
# Marine & Offshore Solution Guide

Diesel Engines, Gas Turbines, Propulsion Systems, Generator Sets, Automation

Edition 1/14
valid from 01/2014

*Power. Passion. Partnership.*

## MTU: Power. Passion. Partnership.

MTU is the core brand of Rolls-Royce Power Systems AG, which is a world-leading provider of high- and medium-speed diesel and gas engines, complete drive systems, distributed energy systems and fuel injection systems for the most demanding requirements.

Especially within the shipping sector the company has established a long and successful partnership with some ten thousands of engines in operation around the globe on all seas. Based on its innovative capabilities, its reliability and system competence, MTU combines unique drive system know-how and a large range of products of excellent quality. Together with MTU's full product and customer services the benefit is yours, as highest availability is on your disposal, no matter where you are based.

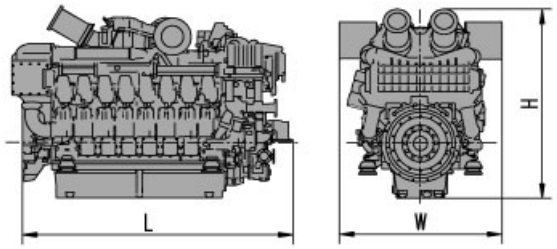
A network of affiliates, agencies and support centres that spans the whole world as well as a big force of customer service specialists trained by MTU assure expert service and provide best maintenance to our engines that meets with highest level of demands, 24 hours a day.

**For more information about MTU Marine Products please visit: www.mtu-online.com**

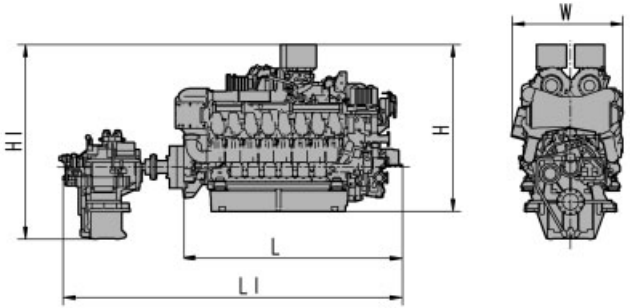
# More information for your convenience

**Dimensions:**
For all engines the respectively made declaration of the dimensions will be defined according to the following schematic diagram:

**Schematic drawing without gearbox:**




**Schematic drawing with gearbox:**




All dimensions are approximate, more detailed information is included within installation drawing.

**Masses:**
The declared values are based on dry engines including all recommended standard equipment (e.g. engine mounting elements, couplings etc.)

**Gearbox:**
Generally, there are different gearbox arrangements available. For example flange-mounted or free-standing arrangements.

For further information please contact your MTU distributor/dealer.

**Four-stroke diesel engines for marine main propulsion, marine generator sets and diesel-electric drives.**
Technical features:
- Direct injection
- Liquid cooled
- V or in-line configuration

**General reference conditions for diesel engines and generator sets:**
- Intake air temperature 25°C
- Sea water temperature 25°C

**All engines are designed and built according to classification requirements, certificate on request:**
Classification with
- Unrestricted service for engines with 10% overload capacity
- Restricted service for engines without overload capacity

IMO Tier I replacement engines or engines for non-emission areas are available upon request.
Please note, specifications are subject to change without a notice.
For further information please contact your MTU distributor/dealer.

CERTIFICATE

This is to certify that

MTU Friedrichshafen GmbH
Maybachplatz 1
88045 Friedrichshafen
Germany

has implemented and maintains a **Quality Management System**.

Scope:
Development, production, sales and service of engines, propulsion systems, monitoring and control systems as well as decentralized energy systems.

Through an audit, documented in a report, it was verified that the management system fulfills the requirements of the following standard:

ISO 9001 : 2008

| | |
|---|---|
| Certificate registration no. | 407382 QM08 |
| Excerpt from Certificate Registration No. | 353331 QM08 |
| Date of certification | 2011-05-05 |
| Valid until | 2014-05-04 |

TGA-ZM-02-90

DQS GmbH

Michael Drechsel
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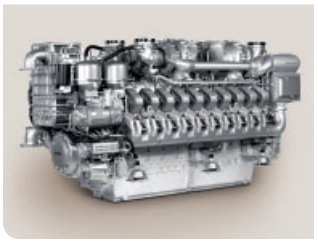
Jan Böge
Managing Director

Accredited Body: DQS GmbH, August-Schanz-Straße 21, 60433 Frankfurt am Main



# Selection guideline
## Marine



| MTU application group > | | 1A | 1B | 1D | 1DS |
|---|---|---|---|---|---|
| v Mechanical propulsion engines | | p. 16-31 | p. 32-47 | p. 48-55 | p. 56-69 |
| **Yacht** | Planing | | | ■ | ■ |
| | Semi planing | | | ■ | ■ |
| | Small displacement | | ■ | ■ | ■ |
| | Large displacement > 120 ft. | ■ | ■ | ■ | ■ |
| **Cargo ships & tankers** | Inland freighters | ■ | | | |
| | Coastal ships | ■ | | | |
| | Sea-river ships | ■ | | | |
| **Passenger ships** | Tourist boats | ■ | ■ | | |
| | Passenger ferries | | ■ | | |
| | Cabin cruisers | ■ | ■ | | |
| **RoPax ferries** | Double-ended ferries | ■ | ■ | | |
| | Fast ferries < 50 m | ■ | ■ | | |
| | Fast ferries > 50 m | | ■ | | |
| **Tugs & push boats** | Tow & push boats | ■ | | | |
| | Harbour tugs | ■ | ■ | | |
| | Coastal tugs | ■ | | | |
| | Escort tugs | ■ | ■ | | |
| **Offshore vessels & crew boats** | Crew boats | ■ | ■ | | |
| | Offshore supply vessels | ■ | ■ | | |
| | Anchor handling tugs | | ■ | | |
| | Pilot boats | ■ | ■ | | |
| | Trawler (fishing vessels) | ■ | ■ | | |
| | Firefighting vessels | | ■ | ■ | |
| | Rescue vessels | | ■ | ■ | |
| | Research vessels | | ■ | ■ | |
| | Dredgers | | ■ | | |
| | Cable laying vessels | ■ | | | |

