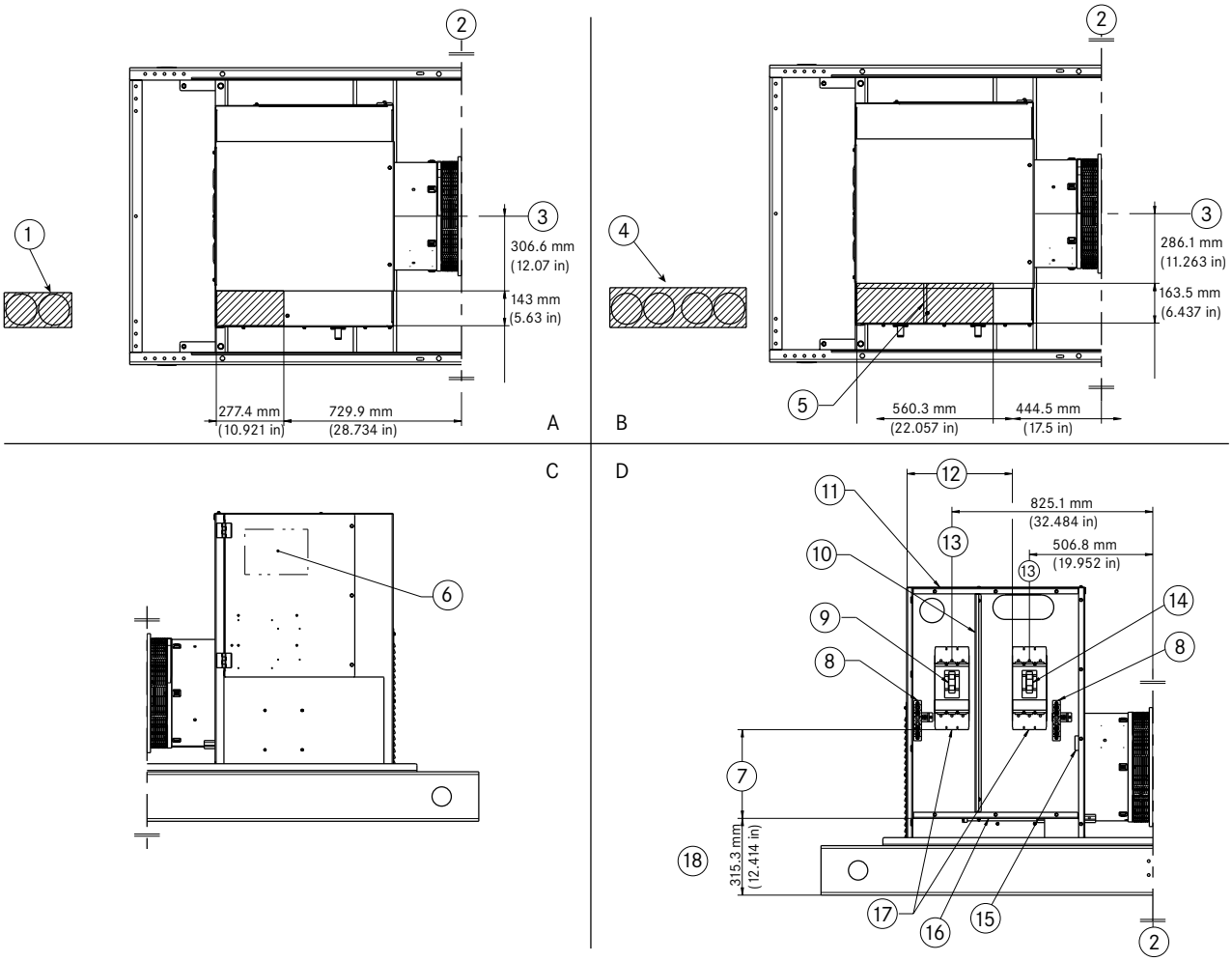


Figure 1: Small Enclosure

A. Top view, top entry conduit area
B. Top view, bottom entry conduit area
C. Left view, breaker enclosure detail
D. Right view, breaker enclosure detail (enclosure cover not shown)

1. Two conduit maximum
2. Rear face of flywheel housing
3. Generator centerline
4. Four conduit maximum
5. Second breaker divider wall
6. Optional control panel location
7. Dimension A
8. Neutral ASM (torque to 275 in/lbs)
9. Optional second breaker
10. Divider wall included with second breaker
11. Top entry conduit area
12. Dimension B
13. Breaker centerline
14. Primary breaker
15. Equipment ground terminal (torque to 275 in/lbs)
16. Bottom entry conduit area
17. Customer connect end (recommended torque on label)
18. Add 205 mm (8.08 in) for bases with integrated single wall fuel tank

A Rolls-Royce solution

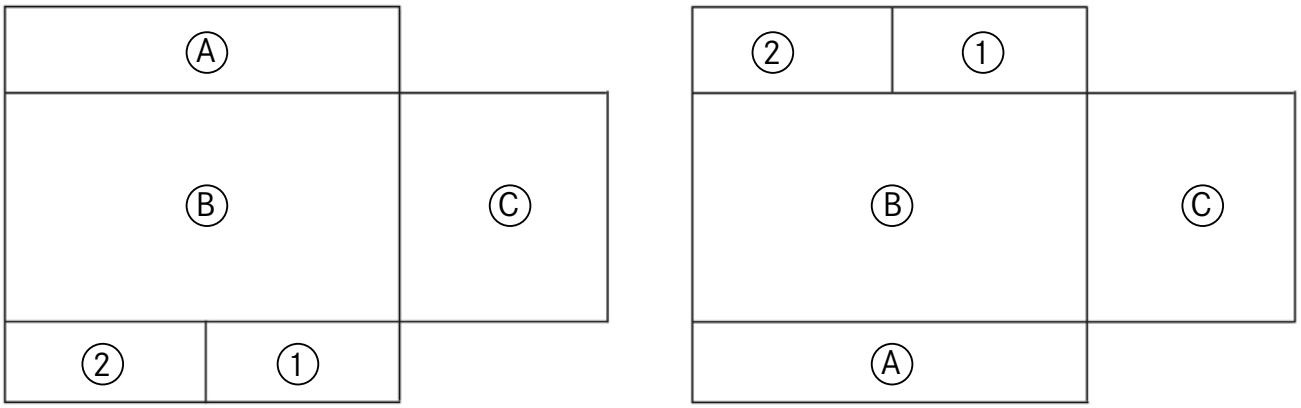
Circuit Breaker Enclosure Data Sheet - Diesel
80-125 kW Standby / 72-111 kW Prime

Available Circuit Breakers		Enclosure Data				
Breaker Frame	Amperage	Output Wire Range 90 °C Cu (wires per lug)	Wire Bending Space[1] Dimension A mm (in)	Wire Gutter Space[1,2] Dimension B mm (in)	Conduit Quantity	Conduit Size[3] in
H-Frame	20-150	(1) 8-3/0	459 (18.08)	450 (17.72)	1	2.5
J-Frame	175	(1) 4-3/0	445 (17.52)	450 (17.72)	1	2.5
J-Frame	200-250	(1) 3/0-350	445 (17.52)	450 (17.72)	1	3
L-Frame 100%	300-400	(2) 2/0-500	364 (14.35)	433 (17.03)	2	3.5
L-Frame 80%	300-600	(2) 2/0-500	364 (14.35)	433 (17.03)	2	3.5

(1) Meets or exceeds NFPA 70, NEC 312.6(A), and NEC 312.6(B)
(2) Top entry only available for single breaker applications
(3) Based on flexible metal conduit at 40% fill using THHN wire

NOTE: Equipment grounding terminal wire range: 6 AWG - 300 kcmil.

Table 1: Small Enclosure Data



Top View - Right Side Breaker

Top View - Left Side Breaker

Figure 2: Small Enclosure Breaker Mounting Positions

A. Controls
B. Outlet box
C. 360 frame alternator

1. Position 1 (Primary)
2. Position 2

LARGE ENCLOSURE

— Large enclosure supplied with all 430 frame alternator applications and select 360 frame alternator applications.
— Right side primary breaker shown. Left side primary breaker optional.
— Reference Figure 4 and Table 3 for breaker mounting positions.

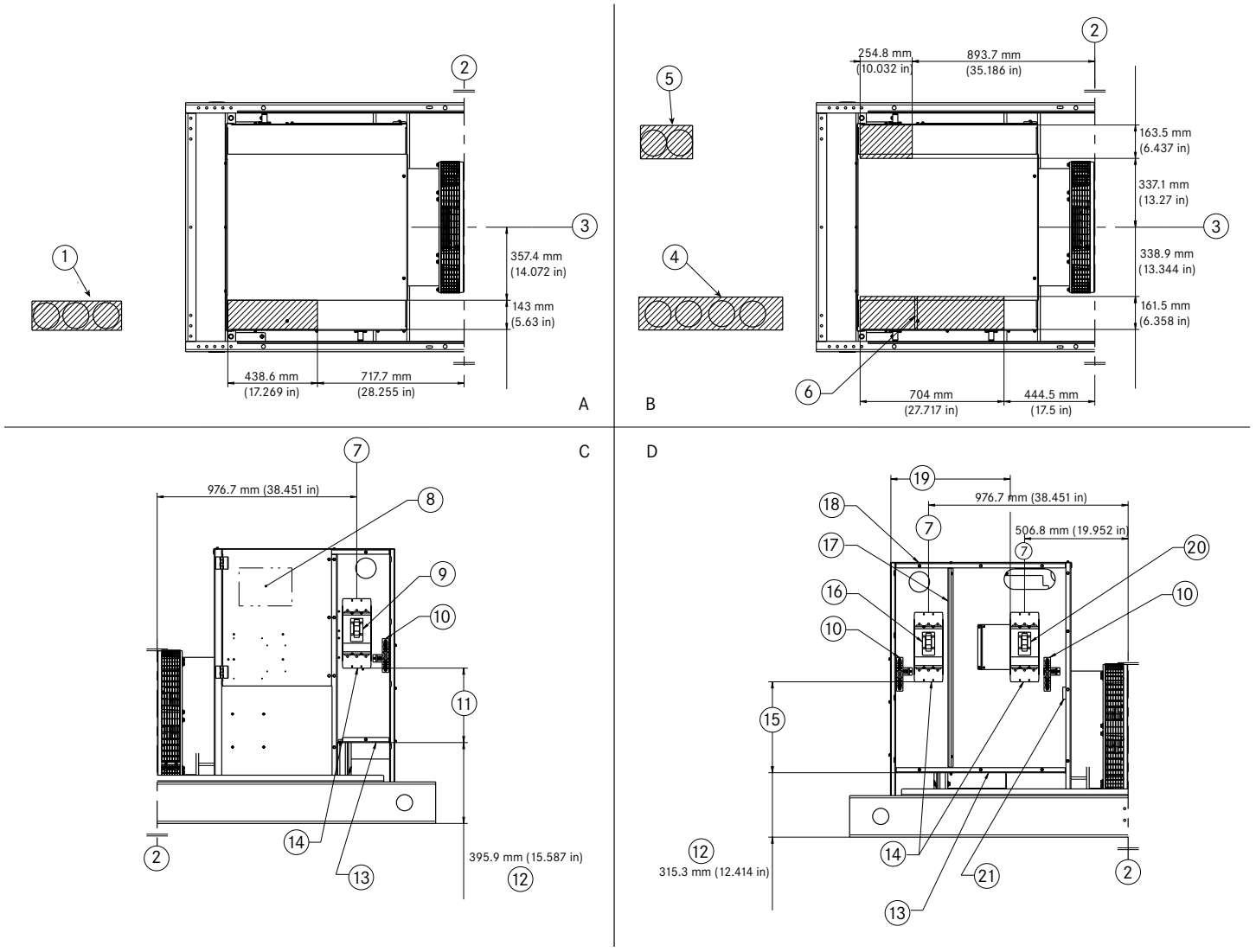


Figure 3: Large Enclosure

A. Top view, top entry conduit area
B. Top view, bottom entry conduit area
C. Left view, breaker enclosure detail (enclosure door not shown)
D. Right view, breaker enclosure detail (enclosure cover not shown)

1. Three conduit maximum
2. Rear face of flywheel housing
3. Generator centerline
4. Four conduit maximum (primary breaker side)
5. Two conduit maximum (opposite primary breaker)
6. Second breaker divider wall
7. Breaker centerline
8. Optional control panel location
9. Optional second/third breaker
10. Neutral ASM (torque to 275 in/lbs)
11. Dimension B
12. See note 4
13. Bottom entry conduit area
14. Customer connect end (recommended torque on label)
15. Dimension A
16. Optional second breaker
17. Divider wall included with second breaker
18. Top entry conduit area
19. Dimension C
20. Primary breaker
21. Equipment ground terminal (torque to 275 in/lbs)

Circuit Breaker Enclosure Data Sheet - Diesel
80-125 kW Standby / 72-111 kW Prime

Available Circuit Breakers		Enclosure Data					
Breaker Frame	Amperage	Output Wire Range 90 °C Cu (wires per lug)	Wire Bending Space[1] Dimension A mm (in)	Wire Gutter Space[1] Dimension B mm (in)	Wire Gutter Space[1,2] Dimension C mm (in)	Conduit Quantity	Conduit Size[3] in
H-Frame	20-150	(1) 8-3/0	532 (20.93)	451 (17.76)	602 (23.69)	1	2.5
J-Frame	175	(1) 4-4/0	518 (20.37)	437 (17.2)	602 (23.69)	1	2.5
J-Frame	200-250	(1) 3/0-350	518 (20.37)	437 (17.2)	602 (23.69)	1	3
L-Frame 100%	300-400	(2) 2/0-500	443 (17.44)	362 (14.27)	584 (23)	2	3.5
L-Frame 80%	300-600	(2) 2/0-500	443 (17.44)	362 (14.27)	584 (23)	2	3.5
M-, P-Frame	250-800	(3) 250-500	407 (16.01)	N/A	451 (17.74)	3	3.5

1) Meets or exceeds NFPA 70, NEC 312.6(A), and NEC 312.6(B)
2) Top entry only available for single breaker applications
3) Based on flexible metal conduit at 40% fill using THHN wire

NOTE: Equipment grounding terminal wire range: 6 AWG - 350 kcmil.

Table 2: Large Enclosure Data

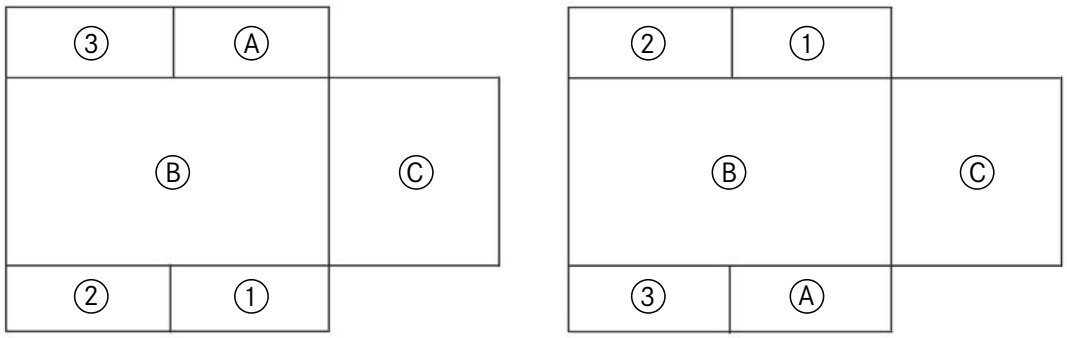


Figure 4: Large Enclosure Breaker Mounting Positions

A. Controls
B. Outlet box
C. 360/430 frame alternator

1. Position 1 (Primary)
2. Position 2
3. Position 3

Breaker Frame		
Position 1 (Primary)	Position 2	Position 3
H/J/L	-	-
H/J/L	H/J/L	-
H/J/L	H/J/L	H/J/L
P/M	-	-
P/M	H/J	-
P/M	H/J	H/J/L
P/M	-	H/J/L

Table 3: Large Enclosure Breaker Mounting Positions

N/A = Not Available

Circuit Breaker Enclosure Data Sheet - Diesel

150-200 kW Standby / 135-180 kW Prime

DESCRIPTION

This circuit breaker enclosure data sheet is used in conjunction with dimensional drawings to assist with submittal documentation, specification requirements, and installation. This document summarizes the enclosure dimensions and mounting positions for the ***mtu*** 6R0120 DS150, ***mtu*** 6R0120 DS180, and ***mtu*** 6R0120 DS200 circuit breakers. The dimensional drawings will govern and should be referenced for installation.

430 FRAME ENCLOSURE

- Enclosure supplied with all 430 frame alternator applications.
- Right side primary breaker shown. Left side primary breaker optional.
- Reference Figure 2 and Table 2 for breaker mounting positions.

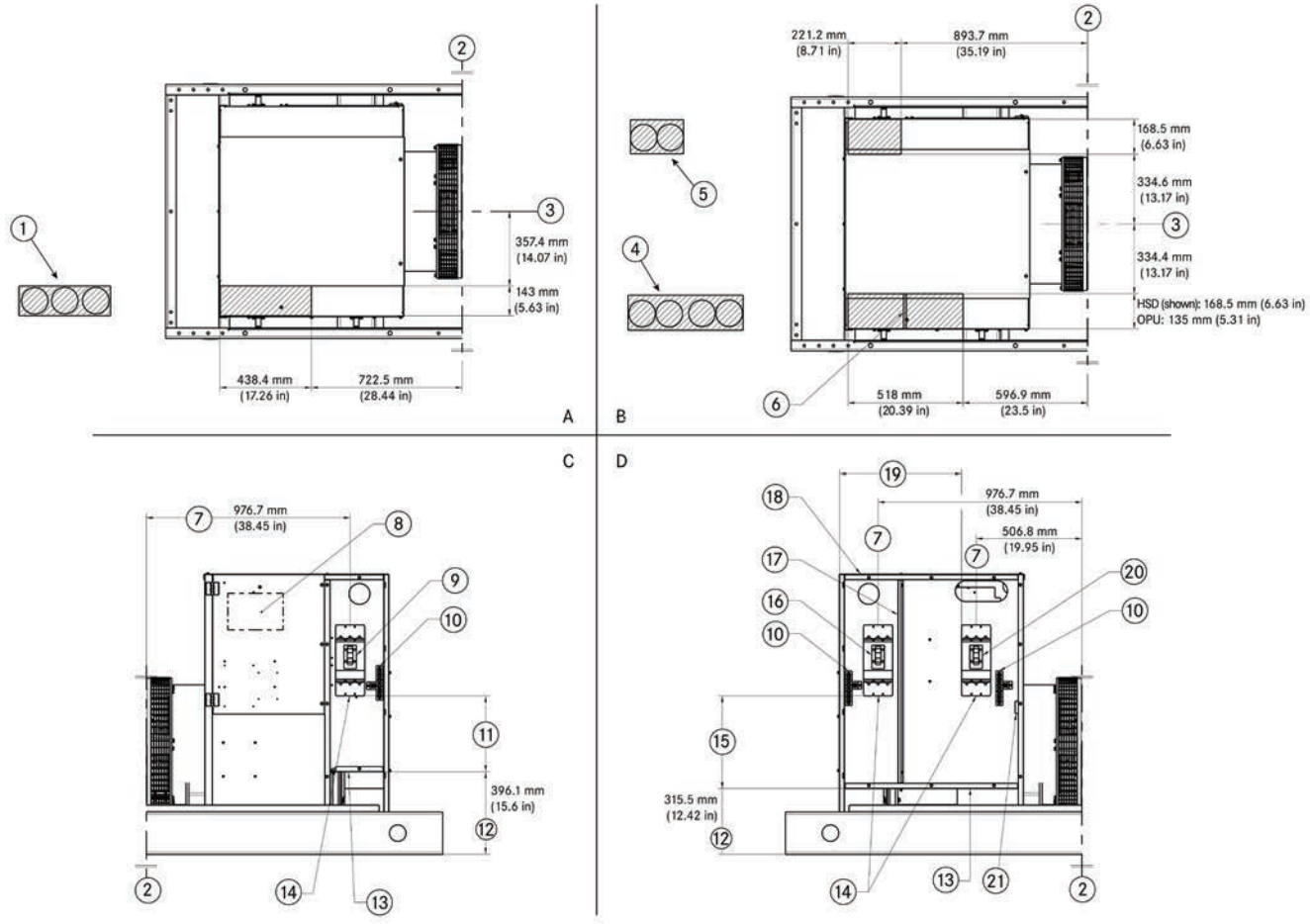


Figure 1: 430 Frame Enclosure

A. Top view, top entry conduit area
B. Top view, bottom entry conduit area
C. Left view, breaker enclosure detail (enclosure door not shown)
D. Right view, breaker enclosure detail (enclosure cover not shown)

1. Three conduit maximum
2. Rear face of flywheel housing
3. Generator centerline
4. Four conduit maximum (primary breaker side)
5. Two conduit maximum (opposite primary breaker)
6. Second breaker divider wall
7. Breaker centerline
8. Optional control panel location
9. Optional second/third breaker
10. Neutral ASM (torque to 275 in-lbs)
11. Dimension B
12. Add 205 mm (8.08 in) for bases with integrated single wall fuel tank
13. Bottom entry conduit area
14. Customer connect end (recommended torque on label)
15. Dimension A
16. Optional second breaker
17. Divider wall included with second breaker
18. Top entry conduit area
19. Dimension C
20. Primary breaker
21. Equipment ground terminal (torque to 275 in-lbs)

A Rolls-Royce solution

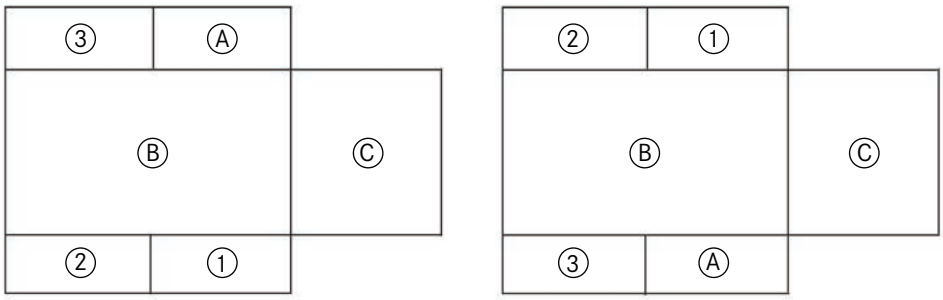
Circuit Breaker Enclosure Data Sheet - Diesel
150-200 kW Standby / 135-180 kW Prime

Available Circuit Breakers		Enclosure Data					
Breaker Frame	Amperage	Output Wire Range 90 °C Cu (wires per lug)	Wire Bending Space[1] Dimension A mm (in)	Wire Bending Space[1] Dimension B mm (in)	Wire Gutter Space[1,2] Dimension C mm (in)	Conduit Quantity	Conduit Size[3] in
H-Frame	20-150	(1) 8-3/0	532 (20.93)	451 (17.76)	602 (23.69)	1	2.5
J-Frame	175	(1) 4-4/0	518 (20.37)	437 (17.2)	602 (23.69)	1	2.5
J-Frame	200-250	(1) 3/0-350	518 (20.37)	437 (17.2)	602 (23.69)	1	3
L-Frame 100%	300-400	(2) 2/0-500	443 (17.44)	362 (14.27)	584 (23)	2	3.5
L-Frame 80%	300-600	(2) 2/0-500	443 (17.44)	362 (14.27)	584 (23)	2	3.5
M/P-Frame	250-800	(3) 250-500	407 (16.01)	N/A	451 (17.74)	3	3.5

(1) Meets or exceeds NFPA 70, NEC 312.6(A), and NEC 312.6(B)
(2) Top entry only available for single breaker applications
(3) Based on flexible metal conduit at 40% fill using THHN wire

NOTE: Equipment grounding terminal wire range: 6 AWG - 350 kcmil.

Table 1: 430 Frame Enclosure Data



Top View - Right Side Breaker **Top View - Left Side Breaker**

Figure 2: 430 Frame Enclosure Breaker Mounting Positions

A. Controls
B. Outlet box
C. Alternator

1. Position 1 (Primary)
2. Position 2
3. Position 3

Breaker Frame		
Position 1 (Primary)	Position 2	Position 3
H/J/L	-	-
H/J/L	H/J/L	-
H/J/L	H/J/L	H/J/L
P/M	-	-
P/M	H/J	-
P/M	H/J	H/J/L
P/M	-	H/J/L

Table 2: 430 Frame Breaker Mounting Positions

N/A = Not Available

Circuit Breaker Enclosure Data Sheet - Diesel

230-300 kW Standby / 210-265 kW Prime

DESCRIPTION

This circuit breaker enclosure data sheet is used in conjunction with dimensional drawings to assist with submittal documentation, specification requirements, and installation. This document summarizes the enclosure dimensions and mounting positions for the ***mtu*** 6R0150 DS230, ***mtu*** 6R0150 DS250, ***mtu*** 6R0150 DS275, and ***mtu*** 6R0150 DS300 circuit breakers, including single, dual, and triple enclosures. The dimensional drawings will govern and should be referenced for installation.

15A-250A H-, J-FRAME ENCLOSURE

— Left side controls shown. Right side controls optional.
— Reference Figure 6 for available breaker mounting positions.

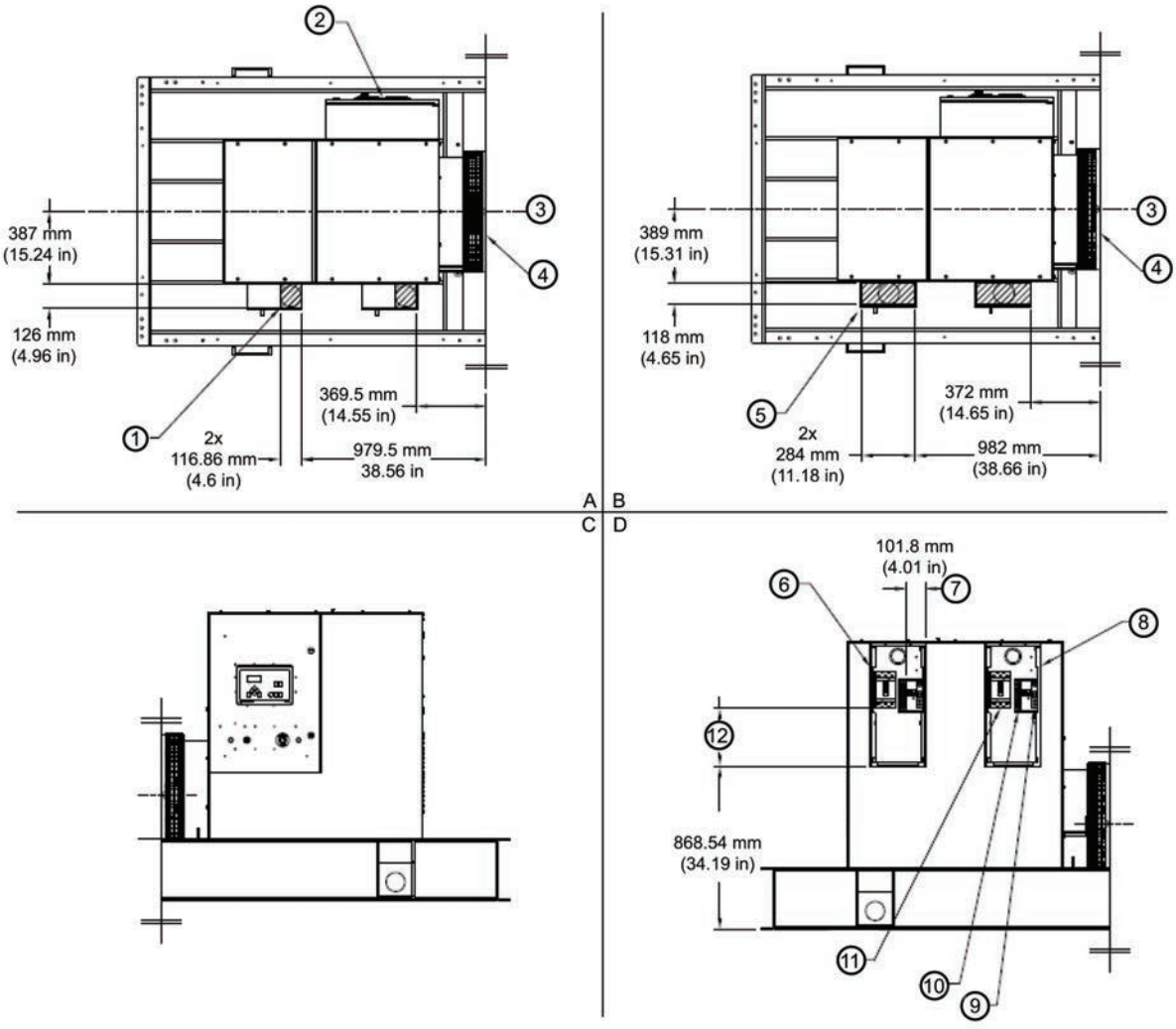


Figure 1: 15A-250A H-, J-Frame Enclosure

A. Top view, top entry conduit area
B. Top view, bottom entry conduit area
C. Left view, breaker enclosure detail (enclosure cover not shown)
D. Right view, breaker enclosure detail (enclosure cover not shown)

1. One conduit maximum per breaker
2. Controls position
3. Generator centerline
4. Rear face of flywheel housing
5. Bottom entry: One conduit maximum per enclosure
6. Breaker position one
7. Wire gutter space
8. Breaker position two
9. Equipment ground wire binding torque: 275 lb-in
10. Neutral wire binding torque: 375 lb-in
11. Customer connect end breaker wire binding torque: 50 lb-in (H-frame), 225 lb-in (J-frame)
12. Dimension A (see Table 1)

300A-600A L-FRAME ENCLOSURE

- Left side controls shown. Right side controls optional.
- Reference Figure 6 for available breaker mounting positions.

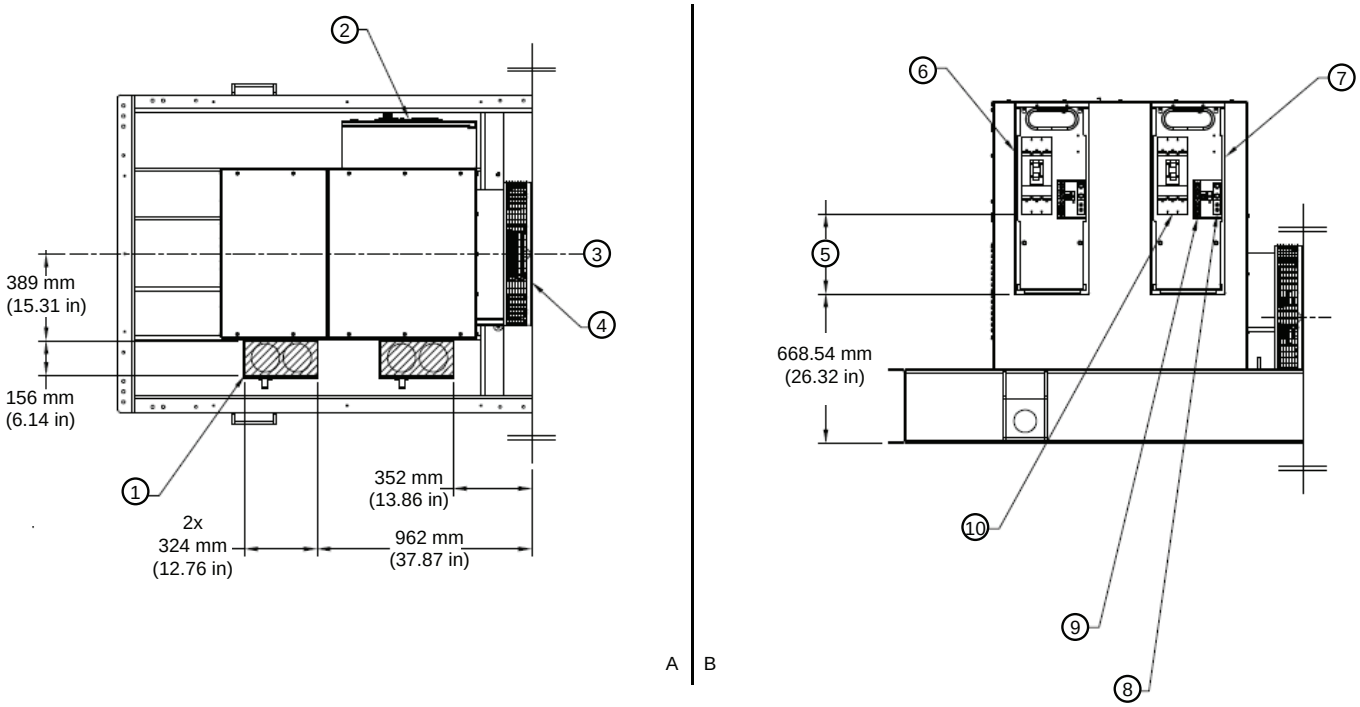


Figure 2: 300A-600A L-Frame Enclosure

A. Top view, bottom entry conduit area
B. Right view, breaker enclosure detail (enclosure cover not shown)

1. Two conduit maximum per breaker
2. Controls position
3. Generator centerline
4. Rear face of flywheel housing
5. Dimension A (see Table 1)
6. Breaker position one
7. Breaker position two
8. Equipment ground wire binding torque: 275 lb-in
9. Neutral wire binding torque: 375 lb-in
10. Customer connect end breaker wire binding torque: 442 lb-in

250A-800A M-, P-FRAME ENCLOSURE

— Left side controls shown. Right side controls optional.
— Reference Figure 6 for available breaker mounting positions.

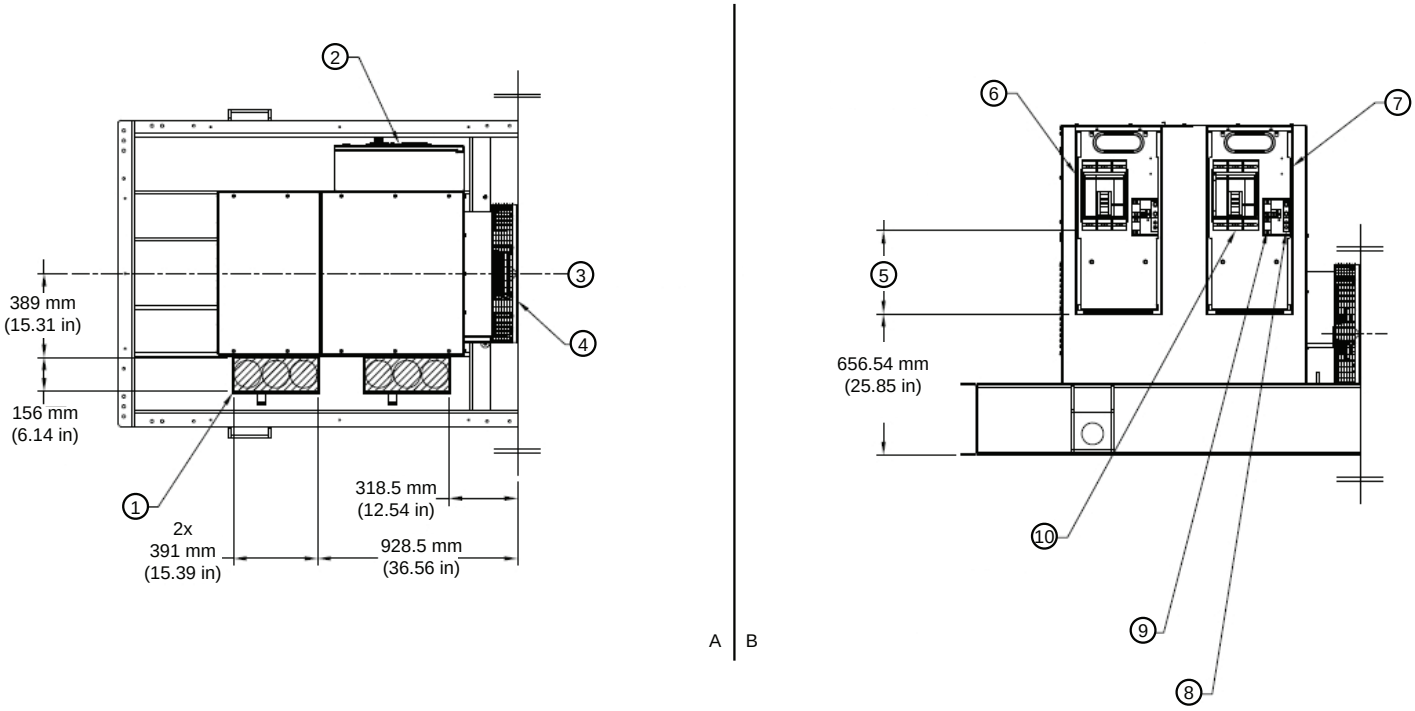


Figure 3: 250A-800A M-, P-Frame Enclosure

A. Top view, bottom entry conduit area
B. Right view, breaker enclosure detail (enclosure cover not shown)

1. Three conduit maximum per breaker
2. Controls position
3. Generator centerline
4. Rear face of flywheel housing
5. Dimension A (see Table 1)
6. Breaker position one
7. Breaker position two
8. Equipment ground wire binding torque: 275 lb-in
9. Neutral wire binding torque: 375 lb-in
10. Customer connect end breaker wire binding torque: 442 lb-in

1000A-1200A P-FRAME ENCLOSURE

- Left side controls shown. Right side controls optional.
- Reference Figure 6 for available breaker mounting positions.

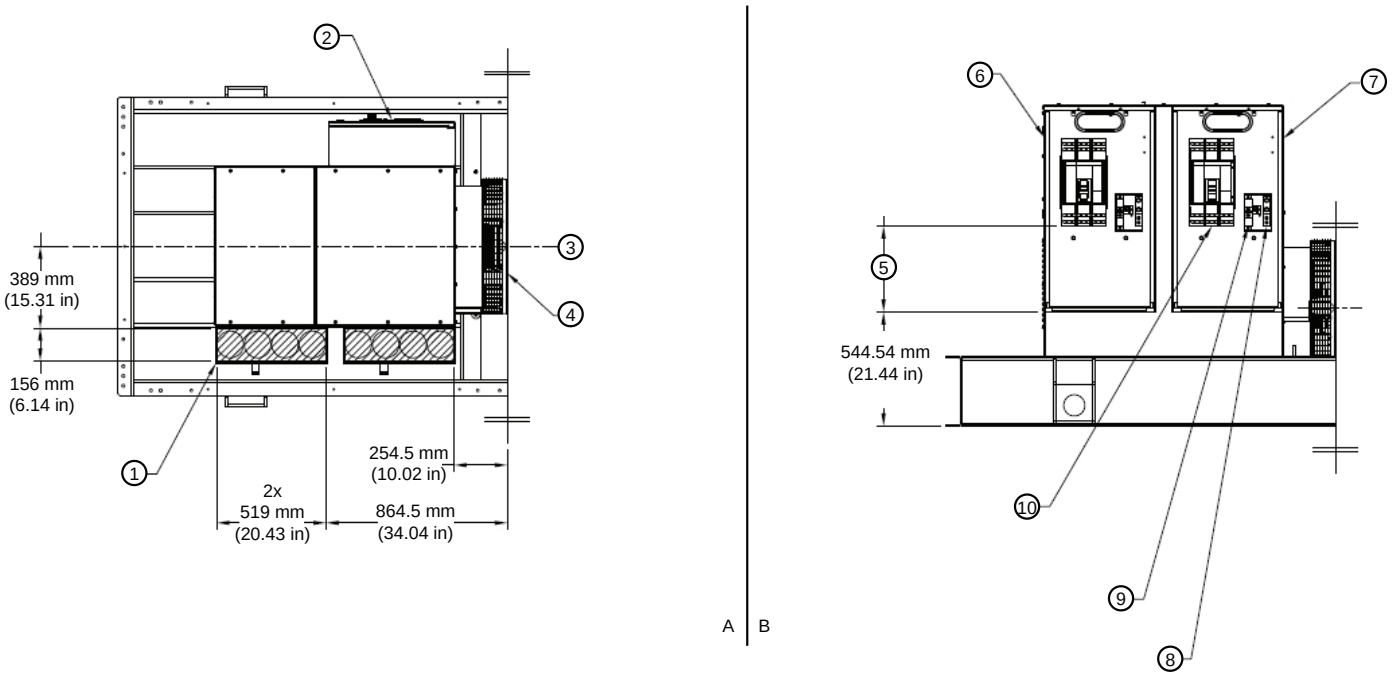


Figure 4: 1000A-1200A P-Frame Enclosure

A. Top view, bottom entry conduit area
B. Right view, breaker enclosure detail (enclosure cover not shown)

1. Four conduit maximum per breaker
2. Controls position
3. Generator centerline
4. Rear face of flywheel housing
5. Dimension A (see Table 1)
6. Breaker position one
7. Breaker position two
8. Equipment ground wire binding torque: 275 lb-in
9. Neutral wire binding torque: 375 lb-in
10. Customer connect end breaker wire binding torque: 442 lb-in

15A-1200A TRIPLE ENCLOSURE

— Left side controls shown. Right side controls optional.
— Reference Figure 6 for available breaker mounting positions.

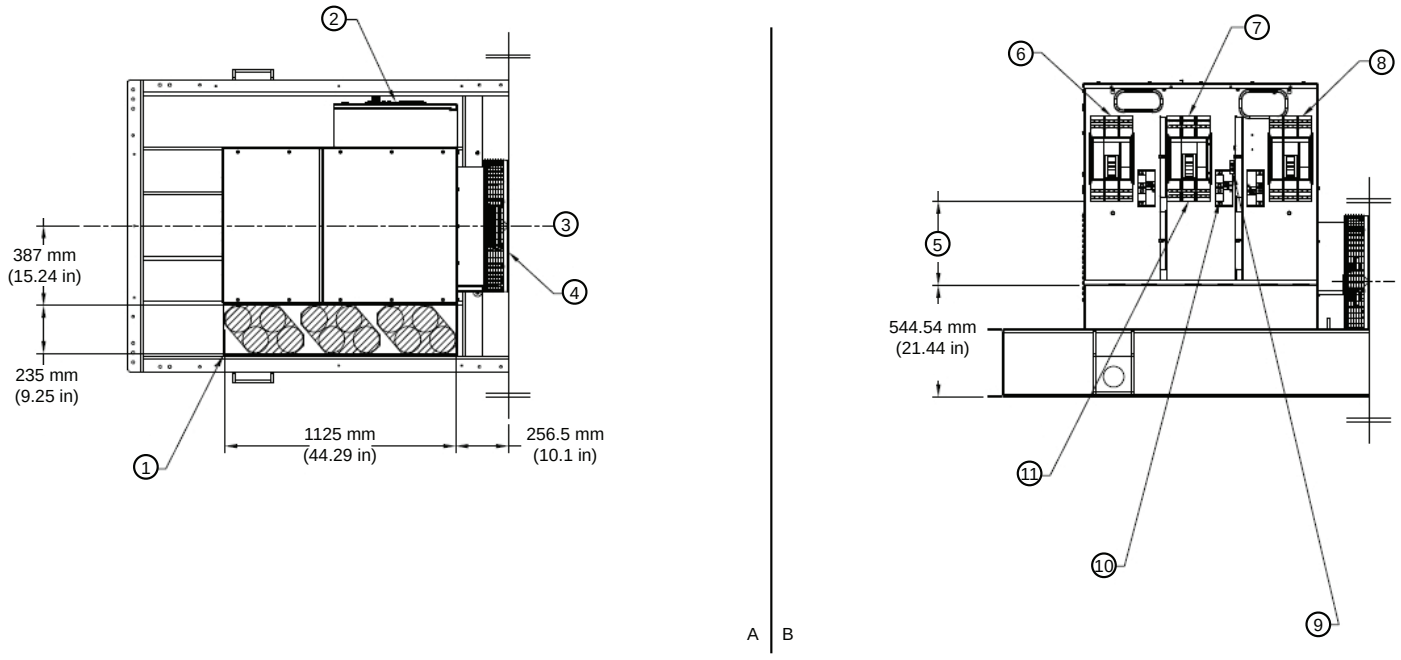


Figure 5: 15A-1200A Triple Enclosure

A. Top view, bottom entry conduit area
B. Right view, breaker enclosure detail (enclosure cover not shown)

1. Four conduit maximum per breaker
2. Controls position
3. Generator centerline
4. Rear face of flywheel housing
5. Dimension A (see Table 1)
6. Breaker position one
7. Breaker position two
8. Breaker position three
9. Equipment ground wire binding torque: 275 lb-in
10. Neutral wire binding torque: 375 lb-in
11. Customer connect end breaker wire binding torque: 50 lb-in (H-frame), 225 lb-in (J-frame), 442 lb-in (L-, M-, P-frame)

Circuit Breaker Enclosure Data Sheet - Diesel
230-300 kW Standby / 210-265 kW Prime

Available Circuit Breakers		Enclosure Data				
Breaker Frame	Amperage	Output Wire Range 90 °C Cu (wires per lug)	Wire Bending Space[1] Dimension A mm (in)		Conduit Quantity	Conduit Size[3] in
			Single and Dual Breaker	Triple Breaker		
H-Frame	15-150	(1) 4-3/0	323 (12.72)	531 (20.91)	1	2
J-Frame	175	(1) 4-4/0	309 (12.16)	517 (20.35)	1	2.5
J-Frame	200-250	(1) 3/0-350	309 (12.16)	517 (20.35)	1	3
L-Frame 100%	300-400	(2) 2/0-500	360 (14.16)	443 (17.44)	2	3.5
L-Frame 80%	300-600	(2) 2/0-500	360 (14.16)	443 (17.44)	2	3.5
M/P-Frame	250-800	(3) 3/0-500	390 (15.35)	465 (18.31)	3	3.5
P-Frame	1,000-1,200	(4) 3/0-500	410 (16.16)	416 (16.38)	4	3.5

[1] Meets or exceeds NFPA 70, NEC 312.6(A), and NEC 312.6(B)
[2] Based on flexible metal conduit at 40% fill using THHN wire.

NOTE: Equipment grounding terminal wire range: 6 AWG - 350 kcmil

Table 1: Enclosure Data

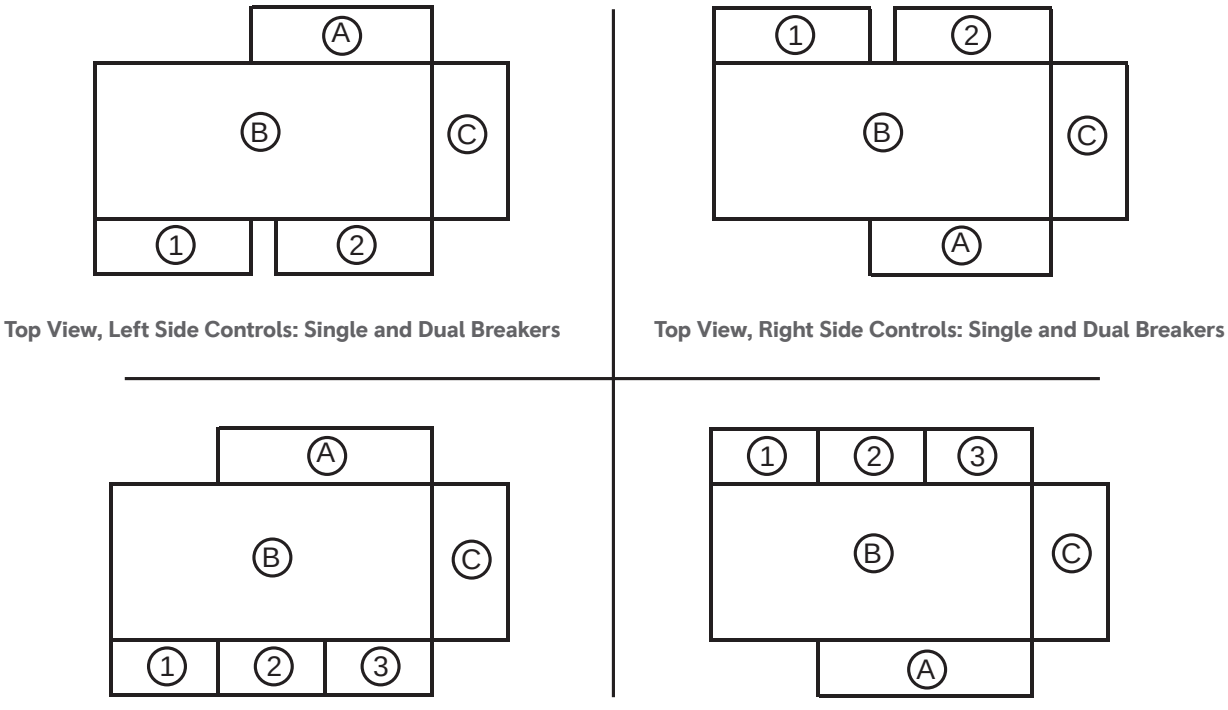


Figure 6: Available Breaker Mounting Positions for Single, Dual, or Three Breakers

A. Controls
B. Outlet box
C. Alternator

1. Position 1
2. Position 2
3. Position 3

Circuit Breaker Enclosure Data Sheet - Diesel

350-400 kW Standby / 325-365 kW Prime

DESCRIPTION

This circuit breaker enclosure data sheet is used in conjunction with dimensional drawings to assist with submittal documentation, specification requirements, and installation. This document summarizes the enclosure dimensions and mounting positions for the ***mtu*** 6R0225 DS350 and ***mtu*** 6R0225 DS400 circuit breakers, including single (small and large), dual, and triple enclosures. The dimensional drawings will govern and should be referenced for installation.

SMALL SINGLE ENCLOSURE (≤ 1200 A)

— Right side breaker shown. Left side breaker optional.
— Reference Figure 2 for breaker mounting positions.

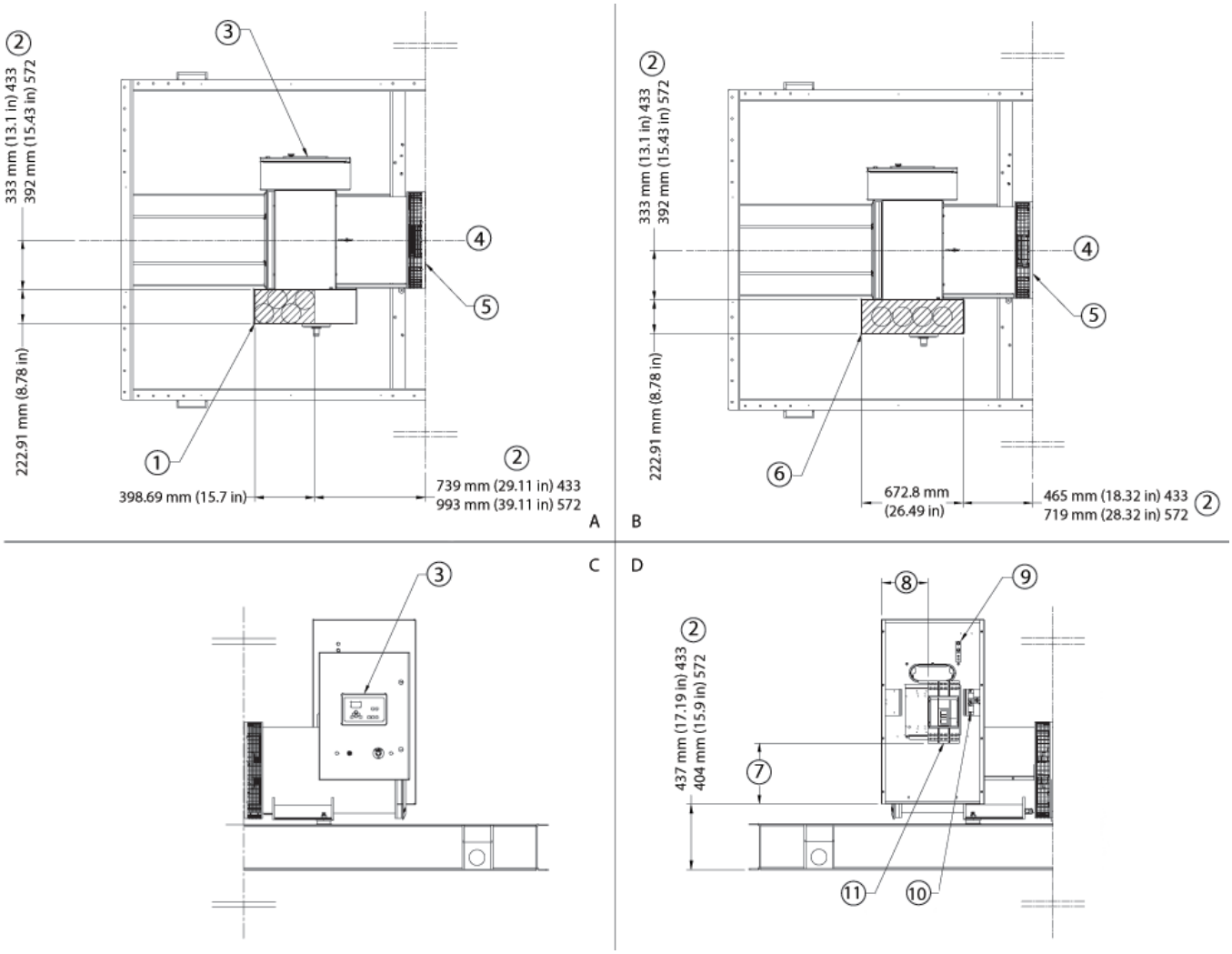


Figure 1: Small Single Enclosure

A. Top view, top entry conduit area
B. Top view, bottom entry conduit area
C. Left view
D. Right view, breaker enclosure detail (enclosure cover not shown)

1. Top entry: Four conduit maximum
2. Dimensions per generator frame
3. Optional control panel location
4. Generator centerline
5. Rear face of flywheel housing
6. Bottom entry: Four conduit maximum
7. Dimension A
8. Dimension B
9. Equipment ground wire binding torque: 275 lb-in
10. Neutral wire binding torque: 375 lb-in
11. Customer connect end (recommended torque on label)

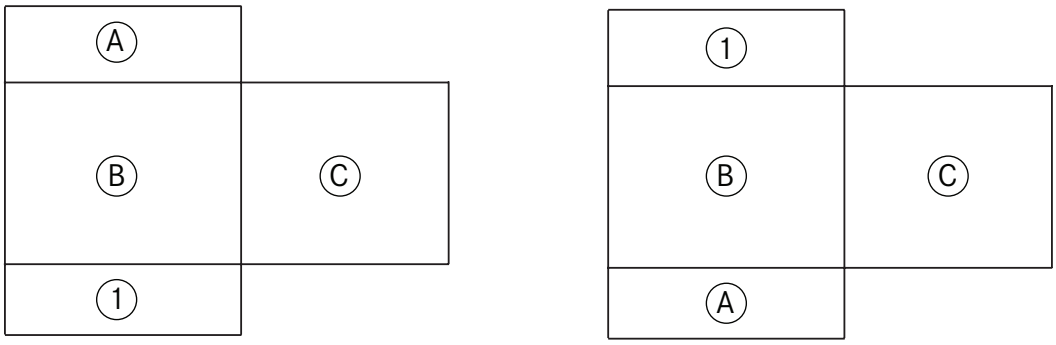
Circuit Breaker Enclosure Data Sheet - Diesel
350-400 kW Standby / 325-365 Prime

Available Circuit Breakers		Enclosure Data				
Breaker Frame	Amperage	Output Wire Range 90 °C Cu (wires per lug)	Wire Bending Space[1] Dimension A mm (in)	Wire Gutter Space[1,2] Dimension B mm (in)	Conduit Quantity	Conduit Size[3] in
H-Frame	20-150	(1) 8-3/0	534.8 (21.1)	364.2 (14.3)	1	2
J-Frame	175	(1) 4-4/0	520.6 (20.5)	364.2 (14.3)	1	2.5
J-Frame	200-250	(1) 3/0-350	520.6 (20.5)	364.2 (14.3)	1	3
L-Frame 100%	300-400	(2) 2/0-500	446.1 (17.6)	346.2 (13.6)	2	3.5
L-Frame 80%	300-600	(2) 2/0-500	446.1 (17.6)	346.2 (13.6)	2	3.5
M/P-Frame	250-800	(3) 3/0-500	409.5 (16.1)	311.3 (12.3)	3	3.5
P-Frame	1,000-1,200	(4) 3/0-500	409.5 (16.1)	311.3 (12.3)	4	3.5

(1) Meets or exceeds NFPA 70 NEC 312.6(A), and NEC 312.6(B)
(2) Top entry only available for single breaker applications
(3) Based on flexible metal conduit at 40% fill using THHN wire according to NEC table 4 and 5

NOTE: Equipment grounding terminal wire range: 6 AWG - 350 kcmil.

Table 1: Small Single Enclosure Data



Top View - Right Side Breaker

Top View - Left Side Breaker

Figure 2: Small Single Enclosure Breaker Mounting Positions

A. Controls
B. Outlet box
C. Alternator

1. Breaker

LARGE SINGLE ENCLOSURE (> 1200 A)

— Right side breaker shown. Left side breaker optional.
— Reference Figure 4 for breaker mounting positions.

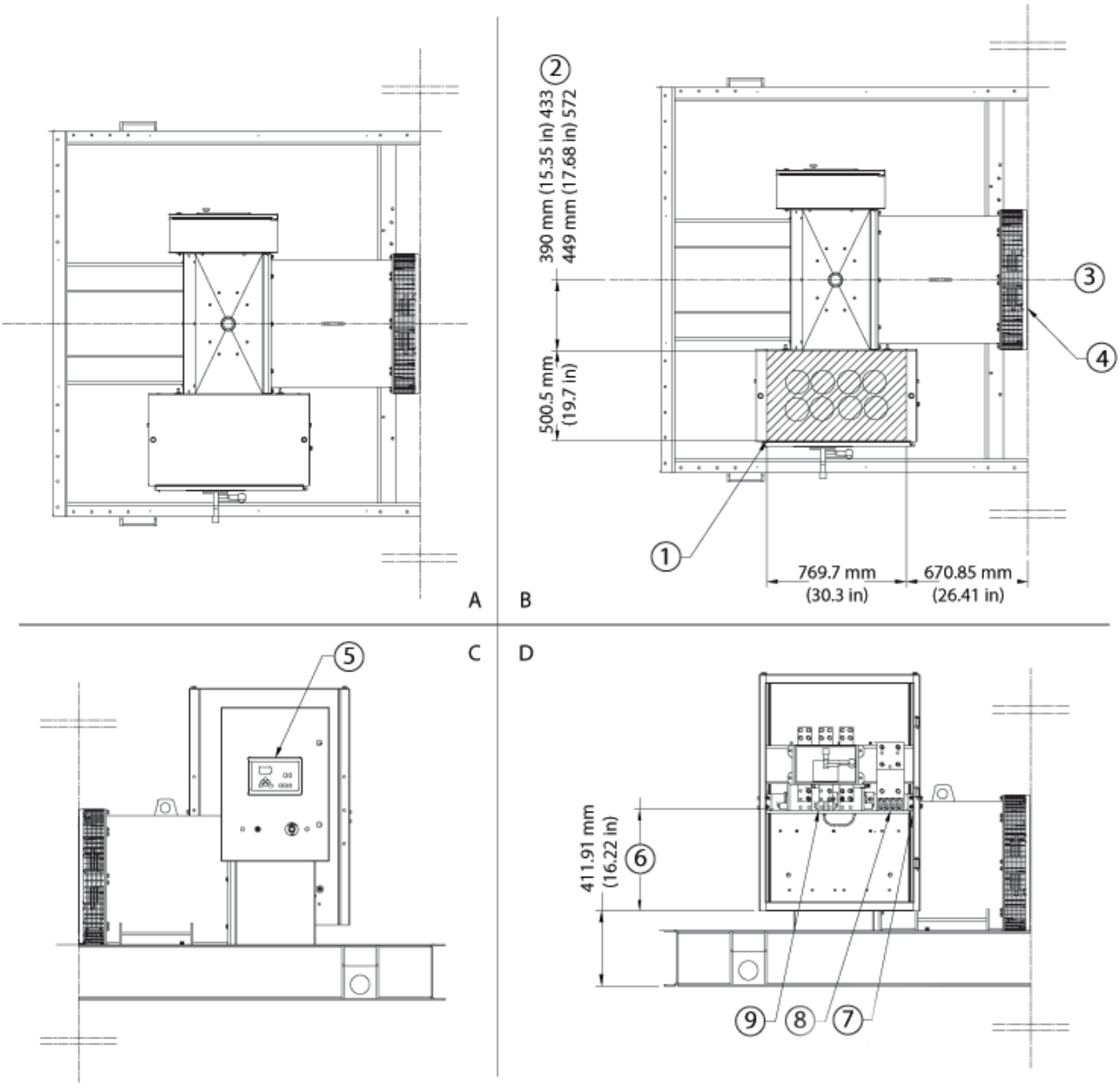


Figure 3: Large Single Enclosure

A. Top view
B. Top view, bottom entry conduit area
C. Left view
D. Right view, breaker enclosure detail (enclosure door not shown)

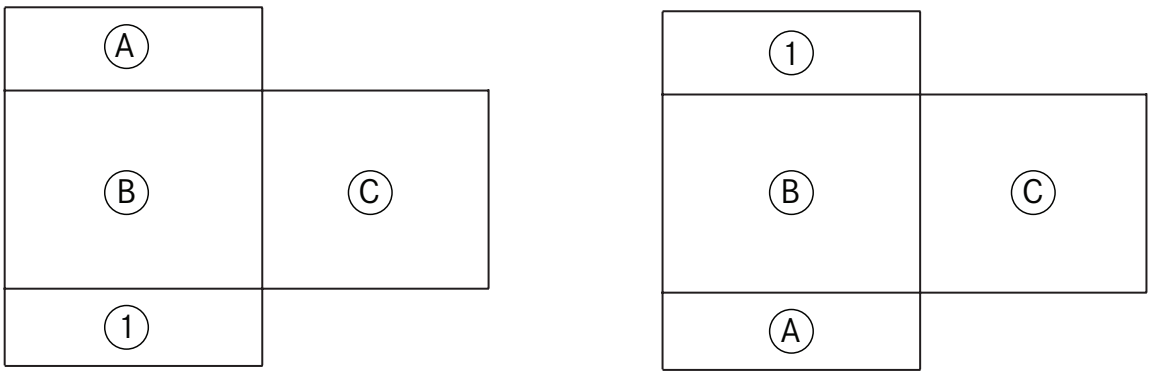
1. Bottom entry: Eight conduit maximum
2. Dimensions per generator frame
3. Generator centerline
4. Rear face of flywheel housing
5. Optional control panel location
6. Dimension A
7. Equipment ground wire binding torque: 500 lb-in
8. Neutral wire binding torque: 46 lb-ft
9. Customer connect end (recommended torque on label)

Available Circuit Breakers		Enclosure Data			
Breaker Frame	Amperage	Output Wire Range 90 °C Cu (wires per lug)	Wire Bending Space[1] Dimension A mm (in)	Conduit Quantity	Conduit Size[2] in
R-Frame	1,600-2,500	(8) 1/0-750	563.9 (22.2)	8	4
NW-Frame	1,000-2,000	(8) 1/0-750	545 (21.5)	8	4

[1] Meets or exceeds NFPA 70 and NEC 312.6(B)
[2] Based on flexible metal conduit at 40% fill using THHN wire according to NEC table 4 and 5

NOTE: Equipment grounding terminal wire range: 6 AWG - 350 kcmil.

Table 2: Large Single Enclosure Data



Top View - Right Side Breaker

Top View - Left Side Breaker

Figure 4: Large Single Enclosure Breaker Mounting Positions

A. Controls
B. Outlet box
C. Alternator

1. Breaker

DUAL ENCLOSURE

— Right side breakers shown. Left side breakers optional.
— Reference Figure 6 for breaker mounting positions.

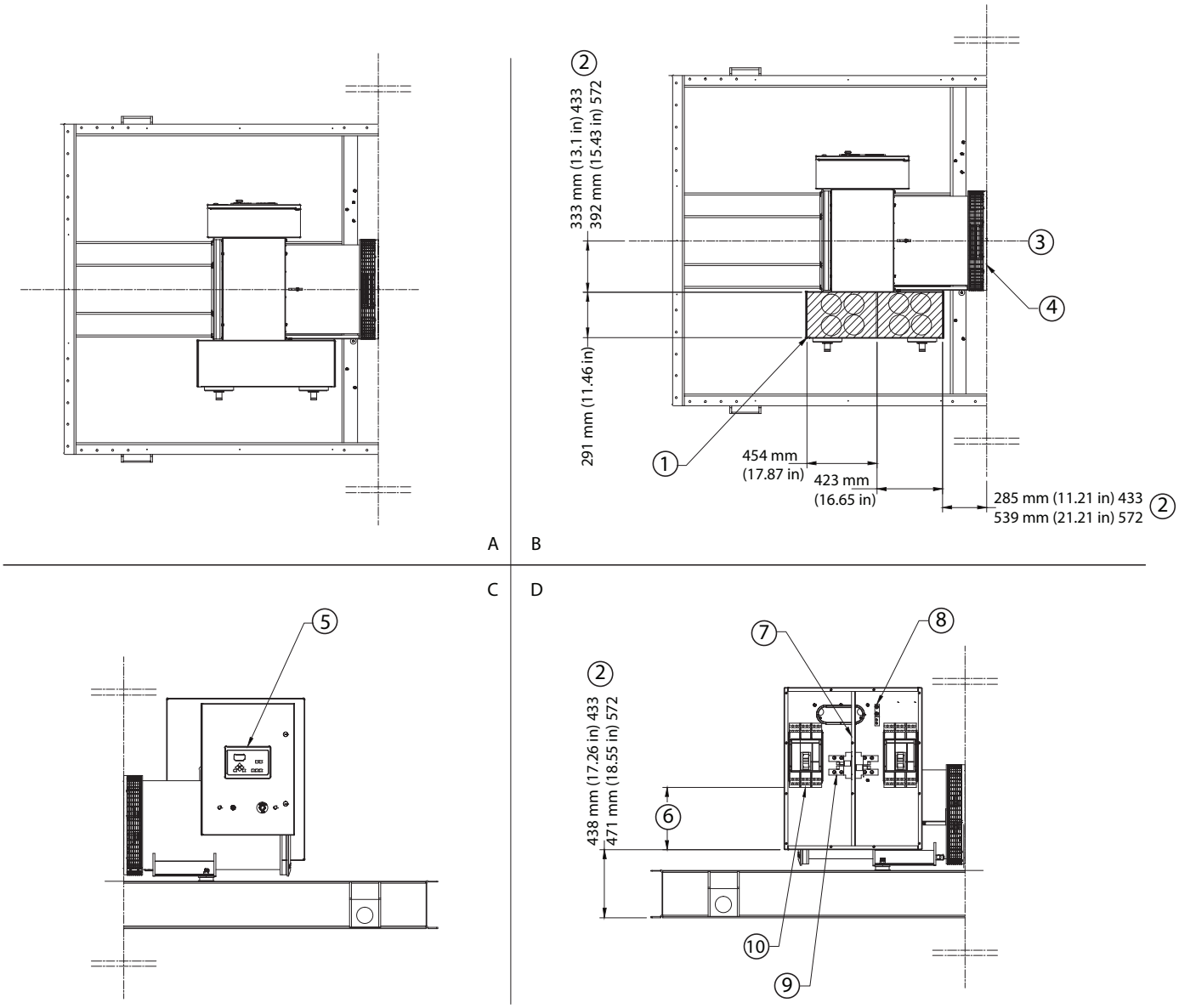


Figure 5: Dual Enclosure

A. Top view
B. Top view, bottom entry conduit area
C. Left view
D. Right view, breaker enclosure detail (enclosure cover not shown)

1. Bottom entry: Four conduit maximum
2. Dimensions per generator frame
3. Generator centerline
4. Rear face of flywheel housing
5. Optional control panel location
6. Dimension A

7. Separation panel
8. Equipment ground wire binding torque: 275 lb-in
9. 2X Neutral wire binding torque: 375 lb-in
10. 2X Customer connect end (recommended torque on label)

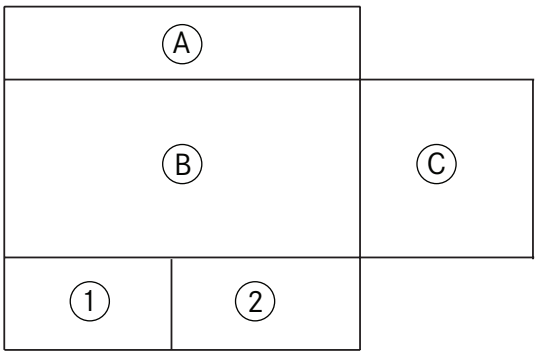
Circuit Breaker Enclosure Data Sheet - Diesel
350-400 kW Standby / 325-365 Prime

Available Circuit Breakers		Enclosure Data			
Breaker Frame	Amperage	Output Wire Range 90 °C Cu (wires per lug)	Wire Bending Space[1] Dimension A mm (in)	Conduit Quantity	Conduit Size[2] in
H-Frame	20-150	(1) 8-3/0	526.8 (20.7)	1	2
J-Frame	175	(1) 4-4/0	512.6 (20.2)	1	2.5
J-Frame	200-250	(1) 3/0-350	512.6 (20.2)	1	3
L-Frame 100%	300-400	(2) 2/0-500	438.1 (17.2)	2	3.5
L-Frame 80%	300-600	(2) 2/0-500	438.1 (17.2)	2	3.5
M/P-Frame	250-800	(3) 3/0-500	405.3 (16)	3	3.5
P-Frame	1,000-2,000	(4) 3/0-500	405.3 (16)	4	3.5

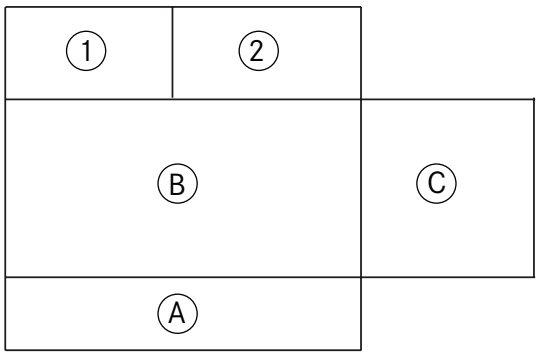
[1] Meets or exceeds NFPA 70 and NEC 312.6(B)
[2] Based on flexible metal conduit at 40% fill using THHN wire according to NEC table 4 and 5

NOTE: Equipment grounding terminal wire range: 6 AWG - 350 kcmil.

Table 3: Dual Enclosure Data



Top View - Right Side Breaker



Top View - Left Side Breaker

Figure 6: Dual Enclosure Breaker Mounting Positions

A. Controls
B. Outlet box
C. Alternator

1. Position 1 (Primary)
2. Position 2

TRIPLE ENCLOSURE

— Right side breakers shown. Left side breakers optional.
— Reference Figure 8 for breaker mounting positions.

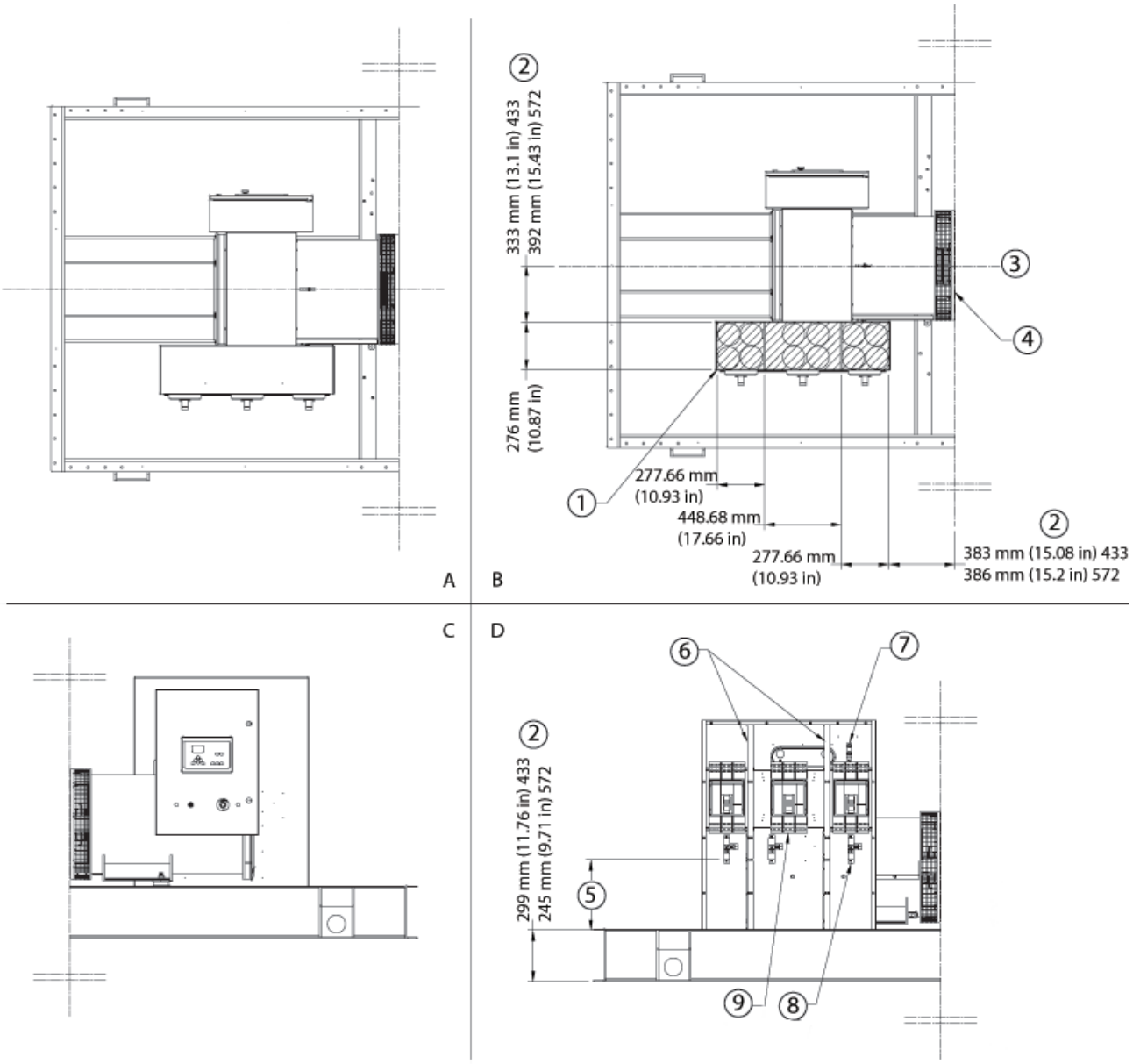


Figure 7: Triple Enclosure

A. Top view
B. Top view, bottom entry conduit area
C. Left view
D. Right view, breaker enclosure detail (enclosure cover not shown)

1. Bottom entry: Four conduit maximum
2. Dimensions per generator frame
3. Generator centerline
4. Rear face of flywheel housing
5. Dimension A
6. Separation panels
7. Equipment ground wire binding torque: 275 lb-in
8. 3X Neutral wire binding torque: 375 lb-in
9. 3X Customer connect end (recommended torque on label)

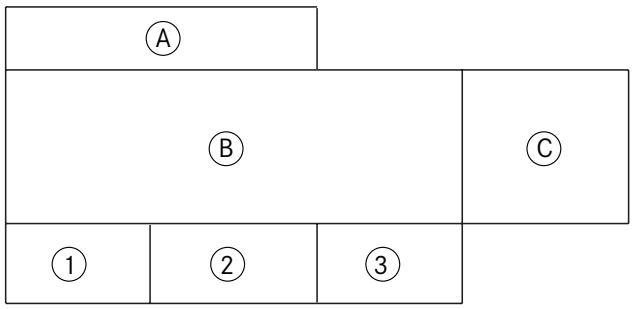
Circuit Breaker Enclosure Data Sheet - Diesel
350-400 kW Standby / 325-365 Prime

Available Circuit Breakers		Enclosure Data			
Breaker Frame	Amperage	Output Wire Range 90 °C Cu (wires per lug)	Wire Bending Space[1] Dimension A mm (in)	Conduit Quantity	Conduit Size[2] in
H-Frame	20-150	(1) 8-3/0	407.2 (16)	1	2
J-Frame	175	(1) 4-4/0	407.2 (16)	1	2.5
J-Frame	200-250	(1) 3/0-350	407.2 (16)	1	3
L-Frame 100%	300-400	(2) 2/0-500	407.2 (16)	2	3.5
L-Frame 80%	300-600	(2) 2/0-500	407.2 (16)	2	3.5
M-, P-Frame	250-800	(3) 3/0-500	407.2 (16)	3	3.5
P-Frame	1,000-2,000	(4) 3/0-500	407.2 (16)	4	3.5

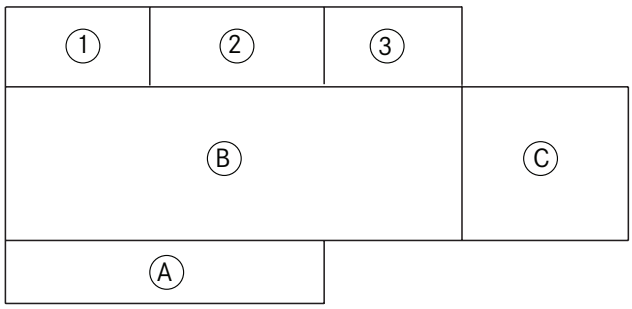
[1] Meets or exceeds NFPA 70 and NEC 312.6(B)
[2] Based on flexible metal conduit at 40% fill using THHN wire according to NEC table 4 and 5

NOTE: Equipment grounding terminal wire range: 6 AWG - 350 kcmil.

Table 4: Triple Enclosure Data



Top View - Right Side Breaker



Top View - Left Side Breaker

Figure 8: Triple Enclosure Breaker Mounting Positions

A. Controls
B. Outlet box
C. Alternator

1. Position 1 (Primary)
2. Position 2
3. Position 3

Circuit Breaker Enclosure Data Sheet - Diesel

60 Hz: 450-500 kW Standby / 400-450 kW Prime

50 Hz: 500-550 kVA Standby / 450-500 kVA Prime

DESCRIPTION

This circuit breaker enclosure data sheet is used in conjunction with dimensional drawings to assist with submittal documentation, specification requirements, and installation. This document summarizes the enclosure dimensions and mounting positions for the 60 Hz - ***mtu*** 10V1600 DS450 and ***mtu*** 10V1600 DS500, and 50 Hz - ***mtu*** 10V1600 DS500, ***mtu*** 10V1600 DS550 circuit breakers, including single (small and large), dual, and triple enclosures. The dimensional drawings will govern and should be referenced for installation.

SMALL SINGLE ENCLOSURE

- Small enclosure supplied with all 570 frame alternator applications.
- Right side breakers shown. Left side breakers optional.
- Reference Figure 2 for breaker mounting positions.

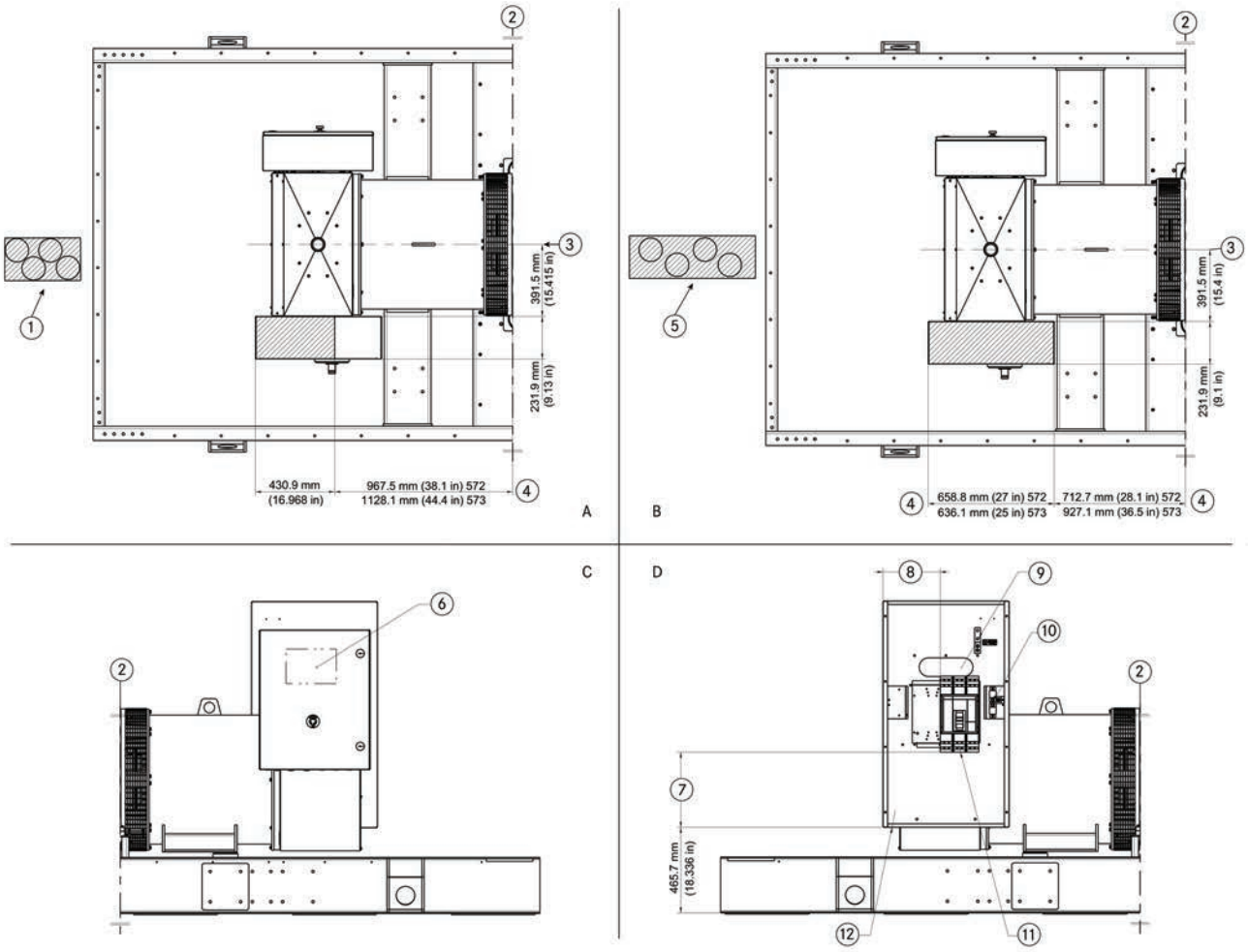


Figure 1: Small Single Enclosure

A. Top view, top entry conduit area
B. Top view, bottom entry conduit area
C. Left view, breaker enclosure detail
D. Right view, breaker enclosure detail (enclosure cover not shown)

1. Four conduit maximum
2. Rear face of flywheel housing
3. Generator centerline
4. Dimensions per generator frame
5. Four conduit displayed
6. Optional control panel location
7. Dimension A
8. Dimension B
9. Equipment ground terminal (torque to 275 in/lbs)
10. Neutral ASM (torque to 275 in/lbs)
11. Customer connect end (recommended torque on label)
12. Bottom entry conduit area

A Rolls-Royce solution

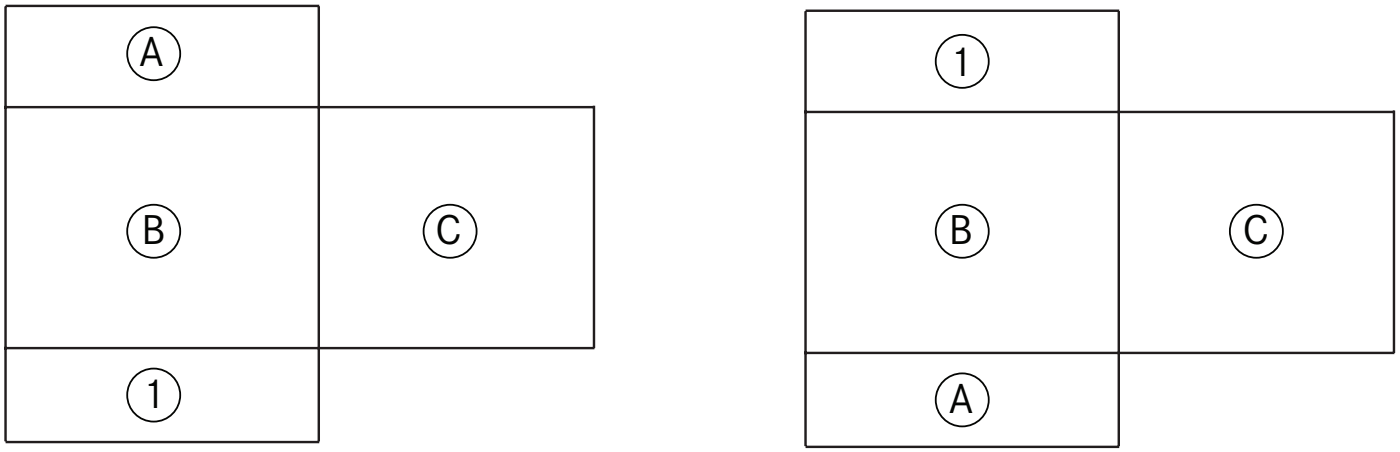
Circuit Breaker Enclosure Data Sheet - Diesel
60 Hz: 450-500 kW Standby / 400-450 kW Prime
50 Hz: 500-550 kVA Standby / 450-500 kVA Prime

Available Circuit Breakers		Enclosure Data				
Breaker Frame	Amperage	Output Wire Range 90 °C Cu (wires per lug)	Wire Bending Space[1] Dimension A mm (in)	Wire Gutter Space[1,2] Dimension B mm (in)	Conduit Quantity	Conduit Size[3] in
H-Frame	20-150	(1) 8-3/0	534.8 (21.1)	364.2 (14.3)	1	2
J-Frame	175	(1) 4-4/0	520.6 (20.5)	364.2 (14.3)	1	2.5
J-Frame	200-250	(1) 3/0-350	520.6 (20.5)	364.2 (14.3)	1	3
L-Frame 100%	300-400	(2) 2/0-500	446.1 (17.6)	346.2 (13.6)	2	3.5
L-Frame 80%	300-600	(2) 2/0-500	446.1 (17.6)	346.2 (13.6)	2	3.5
M/P-Frame	250-800	(3) 3/0-500	409.5 (16.1)	311.3 (12.3)	3	3.5
P-Frame	1,000-1,200	(4) 3/0-500	409.5 (16.1)	311.3 (12.3)	4	3.5

(1) Meets or exceeds NFPA 70, NEC 312.6(A), and NEC 312.6(B)
(2) Top entry only available for single breaker applications
(3) Based on flexible metal conduit at 40% fill using THHN wire according to NEC table 4 and 5

NOTE: Equipment grounding terminal wire range: 6 AWG - 350 kcmil.

Table 1: Small Single Enclosure Data



Top View - Right Side Breaker **Top View - Left Side Breaker**

Figure 2: Small Single Enclosure Breaker Mounting Positions

A. Controls
B. Outlet box
C. Alternator
1. Breaker

LARGE SINGLE ENCLOSURE

— Large enclosure supplied with all 570 frame alternator applications.
— Right side primary breaker shown. Left side primary breaker optional.
— Reference Figure 4 for breaker mounting positions.

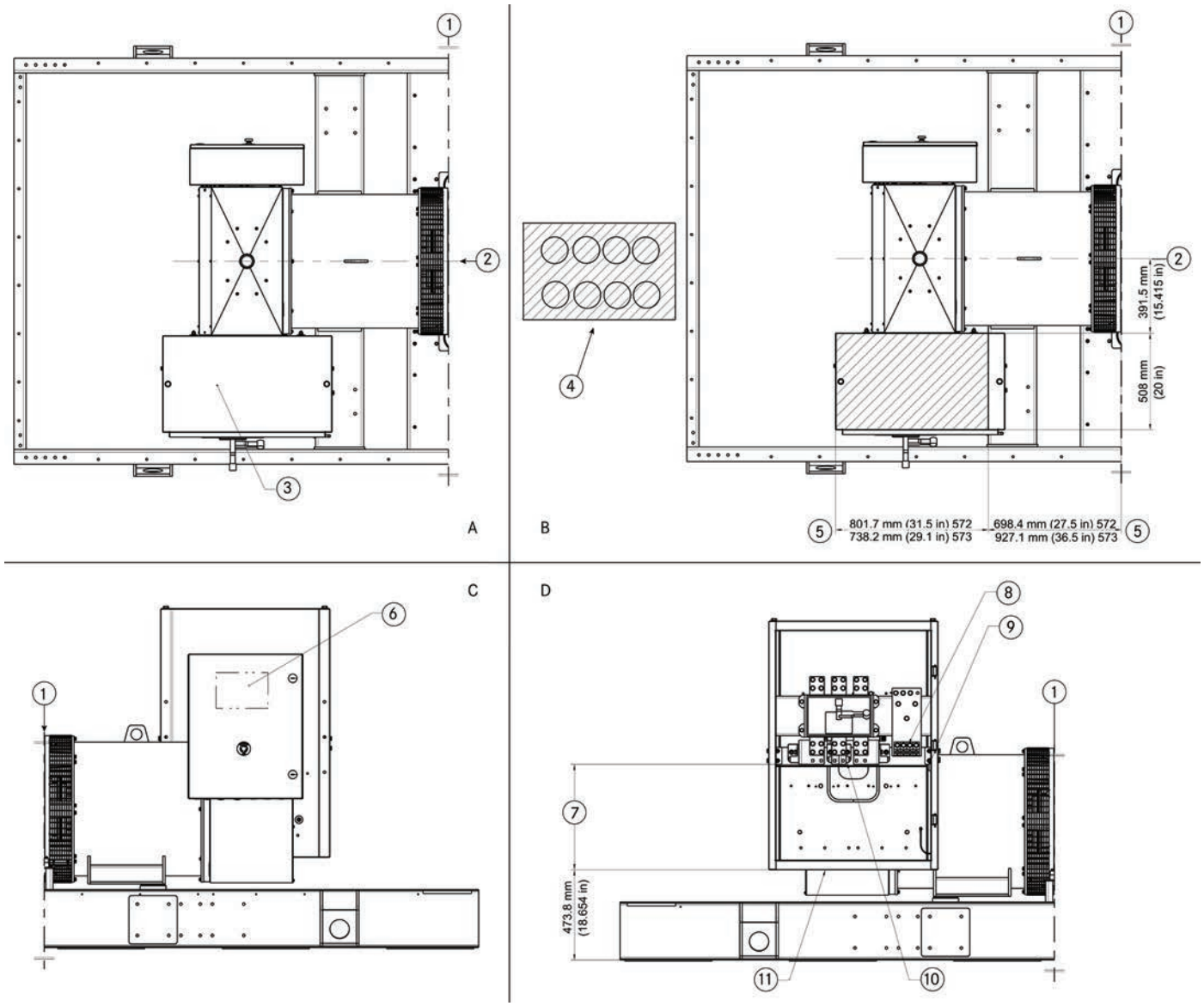


Figure 3: Large Single Enclosure

A. Top view, top entry conduit area
B. Top view, bottom entry conduit area
C. Left view, breaker enclosure detail
D. Right view, breaker enclosure detail (enclosure door not shown)

1. Rear face of flywheel housing
2. Generator centerline
3. Top entry not available with single R/NW breakers
4. Eight conduit displayed
5. Dimensions per generator frame
6. Optional control panel location
7. Dimension A
8. Neutral ASM (torque to 275 in/lbs)
9. Equipment ground terminal (torque to 275 in/lbs)
10. Customer connect end (recommended torque on label)
11. Bottom entry conduit area

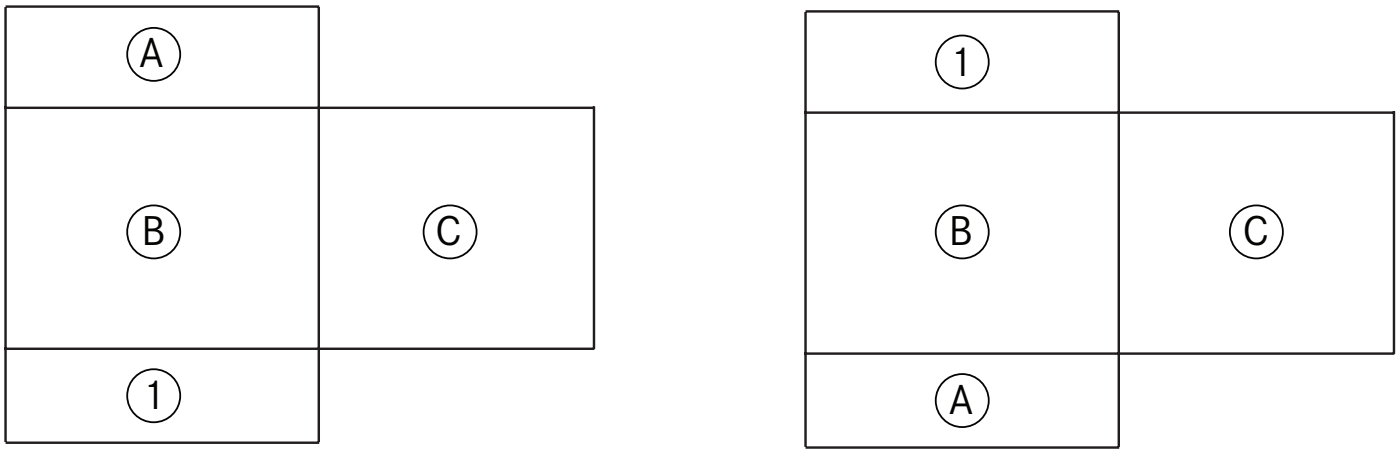
Circuit Breaker Enclosure Data Sheet - Diesel
60 Hz: 450-500 kW Standby / 400-450 kW Prime
50 Hz: 500-550 kVA Standby / 450-500 kVA Prime

Available Circuit Breakers		Enclosure Data			
Breaker Frame	Amperage	Output Wire Range 90 °C Cu (wires per lug)	Wire Bending Space[1] Dimension A mm (in)	Conduit Quantity	Conduit Size[2] in
R-Frame	1,600-2,500	(8) 1/0-750	563.9 (22.2)	8	4
NW-Frame	1,000-2,000	(8) 1/0-750	545 (21.5)	8	4

[1] Meets or exceeds NFPA 70 and NEC 312.6(B)
[2] Based on flexible metal conduit at 40% fill using THHN wire according to NEC table 4 and 5

NOTE: Equipment grounding terminal wire range: 6 AWG - 350 kcmil

Table 2: Large Single Enclosure Data



Top View - Right Side Breaker

Top View - Left Side Breaker

Figure 4: Large Single Enclosure Breaker Mounting Positions

A. Controls
B. Outlet box
C. Alternator

1. Breaker

DUAL ENCLOSURE

— Dual enclosure supplied with all 570 frame alternator applications.
— Right side primary breaker shown. Left side primary breaker optional.
— Reference Figure 6 for breaker mounting positions.

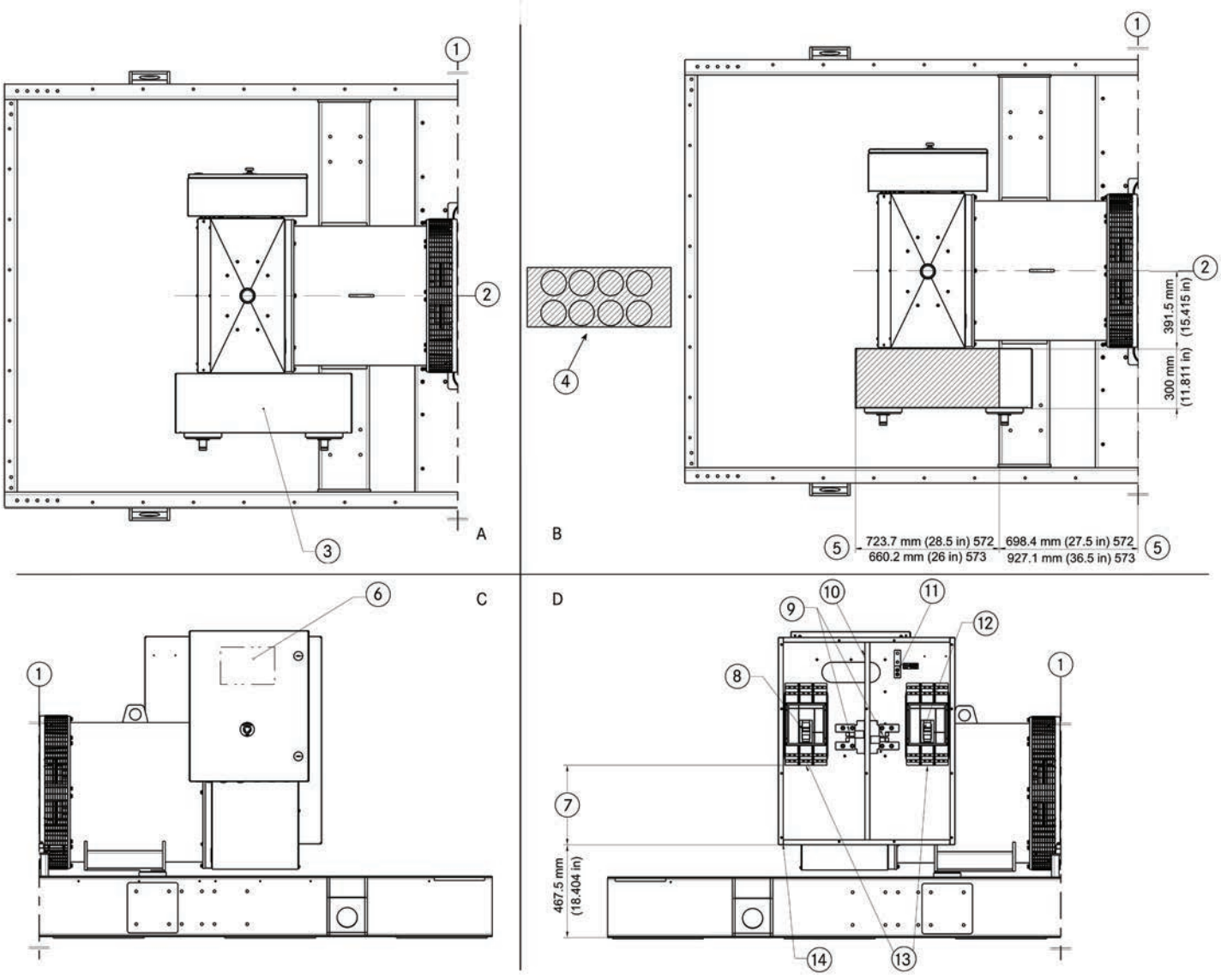


Figure 5: Dual Enclosure

A. Top view, top entry conduit area
B. Top view, bottom entry conduit area
C. Left view, breaker enclosure detail
D. Right view, breaker enclosure detail (enclosure cover not shown)

1. Rear face of flywheel housing
2. Generator centerline
3. Top entry not available with dual breakers
4. Eight conduits displayed
5. Dimensions per generator frame
6. Optional control panel location
7. Dimension A
8. Primary breaker
9. Neutral ASM (torque to 275 in/lbs)
10. Divider wall (included with second breaker)
11. Equipment ground terminal (torque to 275 in/lbs)
12. Secondary breaker
13. Customer connect end (recommended torque on label)
14. Bottom entry conduit area

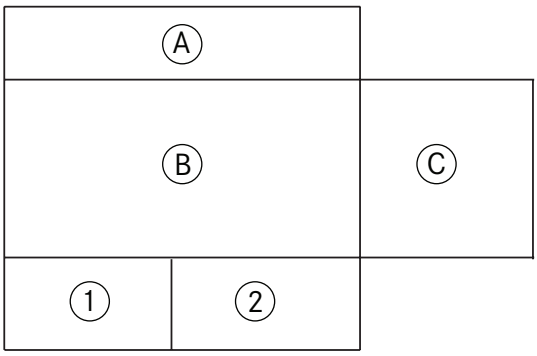
Circuit Breaker Enclosure Data Sheet - Diesel
60 Hz: 450-500 kW Standby / 400-450 kW Prime
50 Hz: 500-550 kVA Standby / 450-500 kVA Prime

Available Circuit Breakers		Enclosure Data			
Breaker Frame	Amperage	Output Wire Range 90 °C Cu (wires per lug)	Wire Bending Space[1] Dimension A mm (in)	Conduit Quantity	Conduit Size[2] in
H-Frame	20-150	(1) 8-3/0	526.8 (20.7)	1	2
J-Frame	175	(1) 4-4/0	512.6 (20.2)	1	2.5
J-Frame	200-250	(1) 3/0-350	512.6 (20.2)	1	3
L-Frame 100%	300-400	(2) 2/0-500	438.1 (17.2)	2	3.5
L-Frame 80%	300-600	(2) 2/0-500	438.1 (17.2)	2	3.5
M-, P-Frame	250-800	(3) 3/0-500	405.3 (16)	3	3.5
P-Frame	1,000-1,200	(4) 3/0-500	405.3 (16)	4	3.5

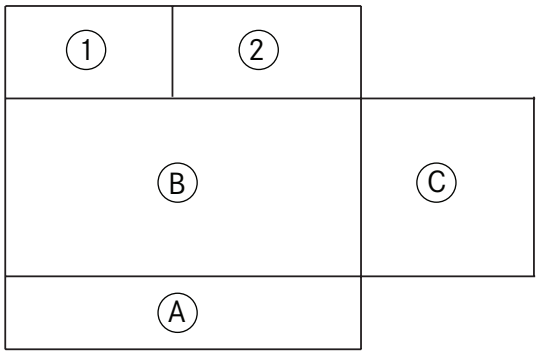
[1] Meets or exceeds NFPA 70 and NEC 312.6(B)
[2] Based on flexible metal conduit at 40% fill using THHN wire according to NEC table 4 and 5

NOTE: Equipment grounding terminal wire range: 6 AWG - 350 kcmil

Table 3: Dual Enclosure Data



Top View - Right Side Breaker



Top View - Left Side Breaker

Figure 6: Dual Enclosure Breaker Mounting Positions

A. Controls
B. Outlet box
C. Alternator

1. Position 1 (Primary)
2. Position 2

TRIPLE ENCLOSURE

- Triple enclosure supplied with all 570 frame alternator applications.
- Right side primary breaker shown. Left side primary breaker optional.
- Reference Figure 8 for breaker mounting positions.

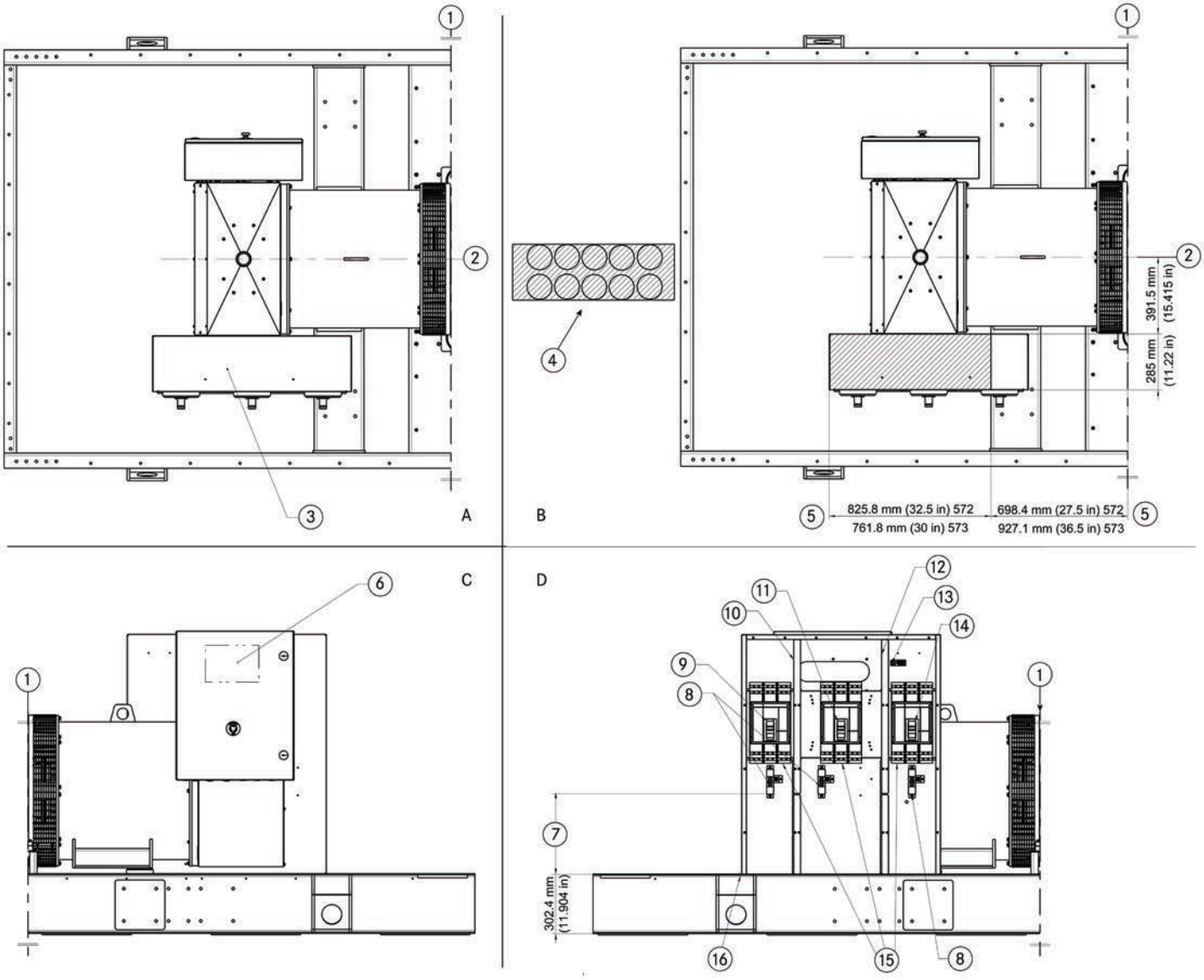


Figure 7: Triple Enclosure

A. Top view, top entry conduit area
B. Top view, bottom entry conduit area
C. Left view, breaker enclosure detail
D. Right view, breaker enclosure detail (enclosure cover not shown)

1. Rear face of flywheel housing
2. Generator centerline
3. Top entry not available with triple breakers
4. Ten conduit maximum
5. Dimensions per generator frame
6. Optional control panel location
7. Dimension A
8. Neutral ASM (torque to 275 in/lbs)
9. Primary breaker
10. Divider wall (included with second breaker)
11. Secondary breaker (800 Amp max)
12. Divider wall (included with third breaker)
13. Equipment ground terminal (torque to 275 in/lbs)
14. Third breaker (800 Amp max)
15. Customer connect end (recommended torque on label)
16. Bottom entry conduit area

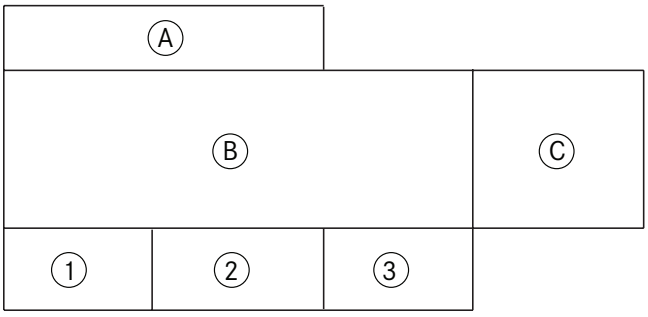
Circuit Breaker Enclosure Data Sheet - Diesel
60 Hz: 450-500 kW Standby / 400-450 kW Prime
50 Hz: 500-550 kVA Standby / 450-500 kVA Prime

Available Circuit Breakers		Enclosure Data			
Breaker Frame	Amperage	Output Wire Range 90 °C Cu (wires per lug)	Wire Bending Space[1] Dimension A mm (in)	Conduit Quantity	Conduit Size[2] in
H-Frame	20-150	(1) 8-3/0	407.2 (16)	1	2
J-Frame	175	(1) 4-4/0	407.2 (16)	1	2.5
J-Frame	200-250	(1) 3/0-350	407.2 (16)	1	3
L-Frame 100%	300-400	(2) 2/0-500	407.2 (16)	2	3.5
L-Frame 80%	300-600	(2) 2/0-500	407.2 (16)	2	3.5
M-, P-Frame	250-800	(3) 3/0-500	407.2 (16)	3	3.5
P-Frame	1,000-1,200	(4) 3/0-500	407.2 (16)	4	3.5

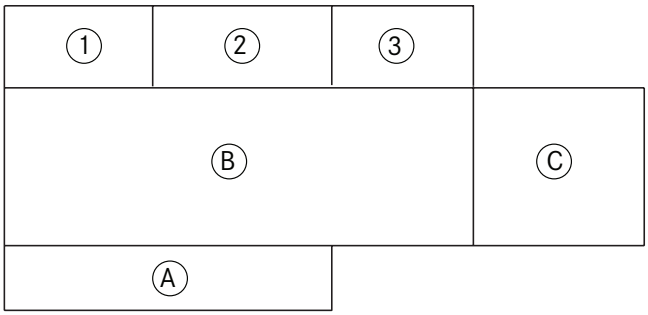
[1] Meets or exceeds NFPA 70 and NEC 312.6(B)
[2] Based on flexible metal conduit at 40% fill using THHN wire according to NEC table 4 and 5

NOTE: Equipment grounding terminal wire range: 6 AWG - 350 kcmil

Table 4: Triple Enclosure Data



Top View - Right Side Breaker



Top View - Left Side Breaker

Figure 8: Triple Enclosure Breaker Mounting Positions

A. Controls
B. Outlet box
C. Alternator

1. Position 1 (Primary)
2. Position 2
3. Position 3

Subject to change. 2021-03

Circuit Breaker Enclosure Data Sheet - Diesel

60 Hz: 550-600 kW Standby / 500-550 kW Prime

50 Hz: 650-715 kVA Standby / 590-650 kVA Prime

DESCRIPTION

This circuit breaker enclosure data sheet is used in conjunction with dimensional drawings to assist with submittal documentation, specification requirements, and installation. This document summarizes the enclosure dimensions and mounting positions for the 60 Hz - ***mtu*** 12V1600 DS550 and ***mtu*** 12V1600 DS600, and 50 Hz - ***mtu*** 12V1600 DS650, ***mtu*** 12V1600 DS715 circuit breakers, including single (small and large), dual, and triple enclosures. The dimensional drawings will govern and should be referenced for installation.

SMALL SINGLE ENCLOSURE

- Small enclosure supplied with all 570 frame alternator applications.
- Right side breakers shown. Left side breakers optional.
- Reference Figure 2 for breaker mounting positions.

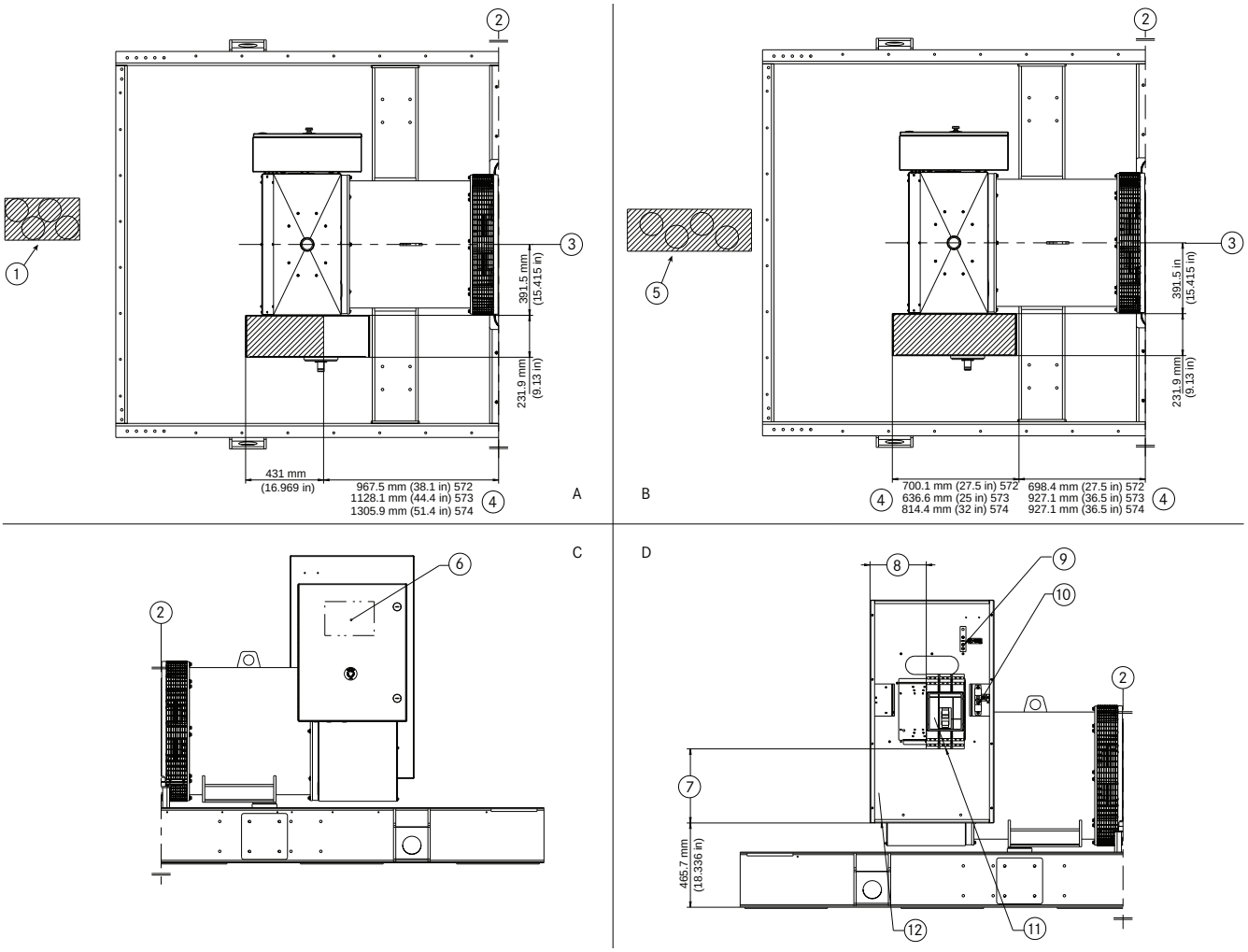


Figure 1: Small Single Enclosure

A. Top view, top entry conduit area
B. Top view, bottom entry conduit area
C. Left view, breaker enclosure detail
D. Right view, breaker enclosure detail (enclosure cover not shown)

1. Four conduit maximum
2. Rear face of flywheel housing
3. Generator centerline
4. Dimensions per generator frame
5. Four conduit displayed
6. Optional control panel location
7. Dimension A
8. Dimension B
9. Equipment ground terminal (torque to 275 in/lbs)
10. Neutral ASM (torque to 275 in/lbs)
11. Customer connect end (recommended torque on label)
12. Bottom entry conduit area

A Rolls-Royce solution

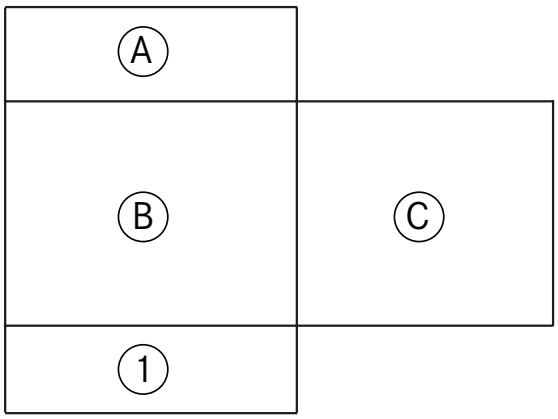
Circuit Breaker Enclosure Data Sheet - Diesel
60 Hz: 550-600 kW Standby / 500-550 kW Prime
50 Hz: 650-715 kVA Standby / 590-650 kVA Prime

Available Circuit Breakers		Enclosure Data				
Breaker Frame	Amperage	Output Wire Range 90 °C Cu (wires per lug)	Wire Bending Space[1] Dimension A mm (in)	Wire Gutter Space[1,2] Dimension B mm (in)	Conduit Quantity	Conduit Size[3] in
H-Frame	20-150	(1) 8-3/0	534.8 (21.1)	364.2 (14.3)	1	2
J-Frame	175	(1) 4-4/0	520.6 (20.5)	364.2 (14.3)	1	2.5
J-Frame	200-250	(1) 3/0-350	520.6 (20.5)	364.2 (14.3)	1	3
L-Frame 100%	300-400	(2) 2/0-500	446.1 (17.6)	346.2 (13.6)	2	3.5
L-Frame 80%	300-600	(2) 2/0-500	446.1 (17.6)	346.2 (13.6)	2	3.5
M/P-Frame	250-800	(3) 3/0-500	409.5 (16.1)	311.3 (12.3)	3	3.5
P-Frame	1,000-1,200	(4) 3/0-500	409.5 (16.1)	311.3 (12.3)	4	3.5

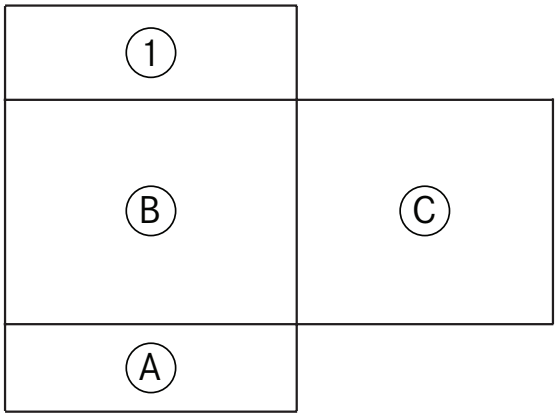
(1) Meets or exceeds NFPA 70, NEC 312.6(A), and NEC 312.6(B)
(2) Top entry only available for single breaker applications
(3) Based on flexible metal conduit at 40% fill using THHN wire according to NEC table 4 and 5

NOTE: Equipment grounding terminal wire range: 6 AWG - 350 kcmil.

Table 1: Small Single Enclosure Data



Top View - Right Side Breaker



Top View - Left Side Breaker

Figure 2: Small Single Enclosure Breaker Mounting Positions

A. Controls
B. Outlet box
C. Alternator

1. Breaker

LARGE SINGLE ENCLOSURE

- Large enclosure supplied with all 570 frame alternator applications.
- Right side primary breaker shown. Left side primary breaker optional.
- Reference Figure 4 for breaker mounting positions.

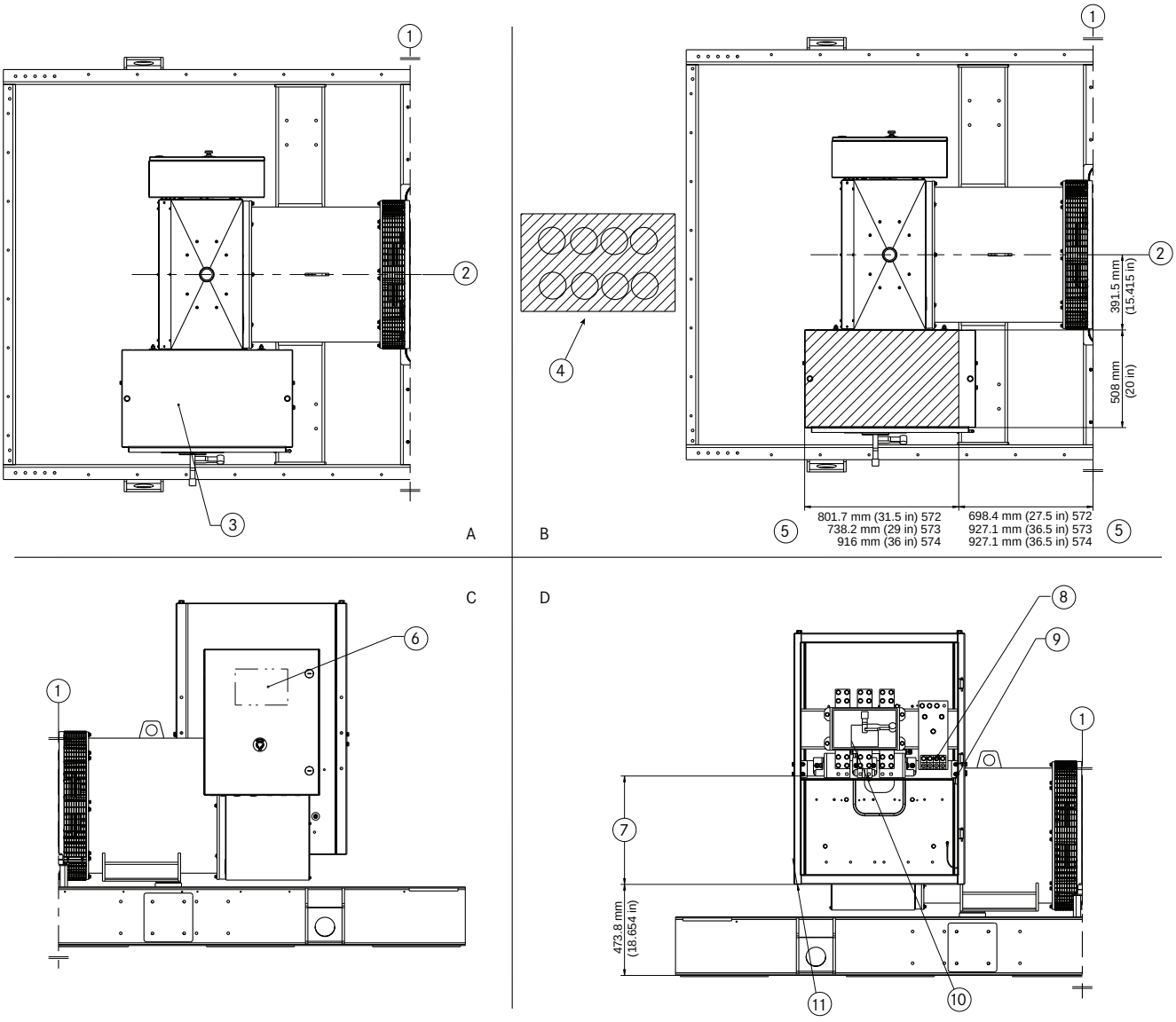


Figure 3: Large Single Enclosure

A. Top view, top entry conduit area
B. Top view, bottom entry conduit area
C. Left view, breaker enclosure detail
D. Right view, breaker enclosure detail (enclosure door not shown)

1. Rear face of flywheel housing
2. Generator centerline
3. Top entry not available with single R/NW breakers
4. Eight conduit displayed
5. Dimensions per generator frame
6. Optional control panel location
7. Dimension A
8. Neutral ASM (torque to 275 in/lbs)
9. Equipment ground terminal (torque to 275 in/lbs)
10. Customer connect end (recommended torque on label)
11. Bottom entry conduit area

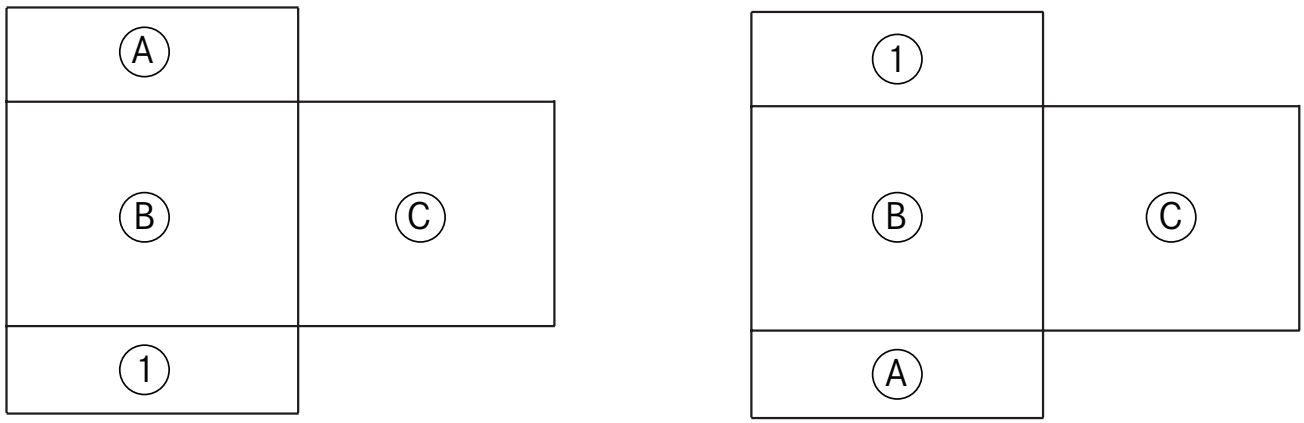
Circuit Breaker Enclosure Data Sheet - Diesel
60 Hz: 550-600 kW Standby / 500-550 kW Prime
50 Hz: 650-715 kVA Standby / 590-650 kVA Prime

Available Circuit Breakers		Enclosure Data			
Breaker Frame	Amperage	Output Wire Range 90 °C Cu (wires per lug)	Wire Bending Space[1] Dimension A mm (in)	Conduit Quantity	Conduit Size[2] in
R-Frame	1,600-2,500	(8) 1/0-750	563.9 (22.2)	8	4
NW-Frame	1,000-2,000	(8) 1/0-750	545 (21.5)	8	4

[1] Meets or exceeds NFPA 70 and NEC 312.6(B)
[2] Based on flexible metal conduit at 40% fill using THHN wire according to NEC table 4 and 5

NOTE: Equipment grounding terminal wire range: 6 AWG - 350 kcmil.

Table 2: Large Single Enclosure Data



Top View - Right Side Breaker **Top View - Left Side Breaker**

Figure 4: Large Single Enclosure Breaker Mounting Positions

A. Controls
B. Outlet box
C. Alternator
1. Breaker

DUAL ENCLOSURE

- Dual enclosure supplied with all 570 frame alternator applications.
- Right side primary breaker shown. Left side primary breaker optional.
- Reference Figure 6 for breaker mounting positions.

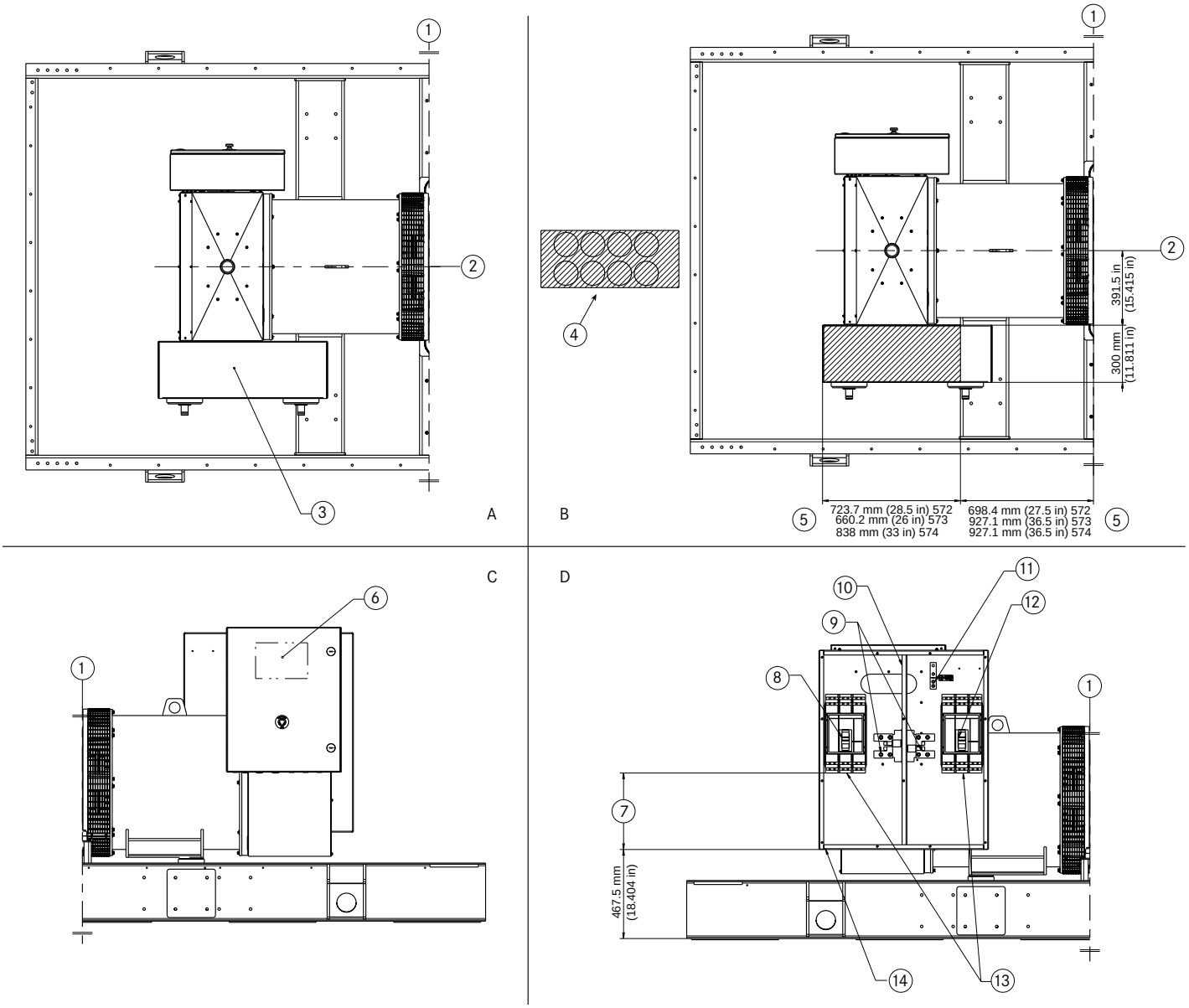


Figure 5: Dual Enclosure

A. Top view, top entry conduit area
B. Top view, bottom entry conduit area
C. Left view, breaker enclosure detail
D. Right view, breaker enclosure detail (enclosure cover not shown)

1. Rear face of flywheel housing
2. Generator centerline
3. Top entry not available with dual breakers
4. Eight conduit displayed
5. Dimensions per generator frame
6. Optional control panel location
7. Dimension A
8. Primary breaker
9. Neutral ASM (torque to 275 in/lbs)
10. Divider wall (included with second breaker)
11. Equipment ground terminal (torque to 275 in/lbs)
12. Secondary breaker
13. Customer connect end (recommended torque on label)
14. Bottom entry conduit area

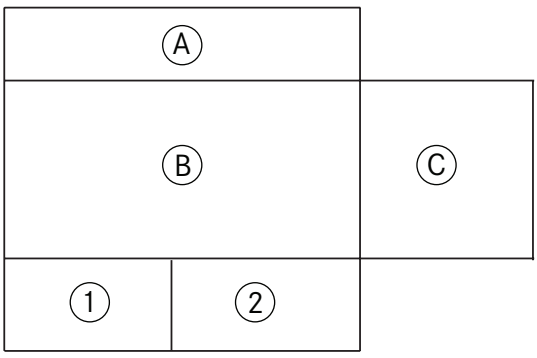
Circuit Breaker Enclosure Data Sheet - Diesel
60 Hz: 550-600 kW Standby / 500-550 kW Prime
50 Hz: 650-715 kVA Standby / 590-650 kVA Prime

Available Circuit Breakers		Enclosure Data			
Breaker Frame	Amperage	Output Wire Range 90 °C Cu (wires per lug)	Wire Bending Space[1] Dimension A mm (in)	Conduit Quantity	Conduit Size[3] in
H-Frame	20-150	(1) 8-3/0	526.8 (20.7)	1	2
J-Frame	175	(1) 4-4/0	512.6 (20.2)	1	2.5
J-Frame	200-250	(1) 3/0-350	512.6 (20.2)	1	3
L-Frame 100%	300-400	(2) 2/0-500	438.1 (17.2)	2	3.5
L-Frame 80%	300-600	(2) 2/0-500	438.1 (17.2)	2	3.5
M/P-Frame	250-800	(3) 3/0-500	405.3 (16)	3	3.5
P-Frame	1,000-1,200	(4) 3/0-500	405.3 (16)	4	3.5

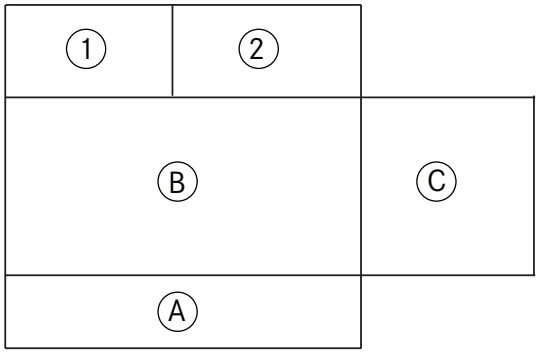
[1] Meets or exceeds NFPA 70 and NEC 312.6(B)
[2] Based on flexible metal conduit at 40% fill using THHN wire according to NEC table 4 and 5

NOTE: Equipment grounding terminal wire range: 6 AWG - 350 kcmil.

Table 3: Dual Enclosure Data



Top View - Right Side Breaker



Top View - Left Side Breaker

Figure 6: Dual Enclosure Breaker Mounting Positions

A. Controls
B. Outlet box
C. Alternator

1. Position 1 (Primary)
2. Position 2

TRIPLE ENCLOSURE

— Triple enclosure supplied with all 570 frame alternator applications.
— Right side primary breaker shown. Left side primary breaker optional.
— Reference Figure 8 for breaker mounting positions.

