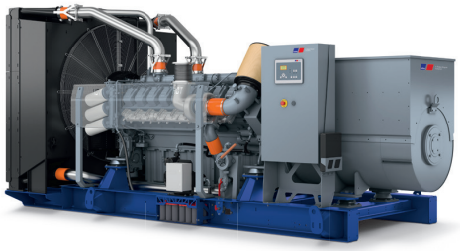
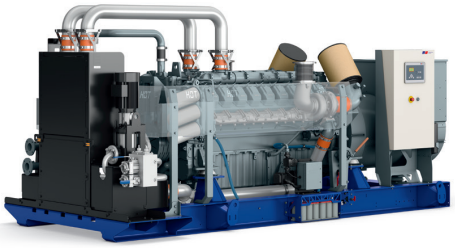
Diesel Generator Set

# mtu 16V2000 DS1100

## 380V - 415V/50 Hz/standby power/ NOx emission optimized/16V2000G76F





Optional equipment and finishing shown. Standard may vary.

## Product highlights

**Benefits**
- Low fuel consumption
- Optimized system integration ability
- High reliability and availability of power
- Long maintenance intervals
- Optimized ratio between size and power
- Wide operating range without derating

**Support**
- Global product support offered

**Standards**
- Engine-generator set is designed and manufactured in facilities certified to standards ISO 2008:9001 and ISO 2004:14001
- Generator set complies to G3 according to ISO 8528
- Generator meets NEMA MG1, BS5000, ISO, DIN EN and IEC standards
- NFPA 110

**Power rating**
- System rating: 1100 kVA
- Accepts rated load in one step per NFPA 110
- Generator set complies to G3 according to ISO 8528-5
- Generator set exceeds load steps according to ISO 8528-5

**Performance assurance certification (PAC)**
- Engine-generator set tested to ISO 8528-5 for transient response
- 85% load factor for continuous power applications
- Verified product design, quality and performance integrity
- All engine systems are prototype and factory tested

**Complete range of accessories available**
- Control panel
- Power panel
- Fuel system
- Fuel connections with shut-off valve mounted to base frame
- Starting/charging system
- Exhaust system
- Mechanical radiator
- Water Charge-Air-Cooler
- Oversized voltage alternators

**Cooling System**
- Air-to-Air Charge-Air Cooling (TD)
- Water-to-Air Charge-Air Cooling (TB)

**Emissions**
- NOx emission optimized
- Tier 2 and NEA (ORDE) optimization optionally available

**Certifications**
- CE certification option
- Unit certificate acc. to VDE-AR-N 4110

A Rolls-Royce solution

# Application data [1)]

| | Emission optimized[2] | |
|---|---|---|
| **Engine** | | |
| Manufacturer | ***mtu*** | |
| Model | 16V2000G76F | |
| Type | 4-cycle | |
| Arrangement | 16V | |
| Displacement: l | 35.7 | |
| Bore: mm | 135 | |
| Stroke: mm | 156 | |
| Compression ratio | 17.5 | |
| Rated speed: rpm | 1500 | |
| Engine governor | ADEC (ECU 9) | |
| Speed regulation | ± 0.25% | |
| Max power: kWm | 979 | |
| Mean effective pressure: bar | 21.9 | |
| Air cleaner | dry | |
| **Fuel system** | | |
| Maximum fuel lift: m | 5 | |
| Total fuel flow: l/min | 30 | |
| **Fuel consumption [3)]** | l/hr | g/kwh |
| At 100% of power rating: | 237 | 201 |
| At 75% of power rating: | 180 | 203 |
| At 50% of power rating: | 124 | 210 |
| **Lube oil system** | | |
| Total oil system capacity: l | 102 | |
| Max. lube oil temperature (alarm): °C | 103 | |
| Max. lube oil temperature (shutdown): °C | 105 | |
| Min. lube oil pressure (alarm): bar | 4.5 | |
| Min. lube oil pressure (shutdown): bar | 4 | |

| | Emission optimized[2] |
|---|---|
| **Combustion air requirements** | |
| Combustion air volume: $m^3/s$ | 1.28 |
| Max. air intake restriction: mbar | 40 |
| **Cooling/radiator system TB** | |
| Coolant flow rate (HT circuit): $m^3/hr$ | 41.6 |
| Coolant flow rate (LT circuit for TB): $m^3/hr$ | 17.5 |
| Heat radiated to charge air cooling (TB): kW (NOx) | 240 |
| Input pressure customer radiator (TB): bar (rel.) | 1.4 |
| Max. pressure loss customer radiator (TB): bar | 0.7 |
| Heat dissipated by engine coolant: kW (NOx) | 375 |
| Heat radiated to ambient: kW | 40 |
| Air flow required for mech. radiator (40°C) cooled unit: $m^3/min$ | 1462 |
| Air flow required for mech. radiator (50°C) cooled unit: $m^3/min$ | 1462 |
| Engine coolant capacity (without cooling equipment): l | 70 |
| Radiator coolant capacity (40°C): l | 74 |
| Radiator coolant capacity (50°C): l | 106 |
| Max. coolant temperature (warning): °C | 102 |
| Max. coolant temperature (shutdown): °C | 105 |
| **Exhaust system** | |
| Exhaust gas temp. (after turbocharger): °C | 530 |
| Exhaust gas volume: $m^3/s$ | 3.35 |
| Maximum allowable back pressure: mbar | 50 |
| Minimum allowable back pressure: mbar | 30 |
| **Generator** | |
| Protection class | IP23 |
| Insulation class | H |
| Voltage regulation (steady state) | ± 0.25% |
| Rado interference class | N |