| MTU application group > | | 1A | 1B | 1D | 1DS |
|---|---|---|---|---|---|
| v Mechanical propulsion engines | | p. 16-31 | p. 32-47 | p. 48-55 | p. 56-69 |
| **Marine Naval Vessels** | Fast attack crafts | | | ■ | ■ |
| | Corvettes | | | ■ | ■ |
| | Frigates and Destroyers | | ■ | ■ | ■ |
| | Amphibious crafts | | ■ | ■ | ■ |
| | Large amphibious and support vessels | ■ | ■ | ■ | |
| | Mine countermeasure vessels | | | ■ | |
| **Patrol boats** | Small patrol crafts | | ■ | ■ | ■ |
| | Coastal patrol crafts | ■ | ■ | ■ | ■ |
| | Large patrol vessels > 120 ft. | | ■ | ■ | ■ |

| MTU application group > | | 3A | 3A | 3B | 3B |
|---|---|---|---|---|---|
| v Power generation and diesel-electric propulsion | | 50 Hz | 60 Hz | 50 Hz | 60 Hz |
| | | p. 70-75 | p. 76-81 | p. 82-87 | p. 88-93 |
| | On-board powergen | ■ | ■ | | |
| | Diesel-electric propulsion | ■ | ■ | ■ | ■ |
| | Emergency powergen | ■ | ■ | ■ | ■ |

The guideline above and on the right gives a rough overview which MTU application groups can be considered for which type of vessel or business model. To allocate which MTU application group suits your demands best, the intended annual usage and the expected load profile have to be considered.

To learn more about the MTU application groups refer to page 10-13.

# Selection guideline
## Oil & Gas Offshore

**Diesel engines for:**

- Floating Platforms, Jack-ups, Semi-Subs
- FPSO, FSO, FPS, FPU, FLNG
- Drill Ships
- Production Platforms
- Accommodation
- Offshore Wind Emergency Power
- AHTS
- PSV, MPSV, MPOS
- Crew boats
- Construction Support (CSV)
- Offshore Wind Installation
- Pipe & Cable Layer
- Shuttle Tanker
- Seismic Vessels
- Others (DSV, SOV, OWS, etc.)
- Production platforms
- Jack-up rigs

**Diesel engines for power generation**

**Power generation - constant speed**

| MTU application group > | 3A | 3A | 3B | 3B | 3C | 3C |
|---|---|---|---|---|---|---|
| v Power generation | 50 Hz | 60 Hz | 50 Hz | 60 Hz | 50 Hz | 60 Hz |
| | p. 94 - 99 | p. 100 - 103 | p. 104 - 109 | p. 110 - 113 | p. 114 - 119 | p. 120 - 123 |
| Power generation | ■ | ■ | ■ | ■ | ■ | ■ |
| Electric firepump drives | | | ■ | ■ | ■ | ■ |
| Electric drilling drives | ■ | ■ | ■ | ■ | | |

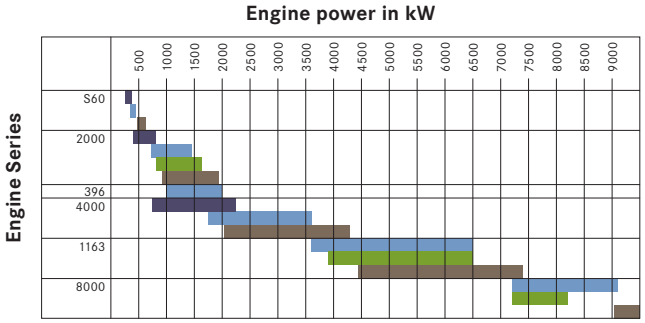
**Diesel engines for mechanical drives**

**Mechanical drives - variable speed**

| MTU application group > | 4A | 4B | 4C |
|---|---|---|---|
| v Mechanical drives | p. 124 - 133 | p. 134 - 139 | p. 140 - 147 |
| Mechanical firepump drives | | ■ | ■ |
| Mechanical pump/ compressor drives | ■ | ■ | ■ |
| Well servicing | ■ | ■ | ■ |

# Power range
## Marine

**Main propulsion:**




| Engines | 1A | 1B | 1D | 1DS |
|---|---|---|---|---|
| S60 | 261-373 | 354-447 | – | 466-615 |
| 2000 | 400-800 | 720-1440 | 810-1630 | 932-1939 |
| 396 | – | 1000-2000 | – | – |
| 4000 | 746-2240 | 1740-3600 | – | 2040-4300 |
| 1163 | – | 3600-6500 | 3900-6500 | 4440-7400 |
| 8000 | – | 7200-9100 | 7200-8200 | 9100-10000 |