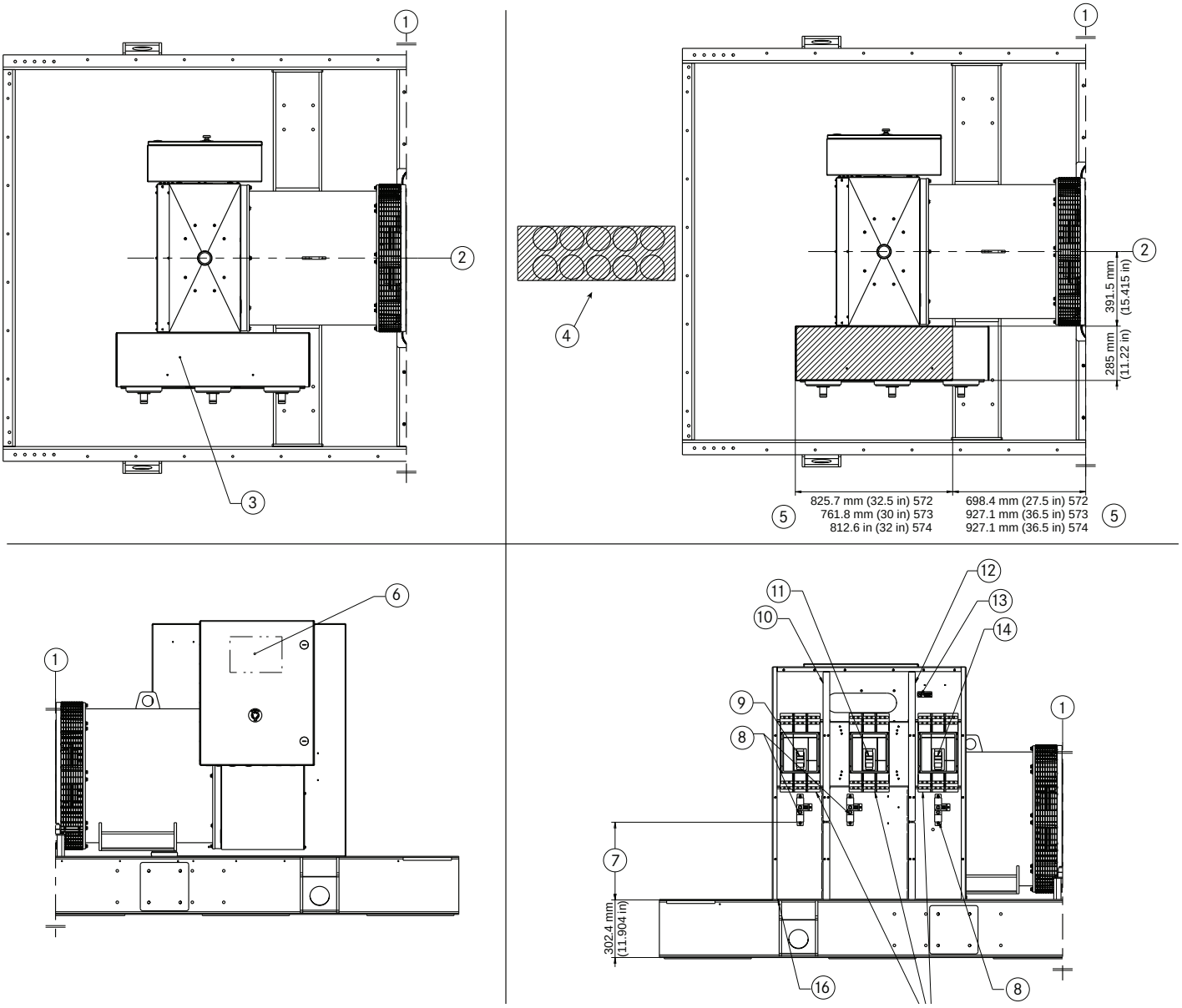


Figure 7: Triple Enclosure

A. Top view, top entry conduit area
B. Top view, bottom entry conduit area
C. Left view, breaker enclosure detail
D. Right view, breaker enclosure detail (enclosure cover not shown)

1. Rear face of flywheel housing
2. Generator centerline
3. Top entry not available with triple breakers
4. Ten conduit maximum
5. Dimensions per generator frame
6. Optional control panel location
7. Dimension A
8. Neutral ASM (torque to 275 in/lbs)
9. Primary breaker
10. Divider wall (included with second breaker)
11. Secondary breaker (800 Amp max)
12. Divider wall (included with third breaker)
13. Equipment ground terminal (torque to 275 in/lbs)
14. Third breaker (800 Amp max)
15. Customer connect end (recommended torque on label)
16. Bottom entry conduit area

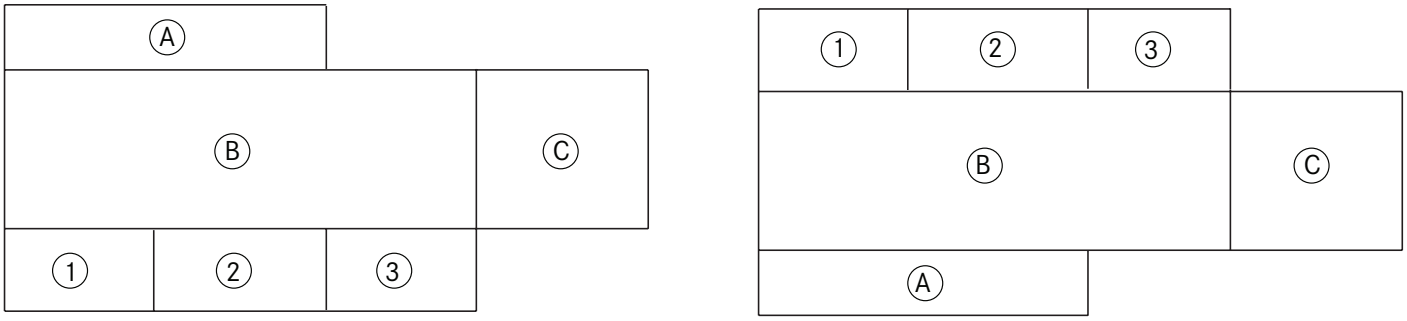
Circuit Breaker Enclosure Data Sheet - Diesel
60 Hz: 550-600 kW Standby / 500-550 kW Prime
50 Hz: 650-715 kVA Standby / 590-650 kVA Prime

Available Circuit Breakers		Enclosure Data			
Breaker Frame	Amperage	Output Wire Range 90 °C Cu (wires per lug)	Wire Bending Space[1] Dimension A mm (in)	Conduit Quantity	Conduit Size[2] in
H-Frame	20-150	(1) 8-3/0	407.2 (16)	1	2
J-Frame	175	(1) 4-4/0	407.2 (16)	1	2.5
J-Frame	200-250	(1) 3/0-350	407.2 (16)	1	3
L-Frame 100%	300-400	(2) 2/0-500	407.2 (16)	2	3.5
L-Frame 80%	300-600	(2) 2/0-500	407.2 (16)	2	3.5
M/P-Frame	250-800	(3) 3/0-500	407.2 (16)	3	3.5
P-Frame	1,000-1,200	(4) 3/0-500	407.2 (16)	4	3.5

[1] Meets or exceeds NFPA 70 and NEC 312.6(B)
[2] Based on flexible metal conduit at 40% fill using THHN wire according to NEC table 4 and 5

NOTE: Equipment grounding terminal wire range: 6 AWG - 350 kcmil.

Table 4: Triple Enclosure Data



Top View - Right Side Breaker

Top View - Left Side Breaker

Figure 8: Triple Enclosure Breaker Mounting Positions

A. Controls
B. Outlet box
C. Alternator

1. Position 1 (Primary)
2. Position 2
3. Position 3

Subject to change. 2021-03

Circuit Breaker Enclosure Data Sheet - Diesel

750-1,250 kW Standby / 680-900 kW Prime

DESCRIPTION

This circuit breaker enclosure data sheet is used in conjunction with dimensional drawings to assist with submittal documentation, specification requirements, and installation. This document summarizes the enclosure dimensions and mounting positions for the ***mtu*** 12V2000 DS750, ***mtu*** 12V2000 DS800, ***mtu*** 16V2000 DS1000, and ***mtu*** 16V2000 DS1250 circuit breakers, including single, dual, and triple enclosures. The dimensional drawings will govern and should be referenced for installation.

BREAKER LAYOUT

- Left side controls shown. Right side controls optional.
- Reference Figure 2 and Table 2 for available breaker mounting positions.

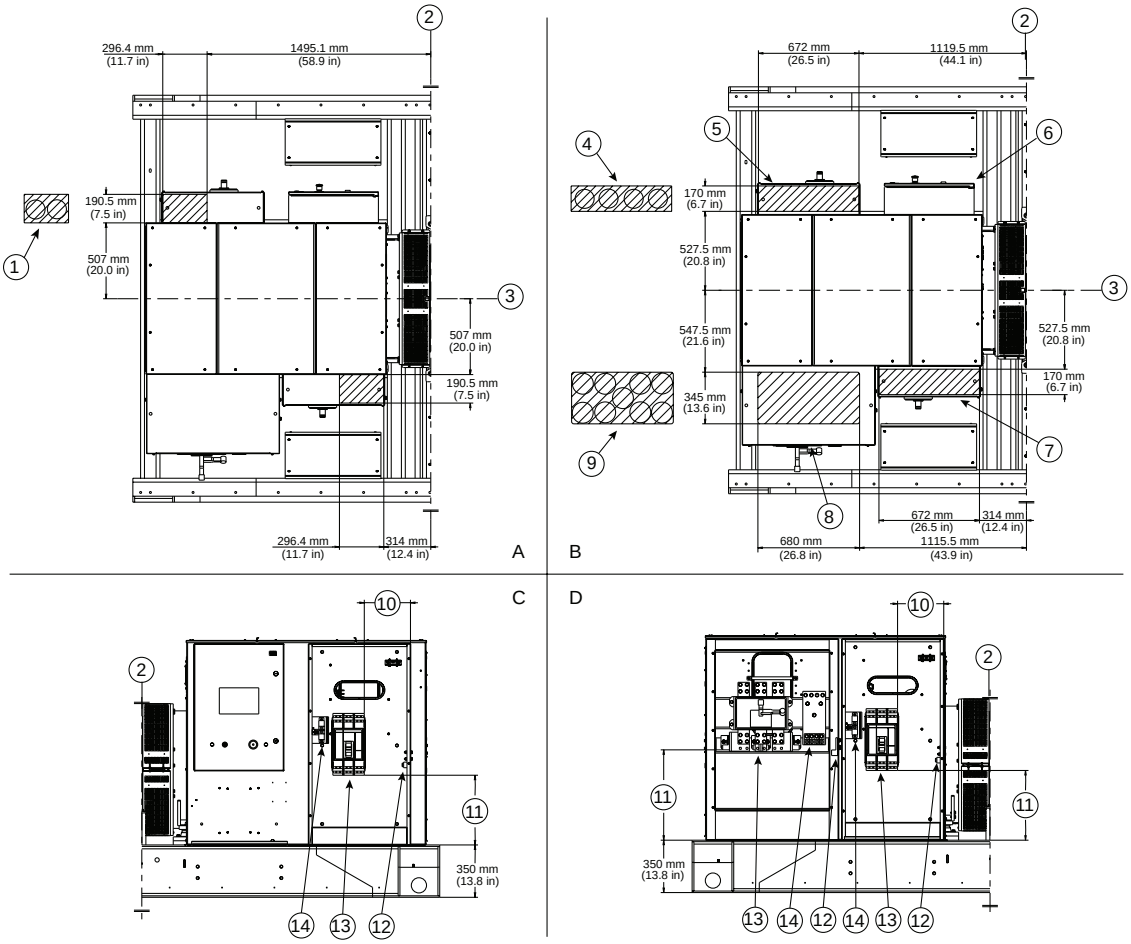


Figure 1: Enclosure

A. Top view, top entry conduit area
B. Top view, bottom entry conduit area
C. Left view, breaker enclosure detail (enclosure cover not shown)
D. Right view, breaker enclosure detail (enclosure cover not shown)

1. Two conduit maximum (top entry)
2. Rear face of flywheel housing
3. Generator centerline
4. Four conduit maximum (bottom entry, ≤1200 amp enclosure)
5. Breaker postion 2 (≤1200 amp enclosure shown)
6. Controls position
7. Breaker postion 3 (≤1200 amp enclosure shown)
8. Breaker position 1 (>1200 amp enclosure shown)
9. Nine conduit maximum (bottom entry, >1200 amp enclosure)
10. Dimension B
11. Dimension A
12. Equipment ground terminal wire binding torque: 500 lb-in
13. Customer connect end breaker wire binding torque: 50 lb-in (H-Frame breaker) 225 lb-in (J-Frame Breaker) 442 lb-in (L, M, P-Frame breaker) 46 lb-ft (NW, R-Frame breaker)
14. Neutral wire binding torque: 375 lb-in (≤1200 amp) 46 lb-ft (>1200 amp)

A Rolls-Royce solution

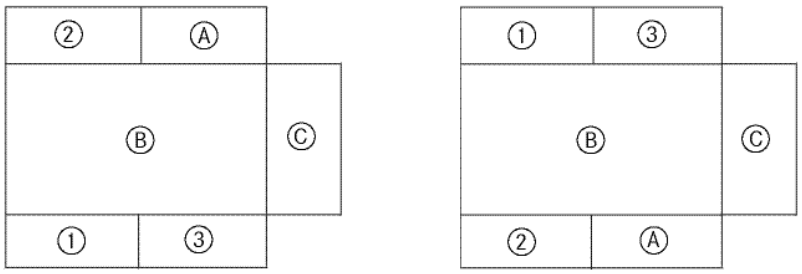
Circuit Breaker Enclosure Data Sheet - Diesel
750-1,250 kW Standby / 680-900 kW Prime

Available Circuit Breakers		Enclosure Data				
Breaker Frame	Amperage	Output Wire Range 90 °C Cu (wires per lug)	Wire Bending Space[1] Dimension A mm (in)	Wire Gutter Space[1,2] Dimension B mm (in)	Conduit Quantity	Conduit Size[3] in
H-Frame	20-150	(1) 8-3/0	591 (23.27)	361 (14.21)	1	2
J-Frame	175	(1) 4-4/0	577 (22.72)	361 (14.21)	1	2.5
J-Frame	200-250	(1) 3/0-350	577 (22.72)	361 (14.21)	1	3
L-Frame 100%	300-400	(2) 2/0-500	502 (19.76)	344 (13.54)	2	3.5
L-Frame 80%	300-600	(2) 2/0-500	502 (19.76)	344 (13.54)	2	3.5
M/P-Frame	250-800	(3) 3/0-500	466 (18.35)	N/A	3	3.5
P-Frame	1,000-1,200	(4) 3/0-500	466 (18.35)	N/A	4	3.5
R/NW-Frame	1,600-2,500	(8) 1/0-750	604 (23.78)	N/A	8	4
R/NW-Frame 80%	3,000	(8) 1/0-750	604 (23.78)	N/A	8	4
R/NW-Frame 100%	3,000	(9) 1/0-750	604 (23.78)	N/A	9	4

(1) Meets or exceeds NFPA 70, NEC 312.6(A), and NEC 312.6(B)
(2) Top entry only available for breakers rated for 600 amps and below.
(3) Based on flexible metal conduit at 40% fill using THHN wire

NOTE: Equipment grounding terminal wire range: 2 AWG - 600 kcmil

Table 1: Enclosure Data



Top View - Left Side Controls Top View - Right Side Controls

Figure 2: Available Breaker Mounting Positions

A. Controls
B. Outlet box
C. Alternator
1. Position 1
2. Position 2
3. Position 3

Breaker Frame Size	Position 1 (Primary)	Position 2	Position 3
H	X	X	X
J	X	X	X
L	X	X	X
M	X	X	X
P	X	X	X
R	X	X	N/A
NW	X	X	N/A

Table 2: Available Breaker Mounting Positions

Circuit Breaker Enclosure Data Sheet - Diesel

1,135-1,750 kW Standby

DESCRIPTION

This circuit breaker enclosure data sheet is used in conjunction with dimensional drawings to assist with submittal documentation, specification requirements, and installation. This document summarizes the enclosure dimensions and mounting positions for the ***mtu*** 12V4000 DS1250, ***mtu*** 12V4000 DS1500, and ***mtu*** 12V4000 DS1750 circuit breakers with single enclosures. The dimensional drawings will govern and should be referenced for installation.

20 AMP TO 1,200 AMP H-FRAME, J-FRAME, L-FRAME, P-FRAME, M-FRAME ENCLOSURE (LS 50.2)

Reference Figure 11 for breaker mounting positions.

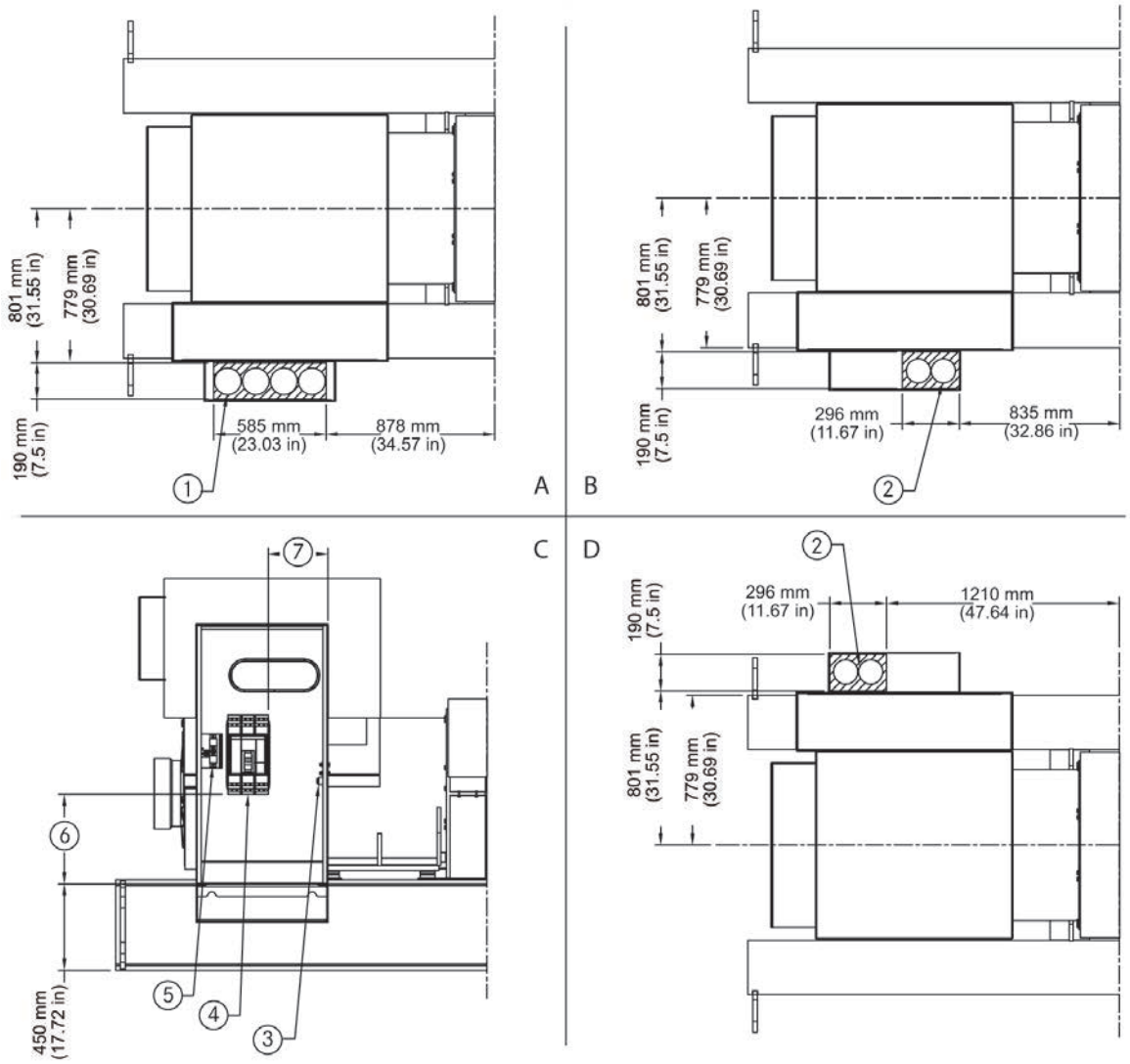


Figure 1: 20 Amp to 1,200 Amp H-Frame, J-Frame, L-Frame, P-Frame, M-Frame Enclosure (LS 50.2)

A. Top view, top and bottom entry conduit area
B. Top view, top entry conduit area
C. Right view
D. Top view, top entry

1. Four conduit maximum (top and bottom entry)
2. Two conduit maximum (top entry)
3. Equipment ground terminal. Wire binding torque: 500 lb-in
4. Customer connect end. Breaker wire binding torque: 50 lb-in (H-Frame breaker), 225 lb-in (J-Frame Breaker), 442 lb-in (L, P, M-Frame breaker)
5. Neutral, top entry. Wire binding torque: 375 lb-in (≤1200 amp), 46 lb-ft (>1200 amp)
6. Dimension A (see Table 1)
7. Dimension B (see Table 1)

1,600 AMP TO 3,000 AMP R-FRAME, NW-FRAME ENCLOSURE (LS 50.2)

Reference Figure 11 for breaker mounting positions.

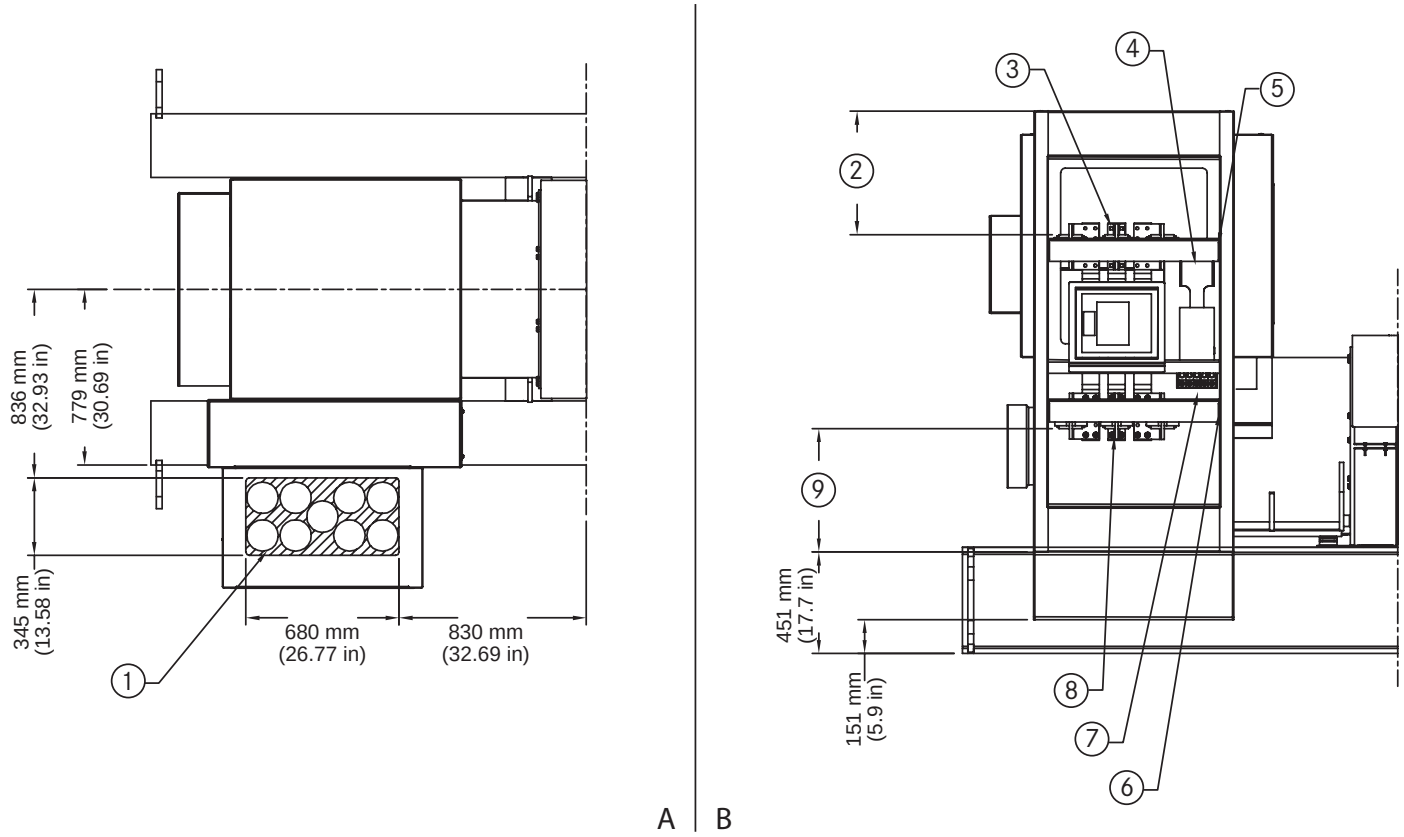


Figure 2: 1,600 Amp to 3,000 Amp R-Frame, NW-Frame Enclosure (LS 50.2)

A. Top view, top and bottom entry conduit area
B. Right view, breaker enclosure detail (enclosure cover not shown)

1. Top and bottom entry, nine conduit maximum
2. Dimension C (see Table 1)
3. Customer connect, top entry. Breaker wire binding torque: 46 lb-ft (R, NW-Frame breaker)
4. Neutral, top entry. Wire binding torque: 375 lb-in (≤1200 amp), 46 lb-ft (>1200 amp)
5. Equipment ground wire, top entry. Wire binding torque: 500 lb-in
6. Equipment ground wire, bottom entry. Wire binding torque: 500 lb-in
7. Neutral, bottom entry. Wire binding torque: 375 lb-in (≤1200 amp), 46 lb-ft (>1200 amp)
8. Customer connect, bottom entry. Breaker wire binding torque: 46 lb-ft (R, NW-Frame breaker)
9. Dimension A (see Table 1)

20 AMP TO 1,200 AMP H-FRAME, J-FRAME, L-FRAME, P-FRAME, M-FRAME ENCLOSURE (LS 641)

Reference Figure 11 for breaker mounting positions.

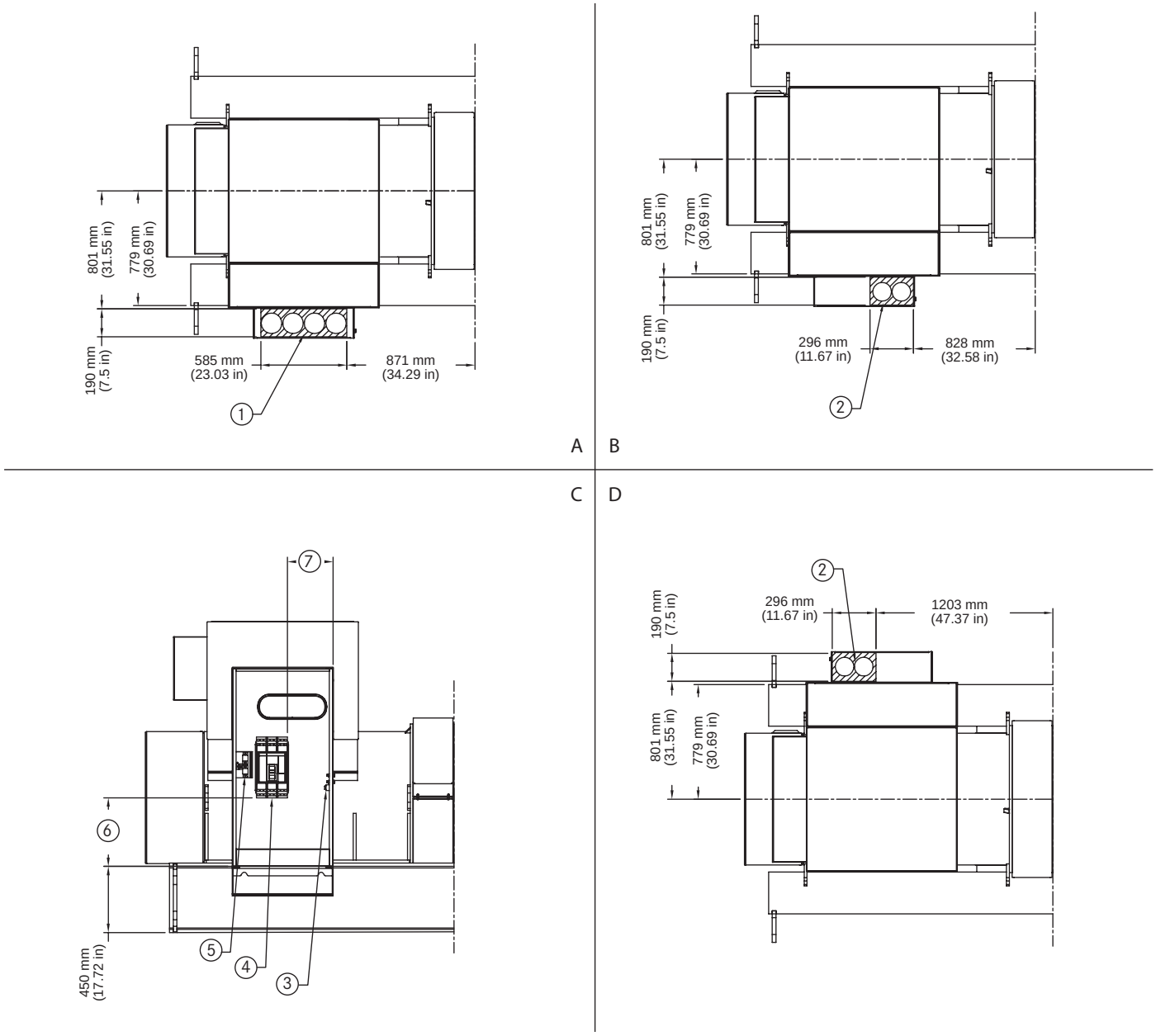


Figure 3: 20 Amp to 1,200 Amp H-Frame, J-Frame, L-Frame, P-Frame, M-Frame Enclosure (LS 641)

A. Top view, top and bottom entry conduit area
B. Top view, top entry conduit area
C. Right view
D. Top view, top entry

1. Four conduit maximum (top and bottom entry)
2. Two conduit maximum (top entry)
3. Equipment ground terminal. Wire binding torque: 500 lb-in
4. Customer connect end. Breaker wire binding torque: 50 lb-in (H-Frame breaker), 225 lb-in (J-Frame Breaker), 442 lb-in (L, P, M-Frame breaker)
5. Neutral, top entry. Wire binding torque: 375 lb-in (≤1200 amp), 46 lb-ft (>1200 amp)
6. Dimension A (see Table 1)
7. Dimension B (see Table 1)

1,600 AMP TO 3,000 AMP R-FRAME, NW-FRAME ENCLOSURE (LS 641)

Reference Figure 11 for breaker mounting positions.

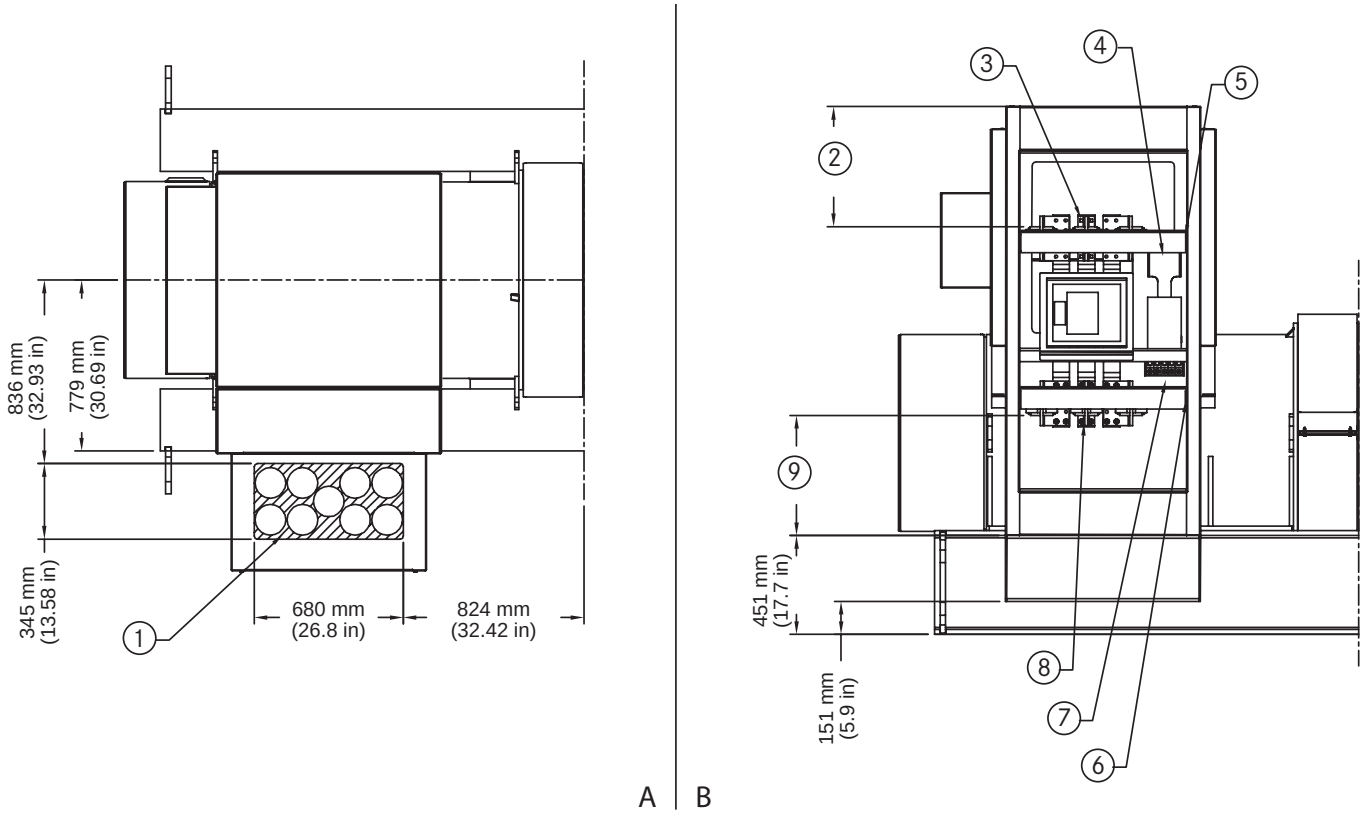


Figure 4: 1,600 Amp to 3,000 Amp R-Frame, NW-Frame Enclosure (LS 641)

A. Top view, top and bottom entry conduit area
B. Right view, breaker enclosure detail (enclosure cover not shown)

1. Top and bottom entry, nine conduit maximum
2. Dimension C (see Table 1)
3. Customer connect, top entry. Breaker wire binding torque: 46 lb-ft (R, NW-Frame breaker)
4. Neutral, top entry. Wire binding torque: 375 lb-in (≤1200 amp), 46 lb-ft (>1200 amp)
5. Equipment ground wire, top entry. Wire binding torque: 500 lb-in
6. Equipment ground wire, bottom entry. Wire binding torque: 500 lb-in
7. Neutral, bottom entry. Wire binding torque: 375 lb-in (≤1200 amp), 46 lb-ft (>1200 amp)
8. Customer connect, bottom entry. Breaker wire binding torque: 46 lb-ft (R, NW-Frame breaker)
9. Dimension A (see Table 1)

4,000 AMP NW-FRAME ENCLOSURE (LS 641)

Reference Figure 11 for breaker mounting position.

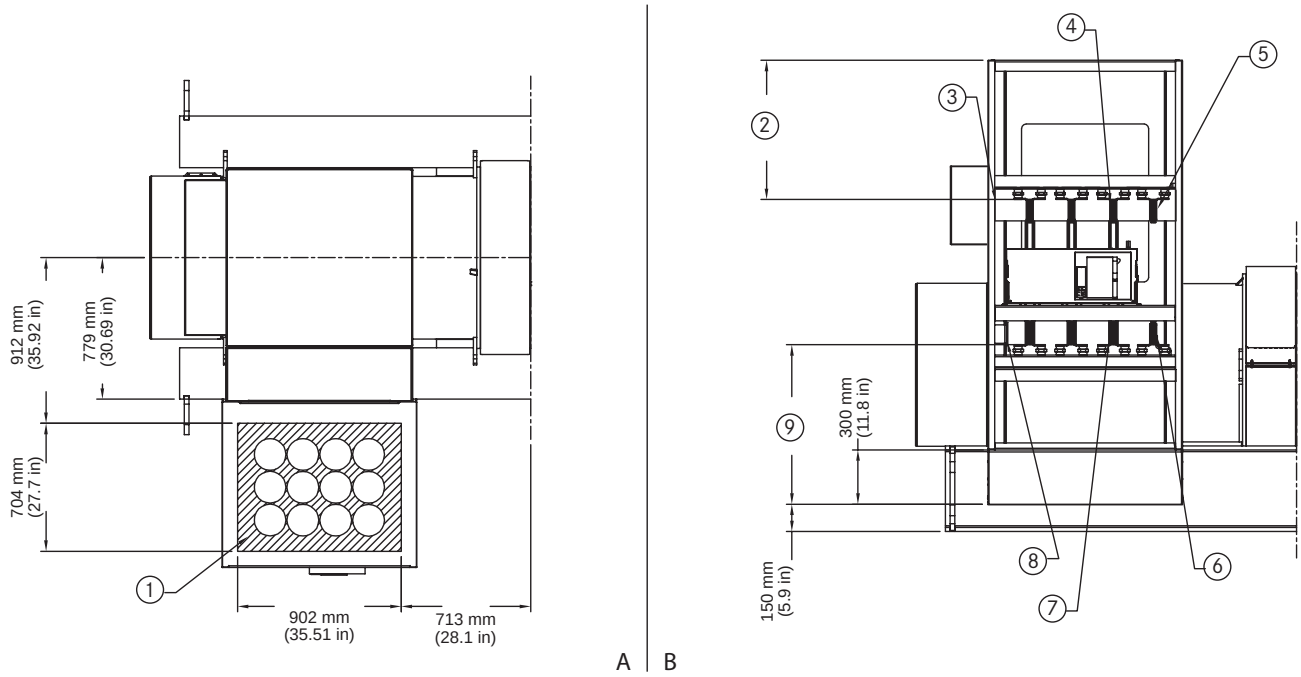


Figure 5: 4,000 Amp NW-Frame Enclosure (LS 641)

A. Top view, top and bottom entry conduit area.
B. Right view, breaker enclosure detail (enclosure cover not shown).

1. Top and bottom entry, eleven conduit maximum.
2. Dimension C (see Table 1)
3. Equipment ground wire, top entry.
4. Customer connect, top entry.
5. Neutral, top entry.
6. Neutral, bottom entry.
7. Customer connect, bottom entry.
8. Equipment ground wire, bottom entry.
9. Dimension A (see Table 1)

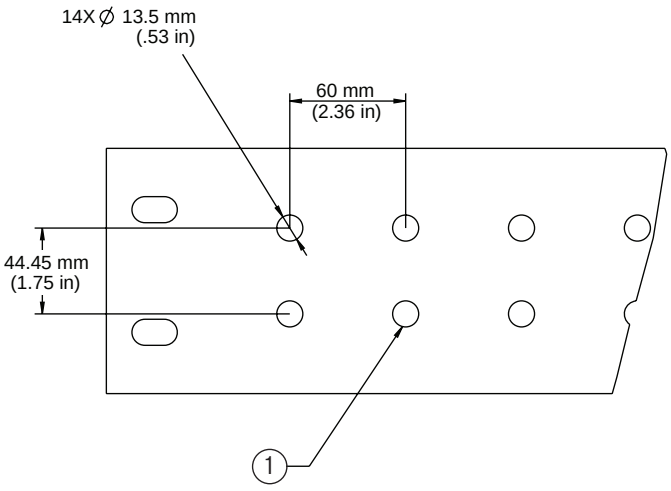


Figure 6: Customer Connect - 4,000 Amp NW-Frame Enclosure (LS 641)

1. For two-hole NEMA connection

20 AMP TO 1,200 AMP H-FRAME, J-FRAME, L-FRAME, P-FRAME, M-FRAME ENCLOSURE (LS 841)

Reference Figure 11 for breaker mounting positions.

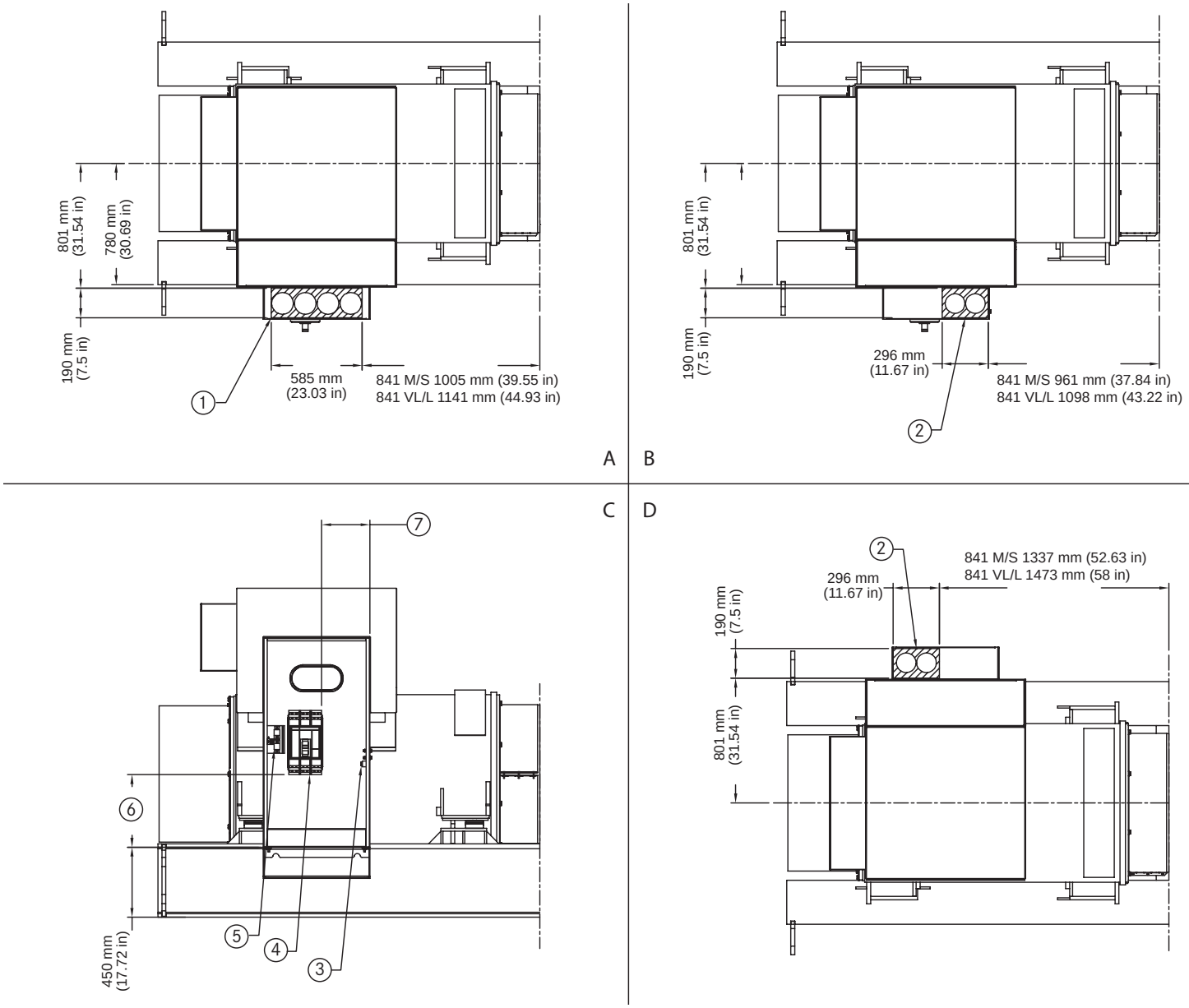


Figure 7: 20 Amp to 1,200 Amp H-Frame, J-Frame, L-Frame, P-Frame, M-Frame Enclosure (LS 841)

A. Top view, top and bottom entry conduit area
B. Top view, top entry conduit area
C. Right view
D. Top view, top entry

1. Four conduit maximum (top and bottom entry)
2. Two conduit maximum (top entry)
3. Equipment ground terminal. Wire binding torque: 500 lb-in
4. Customer connect end. Breaker wire binding torque: 50 lb-in (H-Frame breaker), 225 lb-in (J-Frame Breaker), 442 lb-in (L, P, M-Frame breaker)
5. Neutral, top entry. Wire binding torque: 375 lb-in (≤1200 amp), 46 lb-ft (>1200 amp)
6. Dimension A
7. Dimension B

1,600 AMP TO 3,000 AMP R-FRAME, NW-FRAME ENCLOSURE (LS 841)

Reference Figure 11 for breaker mounting positions.

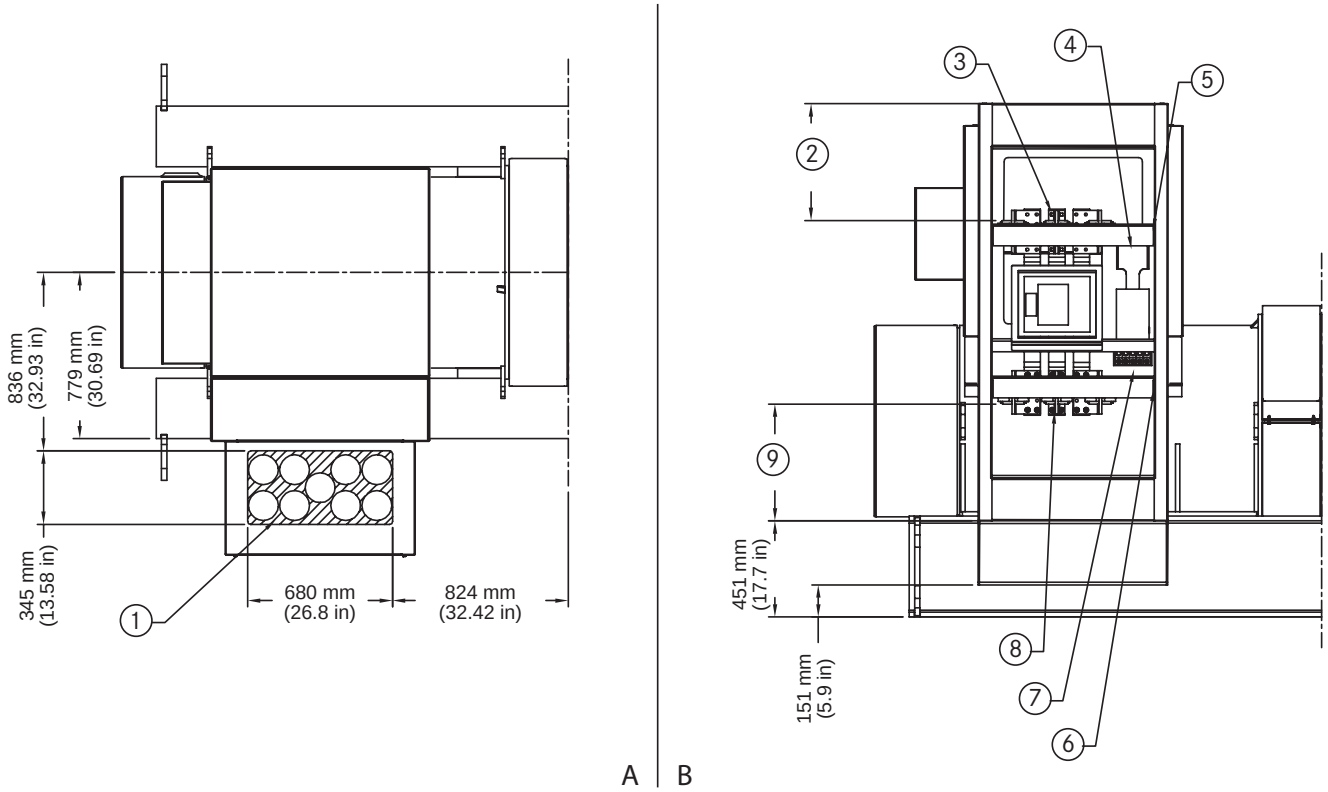


Figure 8: 1,600 Amp to 3,000 Amp R-Frame, NW-Frame Enclosure (LS 841)

A. Top view, top and bottom entry conduit area
B. Right view, breaker enclosure detail (enclosure cover not shown)

1. Top and bottom entry, nine conduit maximum
2. Customer connect, top entry. Breaker wire binding torque: 46 lb-ft (R, NW-Frame breaker)
3. Neutral, top entry. Wire binding torque: 375 lb-in (≤1200 amp), 46 lb-ft (>1200 amp)
4. Equipment ground wire, top entry. Wire binding torque: 500 lb-in
5. Equipment ground wire, bottom entry. Wire binding torque: 500 lb-in
6. Neutral, bottom entry. Wire binding torque: 375 lb-in (≤1200 amp), 46 lb-ft (>1200 amp)
7. Customer connect, bottom entry. Breaker wire binding torque: 46 lb-ft (R, NW-Frame breaker)

4,000 AMP NW-FRAME ENCLOSURE (LS 841)

Reference Figure 11 for breaker mounting position.

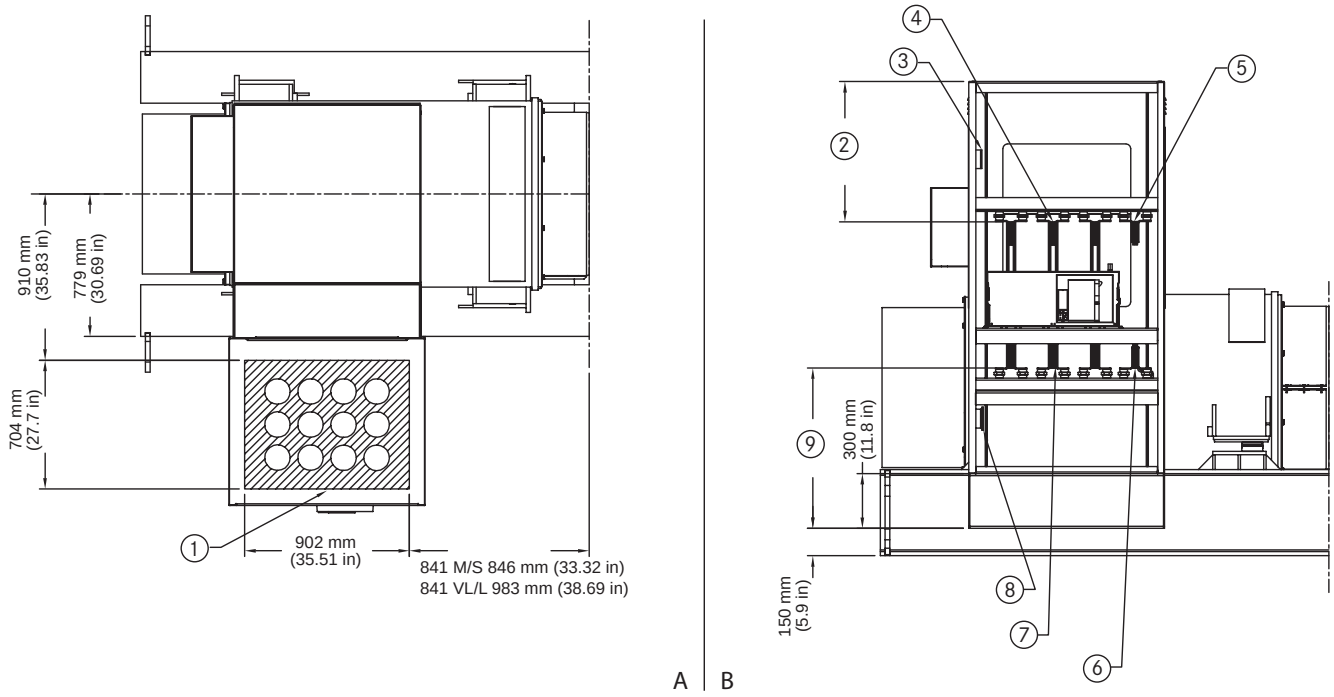


Figure 9: 4,000 Amp NW-Frame Enclosure (LS 841)

A. Top view, top and bottom entry conduit area.
B. Right view, breaker enclosure detail (enclosure cover not shown).

1. Top and bottom entry, eleven conduit maximum.
2. Dimension C (see Table 1)
3. Equipment ground wire, top entry.
4. Customer connect, top entry.
5. Neutral, top entry.
6. Neutral, bottom entry.
7. Customer connect, bottom entry.
8. Equipment ground wire, bottom entry.
9. Dimension A (see Table 1)

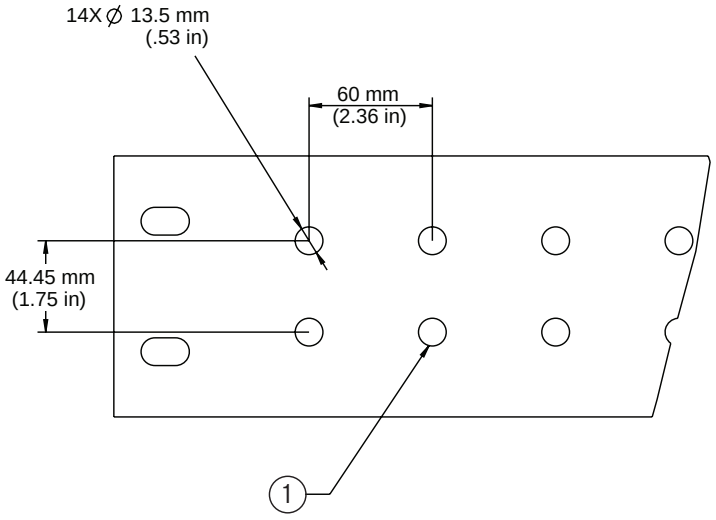


Figure 10: Customer Connect - 4,000 Amp NW-Frame Enclosure (LS 841)

1. For two-hole NEMA connection

Available Circuit Breakers		Enclosure Data					
Breaker Frame	Amperage	Output Wire Range 90 °C Cu (wires per phase)	Wire Bending Space[1] Dimension A mm (in)	Wire Gutter Space[1,2] Dimension B mm (in)	Dimension C mm (in)	Conduit Quantity	Conduit Size[3] in
H-Frame	20-150	(1) 8-3/0	591 (23.27)	361 (14.21)	N/A	1	2
J-Frame	175	(1) 4-4/0	577 (22.72)	361 (14.21)	N/A	1	2.5
J-Frame	200-250	(1) 3/0-350	577 (22.72)	361 (14.21)	N/A	1	3
L-Frame 100%	300-400	(2) 2/0-500	502 (19.76)	344 (13.54)	N/A	2	3.5
L-Frame 80%	300-600	(2) 2/0-500	502 (19.76)	344 (13.54)	N/A	2	3.5
M/P-Frame	250-800	(3) 3/0-500	466 (18.35)	305 (12)	N/A	3	3.5
P-Frame	1,000-1,200	(4) 3/0-500	466 (18.35)	305 (12)	N/A	4	3.5
R/NW-Frame	1,600-2,500	(8) 1/0-750	604 (23.78)	N/A	585 (23.03)	8	4
R/NW-Frame 80%	3,000	(8) 1/0-750	604 (23.78)	N/A	547 (21.54)	8	4
R/NW-Frame 100%	3,000	(9) 1/0-750	604 (23.78)	N/A	547 (21.54)	9	4
NW-Frame 80%	4,000	(12) 1/0-750	878 (34.6)	N/A	767 (30.2)	12	4
NW-Frame 100%	4,000	(12) 1/0-750	878 (34.6)	N/A	767 (30.2)	12	4

[1] Meets or exceeds NFPA 70, NEC 312.6(A), and NEC 312.6(B)
[2] Top entry only available for breakers rated for 600 amps and below.
[3] Based on flexible metal conduit at 40% fill using THHN wire.

NOTE: Equipment grounding terminal wire range: 2 AWG - 600 kcmil. Lugs not included with 4,000A.

Table 1: Enclosure Data

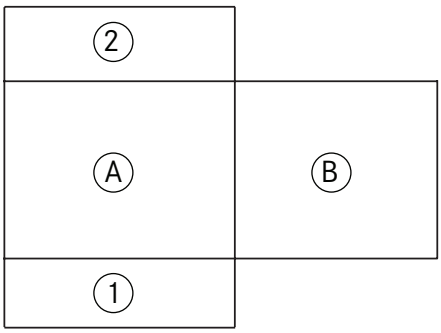


Figure 11: Breaker Mounting Positions

A. Outlet box
B. Alternator
1. Position 1 (Primary)
2. Position 2

Circuit Breaker Enclosure Data Sheet - Diesel

1,825-3,250 kW Standby

DESCRIPTION

This circuit breaker enclosure data sheet is used in conjunction with dimensional drawings to assist with submittal documentation, specification requirements, and installation. This document summarizes the enclosure dimensions and mounting positions for the ***mtu*** 16V4000 DS2000, ***mtu*** 16V4000 DS2250, ***mtu*** 16V4000 DS2500, ***mtu*** 20V4000 DS2500, ***mtu*** 20V4000 DS2800, ***mtu*** 20V4000 DS3000, and ***mtu*** 20V4000 DS3250 circuit breakers with single enclosures. The dimensional drawings will govern and should be referenced for installation.

20 AMP TO 1,200 AMP H-FRAME, J-FRAME, L-FRAME, P-FRAME, M-FRAME ENCLOSURE

— Reference Figure 5 for breaker mounting positions.

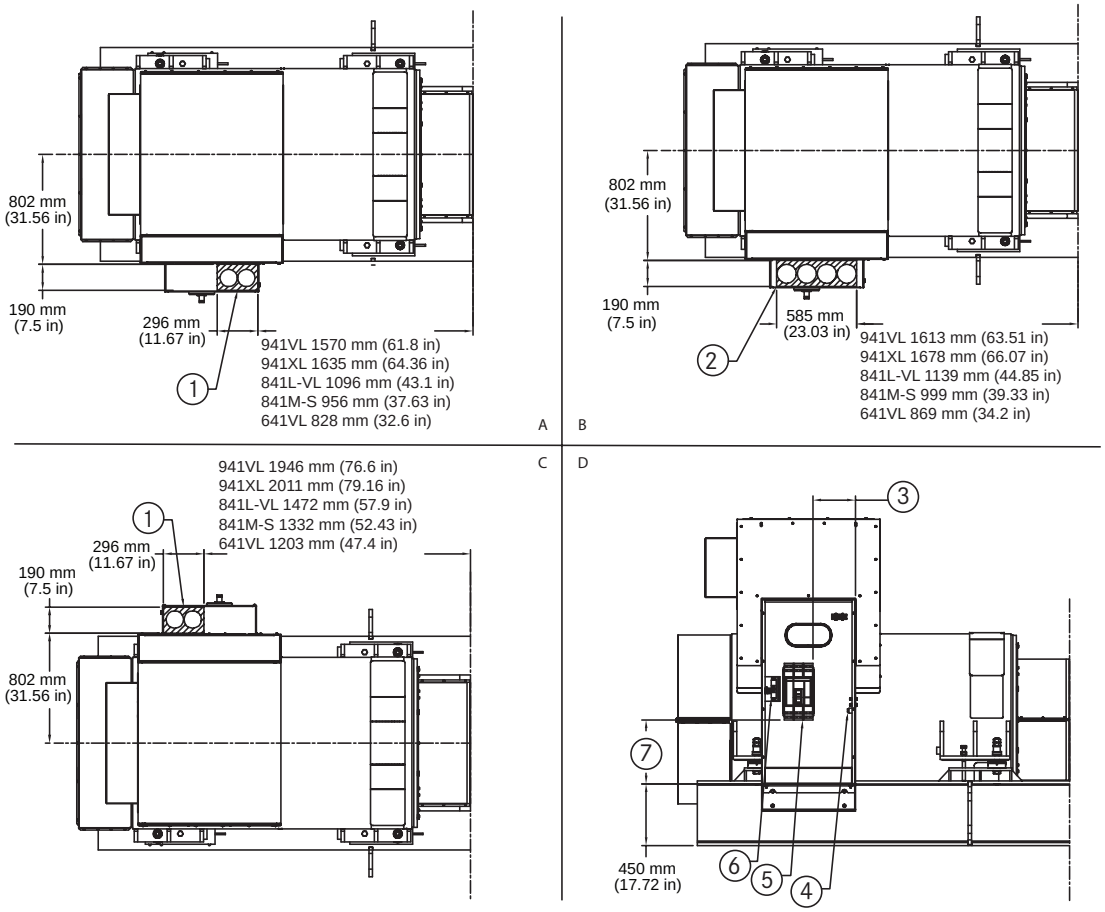


Figure 1: 20 Amp to 1,200 Amp H-Frame, J-Frame, L-Frame, P-Frame, M-Frame Enclosure

A. Top view, top entry conduit area
B. Top view, bottom entry conduit area
C. Top view, top entry, alternate location
D. Left view, breaker enclosure detail (enclosure cover not shown)

1. Two conduit maximum (top entry)
2. Four conduit maximum (bottom or top entry)
3. Dimension B (see Table 1)
4. Equipment ground terminal. Wire binding torque: 500 lb-in
5. Customer connect end. Breaker wire binding torque: 50 lb-in (H-Frame breaker), 225 lb-in (J-Frame Breaker), 442 lb-in (L, P, M-Frame breaker)
6. Neutral, top entry. Wire binding torque: 375 lb-in (≤1200 amp), 46 lb-ft (>1200 amp)
7. Dimension A (see Table 1)

1,600 AMP TO 3,000 AMP R-FRAME, NW-FRAME ENCLOSURE

— Reference Figure 4 for breaker mounting positions.

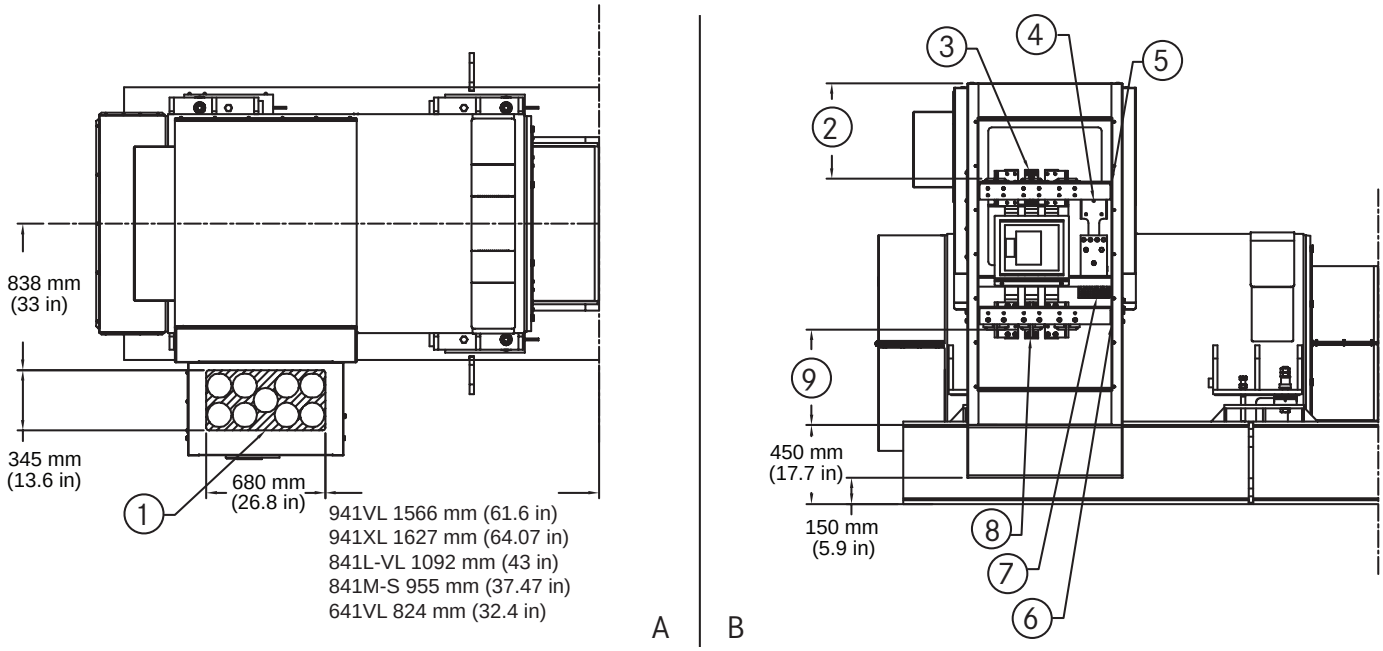


Figure 2: 1,600 Amp to 3,000 Amp R-Frame, NW-Frame Enclosure

A. Top view, top and bottom entry conduit area
B. Right view, breaker enclosure detail (enclosure cover not shown)

1. Top and bottom entry, nine conduit maximum
2. Dimension C (see Table 1)
3. Customer connect, top entry. Breaker wire binding torque: 46 lb-ft (R, NW-Frame breaker)
4. Neutral, top entry. Wire binding torque: 375 lb-in (≤1200 amp), 46 lb-ft (>1200 amp)
5. Equipment ground wire, top entry. Wire binding torque: 500 lb-in
6. Equipment ground wire, bottom entry. Wire binding torque: 500 lb-in
7. Neutral, bottom entry. Wire binding torque: 375 lb-in (≤1200 amp), 46 lb-ft (>1200 amp)
8. Customer connect, bottom entry. Breaker wire binding torque: 46 lb-ft (R,NW-Frame breaker)
9. Dimension A (see Table 1)

4,000 AMP NW-FRAME ENCLOSURE

— Reference Figure 4 for breaker mounting position.

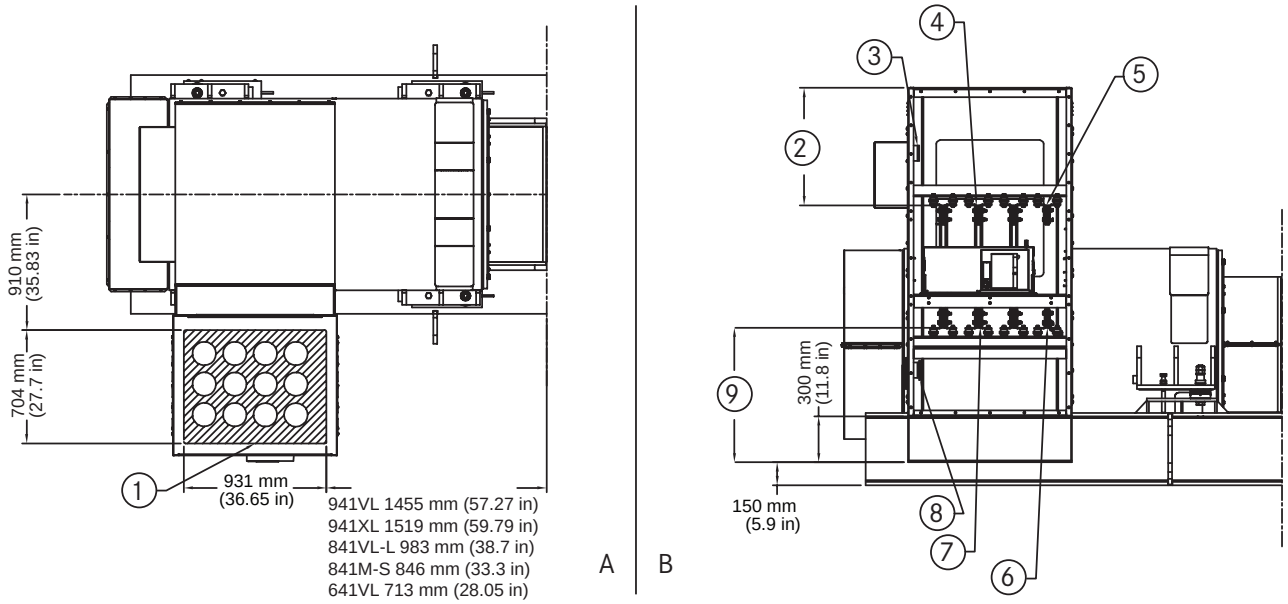


Figure 3: 4,000 Amp NW-Frame Enclosure

A. Top view, top and bottom entry conduit area.
B. Right view, breaker enclosure detail (enclosure cover not shown).

1. Top and bottom entry, eleven conduit maximum.
2. Dimension C (see Table 1)
3. Equipment ground wire, top entry.
4. Customer connect, top entry.
5. Neutral, top entry.
6. Neutral, bottom entry.
7. Customer connect, bottom entry.
8. Equipment ground wire, bottom entry.
9. Dimension A (see Table 1)

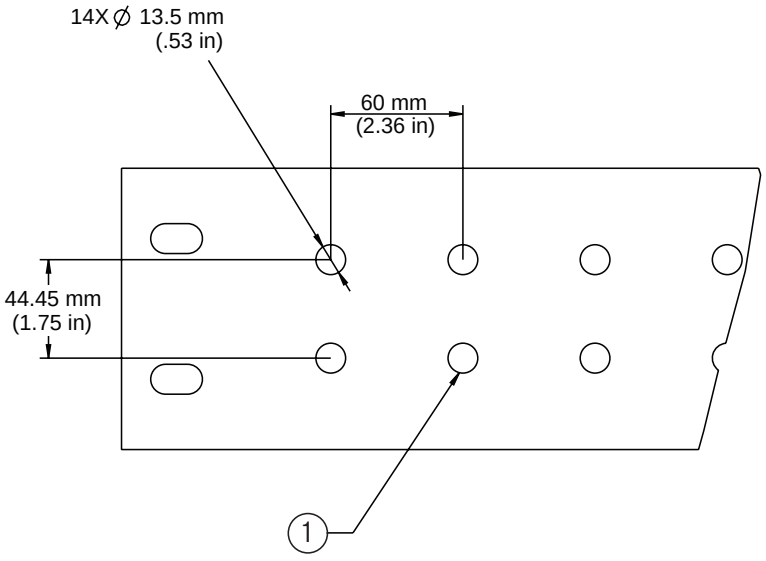


Figure 4: Customer Connect - 4,000 Amp NW-Frame Enclosure

1. For two-hole NEMA connection

Circuit Breaker Enclosure Data Sheet - Diesel
1,825-3,250 kW Standby

Available Circuit Breakers		Enclosure Data					
Breaker Frame	Amperage	Output Wire Range 90 °C Cu (wires per phase)	Wire Bending Space[1] Dimension A mm (in)	Wire Gutter Space[1,2] Dimension B mm (in)	Dimension C mm (in)	Conduit Quantity	Conduit Size[3] in
H-Frame	20-150	(1) 8-3/0	591 (23.27)	361 (14.21)	N/A	1	2
J-Frame	175	(1) 4-4/0	577 (22.72)	361 (14.21)	N/A	1	2.5
J-Frame	200-250	(1) 3/0-350	577 (22.72)	361 (14.21)	N/A	1	3
L-Frame 100%	300-400	(2) 2/0-500	502 (19.76)	344 (13.54)	N/A	2	3.5
L-Frame 80%	300-600	(2) 2/0-500	502 (19.76)	344 (13.54)	N/A	2	3.5
M/P-Frame	250-800	(3) 3/0-500	466 (18.35)	305 (12)	N/A	3	3.5
P-Frame	1,000-1,200	(4) 3/0-500	466 (18.35)	305 (12)	N/A	4	3.5
R/N W-Frame	1,600-2,500	(8) 1/0-750	604 (23.78)	N/A	585 (23.03)	8	4
R/NW-Frame 80%	3,000	(8) 1/0-750	604 (23.78)	N/A	547 (21.54)	8	4
R/NW-Frame 100%	3,000	(9) 1/0-750	604 (23.78)	N/A	547 (21.54)	9	4
NW-Frame 80%	4,000	(12) 1/0-750	878 (34.6)	N/A	767 (30.2)	12	4
NW-Frame 100%	4,000	(12) 1/0-750	878 (34.6)	N/A	767 (30.2)	12	4

(1) Meets or exceeds NFPA 70, NEC 312.6(A), and NEC 312.6(B)
(2) Top entry only available for breakers rated for 600 amps and below.
(3) Based on flexible metal conduit at 40% fill using THHN wire.

NOTE: Equipment grounding terminal wire range: 2 AWG - 600 kcmil. Lugs not included with 4,000A.

Table 1: Enclosure Data

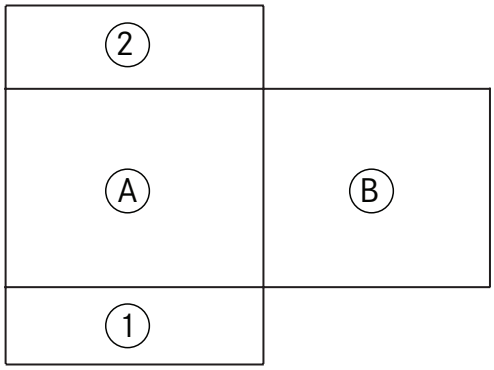


Figure 5: Breaker Mounting Positions

A. Outlet box
B. Alternator
1. Position 1 (Primary)
2. Position 2

Circuit Breaker Enclosure Data Sheet - Gas

30-40 kW Standby

DESCRIPTION

This circuit breaker enclosure data sheet is used in conjunction with dimensional drawings to assist with submittal documentation, specification requirements, and installation. This document summarizes the enclosure dimensions and mounting positions for the ***mtu*** 4R0063 GS30 and ***mtu*** 4R0063 GS40 circuit breaker, 280 frame size enclosures. The dimensional drawings will govern and should be referenced for installation.

280 FRAME ENCLOSURE

- Supplied with all 280 frame alternator applications.
- Right side breakers shown. Left side breakers optional.
- Reference Figure 2 for breaker mounting positions.

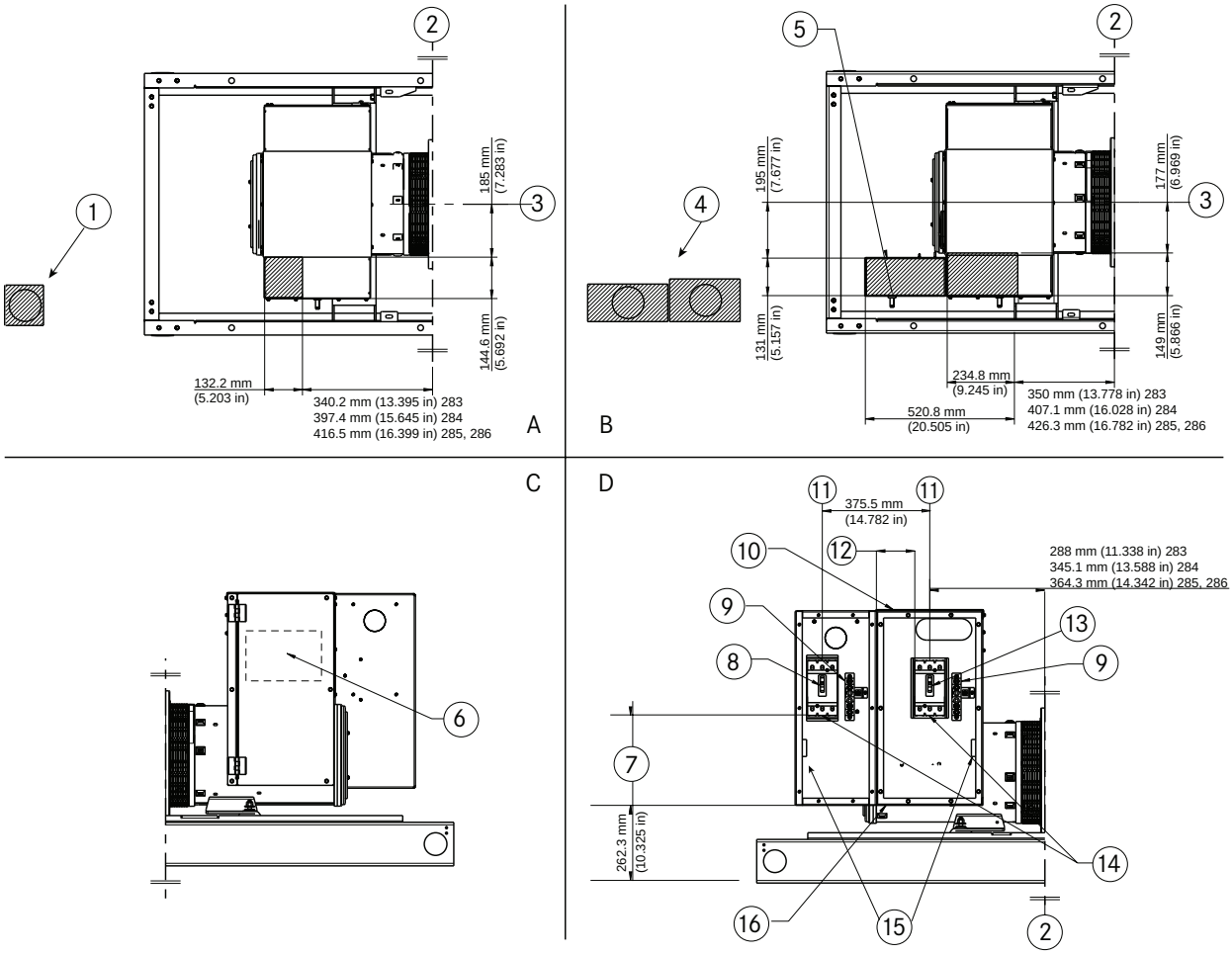


Figure 1: 280 Frame Enclosure

A. Top view, top entry conduit area
B. Top view, bottom entry conduit area
C. Left view, breaker enclosure detail
D. Right view, breaker enclosure detail (enclosure cover not shown)

1. Possible top entry conduit locations
2. Rear face of flywheel housing
3. Generator centerline
4. Possible bottom entry conduit locations
5. Optional secondary breaker enclosure
6. Optional control panel location
7. Dimension A
8. Optional second breaker
9. Neutral ASM (torque to 275 in/lbs)
10. Top entry conduit area
11. Breaker center line
12. Dimension B
13. Primary breaker
14. Customer connect end (recommended torque on label)
15. Equipment ground terminal (torque to 275 in/lbs)
16. Bottom entry conduit area

A Rolls-Royce solution

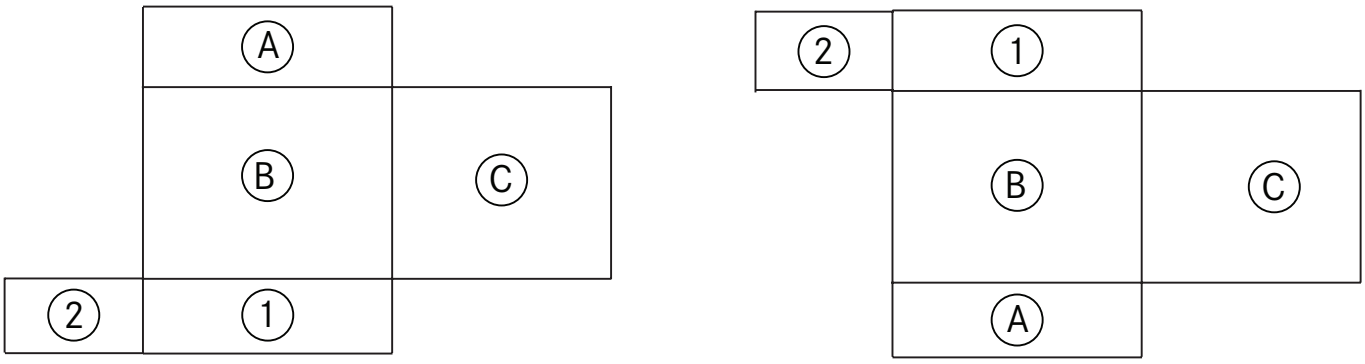
Circuit Breaker Enclosure Data Sheet - Gas
30-40 kW Standby

Available Circuit Breakers		Enclosure Data				
Breaker Frame	Amperage	Output Wire Range 90 °C Cu (wires per lug)	Wire Bending Space[1] Dimension A mm (in)	Wire Gutter Space[1,2] Dimension B mm (in)	Conduit Quantity	Conduit Size[3] in
H-Frame	20-150	(1) 8-3/0	329 (12.95)	134 (5.27)	1	2.5
J-Frame	175	(1) 4-4/0	314 (12.36)	134 (5.27)	1	2.5
J-Frame	200-250	(1) 3/0-350	314 (12.36)	134 (5.27)	1	3

(1) Meets or exceeds NFPA 70, NEC 312.6(A), and NEC 312.6(B)
(2) Top entry only available for single breaker applications
(3) Based on flexible metal conduit at 40% fill using THHN wire

NOTE: Equipment grounding terminal wire range: 6 AWG - 3/0 AWG.

Table 1: 280 Frame Enclosure Data



Top View - Right Side Breaker **Top View - Left Side Breaker**

Figure 2: 280 Frame Enclosure Breaker Mounting Positions

A. Controls
B. Outlet box
C. 280 frame alternator

1. Position 1 (Primary)
2. Position 2

Circuit Breaker Enclosure Data Sheet - Gas

50-60 kW Standby

DESCRIPTION

This circuit breaker enclosure data sheet is used in conjunction with dimensional drawings to assist with submittal documentation, specification requirements, and installation. This document summarizes the enclosure dimensions and mounting positions for the ***mtu*** 8V0071 GS50 and ***mtu*** 8V0071 GS60 circuit breakers. The dimensional drawings will govern and should be referenced for installation.

360 FRAME ENCLOSURE

- Supplied with all 360 frame alternator applications.
- Right side breakers shown. Left side breakers optional.
- Reference Figure 2 for breaker mounting positions.

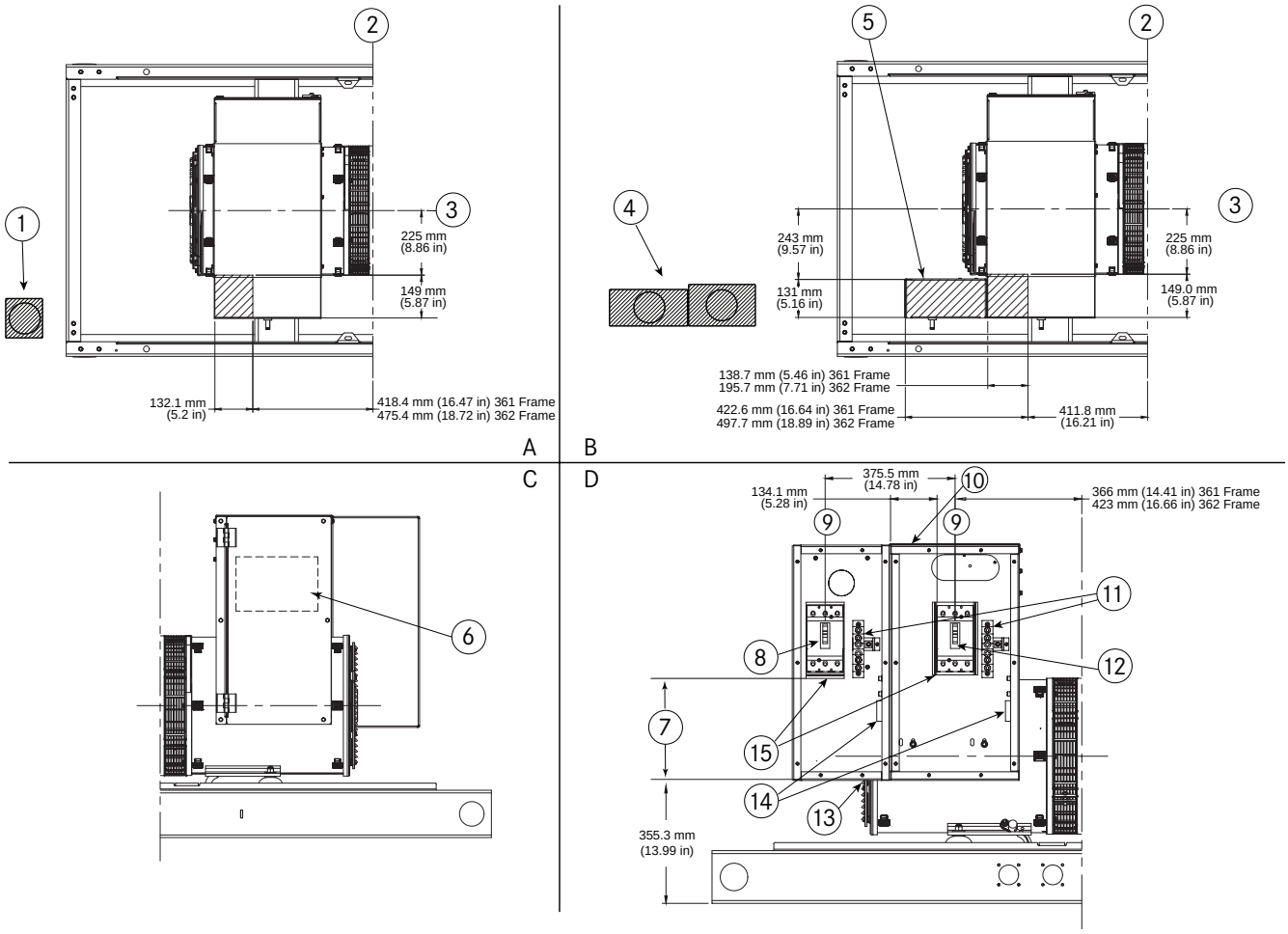


Figure 1: 360 Frame Enclosure

A. Top view, top entry conduit area
B. Top view, bottom entry conduit area
C. Left view, breaker enclosure detail
D. Right view, breaker enclosure detail (enclosure cover not shown)

1. Possible top entry conduit locations
2. Rear face of flywheel housing
3. Generator centerline
4. Possible bottom entry conduit locations
5. Optional secondary breaker enclosure
6. Optional control panel location
7. Dimension A
8. Optional second breaker
9. Breaker centerline
10. Top entry conduit area
11. Neutral ASM (torque to 275 in/lbs)
12. Primary breaker
13. Bottom entry conduit area
14. Equipment ground terminal (torque to 275 in/lbs)
15. Customer connect end (recommended torque on label)

A Rolls-Royce solution

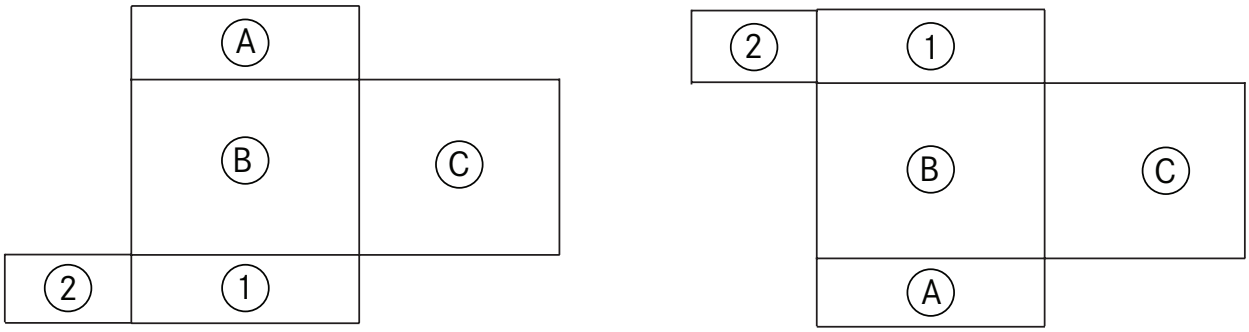
Circuit Breaker Enclosure Data Sheet - Gas
50-60 kW Standby

Available Circuit Breakers		Enclosure Data				
Breaker Frame	Amperage	Output Wire Range 90 °C Cu (wires per lug)	Wire Bending Space[1] Dimension A mm (in)	Wire Gutter Space [1,2] Dimension B mm (in)	Conduit Quantity	Conduit Size[3] in
H-Frame	20-150	(1) 8-3/0	329 (12.95)	134 (5.27)	1	2.5
J-Frame	175	(1) 4-4/0	314 (12.36)	134 (5.27)	1	2.5
J-Frame	200-250	(1) 3/0-350	314 (12.36)	134 (5.27)	1	3

[1] Meets or exceeds NFPA 70, NEC 312.6(A), and NEC 312.6(B)
[2] Top entry only available for single breaker applications
[3] Based on flexible metal conduit at 40% fill using THHN wire

NOTE: Equipment grounding terminal wire range: 6 AWG - 3/0 AWG.

Table 1: 360 Frame Enclosure Data



Top View - Right Side Breaker **Top View - Left Side Breaker**

Figure 2: 360 Frame Enclosure Breaker Mounting Positions

A. Controls
B. Outlet box
C. Alternator

1. Position 1 (Primary)
2. Position 2

Circuit Breaker Enclosure Data Sheet - Gas

100 kW Standby

DESCRIPTION

This circuit breaker enclosure data sheet is used in conjunction with dimensional drawings to assist with submittal documentation, specification requirements, and installation. This document summarizes the enclosure dimensions and mounting positions for the ***mtu*** 8V0078 GS100 circuit breakers. The dimensional drawings will govern and should be referenced for installation.

225-250 FRAME ENCLOSURE

— Enclosure supplied with all 225 and 250 frame alternator applications.
— Reference Figure 2 and Table 2 for breaker mounting positions.

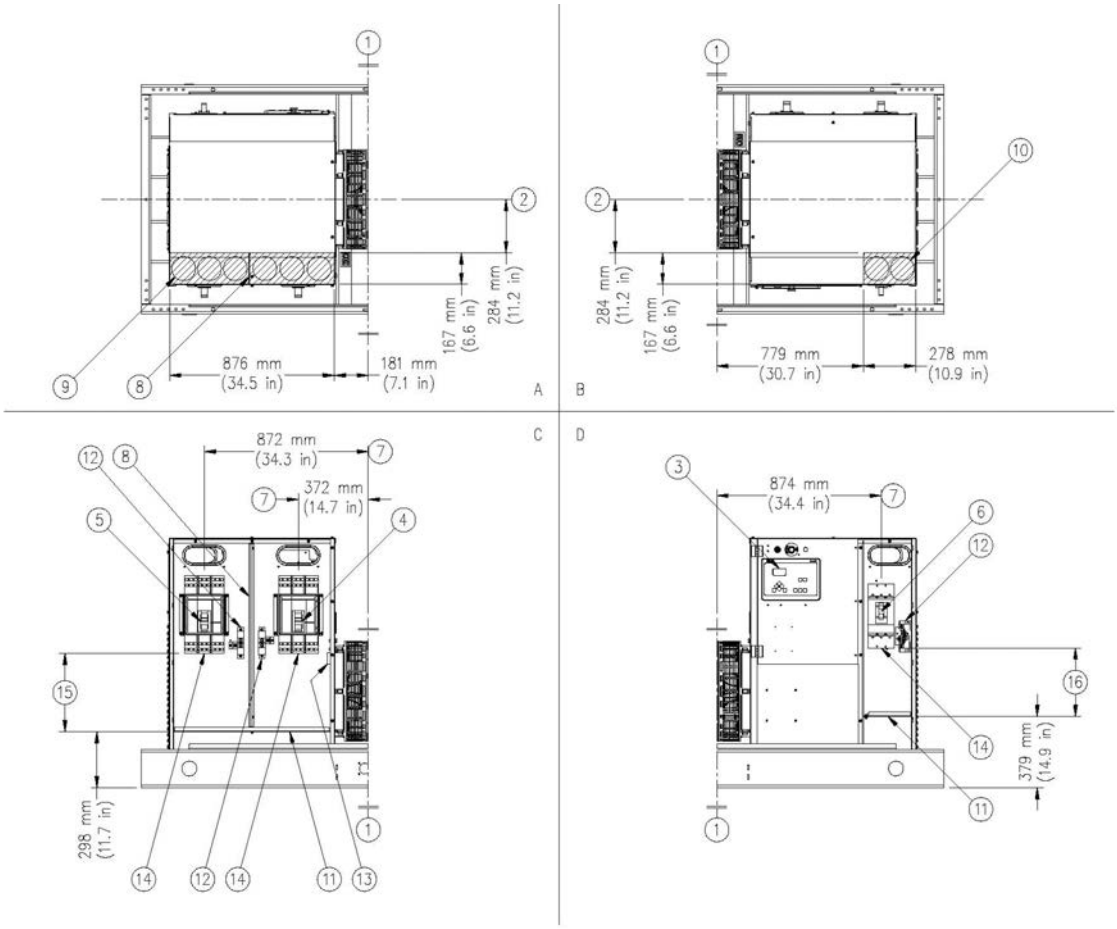


Figure 1: 225-250 Frame Enclosure

A. Top view, top entry conduit area
B. Top view, bottom entry conduit area
C. Right view, breaker enclosure detail (enclosure door not shown)
D. Left view, breaker enclosure detail (enclosure cover not shown)

1. Rear face of flywheel housing
2. Generator centerline
3. Control panel location
4. Breaker position 1
5. Breaker position 2
6. Breaker position 3
7. Breaker centerline
8. Divider wall included with breaker in position 2
9. Three conduit maximum per breaker position 1 and 2
10. Two conduit maximum per breaker position 3
11. Bottom entry conduit area
12. Neutral ASM (torque to 275 in-lbs)
13. Equipment ground terminal (torque to 275 in-lbs)
14. Customer connect end (recommended torque on label)
15. Dimension A
16. Dimension B

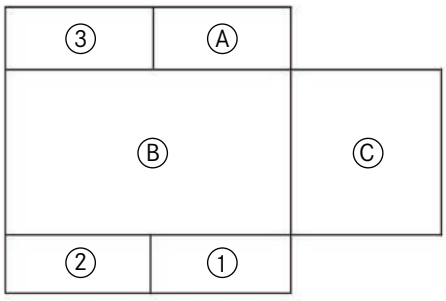
Circuit Breaker Enclosure Data Sheet - Gas
100 kW Standby

Available Circuit Breakers		Enclosure Data					
Breaker Frame	Amperage	Output Wire Range 90 °C Cu (wires per lug)	Wire Bending Space[1] Dimension A mm (in)	Wire Bending Space[1] Dimension B mm (in)	Wire Gutter Space[1,2] Dimension C mm (in)	Conduit Quantity	Conduit Size[3] in
H-Frame	20-150	(1) 8-3/0	521 (20.5)	451 (17.76)	602 (23.69)	1	2.5
J-Frame	175	(1) 4-4/0	535 (21.1)	437 (17.2)	602 (23.69)	1	2.5
J-Frame	200-250	(1) 3/0-350	535 (21.1)	437 (17.2)	602 (23.69)	1	3
L-Frame 100%	300-400	(2) 2/0-500	450 (17.7)	362 (14.27)	584 (23)	2	3.5
L-Frame 80%	300-600	(2) 2/0-500	450 (17.7)	362 (14.27)	584 (23)	2	3.5
M/P-Frame	250-800	(3) 250-500	423 (16.7)	N/A	451 (17.74)	3	3.5

(1) Meets or exceeds NFPA 70, NEC 312.6(A), and NEC 312.6(B)
(2) Top entry only available for single breaker applications
(3) Based on flexible metal conduit at 40% fill using THHN wire

NOTE: Equipment grounding terminal wire range: 6 AWG - 350 kcmil.

Table 1: 225-250 Frame Enclosure Data



Top View - Right Side Breaker

Figure 2: 225-250 Frame Enclosure Breaker Mounting Positions

A. Controls
B. Outlet box
C. Alternator

1. Position 1
2. Position 2
3. Position 3

NOTE: Position 3 is limited to H, J, or L-Frame breaker.

N/A = Not Available

Circuit Breaker Enclosure Data Sheet - Gas

150 kW Standby

DESCRIPTION

This circuit breaker enclosure data sheet is used in conjunction with dimensional drawings to assist with submittal documentation, specification requirements, and installation. This document summarizes the enclosure dimensions and mounting positions for the ***mtu*** 8V0110 GS150 circuit breakers. The dimensional drawings will govern and should be referenced for installation.

430 FRAME ENCLOSURE

- Enclosure supplied with all 430 frame alternator applications.
- Right side primary breaker shown. Left side primary breaker optional.
- Reference Figure 2 and Table 2 for breaker mounting positions.

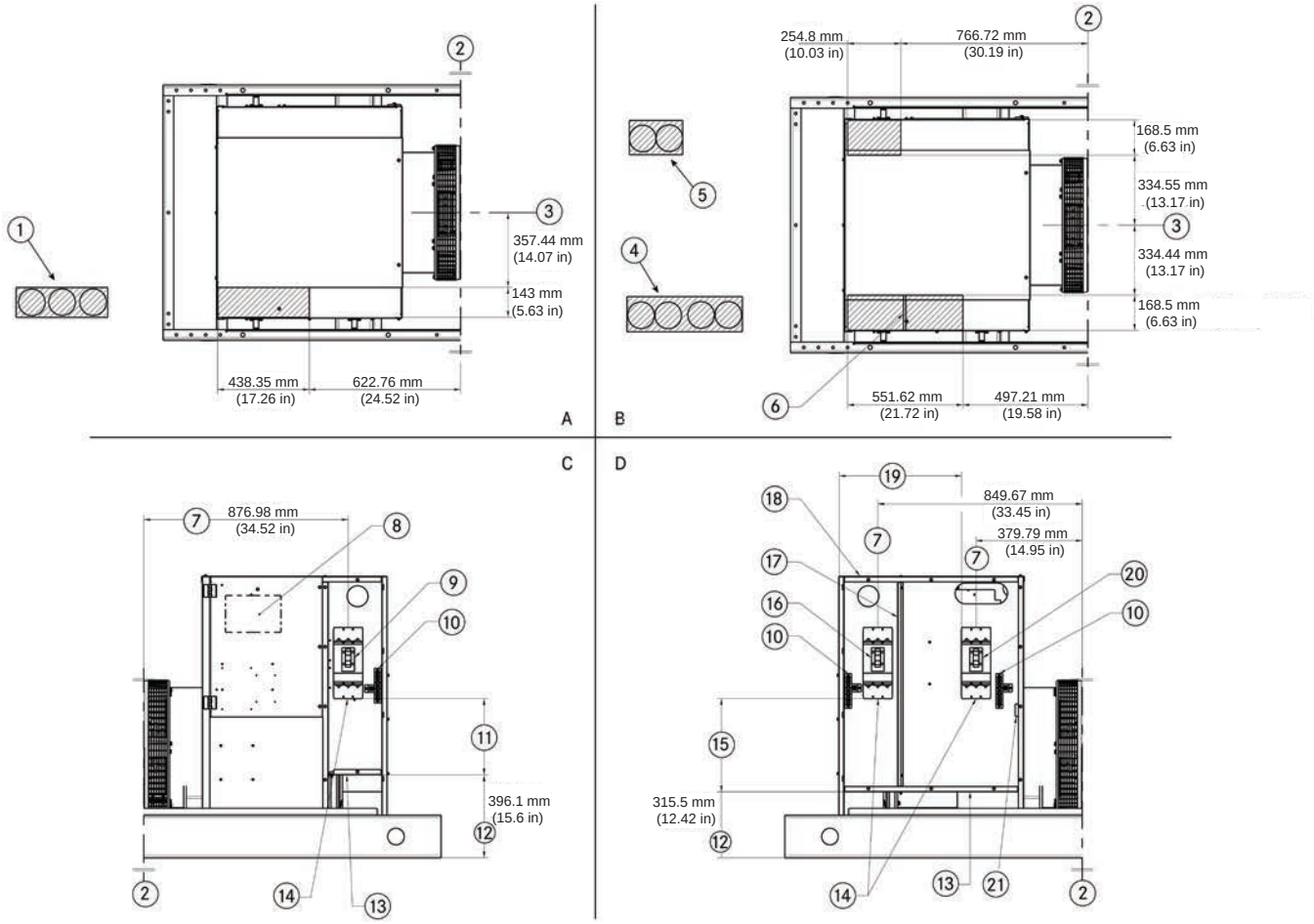


Figure 1: 430 Frame Enclosure

A. Top view, top entry conduit area
B. Top view, bottom entry conduit area
C. Left view, breaker enclosure detail (enclosure door not shown)
D. Right view, breaker enclosure detail (enclosure cover not shown)

1. Three conduit maximum
2. Rear face of flywheel housing
3. Generator centerline
4. Four conduit maximum (primary breaker side)
5. Two conduit maximum (opposite primary breaker)
6. Second breaker divider wall
7. Breaker centerline
8. Optional control panel location
9. Optional second/third breaker
10. Neutral ASM (torque to 275 in-lbs)
11. Dimension B
12. Add 205 mm (8.08 in) for bases with integrated single wall fuel tank
13. Bottom entry conduit area
14. Customer connect end (recommended torque on label)
15. Dimension A
16. Optional second breaker
17. Divider wall included with second breaker
18. Top entry conduit area
19. Dimension C
20. Primary breaker
21. Equipment ground terminal (torque to 275 in-lbs)

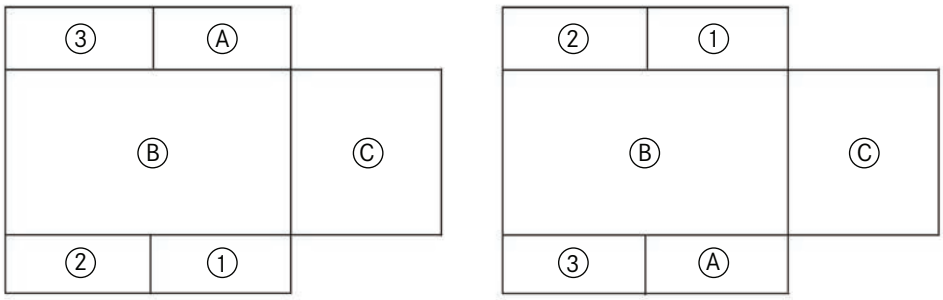
Circuit Breaker Enclosure Data Sheet - Gas
150 kW Standby

Available Circuit Breakers		Enclosure Data					
Breaker Frame	Amperage	Output Wire Range 90 °C Cu (wires per lug)	Wire Bending Space[1] Dimension A mm (in)	Wire Bending Space[1] Dimension B mm (in)	Wire Gutter Space[1,2] Dimension C mm (in)	Conduit Quantity	Conduit Size[3] in
H-Frame	20-150	(1) 8-3/0	532 (20.93)	451 (17.76)	602 (23.69)	1	2.5
J-Frame	175	(1) 4-4/0	518 (20.37)	437 (17.2)	602 (23.69)	1	2.5
J-Frame	200-250	(1) 3/0-350	518 (20.37)	437 (17.2)	602 (23.69)	1	3
L-Frame 100%	300-400	(2) 2/0-500	443 (17.44)	362 (14.27)	584 (23)	2	3.5
L-Frame 80%	300-600	(2) 2/0-500	443 (17.44)	362 (14.27)	584 (23)	2	3.5
M/P-Frame	250-800	(3) 250-500	407 (16.01)	N/A	451 (17.74)	3	3.5

(1) Meets or exceeds NFPA 70, NEC 312.6(A), and NEC 312.6(B)
(2) Top entry only available for single breaker applications
(3) Based on flexible metal conduit at 40% fill using THHN wire

NOTE: Equipment grounding terminal wire range: 6 AWG - 350 kcmil.

Table 1: 430 Frame Enclosure Data



Top View - Right Side Breaker **Top View - Left Side Breaker**

Figure 2: 430 Frame Enclosure Breaker Mounting Positions

A. Controls
B. Outlet box
C. Alternator

1. Position 1 (Primary)
2. Position 2
3. Position 3

Breaker Frame		
Position 1 (Primary)	Position 2	Position 3
H/J/L	-	-
H/J/L	H/J/L	-
H/J/L	H/J/L	H/J/L
P/M	-	-
P/M	H/J	-
PP/MM	H/J	H/J/L
P/M	P/M	L

Table 2: 430 Frame Breaker Mounting Positions

N/A = Not Available

Circuit Breaker Enclosure Data Sheet - Gas

500-650 kW Standby

DESCRIPTION

This circuit breaker enclosure data sheet is used in conjunction with dimensional drawings to assist with submittal documentation, specification requirements, and installation. This document summarizes the enclosure dimensions and mounting positions for the ***mtu*** 12V0265 GS500, ***mtu*** 12V0265 GS550, ***mtu*** 12V0265 GS600, and ***mtu*** 12V0265 GS650 circuit breakers, including single, dual, and triple enclosures. The dimensional drawings will govern and should be referenced for installation.

BREAKER LAYOUT

- Left side controls shown. Right side controls optional.
- Reference Figure 2 and Table 2 for available breaker mounting positions.

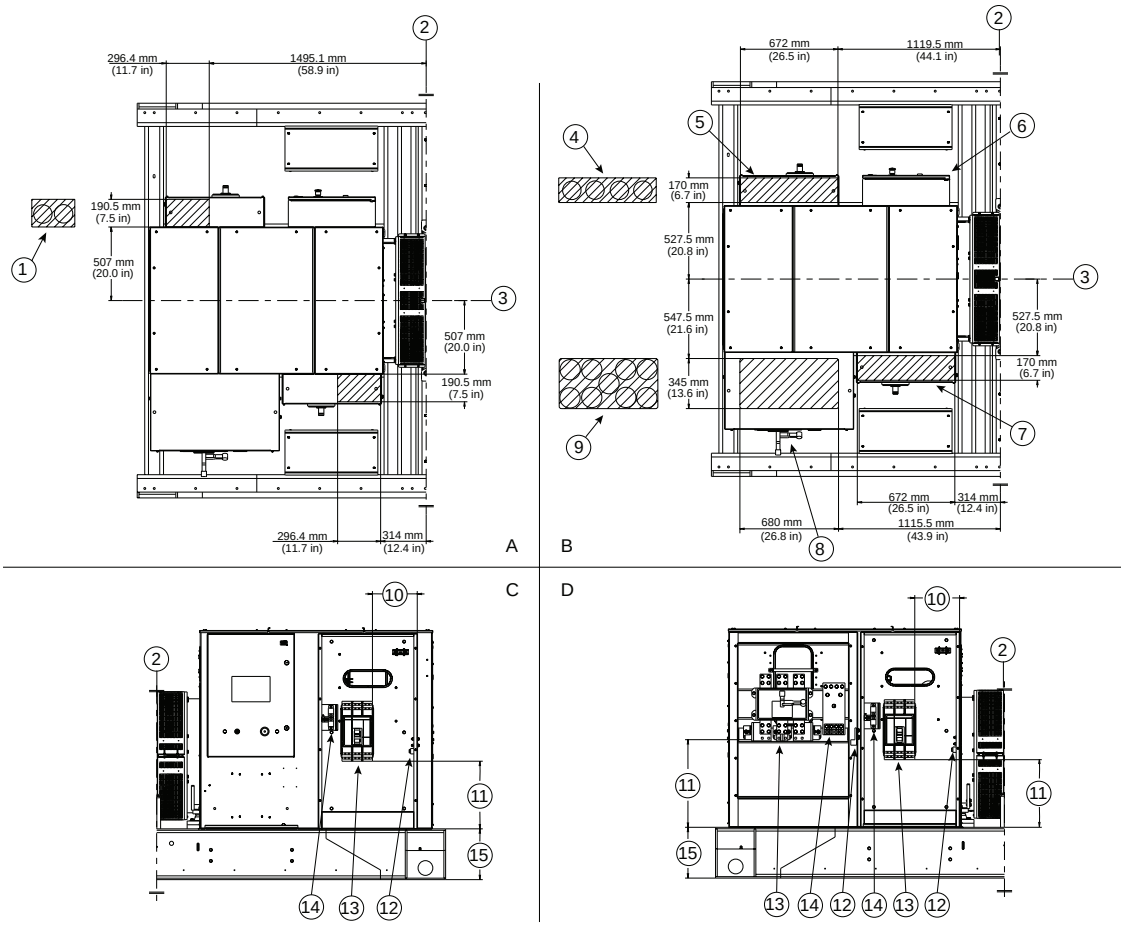


Figure 1: Enclosure

A. Top view, top entry conduit area
B. Top view, bottom entry conduit area
C. Left view, breaker enclosure detail (enclosure cover not shown)
D. Right view, breaker enclosure detail (enclosure cover not shown)

1. Two conduit maximum (top entry)
2. Rear face of flywheel housing
3. Generator centerline
4. Four conduit maximum (bottom entry, ≤1200 amp enclosure)
5. Breaker postion 2 (≤1200 amp enclosure shown)
6. Controls position
7. Breaker postion 3 (≤1200 amp enclosure shown)
8. Breaker position 1 (>1200 amp enclosure shown)
9. Nine conduit maximum (bottom entry, >1200 amp enclosure)
10. Dimension B
11. Dimension A
12. Equipment ground terminal wire binding torque: 500 lb-in
13. Customer connect end breaker wire binding torque: 50 lb-in (H-Frame breaker) 225 lb-in (J-Frame Breaker) 442 lb-in (L, M, P-Frame breaker) 46 lb-ft (NW, R-Frame breaker)
14. Neutral wire binding torque: 375 lb-in (≤1200 amp) 46 lb-ft (>1200 amp)
15. OPU base height: 300 mm (11.8 in) HSD base height: To be determined

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Circuit Breaker Enclosure Data Sheet - Gas
500-650 kW Standby

Available Circuit Breakers		Enclosure Data				
Breaker Frame	Amperage	Output Wire Range 90 °C Cu (wires per lug)	Wire Bending Space[1] Dimension A mm (in)	Wire Gutter Space[1,2] Dimension B mm (in)	Conduit Quantity	Conduit Size[3] in
H-Frame	20-150	(1) 8-3/0	591 (23.27)	361 (14.21)	1	2
J-Frame	175	(1) 4-4/0	577 (22.72)	361 (14.21)	1	2.5
J-Frame	200-250	(1) 3/0-350	577 (22.72)	361 (14.21)	1	3
L-Frame 100%	300-400	(2) 2/0-500	502 (19.76)	344 (13.54)	2	3.5
L-Frame 80%	300-600	(2) 2/0-500	502 (19.76)	344 (13.54)	2	3.5
M/P-Frame	250-800	(3) 3/0-500	466 (18.35)	N/A	3	3.5
P-Frame	1,000-1,200	(4) 3/0-500	466 (18.35)	N/A	4	3.5
R/NW-Frame	1,600-2,500	(8) 1/0-750	604 (23.78)	N/A	8	4

(1) Meets or exceeds NFPA 70, NEC 312.6(A), and NEC 312.6(B)
(2) Top entry only available for breakers rated for 600 amps and below.
(3) Based on flexible metal conduit at 40% fill using THHN wire.

NOTE: Equipment grounding terminal wire range: 2 AWG - 600 kcmil

Table 1: Enclosure Data

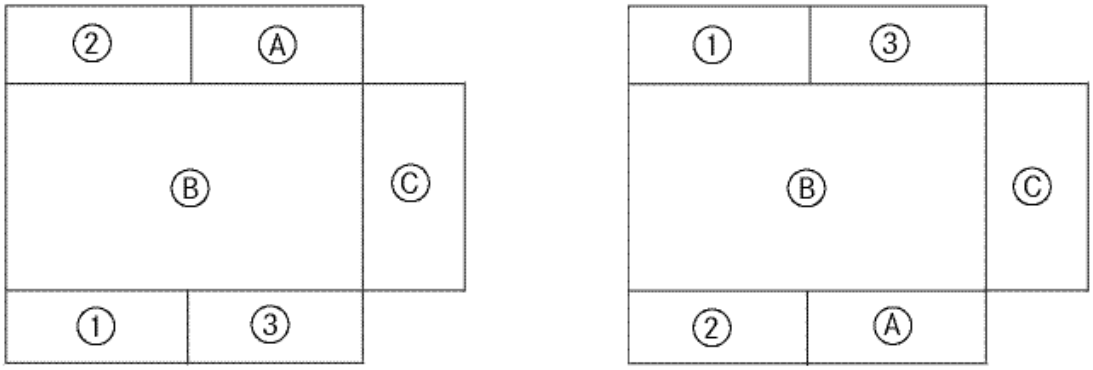

Figure 2: Available Breaker Mounting Positions

A. Controls
B. Outlet box
C. Alternator
1. Position 1
2. Position 2
3. Position 3

Breaker Frame Size	Position 1 (Primary)	Position 2	Position 3
H	X	X	X
J	X	X	X
L	X	X	X
M	X	X	X
P	X	X	X
R	X	X	N/A
NW	X	X	N/A

Table 2: Available Breaker Mounting Positions

Connection Box Data Sheet

210–300 kW Diesel

DESCRIPTION

Connection boxes provide a dedicated wiring space for electrical connection to the generator output when a circuit breaker is not provided.

FEATURES

— Accessible enclosure
— Copper busbars

CERTIFICATIONS AND STANDARDS

— Wire bending space conforms to UL, CSA, and NFPA 70 requirements

WIRE LUG DATA

Amperage	Terminal Description	Wire Range (Qty) Cu/Al	Wire Bending Space to Bottom of Enclosure mm (in)	Wire Binding Screw Torque [1]	Lug Mounting Fasteners
1,200	Busbars	(4) 1/0 AWG - 750 kcmil	469 (14.47)	46 lb-ft	50 lb-ft
	Equipment Grounding Terminal	(1) 2/0 AWG - 600 kcmil	569 (22.41)	41 lb-ft	32 lb-ft

[1] Listed torque values are for maximum conductor sizes accommodated. Consult UL486 Tables 7-4, 7-5, 7-6 for smaller conductor sizes.

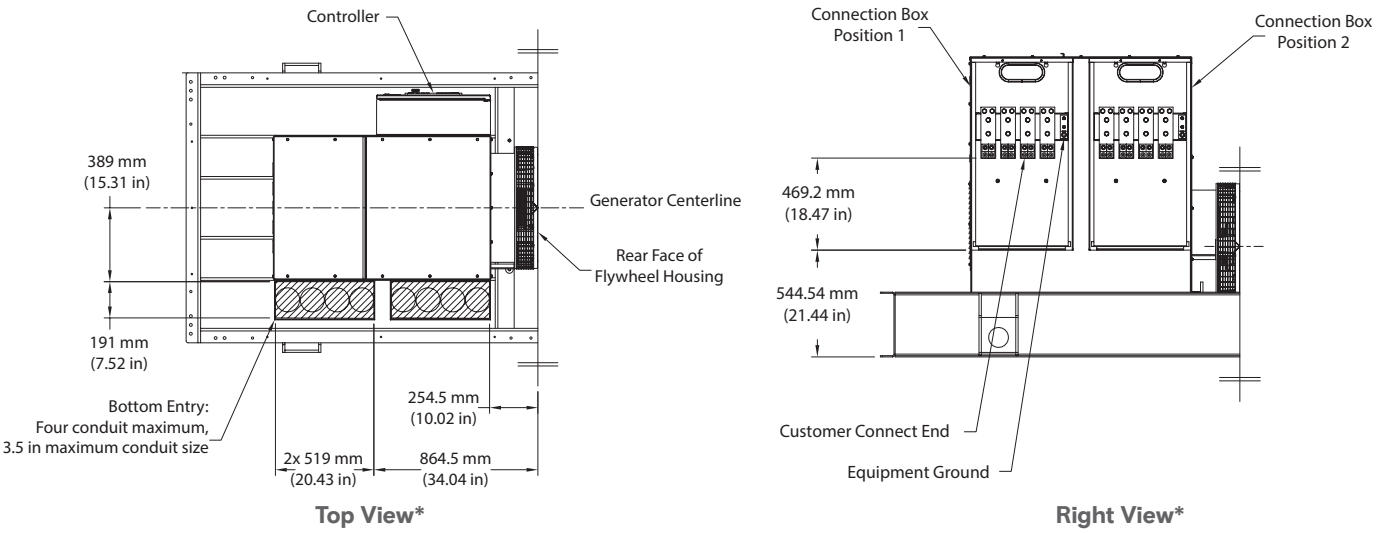

Figure 1: 1,200 Amp Connection Box Diagram

***Note**: Left side controls shown. Right side controls optional.

Subject to change. | WT00043037 | 2021-09

Connection Box Data Sheet

325–400 kW Diesel

DESCRIPTION

Connection boxes provide a dedicated wiring space for electrical connection to the generator output when a circuit breaker is not provided.

FEATURES

— Accessible enclosure
— Copper busbars

CERTIFICATIONS AND STANDARDS

— Wire bending space conforms to UL, CSA, and NFPA 70 requirements

WIRE LUG DATA, ≤ 1,200 AMP CONNECTION BOX

Amperage	Terminal Description	Wire Range (Qty) Cu/Al	Wire Bending Space to Bottom of Enclosure mm (in)	Wire Binding Screw Torque [1]	Lug Mounting Fasteners
1,200	Busbars	(4) 1/0 AWG - 750 kcmil	469 (14.47)	46 lb-ft	50 lb-ft
	Equipment Grounding Terminal	(1) 2/0 AWG - 600 kcmil	569 (22.41)	41 lb-ft	32 lb-ft

[1] Listed torque values are for maximum conductor sizes accommodated. Consult UL486 Tables 7-4, 7-5, 7-6 for smaller conductor sizes.

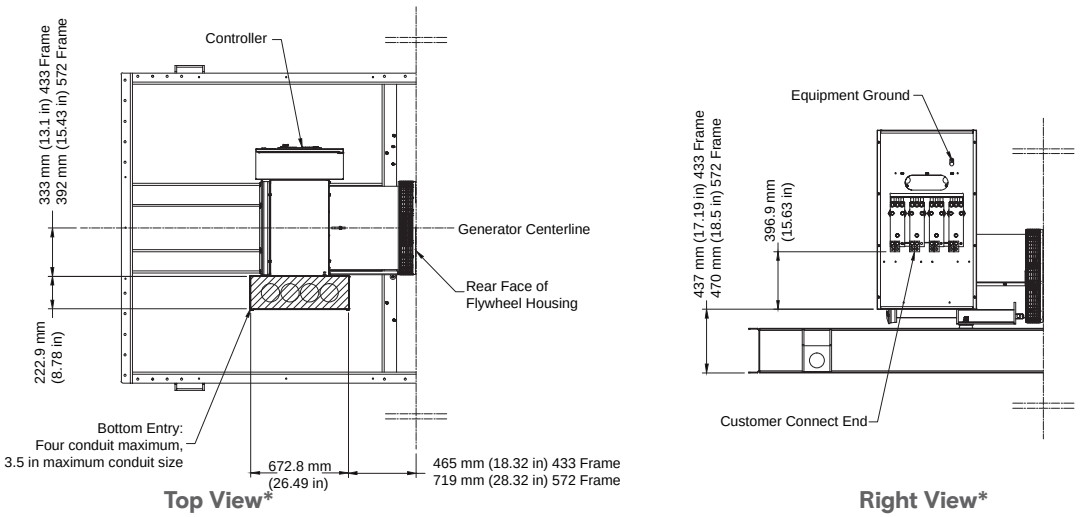

Figure 1: ≤ 1,200 Amp Connection Box Diagram

*__Note:__ Left side controls shown. Right side controls optional.

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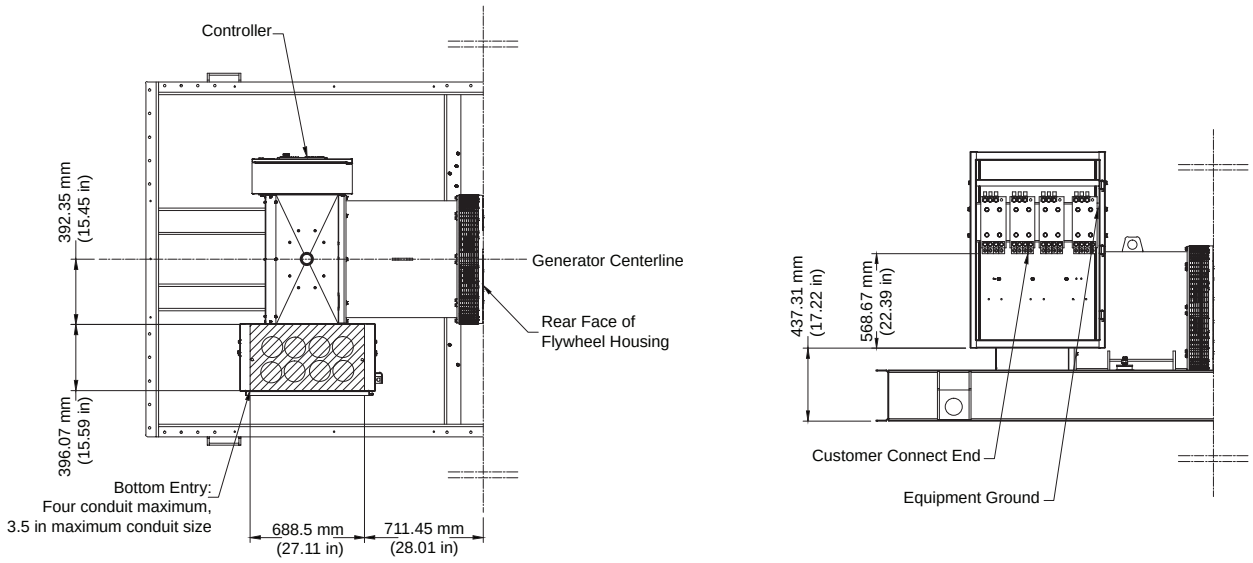
WIRE LUG DATA, > 1,200 AMP CONNECTION BOX

Amperage	Terminal Description	Wire Range (Qty) Cu/Al	Wire Bending Space to Bottom of Enclosure mm (in)	Wire Binding Screw Torque [1]	Lug Mounting Fasteners
2,250	Busbars	(8) 1/0 AWG - 750 kcmil	569 (22.4)	46 lb-ft	50 lb-ft
	Equipment Grounding Terminal	(1) 4/0 AWG - 500 kcmil	841 (33.1)	32 lb-ft	32 lb-ft

[1] Listed torque values are for maximum conductor sizes accommodated. Consult UL486 Tables 7-4, 7-5, 7-6 for smaller conductor sizes.



Top View* **Right View***

Figure 1: 2,250 Amp Connection Box Diagram

***Note:** Left side controls shown. Right side controls optional.

Connection Box Data Sheet

mtu Series 1600

DESCRIPTION

Connection boxes provide a dedicated wiring space for electrical connection to the generator output when a circuit breaker is not provided.

FEATURES

— Accessible enclosure
— Copper busbars

CERTIFICATIONS AND STANDARDS

— Wire bending space conforms to UL, CSA, and NFPA 70 requirements

WIRE LUG DATA

Amperage	Terminal Description	Wire Range (Qty) Cu/Al	Wire Bending Space to Bottom of Enclosure mm (in)	Wire Binding Screw Torque N·m (lb-ft)	Lug Mounting Fasteners N·m (lb-ft)
1,200	Busbars	(4) 1/0 AWG - 600 kcmil	47 (16)	62 (46)	68 (50)
	Equipment Grounding Terminal	(1) 6 AWG - 250 kcmil	985 (38.7)	23 (17)	43 (32)
2,250	Busbars	(8) 1/0 AWG - 750 kcmil	566 (22.3)	62 (46)	68 (50)
	Equipment Grounding Terminal	(1) 4/0 AWG - 500 kcmil	838 (33)	43 (32)	43 (32)

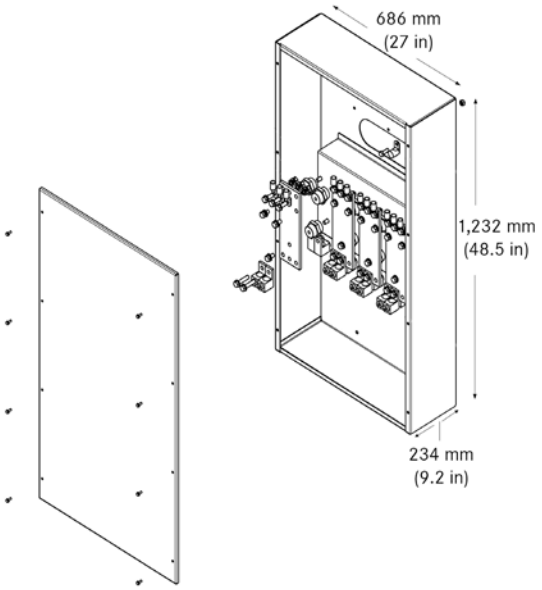


Figure 1: 1,200 Amp Connection Box Diagram

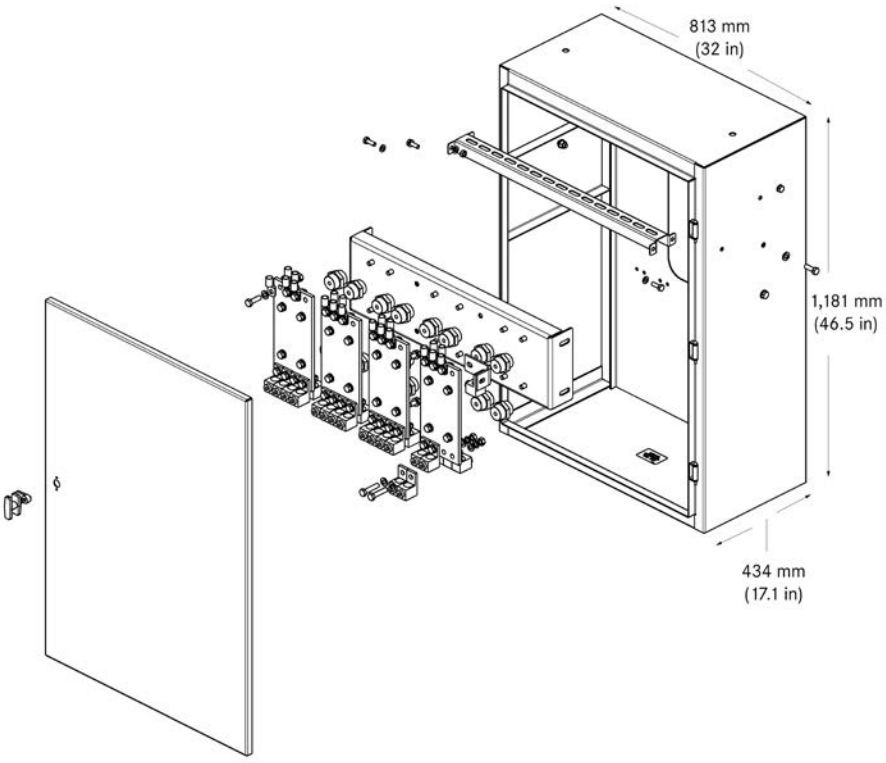


Figure 2: 2,250 Amp Connection Box Diagram

Connection Box Data Sheet

mtu Series 2000

DESCRIPTION

Connection boxes provide a dedicated wiring space for electrical connection to the generator output when no circuit breaker is provided.

FEATURES

— Accessible enclosure
— Copper busbars

CERTIFICATIONS AND STANDARDS

— Wire bending space conforms to UL, CSA, and NFPA 70 requirements

WIRE LUG DATA

Amperage	Terminal Description	Wire Range (Qty) Cu/Al	Wire Bending Space to Bottom of Enclosure mm (in)	Wire Binding Screw Torque N·m (lb-ft)	Lug Mounting Fasteners N·m (lb-ft)
1,200	Busbars	(4) 1/0 AWG - 600 kcmil	566 (22.3)	62 (46)	68 (50)
	Equipment Grounding Terminal	(1) 6 AWG - 250 kcmil	492 (19.4)	23 (17)	43 (32)
3,500	Busbars	(9) 1/0 AWG - 750 kcmil	638 (25.2)	62 (46)	68 (50)
	Equipment Grounding Terminal	(1) 4/0 AWG - 500 kcmil	547 (21.5)	43 (32)	43 (32)

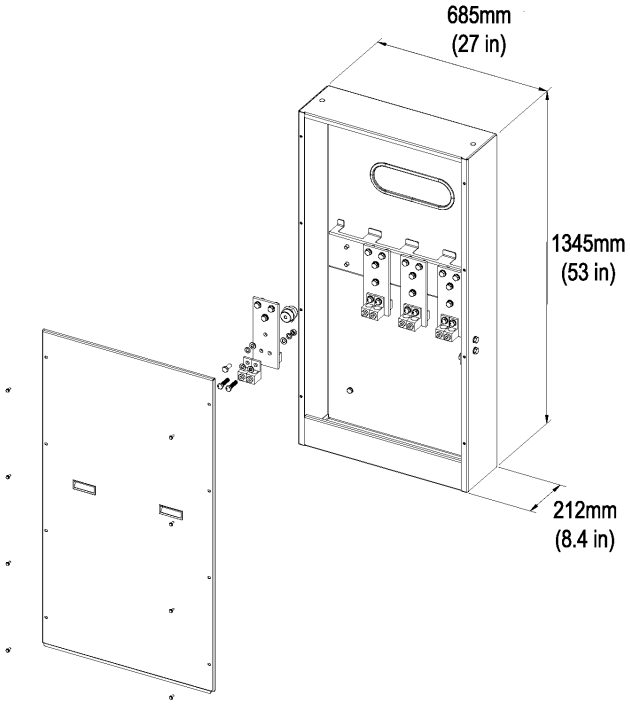


Figure 1: 1,200 Amp Connection Box Diagram

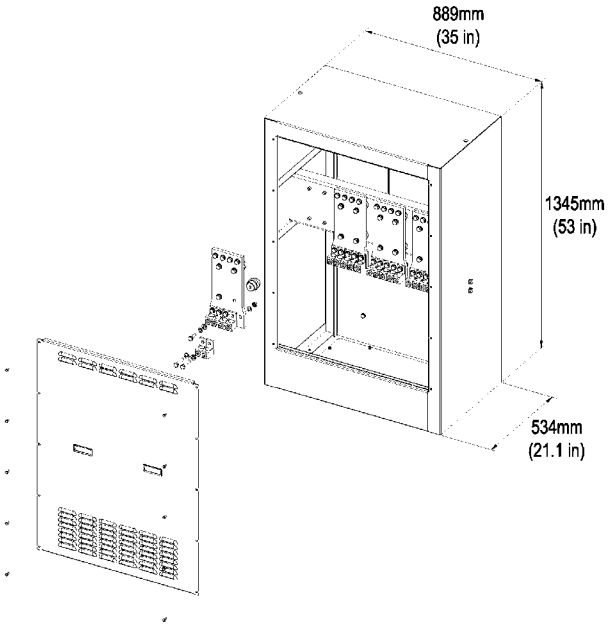


Figure 2: 3,500 Amp Connection Box Diagram

Connection Box Data Sheet (Enhanced)

1,250-1,750 kW Standby Diesel

DESCRIPTION

Connection boxes provide a dedicated wiring space for electrical connection to the generator output when a circuit breaker is not provided. These drawings represent recommended installation specifications. The dimensional drawings will govern and should be referenced for installation.

