Diesel Generator Set

MTU 16V4000 DS2500

380V – 11 kV/50 Hz/data center continuous power/TA-Luft optimized
16V4000G24F/water charge air cooling

Product highlights

Benefits
— Low fuel consumption
— Optimized system integration ability
— High reliability
— High availability of power
— Long maintenance intervals

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 ISO 8528
— Generator meets NEMA MG1, BS5000, ISO, DIN EN and IEC standards
— NFPA 110

Power rating
— System ratings: 2120 kVA - 2360 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
— 100% load factor
— Verified product design, quality and performance integrity
— All engine systems are prototype and factory tested

Complete range of accessories available
— Control panel
— Power panel
— Circuit breaker/power distribution
— Fuel system
— Fuel connections with shut-off valve mounted to base frame
— Starting/charging system
— Exhaust system
— Mechanical and electrical driven radiators
— Medium and oversized voltage alternators

Emissions
— TA-Luft optimized

Certifications
— CE certification option
— Unit certificate acc. to BDEW (German Grid-Code)
Application data

Engine
Manufacturer  MTU
Model  16V4000G24F
Type  4-cycle
Arrangement  16V
Displacement: l  76.3
Bore: mm  170
Stroke: mm  210
Compression ratio  16.4
Rated speed: rpm  1500
Engine governor  ECU 9
Max power: kWm  1965
Air cleaner  Dry

Fuel system
Maximum fuel lift: m  5
Total fuel flow: l/min  20

Fuel consumption
At 100% of power rating: l/hr  516.1
At 75% of power rating: l/hr  378.2
At 50% of power rating: l/hr  252.1

Liquid capacity (lubrication)
Total oil system capacity: l  300
Engine jacket water capacity: l  175
Intercooler coolant capacity: l  50

Combustion air requirements
Combustion air volume: m³/s  3.3
Max. air intake restriction: mbar  50

Cooling/radiator system
Coolant flow rate (HT circuit): m³/hr  68.5
Coolant flow rate (LT circuit): m³/hr  30
Heat rejection to coolant: kW  830
Heat radiated to charge air cooling: kW  500
Heat radiated to ambient: kW  90
Fan power for electr. radiator (40°C): kW  70

Exhaust system
Exhaust gas temp. (after turbocharger): °C  495
Exhaust gas volume: m³/s  7.9
Maximum allowable back pressure: mbar  85
Minimum allowable back pressure: mbar  30

Standard and optional features

System ratings (kW/kVA)

<table>
<thead>
<tr>
<th>Generator model</th>
<th>Voltage</th>
<th>kWel</th>
<th>kVA</th>
<th>AMPS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>without radiator</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>with mechanical radiator</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leroy Somer LSA52.3 L12</td>
<td>380 V</td>
<td>1888</td>
<td>2360</td>
<td>3586</td>
</tr>
<tr>
<td>(Low voltage Leroy Somer standard)</td>
<td>400 V</td>
<td>1888</td>
<td>2360</td>
<td>3406</td>
</tr>
<tr>
<td></td>
<td>415 V</td>
<td>1888</td>
<td>2360</td>
<td>3283</td>
</tr>
<tr>
<td>Marathon 744RSL7092</td>
<td>380 V</td>
<td>1752</td>
<td>2190</td>
<td>3327</td>
</tr>
<tr>
<td>(Low voltage Marathon)</td>
<td>400 V</td>
<td>1824</td>
<td>2280</td>
<td>3291</td>
</tr>
<tr>
<td></td>
<td>415 V</td>
<td>1696</td>
<td>2120</td>
<td>2949</td>
</tr>
<tr>
<td>Marathon 1020FDL7093</td>
<td>380 V</td>
<td>1752</td>
<td>2190</td>
<td>3327</td>
</tr>
<tr>
<td>(Low voltage Marathon oversized)</td>
<td>400 V</td>
<td>1824</td>
<td>2280</td>
<td>3291</td>
</tr>
<tr>
<td></td>
<td>415 V</td>
<td>1696</td>
<td>2120</td>
<td>2949</td>
</tr>
<tr>
<td>Marathon 1020FDH7099</td>
<td>11 kV</td>
<td>1880</td>
<td>2350</td>
<td>123</td>
</tr>
<tr>
<td>(Medium volt. marathon)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leroy Somer LSA53.2 XLI1</td>
<td>11 kV</td>
<td>1880</td>
<td>2350</td>
<td>123</td>
</tr>
<tr>
<td>(Med. volt. Leroy Somer)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* cos phi = 0.8