**1A - Diesel engines for vessels with unrestricted continuous operation**

Average load: 70 - 90% of rated power

Typical annual usage: unrestricted

**1B - Diesel engines for fast vessels with high load factors**

Average load: 60 - 80% of rated power

Typical annual usage: up to 5000 hours

**1D - Diesel engines for fast vessels with intermittent load factors**

Average load: ≤ 60% of rated power

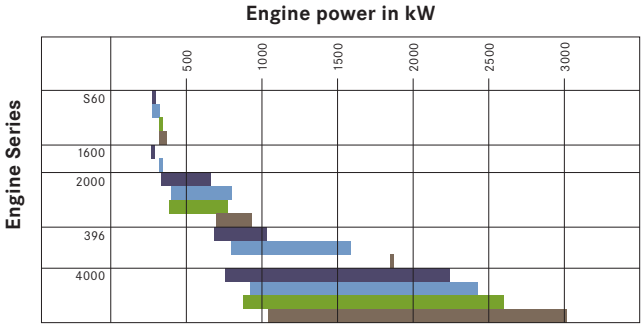
Typical annual usage: up to 3000 hours

**1DS - Diesel engines for fast vessels with low load factors**

Average load: ≤ 60% of rated power

Typical annual usage: up to 1500 hours

**Marine generator sets and diesel-electric drives:**




| Engines | 3A | 3A | 3B | 3B |
|---|---|---|---|---|
| Frequency | 50 Hz | 60 Hz | 50 Hz | 60 Hz |
| S60 | 271 | 271-322 | 322 | 322-370 |
| 1600 | 269 | 323 | – | – |
| 2000 | 332-664 | 400-800 | 385-770 | 695-930 |
| 396 | 680-1030 | 790-1580 | – | 1850 |
| 4000 | 760-2245 | 920-2425 | 880-2600 | 1040-3015 |

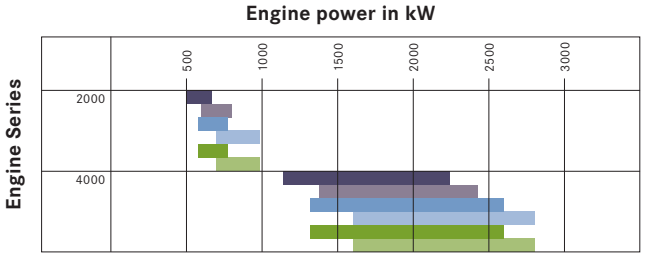
**3A/3B - Diesel engines for onboard power generation and diesel-electric drive**

Continuous operation power, unrestricted (3A - Continuous power 50/60 Hz)

Continuous operation with variable load (3B - Prime Power 50/60 Hz)

# Power range
## Oil & Gas Offshore

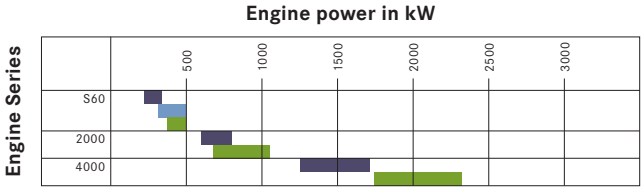
**Diesel engines for power generation:**




| Engines | 3A | 3A | 3B | 3B | 3C | 3C |
|---|---|---|---|---|---|---|
| Frequency | 50 Hz | 60 Hz | 50 Hz | 60 Hz | 50 Hz | 60 Hz |
| 2000 | 498-664 | 600-800 | 575-770 | 695-980 | 575-770 | 695-980 |
| 4000 | 1140-2245 | 1380-2425 | 1320-2600 | 1600-2800 | 1320-2600 | 1600-2800 |

| 3A/3B/3C - Diesel engines for power generation, electric fire-pump drives and well servicing – constant speed |
|---|
| Continuous operation power, unrestricted (3A – Continuous power 50/60 Hz) |
| Continuous operation with variable load (3B – Prime Power 50/60 Hz) |
| Standby operation with variable load (3C – Prime Power limited 50/60 Hz) |

**Diesel engines for mechanical drives:**




| Engines | 4A | 4B | 4C |
|---|---|---|---|
| S60 | 224-336 | 317-496 | 373-496 |
| 2000 | 600-800 | – | 675-1050 |
| 4000 | 1320-1760 | – | 1740-2320 |

| 4A/4B/4C - Diesel engines for mechanical drives – variable speed |
|---|
| 4A – Heavy duty operations |
| 4B – Medium duty operations |
| 4C – Short time duty operations |

# Power definition



**Power definition**
The rated power of diesel engines stated in this sales program corresponds to ISO 3046-1:2002 (E) and ISO 15550:2002 (E). The power produced at the flywheel will be within the tolerance of ± 3% - according to ISO 15550:2002 (E) – up to 25 °C (77 °F) combustion air temperature measured at the air cleaner inlet and up to 25 °C (77 °F) sea or raw water temperature measured at the seawater pump suction inlet, unless other values mentioned explicitly.
ICFN = ISO standard (continuous) fuel stop power
ICXN = ISO standard (continuous) power exceedable by 10% (ratings also apply to ISO 8665 and SAE J1228 standard conditions)

| | |
|---|---|
| Barometric pressure: | 1000 mbar; |
| Site altitude above sea level: | 100 m |
| Fuel specification: | EN 590 to ASTM D 975-00 |