FEATURES

- Accessible enclosure
- Copper busbars
- Lugs not included

CERTIFICATIONS AND STANDARDS

- Wire bending space conforms to UL, CSA, and NFPA 70 requirements

50.2 FRAME (LOW VOLTAGE) CONNECTION BOX

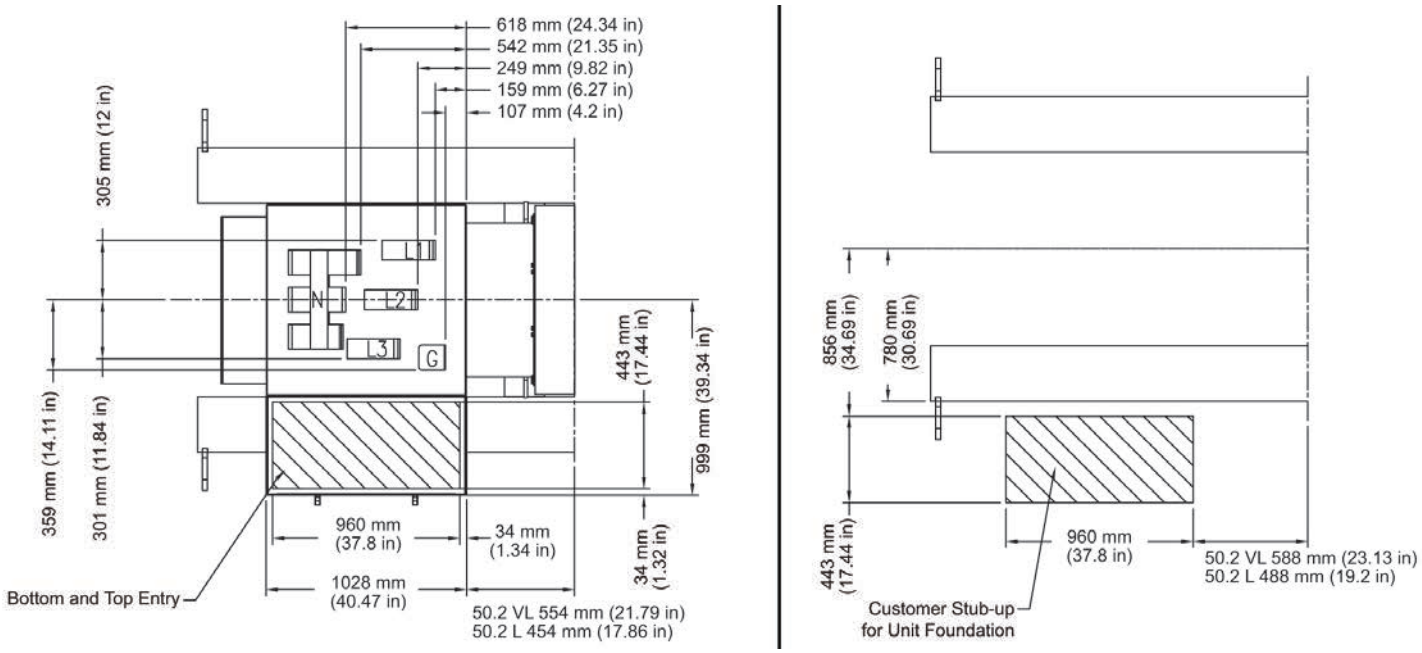


Figure 1: 50.2 Frame (Low Voltage) Connection Box Diagram - Top View (Left side optional)

50.2 FRAME (LOW VOLTAGE) CONNECTION BOX, continued

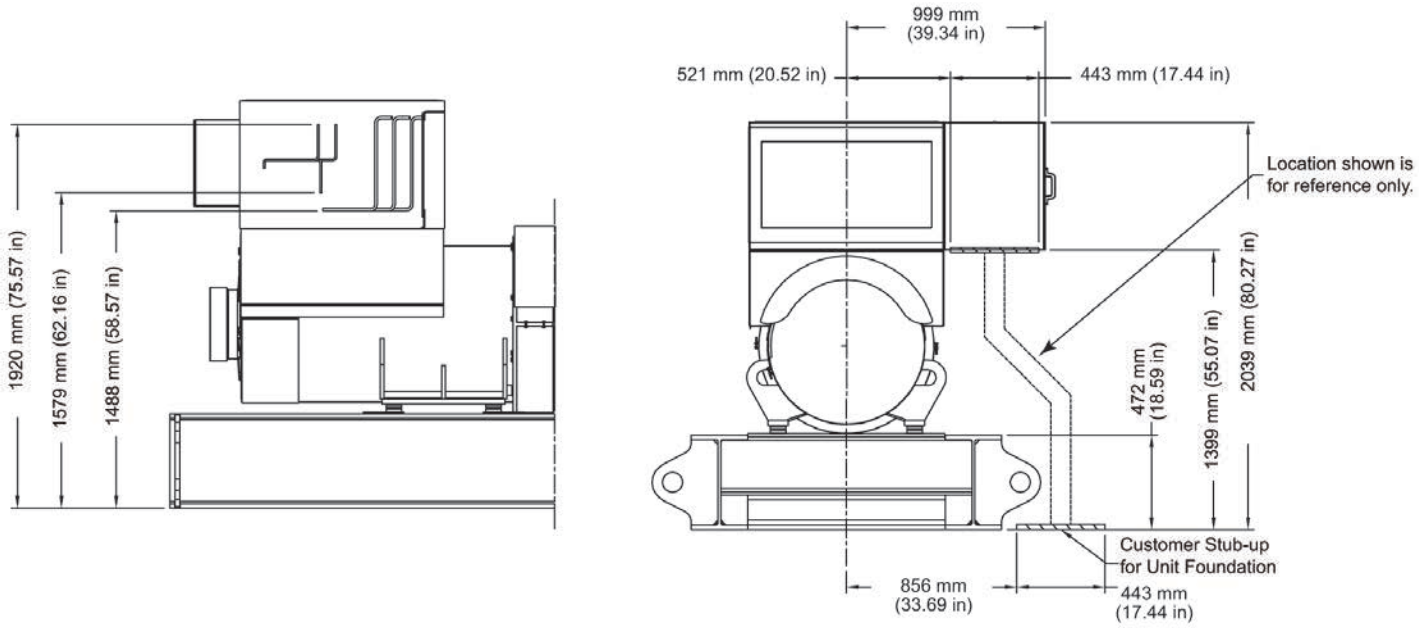
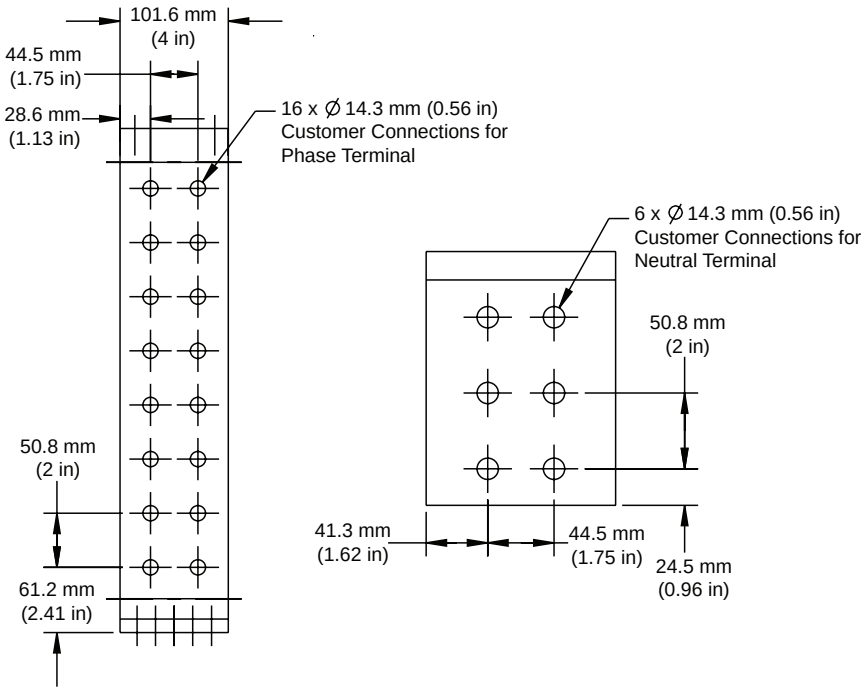


Figure 2: 50.2 Frame (Low Voltage) Connection Box Diagram - Right View / Rear View



L1, L2, L3 Busbar Phase Detail

Busbar Neutral Detail

Figure 3: 50.2 Frame (Low Voltage) Busbar Connections

641 FRAME (LOW VOLTAGE) CONNECTION BOX

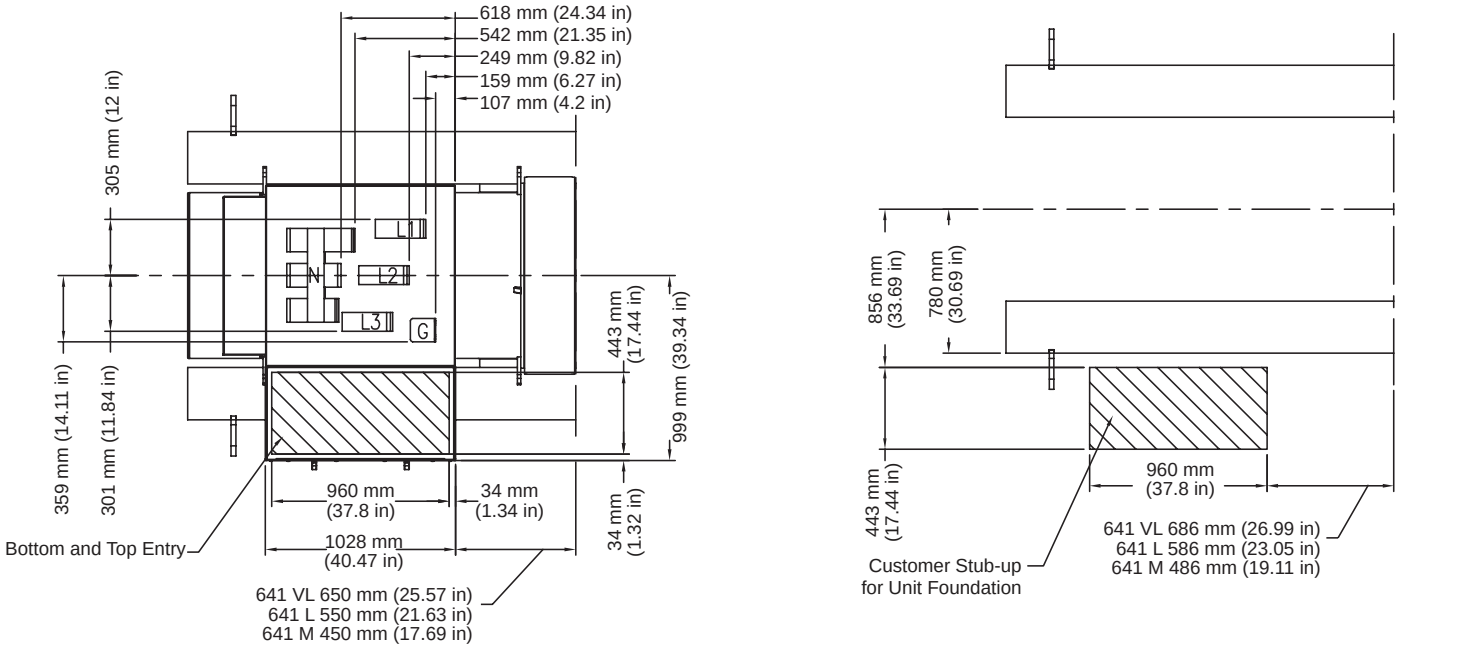


Figure 4: 641 Frame (Low Voltage) Connection Box Diagram - Top View (Left side optional)

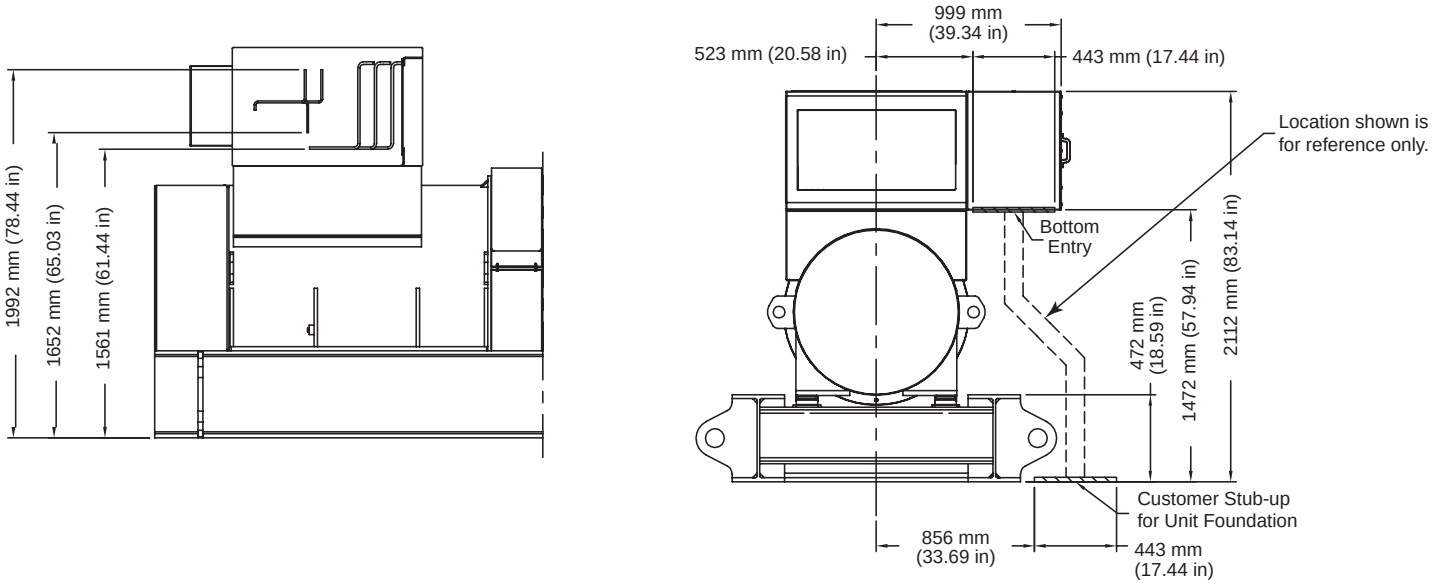
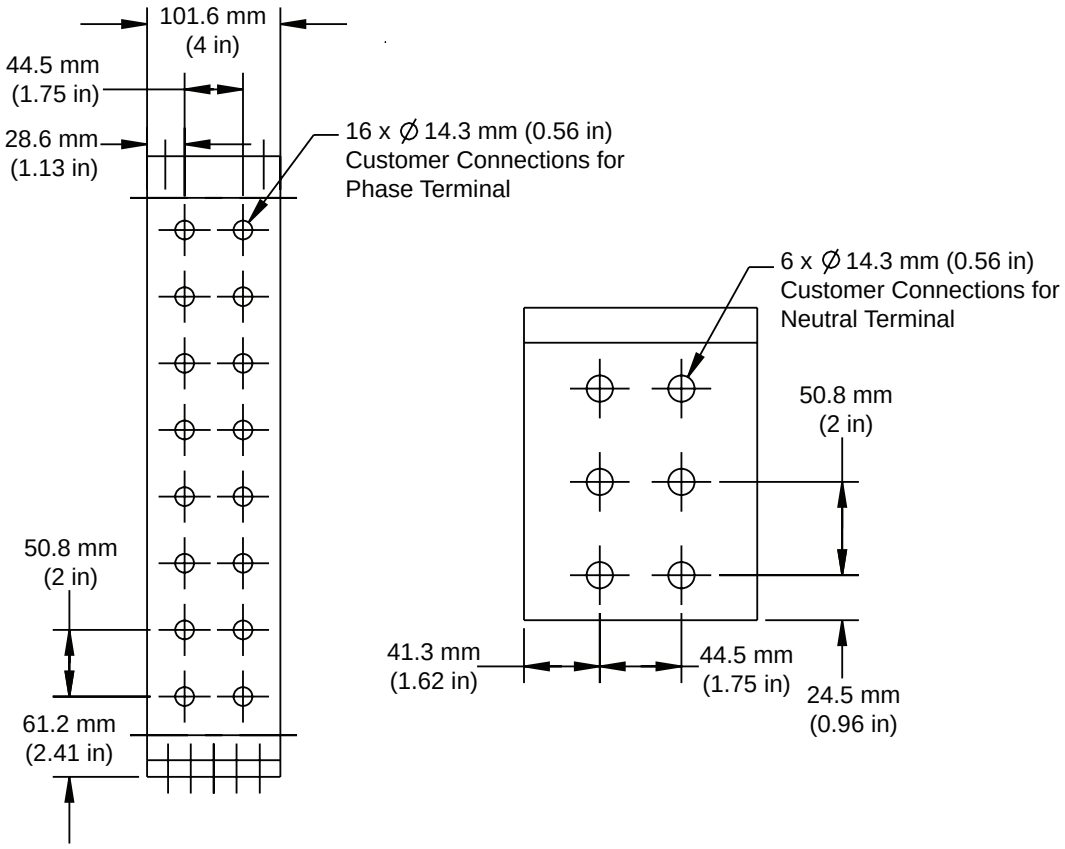


Figure 5: 641 Frame (Low Voltage) Connection Box Diagram - Right View / Rear View

641 FRAME (LOW VOLTAGE) CONNECTION BOX, continued



L1, L2, L3 Busbar Phase Detail Busbar Neutral Detail

Figure 6: 641 Frame (Low Voltage) Busbar Connections

641 FRAME (MEDIUM VOLTAGE) CONNECTION BOX

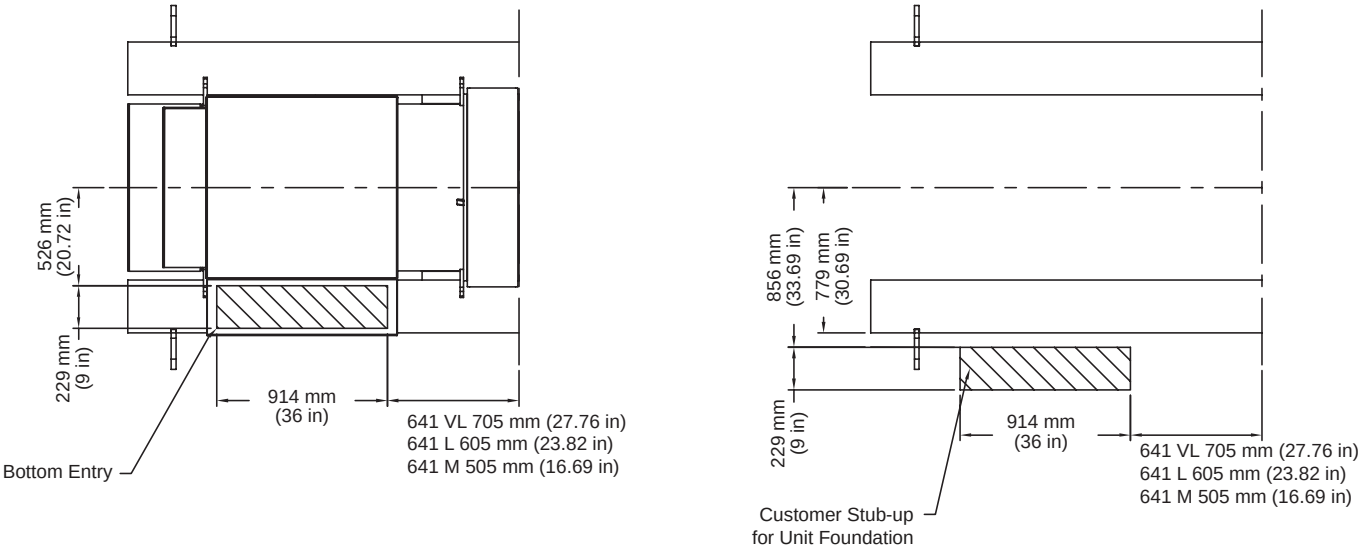


Figure 7: 641 Frame (Medium Voltage) Connection Box - Top View (Left side optional)

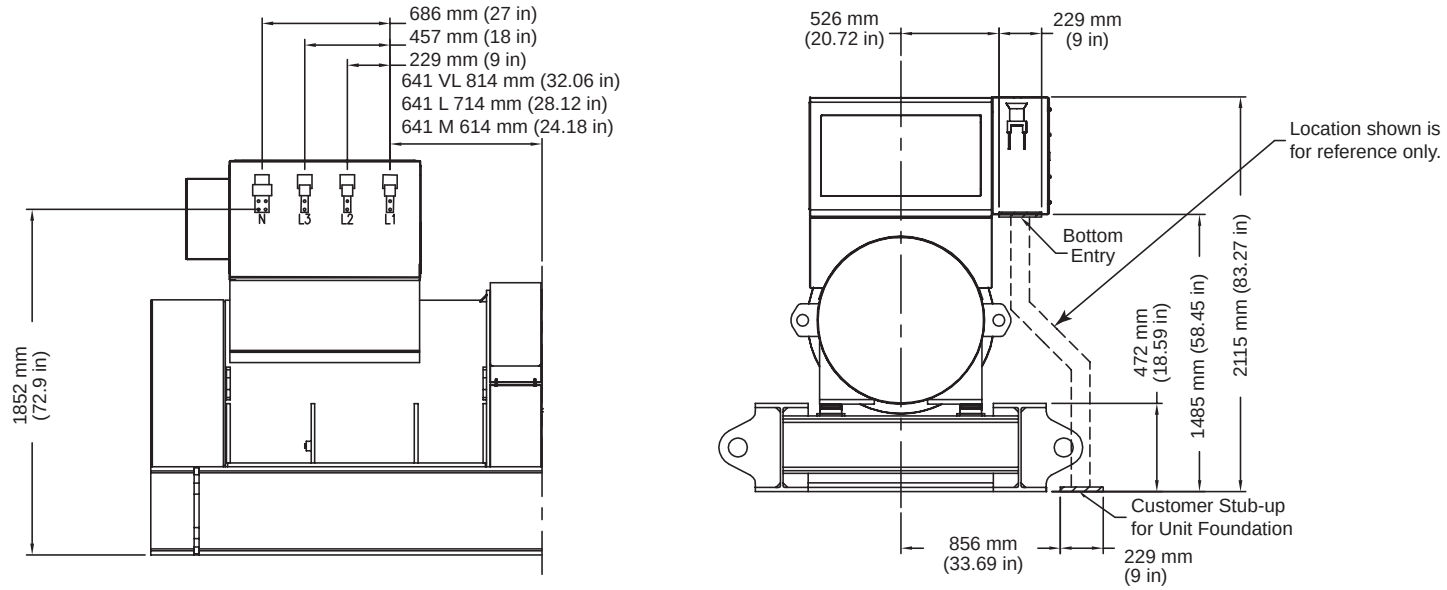
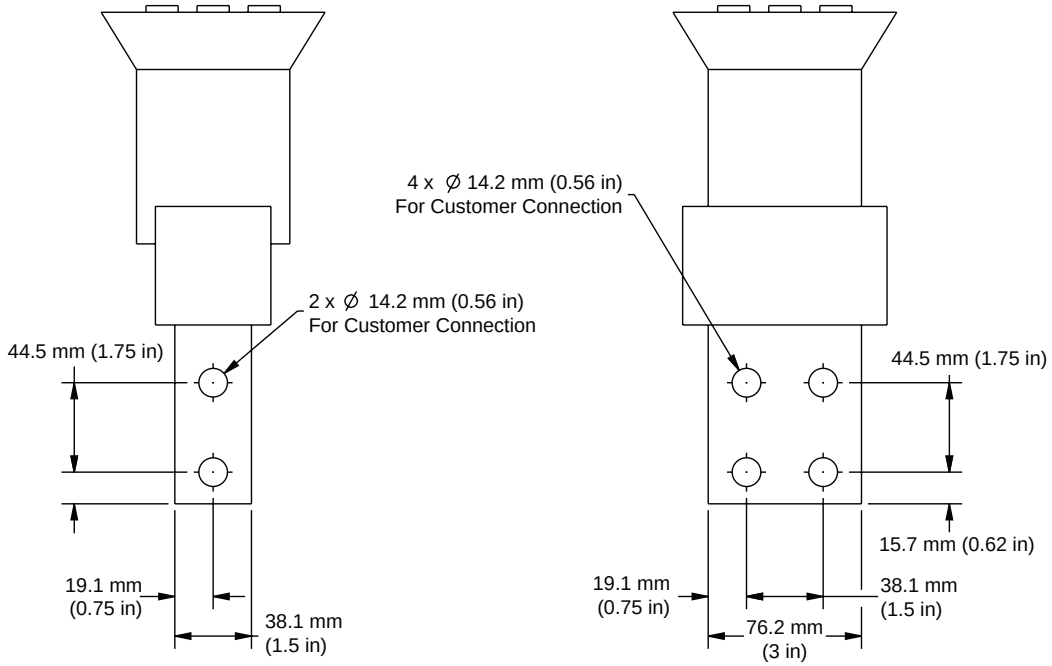


Figure 8: 641 Frame (Medium Voltage) Connection Box - Right View / Rear View

641 FRAME (MEDIUM VOLTAGE) CONNECTION BOX, continued



L1, L2, L3 Busbar Phase Detail **Busbar Neutral Detail**

Figure 9: 641 Frame (Medium Voltage) Busbar Connections

841 FRAME (LOW VOLTAGE) CONNECTION BOX

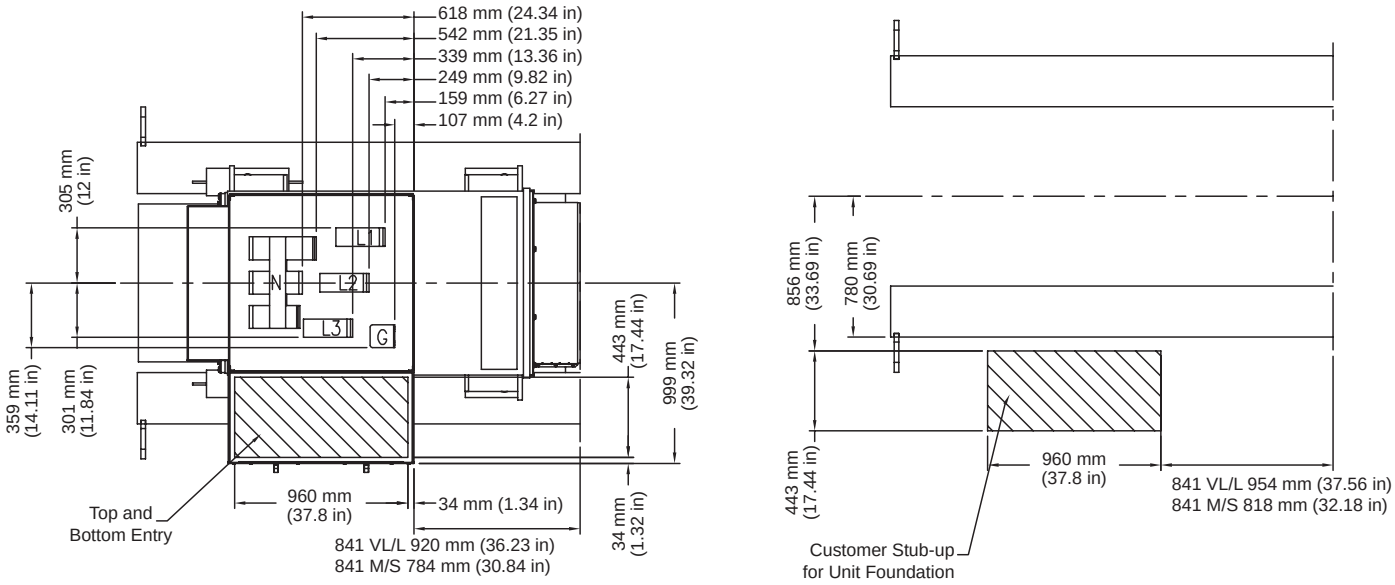


Figure 10: 841 Frame (Low Voltage) Connection Box - Top View (Left side optional)

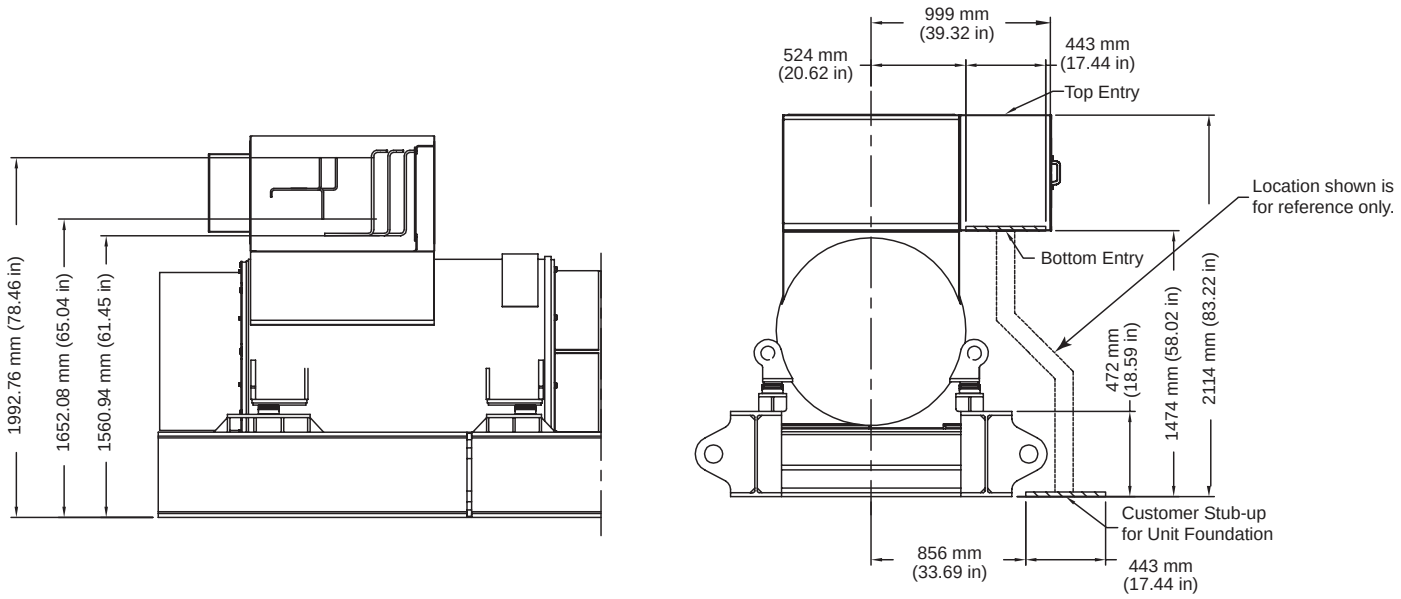
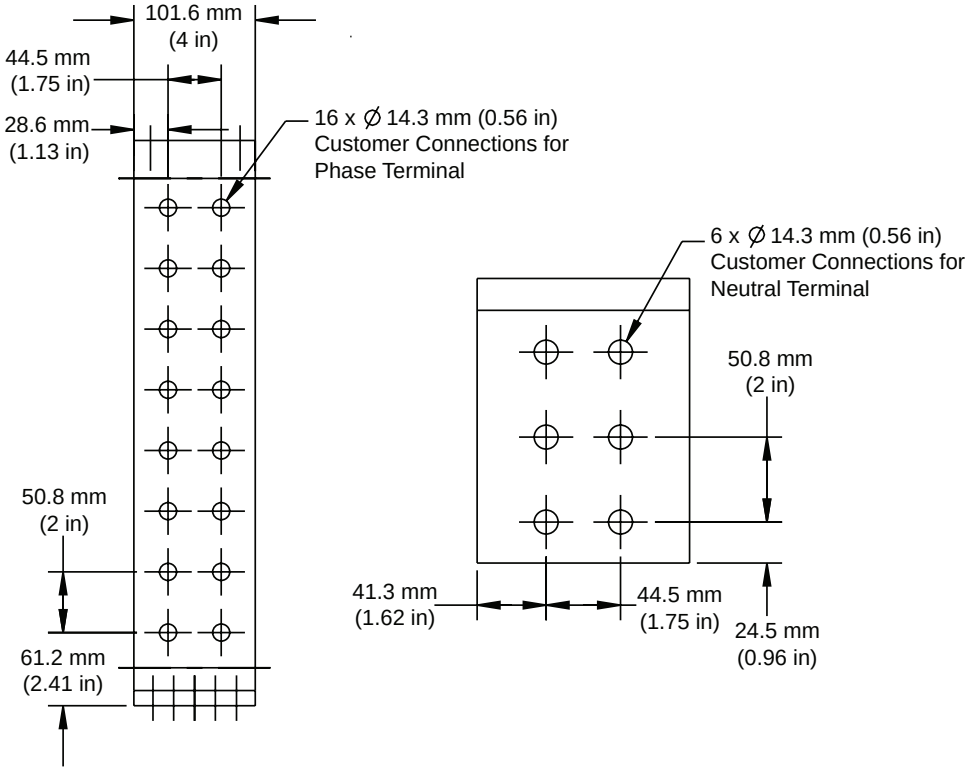


Figure 11: 841 Frame (Low Voltage) Connection Box - Right View / Rear View

841 FRAME (LOW VOLTAGE) CONNECTION BOX, continued



L1, L2, L3 Phase Terminal Detail

Neutral Terminal Detail

Figure 12: 841 Frame (Low Voltage) Busbar Connections

841 frame (MEDIUM VOLTAGE) CONNECTION BOX

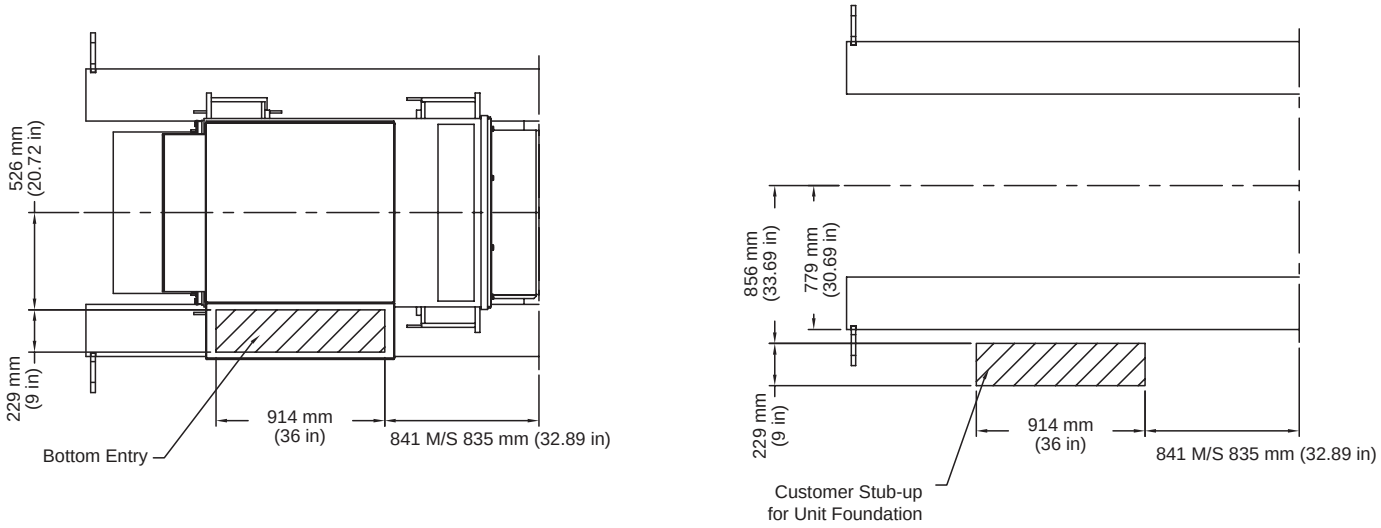


Figure 13: 841 Frame (Medium Voltage) Connection Box - Top View (Left side optional)

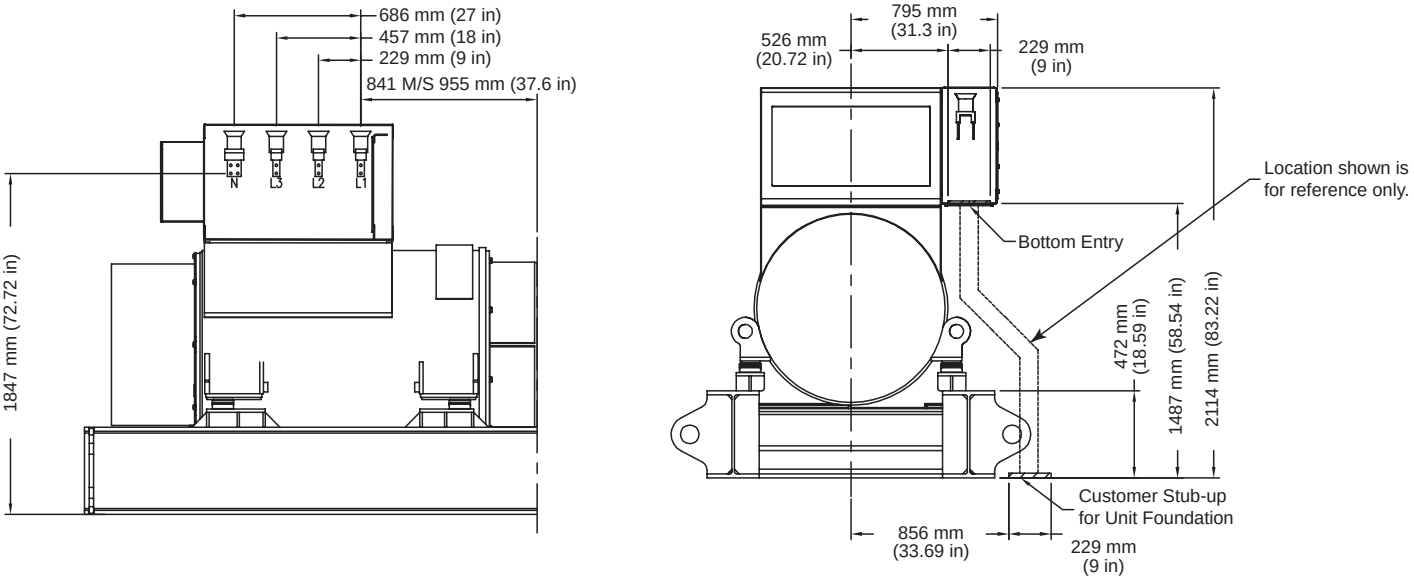
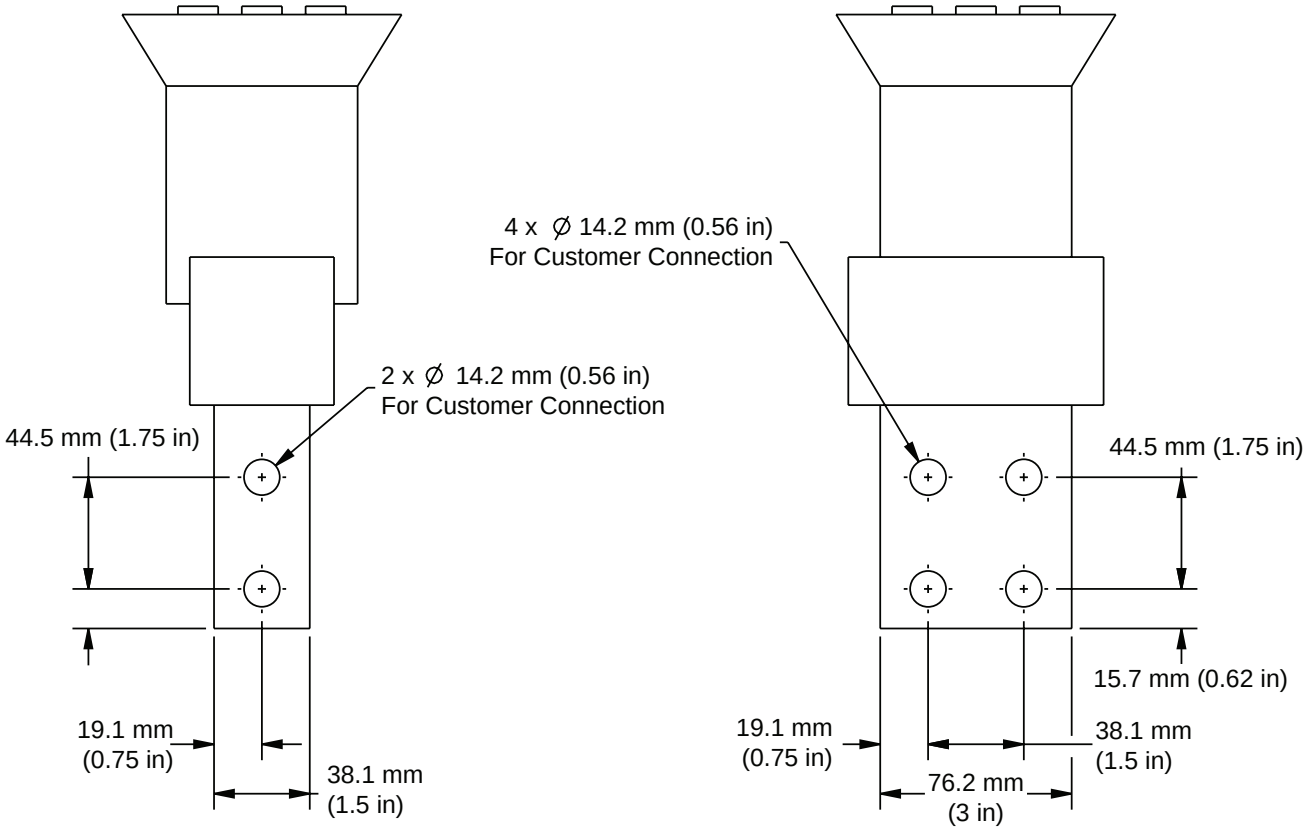


Figure 14: 841 Frame (Medium Voltage) Connection Box - Right View / Rear View

841 FRAME (MEDIUM VOLTAGE) CONNECTION BOX, continued



L1, L2, L3 Phase Terminal Detail

Neutral Terminal Detail

Figure 15: 841 Frame (Medium Voltage) Busbar Connections

4P6 FRAME (HIGH VOLTAGE) CONNECTION BOX

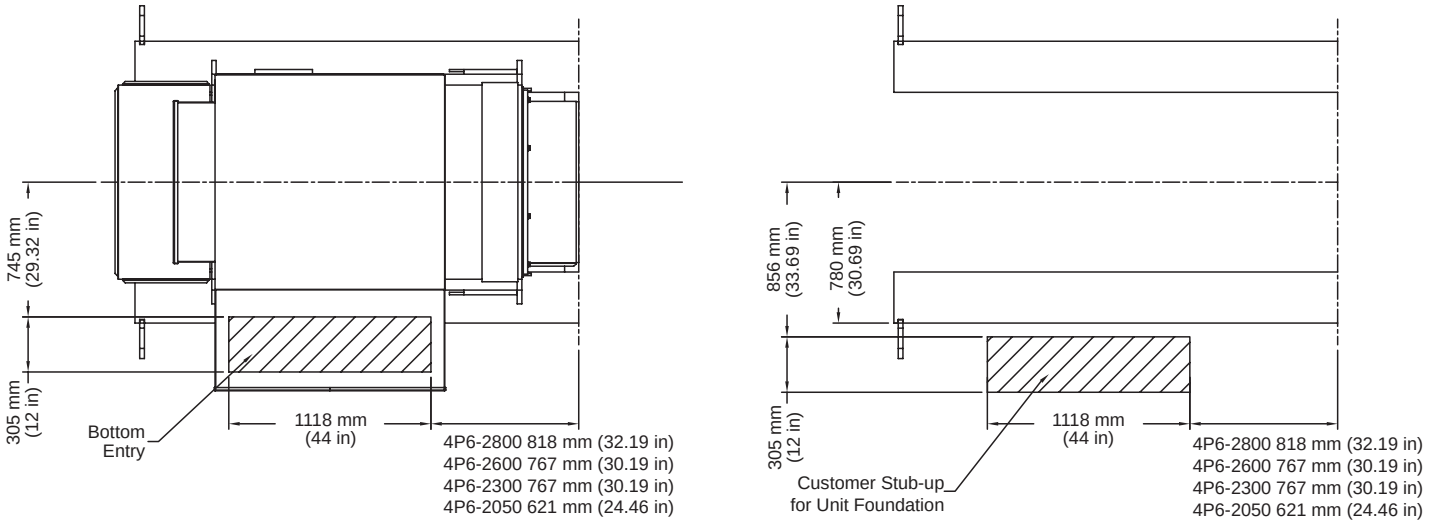


Figure 16: 4P9 Frame (High Voltage) Connection Box Diagram (Left side optional)

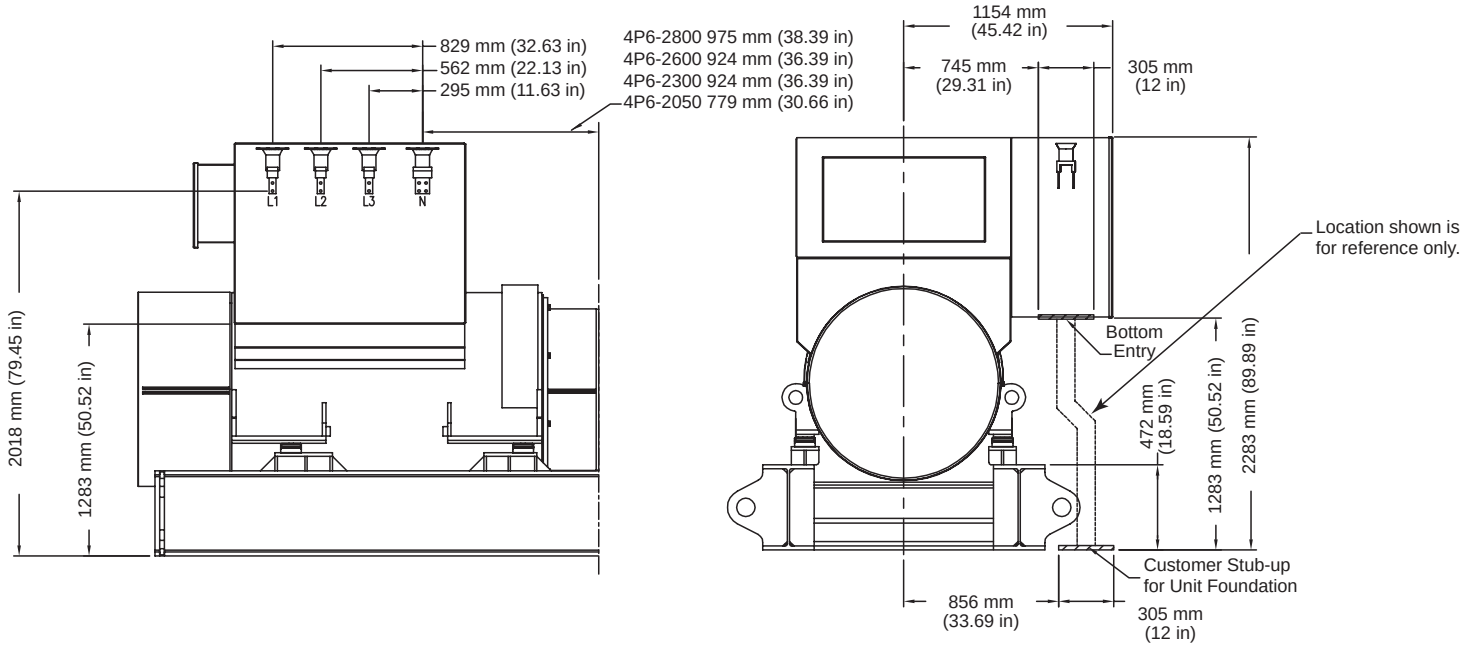
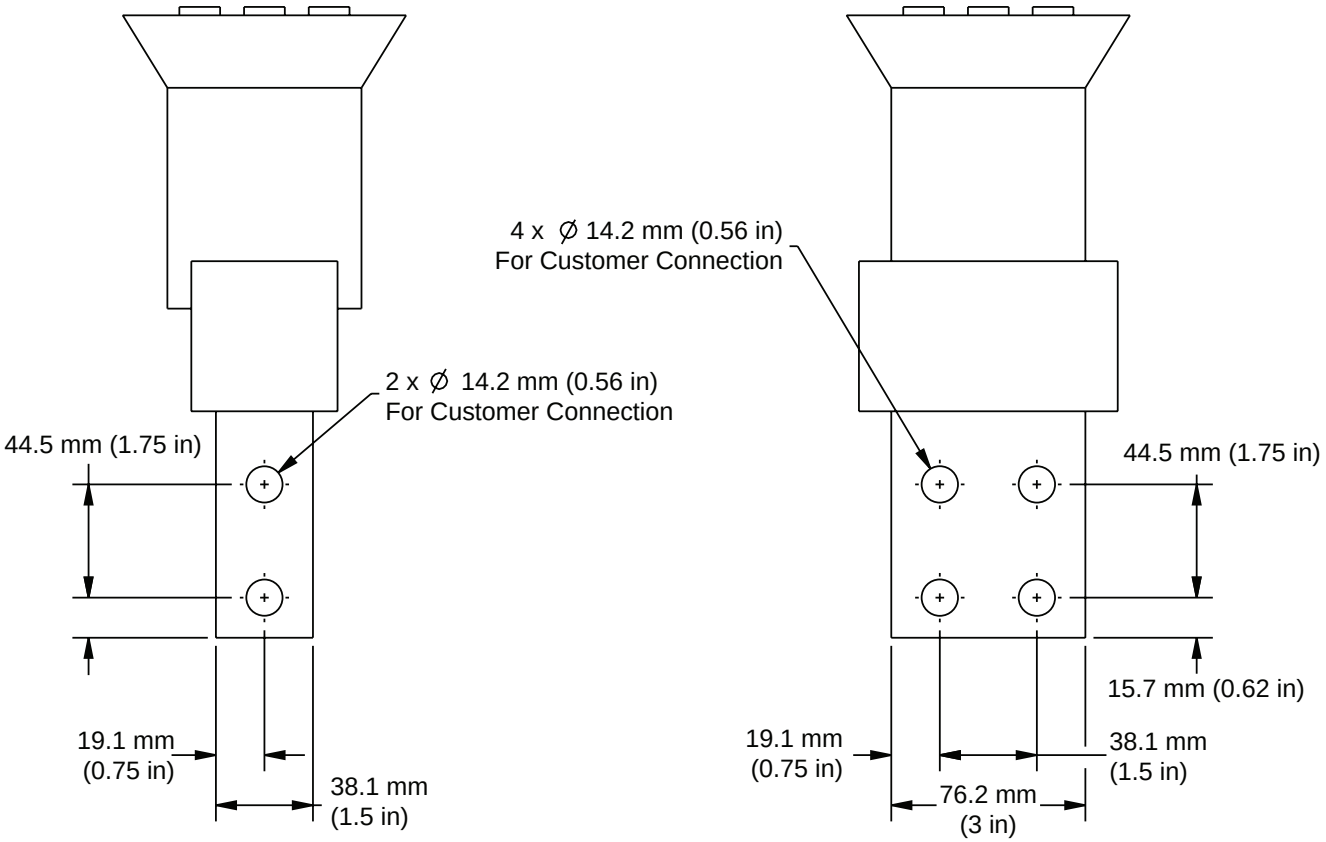


Figure 17: 4P9 Frame (High Voltage) Connection Box Diagram / Rear View

4P6 FRAME (HIGH VOLTAGE) CONNECTION BOX, continued



L1, L2, L3 Phase Terminal Detail

Neutral Terminal Detail

Figure 18: 4P6 Frame (High Voltage) Busbar Connections

Connection Box Data Sheet (Standard)

1,250-3,250 kW Standby Diesel

DESCRIPTION

Connection boxes provide a dedicated wiring space for electrical connection to the generator output when a circuit breaker is not provided. These drawings represent recommended installation specifications. The dimensional drawings will govern and should be referenced for installation.

FEATURES

- Accessible enclosure
- Copper busbars
- Lugs not included

CERTIFICATIONS AND STANDARDS

- Wire bending space conforms to UL, CSA, and NFPA 70 requirements

50.2 FRAME (LOW VOLTAGE) CONNECTION BOX

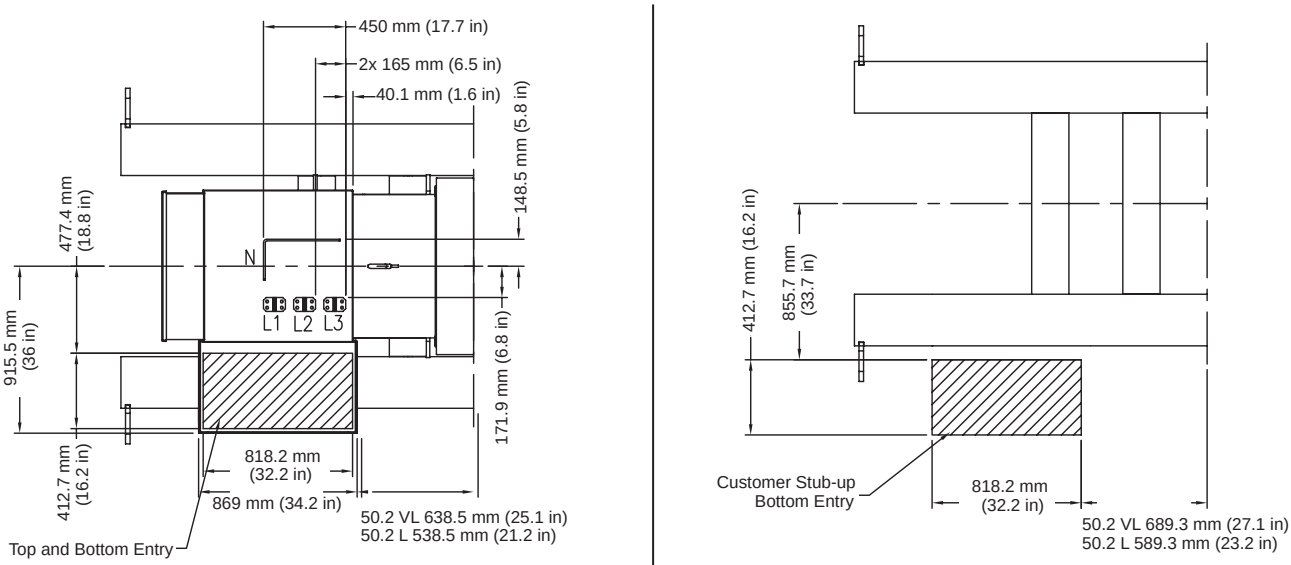


Figure 1: 50.2 Frame (Low Voltage) Connection Box Diagram - Top View (Left side optional)

A Rolls-Royce solution

50.2 FRAME (LOW VOLTAGE) CONNECTION BOX, continued

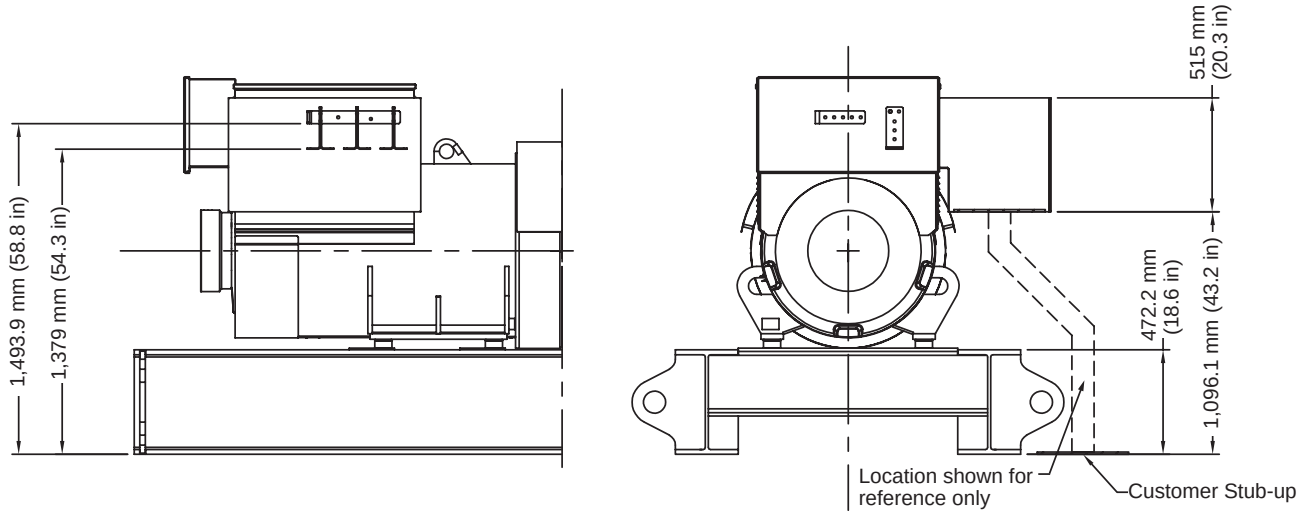
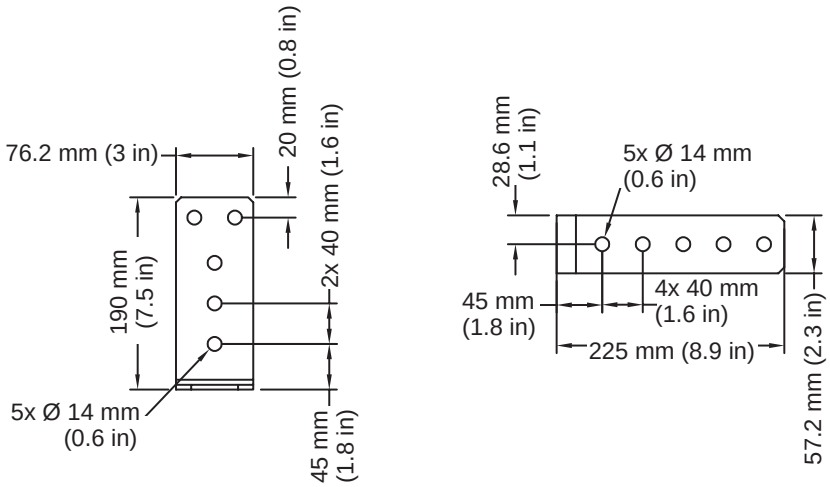


Figure 2: 50.2 Frame (Low Voltage) Connection Box Diagram - Right View / Rear View



L1, L2, L3 Busbar Phase Detail **Busbar Neutral Detail**

Figure 3: 50.2 Frame (Low Voltage) Busbar Connections

641 FRAME (LOW VOLTAGE) CONNECTION BOX

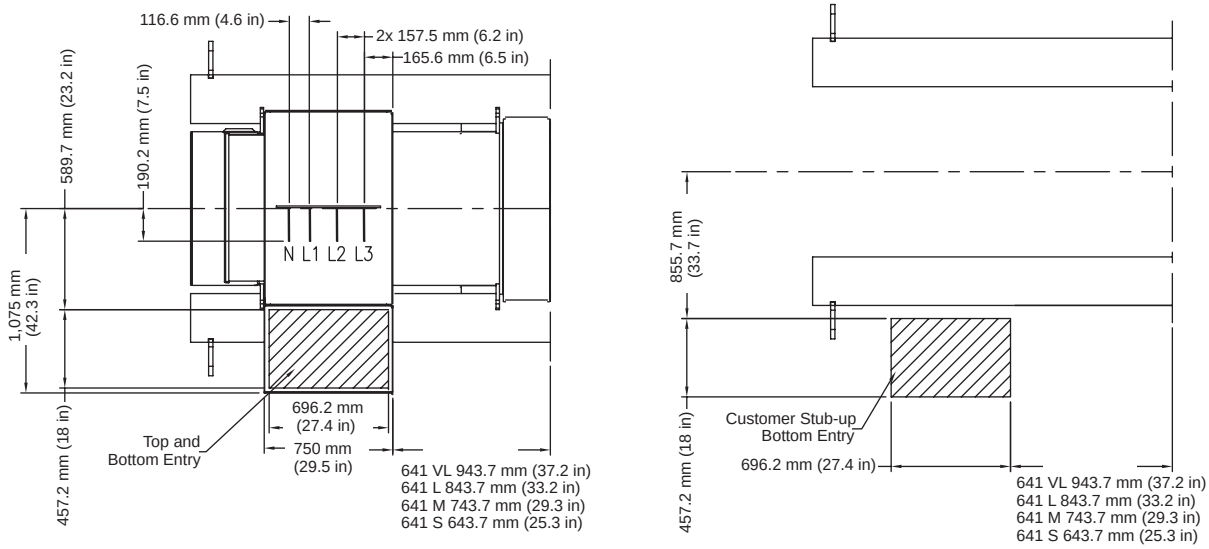


Figure 4: 641 Frame (Low Voltage) Connection Box Diagram - Top View (Left side optional)

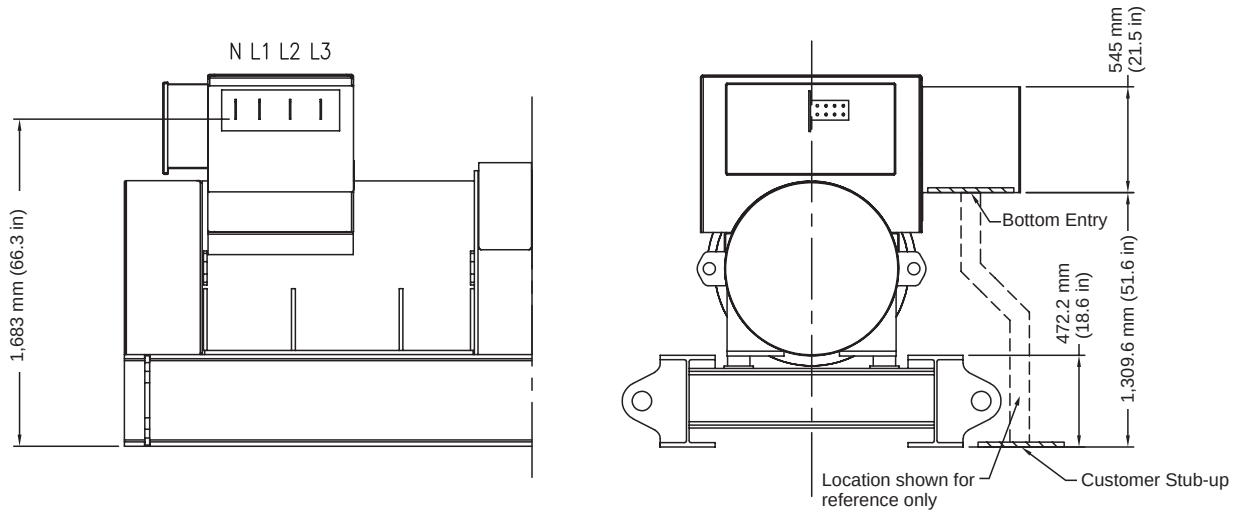
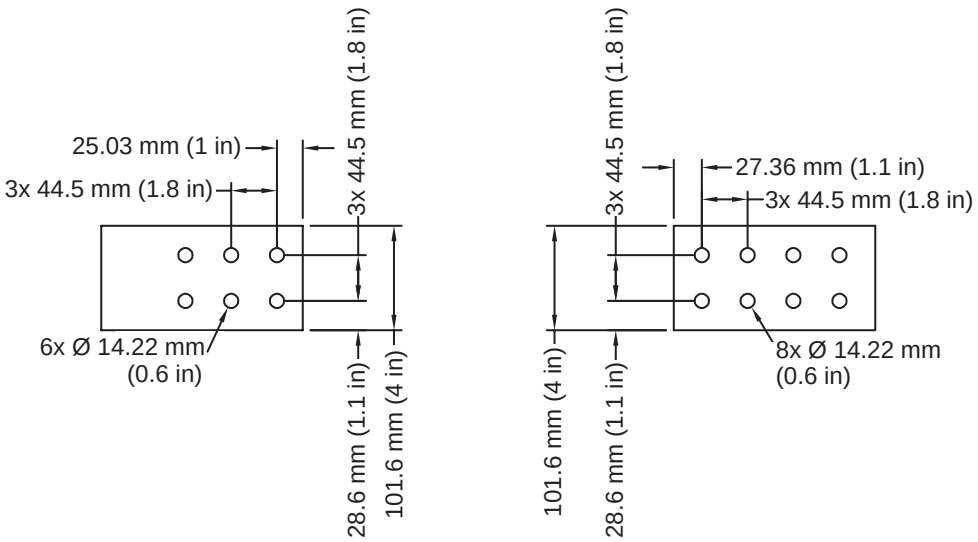


Figure 5: 641 Frame (Low Voltage) Connection Box Diagram - Right View / Rear View

641 FRAME (LOW VOLTAGE) CONNECTION BOX, continued



L1, L2, L3 Busbar Phase Detail **Busbar Neutral Detail**

Figure 6: 641 Frame (Low Voltage) Busbar Connections

841 FRAME (LOW VOLTAGE) CONNECTION BOX

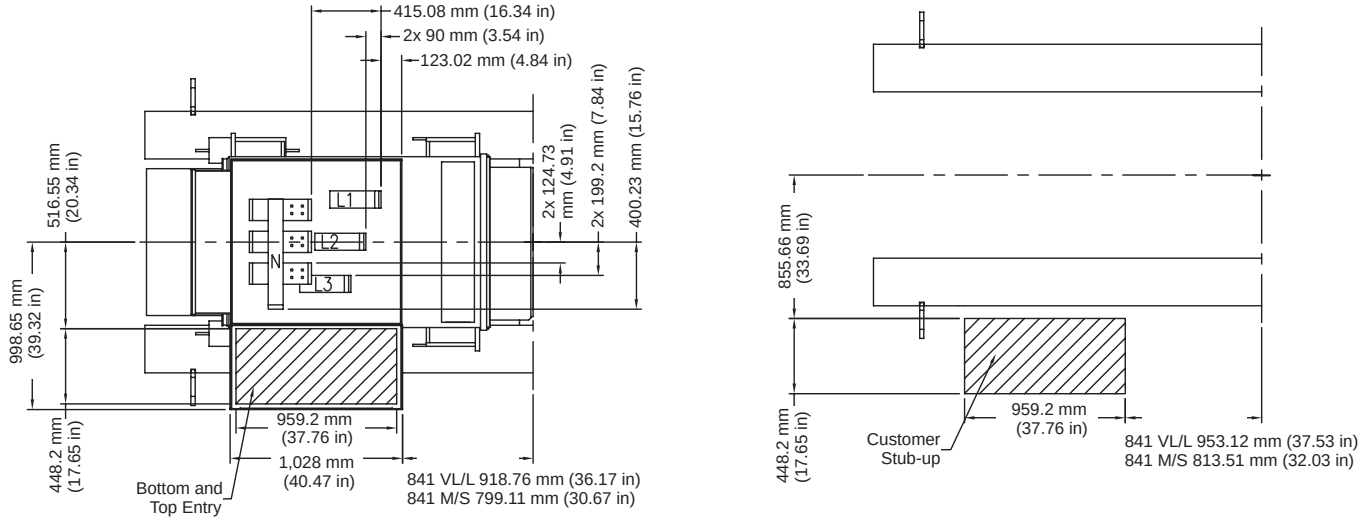


Figure 7: 841 Frame (Low Voltage) Connection Box - Top View (Left side optional)

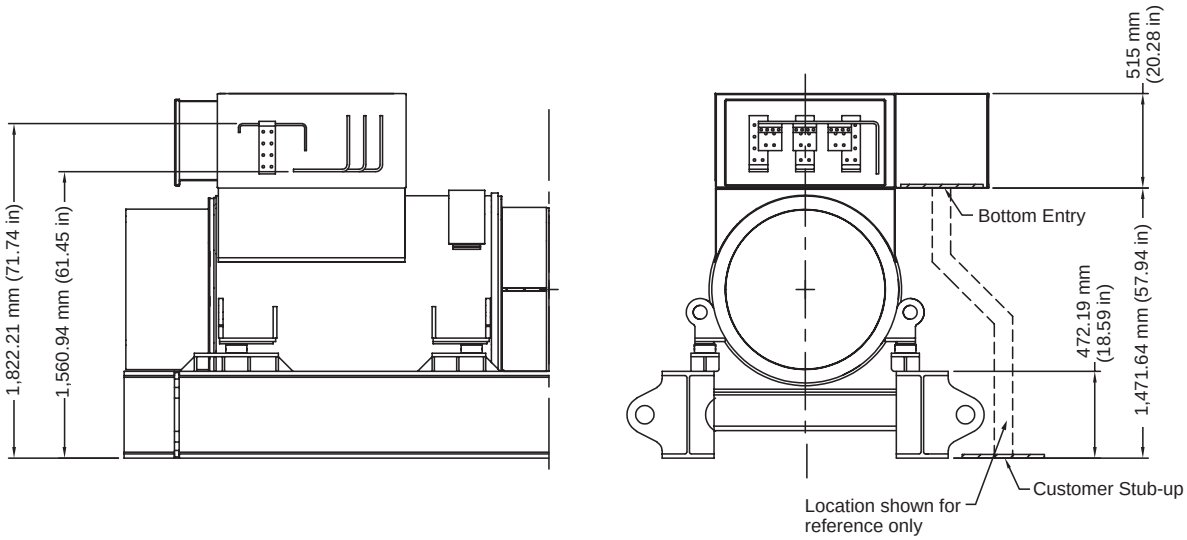
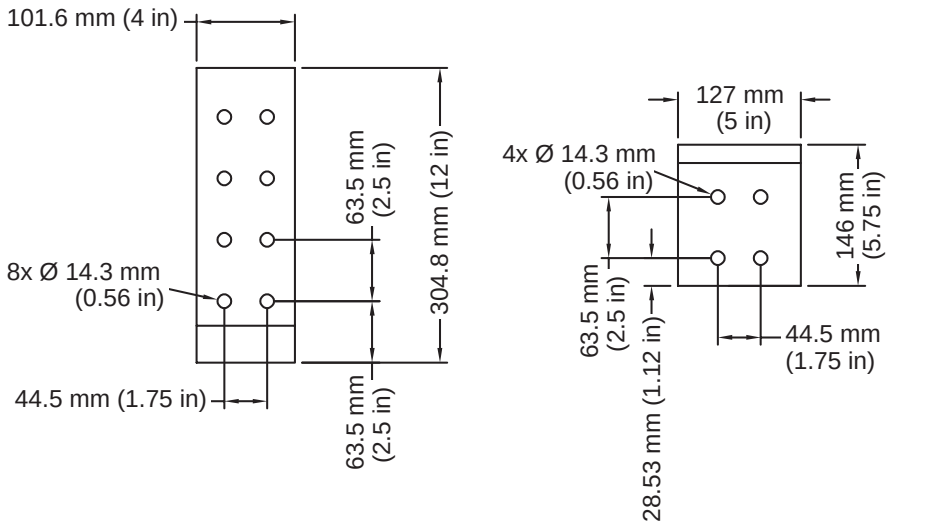


Figure 8: 841 Frame (Low Voltage) Connection Box - Right View / Rear View

841 FRAME (LOW VOLTAGE) CONNECTION BOX, continued



L1, L2, L3 Phase Terminal Detail **Neutral Terminal Detail**

Figure 9: 841 Frame (Low Voltage) Busbar Connections

941 FRAME (LOW VOLTAGE) CONNECTION BOX

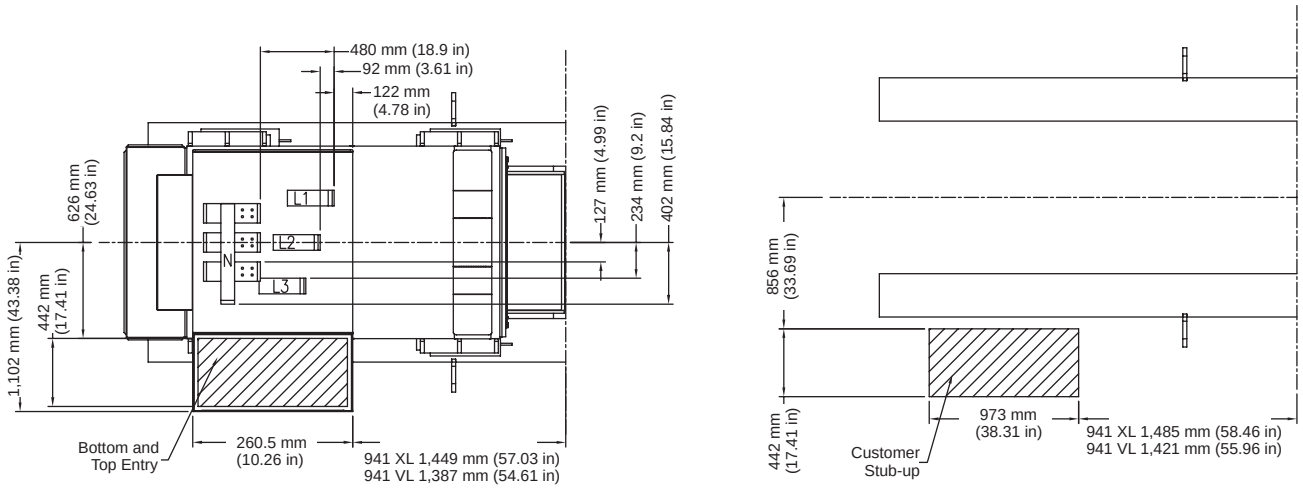


Figure 10: 941 Frame (Low Voltage) Connection Box - Top View (Left side optional)

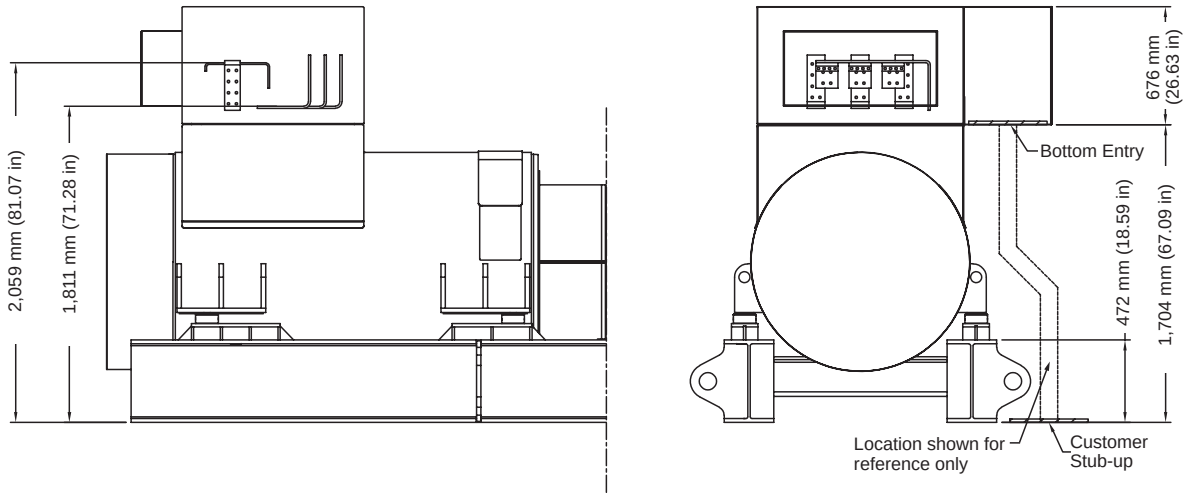
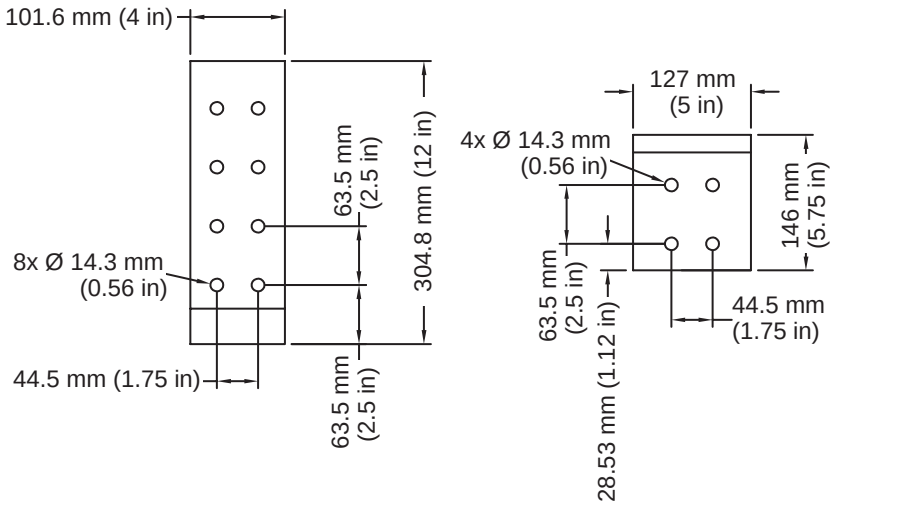


Figure 11: 941 Frame (Low Voltage) Connection Box - Right View / Rear View

941 FRAME (LOW VOLTAGE) CONNECTION BOX, continued



L1, L2, L3 Phase Terminal Detail **Neutral Terminal Detail**

Figure 12: 941 Frame (Low Voltage) Busbar Connections

Connection Box Data Sheet (Enhanced)

2,000-3,250 kW Standby Diesel

DESCRIPTION

Connection boxes provide a dedicated wiring space for electrical connection to the generator output when no circuit breaker is provided. These drawings represent recommended installation specifications. The dimensional drawings will govern and should be referenced for installation.

FEATURES

- Accessible enclosure
- Copper busbars
- Lugs not included

CERTIFICATIONS AND STANDARDS

- Wire bending space conforms to UL, CSA, and NFPA 70 requirements

641 FRAME (LOW VOLTAGE) CONNECTION BOX

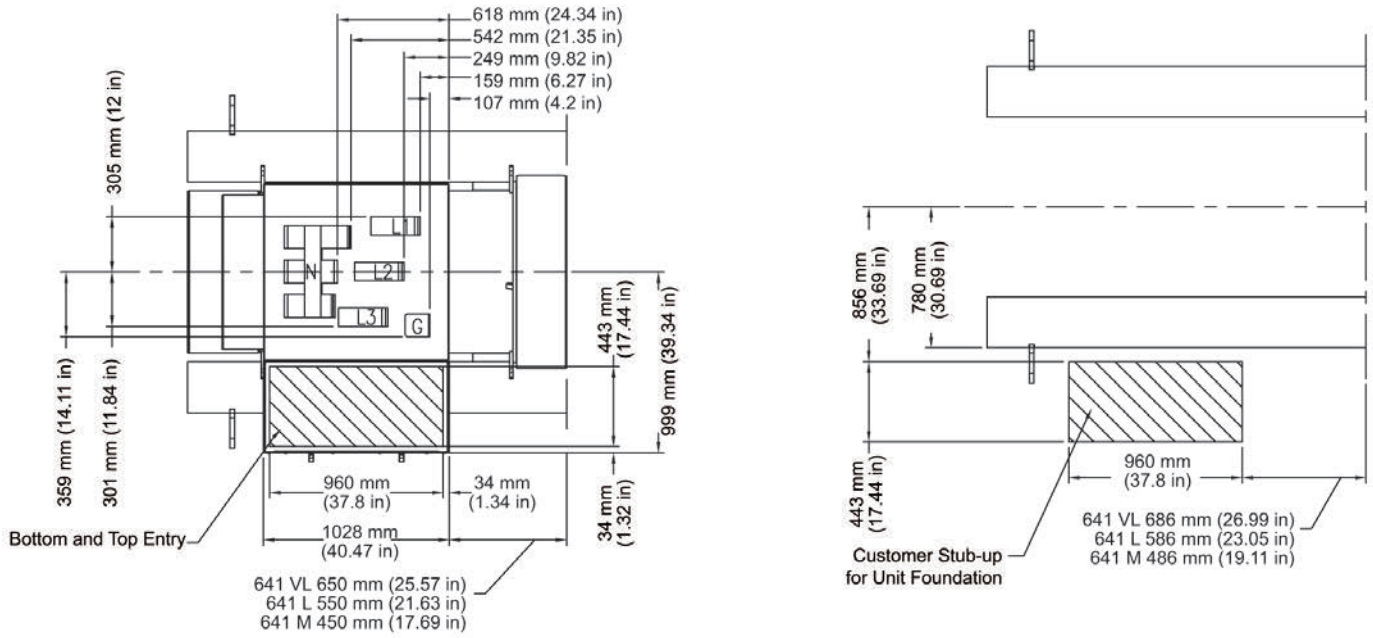


Figure 1: 641 Frame (Low Voltage) Connection Box Diagram - Top View (Left side optional)

A Rolls-Royce solution

641 FRAME (LOW VOLTAGE) CONNECTION BOX, continued

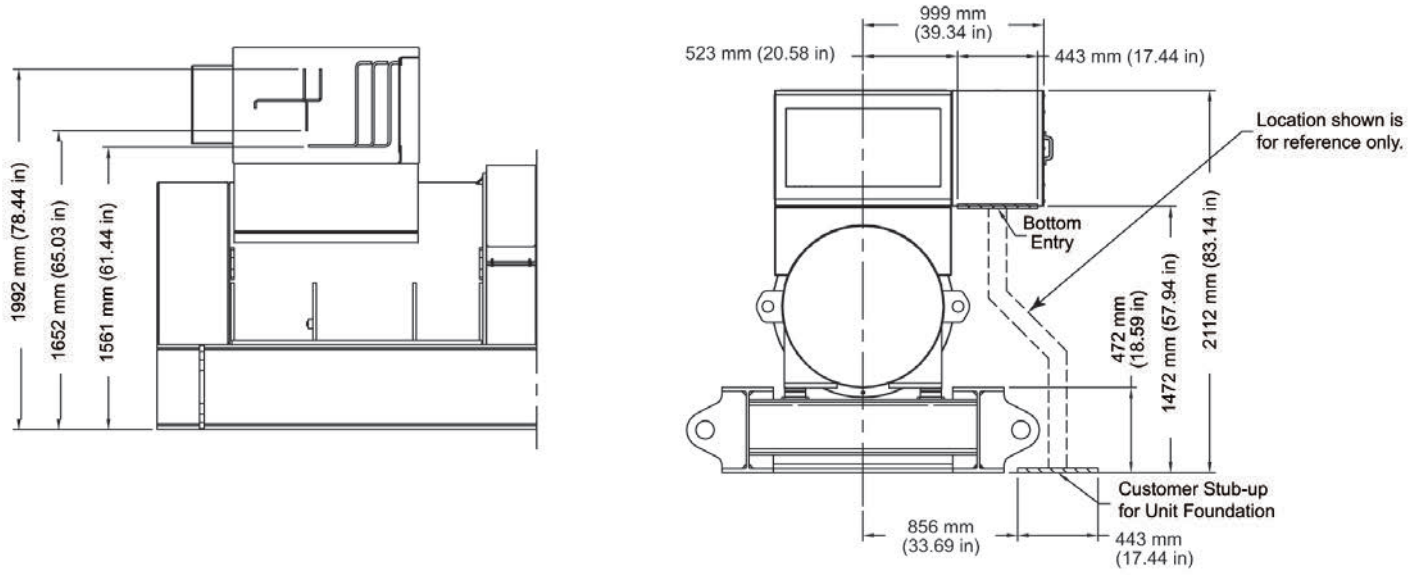
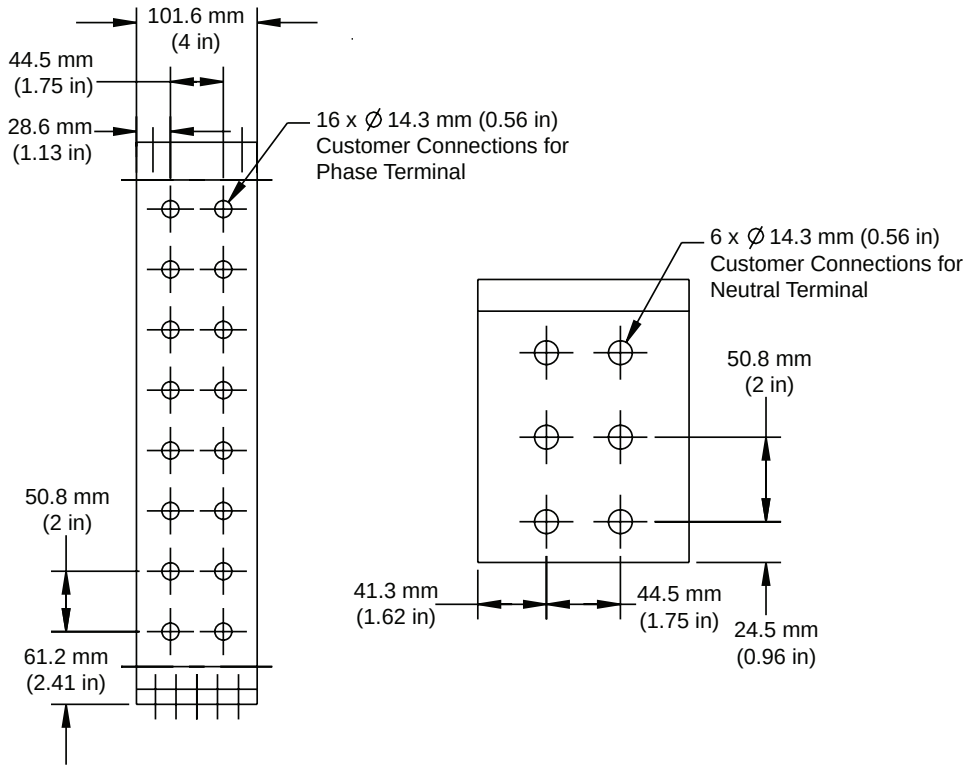


Figure 2: 641 Frame (Low Voltage) Connection Box Diagram - Right View / Rear View



L1, L2, L3 Busbar Phase Detail Busbar Neutral Detail

Figure 3: 641 Frame (Low Voltage) Busbar Connections

641 FRAME (MEDIUM VOLTAGE) CONNECTION BOX

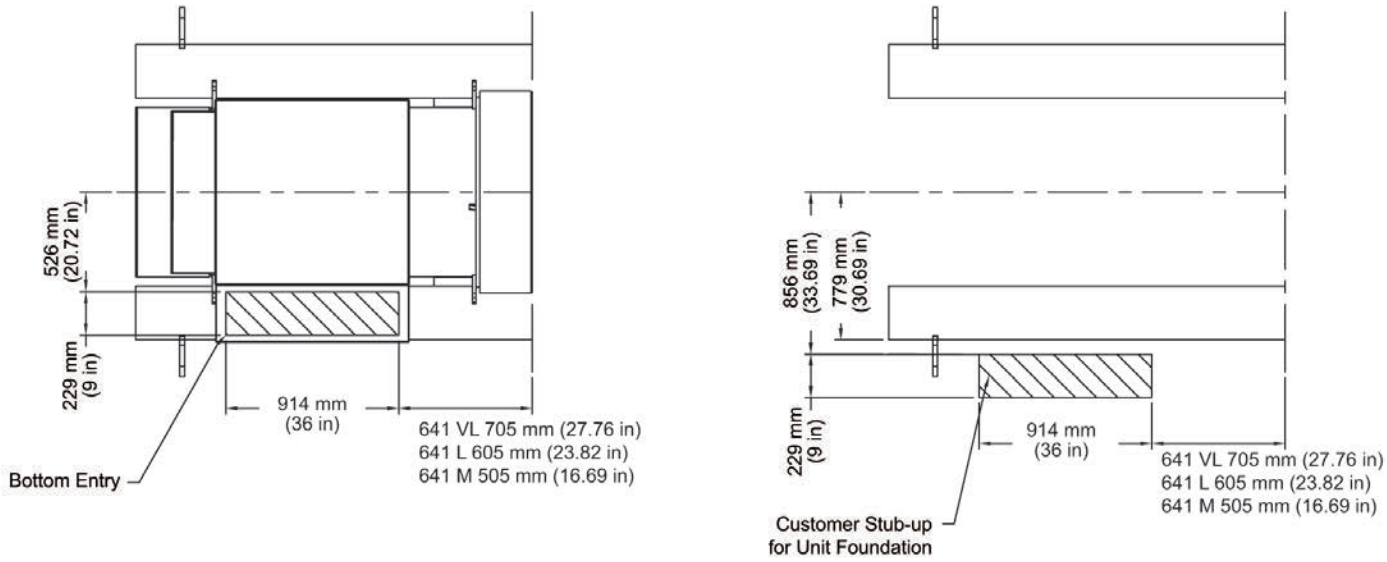


Figure 4: 641 Frame (Medium Voltage) Connection Box - Top View (Left side optional)

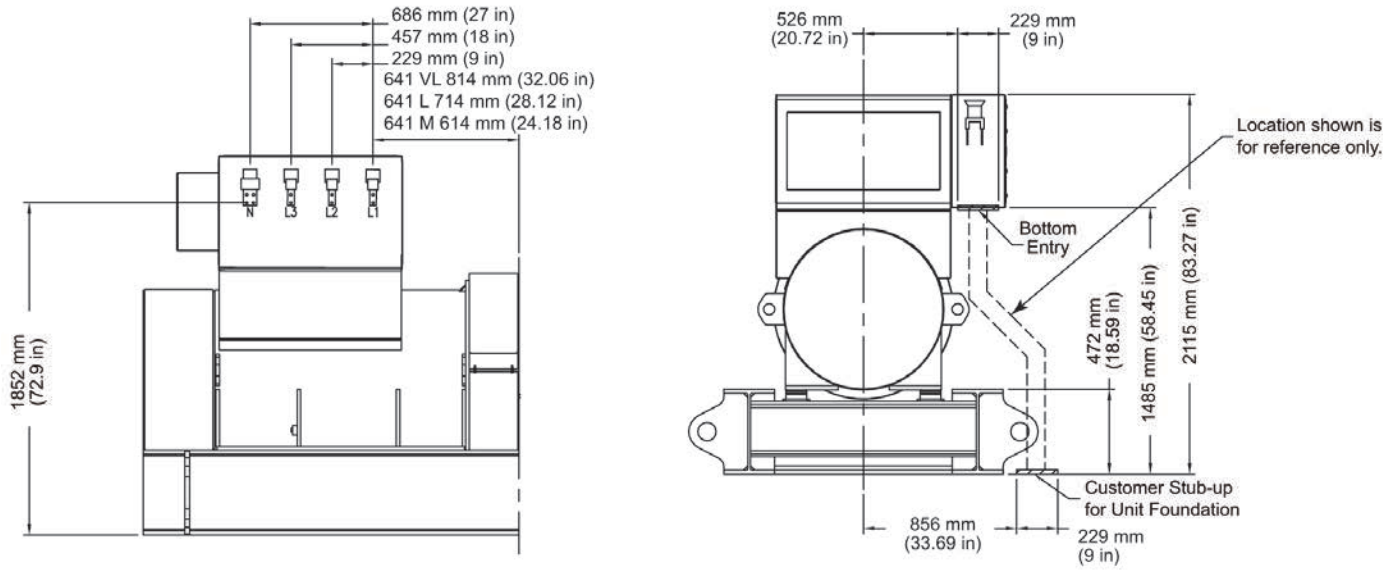
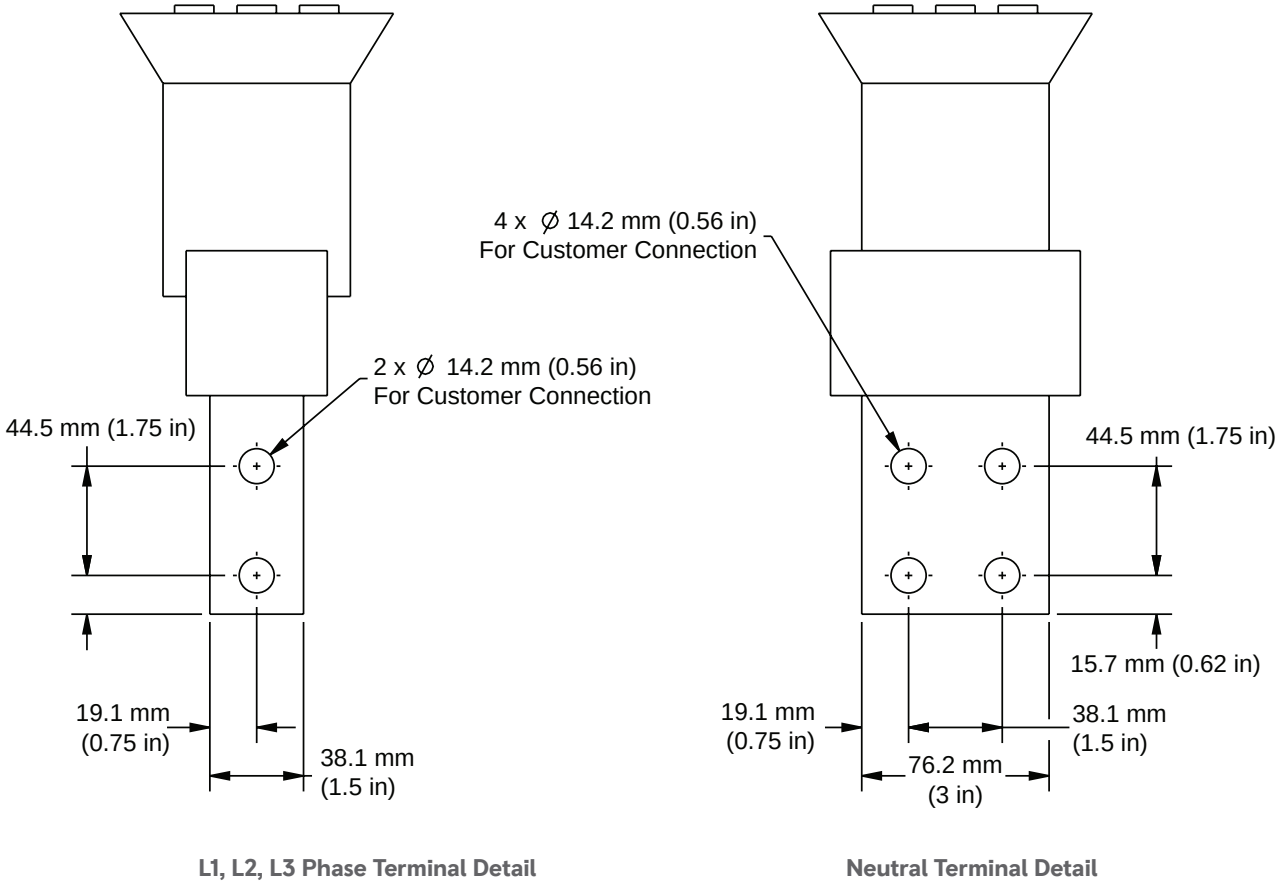


Figure 5: 641 Frame (Medium Voltage) Connection Box - Right View / Rear View

641 FRAME (MEDIUM VOLTAGE) CONNECTION BOX, continued



L1, L2, L3 Phase Terminal Detail

Neutral Terminal Detail

Figure 6: 641 Frame (Medium Voltage) Busbar Connections

841 FRAME (LOW VOLTAGE) CONNECTION BOX

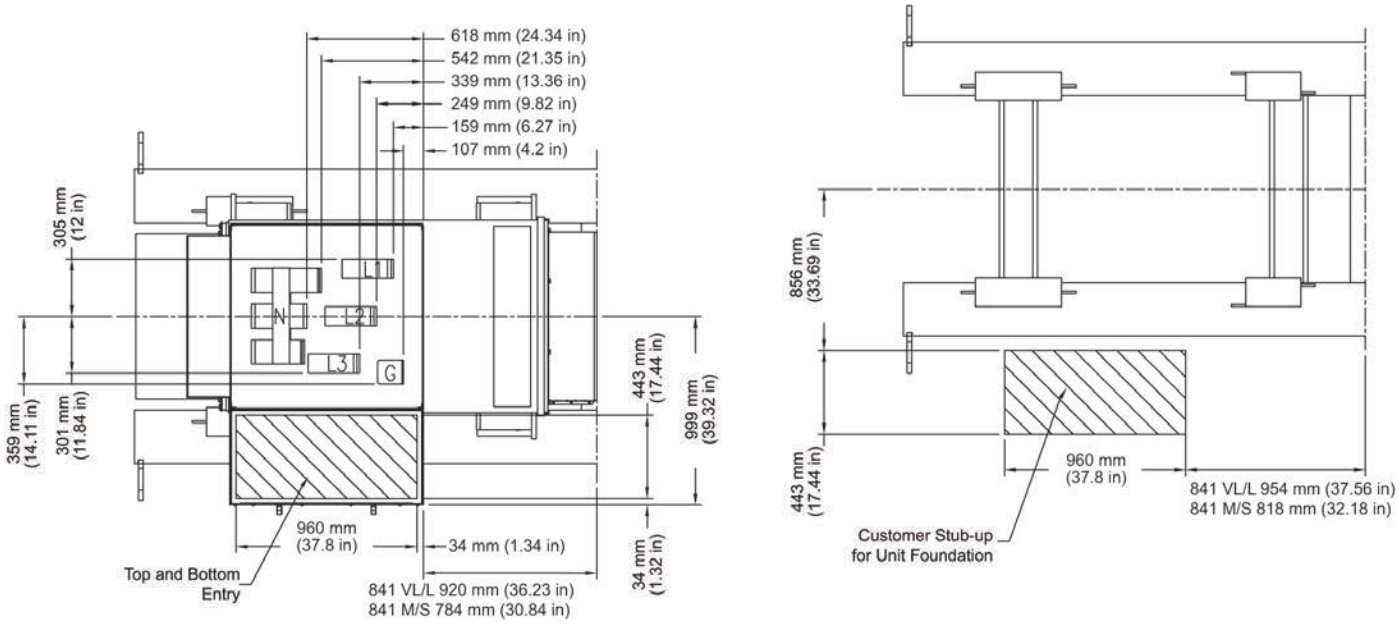


Figure 7: 841 Frame (Low Voltage) Connection Box Diagram - Top View (Left side optional)

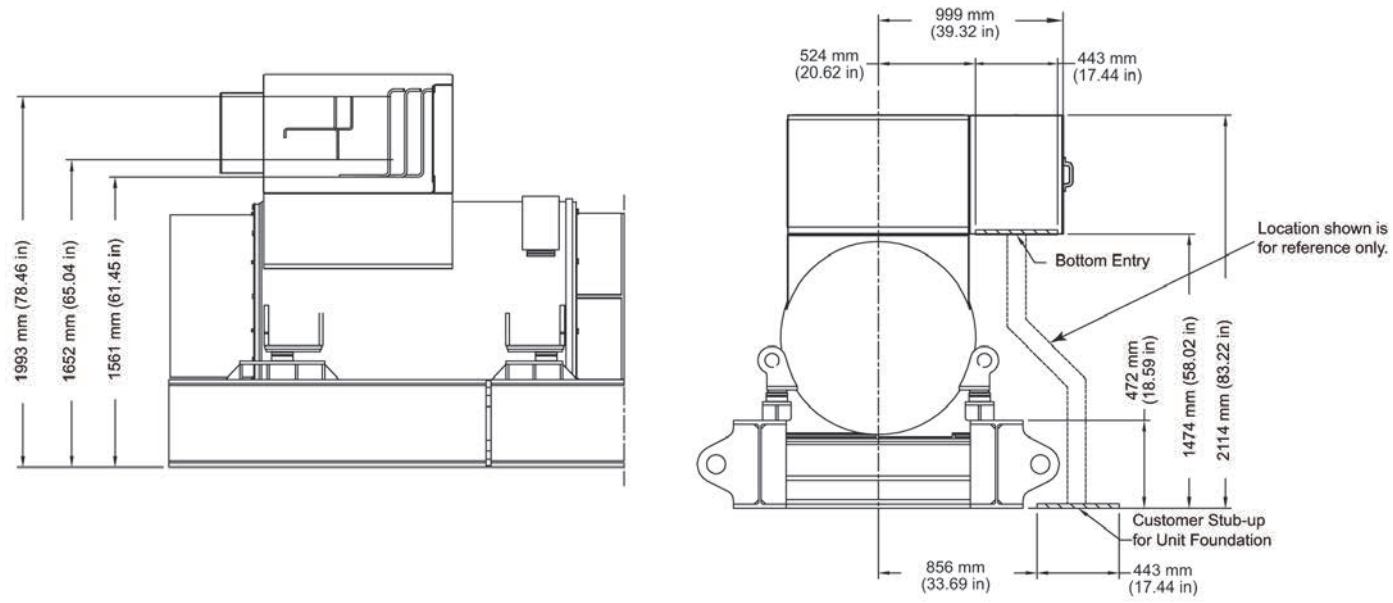


Figure 8: 841 Frame (Low Voltage) Connection Box Diagram - Right View / Rear View

841 FRAME (LOW VOLTAGE) CONNECTION BOX, continued

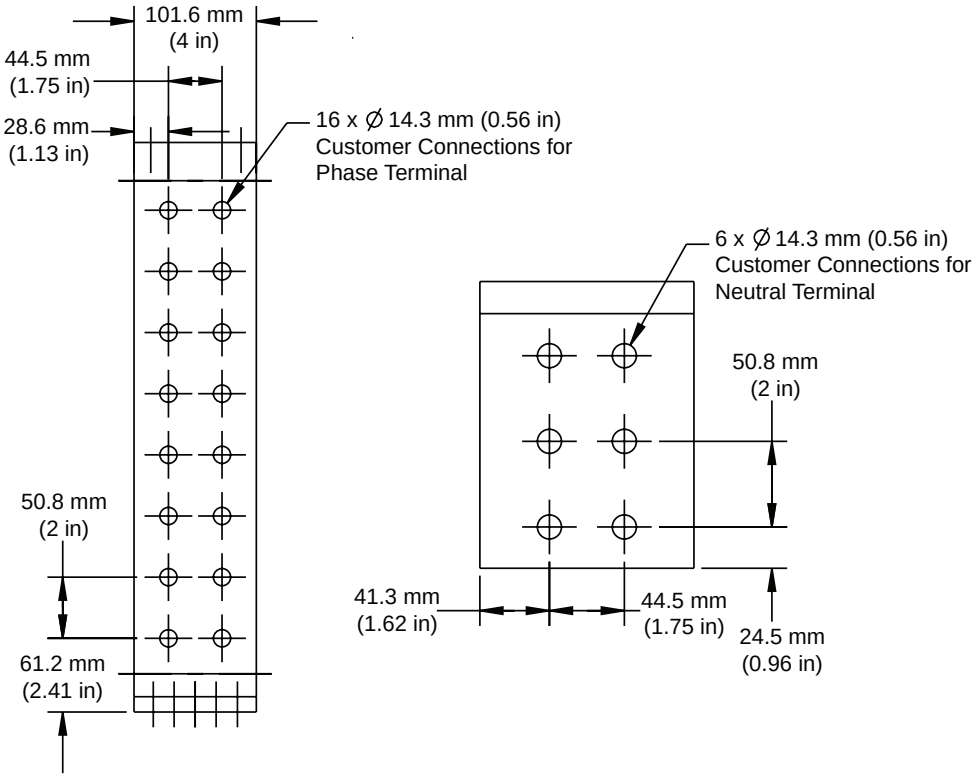


Figure 9: 841 Frame (Low Voltage) Busbar Connections

841 FRAME (MEDIUM VOLTAGE) CONNECTION BOX

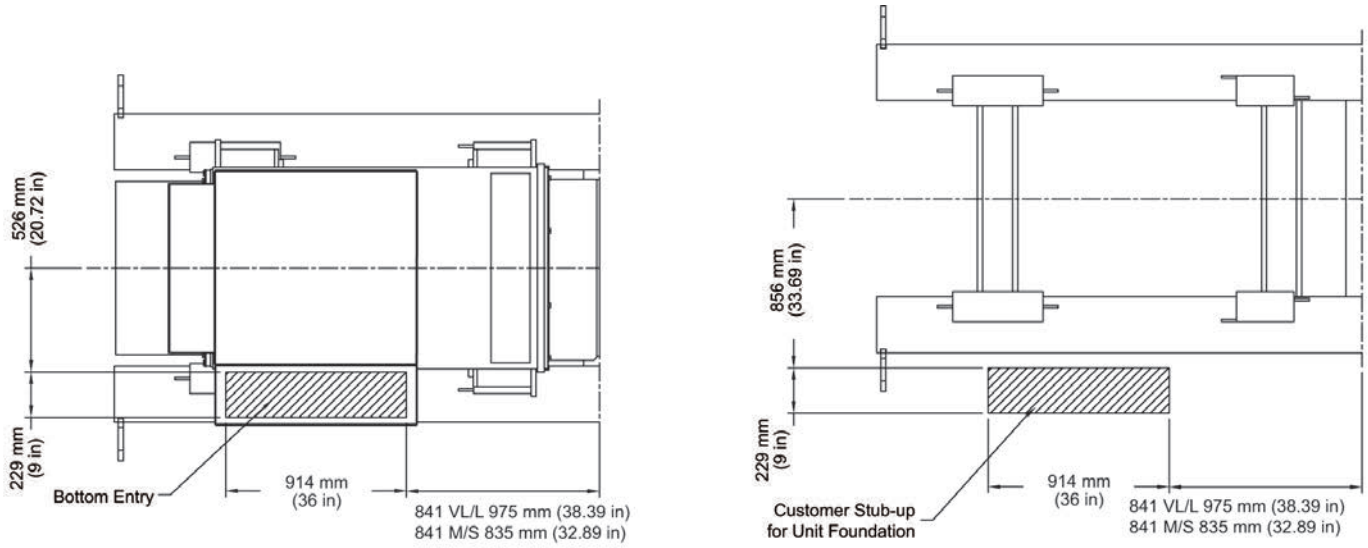


Figure 10: 841 Frame (Medium Voltage) Connection Box Diagram - Top View (Left side optional)

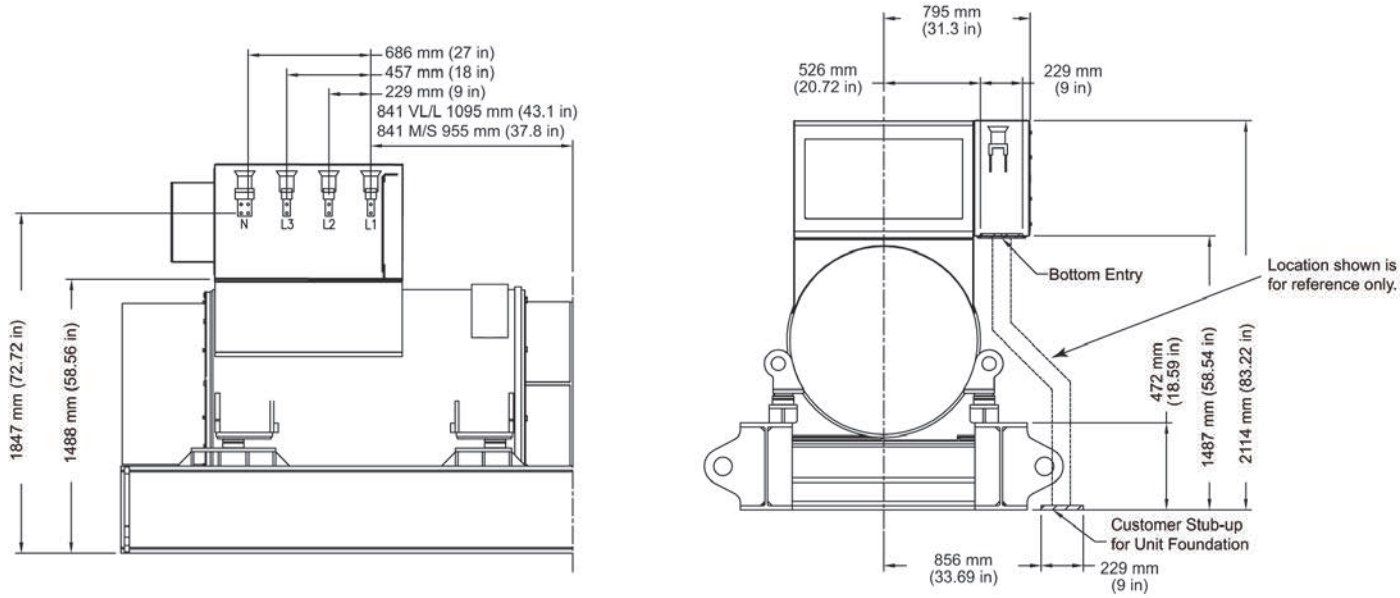
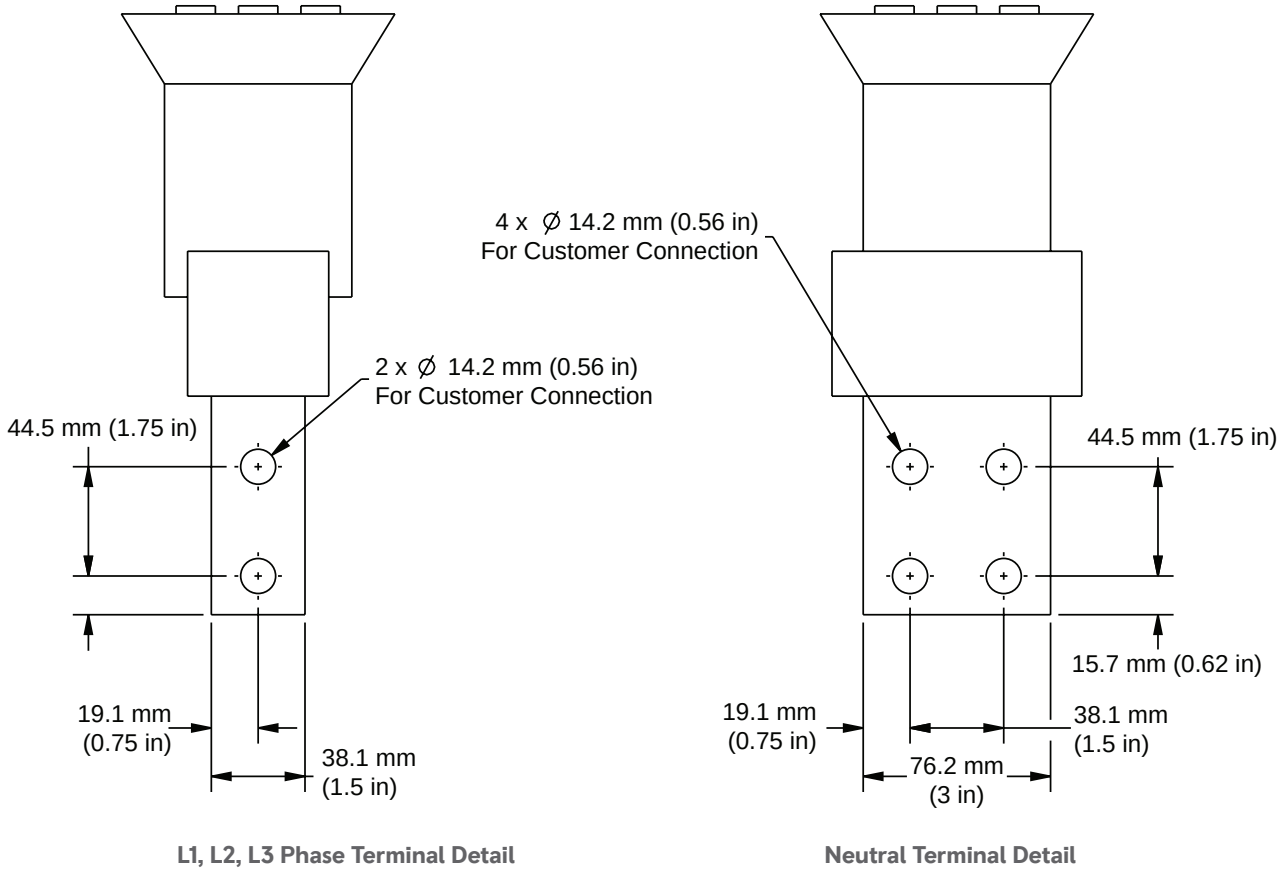


Figure 11: 841 Frame (Medium Voltage) Connection Box Diagram - Right View / Rear View

841 FRAME (MEDIUM VOLTAGE) CONNECTION BOX, continued



L1, L2, L3 Phase Terminal Detail

Neutral Terminal Detail

Figure 12: 841 Frame (Medium Voltage) Busbar Connections

941 FRAME (LOW VOLTAGE) CONNECTION BOX

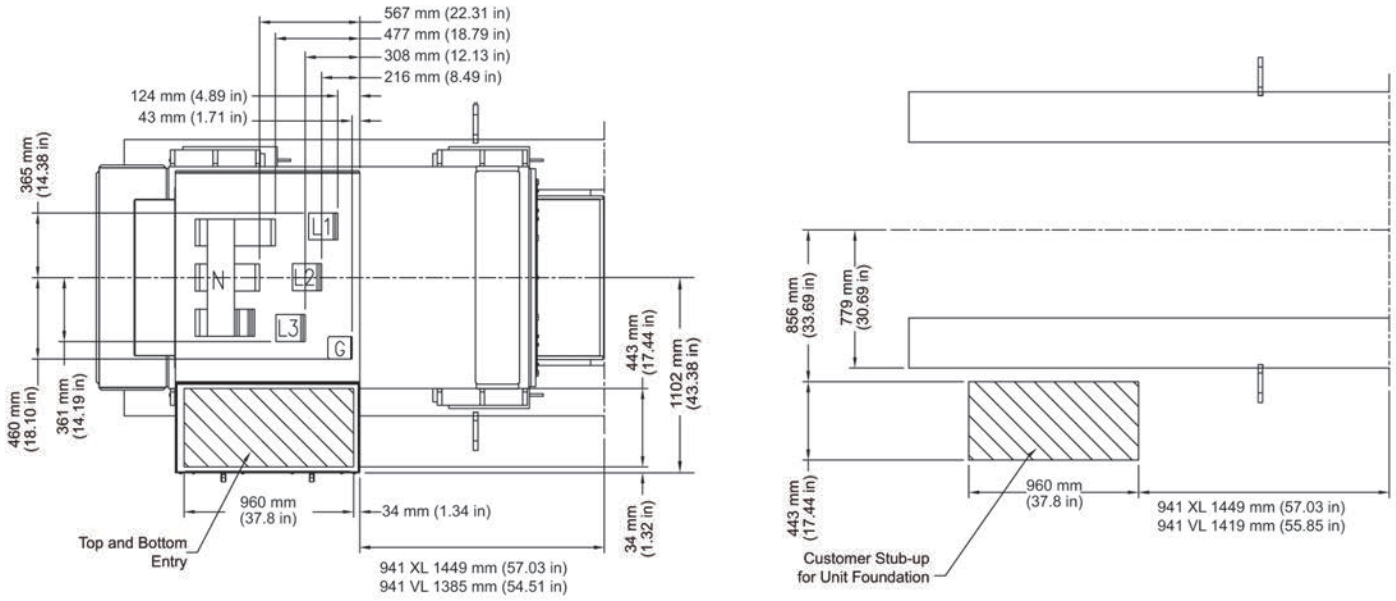


Figure 13: 941 Frame (Low Voltage) Connection Box - Top View (Left side optional)

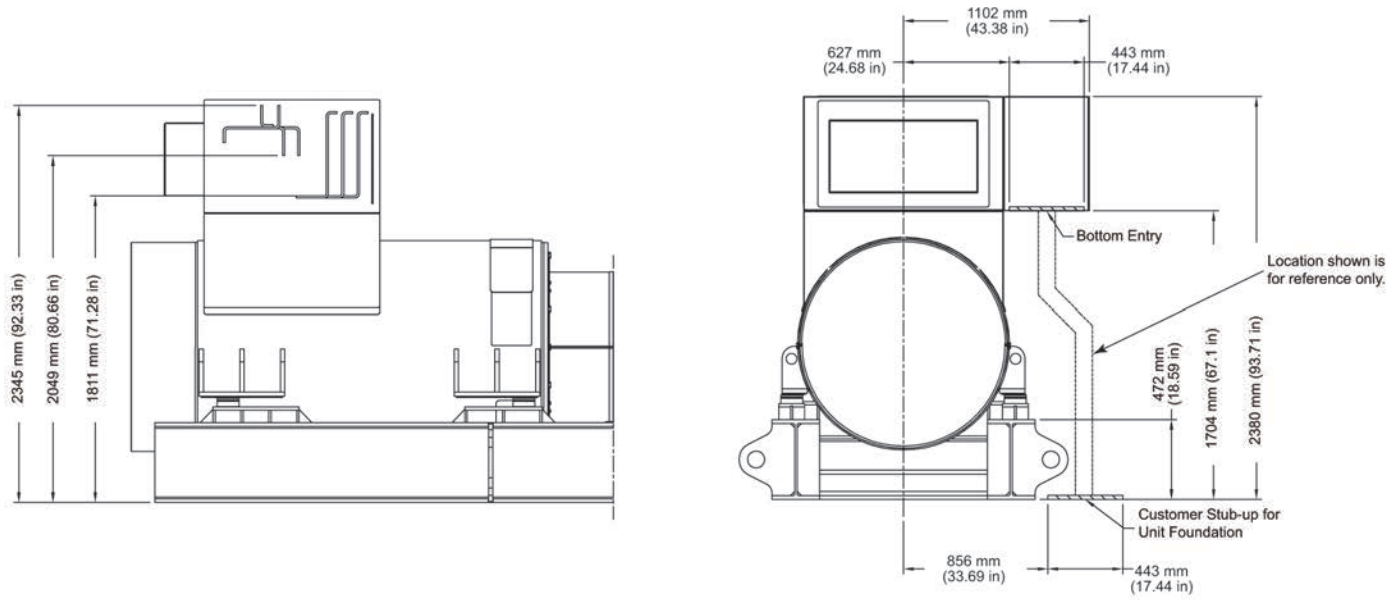
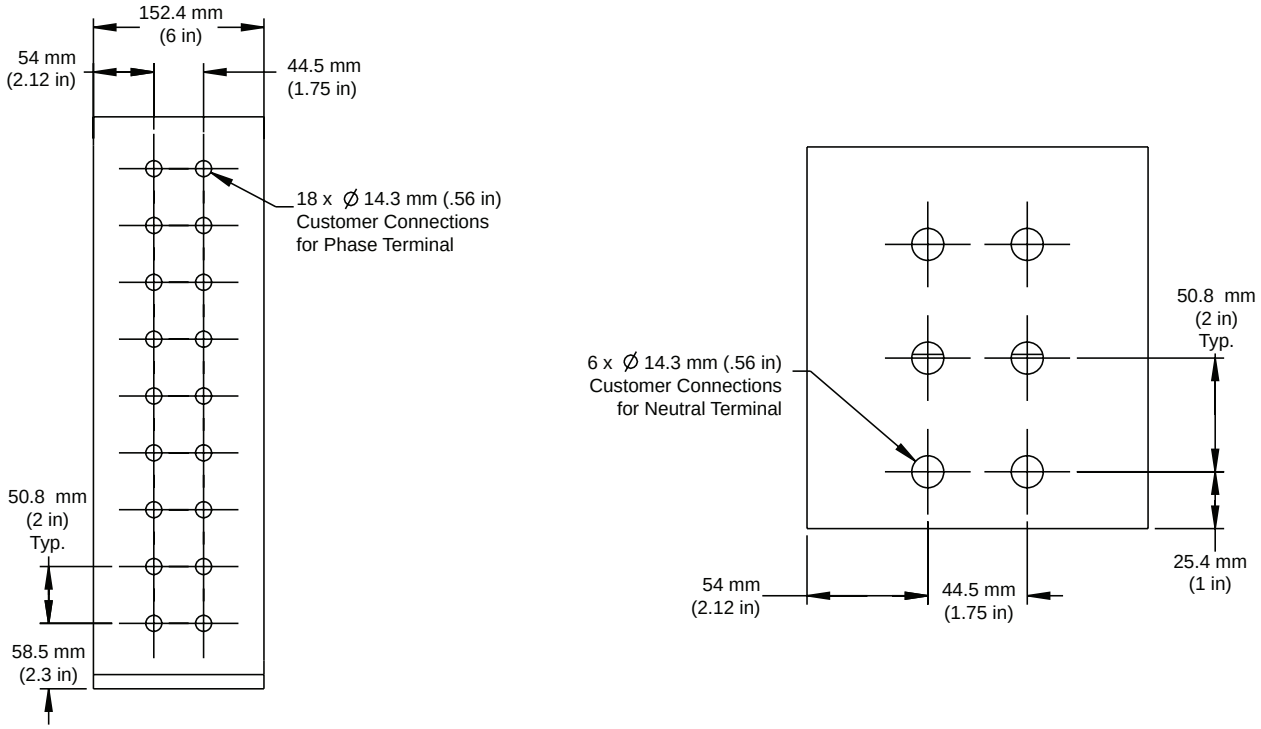


Figure 14: 941 Frame (Low Voltage) Connection Box - Right View / Rear View

941 FRAME (LOW VOLTAGE) CONNECTION BOX, continued



L1, L2, L3 Busbar Phase Detail

Busbar Neutral Detail

Figure 15: 941 Frame (Low Voltage) Busbar Connections

941 FRAME (MEDIUM VOLTAGE) CONNECTION BOX

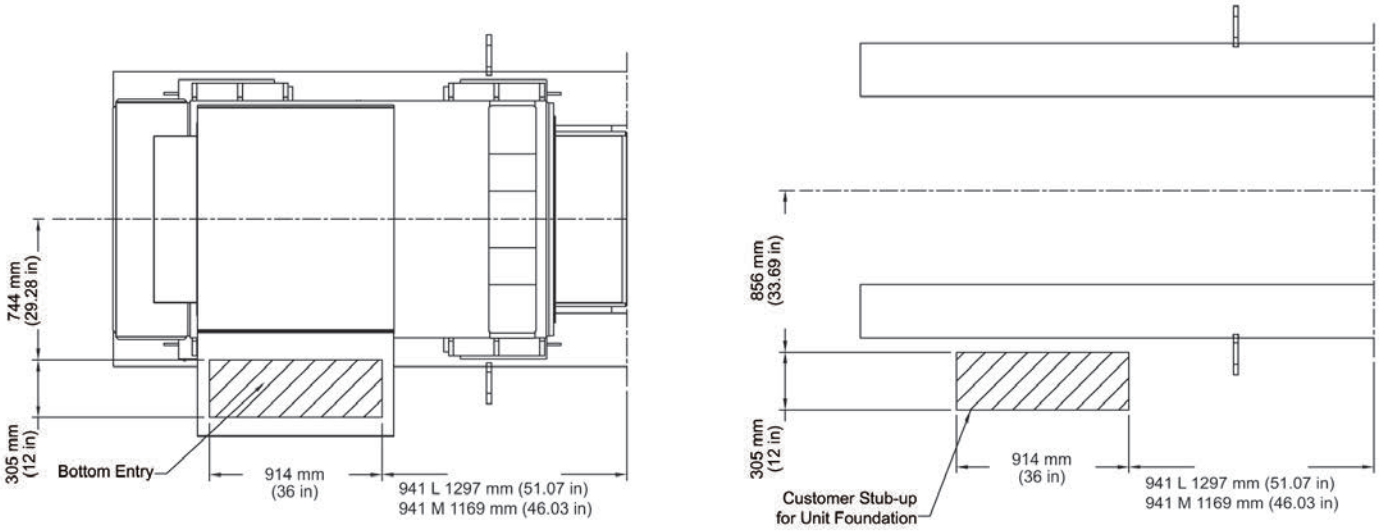


Figure 16: 941 Frame (Medium Voltage) Connection Box - Top View (Left side optional)

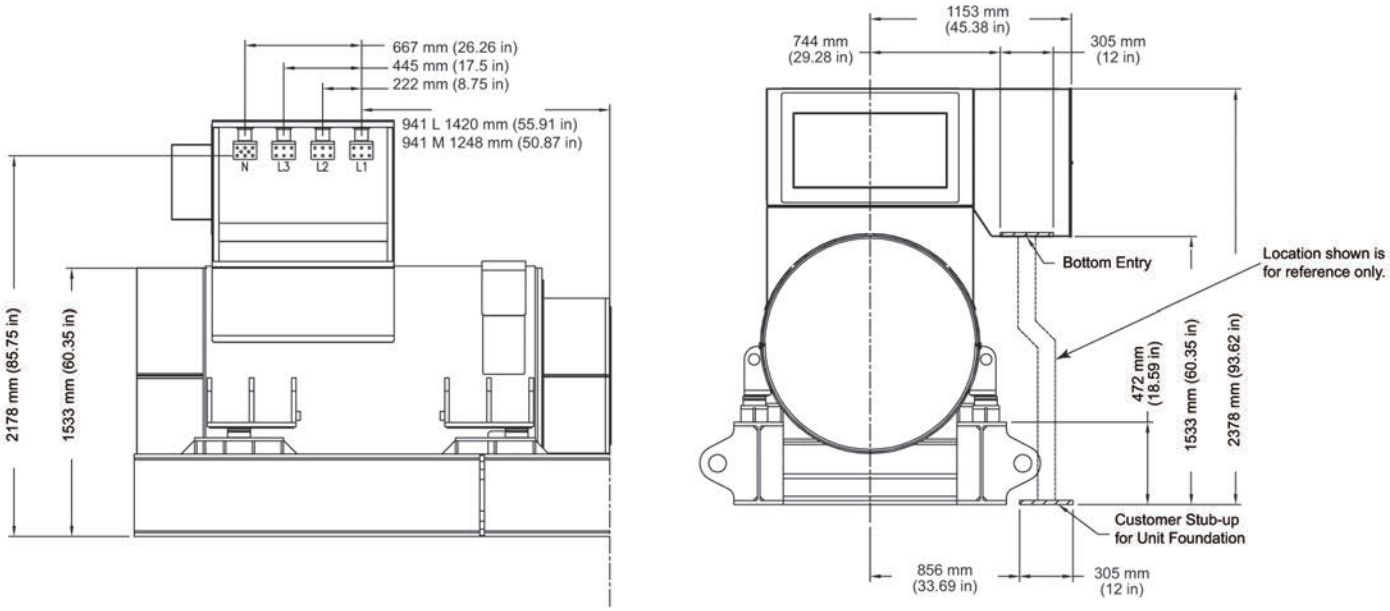
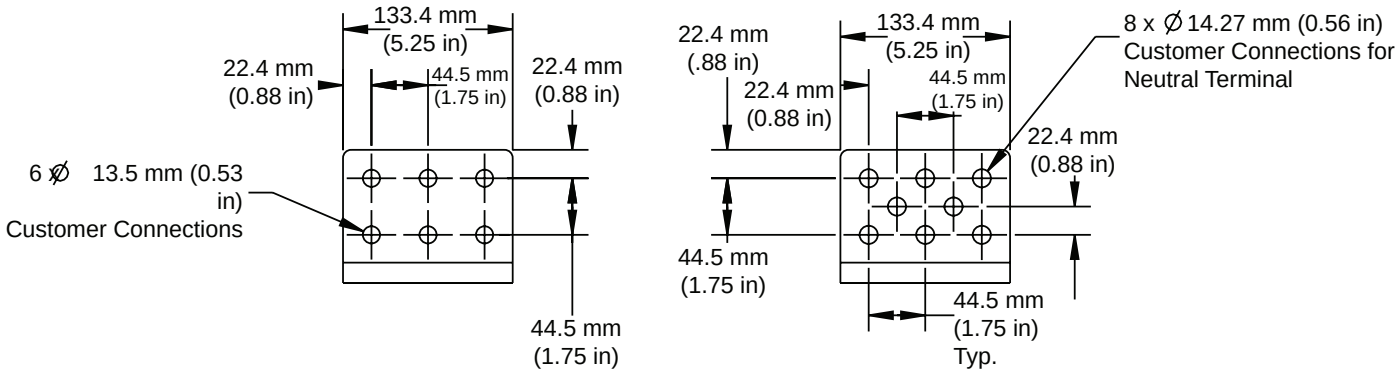


Figure 17: 941 Frame (Medium Voltage) Connection Box - Right View / Rear View

941 FRAME (MEDIUM VOLTAGE) CONNECTION BOX, continued



L1, L2, L3 Phase Terminal Detail **Neutral Terminal Detail**

Figure 18: 941 Frame (Medium Voltage) Busbar Connections

4P6 FRAME (MEDIUM VOLTAGE) CONNECTION BOX

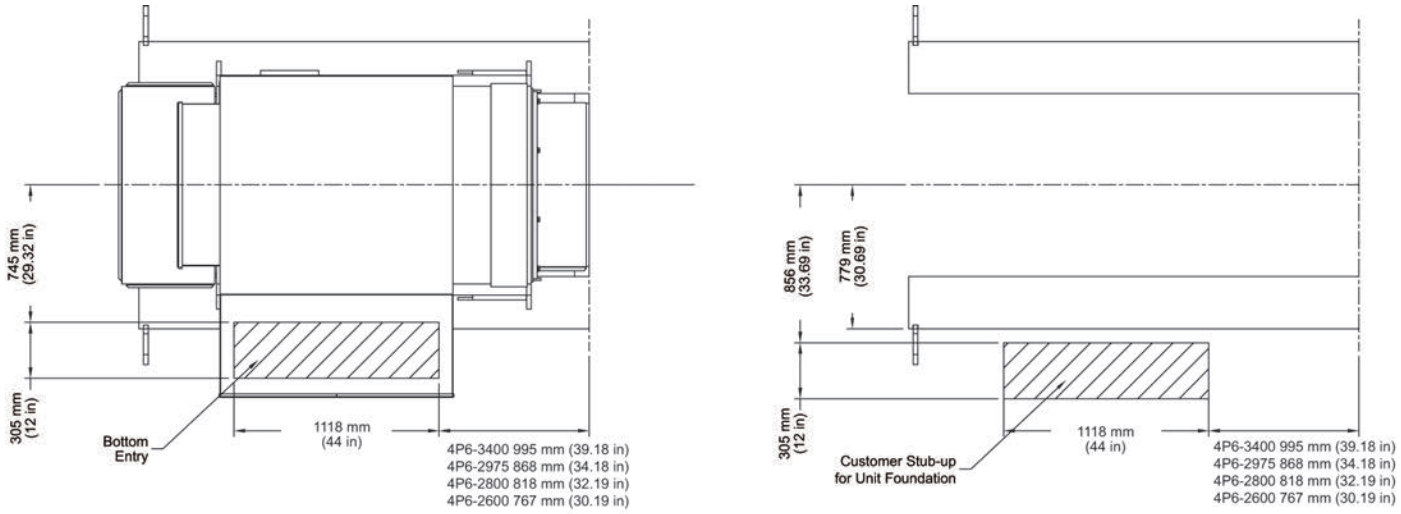


Figure 19: 4P6 Frame (Medium Voltage) Connection Box - Top View (Left side optional)

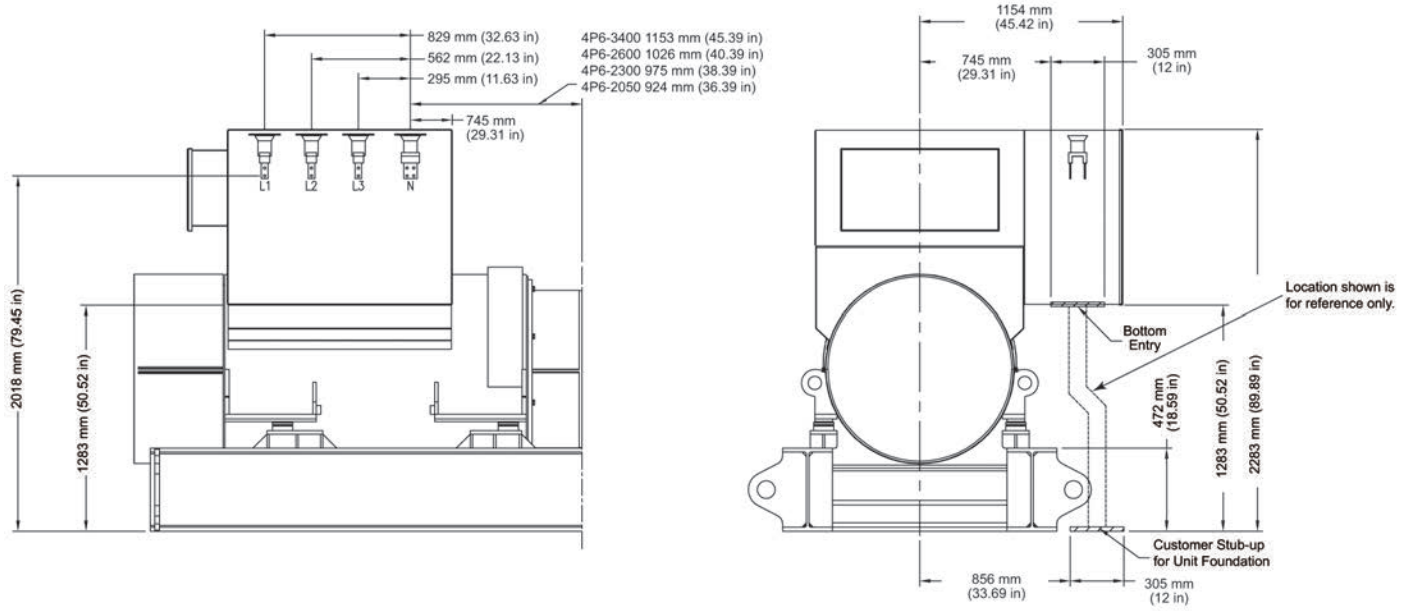
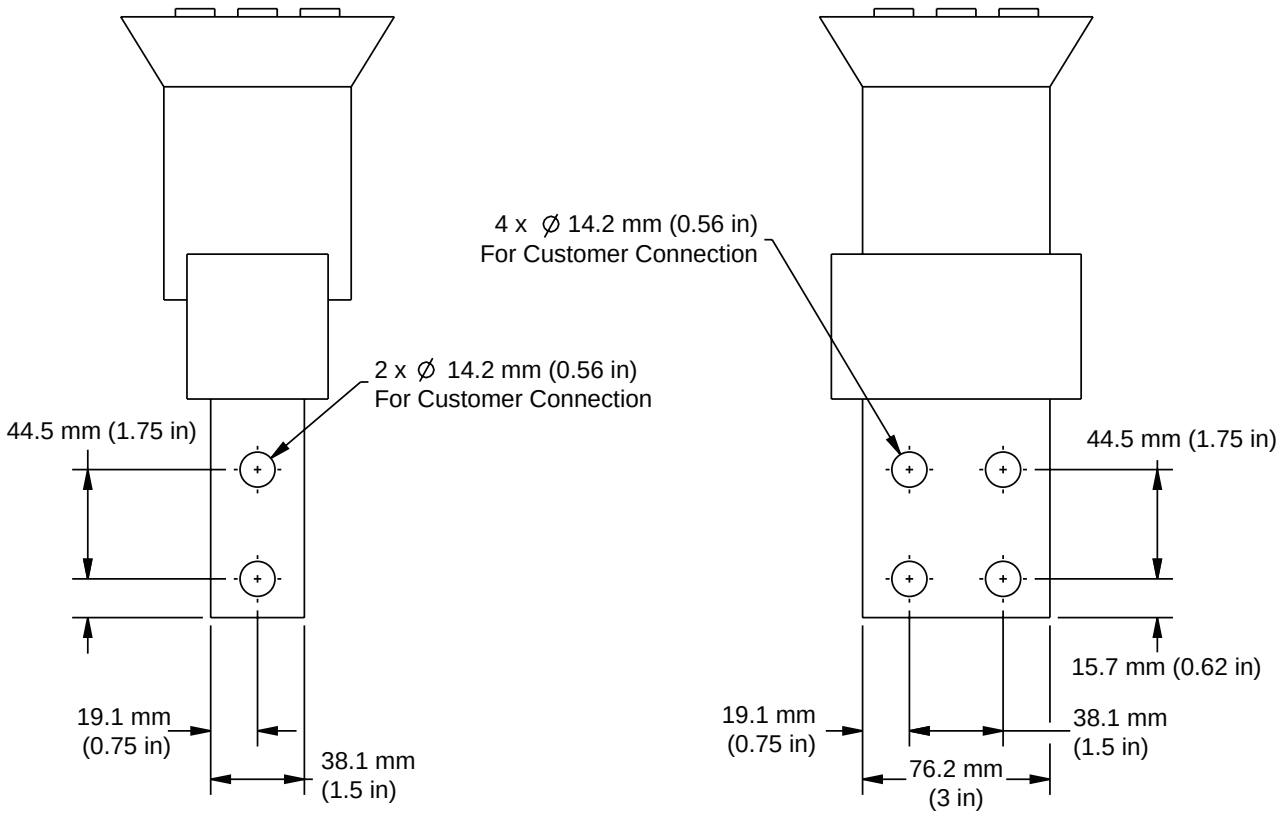


Figure 20: 4P6 Frame (Medium Voltage) Connection Box - Right View / Rear View

4P6 FRAME (MEDIUM VOLTAGE) CONNECTION BOX, continued



L1, L2, L3 Phase Terminal Detail

Neutral Terminal Detail

Figure 21: 4P6 Frame (Medium Voltage) Busbar Connections

4P9 FRAME (MEDIUM VOLTAGE) CONNECTION BOX

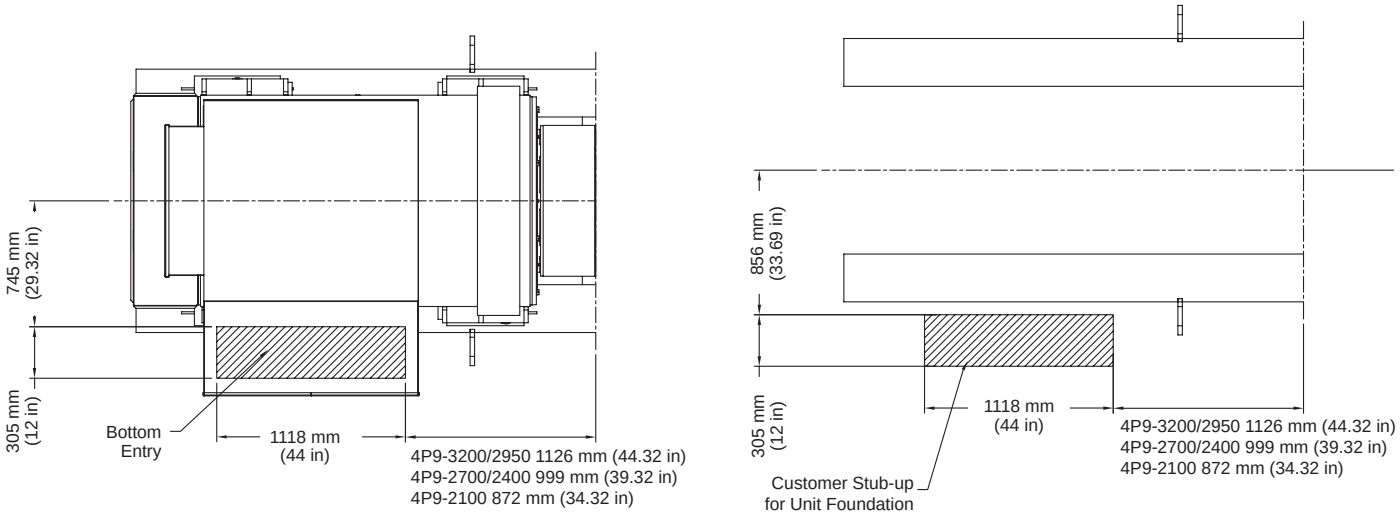


Figure 22: 4P9 Frame (Medium Voltage) Connection Box - Top View (Left side optional)

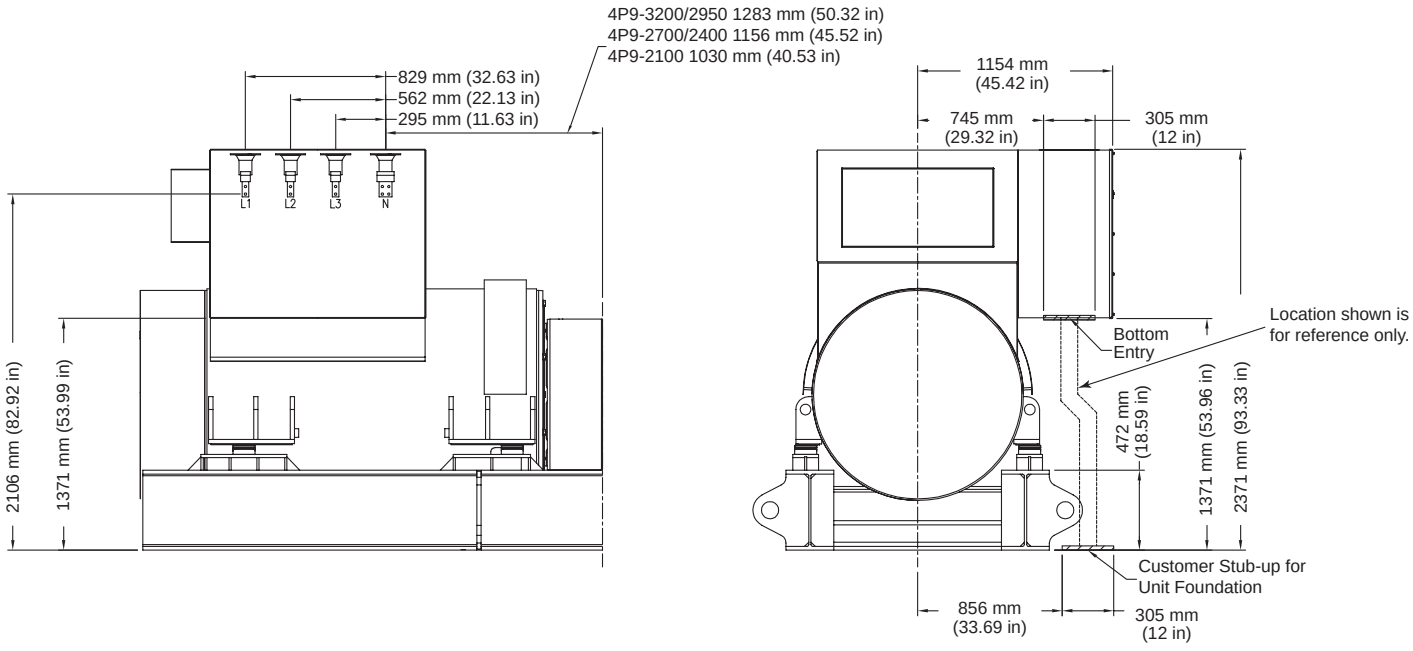
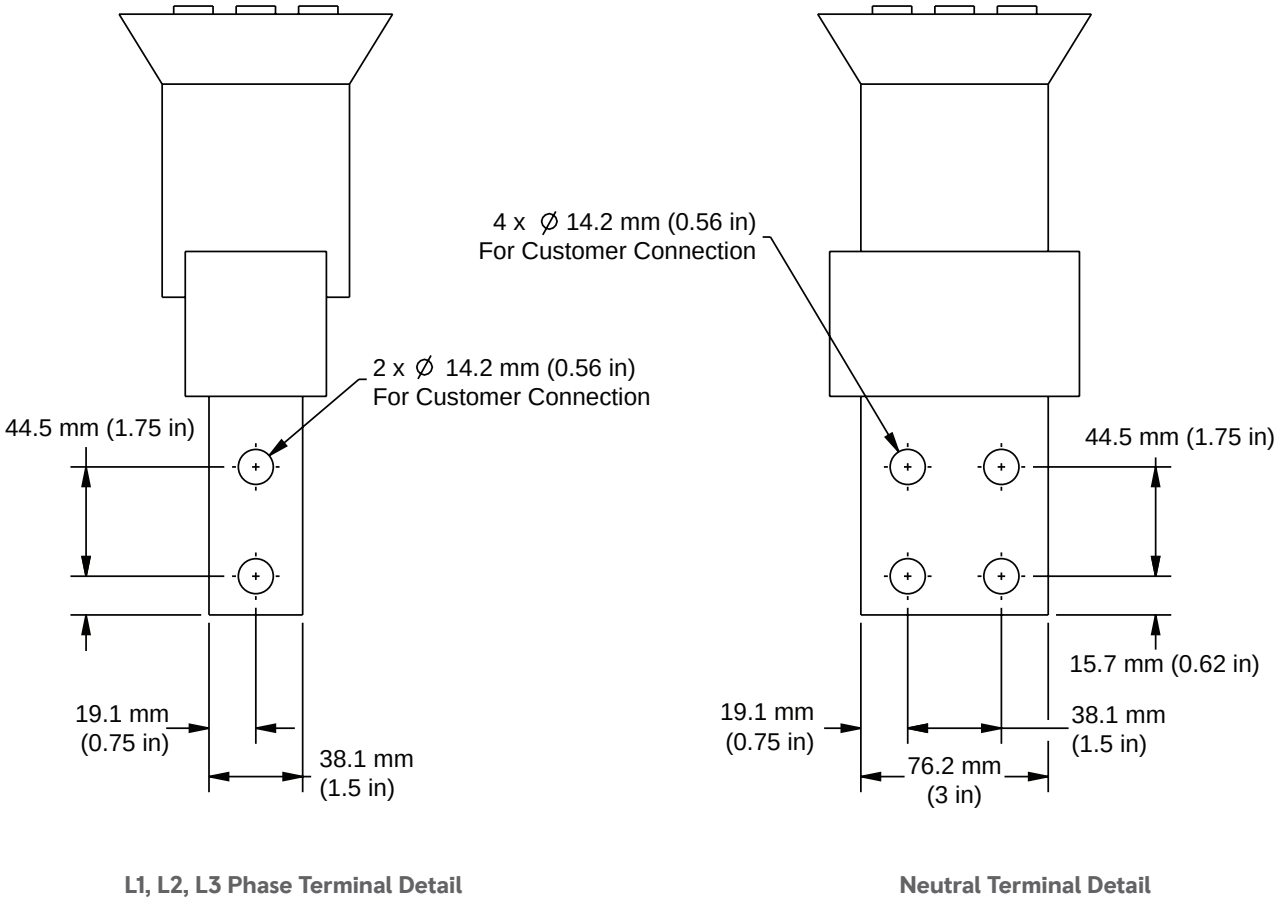


Figure 23: 4P9 Frame (Medium Voltage) Connection Box - Right View / Rear View

4P9 FRAME (MEDIUM VOLTAGE) CONNECTION BOX, continued



L1, L2, L3 Phase Terminal Detail

Neutral Terminal Detail

Figure 24: 4P9 Frame (Medium Voltage) Busbar Connections

Electrical System Data Sheet

ERMS Switch

The Energy Reduction Maintenance Setting (ERMS) switch is used to reduce the current and/or time required to trip a circuit breaker. It does this by reducing the instantaneous protection setting of the breaker, allowing reduction of the fault clearing time and a faster trip. If a fault occurs when the switch is engaged, Arc Flash Incident Energy (AFIE) level exposure is reduced.