1 All data refers only to the engine and is based on ISO standard conditions (25°C and 100m above sea level).

2 Emission optimized data refer to NOx emission optimized and NEA (ORDE) optimized/Tier 2 compliant engines.

3 Values referenced are in accordance with ISO 3046-1. Conversion calculated with fuel density of 0.83 g/ml. All fuel consumption values refer to rated engine power.

# Standard and optional features

## System ratings (kW/kVA)

| Generator model | Voltage | with mechanical radiator (TD) or charge-air-cooler (TB)** | | |
|---|---|---|---|---|
| | | kWel | kVA* | AMPS |
| Leroy Somer LSA 50.2 M6 (Low voltage Leroy Somer standard) | 380 V | 880 | 1100 | 1671 |
| | 400 V | 880 | 1100 | 1588 |
| | 415 V | 880 | 1100 | 1530 |
| Leroy Somer LSA 50.2 L7 (Low voltage Leroy Somer oversized) | 380 V | 880 | 1100 | 1671 |
| | 400 V | 880 | 1100 | 1588 |
| | 415 V | 880 | 1100 | 1530 |
| Marathon 740RSL7183 (Low voltage Marathon standard) | 380 V | 880 | 1100 | 1671 |
| | 400 V | 880 | 1100 | 1588 |
| | 415 V | 880 | 1100 | 1530 |
| Marathon 742RSL7185 (Low voltage Marathon oversized) | 380 V | 880 | 1100 | 1671 |
| | 400 V | 880 | 1100 | 1588 |
| | 415 V | 880 | 1100 | 1530 |

* cos phi = 0.8
** BE, fuel optimized: max. power available up to: open power unit 40°C/400m; NOx emission optimized, EPA Tier 2 compl., NEA: standard operating conditions/open power unit 25°C/100m
Electrical outputs may vary depending on generator voltage and ambient conditions. For power outputs consult your ***mtu*** dealer.
Intake air depression/mbar: 15mbar
Exhaust back pressure/mbar: 30mbar

## Engine

- ■ 4-cycle
- ■ Standard single stage air filter
- ■ Oil drain extension & shut-off valve
- ■ Full flow oil filters
- ■ Closed crankcase ventilation
- ■ Governor-electronic isochronous ADEC/ECU9
- ■ Common rail fuel injection
- ■ Dry exhaust manifold
- ■ Electric starting motor (24V)
- ■ NOx emission optimized engine
- □ Tier 2 optimized engine
- □ NEA (ORDE) optimized engine

## Generator

- ■ Leroy Somer low voltage generator
- ■ Meets NEMA MG1, BS5000, IEC 60034-1, VDE 0530, DIN EN 12601, AS1359 and ISO 8528-3 requirements
- ■ Superior voltage waveform
- ■ Solid state, volts-per-Hertz regulator
- ■ 4 pole three-phase synchronous generator
- ■ Brushless, self-excited, self-regulating, self-ventilated
- ■ Digital voltage regulator
- ■ Anti condensation heater
- ■ Stator winding Y-connected, accessible neutral (brought out)
- ■ Protection IP 23
- ■ less than 5% harmonic distorsion
- ■ 2/3 pitch stator windings
- ■ No load to full load regulation
- ■ ± 0.25% voltage regulation no load to full load
- ■ Insulation class H, utilization acc. to H
- ■ Radio suppression EN55011, group 1, cl. B
- ■ Short circuit capability 3xIn for 10sec
- ■ Sustained short circuit current of up to 300% of the rated current for up to 10 seconds (Leroy Somer generator)
- ■ Winding and bearing RTDs (without monitoring)
- ■ Excitation by AREP + PMI
- ■ Mounting of CT´s: 3x 2 core CT´s
- ■ Voltage setpoint adjustment ±10V
- □ Sustained short circuit current of up to 250% of the rated current for up to 10 seconds (Marathon generator)
- □ Marathon low voltage generator
- □ Oversized generator

