Diesel Generator Set

MTU 12V4000 DS1650

380V – 11 kV/50 Hz/prime power/NEA (ORDE) 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
— 75% 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
— NEA (ORDE) 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**
1. At 100% of power rating: l/hr 342.2; g/kwh 200
2. At 75% of power rating: l/hr 274.6; g/kwh 214
3. At 50% of power rating: l/hr 200.2; g/kwh 234

**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 1.8
- 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 545
- Heat radiated to charge air cooling: kW 260
- Heat radiated to ambient: kW 75
- Fan power for electr. radiator (40°C): kW 55

**Exhaust system**
- Exhaust gas temp. (after turbocharger): °C 505
- 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>NEA (ORDE) optimized without radiator</th>
<th>NEA (ORDE) optimized with mechanical radiator</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>kWe</td>
<td>kVA*</td>
<td>AMPS</td>
</tr>
<tr>
<td><strong>Generator model</strong></td>
<td><strong>Voltage</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leroy Somer LSA52.3 S5 (Low voltage Leroy Somer standard)</td>
<td>380 V</td>
<td>1280</td>
<td>1600</td>
</tr>
<tr>
<td></td>
<td>400 V</td>
<td>1280</td>
<td>1600</td>
</tr>
<tr>
<td></td>
<td>415 V</td>
<td>1280</td>
<td>1600</td>
</tr>
<tr>
<td>Marathon 743RSL7090 (Low voltage Marathon)</td>
<td>380 V</td>
<td>1272</td>
<td>1590</td>
</tr>
<tr>
<td></td>
<td>400 V</td>
<td>1264</td>
<td>1580</td>
</tr>
<tr>
<td></td>
<td>415 V</td>
<td>1192</td>
<td>1490</td>
</tr>
<tr>
<td>Marathon 744RSL7091 (Low voltage Marathon oversize)</td>
<td>380 V</td>
<td>1272</td>
<td>1590</td>
</tr>
<tr>
<td></td>
<td>400 V</td>
<td>1264</td>
<td>1580</td>
</tr>
<tr>
<td></td>
<td>415 V</td>
<td>1192</td>
<td>1490</td>
</tr>
<tr>
<td>Marathon 1020FDH7095 (Medium volt. marathon)</td>
<td>11 kV</td>
<td>1264</td>
<td>1580</td>
</tr>
<tr>
<td>Leroy Somer LSA53.2 VL6 (Medium volt. Leroy Somer)</td>
<td>11 kV</td>
<td>1272</td>
<td>1590</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
- Governor-electronic isochronous
- Common rail fuel injection
- NEA (ORDE) optimized engine

**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 I, 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
- 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 for electrical driven radiator from 45kW – 75kW (PP 600x1000)

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

### Circuit breaker/power distribution

<table>
<thead>
<tr>
<th>Feature</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-pole circuit breaker</td>
<td>□</td>
</tr>
<tr>
<td>4-pole circuit breaker</td>
<td>□</td>
</tr>
<tr>
<td>Manual-actuated circuit breaker</td>
<td>□</td>
</tr>
<tr>
<td>Electrical-actuated circuit breaker</td>
<td>□</td>
</tr>
<tr>
<td>Stand-alone solution in separate cabinet</td>
<td>□</td>
</tr>
</tbody>
</table>

### Fuel system

<table>
<thead>
<tr>
<th>Feature</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Flexible fuel connectors mounted to base frame</td>
<td>■</td>
</tr>
<tr>
<td>Fuel filter with water separator</td>
<td>□</td>
</tr>
<tr>
<td>Fuel filter with water separator heavy-duty</td>
<td>□</td>
</tr>
<tr>
<td>Switchable fuel filter with water separator heavy-duty</td>
<td>■</td>
</tr>
<tr>
<td>Switchable fuel filter with water separator</td>
<td>□</td>
</tr>
<tr>
<td>Separate fuel cooler</td>
<td>□</td>
</tr>
<tr>
<td>Fuel cooler integrated into cooling equipment</td>
<td>□</td>
</tr>
</tbody>
</table>

### Starting/charging system

<table>
<thead>
<tr>
<th>Feature</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>24V starter</td>
<td>■</td>
</tr>
<tr>
<td>Starter batteries, cables, rack, disconnect switch</td>
<td>□</td>
</tr>
<tr>
<td>Battery charger</td>
<td>□</td>
</tr>
</tbody>
</table>

### Mounting system

<table>
<thead>
<tr>
<th>Feature</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Welded base frame</td>
<td>■</td>
</tr>
<tr>
<td>Resilient engine and generator mounting</td>
<td>■</td>
</tr>
<tr>
<td>Modular base frame design</td>
<td>■</td>
</tr>
</tbody>
</table>

### Exhaust system

<table>
<thead>
<tr>
<th>Feature</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exhaust bellows with connection flange</td>
<td>□</td>
</tr>
<tr>
<td>Exhaust silencer with 10 dB(A) sound attenuation</td>
<td>□</td>
</tr>
<tr>
<td>Exhaust silencer with 30 dB(A) sound attenuation</td>
<td>□</td>
</tr>
<tr>
<td>Exhaust silencer with 40 dB(A) sound attenuation</td>
<td>□</td>
</tr>
<tr>
<td>Exhaust silencer with 50 dB(A) sound attenuation</td>
<td>□</td>
</tr>
<tr>
<td>Y-connection-pipe</td>
<td>■</td>
</tr>
<tr>
<td>Y-connection-pipe heavy-duty</td>
<td>■</td>
</tr>
</tbody>
</table>

- ■ 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

— Consult your local MTU distributor for emissions 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: ≤ 75%.
— Consult your local MTU Distributor for derating information.