FEATURES

The ERMS function is available on circuit breakers equipped with:

- BCM ULP with firmware version 4.1.0 and above
- Micrologic P or H trip unit with the blue ERMS label as shown in Figure 1 (A)
- IO module with application switch set to position 3

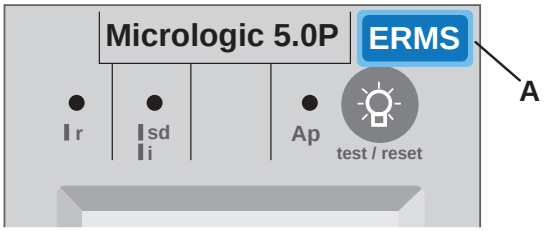


Figure 1: ERMS label on trip unit

Required for installation

(included with ERMS breaker)

- PowerPact or Masterpact circuit breaker with P or H trip unit with ERMS label (see Figure 1)
- Instruction sheet
- ERMS hazard label
- ERMS switch label
- ERMS light label
- Remote setting utility (RSU) 8.5.1 (on memory stick)
- Switch with blue indicator light (24 VDC)
- Switch contact block
- Padlock attachment
- Remote pilot light (blue)
- IO module
- ULP cord (male-to-male RJ45)
- Circuit breaker ULP cord
- ULP terminator

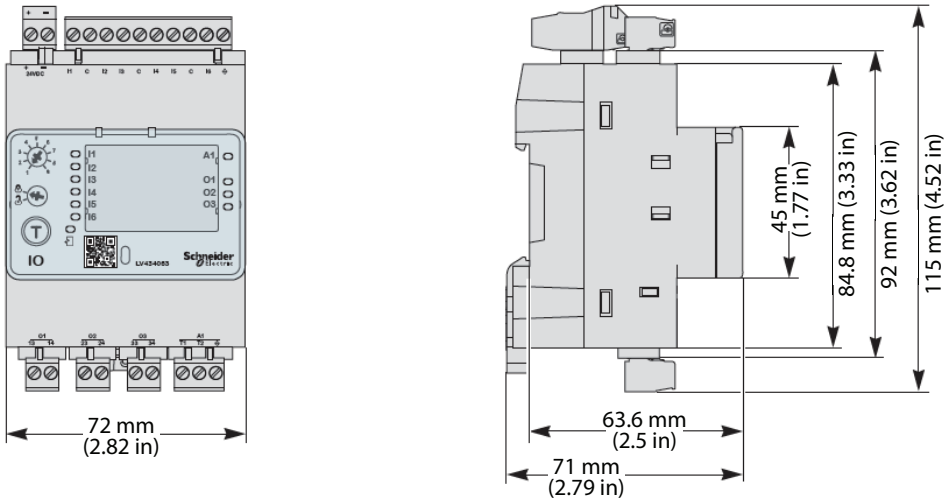


Figure 2: Dimensions

A Rolls-Royce solution

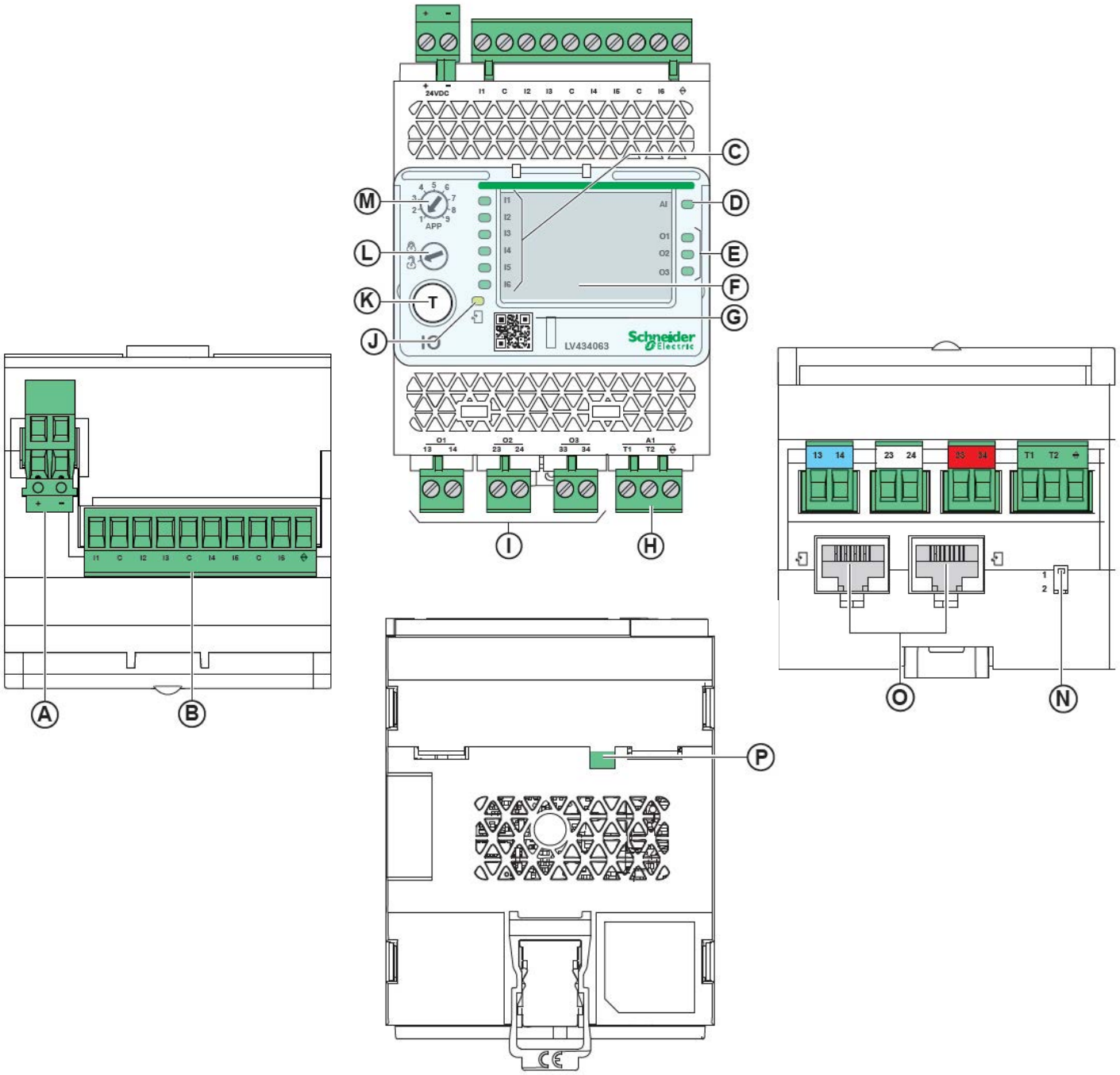


Figure 3: Diagram

A. 24 VDC power supply terminal block
B. Digital input terminal block: Six inputs, three commons, and one shield
C. Six input status LEDs
D. Analog input status LED
E. Three output status LEDs
F. I/O identification labels
G. Sealable transparent cover
H. Analog input terminal block
I. Digital output terminal blocks
J. ULP status LED
K. Test/reset button (accessible with cover closed)
L. Setting locking pad
M. Application rotary switch: 1 to 9
N. Switch for IO module addressing (IO module 1 or IO module 2)
O. Two RJ45 ULP ports
P. Grounding connection

Circuit Breaker Data Sheet

MasterPact MTZ

DESCRIPTION

MasterPact MTZ circuit breakers introduce smart phone connectivity and remote monitoring. The new Micrologic X control unit gives users the opportunity to customize by adding digital modules. It offers a complete range with one family, three frame sizes, and multiple ratings to meet requirements for ANSI C37/UL 1066 and UL 489 applications.

SPECIFICATIONS

- Rated current 800–6,000 A
- Breaking capacity 42–200 kA at 480 VAC
- Voltage rating up to 600 VAC
- Three frame sizes
  - MTZ1 800–1,600 A
  - MTZ2 800–4,000 A
  - MTZ3 4,000–6,000 A
- Draw out and fixed mount
- 3-pole and 4-pole construction
- Optimized selection of three advanced MicroLogic X control units for advanced protection, measurement, and diagnostic functions. MicroLogic X control units can be customized with optional digital modules for enhanced protection and operations.
  - MicroLogic 3.0 X - LI (long time and instantaneous)
  - MicroLogic 5.0 X - LSI (long time, short time, and instantaneous)
  - MicroLogic 6.0 X - LSIG (long time, short time, instantaneous, and ground fault)
  - Built-in Class 1 accuracy active power and energy measurement
  - Switch disconnectors version available
  - Full range of field-installable auxiliaries and accessories

FEATURES

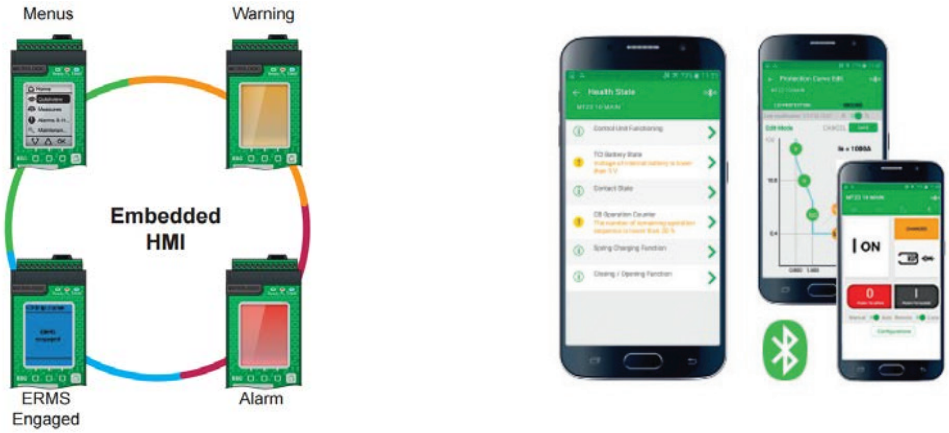
- Micrologic X control units are available in three configurations
  - 3.0 X – LI
  - 5.0 X – LSI
  - 6.0 X – LSIG
- Backlit display changes color to indicate circuit breaker status
- Capable of connecting with wireless, Bluetooth®, or NFC
- Allows user to view Micrologic X display of breaker health, settings, metering, power quality, alarms, and activity log via smartphone
- When monitored and operated with Bluetooth, operator can open/close the breaker or engage/disengage the ERMS from a safe distance outside the arc flash zone
- Trip curve can be changed from A or B setting to a dedicated ERMS trip curve with adjustable L, S, I or G, allowing more flexibility to program using the Bluetooth function outside the arc flash zone.

CERTIFICATIONS

- Insulated case devices listed to UL489 and CSA C22.2 No 5
- Power circuit breakers certified to ANSI C37 (UL 1066) and CSA C22.2 No 268

FEATURES, continued

MicroLogic X displays energy consumption, power quality, phase balance, health status, and more



Review status locally in the electrical room on the MicroLogic X display, on your smartphone, or on an installed display monitor

Master Control Panel Data Sheet

DESCRIPTION

The Master Control Panel (MCP) offers a robust HMI/PLC which is pre-programmed and tested for interface with an MGC Series digital generator set controller and Automatic Transfer Switch (ATS) paralleling systems. The 15.6-inch interactive touch screen displays a single-line diagram layout along with color and symbol status identifiers allowing for complete system monitoring, interface, and load management control from one easy-to-use interface.

PRODUCT HIGHLIGHTS

- System overview and control
- Multiple generator set monitoring
- Single line diagram format
- Color data point identifiers
- Symbol identification
- Control and monitor up to eight generator sets and 16 automatic transfer switches (delay, open, closed, bypass)*
- Simplified setup and page navigation
- Password protection
- Start signal management
- Load shed/add*
- Event log

STANDARD FEATURES

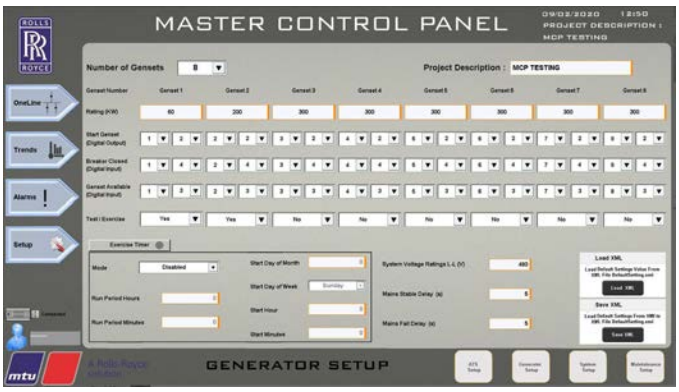
One Line Monitoring

- Generator status
  - Volts (L-L)
  - Generator status
  - Amps
  - Generator condition
  - kW total
  - Breaker position
- ATS status
  - Position*
  - Delay
  - Source status
  - ATS condition
  - Rating
- Generator bus monitoring
  - Volts (L-L)
  - kVA
  - Number of units online
  - Amps
  - Generator bus status
  - kW
  - Generator bus condition
- Control
  - Generator set system mode
    - Auto: Changes the mode of all units in the system to Auto
    - Off: Changes the mode of all units in the system to Off
    - Run: Changes the mode of all units in the system to Run
    - Test: Simulates a mains failure and transfers load to emergency generator bus
  - Generator start signals
  - ATS transfer inhibit*
  - Load shed/add*

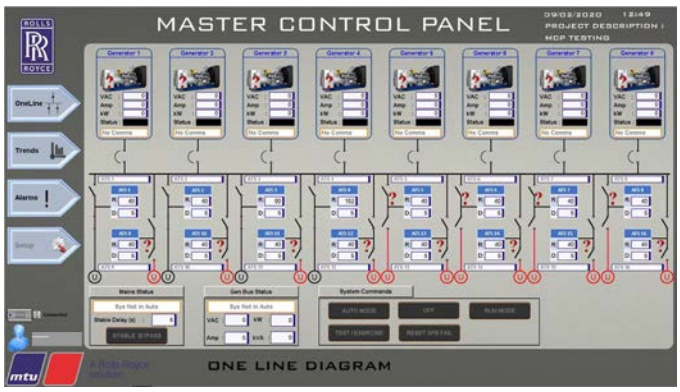
*ATS must have required contact signal interface.

A Rolls-Royce solution

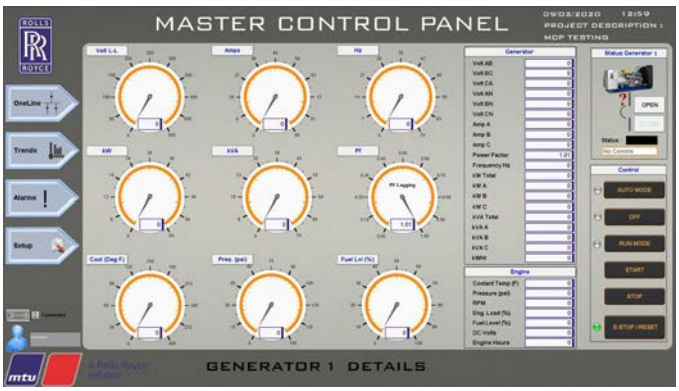
USER INTERFACE



Setup

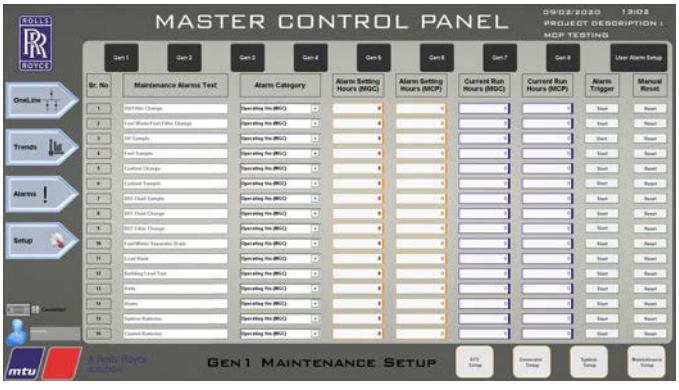


One Line

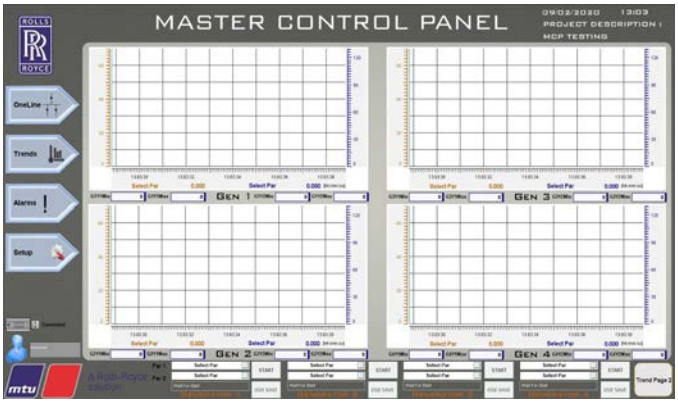


Gen1 Details

ATS Setup



Maintenance

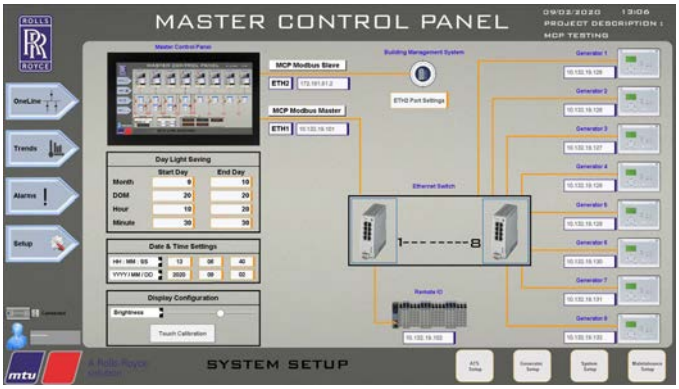


Trends

USER INTERFACE, continued

Alarms

Alarm History



System Setup

FUNCTIONS

Generator Set Metering

Monitor an entire system or an individual generator set. The one-line overview provides for system control and monitoring. Each generator set also has a representative page for controlling one generator set independent of the system.

- Generator parameters consist of six dynamic gauges displaying pre-alarm and alarm thresholds. Generator parameters include voltage (L-L), current (Amps), frequency (Hz), real power (kW), apparent power (kVA), and power factor (PF).
- Engine parameters consist of three dynamic gauges displaying pre-alarm and alarm thresholds. Engine parameters include oil pressure, coolant temperature, and fuel level (%).
- For greater detail, the user may access a representative page for each generator set that includes comprehensive digital trends.

Generator Set Status

- Alarm
- Syncing
- Ready
- No Comms
- Cranking
- Cooldown
- Running
- Resting
- Unloading
- Not in Auto

FUNCTIONS, continued

Control

Generator set mode (status of specific generator set)

- Auto: Changes the mode of specific unit to Auto
- Off: Changes the mode of specific unit to Off
- Run: Changes the mode of specific unit to Run

Breaker commands (status of specific generator set

- Open: Opens specific generator set circuit breaker
- Close: Closes specific generator set circuit breaker (synchronizes generator set to live bus)

Event Recording

The MCP has an event recorder that provides a record of alarms, pre-alarms, and many other events that are all date and time stamped to help the user determine the cause of issues related to the generator set.

Transfer Switch Control

When utility failure is detected by a system ATS, the indication is transmitted to the MCP via the I/O interface. The MCP will send start requests to the generator set while inhibiting the transfer of loads until there is sufficient generator set capacity available to support the most critical offline ATS loads. Upon emergency system availability, the MCP will begin to transfer loads to the emergency bus. The MCP, in cooperation with the MGC Series contollers, will optimize load management for the number of generator sets operating as well as the number of transfer switches supported by the emergency power system. The standard MCP configuration is set up to interface with time delay bypass and open transition ATSs.

Communications

Modbus TCP is the standard interface between the MCP and the MGC Series controllers.

SPECIFICATIONS

Operating Power

With a nominal operating voltage of 24 VDC / 120 VAC, the MCP offers a dual supply configuration for added reliability. The MCP supply power is sourced through a dual supply configuration allowing two sources to simultaneously or separately power the MCP. In the case of a single source failure, the redundant power sources would then solely power the MCP.

24 VDC, 10A/120 VAC, 3A (Single Phase)

Generator set battery is paralleled through a source selective supply connection with a utility fed power supply.

I/O

Contact inputs and outputs included to provide real time monitoring and control of system critical components. Expandable I/O is configured to adapt to specific system requirement.

Digital output rating

120 VAC/24 VDC

Digital input rating

24 VDC connection

Weights and Dimensions

Weight

MCP only: 72.5 kg (159.5 lb)

Dimensions

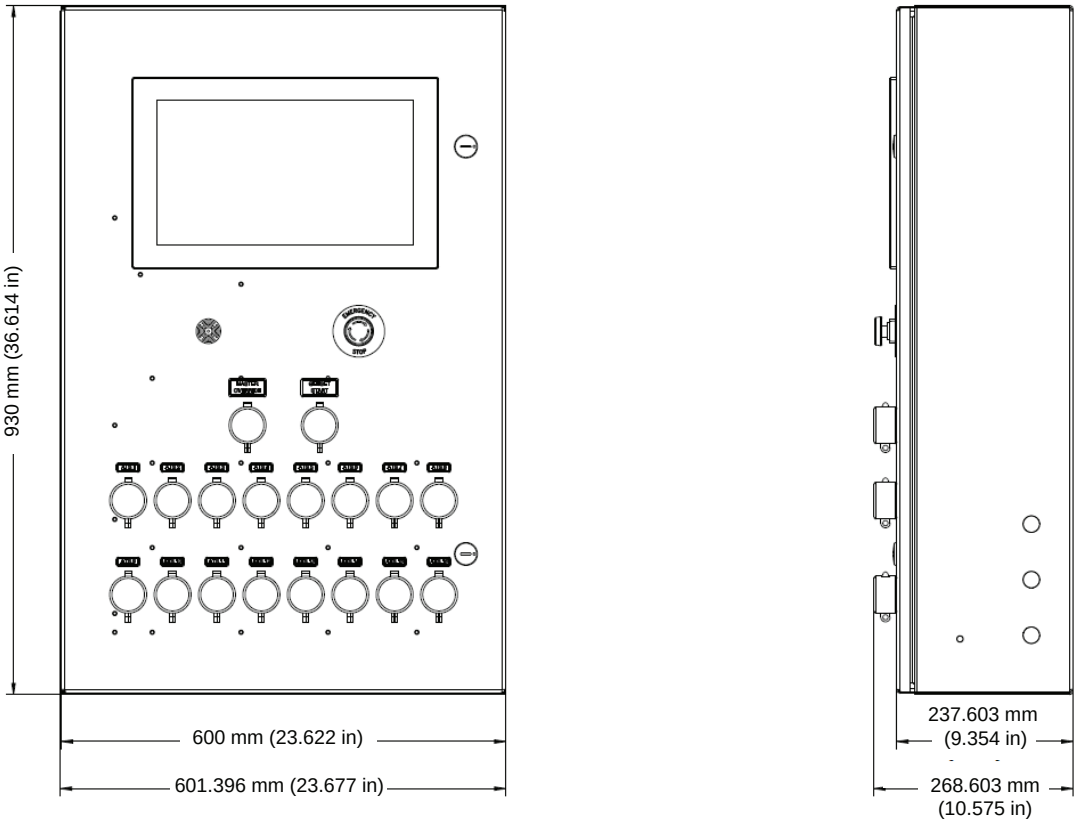
Height: 930 mm (36.61 in)
Width: 601.396 mm (23.677 in)
Depth: 268.603 mm (10.575 in)

Agency Approvals

- UL Listed (c-UL-us Listed to USA and Canada) – Certified to the Standard for Controllers for Use in Power Production, ANSI/UL 6200, 1st edition and to Standard for Controllers for Use in Power Production, CAN/ULC 6200, 1st edition
- CSA Certified (c-CSA-us Certified to USA and Canada) - Certified to CSA C22.2 NO. 286-17, Industrial Control Panels and Assemblies and to UL 508A, Industrial Control Panels, Third Edition
- Seismic certification
  - IBC certification
  - HCAI pre-approval

Environmental

Type 1 / NEMA 1 Enclosure



Master Control Panel Dimensional Diagram

Digital Generator Set Controller Data Sheet

MGC Series Comparison

There are a variety of options available when it comes to selecting a reliable, easy-to-use, and rugged generator set control system. This data sheet is intended to be used only as a reference to determine which configuration of our ***mtu*** Generator Set Controllers (MGC) would best fit your needs. Detailed information can be found on the MGC-1500 Series Data Sheet, MGC-2000 Series Data Sheet, and MGC-3000 Series Data Sheet. Please contact your ***mtu*** Account Manager for more information.

GENERATOR PROTECTION

	MGC-1510	MGC-1520	MGC-2010	MGC-2020	MGC-2050	MGC-3010	MGC-3050
Standard							
Phase Imbalance (47)	✓	✓		✓	✓	✓	✓
Overcurrent (50)	✓	✓					
Overvoltage (59)	✓	✓	✓	✓	✓	✓	✓
Undervoltage (27)	✓	✓	✓	✓	✓	✓	✓
Underfrequency (81U)	✓	✓	✓	✓	✓	✓	✓
Overfrequency (81O)	✓	✓	✓	✓	✓	✓	✓
Reverse Power (32)			✓	✓	✓	✓	✓
Loss of Excitation (40Q)			✓	✓	✓	✓	✓
Enhanced							
Overcurrent (51)				✓	✓	✓	✓
Vector Shift (78)				✓	✓	✓	✓
Rate of Change of Frequency (81R)				✓	✓	✓	✓
Ground Fault						✓	✓

Note: Numbers in parentheses above are ANSI standard device numbers denoting which features the controllers support.

INPUTS

	MGC-1510	MGC-1520	MGC-2010	MGC-2020	MGC-2050	MGC-3010	MGC-3050
Controller							
Digital	7	7	16	16	16	16	16
Analog (Dedicated)	3	-	3	3	3	3	3
Analog	-	-	-	-	-	2	2
CEM							
Digital	-	10	10	10	10	4x10	4x10
AEM							
Analog	-	-	8	8	8	4x8	4x8
TC	-	-	2	2	2	4x2	4x2
RTD	-	-	8	8	8	4x8	4x8

A Rolls-Royce solution

MGC Series Comparison Digital Generator Set Controller Data Sheet

OUTPUTS

	MGC-1510	MGC-1520	MGC-2010	MGC-2020	MGC-2050	MGC-3010	MGC-3050
Controller							
Digital Form A, 30 Amp	-	-	3	3	3	3	3
Digital Form A, 5 Amp	3	3	-	-	-	-	-
Digital Form A, 2 Amp	4	4	12	12	12	12	12
Analog	-	-	-	-	-	2	2
CEM							
Digital Form C, 4 Amp	-	12	12	12	12	4x12	4x12
Digital Form C, 1 Amp	-	12	12	12	12	4x12	4x12
AEM							
Analog	-	-	4	4	4	4x4	4x4
External to Controllers / (CEM)							
Digital Form C, 10 Amp (Interposing Relay)	-	10	10	10	10	10	10

COMMUNICATION

	MGC-1510	MGC-1520	MGC-2010	MGC-2020	MGC-2050	MGC-3010	MGC-3050
ModBus RTU (RS-485)			✓	✓	✓	✓	✓
ModBus TCP-IP						✓	✓
RDP-110	✓	✓	✓	✓	✓	✓	✓
CANBus		✓	✓	✓	✓	✓	✓
Modem Interface (RS-232)				✓	✓	✓	✓
Ethernet						✓	✓

METERING

	MGC-1510	MGC-1520	MGC-2010	MGC-2020	MGC-2050	MGC-3010	MGC-3050
Bus 1 Voltage							
Single Phase	✓	✓	✓	✓	✓	✓	✓
Three Phase	✓	✓	✓	✓	✓	✓	✓
Bus 2 Voltage							
Single Phase							✓
Three Phase							✓
Current Transformers							
Generator	3	3	3	3	3	3	3
Auxiliary	-	-	-	-	-	1	4

AUTOMATIC SYNCHRONIZER

	MGC-1510	MGC-1520	MGC-2010	MGC-2020	MGC-2050	MGC-3010	MGC-3050
Auto Sync					✓	✓	✓

Digital Generator Set Controller Data Sheet

MGC-1500 Series

The MGC-1500 Series controllers include the following models which are described throughout this document.*

— MGC-1510
— MGC-1520

MGC Series Generator Set Controllers are rugged, reliable, and easy-to-use digital generator set control systems. The MGC-1500 Series is perfectly focused, combining rugged construction and microprocessor technology to offer a product that will hold up to almost any environment and is flexible enough to meet your application's needs.

PRODUCT HIGHLIGHTS

— Three-phase generator metering
— Engine metering
— Generator set control
— Engine and generator protection
— BESTCOMS*Plus*®
  - Windows®-based software for optional remote operation (Software can be downloaded at www.mtu-solutions.com)
  - Programming and setup software
  - Intuitive and powerful
  - Remote control and monitoring
  - Programmable logic
  - USB communications
— Suitable for rental generator sets with high/low sensing, single or three phase override, wye/delta/grounded delta configurable, and alternate frequency override (50/60 Hz)
— Resistive sender inputs for oil pressure and coolant temperature
— Multilingual capability
— SAE J1939 Engine Control Unit (ECU) communications (Refer to *Configuration Options*)
— Remote annunciation with RDP-110
— Event recording (up to 30 events in non-volatile memory)
— Extremely rugged, fully potted design
— Seven programmable contact inputs with Input 1 programmed to recognize an emergency stop
— Start, run, and prestart relays with four programmable outputs
— UL recognized, CSA certified, CE approved
— IP56 rating per IEC 60529
— NFPA-110 compatible
— Microprocessor based
— Complete system metering
— Expandable to meet customer needs

* Please refer to the last page of this data sheet for available MGC-1500 series configuration options. The MGC Series Controller Comparison Data Sheet is a available as a reference for all MGC series configuraton options..

DIAGRAM

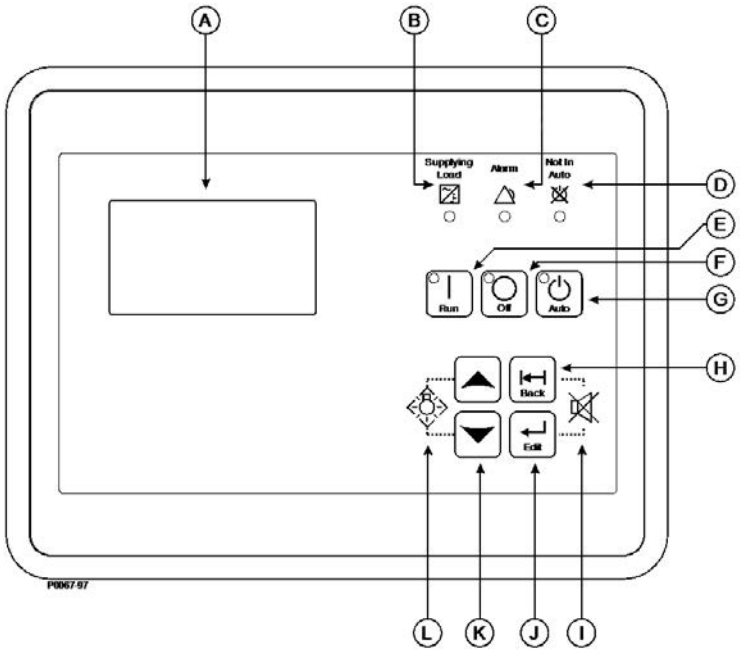


Figure 1: Front Panel Descriptions

A. Liquid crystal display
B. Supplying load indicator
C. Alarm indicator
D. Not in auto indicator
E. Run pushbutton and mode indicator
F. Off pushbutton and mode indicator
G. Auto pushbutton and mode indicator
H. Back pushbutton
I. Alarm silence pushbutton combination
J. Edit pushbutton
K. Arrow pushbuttons
L. Lamp test pushbutton combination

FUNCTIONS

Generator set protection

Generator ANSI codes
- Overvoltage (59)
- Overfrequency (81O)
- Voltage phase imbalance (47)
- Undervoltage (27)
- Underfrequency (81U)
- Overcurrent (50)

All generator set protection features are programmable as alarms, pre-alarms, status, or not used.

Alarms (shutdowns)
- Low oil pressure
- High coolant temperature
- Low coolant temperature
- Overspeed
- Overcrank
- Coolant temp sender fail (non-ECU engines)
- Oil pressure sender fail (non-ECU engines)
- Emergency stop
- Critical low fuel level (refer to *Configuration Options*)

Pre-alarms (warnings)
- Low oil pressure
- Low coolant temperature
- Weak battery voltage
- Low fuel level
- High fuel level
- High coolant temperature
- Battery overvoltage

All alarms and pre-alarms can be enabled or disabled via the BESTCOMSPlus® PC software or the front panel.
Additional custom alarms and pre-alarms are available upon request.

FUNCTIONS, continued

Generator set metering

— Generator parameters include voltage, current, real power (watts), apparent power (VA), and power factor. The view can be programmed to display up to 20 parameters using the scrolling and time delay feature.
— Engine parameters include oil pressure, coolant temperature, RPM, battery voltage, fuel level, engine runtime, and various SAE J1939 supported parameters.

Engine control

— Cranking control: cycle or continuous (quantity and duration fully programmable)
— Engine cooldown: smart cooldown function saves time and fuel
— Successful start counter: counts and records successful engine starts
— Timers:
  - Engine cooldown timer
  - Engine maintenance timer
  - Pre-alarm time delays for weak/low battery voltage
  - Alarm time delay for overspeed
  - Alarm time delay for sender failure
  - Arming time delays after crank disconnect:
    - Low oil pressure
    - High coolant temperature
  - Pre-crank delay
  - Continuous or cycle cranking time delay
  - Programmable logic timers

Event recording

The MGC-1500 Series has an event recorder that provides a record of alarms, pre-alarms, engine starts, engine runtime loaded, engine runtime unloaded, last run date, and many other events that are all date and time stamped to help the user determine the cause and effect of issues related to the generator set. Contains up to 30 event records each retaining numerous occurrences in memory. Time, date, and engine hour detail are available for the most current 30 occurrences within each event record.

Transfer switch control (Mains failure)

(Refer to *Configuration Options*)

The MGC-1500 Series has the ability to detect a mains failure via a single- or three-phase bus input. A mains failure is established when any one of the following conditions are met:

— Any phase of bus voltage falls below the dead bus threshold
— Any phase of bus voltage is unstable due to overvoltage or undervoltage
— Any phase of bus voltage is unstable due to overfrequency or underfrequency

When conditions are met, the MGC-1500 Series will start the generator set and, when ready, will send generator and mains breaker commands to apply power to the load from the generator set. The MGC-1500 Series implements open or closed breaker transitions to and from the mains. When the mains returns and is considered stable, the MGC-1500 Series will transfer the load back to the mains and stop the engine.

USB port

The USB communication port can be used with BESTCOMS*Plus*® software to quickly configure an MGC-1500 Series with the desired settings or retrieve metering values and event log records.

Programmable logic

The MGC-1500 Series offers a very powerful, yet easy-to-use, programmable logic scheme, BESTlogic™*Plus,* for custom programming of the various inputs, outputs, alarms, and pre-alarms. It allows these elements to be integrated into a complete logic scheme so that the user can meet even the most complex specification. The Programmable logic control includes the selection of logic gates and timers with drag-and-drop technology to make it fast and simple.

Remote display panel annunciation

(Refer to *Configuration Options*)

The MGC-1500 Series can communicate to a remote display panel, Model RDP-110. This requires only two wires to annunciate many of the alarms and pre-alarms required by NFPA-110 Level I and II. External power is required.

SAE J1939 communications

(Refer to *Configuration Options*)

SAE J1939 CANBus communications allows the MGC-1500 Series to communicate with the ECU to gather critical engine information like oil pressure, engine coolant temperature, RPM, battery voltage, and much more. By utilizing the ECU, the addition of analog engine senders is no longer required. This can save substantial money for the installer. It also eliminates any errors or discrepancies between the ECU data and the data displayed on the MGC-1500 Series that may be present due to analog sender inaccuracies or incompatibility. An additional benefit is access to the ECU's diagnostic troubleshooting codes (DTCs). The DTCs provide information about the engine's operating conditions and communicate these via SAE J1939 to the MGC-1500 Series, eliminating the need for hand-held service tools to diagnose simple engine issues.

SPECIFICATIONS

Operating power
- Nominal: 12 or 24 VDC
- Range: 6 to 32 VDC
- Power consumption:
  - Sleep mode: 4.5 W
  - Normal operational mode: 6.5 W - Run mode, LCD heater off, three relays energized
  - Maximum operational mode: 14 W - Run mode, LCD heater on, seven relays energized
  - Battery ride-through: Withstands cranking ride-through down to 0 V for 50 ms (typical)

Current sensing (5 Amp CT inputs)
- Continuous rating: 0.1 to 5.0 Aac
- One second rating: 25 Aac
- Burden: 1 VA

Voltage sensing
- Range: 12 to 576 V rms, line-to-line
- Frequency range: 10 to 72 Hz
- Burden: 1 VA
- One second rating: 720 V rms

Contact sensing/input contacts
Contact sensing inputs include one emergency stop input and seven programmable inputs. The emergency stop input accepts normally closed, dry contacts. The remote emergency stop is limited to 75 ft. standard. Extended runs are available with an optional relay. All programmable inputs accept normally open, dry contacts. The factory may utilize up to three of these inputs.

Engine system inputs
- Fuel level sensing resistance range: 5 to 250 Ω nominal
- Coolant temperature sensing resistance range: 5 to 2,750 Ω nominal
- Oil pressure sensing resistance range: 5 to 250 Ω nominal
- Engine speed sensing:
  - Magnetic pickup or CANBus
    - Magnetic pickup voltage range: 3 to 35 V peak (6 to 70 V peak to peak)
    - Magnetic pickup frequency range: 32 to 10,000 Hz

Output contacts
- (7) total outputs: (3) 5 A @ 28 VDC and (4) 2 A @ 28 VDC
- The factory utilizes the following on each generator set which can be reprogrammed as needed:
  - (3) 5 A @ 28 VDC for Pre-start, Start, and Run
  - (4) 2 A @ 28 VDC for general purpose

Metering
Generator voltage (rms)
- Metering range: 12 to 576 VAC (direct measurement), up to 9,999 VAC (with appropriate voltage transformer)
- Accuracy: ±1% of programmed rated voltage or ±2 VAC (subject to accuracy of voltage transformer when used)

Generator current (rms)
- Generator current is measured at the secondary windings of 5 A CTs.
- Metering range: 0 to 5,000 Aac
- CT primary range: 1-5,000 Aac, in primary increments of 1 Aac
- Accuracy: ±3% of programmed rated current or ±3 Aac (subject to accuracy of CTs)

Generator frequency
- Metering range: 10 to 72 Hz
- Accuracy: ±0.25% or 0.05 Hz

Apparent power
- Indicates total kVA and individual line kVA (four-wire, line-to-neutral or three-wire, line-to-line)
- Accuracy: ±5% of the full-scale indication or ±4 kVA

Power factor
- Metering range: 0.2 leading to 0.2 lagging
- Accuracy: ±0.02

Real power
- Indicates total kW and individual line kW (four-wire, line-to-neutral or three-wire, line-to-line)
- Accuracy: ±5% of the full-scale indication or ±4 kW

Oil pressure
- Metering range: 0 to 150 psi or 0 to 1,034 kPa
- Accuracy: ±3% of actual indication or ±2 psi or ±12 kPa (subject to accuracy of sender)

Coolant temperature
- Metering range: 0 °C to 204 °C (32 °F to 410 °F)
- Accuracy: ±3% or actual indication or ±2° (subject to accuracy of sender).

Fuel level
- Metering range: 0 to 100%
- Accuracy: ±3% (subject to accuracy of sender)

Battery voltage
- Metering range: 6 to 32 VDC
- Accuracy: ±3% of actual indication or ±0.2 VDC

Engine RPM
- Metering range: 0 to 4,500 rpm
- Accuracy: ±2% of actual indication or ±2 rpm

Engine run time
- Engine run time is retained in non-volatile memory
- Metering range: 0 to 99,999 h; update interval: 6 min
- Accuracy: ±1% of actual indication or ±12 min

SPECIFICATIONS, continued

Metering, continued

Maintenance timer
- Maintenance timer indicates the time remaining until generator set service is due. Value is retained in non-volatile memory.
- Metering range: 0 to 5,000 h; update interval: 6 min
- Accuracy: ±1% or actual indication or ±12 min

Generator protection functions

Overvoltage (59) and undervoltage (27)
- Pickup range: 70 to 576 VAC
- Activation delay range: 0 to 30 s

Overfrequency (81O) and underfrequency (81U)
- Pickup range: 45 to 66 Hz
- Pickup increment: 0.1 Hz
- Activation delay range: 0 to 30 s

Phase imbalance (47)
- Pickup range: 5 to 100 VAC
- Pickup increment: 1 VAC
- Activation delay range: 0 to 30 s
- Activation delay increment: 0.1 s

Overcurrent (51)
- Pickup range: 0.18 to 1.18 Aac (1 A current sensing)
- Time dial range: 0 to 7,200 s (fixed time curve)

Environmental
- Temperature
  - Operating: -40 °C to 70 °C (-40 °F to 158 °F)
  - Storage: -40 °C to 85 °C (-40 °F to 185 °F)
- Humidity: IEC 68-2-38
- Salt fog: ASTM B 17-73, IEC 68-2-11 (tested while operational)
- Ingress protection: IEC IP54 for front panel
- Shock: 15 G in three perpendicular planes
- Vibration: swept over the following ranges for 12 sweeps in each of three mutually perpendicular planes with each 15-minute sweep.
  - 5 to 29 to 5 Hz at 1.5 G peak for 5 min
  - 29 to 52 to 29 Hz at 0.036” DECS-A for 2.5 min
  - 52 to 500 to 52 Hz at 5 G peak for 7.5 min

Agency approvals
- UL/CSA approvals: “cURus” approved to UL 6200 and CSA C22.2 No.14
- NFPA Compliance: complies with NFPA Standard 110, standard for emergency and standby power
- CE Marked: complies with applicable EC directives

ADDITIONAL SPECIFICATIONS

Battery backup for real time clock
The MGC-1500 Series provides a real-time clock with capacitor backup that is capable of operating the clock for up to 24 hours after power is removed from the controller. As the capacitor nears depletion, an internal backup battery takes over and maintains timekeeping. The battery will maintain the clock for approximately 10 years, depending on conditions. The battery is not replaceable. The clock is used by the events recorder function to timestamp events, and the exercise timer is used to start and stop the generator set when the exercise feature is utilized.

Breaker management
The MGC-1500 Series is capable of controlling the generator breaker and the mains breaker. The status of the breakers is determined by using BESTlogic™Plus programmable logic to set up the GENBRK and MAINSBRK logic blocks. These logic blocks have outputs that can be configured to energize an output contact and control a breaker, as well as inputs for breaker control and status. The MGC-1500 Series will attempt to close a breaker only after verifying that it can be closed. If the breaker cannot be closed, the close request will be ignored. Only one breaker can be closed at a time. Synchronization is required before closing the breaker to a live bus. Closure to a dead bus can be performed after meeting dead bus threshold and timing requirements set by the user.

OPTIONAL ACCESSORIES

(Refer to *Configuration Options*)

Contact Expansion Module 2020 (CEM-2020)

The CEM-2020 is a remote device that provides additional MGC-1500 Series contact inputs and outputs, giving the user flexibility to use the same model MGC-1500 Series generator set controller for simple functions or more complicated applications that require contact functionality or duplication of contacts for remote annunciation. Its features include:

- **10 Contact Inputs:** the CEM-2020 provides 10 programmable contact inputs with the same functionality as the contact inputs on the MGC-1500 Series.
- **24 Contact Outputs:** the CEM-2020 provides 24 Form C programmable output contacts with the same functionality as the output contacts on the MGC-1500 Series. The output ratings of the Form C contacts are:

Output No.	Rating (Cont.)	Additional Information
5-16	1 A @ 30 VDC	This is a gold flash contact for low current circuits.
17-28	4 A @ 30 VDC	

Table 1: Output Ratings Form C Contacts

- **Communications via CANBus:** the CEM-2020 communicates to the MGC-1500 Series via SAE J1939 CANBus communications and allows the user to program the functionality of these inputs and outputs in the BESTCOMSPlus® software.
- The user can add labels for the inputs and outputs that appear in BESTCOMS®Plus, on the front panel, and in programmable logic. All the functionality can be assigned to these inputs and outputs as if they were an integrated part of the MGC-1500 Series. The CEM-2020 module has all of the environmental ratings of the MGC-1500 Series, including a model for UL Class1 Div2 applications. The CEM-2020 terminals accept a maximum wire size of 12 AWG, while the chassis ground requires 12 AWG wire. Flexibility is one of the benefits of the MGC-1500 Series, and this add-on module enhances that benefit even further.

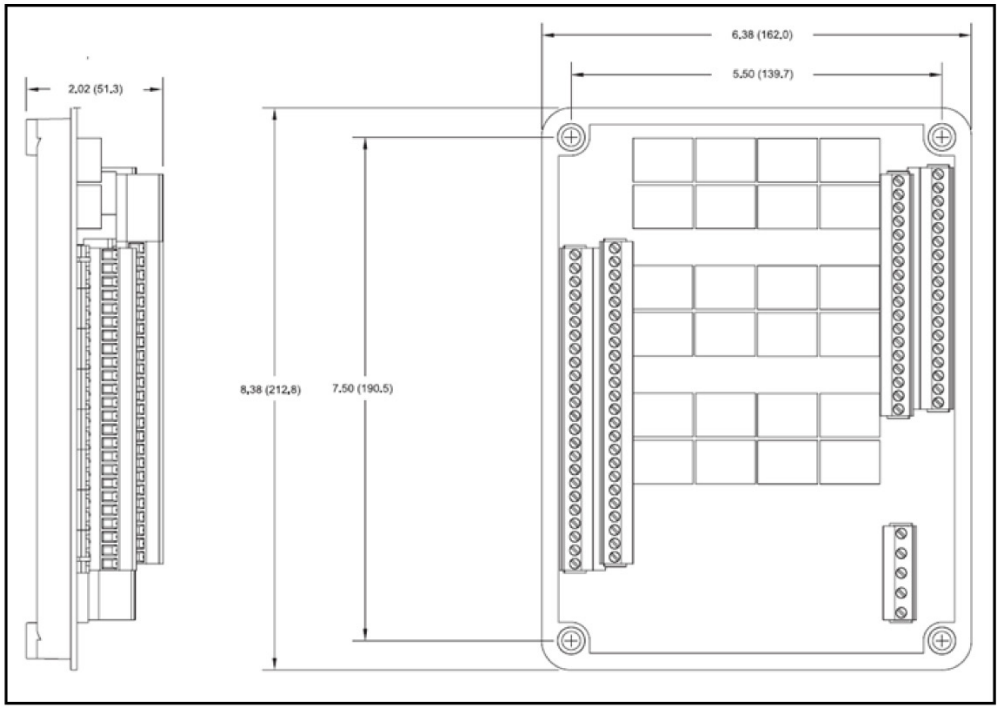


Figure 2: CEM-2020 Overall Dimensions

CONFIGURATION OPTIONS

Generator protection

	MGC-1510	MGC-1520
Standard		
Phase Imbalance (47)	X	X
Overcurrent (50)	X	X
Overvoltage (59)	X	X
Undervoltage (27)	X	X
Underfrequency (81U)	X	X
Overfrequency (81O)	X	X
Reverse Power (32)		
Loss of Excitation (40Q)		
Enhanced		
Overcurrent (51)		
Vector Shift (78)		
Rate of Change of Frequency (81R)		
Ground Fault		

Note: Numbers in parentheses above are ANSI standard device numbers denoting which features the controllers support.

Inputs

	MGC-1510	MGC-1520
Controller		
Digital	7	7
Analog (Dedicated)	3	-
Analog	-	-
CEM		
Digital	-	10
AEM		
Analog	-	-
TC	-	-
RTD	-	-

Outputs

	MGC-1510	MGC-1520
Controller		
Digital Form A, 30 Amp	-	-
Digital Form A, 5 Amp	3	3
Digital Form A, 2 Amp	4	4
Analog	-	-
CEM		
Digital Form C, 4 Amp	-	12
Digital Form C, 1 Amp	-	12
AEM		
Analog	-	-
External to Controllers (CEM)		
Digital Form C, 10 Amp (Interposing Relay)	-	10

Communication

	MGC-1510	MGC-1520
ModBus RTU (RS-485)		
ModBus TCP-IP		
RDP-110	X	X
CANBus		X
Modem Interface (RS-232)		
Ethernet		

Metering

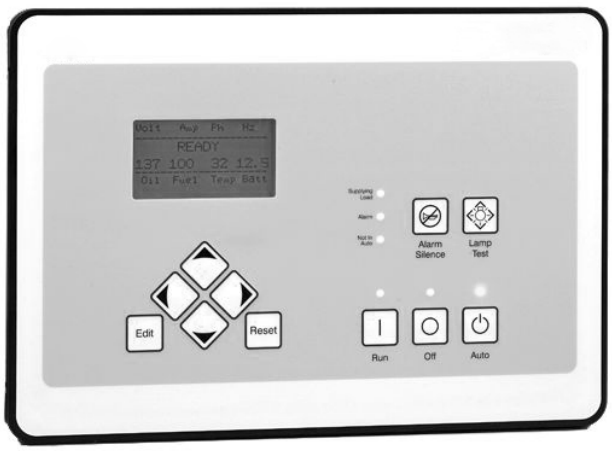
	MGC-1510	MGC-1520
Bus 1 Voltage		
Single Phase	X	X
Three Phase	X	X
Bus 2 Voltage		
Single Phase		
Three Phase		
Current Transformers		
Generator	3	3
Auxiliary	-	-

Subject to change. | WT00032339 | 2020-07

Digital Generator Set Controller Data Sheet

MGC-2000 Series

The MGC-2000 Series controllers include the following models which are described throughout this document.*
- MGC-2010
- MGC-2020
- MGC-2050



mtu Generator Set Controllers (MGC Series) are highly advanced integrated digital generator set control systems. The MGC-2000 Series is perfectly focused, combining rugged construction and microprocessor technology to offer a product that will hold up to almost any environment and is flexible enough to meet your application's needs. The MGC-2000 Series provides generator set control, transfer switch control, metering, protection, and programmable logic in a simple, easy-to-use, reliable, rugged, and cost effective package.

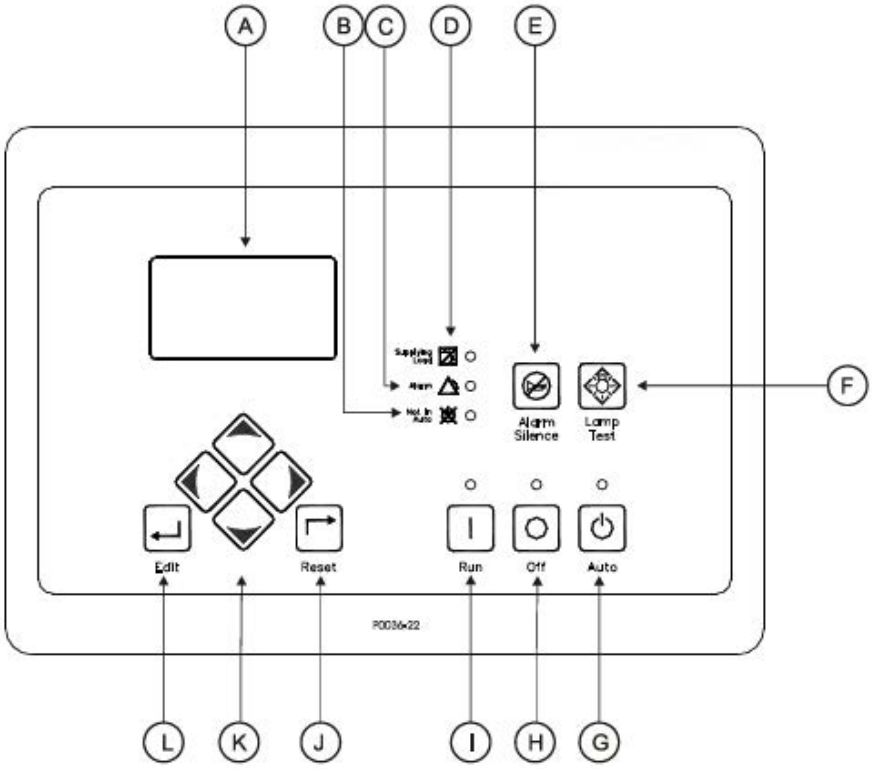
PRODUCT HIGHLIGHTS

- Three-phase generator metering
- Engine metering
- Generator set control
- Engine and generator protection
- Var sharing over Ethernet
- BESTCOMS*Plus*®
  - Windows®-based software for optional remote operation (Software can be downloaded at www.mtu-solutions.com)
  - Programming and setup software
  - Intuitive and powerful
  - Remote control and monitoring
  - Programmable logic
  - USB communications
- Automatic transfer switch compatible
- Exercise timer
- Suitable for use on rental generator sets with high/low line sensing, single or three phase sensing override, and wye/delta/grounded delta
- SAE J1939 Engine Control Unit (ECU) communications
- Automatic generator configuration detection
- Selection of integrating reset of instantaneous reset characteristics for overcurrent protection
- Multilingual capability
- Remote annunciation to RDP-110
- Extremely rugged, fully potted design
- 16 programmable contact inputs, 12 programmable contact outputs
- ModBus™ communications with RS-485 (Refer to *Configuration Options*.)
- UL recognized, CSA certified, CE approved
- Highly Accelerated Life Tests (HALT) tested
- IP 54 front panel rating with integrated gasket
- NFPA-110 compatible
- Microprocessor based
- Complete system metering
- Expandable to meet customer needs

*Please refer to the last page of this data sheet for available MGC-2000 Series configuration options. The MGC Series Controller Comparison Data Sheet is available as a reference for all MGC Series configuration options.

A Rolls-Royce solution

DIAGRAM



Front Panel Descriptions

A. Liquid Crystal Display
B. Not in Auto Indicator
C. Alarm Indicator
D. Supplying Load Indicator
E. Alarm Silence Pushbutton
F. Lamp Test Pushbutton
G. Auto Pushbutton and Mode Indicator
H. Off Pushbutton and Mode Indicator
I. Run Pushbutton and Mode Indicator
J. Reset Pushbutton
K. Arrow Pushbuttons
L. Edit Pushbutton

FUNCTIONS

Generator set protection

Generator ANSI codes

- Overvoltage (59)
- Overfrequency (81o)
- Reverse power (32)
- Undervoltage (27)
- Underfrequency (81u)
- Loss of excitation (40q)
- Phase imbalance (47)
- Overcurrent (51) (optional)
- Vector shift (78) (optional)
- Rate of change of frequency (ROCOF) (81R) (Refer to *Configuration Options*.)

All generator set protection features are programmable as alarms, pre-alarms, status, or not used.

Alarms (Shutdowns)

- Low oil pressure
- High coolant temperature
- Low coolant level
- Overspeed
- Overcrank
- Coolant temp sender fail (non-ECU engines)
- Oil pressure sender fail (non-ecu engines)
- Emergency stop
- Critical low fuel level (Refer to *Configuration Options*.)

FUNCTIONS, continued:

Generator Set Protection, continued:

Pre-alarms (Warnings)
- Low oil pressure
- High coolant temperature
- Low coolant temperature
- Battery overvoltage
- Weak battery voltage
- Aem comms failure
- Breaker open failure
- Cem comms failure
- Generator reverse rotation
- Engine kw overload (three levels)
- Loss of sensing
- Checksum failure
- Ecu comms fail
- Low fuel level
- High fuel level
- Active diagnostic trouble codes (DTC)
- Breaker close failure
- Low battery voltage

All alarms and pre-alarms can be enabled or disabled via the BESTCOMS*Plus*® PC software or the front panel. Additional custom alarms and pre-alarms are available upon request.

Generator set metering
- Generator parameters include voltage, current, real power (watts), apparent power (VA), and power factor (PF).
- Engine parameters include oil pressure, coolant temperature, battery voltage, speed, fuel level, engine load, coolant level (from ECU), ECU specific parameters, and run-time statistics.

Engine control
- Cranking control: cycle or continuous (quantity and duration fully programmable)
- Engine cooldown: smart cooldown function saves fuel and engine life
- Successful start counter: counts and records successful engine starts
- Timers:
  - Engine cooldown timer
  - Engine maintenance timer
  - Pre-alarm time delays for weak/low battery voltage
  - Alarm time delay for overspeed
  - Alarm time delay for sender failure
  - Arming time delays after crank disconnect:
    - Low oil pressure
    - High coolant temperature
  - Pre-crank delay
  - Continuous or cycle cranking time delay
  - Programmable logic timers

Event recording
The MGC-2000 Series has an event recorder that provides a record of alarms, pre-alarms, engine starts, engine runtime loaded, engine runtime unloaded, last run date, and many other events that are all date and time stamped to help the user determine the cause and effect of issues related to the generator set. Contains 30 event records each retaining up to 99 occurrences in memory. Time, date, and engine hour detail is available for the most current 30 occurrences within each event record.

Transfer switch control (Mains failure)
The MGC-2000 Series has the ability to detect a mains failure via a single- or three-phase bus input. A mains failure is established when any one of the following conditions are met:

- Any phase of bus voltage falls below the dead bus threshold
- Any phase of bus voltage is unstable due to overvoltage or undervoltage
- Any phase of bus voltage is unstable due to overfrequency or underfrequency

When conditions are met, the MGC-2000 Series will start the generator set and, when ready, will send generator and mains breaker commands to apply power to the load from the generator set. The MGC-2000 Series implements open or closed breaker transitions to and from the mains. When the mains returns and is considered stable, the MGC-2000 Series will transfer the load back to the mains and stop the engine.

ModBus™ RTU
When utilized, the user can send and receive information from the MGC-2000 Series via the RS-485 communications port and ModBus™ RTU protocol. This feature allows the MGC-2000 Series controlled generator set to be fully integrated into the building management system. Please see the *MGC-2000 Series Controller Manual* for the ModBus™ register list.

Programmable logic
The MGC-2000 Series offers a very powerful, yet easy-to-use, programmable logic scheme, BESTlogic™*Plus*, for custom programming of the various inputs, outputs, alarms, and pre-alarms. It allows these elements to be integrated into a complete logic scheme so that the user can meet even the most complex specification. The programmable logic control includes the selection of logic gates and timers, with drag-and-drop technology to make it fast and simple.

FUNCTIONS, continued:

Remote display panel annunciation
The MGC-2000 Series can communicate to a remote display panel, Model RDP-110. This requires only two wires to annunciate all of the alarms and pre-alarms required by NFPA-110 Level I and II. External power is required.

External modem interface
The MGC-2020 and MGC-2050 controllers include an external modem interface permitting an external modem to be connected to the MGC controller via RS-232. A dial-out modem enables remote control, monitoring, and setting of the MGC-2000 Series. When an alarm or pre-alarm condition occurs, the MGC-2000 Series can dial up to four telephone numbers in sequence until an answer is received and the condition is annunciated.

Note: Only an external modem interface is provided. The external modem must be provided by a third party. The external modem is only available on the MGC-2020 and MGC-2050 controller configurations of the MGC-2000 Series.

SAE J1939 communications
SAE J1939 CANBus communications allows the MGC-2000 Series to communicate with the ECU to gather critical engine information like oil pressure, engine coolant temperature, RPM, battery voltage, and much more. By utilizing the ECU, the addition of analog engine senders is no longer required. This can save substantial money for the installer. It also eliminates any errors or discrepancies between the ECU data and the data displayed on the MGC-2000 Series that may be present due to analog sender inaccuracies or incompatibility. An additional benefit is access to the ECU's diagnostic troubleshooting codes (DTCs). The DTCs provide information about the engine's operating conditions and communicates these, via SAE J1939, to the MGC-2000 Series, eliminating the need for hand-held service tools to diagnose simple engine issues.

SPECIFICATIONS

Operating power
- Nominal: 12 or 24 VDC
- Range: 6 to 32 VDC
- Power consumption:
  - Sleep Mode: 5W with all relays non-energized
  - Normal operational mode: 7.9W - run mode, LCD heater off, six relays energized
- Battery ride-through: withstands cranking ride-through down to 0 V for 50 ms, starting at 10 VDC.

Current sensing (5 A CT inputs)
- Continuous rating: 0.1 to 5.0 Aac
- One second rating: 10 Aac
- Burden: 1 VA

Voltage sensing
- Range: 12 to 576 V rms, line-to-line
- Frequency range: 10 to 72 Hz
- Burden: 1 VA
- One second rating: 720 V rms

Input contacts
Contact sensing inputs include one emergency stop input and 16 programmable inputs. The emergency stop input accepts normally closed, dry contacts. The remote emergency stop is limited to 75 ft. standard. Extended runs are available with optional relay. All programmable inputs accept normally open, dry contacts. The factory utilizes up to three of these inputs.

Engine System Inputs
- Fuel Level Sensing Resistance Range: 0 to 250 Ω nominal
- Coolant Temperature Sensing Resistance Range: 10 to 2,750 Ω nominal
- Oil Pressure Sensing Resistance Range: 0 to 250 Ω nominal
- Engine Speed Sensing:
  - Magnetic Pickup or CANBus
    - Magnetic Pickup Voltage Range: 3 to 35 V peak (6 to 70 V peak to peak)
    - Magnetic Pickup Frequency Range: 32 to 10,000 Hz
  - Generator Frequency (alternate or redundant)
    - Voltage Range: 12 to 576 V rms

Output contacts
- (15) total programmable outputs: (3) 30 A @ 28 VDC and (12) 2 A @ 30 VDC
- The factory utilizes the following on each generator set which can be reprogrammed as needed:
  - (3) 30 A @ 28 VDC for pre-start, start, and run
  - (12) 2 A @ 30 VDC for general purpose

SPECIFICATIONS, continued:

Metering

Generator and bus voltage (rms)
- Metering range: 0 to 576 VAC (direct measurement); up to 9,999 VAC (with appropriate voltage transformer)
- Accuracy: ±1% of programmed rated voltage of ±2 VAC (subject to accuracy of voltage transformer when used)

Generator current (rms)
- Generator current is measured at the secondary windings of 5 A CTs.
- Metering range: 0 to 5,000 Aac
- CT primary range: 1 to 5,000 Aac, in primary increments of 1 Aac
- Accuracy: ±1% of programmed rated current or ±2 Aac (subject to accuracy of CTs)

Generator and bus frequency
- Metering range: 10 to 72 Hz
- Accuracy: ±0.25% or 0.05 Hz

Apparent power
- Indicates total kVA and individual line kVA (four-wire, line-to-neutral or three-wire, line-to-line).
- Accuracy: ±3% or the full-scale indication or ±2 kVA

Power factor
- metering range: 0.2 leading to 0.2 lagging
- Accuracy: ±0.02

Real power
- Indicates total kW and individual line kW (four-wire, line-to-neutral or three-wire, line-to-line)
- Accuracy: ±3% of the full-scale indication or ±2 kW

Oil pressure
- Metering range: 0 to 150 psi or 0 to 1,034 kPa
- Accuracy: ±3% of actual indication or ±2 psi or ±12 kPa (subject to accuracy of sender)

Coolant temperature
- Metering range: 0 °C to 204 °C (32 °F to 410 °F)
- Accuracy: ±3% of actual indication or ±2° (subject to accuracy of sender)

Fuel level
- Metering range: 0 to 100%
- Accuracy: ±2% (subject to accuracy of sender)

Battery voltage
- Metering range: 6 to 32 VDC
- Accuracy: ±3% of actual indication or ±0.2 VDC

Engine RPM
- Metering range: 0 to 4,500 rpm
- Accuracy: ±2% of actual indication or ±2 rpm

Engine run time
- Engine run time is retained in non-volatile memory.
- Metering range: 0 to 99,999 h; update interval: 6 min
- Accuracy: ±1% of actual indication or ±12 min

Maintenance timer
- Maintenance timer indicates the time remaining until generator set service is due. Value is retained in non-volatile memory.
- Metering range: 0 to 5,000 h; update interval: 6 min
- Accuracy: ±1% of actual indication or ±12 min

Generator protection functions

Overvoltage (59) and undervoltage (27)
- Pickup range: 70 to 576 VAC
- Activation delay range: 0 to 30 s

Overfrequency (81O) and underfrequency (81U)
- Pickup range: 45 to 66 Hz
- Pickup increment: 0.1 Hz
- Activation delay range: 0 to 30 s

Reverse power (32)
- Pickup range: –50 to 5%
- Pickup increment: 0.1%
- Hysteresis range: 1 to 10%
- Hysteresis increment: 0.1%
- Activation delay range: 0 to 30 s
- Activation delay increment: 0.1 S

Loss of excitation (40Q)
- Pickup range: –150 to 0%
- Pickup increment: 0.1%
- Hysteresis range: 1 to 10%
- Hysteresis increment: 0.1%
- Activation delay range: 0 to 30 s
- Activation delay increment: 0.1 S

SPECIFICATIONS, continued:

Generator protection functions, continued:

Phase imbalance (47)
- Pickup range: 5 to 100 VAC
- Pickup increment: 1 VAC
- Activation Delay Range: 0 To 30 S
- Activation Delay Increment: 0.1 S

ROCOF (81R) (optional)
- Pickup range: 0.2 to 10 Hz/s
- Pickup increment: 0.1 Hz/s
- Activation delay range: 0 to 10,000 ms
- Activation delay increment: 1 ms
- Accuracy: 0.2 Hz/s
-

Overcurrent (51)
- Pickup range: 0.18 to 1.18 Aac (1 A current sensing)
- Time dial range: 0

Vector shift (78) (optional)
- Pickup range: 2 to 90°
- Pickup increment: 1°
- Accuracy: ±1°

Environmental
- Temperature
  - Operating: -40 °C to 70 °C (-40 °F to 158 °F)
  - Storage: -40 °C to 85 °C (-40 °F to 185 °F)
- Humidity: IEC 68-2-38
- Salt fog: ASTM B 17-73, IEC 68-2-11 (tested while operational)
- Ingress protection: IEC IP54 for front panel
- Shock: 15 G in three perpendicular planes
- Vibration: 5 to 29 to 5 Hz at 1.5 G peak for 5 min.
  29 to 52 to 29 Hz at 0.036" DECS-A for 2.5 min.
  52 to 500 to 52 Hz at 5 G peak for 7.5 min.
  - Swept over the above ranges for 12 sweeps in each of three mutually perpendicular planes with each 15 minute sweep

Agency approvals
- UL/CSA approvals: "cURus" approved to UL 6200 and CSA C22.2 No.14
- NFPA compliance: complies with NFPA Standard 110, standard for emergency and standby power
- CE marked: complies with applicable EC directives

ADDITIONAL SPECIFICATIONS

Battery backup for real time clock
The MGC-2000 Series provides a real-time clock with an internal backup battery. The battery will maintain timekeeping for approximately 10 years (depending on conditions) after power is removed from the controller. The clock is used by the event recorder and sequence of events functions to time-stamp events, and the exercise timer is used to start and stop the generator set when the exercise feature is utilized.

Breaker management
The MGC-2000 Series is capable of controlling the generator breaker and the mains breaker. The status of the breakers is determined by using BESTlogic™*Plus* programmable logic to set up the GENBRK and MAINSBRK logic blocks. These logic blocks have outputs that can be configured to energize an output contact and control a breaker, as well as inputs for breaker control and status. The MGC-2000 Series will attempt to close a breaker only after verifying that it can be closed. If the breaker cannot be closed, the close request will be ignored. Only one breaker can be closed at a time. Synchronization is required before closing the breaker to a live bus. Closure to a dead bus can be performed after meeting dead bus threshold and timing requirements set by the user.

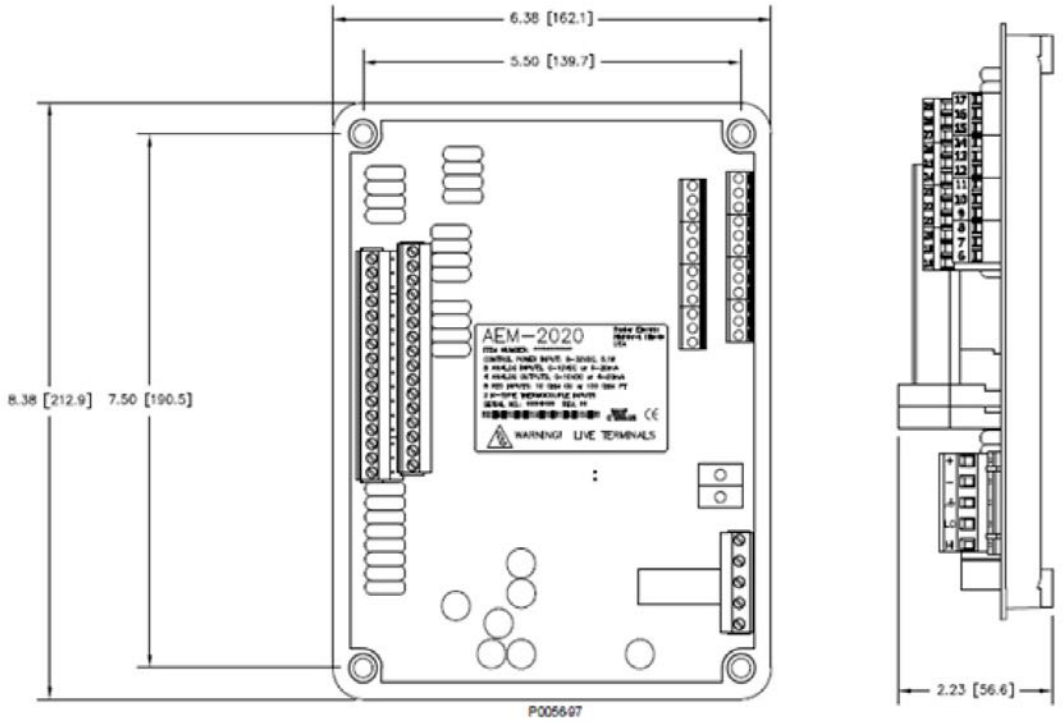
- .

OPTIONAL ACCESSORIES

Analog Extension Module 2020 (AEM–2020)

The optional AEM-2020 is a remote auxiliary device that provides additional MGC-2000 Series analog inputs and outputs. Its features include:

- **Eight analog inputs:** The AEM-2020 provides eight analog inputs that are user-selectable for 4 to 20 mA or 0 to 10 VDC. Each analog input has under/over thresholds that can be configured as status only, alarm, or pre-alarm. When enabled, an out of range alarm alerts the user of an open or damaged analog input wire. The label text of each analog input is customizable
- **Eight Resistance Temperature Detector (RTD) inputs:** The AEM-2020 provides eight user-configurable RTD inputs for monitoring generator set temperature. Each RTD input can be configured as status only, alarm, or pre-alarm to protect against high or low temperature conditions. When enabled, an out-of-range alarm alerts the user of an open or damaged RTD input wire. The label text of each RTD input is customizable.
- **Two thermocouple inputs:** The AEM-2020 provides two thermocouple inputs for monitoring generator set temperature. Each thermocouple input can be configured as status only, alarm, or pre-alarm to protect against high or low temperature conditions. When enabled, an out-of-range alarm alerts the user of an open or damaged thermocouple input wire. The label text of each thermocouple input is customizable.
- **Four analog outputs:** The AEM-2020 provides four analog outputs that are user-selectable for 4 to 20 mA or 0 to 10 VDC. A wide selection of parameters including oil pressure, fuel level, generator voltage, and bus voltage can be configured as analog outputs. Refer to *Section 4, BESTCOMSPlus® Software* of the *MGC-2000 Series Controller Manual,* for a full list of parameter selections.
- **Communications via CANBus:** A Control Area Network (CAN) is a standard interface that enables communication between the AEM-2020 and the MGC-2000 Series.



Input and Output Terminals

OPTIONAL ACCESSORIES, CEM-2020, continued

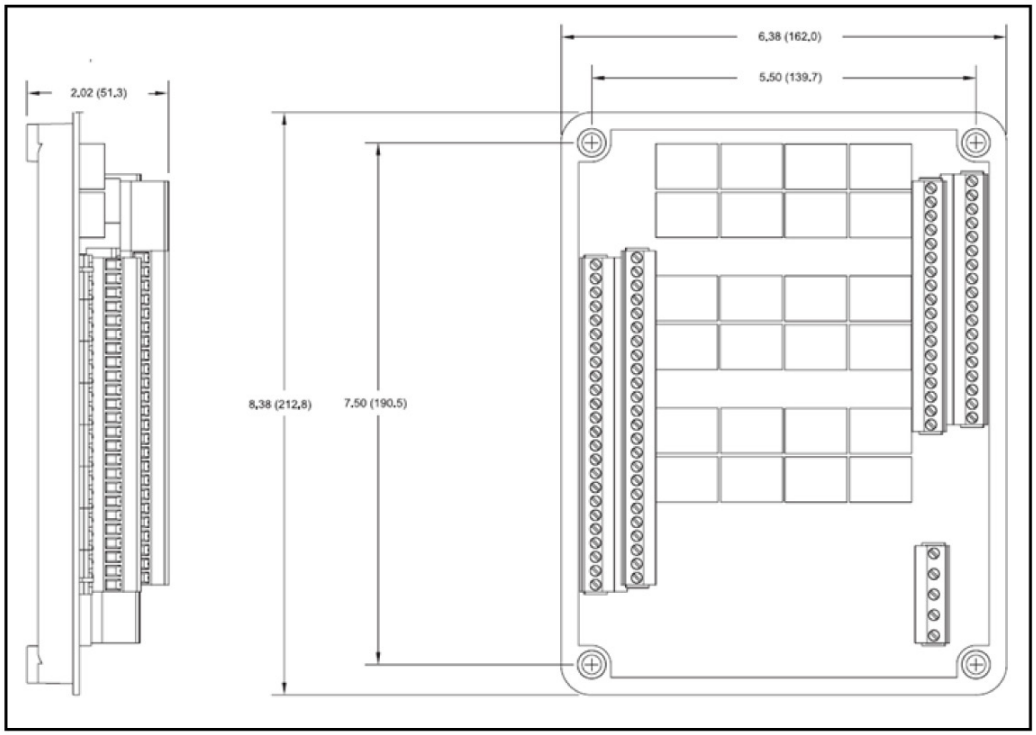
Contact Expansion Module 2020 (CEM-2020)

The CEM-2020 is a remote device that provides additional MGC-2000 Series contact inputs and outputs, giving the user flexibility to use the same model MGC-2000 Series generator set controller for simple or complicated applications that require contact functionality or duplication of contacts for remote annunciation. Its features include:

- **10 Contact Inputs:** The CEM-2020 provides 10 programmable contact inputs with the same functionality as the contact inputs on the MGC-2000 Series.
- **24 Output Contacts:** The CEM-2020 provides 24 Form C programmable output contacts with the same functionality as the output contacts on the MGC-2000 Series. The output ratings of the Form C contacts are:

Output No.	Rating (Cont.)	Additional Information
13–24	1 A @ 30 VDC	This is a gold flash contact for low current circuits.
25–36	4 A @ 30 VDC	

- **Communications via CANBus:** The CEM-2020 communicates to the MGC-2000 Series via SAE J1939 CANBus communications and allows the user to program the functionality of these inputs and outputs in the BESTCOMS*Plus*® software.
- The user can add labels for the inputs and outputs that appear in BESTCOMS*Plus*®, show up on the front panel, and in programmable logic. All the functionality can be assigned to these inputs and outputs as if they were an integrated part of the MGC-2000 Series. The CEM-2020 module has all of the environmental ratings of the MGC-2000 Series, including a model for UL Class1 Div2 applications. The CEM-2020 terminals accept a maximum wire size of 12 AWG, while the chassis ground requires 12 AWG wire. Flexibility is one of the benefits of the MGC-2000 Series, and this add-on module enhances that benefit even further.



CEM-2020 Overall Dimensions

CONFIGURATION OPTIONS

Generator protection	MGC-2010	MGC-2020	MGC-2050
Standard			
Phase Imbalance (47)		✓	✓
Overcurrent (50)			
Overvoltage (59)	✓	✓	✓
Undervoltage (27)	✓	✓	✓
Underfrequency (81U)	✓	✓	✓
Overfrequency (81O)	✓	✓	✓
Reverse Power (32)	✓	✓	✓
Loss of Excitation (40Q)	✓	✓	✓
Enhanced			
Overcurrent (51)		✓	✓
Vector Shift (78)		✓	✓
Rate of Change of Frequency (81R)		✓	✓
Ground Fault			

Inputs	MGC-2010	MGC-2020	MGC-2050
Controller			
Digital	16	16	16
Analog (Dedicated)	3	3	3
Analog	-	-	-
CEM			
Digital	10	10	10
AEM			
Analog	8	8	8
TC	2	2	2
RTD	8	8	8

Outputs	MGC-2010	MGC-2020	MGC-2050
Controller			
Digital Form A, 30 Amp	3	3	3
Digital Form A, 5 Amp	-	-	-
Digital Form A, 2 Amp	12	12	12
Analog	-	-	-
CEM			
Digital Form C, 4 Amp	12	12	12
Digital Form C, 1 Amp	12	12	12
AEM			
Analog	4	4	4
External to Controllers / (CEM)			
Digital Form C, 10 Amp (Interposing Relay)	10	10	10

Communication	MGC-2010	MGC-2020	MGC-2050
ModBus RTU (RS-485)	✓	✓	✓
ModBus TCP-IP			
RDP-110	✓	✓	✓
CANBus	✓	✓	✓
Modem Interface (RS-232)		✓	✓
Ethernet			

Metering	MGC-2010	MGC-2020	MGC-2050
Bus 1 Voltage			
Single Phase	✓	✓	✓
Three Phase	✓	✓	✓
Bus 2 Voltage			
Single Phase			
Three Phase			
Current Transformers			
Generator	3	3	3
Auxiliary	-	-	-

Subject to change. | WT00032340 | 2021-03

Digital Generator Set Controller Data Sheet

MGC-3000 Series

The MGC-3000 Series controllers include the following models which are described throughout this document.*
— MGC-3010
— MGC-3050

mtu Generator Set Controllers (MGC Series) are rugged, reliable, all-in-one digital generator set control and load share systems. The MGC-3000 Series is designed to be a high end controller that is well suited for mains fail, paralleled units, and systems with multiple buses. The MGC-3000 Series has all of the necessary items for complete generator set control, protection, and metering with a massive, but easy-to-use, programmable logic system.

PRODUCT HIGHLIGHTS

— Three-phase generator metering
— Up to two buses with three-phase voltage metering
— Three dedicated generator CTs with up to four auxiliary CTs
— Engine metering
— Generator set control
— Generator protection
— Residual current - Equipment Ground Fault Protection (EGFP) certified to UL 1053
— BESTCOMS*Plus*®
  - Windows®-based software for optional remote operation (Software can be downloaded at www.mtu-solutions.com)
  - Programming and setup software
  - Intuitive and powerful
  - Remote control and monitoring
  - Programmable logic
  - USB communications
— Automatic transfer switch compatible
— Resistor sender inputs for oil pressure and coolant pressure (option for analog senders available)
— Dual CAN bus ports [one for each SAE J1939 Engine Control Unit (ECU) and expansion modules]
— Dual Ethernet ports
— Load sharing capabilities of kW and kVARs over Ethernet
— Load share line compatibility (0-10 VDC)
— Zero power transfer capabilities
— Two analog inputs
— Governor and AVR bias outputs (reprogrammable to general analog outputs)
— 16 programmable contact inputs, 12 programmable contact outputs
— Three programmable LEDs for customized annunciation
— Connects to up to four AEM-2020s and four CEM-2020s
— Configurable protection with up to 371 different parameters
— Configurable elements for customizable alarms
— Real time analysis feature
— UL recognized, CSA certified, CE approved
— Multilingual capability
— Remote annunciation with RDP-110
— NFPA-110 compatible
— Microprocessor based
— Expandable to meet customer needs
— Optional accessories for Ethernet communication

*Please refer to the last page of this data sheet for available MGC-3000 Series configuration options. The MGC Series Controller Comparison Data Sheet is available as a reference for all MGC Series configuration options.

DIAGRAM

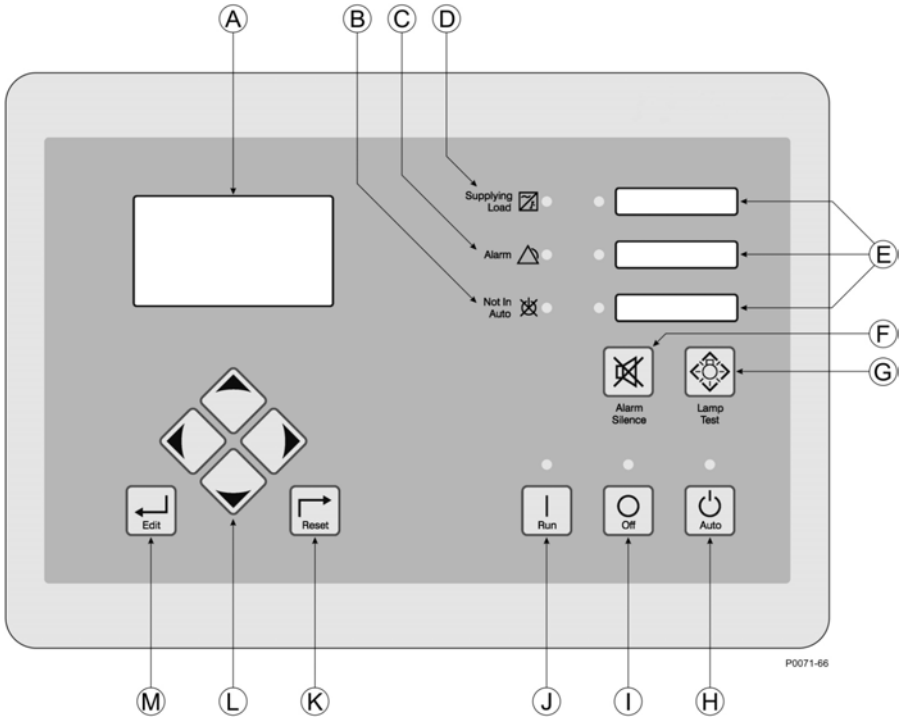


Figure 1: MGC-3000 Front Panel

A. Liquid crystal display
B. Not in Auto indicator
C. Alarm indicator
D. Supplying load indicator
E. Programmable indicators
F. Alarm Silence pushbutton
G. Lamp Test pushbutton
H. Auto pushbutton and mode indicator
I. Off pushbutton and mode indicator
J. Run pushbutton and mode indicator
K. Reset pushbutton
L. Arrow pushbuttons
M. Edit pushbutton

FUNCTIONS

Generator set protection

Generator ANSI codes

- Overvoltage (59)
- Overfrequency (81O)
- Reverse and forward power (32)
- Phase voltage imbalance (47)
- Vector shift (78)
- Undervoltage (27)
- Underfrequency (81U)
- Loss of excitation (40Q)
- Overcurrent (51)
- Rate of change of frequency (81R)

Note: All generator set protection features are programmable as alarms, pre-alarms, status, or not used.

FUNCTIONS, continued:

Residual current - Equipment Ground Fault Protection (EGFP)

The MGC-3000 Series controller offers residual current (ground-strap) equipment ground fault protection when utilized with a ground current transformer and a shunt trip equipped service disconnect (if tripping is required). The main bonding jumper that connects the equipment ground bus to the generator neutral passes through the center of the ground current transformer to allow for detection of ground fault currents. The MGC-3000 series controller may be configured for either ground fault indication only (GFI) or ground fault indication and trip (GFIT).

This method is suitable for the following application:

NFPA 70, National Electric Code (NEC) 215.10 specifies that each feeder disconnect rated 1,000 amperes or more and installed on solidly grounded wye electrical systems of more than 150 volts to ground, but not exceeding 600 volts phase-to-phase, shall be provided with ground fault protection of equipment in accordance with the provisions of NEC 230.95.

Figure 2: Ground Fault Protection

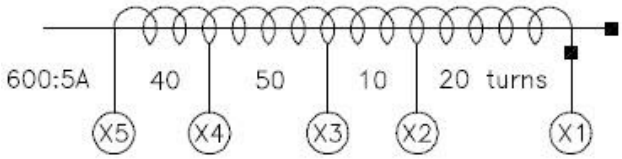


Figure 3: Ground Fault Protection Circuit

The MGC-3000 Series controller ground fault protection circuit complies with the applicable requirements of UL1053, as required by UL6200, and is also listed under ***mtu*** UL file AU3559.

During normal operating conditions, there should be little to no ground return current flowing from the equipment ground bus, through the main bonding jumper, and back to the generator set neutral. The generator set circuit breaker will be closed, and actual ground return current should be below the trip/indication threshold in the MGC-3000 Series controller. Therefore, the controller will not activate the shunt trip.

The MGC-3000 Series controller ground fault protection system utilizes a GE ITI 115-601MR, multi-ratio, relay class C50, current transformer that allows the EGFP system to be finely tuned and sensitized for the level of ground current expected.

Ratios	Tap
50:5	X2 - X3
100:5	X1 - X2
150:5	X1 - X3
200:5	X4 - X5
250:5	X3 - X4
300:5	X2 - X4
400:5	X1 - X4
450:5	X3 - X5
500:5	X2 - X5
600:5	X1 - X5

Table 1: 600:5

The MGC-3000 Series controller ground fault protection may be utilized in non-separately and separately derived systems. Please refer to Figures 4 and 5 below.

FUNCTIONS, Residual current - Equipment Ground Fault Protection (EGFP), continued:

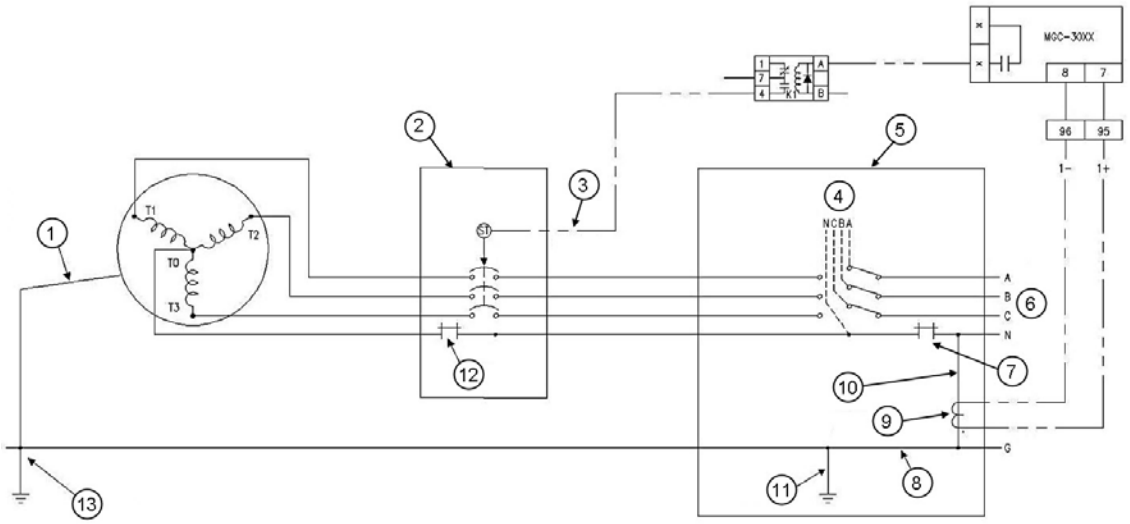


Figure 4: Residual Equipment Ground Fault Protection - Non-Separately Derived System

1. Conductor from generator frame to grounding electrode
2. 3-pole generator set circuit breaker
3. Shunt trip
4. Load
5. Service enclosure
6. Utility
7. Neutral disconnect link
8. Equipment ground bus
9. Current transformer
10. Main bonding jumper
11. Grounding electrode
12. Neutral disconnect link
13. Grounding electrode

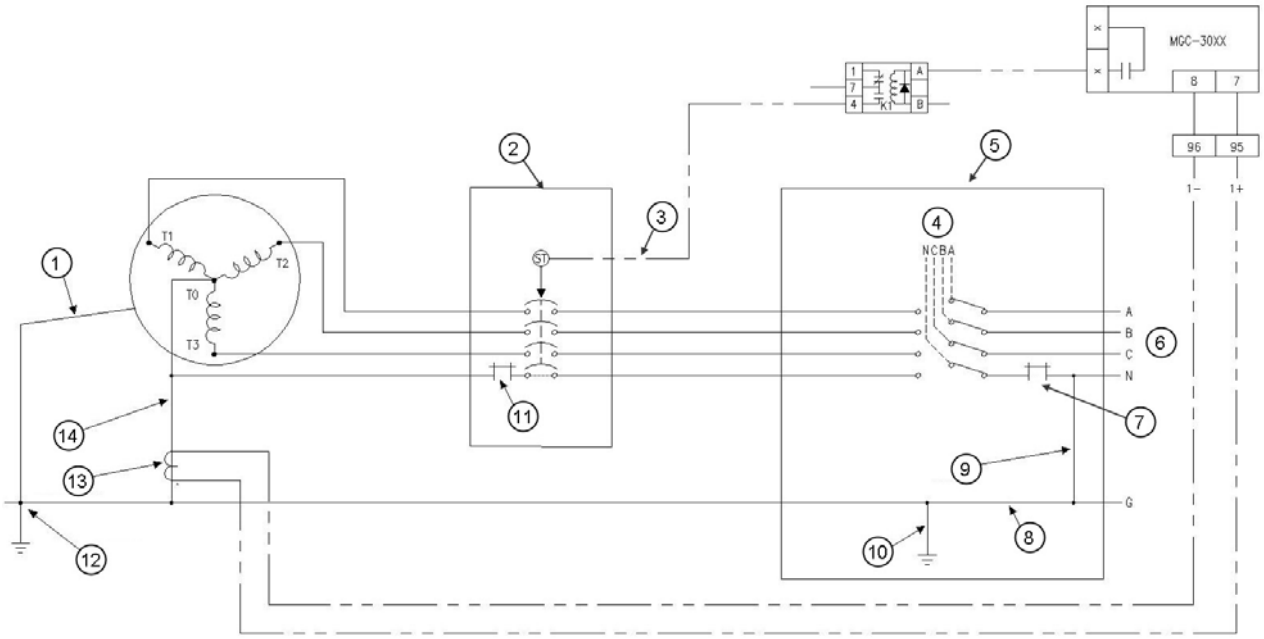


Figure 5: Residual Equipment Ground Fault Protection - Separately Derived System

1. Conductor from generator frame to grounding electrode
2. 3- or 4-pole generator set circuit breaker
3. Shunt trip
4. Load
5. Service enclosure
6. Utility
7. Neutral disconnect link
8. Equipment ground bus
9. Main bonding jumper
10. Grounding electrode
11. Neutral disconnect link
12. Grounding electrode
13. Current transformer
14. Main bonding jumper

FUNCTIONS, continued:

Generator set protection, continued:

Alarms (Shutdowns)
- Low oil pressure
- High coolant temperature
- Low coolant level
- Overspeed
- Overcrank
- Coolant temp sender fail (non-ECU engines)
- Oil pressure sender fail (non-ECU engines)
- Emergency stop
- Critical low fuel level (Refer to *Configuration Options*.)

Pre-alarms (Warnings)
- Low oil pressure
- High coolant temperature
- Low coolant temperature
- Battery overvoltage
- Weak battery voltage
- AEM1 through AEM4 comms failure
- Breaker open failure
- CEM1 through CEM4 comms failure
- Generator reverse rotation
- ID missing
- Intergenset communication failure
- Loss of voltage sensing
- Checksum failure
- ECU comms fail
- Low fuel level
- High fuel level
- Active Diagnostic Trouble Codes (DTC)
- Breaker close failure
- Bus 1 and bus 2 reverse rotation
- Ethernet 1 and Ethernet 2 link lost
- High battery voltage
- ID repeat
- Low battery voltage
- Synchronizer failure

All alarms and pre-alarms can be enabled or disabled via the BESTCOMS*Plus*® PC software or the front panel. Additional custom alarms and pre-alarms are available upon request.

Generator and bus protection and metering
- Multifunction protection guards against overvoltage, undervoltage, excessive forward and reverse power, underfrequency, and overfrequency. Overcurrent, phase imbalance, and loss of mains are available as options. Each protection function has an adjustable pickup and time delay setting. 16 inverse time curves, in addition to user-programmable curves, enable the MGC-3000 Series to offer overcurrent protection in a variety of applications. Each protective element can be assigned to the generator, bus 1, or bus 2.
- Metered generator and bus parameters include voltage, current, real power (watts), apparent power (VA), and power factor (PF).

Engine protection and metering
- Engine protection features include oil pressure and coolant temperature monitoring, overcrank protection, ECU-specific protection elements, and diagnostic reporting.
- Metered engine parameters include oil pressure, coolant pressure, battery voltage, speed, fuel level, engine load, coolant level (from ECU), ECU-specific parameters, and run-time statistics.

Engine control
- Cranking control: cycle or continuous (quantity and duration fully programmable)
- Engine cooldown: smart cooldown function saves fuel and engine life.
- Successful start counter: counts and records successful engine starts
- Timers:
  - Engine cooldown timer
  - Engine maintenance timer
  - Pre-alarm time delays for weak/low battery voltage
  - Alarm time delay for overspeed
  - Alarm time delay for sender failure
  - Arming time delays after crank disconnect:
    - Low oil pressure
    - High coolant temperature
  - Pre-crank delay
  - Continuous or cycle cranking time delay
  - Programmable logic timers

FUNCTIONS, continued:

Load sharing

The MGC-3000 Series provides analog outputs to the power system in the form of analog bias signals to the voltage regulator and speed governor. When the generator breaker is closed and load sharing is enabled, the MGC-3000 Series shares the real power load proportionally with other generators in the system. Load sharing can be implemented on the Analog Load Share Line or through Ethernet communications. Reactive power (kVAR) sharing is accomplished through Ethernet communications.

Event recording

A history of system events are logged in non-volatile memory. The MGC-3000 Series retains records for 128 unique types of events. Each record tracks the number of times that an event has occurred and records a time stamp of the first and last occurrences.

A Sequence of Events (SER) log is also available. This log tracks the internal and external status of the MGC-3000 Series. Events are scanned at five millisecond intervals with 1,023 events stored per record. All changes of state that occur during each scan are time- and date-stamped. SER reports are available through BESTCOMS*Plus*®. Over 1,000 records can be retained in non-volatile memory. When the SER memory becomes full, the oldest record is replaced by the latest one acquired.

Transfer switch control (Mains failure)

The MGC-3000 Series has the ability to detect a mains failure via a single- or three-phase bus input. A mains failure is established when any one of the following conditions are met:

- Any phase of bus voltage falls below the dead bus threshold
- Any phase of bus voltage is unstable due to overvoltage or undervoltage
- Any phase of bus voltage is unstable due to overfrequency or underfrequency

When conditions are met, the MGC-3000 Series will start the generator set and, when ready, will send generator and mains breaker commands to apply power to the load from the generator set. The MGC-3000 Series implements open or closed breaker transitions to and from the mains. When the mains returns and is considered stable, the MGC-3000 Series will transfer the load back to the mains and stop the engine. During closed breaker transitions, the Auto Synchronizer can synchronize the generator to the mains before transferring the load from generator power to utility power.

ModBus™ RTU

MGC-3000 Series controllers can be monitored and controlled via a polled network using the ModBus™ protocol. The RS-485 port supports a user-selectable baud rate of 1,200, 2,400, 4,800, 9,600, 19,200, 38,400, 57,600, or 115,200. Seven or eight data bits per character can be selected. Odd, even, or no parity is supported. One or two stop bits are selectable. Please see the *MGC-3000 Series Controller Manual* for the ModBus™ register list.

Ethernet

Ethernet ports provide communications between the MGC-3000 Series and a PC via BESTCOMS*Plus*® or other MGC-3000 Series controller(s) in a network. An Ethernet connection to a PC running BESTCOMS*Plus*® provides remote metering, setting, annunciation, and control of the MGC-3000 Series. Ethernet communication between MGC-3000 Series controller(s) allows for generator sequencing on an islanded system.

MGC-3000 Series controllers can be monitored and controlled via Ethernet using the ModBus™ TCP/IP.

Programmable logic

The MGC-3000 Series offers a very powerful, yet easy-to-use, programmable logic scheme, BESTlogic™*Plus*, for custom programming of the various inputs, outputs, alarms, and pre-alarms. It allows these elements to be integrated into a complete logic scheme so that the user can meet even the most complex specification. The programmable logic control includes the selection of logic gates and timers with drag-and-drop technology to make it fast and simple.

Remote display panel annunciation

(Refer to Configuration Options.)

The MGC-3000 Series can communicate to a remote display panel, Model RDP-110. This requires only two wires to annunciate all of the alarms and pre-alarms required by NFPA-110 Level I and II. External power is required.

FUNCTIONS, continued:

External modem interface

The MGC-3000 Series includes an external modem interface permitting an external modem to be connected to the MGC controller via RS-232. A dial-out modem enables remote control, monitoring, and setting of the MGC-3000 Series. When an alarm or pre-alarm condition occurs, the MGC-3000 Series can dial up to four telephone numbers in sequence until an answer is received and the condition is annunciated.

Note: Only an external modem interface is provided. The external modem must be provided by a third party.

CAN

MGC-3000 Series controllers have two separate CAN ports: CAN 1 and CAN 2. CAN 1 communicates solely with expansion modules. This port accommodates up to four AEM-2020s and up to four CEM-2020s simultaneously. CAN 2 is dedicated for communication with ECU and related devices.

SAE J1939 communications

SAE J1939 CANBus communications allows the MGC-3000 Series to communicate with the ECU to gather critical engine information like oil pressure, engine coolant temperature, RPM, battery voltage, and much more. By utilizing the ECU, the addition of analog engine senders is no longer required. This can save substantial money for the installer. It also eliminates any errors or discrepancies between the ECU data and the data displayed on the MGC-3000 Series that may be present due to analog sender inaccuracies or incompatibility. An additional benefit is access to the ECU's diagnostic troubleshooting codes (DTCs). The DTCs provide information about the engine's operating conditions and communicate this information via SAE J1939 to the MGC-3000 Series, eliminating the need for hand-held service tools to diagnose simple engine issues.

SPECIFICATIONS

Operating power

- Nominal: 12 or 24 VDC
- Range: 6 to 32 VDC
- Power consumption:
  - Sleep mode
  - Normal operational mode: For specific power consumption scenarios, refer to generator set manual.
  - Battery ride-through: withstands cranking ride-through down to 0 VDC for 50 ms (typical)

Current sensing (5 Amp CT inputs)

- Continuous rating: 0.1 to 7.5 Aac
- One second rating: 50 Aac
- Burden: 1 VA

Voltage sensing

- Range: 12 to 576 V rms, line-to-line
- Frequency range: 10 to 90 Hz
- Burden: 1 VA
- One second rating: 720 V rms

Input contacts

- Contact sensing inputs include one emergency stop input and 15 additional programmable inputs. The emergency stop input accepts normally closed, dry contacts. The remote emergency stop is limited to 75 ft. standard. Extended runs are available with an optional relay. All programmable inputs accept normally open, dry contacts. The factory may utilize up to three contact inputs.

Engine system inputs

- Fuel level sensing resistance range: 5 to 250 Ω nominal
- Coolant temperature sensing resistance range: 5 to 2,750 Ω nominal
- Oil pressure sensing resistance range: 5 to 250 Ω nominal
- Engine speed sensing:
  - Magnetic pickup or CANBus
    - Magnetic pickup voltage range: 3 to 35 V peak (6 to 70 V peak to peak)
    - Magnetic pickup frequency range: 32 to 10,000 Hz
  - Generator frequency (alternate or redundant)
    - Voltage range: 12 to 576 V rms

Output contacts

- (15) total programmable outputs: (3) 30 A @ 28 VDC and (12) 2 A @ 30 VDC
- The factory utilizes the following on each generator set which can be reprogrammed as needed:
  - (3) 30 A @ 28 VDC for Pre-start, start, and run
  - (12) 2 A @ 30 VDC for general purposes

SPECIFICATIONS, continued:

Metering

Generator voltage (rms)
- Metering range: 0 to 576 VAC (direct measurement); up to 9,999 VAC (with appropriate voltage transformer)
- Accuracy: ±1% of programmed rated voltage or ±2 VAC (subject to accuracy of voltage transformer when used)

Generator current (rms)
- Generator current is measured at the secondary windings of 5 A CTs.
- Metering range: 0 to 5,000 Aac
- CT primary range: 1 to 5,000 Aac in primary increments of 1 Aac
- Accuracy: ±1% of programmed rated current or ±2 Aac (subject to accuracy of CTs)

Generator frequency
- Metering range: 10 to 90 Hz
- Accuracy: ±0.25% or 0.05 Hz

Apparent power
- Indicates total kVA and individual line kVA (four-wire, line-to-neutral or three-wire, line-to-line).
- Accuracy: ±2% of the full-scale indication or ±2 kVA

Power factor
- Metering range: 0.2 leading to 0.2 lagging
- Accuracy: ±0.01

Real power
- Indicates total kW and individual line kW (four-wire, line-to-neutral or three-wire, line-to-line)
- Accuracy: ±2% of the full-scale indication or ±2 kW

Oil pressure
- Metering range: 0 to 145 psi or 0 to 1,000 kPa
- Accuracy: ±3% of actual indication or ±2 psi or ±12 kPa (subject to accuracy of sender)

Coolant temperature
- Metering range: 0 °C to 204 °C (32 °F to 410 °F)
- Accuracy: ±2% of actual indication or ±2° (subject to accuracy of sender)

Fuel level
- Metering range: 0 to 100%
- Accuracy: ±2% (subject to accuracy of sender)

Battery voltage
- Metering range: 6 to 32 VDC
- Accuracy: ±2% of actual indication or ±0.2 VDC

Engine RPM
- Metering range: 0 to 4,500 rpm
- Accuracy: ±2% of actual indication or ±2 rpm

Maintenance timer
- Maintenance timer indicates the time remaining until generator set service is due. Value is retained in non-volatile memory.
- Metering range: 0 to 5,000 h; Update interval: 6 min
- Accuracy: ±1% of actual indication or ±12 min

Generator protection functions

Overvoltage (59) and undervoltage (27)
- Pickup range: 0 to 576 VAC
- Activation delay range: 0 to 600 s

Overfrequency (81O) and underfrequency (81U)
- Pickup range: 37.5 to 66 Hz
- Pickup increment: 0.01 Hz
- Activation delay range: 0 to 600 s

Reverse and forward power (32)
- Pickup range: 0 to 200%
- Pickup increment: 0.1%
- Activation delay range: 0 to 600 s
- Activation delay increment: 0.1 s

Loss of excitation (40Q)
- Pickup range: –150 to 0%
- Pickup increment: 0.1%
- Activation delay range: 0 to 600 s
- Activation delay increment: 0.1 s

Phase voltage imbalance (47)
- Pickup range: 5 to 150 VAC
- Pickup increment: 1 VAC
- Activation delay range: 0 to 600 s
- Activation delay increment: 0.1 s

Overcurrent (51)
- Pickup range: 0.9 to 7.75 Aac (5 A current sensing)
- Time dial range: 0 to 7,200 s (fixed time curve), 0 to 9.9 (inverse curve time multiplier)
- Inverse time curves: 16: Selectable time overcurrent characteristic curves.

SPECIFICATIONS, continued:

Generator protection functions, continued:

Vector shift (78)
- Pickup range: 2 to 90°
- Pickup increment: 1°
- Accuracy: ±1°

ROCOF (81R)
- Pickup range: 0.2 to 10 Hz/s
- Pickup increment: 0.1 Hz/s
- Activation delay range: 0 to 10,000 ms
- Activation delay increment: 1 ms

Environment
- Temperature
  - Operating: -40 °C to 70 °C (-40 °F to 158 °F)
  - Storage: -40 °C to 85 °C (-40 °F to 185 °F)
- Humidity: IEC 68-2-38
- Salt fog: IEC 60068
- Ingress protection: IEC IP56 for front panel
- Shock: 15 G in 3 perpendicular planes
- Vibration: 3 to 25 Hz at 1.6 mm (0.063 in) peak amplitude
  25 to 2,000 Hz at 5 G

Agency approvals
- UL/CSA approvals: “cURus” approved to UL 6200 and CSA C22.2 No.14
- NFPA compliance: complies with NFPA Standard 110, standard for emergency and standby power
- CE marked: complies with applicable EC directives

ADDITIONAL SPECIFICATIONS

Battery backup for real time clock
The MGC-3000 Series provides a real-time clock with an internal backup battery. The battery will maintain timekeeping for approximately five years (depending on conditions) after power is removed from the controller. The clock is used by the event recorder and sequence of events functions to time-stamp events, and the exercise timer is used to start and stop the generator set when the exercise feature is utilized.

Breaker management
MGC-3000 Series units are capable of controlling the generator breaker and the mains breaker. Once it is determined that a breaker close request is valid, the MGC-3000 Series attempts to operate the breaker. The user can choose to control only the generator breaker, both breakers, or none at all. Breaker management settings can be configured using BESTCOMS*Plus*® or using the front panel interface.

Synchronizer
The MGC-3000 Series has an integrated automatic synchronizer to perform synchronization. The controller monitors the voltages, frequencies, and phase relationships of both the generator and the bus. It then sends a signal to the governor to increase or decrease the speed of the engine to match the generator frequency and phase angle to the bus frequency and phase angle. It also sends a signal to the voltage regulator to match the voltage levels. Once all of these conditions are met, the controller sends a breaker close signal to the generator circuit breaker.

There are two types of automatic synchronizers available. A phase lock type of automatic synchronizer controls the frequency of the generator and brings it into the predetermined phase angle window. When a time delay expires while in the window, the close signal is given to the generator circuit breaker. The anticipatory style of automatic synchronizer controls the slip frequency between the generator and the bus. The synchronizer calculates the timing of the closing signal to allow the generator breaker to be closed when the phase angle between the two sources is at zero degrees. This calculation takes into account the slip rate, the generator breaker closing time, and the phase angle difference.

ADDITIONAL SPECIFICATIONS, continued:

Multigen Management

Enabling sequencing on a networked group of load share units allows these units to manage load by starting and stopping appropriate units based on a factor of load demand and available capacity. The mode of operation is used to determine the order in which each generator in a group will contribute to the system's power production upon a demand start/stop request.

Modes of operation include:

- Staggered service time
- Balanced service time
- Largest size first
- Smallest size first
- Smallest unit ID

OPTIONAL ACCESSORIES

(Refer to *Configuration Options)*

Analog Extension Module 2020 (AEM–2020)

The optional AEM-2020 is a remote auxiliary device that provides additional MGC-3000 Series analog inputs and outputs. With the MGC-3000 Series, it is possible to have up to four AEM-2020s. Its features include:

- **Eight analog inputs:** The AEM-2020 provides eight analog inputs that are user-selectable for 4 to 20 mA or 0 to 10 VDC. Each analog input has under/over thresholds that can be configured as status only, alarm, or pre-alarm. When enabled, an out-of-range alarm alerts the user of an open or damaged analog input wire. The label text of each analog input is customizable.
- **Eight Resistance Temperature Detector (RTD) Inputs:** The AEM-2020 provides eight user-configurable RTD inputs for monitoring generator set temperature. Each RTD input can be configured as status only, alarm, or pre-alarm to protect against high or low temperature conditions. When enabled, an out-of-range alarm alerts the user of an open or damaged RTD input wire. The label text of each RTD input is customizable.
- **Two thermocouple inputs:** The AEM-2020 provides two thermocouple inputs for monitoring generator set temperature. Each thermocouple input can be configured as status only, alarm, or pre-alarm to protect against high or low temperature conditions. When enabled, an out-of-range alarm alerts the user of an open or damaged thermocouple input wire. The label text of each thermocouple input is customizable.
- **Four analog outputs:** The AEM-2020 provides four analog outputs that are user-selectable for 4 to 20 mA or 0 to 10 VDC. A wide selection of parameters including oil pressure, fuel level, generator voltage, and bus voltage can be configured as analog outputs. Refer to *Section 4, BESTCOMSPlus® Software* of the *MGC-3000 Series Controller Manual*, for a full list of parameter selections.
- **Communications via CANBus:** A Control Area Network (CAN) is a standard interface that enables communication between the AEM-2020 and the MGC-3000 Series.

OPTIONAL ACCESSORIES, continued

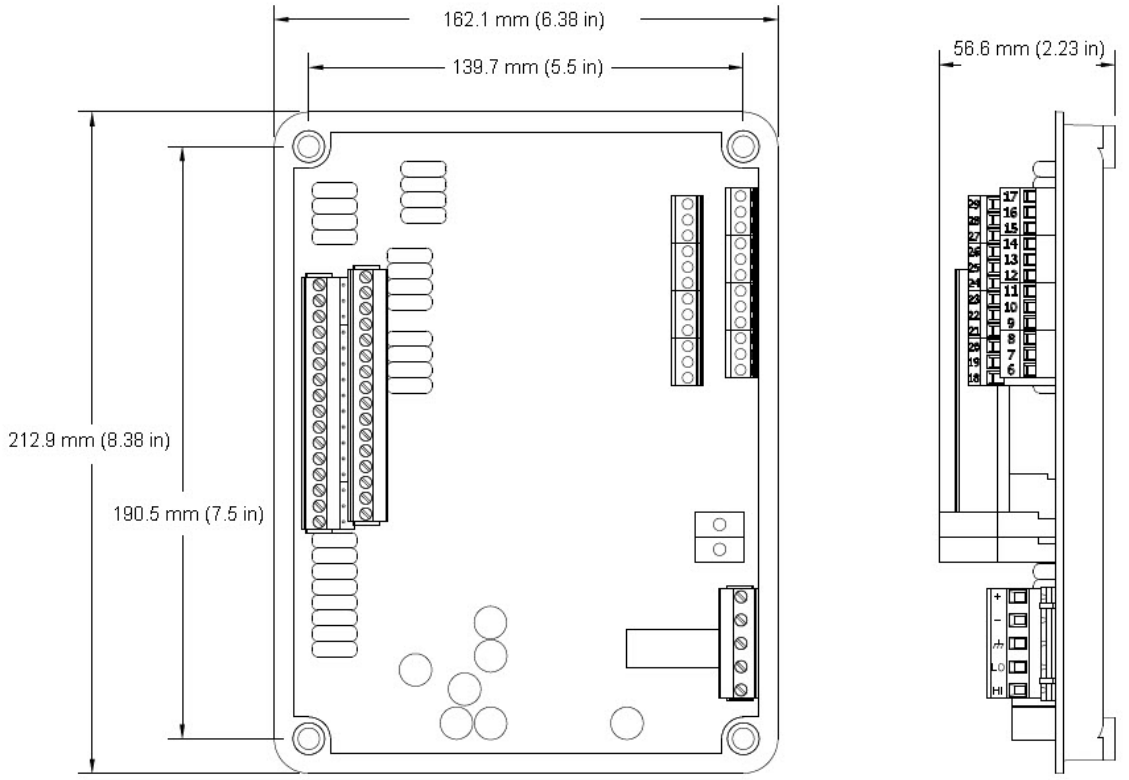


Figure 6: Input and Output Terminals

Contact Expansion Module 2020 (CEM-2020)

The CEM-2020 is a remote device that provides additional MGC-3000 Series contact inputs and outputs, giving the user flexibility to use the same model MGC-3000 Series generator set controller for simple or more complicated applications that require contact functionality or duplication of contacts for remote annunciation. With the MGC-3000 Series, it is possible to have up to four CEM-2020s. Its features include:

- **10 Contact Inputs:** The CEM-2020 provides 10 programmable contact inputs with the same functionality as the contact inputs on the MGC-3000 Series.
- **24 Contact Outputs:** The CEM-2020 provides 24 Form C programmable contact outputs with the same functionality as the output contacts on the MGC-3000 Series. The output ratings of the Form C contacts are:

Output No.	Rating (Cont.)	Additional Information
1–12	1 A @ 30 VDC	This is a gold flash contact for low current circuits.
13–24	4 A @ 30 VDC	

OPTIONAL ACCESSORIES, continued:

- **Communications via CANBus:** The CEM-2020 communicates to the MGC-Series 3000 via SAE J1939 CANBus communications and allows the user to program the functionality of these inputs and outputs in the BESTCOMS*Plus*® software.
- The user can add labels for the inputs and outputs that appear in BESTCOMS*Plus*®, on the front panel, and in programmable logic. All the functionality can be assigned to these inputs and outputs as if they were an integrated part of the MGC-3000 Series. The CEM-2020 module has all of the environmental ratings of the MGC-3000 Series, including a model for UL Class1 Div2 applications. The CEM-2020 terminals accept a maximum wire size of 12 AWG, while the chassis ground requires 12 AWG wire. Flexibility is one of the benefits of the MGC-3000 Series, and this add-on module enhances that benefit even further.

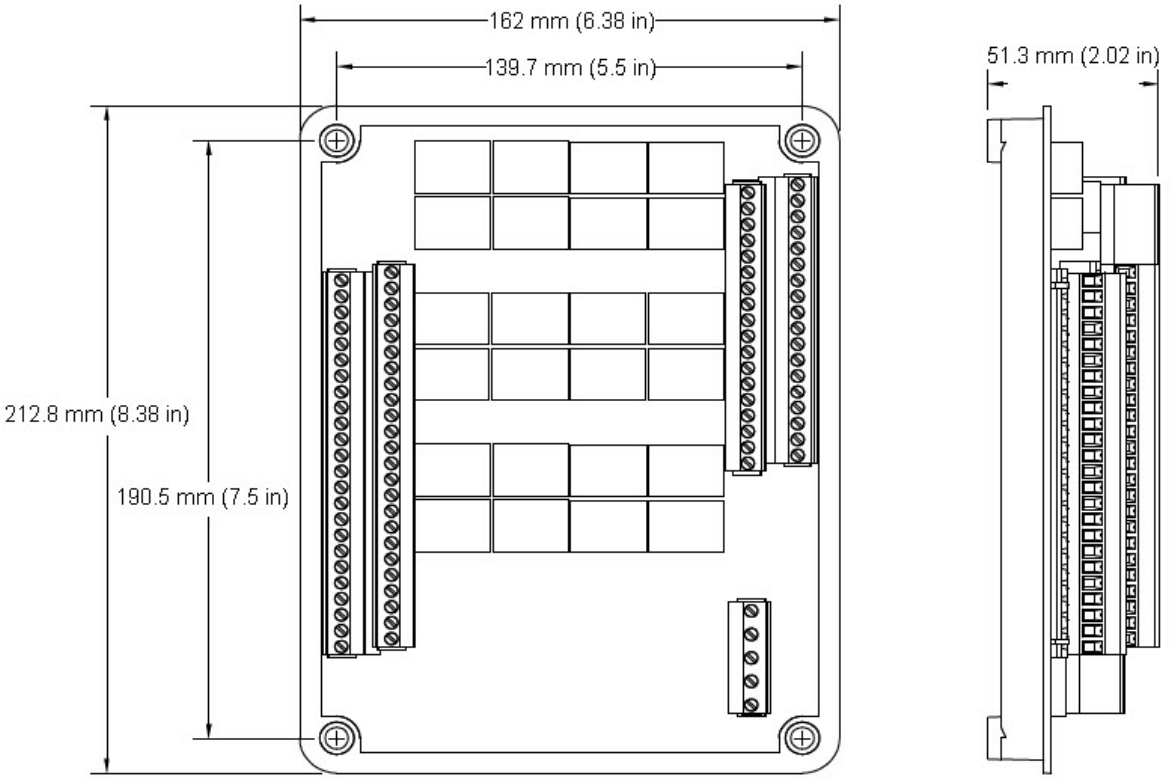


Figure 7: CEM-2020 Overall Dimensions

CONFIGURATION OPTIONS

Generator protection

	MGC-3010	MGC-3050
Standard		
Phase Imbalance (47)	✓	✓
Overcurrent (50)		
Overvoltage (59)	✓	✓
Undervoltage (27)	✓	✓
Underfrequency (81U)	✓	✓
Overfrequency (81O)	✓	✓
Reverse Power (32)	✓	✓
Loss of Excitation (40Q)	✓	✓
Enhanced		
Overcurrent (51)	✓	✓
Vector Shift (78)	✓	✓
Rate of Change of Frequency (81R)	✓	✓
Ground Fault	✓	✓

Table 2: Generator Protection

Inputs

	MGC-3010	MGC-3050
Controller		
Digital	16	16
Analog (Dedicated)	3	3
Analog	2	2
CEM		
Digital	4x10	4x10
AEM		
Analog	4x8	4x8
TC	4x2	4x2
RTD	4x8	4x8

Table 3: Inputs

Outputs

	MGC-3010	MGC-3050
Controller		
Digital Form A, 30 Amp	3	3
Digital Form A, 5 Amp	-	-
Digital Form A, 2 Amp	12	12
Analog	2	2
CEM		
Digital Form C, 4 Amp	4x12	4x12
Digital Form C, 1 Amp	4x12	4x12
AEM		
Analog	4x4	4x4
External to Controllers (CEM)		
Digital Form C, 10 Amp (Interposing Relay)	10	10

Table 4: Outputs

Communication

	MGC-3010	MGC-3050
ModBus RTU (RS-485)	✓	✓
ModBus TCP-IP	✓	✓
RDP-110	✓	✓
CANBus	✓	✓
Modem Interface (RS-232)	✓	✓
Ethernet	✓	✓

Table 5: Communication

Metering

	MGC-3010	MGC-3050
Bus 1 Voltage		
Single Phase	✓	✓
Three Phase	✓	✓
Bus 2 Voltage		
Single Phase		✓
Three Phase		✓
Current Transformers		
Generator	3	3
Auxiliary	1	4

Table 6: Metering

Subject to change. | WT00032341 | 2021-03

Remote Display Panel Data Sheet

RDP-110C Annunciator

DESCRIPTION

The RDP-110C is a remote annunciation device used in conjunction with digital generator set controllers to provide remote annunciation of the emergency standby generator system. This panel allows for two programmable alarms, two programmable pre-alarms, and is compatible with NFPA 110. The digital generator set controller detects an alarm or pre-alarm condition and communicates via RS-485 to the RDP-110C. The RDP-110C is available with a universal configuration that can be surface- or semi-flush-mounted.

Image for illustration purposes only.
Refer to dimensional drawings on page 3.

HIGHLIGHTS

- Annunciation of eight alarms and seven pre-alarms as detected by the digital generator set controller
- Four programmable LEDs via BESTlogic™ *Plus*
- RS-485 communications reduces the number of interconnection wires to four
- Interconnect distance up to 1,219 m (4,000 ft)
- UL Listed
- CSA Certified

STANDARD FEATURES

- Eight LED alarms
  - Low coolant level
  - Low oil pressure
  - Engine overspeed
  - Fuel leak*
  - High coolant temperature
  - Engine overcrank
  - Emergency stop activated
  - Sender failure*
- Seven LED Pre-Alarms
  - High coolant temperature
  - Low oil pressure
  - Battery overvoltage*
  - Battery charger failure*
  - Low coolant temperature
  - Low fuel level
  - Weak battery
- Three LED operating conditions
  - Switch not in auto
  - EPS supplying load
  - Display panel on
- Audible alarm horn rated at 90 dB (from a distance of two feet)
- Lamp test and alarm silence
- Power supply inputs for 12 VDC or 24 VDC
- Surface- or semi-flush-mounted
- Conduit box included
- Designed for use in harsh environments
- Interconnect distance up to 1,219 m (4,000 ft)
- UL Listed
- CSA Certified

* Pre-configured, but can be reprogrammed and relabeled to match the function of the indicator.

SPECIFICATIONS

Ordering Information

mtu part number: X00A30900392

Power Input

— DC voltage: 8 to 32 VDC (2W)

Environmental and Physical

— Operating temperature: -40 °C to 70 °C (-40 °F to 158 °F)
— Storage temperature: -40 °C to 85 °C (-40 °F to 185 °F)
— Salt fog: qualified to ASTM 117B-1989
— Vibration: The device withstands 2 g in each of the three mutually perpendicular planes, swept over the range of 10 to 500 Hz for a total of six sweeps, 15 minutes each sweep, without structural damage or degradation of performance.
— Shock: 15 g
— Weight: 1.04 kg (2.3 lb)

Agency Approvals

— NFPA 110 Level 1 compliant
— UL Listed to UL 6200, file E97035
— CSA Certified to CSA C22.2 No. 14, file LR 23131

Connections

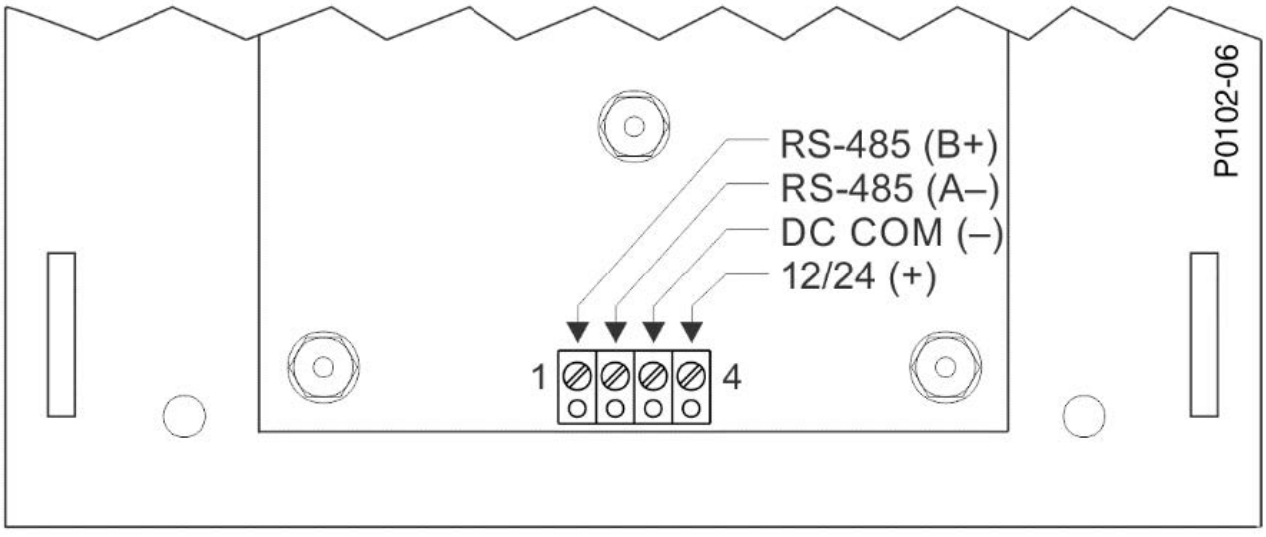


Figure 1: RDP-110C Circuit Board Connections

DIMENSIONS

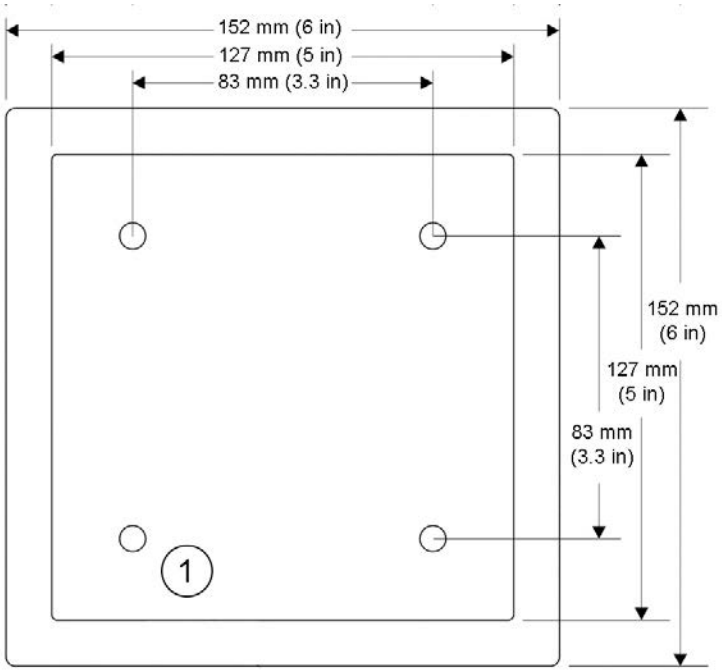


Figure 2: RDP-110C Mounting Dimensions (Rear Panel)

1. Mounting hole diameter (4 places, on rear wall of enclosure) is 7 mm (0.281 in).

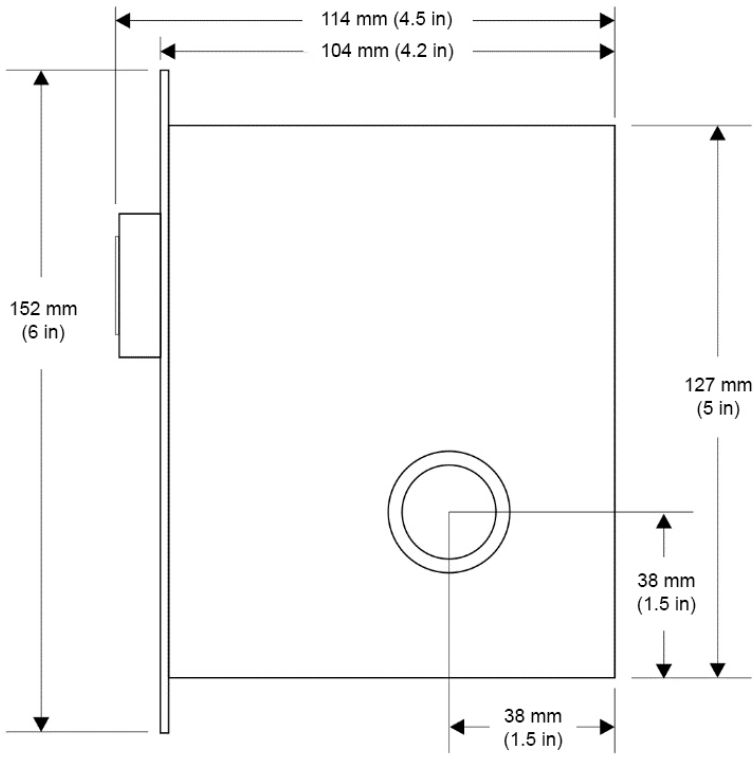


Figure 3: RDP-110C Mounting Dimensions and Knockout Locations (Left Side)

PANEL DISPLAY

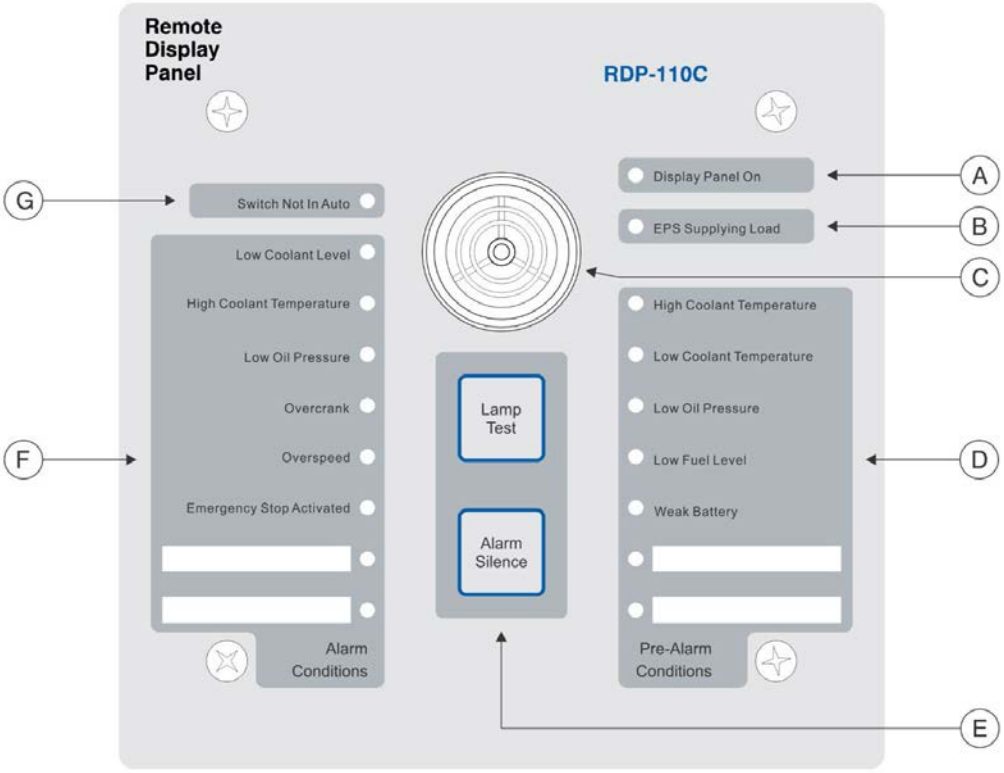


Figure 4: RDP-110C Front Panel Controls and Indicators

A. Green LED lights when power is applied to the RDP-110C.
B. Green LED lights when the generator set is supplying more than 2% of rated load.
C. The horn sounds when an alarm or pre-alarm exists or the connected digital generator set controller is not operating in Auto mode.
D. Amber Pre-Alarm LEDs light when the corresponding pre-alarm setting is exceeded.
E. RDP-110C controls consist of two push-buttons. The Alarm Silence pushbutton silences the horn. The Lamp Test push-button can be used to verify operation of all RDP-110C LEDs and the horn.
F. Red Alarm LEDs light when the corresponding alarm setting is exceeded.
G. Red LED lights when the digital generator set controller is not operating in Auto mode.