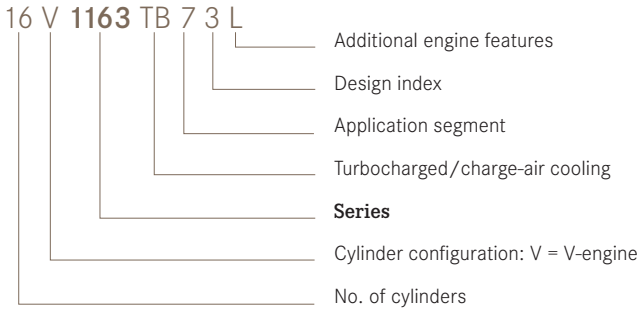
(Fuel consumption [with all pumps] in accordance with DIN ISO 3046 [except S60], values stated for IMO certification.)

**Emission Qualifications:**
IMO International Maritime Organization (MARPOL)
EPA-US marine regulation 40 CFR 94
EU-Nonroad directive 97/68 EC
EU-Recreational crafts 94/25 EC
CCNR – Central Commission for the Navigation on the Rhine
Between CCNR (RVIR) and EU-Nonroad Directive 97/68 EC (EU IIIA) mutual recognition is agreed.

# Explanation of the engine designation

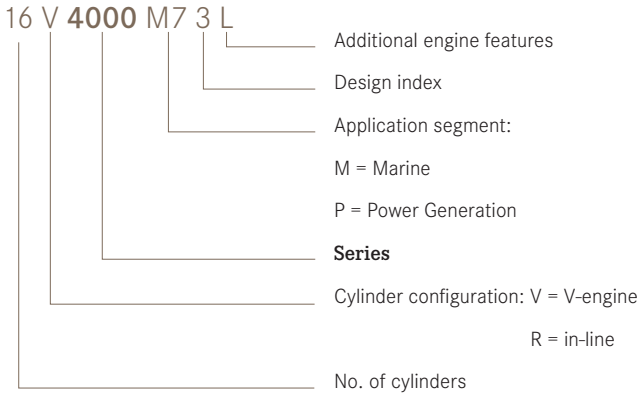
**Series 396 / 1163**

Example:




**Series 60 / 1600 / 2000 / 4000 / 1163 / 8000**

Example:




| Turbocharged engines with | |
|---|---|
| Separate-circuit charge-air cooling | S60 / 2000 P/ 4000 P /1163 |
| Split-circuit charge-air cooling | 1600 M / 2000 M / 4000 M / 396 TE / 8000 M |

| Additional engine features | |
|---|---|
| Power uprated | L |
| Power/speed reduced | R |
| Frequency | A or F (50 Hz) |
| | B or S (60 Hz) |

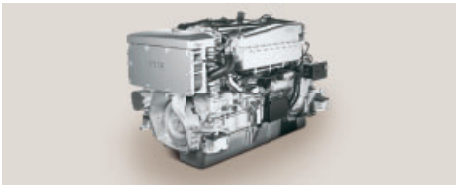
# Diesel engines for vessels with unrestricted continuous operation



# Diesel engines for vessels with unrestricted continuous operation



## Series 60



S60

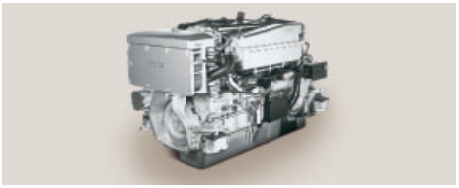
### Average load: 70 - 90% of rated power
### Rated power: 261 kW - 317 kW

| Engine model | | S60 | S60 | S60 | S60 |
|---|---|---|---|---|---|
| **Rated power ICFN** | **kW (bhp)** | **261 (350)** | **280 (375)** | **298 (400)** | **317 (425)** |
| **Speed** | **rpm** | **1800** | **1800** | **1800** | **1800** |
| **Exhaust optimization** | | IMO II/EPA 2 | IMO II/EPA 2 | IMO II/EPA 2 | IMO II/EPA 2 |
| **Fuel consumption** | | | | | |
| at rated power | g/kWh | 206 | 205 | 198 | 197 |
| | l/h (gal/h) | 64.7 (17.1) | 69.3 (18.3) | 71.0 (18.7) | 75.0 (19.8) |
| **Dimensions and masses – engine** | | | | | |
| Length (L) | mm (in) | 1842 (72.5) | 1842 (72.5) | 1842 (72.5) | 1842 (72.5) |
| Width (W) | mm (in) | 1035 (40.7) | 1035 (40.7) | 1035 (40.7) | 1035 (40.7) |
| Height (H) | mm (in) | 1160 (45.7) | 1160 (45.7) | 1160 (45.7) | 1160 (45.7) |
| Mass, dry | kg (lbs) | 1633 (3600) | 1633 (3600) | 1633 (3600) | 1633 (3600) |
| **Dimensions and masses – with gearbox** | | | | | |
| Gearbox model, standard | | MG 5114 SC | MG 5114 SC | MG 5114 SC | MG 5114 SC |
| Gearbox model, alternative | | on request | on request | on request | on request |
| Length (L 1) | mm (in) | 2036 (80.2) | 2036 (80.2) | 2036 (80.2) | 2036 (80.2) |
| Width (W) | mm (in) | 1035 (40.7) | 1035 (40.7) | 1035 (40.7) | 1035 (40.7) |
| Height (H 1) | mm (in) | 1170 (46.1) | 1170 (46.1) | 1170 (46.1) | 1170 (46.1) |
| Mass, dry | kg (lbs) | 1941 (4279) | 1941 (4279) | 1941 (4279) | 1941 (4279) |
| **Engine main data** | | | | | |
| No. of cylinders | | 6 | 6 | 6 | 6 |
| Bore / stroke | mm (in) | 133/168 (5.2/6.6) | 133/168 (5.2/6.6) | 133/168 (5.2/6.6) | 133/168 (5.2/6.6) |
| Displacement, total | l (cu in) | 14 (855) | 14 (855) | 14 (855) | 14 (855) |
| Classification, unrestricted service | | X | X | X | X |