1 All data refers only to the engine and is based on ISO standard conditions (25°C and 100m above sea level).
2 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

### Engine
- 4-Cycle
- Standard single stage air filter
- Oil drain extension & shut-off valve
- Closed crankcase ventilation
- Improved oil separator
- Governor-electronic isochronous
- Common rail fuel injection
- TA-Luft optimized engine
- Centrifugal oil filter

### Generator
- 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 IP23
- Insulation class H, utilization acc. to H
- Radio suppression EN55011, group 1, cl. B
- Short circuit capability 3xIn for 10sec
- Winding and bearing RTDs (without monitoring)
- Excitation by AREP
- Mounting of CT's: 2 core CT's
- Winding pitch: 2/3 winding
- Voltage setpoint adjustment ± 10%
- Meets NEMA MG-1, BS 5000, IEC 60034-1, VDE 0530, DIN EN 12601, AS1359 and ISO 8528 requirements
- Leroy Somer low voltage generator
- Marathon low voltage generator
- Oversized generator
- Medium voltage generator

### Cooling system
- Jacket water pump
- Thermostat(s)
- Water charge air cooling
- Mechanical radiator
- Electrical driven front-end cooler
- Jacket water heater

### 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 temperature monitoring
- Generator bearing temperature monitoring
- Modbus TCP-IP

### Power panel
- Available in 600x600 and 600x1000
- Phase monitoring relay 230V/400V
- Supply for battery charger
- Supply for jacket water heater
- Supply for anti condensation heating
- Plug socket cabinet for 230V compatible Euro/USA
- Supply electrical driven radiator from 45kW – 75kW (PP 600x1000)

- Represents standard features
- Represents optional features
Standard and optional features

Circuit breaker/power distribution

☐ 3-pole circuit breaker  ☐ Manual-actuated circuit breaker  ☐ Stand-alone solution in separate cabinet
☐ 4-pole circuit breaker  ☐ Electrical-actuated circuit breaker

Fuel system

■ Flexible fuel connectors mounted to base frame
☐ Fuel filter with water separator
☐ Fuel filter with water separator heavy-duty
☐ Switchable fuel filter with water separator
☐ Switchable fuel filter with water separator heavy-duty
☐ Separate fuel cooler
☐ Fuel cooler integrated into cooling equipment

Starting/charging system

■ 24V starter
☐ Starter batteries, cables, rack, disconnect switch
☐ Battery charger

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
Weights and dimensions

<table>
<thead>
<tr>
<th>System</th>
<th>Dimensions (L x W x H)</th>
<th>Weight (dry/less tank)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open power unit (OPU)</td>
<td>4766 x 1810 x 2330 mm</td>
<td>13395 kg</td>
</tr>
</tbody>
</table>

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.

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: ≤ 100%.
- Consult your local MTU distributor for derating information.

Emissions data

<table>
<thead>
<tr>
<th>NOx + NMHC</th>
<th>CO</th>
<th>PM</th>
</tr>
</thead>
<tbody>
<tr>
<td>1700</td>
<td>300</td>
<td>50</td>
</tr>
</tbody>
</table>

All units are in mg/Nm³

Emission levels of the engine may vary as a function of ambient temperature, barometric pressure, humidity, fuel type and quality, installation parameters, measuring instrumentation, etc. The data provided refers to ISO standard ambient conditions (25°C and 100m above sea level). The data provided are laboratory results from one engine representing this rating. The data was obtained under controlled environmental conditions with calibrated instrumentation.