Remote Emergency Stop Pushbutton Data Sheet

DESCRIPTION

The remote emergency stop pushbutton provides an added level of safety for generator set shutdown. This sturdy, self-latching mushroom button is assembled in a rugged, handy box.

When the button is in its normal state (released and indicator is green), the contacts are closed. Pressing the button opens the contact, which de-energizes the downstream relay coils.

This action communicates with the generator set controller and/or the ECU to initiate an emergency shutdown. Once actuated, the pushbutton must be manually released (twist-to-release) before the generator set controller alarm can be cleared.

FEATURES

- Heavy-duty steel enclosure
- Self-monitoring contact block opens circuit if detached from the actuator
- 45 mm (1.77 in) mushroom button with mechanical indicator
- Pre-assembled

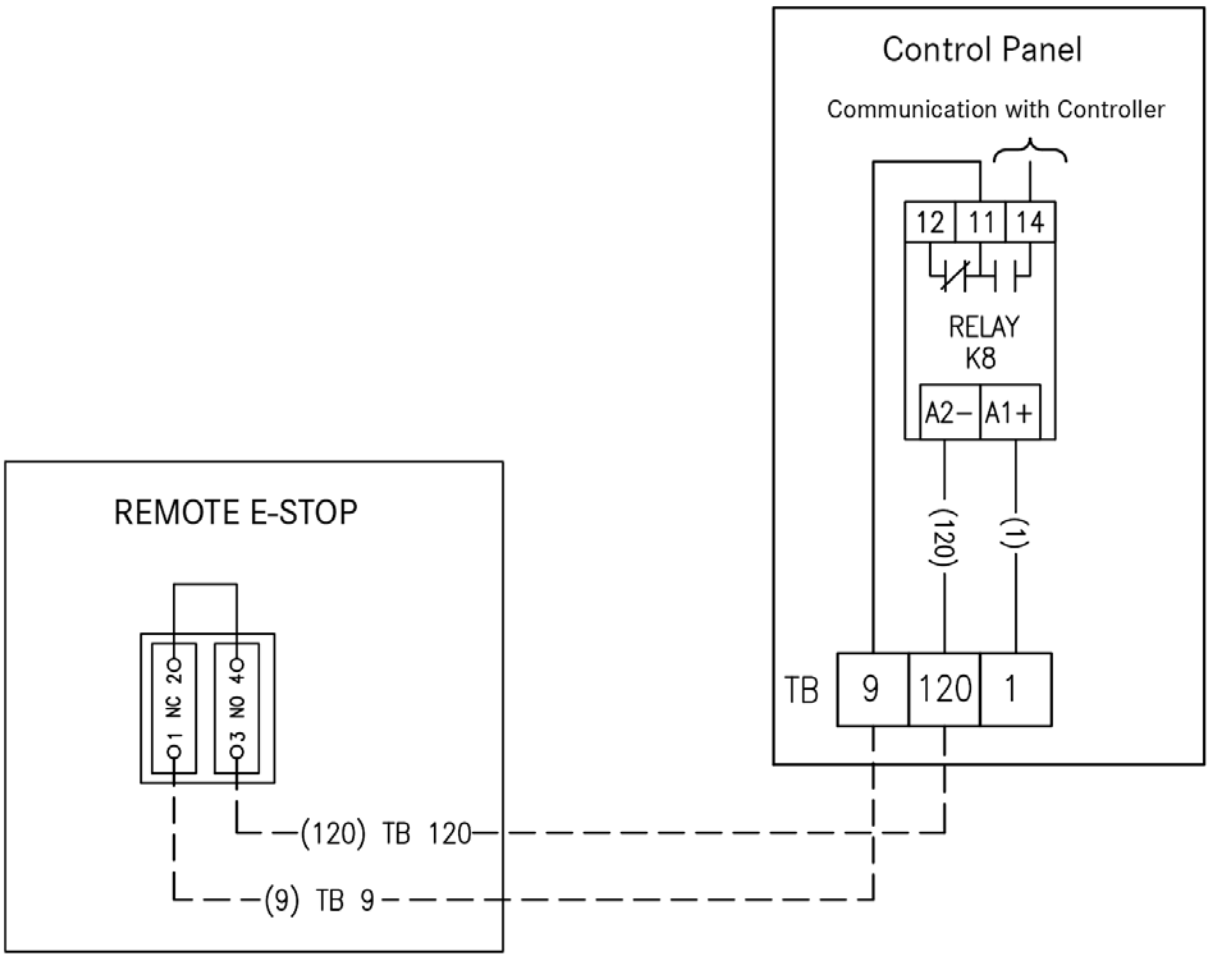
SPECIFICATIONS

- ***mtu*** Part #: SUASA150340
- Enclosure Dimensions:
  - Length: 152.4 mm (6 in)
  - Width: 152.4 mm (6 in)
  - Height: 101.6 mm (4 in)
- Pushbutton Actuator Dimensions:
  - Diameter (Ø): 45 mm (1.77 in)
  - Length: 48 mm (1.89 in)
- Weight: 1.36 kg (3 lbs)
- Enclosure Type: Surface-mount, Type 1 (IP 20 equivalent)
- Contact Configuration:1 N.C. (Normally Closed)
- Terminal Type: Screw clamp
- Wire Range: 4-20 AWG stranded, 14-18 AWG solid
- Approvals:
  - Switch: UL Listed, CSA Certified, CE Marking, IEC 60947-5-1
  - Enclosure: UL Listed, CSA Certified
- Electrical Ratings for ***mtu*** generator set:
  - 12 VDC or 24 VDC
  - 1 Amp

CERTIFICATIONS AND STANDARDS

- Switch: UL Listed, CSA Certified, CE Marking, IEC 60947-5-1
- Enclosure: UL Listed, CSA Certified

DIAGRAM



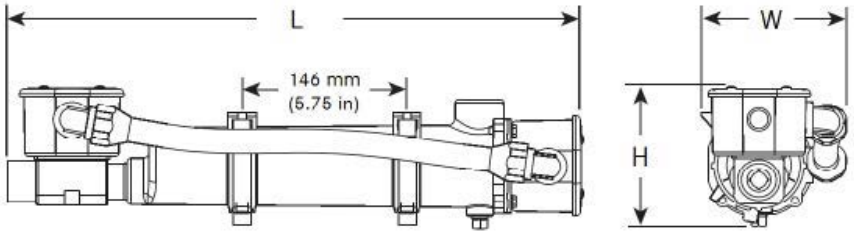
Electrical Schematic

Water Heater Data Sheet

CB, CL, and WL Series

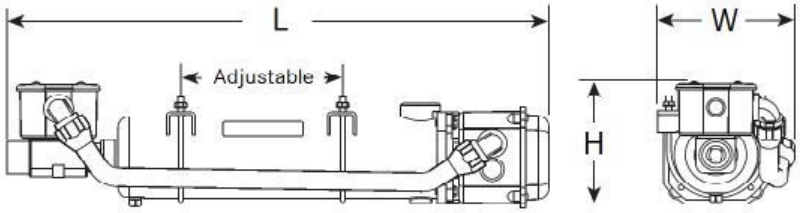
The CB, CL, and WL tank-style engine heaters are designed to preheat diesel and gas engines in generator set applications. With easy start-up regardless of ambient temperature, they feature a built-in thermostat and heat engines from 6L to 25L displacement. Thermosiphon circulation of the coolant delivers heat throughout the entire engine for optimum performance.

CB Model with Thermostat



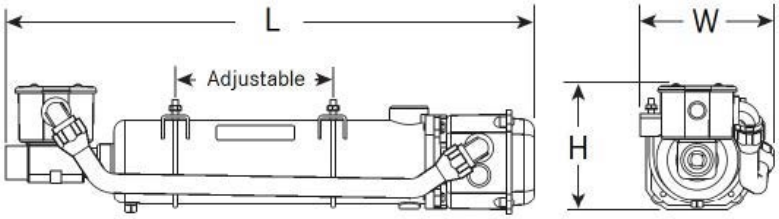
CB Model

CL Model with Thermostat



CL Model

WL Model with Thermostat



WL Model

CERTIFICATIONS AND STANDARDS

- CB and CL Models: c-UL-us Listed, CSA Certified, and CE Compliant
- WL Model: CE Compliant

SPECIFICATIONS

	CB Model	CL Model	WL Model
Height:	132 mm (5.2 in)	147 mm (5.8 in)	147 mm (5.8 in)
Length:	510 mm (20.1 in)	597 mm (23.5 in)	597 mm (23.5 in)
Width:	129 mm (5.1 in)	158 mm (6.2 in)	158 mm (6.2 in)
Weight:	3 kg (6.9 lb)	4.5 kg (10 lb)	4.5 kg (10 lb)

SPECIFICATIONS, continued

- Heating Fluid: Engine coolant (50% glycol/50% water)
- Power: 1.5, 2, 2.5, 3, 4, and 5 kW
- Rated Voltage: 120V – 575V
- Phase: 1 and 3
- Enclosure: IP44
- Fluid Capacity:
  - CL and WL Models: 2 L (0.5 gal)
  - CB Models: 1.2 L (0.3 gal)
- Max Pressure: 8.61 bar (125 psi)
- Inlet / Outlet: 1" NPT Male / 1" NPT Female
- Thermostat Range:
  - On: 38 °C (100 °F)
  - Off: 49 °C (120 °F)

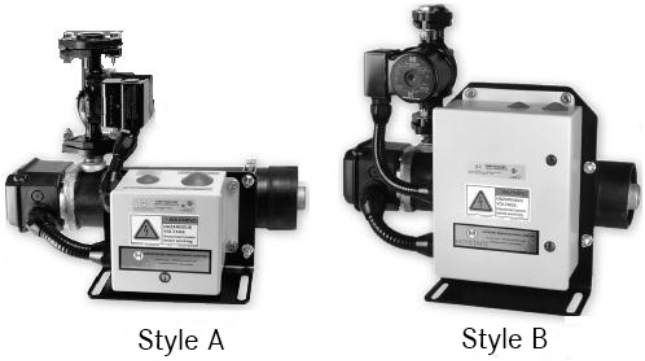
Model Number	*mtu* Part Number	Watts	Volts	Phase	Hz	Amps
CB115410-200	SUA98952	1,500	480	1	60	3.1
CB120210-200	SUA98996	2,000	240	1	60	8.3
CB120410-200	SUA98953	2,000	480	1	60	4.2
CB120810-200	SUA98404	2,000	208	1	60	9.6
CB125210-200	SUA96723	2,500	240	1	60	10.4
CB125410-200	SUA90334	2,500	480	1	60	5.2
CB125810-200	SUA96727	2,500	208	1	60	12
CL130410-200	SUA97791	3,000	480	1	60	6.3
CL140210-200	SUA99109	4,000	240	1	60	16.7
CL140410-200	SUA52741	4,000	480	1	60	8.3
CL140810-200	SUA99110	4,000	208	1	60	19.2
CL150210-200	SUA98913	5,000	240	1	60	20.8
CL150212-200	SUA82416	5000	240	1	60	20.8
CL150412-200	SUA83334	5000	480	1	60	10.4
CL150810-200	SUA96725	5,000	208	1	60	24
WL325410-200	SUA96568	2,500	480	3	60	3
WL325810-200	SUA97254	2,500	208	3	60	6.9
WL340410-200	SUA96787	4,000	480	3	60	4.8
WL340810-200	SUA99286	4,000	208	3	60	11.1
WL350410-200	SUA98951	5,000	480	3	60	6
WL350810-200	SUA92800	5,000	208	3	60	13.9

Water Heater Data Sheet

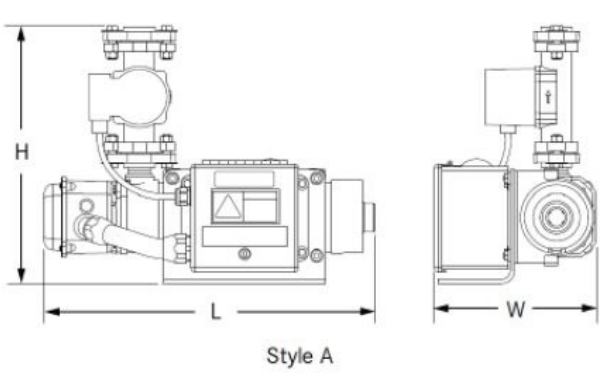
CSM Series

DESCRIPTION

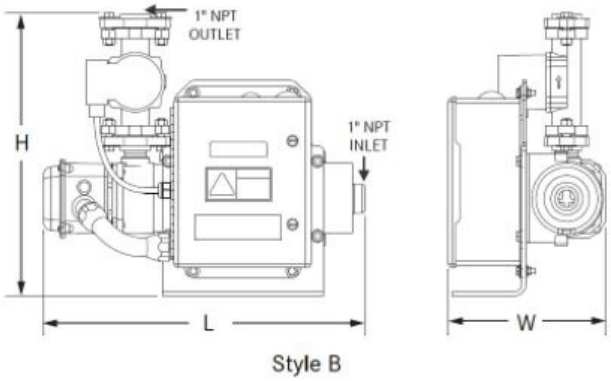
The CSM model is designed to preheat diesel and gas engines in generator set applications. The CSM heating system features a coolant preheater with thermostat, heating engines ranging in size from 15L to 100L displacement, pump, and all required controls. Forced circulation of the coolant delivers uniform heating throughout the entire engine, extends element life, and offers a significant reduction in electrical consumption.



Style A Style B



Style A



Style B

CERTIFICATIONS AND STANDARDS

— c-UL-us Listed (60 Hz)
— CE Compliant (Style B)

SPECIFICATIONS

	Style A	Style B
Height:	383 mm (15 in)	434 mm (17 in)
Length:	493 mm (19.4 in)	493 mm (19.4 in)
Width:	242 mm (9.5 in)	242 mm (9.5 in)
Weight:	16.8 kg (37 lb)	24.5 kg (54 lb)

Heating Fluid:	Engine coolant (50% glycol/50% water)
Power:	3, 6, 9, 10.5, and 12 kW
Rated Voltage:	1 or 3 Phase, 120-690V (50 or 60 Hz)
Fixed Thermostat:	38-49 °C (100-120 °F)

A Rolls-Royce solution

SPECIFICATIONS, continued

Flow:	2.2 m^3/hr (10 gpm) at 3 mWc (10 ft/head)
Max Pressure:	860 kPa (125 psi)
Pressure Loss:	1.5 kPa (0.2 psi)
Inlet / Outlet:	1" NPT / 1" NPT
Main Control Box	
Ingress Protection:	NEMA 4 (IP66)
Motor Ingress Protection:	IP44 (50 Hz), NEMA 2 (60 Hz)

Model Number	*mtu* Part Number	Watts	Volts	Phase	Hz	Amps	Style
CSM10302-000	SUA95187	3,000	240	1	60	13.1	A
CSM10308-000	SUA85631	3,000	208	1	60	15.1	A
CSM1060C-000	SUA85778	6,000	220	1	50	26	A
CSM10602-000	SUA85269	6,000	240	1	60	25.6	A
CSM10604-000	SUA87941	6,000	480	1	60	12.8	B
CSM10608-000	SUA86669	6,000	208	1	60	29.6	A
CSM1090C-000	SUA101813	9,000	220	1	50	41.5	A
CSM10902-000	SUA86156	9,000	240	1	60	38.1	A
CSM10904-000	SUA85170	9,000	480	1	60	19.1	B
CSM10908-000	SUA86157	9,000	208	1	60	44	A
CSM11058-000	X52830700001	10,500	208	1	60	51.2	B
CSM11202-000	SUA86158	12,000	240	1	60	50.6	B
CSM11204-000	SUA87538	12,000	480	1	60	25.3	B
CSM11208-000	SUA84406	12,000	208	1	60	58.4	B
CSM3060A-000	SUA88779	6,000	400	3	50	8.9	B
CSM30604-000	SUA88350	6,000	480	3	60	7.4	B
CSM30608-000	SUA88168	6,000	208	3	60	17.1	B
CSM3090A-000	SUA106952	9,000	400	3	50	13.2	B
CSM30904-000	SUA85254	9,000	480	3	60	11	B
CSM30908-000	SUA87710	9,000	208	3	60	25.4	B
CSM31204-000	SUA90111	12,000	480	3	60	14.6	B
CSM31208-000	SUA88155	12,000	208	3	60	33.7	B

Water Heater Data Sheet

TPS Series

DESCRIPTION

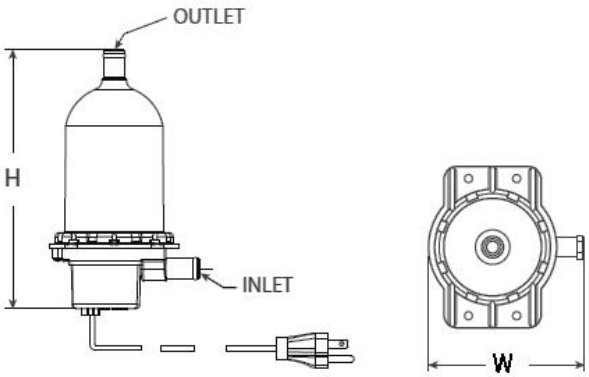
The TPS engine preheater is designed to preheat diesel and gas engines in generator set applications. Simple to install and very lightweight, the TPS engine preheater features a built-in thermostat and heats engines with up to 12 L displacement. Thermosiphon circulation of the coolant delivers heat throughout the entire engine.

CERTIFICATIONS AND STANDARDS

— c-UL-us Listed
— CE Compliant

SPECIFICATIONS

Height:	200 mm (7.9 in)
Width:	117 mm (4.6 in)
Weight:	771 g (1.7 lb)
Heating fluid:	Engine coolant (50% glycol/50% water)
Power:	0.5, 1, 1.5, 1.8, and 2 kW
Voltage range:	120 to 240 V
Tank material:	Polyphenylene sulfide (PPS)
Heating element:	Incoloy 800
Enclosure:	IP41
Fluid capacity:	416 cm^3 (0.11 gal)
Max pressure:	6.2 bar (90 psi)
Inlet / outlet:	15.9 mm (0.625 in)
Thermostat range:	
On	38 °C (100 °F)
Off	49 °C (120 °F)



Model Number	*mtu* Part Number	Watts	Volts	Phase	Hz	Amps
TPS051GT10-000	SUA90366	500	120	1	60	4.2
TPS101GT10-000	SUA52746	1,000	120	1	60	8.4
TPS151GT10-000	SUA52748	1,500	120	1	60	12.5
TPS181GT10-000	SUA52750	1,800	120	1	60	15
TPS202GT10-000	SUA52751	2,000	240	1	60	8.3

Subject to change. | WT00032343 | 2021-04

A Rolls-Royce solution

Distribution Panel Data Sheet

100 A, 1 PH, Type 1 Enclosure, 30–200 kW Diesel / 30–125 kW Gas

DESCRIPTION

The distribution panel provides a single-point connection from a main load center to factory-installed accessories. This is an optional accessory for 30–200 kW diesel and 30–125 kW gas generator sets.*

FEATURES

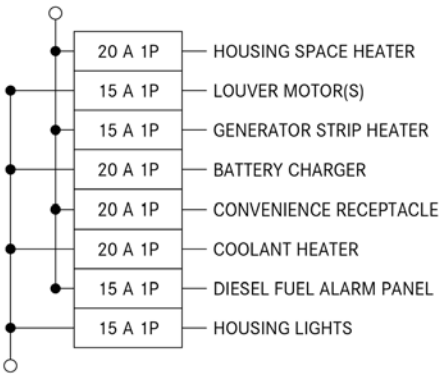
- Flush-mount cover with door
- Automatic flush adjustment
- Corrosion-resistant baked enamel finish

SPECIFICATIONS

- Ampere rating: 100 A
- Factory installed main lugs
- Maximum number of single pole circuits:
  - 8 using standard circuit breakers
  - 16 using tandem circuit breakers
- Voltage rating: 120/240 VAC, 1-phase, 3 wire
- Environmental rating: Type 1 Enclosure
- Bus material: tin-plated aluminum
- Short circuit current rating: 10 kA
- Main lug wire size: #4 to 1 AWG (Al/Cu)
- All lugs suitable for 75 °C (167 °F) copper or aluminum wires
- Dimensions:
  - Height: 317 mm (12.46 in)
  - Width: 226 mm (8.88 in)
  - Depth: 97 mm (3.8 in)

CERTIFICATIONS AND STANDARDS

- UL Listed
- CSA Certified



Distribution Panel Diagram †

NOTE:

* Also available for other applications. Contact your ***mtu*** Account Manager.

† Diagram shows typical wiring configuration with all options included. Unused circuit breakers will be labeled as spare.

Subject to change. | WT00038238 | 2021-09

Distribution Panel Data Sheet

125 A, 1 PH, NEMA 3R, 210–600 kW Diesel

DESCRIPTION

The distribution panel provides a single-point connection from a main load center to factory-installed accessories. This is an optional accessory for 210–600 kW diesel generator sets.*

FEATURES

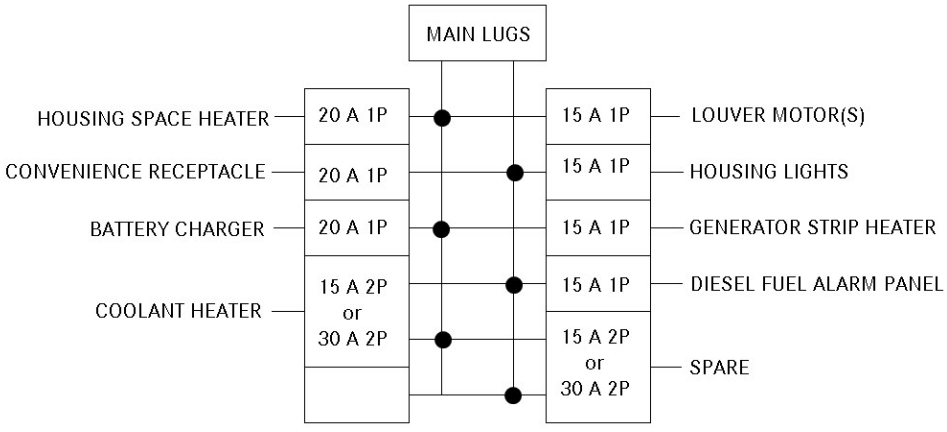
- Surface-mount cover
- Corrosion-resistant galvanized enclosure with baked enamel finish

SPECIFICATIONS

- Ampere rating: 125 A
- Factory-installed main lugs
- Single pole circuits:
  - 1 in THQL 1P spaces (qty. 12)
- Voltage rating: 120/240 VAC, 1-phase, 3 wire
- Environmental rating: NEMA 3R outdoor rated
- Bus material: copper
- Short circuit current rating: 22 kW
- Dimensions:
  - Height: 546.1 mm (21.5 in)
  - Width: 330.2 mm (13 in)
  - Depth: 127 mm (5 in)

CERTIFICATIONS AND STANDARDS

- UL Listed or CSA Certified, depending on system configuration



Distribution Panel Diagram †

NOTE:

* Also available for other applications. Contact your ***mtu*** Account Manager.

† Diagram shows typical wiring configuration with all options included. Unused circuit breakers will be labeled as spare.

Subject to change. | WT00043039 | 2021-09

Distribution Panel Data Sheet

150 A, 3 PH, NEMA 3R, 750–1,250 kW Diesel

DESCRIPTION

The distribution panel provides a single-point connection from a main load center to factory-installed accessories. This is an optional accessory for 750–1,250 kW diesel generator sets.*

FEATURES

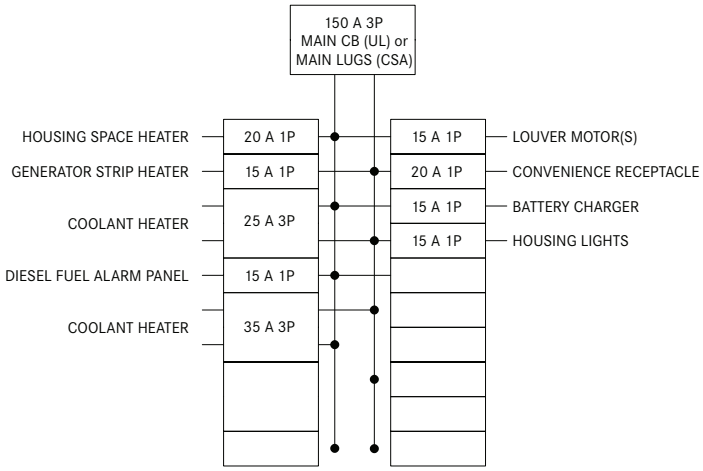
— Surface-mount cover
— Corrosion-resistant galvanized enclosure with baked enamel finish cover

SPECIFICATIONS

— Ampere rating: 150 A
— Factory-installed main circuit breaker (UL) or main lugs (CSA) and equipment ground kit
— Single-pole circuits
  - 1 in THQL 1P spaces (qty. 24)
— Voltage rating: 208Y/120 VAC, 3-phase, 4 wire
— Environmental rating: NEMA 3R outdoor rated enclosure
— Bus material: copper
— Short circuit current rating: 22 kA
— Dimensions:
  - Height: 830.6 mm (32.7 in) or 678.2 mm (26.7 in)
  - Width: 317.5 mm (12.5 in)
  - Depth: 116.8 mm (4.6 in)

CERTIFICATIONS AND STANDARDS

— UL Listed or CSA Certified, depending on system configuration



Distribution Panel Diagram †

NOTE:

* Also available for other applications. Contact your ***mtu*** Account Manager.

† Diagram shows typical wiring configuration with all options included. Unused circuit breakers will be labeled as spare.

Subject to change. | WT00037878 | 2021-10

Distribution Panel Data Sheet

200 A, 1 PH, NEMA 3R, 750–1,250 kW Diesel

DESCRIPTION

The distribution panel provides a single-point connection from a main load center to factory-installed accessories. This is an optional accessory for 750–1,250 kW diesel generator sets.*

FEATURES

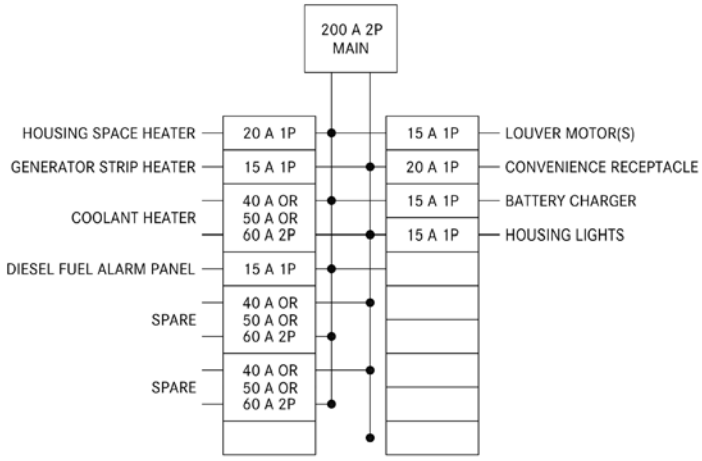
— Surface-mount cover
— Corrosion-resistant galvanized enclosure with baked enamel finish cover

SPECIFICATIONS

— Ampere rating: 200 A
— Factory-installed main circuit breaker and equipment ground kit
— Single-pole circuits
  - 1 in THQL 1P Spaces (qty. 20)
— Voltage rating: 120/240 VAC, 1-phase, 3 wire
— Environmental rating: NEMA 3R outdoor rated enclosure
— Bus material: copper
— Short circuit current rating: 22 kA
— Dimensions:
  - Height: 830.6 mm (32.7 in)
  - Width: 317.5 mm (12.5 in)
  - Depth: 116.8 mm (4.6 in)

CERTIFICATIONS AND STANDARDS

— UL Listed or CSA Certified, depending on system configuration



Distribution Panel Diagram †

NOTE:

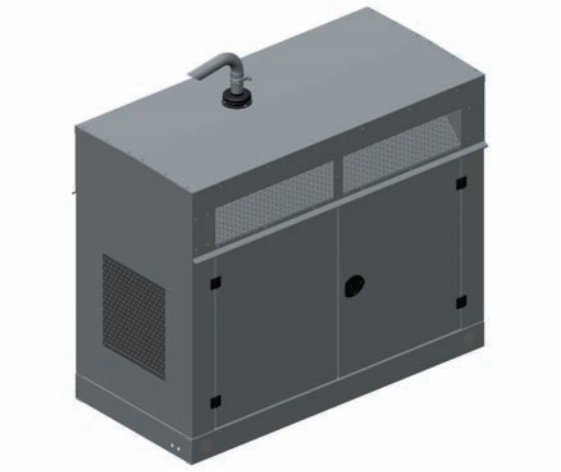
* Also available for other applications. Contact your ***mtu*** Account Manager.

† Diagram shows typical wiring configuration with all options included. Unused circuit breakers will be labeled as spare.

Enclosure and Sound Data Sheet - Diesel, Infinite Exhaust

60 Hz: 30-60 kW Standby / 27-55 kW Prime

50 Hz: 34-55 kVA Standby / 30-50 kVA Prime



Level 1 Enclosure (pictured)*

Level 3 Enclosure (pictured)*

Enclosure Level Identification	
Level 1	Basic weather-protective enclosure constructed of heavy gauge steel or aluminum with fixed stormproof panels designed for 195 mph wind load rating. Skid-mounted enclosure consists of a bolted and welded construction with unit-mounted internal silencer. Hinged, lockable double-door access on both sides of the enclosure.
Level 2	Enhanced weather-protective enclosure constructed of heavy gauge steel or aluminum with fixed stormproof panels designed for 195 mph wind load rating. Skid-mounted enclosure consists of a bolted and welded construction with unit-mounted internal silencer. Hinged, lockable double-door access on both sides of enclosure. UL 94 HF-1 compliant, 1.5" thick sound attenuated foam insulation installed inside enclosure walls where applicable.
Level 3	Level 2 enclosure with air exhaust scoop with UL 94 HF-1 compliant, 1.5" thick sound attenuated foam insulation installed where applicable.

CERTIFICATIONS AND STANDARDS

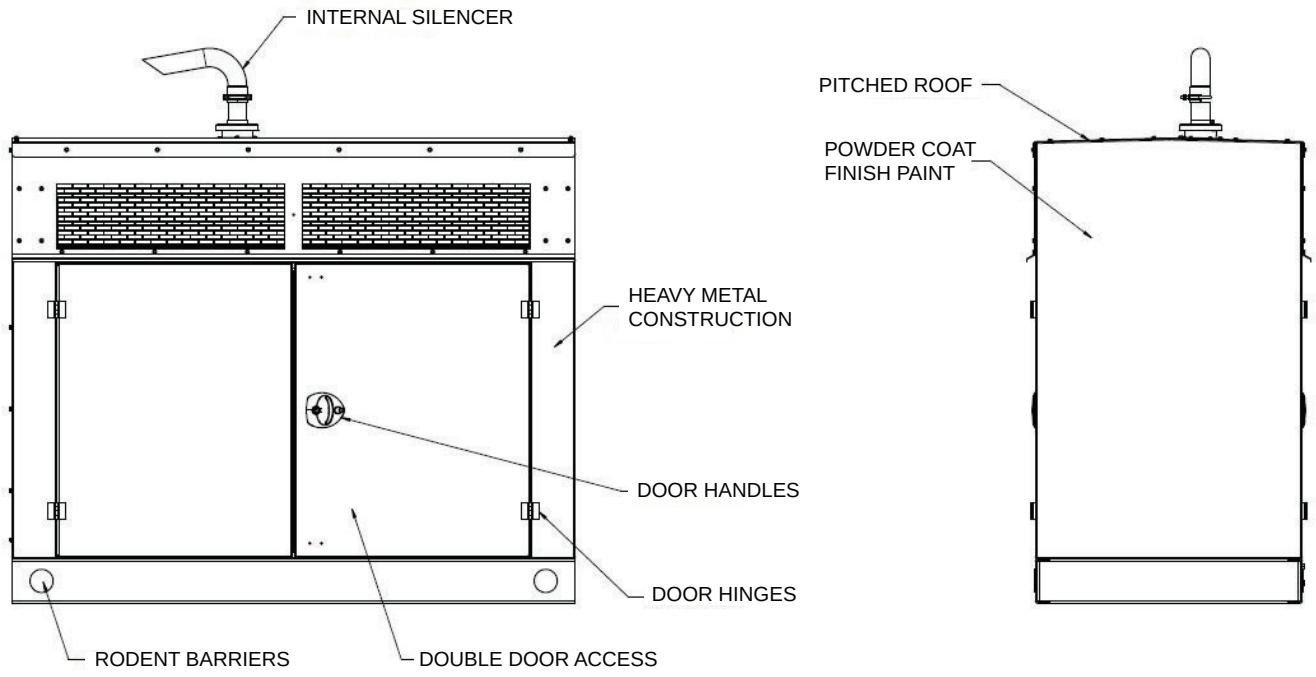
- UL 2200
- CSA C22.2 No. 100
- CSA C22.2 No. 14
- High Velocity Hurricane Zone (HVHZ)
  - Miami Dade NOA
- Florida Building Code
- IBC Wind

A Rolls-Royce solution

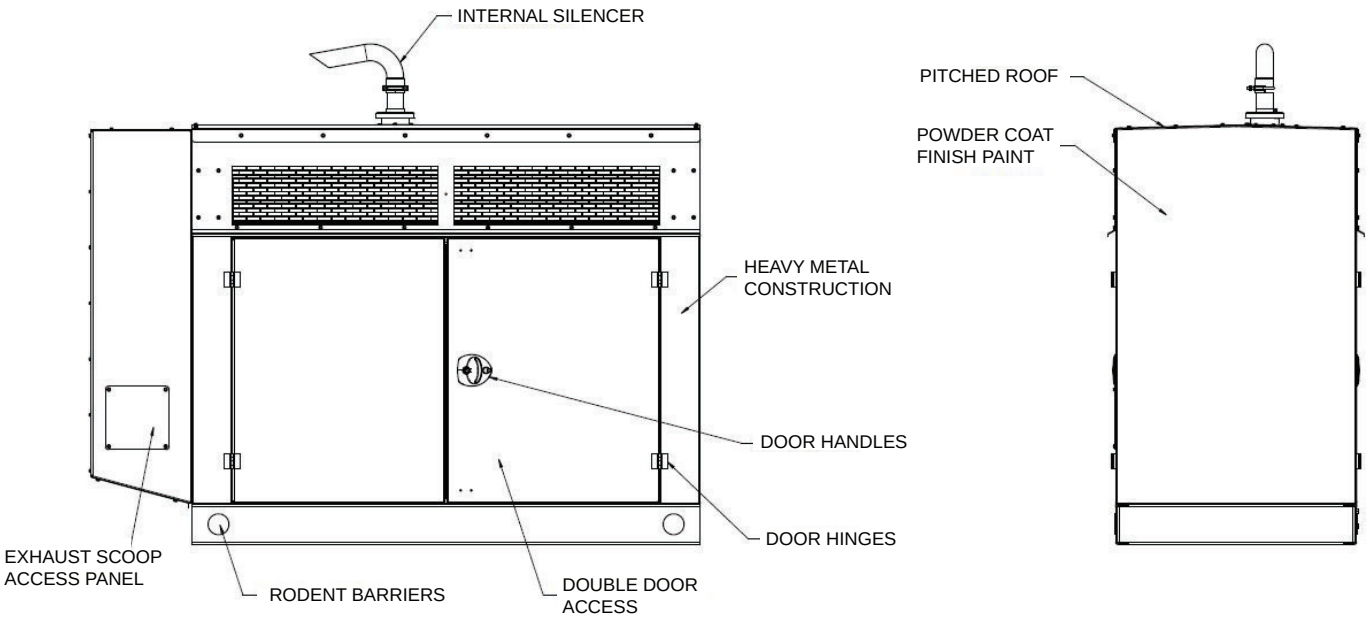
Enclosure and Sound Data Sheet - Diesel, Infinite Exhaust
60 Hz: 30-60 kW Standby / 27-55 kW Prime
50 Hz: 34-55 kVA Standby / 30-50 kVA Prime

STANDARD FEATURES FOR ALL LEVELS

- Heavy material construction
  - Steel enclosure: 1.9 mm (0.075 in) - 14 gauge or greater thickness
  - Aluminum enclosure: 2.3 mm (0.09 in) or greater thickness
- 195 mph wind rating
- Service access
  - Double door access gives ease of service to all components
- Pitched roof
- Rain collar
- Rodent barriers
- Exhaust scoop access panel and drain
- Hardware
  - Powder coated hinges with stainless steel pins
  - Key-lockable and pad-lockable powder coated door handles
- Powder coat finish paint: RAL 7001 Silver Grey standard
  - Custom colors available upon request
- Internal silencer
  - Internally-insulated space saver design
  - Level 1: Industrial Grade
  - Level 2/3: Hospital Grade



Level 1 Enclosure (pictured)*



Level 3 Enclosure (pictured)*

OPTIONAL FEATURES (LEVEL 2 AND LEVEL 3 ONLY)

- Door restraints
- LED light package
- Gravity exhaust louvers
- Distribution panel
- Enclosure space heater
- Motorized intake louvers
- For other custom options, please consult factory.

OPTIONAL HIGH VELOCITY HURRICANE ZONE (HVHZ) ENCLOSURE

- TAS 201-94 (impact test procedures)
  - Level E = 9 lbs at 80 ft/sec
- TAS 202-94 (static air pressure)
  - Static testing up to 153 pounds per sqare foot (psf)
- TAS 203-94 (cyclic pressure loading)
  - Cyclical tests up to ±126 psf over 671 cycles
- ASTM E72-15 (racking strength test)
- Simulated 195 mph wind at Exposure D
- Meets Florida Building Code (FBC) Section 1626 requirements

Enclosure and Sound Data Sheet - Diesel, Infinite Exhaust
60 Hz: 30-60 kW Standby / 27-55 kW Prime
50 Hz: 34-55 kVA Standby / 30-50 kVA Prime

ENGINE EXHAUST SOUND RATINGS dB(A) AT 1 METER
OPU SOUND RATINGS dB(A) AT 1 METER
ENCLOSURE SOUND RATINGS dB(A) AT 7 METERS

			1 Meter		7 Meters		
Application	**Model**	**Power Node**	**Engine Exhaust[1]**	**OPU**	**Level 1**	**Level 2**	**Level 3**
60 Hz Standby	***mtu*** 3R0096 DS30	30 kW	101.6	84.1	C/F	67	63.8
	mtu 4R0113 DS40	40 kW	105.1	91.6	78.2	73.6	65.1
	mtu 4R0113 DS50	50 kW	105.1	91.6	78.2	71.9	64.7
	mtu 4R0113 DS60	60 kW	107	87.6	76.8	71.1	67.8
Application	**Model**	**Power Node**	**Engine Exhaust[1]**	**OPU**	**Level 1**	**Level 2**	**Level 3**
60 Hz Prime	***mtu*** 3R0096 DS30	27 kW	92.1	82.6	C/F	68.2	64.3
	mtu 4R0113 DS40	40 kW	104.3	89.3	76.2	71.9	62.8
	mtu 4R0113 DS50	45 kW	104.3	89.3	76.2	70.4	62.6
	mtu 4R0113 DS60	55 kW	103.7	88.4	76.7	70.8	67.4
Application	**Model**	**Power Node**	**Engine Exhaust[1]**	**OPU**	**Level 1**	**Level 2**	**Level 3**
50 Hz Standby	***mtu*** 3R0096 DS34	34 kVA	96.9	78.6	70.5	64.8	64.5
	mtu 4R0113 DS44	44 kVA	93.3	89.3	76.2	70.4	62.6
	mtu 4R0113 DS55	55 kVA	104.5	88.9	74.4	68.2	65.7
Application	**Model**	**Power Node**	**Engine Exhaust[1]**	**OPU**	**Level 1**	**Level 2**	**Level 3**
50 Hz Prime	***mtu*** 3R0096 DS34	30 kVA	92.9	76.8	70.4	65.1	63.8
	mtu 4R0113 DS44	40 kVA	94.7	89.5	75.7	70.1	62.2
	mtu 4R0113 DS55	50 kVA	98.9	87.9	74.1	68	65.6

[1] Undampened engine exhaust noise

NOTE:
- Measurements with infinite exhaust connection
- Aluminum enclosure sound levels are approximately 2 dB(A) higher than listed sound levels for steel enclosures
- For installation within 50 miles of the coast, aluminum enclosures are recommended to prevent accelerated corrosion
- Sound pressure levels subject to environment, instrumentation, measurement, installation, and generator set variability
- Generator set is tested on level ground without spring isolators installed
- Sound power levels per ISO 8528-10 and ANSI S1.13-2005
- Sound data measured with:
  - Full-rated load
  - Standard radiator package

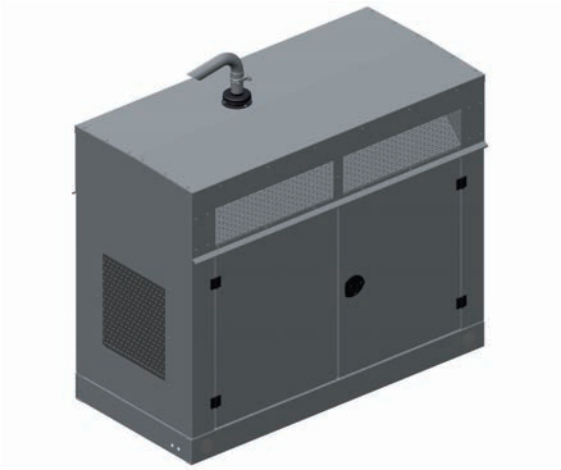
C/F = Consult Factory

* Note: Visual appearance may differ between power nodes.

Enclosure and Sound Data Sheet - Diesel, Open Field

60 Hz: 30-60 kW Standby / 27-55 kW Prime

50 Hz: 34-55 kVA Standby / 30-50 kVA Prime



Level 1 Enclosure (pictured)*

Level 3 Enclosure (pictured)*

Enclosure Level Identification	
Level 1	Basic weather-protective enclosure constructed of heavy gauge steel or aluminum with fixed stormproof panels designed for 195 mph wind load rating. Skid-mounted enclosure consists of a bolted and welded construction with unit-mounted internal silencer. Hinged, lockable double-door access on both sides of the enclosure.
Level 2	Enhanced weather-protective enclosure constructed of heavy gauge steel or aluminum with fixed stormproof panels designed for 195 mph wind load rating. Skid-mounted enclosure consists of a bolted and welded construction with unit-mounted internal silencer. Hinged, lockable double-door access on both sides of enclosure. UL 94 HF-1 compliant,1.5" thick sound attenuated foam insulation installed inside enclosure walls where applicable.
Level 3	Level 2 enclosure with air exhaust scoop with UL 94 HF-1 compliant, 1.5" thick sound attenuated foam insulation installed where applicable.

CERTIFICATIONS AND STANDARDS

- UL 2200
- CSA C22.2 No. 100
- CSA C22.2 No. 14
- High Velocity Hurricane Zone (HVHZ)
  - Miami Dade NOA
- Florida Building Code
- IBC Wind

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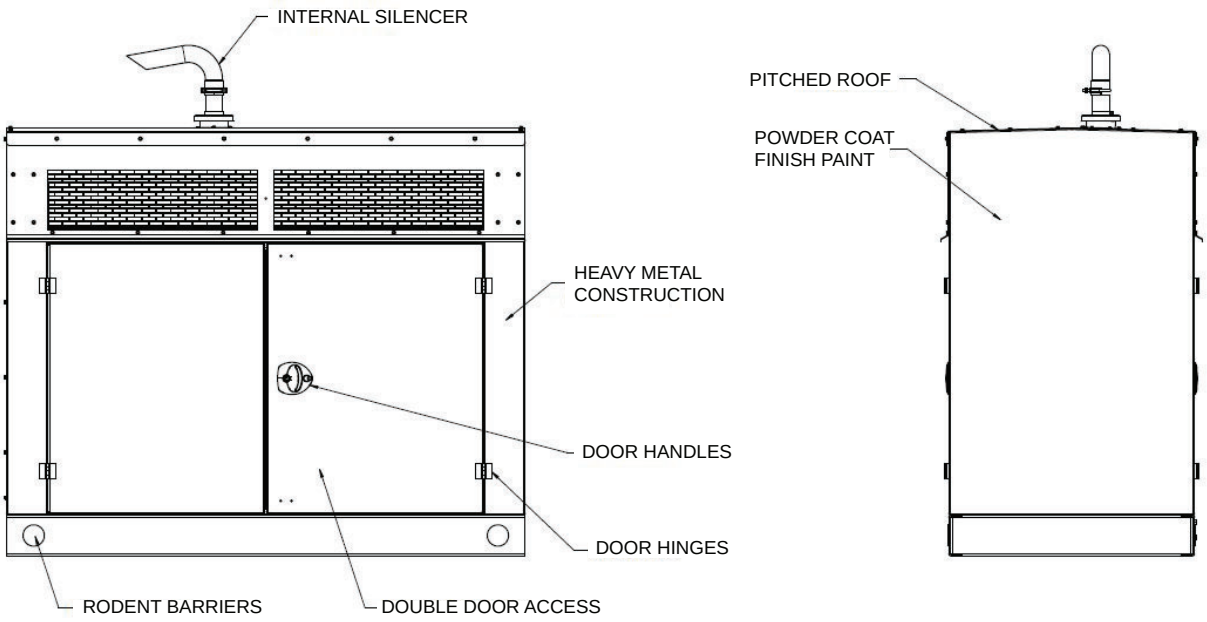
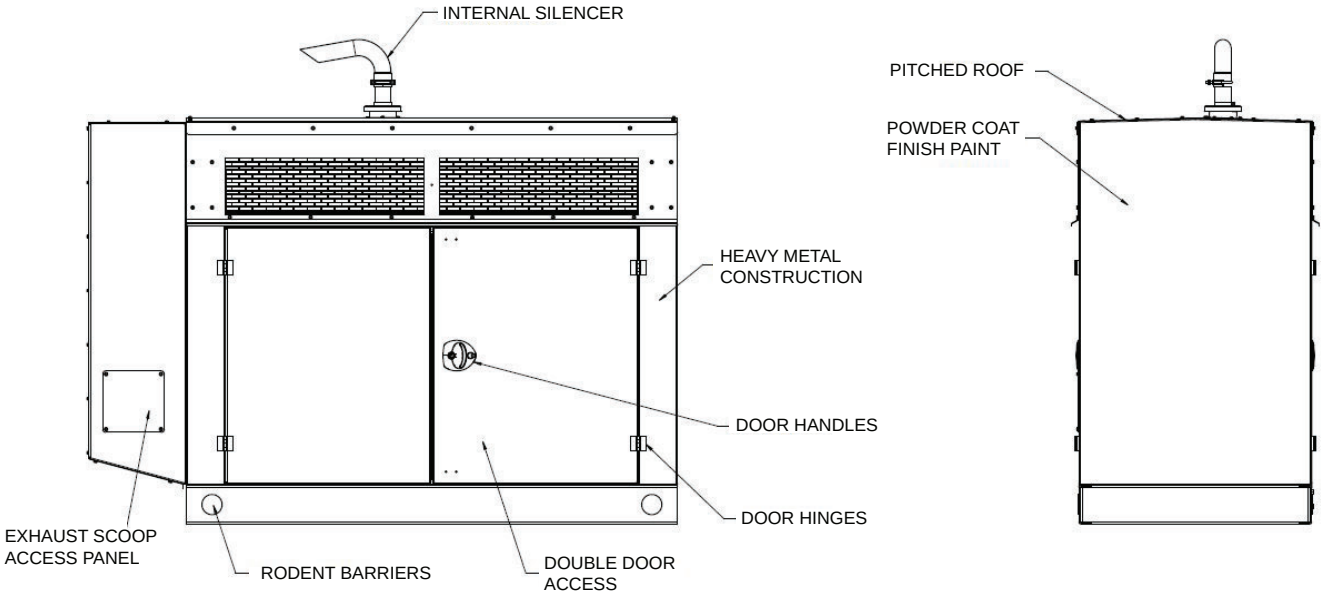
Enclosure and Sound Data Sheet - Diesel, Open Field
60 Hz: 30-60 kW Standby / 27-55 kW Prime
50 Hz: 34-55 kVA Standby / 30-50 kVA Prime

STANDARD FEATURES FOR ALL LEVELS

- Heavy material construction
  - Steel enclosure: 1.9 mm (0.075 in) - 14 gauge or greater thickness
  - Aluminum enclosure: 2.3 mm (0.09 in) or greater thickness
- 195 mph wind rating
- Service access
  - Double door access gives ease of service to all components
- Pitched roof
- Rain collar
- Rodent barriers
- Exhaust scoop access panel and drain
- Hardware
  - Powder coated hinges with stainless steel pins
  - Key-lockable and pad-lockable powder coated door handles
- Powder coat finish paint: RAL 7001 Silver Grey standard
  - Custom colors available upon request
- Internal silencer
  - Internally-insulated space saver design
  - Level 1: Industrial Grade
  - Level 2/3: Hospital Grade



Level 1 Enclosure (pictured)*



Level 3 Enclosure (pictured)*

OPTIONAL FEATURES (LEVEL 2 AND LEVEL 3 ONLY)

- Door restraints
- LED light package
- Gravity exhaust louvers
- Distribution panel
- Enclosure space heater
- Motorized intake louvers
- For other custom options, please consult factory.

OPTIONAL HIGH VELOCITY HURRICANE ZONE (HVHZ) ENCLOSURE

- TAS 201-94 (impact test procedures)
  - Level E = 9 lbs at 80 ft/sec
- TAS 202-94 (static air pressure)
  - Static testing up to 153 pounds per sqare foot (psf)
- TAS 203-94 (cyclic pressure loading)
  - Cyclical tests up to ±126 psf over 671 cycles
- ASTM E72-15 (racking strength test)
- Simulated 195 mph wind at Exposure D
- Meets Florida Building Code (FBC) Section 1626 requirements

Enclosure and Sound Data Sheet - Diesel, Open Field
60 Hz: 30-60 kW Standby / 27-55 kW Prime
50 Hz: 34-55 kVA Standby / 30-50 kVA Prime

ENGINE EXHAUST SOUND RATINGS dB(A) AT 1 METER
OPU SOUND RATINGS dB(A) AT 1 METER
ENCLOSURE SOUND RATINGS dB(A) AT 7 METERS

			1 Meter		7 Meters		
Application	**Model**	**Power Node**	**Engine Exhaust[1]**	**OPU[2]**	**Level 1**	**Level 2**	**Level 3**
60 Hz Standby	***mtu*** 3R0096 DS30	30 kW	101.6	84.1	79.2	72.4	69.6
	mtu 4R0113 DS40	40 kW	105.1	91.6	84.3	77	71
	mtu 4R0113 DS50	50 kW	105.1	91.6	84.6	76.7	71.5
	mtu 4R0113 DS60	60 kW	107	87.6	83.9	77.2	73.4
Application	**Model**	**Power Node**	**Engine Exhaust[1]**	**OPU[2]**	**Level 1**	**Level 2**	**Level 3**
60 Hz Prime	***mtu*** 3R0096 DS30	27 kW	92.1	82.6	79.2	72.4	69.6
	mtu 4R0113 DS40	40 kW	104.3	89.3	84.3	77	71
	mtu 4R0113 DS50	45 kW	104.3	89.3	84.6	76.7	71.5
	mtu 4R0113 DS60	55 kW	103.7	88.4	83.9	77.2	73.4
Application	**Model**	**Power Node**	**Engine Exhaust[1]**	**OPU[2]**	**Level 1**	**Level 2**	**Level 3**
50 Hz Standby	***mtu*** 3R0096 DS34	34 kVA	96.9	78.6	C/F	C/F	C/F
	mtu 4R0113 DS44	44 kVA	93.3	89.3	C/F	C/F	C/F
	mtu 4R0113 DS55	55 kVA	104.5	88.9	C/F	C/F	C/F
Application	**Model**	**Power Node**	**Engine Exhaust[1]**	**OPU[2]**	**Level 1**	**Level 2**	**Level 3**
50 Hz Prime	***mtu*** 3R0096 DS34	30 kVA	92.9	76.8	C/F	C/F	C/F
	mtu 4R0113 DS44	40 kVA	94.7	89.5	C/F	C/F	C/F
	mtu 4R0113 DS55	50 kVA	98.9	87.9	C/F	C/F	C/F

[1] Undampened engine exhaust noise
[2] Measurement with infinite exhaust connection

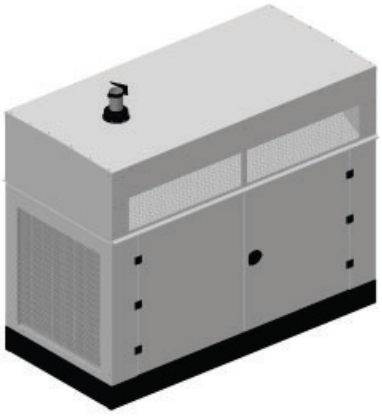
NOTE:
- Measurements include exhaust noise
- Aluminum enclosure sound levels are approximately 2 dB(A) higher than listed sound levels for steel enclosures
- For installation within 50 miles of the coast, aluminum enclosures are recommended to prevent accelerated corrosion
- Sound pressure levels subject to environment, instrumentation, measurement, installation, and generator set variability
- Generator set is tested on level ground without spring isolators installed
- Sound power levels per ISO 8528-10 and ANSI S1.13-2005
- Sound data measured with:
  - Full-rated load
  - Standard radiator package

C/F = Consult Factory

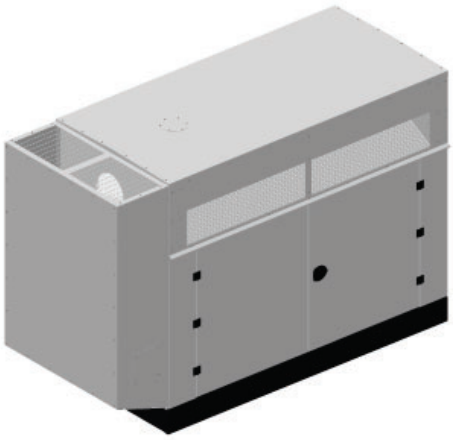
* Note: Visual appearance may differ between power nodes.

Enclosure and Sound Data Sheet - Diesel, Infinite Exhaust

60 Hz: 80-200 kW Standby / 72-180 kW Prime



Level 1 Enclosure (pictured)*



Level 3 Enclosure (pictured)*

Enclosure Level Identification	
Level 1	Skid-mounted weather-protective enclosure constructed of heavy gauge steel or aluminum with fixed stormproof panels designed for 195 mph wind load rating. Enclosure consists of a bolted and welded construction with unit-mounted internal silencer. Hinged, lockable double-door access on both sides of the enclosure.
Level 2	Level 1 enclosure with UL 94 HF-1 compliant, 1.5" thick sound attenuated foam insulation installed inside enclosure walls.
Level 3	Level 2 enclosure with air exhaust scoop. UL 94 HF-1 compliant, 1.5" thick sound attenuated foam insulation installed in scoop.

CERTIFICATIONS AND STANDARDS

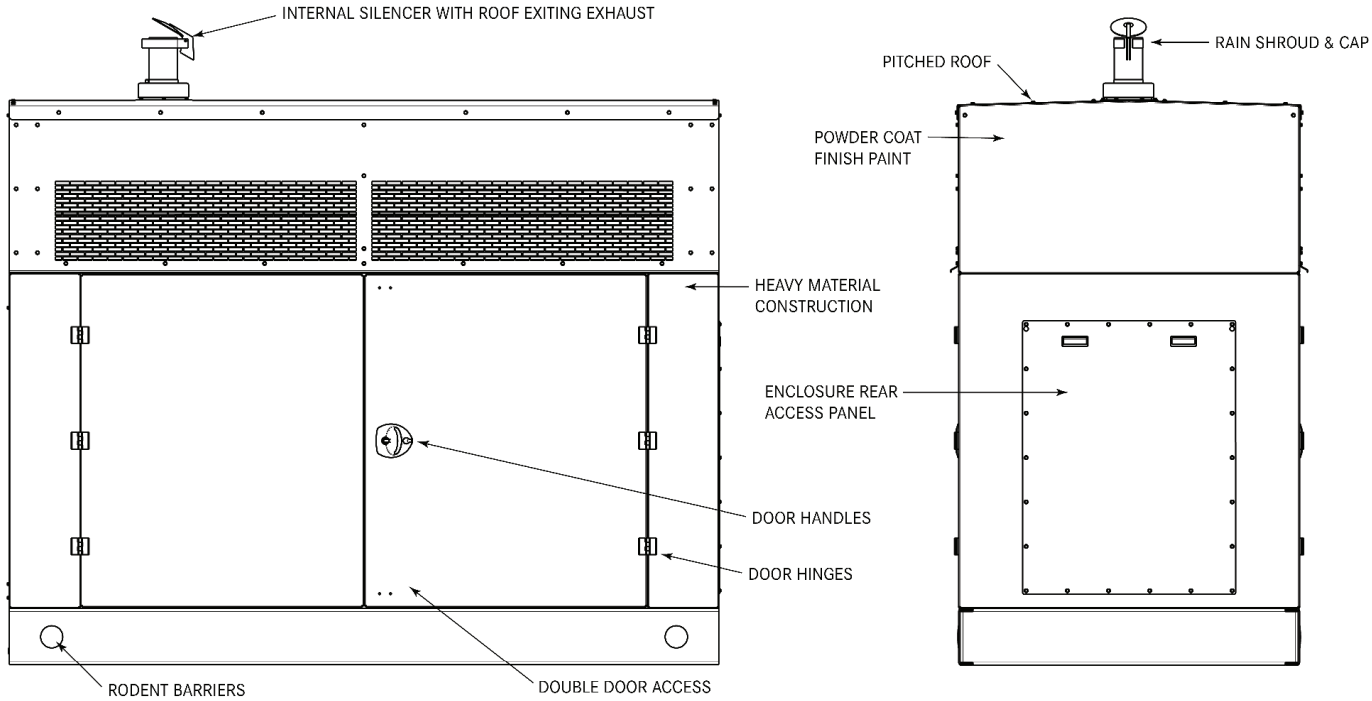
- UL 2200
- CE Marking provided
- CSA C22.2 No. 100
- CSA C22.2 No. 14
- High Velocity Hurricane Zone (HVHZ)
  - Miami Dade NOA
- Florida Building Code
- IBC Wind

A Rolls-Royce solution

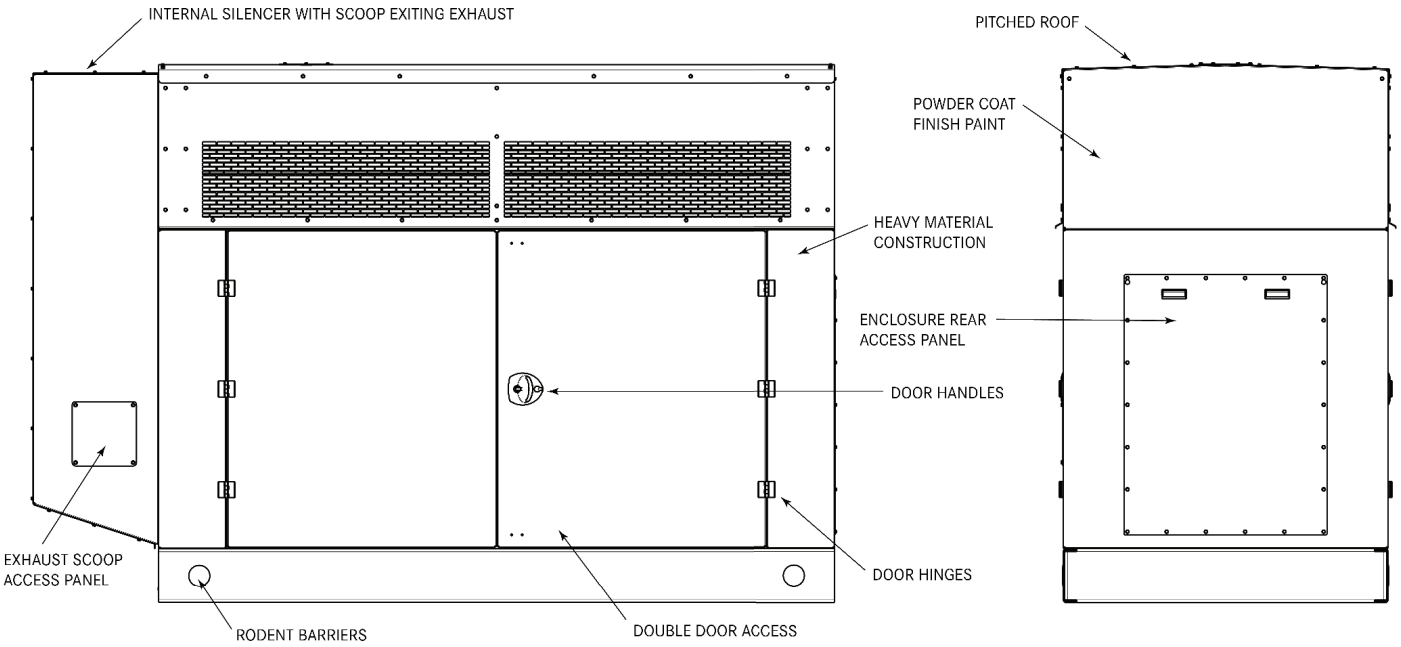
Enclosure and Sound Data Sheet - Diesel, Infinite Exhaust
60 Hz: 80-200 kW Standby / 72-180 kW Prime

STANDARD FEATURES FOR ALL LEVELS

- Heavy material construction
  - Steel enclosure: 1.9 mm (0.075 in) - 14 gauge or greater thickness
  - Aluminum enclosure: 2.3 mm (0.09 in) or greater thickness
- 195 mph wind rating
- Service access
  - Double door access gives ease of service to all components
- Pitched roof
- Rain shroud
- Rain cap (Level 1 and 2 only)
- Rodent barriers
- Exhaust scoop access panel and drain
- Hardware
  - Powder coated hinges with stainless steel pins
  - Key-lockable and pad-lockable powder coated door handles
- Powder coat finish paint: RAL 7001 Silver Grey standard
  - Custom colors available upon request
- Internal silencer (Hospital Grade)
  - Insulated silencer
  - Stainless steel flexible exhaust connections (where applicable)



Level 1 Enclosure (pictured)*



Level 3 Enclosure (pictured)*

OPTIONAL FEATURES

- Door restraints
- LED light package
- Motorized intake louvers
- Distribution panel
- Enclosure space heater
- Gravity exhaust louvers
- For other custom options, please consult factory.

OPTIONAL HIGH VELOCITY HURRICANE ZONE (HVHZ) ENCLOSURE

- TAS 201-94 (impact test procedures)
  - Level E = 9 lbs at 80 ft/sec
- TAS 202-94 (static air pressure)
  - Static testing up to 153 pounds per sqare foot (psf)
- TAS 203-94 (cyclic pressure loading)
  - Cyclical tests up to ±126 psf over 671 cycles
- ASTM E72-15 (racking strength test)
- Simulated 195 mph wind at Exposure D
- Meets Florida Building Code (FBC) Section 1626 requirements

ENGINE EXHAUST SOUND RATINGS dB(A) AT 1 METER
OPU SOUND RATINGS dB(A) AT 1 METER
ENCLOSURE SOUND RATINGS dB(A) AT 7 METERS

			1 Meter		7 Meters		
Application	Model	Power Node	Engine Exhaust[1]	OPU	Level 1	Level 2	Level 3
60 Hz Standby	***mtu*** 4R0120 DS80	80 kW	105.2	93.6	C/F	C/F	C/F
	mtu 4R0120 DS100	100 kW	108.4	93.6	C/F	C/F	C/F
	mtu 4R0120 DS125	125 kW	112.4	93.8	C/F	C/F	68.5
	mtu 6R0120 DS150	150 kW	109.1	99.6	C/F	C/F	C/F
	mtu 6R0120 DS180	180 kW	110.8	99.6	C/F	C/F	C/F
	mtu 6R0120 DS200	200 kW	111.5	99.7	C/F	C/F	C/F
Application	Model	Power Node	Engine Exhaust[1]	OPU	Level 1	Level 2	Level 3
60 Hz Prime	***mtu*** 4R0120 DS80	72 kW	104.4	93.9	C/F	C/F	C/F
	mtu 4R0120 DS100	90 kW	106.7	94.2	C/F	C/F	C/F
	mtu 4R0120 DS125	111 kW	110	94.2	C/F	C/F	C/F
	mtu 6R0120 DS150	135 kW	108.8	99.5	C/F	C/F	C/F
	mtu 6R0120 DS180	163 kW	109.7	99.6	C/F	C/F	C/F
	mtu 6R0120 DS200	180 kW	110.8	99.6	C/F	C/F	C/F

[1] Undampened engine exhaust noise

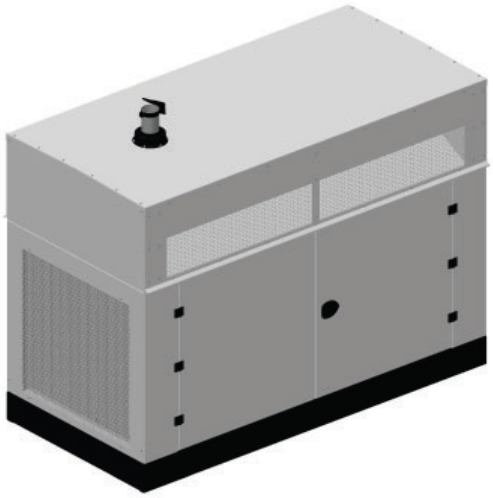
NOTE:
- Measurements with infinite exhaust connection
- Aluminum enclosure sound levels are approximately 2 dB(A) higher than listed sound levels for steel enclosures
- For installation within 50 miles of the coast, aluminum enclosures are recommended to prevent accelerated corrosion
- Sound pressure levels subject to environment, instrumentation, measurement, installation, and generator set variability
- Generator set is tested on level ground without spring isolators installed
- Sound power levels per ISO 8528-10 and ANSI S1.13-2005
- Sound data measured with:
  - Full-rated load
  - Standard radiator package

C/F = Consult Factory

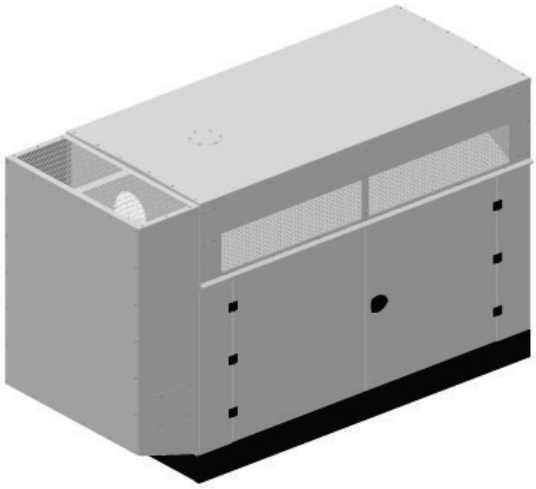
* Note: Visual appearance may differ between power nodes.

Enclosure and Sound Data Sheet - Diesel, Open Field

60 Hz: 80-200 kW Standby / 72-180 kW Prime



Level 1 Enclosure (pictured)*



Level 3 Enclosure (pictured)*

Enclosure Level Identification	
Level 1	Skid-mounted weather-protective enclosure constructed of heavy gauge steel or aluminum with fixed stormproof panels designed for 195 mph wind load rating. Enclosure consists of a bolted and welded construction with unit-mounted internal silencer. Hinged, lockable double-door access on both sides of the enclosure.
Level 2	Level 1 enclosure with UL 94 HF-1 compliant, 1.5" thick sound attenuated foam insulation installed inside enclosure walls.
Level 3	Level 2 enclosure with air exhaust scoop. UL 94 HF-1 compliant, 1.5" thick sound attenuated foam insulation installed in scoop.

CERTIFICATIONS AND STANDARDS

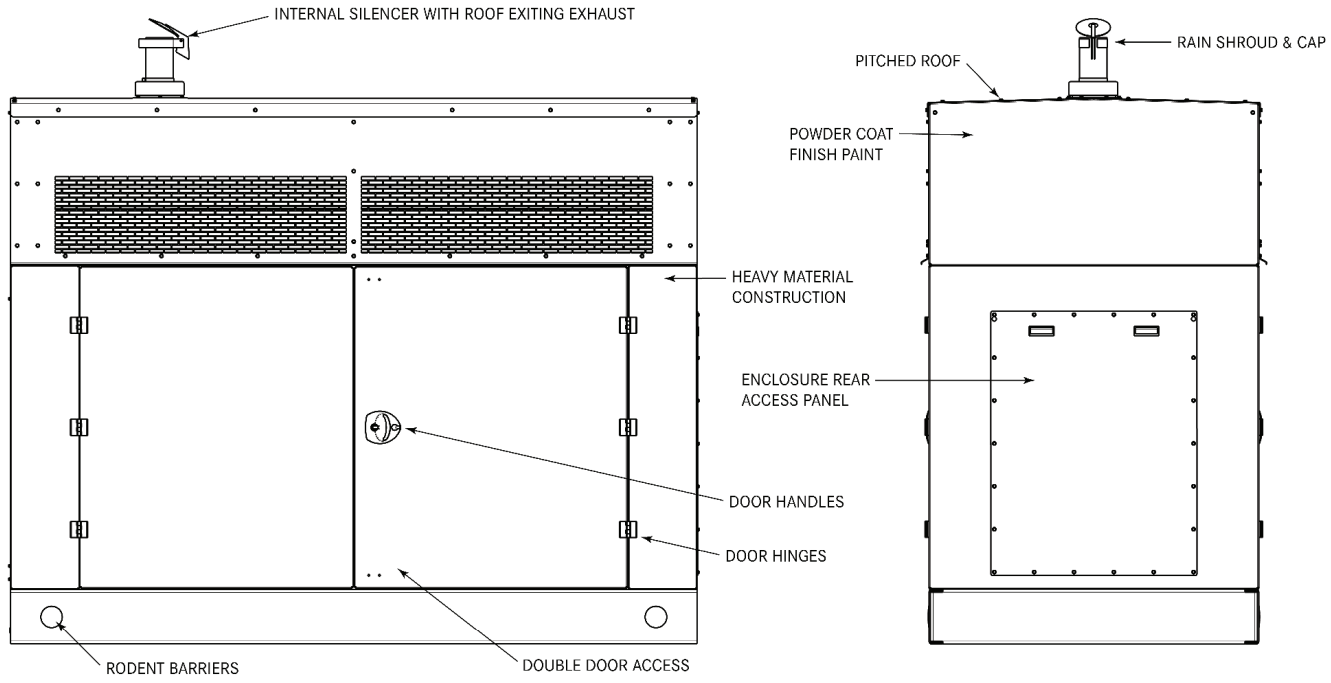
- UL 2200
- CE Marking Provided
- CSA C22.2 No. 100
- CSA C22.2 No. 14
- High Velocity Hurricane Zone (HVHZ)
  - Miami Dade NOA
- Florida Building Code
- IBC Wind

A Rolls-Royce solution

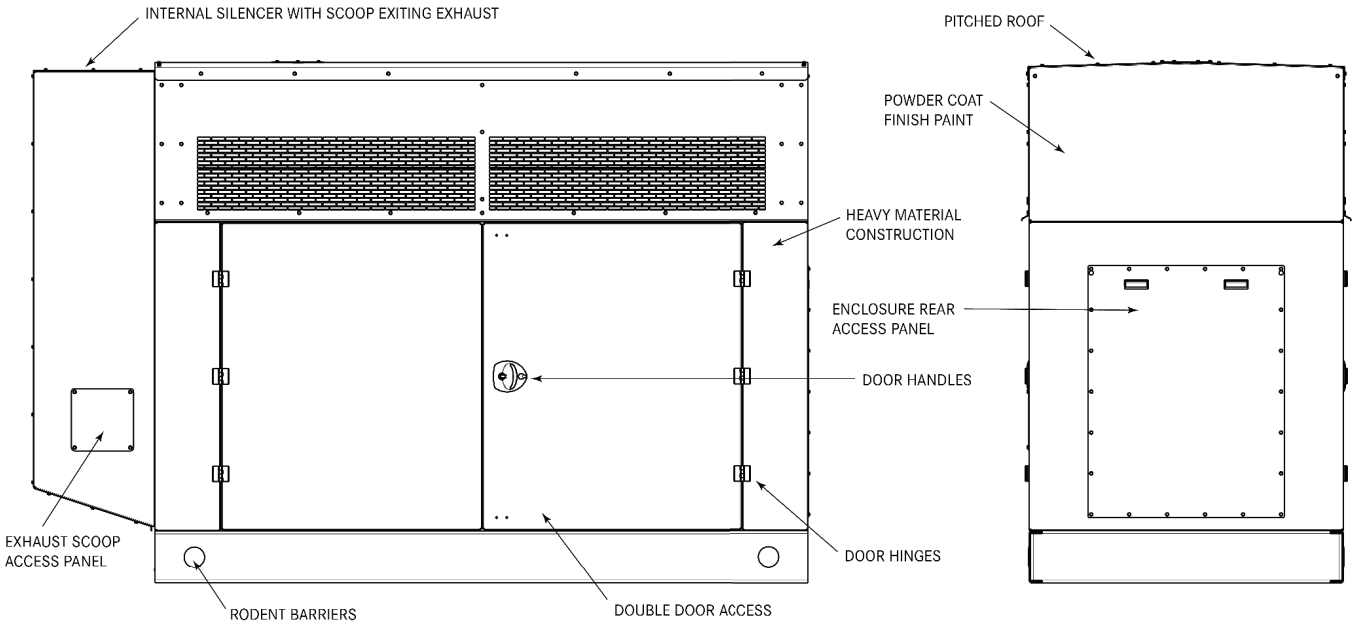
Enclosure and Sound Data Sheet - Diesel, Open Field
60 Hz: 80-200 kW Standby / 72-180 kW Prime

STANDARD FEATURES FOR ALL LEVELS

- Heavy material construction
  - Steel enclosure: 1.9 mm (0.075 in) - 14 gauge or greater thickness
  - Aluminum enclosure: 2.3 mm (0.09 in) or greater thickness
- 195 mph wind rating
- Service access
  - Double door access gives ease of service to all components
- Pitched roof
- Rain shroud
- Rain cap (Level 1 and 2 only)
- Rodent barriers
- Exhaust scoop access panel and drain
- Hardware
  - Powder coated hinges with stainless steel pins
  - Key-lockable and pad-lockable powder coated door handles
- Powder coat finish paint: RAL 7001 Silver Grey standard
  - Custom colors available upon request
- Internal silencer (Hospital Grade)
  - Insulated silencer
  - Stainless steel flexible exhaust connections (where applicable)



Level 1 Enclosure (pictured)*



Level 3 Enclosure (pictured)*

OPTIONAL FEATURES

- Door restraints
- LED light package
- Enclosure space heater
- Motorized intake louvers
- Distribution panel
- Gravity exhaust louvers
- For other custom options, please consult factory.

OPTIONAL HIGH VELOCITY HURRICANE ZONE (HVHZ) ENCLOSURE

- TAS 201-94 (impact test procedures)
  - Level E = 9 lbs at 80 ft/sec
- TAS 202-94 (static air pressure)
  - Static testing up to 153 pounds per sqare foot (psf)
- TAS 203-94 (cyclic pressure loading)
  - Cyclical tests up to ±126 psf over 671 cycles
- ASTM E72-15 (racking strength test)
- Simulated 195 mph wind at Exposure D
- Meets Florida Building Code (FBC) Section 1626 requirements

ENGINE EXHAUST SOUND RATINGS dB(A) AT 1 METER
OPU SOUND RATINGS dB(A) AT 1 METER
ENCLOSURE SOUND RATINGS dB(A) AT 7 METERS

			1 Meter		7 Meters		
Application	**Model**	**Power Node**	**Engine Exhaust[1]**	**OPU[2]**	**Level 1**	**Level 2**	**Level 3**
60 Hz Standby	***mtu*** 4R0120 DS80	80 kW	105.2	93.6	82.2	81.5	73.7
	mtu 4R0120 DS100	100 kW	108.3	93.6	82.2	81.3	74.4
	mtu 4R0120 DS125	125 kW	112.4	93.8	82.2	81.8	74.5
	mtu 6R0120 DS150	150 kW	109.1	99.6	91.2	88.4	72.8
	mtu 6R0120 DS180	180 kW	110.8	99.6	91.2	88.7	73
	mtu 6R0120 DS200	200 kW	111.5	99.7	91.2	88.7	73.1
Application	**Model**	**Power Node**	**Engine Exhaust[1]**	**OPU[2]**	**Level 1**	**Level 2**	**Level 3**
60 Hz Prime	***mtu*** 4R0120 DS80	72 kW	104.4	93.9	82	81.7	73.6
	mtu 4R0120 DS100	90 kW	106.7	94.2	82.1	81.8	74.1
	mtu 4R0120 DS125	111 kW	110.0	94.2	82.7	81.8	74.4
	mtu 6R0120 DS150	135 kW	108.8	99.5	91.1	88.7	72.5
	mtu 6R0120 DS180	163 kW	109.7	99.6	91.1	88.7	72.7
	mtu 6R0120 DS200	180 kW	110.8	99.6	91.1	88.7	73

[1] Undampened engine exhaust noise

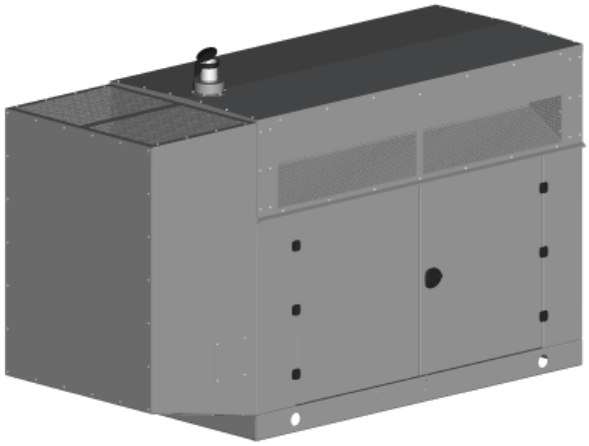
[2] Measurement with infinite exhaust connection

NOTE:
- Measurements include exhaust noise.
- Aluminum enclosure sound levels are approximately 2 dB(A) higher than listed sound levels for steel enclosures.
- For installation within 50 miles of the coast, aluminum enclosures are recommended to prevent accelerated corrosion.
- Sound pressure levels subject to environment, instrumentation, measurement, installation, and generator set variability.
- Generator set is tested on level ground without spring isolators installed.
- Sound power levels per ISO 8528-10 and ANSI S1.13-2005
- Sound data measured with:
  - Full-rated load
  - Standard radiator package

* Note: Visual appearance may differ between power nodes.

Enclosure and Sound Data Sheet - Diesel, Infinite Exhaust

60 Hz: 80-200 kW Standby / 80-180 kW Prime



Level 3 Enclosure (pictured)*

Enclosure Level Identification	
Level 1	Skid-mounted weather-protective enclosure constructed of heavy gauge steel or aluminum with fixed stormproof panels designed for 130 mph wind load rating. Enclosure consists of a bolted and welded construction with unit-mounted internal silencer. Hinged, lockable double-door access on both sides of the enclosure.
Level 2	Level 1 enclosure with UL 94 HF-1 compliant, 1.5" thick sound attenuated foam insulation installed inside enclosure walls.
Level 3†	Level 2 enclosure with air exhaust scoop with UL 94 HF-1 compliant, 1.5" thick sound attenuated foam insulation installed in scoops where applicable.
Level 3 with Exhaust Scoop Sound Attenuation Kit‡	Level 3 enclosure with 1.5" thick sound attenuated foam insulation installed in scoop (80-100 kW only).

CERTIFICATIONS AND STANDARDS

- UL 2200
- CSA C22.2 No. 100
- CSA C22.2 No. 14
- High Velocity Hurricane Zone (HVHZ)
  - Miami Dade NOA
- Florida Building Code
- IBC Wind

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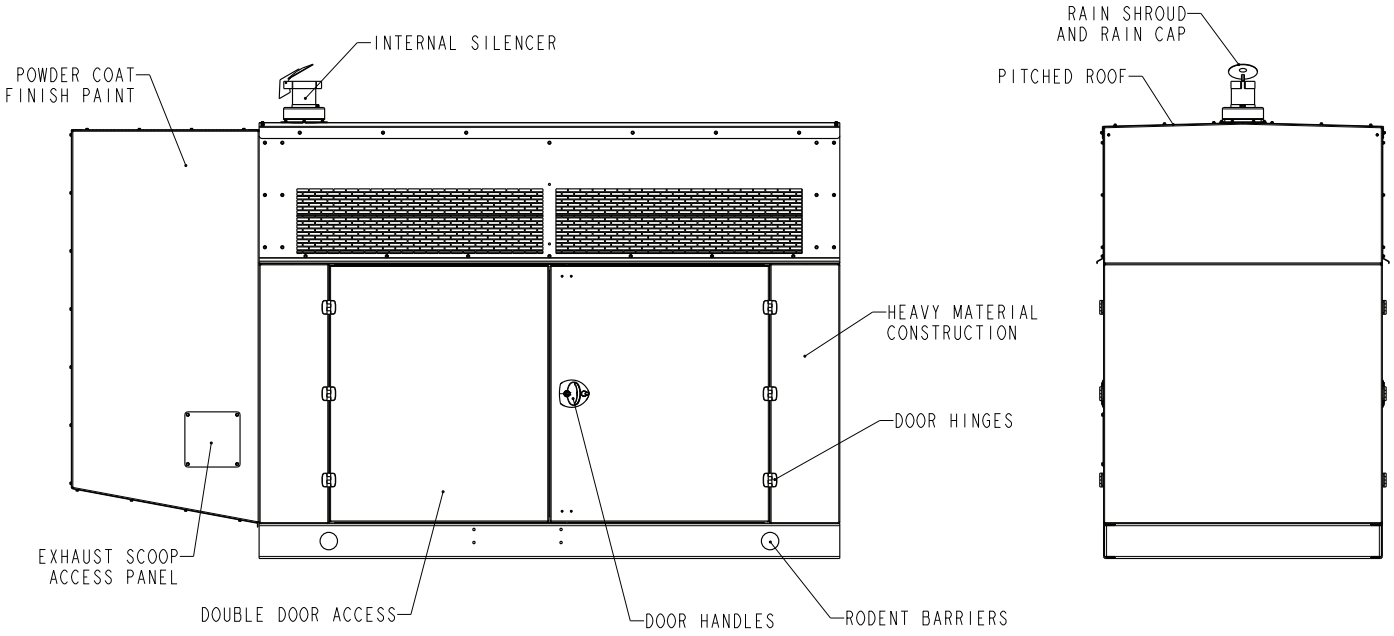
Enclosure and Sound Data Sheet - Diesel, Infinite Exhaust
60 Hz: 80-200 kW Standby / 80-180 kW Prime

STANDARD FEATURES FOR ALL LEVELS

- Heavy material construction
  - Steel enclosure: 1.9 mm (0.075 in) - 14 gauge or greater thickness
  - Aluminum enclosure: 2.3 mm (0.09 in) or greater thickness
- 130 mph wind rating
- Service access
  - Double door access gives ease of service to all components
- Pitched roof
- Rain shroud and rain cap
- Rodent barriers
- Exhaust scoop access panel and drain
- Hardware
  - Powder coated hinges with stainless steel pins
  - Key-lockable and pad-lockable powder coated door handles
- Powder coat finish paint: RAL 7001 Silver Grey standard
  - Custom colors available upon request
- Internal silencer (critical grade or better)
  - Insulated or wrapped mufflers and exhaust pipes
  - Stainless steel flexible exhaust connections (where applicable)



Level 3 Enclosure (pictured)*

OPTIONAL FEATURES

- Door restraints
- AC or DC light package
- Motorized / gravity louvers (where available)
- 195 mph wind rating
- For other custom options, please consult factory.

OPTIONAL HIGH VELOCITY HURRICANE ZONE (HVHZ) ENCLOSURE

- TAS 201-94 (impact test procedures)
  - Level E = 9 lbs at 80 ft/sec
- TAS 202-94 (static air pressure)
  - Static testing up to 153 pounds per sqare foot (psf)
- TAS 203-94 (cyclic pressure loading)
  - Cyclical tests up to ±126 psf over 671 cycles
- ASTM E72-15 (racking strength test)
- Simulated 195 mph wind at Exposure D
- Meets Florida Building Code (FBC) Section 1626 requirements

ENGINE EXHAUST SOUND RATINGS dB(A) AT 1 METER
OPU SOUND RATINGS dB(A) AT 1 METER
ENCLOSURE SOUND RATINGS dB(A) AT 7 METERS

			1 Meter		7 Meters			
Application	Model	Power Node	Engine Exhaust[1]	OPU	Level 1	Level 2	Level 3	Level 3 with Exhaust Scoop Sound Attenuation Kit‡
60 Hz Standby	***mtu*** 4R0113 DS80	80 kW	C/F	92	78.9	75.2	70.9	66.7
	mtu 4R0113 DS100	100 kW	C/F	95.3	80.2	77.1	73.4	69.1
	mtu 4R0113 DS125	125 kW	C/F	98	83.5	81.7	73.1	N/A
	mtu 6R0113 DS150	150 kW	C/F	96	84.4	83	74.1	N/A
	mtu 6R0113 DS180	180 kW	C/F	98	85.1	83.3	74.6	N/A
	mtu 6R0113 DS200	200 kW	C/F	98	85.1	83.2	74.4	N/A

			1 Meter		7 Meters			
Application	Model	Power Node	Engine Exhaust[1]	OPU	Level 1	Level 2	Level 3	Level 3 with Exhaust Scoop Sound Attenuation Kit‡
60 Hz Prime	***mtu*** 4R0113 DS80	80 kW	C/F	92	78.9	75.2	70.9	66.7
	mtu 4R0113 DS100	90 kW	C/F	95	80.4	76.8	73.3	69
	mtu 4R0113 DS125	111 kW	C/F	97.9	83.3	81.8	72.9	N/A
	mtu 6R0113 DS150	135 kW	C/F	96.6	84.2	82.8	73.6	N/A
	mtu 6R0113 DS180	180 kW	C/F	98.1	85.1	83.3	74.6	N/A

[1] Undampened engine exhaust noise

NOTE:
- Measurements with infinite exhaust connection
- Aluminum enclosure sound levels are approximately 2 dB(A) higher than listed sound levels for steel enclosures
- For installation within 50 miles of the coast, aluminum enclosures are recommended to prevent accelerated corrosion
- Sound pressure levels subject to environment, instrumentation, measurement, installation, and generator set variability
- Generator set is tested on level ground without spring isolators installed
- Sound power levels per ISO 8528-10 and ANSI S1.13-2005
- Sound data measured with:
  - Full-rated load
  - Standard radiator package

C/F = Consult Factory
N/A = Not Available

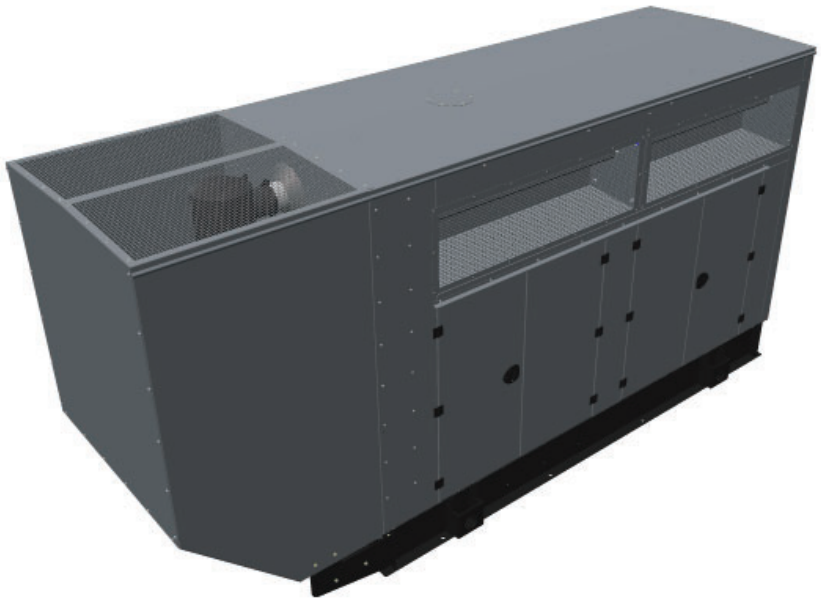
* Note: Visual appearance may differ between power nodes.

† 80-100 kW: Without foam in scoop, however it is optional. Refer to Level 3 w/exhaust scoop sound attenuation kit.
125-200 kW: Foam in scoop is standard.

‡ The Level 3 w/exhaust scoop sound attenuation kit is only available for 80-100 kW range.

Enclosure and Sound Data Sheet - Diesel, Open Field

60 Hz: 230-400 kW Standby / 210-250 kW Prime



Level 3 Enclosure (pictured)*

Enclosure Level Identification	
Level 1	Skid-mounted weather-protective enclosure constructed of heavy gauge steel or aluminum with fixed stormproof panels designed for 130 mph wind load rating. Enclosure consists of a bolted and welded construction with unit-mounted internal silencer. Hinged, lockable double-door access on both sides of the enclosure with single rear door access.
Level 2	Level 1 enclosure with air exhaust scoop. UL 94 HF-1 compliant, 1.5" thick sound attenuated foam insulation installed inside enclosure ceiling and walls.
Level 3	Level 2 enclosure with an additional silencer mounted in the exhaust scoop. UL 94 HF-1 compliant, 1.5" thick sound attenuated foam insulation installed in scoop and inside enclosure ceiling and walls.

CERTIFICATIONS AND STANDARDS

- UL 2200
- CSA C22.2 No. 100
- CSA C22.2 No. 14
- High Velocity Hurricane Zone (HVHZ)
  - Miami Dade NOA
- Florida Building Code
- IBC Wind

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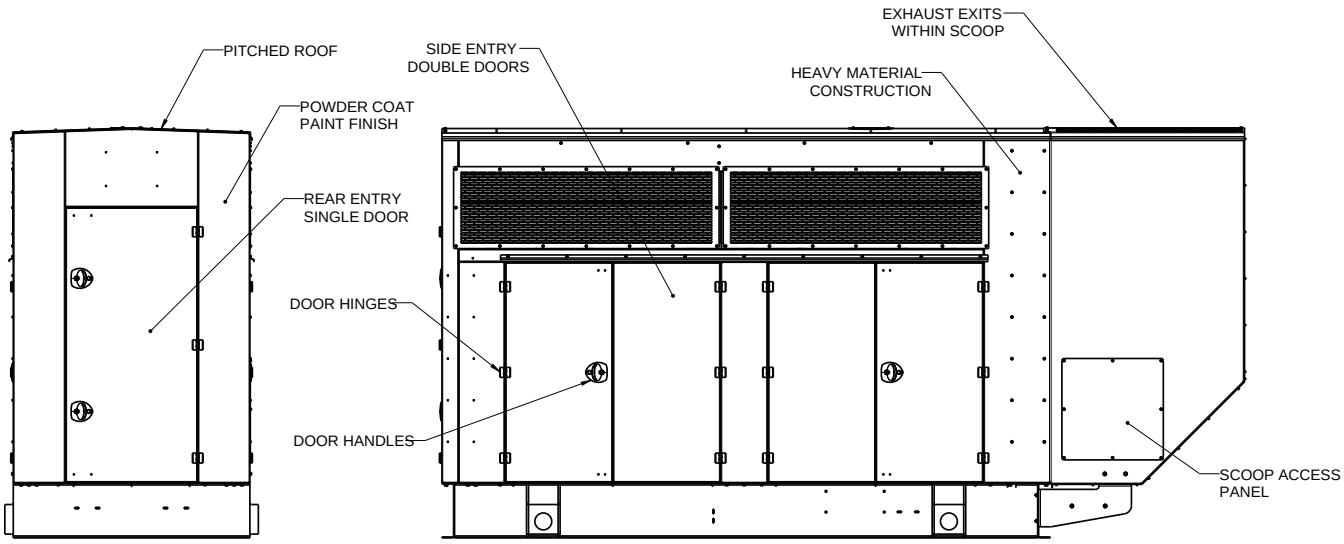
Enclosure and Sound Data Sheet - Diesel, Open Field
230-400 kW Standby / 210-250 kW Prime

STANDARD FEATURES FOR ALL LEVELS

- Heavy material construction
  - Steel enclosure: 1.9 mm (0.075 in) - 14 gauge or greater thickness
  - Aluminum enclosure: 2.3 mm (0.09 in) or greater thickness
- 130 mph wind rating
- Service access
  - Double door access gives ease of service to all components
- Pitched roof
- Rain shroud
- Rain cap (Level 1 and Level 3 only)
- Rodent barriers
- Exhaust scoop access panel and drain
- Hardware
  - Powder coated hinges with stainless steel pins
  - Key-lockable and pad-lockable powder coated door handles
- Powder coat finish paint: RAL 7001 Silver Grey standard
  - Custom colors available upon request
- Internal silencer
  - Insulated muffler wrap
  - Stainless steel flexible exhaust connections (where applicable)



Level 3 Enclosure (pictured)*

OPTIONAL FEATURES

- Door restraints
- LED light package
- Motorized / gravity louvers (where available)
- Enclosure space heater
- 195 mph wind rating
- For other custom options, please consult factory

OPTIONAL HIGH VELOCITY HURRICANE ZONE (HVHZ) ENCLOSURE

- TAS 201-94 (impact test procedures)
  - Level E = 9 lbs at 80 ft/sec
- TAS 202-94 (static air pressure)
  - Static testing up to 153 pounds per sqare foot (psf)
- TAS 203-94 (cyclic pressure loading)
  - Cyclical tests up to ±126 psf over 671 cycles
- ASTM E72-15 (racking strength test)
- Simulated 195 mph wind at Exposure D
- Meets Florida Building Code (FBC) Section 1626 requirements

ENGINE EXHAUST SOUND RATINGS dB(A) AT 1 METER
OPU SOUND RATINGS dB(A) AT 1 METER
ENCLOSURE SOUND RATINGS dB(A) AT 7 METERS

			1 Meter		7 Meters		
Application	Model	Power Node	Engine Exhaust[1]	OPU[2]	Level 1	Level 2	Level 3
60 Hz Standby	***mtu*** 6R0150 DS230	230 kW	C/F	99	88.5	80.5	74.1
	mtu 6R0150 DS250	250 kW	C/F	99	88.6	80.1	74.6
	mtu 6R0150 DS275	275 kW	C/F	98.9	88.3	80.6	74.3
	mtu 6R0150 DS300	300 kW	113.1	100.6	90.3	81.9	75.1
	mtu 6R0225 DS350 [3]	275 kW	C/F	103.3	89.5	80.9	75.6
	mtu 6R0225 DS350 [3]	300 kW	C/F	103.1	90.1	81.1	76.2
	mtu 6R0225 DS350	350 kW	C/F	103.9	89.9	81.6	76.5
	mtu 6R0225DS400	400 kW	112.4	104	91	82.1	75.5
60 Hz Prime	***mtu*** 6R0150 DS230	210 kW	C/F	98.4	88	79.7	73.9
	mtu 6R0150 DS250	230 kW	C/F	98.9	88.5	80.5	74.1
	mtu 6R0150 DS250	250 kW	C/F	98.9	88.6	80.1	74.6

[1] Undampened engine exhaust noise
[2] Measurement with infinite exhaust connection
[3] Single-phase units only

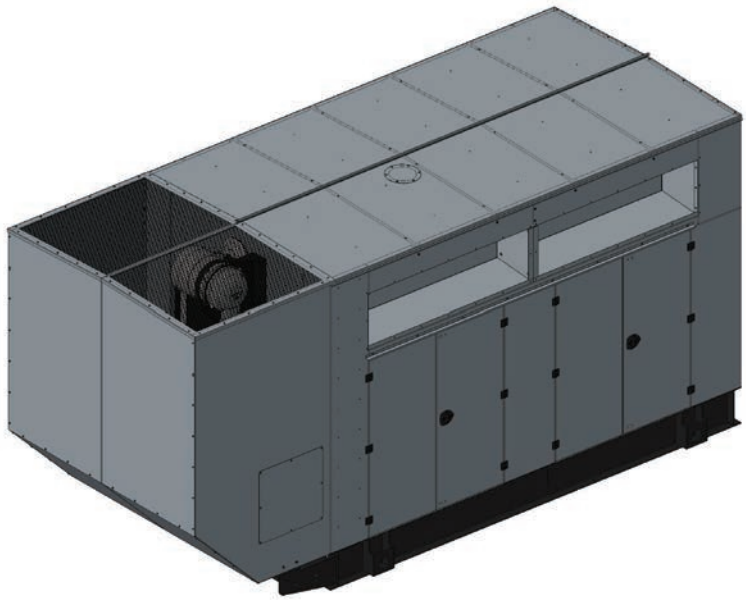
NOTE:
- Measurement includes exhaust noise.
- Aluminum enclosure sound levels are approximately 2 dB(A) higher than listed sound levels for steel enclosures.
- For installation within 50 miles of the coast, aluminum enclosures are recommended to prevent accelerated corrosion.
- Sound pressure levels subject to environment, instrumentation, measurement, installation, and generator set variability.
- Generator set is tested on level ground without spring isolators installed.
- Sound power levels per ISO 8528-10 and ANSI S1.13-2005
- Sound data measured with:
  - Full-rated load
  - Standard radiator package

C/F = Consult Factory

* Note: Visual appearance may differ between power nodes.

Enclosure and Sound Data Sheet - Diesel, Open Field

Tier 4: 230-400 kW Standby / 210-365 kW Prime



Level 3 Enclosure (pictured)*

Enclosure Level Identification	
Level 1	Not available. Radiator exhaust air discharge scoop included standard to enclose aftertreatment system.
Level 2	Skid-mounted weather-protective enclosure constructed of heavy gauge steel or aluminum with fixed stormproof panels designed for 130 mph or 195 mph wind load rating. Enclosure consists of a bolted and welded construction with air exhaust scoop, and scoop-mounted aftertreatment system. Hinged, lockable double-door access on both sides of the enclosure with single rear door access.
Level 3	Level 2 enclosure with UL 94 HF-1 compliant, 1.5" thick sound attenuated foam insulation installed inside enclosure walls, and the air exhaust scoop. **Note:** For 325-400 kW, UL 94 HF-1 compliant, 1.5" thick sound attenuated foam insulation is installed inside the enclosure walls and ceiling, and the air exhaust scoop.

CERTIFICATIONS AND STANDARDS

- UL 2200
- CSA C22.2 No. 100
- CSA C22.2 No. 14
- High Velocity Hurricane Zone (HVHZ)
  - Miami Dade NOA
- Florida Building Code
- IBC Wind

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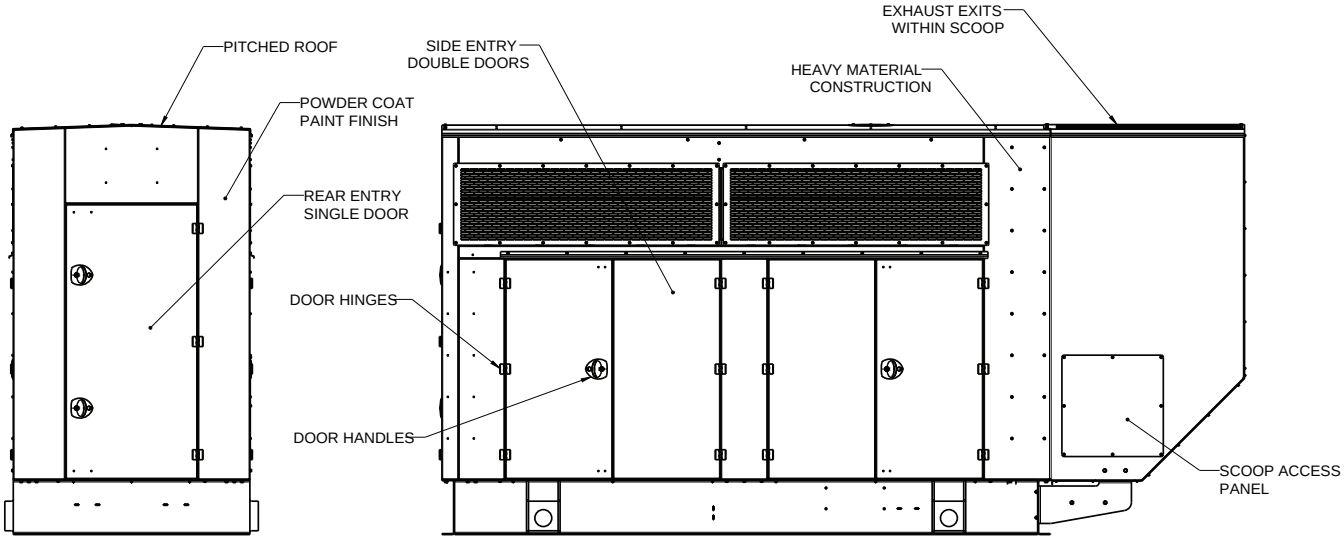
Enclosure and Sound Data Sheet - Diesel, Open Field
Tier 4: 230-400 kW Standby / 210-365 kW Prime

STANDARD FEATURES FOR ALL LEVELS

- Heavy material construction
  - Steel enclosure: 1.9 mm (0.075 in) - 14 gauge or greater thickness
  - Aluminum enclosure: 2.3 mm (0.09 in) or greater thickness
- Wind rating
  - 130 mph (6R0150)
  - 195 mph (6R0225)
- Service access
  - Double door access gives ease of service to all components
- Pitched roof
- Rain shroud
- Rain cap
- Rodent barriers
- Exhaust scoop access panel and drain
- Hardware
  - Powder coated hinges with stainless steel pins
  - Key-lockable and pad-lockable powder coated door handles
- Powder coat finish paint: RAL 7001 Silver Grey standard
  - Custom colors available upon request
- Scoop-mounted aftertreatment system
  - Insulated exhaust system
  - Stainless steel flexible exhaust connections (where applicable)



Level 3 Enclosure (pictured)*

OPTIONAL FEATURES

- Door restraints
- LED light package
- Motorized / gravity louvers (where available)
- Enclosure space heater
- 195 mph wind rating (6R0150)
- For other custom options, please consult factory

OPTIONAL HIGH VELOCITY HURRICANE ZONE (HVHZ) ENCLOSURE

- TAS 201-94 (impact test procedures)
  - Level E = 9 lbs at 80 ft/sec
- TAS 202-94 (static air pressure)
  - Static testing up to 153 pounds per sqare foot (psf)
- TAS 203-94 (cyclic pressure loading)
  - Cyclical tests up to ±126 psf over 671 cycles
- ASTM E72-15 (racking strength test)
- Simulated 195 mph wind at Exposure D
- Meets Florida Building Code (FBC) Section 1626 requirements

ENGINE EXHAUST SOUND RATINGS dB(A) AT 1 METER
OPU SOUND RATINGS dB(A) AT 1 METER
ENCLOSURE SOUND RATINGS dB(A) AT 7 METERS

			1 Meter		7 Meters	
Application	Model	Power Node	Engine Exhaust[1]	OPU[2]	Level 2	Level 3
60 Hz Standby	***mtu*** 6R0150 DS230	230 kW	65.7	97.9	79.8	72.8
	mtu 6R0150 DS250	250 kW	66.7	97.7	79.7	72.8
	mtu 6R0150 DS275	275 kW	67.5	97.7	79.3	72.6
	mtu 6R0150 DS300	300 kW	68.7	97.5	79.3	72.6
	mtu 6R0225 DS350 [3]	275 kW	C/F	99.9	82	73.8
	mtu 6R0225 DS350 [3]	300 kW	C/F	100.1	82.1	74.2
	mtu 6R0225 DS350	350 kW	85.5	100.4	82.5	74.6
	mtu 6R0225 DS400	400 kW	84.9	100.6	82.8	74.8
60 Hz Prime	***mtu*** 6R0150 DS230	210 kW	64.4	97.3	79.8	72.6
	mtu 6R0150 DS250	230 kW	65.7	97.9	79.5	72.5
	mtu 6R0150 DS250	250 kW	66.7	97.7	79.4	72.9
	mtu 6R0150 DS300	265 kW	67.7	97.5	79.4	73.2
	mtu 6R0225 DS350 [3]	250 kW	C/F	100.3	81.7	73.6
	mtu 6R0225 DS350 [3]	275 kW	C/F	100	81.8	74
	mtu 6R0225 DS350	325 kW	84.3	100.2	82.4	74.2
	mtu 6R0225 DS400	365 kW	85.6	100.5	82.7	74.5

[1] Engine exhaust noise post aftertreatment system
[2] Measurement with infinite exhaust connection
[3] Single-phase units only

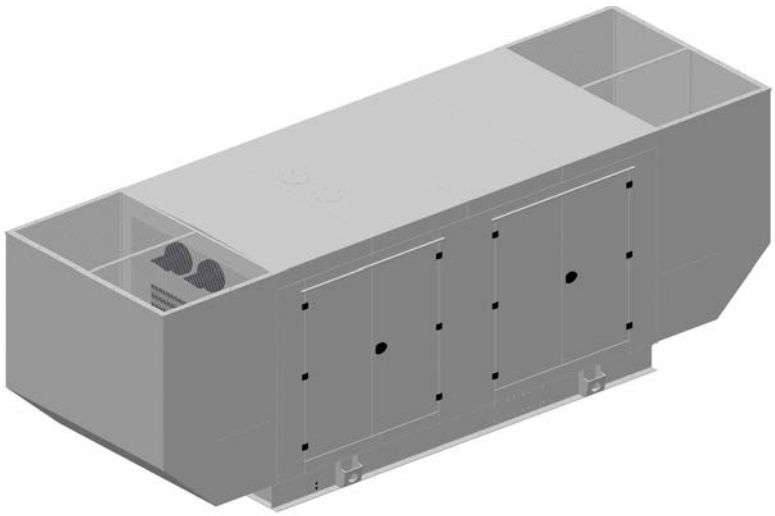
NOTE:
- Measurement includes exhaust noise.
- Aluminum enclosure sound levels are approximately 2 dB(A) higher than listed sound levels for steel enclosures.
- For installation within 50 miles of the coast, aluminum enclosures are recommended to prevent accelerated corrosion.
- Sound pressure levels subject to environment, instrumentation, measurement, installation, and generator set variability.
- Generator set is tested on level ground without spring isolators installed.
- Sound power levels per ISO 8528-10 and ANSI S1.13-2005
- Sound data measured with:
  - Full-rated load
  - Standard radiator package

C/F = Consult Factory

* Note: Visual appearance may differ between power nodes.

Enclosure and Sound Data Sheet - Diesel, Infinite Exhaust

60 Hz: 450-600 kW Standby / 400-550 kW Prime



Level 3 Enclosure (pictured)*

Enclosure Level Identification	
Level 1	Weather-protective enclosure constructed of heavy gauge steel or aluminum with fixed stormproof panels designed for 130 mph wind load rating. Enclosure consists of a bolted and welded construction with unit-mounted internal silencer included. Hinged, lockable double-door access on both sides of the enclosure.
Level 2	Level 1 enclosure with exhaust scoop.
Level 3	Level 2 enclosure with air intake scoop with UL 94 HF-1 compliant, 1.5" thick sound attenuated foam insulation installed in scoops and inside enclosure walls, where applicable.

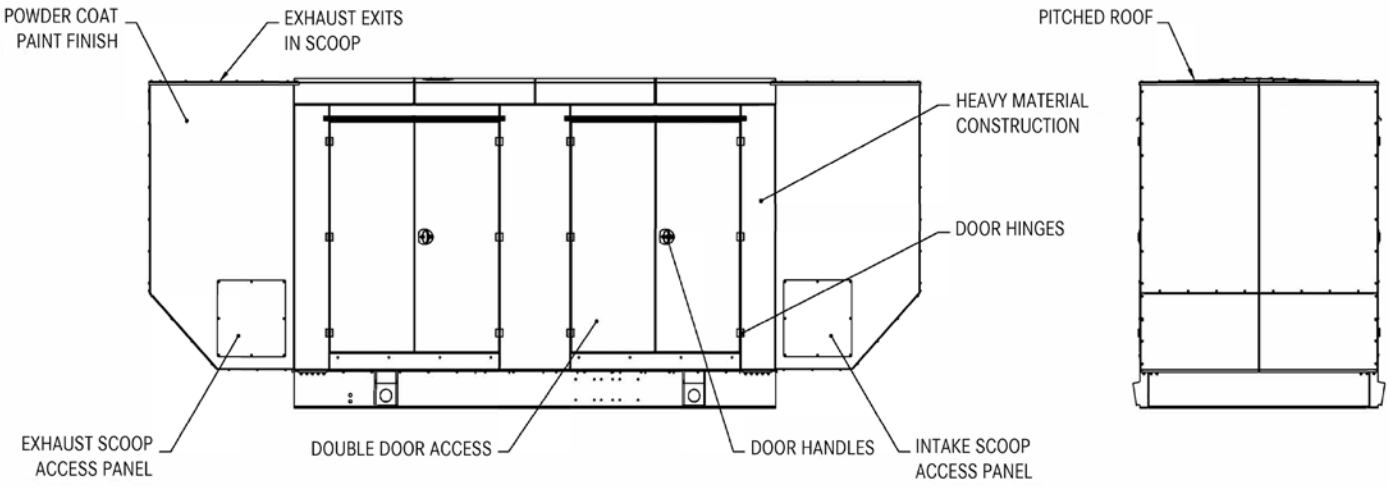
CERTIFICATIONS AND STANDARDS

- UL 2200
- CSA C22.2 No. 100
- CSA C22.2 No. 14
- High Velocity Hurricane Zone (HVHZ)
  - Miami Dade NOA
- Florida Building Code
- IBC Wind

STANDARD FEATURES FOR ALL LEVELS

- Heavy material construction
  - Steel enclosure: 1.9 mm (0.075 in) - 14 gauge or greater thickness
  - Aluminum enclosure: 2.3 mm (0.09 in) or greater thickness
- 130 mph wind rating
- Service access
  - Double door access gives ease of service to all components
- Pitched roof
- Rain shroud and rain cap
- Rodent barriers
- Scoop access panels and drain
- Hardware
  - Powder coated hinges with stainless steel pins
  - Key-lockable and pad-lockable powder coated door handles
- Powder coat finish paint: RAL 7001 Silver Grey standard
  - Custom colors available upon request
- Internal silencer (Critical grade or better)
  - Insulated or wrapped mufflers and exhaust pipes
  - Stainless steel flexible exhaust connections (where applicable)

A Rolls-Royce solution



Level 3 Enclosure (pictured)*

OPTIONAL FEATURES

- Door restraints
- AC or DC light package
- Motorized / gravity louvers (where available)
- 195 mph wind rating
- For other custom options, please consult factory.

OPTIONAL HIGH VELOCITY HURRICANE ZONE (HVHZ) ENCLOSURE

- TAS 201-94 (impact test procedures)
  - Level E = 9 lbs at 80 ft/sec
- TAS 202-94 (static air pressure)
  - Static testing up to 153 pounds per sqare foot (psf)
- TAS 203-94 (cyclic pressure loading)
  - Cyclical tests up to ±126 psf over 671 cycles
- ASTM E72-15 (racking strength test)
- Simulated 195 mph wind at Exposure D
- Meets Florida Building Code (FBC) Section 1626 requirements

ENGINE EXHAUST SOUND RATINGS dB(A) AT 1 METER
OPU SOUND RATINGS dB(A) AT 1 METER
ENCLOSURE SOUND RATINGS dB(A) AT 7 METERS

			1 Meter		7 Meters		
Application	**Model**	**Power Node**	**Engine Exhaust[1]**	**OPU**	**Level 1**	**Level 2**	**Level 3**
60 Hz Standby	***mtu*** 10V1600 DS450	450 kW	104	C/F	87.7	C/F	76.2
	mtu 10V1600 DS500	500 kW	106	102.8	87.9	C/F	76.3
	mtu 12V1600 DS550	550 kW	108.9	100.5	87	C/F	78.2
	mtu 12V1600 DS600	600 kW	109.9	100.5	87.2	C/F	78
Application	**Model**	**Power Node**	**Engine Exhaust[1]**	**OPU**	**Level 1**	**Level 2**	**Level 3**
60 Hz Prime	***mtu*** 10V1600 DS450	400 kW	C/F	101.8	C/F	C/F	C/F
	mtu 10V1600 DS500	450 kW	104	102.8	C/F	C/F	C/F
	mtu 12V1600 DS550	500 kW	107.6	100.1	C/F	C/F	C/F
	mtu 12V1600 DS600	550 kW	108.8	100.3	C/F	C/F	C/F

[1] Undampened engine exhaust noise

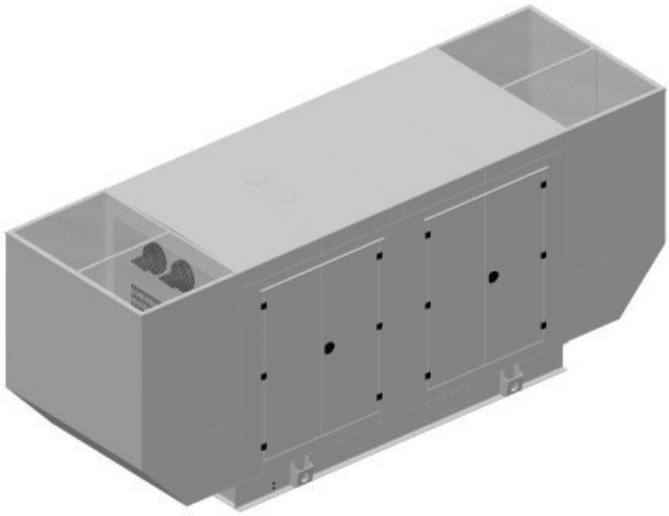
NOTE:
- Measurements with infinite exhaust connection.
- Aluminum enclosure sound levels are approximately 2 dB(A) higher than listed sound levels for steel enclosures.
- For installation within 50 miles of the coast, aluminum enclosures are recommended to prevent accelerated corrosion.
- Sound pressure levels subject to environment, instrumentation, measurement, installation, and generator set variability.
- Generator set is tested on level ground without spring isolators installed.
- Sound power levels per ISO 8528-10 and ANSI S1.13-2005
- Sound data measured with:
  - Full-rated load
  - Standard radiator package

C/F = Consult Factory

* Note: Visual appearance may differ between power nodes.

Enclosure and Sound Data Sheet - Diesel, Open Field

60 Hz: 450-600 kW Standby / 400-550 kW Prime



Level 3 Enclosure (pictured)*

Enclosure Level Identification	
Level 1	Weather-protective enclosure constructed of heavy gauge steel or aluminum with fixed stormproof panels designed for 130 mph wind load rating. Enclosure consists of a bolted and welded construction with unit-mounted internal silencer included. Hinged, lockable double-door access on both sides of the enclosure.
Level 2	Level 1 enclosure with exhaust scoop.
Level 3	Level 2 enclosure with air intake scoop with UL 94 HF-1 compliant, 1.5" thick sound attenuated foam insulation installed in scoops and inside enclosure walls, where applicable.

CERTIFICATIONS AND STANDARDS

- UL 2200
- CSA C22.2 No. 100
- CSA C22.2 No. 14
- High Velocity Hurricane Zone (HVHZ)
  - Miami Dade NOA
- Florida Building Code
- IBC Wind

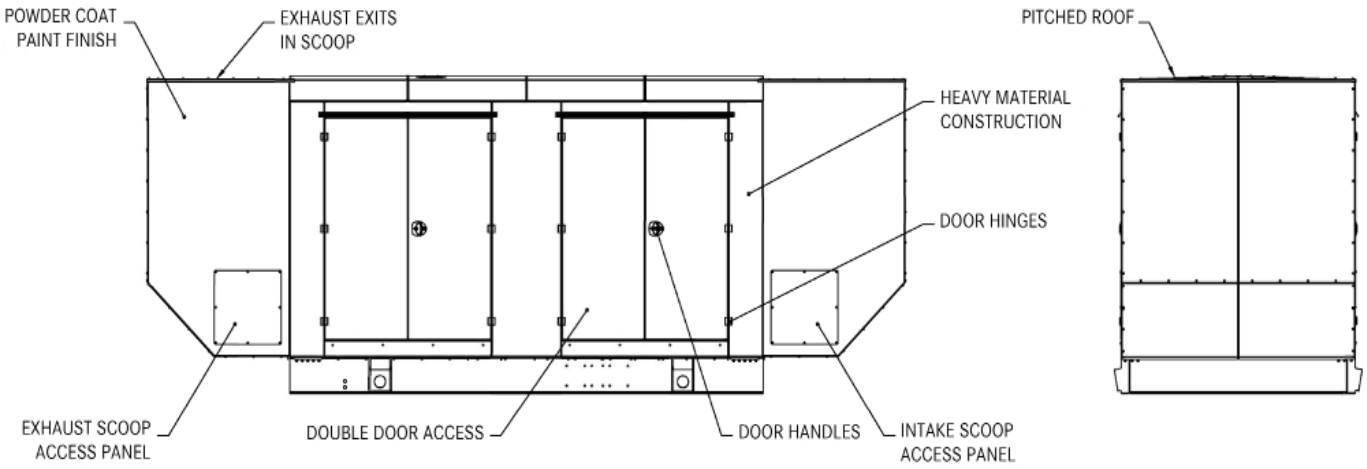
STANDARD FEATURES FOR ALL LEVELS

- Heavy material construction
  - Steel enclosure: 1.9 mm (0.075 in) - 14 gauge or greater thickness
  - Aluminum enclosure: 2.3 mm (0.09 in) or greater thickness
- 130 mph wind rating
- Service access
  - Double door access gives ease of service to all components
- Pitched roof
- Rain shroud and rain cap
- Rodent barriers
- Scoop access panels and drain
- Hardware
  - Powder coated hinges with stainless steel pins
  - Key-lockable and pad-lockable powder coated door handles
- Powder coat finish paint: RAL 7001 Silver Grey standard
  - Custom colors available upon request
- Internal silencer (Critical grade or better)
  - Insulated or wrapped mufflers and exhaust pipes
  - Stainless steel flexible exhaust connections (where applicable)

A Rolls-Royce solution

Enclosure and Sound Data Sheet - Diesel, Open Field

60 Hz: 450-600 kW Standby / 400-550 kW Prime



Level 3 Enclosure (pictured)*

OPTIONAL FEATURES

- Door restraints
- AC or DC light package
- Motorized / gravity louvers (where available)
- 195 mph wind rating
- For other custom options, please consult factory.

OPTIONAL HIGH VELOCITY HURRICANE ZONE (HVHZ) ENCLOSURE

- TAS 201-94 (impact test procedures)
  - Level E = 9 lbs at 80 ft/sec
- TAS 202-94 (static air pressure)
  - Static testing up to 153 pounds per sqare foot (psf)
- TAS 203-94 (cyclic pressure loading)
  - Cyclical tests up to ±126 psf over 671 cycles
- ASTM E72-15 (racking strength test)
- Simulated 195 mph wind at Exposure D
- Meets Florida Building Code (FBC) Section 1626 requirements

ENGINE EXHAUST SOUND RATINGS dB(A) AT 1 METER
OPU SOUND RATINGS dB(A) AT 1 METER
ENCLOSURE SOUND RATINGS dB(A) AT 7 METERS

			1 Meter		7 Meters		
Application	Model	Power Node	Engine Exhaust[1]	OPU[2]	Level 1	Level 2	Level 3
60 Hz Standby	***mtu*** 10V1600 DS450	450 kW	104	102.8	91	86.5	74.5
	mtu 10V1600 DS500	500 kW	106	102.8	91	86.6	74.9
	mtu 12V1600 DS550	550 kW	108.9	100.5	92.9	88	81.2
	mtu 12V1600 DS600	600 kW	109.9	100.5	92.8	89	81.5
Application	Model	Power Node	Engine Exhaust[1]	OPU[2]	Level 1	Level 2	Level 3
60 Hz Prime	***mtu*** 10V1600 DS450	400 kW	C/F	101.8	90.7	86	74
	mtu 10V1600 DS500	450 kW	104	102.8	91	86.5	74.5
	mtu 12V1600 DS550	500 kW	107.6	100.1	92.8	88	81
	mtu 12V1600 DS600	550 kW	108.8	100.3	92.9	88	81.2

[1] Undampened engine exhaust noise

[2] Measurement with infinite exhaust connection

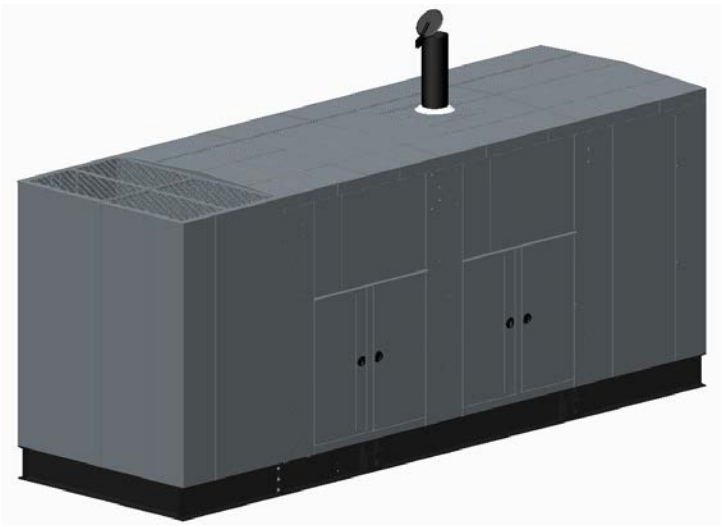
NOTE:
- Measurements include exhaust noise.
- Aluminum enclosure sound levels are approximately 2 dB(A) higher than listed sound levels for steel enclosures.
- For installations within 50 miles of the coast, aluminum enclosures are recommended to prevent accelerated corrosion.
- Sound pressure levels subject to environment, instrumentation, measurement, installation, and generator set variability.
- Generator set is tested on level ground without spring isolators installed.
- Sound power levels per ISO 8528-10 and ANSI S1.13-2005
- Sound data measured with:
  - Full-rated load
  - Standard radiator package

C/F = Consult Factory

* Note: Visual appearance may differ between power nodes.

Enclosure and Sound Data Sheet - Diesel, Open Field

60 Hz: 750-800 kW Standby / 680-725 kW Prime



Level 3 Enclosure (pictured)*

Enclosure Level Identification	
Level 1	Weatherproof enclosure constructed of heavy gauge steel or aluminum with fixed stormproof panels. Enclosure consists of a bolted and welded construction with factory-mounted internal silencer. Hinged, lockable access doors on both sides of the enclosure.
Level 2	Weatherproof enclosure with UL 94 HF-1 compliant, 1.5" thick sound attenuated foam insulation installed inside enclosure walls.
Level 3	Weatherproof, foamed enclosure with additional air intake baffles and exhaust scoop redirecting noise and air flow upward.

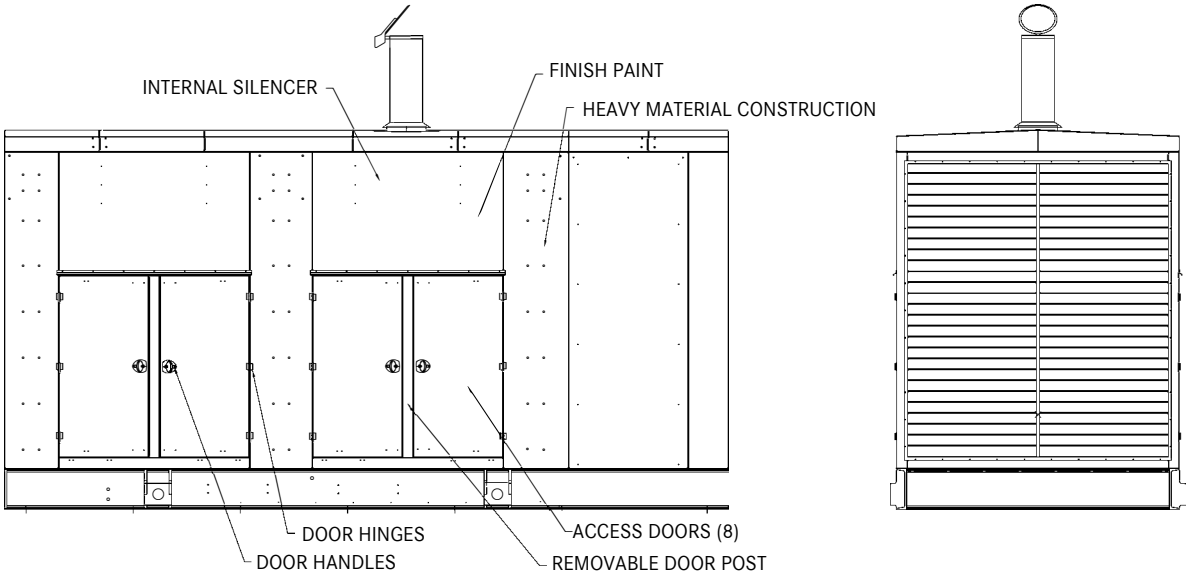
CERTIFICATIONS AND STANDARDS

- UL 2200
- CSA C22.2 No. 100
- CSA C22.2 No. 14

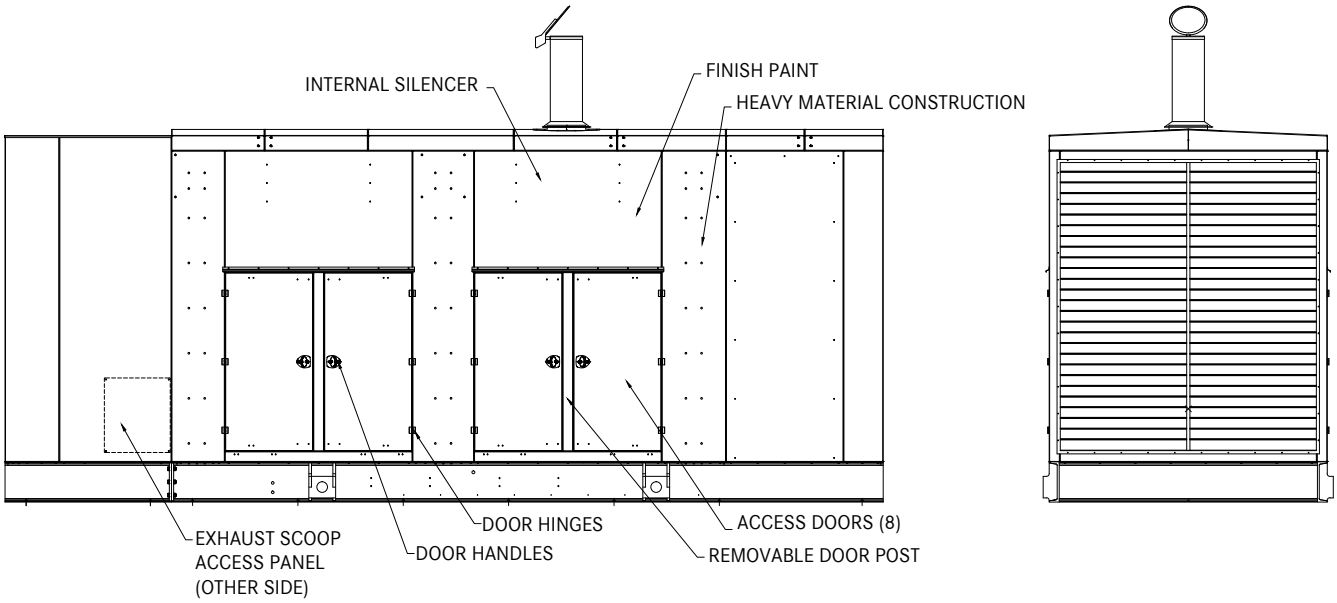
STANDARD FEATURES FOR ALL LEVELS

- Heavy material construction
  - Steel enclosure: 1.9 mm (0.075 in) - 14 gauge or greater thickness
  - Aluminum enclosure: 2.3 mm (0.09 in) or greater thickness
- 130 mph wind rating
- Service access
  - Access doors with removable door posts give ease of service to all components.
- Heavy-duty door gasket
- Door restraints
- Rain shroud and rain cap
- Exhaust scoop access panel (where applicable)
- Hardware
  - Powder coated hinges with stainless steel pins
  - Key-lockable and pad-lockable powder coated door handles
- Finish paint: RAL 7001 Silver Grey standard
  - Custom colors available upon request
- Internal silencer (Hospital grade) for all levels
  - Stainless steel flexible exhaust connections (where applicable)

Enclosure and Sound Data Sheet - Diesel, Open Field
60 Hz: 750-800 kW Standby / 680-725 kW Prime



Level 1 and 2 Enclosure (pictured)*



Level 3 Enclosure (pictured)*

OPTIONAL FEATURES

- AC/DC LED light package
- Motorized intake louver
- Gravity exhaust louver
- Space heater
- 190 mph wind rating
- IBC Certification
- For other custom options, please consult factory.

ENGINE EXHAUST SOUND RATINGS dB(A) AT 1 METER
OPU SOUND RATINGS dB(A) AT 1 METER
ENCLOSURE SOUND RATINGS dB(A) AT 7 METERS

			1 Meter		7 Meters		
Application	**Model**	**Power Node**	**Engine Exhaust[1]**	**OPU[2]**	**Level 1**	**Level 2**	**Level 3**
Standby	***mtu*** 12V2000 DS750 (G05)	750 kW	118.2	101.7	95	87	75.2
	mtu 12V2000 DS800 (G05)	800 kW	118.2	101.7	94	87	75.2
Application	**Model**	**Power Node**	**Engine Exhaust[1]**	**OPU[2]**	**Level 1**	**Level 2**	**Level 3**
Prime	***mtu*** 12V2000 DS750 (G05)	680 kW	116.2	101.7	95	87	75.2
	mtu 12V2000 DS800 (G05)	725 kW	116.2	101.7	94	87	75.2

[1] Undampened engine exhaust noise

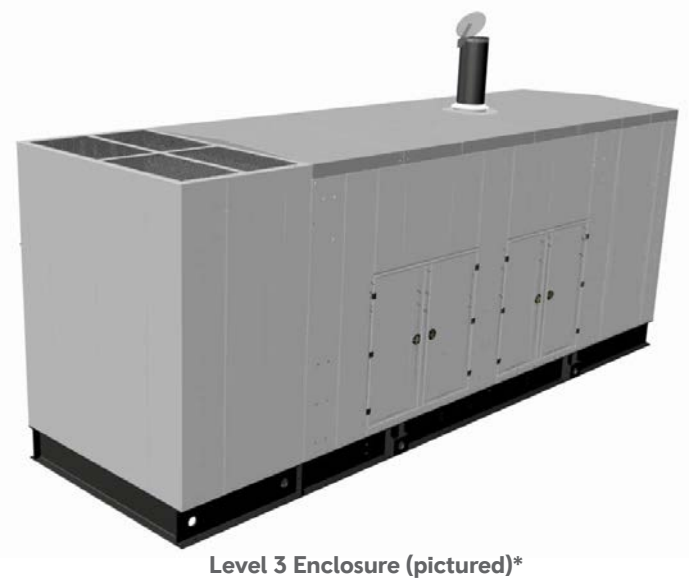
[2] Measurement with infinite exhaust connection

NOTE:
- Measurement includes exhaust noise.
- Aluminum enclosure sound levels are approximately 2 dB(A) higher than listed sound levels for steel enclosures.
- For installation within 50 miles of the coast, aluminum enclosures are recommended to prevent accelerated corrosion.
- Sound pressure levels subject to environment, instrumentation, measurement, installation, and generator set variability.
- Generator set is tested on level ground without spring isolators installed.
- Sound power levels per ISO 8528-10 and ANSI S1.13-2005
- Sound data measured with:
  - Full-rated load
  - Standard radiator package

* Note: Visual appearance may differ between power nodes.