# Diesel engines for vessels with unrestricted continuous operation



## Series 60



S60

### Average load: 70 - 90% of rated power
### Rated power: 336 kW - 373 kW

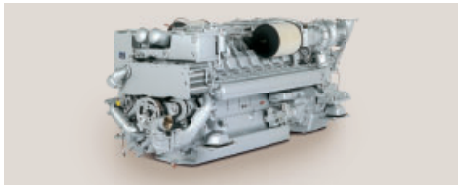
| Engine model | | S60 | S60 | S60 |
|---|---|---|---|---|
| **Rated power ICFN** | **kW (bhp)** | **336 (450)** | **354 (475)** | **373 (500)** |
| **Speed** | **rpm** | **1800** | **1800** | **1800** |
| **Exhaust optimization** | | IMO II/EPA 2 | IMO II/EPA 2 | IMO II/EPA 2 |
| **Fuel consumption** | | | | |
| at rated power | g/kWh | 196 | 196 | 196 |
| | l/h (gal/h) | 79.5 (21.0) | 83.7 (22.1) | 88.2 (23.3) |
| **Dimensions and masses – engine** | | | | |
| Length (L) | mm (in) | 1842 (72.5) | 1842 (72.5) | 1842 (72.5) |
| Width (W) | mm (in) | 1035 (40.7) | 1035 (40.7) | 1035 (40.7) |
| Height (H) | mm (in) | 1160 (45.7) | 1160 (45.7) | 1160 (45.7) |
| Mass, dry | kg (lbs) | 1633 (3600) | 1633 (3600) | 1633 (3600) |
| **Dimensions and masses – with gearbox** | | | | |
| Gearbox model, standard | | MG 5114 SC | MG 5114 SC | MG 5114 SC |
| Gearbox model, alternative | | on request | on request | on request |
| Length (L1) | mm (in) | 2036 (80.2) | 2036 (80.2) | 2036 (80.2) |
| Width (W) | mm (in) | 1035 (40.7) | 1035 (40.7) | 1035 (40.7) |
| Height (H1) | mm (in) | 1170 (46.1) | 1170 (46.1) | 1170 (46.1) |
| Mass, dry | kg (lbs) | 1941 (4279) | 1941 (4279) | 1941 (4279) |
| **Engine main data** | | | | |
| No. of cylinders | | 6 | 6 | 6 |
| Bore / stroke | mm (in) | 133/168 (5.2/6.6) | 133/168 (5.2/6.6) | 133/168 (5.2/6.6) |
| Displacement, total | l (cu in) | 14 (855) | 14 (855) | 14 (855) |
| Classification, unrestricted service | | X | X | X |

