Diesel Generator Set

**mtu 16V2000 DS1000**

380V - 415V/50 Hz/prime power for stationary emergency/
fuel consumption optimized/NOx emission optimized/16V2000G16F

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**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: 910 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**
- Fuel consumption optimized
- NOx emission optimized, Tier 2 compliant and NEA (ORDE) optimization optionally available

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

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Optional equipment and finishing shown. Standard may vary.
### Application data

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturer</td>
<td>mtu</td>
<td>mtu</td>
<td>Coolant flow rate (HT circuit): m³/hr</td>
<td>41.6</td>
<td>41.6</td>
</tr>
<tr>
<td>Model</td>
<td>16V2000G16F</td>
<td>16V2000G16F</td>
<td>Coolant flow rate (LT circuit for TB): m³/hr</td>
<td>17.5</td>
<td>17.5</td>
</tr>
<tr>
<td>Type</td>
<td>4-cycle</td>
<td>4-cycle</td>
<td>Heat radiated to charge air cooling (TB): kW (NOx)</td>
<td>115</td>
<td>170</td>
</tr>
<tr>
<td>Arrangement</td>
<td>16V</td>
<td>16V</td>
<td>Input pressure customer radiator (TB): bar (rel.)</td>
<td>1.4</td>
<td>1.4</td>
</tr>
<tr>
<td>Displacement: l</td>
<td>35.7</td>
<td>35.7</td>
<td>Max. pressure loss customer radiator (TB): bar</td>
<td>0.7</td>
<td>0.7</td>
</tr>
<tr>
<td>Bore: mm</td>
<td>135</td>
<td>135</td>
<td>Heat dissipated by engine coolant: kW (NOx)</td>
<td>340</td>
<td>325</td>
</tr>
<tr>
<td>Stroke: mm</td>
<td>156</td>
<td>156</td>
<td>Heat radiated to ambient: kW</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>Compression ratio</td>
<td>17.5</td>
<td>17.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rated speed: rpm</td>
<td>1500</td>
<td>1500</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engine governor</td>
<td>ADEC (ECU 9)</td>
<td>ADEC (ECU 9)</td>
<td>Air flow required for mech. radiator (40°C) cooled unit: m³/min</td>
<td>1462</td>
<td>1462</td>
</tr>
<tr>
<td>Speed regulation</td>
<td>± 0.25%</td>
<td>± 0.25%</td>
<td>Air flow required for mech. radiator (50°C) cooled unit: m³/min</td>
<td>1462</td>
<td>1462</td>
</tr>
<tr>
<td>Max power: kW</td>
<td>806</td>
<td>806</td>
<td>Engine coolant capacity (without cooling equipment): l</td>
<td>70</td>
<td>70</td>
</tr>
<tr>
<td>Mean effective pressure: bar</td>
<td>18.1</td>
<td>18.1</td>
<td>Radiator coolant capacity (40°C): l</td>
<td>74</td>
<td>74</td>
</tr>
<tr>
<td>Air cleaner</td>
<td>dry</td>
<td>dry</td>
<td>Radiator coolant capacity (50°C): l</td>
<td>106</td>
<td>106</td>
</tr>
<tr>
<td>Fuel system</td>
<td></td>
<td></td>
<td>Max. coolant temperature (warning): °C</td>
<td>102</td>
<td>102</td>
</tr>
<tr>
<td>Maximum fuel lift: m</td>
<td>5</td>
<td>5</td>
<td>Max. coolant temperature (shutdown): °C</td>
<td>105</td>
<td>105</td>
</tr>
<tr>
<td>Total fuel flow: l/min</td>
<td>30</td>
<td>30</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Fuel consumption

| Lube oil system | | | Exhaut system | | |
|----------------------------------|------------------|------------------|
| Total oil system capacity: l | 102 | 102 | Exhaust gas temp. (after turbocharger): °C | 540 | 520 |
| Max. lube oil temp. (alarm): °C | 103 | 103 | Exhaust gas volume: m³/s | 2.5 | 2.85 |
| Max. lube oil temp. (shutdown): °C | 105 | 105 | Maximum allowable back pressure: mbar | 50 | 50 |
| Min. lube oil pressure (alarm): bar | 4.5 | 4.5 | Minimum allowable back pressure: mbar | 30 | 30 |
| Min. lube oil pressure (shutdown): bar | 4 | 4 | | | |

### Lube oil system

| Combustion air requirements | | |
|-------------------------------|------------------|
| Combustion air volume: m³/s | 0.93 | 1.10 | Generator | | |
| Max. air intake restriction: mbar | 40 | 40 | Protection class | IP23 | IP23 |
| | | | Insulation class | H | H |
| | | | Voltage regulation (steady state) | ± 0.25% | ± 0.25% |
| | | | Rado interference class | N | N |

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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)**

<table>
<thead>
<tr>
<th>Generator model</th>
<th>Voltage</th>
<th>with mechanical radiator (TD) or charge-air-cooler (TB)**</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>kWel</td>
</tr>
<tr>
<td>Leroy Somer LSA 49.3 L10</td>
<td>380 V</td>
<td>728</td>
</tr>
<tr>
<td>(Low voltage</td>
<td>400 V</td>
<td>728</td>
</tr>
<tr>
<td>Leroy Somer standard</td>
<td>415 V</td>
<td>728</td>
</tr>
<tr>
<td>Leroy Somer LSA 50.2 M6</td>
<td>380 V</td>
<td>728</td>
</tr>
<tr>
<td>(Low voltage</td>
<td>400 V</td>
<td>728</td>
</tr>
<tr>
<td>Leroy Somer oversized</td>
<td>415 V</td>
<td>728</td>
</tr>
<tr>
<td>Marathon 740RSL7183</td>
<td>380 V</td>
<td>728</td>
</tr>
<tr>
<td>(Low voltage</td>
<td>400 V</td>
<td>728</td>
</tr>
<tr>
<td>Marathon standard</td>
<td>415 V</td>
<td>728</td>
</tr>
<tr>
<td>Marathon 742RSL7185</td>
<td>380 V</td>
<td>728</td>
</tr>
<tr>
<td>(Low voltage</td>
<td>400 V</td>
<td>728</td>
</tr>
<tr>
<td>Marathon oversized</td>
<td>415 V</td>
<td>728</td>
</tr>
</tbody>
</table>

* 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)
- Fuel consumption optimized engine
- 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, ASI1359 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 distortion
- 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 I, 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

<table>
<thead>
<tr>
<th>System</th>
<th>Dimensions (LxWxH)</th>
<th>Weight (incl. engine-oil and coolant)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open power unit (OPU)</td>
<td>4440 x 1990 x 2200 mm</td>
<td>6500 kg</td>
</tr>
<tr>
<td>Air-to-Air (TD)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Open power unit (OPU)</td>
<td>4447 x 1988 x 2046 mm</td>
<td>6100 kg</td>
</tr>
<tr>
<td>Water-to-Air (TB)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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.

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

— Prime power for stationary emergency 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. 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%. Operating hours/year: max. 500.

— Consult your local mtu distributor for derating information.