Enclosure and Sound Data Sheet - Diesel, Open Field

60 Hz: 1,000-1,250 kW Standby / 900 kW Prime



Level 3 Enclosure (pictured)*

Enclosure Level Identification	
Level 1	Weatherproof enclosure constructed of heavy gauge steel or aluminum with fixed stormproof panels. Enclosure consists of a bolted and welded construction with factory-mounted internal silencer. Hinged, lockable access doors on both sides of the enclosure.
Level 2	Weatherproof enclosure with UL 94 HF-1 compliant, 1.5" thick sound attenuated foam insulation installed inside enclosure walls.
Level 3	Weatherproof, foamed enclosure with additional air intake baffles and exhaust scoop redirecting noise and air flow upward.

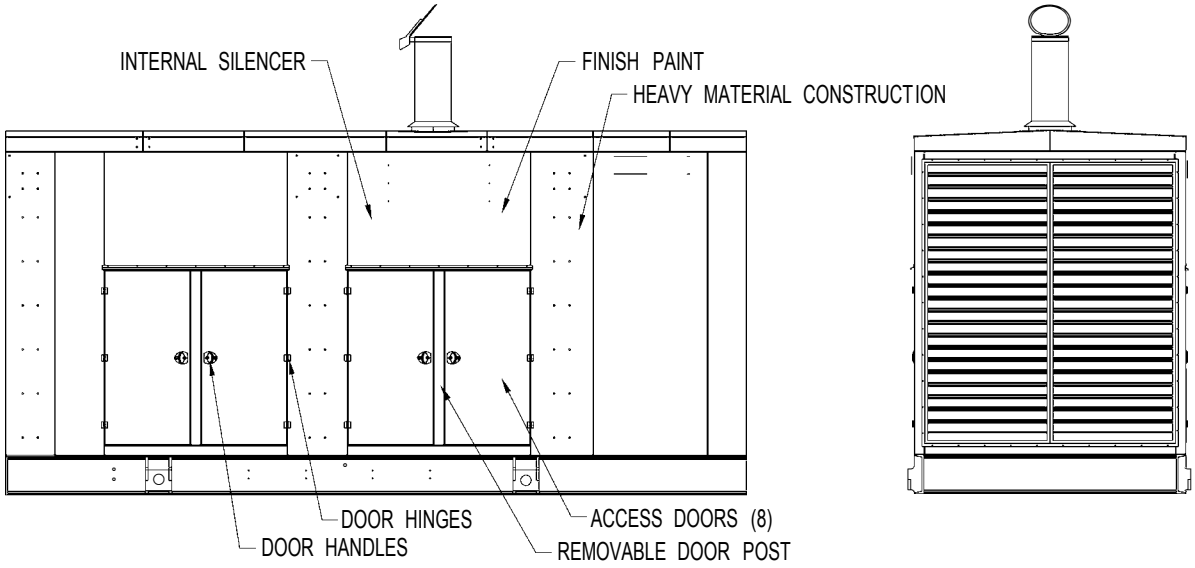
CERTIFICATIONS AND STANDARDS

- UL 2200
- CSA C22.2 No. 100
- CSA C22.2 No. 14

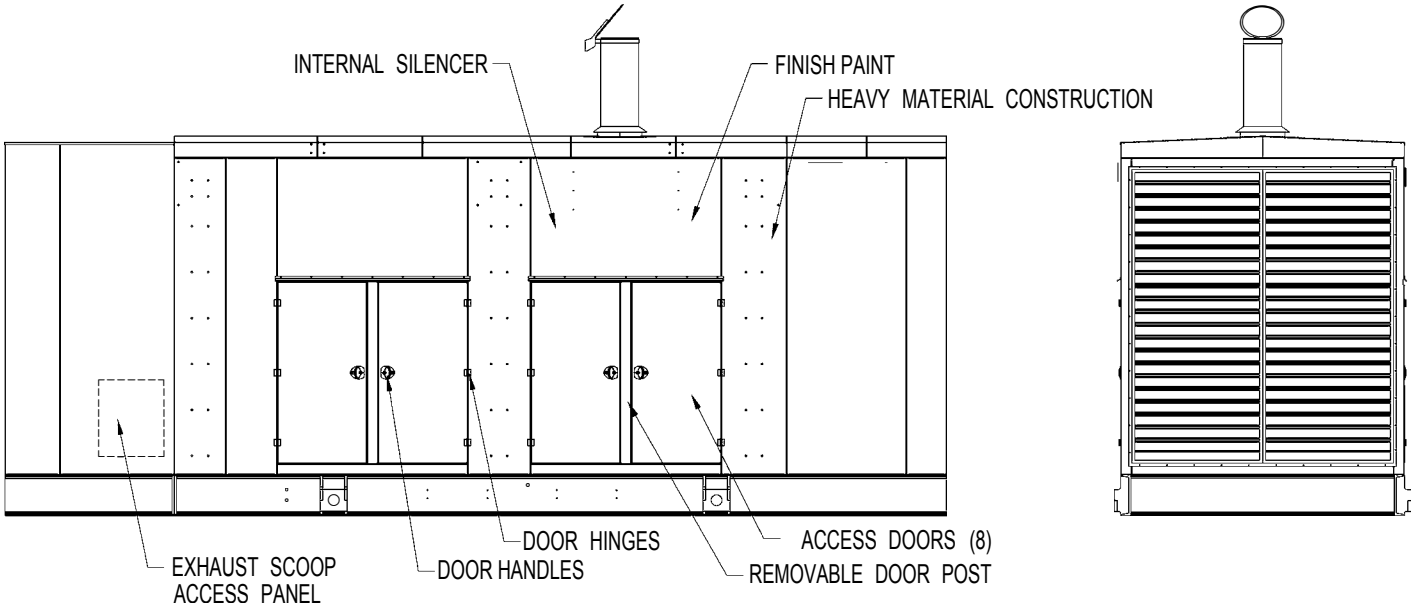
STANDARD FEATURES FOR ALL LEVELS

- Heavy material construction
  - Steel enclosure: 1.9 mm (0.075 in) - 14 gauge or greater thickness
  - Aluminum enclosure: 2.3 mm (0.09 in) or greater thickness
- 130 mph wind rating
- Service access
  - Access doors with removable door posts give ease of service to all components.
- Heavy-duty door gasket
- Door restraints
- Rain shroud and rain cap
- Exhaust scoop access panel (where applicable)
- Hardware
  - Powder coated hinges with stainless steel pins
  - Key-lockable and pad-lockable powder coated door handles
- Finish paint: RAL 7001 Silver Grey standard
  - Custom colors available upon request
- Internal silencer (hospital grade) for all levels
  - Stainless steel flexible exhaust connections (where applicable)

Enclosure and Sound Data Sheet - Diesel, Open Field
60 Hz: 1,000-1,250 kW Standby / 900 kW Prime



Level 1 and 2 Enclosure (pictured)*



Level 3 Enclosure (pictured)*

OPTIONAL FEATURES

- AC/DC LED light package
- Motorized intake louver
- Gravity exhaust louver
- Space heater
- 190 mph wind rating
- IBC Certification
- For other custom options, please consult factory.

ENGINE EXHAUST SOUND RATINGS dB(A) AT 1 METER
OPU SOUND RATINGS dB(A) AT 1 METER
ENCLOSURE SOUND RATINGS dB(A) AT 7 METERS

			1 Meter		7 Meters		
Application	**Model**	**Power Node**	**Engine Exhaust[1]**	**OPU[2]**	**Level 1**	**Level 2**	**Level 3**
Standby	***mtu*** 16V2000 DS1000 (G06)	1,000 kW	121.8	105.5	92	86.4	74.7
	mtu 16V2000 DS1250 (G06)	1,250 kW	121.8	106.8	93	86	75
Application	**Model**	**Power Node**	**Engine Exhaust[1]**	**OPU[2]**	**Level 1**	**Level 2**	**Level 3**
Prime	***mtu*** 16V2000 DS1000 (G06)	900 kW	121.3	105.5	92	86	74.7

[1] Undampened engine exhaust noise

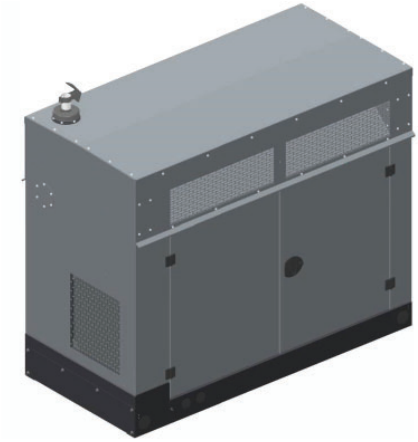
[2] Measurement with infinite exhaust connection

NOTE:
- Measurement includes exhaust noise.
- Aluminum enclosure sound levels are approximately 2 dB(A) higher than listed sound levels for steel enclosures.
- For installation within 50 miles of the coast, aluminum enclosures are recommended to prevent accelerated corrosion.
- Sound pressure levels subject to environment, instrumentation, measurement, installation, and generator set variability.
- Generator set is tested on level ground without spring isolators installed.
- Sound power levels per ISO 8528-10 and ANSI S1.13-2005
- Sound data measured with:
  - Full-rated load
  - Standard radiator package

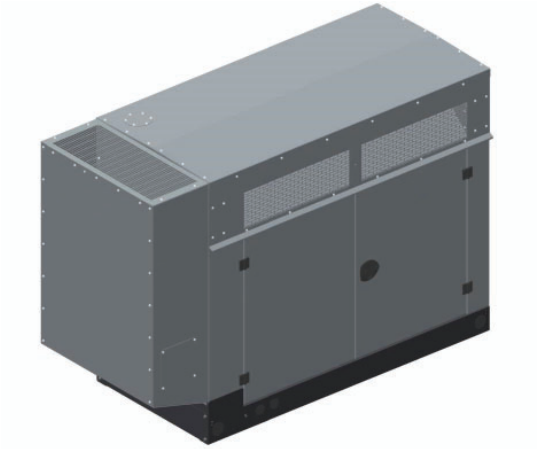
* Note: Visual appearance may differ between power nodes.

Enclosure and Sound Data Sheet - Gas, Open Field

60 Hz: 30-40 kW Standby



Level 1 or 2 Enclosure (pictured)*



Level 3 Enclosure (pictured)*

Enclosure Level Identification	
Level 1	Basic weather-protective enclosure constructed of heavy gauge steel or aluminum with fixed stormproof panels designed for 195 mph wind load rating. Skid-mounted enclosure consists of a bolted and welded construction with unit-mounted internal silencer. Hinged, lockable double-door access on both sides of the enclosure.
Level 2	Enhanced weather-protective enclosure constructed of heavy gauge steel or aluminum with fixed stormproof panels designed for 195 mph wind load rating. Skid-mounted enclosure consists of a bolted and welded construction with unit-mounted internal silencer. Hinged, lockable double-door access on both sides of enclosure. UL 94 HF-1 compliant,1.5" thick sound attenuated foam insulation installed inside enclosure walls where applicable.
Level 3	Level 2 enclosure with air exhaust scoop with UL 94 HF-1 compliant, 1.5" thick sound attenuated foam insulation installed where applicable.

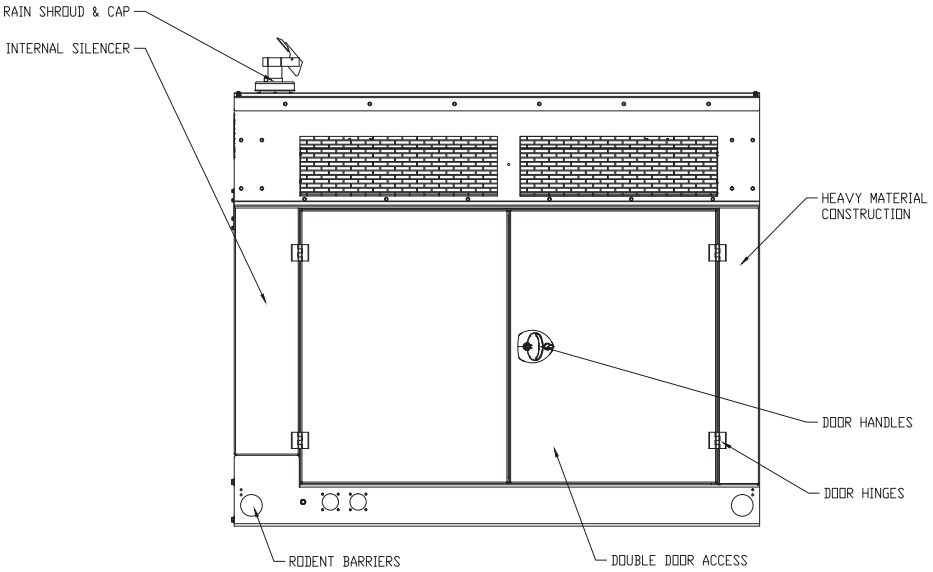
CERTIFICATIONS AND STANDARDS

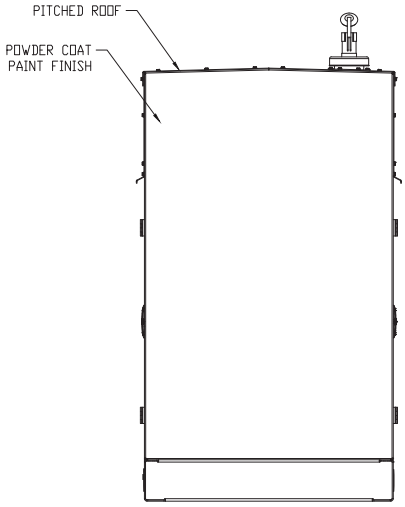
- UL 2200
- CSA C22.2 No. 100
- CSA C22.2 No. 14
- High Velocity Hurricane Zone (HVHZ)
  - Miami Dade NOA
- Florida Building Code
- IBC Wind

STANDARD FEATURES FOR ALL LEVELS

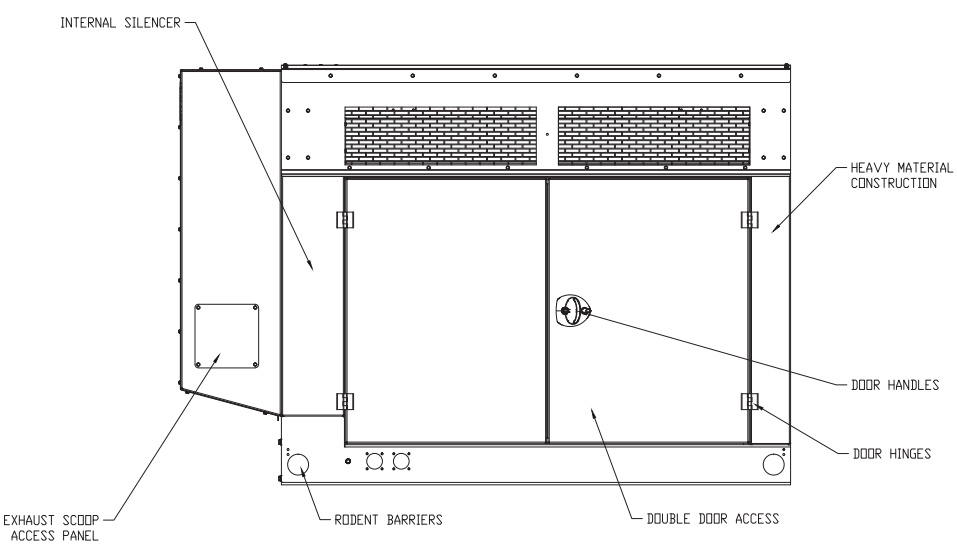
- Heavy material construction
  - Steel enclosure: 1.9 mm (0.075 in) - 14 gauge or greater thickness
  - Aluminum enclosure: 2.3 mm (0.09 in) or greater thickness
- 195 mph wind rating
- Service access
  - Double door access gives ease of service to all components
- Pitched roof
- Rain shroud and rain cap
- Rodent barriers
- Exhaust scoop access panel and drain
- Hardware
  - Powder coated hinges with stainless steel pins
  - Key-lockable and pad-lockable powder coated door handles
- Powder coat finish paint: RAL 7001 Silver Grey standard
  - Custom colors available upon request
- Internal silencer (Level 1-3) or both internal and scoop mounted silencer (Level 3: 30 kW only)
  - Critical grade silencers
  - Insulated or wrapped silencers and exhaust pipes
  - Stainless steel flexible exhaust connection (where applicable)

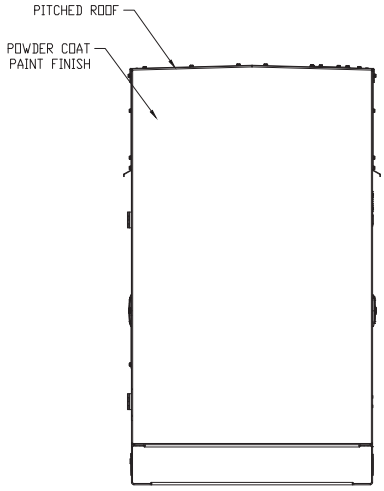
Enclosure and Sound Data Sheet - Gas, Open Field
60 Hz: 30-40 kW Standby





Levels 1 and 2 Enclosure (pictured)*





Level 3 Enclosure (pictured)*

OPTIONAL FEATURES (LEVELS 2 AND 3 ONLY)

- Door restraints
- LED light package
- Gravity exhaust louvers
- Distribution panel
- Enclosure space heater
- Motorized intake louvers
- For other custom options, please consult factory.

OPTIONAL HIGH VELOCITY HURRICANE ZONE (HVHZ) ENCLOSURE

- TAS 201-94 (impact test procedures)
  - Level E = 9 lbs at 80 ft/sec
- TAS 202-94 (static air pressure)
  - Static testing up to 153 pounds per sqare foot (psf)
- TAS 203-94 (cyclic pressure loading)
  - Cyclical tests up to ±126 psf over 671 cycles
- ASTM E72-15 (racking strength test)
- Simulated 195 mph wind at Exposure D
- Meets Florida Building Code (FBC) Section 1626 requirements

ENGINE EXHAUST SOUND RATINGS dB(A) AT 1 METER
OPU SOUND RATINGS dB(A) AT 1 METER
ENCLOSURE SOUND RATINGS dB(A) AT 7 METERS

			1 Meter		7 Meters		
Application	**Model**	**Power Node**	**Engine Exhaust[1]**	**OPU[2]**	**Level 1**	**Level 2**	**Level 3**
Standby (Natural Gas)	***mtu*** 4R0063 GS30	30 kW	108.5	85.6	71.5	70.3	64.1
	mtu 4R0063 GS40	40 kW	94.5	84.1	70.7	67.5	61.8
Application	**Model**	**Power Node**	**Engine Exhaust[1]**	**OPU[2]**	**Level 1**	**Level 2**	**Level 3**
Stanndby (Liquid Propane)	***mtu*** 4R0063 GS30	30 kW	108.5	85.6	71.6	70.4	64.2
	mtu 4R0063 GS40	40 kW	94.6	84.2	70.8	67.6	61.9

[1] Undampened engine exhaust noise

[2] Measurement with infinite exhaust connection

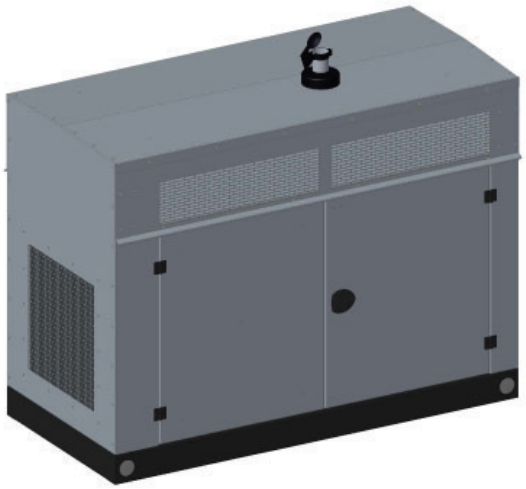
NOTE:
- Measurements include exhaust noise unless stated otherwise.
- Aluminum enclosure sound levels are approximately 2 dB(A) higher than listed sound levels for steel enclosures.
- For installation within 50 miles of the coast, aluminum enclosures are recommended to prevent accelerated corrosion.
- Sound pressure levels subject to environment, instrumentation, measurement, installation, and generator set variability.
- Generator set is tested on ground without spring isolators installed.
- Sound pressure levels per ISO 8528-10 and ANSI S1.13-2005
- Sound data measured with:
  - Full-rated load
  - Standard radiator package

C/F = Consult Factory

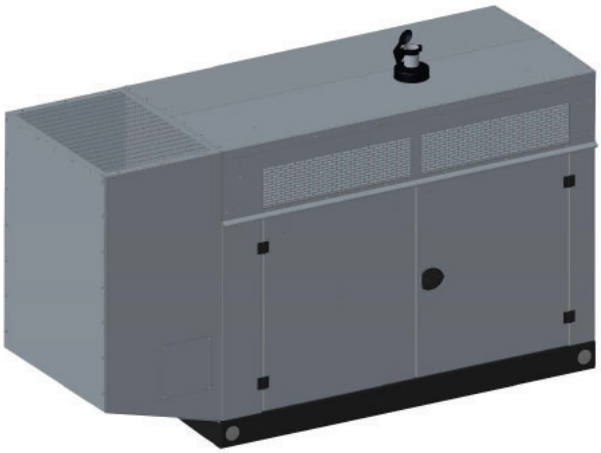
* Note: Visual appearance may differ between power nodes.

Enclosure and Sound Data Sheet - Gas, Open Field

60 Hz: 50-60 kW Standby



Level 1 Enclosure (pictured)



Level 3 Enclosure (pictured)

Enclosure Level Identification	
Level 1	Skid-mounted weather-protective enclosure constructed of heavy gauge steel or aluminum with fixed stormproof panels designed for 130 mph wind load rating. Enclosure consists of a bolted and welded construction with unit-mounted internal silencer. Hinged, lockable double-door access on both sides of the enclosure.
Level 2	Level 1 enclosure with UL 94 HF-1 compliant, 1.5" thick sound attenuated foam insulation installed on enclosure walls.
Level 3	Level 2 enclosure with air exhaust scoop.
Level 3 Plus	Level 3 enclosure with UL 94 HF-1 compliant, 1.5” thick sound attenuated foam on ceiling and in air exhaust scoop.

CERTIFICATIONS AND STANDARDS

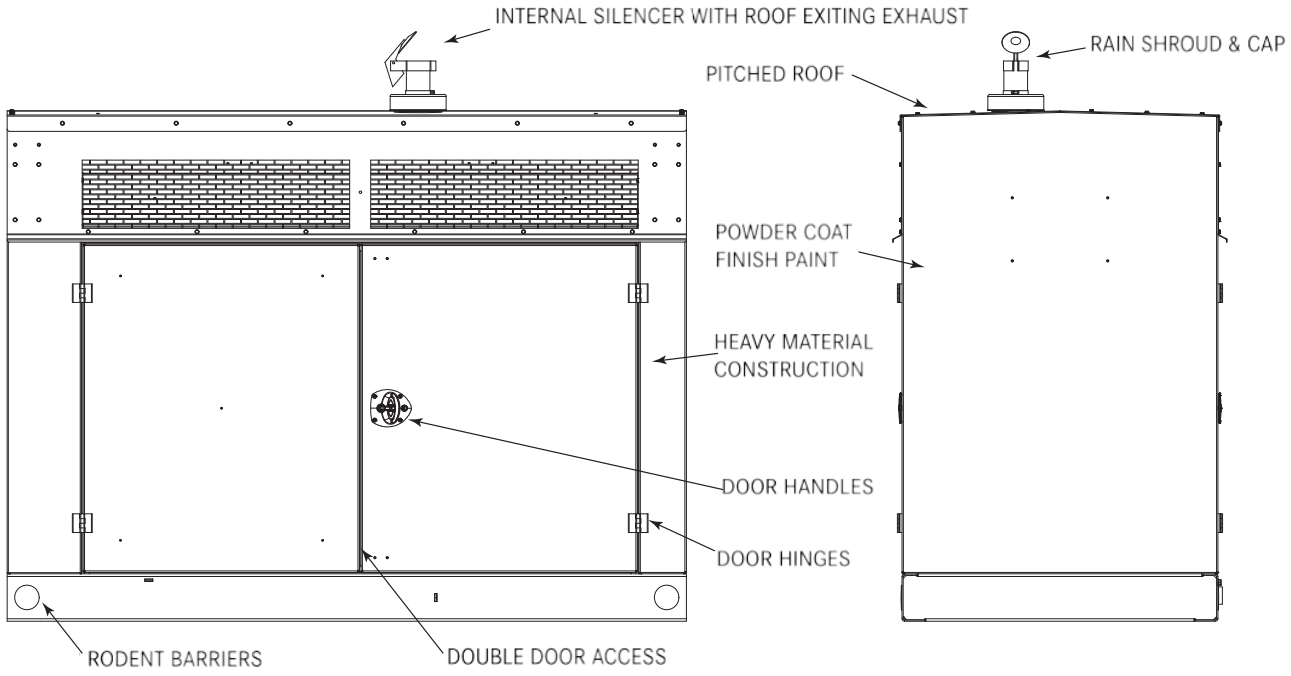
- UL 2200
- CE Marking Provided
- CSA C22.2 No. 100
- CSA C22.2 No. 14
- High Velocity Hurricane Zone (HVHZ)
  - Miami Dade NOA
- Florida Building Code
- IBC Wind

A Rolls-Royce solution

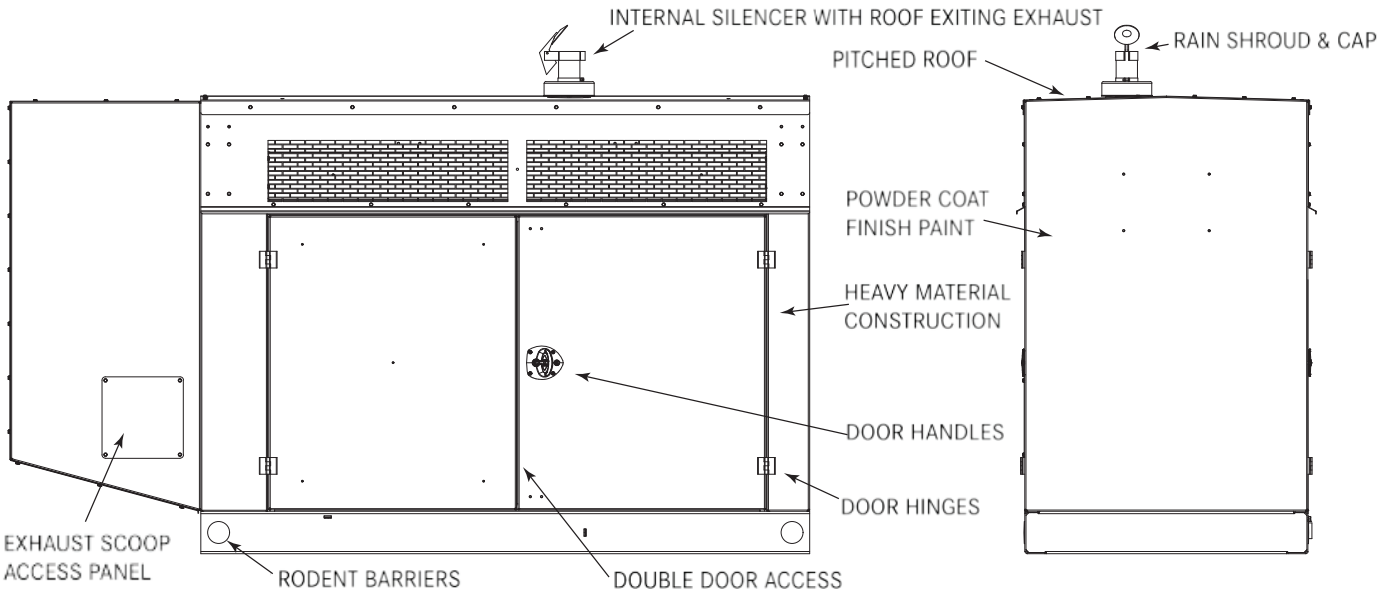
Enclosure and Sound Data Sheet - Gas, Open Field
60 Hz: 50-60 kW Standby

STANDARD FEATURES FOR ALL LEVELS

- Heavy material construction
  - Steel enclosure: 1.9 mm (0.075 in) - 14 gauge or greater thickness
  - Aluminum enclosure: 2.3 mm (0.09 in) or greater thickness
- 130 mph wind rating
- Service access
  - Double door access gives ease of service to all components
- Pitched roof
- Rain shroud
- Rain cap
- Rodent barriers
- Exhaust scoop access panel and drain
- Hardware
  - Powder coated hinges with stainless steel pins
  - Key-lockable and pad-lockable powder coated door handles
- Powder coat finish paint: RAL 7001 Silver Grey standard
  - Custom colors available upon request
- Internal silencer (Hospital Grade)
  - Wrapped exhaust pipe



Level 1 Enclosure (pictured)



Level 3 Enclosure (pictured)

OPTIONAL FEATURES

- Door restraints
- LED light package
- Enclosure space heater
- Motorized intake louvers
- 195 mph wind rating
- Distribution panel
- Gravity exhaust louvers
- For other custom options, please consult factory.

OPTIONAL HIGH VELOCITY HURRICANE ZONE (HVHZ) ENCLOSURE

- TAS 201-94 (impact test procedures)
  - Level E = 9 lbs at 80 ft/sec
- TAS 202-94 (static air pressure)
  - Static testing up to 153 pounds per sqare foot (psf)
- TAS 203-94 (cyclic pressure loading)
  - Cyclical tests up to ±126 psf over 671 cycles
- ASTM E72-15 (racking strength test)
- Simulated 195 mph wind at Exposure D
- Meets Florida Building Code (FBC) Section 1626 requirements

OPU SOUND RATINGS dB(A) AT 1 METER
ENCLOSURE SOUND RATINGS dB(A) AT 7 METERS

			1 Meter		7 Meters			
Application	Model	Power Node	Engine Exhaust[1]	OPU[2]	Level 1	Level 2	Level 3	Level 3 Plus
60 Hz (Natural Gas)	***mtu*** 8V0071 GS50	50 kW	107.3	87.7	74.3	73.9	68.9	66.9
	mtu 8V0071 GS60	60 kW	107.2	88.3	74.7	73.6	68.2	67.3
Application	Model	Power Node	Engine Exhaust[1]	OPU[2]	Level 1	Level 2	Level 3	Level 3 Plus
60 Hz (Liquid Propane)	***mtu*** 8V0071 GS50	50 kW	107.3	87.7	74.3	73.9	68.9	66.9
	mtu 8V0071 GS60	60 kW	107.2	88.3	74.7	73.6	68.2	67.3

[1] Undampened engine exhaust noise

[2] Measurement with infinite exhaust connection

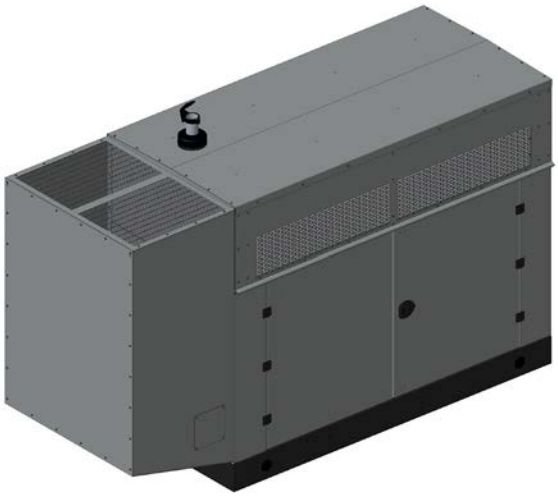
NOTE:

— Measurements include exhaust noise.
— Aluminum enclosure sound levels are approximately 2 dB(A) higher than listed sound levels for steel enclosures.
— For installation within 50 miles of the coast, aluminum enclosures are recommended to prevent accelerated corrosion.
— Sound pressure levels subject to environment, instrumentation, measurement, installation, and generator set variability.
— Generator set is tested on level ground without spring isolators installed.
— Sound power levels per ISO 8528-10 and ANSI S1.13-2005
— Sound data measured with:
  - Full-rated load
  - Standard radiator package

Enclosure and Sound Data Sheet - Gas, Open Field

60 Hz: 100 kW Standby

Level 1 Enclosure (pictured)



Level 3 Enclosure (pictured)

Enclosure Level Identification	
Level 1	Skid-mounted weather-protective enclosure constructed of heavy gauge steel or aluminum with fixed stormproof panels designed for 130 mph wind load rating. Enclosure consists of a bolted and welded construction with unit-mounted internal silencer. Hinged, lockable double-door access on both sides of the enclosure.
Level 2	Level 1 enclosure with UL 94 HF-1 compliant, 1.5" thick sound attenuated foam insulation installed on enclosure walls.
Level 3	Level 2 enclosure with air exhaust scoop including UL 94 HF-1 compliant, 1.5" thick sound attenuated foam insulation.

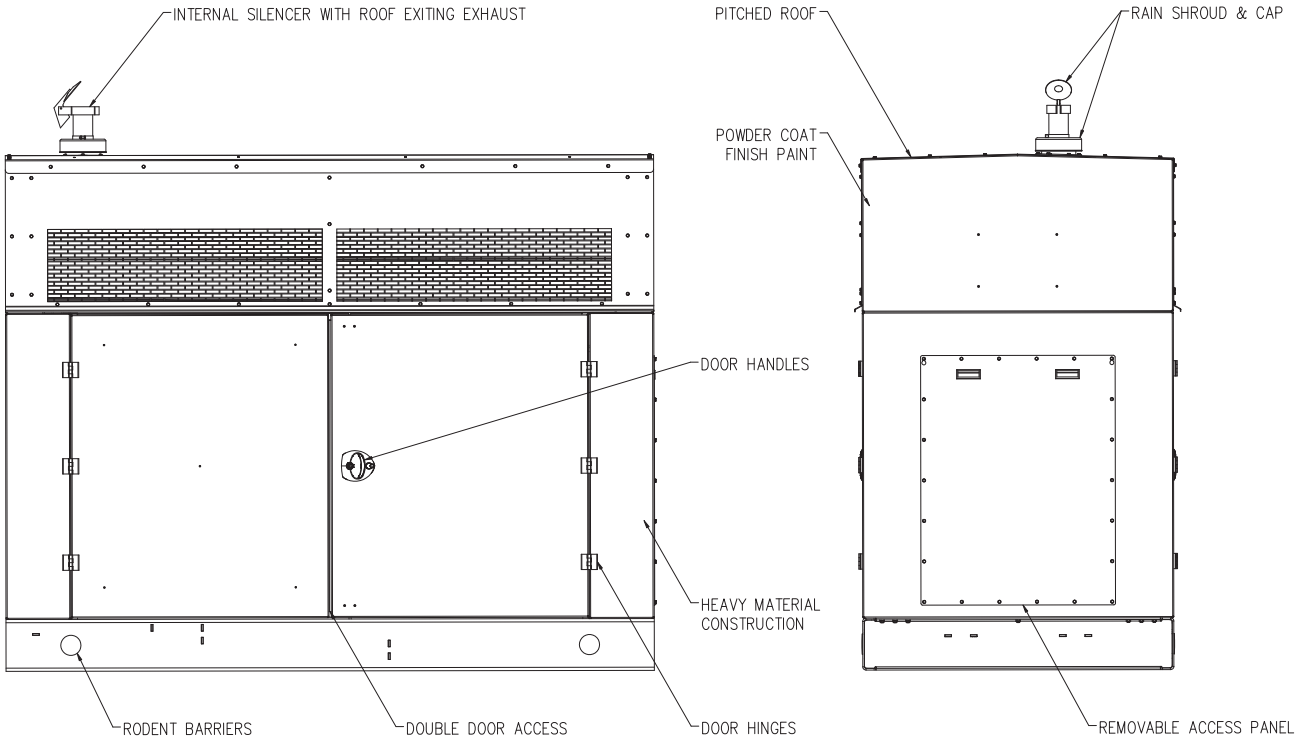
CERTIFICATIONS AND STANDARDS

- UL 2200
- CE Marking Provided
- CSA C22.2 No. 100
- CSA C22.2 No. 14
- High Velocity Hurricane Zone (HVHZ)
  - Miami Dade NOA
- Florida Building Code
- IBC Wind

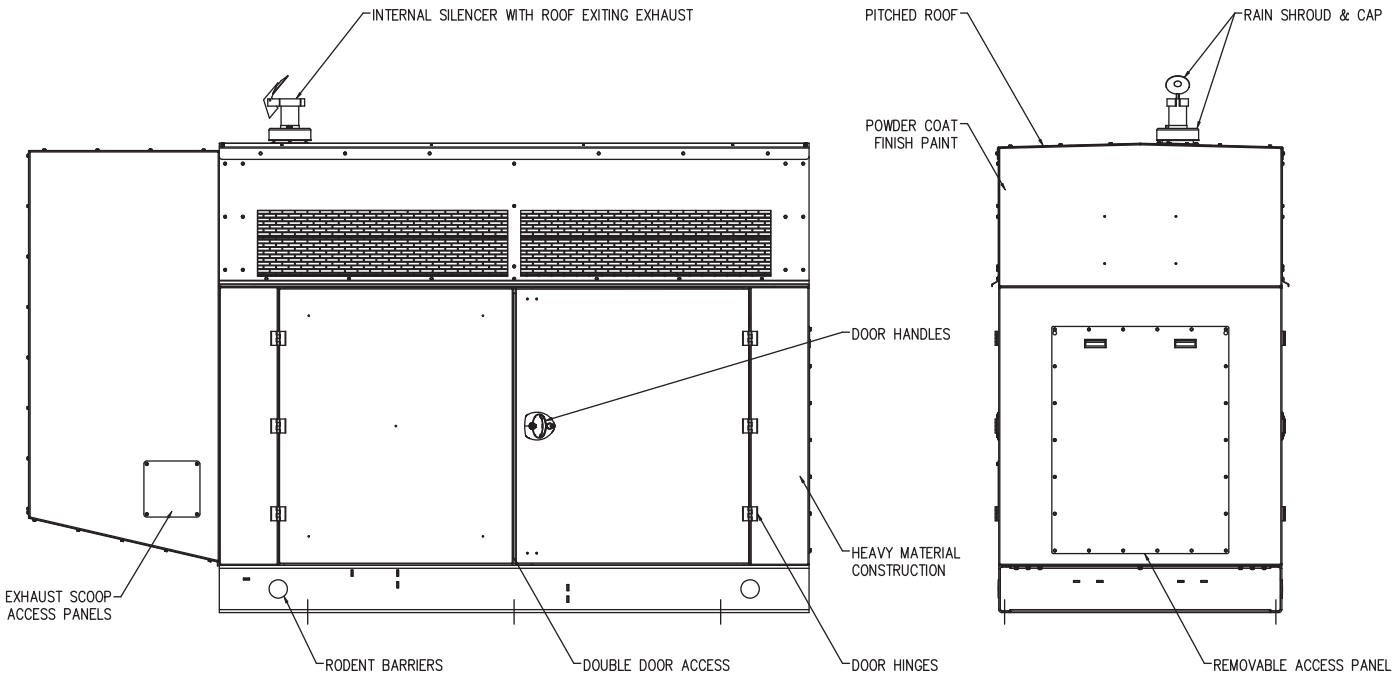
Enclosure and Sound Data Sheet - Gas, Open Field
60 Hz: 100 kW Standby

STANDARD FEATURES FOR ALL LEVELS

- Heavy material construction
  - Steel enclosure: 1.9 mm (0.075 in) - 14 gauge or greater thickness
  - Aluminum enclosure: 2.3 mm (0.09 in) or greater thickness
- 130 mph wind rating
- Service access
  - Double door access gives ease of service to all components
- Pitched roof
- Rain shroud
- Rain cap
- Rodent barriers
- Exhaust scoop access panel and drain
- Hardware
  - Powder coated hinges with stainless steel pins
  - Key-lockable and pad-lockable powder coated door handles
- Powder coat finish paint: RAL 7001 Silver Grey standard
  - Custom colors available upon request
- Internal silencer (Critical grade or better)
  - Insulated or wrapped mufflers and exhaust pipes
  - Stainless steel flexible exhaust connections (where applicable)



Level 1 Enclosure (pictured)



Level 3 Enclosure (pictured)

OPTIONAL FEATURES

- Door restraints
- LED light package
- Enclosure space heater
- Motorized intake louvers
- 195 mph wind rating
- Distribution panel
- Gravity exhaust louvers
- For other custom options, please consult factory.

OPTIONAL HIGH VELOCITY HURRICANE ZONE (HVHZ) ENCLOSURE

- TAS 201-94 (impact test procedures)
  - Level E = 9 lbs at 80 ft/sec
- TAS 202-94 (static air pressure)
  - Static testing up to 153 pounds per sqare foot (psf)
- TAS 203-94 (cyclic pressure loading)
  - Cyclical tests up to ±126 psf over 671 cycles
- ASTM E72-15 (racking strength test)
- Simulated 195 mph wind at Exposure D
- Meets Florida Building Code (FBC) Section 1626 requirements

Enclosure and Sound Data Sheet - Gas, Open Field
60 Hz: 100 kW Standby

OPU SOUND RATINGS dB(A) AT 1 METER
ENCLOSURE SOUND RATINGS dB(A) AT 7 METERS

			1 Meter		7 Meters		
Application	**Model**	**Power Node**	**Engine Exhaust[1]**	**OPU[2]**	**Level 1**	**Level 2**	**Level 3**
60 Hz (Natural Gas)	***mtu*** 8V0078 GS100	100 kW	96.5	100.2	87.9	85.5	73.6
Application	**Model**	**Power Node**	**Engine Exhaust[1]**	**OPU[2]**	**Level 1**	**Level 2**	**Level 3**
60 Hz (Liquid Propane)	***mtu*** 8V0078 GS100	80 kW	95.4	99.7	86.3	84.1	72.9

[1] Undampened engine exhaust noise

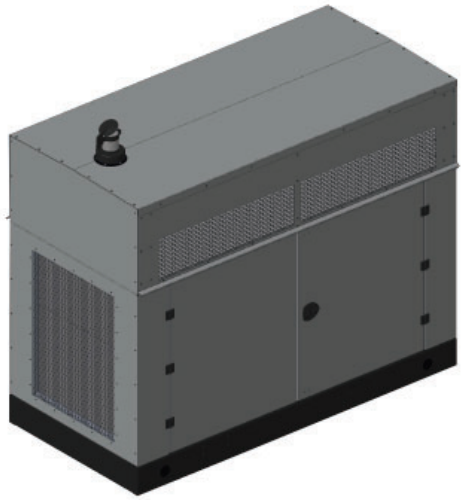
[2] Measurement with infinite exhaust connection

NOTE:

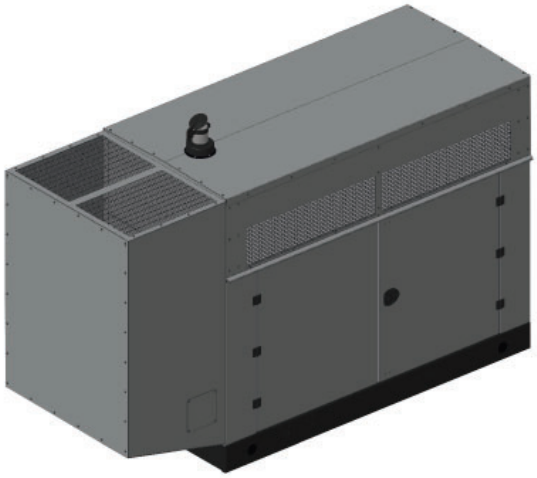
— Measurements include exhaust noise.
— Aluminum enclosure sound levels are approximately 2 dB(A) higher than listed sound levels for steel enclosures.
— For installation within 50 miles of the coast, aluminum enclosures are recommended to prevent accelerated corrosion.
— Sound pressure levels subject to environment, instrumentation, measurement, installation, and generator set variability.
— Generator set is tested on level ground without spring isolators installed.
— Sound power levels per ISO 8528-10 and ANSI S1.13-2005
— Sound data measured with:
  - Full-rated load
  - Standard radiator package

Enclosure and Sound Data Sheet - Gas, Open Field

60 Hz: 150 kW Standby



Level 1 Enclosure (pictured)



Level 3 Enclosure (pictured)

Enclosure Level Identification	
Level 1	Skid-mounted weather-protective enclosure constructed of heavy gauge steel or aluminum with fixed stormproof panels designed for 130 mph wind load rating. Enclosure consists of a bolted and welded construction with unit-mounted internal silencer. Hinged, lockable double-door access on both sides of the enclosure.
Level 2	Level 1 enclosure with UL 94 HF-1 compliant, 1.5" thick sound attenuated foam insulation installed on enclosure walls.
Level 3	Level 2 enclosure with air exhaust scoop including UL 94 HF-1 compliant, 1.5" thick sound attenuated foam insulation.
Level 3 Plus	Level 3 enclosure with UL 94 HF-1 compliant, 1.5" thick sound attenuated foam on enclosure walls and ceiling.

CERTIFICATIONS AND STANDARDS

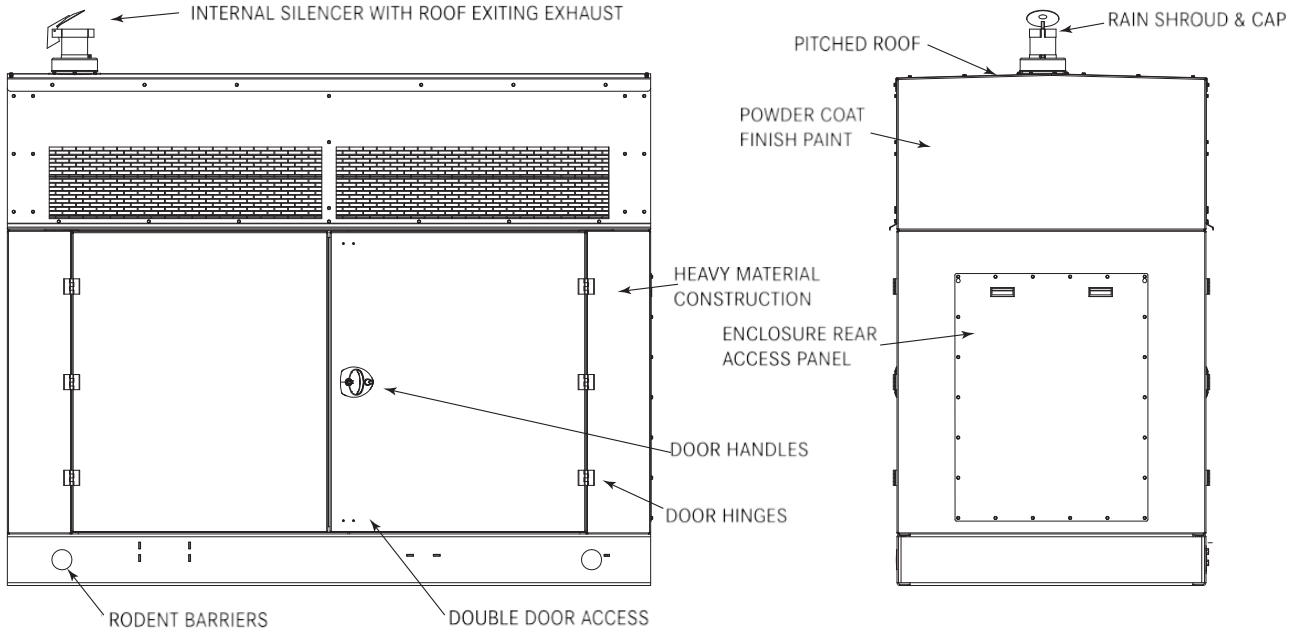
- UL 2200
- CE Marking Provided
- CSA C22.2 No. 100
- CSA C22.2 No. 14
- High Velocity Hurricane Zone (HVHZ)
  - Miami Dade NOA
- Florida Building Code
- IBC Wind

A Rolls-Royce solution

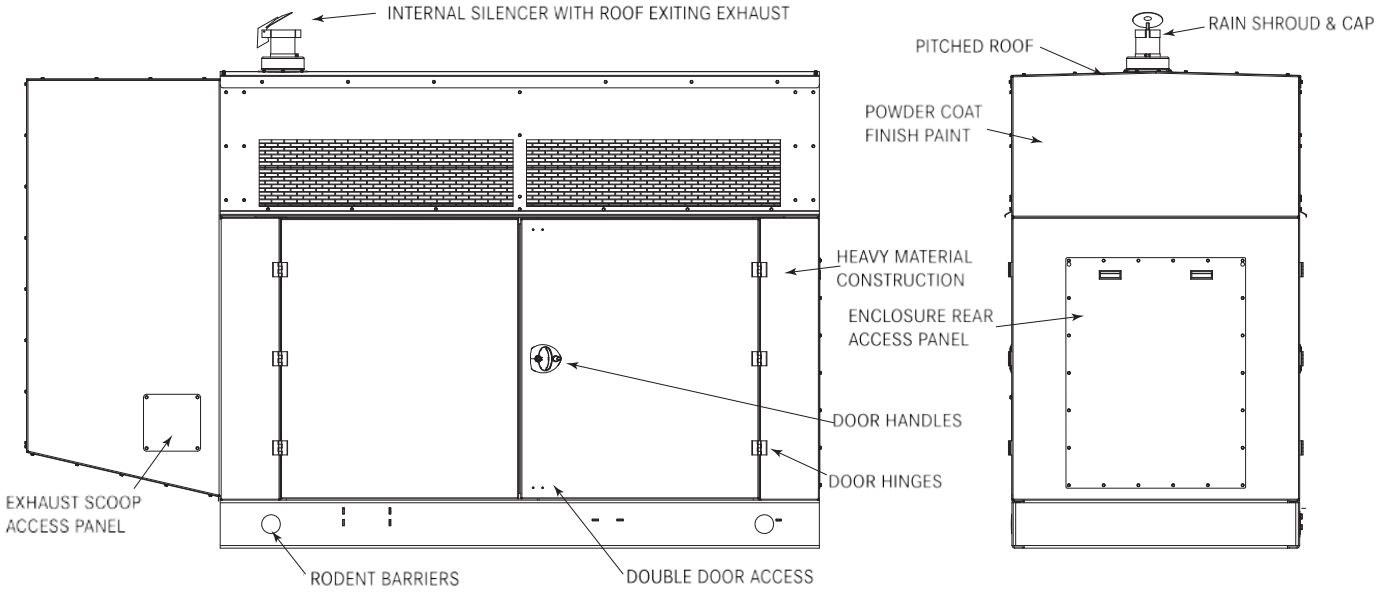
Enclosure and Sound Data Sheet - Gas, Open Field
60 Hz: 150 kW Standby

STANDARD FEATURES FOR ALL LEVELS

- Heavy material construction
  - Steel enclosure: 1.9 mm (0.075 in) - 14 gauge or greater thickness
  - Aluminum enclosure: 2.3 mm (0.09 in) or greater thickness
- 130 mph wind rating
- Service access
  - Double door access gives ease of service to all components
- Pitched roof
- Rain shroud
- Rain cap
- Rodent barriers
- Exhaust scoop access panel and drain
- Hardware
  - Powder coated hinges with stainless steel pins
  - Key-lockable and pad-lockable powder coated door handles
- Powder coat finish paint: RAL 7001 Silver Grey standard
  - Custom colors available upon request
- Internal silencer (Hospital Grade)
  - Insulated silencer
  - Stainless steel flexible exhaust connections (where applicable)



Level 1 Enclosure (pictured)



Level 3 Enclosure (pictured)

OPTIONAL FEATURES

- Door restraints
- LED light package
- Enclosure space heater
- Motorized intake louvers
- 195 mph wind rating
- Distribution panel
- Gravity exhaust louvers
- For other custom options, please consult factory.

OPTIONAL HIGH VELOCITY HURRICANE ZONE (HVHZ) ENCLOSURE

- TAS 201-94 (impact test procedures)
  - Level E = 9 lbs at 80 ft/sec
- TAS 202-94 (static air pressure)
  - Static testing up to 153 pounds per sqare foot (psf)
- TAS 203-94 (cyclic pressure loading)
  - Cyclical tests up to ±126 psf over 671 cycles
- ASTM E72-15 (racking strength test)
- Simulated 195 mph wind at Exposure D
- Meets Florida Building Code (FBC) Section 1626 requirements

Enclosure and Sound Data Sheet - Gas, Open Field
60 Hz: 150 kW Standby

OPU SOUND RATINGS dB(A) AT 1 METER
ENCLOSURE SOUND RATINGS dB(A) AT 7 METERS

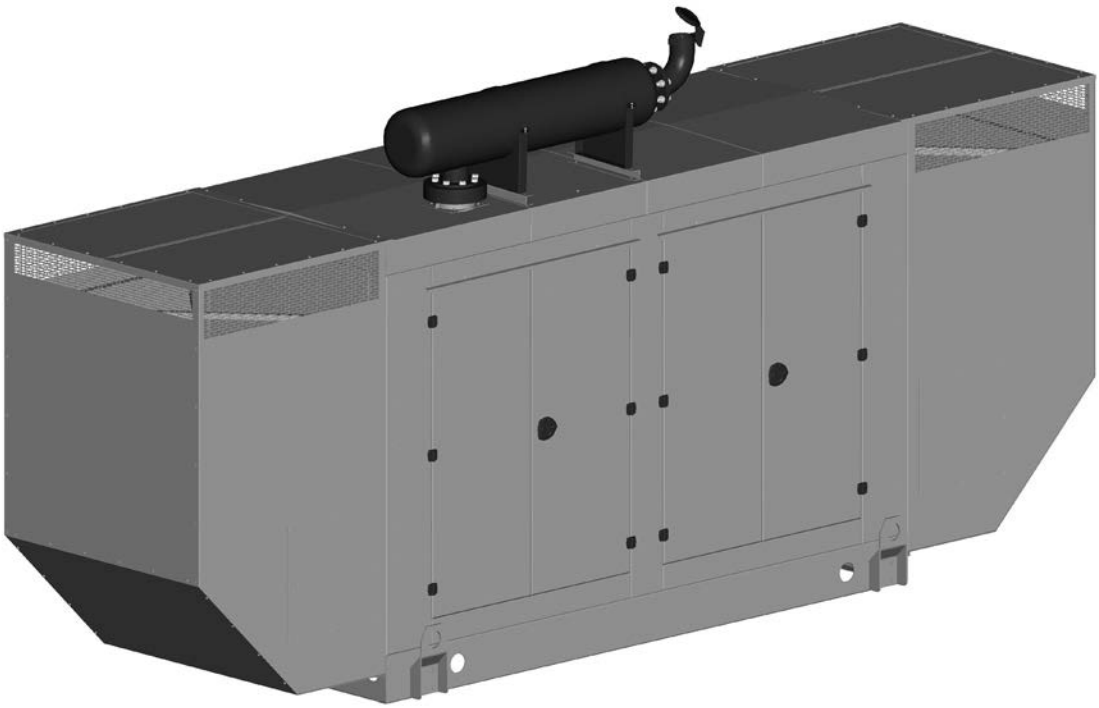
			1 Meter	7 Meters			
Application	**Model**	**Power Node**	**OPU[1]**	**Level 1**	**Level 2**	**Level 3**	**Level 3 Plus**
60 Hz (Natural Gas)	***mtu*** 8V0110 GS150	150 kW	93.6	87.6	87.6	74.5	71.9
Application	**Model**	**Power Node**	**OPU[1]**	**Level 1**	**Level 2**	**Level 3**	**Level 3 Plus**
60 Hz (Liquid Propane)	***mtu*** 8V0110 GS150	150 kW	93.9	87.6	87.6	74.4	71.9

[1] Measurement with infinite exhaust connection

NOTE:
- Measurements include exhaust noise.
- Aluminum enclosure sound levels are approximately 2 dB(A) higher than listed sound levels for steel enclosures.
- For installation within 50 miles of the coast, aluminum enclosures are recommended to prevent accelerated corrosion.
- Sound pressure levels subject to environment, instrumentation, measurement, installation, and generator set variability.
- Generator set is tested on level ground without spring isolators installed.
- Sound power levels per ISO 8528-10 and ANSI S1.13-2005
- Sound data measured with:
  - Full-rated load
  - Standard radiator package

Enclosure and Sound Data Sheet - Gas, Infinite Exhaust

60 Hz: 200 kW Standby / 175 kW Prime



Level 3 Enclosure (pictured)*

Enclosure Level Identification	
Level 1	Weather-protective enclosure constructed of heavy gauge steel or aluminum with fixed stormproof panels designed for 130 mph wind load rating. Enclosure consists of a bolted construction with factory-mounted internal or external silencer. Hinged, lockable double-door access on both sides of the enclosure.
Level 2	Level 1 enclosure with UL 94 HF-1 compliant, 1.5" thick sound attenuated foam insulation installed inside enclosure walls.
Level 3	Level 2 enclosure with air intake and exhaust scoops with UL 94 HF-1 compliant, 1.5" thick sound attenuated foam.

CERTIFICATIONS AND STANDARDS

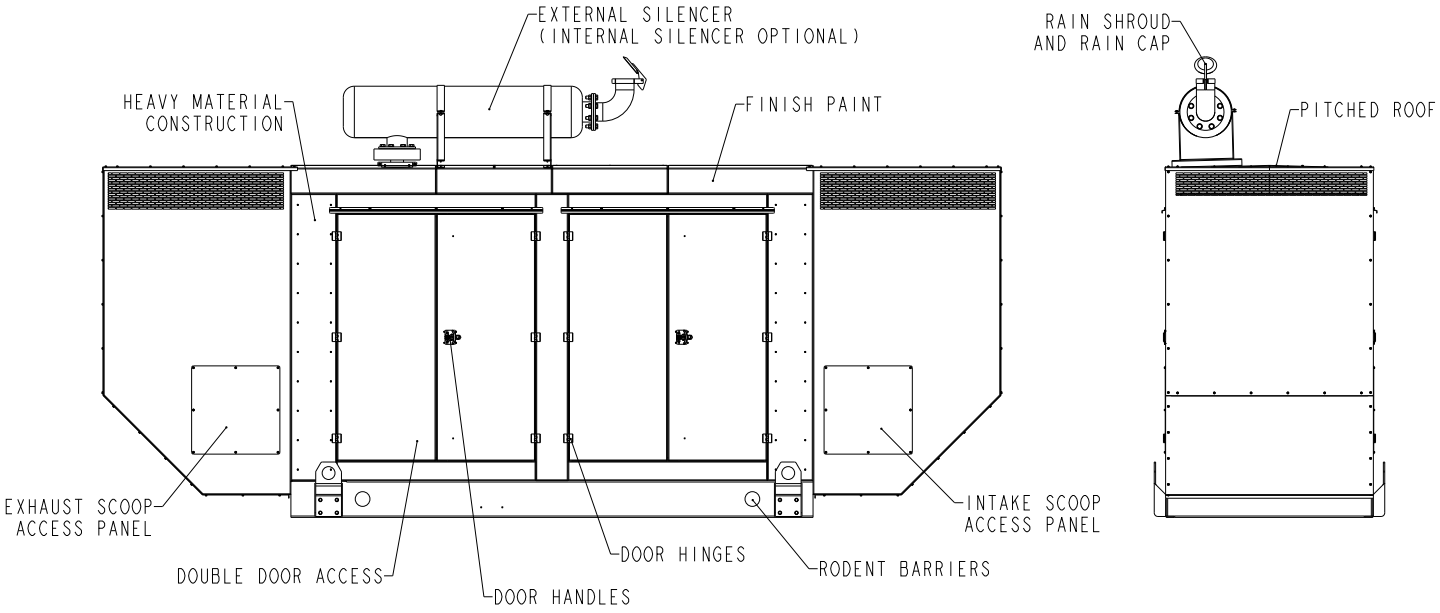
- UL 2200
- CSA C22.2 No. 100
- CSA C22.2 No. 14

A Rolls-Royce solution

Enclosure and Sound Data Sheet - Gas, Infinite Exhaust
60 Hz: 200 kW Standby / 175 kW Prime

STANDARD FEATURES FOR ALL LEVELS

- Heavy material construction
  - Steel enclosure: 1.9 mm (0.075 in) - 14 gauge or greater thickness
  - Aluminum enclosure: 2.3 mm (0.09 in) or greater thickness
- 130 mph wind rating
- Service access
  - Double door access gives ease of service to all components
- Pitched roof
- Rain shroud and rain cap
- Rodent barriers
- Scoop access panels and drain
- Hardware
  - Powder coated hinges with stainless steel pins
  - Key-lockable and pad-lockable powder coated door handles
- Powder coat finish paint: RAL 7001 Silver Grey standard
  - Custom colors available upon request
- External silencer (Industrial grade or better)
  - Wrapped exhaust pipes and catalyst
  - Stainless steel flexible exhaust connections (where applicable)



Level 3 Enlosure (pictured)*

OPTIONAL FEATURES

- Door restraints
- AC or DC light package
- Motorized / gravity louvers (where available)
- Internal silencer (critical grade)
  - Insulated or wrapped silencers, catalyst, and exhaust pipes
  - Stainless steel flexible exhaust connections (where applicable)
- For other custom options, please consult factory.

SOUND RATINGS dB(A) AT 7 METERS

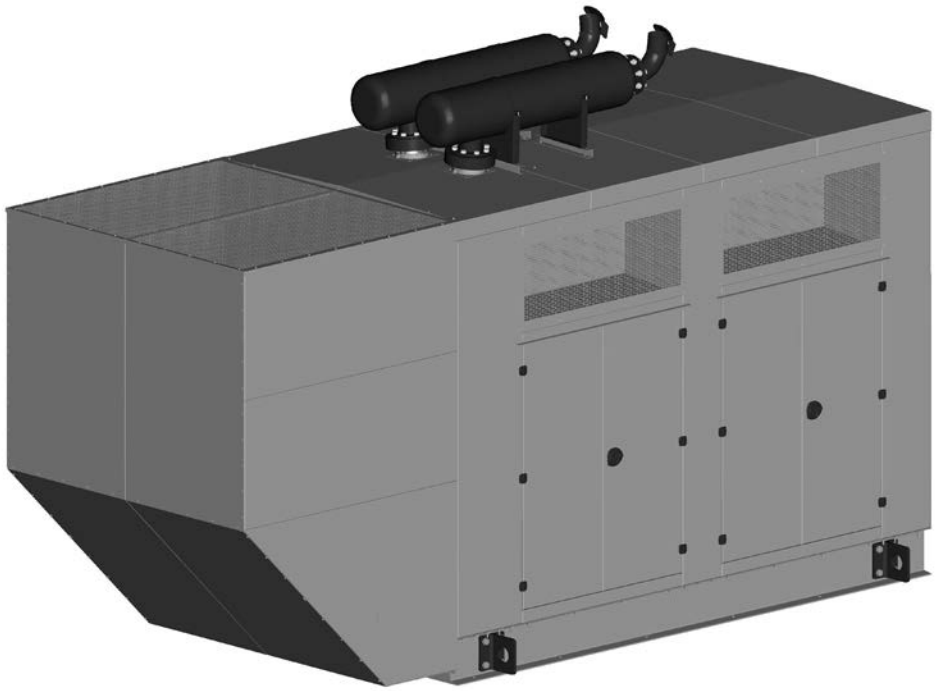
Application	Model	Power Node	Level 1	Level 2	Level 3
Standby (Natural Gas)	***mtu*** 6R0185 GS200	200 kW	84.1	82.8	71.4
Standby (Liquid Propane)	***mtu*** 6R0185 GS200	130 kW	83.9	83.1	71.6
Prime (Natural Gas)	***mtu*** 6R0185 GS200	175 kW	84.7	82.8	71

NOTE:
- Aluminum enclosure sound levels are approximately 2 dB(A) higher than listed sound levels for steel enclosures
- For installation within 50 miles of the coast, aluminum enclosures are recommended to prevent accelerated corrosion
- Sound pressure levels subject to environment, instrumentation, measurement, installation, and generator set variability
- Generator set is tested on level ground without spring isolators installed
- Sound power levels per ISO 8528-10 and ANSI S1.13-2005
- Sound data measured with:
  - Full-rated load
  - Standard radiator package
  - Infinite exhaust connection

* Note: Visual appearance may differ between power nodes.

Enclosure and Sound Data Sheet - Gas, Infinite Exhaust

60 Hz: 260-400 kW Standby / 235-355 kW Prime



Level 3 Enclosure (pictured)*

Enclosure Level Identification	
Level 1	Weather-protective enclosure constructed of heavy gauge steel or aluminum with fixed stormproof panels designed for 130 mph wind load rating. Enclosure consists of a bolted construction with factory-mounted external. Hinged, lockable double-door access on both sides of the enclosure.
Level 2	Level 1 enclosure with UL 94 HF-1 compliant, 1.5" thick sound attenuated foam insulation installed inside enclosure walls.
Level 3	Level 2 enclosure with exhaust scoop with UL 94 HF-1 compliant, 1.5" thick sound attenuated foam. Internal silencers available.

CERTIFICATIONS AND STANDARDS

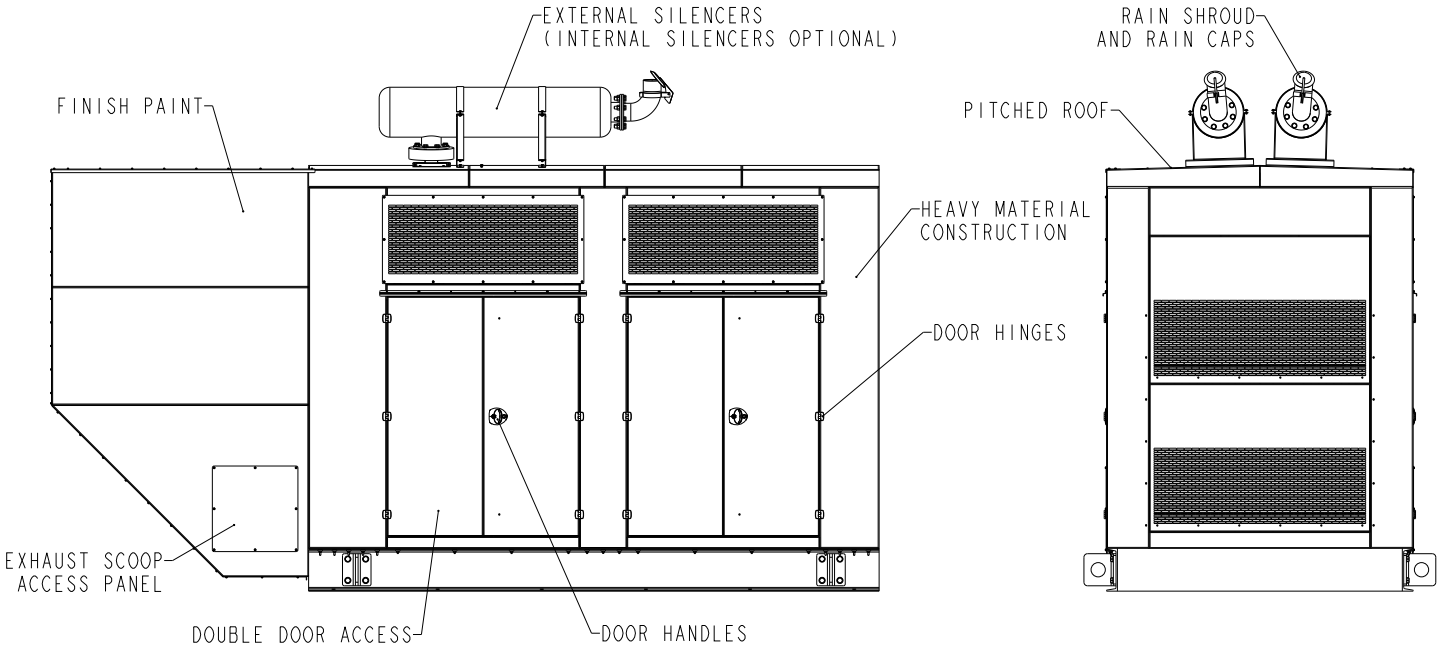
- UL 2200
- CSA C22.2 No. 100
- CSA C22.2 No. 14

A Rolls-Royce solution

Enclosure and Sound Data Sheet - Gas, Infinite Exhaust
60 Hz: 260-400 kW Standby / 235-355 kW Prime

STANDARD FEATURES FOR ALL LEVELS

- Heavy material construction
  - Steel Enclosure: 1.9 mm (0.075 in) - 14 gauge or greater thickness
  - Aluminum Enclosure: 2.3 mm (0.09 in) or greater thickness
- 130 mph wind rating
- Service access
  - Double door access gives ease of service to all components
- Pitched roof
- Rain shroud and rain cap
- Rodent barriers
- Scoop access panels and drain
- Hardware
  - Powder coated hinges with stainless steel pins
  - Key-lockable and pad-lockable powder coated door handles
- Powder Coat Finish Paint: RAL 7001 Silver Grey standard
  - Custom colors available upon request
- External silencer (Industrial grade or better)
  - Stainless steel flexible exhaust connections (where applicable)



Level 3 Enlosure (pictured)*

OPTIONAL FEATURES

- Door restraints
- AC or DC light package
- Motorized / gravity louvers (where available)
- Internal silencer (Critical grade)
  - Insulated or wrapped silencers, catalyst, and exhaust pipes
  - Stainless steel flexible exhaust connections (where applicable)
- 190 mph wind rating
- For other custom options, please consult factory.

SOUND RATINGS dB(A) AT 7 METERS

Application	Model	Power Node	Level 1	Level 2	Level 3
Standby (Natural Gas)	***mtu*** 8V0183 GS260	260 kW	80.6	80.1	72.7
	mtu 10V0183 GS350	350 kW	83.9	80.9	73.9
	mtu 12V0183 GS400	400 kW	83.9	81.4	73.6
Standby (Liquid Propane)	***mtu*** 8V0183 GS260	160 kW	81.2	80	72.9
	mtu 10V0183 GS350	245 kW	83.7	80.8	74.5
	mtu 12V0183 GS400	295 kW	83.7	81.3	75.1
Prime (Natural Gas)	***mtu*** 8V0183 GS260	235 kW	80.6	80	72.8
	mtu 12V0183 GS400	355 kW	83.6	81.2	73

NOTE:

— Aluminum enclosure sound levels are approximately 2 dB(A) higher than listed sound levels for steel enclosures
— For installation within 50 miles of the coast, aluminum enclosures are recommended to prevent accelerated corrosion
— Sound pressure levels subject to environment, instrumentation, measurement, installation, and generator set variability
— Generator set is tested on level ground without spring isolators installed
— Sound power levels per ISO 8528-10 and ANSI S1.13-2005
— Sound data measured with:
  - Full-rated load
  - Standard radiator package
  - Infinite exhaust connection

* Note: Visual appearance may differ between power nodes.

Enclosure Data Sheet

LED Enclosure Lighting

DESCRIPTION

This general purpose LED light is the ideal lighting solution for generator enclosures. It capitalizes on the intense brightness of LEDs, while using a fraction of the electrical current required for standard incandescent lights. In the event that utility power is disrupted, the generator set starting battery will power the LED light bar. If battery cables are disconnected for scheduled maintenance or other reasons, the lights will operate from AC to DC power supply. The changeover from one power source to the other takes place automatically with no disruption in illumination.

FEATURES

- Low-profile, space-saving design
- Rugged, water-resistant environmental rating
- Clear, shatterproof lens for maximum brightness
- European-style wiring uses daisy chain connections to power multiple lights (up to four lights in series)
- Bright, closely-spaced LEDs enhance light quality
- Automatic temperature protection built into the unit
- Momentary pushbutton switch activates time delay; lights turn off automatically
- Adjustable time delay is factory set for 30 minutes
- Standard AC and DC power supplies
  - Best source selector uses whichever power source is available
  - System starting battery for DC power
  - High efficiency, regulated power supply for AC to DC power
- Sturdy aluminum housing

SPECIFICATIONS

LED Light Bar

Electrical Characteristics

Operating voltage	12 to 30 VDC
Typical current	0.66 A at 12 VDC 0.30 A at 24 VDC
Maximum current	0.8 A
Supply protection circuitry	Protected against reverse polarity and transient voltages

Light Characteristics

Lumen output	650 (± 5%) per light bar, typical at 25 °C (77 °F)
Luminous efficacy	90 lumens/watt typical at 24 VDC at 25 °C (77 °F)
Lighted length	285 mm (11.2 in)
Color	Cool white
LED lifetime	Lumen output will decrease less than 30% after 50,000 hours

Environmental Rating

- IEC IP67 / IP69K per DIN 40050
- NEMA 6

SPECIFICATIONS, continued

Pushbutton Switch
- Industrial pilot duty
- Flush 22 mm (0.87 in) green-colored button cap

DC Power Supply

— Fuse	Automotive blade-type
— Voltage rating	12 or 24 VDC nominal
— Fuse current rating	3 A max

AC to DC Power Supply

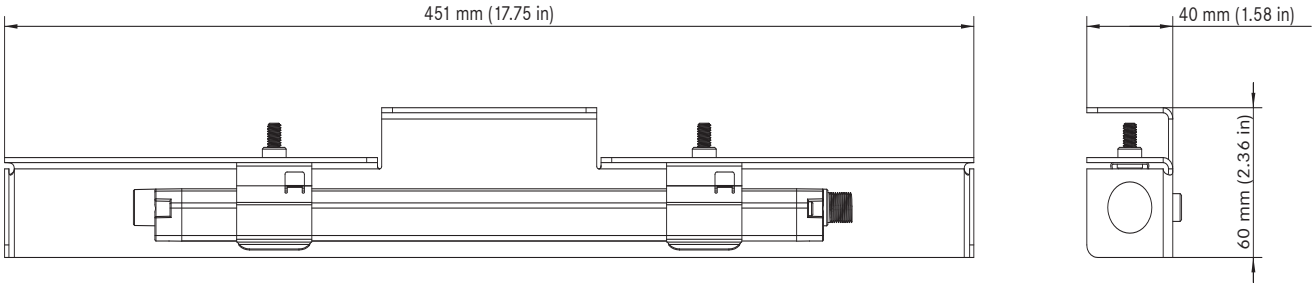
— Input voltage	100 to 240 VAC
— Input frequency	45 to 65 Hz
— Input current	1 A max
— Output voltage	12 VDC
— Output current	4.6 A

Best Source Selector

— Blocking diodes	Type 1N5408

Time Delay Relay
- Activated by pushbutton switch
- Adjustable from 6 to 60 minutes in 10% increments

DIAGRAM



LED Enclosure Lighting Dimensions

Enclosure Data Sheet

Enclosure Heater

DESCRIPTION

The generator set enclosure heater is quiet, reliable, space-saving, and surface-mounted. It features a wide range of wattage options that can be customized to the generator set heating requirements and environmental conditions.

FEATURES

— Squirrel cage blower
— 20 gauge steel construction
— Multiple wattages

SPECIFICATIONS

***mtu* part number:**
— XG3006100004

Electrical ratings:
— Supply voltage: 120 V, 60 Hz
— Supply current: 2.1 - 12.6 Amps
— Output: 250 - 1,500 Watts

Blower and motor:
— Tangential cylindrical blower delivering 75 CFM
— Driven by C-frame type motor
  - Shaded pole
  - Permanently lubricated
  - Impedance protection
  - Sealed bearings
— Same voltage as heater

Environmental:
— For use in a weather-protected location.

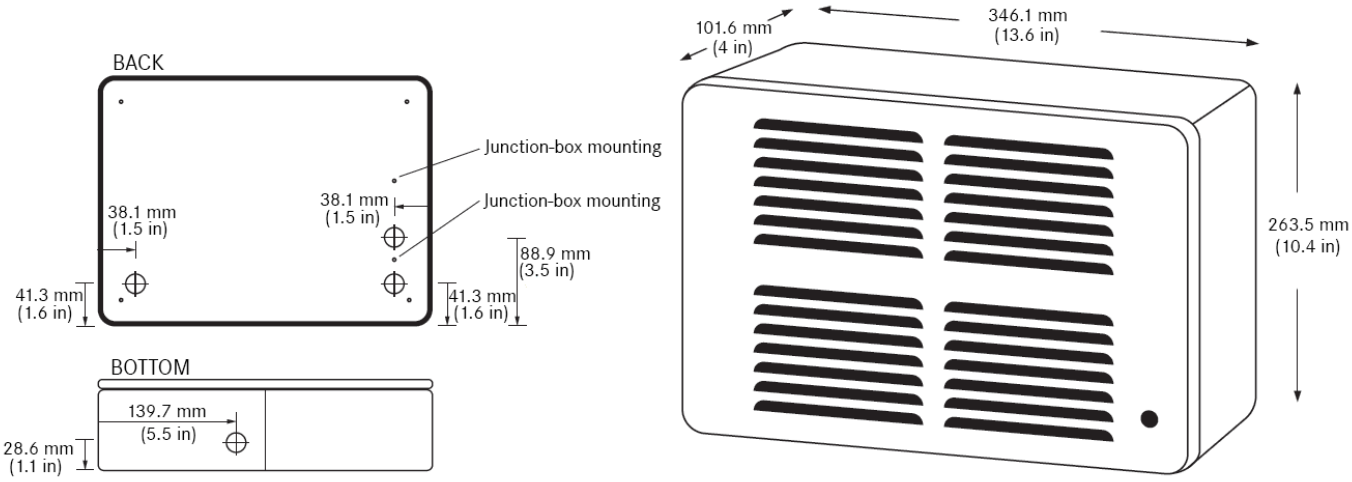
Elements:
— Assembly consists of three steel-sheathed heating tubes in a furnace-brazed, plate-finned, block design
— Sheath tubes contain coiled nichrome wire embedded in an insulator of magnesium oxide
— Element assembly provides a minimum of six possible wattage configurations
— Heater is factory wired for 1,500 watts

Heater controls:
— Thermal protection
  - Heater is equipped with thermal overload protection. If thermal overload trips due to abnormal operating temperatures, the thermal overload remains open until manually reset by turning the heater or thermostat off for 15 minutes.
— Thermostat
  - Adjustable single-pole, single-throw thermostat is included
— Automatic shutoff
  - A dedicated relay provided in the control panel turns off the heater automatically when the generator set is running.

CERTIFICATIONS AND STANDARDS

— c-UL-us Listed

Generator Set Enclosure Heater Data Sheet



Mounting and Dimensions Diagram

Subject to change. | WT00030631| 2021-04

Electrical System Data Sheet

Ground Fault Convenience Receptacle

DESCRIPTION

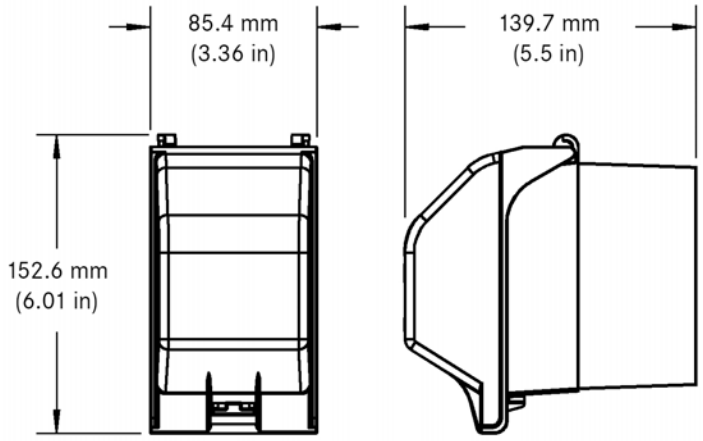
Convenience receptacles provide a 20 Amp Ground Fault Circuit Interrupter (GFCI). Receptacle is mounted in a weatherproof box, including a weatherproof cover, located adjacent to the generator set control panel.

FEATURES

- Limits improper access to energized contacts
- Patented tamper-resistant protection
- Patented self-test diagnostics
- Power indication
- Ground fault indicator
- Open circuit condition eliminates false assumption of protection at face
- Durable, polyester face with V-0 flammability rating
- Vertical latching receptacle cover prevents accidental equipment disconnects
- Box and cover die cast aluminum construction and industrial design provide a rugged and protective enclosure for receptacle

CERTIFICATIONS AND STANDARDS

- Receptacle: c-UL-us Listed
- Box and Cover: UL Listed and CSA Certified



Convenience Receptacle Box and Cover Dimensional Diagram

Subject to change. | WT00038239 | 2021-10

Air Filter Data Sheet

DESCRIPTION

Air filters offer engine protection and minimal downtime during normal maintenance. The air filters on ***mtu*** generator sets are easy to install, durable, and reliable.

FEATURES

- Designed to withstand severe intake pulsation and high humidity
- Sturdy, self-supporting, one-piece construction
- Lightweight and compact

SPECIFICATIONS

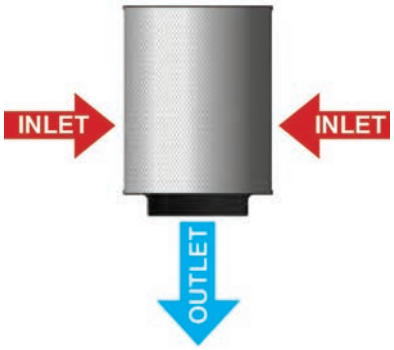
mtu Part #	Airflow @ Inches of Water Restriction (refer to *Airflow Diagrams* below)			Weight	Maximum Temp	
	m^3/min (SCFM) @ 4 in. H_2O	m^3/min (SCFM) @ 6 in. H_2O	m^3/min (SCFM) @ 8 in. H_2O	kg (lb)	Continuous °C (°F)	Intermittent °C (°F)
SUA106417	4.3 (150)	5.1 (180)	6.1 (215)	1 (2.2)	83 (180)	105 (220)
SUA90069	43.9 (1,550)	52 (1,836)	60 (2,118)	3.6 (8)	83 (180)	105 (220)
SUA86885	13.7 (485)	17.6 (620)	21.5 (760)	2.6 (5.8)	83 (180)	105 (220)
SUA77166	3.8 (135)	4.6 (163)	5.3 (190)	1.3 (2.9)	N/A	N/A
SUA40198	3.1 (112)	4.1 (145)	4.8 (170)	0.64 (1.4)	83 (180)	105 (220)
XG3012100019	23.5 (830)	31.43 (1,110)	36.67 (1,295)	1.45 (3.2)	83 (180)	105 (220)
XG2112100001 XG2512100002	9.63 (340)	13.03 (460)	15.85 (560)	1.59 (3.5)	N/A	N/A

mtu Part #	Dimensions (refer to *Dimension Diagrams* on next page)				Minimum Removal Clearance
	Body Length (D) mm (in)	Body Diameter (A) mm (in)	Outlet Length (F) mm (in)	Outlet Diameter (C) mm (in)	mm (in)
SUA106417	127 (5)	216 (8.5)	35 (1.38)	76 (3)	38.1 (1.5)
SUA90069	400 (15.75)	318 (12.5)	48 (1.89)	198 (7.8)	38.1 (1.5)
SUA86885	279 (11)	318 (12.5)	35 (1.38)	127 (5)	38.1 (1.5)
SUA77166	172 (6.75)	216 (8.5)	27 (1.08)	75 (2.96)	38.1 (1.5)
SUA40198	102 (4)	216 (8.5)	35 (1.38)	64 (2.5)	38.1 (1.5)
XG3012100019	381 (15)	318 (12.5)	35 (1.38)	152 (6)	38.1 (1.5)
XG2112100001 XG2512100002	267 (10.5)	267 (10.5)	35 (1.38)	102 (4)	38.1 (1.5)

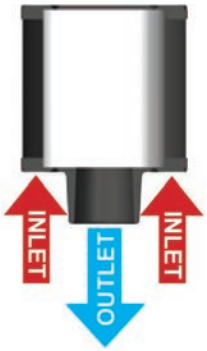
N/A = Not Available

A Rolls-Royce solution

AIRFLOW DIAGRAMS



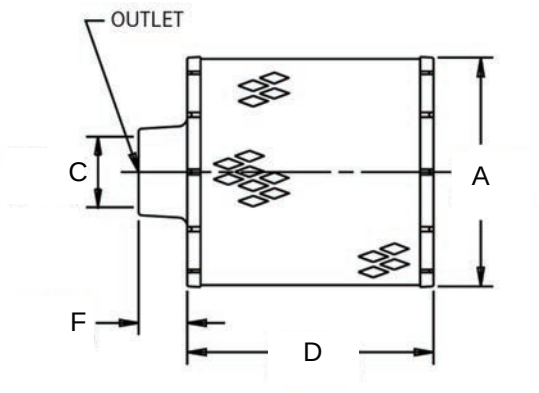
Airflow Diagram: SUA90069, XG3012100019



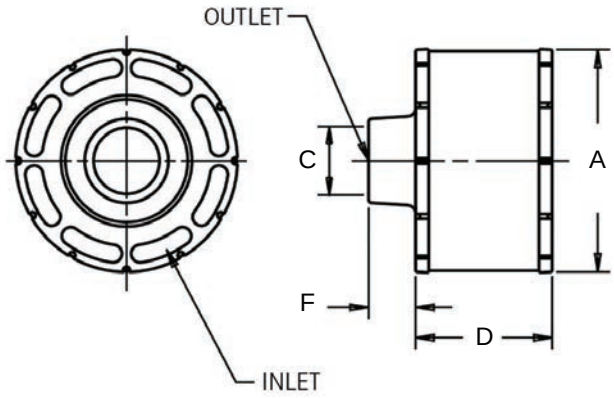
Airflow Diagram: SUA106417, SUA86885, SUA77166, SUA40198

Airflow Diagram: XG2112100001, XG2512100002

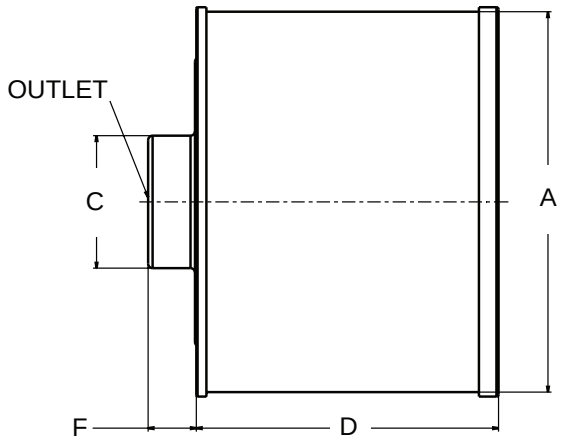
DIMENSION DIAGRAMS



Dimension Diagram: SUA90069, XG3012100019



Dimension Diagram: SUA106417, SUA86885, SUA40198



Dimension Diagram: SUA77166, XG2112100001, XG2512100002

Heavy Duty Air Filter Data Sheet

210-400 kW Diesel

DESCRIPTION

Air filters offer engine protection and minimal downtime during normal maintenance. Heavy duty air filters are easy to install, durable, and reliable.

An efficient first stage of dust removal is accomplished by spinning the dust to the end cap of the air cleaner, where it is accumulated and ejected through the ejection valve. High capacity filters are used to perform final filtration prior to entering the air intake stream.

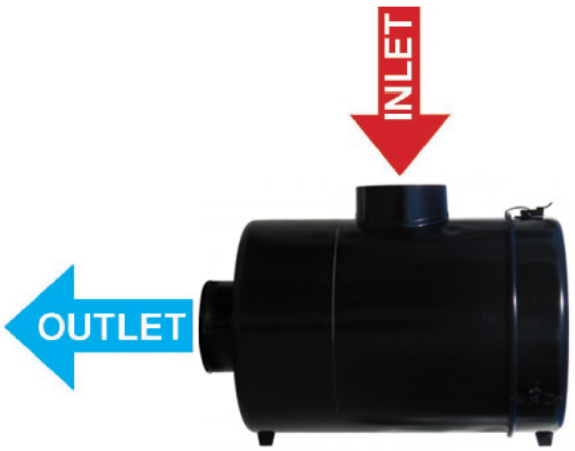
FEATURES

— Constructed of rigid and durable Electro Galvanized Carbon Steel
— Finished in a black powder coating

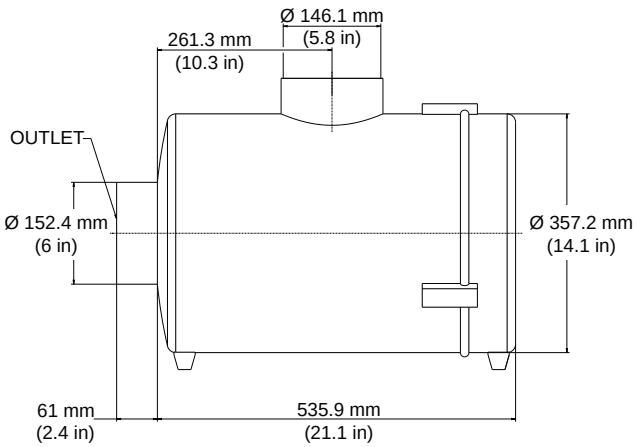
SPECIFICATIONS

Specification Description		*mtu* Part Number	
		SUA96271	XG3012100036
Airflow @ Inches of Water Restriction (refer to *Airflow Diagrams* below)	m^3/min (SCFM) @ 8 in. H_2O	26.9 (950)	32.42 (1,145)
	m^3/min (SCFM) @ 12 in. H_2O	33.41 (1,180)	40.04 (1,414)
Weight	kg (lb)	14.06 (31)	22.68 (50)
Dimensions (refer to *Dimension Diagram* on next page)	Body diameter, mm (in)	357.1 (14.1)	407.9 (16.06)
	Body length, mm (in)	539.8 (21.1)	732.8 (28.9)
	Outlet diameter, mm (in)	152.4 (6)	152.4 (6)
	Center to end, mm (in)	261.3 (10.3)	339.1 (13.4)
	Minimum removal clearance, mm (in)	381 (15)	571.5 (22.5)
	Outlet Length, mm (in)	61 (2.24)	61 (2.4)

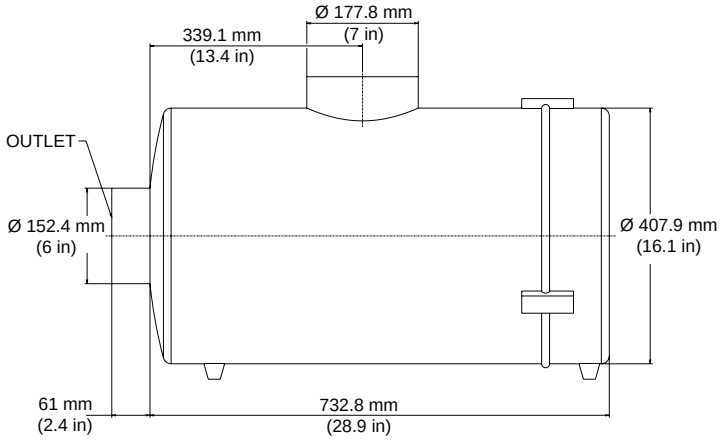
Heavy Duty Air Filter Data Sheet
210-400 kW Diesel



Air Flow Diagram



Dimension Diagram: SUA96271



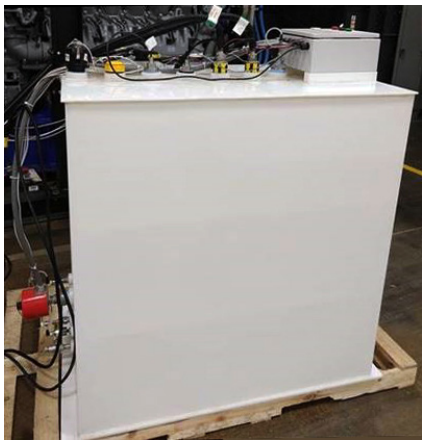
Dimension Diagram: XG3012100036

Exhaust System Data Sheet

Diesel Exhaust Fluid (DEF) Tank

DEFINITION

Diesel Exhaust Fluid (DEF) above ground tanks are intended to be installed and used with ***mtu*** generator sets and ***mtu*** after-treatment systems. These tanks are manufactured from high density polyethylene (HDPE). They are atmospheric rated and suitable for above-ground storage of DEF fluid only.



FEATURES

- Critical DEF low level shutdown
- 3-point level indication sensor
- 2-point customer refill level sensor
- Normal vent
- Camlock style manual fill
- Lockable fill cap
- Adjustable tank heater: immersion type
- Basin drain valve
- SAE J2044 3/8” supply and return fittings
- DEF temperature alarm
- Indicator panel
  - Power on (green)
  - Heater on (yellow)
  - Alarm (red)

SPECIFICATIONS

- 250 gallon capacity
- High density polyethylene tank
- Weight:
  - Dry weight: 55 kg (120 lbs)
  - Operating weight: 1,089 kg (2,400 lbs)
- Dimensions:
  - Height: 1,486 mm (58.5 in)
  - Width: 1,334 mm (52.5 in)
  - Depth: 791 mm (31.13 in)

ecoCUBE® After-Treatment Data Sheet

mtu Series 4000

DESCRIPTION

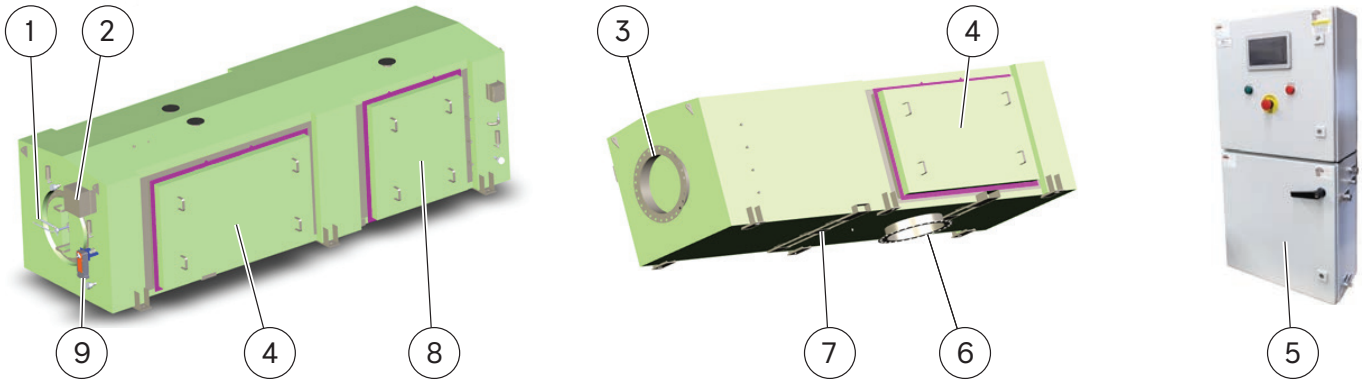
The ecoCUBE® after-treatment solution is used with ***mtu*** Series 4000 generator sets and is designed to meet local air board requirements. The system is comprised of a Selective Catalyst Reduction (SCR) and a catalyzed Diesel Particulate Filter (cDPF). The SCR is a vanadium-based catalyst and the DPF is a passive filter that doesn't add any parasitic to the generator set (often referred to as cDPF). These systems are available for ***mtu*** Series 4000 60 Hz generator sets, however, special approval is required prior to use on the 3,250 kW power node.

OVERVIEW

The ecoCUBE® after-treatment solution system includes the following:

- SCR + cDPF reactor as one system
- Controller (with DEF pumps)
- Installed temperature, NO_x, and pressure sensors
- Air compressor
- DEF level sensor
- DEF tank vent

SCR + cDPF



1. Injector lance (DEF and air connection)
2. Junction box
3. Exhaust outlet
4. DPF door
5. Controller
6. Exhaust inlet
7. Fork truck pockets
8. SCR door
9. Diverter valve
10. Air compressor (not shown)
11. Insulation (not shown)
12. Mounting feet (not shown)
13. Condensation drain (not shown)

A Rolls-Royce solution

FEATURES

Design considerations
— Designed to last the life of the generator set
— Approximately eight hours of operation required for DPF to be de-greened
— Unit can meet performance standard targets (shown in Specifications table) in less than two minutes when operating at full load; however, at partial load and in cold climates, the duration is longer.

Controller
— Lower cabinet contains DEF components and compressed air
— Upper cabinet contains controller and related I/O interfaces
— Communication
  - Via Modbus TCP/IP to the facility
  - J1939 to other after-treatment sensors
  - Via dry contacts to the generator set for the run signal

Diverter valve
— Valve will open and allow for a small amount of exhaust flow to bypass the DPF
— Designed for thermal events or over-pressure events

DPF
— Passive filter with diesel oxidation catalyst
— Side access for service
— Regeneration achieved when exhaust temperatures reach operating temperature
— See ecoCUBE® Operation and Maintenance Manual for more details

SCR
— Uses DEF injected into the exhaust stream
— Special formulated, vanadium-based catalyst system designed specifically for performance
— Side access for servicing SCR bricks

DEF pump
24 VDC powered pumps designed specifically to work with DEF fluid

Air compressor
— Tankless air compressor
— Eliminates need for air filter, reducing routine maintenance

Modbus
See ecoCUBE® Operation and Maintenance Manual for full list of Modbus registers

Site requirements (commissioning)
Operate each unit at several load points to ensure proper functioning of the system. Commissioning details are outlined in the ecoCUBE® Operation and Maintenance Manual.

Installation
The following will be supplied/installed by the integrator:
— Wiring from the controller to the engine for run signal (dry contact and 4-20 millamp)
— Wiring from the controller to the reactor
— DEF lines with heating from the tank to the reactor
— Power supply to the controller (24 VDC and 120 VAC)
— Installation of the DEF tank

Please reference the ecoCUBE® Operation and Maintenance Manual for more details.

SPECIFICATIONS

	Model	12V4000	16V4000	16V4000	20V4000	20V4000
System data	Power (Standby)	1,250-1,750 kW	2,000 kW	2,250-2,500 kW	2,500-3,000 kW	3,250 kW
Reactor data	Part number	TBD	TBD	TBD	TBD	C/F
	Inlet/outlet flange (ANSI)	18/18	28/28	28/28	28/28	C/F
	Exhaust pressure drop	21 in/H_2O	20 in/H_2O	20 in/H_2O	22 in/H_2O	C/F
	DEF consumption	7.2 gal/hr	7.3 gal/hr	10.2 gal/hr	12.6 gal/hr	C/F
	Length	4,903 mm (193 in)	6,020 mm (237 in)	6,020 mm (237 in)	6,020 mm (237 in)	C/F
	Width	1,728 mm (68 in)	2,185 mm (86 in)	2,185 mm (86 in)	2,185 mm (86 in)	C/F
	Height	1,702 mm (67 in)	1,931 mm (76 in)	1,931 mm (76 in)	1,931 mm (76 in)	C/F
	Weight	3,878 kg (8,550 lbs)	4,717 kg (10,400 lbs)	4,808 kg (10,600 lbs)	4,899 kg (10,800 lbs)	C/F
Emission reduction from EDS values	NO_x emissions	> 92%	> 92%	> 92%	> 92%	C/F
	CO	> 90%	> 90%	> 90%	> 90%	C/F
	NMHC	> 70%	> 70%	> 70%	> 70%	C/F
	PM	> 85%	> 85%	> 85%	> 85%	C/F

Note: Values above are estimated reduction values and cannot be guaranteed.
C/F = Consult factory

Gaseous Fuel System Data Sheet

mtu SI Fuel System Specifications

DESCRIPTION

This custom fuel system uses common gaseous fuel system components and features a state-of-the-art Engine Control Module (ECM) which incorporates the latest technology available.

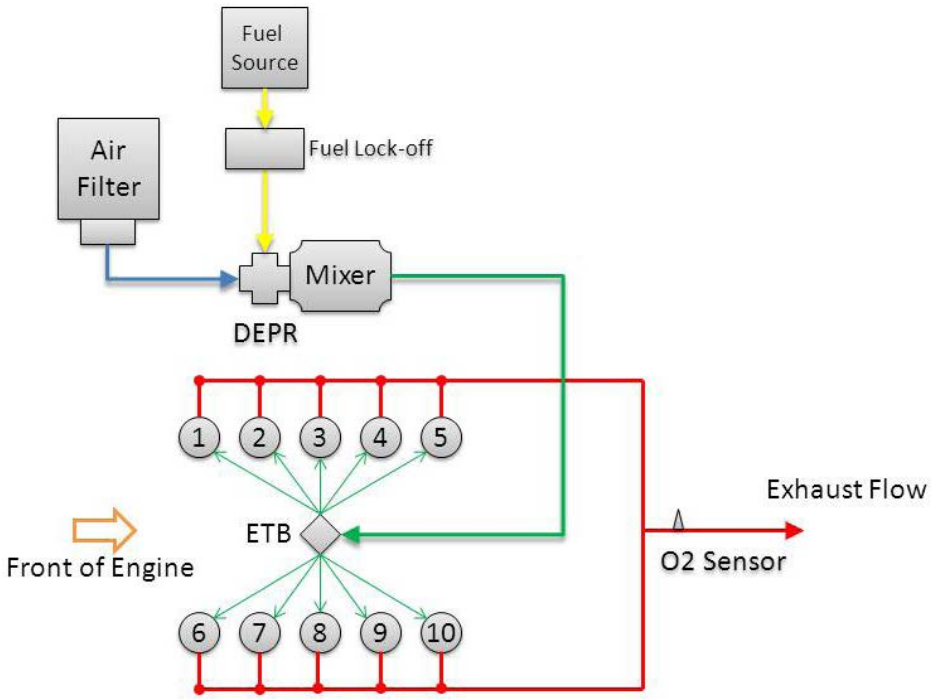
As today's emissions regulations become stricter on engines, other solutions are necessary for compliance. This is accomplished by our new gaseous generator sets by using a closed loop fuel system utilizing sequential ignition and after treatment (where required). This system is capable of detecting engine faults and protecting itself from harm while also alerting the user with a Malfunction Indicator Light (MIL) through the digital generator set controller. The ECM communicates with the controller to allow a fully integrated system sharing necessary information between components reducing additional sensors. The fuel system is adept to operating conditions and changes parameters based on its surroundings for variables such as barometric pressure and intake air temperature. Knock sensing is also a built-in function to the fuel system allowing peak power for the environmental conditions of the unit when this protection is deemed necessary.

The fuel system utilizes a Windows®-based interface for viewing the engine parameters along with diagnostic tools for determining component failures, allowing quick solutions in the field.

PRODUCT HIGHLIGHTS

Fuel system capabilities include (but are not limited to):

- CAN J-1939 for full communication with the digital generator set controller amongst other devices capable of reading CANBus signals
- Closed loop lambda control for EPA compliance
- Sequential ignition system
- Electronic governing
- Controls engines up to 10 cylinders
- Electronic fuel lock-off control
- Built-In engine data logger
- Built-in engine protection from engine faults
- Every fuel system pre-programmed for single fuel operation on both NG or LPG fuel
- Active knock control (where applicable)



Fuel System Overview Diagram (10V shown)

**DEPR = Digital Electronic Pressure Regulator

Gaseous Fuel System Data Sheet

Origin Fuel System Specifications

DESCRIPTION

These four-stroke internal combustion engines are certified to operate on either Propane, Liquid Petroleum Gas (LPG) or Natural Gas (NG).

The fuel system on this engine is a closed loop design. As the engine runs, sensors located at various points within the system provide continuous operating feedback to the Engine Control Module (ECM). The ECM adjusts the engine speed, ignition timing, and fuel supply in response to changes in the applied load, surrounding air temperature, operating temperature of the engine, and amount of oxygen present in the exhaust.

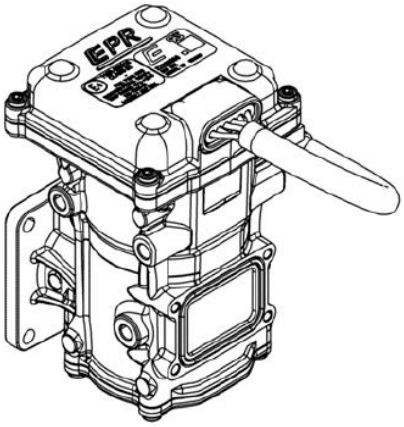
The ignition system for the engine, consists of two ignition coil packs, spark plug wires, and spark plugs. The ignition coil pack controls the spark timing for the engine. This ignition system is a wasted-spark system. In a wasted-spark system, spark is provided to two cylinders simultaneously. One spark plug fires during the compression stroke of a cylinder and creates combustion; while the other spark plug fires during the exhaust stroke and is wasted. After receiving the crank signal, the ECM sends the ignition control packs a triggering signal that controls the timing of the ignition spark. The ignition coils then provide voltage to the spark plugs through high tension leads.

The Direct acting Electronic Pressure Regulator (DEPR) controls the gaseous fuel pressure and fuel delivery. The DEPR receives fuel pressure commands from the ECM and modulates fuel pressure to the air-fuel mixer. The DEPR allows for fast and accurate gaseous fuel control to provide a combustible mixture to the engine.

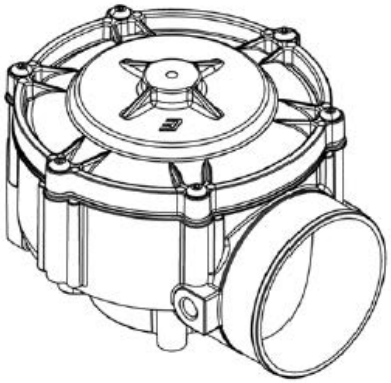
The air-fuel mixer is mounted in the air stream ahead of the throttle. It is a non-adjustable metering device that combines LPG/NG vapor with intake air for combustion.

The throttle body controls the operating speed of the engine according to input from the ECM. Defaults programmed into the ECM software, along with throttle position sensors, allow the ECM to control the overall operation of the engine in response to changing speeds and loads.

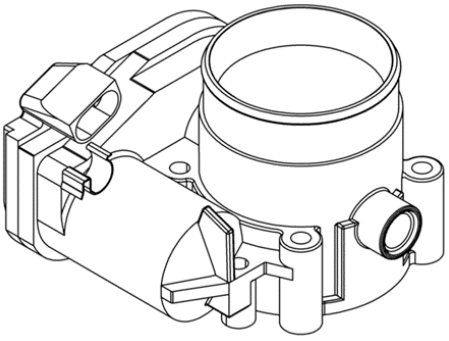
The ECM is a digital controller that oversees the various operating parameters of the engine. The ECM receives input data from sensors mounted to the engine and fuel system, and then outputs various signals to adjust engine operation. The ECM also performs diagnostic functions on the fuel system. If a malfunction occurs, the ECM sends a fault signal to alert the operator to the problem. A corresponding Diagnostic Trouble Code (DTC) is generated and stored in memory within the ECM. A technician can then use a computerized diagnostic scan tool to retrieve the stored DTC number(s) and identify the problem.



DEPR



Air-fuel mixer



Throttle Body

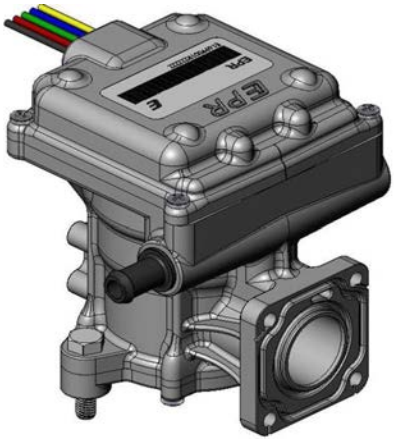
Gaseous Fuel System Data Sheet

PSI Fuel System Specifiations

DESCRIPTION

The PSI EPA-certified fuel system uses a Direct Electronic Pressure Regulator (D-EPR) to control fuel delivery for the precise fuel metering necessary for optimum combustion, fuel economy, and transient response. The D-EPR is a single-stage, microprocessor-based electromechanical fuel pressure regulator that incorporates a high-speed, fast-acting actuator.

The D-EPR communicates with the GCP 90-Way ECU over a Controller Area Network (CAN) link, receiving fuel pressure commands and broadcasting D-EPR operating parameters back to the ECU. When the D-EPR receives an output pressure command from the ECU, the internal actuator is driven to attain the targeted fuel pressure. The EPR then closes the loop internally, using a built-in pressure sensor to maintain target fuel pressure and fuel flow rate, until another external command from the ECU is received (intervals <10ms).

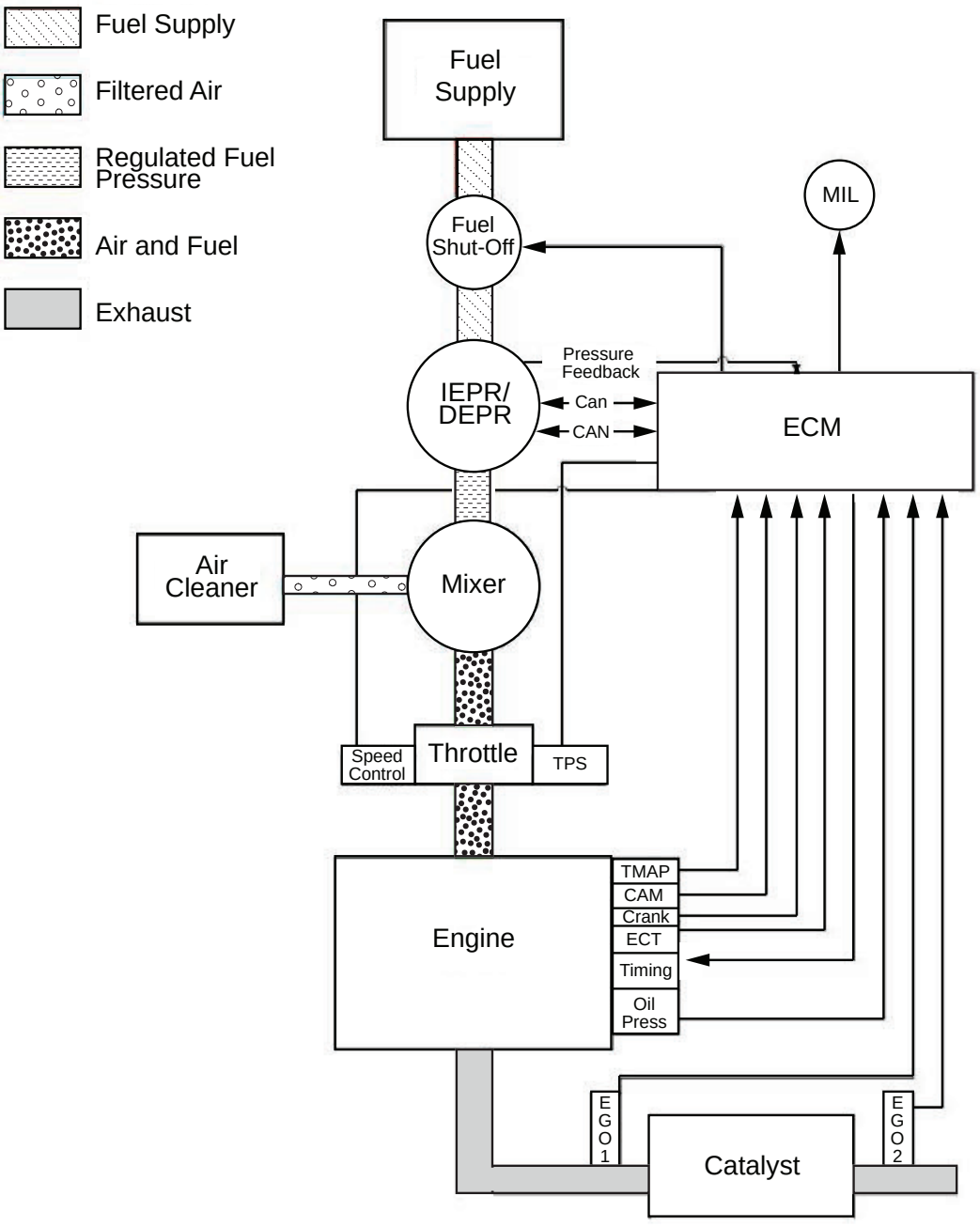


FEATURES

- EPA-certified fuel system
- Direct control of fuel pressure by cycling the valve inside the device rather than indirectly controlling pressure by cycling a diaphragm
- ECM-regulated engine airflow using an integral 1/20 gear drive DC motor
- Air/fuel mixer increases or decreases fuel entering the engine in response to airflow
- Sizing ensures adequate flow to achieve the power target with sufficient control at idle flow rates

SPECIFICATIONS

- Closed-loop fuel control
- High temperature stability
- Low current consumption (10 mA)
- Accuracy < ± -1%
- Time delay = 1 msec



Fuel System Overview Diagram

Gaseous Fuel System Data Sheet

Single Valve Gas Solenoid

DESCRIPTION

Internal pilot-operated solenoid valve used to control the flow of fuel gases in generator systems. This compact valve design exceeds flow requirements and is also capable of withstanding temperatures as low as -40 °F.

FEATURES

— Unique double disc design with overtravel provides redundant sealing for leak tight shutoff
— For on-off control of fuel gas
— ⅛" NPT pipe taps with plugs for routine testing

VALVE CONSTRUCTION

Valve Part Materials (XG2541200051)	
Body	Aluminum
Seals and disc	NBR
Core bushing	PTFE Coated Fiberglass
Core, bonnet and plugnut	Zinc-Plated CRS
Springs	302 stainless steel
Pipe plug	Zinc-plated steel
Pilot seat	302 stainless steel

Valve Part Materials (All other part numbers)	
Body	Aluminum
Seals and disc	NBR
Core tube	305 stainless steel
Core guide	POM
Rider ring	PTFE
Core and plugnut	430F stainless steel
Springs	302 stainless steel
Shading coil	Copper
Pipe plug	Zinc-plated steel

ELECTRICAL

Standard coil and class of insulation

- XG2541200051	H
- All other part numbers	F

DC Watts

- SUA46013	11.2
- XG2541200051	45
- All other part numbers	15.8

VALVE RESPONSE TIME

Opening time:	Less than 1 second
Closing time:	Less than 1 second

APPROVALS

UL listed to standard 429 “Electrically Operated Valves” Guide YIOZ, File MP618 Safety Shutoff Valves.

CSA certified to:

1. Standard C22.2 No. 139 “Electrically Operated Valves”, File 010381
2. Automatic Gas Valves Z21.21 (6.5), C/I, File 112872
3. Automatic Gas Safety Shutoff Valves (3.9), File 112872 (All except XG2541200051)

NPT	Voltage	Part Number
¾"	12	SUA46013
1 ½"	12	XG3241200001
1 ½“	12	XG2541200051
1 ½"	24	XG3241200002
2"	12	X00A30100155
2"	24	XG3241200003

Fuel System Data Sheet

Dual Valve Gas Solenoid

There are three primary types of valves. Valves 1 and 3 feature two normally closed safety shutoff valves in one housing, as well as a maximum flow adjustment. Valve 2 features two normally closed safety shutoff valves with a gas pressure regulator in one housing. Valves 1 and 2 are used in single and dual fuel systems to regulate the flow of gaseous fuels to generator systems. All types are fast opening and fast closing.

CERTIFICATIONS AND STANDARDS

All models are CSA Certified.

PART NUMBER LIST

12 Volt Systems	24 Volt Systems
SUA102426	SUA102427
SUA102428	SUA102429
SUA91985	SUA97687
	XG3241200015

SPECIFICATIONS

	Valve 1	Valve 2	Valve 3
Part numbers	SUA97687	SUA102426 SUA102427 SUA102428 SUA102429 SUA91985	XG3241200015
Gases	Natural gas, propane	Natural gas, propane	Natural gas, propane
Maximum operating pressure	5 psi	5 psi	7 psi
Maximum close-off pressure	C/F	7 psi	7 psi
Ambient temperature	5 °F to 140 °F	-40 °F to 140 °F	5 °F to 140 °F
Cycle rate	C/F	60 cycles/hour	C/F
Operating time	100% duty cycle	100% duty cycle	100% duty cycle
Valve Construction			
Housing	Aluminum, steel	Aluminum, steel	Aluminum, steel
Seal on valve seats	NBR-based rubber	NBR-based rubber	NBR-based rubber
Valve Response Time			
Opening time	Less than 1 second	Less than 1 second	Less than 1 second
Closing time	Less than 1 second	Less than 1 second	Less than 1 second

SUPPLEMENTAL HARDWARE

Valve	1½" Flange	2" Flange	3" Flange	Gas Pressure Switch
SUA97687	N/A	SUA97686	N/A	N/A
SUA102426	SUA91990	SUA91991	N/A	SUA91987
SUA102427	SUA91990	SUA91991	N/A	SUA91987
SUA102428	SUA91992	N/A	N/A	SUA91987
SUA102429	SUA91992	N/A	N/A	SUA91987
XG3241200015	N/A	N/A	XG3241200019	SUA91987

Subject to change. | WT00037880 | 2021-04

Fuel Lift Pump Data Sheet

mtu Series 4000

DESCRIPTION

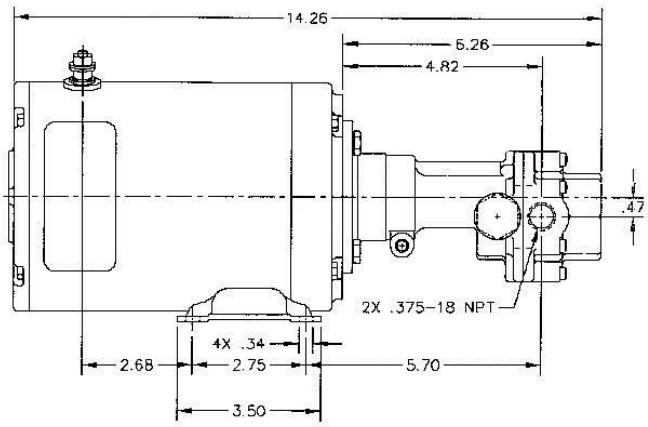
The auxiliary fuel lift pump is comprised of a rotary gear pump head coupled to an electric motor. The 24 VDC permanent magnet motor is rated at 1/4 HP. The pump head features a bronze design with 303 stainless steel shafts, Viton lip seals, and an integral relief valve.* The recommended liquid temperature range is from -40 °F to 300 °F.†

For use with ***mtu*** Series 4000 engines, this fuel lift pump is operated during cranking only. The fuel lift pump is not intended for continuous operation, and it will not be effective while the engine is running. Normal engine lift capability during cranking is 40 inches water column (WC) at the engine fuel inlet. With the use of the fuel lift pump, the vertical lift during cranking will increase up to 120 inches WC at the engine fuel inlet. Engine lift capability during running is 120 inches WC at the engine fuel inlet.

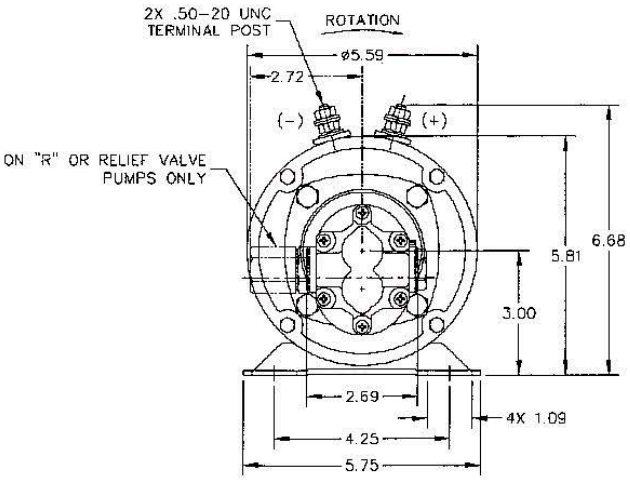
The addition of fuel water separators and the plumbing configuration need to be considered to determine the final system lift capability. Line sizes should be increased to reduce restriction when drawing fuel from longer distances and heights. Minimize the use of elbows and other restrictive fittings as much as possible.

SPECIFICATIONS

- ***mtu*** part number: X52808800041
- Bronze and stainless steel wetted components
- Viton lip seals
- Self-lubricating bearings
- 24 VDC, 1/4 HP electric motor
- 3/8" NPT ports
- Built-in relief valve



Fuel Lift Pump: Side View

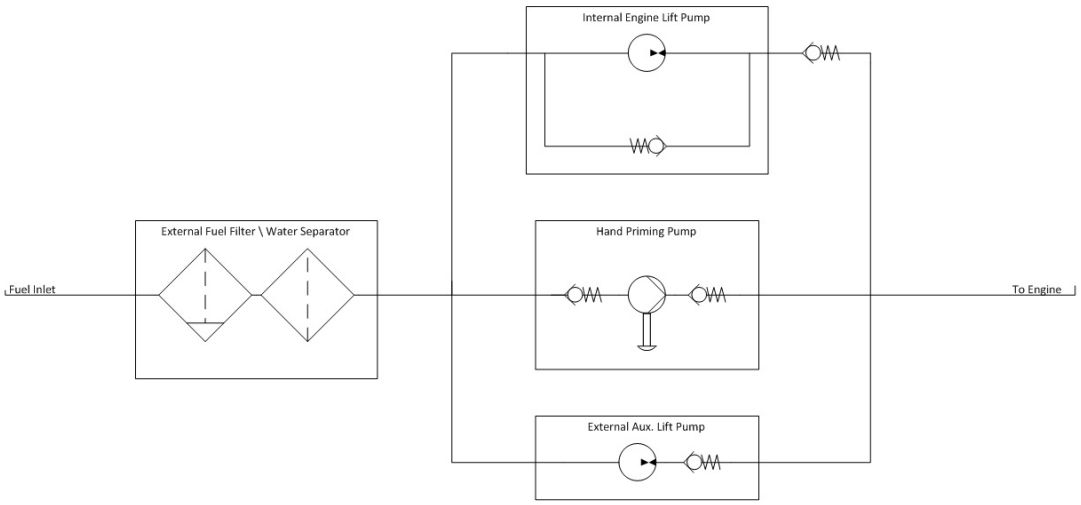


Fuel Lift Pump: Front View

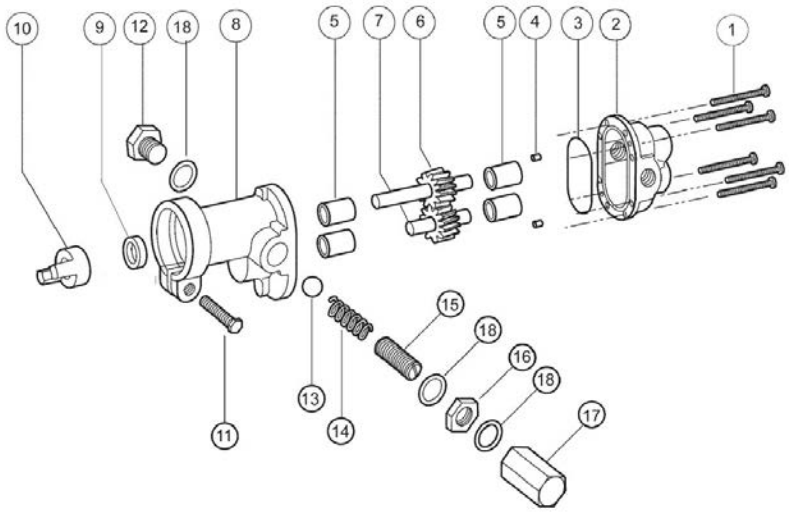
* The integral relief valve is designed as a safety against overpressurization and is not intended for continuous duty. Use in continuous duty will cause the pump to overheat.

† Liquids should not be allowed to freeze in the pump as this can cause pump damage.

A Rolls-Royce solution



Fuel Lift Pump: Schematic



Fuel Lift Pump: Exploded View

PARTS LIST

Each item in the parts list below corresponds to its number in the diagram above.

Item #	Description	Qty
1	Screw	6
2	Body	1
3	O-ring	1
4	Dowel pin	2
5	Bearing	4
6	Drive gear assembly	1

Item #	Description	Qty
7	Idle gear assembly	1
8	Cover	1
9	Lip seal	1
10	Coupling	1
11	Screw	1
12	Plug nut	1

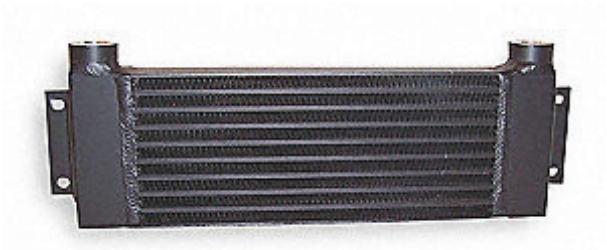
Item #	Description	Qty
13	Ball	1
14	Spring	1
15	Adjustment screw	1
16	Locknut	1
17	Bypass nut	1
18	Fiber washer	3

Fuel System Data Sheet

Fuel Cooler

DESCRIPTION

This fuel cooler is developed with state-of-the-art technology, produced in compliance with the highest quality standards, and comprehensively tested. The fuel cooler complies with both European and American standards and is suited for normal or rugged environmental operating conditions.



FEATURES

- High-performance cooler
- Design provides high heat transfer capacity in compact size
- R&D designed, engineered, and tested internal and external fins
- Rugged bar and plate construction
- Patented double-life hollow sections increase service life

SPECIFICATIONS

— ***mtu*** part number:	XG3030100644
— Maximum working pressure:	250 PSI
— Maximum working temperature:	121.1 °C (250 °F)
— Construction materials:	Aluminum

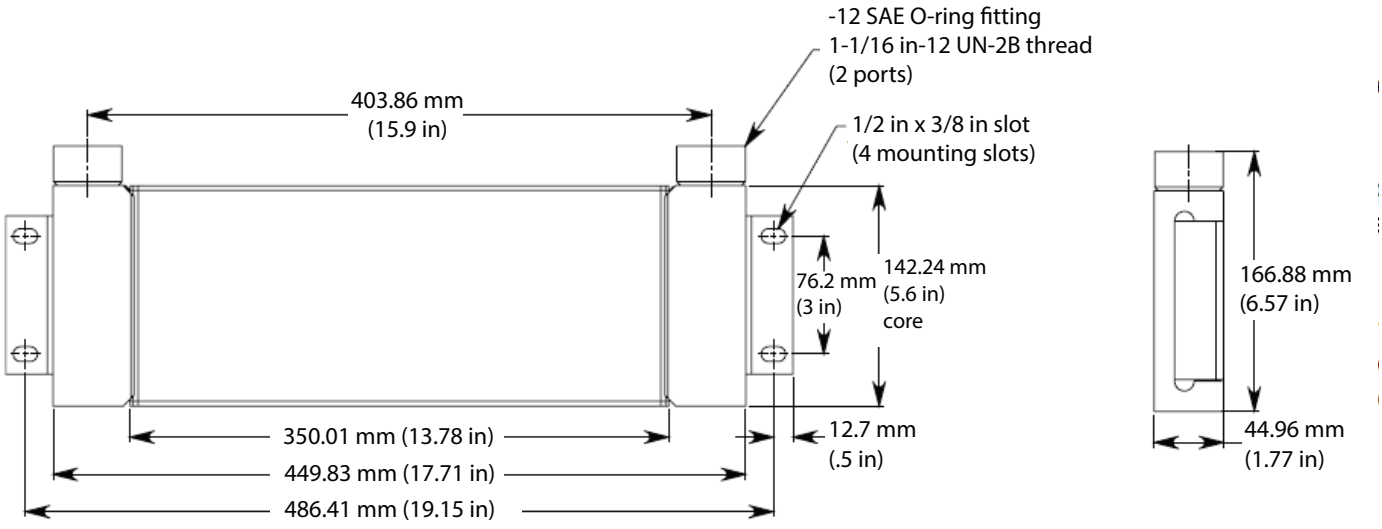


Figure 1: Dimensions Diagram

Subject to change. | WT00043049 | 2021-09

Diesel Fuel System Data Sheet

Sub-Base Tank

DESCRIPTION

The sub-base fuel tanks used with ***mtu*** generator sets are manufactured and listed per UL142 and ULC-S601 standards for steel above-ground tanks. These certifications ensure that our tanks meet the structural and mechanical integrity requirements for mounting generator sets directly on top, providing our customers with a safe and efficient fuel storage system. These tanks are suitable for above-ground storage of non-corrosive, stable, flammable, or combustible liquids that have a specific gravity not exceeding that of water. They are intended for installation and use in accordance with the codes referenced in the *Certifications and Standards* section. The secondary containment construction consists of a steel tank within a closed steel containment dike that is capable of being monitored for leakage.

STANDARD FEATURES

- Normal vent
- Emergency vent
- Manual fill
- Cam lockable fill cap
- Basin drain (plugged)
- Removable supply and return dip tubes
- Leak detection
- Black paint finish
- Secondary containment
- Electrical stub-up area: Provides space for generator set electrical connections and internal wiring capabilities
- Baffles: Separate cold engine supply fuel from hot returning fuel (additional baffling as required for structural integrity)
- Fuel level gauge: A direct-reading fuel level gauge with electric sender

OPTIONAL FEATURES

- Fuel fill drop tube
- Level alarm
- High fuel pre-alarm and low fuel level shutdown
- Five-gallon spill/fill containment box with lockable hatch
- Optional selectable accessories to meet regional codes/ jurisdictions
- IBC certification 2012, 2015, and 2018

CERTIFICATIONS AND STANDARDS

United States	Canada
UL 142	ULC-S601

In addition, this equipment is compatible with the following certifications when properly installed in accordance with all applicable codes, standards, regulations, and laws pertaining to the installation and application of the product. Reference the prevailing codes for installation requirements.

United States	Canada
NFPA 30	Part 4: National Fire Code of Canada
NFPA 37	CSA B139
NFPA 110	CSA C282
International Fire Code	CCME PN 1326

SUGGESTED REGIONAL CODE REQUIREMENTS

Pre-engineered accessories can be added to sub-base fuel tanks on 30-1,250 kW generator sets to meet regional codes/ jurisdictions. Reference the table on page 3 for available options.

Regional Codes/ Jurisdiction	Suggested Accessories for Regional Codes/Jurisdiction																		
	Audible and Visual Alarm				Fuel Fill Spill Containment (5 Gallon)	Overfill Prevention Valve (OFPV) (95%)*	Fire Rated Fuel Lines	Camlock Fill	Hazmat Label	Vent Whistle	Regional Labeling	Fuel Fill Drop Tube	Fuel Supply Check Valve	Fuel Supply Ball Valve	Tank Risers**	Extended Vents (12 ft above grade)	Fuel Leak Switch	IBC (Optional)
	Low Fuel Switch (50%)	High Fuel Switch (90%)	Critical High Switch (95%)	Fuel Alarm Panel															
California	x	x		x	x	x		x	x			x	x			x	x	x	
Colorado	x	x		x	x	x		x	x			x	x		x	x	x	x	
Dallas, TX		x		x	x	x		x	x			x	x			x	x	x	
Denver, CO	x	x		x	x	x		x	x			x	x			x	x	x	
Florida (FDEP)		x		x	x	x (90%)		x	x		x	x	x		x		x	x	
Georgia	x	x		x	x	x		x	x			x	x			x	x	x	
Georgia (GEFA)	x	x		x	x	x		x	x			x	x			x	x	x	
IFC 2003/2006/2009	x	x		x	x	x		x	x			x	x			x	x	x	
Iowa	x	x		x	x				x			x	x				x	x	
King County, WA	x	x	x	x	x	x		x	x			x	x			x	x	x	
Maryland	x	x		x	x	x		x	x			x	x				x	x	
Massachusetts	x	x		x	x				x			x	x			x	x	x	
Michigan		x		x	x	x	x	x	x		x	x	x		x		x	x	
Montana		x		x	x	x		x	x			x	x		x		x	x	
Nebraska	x	x		x	x	x		x	x			x	x				x	x	
New Hampshire		x		x	x	x		x	x			x	x	x			x	x	
North Carolina	x	x		x		x		x	x			x	x				x	x	
Ohio	x	x		x	x	x		x	x			x	x			x	x	x	
Oklahoma	x	x	x	x	x	x		x	x			x	x		x	x	x	x	
Ontario	x	x		x	x	x		x	x	x	x	x	x				x	x	
Phoenix, AZ	x	x		x		x		x	x			x	x			x	x	x	
Washington	x	x		x	x	x		x	x			x	x			x	x	x	
Wisconsin	x	x		x	x	x		x	x			x	x				x	x	

* Percentage may vary due to tank construction.
** Risers meet minimum code requirements.
Note: Verify regional code requirements prior to specification.

Subject to change. | WT00043116 | 2021-07

Excitation System Data Sheet

Auxiliary Winding

DESCRIPTION

The auxiliary winding excitation system is a reliable and compact solution for generator excitation support. This system consists of two auxiliary windings that provide a constant power source for the voltage regulator to support transient events and short circuit conditions. The functionality of the auxiliary windings meet the same performance requirements as the Permanent Magnet Generator (PMG) power supply.

FEATURES

Improved transient response

When a generator is subject to a large step load, the generator's terminal voltage experiences a sudden voltage dip. With a shunt-style regulator, reduced voltage means the regulator's ability to increase excitation is reduced, and voltage recovery will take longer. Power from auxiliary windings is a product of two dedicated-purpose windings. One winding is designed to supply constant output to the voltage regulator. This creates a range of electrical operation from no load to full load on the generator for excellent transient electrical response.