# Diesel engines for vessels with unrestricted continuous operation



## Series 2000
## Series 4000

Average load: 70 - 90% of rated power
Rated power: 400 kW - 895 kW



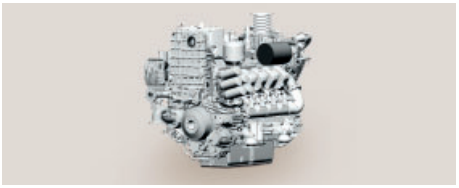
16V 2000

| Engine model | | 8V 2000 M61 | 12V 2000 M61 | 8V 4000 M53R | 8V 4000 M54R | 16V 2000 M61 | 8V 4000 M54 |
|---|---|---|---|---|---|---|---|
| **Rated power ICFN** | **kW (bhp)** | **400 (536)** | **600 (805)** | **746 (1000)** | **746 (1000)** | **800 (1070)** | **895 (1200)** |
| **Speed** | **rpm** | **1800** | **1800** | **1600** | **1600** | **1800** | **1800** |
| **Exhaust optimization** | | IMO II/EPA 2/ CCNR II | IMO II/EPA 2/ CCNR II | IMO II/EPA 2/ EU IIIA | EPA 3/IMO II | IMO II/EPA 2/ CCNR II | EPA 3/IMO II |
| **Fuel consumption** | | | | | | | |
| at rated power | g/kWh | 205 | 213 | 206 | 212 | 207 | 212 |
| | l/h (gal/h) | 98.8 (26.1) | 153.4 (40.5) | 185.2 (48.9) | 190 (50.2) | 199.5 (52.7) | 228 (60.2) |
| Optimum value | g/kWh | 199 | 200 | 204 | 199 | 201 | 196 |
| **Dimensions and masses – engine** | | | | | | | |
| Length (L) | mm (in) | 1434 (56.5) | 1890 (74.4) | 2040 (80.3) | 2386 (93.9) | 2235 (88.0) | 2386 (93.9) |
| Width (W) | mm (in) | 1216 (47.9) | 1400 (55.1) | 1615 (63.6) | 1613 (63.5) | 1400 (55.1) | 1613 (63.5) |
| Height (H) | mm (in) | 1150 (45.3) | 1290 (50.8) | 2060 (81.1) | 1972 (77.6) | 1290 (50.8) | 1972 (77.6) |
| Mass, dry | kg (lbs) | 1790 (3946) | 2715 (5985) | 5460 (12037) | 5680 (12522) | 3230 (7121) | 5680 (12522) |
| **Dimensions and masses – with gearbox** | | | | | | | |
| Gearbox model, standard | | ZF W650 | ZF 3000 | WAF 542 L | on request, | ZF 3050 | on request, |
| Gearbox model, alternative | | on request | on request | ZF W3350 | please | on request | please |
| Length (L1) | mm (in) | 2051 (80.7) | 2711 (106.7) | 3450 (135.8) | contact your | 3055 (120.3) | contact your |
| Width (W) | mm (in) | 1216 (47.9) | 1398 (55.0) | 1615 (63.6) | MTU dealer | 1425 (56.1) | MTU dealer |
| Height (H1) | mm (in) | 1465 (57.7) | 1290 (50.8) | 2445 (69.3) | | 1290 (50.8) | |
| Mass, dry | kg (lbs) | 2425 (5346) | 3290 (7253) | 7190 (15851) | | 3895 (8587) | |
| **Engine main data** | | | | | | | |
| No. of cylinders | | 8 | 12 | 8 | 8 | 16 | 8 |
| Bore / stroke | mm (in) | 130/150 (5.1/5.9) | 130/150 (5.1/5.9) | 170/210 (6.7/8.3) | 170/210 (6.7/8.3) | 130/150 (5.1/5.9) | 170/210 (6.7/8.3) |
| Displacement, total | l (cu in) | 15.9 (970) | 23.9 (1458) | 38.2 (2331) | 38.1 (2325) | 31.8 (1943) | 38.1 (2325) |
| Classification, unrestricted service | | X | X | X | X | X | X |

# Diesel engines for vessels with unrestricted continuous operation



## Series 4000



8V 4000

### Average load: 70 - 90% of rated power
### Rated power: 920 kW - 1398 kW

| Engine model | | 8V 4000 M53 | 8V 4000 M63 | 12V 4000 M53R | 12V 4000 M54 | 12V 4000 M53 | 12V 4000 M64 |
|---|---|---|---|---|---|---|---|
| **Rated power ICFN** | **kW (bhp)** | **920 (1234)** | **1000 (1341)** | **1140 (1529)** | **1193 (1600)** | **1380 (1851)** | **1398 (1875)** |
| **Speed** | **rpm** | **1800** | **1800** | **1600** | **1800** | **1800** | **1800** |
| **Exhaust optimization** | | IMO II/EPA 2/ EU IIIA | IMO II/EPA 2/ EU IIIA | IMO II/EPA 2/ EU IIIA | EPA 3/IMO II | IMO II/EPA 2/ EU IIIA | EPA 3/IMO II |
| **Fuel consumption** | | | | | | | |
| at rated power | g/kWh | 208 | 209 | 201 | on request, please contact your MTU dealer | 201 | on request, please contact your MTU dealer |
| | l/h (gal/h) | 230.6 (60.9) | 251.8 (66.5) | 276.1 (72.9) | | 334.2 (88.2) | |
| Optimum value | g/kWh | 192 | 189 | 200 | | 196 | |
| **Dimensions and masses – engine** | | | | | | | |
| Length (L) | mm (in) | 2040 (80.3) | 2040 (80.3) | 2520 (99.2) | 2638 (103.9) | 2520 (99.2) | 2638 (103.9) |
| Width (W) | mm (in) | 1615 (63.6) | 1615 (63.6) | 1850 (72.8) | 1690 (66.5) | 1850 (72.8) | 1690 (66.5) |
| Height (H) | mm (in) | 2060 (81.1) | 2060 (81.1) | 2075 (81.7) | 2071 (81.5) | 2075 (81.7) | 2071 (81.5) |
| Mass, dry | kg (lbs) | 5460 (12037) | 5460 (12037) | 7240 (15961) | 7750 (17086) | 7240 (15961) | 7750 (17086) |
| **Dimensions and masses – with gearbox** | | | | | | | |
| Gearbox model, standard | | WAF 562 | WAF 562 | WAF 665 | on request, please contact your MTU dealer | WAF 665 | on request, please contact your MTU dealer |
| Gearbox model, alternative | | ZZF W5300 | ZF W5350 | ZF W5355 | | ZF W7640 | |
| Length (L1) | mm (in) | 3142 (123.7) | 3142 (123.7) | 4240 (166.9) | | 4240 (166.9) | |
| Width (W) | mm (in) | 1615 (63.6) | 1615 (63.6) | 1850 (72.8) | | 1850 (72.8) | |
| Height (H1) | mm (in) | 2417 (95.2) | 2417 (95.2) | 2470 (97.2) | | 2470 (97.2) | |
| Mass, dry | kg (lbs) | 6967 (15360) | 6967 (15360) | 9275 (20448) | | 9275 (20448) | |
| **Engine main data** | | | | | | | |
| No. of cylinders | | 8 | 8 | 12 | 12 | 12 | 12 |
| Bore / stroke | mm (in) | 170/210 (6.7/8.3) | 170/210 (6.7/8.3) | 170/210 (6.7/8.3) | 170/210 (6.7/8.3) | 170/210 (6.7/8.3) | 170/210 (6.7/8.3) |
| Displacement, total | l (cu in) | 38.2 (2331) | 38.2 (2331) | 57.2 (3491) | 57.2 (3490.1) | 57.2 (3491) | 57.2 (3491) |
| Classification, unrestricted service | | X | X | X | X | X | X |