■ Represents standard features
□ Represents optional features

# Standard and optional features

## Cooling system

*Air-to-Air Charge-Air-Cooling TD*

- ■ Mechanical radiator
- ■ Jacket water pump
- ■ Expansion tank
- ■ Fan
- ■ Thermostat(s)
- ☐ Jacket water heater

*Water-to-Air Charge-Air-Cooling TB*

- ■ Coolant pump
- ■ Manifold with thermostatic valves
- ■ WCAC-base frame with safety covers
- ☐ HT-piping with flexible engine connection

## Control panel

- ■ Pre-wired control cabinet for easy application of customized controller (V1+)
- ☐ Island operation (V2)
- ☐ Automatic mains failure operation with ATS (V3a)
- ☐ Automatic mains failure operation incl. control of generator and mains breaker (V3b)
- ☐ Island parallel operation of multiple gensets (V4)
- ☐ Automatic mains failure operation with short (< 10s) mains parallel overlap synchronization (V5)
- ☐ Mains parallel operation of a single genset (V6)
- ☐ Mains parallel operation of multiple gensets (V7)
- ☐ Basler controller
- ☐ Deif controller
- ■ Complete system metering
- ■ Digital metering
- ■ Engine parameters
- ■ Generator protection functions
- ■ Engine protection
- ■ SAE J1939 engine ECU communications
- ■ Parametrization software
- ■ Multilingual capability
- ■ Multiple programmable contact inputs
- ■ Multiple contact outputs
- ■ Event recording
- ■ IP 54 front panel rating with integrated gasket
- ☐ Different expansion modules
- ☐ Remote annunciator
- ☐ Daytank control
- ☐ Generator winding- and bearing temperature monitoring
- ☐ Differential protection with multi-function protection relay
- ☐ Modbus TCP-IP

## Power panel

- ☐ Available in 600x600
- ☐ Phase monitoring relay 230V/400V
- ☐ Supply for battery charger
- ☐ Supply for jacket water heater
- ☐ Plug socket cabinet for 230V compatible Euro

## Fuel system

- ■ Flexible fuel connectors mounted to base frame
- ☐ Fuel filter with water separator
- ☐ Switchable fuel filter with water separator
- ☐ Fuel cooler (for TD-only)

## Starting/charging system

- ■ 24V starter
- ☐ Starter batteries, cables, rack, disconnect switch
- ☐ Battery charger
- ☐ Redundant starter 2x 7.5kW

## Mounting system

- ■ Welded base frame
- ■ Resilient engine and generator mounting
- ■ Modular base frame design

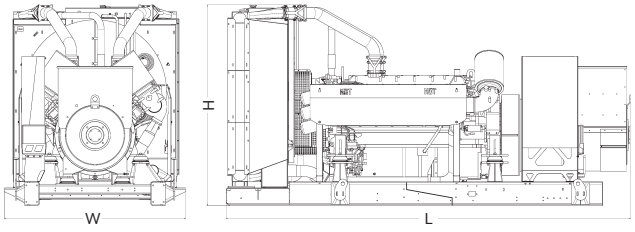
## Exhaust system

- ☐ Exhaust bellows with connection flange
- ☐ Exhaust silencer with 10 dB(A) sound attenuation
- ☐ Exhaust silencer with 30 dB(A) sound attenuation
- ☐ Exhaust silencer with 40 dB(A) sound attenuation
- ☐ Y-connection-pipe

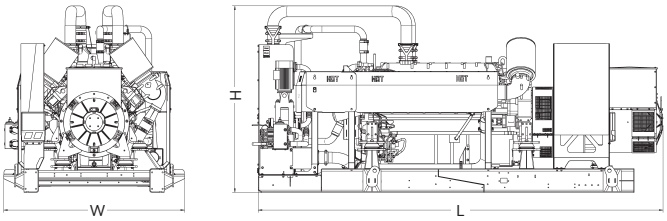
■ Represents standard features
☐ Represents optional features

# Weights and dimensions

### Air-to-Air Charge-Air Cooling (TD)




### Water-to-Air Charge-Air Cooling (TB)




Drawing above for illustration purposes only, based on a standard open power 400 Volt engine-generator set. Lengths may vary with other voltages. Do not use for installation design. See website for unit specific template drawings.

| System | Dimensions (LxWxH) | Weight (incl. engine-oil and coolant) |
|---|---|---|
| Open power unit (OPU) Air-to-Air (TD) | 4440 x 1990 x 2200 mm | 7300 kg |
| Open power unit (OPU) Water-to-Air (TB) | 4447 x 1988 x 2046 mm | 6900 kg |

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

## Sound data

— Consult your local ***mtu*** distributor for sound data.

## Emissions data

— Consult your local ***mtu*** distributor for emissions data.

## Rating definitions and conditions

— Standby power 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%. Operating hours/year: max. 500.
— Consult your local ***mtu*** distributor for derating information.

Subject to change. | 3239601 | Edition 01/22 | BMC 2022-07.