300% short circuit capability

The second winding of the auxiliary windings is designed to supply output to the voltage regulator for short circuit conditions in order to ensure the machine produces 300% of rated output current for ten seconds (at 60 Hz operation). This functionality is important when a fault occurs to ensure current continues to flow long enough for downstream breakers to trip and clear the fault in the power system. When a fault occurs with a shunt-type regulator, the sudden drop in voltage reduces the regulator's ability to increase excitation required to keep current flowing out of the generator. The auxiliary winding excitation system provides the required short circuit support needed to avoid such a dangerous scenario.

Resistant to the effects of harmonics

Auxiliary windings are embedded in the generator stator windings. These windings are electrically isolated from potential issues that may arise from harmonic-producing loads connected to the generator output leads. Rectifier-type loads may cause voltage wave form notching, and the disrupted voltage wave form can affect voltage regulator operation on shunt-powered regulators. Auxiliary windings provide a reliable, isolated power supply that mitigates negative effects that non-linear loads may cause with a self-excited excitation system.

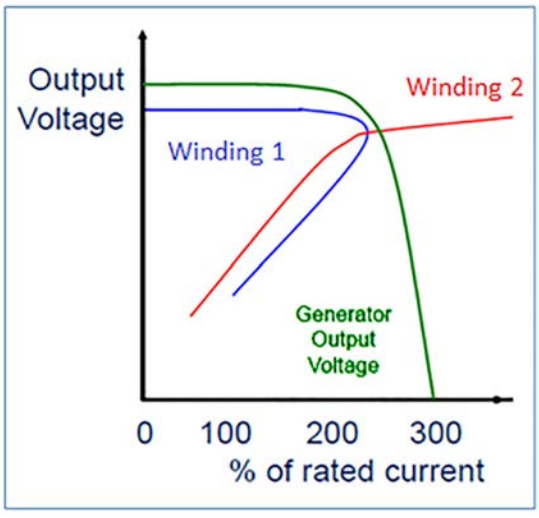


Figure 1: Generator Output Voltage

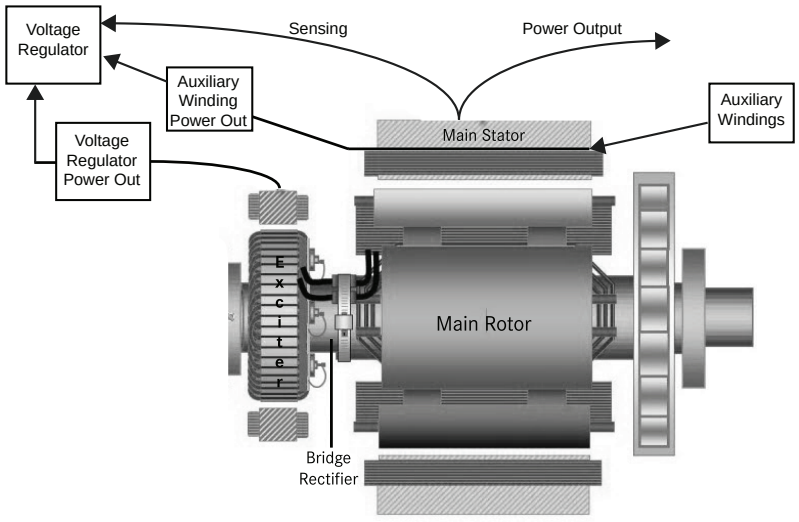


Figure 2: Generator Equipped with Auxiliary Windings*

A Rolls-Royce solution

FEATURES, continued:

Reliable and compact

To ensure positive voltage buildup irrespective of condition and the period of non-operation, small permanent magnets are inserted in the exciter. These magnets provide the starting magnetism in a similar manner to PMG operation. The permanent magnet inserts complete the auxiliary winding excitation system, which reliably provides performance in accordance with customer requirements without need for additive components required for PMG installations.

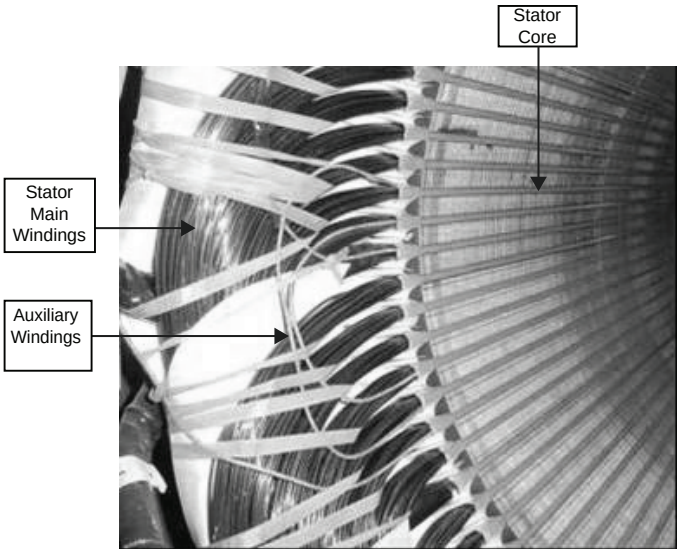


Figure 3: Stator Windings*

EXCITATION SYSTEM COMPARISON CHART

	Auxiliary Windings	Permanent Magnet Generator (PMG)
Motor starting capability	High	High
Short circuit current capability	300% at 60 Hz	300% at 60 Hz
Susceptibility to non-linear loads	Minimum	Minimum
Number of components	Minimum	Maximum
Retrofitability	No	Yes
Generator length	Minimum	Maximum
Stator design	Special	Standard with PM attachment
Voltage buildup	Uses residual magnetism and permanent magnet inserts on some frames	Positive from permanent magnets

* Note: Visual appearance may vary.

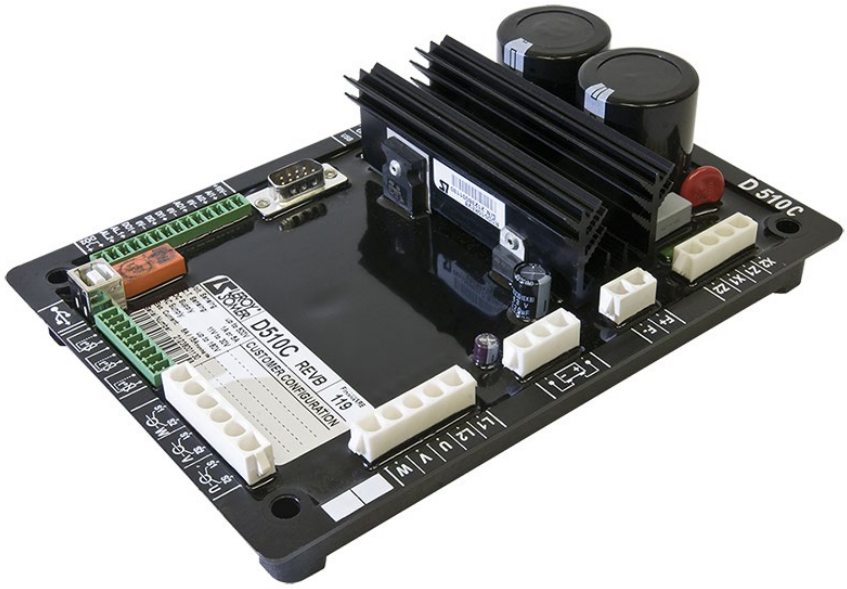
Nidec
All for dreams

LEROY-SOMER™

DATASHEET

D 510C A.V.R.

FOR SHUNT - AREP or PMG excitation



The D510C is a digital voltage regulator, which monitors and regulates the alternator output voltage. It is designed for alternators with SHUNT, AREP or PMG excitation.

The D510C is an AVR which can be configured using the Easyreg® software.

- There are 4 possible regulation modes : Voltage, P.F., kVA, manual
- The I/O can be configured:
  - 2 x I : analog
  - 1 x O: analog
  - 2 x I : digital
  - 3 x O : digital
- 1 dry contact
- 1 USB port
- DB9 plug for CAN

It complies fully with the requirements of IEC standard 60034-1 and UL 708 and CSA certifications.

CHARACTERISTICS

- Voltage regulation : ± 0.25%
- Function: regulation of voltage, PF, kVAR and manual regulation.
- Response time depending on PID settings.
- Rated field current : 6 A.
- Maximum field current : 15 A/10 s.
- Power supply range for voltage sensing: up to 530 V.
- Protection:
  - Short-circuit / Loss of voltage reference / Overvoltage / Overexcitation / High Temperature /
  - Speed drop / Diode fault / Stator current unbalance / Current limitation
- Engine assistance
  - Soft start : 0 - 100 s
  - U/F adjustable from 0.5 to 3 in increments of 0.1
  - LAM : 0 to 30%
  - Gradual increase : 0.1 to 30 s/Hz
- Grid code function

CONNEXION AND SETTING

The AVR is set using the Easyreg® software.

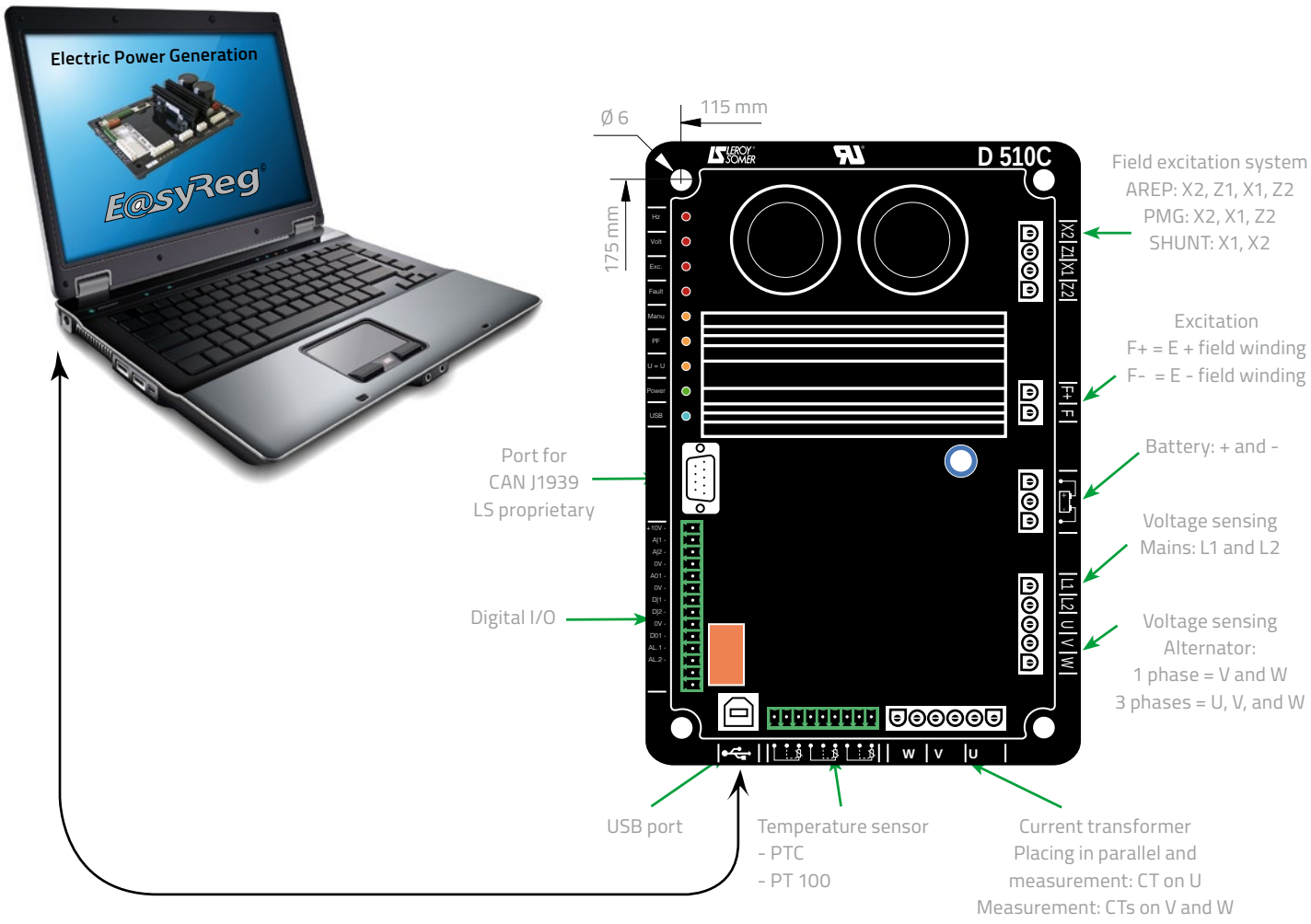
- This can be used to:
  - Set the AVR parameters
  - Configure the inputs and outputs
  - Display faults and parameter measurements.

OPERATION CONDITIONS

- Operating temperature:
  - 40°C to + 65°C
- Storage temperature: - 55°C to + 85°C.
- Shocks on the base : 9 g depending on the 3 axes.
- Vibrations:
  - Less than 10 Hz : 2 mm half-peak amplitude.
  - 10 Hz to 100 Hz : 100 mm/s.
  - Above 100 Hz : 8 g.

OPERATION RANGE

	LSA 40	42,3	44,3	46,3	47,2	49,3	50,2	51,2	53,1	54
SHUNT AREP OU PMG	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓



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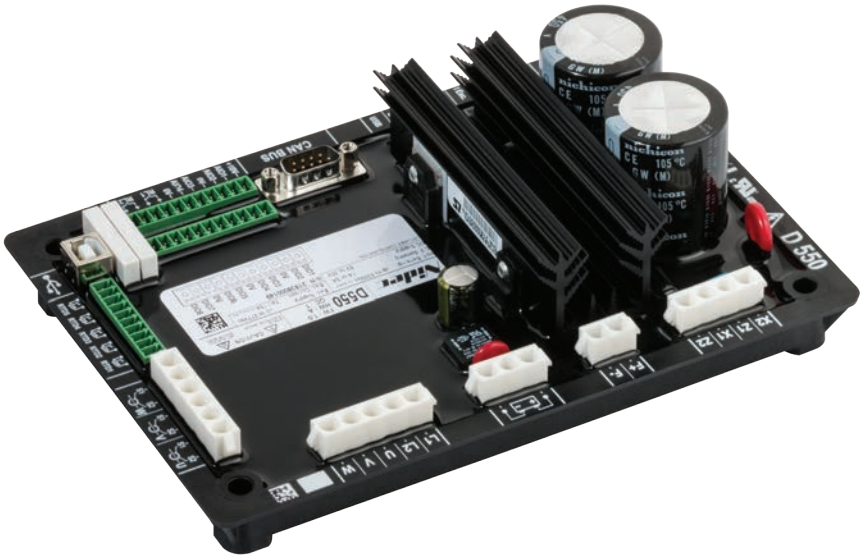
LEROY-SOMER™
KATO ENGINEERING™

DATASHEET

D550 DIGITAL AVR
FOR ALTERNATORS WITH SHUNT, AREP OR PMG EXCITATION



The D550 is a digital automatic voltage regulator (AVR) for alternators with rated field current up to 8 A at 55°C.

It offers a vast array of regulation modes suitable for all power generation applications, including grid-connected configurations.

The D550 also integrates a visual interface through the EasyReg Advanced software, which allows the user to read the configuration values and parameters. It can also be configured directly via USB without external power supply.

The D550 also includes several protections and functions to keep the alternator running in full safe operation, in particular settings to comply with public network connection instructions (grid code).

The communication port is CANJ1939 compatible.

KEY FEATURES

- **Regulation modes**
  - Voltage regulation accuracy: -/+ 0.25%
  - Field current (manual mode)
  - Generator power factor
  - Grid power factor
  - Generator kVAr
- **Regulation features**
  - Voltage equalization
  - Droop management
  - Cross current compensation
  - Soft start
  - Load Acceptance Module (L.A.M.) function to assist during heavy load application events
  - Negative field forcing
- **kW, kVAr, kVA & PF calculation**
- **Protections & Limitations**
  - Under and over field current limitation
  - Loss of field sensing
  - Generator under/over voltage
  - Loss of sensing
  - V/Hz regulation mode
  - Diode fault monitor
- **Data logger** (option)
- **Synchronization monitoring**
- **Events log**

ELECTRIC FEATURES

- **Generator voltage measurement**
  - 3-phase, 2-phase
  - Range: 0-230-530 VAC
  - Consumption: < 2 VA
- **Grid voltage measurement**
  - 2-phase
  - Range: 0-230-530 VAC
  - Consumption: < 2 VA
- **Generator current measurement**
  - 1 or 3-phase
  - Secondary range: 1 or 5 A
  - Consumption: < 2 VA
- **AC supply input**
  - PMG, AREP, SHUNT
  - Range: 50-277 VAC
- **Excitation**
  - Rated field current (continuous):
    7 A at 70°C
    8 A at 55°C
  - Field forcing current (10s max):
    15 A at 70°C
  - Recommended field resistance:
    > 4 ohms
- **Auxiliary supply:** 8-35 VDC
  - Consumption: < 1 A
- **Frequency range:** 30-400 Hz
- **Storage temperature:** -55°C +85°C
- **Operating temperature:** -40°C +70°C

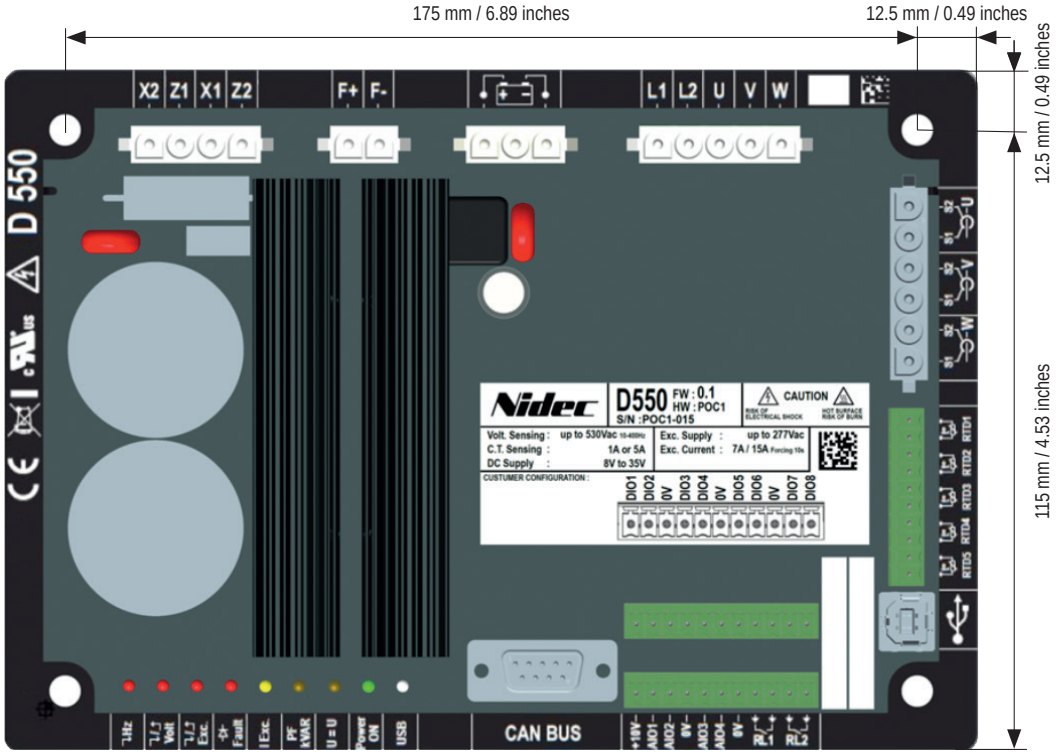
INPUTS / OUPUTS

- **8 programmable digital inputs & outputs**
  - Output specification: 150 mA - 30 VDC
- **4 programmable analog inputs & outputs**
  - 4-20 mA / ±10 V / 0-10 V / potentiometer (1 kΩ)
- **2 relay outputs**
  - Specifications: 125 VAC - 5 A
- **5 temperature sensings**
  - Type: Pt100/CTP
  - Programmable threshold

COMMUNICATION & SETTINGS

- Software configuration (PC tool)
- USB port (self powered)
- CAN J1939 and Proprietary (Leroy-Somer protocol)

DIMENSIONS



Same footprint as Leroy-Somer D510C

marathon®
Generators

DVR® 2400
DIGITAL VOLTAGE REGULATOR

NEW FEATURES
- USB 2.0 access through front panel
- Euro style connector for low voltage connections
- Event Logging
- PMG voltage metering
- Polarity configuration for external inputs
- Configurable cut-in and cut-out frequencies
- Retain/reset configuration of remote adjust

FOUR DIGIT HMI DISPLAY
From intial setup to monitoring regulator status, this display provides innovative, fast and easy setup.

REGULATION MODES
Single and Three phase (AVR), Manual Field Current Regulation (FCR), Reactive Power Regulation (VAR) and Power Factor Regulation (PF). All modes compatible with control by external devices.

GENERATOR SOFT START
Controlled increase to rated voltage limits overshoot during voltage build-up in AVR modes.

TRUE RMS VOLTAGE SENSING - SINGLE OR THREE PHASE
Directly sense 100 to 600 Volts at 50/60 Hz. Circuitry senses true RMS voltage for superior regulation.

SINGLE PHASE POWER METERING

FRAME SIZE SPECIFIC PID SELECTION
Simply select the appropriate frame size and your gains are set.

ROBUST GENERATOR PROTECTION FEATURES
9 different Alarm and Shutdown protection features, many are customizable for your application including:
- Field Over & Under Excitation
- Instantaneous Field Over Current
- Generator Over & Under Voltage
- Generator Voltage Imbalance
- Generator Loss of Sensing

REGAL®

DVR®2400 DIGITAL VOLTAGE REGULATOR

SPECIFICATIONS

Voltage Regulation - 0.25% over load range at rated power factor and constant generator frequency.

Output Power - 100 Vdc, 4.0 Adc continuous rating and 190 Vdc, 7.5 Adc forcing capability for one minute.

Exciter Field DC Resistance - 18 to 25Ω Range

Remote Voltage Adjustment - ±30% of nominal via analog input, ±15% via external contacts.

Input Power - 180 to 240 Vac, 250 to 300 Hz PMG power supply

Regulator Sensing - 100 to 600 Vac, 50/60 Hz, 1-phase/3phase

Operating Temperature - From -40˚C to +70˚C (-40˚F to + 158˚F)

Storage Temperature - From -40˚C to +85˚C (-40˚F to +185˚F)

Ingress Protection - IP52 (front side mounted in conduit box along with swing cover); IP10 (rear side with protective cover)

Shock - 20G in 3 perpendicular planes

Vibration - 2.5G at 5 to 26 Hz; 0.050" double amplitude (27 to 52 Hz); 7G at 53 to 500 Hz

Weight - 3.5 lb. (1361 g)

Humidity Testing - Per MIL-STD-705B, Method 711-D

Salt Fog Testing - Per MIL-STD-810E

EMI Compatibility

Immunity

Meets EN 61000-6-2: 2005 Electromagnetic compatibility (EMC) -Part 6-2: Generic standards- immunity for industrial environments.

Emission

- Meets EN 61000-6-4: 2007 Electromagnetic compatibility (EMC) - Part 6-4: Generic Standards - emmission standard for industrial environments

EMI Compatibility Tests

Immunity

- Electrostatic Discharge (ESD): IEC 61000-4-2
- Radiated RF: IEC 61000-4-3
- Electrical Fast Transient (EFT) /Burst: IEC 61000-4-4
- Conducted RF: IEC 61000-4-6
- Power Frequency and Magnetic Field: IEC 61000-4-8

Emission

- Radiated RF: EN 61000-6-4: 2007, 30 MHz to 1000 MHz

marathon® Generators

Regal Beloit America, Inc.
100 East Randolph Street
Wausau, WI 54402-8003
PH: 715-675-3359

www.marathonelectric.com

REGAL®

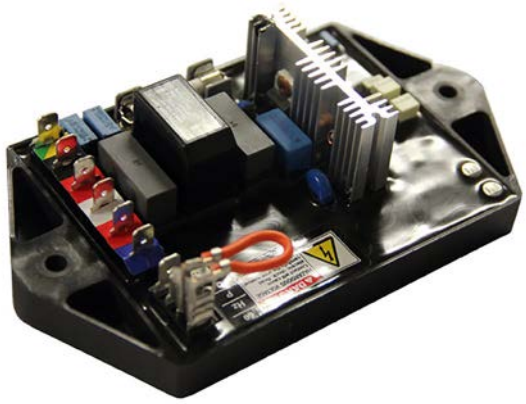
Voltage Regulator Data Sheet

Mark VX/XX

DESCRIPTION

The Mark VX M00FA122A voltage regulator suits single and 3-phase Marelli Motori MXB series synchronous generators.

The Mark XX M00FA133A voltage regulator suits single and 3-phase Marelli Motori MXB series generators with Permanent Magnet Generator (PMG).



FEATURES AND BENEFITS

— Potentiometer calibration
— External potentiometer, 100 kΩ - 1 W for ΔV = ± 5 % of rated voltage
— External DC voltage signal (0-10V)
— Resin-bonded circuit board for reliable operation in humid, dusty or salty conditions
— Regulation accuracy better than ± 0.5% no-load to full-load
— Under-frequency limiter protection
— Internal radio interference suppressor
— Replaceable internal fuse

SPECIFICATIONS

***mtu* Part Number**
Mark VX: XG3130900077
Mark XX: XG3130900078

Power supply voltage
Mark VX: 170 to 277 Vac, 50/60 Hz
Mark XX: 170 to 277 Vac, 175/210 Hz

Power supply source
Mark VX: Auxiliary windings, mains
Mark XX: PMG

Voltage build-up
5 Vac

Voltage sensing (single phase)
170 to 277 Vac

Maximum continuative field current
5 Adc

Maximum forcing field current
8 Adc

Maximum field voltage
100 Vdc

Field resistance
8 Ω to 20 Ω

Regulation accuracy no-load to full-load
± 0.5 %

Accuracy with ± 4% engine governing
± 1 %

Thermal drift
± 0.5 %

Response time
1 cycle

Operating temperature
-30 °C (-22 °F) to 70 °C (158 °F)

Storage temperature
-40 °C (-40 °F) to 80 °C (176 °F)

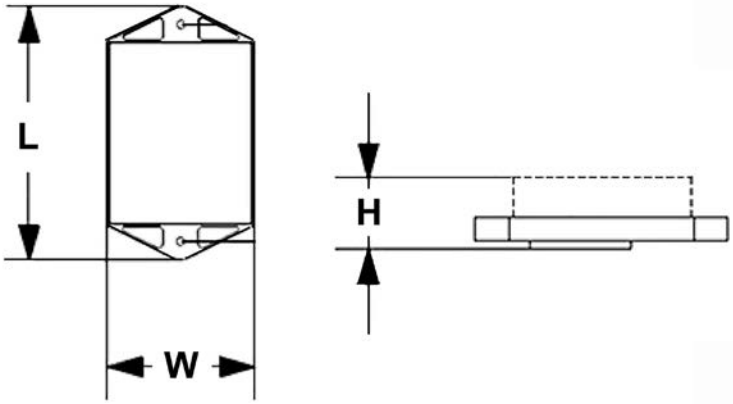
Certifications and Standards
CE and UL unlisted
CSA certified

A Rolls-Royce solution

Mark VX/XX Voltage Regulator Data Sheet

WEIGHT AND DIMENSIONS

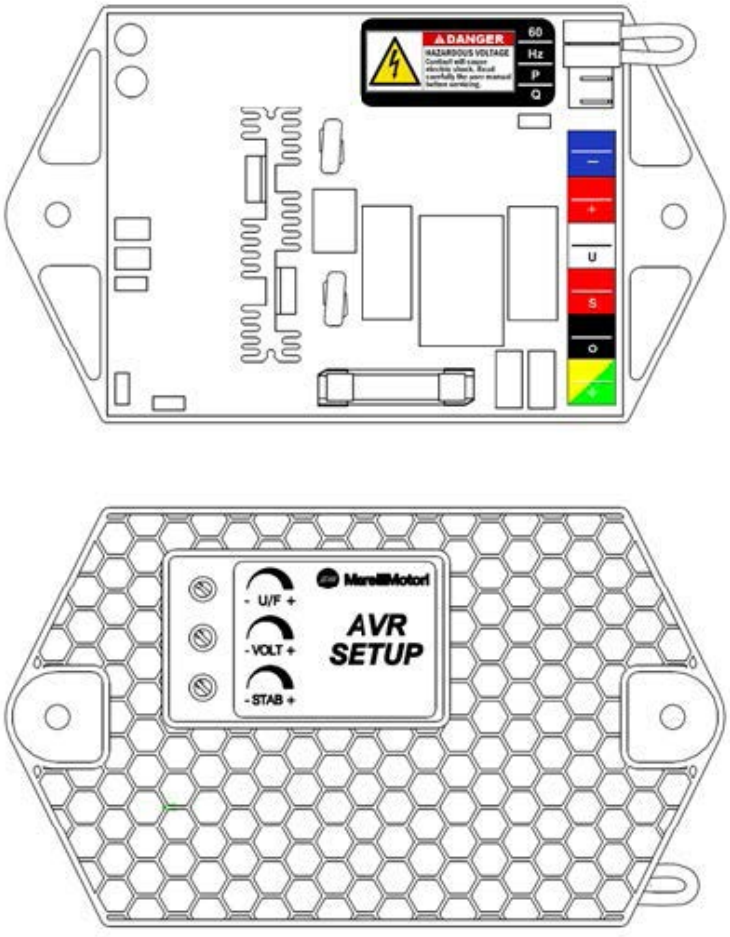
Weight: 370 g (8 oz)
Length: 160 mm (6.3 in)
Width: 93.6 mm (3.7 in)
Height: 45 mm (1.8 in)



Mark VX/XX Dimensions

BOARD LAYOUT AND TERMINALS

U O	Power supply
S O	Generator voltage sensing
+ -	Output (to the exciter field)
60 Hz	60 Hz mode selection
P Q	Connection to external control device
⏚	Connection to ground of internal EMI filter



Mark VX/XX board layout and terminals

Voltage Regulator Data Sheet

MAVC63-4

DESCRIPTION

Rugged and reliable, the MAVC63-4 analog voltage controller regulates voltage on 50 or 60 Hz brushless generators. The controller includes frequency compensation, over-excitation shutdown, solid-state buildup circuitry, and electromagnetic interference (EMI) filtering.

FEATURES AND BENEFITS

- Integrated circuitry for compact size, simplicity, and high reliability
- Rugged and durable with fast response
- Regulation accuracy better than ±1% no-load to full-load
- Exciter field current 4A continuous, 7A forcing
- Voltage regulation performance is constant over operating temperature range without derating or degradation
- Potted design allows installation in harsh environments
- Reliable and rugged construction reduces service calls
- Volts-per-Hertz limiting, over-excitation shutdown, and external voltage adjustments allow the MAVC63-4 to work with most applications
- Compact size for easy installation in most generator terminal boxes
- Designed for simple voltage regulation adjustments

SPECIFICATIONS

***mtu* Part Number**
SUA77199

Input Power (Single Phase)
Range: 190 to 240 Vac, ±10%
Frequency: 50/60 Hz, ±10%
Burden: 500 VA

Sensing Input (Single Phase)
(Common with input power)
Range: 190 to 240 Vac, ±10%
Frequency: 50/60 Hz, ±10%

Regulation Accuracy
Better than ±1%, no-load to full-load

EMI Suppression
Internal EMI filtering

Voltage Buildup
Automatic voltage buildup occurs for residual generator voltages as low as 6 Vac.

Output Power
Max continuous: 63 Vdc at 4 Adc (252 W)
One-minute forcing: 100 Vdc at 7 Adc (700 W) with 240 Vac power input

Voltage Adjustment
Range: 171 to 264 Vac

Response Time
< 1.5 cycles for ±5% change in sensing voltage

Overexcitation Shutdown
Field voltage shuts down after time delay if exciter field voltage exceeds 100 Vdc, ±5%.

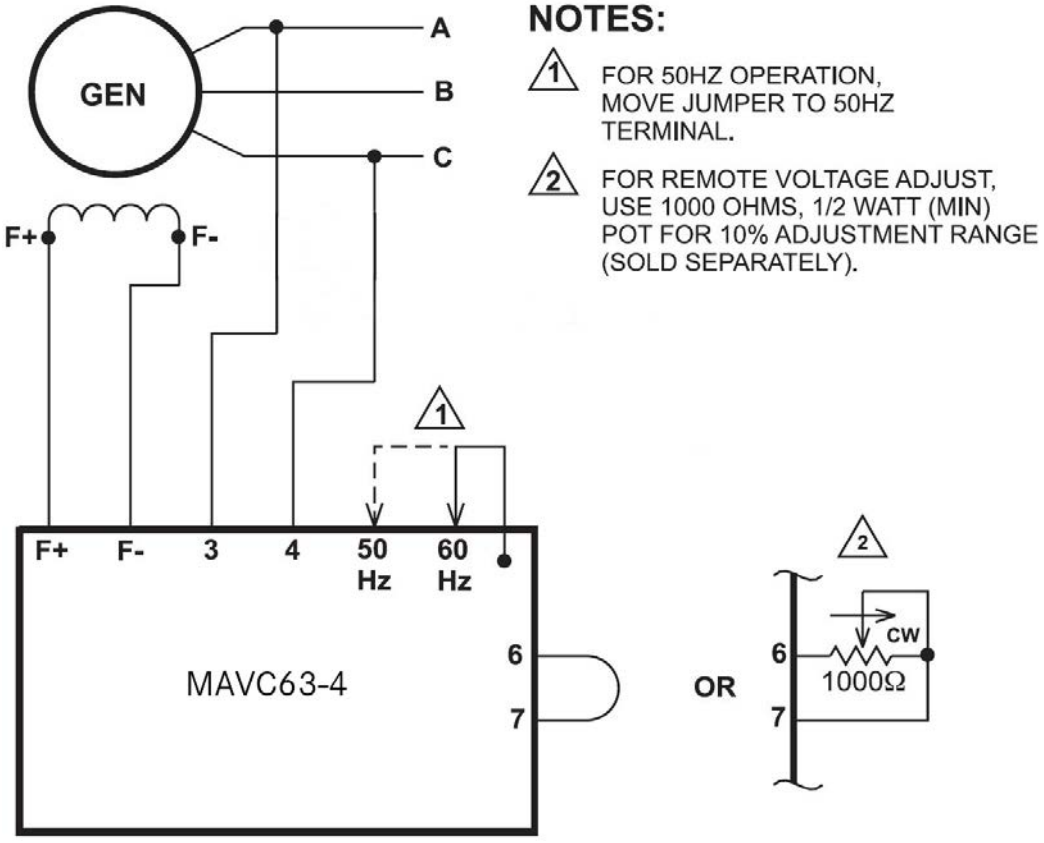
SPECIFICATIONS, continued

Power Dissipation
8 W maximum

Certifications and Standards
UL recognized component
CSA certified

Weight and Dimensions
Weight: 220 g (8 oz)
Dimensions :
Width: 100.8 mm (3.97 in)
Height: 68.3 mm (2.69 in)
Depth: 55.9 mm (2.2 in)

Environmental
Operating temperature: -40 °C (-40 °F) to 60 °C (140 °F)
Storage temperature: -65 °C (-85 °F) to 85 °C (185 °F)
Shock: 20 G in three perpendicular planes
Vibration:
2 to 27 Hz: 1.3 G
27 to 52 Hz: 0.036” double amplitude
52 to 1,000 Hz: 5 G



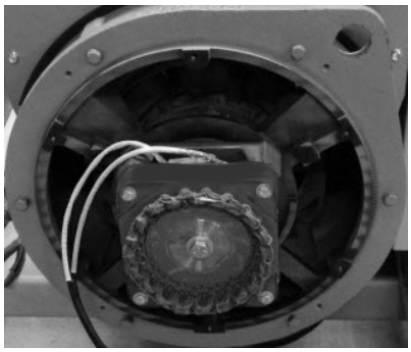
MAVC63-4 Connection Diagram

Generator System Data Sheet

Permanent Magnet Generator (PMG)

DESCRIPTION

A permanent magnet generator (PMG) is standard on 450 kW and larger units and is available as an optional accessory on most units smaller than 450 kW. The PMG is an improved method of supplying power to the voltage regulator and adds distinct advantages over shunt type power supply.



Permanent Magnet Generator*

FEATURES

Improved transient response

When a generator is subject to a large step load, the generator's terminal voltage experiences a sudden voltage dip. With a shunt style regulator, reduced voltage means the regulator's ability to increase excitation is reduced and voltage recovery will take longer. Power from a PMG is only dependent on the speed of rotation so voltage regulator power, and therefore excitation power, is not compromised during a load step.

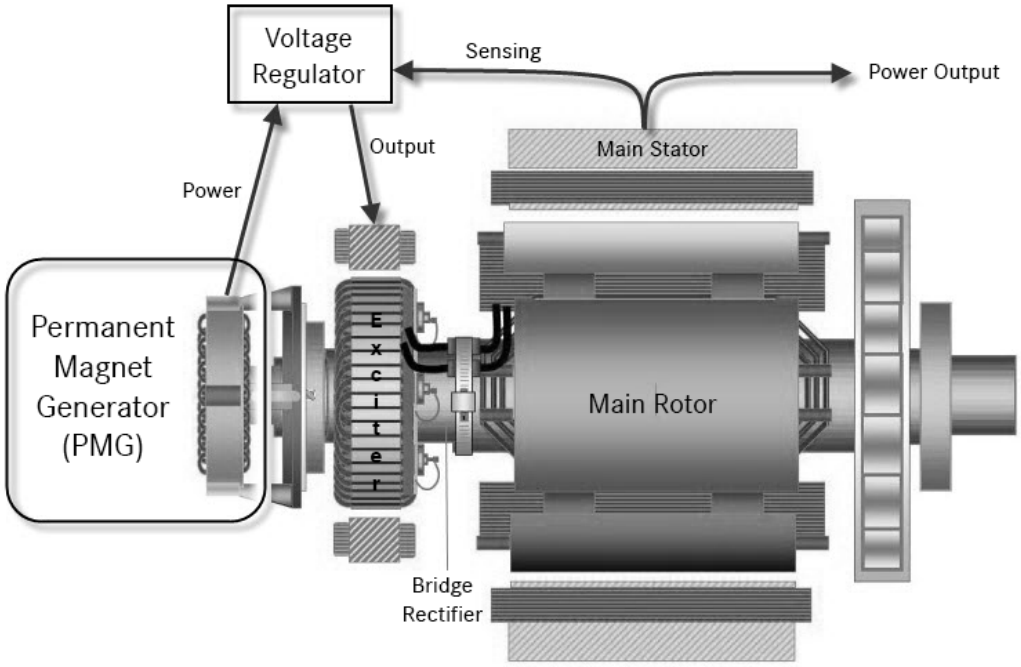
300% short circuit capability

The PMG enables the generator to provide up to 300% short circuit current for 10 seconds. This is important when a fault occurs to ensure current continues to flow long enough for downstream breakers to trip and clear the fault. When a fault occurs with a shunt type regulator, the sudden drop in voltage indicates the regulator has no power to increase excitation to keep current flowing. Without current flow, the downstream breakers may not trip.

Resistant to the effects of harmonics

A PMG is also beneficial in applications with harmonic producing loads. When rectifier-type loads are present and cause voltage wave form notching, the disrupted voltage wave form can affect voltage regulator operation on shunt powered regulators. Unlike a shunt regulator, the PMG supplies the regulator with a power source which is isolated from the electrical system.

Permanent Magnet Generator (PMG) Data Sheet



Generator Equipped with PMG*

EXCITATION SYSTEM COMPARISON CHART

	Auxiliary Winding	Permanent Magnet Generator (PMG)
Motor starting capability	High	High
Short circuit current capability	300% at 60 Hz	300% at 60 Hz
Susceptibility to non-linear loads	Minimum	Minimum
Number of components	Minimum	Maximum
Retrofitability	No	Yes
Generator length	Minimum	Maximum
Stator design	Special	Standard with PM attachment
Voltage buildup	Uses residual magnetism and permanent magnet inserts on some frames	Positive from permanent magnets

* Note: Visual appearance may vary.

Subject to change. | WT00037948 | 2023-05

Voltage Regulator Data Sheet

PM300E

The PM300E voltage regulator is an encapsulated electronic voltage regulator which controls the output of a brushless AC generator by regulating the current into the exciter field. Its unique design allows for PMG connectivity for short circuit operation and increased voltage regulation efficiency. The PM300E is a low-cost PMG option on 280, 360, and 430 frame generators.

STANDARD FEATURES

Adjustments for voltage, stability, and V/Hz roll-off

SPECIFICATIONS

mtu part number
SUA106154

Sensing input
Voltage: 190-240 V, 50/60 Hz

Power input
Voltage: 190-240 V, 250/300 Hz

Output power continuous
63 VDC maximum at 3.0 ADC (190 W)

Exciter field DC resistance
15 to 100 ohm

Voltage regulation
< ± 1% (with 4% engine governing)

Voltage buildup
Residual voltage at AVR terminal > 10 VAC

External volts adjustment
± 5% with 1,000 ohm rheostat
± 10% with 2,000 ohm rheostat

Burden
500 VA

EMI suppression
Internal electromagnetic interference filtering

Under frequency protection
60 Hz Operation: 54-61 Hz
50 Hz Operation: 45-51 Hz

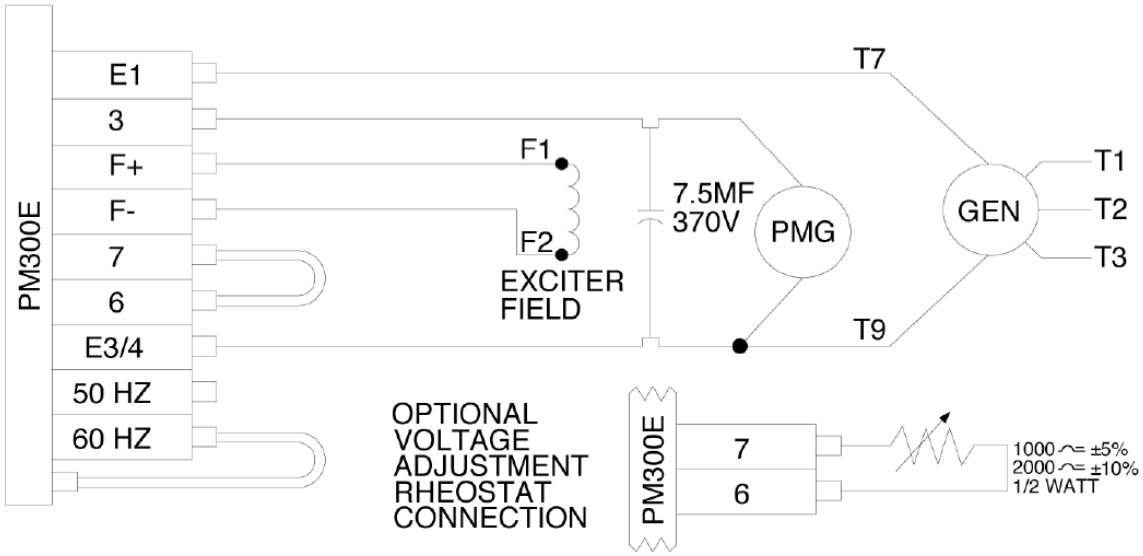
Unit power dissipation
Maximum 8 W

Surrounding air temperature
-40 °C (-40 °F) to 60 °C (140 °F)

Storage temperature
-65 °C (-85 °F) to 85 °C (185 °F)

Weight and dimensions
Weight: ±2% 200 g (7 oz)

Dimensions:	Width:	99.5 mm (3.92 in)
	Height:	67 mm (2.64 in)
	Depth:	47.5 mm (1.87 in)



Interconnection Diagram for 416-480 or 208-240 V
WYE Connected Generator

Strip Heater Data Sheet

Leroy Somer Generator

DESCRIPTION

Strip heaters are used when engine generator sets are installed in cold temperature or high humidity climates. The heater maintains the generator windings at a suitable temperature to prevent corrosion due to condensation.

FEATURES

— Rugged, dependable construction
— Minimum maintenance cost
— High-emissivity black oxide finish

SPECIFICATIONS

— Operational to 600-700 °C (1,112-1,292 °F)
— Supply voltage: 120 V, 60 Hz

Generator Frame	Watts	Length	Width	Height
49	250	217 mm (8.5 in)	25 mm (0.98 in)	50 mm (1.97 in)
50	500	367 mm (14.4 in)	25 mm (0.98 in)	50 mm (1.97 in)
641*	600	355.6 mm (14 in)	65 mm (2.56 in)	21.6 mm (.85 in)
841*	600	355.6 mm (14 in)	65 mm (2.56 in)	21.6 mm (.85 in)
941*	600	355.6 mm (14 in)	65 mm (2.56 in)	21.6 mm (.85 in)
4P6.6*	1,000	603.3 mm (23.8 in)	38.1 mm (1.5 in)	23.9 mm (0.94 in)
4P9.6*	1,000	603.3 mm (23.8 in)	38.1 mm (1.5 in)	23.9 mm (0.94 in)

* Two strip heaters required per generator set

CERTIFICATIONS AND STANDARDS

— UL listed
— CSA certified

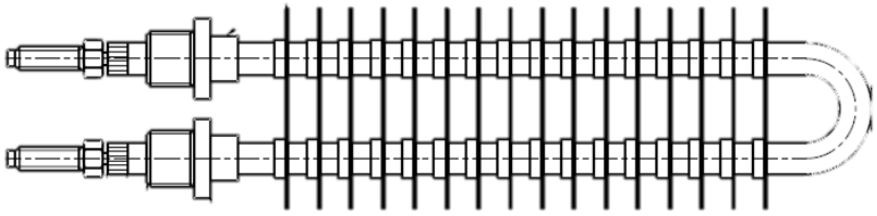


Figure 1: 49, 50 Frame Diagram

Note: Visual appearance may vary depending on frame size.

A Rolls-Royce solution

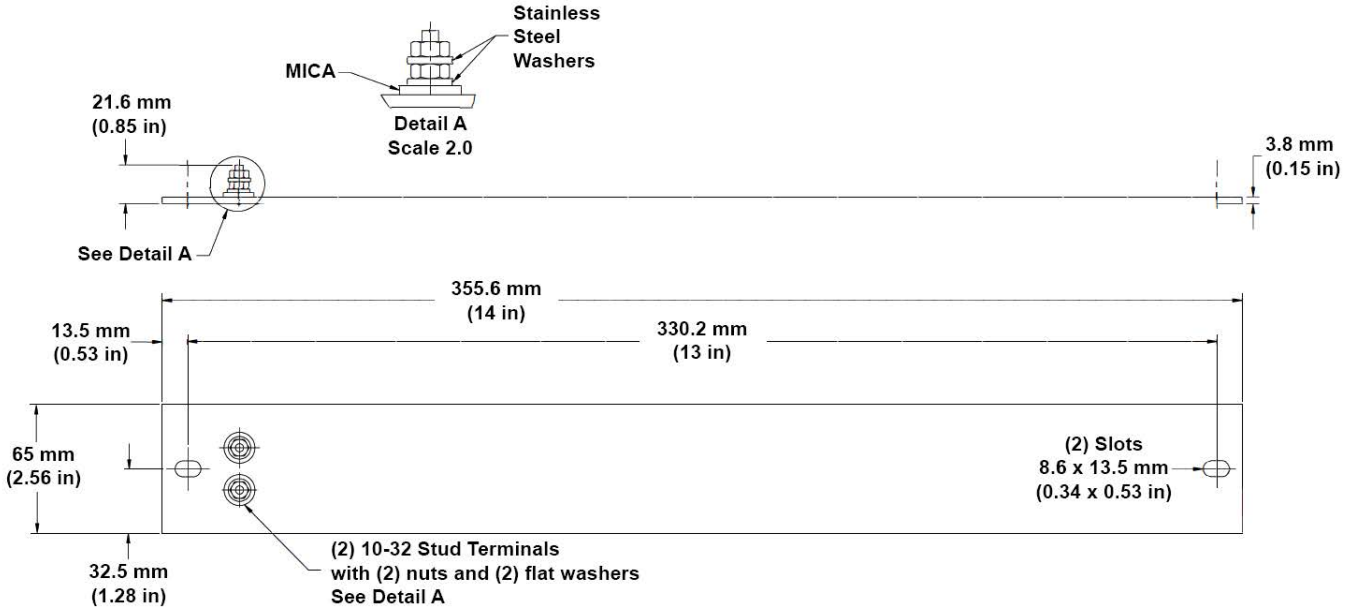


Figure 2: 641, 841, 941 Frame Diagram

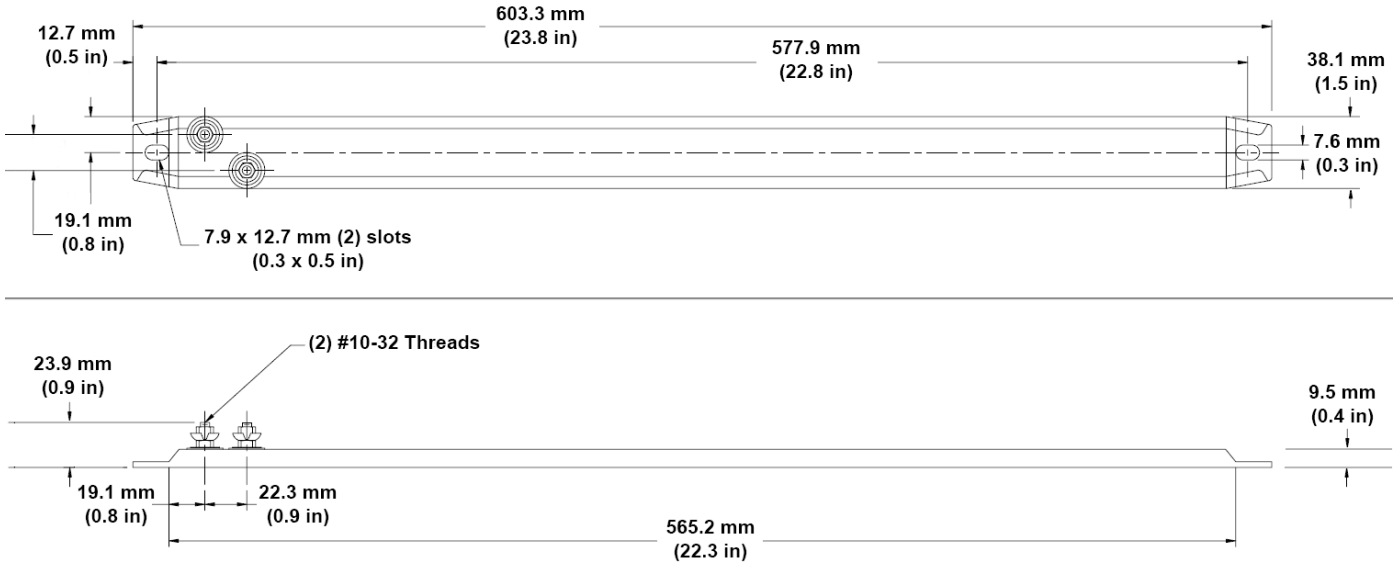


Figure 3: 4P6.6, 4P9.6 Frame Diagram

Note: Dimensions shown are maximum dimensions.

Strip Heater Data Sheet

Marathon Generator

DESCRIPTION

Strip heaters are used when engine generator sets are installed in cold temperature or high humidity climates. The heater maintains the generator windings at a suitable temperature to prevent corrosion due to condensation.

FEATURES

— Rugged, dependable construction
— Minimum maintenance cost
— High-emissivity black oxide finish*

SPECIFICATIONS

— Chrome steel sheath*
— Operational to 648 °C (1,200 °F)*
— Supply voltage: 120 V, 60 Hz. Two heaters may be wired in series for 240 V operation.

Generator Frame	Watts per Element	Elements per Generator	Dimension A**	Dimension B**	Dimension C**
280	42	2	88.9 mm (3.5 in)	328.4 mm (12.93 in)	N/A
360	126	2	127 mm (5 in)	432 mm (17 in)	N/A
430	250	2	304.8 mm (12 in)	279.4 mm (11 in)	266.7 mm (10.5 in)
570	500	2	454 mm (17.9 in)	428.6 mm (16.9 in)	415.9 mm (16.4 in)
740	250	4	454 mm (17.9 in)	428.6 mm (16.9 in)	415.9 mm (16.4 in)
1,000	625	2	152.4 mm (6 in)	1168.4 mm (46 in)	N/A

* 430-740 generator frame models only
** Refer to Dimensional Diagrams below for dimension reference points
N/A = Not Available

CERTIFICATIONS AND STANDARDS

— UL listed
— CSA certified

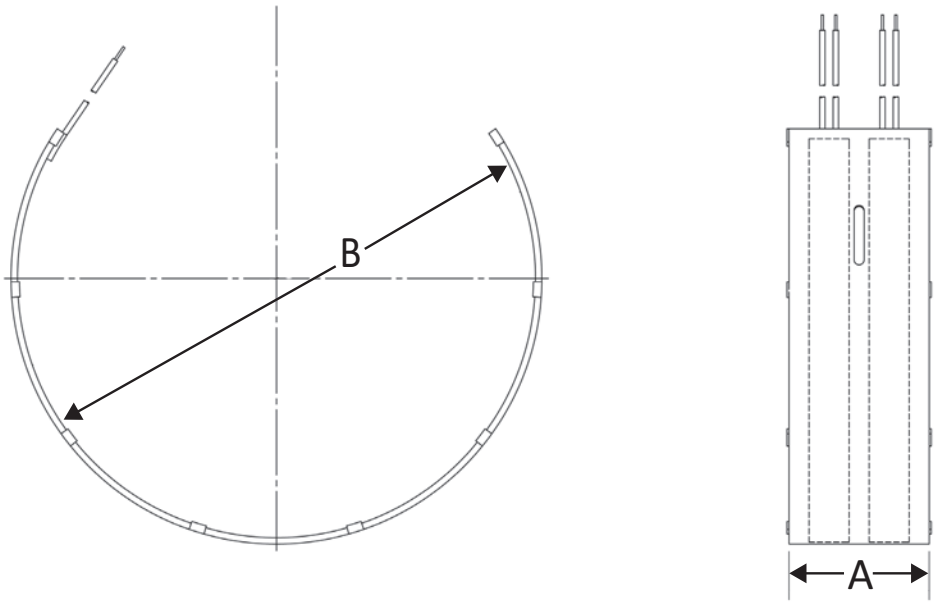


Figure 1: 280, 360, and 1,000 Frame Dimensional Diagram

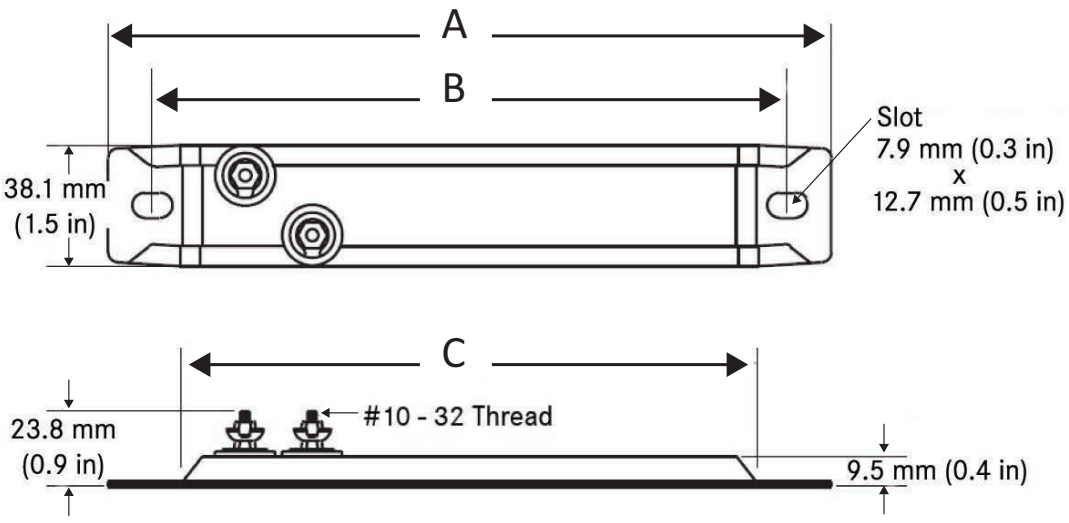


Figure 2: 430, 570, and 740 Frame Dimensional Diagram

Strip Heater Data Sheet

Marelli Generator

DESCRIPTION

Strip heaters are used when engine generator sets are installed in cold temperature or high humidity climates. The heater maintains the generator windings at a suitable temperature to prevent corrosion due to condensation.

FEATURES

— Rugged, dependable construction
— Minimum maintenance cost

SPECIFICATIONS

— Supply voltage: 120 V, 60 Hz. Two heaters may be wired in series for 240 V operation.

Generator Frame	Watts per Element	Elements per Generator	Operational Temperature (max)	Dimension A**	Dimension B**	Figure
180	15	3	220 °C (428 °F)	N/A	N/A	**1**
225-250	150	1	650 °C (1,202 °F)	203.2 mm (8 in)	177.8 mm (7 in)	**2**
315-355*	250	1	650 °C (1,202 °F)	304.8 mm (12 in)	279.4 mm (11 in)	**2**

* Heaters are installed at factory by Marelli
** Refer to Dimensional Diagrams below for dimension reference points
N/A = Not Available

CERTIFICATIONS AND STANDARDS

— UL listed
— CSA certified

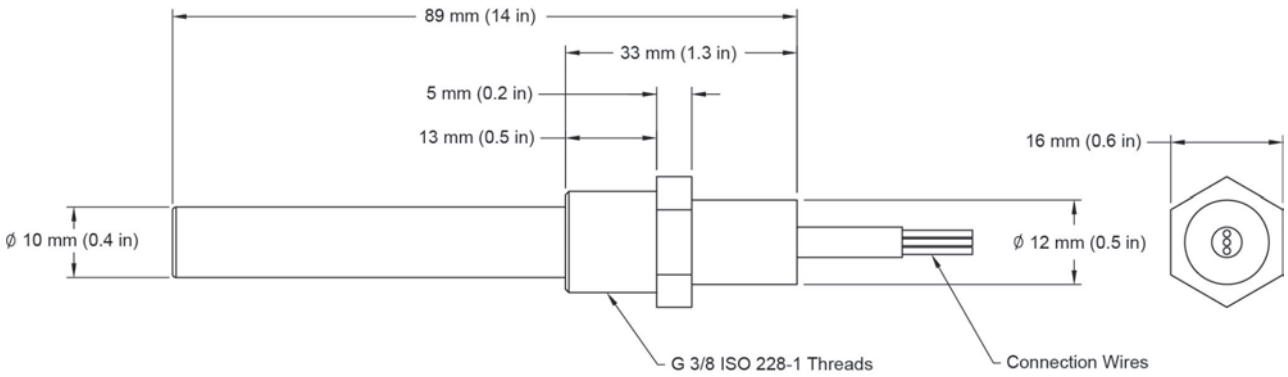


Figure 1: 180 Frame Dimensional Diagram

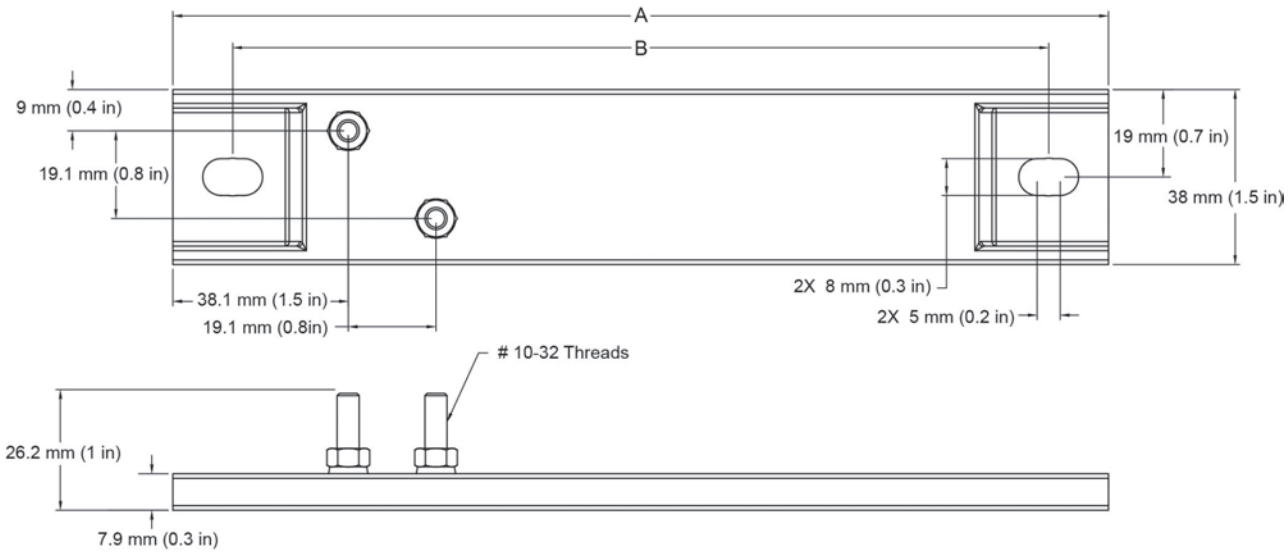


Figure 2: 225-250 and 315-355 Frame Dimensional Diagram

Oil Supply Tank and Stand Data Sheet

KENCO®

The KENCO® oil supply tank and stand is designed to supply lubrication oil to the crankcase of a compressor or engine in an isolated location where daily supervision and maintenance are impossible. KENCO® oil supply tank and stand used in conjunction with oil level controllers can provide protection from lubrication failure.

FEATURES

- 30-gallon oil supply tank
- Sight tube connection threads directly into the face of the tank for simplified installation and maintenance.
- Air vent allows tank to breathe while preventing dirt and other matter from contaminating the tank contents.
- Tank volume scale provides a visual means of monitoring crankcase oil consumption based on the volumetric capacity of the tank.

SPECIFICATIONS

mtu part numbers

30-gallon tank: SUA99641
72-inch stand: SUA107691

Standard tank and stand construction materials

- Tank material: carbon steel*
- Tank stand: carbon steel
- Sight tube: polycarbonate
- Sight tube connections: brass
- Drain valve: brass
- Tank vent: carbon steel
- Seal materials: Acetal, Buna, and Teflon®

*Other tank materials available upon request.

OPTIONAL ACCESSORIES

Isolation valve

- Isolates the sight tube from the contents of the tank
- Ideal when performing routine maintenance or replacement of the sight tube

4400 close-mount level gauge

- Replaces the standard polycarbonate sight tube
- Nickel-plated brass frame protects the sight tube on three sides from mechanical impact
- Redline glass sight tube enhances the visibility of the sight tube contents

OPTIONAL ACCESSORIES, continued:

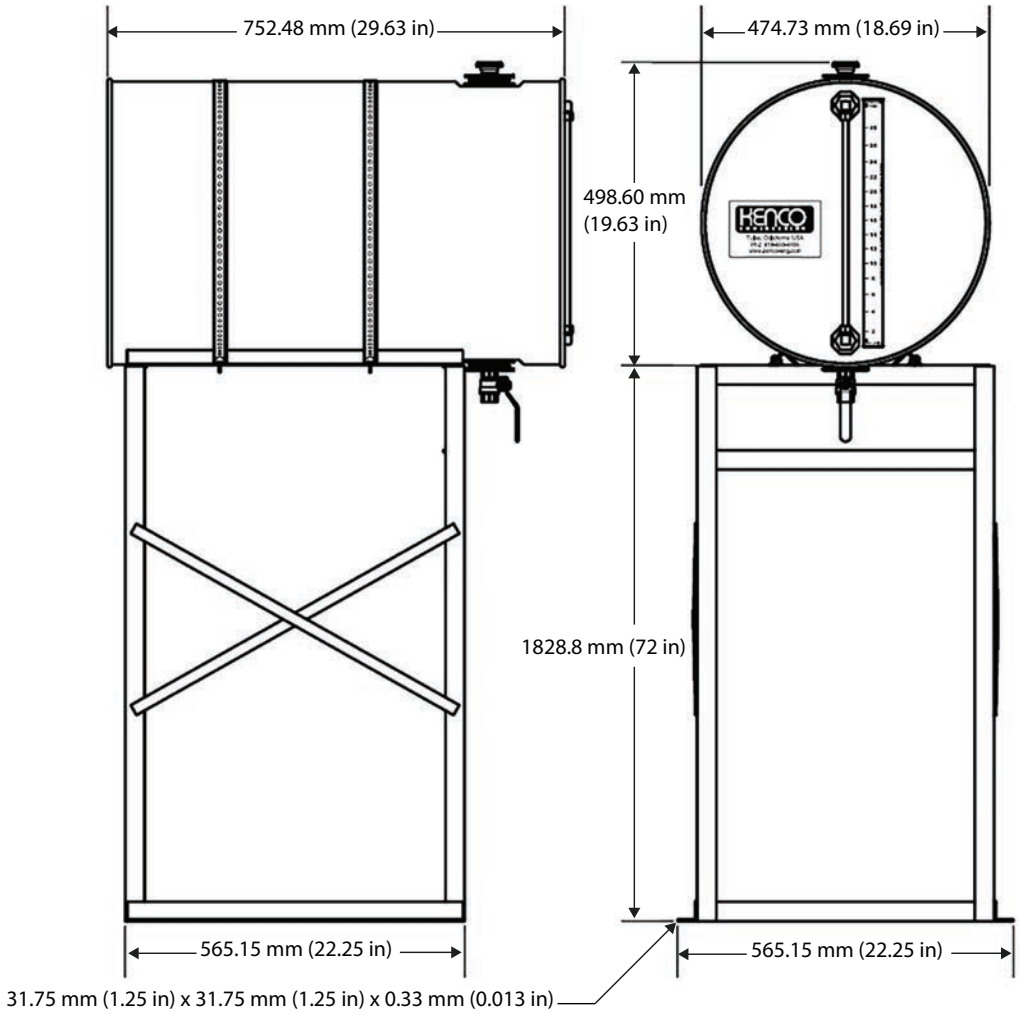
Condensate drain
— Unique outlet fitting forms a sediment trap
— Side-mounted drain cock drains water and sediment without the loss of oil

Galvanized tanks and stands
— Corrosion-inhibiting solution offers extra protection

Rust preventative coating
— Provides an extra level of protection inside the tank

Fire safe valve/fire safe valve with condensate drain
— Thermally-actuated outlet valve closes in the event of fire near the oil supply tank, preventing oil from escaping the tank and fueling the fire.
— Closes off both the tank outlet and the sight tube.
— 71 °C (160 °F) to 88 °C (190 °F) fuseable link melting point*
— Also available with a side-mounted condensate drain plug

* Other temperature ratings available upon request. Consult factory/***mtu*** Distributor for options.



30-Gallon Tank and Stand

Note: Visual appearance of the tank stand will vary.

Subject to change. 2021-04

Oil Level Maintainer Data Sheet

LM300 Series

The LM300 Series level maintainer automatically adds oil to the crankcase as needed to keep lubricating oil level normal.

FEATURES

- Maintains proper lubricating oil level
- Manual float switch test
- High visibility “frog eye” lens

SPECIFICATIONS

mtu part numbers

LM300 (No switches)	X59530100021
LM303 (Hi/low switches)	SUA97594
LM304 (Low/low-low switches)	SUA88183

Maximum ambient temperature
121 °C (250 °F)

Oil inlet connection
Top entry 1/2-14 NPT with built-in filter screen (removable for cleaning)

Inlet orifices
6 mm (1/4 in)

Wire (switch models)
1.2 mm^2 x 330 mm (18 AWG x 13 in)

Maximum Inlet Pressure (MIP)
- 207 kPa (30 psi) [2.07 bar] with 3 mm (1/8 in) orifice
- 4.6 m oil (15 ft oil) with 6 mm (1/4 in) orifice

Maximum differential
51 mm (2 in) between running and stationary oil level

Maximum Case Pressure (MCP)
103 kPa (15 psi) [1.03 bar]

Switch contact
Silver, SPDT snap acting, rated at 10 A @ 30 VDC (10 A @ 125, 250 VAC)

Outlet connection
3/4-14 NPT left side, right side, and bottom

Crankcase balance vent fitting
1/2-14 NPT

Lens
Clear “Frog Eye” non-staining, high impact, high temperature nylon; UV and heat stabilized

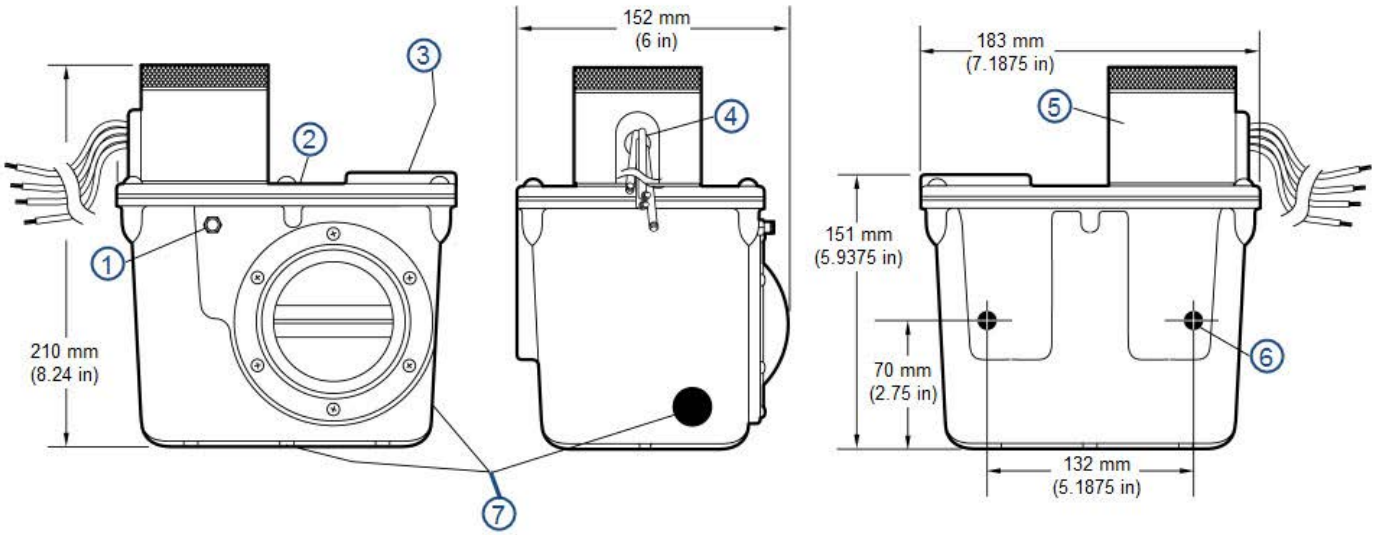
Dial
High-visibility white background with green and white index lines for normal level indication

CERTIFICATIONS AND STANDARDS

CSA certified or CE marked, depending on system configuration

A Rolls-Royce solution

Oil Level Maintainer Data Sheet
LM300 Series



Dimensions

1. Test knob
2. Crankcase vent connection (1/2-14 NPT)
3. Oil inlet connection (1/2-14 NPT with removable screen)
4. Electrical conduit (1/2-14 NPT)
5. Snap switch case assembly
6. 3/8-16 UNC-2B mounting holes (two pieces)
7. Oil outlet connection - Three places, 3/4-14 NPT

Oil Level Maintainer Data Sheet

GARZO 108B

The GARZO 108B level maintainer automatically adds oil to the crankcase as needed to keep lubricating oil level normal.

FEATURES

— Maintains proper lubricating oil level
— Low level alarm switch
— 1/4 in tempered glass lens

SPECIFICATIONS

mtu part number
X52864300002

Oil inlet connection
Top entry 1/2-14 NPT with built-in filter screen (removable for cleaning)

Wire (Switch models)
1.2 mm^2 x 330 mm (18 AWG x 13 in)

Maximum Inlet Pressure (MIP)
103 kPa (15 psi) [1.03 bar]

Maximum Case Pressure (MCP)
103 kPa (15 psi) [1.03 bar]

Switch contact
Explosion proof, rated at 15 A @ 125, 250, or 480 VAC (1/2 A @ 125 VDC, 1/4 A @ 250 VDC)

Outlet connection
3/4-14 NPT left side, right side, and bottom

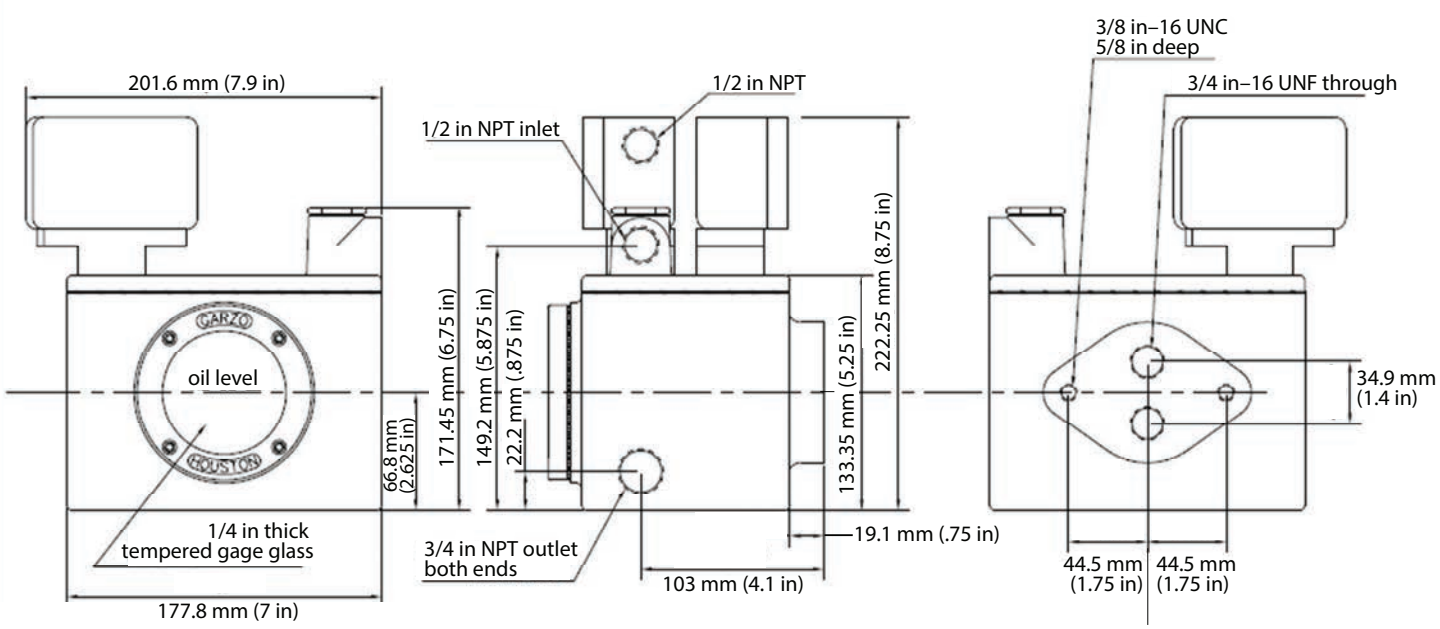
Crankcase balance vent fitting
1/4-18 NPT

Lens
Tempered glass

CERTIFICATIONS AND STANDARDS

Switch
UL Class 1, Group C & D, Division 1
CSA Certification

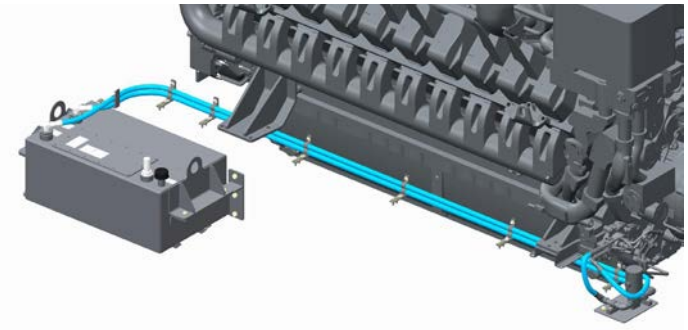
DIMENSIONS



Oil Replenishment System Data Sheet

mtu Series 4000

The Oil Replenishment System is offered on ***mtu*** Series 4000 engine generator sets. The oil replenishment system maintains a constant level of oil in the oil sump. A pressure sensor, located in the return line leading to the external tank, signals a warning if the oil level in the oil sump exceeds the lower limit.



FEATURES

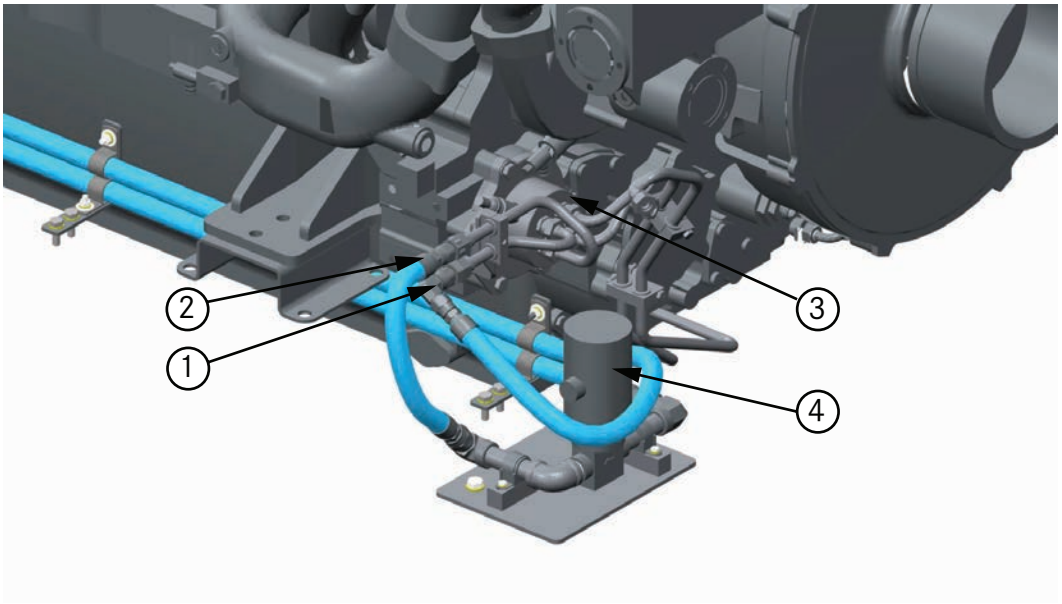
- Turnkey system
- Unit-mounted aluminum oil reservoir tank
  - 12V4000Gx4: 30 gallon total capacity (20 gallon oil capacity/10 gallon expansion capacity)
  - 16V4000Gx4: 45 gallon total capacity (30 gallon oil capacity/15 gallon expansion capacity)
  - 20V4000Gx4: 45 gallon total capacity (30 gallon oil capacity/15 gallon expansion capacity)
  - Cleanout access
  - Visual oil level gauge
  - Integrated breather cap and extended fill neck
- Solenoid valve prevents engine oil overfill during non-operation
- Oil reservoir tank can be mounted on left or right side

CERTIFICATIONS AND STANDARDS

IBC Certified

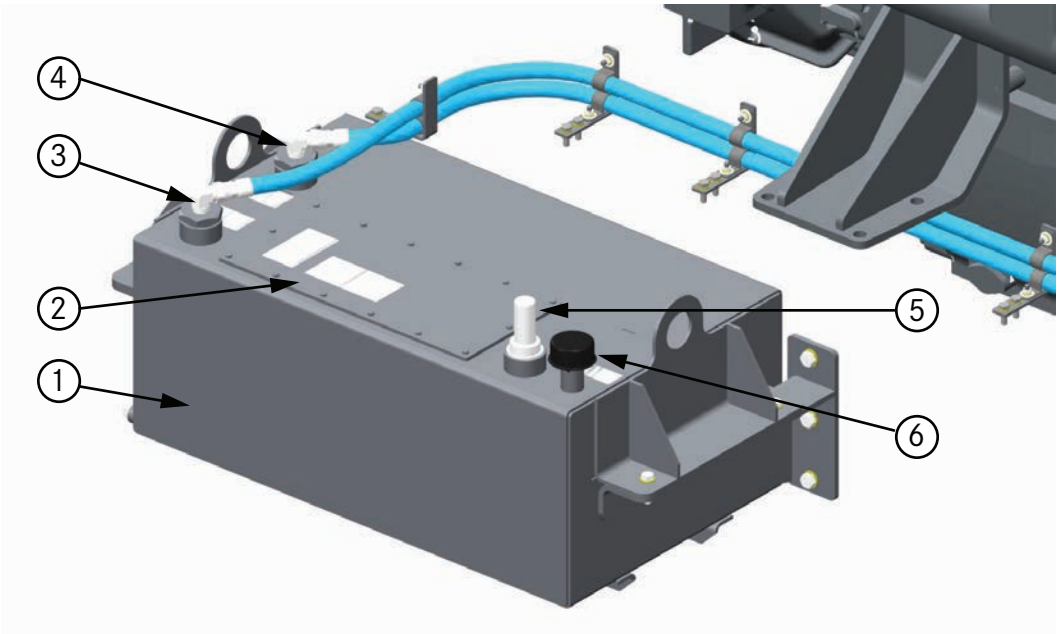
A Rolls-Royce solution

SYSTEM DETAILS



Oil Replenishment System - Pump End

1. Pump output to reservoir tank
2. Pump input from reservoir tank
3. Oil replenishment pump system
4. Solenoid valve



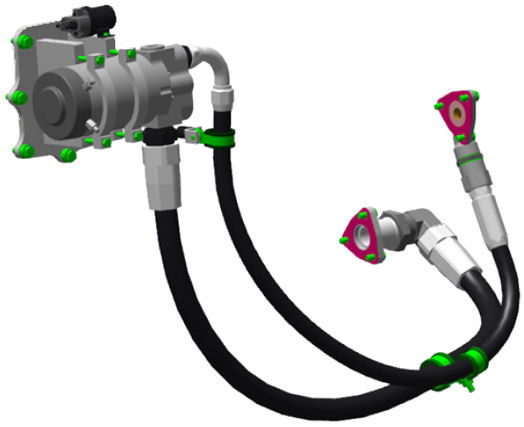
Oil Replenishment System - Tank End

1. Oil reservoir tank
2. Access/cleanout cover
3. Oil return from engine
4. Oil supply to engine
5. Level gauge/sight glass
6. Filler neck/breather cap

Pre-lubrication Pump System Data Sheet

P4L-40 Prelube for ***mtu*** Series 4000

The P4L-40 Prelube™ pre-lubrication pump system is offered on all ***mtu*** Series 4000 60 Hz generator sets. This 24V pump is mounted to the engine and provides lubrication to the engine during generator set start. It is designed to reduce engine wear and extend engine life by improving oil flow to critical components.



FEATURES

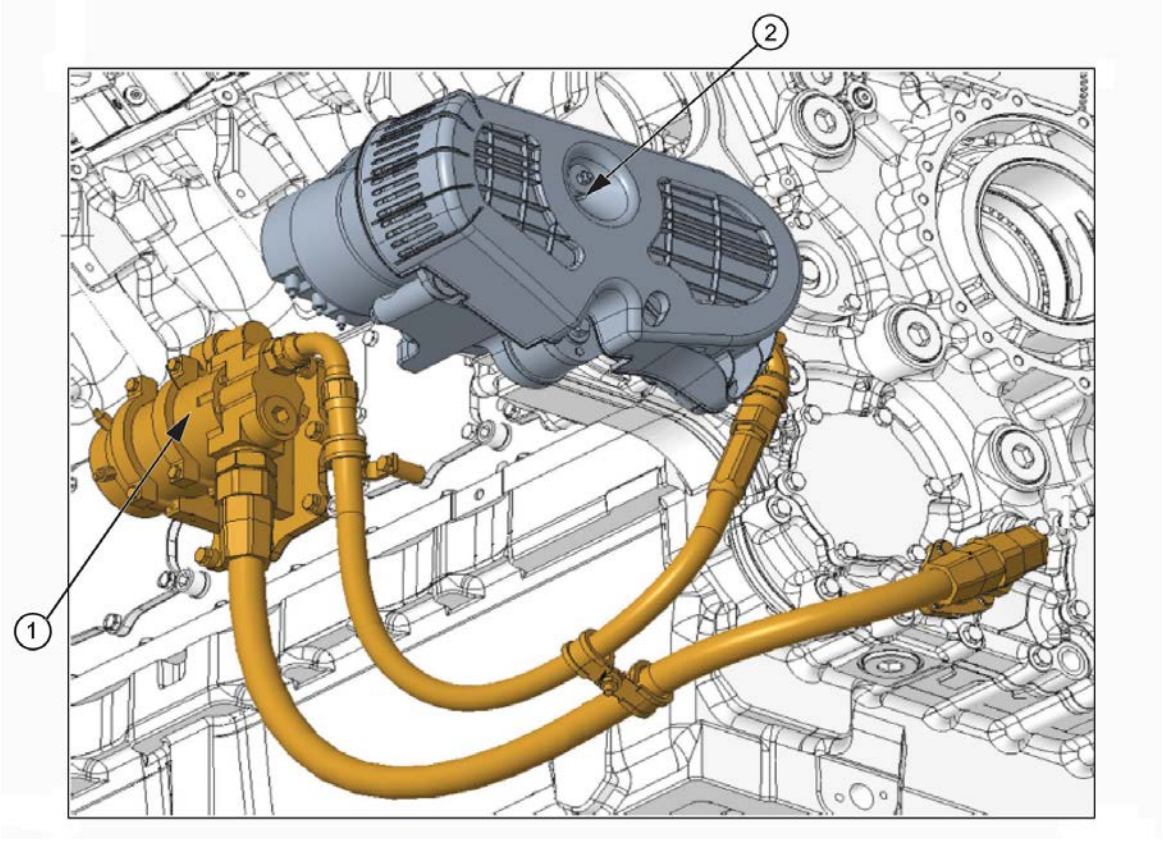
- ***mtu*** part number: X59418100024
- Engine-mounted
- Plumbed and wired at the factory
- High-efficiency, series-wound DC motor reduces current draw in all conditions
- High-strength, low-weight pump
  - Aluminum housing with steel gears and shaft support
  - 120 psi integral relief valve and seal protection
- Motor switch
  - Rated for 300A continuous
  - Consumes minimal power for activation
- Check valve prevents oil backflow after engine start
- Maximum resistance of all cabling is 24V, 0.010 Ohm
  - Cable size and fuse prevent damage due to excessive current

OPERATING PARAMETERS

Maximum Duty Cycle:	Five minutes ON and 30 minutes OFF at < 125A
Ambient Temperature:	–40 to 125 °C (-40 to 257 °F)

A Rolls-Royce solution

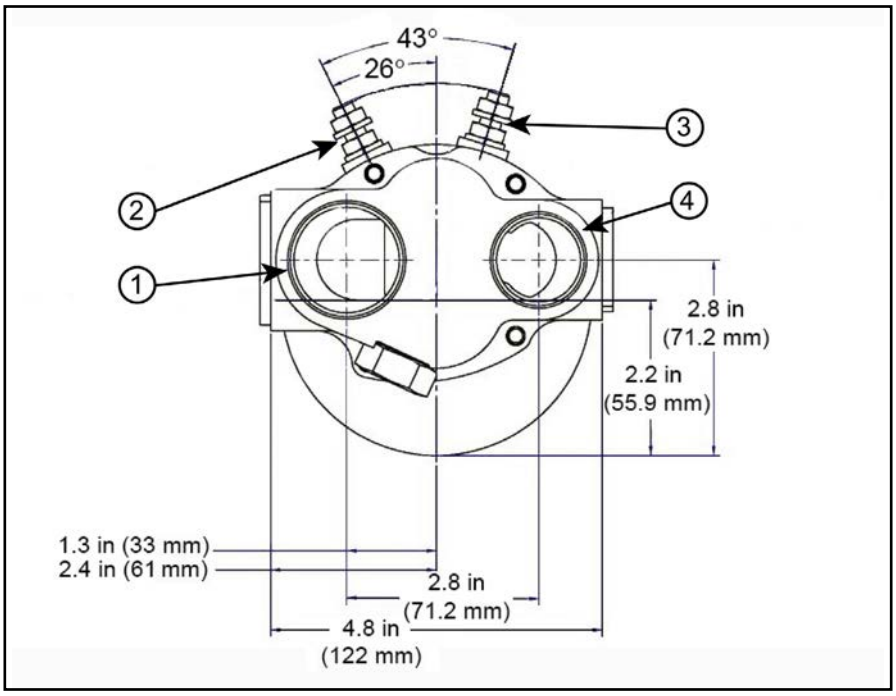
SYSTEM DETAILS



P4L-40 Prelube Pre-lubrication Pump (Mounted on Engine)

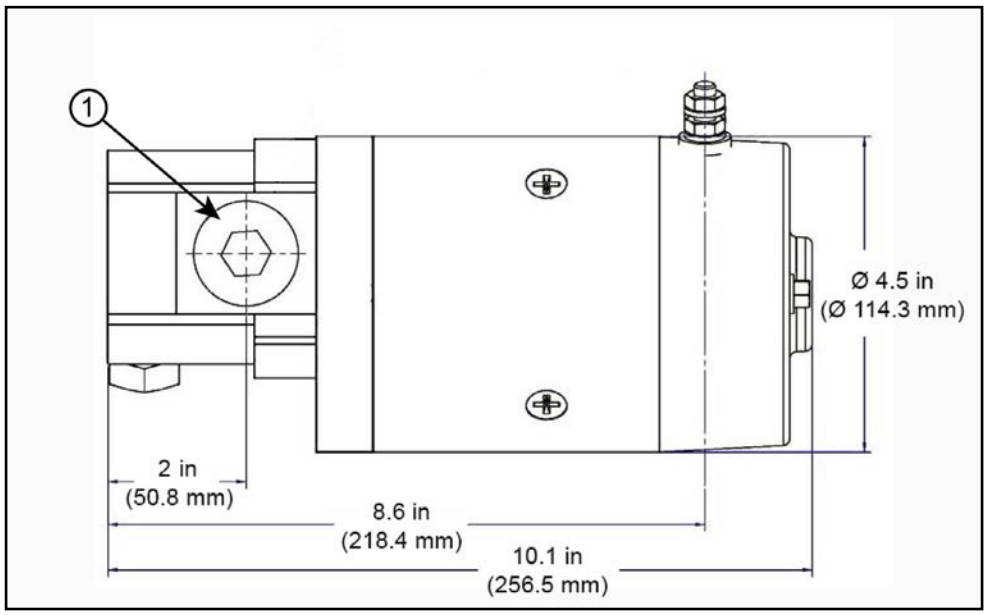
1. Pre-lubrication pump
2. Battery charging alternator

SYSTEM DETAILS, continued



Front View of P4L-40 Prelube Pre-lubrication Pump

1. Inlet - 20 straight thread port
2. Battery terminal 5/16 - 18, torque to 6 lbf-ft/8 N-m (per SAE J1926)
3. Ground terminal 5/16 - 18, torque to 6 lbf/ft/8 N-m
4. Outlet - 16 straight thread (per SAE J192)



Side View of P4L-40 Prelube Pre-lubrication Pump

1. Outlet (near side) - 16 straight thread port (per SAE J192)
   Inlet (far side) - 20 straight thread port (per SAE J1926)

Paralleling Application Guide Data Sheet

Base Loading with Utility

SCOPE

The purpose of this document is to define a specific paralleling scenario - paralleling ***mtu*** generator sets with a utility power source. Additionally, it expands on this paralleling scenario with simple, integrated solutions.

DEFINITION(S)

Base loading with utility operation

Base loading refers to the application of the system in which the generator set will parallel to a utility power source. The amount of power exported to utility can be determined by a percentage of the generator set rating.

ABBREVIATED SEQUENCE OF OPERATION

1. A generator set base loading request is made by the customer.
   a. The customer initiates a start request to the generator set.
   b. The generator set starts and builds rated voltage and frequency.
   c. The generator set synchronizes and closes to the utility power source.
   d. The generator set begins to ramp on resistive and reactive load until the appointed percentage of load is reached.
   e. Regardless of fluctuations in the utility power source, the generator set will constantly adjust to maintain the correct percentage of load.
2. The generator set base loading request is terminated by the customer.
   a. The customer removes the start request from the generator set.
   b. The generator set sheds load until it is producing very little power.
   c. After unloading, the generator set opens its circuit breaker and disconnects from the utility power source.
   d. The generator set enters a controller-appointed, cool-down period.
   e. The generator set stops, returns to standby, and awaits the next start request.

SYSTEM OPERATION

— Real power load sharing
— Reactive power load sharing

PARALLELING CONTROLS, EQUIPMENT, AND INTERFACING (*mtu* SCOPE OF SUPPLY)

— MGC-3000 Series digital generator set controller (referred to as the controller)
— Meter Current Transformers (CTs) and Potential Transformer (PT) (as needed)
— Permanent Magnet Generator (PMG) or Auxiliary Winding Regulation Excitation Principle (AREP) excitation system
— Digital voltage regulator with analog bias capability
— Motor-operated generator circuit breaker (may or may not be mounted to the generator set)*
  - Shunt trip
  - Shunt close
  - Auxiliary switch (breaker position)
  - Motorized spring charger

*If a circuit breaker is selected, the ***mtu*** scope of supply will include a motor-operated breaker of the indicated configuration.

ADDITIONAL PARALLELING CONTROLS, EQUIPMENT, AND INTERFACING (SUPPLIED BY THIRD PARTY)

- Paralleling switchgear, circuit breakers, and/or disconnects
- Paralleling bus and cabling
- External start signal source and connection to generator set
- Utility bus sensing connection to generator set

PROGRAMMING AND LOGIC

- Basic programming and logic will be provided to start, synchronize, and base load with the utility power source.
- Site programming and system tuning are required by the customer for proper onsite operation.

OTHER SYSTEM CONSIDERATIONS

For generator sets used in non-emergency applications within EPA regulated areas, Tier 4i/T4 final certified engines must be used.

SEQUENCE OF OPERATION

Base loading request to generator set

When a customer requires the generator set to parallel to a utility power source for the purpose of supplementing utility power, a base loading request can be made. The customer issues a start request to the generator set. The start signal is a command for the generator set to start, synchronize to utility power source, and close its circuit breaker. All available generator sets will start and achieve nominal frequency and voltage.

Synchronization of generator set

The controller on the off-line generator set biases the digital voltage regulator and governor to match its speed and voltage to the utility bus. The controller biases the speed of the engine governor to drive the difference between the phase angle of the generator set and the phase angle of the utility bus to zero. Additionally, the controller biases the voltage regulator to match the generator set voltage to the utility bus voltage. When the synchronization window criteria are met, the generator set is considered synchronized with the utility bus, and the controller issues a command to close its circuit breaker. Once its circuit breaker is closed and the controller receives “breaker closed” feedback from the circuit breaker auxiliary switch, the generator set is considered paralleled. The controller no longer actively attempts to synchronize the generator set.

Base loading

While paralleled, the generator set is electrically interlocked and will share real load (kW) and reactive load (kVAR) with the utility power source based on a percentage of the load capacity of the generator set. When the generator set circuit breaker is first connected, the generator set produces a negligible amount of real power. The controller will bias the engine governor to begin loading kW on the generator set at a predefined amount of load per second. Load will ramp onto the generator set until the user-defined amount of base load is met. The controller in turn biases the engine governor to control the real load on the generator set.

Reactive load is also precisely shared between the paralleled generator set and the utility power source. When the generator set circuit breaker is first connected, the generator set produces a negligible amount of reactive power. The controller will bias the voltage regulator to begin loading kVARs on the generator set at a predefined amount of load per second. Load will ramp onto the generator set until the user-defined amount of base load is met. Reactive base loading can be defined in either of two manners: percentage of VARs (leading or lagging) or Power Factor (PF) set point (- Leading / + Lagging). The controller in turn biases the voltage regulator to control the reactive load on the generator set.

SEQUENCE OF OPERATION, continued

Base loading, continued

As the generator set is base loading against the utility power source, the controller will constantly adjust to fluctuations in load and in the utility power source to maintain the base load level requested.

In the event that a generator experiences a fault while supporting the load, it will disconnect itself from the utility bus.

Termination of base loading request to generator set

When the customer no longer wants the generator set to base load against the utility power source, the start request signal is removed. The controller will bias the governor and voltage regulator to ramp load off of the generator set. Once the generator set is unloaded and has reached the pre-defined breaker open set point percentage, the circuit breaker will open. The generator set will enter a cool-down period, after which time the generator set will stop, re-enter standby mode, and await the next start request.

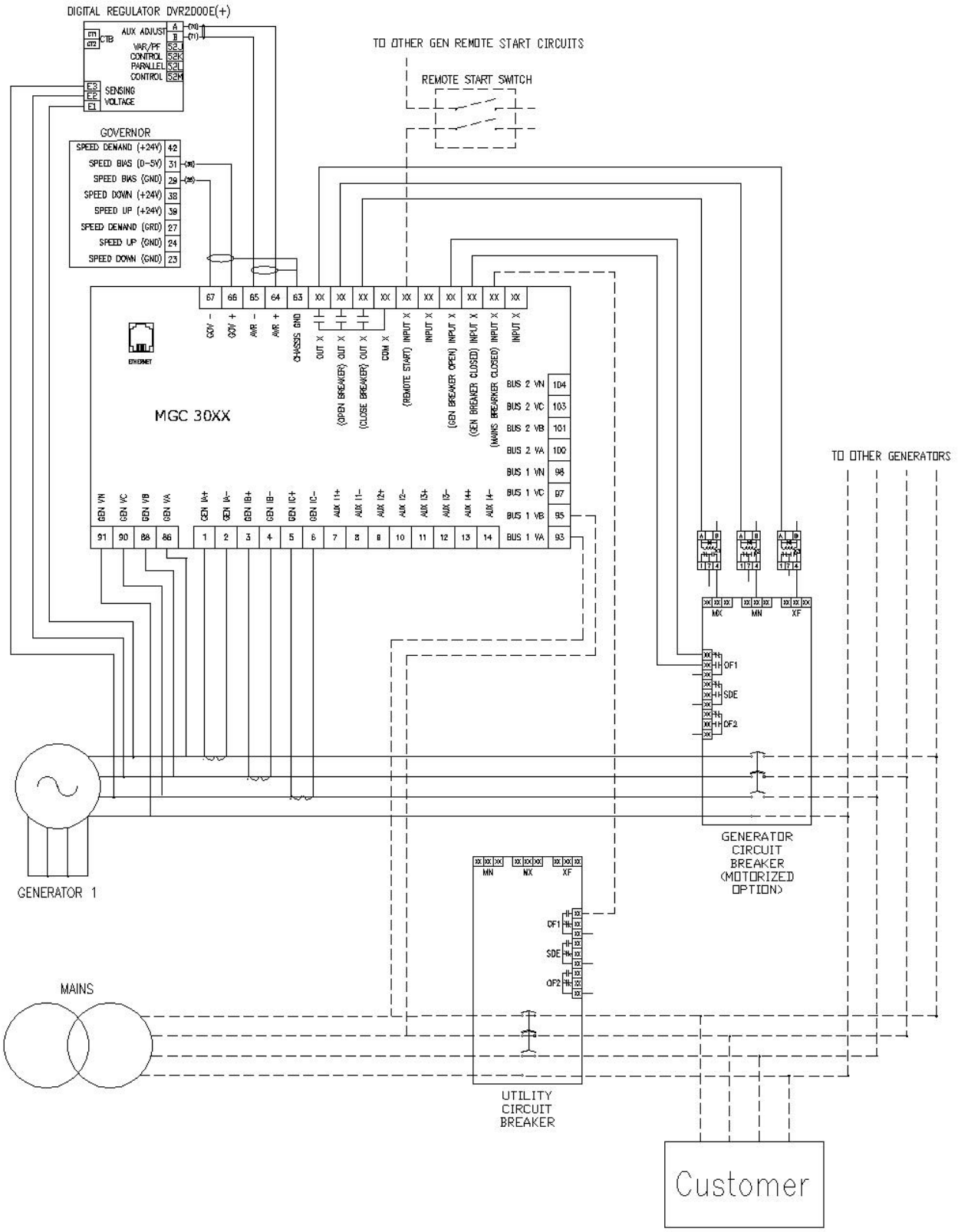


Figure 1: Base Loading with Utility

The dashed line (– – –) denotes wiring/equipment supplied by a third party

Paralleling Application Guide Data Sheet

Generator to Generator in Island Operation

SCOPE

The purpose of this document is to define a specific paralleling scenario - paralleling ***mtu*** generator sets with other ***mtu*** generator sets in island operation. Additionally, it expands on this paralleling scenario with simple, integrated solutions.

DEFINITION(S)

Generator to generator in island operation

Island refers to the application of the system. Generator to generator in island refers to an isolated system in which the generator sets will not be paralleled with any source other than the generator sets within the system. The generator sets will be connected to a common bus.

Automatic Transfer Switch (ATS)

An automatic transfer switch connects an electrical load to either of two different sources. Typically, one source is considered normal, and the other source is considered emergency. The ATS has the ability to sense the stability and availability of either source and can issue transference of load between either source.

Master Control Panel (MCP)

A master control panel is a third party device responsible for monitoring ATS start requests, issuing transfer inhibits and load priority commands to the ATSs, adding and shedding loads, and issuing start requests to generator sets.

MGC-3000 Series System Manager

The MGC-3000 Series System Manager is an MGC-3000 Series controller with the lowest, non-zero sequencing ID. This controller is responsible for dead bus arbitration between generator sets. The System Manager can be one of any controllers in the generator set system.

Intergenset communication network

The intergenset communications network consists of generator set load share modules connected together via Cat5 cable and an industrial ethernet switch. Dead bus arbitration, generator set sequencing, and load sharing commences between generator sets over this network.

ABBREVIATED SEQUENCE OF OPERATION

1. Instability or failure of the normal power source is detected by the ATS controllers.
   a. ATS controllers send start requests to the MCP.
   b. MCP sends individual start requests to the group of generator sets.
   c. Generator sets start and build rated voltage and frequency.
   d. Dead bus arbitration commences between the generator sets through the intergenset communication network.
      i. The System Manager grants to the first generator set that reaches the voltage and frequency thresholds the permission to close to the dead bus.
      ii. All off-line generator sets at this time are inhibited from closing their circuit breakers to the bus until voltage is sensed.
      iii. The highest priority ATS transfers to emergency power when voltage and frequency are within the ATS controller thresholds.
      iv. The remaining off-line generator sets synchronize and close to the live generator bus.
   e. The remaining ATSs wait for release of transfer inhibit from the MCP before connecting to emergency power. The MCP monitors the bus and the number of generator sets online to ensure that there are enough generator sets connected to the bus to support the load requirements.

ABBREVIATED SEQUENCE OF OPERATION, continued

   f. Online generator sets actively share load via the intergenset communications network.
2. ATS controllers detect when the normal power source has returned to stable conditions, and all delay timers have expired.
   a. ATSs return to normal position, removing start signals to the MCP.
   b. MCP removes all start requests for emergency power from the generator sets.
   c. The generator sets open their respective circuit breakers (disconnecting from the generator bus).
   d. The generator sets enter a controller-appointed, cool-down period.
   e. The group of generator sets stop, return to standby, and await the next start request.

SYSTEM OPERATION

- Real power load sharing
- Reactive power load sharing
- Dead bus arbitration

PARALLELING CONTROLS, EQUIPMENT, AND INTERFACING (*mtu* SCOPE OF SUPPLY)

- MGC-3000 Series digital generator set controller (referred to as the controller)
- Meter Current Transformers (CTs) and Potential Transformer (PT) (as needed)
- Permanent Magnet Generator (PMG) or Auxiliary Winding Regulation Excitation Principle (AREP) excitation system
- Digital voltage regulator with analog bias capability
- Motor-operated generator circuit breaker (may or may not be mounted to the generator set)*
  - Shunt trip
  - Shunt close
  - Auxiliary switch (breaker position)
  - Motorized spring charger

*If a circuit breaker is selected, the ***mtu*** scope of supply will include a motor-operated breaker of the indicated configuration.

ADDITIONAL PARALLELING CONTROLS, EQUIPMENT, AND INTERFACING (SUPPLIED BY THIRD PARTY)

- Master Control Panel (MCP) with connections for monitoring ATS start requests, issuing transfer inhibits and load priority commands to ATSs, adding and shedding loads, and issuing start requests to generator sets
- Automatic transfer switch(es) (ATS), paralleling switchgear, circuit breakers, and/or disconnects
- Paralleling bus and cabling
- Start signal source connection to generator sets
- Main bus sensing connection to generator sets
- Industrial Ethernet switch for intergenset communications network
- Cat5 cable connection from Ethernet switch to all generator sets for intergenset communications network

PROGRAMMING AND LOGIC

- Basic programming and logic will be provided to start, synchronize, and load share with other ***mtu*** generator sets.
- Site programming and system tuning are required by the customer for proper onsite operation.
- MCP integration and programming are required by the customer for proper onsite operation.

SEQUENCE OF OPERATION

Failure of normal power source and start request to emergency power system

All ATS controllers monitor both normal and emergency power sources. Unless programmed otherwise, the ATSs will always be connected to the normal source. When the voltage or frequency of the normal source does not meet the predefined voltage and frequency thresholds, each ATS controller sends a start request signal to the MCP. The MCP then issues individual start requests to every unit in the group of generator sets composing the emergency power system. The start signal to each generator set is a command for the generator sets to start, synchronize to the generator bus, close their circuit breakers, and load share. All available generator sets will start and achieve nominal frequency and voltage.

Dead bus arbitration

Dead bus arbitration between generator sets commences via the intergenset communication network to ensure that two or more generator sets do not close their circuit breakers to the dead bus at the same time out of phase. The System Manager (the controller with the smallest non-zero sequencing ID) negotiates the dead bus arbitration. The first generator set to reach the voltage and frequency thresholds (adjustable from 85-95%) within the system requests permission to close its circuit breaker and is granted permission by the system manager to close to the dead bus. When this permission is given, all other generator sets are inhibited from closing to the dead bus and will not attempt to close to the bus until voltage and frequency are present and meet the predefined voltage and frequency thresholds.

Synchronization of generator sets

The controllers on the remaining off-line generator sets bias their digital voltage regulators and governors to match their speed and voltage to the generator bus. The controller biases the speed of the engine governor to drive the difference between the phase angle of the generator set and the phase angle of the generator bus to zero. Additionally, the controller biases the voltage regulator to match the generator set voltage to the generator bus voltage. When the synchronization window criteria are met, the generator set is considered synchronized with the generator bus, and the controller issues a command to close its breaker. Once its breaker is closed and the controller receives “breaker closed” feedback from the circuit breaker auxiliary switch, the generator set is considered paralleled. The controller no longer actively attempts to synchronize the generator set.

Synchronization of generator sets, continued

The phase and voltage window are adjustable to allow synchronization to happen more aggressively (quickly) or passively (slowly) to meet all customer-defined requirements. Additionally, the controller synchronizer can be configured for two different modes: 1) phase lock loop synchronization for breakers that take longer to close (30 cycles after command is issued), and 2) anticipatory synchronization for reduced synchronization time and breakers that close quickly (five cycles after command is issued).

Load sharing

While paralleled, generator sets are electrically interlocked and will share real load (kW) and reactive load (kVAR) with other paralleled generator sets. Real load is shared between paralleled generator sets via the intergenset communications network. Generator sets that have closed their circuit breakers to the generator bus broadcast their real power capacity and real power production over the intergenset communications network. The controllers divide the real power production of the system by the real power capacity of the system to produce a unitized percentage of real power to be shared by the connected generator (R. Glenn, Basler Electric). Based on this unitized percentage, the controller biases the engine governor to control the real load on the generator sets.

This method of sharing load does not require an analog load share line between generator sets which is commonly required in paralleling applications. Additionally, the unitized percentage power calculation allows generator sets of different sizes to share load proportionate to their capacities. Reactive load is shared between paralleled generator sets via the intergenset communications network. The generator sets that have closed their breakers to the generator bus broadcast their reactive power capacity and current reactive power production over the intergenset communications network. The controllers divide the reactive power production of the system by the reactive power capacity of the system to produce a unitized percentage of reactive power to be shared by the connected generator sets (R. Glenn, Basler Electric). Based on this unitized percentage, the controller biases the voltage regulator to control the reactive load on the generator sets.

Typically, generator sets that are paralleled together require voltage droop or a cross-current compensation loop to produce reactive power proportionately. Also, it is common for the voltage in these types of systems to droop below nominal,

SEQUENCE OF OPERATION, continued

Load sharing, continued

which is not ideal for some loads. However, by controlling reactive power production via the intergenset communication network, ***mtu*** generator sets do not require the system to run in voltage droop and do not require an additional B phase droop current transformer (CT). This results in a generator set system that is easy to interface and has precise control over reactive power production.

Emergency system operation

As generator sets connect and become available to the generator bus, the ATS controllers sense that the emergency source is available. The MCP will begin to release the transfer inhibit contacts to the ATS controllers that are servicing priority loads, and these ATSs will transfer loads from the normal source to the emergency source. As available power on the generator bus increases (amount of available power is determined by the sum of each online generator set's kW rating), the MCP will release the transfer inhibit contacts to the ATS controllers servicing lower priority loads.

The generator sets support the loads as long as the normal source is unavailable or does not meet the acceptance thresholds for voltage and frequency. The ATS controllers will continuously monitor normal source voltage and frequency. Normal source is the preferred power source. If available during non-test procedures, an ATS will connect the loads to the normal source.

Emergency system operation, continued

In the event that a generator set experiences a fault while supporting the load, it will disconnect itself from the generator bus. The MCP will determine if there are still enough generator sets online to support the load and will shed a low priority load if necessary to adjust the bus load.

Restoration of normal power source

When the normal source returns, the ATS controllers sense availability of the normal source, and all delays have expired (adjustable), the ATS controllers will transfer the ATSs to the normal source position and remove their start request signals to the MCP. The generator sets remain paralleled and connected to the common bus until all ATSs have transferred back to the normal source. Once all load has been transferred to the normal source, the MCP will remove the individual start request signals from all generator sets. The generator sets will open their circuit breakers and enter a controller-appointed, cool-down period (adjustable), after which time they stop, re-enter standby mode, and await the next start request.

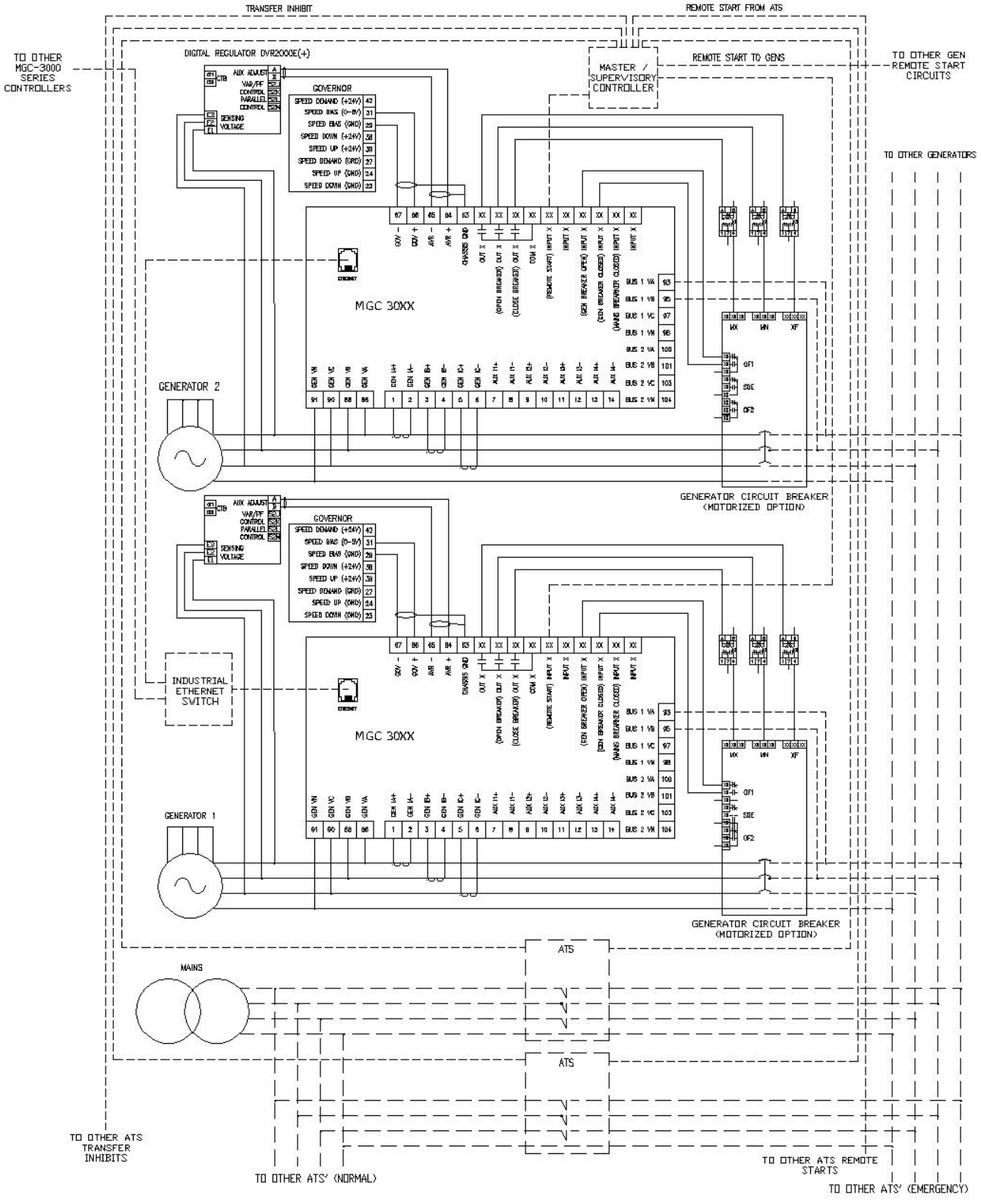


Figure 1: Generator to Generator in Island Operation (*mtu* generator sets only)

The dashed line (– – –) denotes wiring/equipment supplied by a third party

Paralleling Application Guide Data Sheet

Generator to Generator with Utility

SCOPE

The purpose of this document is to define a specific paralleling scenario - paralleling ***mtu*** generator sets with other ***mtu*** generator sets and synchronizing the system of generator sets to a utility power source. Additionally, it expands on this paralleling scenario with simple, integrated solutions.

DEFINITIONS

Generator to generator with utility

Generator to generator with utility refers to the application of the system in which the generator sets will be paralleled with other generator sets on a common bus and then synchronized to another power source other than the remaining generator sets within the system.

Automatic Transfer Switch (ATS)

An automatic transfer switch connects an electrical load to either of two different sources. Typically, one source is considered normal, and the other source is considered emergency. ATSs have the ability to sense the stability and availability of either source and can issue transference of load between either source.

Master Control Panel (MCP)

A master control panel is a third party device responsible for monitoring ATS start requests, issuing transfer inhibits and load priority commands to ATSs, adding and shedding loads, issuing start requests to generator sets, and synchronizing the generator sets to another power source.

MGC-3000 Series System Manager

The MGC-3000 Series System Manager is an MGC-3000 Series controller with the lowest, non-zero sequencing ID. This controller is responsible for dead bus arbitration between generator sets. The System Manager can be one of any controllers in the generator set system.

Intergenset communication network

The intergenset communication network consists of generator set load share modules connected together via Cat5 cable and an industrial ethernet switch. Dead bus arbitration, generator set sequencing, and load sharing commences between generator sets over this network.

ABBREVIATED SEQUENCE OF OPERATION

1. Instability or failure of the normal power source is detected by the ATS controllers.
   a. ATS controllers send start requests to the MCP.
   b. MCP sends individual start requests to the group of generator sets.
   c. Generator sets start and build rated voltage and frequency.
   d. Dead bus arbitration commences between the generator sets through the intergenset communication network.
      i. The System Manager grants to the first generator set that reaches the voltage and frequency thresholds the permission to close to the dead bus.
      ii. All off-line generator sets, at this time, are inhibited from closing their circuit breakers to the bus until voltage is sensed.
      iii. The highest priority ATS transfers to emergency power when voltage and frequency are within the ATS controller thresholds.
      iv. The remaining off-line generator sets synchronize and close to the live generator bus.
   e. The remaining ATSs wait for release of transfer inhibit from the MCP before connecting to emergency power. The MCP monitors the bus and the number of generator sets online to ensure that there are enough generator sets connected to the bus to support the load requirements.

ABBREVIATED SEQUENCE OF OPERATION, continued

f. Online generator sets actively share load via the intergenset communications network and analog load share line.

2. ATS controllers detect normal power source has returned to stable conditions, and all delay timers have expired.
   a. The MCP synchronizes the generator set bus to the normal power source.
   b. ATSs return to normal position, removing start signals to the MCP.
   c. MCP removes all start requests for emergency power from the generator sets.
   d. The generator sets open their respective circuit breakers (disconnecting from the generator bus).
   e. The generator sets enter a controller-appointed, cool-down period.
   f. The group of generator sets stops, returns to standby, and awaits the next start request.

SYSTEM OPERATION

- Real power load sharing (via load share line)
- Reactive power load sharing (via intergenset communication network)
- Dead bus arbitration
- Synchronization to other power source

PARALLELING CONTROLS, EQUIPMENT, AND INTERFACING (*mtu* SCOPE OF SUPPLY)

- MGC-3000 Series digital generator set controller (referred to as the controller)
- Meter Current Transformers (CTs) and Potential Transformer (PT) (as needed)
- Permanent Magnet Generator (PMG) or Auxiliary Winding Regulation Excitation Principle (AREP) excitation system
- Digital voltage regulator with analog bias capability
- Motor-operated generator circuit breaker (may or may not be mounted to the generator set)*
  - Shunt trip
  - Shunt close
  - Auxiliary switch (breaker position)
  - Motorized spring charger

*If a circuit breaker is selected, the ***mtu*** scope of supply will include a motor-operated breaker of the indicated configuration.

ADDITIONAL PARALLELING CONTROLS, EQUIPMENT, AND INTERFACING (Supplied by Third Party)

- Master Control Panel (MCP) with connections for monitoring ATS start requests, issuing transfer inhibits and load priority commands to ATSs, adding and shedding loads, issuing start requests to generator sets, and load sharing (for synchronizing the generator sets to another power source)
- ATSs, paralleling switchgear, circuit breakers, and/or disconnects
- Paralleling bus and cabling
- Start signal source connection to generator sets
- Main bus sensing connection to generator sets
- Industrial Ethernet switch for intergenset communications network
- Cat5 cable connection from Ethernet switch to all generator sets for intergenset communications network
- Load share line between all generator sets and MCP

PROGRAMMING AND LOGIC

— Basic programming and logic will be provided to start, synchronize, and load share with other ***mtu*** generator sets.
— Site programming and system tuning are required by the customer for proper onsite operation.
— MCP integration and programming are required by the customer for proper onsite operation.

SEQUENCE OF OPERATION

Failure of normal power source and start request to emergency power system

All ATS controllers monitor both normal and emergency power sources. Unless programmed otherwise, the ATSs will always be connected to the normal source. When the voltage or frequency of the normal source does not meet the predefined voltage and frequency thresholds, each ATS controller sends a start request signal to the MCP. The MCP will then issue individual start requests to every unit in the group of generator sets composing the emergency power system. The start signal to each generator set is a command for the generator sets to start, synchronize to the generator bus, close their circuit breakers, and load share. All available generator sets will start and achieve nominal frequency and voltage.

Dead bus arbitration

Dead bus arbitration between generator sets commences via the intergenset communication network to ensure that two or more generator sets do not close their circuit breakers to the dead bus at the same time out of phase. The System Manager (the controller with the smallest non-zero sequencing ID) negotiates the dead bus arbitration. The first generator set to reach the voltage and frequency thresholds (adjustable from 85-95%) within the system requests permission to close its circuit breaker and is granted permission by the System Manager to close to the dead bus. When this permission is given, all other generator sets are inhibited from closing to the dead bus and will not attempt to close to the bus until voltage and frequency are present and meet the predefined voltage and frequency thresholds.

Synchronization of generator sets

The controllers on the remaining off-line generator sets bias their digital voltage regulators and governors to match their speed and voltage to the generator bus. The controller biases the speed of the engine governor to drive the difference between the phase angle of the generator set and the phase angle of the generator bus to zero. Additionally, the controller biases the voltage regulator to match the generator set voltage to the generator bus voltage. When the synchronization window criteria are met, the generator set is considered synchronized with the generator bus, and the controller issues a command to close its circuit breaker.

Once its circuit breaker is closed and the controller receives “breaker closed” feedback from the circuit breaker auxiliary switch, the generator set is considered paralleled. The controller no longer actively attempts to synchronize the generator set. The phase and voltage window are adjustable to allow synchronization to happen more aggressively (quickly) or passively (slowly) to meet all customer-defined requirements.

Additionally, the controller synchronizer can be configured for two different modes: 1) Phase lock loop synchronization for breakers that take longer to close (30 cycles after command is issued), and 2) Anticipatory synchronization for reduced sync time and breakers that close quickly (five cycles after command is issued).

SEQUENCE OF OPERATION, Load Sharing, continued

Load sharing

While paralleled, generator sets are electrically interlocked and will share real load (kW) and reactive load (kVAR) with other paralleled generator sets. Real load is shared between paralleled generator sets via the intergenset communications network. Generator sets that have closed their circuit breakers to the generator bus broadcast their real power capacity and real power production over the intergenset communications network. The controllers divide the real power production of the system by the real power capacity of the system to produce a unitized percentage of real power to be shared by the connected generator (R. Glenn, Basler Electric). Based on this unitized percentage, the controller biases the engine governor to control the real load on the generator sets.

This method of sharing load does not require an analog load share line between generator sets which is commonly required in paralleling applications. Additionally, the unitized percentage power calculation allows generator sets of different sizes to share load proportionate to their capacities. Reactive load is shared between paralleled generator sets via the intergenset communications network. The generator sets that have closed their breakers to the generator bus broadcast their reactive power capacity and current reactive power production over the intergenset communications network. The controllers divide the reactive power production of the system by the reactive power capacity of the system to produce a unitized percentage of reactive power to be shared by the connected generator sets (R. Glenn, Basler Electric). Based on this unitized percentage, the controller biases the voltage regulator to control the reactive load on the generator sets.

Typically, generator sets that are paralleled together require voltage droop or a cross-current compensation loop to produce reactive power proportionately. Also, it is common for the voltage in these types of systems to droop below nominal, which is not ideal for some loads. However, by controlling reactive power production via the intergenset communication network, ***mtu*** generator sets do not require the system to run in voltage droop and do not require an additional B phase droop current transformer (CT). This results in a generator set system that is easy to interface and has precise control over reactive power production.

Emergency system operation

As generator sets connect and become available to the generator bus, the ATS controllers sense that the emergency source is available. The MCP will begin to release the transfer inhibit contacts to the ATS controllers that are servicing priority loads, and these ATSs will transfer loads from the normal source to the emergency source. As available power on the generator bus increases (amount of available power is determined by the sum of each online generator set's kW rating), the MCP will release the transfer inhibit contacts to the ATS controllers servicing lower priority loads.

The generator sets support the loads as long as the normal source is unavailable or does not meet the acceptance thresholds for voltage and frequency. The ATS controllers will continuously monitor normal source voltage and frequency. Normal source is the preferred power source. If available during non-test procedures, an ATS will connect the loads to the normal source.

In the event that a generator set experiences a fault while supporting the load, it will disconnect itself from the generator bus. The MCP will determine if there are still enough generator sets online to support the load and will shed a low priority load if necessary to adjust the bus load.

Restoration of normal power source

When the normal source returns and the ATS controllers sense availability of the normal source, the MCP will synchronize the generator bus to the normal source. The MCP will bias the generator set load share line to drive the difference between the phase angle of the generator set and the phase angle of the normal source to zero. When all delays have expired (adjustable), the ATS controllers will transfer the ATSs to the normal source position and remove their start request signals to the MCP. The generator sets remain paralleled and connected to the common bus until all ATSs have transferred back to the normal source. Once all load has been transferred to the normal source, the MCP will remove the individual start request signals from all generator sets. The generator sets will open their circuit breakers and enter a controller-appointed, cool-down period (adjustable), after which time they stop, re-enter standby mode, and await the next start request.

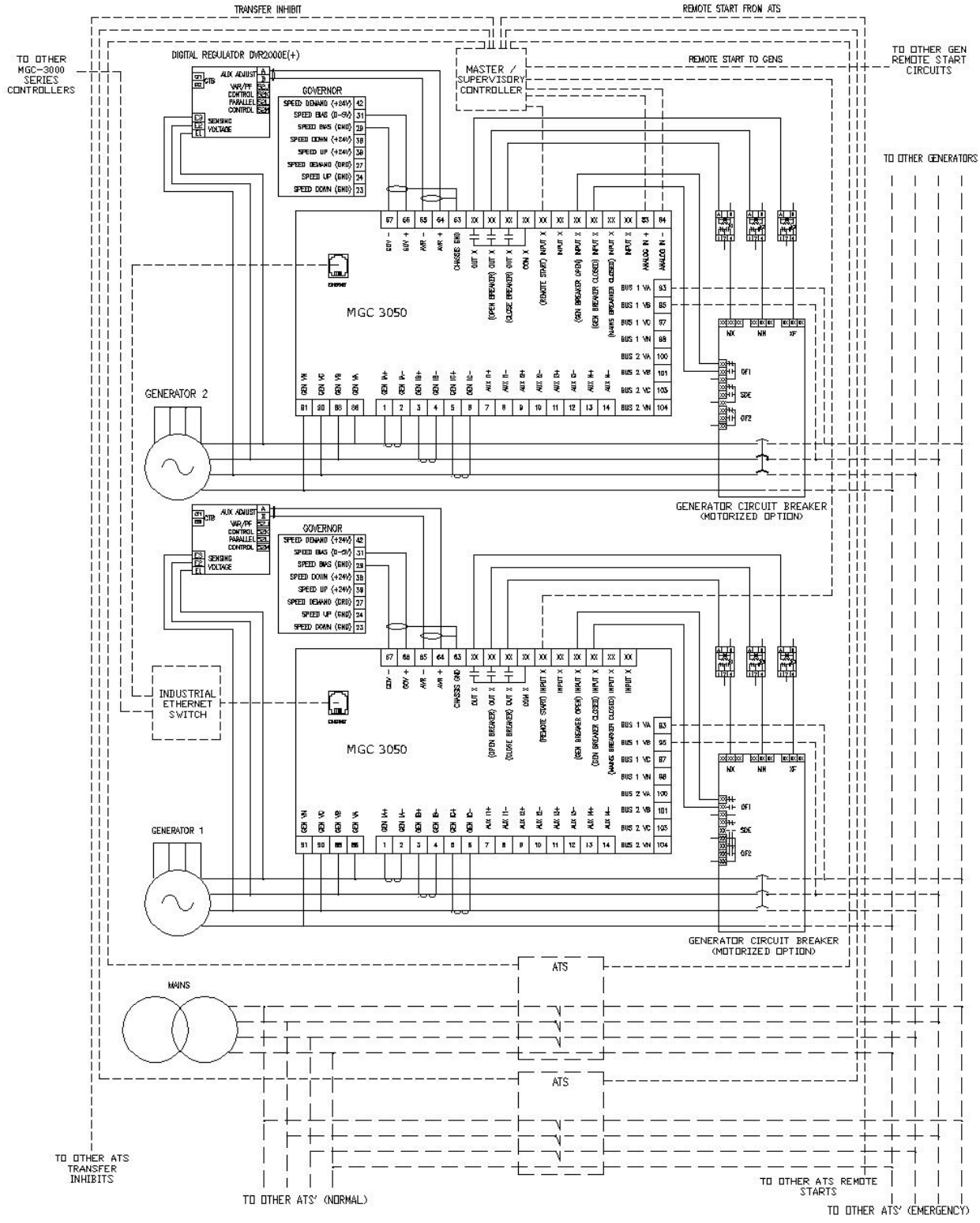


Figure 1: Generator to Generator with Utility (*mtu* generator sets only)

The dashed line (– – –) denotes wiring/equipment supplied by a third party

Paralleling Application Guide Data Sheet

Paralleling without ***mtu*** Components

SCOPE

The purpose of this document is to define a specific paralleling scenario - paralleling ***mtu*** generator sets without ***mtu*** supplied or supported components.

DEFINITION(S)

Paralleling without *mtu* components

Paralleling without ***mtu*** components refers to the application of a system in which generator sets will be paralleled with third party supplied or supported components.

ABBREVIATED SEQUENCE OF OPERATION

None indicated. Sequence of operation to be specified by customer.

SYSTEM OPERATION

None indicated. System operation to be specified by customer.

PARALLELING CONTROLS, EQUIPMENT, AND INTERFACING (*mtu* SCOPE OF SUPPLY)

Generator set voltage bias and speed bias contacts will be provided for customer connection.

ADDITIONAL PARALLELING CONTROLS, EQUIPMENT, AND INTERFACING (SUPPLIED BY THIRD PARTY)

- Synchronizing and load sharing controller
- ATSs, paralleling switchgear, circuit breakers, and/or disconnects
- Paralleling bus and cabling
- Start signal source connection to generator sets

PROGRAMMING AND LOGIC

- Basic programming and logic will be provided to start and operate generator set
- Site programming and system tuning are required by the customer for proper onsite for operation

SEQUENCE OF OPERATION

None indicated. Sequence of operation to be specified by customer.

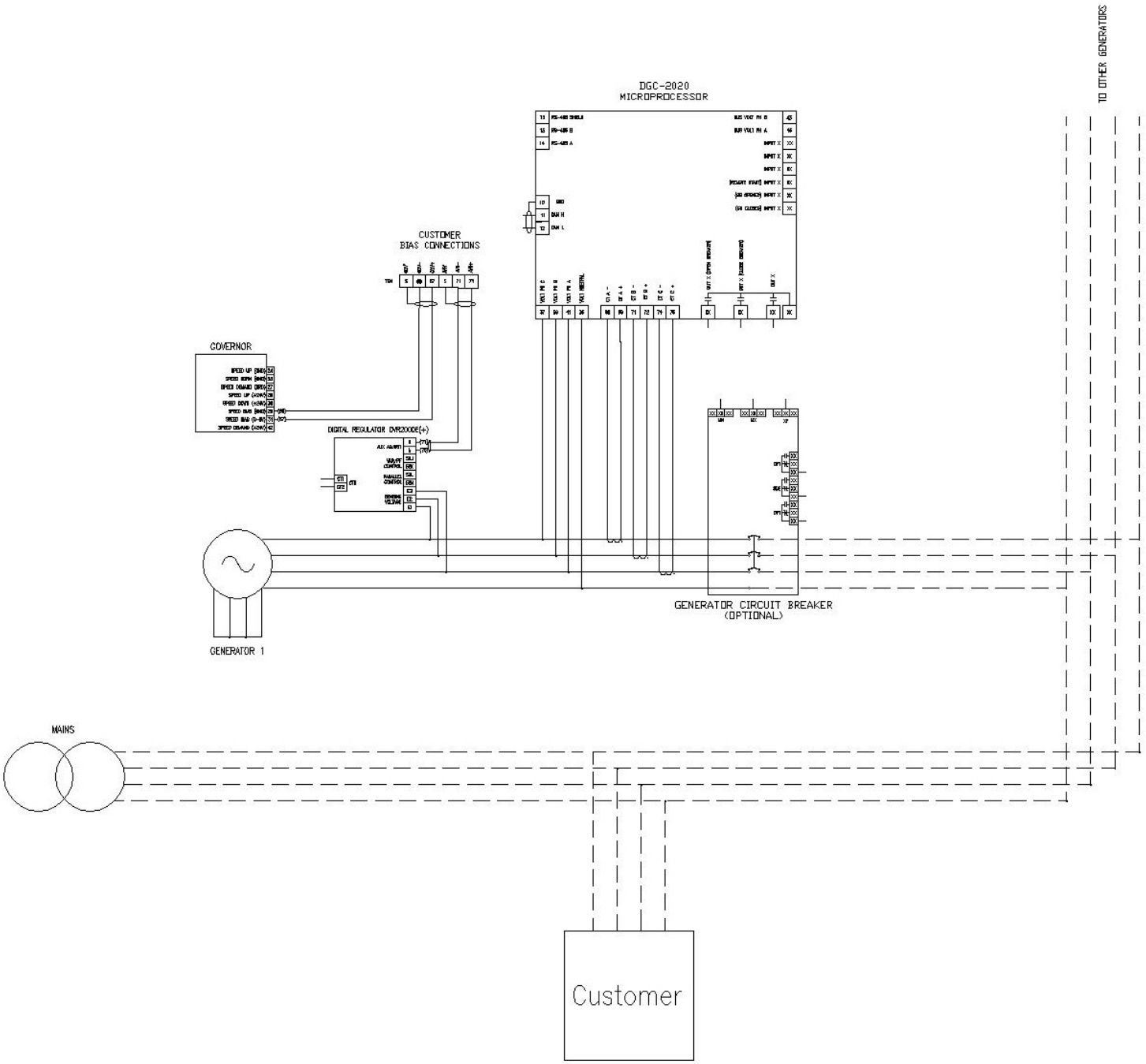


Figure 1: Paralleling without *mtu* Components

The dashed line (– – –) denotes wiring/equipment supplied by a third party

Paralleling Application Guide Data Sheet

Peak Shaving with Utility

SCOPE

The purpose of this document is to define a specific paralleling scenario - paralleling ***mtu*** generator sets with a utility power source. Additionally, it expands on this paralleling scenario with simple, integrated solutions.

DEFINITION(S)

Peak Shaving with Utility Operation

Peak shaving refers to the application of the system in which the generator set will parallel to a utility power source to subsidize customer load requirements while still maintaining the contractually agreed limit of power supplied by the utility power source. Typically, this is for the purpose of avoiding excess electrical demand charges.

ELECTRICAL DEMAND CONTROLLER (EDC)

An electrical demand controller is a third-party device responsible for monitoring electrical demand from utility, issuing start requests to generator sets, and biasing generator sets to control the amount of electrical demand on a utility power source.