# Diesel engines for vessels with unrestricted continuous operation



## Series 4000

16V 4000

### Average load: 70 - 90% of rated power
### Rated power: 1492 kW - 1920 kW

| Engine model | | 16V 4000 M53R | 12V4000M63 | 16V4000M53R | 16V 4000 M54 | 16V 4000 M53 | 16V4000M63R |
|---|---|---|---|---|---|---|---|
| **Rated power ICFN** | **kW (bhp)** | **1492 (2000)** | **1500 (2012)** | **1520 (2038)** | **1685 (2260)** | **1840 (2467)** | **1920 (2575)**[2] |
| **Speed** | **rpm** | **1600** | **1800** | **1600** | **1800** | **1800**[1] | **1600** |
| **Exhaust optimization** | | IMO II/EPA 2/ EU IIIA | IMO II/EPA 2/ EU IIIA | IMO II/EPA 2/ EU IIIA | EPA 3/IMO II | IMO II/EPA 2/ EU IIIA | IMO II |
| **Fuel consumption** | | | | | | | |
| at rated power | g/kWh | 199 | 201 | 199 | 206 | 199 | 203 |
| | l/h (gal/h) | 357.7 (94.5) | 363.3 (95.9) | 364.4 (96.2) | 417 (110.2) | 441.2 (116.5) | 468 (123.6) |
| Optimum value | g/kWh | on request | 196 | 198 | 195 | 198 | 203 |
| **Dimensions and masses – engine** | | | | | | | |
| Length (L) | mm (in) | 2990 (117.7) | 2520 (99.2) | 2990 (117.7) | 3108 (122.4) | 2990 (117.7) | 2990 (117.7) |
| Width (W) | mm (in) | 1850 (72.8) | 1850 (72.8) | 1850 (72.8) | 1690 (66.5) | 1850 (72.8) | 1850 (72.8) |
| Height (H) | mm (in) | 2070 (81.5) | 2075 (81.7) | 2070 (81.5) | 2064 (81.3) | 2070 (81.5) | 2070 (81.5) |
| Mass, dry | kg (lbs) | 8590 (18938) | 7240 (15961) | 8590 (18938) | 8840 (19489) | 8590 (18938) | 8590 (18938) |
| **Dimensions and masses – with gearbox** | | | | | | | |
| Gearbox model, standard | | WAF 763 | WAF 763 L | WAF 763 | on request, please contact your MTU dealer | WAF 863 L | WAF 863 |
| Gearbox model, alternative | | ZF W7610 | ZF W7640 | ZF W7610 | | ZF W7610 | ZF 9311 |
| Length (L1) | mm (in) | 4785 (188.4) | 4295 (169.1) | 4785 (188.4) | | 4870 (191.7) | 5150 (202.7) |
| Width (W) | mm (in) | 1850 (72.8) | 1850 (72.8) | 1850 (72.8) | | 1850 (72.8) | 1850 (72.8) |
| Height (H1) | mm (in) | 2570 (101.2) | 2570 (101.2) | 2570 (101.2) | | 2680 (105.5) | 2680 (105.5) |
| Mass, dry | kg (lbs) | 11085 (24438) | 9675 (21329) | 11085 (24438) | | 11945 (26334) | 12375 (27282) |
| **Engine main data** | | | | | | | |
| No. of cylinders | | 16 | 12 | 16 | 16 | 16 | 16 |
| Bore / stroke | mm (in) | 170/210 (6.7/8.3) | 170/210 (6.7/8.3) | 170/210 (6.7/8.3) | 170/210 (6.7/8.3) | 170/210 (6.7/8.3) | 170/210 (6.7/8.3) |
| Displacement, total | l (cu in) | 76.3 (4656) | 57.2 (3491) | 76.3 (4656) | 76.3 (4656) | 76.3 (4656) | 76.3 (4656) |
| Classification, unrestricted service | | X | X | X | X | X | X |

