Diesel Generator Set

MTU 12V4000 DS1650

380V – 11 kV/50 Hz/grid stability power/TA-Luft optimized
12V4000G14F/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: 1490 kVA - 1600 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: 12V4000G14F
- Type: 4-cycle
- Arrangement: 12V
- Displacement: l 57.2
- Bore: mm 170
- Stroke: mm 210
- Compression ratio: 16.4
- Rated speed: rpm 1500
- Engine governor: ECU 9
- Max power: kWm 1420
- Air cleaner: Dry

**Fuel system**
- Maximum fuel lift: m 5
- Total fuel flow: l/min 16

**Fuel consumption**
- At 100% of power rating: l/hr 373, g/kwh 218
- At 75% of power rating: l/hr 272, g/kwh 212
- At 50% of power rating: l/hr 184.8, g/kwh 216

**Liquid capacity (lubrication)**
- Total oil system capacity: l 260
- Engine jacket water capacity: l 160
- Intercooler coolant capacity: l 40

**Combustion air requirements**
- Combustion air volume: m³/s 2.1
- Max. air intake restriction: mbar 50

**Cooling/radiator system**
- Coolant flow rate (HT circuit): m³/hr 56
- Coolant flow rate (LT circuit): m³/hr 30
- Heat rejection to coolant: kW 590
- Heat radiated to charge air cooling: kW 360
- Heat radiated to ambient: kW 75
- Fan power for electr. radiator (40°C): kW 70

**Exhaust system**
- Exhaust gas temp. (after turbocharger): °C 470
- Exhaust gas volume: m³/s 5.2
- 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>TA-Luft optimized without radiator</th>
<th>TA-Luft optimized with mechanical radiator</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>kWeI  kVA  AMPS</td>
<td>kWeI  kVA  AMPS</td>
</tr>
<tr>
<td>Leroy Somer LSA52.3 S5</td>
<td>380 V</td>
<td>1280  1600  2431</td>
<td>1208  1510  2294</td>
</tr>
<tr>
<td>Low voltage</td>
<td>400 V</td>
<td>1280  1600  2309</td>
<td>1208  1510  2179</td>
</tr>
<tr>
<td>Leroy Somer standard</td>
<td>415 V</td>
<td>1280  1600  2226</td>
<td>1208  1510  2101</td>
</tr>
<tr>
<td>Marathon 743 RSL7090</td>
<td>380 V</td>
<td>1272  1590  2416</td>
<td>1208  1510  2294</td>
</tr>
<tr>
<td>Low voltage</td>
<td>400 V</td>
<td>1264  1580  2281</td>
<td>1208  1510  2197</td>
</tr>
<tr>
<td>Marathon (Low voltage Marathon)</td>
<td>415 V</td>
<td>1192  1490  2073</td>
<td>1192  1490  2073</td>
</tr>
<tr>
<td>Marathon 744 RSL7091</td>
<td>380 V</td>
<td>1272  1590  2416</td>
<td>1208  1510  2293</td>
</tr>
<tr>
<td>Low voltage</td>
<td>400 V</td>
<td>1264  1580  2281</td>
<td>1208  1510  2197</td>
</tr>
<tr>
<td>Marathon (Low voltage Marathon)</td>
<td>415 V</td>
<td>1192  1490  2073</td>
<td>1192  1490  2073</td>
</tr>
<tr>
<td>Marathon 1020 FDL7095</td>
<td>11 kV</td>
<td>1272  1590  83</td>
<td>1200  1500  79</td>
</tr>
<tr>
<td>Medium volt. (Marathon)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leroy Somer LSA53.2 VL6</td>
<td>11 kV</td>
<td>1272  1590  83</td>
<td>1208  1510  79</td>
</tr>
</tbody>
</table>

* cos phi = 0.8

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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. 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
- Measured by AREP
- 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
- 4-pole circuit breaker
- Manual-actuated circuit breaker
- Electrical-actuated circuit breaker
- Stand-alone solution in separate cabinet

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

- Represents standard features
- Represents optional features
Weights and dimensions

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.

<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>4059 x 1810 x 2330 mm</td>
<td>10654 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.

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.

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.