ABBREVIATED SEQUENCE OF OPERATION

1. EDC senses that electrical demand on the utility power source has exceeded the customer-defined threshold, and all timers have elapsed.
    a. EDC issues the start request to the generator set.
    b. The generator set starts and builds rated voltage and frequency.
    c. The generator set synchronizes and closes to the utility power source.
    d. The EDC monitors the electrical demand on the utility power source and biases the generator set in proportion to the amount of load that must be shaved from the utility power source.
    e. The generator set begins to ramp on resistive and reactive load in proportion to a bias signal provided by the EDC.
    f. Regardless of fluctuations in the utility power source or building load, the EDC will constantly make adjustments to the bias signal to the generator set to maintain the agreed electrical demand on the utility power source to avoid peak demand charges.
2. EDC senses that electrical demand on the utility power source has fallen below the customer-defined threshold, and all timers have elapsed.
    a. EDC removes the start request from the generator set.
    b. The generator set sheds load until it produces very little power.
    c. After unloading, the generator set opens its breaker and disconnects from the utility power source.
    d. The generator set enters a controller-appointed, cool-down period.
    e. The generator set stops, returns to standby and awaits the next start request.

SYSTEM OPERATION

- Real power load sharing
- Reactive power load sharing

PARALLELING CONTROLS, EQUIPMENT, AND INTERFACING (*mtu* SCOPE OF SUPPLY)

- MGC-3000 Series digital generator set controller (referred to as the controller)
- Meter current transformers (CTs) and potential transformer (PT) (as needed)
- Permanent Magnet Generator (PMG) or Auxiliary Winding Regulation Excitation Principle (AREP) excitation system
- Digital voltage regulator with analog bias capability
- Motor-operated generator circuit breaker (may or may not be mounted to the generator set)*
  - Shunt trip
  - Shunt close
  - Auxiliary switch (breaker position)
  - Motorized spring charger

*If a circuit breaker is selected, the ***mtu*** scope of supply will include a motor-operated breaker of the indicated configuration.

ADDITIONAL PARALLELING CONTROLS, EQUIPMENT, AND INTERFACING (SUPPLIED BY THIRD PARTY)

- Electrical Demand Controller (EDC) with connections for monitoring electrical demand from utility, issuing start requests to generator set, and biasing generator set to control the amount of electrical demand on a utility power source
- Paralleling switchgear, circuit breakers, and/or disconnects
- Electrical demand controller with bias capabilities
- Paralleling bus and cabling
- Start signal source connection to generator set
- Utility bus sensing connection to generator set

PROGRAMMING AND LOGIC

- Basic programming and logic will be provided to start, synchronize, and accept a bias signal to peak shave with the utility power source from the EDC.
- Site programming and system tuning are required by the customer for proper onsite operation.

OTHER SYSTEM CONSIDERATIONS

For generator sets used in non-emergency applications within EPA regulated areas, Tier 4i/T4 final certified engines must be used.

SEQUENCE OF OPERATION

Peak shaving request to generator set

The EDC monitors the electrical demand on the utility power source. When electrical demand exceeds a customer-defined threshold (adjustable) and all applicable delay timers have elapsed, the EDC will issue a start request to the generator set. The start request is a command for the generator set to start, synchronize to utility power source, and close its circuit breaker. All available generator sets will start and achieve nominal frequency and voltage.

Synchronization of generator set

The controller on the off-line generator set biases its digital voltage regulator and governor to match its speed and voltage to the utility bus. The controller biases the speed of the engine governor to drive the difference between the phase angle of the generator set and the phase angle of the utility bus to zero. Additionally, the controller biases the voltage regulator to match the generator set voltage to the utility bus voltage. When the synchronization window criteria are met, the generator set is considered synchronized with the utility bus, and the controller issues a command to close its circuit breaker. Once its circuit breaker is closed and the controller receives “breaker closed” feedback from the circuit breaker auxiliary switch, the generator set is considered paralleled. The controller no longer actively attempts to synchronize the generator set.

Peak shaving

While paralleled, the generator set is electrically interlocked and will share real load (kW) and reactive load (kVAR) with the utility power source based on a bias signal supplied by the EDC. When the generator set circuit breaker is first connected, the generator set is producing a negligible amount of real power. The EDC will begin to bias the controller while the controller in turn biases the engine governor to begin loading kW on the generator set with respect to the bias signal from the EDC. Load will ramp onto the generator set until the generator set has shaved enough load off of utility to avoid excess demand charges to the customer.

Reactive load is also precisely shared between the paralleled generator set and the utility power source. When the generator set circuit breaker is first connected, the generator set produces a negligible amount of reactive power. The controller will bias the voltage regulator to begin loading kVARs onto the generator set in proportion to the amount of real power the generator set is producing. Load will ramp onto the generator set until the user-defined Power Factor (PF) set point is met.

As the generator set is peak shaving load off of the utility power source, the controller (in response to the EDC bias signal) will constantly adjust to fluctuations in load and in the utility power source to ensure that electrical demand on the utility source does not exceed the contractually agreed limit.

If a generator set experiences a fault while peak shaving, it will disconnect itself from the utility bus.

Termination of peak shaving request to generator set

When the EDC senses that electrical demand on utility has fallen below the customer-defined threshold and all applicable delay timers have elapsed, the EDC will reduce the bias signal to the controller. The controller will bias the governor and voltage regulator to ramp load off of the generator set. Once the generator set is unloaded and has reached the pre-defined (adjustable) breaker open set point percentage, the EDC will remove the start request, and the generator set circuit breaker will open. The generator set will enter a cool-down period, after which time the generator set will stop, re-enter standby mode, and await the next start request.

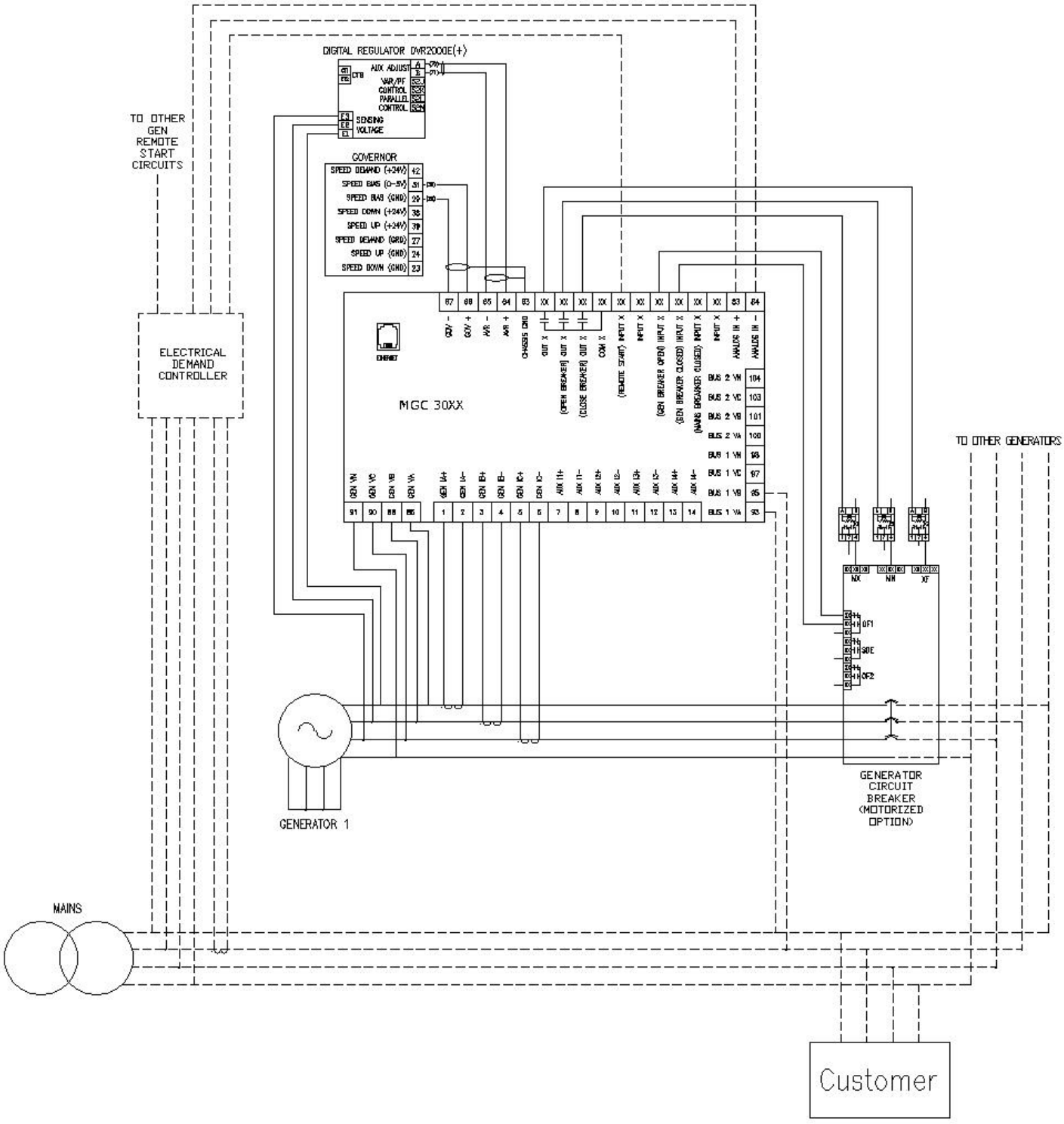


Figure 1: Peak Shaving with Utility

The dashed line (– – –) denotes wiring/equipment supplied by a third party

Subject to change. 2021-06

Starting System Data Sheet

Battery Warmer Plate

DESCRIPTION

Battery warmer plates improve battery performance in cooler climates by providing heat to warm a battery. The benefits of a warm battery versus a cold battery include better current flow during engine crank cycle, longer battery life by reducing deep cycling, and quicker charging time. A warm battery also allows for less load on the charging system by having more battery power available during the charging cycle.

FEATURES

- Quick-start, pre-set thermostat maintains temperature at 27 °C (80 °F)
- Grounded cord: 2.4 m (8 ft)

SPECIFICATIONS

- ***mtu*** Part #: SUA33218
- Dimensions: Length: 228 mm (9 in)
  Width: 151 mm (6 in)
  Height: 18 mm (0.75 in)
- Weight: 1 kg (2.2 lbs)
- Operation: 200 Watt, 120 VAC, 60 Hz

CERTIFICATIONS AND STANDARDS

This battery warming plate is not listed or labeled in conformance with UL or CSA standards.

Note: Battery warmer plates are not recommended for nickel cadmium batteries.

Subject to change. | WT00037985 | 2021-09

Starting System Data Sheet

Commercial Battery

Extra ruggedness and resistance to vibration, heat, chemicals, and physical abuse are built into every commercial battery provided with an ***mtu*** generator set. The battery design features the latest in power storage technology for lead-acid batteries, as well as incorporates proven designs developed with the most experience in the business.

PRODUCT FEATURES

- **Case Design:** Tough, high-impact reinforced polypropylene case is heat sealed under extreme pressure to withstand heavy commercial service usage. This helps to prevent electrolyte leakage, improves reliability, and reduces breakage.
- **Internal Design:** Full-frame power path grids avoid sharp wires protruding through separators and directs the power straight to the lug for low resistance and higher cranking amps.
- **Terminals:** Standard terminals are solidly built preventing porosity, corrosion, black post, and harmful acid leaks.
- **Power Density:** Extra heavy-duty batteries deliver more cranking amps per pound.
- **Maintenance:** The battery uses pure de-mineralized electrolytes for reduced water loss, reduced gassing, longer battery life, and low maintenance.
- **Reliability:** Narrow ribs reduce separator corrosion to protect against shorts while deep-pocket envelopes dramatically improve reliability and extend service life.
- **Quality:** Over 250 quality control checks, combined with computer-aided design technology, provide a tough, durable battery in each commercial battery provided with an ***mtu*** generator set.

						Overall Dimension			
BCI Group Size	Terminal Type	*mtu* Part Number	Volt	Cranking Performance CCA (Cold Cranking Amps) -18° C / 0° F	Reserve Capacity	Length mm (in)	Width mm (in)	Height mm (in)	Weight (Wet) kg (lbs)
24	Post	SUA102538	12	650	115	273 (10.75)	171 (6.75)	229 (9)	18.1 (40)
31	Post	SUA120299	12	950	175	330 (13)	171 (6.75)	241 (9.5)	25.7 (56.5)
4D	Post	SUA102493	12	1,050	290	527 (20.75)	216 (8.5)	258 (10.125)	45.2 (99.5)
8D	Post	SUA102492	12	1,400	430	527 (20.75)	279 (11)	254 (10)	59.3 (130.5)

Battery Charger Data Sheet

EnerGenius® IQ 35 Amp

DESCRIPTION

The EnerGenius® IQ 35 Amp battery charger is a rugged utility-grade battery charger with microprocessor control.

This battery charger delivers DC power, charges the battery, automatically tests battery performance, logs all relevant site data, and clearly communicates results. A charge control system reduces recharge time and reduces risk of overcharge.

FEATURES

- Built-in intelligence makes it easy to correctly configure charger for battery and site conditions
- Battery-check system automatically tests battery to reduce risk of unexpected application shutdown
- Black box data recorder helps spot previously hidden problems and directs preventive maintenance
- Advanced user interface with USB PC utility that provides easy-to-understand system status and control.
- Dual microprocessors for digital load sharing that minimize risk of single-point failure
- Modbus communication option provides remote monitoring and administration
- Automatic battery commissioning mode

SPECIFICATIONS

Output

- 24 VDC nominal filtered output
- Suitable for Lead-acid or Ni-Cd batteries
- Battery temperature compensation with adjustable slope
- Adjustable current limit 33% to 110%
- Timed commission charge with automatic revert to standard settings

Input

- Refer to **ORDERING INFORMATION** section of this document

User interface

- Float, auto, and manual equalized charging modes and LEDs
- Manual and automatic equalize charge timer for 0-256 hours
- All parameters are keypad adjustable with keypad lock

Meters

- 1% accuracy digital DC volt and amp meters; percent nominal AC input voltage
- DC voltmeter displays both volts per cell and total voltage

Remote alarms and communications

- Alarm status via individual Form C contact
- Modbus data communications option

Battery check system

- Front panel battery-check button
- Fully adjustable automatic battery-check system

History and event logging

- Long-term black box memory
- PC-based event log analysis software

SPECIFICATIONS, continued:

Safety and Reliability

- Fully automatic charge control
- 60 Hz units NEMA PE-5 compliant and high efficiency
- 2-pole AC circuit breaker, 10K AIC
- 2-pole UL-listed DC circuit breaker
- Electronic soft start and programmable start delay
- Backwards battery protection
- Fault-tolerant dual-microprocessor architecture
- All-digital design, no potentiometers
- Conformal coated, surface-mount technology circuit cards
- Redundant and selective over-voltage shutdown
- Battery temperature compensation
- Surge withstand: ANSI 62.41, ANSI C37.90, IEC 61000-6-2
- Display and alarm relay test

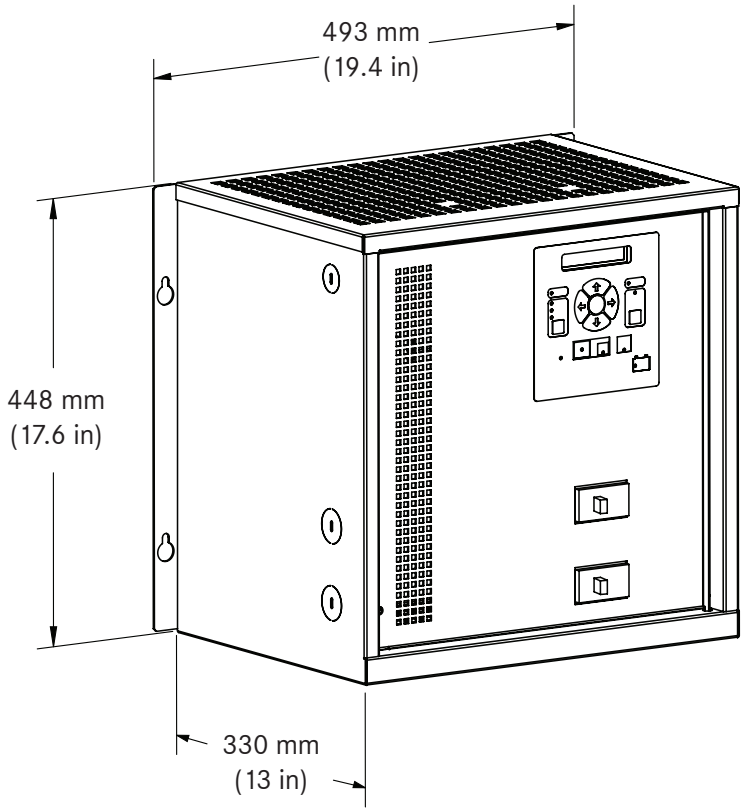
Mechanical

- Rugged steel housing and tough-baked polyester finish
- Housing protection ratings: NEMA Type 1, IP 20
- Weight: 59 kg (129 lbs)
- Operating temperature range: - 40 °C (-40 °F) to 50 °C (122 °F) with overtemp current reduction

CERTIFICATIONS AND STANDARDS

- 60 Hz: c-UL-us listed and CSA certified
- 50/60 Hz: c-UL-us listed and CE marked

DIAGRAMS AND DIMENSIONS



ORDERING INFORMATION

mtu Part #	Output Volts	Output Amps	Voltage	Frequency	NFPA 100 Alarms	Communications
SUA97983	24	35	115-120 / 208 / 230-240	50/60 Hz	Yes(1)	N/A
SUA101148	24	35	480	60 Hz	Yes(1)	N/A
SUA105039	24	35	115-120 / 208 / 230-240	50/60 Hz	Yes(2)	Modbus

(1) 7-alarm relays and AC pilot relay
(2) 5-alarm relays

N/A = Not Available

Battery Charger Data Sheet

MicroGenius Battery Charger

BENEFITS AND FEATURES

Designed for mission-critical applications, the MicroGenius® 2, MicroGenius S2, and MicroGenius S4 battery charger packs advanced technology charging into a small, lightweight, and rainproof package. MicroGenius is the only charger that delivers high-performance charging while prolonging useful life of batteries and significantly reducing risk of sudden battery failure. Rigorous worst-case analysis design processes and extensive abuse testing ensure reliable operation in adverse environments.

- Dynamic Boost™ Charge safely recharges batteries faster than competing products
- HELIX™ technology increases battery life and cuts risk of sudden battery failure
- Field-selectable 12/24 volt output
- Hardened switchmode powertrain delivers first-class abuse resistance and state-of-the-art energy efficiency
- Small, lightweight, water-resistant, and rugged
- Standard J-1939 and Modbus communications

SPECIFICATIONS

AC input

	MicroGenius 2	MicroGenius S2	MicroGenius S4
VAC, Hz	90-265 VAC, 47-63 Hz		
Protection	Supplementary overcurrent protection fuse, transient protected to EN61000-4-5 level 4		
Power factor and efficiency	PF > 0.95 typical; efficiency to 93%; meets CEC Title 20 Efficiency Regulations; standby AC draw < 3W		

A Rolls-Royce solution

SPECIFICATIONS, continued

DC output

	MicroGenius 2	MicroGenius S2	MicroGenius S4
Volts	12V / 24V		
Amps	**MicroGenius 180:** 10A/6A **MicroGenius 300:** 10A **MicroGenius 450:** 15A **MicroGenius 600:** 20A	20A	45A
Charging modes	Multi-stage, including float, boost, and commissioning charge modes		
Current limit	Factory set at 100% of rating. Field adjustable w/optional keypad or from PC[1]		
Charging characteristic	Constant voltage, current limited; patented Dynamic Boost control		
Line and load regulation	± 0.5%		
Output ripple	< 30 mVrms with or without battery. Delivers fast-responding, stable, well-filtered DC without battery.		
Battery temperature compensation	Standard. Optional remote battery temperature probe[2]		
Output protection	Current limit, supplementary overcurrent protection fuse, transient protected		
Dead battery charge	Starts into and recharges zero volt battery without user intervention		
Parallel operation	Two or more chargers operate with all modes sychronized for increased current or fault tolerance[3]		

Adjustment and controls

	MicroGenius 2	MicroGenius S2	MicroGenius S4
Charge mode control	Fully automatic patented Dynamic Boost system. Manual boost and battery commissioning available from keypad.		
Adjustments	12 or 24 volt; battery type program; fine voltage setting, alarm setpoints; alarm relay mapping		
Battery type programs	Flooded lead-acid, Ni-Cd, VRLA, ultracapacitor, lithium[4]		
Field voltage adjustment	Three methods: jumper pins, from front panel keypad (requires that model number digit 12 be F), or from PC[1]	Two methods: from front panel keypad or from PC[1]	

Status display

	MicroGenius 2	MicroGenius S2	MicroGenius S4
LEDs	Two multi-color front panel status LEDs		
Metering and status display	Voltmeter accurate to + 2%; ammeter to + 5%. 20-character display of status and alarm messages		

SPECIFICATIONS, continued

Alarms

	MicroGenius 2	MicroGenius S2	MicroGenius S4
Alarms	Factory set and field reconfigurable. Standard generator set configuration includes summary, AC fail, charger fail, high DC volts, low DC volts, low cranking volts.		
Form C contact alarms	**MicroGenius 180 (X00A42500005):** N/A **MicroGenius 180 (XG3042500013)/ 300/450/600:** Two Form C contacts, each rated 30V, 2A resistive, assignable. Standard configuration includes summary, AC fail, charger fail, high DC volts, low DC volts and discharging battery.	Five Form C contacts, each rated 30V, 2A resistive, assignable. Standard configuration includes summary, AC fail, charger fail, high DC volts, low DC volts and discharging battery.	

Networking

	MicroGenius 2	MicroGenius S2	MicroGenius S4
J-1939 communications	CAN 2.0 extended ID on RJ-45 port		
Modbus communications	Modbus RS-485 on RJ-45 port or Modbus TCP/IP on RJ-45 port.		Uses only Modbus TCP/IP. Do not use Modbus RS-485 for serial port communication.
SENSbus	Proprietary bus for connection of parelleled chargers and SENS accessories		

Environmental

	MicroGenius 2	MicroGenius S2	MicroGenius S4
Operating temp[5] (convection cooled)	**MicroGenius 180:** Meets full specification from -40 °C to +60 °C (-40 °F to +140 °F) **MicroGenius 300/600:** Meets full specification from -40 °C to +50 °C (-40 °F to +122 °F) **MicroGenius 450:** Meets full specification from -40 °C to +40 °C (-40 °F to +104 °F)	Meets full specification from -40 °C to +40 °C (-40 °F to +104 °F)	
Humidity	5% to 95%, non-condensing		
Ingress protection	IP 22; NEMA 3R; UL Listed "Rainproof"	IP 20; NEMA 1. Optional drip shield for IP 22/NEMA 3R rating.	
Vibration	Swept Sine (EN60068-2-6); 4G, 18-500 Hz, 3 axes. Random: 20-500 Hz, 0.01G2/Hz		
Shock	EN 60068-2-27 (15G)		
Electrical transient	ANSI/IEEE C62.41 and EN 61000-4-12 on power terminals		

SPECIFICATIONS, continued

Abuse protection

	MicroGenius 2	MicroGenius S2	MicroGenius S4
Reverse polarity	Charger self-protects without fuse clearing. Indication via LED and optional LCD.	Charger self-protects without fuse clearing. Indication via LED and LCD.	Charger self-protects without output protective device clearing. Indication via LED and LCD.
Wrong voltage battery	Charger-battery voltage mismatch shuts down charger. Indication via LED and LCD		
Overvoltage shutdown	Selective: Shutdown only operates if charger causes the overvoltage condition		
Overtemp protection	Gradual output power reduction if heatsink temperature becomes excessive		

Regulatory compliance

	MicroGenius 2	MicroGenius S2	MicroGenius S4
North America	C-UL Listed for US and Canada: UL 1236 categories BBGQ, BBHH, BBJY and QWIR[6], CSA 22.2, No. 107.2. Certified to UL 1236 supplements SB (marine), SC (fire pump) and SE (emergency generator)		
	NFPA-70, NFPA-1107 **Note:** MicroGenius 2 180 (X00A42500005) meets NFPA-70 only.		
	FCC Part 15, Class B	FCC Part 15, Class A	
	Seismic: Rigid and non-structure wall mount; max SDS of 2.5G. IBC 2000-2015, Calif. BC 2007-2016		
	American Bureau of Shipping, type approved		
European Union (CE)	EMC: 2014/30/EU (EN 61000-6-2 and EN 61000-6-4)		
	LVD: 2014/35/EU (EN 60335-1 and EN 60335-2-29)		
	RoHS 2: 2011/65/EU (EN 50581)		

Construction

	MicroGenius 2	MicroGenius S2	MicroGenius S4
Housing/Configuration	Die-cast aluminum heatsink base with stainless steel covers and fasteners	Aluminum with powder coated finish	
Connections	AC and DC terminal blocks: 20 to 10 AWG J-1939 and Modbus-485: RJ-45. Form C alarms: 28 to 16 AWG	AC and DC terminal blocks: 20 to 2 AWG J-1939 and Modbus: RJ-45. Form C alarms: 28 to 16 AWG	AC and DC terminal blocks: 14 AWG to 2/0 AC and DC breakers < 50A (optional): 14 to 2 AWG AC to DC breakers, ≥ 50 A (optional): 12 AWG to 2/0 J-1939 and Modbus: RJ-45 Form C alarms: 28 to 16 AWG

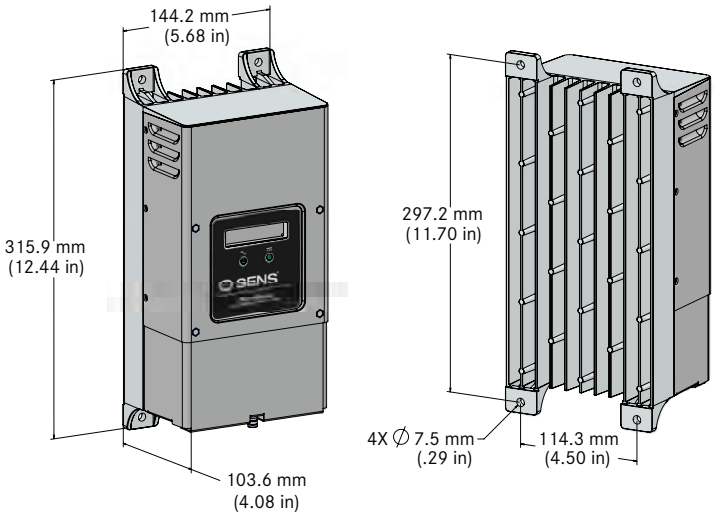
1 Requires optional computer-to-charger adapter. To order, contact ***mtu*** Parts Department.
2 Remote battery temp sensor is optional. To order, contact ***mtu*** Parts Department.
3 Requires standard RJ-45 network cable to connect paralleling bus. To order, contact ***mtu*** Parts Department.
4 Contact factory to determine compatibility with the battery management system (BMS) of your lithium battery.
5 At 65 °C (149 °F) and above, the LCD display may be unreadable and display life will be reduced.
6 Except 180 W unit in 24-V configuration, which is not listed to QWIR
7 All chargers equipped with an alarm/display board meet NFPA-110 requirements. For chargers without an alarm/display board to meet NFPA-110, charger performance and alarm data available on the J-1939 port must be annunciated by the generator set control panel.

MICROGENIUS ORDERING INFORMATION

Battery charger	*mtu* part #	Output volts	Output amps
MicroGenius 2 180*	X00A42500005	12/24 Volts	10/6 Amps
MicroGenius 2 180**	XG3042500013	12 Volts	10 Amps
MicroGenius 2 300**	X54942500005	24 Volts	10 Amps
MicroGenius 2 450**	XG3042500014	24 Volts	15 Amps
MicroGenius 2 600**	XG4842500003	24 Volts	20 Amps
MicroGenius S2	X54942500003	12/24 Volts	20 Amps
MicroGenius S4	X54942500002	12/24 Volts	45 Amps

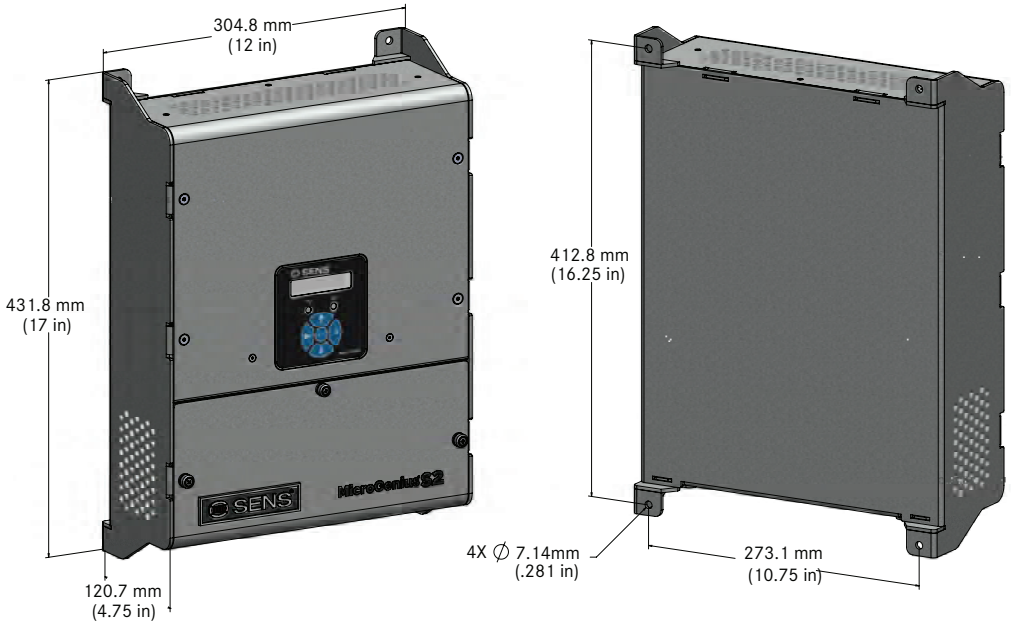
*Meets NFPA-70 only.
Includes ***mtu*-specific programming

DIAGRAMS AND DIMENSIONS

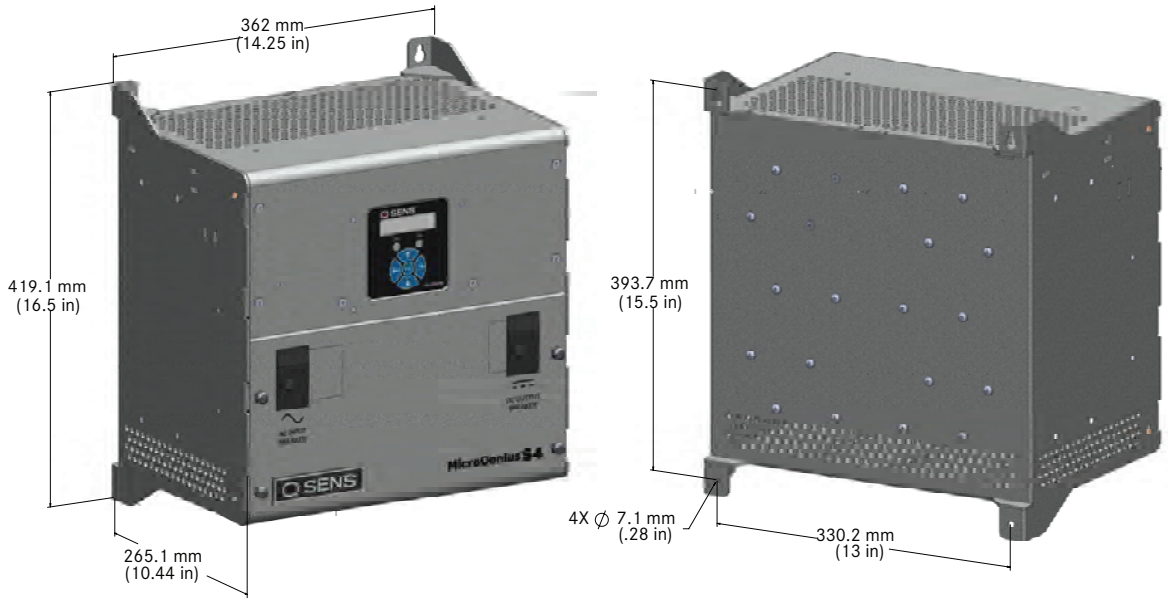


MicroGenius 2 Dimensions

DIAGRAMS AND DIMENSIONS, continued



MicroGenius S2 Dimensions



MicroGenius S4 Dimensions

Subject to change. | WT00038096 | 2023-09

Battery Charger Data Sheet

mtu 12-6A Battery Charger

DESCRIPTION

The ***mtu*** 12-6A battery charger is designed to recharge batteries and extend the life of connected batteries that are stored for long periods of time. It is multi-stage, completely automatic, lightweight, and silent with visible red and green LED lights located on the faceplate for easy operation.

FEATURES

- Waterproof (IP68 rating)
- LED charge indicators
- Protected against:
  - Overcurrent
  - Overcharge
  - Reverse polarity
  - Short circuit
- Hermetically sealed ignition
- Thermal protection at 50 °C (122 °F)

SPECIFICATIONS

- ***mtu*** Part #: XG3130100003
- Dimensions
  - Length: 88.9 mm (3.5 in)
  - Width: 162.6 mm (6.4 in)
  - Height: 58.4 mm (2.3 in)
- Weight: 1.8 kg (4 lbs)
- AC Input
  - Input Volts: 115 V for 50 Hz and 60 Hz
  - Input Current: 2 Amps
- Charger Output
  - Output Volts: 12 VDC nominal
  - Output Current: 6 Amps

STATUS INDICATION

- LED status indicator: two front panel LEDs indicate normal and alarm states

CERTIFICATIONS AND STANDARDS

- c-UL-us Listed to UL 1236 and CSA Standard C22.2 no. 107.2
- CE marked
- CEC - California Energy Commission compliant
- FCC labeled
- RoHS compliant - Restriction of Hazardous Substances

A Rolls-Royce solution

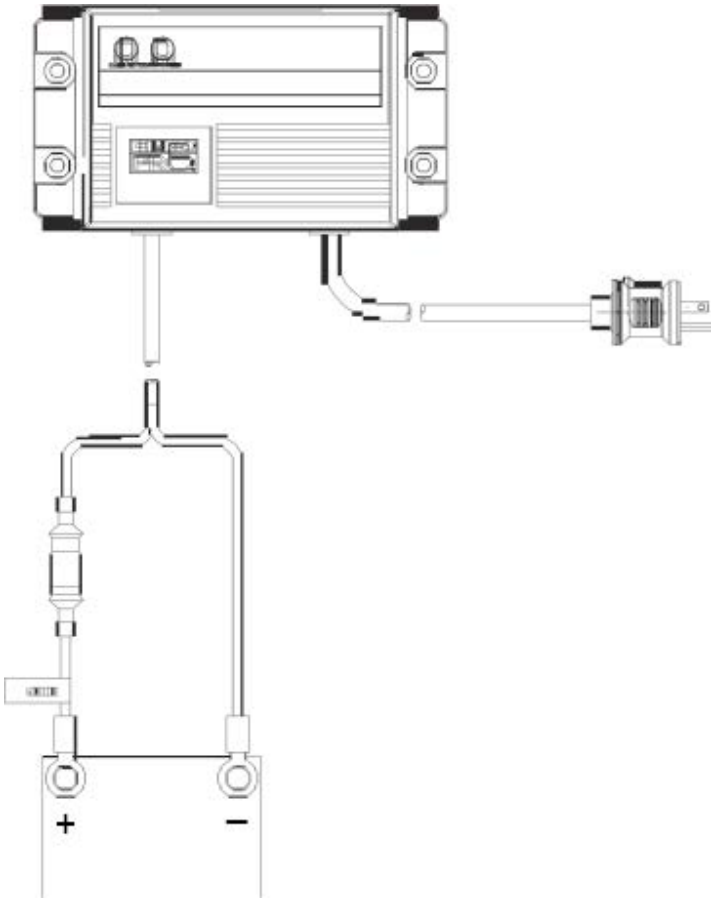


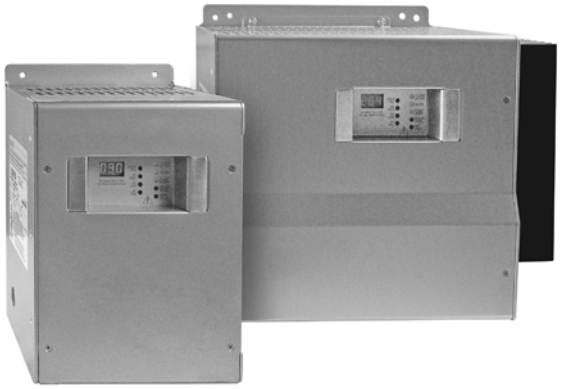
Figure 1: *mtu* 12-6A Battery Charger Schematic

Subject to change. | WT00037986 | 2021-03

Battery Charger Data Sheet

NRG Intelligent Engine Start Battery Charger

The smart choice for mission-critical engine starting:
- Fast, accurate, mission-critical charging gives best starting reliability
- 4-rate, temperature-compensated output offers longest battery life
- Replace nearly any charger without planning ahead
- Industry-first battery-fault alarm helps dispatch service early
- Lasting reliability — field MTBF > 1 million hours with industry-best warranty
- IBC seismic certification meets latest building codes, no installation delays



BENEFITS AND FEATURES

Failure to start due to battery problems is the leading cause of inoperable generator sets.

The NRG battery charger maximizes starting system reliability while slashing generator set servicing costs:
- One NRG replaces almost any charger without extra site visits. Installers can select or change at any time 120, 208, or 240 volts AC input, 12 or 24-volt battery and output settings optimized for nearly any lead-acid or nickel cadmium battery.
- Easy-to-understand user interface provides state-of-the-art system status including digital metering, NFPA 110 alarms, and a battery fault alarm that can send service personnel to the site before failure to start.
- Batteries charged by NRG give higher performance and last longer. In uncontrolled environments, precision charging increases battery life and watering intervals 400% or more.
- NRG meets all relevant industry standards – including UL, NFPA 110, and CE. Seismic Certification per International Building Code (IBC) 2000, 2003, 2006. All units are C-UL listed. 50/60 Hz units add CE marking to UL agency marks.

EnerGenius reliability technology built into every charger includes:
- All-electronic operation with generous component de-rating
- Disconnected/reversed/incorrect voltage battery alarm and protection
- Protection of connected equipment against load dump transients
- Widest temperature rating and overtemperature protection
- Superior lightning and voltage transient protection
- Demonstrated field MTBF > 1 million hours

SPECIFICATIONS

AC Input

- Voltage: 110-120/208-240 VAC, ±10%, single phase, field selectable
- Input current:
  - 10A charger: 6.6/3.3 amps maximum
  - 20A charger: 12.6/6.3 amps maximum
- Frequency: 60 Hz ±5% standard; 50/60 Hz ±5% optional
- Input protection: 1-pole fuse, soft-start, transient suppression

Charger Output

- Nominal voltage rating: 12/24 volt, field selectable
- Battery settings: six discrete battery voltage programs
  - Low or high S.G. flooded
  - Low or high S.G. VRLA
  - Nickel cadmium 9, 10, 18, 19 or 20 cells
- Regulation: ±0.5% line and load regulation
- Current: 10 or 20 amps nominal
- Electronic current limit: 105% rated output typical—no crank disconnect required
- Charge characteristic: constant voltage, current limited, 4-rate automatic equalization
- Temperature compensation: Enable or disable anytime, remote sensor optional
- Output protection: Current limit, 1-pole fuse, transient suppression

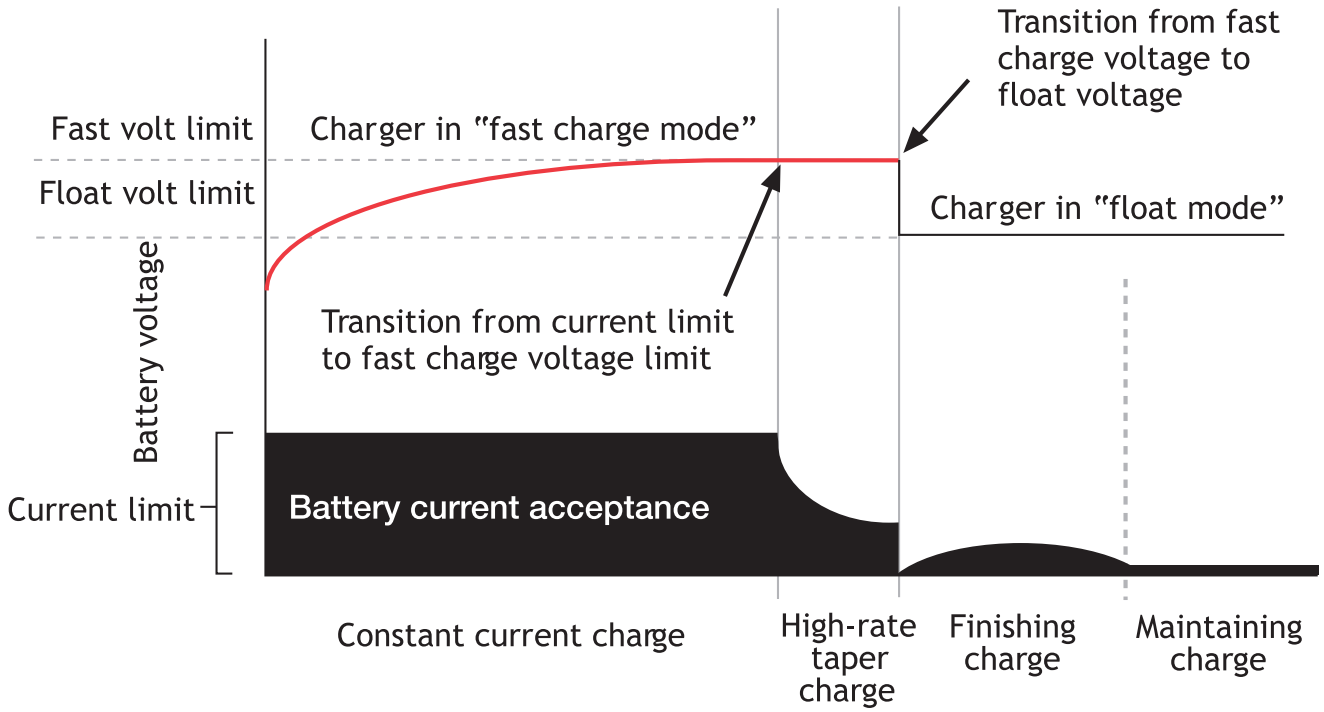


Figure 1: Standard Four (4) Rate Charging

SPECIFICATIONS, continued:

User Interface, Indication and Alarms

— Digital meter: automatic meter alternately displays output volts, amps[1]
— Accuracy: ±2% volts, ±5% amp
— Alarms: LED and Form C contact(s) per table:

	Alarm Code "C" (meets requirements of NFPA 110)
AC good	LED
Float mode	LED
Fast charge	LED
Temp comp active	LED
AC fail	LED and Form C contact[2]
Low battery volts	LED and Form C contact[2]
High battery volts	LED and Form C contact[2]
Charger fail	LED and Form C contact[2]
Battery Fault	LED and Form C contact[2]

Front panel status display

[1] Three-position jumper allows user to select from three display settings: alternating volts / amps (normal), constant volts, or constant amps
[2] Contacts rated 2A at 30 VDC resistive

Table 1: Alarm Code "C", LED and Form C contacts

Controls

— AC input voltage select: field-selectable switch
— 12/24-volt output select: field-selectable two-position jumper
— Battery program select: field-selectable six-position jumper
— Meter display select: field-selectable three-position jumper
— Fast charger enable/disable: field-selectable two-position jumper
— Temp compensation enable: standard, can be disabled or re-enabled in the field
— Remote temp comp enable: connect optional remote sensor to temp comp port

Simple field adjustments

Environmental

— Operating temperature: -20 °C to 60 °C, meets full specification to 45 °C
— Over temperature protection: gradual current reduction to maintain safe power device temperature
— Humidity: 5% to 95%, non-condensing
— Vibration (10A unit): UL 991 Class B (2G sinusoidal)
— Transient immunity: ANSI/IEEE C62.41, Cat. B, EN50082-2 heavy industrial, EN 61000-6-2
— Seismic certification:
  - IBC 2000, 2003, 2006, 2009
  - Maximum S_{ds} of 2.28 g

NRG Intelligent Engine Start Battery Charger Data Sheet

Agency Standards

- Safety
  - C-UL Listed to UL 1236 (required for UL 2200 gensets),
  - UL Category BBGQ, CSA standard 22.2 no. 107.2-M89
  - CE: 50/60 Hz units DOC to EN 60335
- Agency marking
  - 60 Hz: c-UL-us listed
  - 50/60 Hz: c-UL-us listed plus CE marked
- EMC
  - Emissions: FCC Part 15, Class B; EN 50081-2
  - Immunity: EN 61000-6-2
- NFPA standards
  - NFPA 70
  - NFPA 110 (NFPA 110 requires alarms “C”)

Construction

- Material: non-corroding aluminum enclosure
- Dimensions: see Diagrams and Dimensions section of this document
- Printed circuit card: Surface mount technology, conformal coated
- Cooling: natural convection
- Protection degree
  - Listed housing: NEMA-1 (IP20)
  - Optional IP21 drip shield
  - Optional NEMA 3R enclosure
- Damage prevention: fully recessed display and controls
- Electrical connections: compression terminal blocks

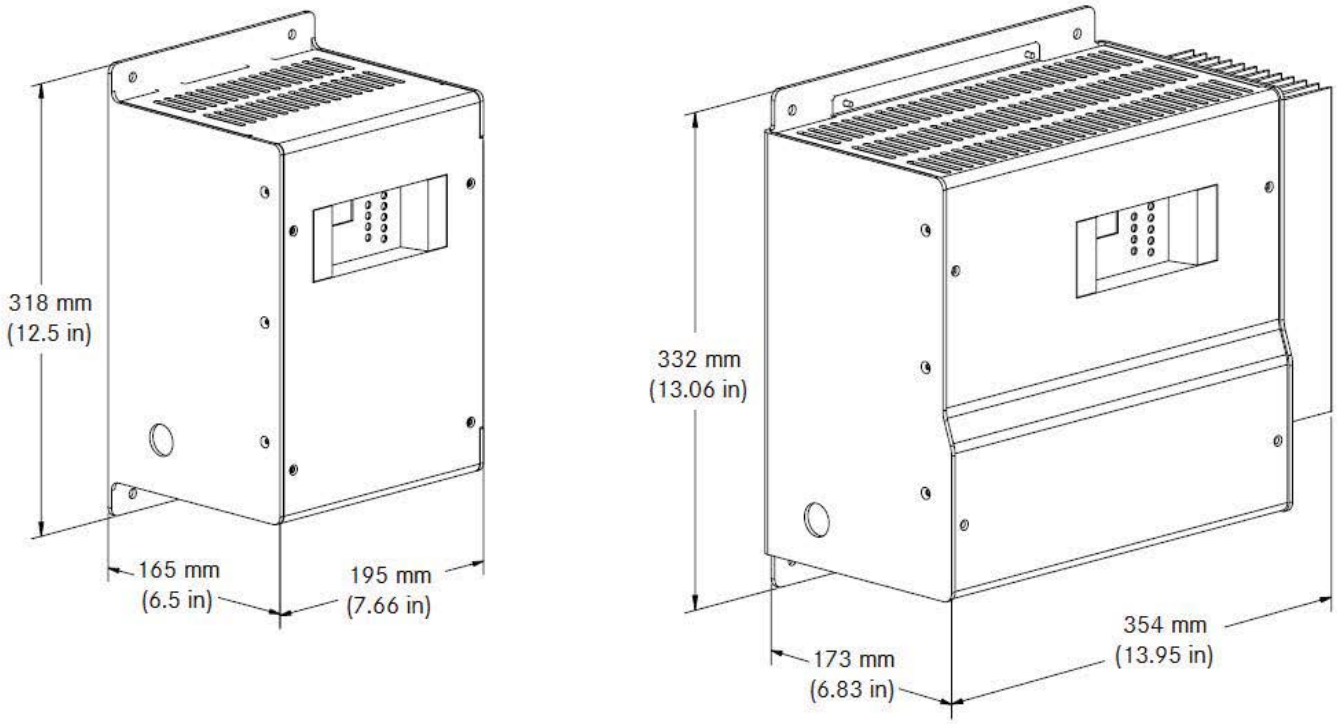
Warranty

Standard warranty: standard warranty terms apply

Optional Features

- Input: input frequency, 50/60 Hz
- Remote temp comp sensor: recommended where battery and charger are in different locations
- Drip shield meets s/b (IP21): protects from dripping water
- NEMA 3R housing: enables outdoor installation (remote temp sensor recommended)

DIAGRAMS AND DIMENSIONS



10A Chargers

20A Chargers

Figure 2: Charger Dimensions

NRG Ordering Information						
Output Volts	Output Amps	Frequency	Model	Available Configurations	NFPA 110 Alarms	Weight kg (lbs)
12/24	10	60 Hz	SUA83187	Enclosed	Yes	10.4 (23)
12/24	20	60 Hz	SUA90170	Enclosed	Yes	19.1 (42)
12/24	10	50/60 Hz	SUA89983	Enclosed	Yes	10.4 (23)
12/24	20	50/60 Hz	SUA94705	Enclosed	Yes	19.1 (42)
24	20	60 Hz	SUA87576	Enclosed	Yes	19.1 (42)
24	20	50/60 Hz	SUA89971	Enclosed	Yes	19.1 (42)

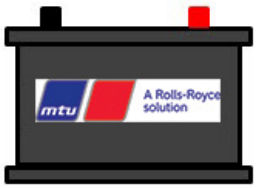
All models offer field-selectable input 120/208-240 volts.

Starting System Data Sheet

Optional Starting Systems

DESCRIPTION

The following starter package is available for ***mtu*** Series 1600, ***mtu*** Series 2000, and ***mtu*** Series 4000 generator sets. In addition to the standard system, a redundant starting system is also offered to provide seamless operation in case of a starter failure. This optional starting system is both factory-configurable and field-installable.



STARTER OPTIONS

Standard Starter

- Consists of one or two starters that are required to start the unit (product-dependent)
- Default crank cycle: 3 x 15C x 15R (15 seconds crank/15 seconds rest)
- Minimum requirement with a low-cost design based on engineering economics (cost-effective solution)
- Standard equipment on all ***mtu*** generator sets

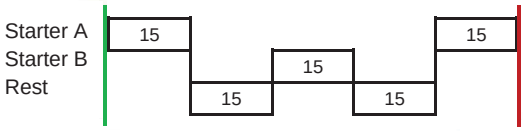
Redundant (Alternating) Starter

The optional redundant starting system is designed to function in an alternating configuration using logic programmed in the ***mtu*** generator set controller. For ***mtu*** Series 1600 and ***mtu*** Series 2000, a second starter of the same model as the standard starter is added to the generator set. For ***mtu*** Series 4000, the dual 9kW starters are replaced with dual 15kW starters. The ***mtu*** generator set controller cycles relays to control each starter independently through crank and rest states according to the specifications of the selected starting system.

- The redundant starter option requires two starters, and will alternate between the two starters

Note: Some redundant starting options on the ***mtu*** Series 4000 generator sets may not fulfill the NFPA 110 type 10 requirements.

Crank Cycle	Functionality	Availability
– Modified crank cycle: 3 x 15C x 15R (15 seconds crank/15 seconds rest) – Rest time between starters prevents starter engagement while engine is spinning down. – See **Figure 1: Scenario with Alternating Starters**	– Only one starter is needed to start the unit. – Starters engage and crank independently. – Starters alternate with each crank cycle. – If starter failure occurs, the controller will wait through the remaining crank cycle of the failed starter and rest cycle. The controller will then engage the alternate starter for the next crank cycle. – If both starters fail, the alarm will occur after the third crank attempt of the cycle.	– ***mtu*** Series 1600 – ***mtu*** Series 2000 – ***mtu*** Series 4000



Total time: 75 seconds
Total crank time: 45 seconds
Total rest time: 30 seconds

If generator set has not started, over-crank alarm is set on control panel. Alarm must be manually reset.

Figure 1: Scenario with Alternating Starters

Note: Crank cycle is different from the NFPA 110 standard. Check with the local authority having jurisdiction for acceptance.

BATTERY OPTIONS

In addition to the starter, the battery is a critical component of the starting system. Several battery options are available. The battery type should be chosen based on the needs of your application and the starter system that is selected.

Standard Battery Set

- A battery or set of batteries capable of starting the unit
- Default, cost-effective solution

Isolated Redundant Batteries

- Starter power is isolated.
- Consists of two sets of standard batteries and two battery chargers.
- Each charger is connected to a set of batteries.
- Both sets of batteries are interfaced to the unit via a control power diode block or similar device.
- One set of batteries powers one starter.
- On-engine battery charging alternator is not required and is removed where possible.
- Positive electrical connection between the starters is removed.
- May be configured with any of the above starter options.

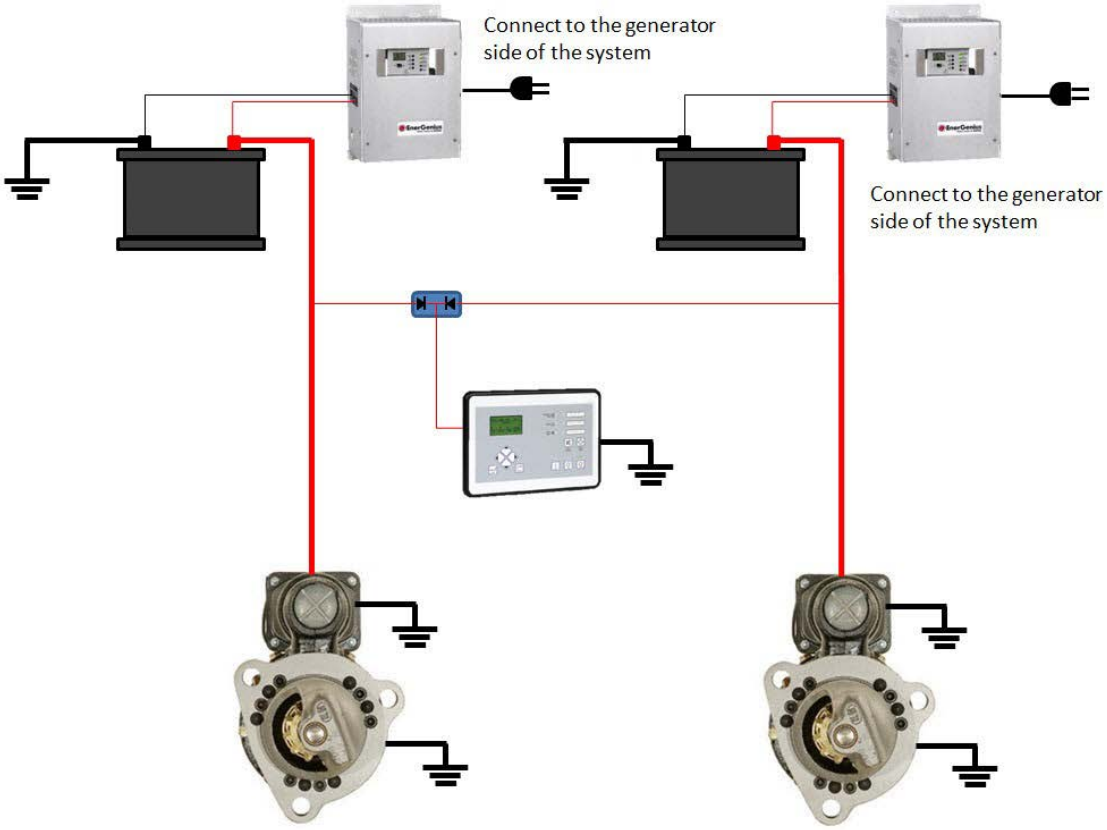


Figure 2: Isolated Redundant Batteries

ROLLS-ROYCE SOLUTIONS AMERICA INC.

Two (2) Year / 3,000 Hour Basic Limited Warranty
Standby (3D) / Prime (3B) / Data Center Continuous Power (3F)

Rolls-Royce Solutions America Inc. ("RRSA") issues the following express Limited Warranty subject to the following terms, conditions, and limitations:

An original consumer ("Owner") who purchases an RRSA engine generator set ("Product") is entitled to coverage under this Limited Warranty. RRSA warrants to the Owner that the Product is free of defects in material and workmanship and will perform under normal use and service from valid start-up performed by RRSA. Any nonconformity to the foregoing is defined as a Warrantable Defect. This Limited Warranty applies to Product shipped by RRSA after January 1, 2014.

1. Disclaimers

LIMITATION OF WARRANTIES: THIS LIMITED WARRANTY IS GIVEN EXPRESSLY AND IN PLACE OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE, FREEDOM FROM INFRINGEMENT OR THIRD PARTY INTELLECTUAL PROPERTY RIGHTS, OR ARISING FROM COURSE OF DEALING, COURSE OF PERFORMANCE OR USAGE OF TRADE. THERE ARE NO UNDERSTANDINGS, AGREEMENTS, REPRESENTATIONS, OR WARRANTIES NOT SPECIFIED HEREIN.

THIS LIMITED WARRANTY, THE OBLIGATIONS OF RRSA AND THE RIGHTS AND REMEDIES OF THE OWNER SET FORTH IN THIS LIMITED WARRANTY ARE EXCLUSIVE AND ARE EXPRESSLY IN LIEU OF, AND THE OWNER HEREBY WAIVES AND RELEASES ALL OTHER OBLIGATIONS, WARRANTIES (INCLUDING WARRANTY AGAINST REDHIBITORY DEFECTS), REPRESENTATIONS OR LIABILITIES, EXPRESS OR IMPLIED, ARISING BY LAW IN CONTRACT, TORT (INCLUDING NEGLIGENCE OR STRICT LIABILITY) OR OTHERWISE, INCLUDING BUT NOT LIMITED TO ANY CLAIMS ARISING OUT OF, CONNECTED WITH OR RESULTING FROM THE PERFORMANCE OF THIS LIMITED WARRANTY OR FROM THE DESIGN, MANUFACTURE, SALE, REPAIR, LEASE OR USE OF THE PRODUCT, ANY COMPONENT THEREOF AND SERVICES DELIVERED OR RENDERED HEREUNDER OR OTHERWISE.

IN NO EVENT, WHETHER AS A RESULT OF BREACH OF CONTRACT OR WARRANTY, ALLEGED NEGLIGENCE, OR OTHERWISE, SHALL RRSA BE SUBJECT TO LIABILITY FOR INCIDENTAL, CONSEQUENTIAL, INDIRECT, SPECIAL OR PUNITIVE DAMAGES OF ANY KIND, INCLUDING WITHOUT LIMITATION, DAMAGE TO THE PRODUCT, OR OTHER PROPERTY, COMMERCIAL LOSSES, LOST PROFITS, LOSS OF USE, INCONVENIENCE, LOSS OF TIME, COST OF CAPITAL, COST OF SUBSTITUTE EQUIPMENT, DOWNTIME, OR CLAIMS OF CUSTOMERS.

RRSA'S AGGREGATE TOTAL LIABILITY RELATING TO THE SYSTEM AND/OR PRODUCT UNDER THIS LIMITED WARRANTY OR UNDER ANY OTHER CLAIM (IN CONTRACT, TORT, OR OTHERWISE) MADE IN CONNECTION WITH THE SALE OR USAGE OF THE SYSTEM AND/OR PRODUCT IS LIMITED TO THE DOLLAR AMOUNT OF THE OWNER'S ORIGINAL PAYMENT MADE FOR THE SYSTEM AND/OR PRODUCT.

2. Limited Warranty Periods

Limited Warranty Period. The Limited Warranty Period for a Warrantable Defect in the Product is twenty-four (24) months after the first commissioning of the Product. In all cases, the Limited Warranty period will expire not later than thirty-six (36) months from the date of shipment from the RRSA Mankato, MN facility or after 3,000 operation hours, whichever occurs first.

Accessories Coverage Period. The Accessories Coverage Period for a Warrantable Defect in cords, receptacles, cord reels, gas flex pipes, housing lights, space heaters, and associated equipment ("Accessories") is twelve (12) months from the date of shipment from RRSA Mankato, MN facility.

RRSA warranty obligations under this Limited Warranty are contingent upon distributor completing the following:

(a) The RRSA warranty and the *Start-Up Validation and Pre-Inspection Form*. Return both to RRSA within sixty (60) days of the start-up date; and
(b) The engine registration form (when applicable). Return to the manufacturer as stated in the engine registration form instructions.

3. RRSA Responsibilities

If a Warrantable Defect is found during the Limited Warranty Period and/or the Accessories Coverage Period, and provided the Owner has complied with its obligations under Section 4, RRSA will, during normal working hours, through an RRSA authorized distributor, dealer, or service outlet, perform some or all of the following:

(a) Repair or replace, at the sole election of RRSA, the defective part with a new or remanufactured replacement part;
(b) Provide reasonable or customary labor needed to correct the Warrantable Defect;
(c) Provide technician travel time of 400 miles to and from the closest RRSA authorized distributor, dealer, or service outlet to the Product location;
(d) Part removal and re-installation, if necessary and as solely determined by RRSA.

The obligation to repair or replace defective parts by RRSA does not include responsibility for reimbursement of incidental or consequential costs. If RRSA repairs or replaces an Accessory, part, or Product under this Limited Warranty, the repaired or replaced Accessory, part, or Product assumes the unexpired portion of the warranty period remaining from the original Accessory, part, or Product. Repair or replacement of an Accessory, part, or Product will not extend the term of the original Limited Warranty Period or Accessories Coverage Period. Parts or Product replaced shall become the property of RRSA.

Failure of RRSA to enforce any of the terms or conditions stated herein shall not be construed as a waiver of such provision or of any other terms and conditions of this Limited Warranty.

4. Owner Responsibilities

During the Limited Warranty Period and Accessories Coverage Period, the Owner is responsible for, and RRSA will not reimburse for the following:

(a) Battery;
(b) Premium or overtime labor costs;
(c) Labor and material costs for Product removal and reinstallation;
(d) Any special access fees required to gain access to RRSA equipment, without limitation, training or safety policy requirement to gain access;
(e) Transportation costs or travel expenses related to delivery of the Product to the designated distributor, dealer, or service outlet;
(f) Incidental and consequential costs, damages, or administrative expenses of whatever nature;
(g) Non-Product repairs, vehicle damage, “downtime” expenses, cargo damage, fines, lost income, any business costs of any kind, Owner’s travel expenses, and other losses resulting from a Warrantable Defect;
(h) Shipping charges for replacement parts/Products in excess of those which are usual and customary; or
(i) Local taxes, if applicable.

In addition, Owner must:

(a) Operate, use, and maintain the Product in accordance with the applicable Owner’s manual and/or any other manuals specified by RRSA, including without limitation handling, inspection, servicing, or operating instructions;

(b) Promptly notify RRSA or its authorized representative of a Warrantable Defect and make the Product available for repair;
(c) Comply with RRSA or its authorized representative's reasonable directions regarding the timing, sequence, and location of warranty repairs and make the Product available for inspection;
(d) Perform all required maintenance and maintain and provide proof that all required maintenance has been performed;
(e) Use RRSA specified parts, components, and consumables;
(f) Promptly return to RRSA all parts replaced under this Limited Warranty;
(g) Comply with RRSA long term storage guidelines, if applicable, and maintain and provide proof of compliance;
(h) Routinely exercise the Product in accordance with operating instructions;
(i) Install the Product in accordance with the installation guide provided; and
(j) Reimburse RRSA for all costs incurred in providing warranty service where, following examination, the request or claim for warranty coverage proves to be unfounded or excluded, as well as all incidental costs including those incurred investigating the claim.

5. Limitations

RRSA is not responsible, and this Limited Warranty is not available under any circumstances, for any of the following:

(a) Failure of Owner to fulfill its obligations under Section 4;
(b) Failure of Owner to follow RRSA instructions for Product stored by Owner longer than 180 days from date of shipment from the RRSA Mankato, MN facility;
(c) Defects caused by adjustments made by Owner to the fuel system or governor system;
(d) Defects which were obvious or capable of being identified by reasonable inspection and were not reported to RRSA within a reasonable time;
(e) Rental equipment used during warranty work;
(f) Defects caused or potentially caused by service work performed by non-RRSA authorized service providers and/or the use of non-genuine RRSA parts;
(g) Defects resulting from natural wear and tear, external action, negligence, natural disasters, accidents, incorrect use, improper handling or storage, inadequate corrosion-proofing, incorrect assembly or installation, or modification of the Product;
(h) Defects resulting from abuse or neglect, including unauthorized modifications to the Product;
(i) Repair or any use or installation which RRSA, in its sole discretion, determines to be improper;
(j) Defects caused by incorrect maintenance;
(k) Defects resulting from Owner's delay in making the Product available after being notified of a potential problem or Owner's failure to take immediate measures to avoid or mitigate damage;
(l) Damage caused by shipping;
(m) Repair of parts sold by RRSA that are warranted directly to the Owner by the respective part's manufacturer;
(n) Misapplication of the Product;
(o) Diesel engine "wet stacking" due to lightly loaded diesel engines;
(p) Acts of nature or acts of God;
(q) Any failure, other than those resulting from a defect in material or factory workmanship of the Product;
(r) Use of the Product for purposes other than those for which it was intended, including without limitation use of the Product under extraordinary operating conditions not made known to RRSA in writing at the time of the order; or
(s) Material provided by or a design specified by the Owner.

6. Software Warranty. Where software is included in the Product, RRSA warrants to the Owner that 1) the software will be substantially free from material program errors and material defects in material and workmanship, and that 2) it shall

function substantially in accordance with RRSA specification at the time of dispatch from the RRSA manufacturing facility. RRSA does not warrant that the software is error-free or free from "bugs" as commonly categorized by the computer industry. RRSA shall, during the Limited Warranty Period, endeavor to remedy at its cost, in its sole discretion, by repair or replacement of any material program errors or material defects of which Owner has promptly notified RRSA. RRSA, at its option, may elect to provide the most current software at no cost, and in such case RRSA will not cover the cost to install the applicable updated software. RRSA shall have no obligation with respect to any nonconformities resulting from unauthorized modifications to the software or any Owner interfacing.

7. **Emissions Warranty.** The Product may be covered under an emissions warranty specified by the U.S. Environmental Protection Agency and/or the California Air Resources Board. The terms of the warranty, if applicable, may be accessed by following the link: https://www.mtu-solutions.com/eu/en/technical-information/emissions-warranty.html. Any such Emissions Warranty is incorporated herein by reference in its entirety to the extent and with the same force as if fully set forth herein. The Product, if certified, may only be certified to comply with the required country or region-specific emission regulations. Where applicable, the Product is only certified to those specific emission regulations/standards which are clearly stated in the respective RRSA defined technical specifications. IT IS THE OWNER'S SOLE RESPONSIBILITY TO ENSURE THAT THE EXPORT/IMPORT, INSTALLATION, AND USE OF THE PRODUCT(S) COMPLIES WITH THE APPLICABLE EMISSION REGULATIONS IN THE COUNTRY OR REGION WHERE THE PRODUCT(S) WILL BE USED.

8. The Owner is entitled to rectify the defect or to have it rectified by third parties only in urgent cases where operational safety is at risk or in order to prevent disproportionately extensive damage; provided that Owner has informed RRSA and obtained prior written consent from RRSA. In such cases, RRSA shall, in its sole discretion, reimburse the costs incurred by the Owner up to an amount equivalent to the costs RRSA would have incurred had it remedied the defect itself.

9. This Limited Warranty gives the Owner specific legal rights, and the Owner may also have other rights, which vary from state to state. Some states do not allow warranty duration limitations and/or certain exclusions or limitation of incidental or consequential damages. Therefore, the previously expressed exclusion(s) may not apply to Owner. If any one or more of the provisions contained in this Limited Warranty shall be invalid, illegal, or unenforceable in any respect, the validity, legality, or enforceability of the remaining provisions contained therein shall not in any way be affected or impaired thereby.

10. This Limited Warranty is governed by the laws of the State of Michigan without regard to its conflicts of law principles and excluding the United Nations Convention for the International Sale of Goods. Any and all disputes between the parties that may arise pursuant to the sale or use of the Product shall be heard and determined before an appropriate state of federal court located in Oakland County, Michigan. The Owner acknowledges that such court has the jurisdiction to interpret and enforce the provisions herein, and Owner waives any and all objections that it may have as to personal jurisdiction or venue in any of the above courts.

11. In order to obtain performance of an RRSA warranty obligation, the Owner should contact the nearest RRSA authorized distributor, dealer, or service outlet for instructions. To find the location of the nearest RRSA authorized distributor, dealer, or service outlet call +1 248-560-8000 or write to: Rolls-Royce Solutions America Inc. Warranty Department, 39525 MacKenzie Drive, Novi, MI 48377.

ROLLS-ROYCE SOLUTIONS AMERICA INC.

Two (2) Year / 6,000 Hour Basic Extended Prime Limited Warranty

Rolls-Royce Solutions America Inc. ("RRSA") issues the following express Limited Warranty subject to the following terms, conditions, and limitations:

An original consumer ("Owner") who purchases an RRSA engine generator set ("Product") is entitled to coverage under this Limited Warranty. RRSA warrants to the Owner that the Product is free of defects in material and workmanship and will perform under normal use and service from valid start-up performed by RRSA. Any nonconformity to the foregoing is defined as a Warrantable Defect. This Limited Warranty applies to Product shipped by RRSA after January 1, 2014.

1. Disclaimers

LIMITATION OF WARRANTIES: THIS LIMITED WARRANTY IS GIVEN EXPRESSLY AND IN PLACE OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE, FREEDOM FROM INFRINGEMENT OR THIRD PARTY INTELLECTUAL PROPERTY RIGHTS, OR ARISING FROM COURSE OF DEALING, COURSE OF PERFORMANCE OR USAGE OF TRADE. THERE ARE NO UNDERSTANDINGS, AGREEMENTS, REPRESENTATIONS, OR WARRANTIES NOT SPECIFIED HEREIN.

THIS LIMITED WARRANTY, THE OBLIGATIONS OF RRSA AND THE RIGHTS AND REMEDIES OF THE OWNER SET FORTH IN THIS LIMITED WARRANTY ARE EXCLUSIVE AND ARE EXPRESSLY IN LIEU OF, AND THE OWNER HEREBY WAIVES AND RELEASES ALL OTHER OBLIGATIONS, WARRANTIES (INCLUDING WARRANTY AGAINST REDHIBITORY DEFECTS), REPRESENTATIONS OR LIABILITIES, EXPRESS OR IMPLIED, ARISING BY LAW IN CONTRACT, TORT (INCLUDING NEGLIGENCE OR STRICT LIABILITY) OR OTHERWISE, INCLUDING BUT NOT LIMITED TO ANY CLAIMS ARISING OUT OF, CONNECTED WITH OR RESULTING FROM THE PERFORMANCE OF THIS LIMITED WARRANTY OR FROM THE DESIGN, MANUFACTURE, SALE, REPAIR, LEASE OR USE OF THE PRODUCT, ANY COMPONENT THEREOF AND SERVICES DELIVERED OR RENDERED HEREUNDER OR OTHERWISE.

IN NO EVENT, WHETHER AS A RESULT OF BREACH OF CONTRACT OR WARRANTY, ALLEGED NEGLIGENCE, OR OTHERWISE, SHALL RRSA BE SUBJECT TO LIABILITY FOR INCIDENTAL, CONSEQUENTIAL, INDIRECT, SPECIAL OR PUNITIVE DAMAGES OF ANY KIND, INCLUDING WITHOUT LIMITATION, DAMAGE TO THE PRODUCT, OR OTHER PROPERTY, COMMERCIAL LOSSES, LOST PROFITS, LOSS OF USE, INCONVENIENCE, LOSS OF TIME, COST OF CAPITAL, COST OF SUBSTITUTE EQUIPMENT, DOWNTIME, OR CLAIMS OF CUSTOMERS.

RRSA'S AGGREGATE TOTAL LIABILITY RELATING TO THE SYSTEM AND/OR PRODUCT UNDER THIS LIMITED WARRANTY OR UNDER ANY OTHER CLAIM (IN CONTRACT, TORT, OR OTHERWISE) MADE IN CONNECTION WITH THE SALE OR USAGE OF THE SYSTEM AND/OR PRODUCT IS LIMITED TO THE DOLLAR AMOUNT OF THE OWNER'S ORIGINAL PAYMENT MADE FOR THE SYSTEM AND/OR PRODUCT.

2. Limited Warranty Periods

Limited Warranty Period. The Limited Warranty Period for a Warrantable Defect in the Product is twenty-four (24) months after the first commissioning of the Product. In all cases, the Limited Warranty period will expire not later than thirty-six (36) months from the date of shipment from the RRSA Mankato, MN facility or after 6,000 operation hours, whichever occurs first.

Accessories Coverage Period. The Accessories Coverage Period for a Warrantable Defect in cords, receptacles, cord reels, gas flex pipes, housing lights, space heaters, and associated equipment ("Accessories") is twelve (12) months from the date of shipment from the RRSA Mankato, MN facility.

RRSA warranty obligations under this Limited Warranty are contingent upon distributor completing the following:

(a) The RRSA warranty and the *Start-Up Validation and Pre-Inspection Form*. Return both to RRSA within sixty (60) days of the start-up date; and
(b) The engine registration form (when applicable). Return to the manufacturer as stated in the engine registration form instructions.

3. RRSA Responsibilities

If a Warrantable Defect is found during the Limited Warranty Period and/or the Accessories Coverage Period, and provided the Owner has complied with its obligations under Section 4, RRSA will, during normal working hours, through an RRSA authorized distributor, dealer, or service outlet, perform some or all of the following:

(a) Repair or replace, at the sole election of RRSA, the defective part with a new or remanufactured replacement part;
(b) Provide reasonable or customary labor needed to correct the Warrantable Defect;
(c) Provide technician travel time of 400 miles to and from the closest RRSA authorized distributor, dealer, or service outlet to the Product location;
(d) Part removal and re-installation, if necessary and as solely determined by RRSA.

The obligation to repair or replace defective parts by RRSA does not include responsibility for reimbursement of incidental or consequential costs. If RRSA repairs or replaces an Accessory, part, or Product under this Limited Warranty, the repaired or replaced Accessory, part, or Product assumes the unexpired portion of the warranty period remaining from the original Accessory, part, or Product. Repair or replacement of an Accessory, part, or Product will not extend the term of the original Limited Warranty Period or Accessories Coverage Period. Parts or Product replaced shall become the property of RRSA.

Failure of RRSA to enforce any of the terms or conditions stated herein shall not be construed as a waiver of such provision or of any other terms and conditions of this Limited Warranty.

4. Owner Responsibilities

During the Limited Warranty Period and Accessories Coverage Period, the Owner is responsible for, and RRSA will not reimburse for the following:

(a) Battery;
(b) Premium or overtime labor costs;
(c) Labor and material costs for Product removal and reinstallation;
(d) Any special access fees required to gain access to RRSA equipment, without limitation, training or safety policy requirement to gain access;
(e) Transportation costs or travel expenses related to delivery of the Product to the designated distributor, dealer, or service outlet;
(f) Incidental and consequential costs, damages, or administrative expenses of whatever nature;
(g) Non-Product repairs, vehicle damage, “downtime” expenses, cargo damage, fines, lost income, any business costs of any kind, Owner’s travel expenses, and other losses resulting from a Warrantable Defect;
(h) Shipping charges for replacement parts/Products in excess of those which are usual and customary; or
(i) Local taxes, if applicable.

In addition, Owner must:

(a) Operate, use, and maintain the Product in accordance with the applicable Owner’s manual and/or any other manuals specified by RRSA, including without limitation handling, inspection, servicing, or operating instructions;
(b) Promptly notify RRSA or its authorized representative of a Warrantable Defect and make the Product available for repair;
(c) Comply with RRSA or its authorized representative’s reasonable directions regarding the timing, sequence, and location of warranty repairs and make the Product available for inspection;

(d) Perform all required maintenance and maintain and provide proof that all required maintenance has been performed;
(e) Use RRSA specified parts, components, and consumables;
(f) Promptly return to RRSA all parts replaced under this Limited Warranty;
(g) Comply with RRSA long term storage guidelines, if applicable, and maintain and provide proof of compliance;
(h) Routinely exercise the Product in accordance with operating instructions;
(i) Install the Product in accordance with the installation guide provided; and
(j) Reimburse RRSA for all costs incurred in providing warranty service where, following examination, the request or claim for warranty coverage proves to be unfounded or excluded, as well as all incidental costs including those incurred investigating the claim.

5. Limitations

RRSA is not responsible, and this Limited Warranty is not available under any circumstances, for any of the following:

(a) Failure of Owner to fulfill its obligations under Section 4;
(b) Failure of Owner to follow RRSA instructions for Product stored by Owner longer than 180 days from date of shipment from the RRSA Mankato, MN facility;
(c) Defects caused by adjustments made by Owner to the fuel system or governor system;
(d) Defects which were obvious or capable of being identified by reasonable inspection and were not reported to RRSA within a reasonable time;
(e) Rental equipment used during warranty work;
(f) Defects caused or potentially caused by service work performed by non-RRSA authorized service providers and/or the use of non-genuine RRSA parts;
(g) Defects resulting from natural wear and tear, external action, negligence, natural disasters, accidents, incorrect use, improper handling or storage, inadequate corrosion-proofing, incorrect assembly or installation, or modification of the Product;
(h) Defects resulting from abuse or neglect, including unauthorized modifications to the Product;
(i) Repair or any use or installation which RRSA, in its sole discretion, determines to be improper;
(j) Defects caused by incorrect maintenance;
(k) Defects resulting from Owner's delay in making the Product available after being notified of a potential problem or Owner's failure to take immediate measures to avoid or mitigate damage;
(l) Damage caused by shipping;
(m) Repair of parts sold by RRSA that are warranted directly to the Owner by the respective part's manufacturer;
(n) Misapplication of the Product;
(o) Diesel engine "wet stacking" due to lightly loaded diesel engines;
(p) Acts of nature or acts of God;
(q) Any failure, other than those resulting from a defect in material or factory workmanship of the Product;
(r) Use of the Product for purposes other than those for which it was intended, including without limitation use of the Product under extraordinary operating conditions not made known to RRSA in writing at the time of the order; or
(s) Material provided by or a design specified by the Owner.

6. Software Warranty. Where software is included in the Product, RRSA warrants to the Owner that 1) the software will be substantially free from material program errors and material defects in material and workmanship, and that 2) it shall function substantially in accordance with RRSA specification at the time of dispatch from the RRSA manufacturing facility. RRSA does not warrant that the software is error-free or free from "bugs" as commonly categorized by the computer industry. RRSA shall, during the Limited Warranty Period, endeavor to remedy at its cost, in its sole discretion, by repair or replacement of any material program errors or material defects of which Owner has promptly notified RRSA. RRSA, at its option, may elect to provide the most current software at no cost, and in such case RRSA will not cover the cost to install the applicable updated software. RRSA shall have no obligation with respect to any nonconformities resulting from unauthorized modifications to the software or any Owner interfacing.

7. **Emissions Warranty.** The Product may be covered under an emissions warranty specified by the U.S. Environmental Protection Agency and/or the California Air Resources Board. The terms of the warranty, if applicable, may be accessed by following the link: https://www.mtu-solutions.com/eu/en/technical-information/emissions-warranty.html. Any such Emissions Warranty is incorporated herein by reference in its entirety to the extent and with the same force as if fully set forth herein. The Product, if certified, may only be certified to comply with the required country or region-specific emission regulations. Where applicable, the Product is only certified to those specific emission regulations/standards which are clearly stated in the respective RRSA defined technical specifications. IT IS THE OWNER'S SOLE RESPONSIBILITY TO ENSURE THAT THE EXPORT/IMPORT, INSTALLATION, AND USE OF THE PRODUCT(S) COMPLIES WITH THE APPLICABLE EMISSION REGULATIONS IN THE COUNTRY OR REGION WHERE THE PRODUCT(S) WILL BE USED.

8. The Owner is entitled to rectify the defect or to have it rectified by third parties only in urgent cases where operational safety is at risk or in order to prevent disproportionately extensive damage; provided that Owner has informed RRSA and obtained prior written consent from RRSA. In such cases, RRSA shall, in its sole discretion, reimburse the costs incurred by the Owner up to an amount equivalent to the costs RRSA would have incurred had it remedied the defect itself.

9. This Limited Warranty gives the Owner specific legal rights, and the Owner may also have other rights, which vary from state to state. Some states do not allow warranty duration limitations and/or certain exclusions or limitation of incidental or consequential damages. Therefore, the previously expressed exclusion(s) may not apply to Owner. If any one or more of the provisions contained in this Limited Warranty shall be invalid, illegal, or unenforceable in any respect, the validity, legality, or enforceability of the remaining provisions contained therein shall not in any way be affected or impaired thereby.

10. This Limited Warranty is governed by the laws of the State of Michigan without regard to its conflicts of law principles and excluding the United Nations Convention for the International Sale of Goods. Any and all disputes between the parties that may arise pursuant to the sale or use of the Product shall be heard and determined before an appropriate state of federal court located in Oakland County, Michigan. The Owner acknowledges that such court has the jurisdiction to interpret and enforce the provisions herein, and Owner waives any and all objections that it may have as to personal jurisdiction or venue in any of the above courts.

11. In order to obtain performance of an RRSA warranty obligation, the Owner should contact the nearest RRSA authorized distributor, dealer, or service outlet for instructions. To find the location of the nearest RRSA authorized distributor, dealer, or service outlet call +1 248-560-8000 or write to: Rolls-Royce Solutions America Inc. Warranty Department, 39525 MacKenzie Drive, Novi, MI 48377.

ROLLS-ROYCE SOLUTIONS AMERICA INC.

Five (5) Year / 3,000 Hour
Comprehensive Extended Standby Limited Warranty

Rolls-Royce Solutions America Inc. ("RRSA") issues the following express Limited Warranty subject to the following terms, conditions, and limitations:

An original consumer ("Owner") who purchases an RRSA engine generator set ("Product") is entitled to coverage under this Limited Warranty. RRSA warrants to the Owner that the Product is free of defects in material and workmanship and will perform under normal use and service from valid start-up performed by RRSA. Any nonconformity to the foregoing is defined as a Warrantable Defect. This Limited Warranty applies to Product shipped by RRSA after January 1, 2014.

1. Disclaimers

LIMITATION OF WARRANTIES: THIS LIMITED WARRANTY IS GIVEN EXPRESSLY AND IN PLACE OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE, FREEDOM FROM INFRINGEMENT OR THIRD PARTY INTELLECTUAL PROPERTY RIGHTS, OR ARISING FROM COURSE OF DEALING, COURSE OF PERFORMANCE OR USAGE OF TRADE. THERE ARE NO UNDERSTANDINGS, AGREEMENTS, REPRESENTATIONS, OR WARRANTIES NOT SPECIFIED HEREIN.

THIS LIMITED WARRANTY, THE OBLIGATIONS OF RRSA AND THE RIGHTS AND REMEDIES OF THE OWNER SET FORTH IN THIS LIMITED WARRANTY ARE EXCLUSIVE AND ARE EXPRESSLY IN LIEU OF, AND THE OWNER HEREBY WAIVES AND RELEASES ALL OTHER OBLIGATIONS, WARRANTIES (INCLUDING WARRANTY AGAINST REDHIBITORY DEFECTS), REPRESENTATIONS OR LIABILITIES, EXPRESS OR IMPLIED, ARISING BY LAW IN CONTRACT, TORT (INCLUDING NEGLIGENCE OR STRICT LIABILITY) OR OTHERWISE, INCLUDING BUT NOT LIMITED TO ANY CLAIMS ARISING OUT OF, CONNECTED WITH OR RESULTING FROM THE PERFORMANCE OF THIS LIMITED WARRANTY OR FROM THE DESIGN, MANUFACTURE, SALE, REPAIR, LEASE OR USE OF THE PRODUCT, ANY COMPONENT THEREOF AND SERVICES DELIVERED OR RENDERED HEREUNDER OR OTHERWISE.

IN NO EVENT, WHETHER AS A RESULT OF BREACH OF CONTRACT OR WARRANTY, ALLEGED NEGLIGENCE, OR OTHERWISE, SHALL RRSA BE SUBJECT TO LIABILITY FOR INCIDENTAL, CONSEQUENTIAL, INDIRECT, SPECIAL OR PUNITIVE DAMAGES OF ANY KIND, INCLUDING WITHOUT LIMITATION, DAMAGE TO THE PRODUCT, OR OTHER PROPERTY, COMMERCIAL LOSSES, LOST PROFITS, LOSS OF USE, INCONVENIENCE, LOSS OF TIME, COST OF CAPITAL, COST OF SUBSTITUTE EQUIPMENT, DOWNTIME, OR CLAIMS OF CUSTOMERS.

RRSA'S AGGREGATE TOTAL LIABILITY RELATING TO THE SYSTEM AND/OR PRODUCT UNDER THIS LIMITED WARRANTY OR UNDER ANY OTHER CLAIM (IN CONTRACT, TORT, OR OTHERWISE) MADE IN CONNECTION WITH THE SALE OR USAGE OF THE SYSTEM AND/OR PRODUCT IS LIMITED TO THE DOLLAR AMOUNT OF THE OWNER'S ORIGINAL PAYMENT MADE FOR THE SYSTEM AND/OR PRODUCT.

2. Limited Warranty Periods

Limited Warranty Period. The Limited Warranty Period for a Warrantable Defect in the Product is sixty (60) months after the first commissioning of the Product. In all cases, the Limited Warranty period will expire not later than seventy-two (72) months from the date of shipment from the RRSA Mankato, MN facility or after 3,000 operation hours, whichever occurs first.

Accessories Coverage Period. The Accessories Coverage Period for a Warrantable Defect in cords, receptacles, cord reels, gas flex pipes, housing lights, space heaters, and associated equipment ("Accessories") is twelve (12) months from the date of shipment from RRSA Mankato, MN facility.

RRSA warranty obligations under this Limited Warranty are contingent upon distributor completing the following:

(a) The RRSA warranty and the *Start-Up Validation and Pre-Inspection Form.* Return both to RRSA within sixty (60) days of the start-up date; and
(b) The engine registration form (when applicable). Return to the manufacturer as stated in the engine registration form instructions.

3. RRSA Responsibilities

If a Warrantable Defect is found during the Limited Warranty Period and/or the Accessories Coverage Period, and provided the Owner has complied with its obligations under Section 4, RRSA will, during normal working hours, through an RRSA authorized distributor, dealer, or service outlet, perform some or all of the following:

(a) Repair or replace, at the sole election of RRSA, the defective part with a new or remanufactured replacement part;
(b) Provide reasonable or customary labor needed to correct the Warrantable Defect;
(c) Provide technician travel time of 400 miles to and from the closest RRSA authorized distributor, dealer, or service outlet to the Product location;
(d) Part removal and re-installation, if necessary and as solely determined by RRSA.

The obligation to repair or replace defective parts by RRSA does not include responsibility for reimbursement of incidental or consequential costs. If RRSA repairs or replaces an Accessory, part, or Product under this Limited Warranty, the repaired or replaced Accessory, part, or Product assumes the unexpired portion of the warranty period remaining from the original Accessory, part, or Product. Repair or replacement of an Accessory, part, or Product will not extend the term of the original Limited Warranty Period or Accessories Coverage Period. Parts or Product replaced shall become the property of RRSA.

Failure of RRSA to enforce any of the terms or conditions stated herein shall not be construed as a waiver of such provision or of any other terms and conditions of this Limited Warranty.

4. Owner Responsibilities

During the Limited Warranty Period and Accessories Coverage Period, the Owner is responsible for, and RRSA will not reimburse for the following:

(a) Battery;
(b) Premium or overtime labor costs;
(c) Labor and material costs for Product removal and reinstallation;
(d) Any special access fees required to gain access to RRSA equipment, without limitation, training or safety policy requirement to gain access;
(e) Transportation costs or travel expenses related to delivery of the Product to the designated distributor, dealer, or service outlet;
(f) Incidental and consequential costs, damages, or administrative expenses of whatever nature;
(g) Non-Product repairs, vehicle damage, “downtime” expenses, cargo damage, fines, lost income, any business costs of any kind, Owner’s travel expenses, and other losses resulting from a Warrantable Defect;
(h) Shipping charges for replacement parts/Products in excess of those which are usual and customary; or
(i) Local taxes, if applicable.

In addition, Owner must:

(a) Operate, use, and maintain the Product in accordance with the applicable Owner’s manual and/or any other manuals specified by RRSA, including without limitation handling, inspection, servicing, or operating instructions;

(b) Promptly notify RRSA or its authorized representative of a Warrantable Defect and make the Product available for repair;
(c) Comply with RRSA or its authorized representative's reasonable directions regarding the timing, sequence, and location of warranty repairs and make the Product available for inspection;
(d) Perform all required maintenance and maintain and provide proof that all required maintenance has been performed;
(e) Use RRSA specified parts, components, and consumables;
(f) Promptly return to RRSA all parts replaced under this Limited Warranty;
(g) Comply with RRSA long term storage guidelines, if applicable, and maintain and provide proof of compliance;
(h) Routinely exercise the Product in accordance with operating instructions;
(i) Install the Product in accordance with the installation guide provided; and
(j) Reimburse RRSA for all costs incurred in providing warranty service where, following examination, the request or claim for warranty coverage proves to be unfounded or excluded, as well as all incidental costs including those incurred investigating the claim.

5. Limitations

RRSA is not responsible, and this Limited Warranty is not available under any circumstances, for any of the following:

(a) Failure of Owner to fulfill its obligations under Section 4;
(b) Failure of Owner to follow RRSA instructions for Product stored by Owner longer than 180 days from date of shipment from the RRSA Mankato, MN facility;
(c) Defects caused by adjustments made by Owner to the fuel system or governor system;
(d) Defects which were obvious or capable of being identified by reasonable inspection and were not reported to RRSA within a reasonable time;
(e) Rental equipment used during warranty work;
(f) Defects caused or potentially caused by service work performed by non-RRSA authorized service providers and/or the use of non-genuine RRSA parts;
(g) Defects resulting from natural wear and tear, external action, negligence, natural disasters, accidents, incorrect use, improper handling or storage, inadequate corrosion-proofing, incorrect assembly or installation, or modification of the Product;
(h) Defects resulting from abuse or neglect, including unauthorized modifications to the Product;
(i) Repair or any use or installation which RRSA, in its sole discretion, determines to be improper;
(j) Defects caused by incorrect maintenance;
(k) Defects resulting from Owner's delay in making the Product available after being notified of a potential problem or Owner's failure to take immediate measures to avoid or mitigate damage;
(l) Damage caused by shipping;
(m) Repair of parts sold by RRSA that are warranted directly to the Owner by the respective part's manufacturer;
(n) Misapplication of the Product;
(o) Diesel engine "wet stacking" due to lightly loaded diesel engines;
(p) Acts of nature or acts of God;
(q) Any failure, other than those resulting from a defect in material or factory workmanship of the Product;
(r) Use of the Product for purposes other than those for which it was intended, including without limitation use of the Product under extraordinary operating conditions not made known to RRSA in writing at the time of the order; or
(s) Material provided by or a design specified by the Owner.

6. Software Warranty. Where software is included in the Product, RRSA warrants to the Owner that 1) the software will be substantially free from material program errors and material defects in material and workmanship, and that 2) it shall function substantially in accordance with RRSA specification at the time of dispatch from the RRSA manufacturing facility. RRSA does not warrant that the software is error-free or free from "bugs" as commonly categorized by the computer

industry. RRSA shall, during the Limited Warranty Period, endeavor to remedy at its cost, in its sole discretion, by repair or replacement of any material program errors or material defects of which Owner has promptly notified RRSA. RRSA, at its option, may elect to provide the most current software at no cost, and in such case RRSA will not cover the cost to install the applicable updated software. RRSA shall have no obligation with respect to any nonconformities resulting from unauthorized modifications to the software or any Owner interfacing.

7. **Emissions Warranty.** The Product may be covered under an emissions warranty specified by the U.S. Environmental Protection Agency and/or the California Air Resources Board. The terms of the warranty, if applicable, may be accessed by following the link: https://www.mtu-solutions.com/eu/en/technical-information/emissions-warranty.html. Any such Emissions Warranty is incorporated herein by reference in its entirety to the extent and with the same force as if fully set forth herein. The Product, if certified, may only be certified to comply with the required country or region-specific emission regulations. Where applicable, the Product is only certified to those specific emission regulations/standards which are clearly stated in the respective RRSA defined technical specifications. IT IS THE OWNER'S SOLE RESPONSIBILITY TO ENSURE THAT THE EXPORT/IMPORT, INSTALLATION, AND USE OF THE PRODUCT(S) COMPLIES WITH THE APPLICABLE EMISSION REGULATIONS IN THE COUNTRY OR REGION WHERE THE PRODUCT(S) WILL BE USED.

8. The Owner is entitled to rectify the defect or to have it rectified by third parties only in urgent cases where operational safety is at risk or in order to prevent disproportionately extensive damage; provided that Owner has informed RRSA and obtained prior written consent from RRSA. In such cases, RRSA shall, in its sole discretion, reimburse the costs incurred by the Owner up to an amount equivalent to the costs RRSA would have incurred had it remedied the defect itself.

9. This Limited Warranty gives the Owner specific legal rights, and the Owner may also have other rights, which vary from state to state. Some states do not allow warranty duration limitations and/or certain exclusions or limitation of incidental or consequential damages. Therefore, the previously expressed exclusion(s) may not apply to Owner. If any one or more of the provisions contained in this Limited Warranty shall be invalid, illegal, or unenforceable in any respect, the validity, legality, or enforceability of the remaining provisions contained therein shall not in any way be affected or impaired thereby.

10. This Limited Warranty is governed by the laws of the State of Michigan without regard to its conflicts of law principles and excluding the United Nations Convention for the International Sale of Goods. Any and all disputes between the parties that may arise pursuant to the sale or use of the Product shall be heard and determined before an appropriate state of federal court located in Oakland County, Michigan. The Owner acknowledges that such court has the jurisdiction to interpret and enforce the provisions herein, and Owner waives any and all objections that it may have as to personal jurisdiction or venue in any of the above courts.

11. In order to obtain performance of an RRSA warranty obligation, the Owner should contact the nearest RRSA authorized distributor, dealer, or service outlet for instructions. To find the location of the nearest RRSA authorized distributor, dealer, or service outlet call +1 248-560-8000 or write to: Rolls-Royce Solutions America Inc. Warranty Department, 39525 MacKenzie Drive, Novi, MI 48377.

ROLLS-ROYCE SOLUTIONS AMERICA INC.

Two (2) Year Basic Standby Limited Warranty
Automatic Transfer Switch (ATS)
Master Control Panel (MCP)

Your Rolls-Royce Solutions America Inc. ("RRSA") Automatic Transfer Switch or Master Control Panel ("Product") has been manufactured and inspected with care by experienced craftspeople. If you are the original consumer ("Owner"), RRSA warrants, for the Limited Warranty Period indicated below, each Product will be free from defects in materials and workmanship, and will perform under normal use and service from valid start-up performed by RRSA. Any nonconformity to the foregoing is defined as a Warrantable Defect.

1. Disclaimers

LIMITATION OF WARRANTIES: THIS LIMITED WARRANTY IS GIVEN EXPRESSLY AND IN PLACE OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE, FREEDOM FROM INFRINGEMENT OR THIRD PARTY INTELLECTUAL PROPERTY RIGHTS, OR ARISING FROM COURSE OF DEALING, COURSE OF PERFORMANCE OR USAGE OF TRADE. THERE ARE NO UNDERSTANDINGS, AGREEMENTS, REPRESENTATIONS, OR WARRANTIES NOT SPECIFIED HEREIN.

THIS LIMITED WARRANTY, THE OBLIGATIONS OF RRSA AND THE RIGHTS AND REMEDIES OF THE OWNER SET FORTH IN THIS LIMITED WARRANTY ARE EXCLUSIVE AND ARE EXPRESSLY IN LIEU OF, AND THE OWNER HEREBY WAIVES AND RELEASES ALL OTHER OBLIGATIONS, WARRANTIES (INCLUDING WARRANTY AGAINST REDHIBITORY DEFECTS), REPRESENTATIONS OR LIABILITIES, EXPRESS OR IMPLIED, ARISING BY LAW IN CONTRACT, TORT (INCLUDING NEGLIGENCE OR STRICT LIABILITY) OR OTHERWISE, INCLUDING BUT NOT LIMITED TO ANY CLAIMS ARISING OUT OF, CONNECTED WITH OR RESULTING FROM THE PERFORMANCE OF THIS LIMITED WARRANTY OR FROM THE DESIGN, MANUFACTURE, SALE, REPAIR, LEASE OR USE OF THE PRODUCT, ANY COMPONENT THEREOF AND SERVICES DELIVERED OR RENDERED HEREUNDER OR OTHERWISE.

IN NO EVENT, WHETHER AS A RESULT OF BREACH OF CONTRACT OR WARRANTY, ALLEGED NEGLIGENCE, OR OTHERWISE, SHALL RRSA BE SUBJECT TO LIABILITY FOR INCIDENTAL, CONSEQUENTIAL, INDIRECT, SPECIAL OR PUNITIVE DAMAGES OF ANY KIND, INCLUDING WITHOUT LIMITATION, DAMAGE TO THE PRODUCT, OR OTHER PROPERTY, COMMERCIAL LOSSES, LOST PROFITS, LOSS OF USE, INCONVENIENCE, LOSS OF TIME, COST OF CAPITAL, COST OF SUBSTITUTE EQUIPMENT, DOWNTIME, OR CLAIMS OF CUSTOMERS.

RRSA'S AGGREGATE TOTAL LIABILITY RELATING TO THE SYSTEM AND/OR PRODUCT UNDER THIS LIMITED WARRANTY OR UNDER ANY OTHER CLAIM (IN CONTRACT, TORT, OR OTHERWISE) MADE IN CONNECTION WITH THE SALE OR USAGE OF THE SYSTEM AND/OR PRODUCT IS LIMITED TO THE DOLLAR AMOUNT OF THE OWNER'S ORIGINAL PAYMENT MADE FOR THE SYSTEM AND/OR PRODUCT.

2. Limited Warranty Period

The Limited Warranty Period for a Warrantable Defect in the Product is two (2) years from factory invoice date. The Owner must provide proof of purchase of the original Product at the time of request for warranty consideration.

3. RRSA Responsibilities

If a Warrantable Defect is found during the Limited Warranty Period, and provided the Owner has complied with its obligations under Section 4, RRSA will, during normal working hours, through an RRSA authorized distributor, dealer, or service outlet, perform some or all of the following:

(a) Repair or replace, at the sole election of RRSA, the defective part with a new or remanufactured replacement part;
(b) Provide reasonable or customary labor needed to correct the Warrantable Defect;

(c) Provide technician travel time of 400 miles to and from the closest RRSA authorized distributor, dealer, or service outlet to the Product location;
(d) Part removal and re-installation, if necessary and as solely determined by RRSA.

The obligation to repair or replace defective parts by RRSA does not include responsibility for reimbursement of incidental or consequential costs. If RRSA repairs or replaces a part, or Product under this Limited Warranty, the repaired or replaced part or Product assumes the unexpired portion of the warranty period remaining from the original part or Product. Repair or replacement of a part or Product will not extend the term of the original Limited Warranty Period. Parts or Product replaced shall become the property of RRSA.

Failure of RRSA to enforce any of the terms or conditions stated herein shall not be construed as a waiver of such provision or of any other terms and conditions of this Limited Warranty.

4. Owner Responsibilities

During the Limited Warranty Period, the Owner is responsible for, and RRSA will not reimburse for the following:

(a) Battery;
(b) Premium or overtime labor costs;
(c) Labor and material costs for Product removal and reinstallation;
(d) Any special access fees required to gain access to RRSA equipment, without limitation, training or safety policy requirement to gain access;
(e) Transportation costs or travel expenses related to delivery of the Product to the designated distributor, dealer, or service outlet;
(f) Incidental and consequential costs, damages, or administrative expenses of whatever nature;
(g) Non-Product repairs, vehicle damage, “downtime” expenses, cargo damage, fines, lost income, any business costs of any kind, Owner’s travel expenses, and other losses resulting from a Warrantable Defect;
(h) Shipping charges for replacement parts/Products in excess of those which are usual and customary; or
(i) Local taxes, if applicable.

In addition, Owner must:

(a) Operate, use, and maintain the Product in accordance with the applicable Owner’s manual and/or any other manuals specified by RRSA, including without limitation handling, inspection, servicing, or operating instructions;
(b) Promptly notify RRSA or its authorized representative of a Warrantable Defect and make the Product available for repair;
(c) Comply with RRSA or its authorized representative’s reasonable directions regarding the timing, sequence, and location of warranty repairs and make the Product available for inspection;
(d) Perform all required maintenance and maintain and provide proof that all required maintenance has been performed;
(e) Use RRSA specified parts, components, and consumables;
(f) Promptly return to RRSA all parts replaced under this Limited Warranty;
(g) Comply with RRSA long term storage guidelines, if applicable, and maintain and provide proof of compliance;
(h) Routinely exercise the Product in accordance with operating instructions;
(i) Install the Product in accordance with the installation guide provided; and
(j) Reimburse RRSA for all costs incurred in providing warranty service where, following examination, the request or claim for warranty coverage proves to be unfounded or excluded, as well as all incidental costs including those incurred investigating the claim.

5. Limitations

RRSA is not responsible, and this Limited Warranty is not available under any circumstances, for any of the following:

(a) Failure of Owner to fulfill its obligations under Section 4;
(b) Failure of Owner to follow RRSA instructions for Product stored by Owner longer than 180 days from date of shipment from the RRSA Mankato, MN facility;
(c) Defects caused by adjustments made by Owner to the fuel system or governor system;
(d) Defects which were obvious or capable of being identified by reasonable inspection and were not reported to RRSA within a reasonable time;
(e) Rental equipment used during warranty work;
(f) Defects caused or potentially caused by service work performed by non-RRSA authorized service providers and/or the use of non-genuine RRSA parts;
(g) Defects resulting from natural wear and tear, external action, negligence, natural disasters, accidents, incorrect use, improper handling or storage, inadequate corrosion-proofing, incorrect assembly or installation, or modification of the Product;
(h) Defects resulting from abuse or neglect, including unauthorized modifications to the Product;
(i) Repair or any use or installation which RRSA, in its sole discretion, determines to be improper;
(j) Defects caused by incorrect maintenance;
(k) Defects resulting from Owner's delay in making the Product available after being notified of a potential problem or Owner's failure to take immediate measures to avoid or mitigate damage;
(l) Damage caused by shipping;
(m) Repair of parts sold by RRSA that are warranted directly to the Owner by the respective part's manufacturer;
(n) Misapplication of the Product;
(o) Acts of nature or acts of God;
(p) Any failure, other than those resulting from a defect in material or factory workmanship of the Product;
(q) Use of the Product for purposes other than those for which it was intended, including without limitation use of the Product under extraordinary operating conditions not made known to RRSA in writing at the time of the order; or
(r) Material provided by or a design specified by the Owner.

6. Software Warranty. Where software is included in the Product, RRSA warrants to the Owner that 1) the software will be substantially free from material program errors and material defects in material and workmanship, and that 2) it shall function substantially in accordance with RRSA specification at the time of dispatch from the RRSA manufacturing facility. RRSA does not warrant that the software is error-free or free from "bugs" as commonly categorized by the computer industry. RRSA shall, during the Limited Warranty Period, endeavor to remedy at its cost, in its sole discretion, by repair or replacement of any material program errors or material defects of which Owner has promptly notified RRSA. RRSA, at its option, may elect to provide the most current software at no cost, and in such case RRSA will not cover the cost to install the applicable updated software. RRSA shall have no obligation with respect to any nonconformities resulting from unauthorized modifications to the software or any Owner interfacing.

7. The Owner is entitled to rectify the defect or to have it rectified by third parties only in urgent cases where operational safety is at risk or in order to prevent disproportionately extensive damage; provided that Owner has informed RRSA and obtained prior written consent from RRSA. In such cases, RRSA shall, in its sole discretion, reimburse the costs incurred by the Owner up to an amount equivalent to the costs RRSA would have incurred had it remedied the defect itself.

8. This Limited Warranty gives the Owner specific legal rights, and the Owner may also have other rights, which vary from state to state. Some states do not allow warranty duration limitations and/or certain exclusions or limitation of incidental or consequential damages. Therefore, the previously expressed exclusion(s) may not apply to Owner. If any one or more of the provisions contained in this Limited Warranty shall be invalid, illegal, or unenforceable in any respect, the validity, legality, or enforceability of the remaining provisions contained therein shall not in any way be affected or impaired thereby.

9. This Limited Warranty is governed by the laws of the State of Michigan without regard to its conflicts of law principles and excluding the United Nations Convention for the International Sale of Goods. Any and all disputes between the parties that may arise pursuant to the sale or use of the Product shall be heard and determined before an appropriate state of federal court located in Oakland County, Michigan. The Owner acknowledges that such court has the jurisdiction to interpret and enforce the provisions herein, and Owner waives any and all objections that it may have as to personal jurisdiction or venue in any of the above courts.

10. In order to obtain performance of an RRSA warranty obligation, the Owner should contact the nearest RRSA authorized distributor, dealer, or service outlet for instructions. To find the location of the nearest RRSA authorized distributor, dealer, or service outlet call +1 248-560-8000 or write to: Rolls-Royce Solutions America Inc. Warranty Department, 39525 MacKenzie Drive, Novi, MI 48377.

ROLLS-ROYCE SOLUTIONS AMERICA INC.

Five (5) Year Basic Extended Standby Limited Warranty
Automatic Transfer Switch (ATS)
Master Control Panel (MCP)

Your Rolls-Royce Solutions America Inc. ("RRSA") Automatic Transfer Switch or Master Control Panel ("Product") has been manufactured and inspected with care by experienced craftspeople. If you are the original consumer ("Owner"), RRSA warrants, for the Limited Warranty Period indicated below, each Product will be free from defects in materials and workmanship, and will perform under normal use and service from valid start-up performed by RRSA. Any nonconformity to the foregoing is defined as a Warrantable Defect.

1. Disclaimers

LIMITATION OF WARRANTIES: THIS LIMITED WARRANTY IS GIVEN EXPRESSLY AND IN PLACE OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE, FREEDOM FROM INFRINGEMENT OR THIRD PARTY INTELLECTUAL PROPERTY RIGHTS, OR ARISING FROM COURSE OF DEALING, COURSE OF PERFORMANCE OR USAGE OF TRADE. THERE ARE NO UNDERSTANDINGS, AGREEMENTS, REPRESENTATIONS, OR WARRANTIES NOT SPECIFIED HEREIN.

THIS LIMITED WARRANTY, THE OBLIGATIONS OF RRSA AND THE RIGHTS AND REMEDIES OF THE OWNER SET FORTH IN THIS LIMITED WARRANTY ARE EXCLUSIVE AND ARE EXPRESSLY IN LIEU OF, AND THE OWNER HEREBY WAIVES AND RELEASES ALL OTHER OBLIGATIONS, WARRANTIES (INCLUDING WARRANTY AGAINST REDHIBITORY DEFECTS), REPRESENTATIONS OR LIABILITIES, EXPRESS OR IMPLIED, ARISING BY LAW IN CONTRACT, TORT (INCLUDING NEGLIGENCE OR STRICT LIABILITY) OR OTHERWISE, INCLUDING BUT NOT LIMITED TO ANY CLAIMS ARISING OUT OF, CONNECTED WITH OR RESULTING FROM THE PERFORMANCE OF THIS LIMITED WARRANTY OR FROM THE DESIGN, MANUFACTURE, SALE, REPAIR, LEASE OR USE OF THE PRODUCT, ANY COMPONENT THEREOF AND SERVICES DELIVERED OR RENDERED HEREUNDER OR OTHERWISE.

IN NO EVENT, WHETHER AS A RESULT OF BREACH OF CONTRACT OR WARRANTY, ALLEGED NEGLIGENCE, OR OTHERWISE, SHALL RRSA BE SUBJECT TO LIABILITY FOR INCIDENTAL, CONSEQUENTIAL, INDIRECT, SPECIAL OR PUNITIVE DAMAGES OF ANY KIND, INCLUDING WITHOUT LIMITATION, DAMAGE TO THE PRODUCT, OR OTHER PROPERTY, COMMERCIAL LOSSES, LOST PROFITS, LOSS OF USE, INCONVENIENCE, LOSS OF TIME, COST OF CAPITAL, COST OF SUBSTITUTE EQUIPMENT, DOWNTIME, OR CLAIMS OF CUSTOMERS.

RRSA'S AGGREGATE TOTAL LIABILITY RELATING TO THE SYSTEM AND/OR PRODUCT UNDER THIS LIMITED WARRANTY OR UNDER ANY OTHER CLAIM (IN CONTRACT, TORT, OR OTHERWISE) MADE IN CONNECTION WITH THE SALE OR USAGE OF THE SYSTEM AND/OR PRODUCT IS LIMITED TO THE DOLLAR AMOUNT OF THE OWNER'S ORIGINAL PAYMENT MADE FOR THE SYSTEM AND/OR PRODUCT.

2. Limited Warranty Period

Limited Warranty Period. The Limited Warranty Period for a Warrantable Defect in the Product is two (2) years from factory invoice date. The Owner must provide proof of purchase of the original Product at the time of request for warranty consideration.

Component Only Coverage Period. The Component Only Coverage Period for a Warrantable Defect in the components of the Product is five (5) years from factory invoice date. The Owner must provide proof of purchase of the original Product at the time of request for warranty consideration.

3. RRSA Responsibilities

If a Warrantable Defect is found during the Limited Warranty Period, and provided the Owner has complied with its obligations under Section 4, RRSA will, during normal working hours, through an RRSA authorized distributor, dealer, or service outlet, perform some or all of the following:

(a) Repair or replace, at the sole election of RRSA, the defective part with a new or remanufactured replacement part;
(b) Provide reasonable or customary labor needed to correct the Warrantable Defect;
(c) Provide technician travel time of 400 miles to and from the closest RRSA authorized distributor, dealer, or service outlet to the Product location;
(d) Part removal and re-installation, if necessary and as solely determined by RRSA.

If a Warrantable Defect is found during the Component Only Coverage Period, and, provided the Owner has complied with its obligations under Section 4, RRSA will only pay for the cost of the parts repaired or replaced on the defective component (material cost only). All other costs including, but not limited to, labor, transportation, shipping costs, lubricating oil, filters, antifreeze, and other service items rendered by the defect are the Owner's sole responsibility.

The obligation to repair or replace defective parts by RRSA does not include responsibility for reimbursement of incidental or consequential costs. If RRSA repairs or replaces a part, or Product under this Limited Warranty, the repaired or replaced part or Product assumes the unexpired portion of the warranty period remaining from the original part or Product. Repair or replacement of a part or Product will not extend the term of the original Limited Warranty Period. Parts or Product replaced shall become the property of RRSA.

Failure of RRSA to enforce any of the terms or conditions stated herein shall not be construed as a waiver of such provision or of any other terms and conditions of this Limited Warranty.

4. Owner Responsibilities

During the Limited Warranty Period, the Owner is responsible for, and RRSA will not reimburse for the following:

(a) Battery;
(b) Premium or overtime labor costs;
(c) Labor and material costs for Product removal and reinstallation;
(d) Any special access fees required to gain access to RRSA equipment, without limitation, training or safety policy requirement to gain access;
(e) Transportation costs or travel expenses related to delivery of the Product to the designated distributor, dealer, or service outlet;
(f) Incidental and consequential costs, damages, or administrative expenses of whatever nature;
(g) Non-Product repairs, vehicle damage, "downtime" expenses, cargo damage, fines, lost income, any business costs of any kind, Owner's travel expenses, and other losses resulting from a Warrantable Defect;
(h) Shipping charges for replacement parts/Products in excess of those which are usual and customary; or
(i) Local taxes, if applicable.

In addition, Owner must:

(a) Operate, use, and maintain the Product in accordance with the applicable Owner's manual and/or any other manuals specified by RRSA, including without limitation handling, inspection, servicing, or operating instructions;
(b) Promptly notify RRSA or its authorized representative of a Warrantable Defect and make the Product available for repair;
(c) Comply with RRSA or its authorized representative's reasonable directions regarding the timing, sequence, and location of warranty repairs and make the Product available for inspection;
(d) Perform all required maintenance and maintain and provide proof that all required maintenance has been performed;

(e) Use RRSA specified parts, components, and consumables;
(f) Promptly return to RRSA all parts replaced under this Limited Warranty;
(g) Comply with RRSA long term storage guidelines, if applicable, and maintain and provide proof of compliance;
(h) Routinely exercise the Product in accordance with operating instructions;
(i) Install the Product in accordance with the installation guide provided; and
(j) Reimburse RRSA for all costs incurred in providing warranty service where, following examination, the request or claim for warranty coverage proves to be unfounded or excluded, as well as all incidental costs including those incurred investigating the claim.

5. Limitations

RRSA is not responsible, and this Limited Warranty is not available under any circumstances, for any of the following:

(a) Failure of Owner to fulfill its obligations under Section 4;
(b) Failure of Owner to follow RRSA instructions for Product stored by Owner longer than 180 days from date of shipment from the RRSA Mankato, MN facility;
(c) Defects caused by adjustments made by Owner to the fuel system or governor system;
(d) Defects which were obvious or capable of being identified by reasonable inspection and were not reported to RRSA within a reasonable time;
(e) Rental equipment used during warranty work;
(f) Defects caused or potentially caused by service work performed by non-RRSA authorized service providers and/or the use of non-genuine RRSA parts;
(g) Defects resulting from natural wear and tear, external action, negligence, natural disasters, accidents, incorrect use, improper handling or storage, inadequate corrosion-proofing, incorrect assembly or installation, or modification of the Product;
(h) Defects resulting from abuse or neglect, including unauthorized modifications to the Product;
(i) Repair or any use or installation which RRSA, in its sole discretion, determines to be improper;
(j) Defects caused by incorrect maintenance;
(k) Defects resulting from Owner's delay in making the Product available after being notified of a potential problem or Owner's failure to take immediate measures to avoid or mitigate damage;
(l) Damage caused by shipping;
(m) Repair of parts sold by RRSA that are warranted directly to the Owner by the respective part's manufacturer;
(n) Misapplication of the Product;
(o) Acts of nature or acts of God;
(p) Any failure, other than those resulting from a defect in material or factory workmanship of the Product;
(q) Use of the Product for purposes other than those for which it was intended, including without limitation use of the Product under extraordinary operating conditions not made known to RRSA in writing at the time of the order; or
(r) Material provided by or a design specified by the Owner.

6. Software Warranty. Where software is included in the Product, RRSA warrants to the Owner that 1) the software will be substantially free from material program errors and material defects in material and workmanship, and that 2) it shall function substantially in accordance with RRSA specification at the time of dispatch from the RRSA manufacturing facility. RRSA does not warrant that the software is error-free or free from "bugs" as commonly categorized by the computer industry. RRSA shall, during the Limited Warranty Period, endeavor to remedy at its cost, in its sole discretion, by repair or replacement of any material program errors or material defects of which Owner has promptly notified RRSA. RRSA, at its option, may elect to provide the most current software at no cost, and in such case RRSA will not cover the cost to install the applicable updated software. RRSA shall have no obligation with respect to any nonconformities resulting from unauthorized modifications to the software or any Owner interfacing.

7. The Owner is entitled to rectify the defect or to have it rectified by third parties only in urgent cases where operational safety is at risk or in order to prevent disproportionately extensive damage; provided that Owner has informed RRSA and obtained prior written consent from RRSA. In such cases, RRSA shall, in its sole discretion, reimburse the costs incurred by the Owner up to an amount equivalent to the costs RRSA would have incurred had it remedied the defect itself.

8. This Limited Warranty gives the Owner specific legal rights, and the Owner may also have other rights, which vary from state to state. Some states do not allow warranty duration limitations and/or certain exclusions or limitation of incidental or consequential damages. Therefore, the previously expressed exclusion(s) may not apply to Owner. If any one or more of the provisions contained in this Limited Warranty shall be invalid, illegal, or unenforceable in any respect, the validity, legality, or enforceability of the remaining provisions contained therein shall not in any way be affected or impaired thereby.

9. This Limited Warranty is governed by the laws of the State of Michigan without regard to its conflicts of law principles and excluding the United Nations Convention for the International Sale of Goods. Any and all disputes between the parties that may arise pursuant to the sale or use of the Product shall be heard and determined before an appropriate state of federal court located in Oakland County, Michigan. The Owner acknowledges that such court has the jurisdiction to interpret and enforce the provisions herein, and Owner waives any and all objections that it may have as to personal jurisdiction or venue in any of the above courts.

10. In order to obtain performance of an RRSA warranty obligation, the Owner should contact the nearest RRSA authorized distributor, dealer, or service outlet for instructions. To find the location of the nearest RRSA authorized distributor, dealer, or service outlet call +1 248-560-8000 or write to: Rolls-Royce Solutions America Inc. Warranty Department, 39525 MacKenzie Drive, Novi, MI 48377.

ROLLS-ROYCE SOLUTIONS AMERICA INC.

Five (5) Year Comprehensive Extended Standby Limited Warranty
Automatic Transfer Switch (ATS)
Master Control Panel (MCP)

Your Rolls-Royce Solutions America Inc. ("RRSA") Automatic Transfer Switch or Master Control Panel ("Product") has been manufactured and inspected with care by experienced craftspeople. If you are the original consumer ("Owner"), RRSA warrants, for the Limited Warranty Period indicated below, each Product will be free from defects in materials and workmanship, and will perform under normal use and service from valid start-up performed by RRSA. Any nonconformity to the foregoing is defined as a Warrantable Defect.

1. Disclaimers

LIMITATION OF WARRANTIES: THIS LIMITED WARRANTY IS GIVEN EXPRESSLY AND IN PLACE OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE, FREEDOM FROM INFRINGEMENT OR THIRD PARTY INTELLECTUAL PROPERTY RIGHTS, OR ARISING FROM COURSE OF DEALING, COURSE OF PERFORMANCE OR USAGE OF TRADE. THERE ARE NO UNDERSTANDINGS, AGREEMENTS, REPRESENTATIONS, OR WARRANTIES NOT SPECIFIED HEREIN.

THIS LIMITED WARRANTY, THE OBLIGATIONS OF RRSA AND THE RIGHTS AND REMEDIES OF THE OWNER SET FORTH IN THIS LIMITED WARRANTY ARE EXCLUSIVE AND ARE EXPRESSLY IN LIEU OF, AND THE OWNER HEREBY WAIVES AND RELEASES ALL OTHER OBLIGATIONS, WARRANTIES (INCLUDING WARRANTY AGAINST REDHIBITORY DEFECTS), REPRESENTATIONS OR LIABILITIES, EXPRESS OR IMPLIED, ARISING BY LAW IN CONTRACT, TORT (INCLUDING NEGLIGENCE OR STRICT LIABILITY) OR OTHERWISE, INCLUDING BUT NOT LIMITED TO ANY CLAIMS ARISING OUT OF, CONNECTED WITH OR RESULTING FROM THE PERFORMANCE OF THIS LIMITED WARRANTY OR FROM THE DESIGN, MANUFACTURE, SALE, REPAIR, LEASE OR USE OF THE PRODUCT, ANY COMPONENT THEREOF AND SERVICES DELIVERED OR RENDERED HEREUNDER OR OTHERWISE.

IN NO EVENT, WHETHER AS A RESULT OF BREACH OF CONTRACT OR WARRANTY, ALLEGED NEGLIGENCE, OR OTHERWISE, SHALL RRSA BE SUBJECT TO LIABILITY FOR INCIDENTAL, CONSEQUENTIAL, INDIRECT, SPECIAL OR PUNITIVE DAMAGES OF ANY KIND, INCLUDING WITHOUT LIMITATION, DAMAGE TO THE PRODUCT, OR OTHER PROPERTY, COMMERCIAL LOSSES, LOST PROFITS, LOSS OF USE, INCONVENIENCE, LOSS OF TIME, COST OF CAPITAL, COST OF SUBSTITUTE EQUIPMENT, DOWNTIME, OR CLAIMS OF CUSTOMERS.

RRSA'S AGGREGATE TOTAL LIABILITY RELATING TO THE SYSTEM AND/OR PRODUCT UNDER THIS LIMITED WARRANTY OR UNDER ANY OTHER CLAIM (IN CONTRACT, TORT, OR OTHERWISE) MADE IN CONNECTION WITH THE SALE OR USAGE OF THE SYSTEM AND/OR PRODUCT IS LIMITED TO THE DOLLAR AMOUNT OF THE OWNER'S ORIGINAL PAYMENT MADE FOR THE SYSTEM AND/OR PRODUCT.

2. Limited Warranty Period

The Limited Warranty Period for a Warrantable Defect in the Product is five (5) years from factory invoice date. The Owner must provide proof of purchase of the original Product at the time of request for warranty consideration.

3. RRSA Responsibilities

If a Warrantable Defect is found during the Limited Warranty Period, and provided the Owner has complied with its obligations under Section 4, RRSA will, during normal working hours, through an RRSA authorized distributor, dealer, or service outlet, perform some or all of the following:

(a) Repair or replace, at the sole election of RRSA, the defective part with a new or remanufactured replacement part;
(b) Provide reasonable or customary labor needed to correct the Warrantable Defect;

(c) Provide technician travel time of 400 miles to and from the closest RRSA authorized distributor, dealer, or service outlet to the Product location;
(d) Part removal and re-installation, if necessary and as solely determined by RRSA.

The obligation to repair or replace defective parts by RRSA does not include responsibility for reimbursement of incidental or consequential costs. If RRSA repairs or replaces a part, or Product under this Limited Warranty, the repaired or replaced part or Product assumes the unexpired portion of the warranty period remaining from the original part or Product. Repair or replacement of a part or Product will not extend the term of the original Limited Warranty Period. Parts or Product replaced shall become the property of RRSA.

Failure of RRSA to enforce any of the terms or conditions stated herein shall not be construed as a waiver of such provision or of any other terms and conditions of this Limited Warranty.

4. Owner Responsibilities

During the Limited Warranty Period, the Owner is responsible for, and RRSA will not reimburse for the following:

(a) Battery;
(b) Premium or overtime labor costs;
(c) Labor and material costs for Product removal and reinstallation;
(d) Any special access fees required to gain access to RRSA equipment, without limitation, training or safety policy requirement to gain access;
(e) Transportation costs or travel expenses related to delivery of the Product to the designated distributor, dealer, or service outlet;
(f) Incidental and consequential costs, damages, or administrative expenses of whatever nature;
(g) Non-Product repairs, vehicle damage, “downtime” expenses, cargo damage, fines, lost income, any business costs of any kind, Owner’s travel expenses, and other losses resulting from a Warrantable Defect;
(h) Shipping charges for replacement parts/Products in excess of those which are usual and customary; or
(i) Local taxes, if applicable.

In addition, Owner must:

(a) Operate, use, and maintain the Product in accordance with the applicable Owner’s manual and/or any other manuals specified by RRSA, including without limitation handling, inspection, servicing, or operating instructions;
(b) Promptly notify RRSA or its authorized representative of a Warrantable Defect and make the Product available for repair;
(c) Comply with RRSA or its authorized representative’s reasonable directions regarding the timing, sequence, and location of warranty repairs and make the Product available for inspection;
(d) Perform all required maintenance and maintain and provide proof that all required maintenance has been performed;
(e) Use RRSA specified parts, components, and consumables;
(f) Promptly return to RRSA all parts replaced under this Limited Warranty;
(g) Comply with RRSA long term storage guidelines, if applicable, and maintain and provide proof of compliance;
(h) Routinely exercise the Product in accordance with operating instructions;
(i) Install the Product in accordance with the installation guide provided; and
(j) Reimburse RRSA for all costs incurred in providing warranty service where, following examination, the request or claim for warranty coverage proves to be unfounded or excluded, as well as all incidental costs including those incurred investigating the claim.

5. Limitations

RRSA is not responsible, and this Limited Warranty is not available under any circumstances, for any of the following:

(a) Failure of Owner to fulfill its obligations under Section 4;
(b) Failure of Owner to follow RRSA instructions for Product stored by Owner longer than 180 days from date of shipment from the RRSA Mankato, MN facility;
(c) Defects caused by adjustments made by Owner to the fuel system or governor system;
(d) Defects which were obvious or capable of being identified by reasonable inspection and were not reported to RRSA within a reasonable time;
(e) Rental equipment used during warranty work;
(f) Defects caused or potentially caused by service work performed by non-RRSA authorized service providers and/or the use of non-genuine RRSA parts;
(g) Defects resulting from natural wear and tear, external action, negligence, natural disasters, accidents, incorrect use, improper handling or storage, inadequate corrosion-proofing, incorrect assembly or installation, or modification of the Product;
(h) Defects resulting from abuse or neglect, including unauthorized modifications to the Product;
(i) Repair or any use or installation which RRSA, in its sole discretion, determines to be improper;
(j) Defects caused by incorrect maintenance;
(k) Defects resulting from Owner's delay in making the Product available after being notified of a potential problem or Owner's failure to take immediate measures to avoid or mitigate damage;
(l) Damage caused by shipping;
(m) Repair of parts sold by RRSA that are warranted directly to the Owner by the respective part's manufacturer;
(n) Misapplication of the Product;
(o) Acts of nature or acts of God;
(p) Any failure, other than those resulting from a defect in material or factory workmanship of the Product;
(q) Use of the Product for purposes other than those for which it was intended, including without limitation use of the Product under extraordinary operating conditions not made known to RRSA in writing at the time of the order; or
(r) Material provided by or a design specified by the Owner.

6. Software Warranty. Where software is included in the Product, RRSA warrants to the Owner that 1) the software will be substantially free from material program errors and material defects in material and workmanship, and that 2) it shall function substantially in accordance with RRSA specification at the time of dispatch from the RRSA manufacturing facility. RRSA does not warrant that the software is error-free or free from "bugs" as commonly categorized by the computer industry. RRSA shall, during the Limited Warranty Period, endeavor to remedy at its cost, in its sole discretion, by repair or replacement of any material program errors or material defects of which Owner has promptly notified RRSA. RRSA, at its option, may elect to provide the most current software at no cost, and in such case RRSA will not cover the cost to install the applicable updated software. RRSA shall have no obligation with respect to any nonconformities resulting from unauthorized modifications to the software or any Owner interfacing.

7. The Owner is entitled to rectify the defect or to have it rectified by third parties only in urgent cases where operational safety is at risk or in order to prevent disproportionately extensive damage; provided that Owner has informed RRSA and obtained prior written consent from RRSA. In such cases, RRSA shall, in its sole discretion, reimburse the costs incurred by the Owner up to an amount equivalent to the costs RRSA would have incurred had it remedied the defect itself.

8. This Limited Warranty gives the Owner specific legal rights, and the Owner may also have other rights, which vary from state to state. Some states do not allow warranty duration limitations and/or certain exclusions or limitation of incidental or consequential damages. Therefore, the previously expressed exclusion(s) may not apply to Owner. If any one or more of the provisions contained in this Limited Warranty shall be invalid, illegal, or unenforceable in any respect, the validity,

legality, or enforceability of the remaining provisions contained therein shall not in any way be affected or impaired thereby.

9. This Limited Warranty is governed by the laws of the State of Michigan without regard to its conflicts of law principles and excluding the United Nations Convention for the International Sale of Goods. Any and all disputes between the parties that may arise pursuant to the sale or use of the Product shall be heard and determined before an appropriate state of federal court located in Oakland County, Michigan. The Owner acknowledges that such court has the jurisdiction to interpret and enforce the provisions herein, and Owner waives any and all objections that it may have as to personal jurisdiction or venue in any of the above courts.

10. In order to obtain performance of an RRSA warranty obligation, the Owner should contact the nearest RRSA authorized distributor, dealer, or service outlet for instructions. To find the location of the nearest RRSA authorized distributor, dealer, or service outlet call +1 248-560-8000 or write to: Rolls-Royce Solutions America Inc. Warranty Department, 39525 MacKenzie Drive, Novi, MI 48377.

ROLLS-ROYCE SOLUTIONS AMERICA INC.

One (1) Year Basic Parts Standby Limited Warranty

Your Rolls-Royce Solutions America Inc. ("RRSA") product has been manufactured and inspected with care by experienced craftspeople. If you are the original consumer ("Owner"), RRSA warrants, for the limited warranty period indicated below, each product will be free from defects in materials and workmanship, and will perform under normal use and service from valid start-up performed by RRSA. This Limited Warranty shall apply only when the product has been properly installed, serviced, and operated in accordance with the applicable RRSA instruction manuals. If this Limited Warranty applies, the liability of RRSA shall be limited to the replacement, repair, or appropriate adjustment of the product, at the option of RRSA. This Limited Warranty does not apply to malfunctions caused by normal wear and tear, or by damage, accident, acts of God, unreasonable use, misuse, repair, or service by unauthorized persons.

DISCLAIMERS

LIMITATION OF WARRANTIES: THIS LIMITED WARRANTY IS GIVEN EXPRESSLY AND IN PLACE OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE, FREEDOM FROM INFRINGEMENT OR THIRD PARTY INTELLECTUAL PROPERTY RIGHTS, OR ARISING FROM COURSE OF DEALING, COURSE OF PERFORMANCE OR USAGE OF TRADE. THERE ARE NO UNDERSTANDINGS, AGREEMENTS, REPRESENTATIONS, OR WARRANTIES NOT SPECIFIED HEREIN.

THIS LIMITED WARRANTY, THE OBLIGATIONS OF RRSA AND THE RIGHTS AND REMEDIES OF THE OWNER SET FORTH IN THIS LIMITED WARRANTY ARE EXCLUSIVE AND ARE EXPRESSLY IN LIEU OF, AND THE OWNER HEREBY WAIVES AND RELEASES ALL OTHER OBLIGATIONS, WARRANTIES (INCLUDING WARRANTY AGAINST REDHIBITORY DEFECTS), REPRESENTATIONS OR LIABILITIES, EXPRESS OR IMPLIED, ARISING BY LAW IN CONTRACT, TORT (INCLUDING NEGLIGENCE OR STRICT LIABILITY) OR OTHERWISE, INCLUDING BUT NOT LIMITED TO ANY CLAIMS ARISING OUT OF, CONNECTED WITH OR RESULTING FROM THE PERFORMANCE OF THIS LIMITED WARRANTY OR FROM THE DESIGN, MANUFACTURE, SALE, REPAIR, LEASE OR USE OF THE PRODUCT, ANY COMPONENT THEREOF AND SERVICES DELIVERED OR RENDERED HEREUNDER OR OTHERWISE.

IN NO EVENT, WHETHER AS A RESULT OF BREACH OF CONTRACT OR WARRANTY, ALLEGED NEGLIGENCE, OR OTHERWISE, SHALL RRSA BE SUBJECT TO LIABILITY FOR INCIDENTAL, CONSEQUENTIAL, INDIRECT, SPECIAL OR PUNITIVE DAMAGES OF ANY KIND, INCLUDING WITHOUT LIMITATION, DAMAGE TO THE PRODUCT, OR OTHER PROPERTY, COMMERCIAL LOSSES, LOST PROFITS, LOSS OF USE, INCONVENIENCE, LOSS OF TIME, COST OF CAPITAL, COST OF SUBSTITUTE EQUIPMENT, DOWNTIME, OR CLAIMS OF CUSTOMERS.

RRSA'S AGGREGATE TOTAL LIABILITY RELATING TO THE SYSTEM AND/OR PRODUCT UNDER THIS LIMITED WARRANTY OR UNDER ANY OTHER CLAIM (IN CONTRACT, TORT, OR OTHERWISE) MADE IN CONNECTION WITH THE SALE OR USAGE OF THE SYSTEM AND/OR PRODUCT IS LIMITED TO THE DOLLAR AMOUNT OF THE OWNER'S ORIGINAL PAYMENT MADE FOR THE SYSTEM AND/OR PRODUCT.

LIMITED WARRANTY PERIOD

Parts have a one (1) year limited warranty from the date of installation by an authorized RRSA Service Provider or the date of purchase from an authorized RRSA Provider, whichever occurs first. The obligation of RRSA under this warranty is expressly limited to supplying replacement parts and does not cover any other associated costs incurred. Parts replaced under this warranty will carry the remaining warranty time from the original purchased part, and if required, RRSA has the right to request proof-of-purchase of the original purchased part. All parts being considered for warranty must be returned to RRSA for evaluation, unless RRSA authorizes the part to not be returned. This Limited Warranty is governed by the laws of the State of Michigan without regard to its conflicts of law principles and excluding the United Nations Convention for the International Sale of Goods. Any and all disputes between the parties that may arise pursuant to the sale or use of the Product shall be heard and determined before an appropriate state of federal court located in Oakland County,

Michigan. The Owner acknowledges that such court has the jurisdiction to interpret and enforce the provisions herein, and Owner waives any and all objections that it may have as to personal jurisdiction or venue in any of the above courts.

TO OBTAIN WARRANTY SERVICE

Warranty service may only be performed by RRSA authorized service providers. **Service provided by unauthorized persons will void this Limited Warranty. Non-RRSA replacement part(s) will void this Limited Warranty.** Contact your nearest RRSA Service Representative to obtain warranty service. For assistance in locating your nearest authorized service representative, call +1 248-560-8000 or write to: Rolls-Royce Solutions America Inc. Warranty Department, 39525 MacKenzie Drive, Novi, MI 48377.

SOFTWARE WARRANTY

Where software is included in the product, RRSA warrants to the Owner that 1) the software will be substantially free from material program errors and material defects in material and workmanship, and that 2) it shall function substantially in accordance with the RRSA specification at the time of dispatch from the RRSA manufacturing facility. RRSA does not warrant that the software is error-free or free from “bugs” as commonly categorized by the computer industry. RRSA shall, during the Limited Warranty Period, endeavor to remedy at its cost, in its sole discretion, by repair or replacement of any material program errors or material defects of which Owner has promptly notified RRSA. RRSA, at its option, may elect to provide the most current software at no cost, and in such case RRSA will not cover the cost to install the applicable updated software. RRSA shall have no obligation with respect to any nonconformities resulting from unauthorized modifications to the software or any Owner interfacing.