1) 1600 rpm available on request
2) 1840 kW with 1600 rpm available on request

# Diesel engines for vessels with unrestricted continuous operation



## Series 4000

16V 4000

### Average load: 70 - 90% of rated power
### Rated power: 1999 kW - 2240 kW

| Engine model | | 16V 4000 M64 | 16V 4000 M63 | 16V 4000 M63L |
|---|---|---|---|---|
| **Rated power ICFN** | **kW (bhp)** | **1999 (2681)** | **2000 (2680)**[1] | **2240 (3004)** |
| **Speed** | **rpm** | **1800** | **1800** | **1800** |
| **Exhaust optimization** | | EPA 3/IMO II | IMO II/EPA 2/ EU III A | IMO II/EPA 2/ EU IIIA |
| **Fuel consumption** | | | | |
| at rated power | g/kWh | 202 | 199 | 195 |
| | l/h (gal/h) | 485 (128.1) | 479.5 (126.7) | 526.3 (139.1) |
| Optimum value | g/kWh | 194 | 192 | 194 |
| **Dimensions and masses – engine** | | | | |
| Length (L) | mm (in) | 3108 (122.4) | 2990 (117.7) | 2990 (117.7) |
| Width (W) | mm (in) | 1690 (66.5) | 1850 (72.8) | 1850 (72.8) |
| Height (H) | mm (in) | 2064 (81.3) | 2070 (81.5) | 2070 (81.5) |
| Mass, dry | kg (lbs) | 8840 (19489) | 8590 (18937) | 8590 (18937) |
| **Dimensions and masses – with gearbox** | | | | |
| Gearbox model, standard | | on request, | WAF 863 L | WAF 863 |
| Gearbox model, alternative | | please | ZF W7615 | ZF 9350 |
| Length (L1) | mm (in) | contact your | 4870 (191.7) | 4870 (191.7) |
| Width (W) | mm (in) | MTU dealer | 1850 (72.8) | 1850 (72.8) |
| Height (H1) | mm (in) | | 2680 (105.5) | 2680 (105.5) |
| Mass, dry | kg (lbs) | | 11945 (26334) | 11945 (26334) |
| **Engine main data** | | | | |
| No. of cylinders | | 16 | 16 | 16 |
| Bore / stroke | mm (in) | 170/210 (6.7/8.3) | 170/210 (6.7/8.3) | 170/210 (6.7/8.3) |
| Displacement, total | l (cu in) | 76.3 (4656.1) | 76.3 (4656) | 76.3 (4656) |
| Classification, unrestricted service | | X | X | X |

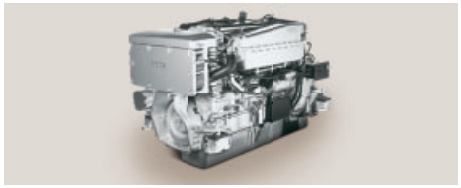
1) 1920 kW available on request

# Diesel engines for fast vessels with high load factors



# Diesel engines for fast vessels with high load factors

## Series 60



S60

### Average load: 60 - 80% of rated power
### Rated power: 354 kW - 447 kW

| Engine model | | S60 | S60 | S60 |
|---|---|---|---|---|
| **Rated power ICFN** | **kW (bhp)** | **354 (475)** | **399 (535)** | **447 (600)** |
| **Speed** | **rpm** | **2100** | **2100** | **2100** |
| **Exhaust optimization** | | IMO II/EPA 2 | IMO II/EPA 2 | IMO II/EPA 2 |
| **Fuel consumption** | | | | |
| at rated power | g/kWh | 203 | 205 | 210 |
| | l/h (gal/h) | 86.7 (22.9) | 98.4 (26.0) | 113.2 (29.9) |
| **Dimensions and masses – engine** | | | | |
| Length (L) | mm (in) | 1842 (72.5) | 1842 (72.5) | 1842 (72.5) |
| Width (W) | mm (in) | 1035 (40.7) | 1035 (40.7) | 1035 (40.7) |
| Height (H) | mm (in) | 1160 (45.7) | 1160 (45.7) | 1160 (45.7) |
| Mass, dry | kg (lbs) | 1633 (3600) | 1633 (3600) | 1633 (3600) |
| **Dimensions and masses – with gearbox** | | | | |
| Gearbox model, standard | | MG 5114 SC | MG 5114 SC | MG 5114 SC |
| Gearbox model, alternative | | on request | on request | on request |
| Length (L1) | mm (in) | 2036 (80.1) | 2036 (80.1) | 2036 (80.1) |
| Width (W) | mm (in) | 1035 (40.7) | 1035 (40.7) | 1035 (40.7) |
| Height (H1) | mm (in) | 1170 (46.1) | 1170 (46.1) | 1170 (46.1) |
| Mass, dry | kg (lbs) | 1941 (4279) | 1941 (4279) | 1941 (4279) |
| **Engine main data** | | | | |
| No. of cylinders | | 6 | 6 | 6 |
| Bore / stroke | mm (in) | 133/168 (5.2/6.6) | 133/168 (5.2/6.6) | 133/168 (5.2/6.6) |
| Displacement, total | l (cu in) | 14 (855) | 14 (855) | 14 (855) |
| Classification, unrestricted service | | X | X | X |

# Diesel engines for fast vessels with high load factors

## Series 2000
## Series 396

### Average load: 60 - 80% of rated power
### Rated power: 720 kW - 1050 kW

10V 2000



| Engine model | | 8V 2000 M72 | 12V2000 M70 | 10V 2000 M72 | 8V 396 TE74L | 16V 2000 M70 |
|---|---|---|---|---|---|---|
| **Rated power ICFN** | **kW (bhp)** | **720 (965)** | **788 (1057)** | **900 (1205)** | **1000 (1341)** | **1050 (1408)** |
| **Speed** | **rpm** | **2250** | **2100** | **2250** | **1900** | **2100** |
| **Exhaust optimization** | | IMO II/EPA 2/ EU IIIA[1] | IMO I | IMO II/EPA 2/ EU IIIA[1] | IMO II compliant[2] | IMO II/EPA 2 |
| **Fuel consumption** | | | | | | |
| at rated power | g/kWh | 212 | 209 | 215 | 217 | 212 |
| | l/h (gal/h) | 183.9 (48.6) | 198.4 (52.4) | 233.1 (61.6) | 261.4 (69.1) | 266.9 (70.5) |
| Optimum value | g/kWh | 195 | 197 | 197 | 213 | 195 |
| **Dimensions and masses – engine** | | | | | | |
| Length (L) | mm (in) | 1370 (53.9) | 1890 (74.4) | 1545 (60.8) | 1745 (68.7) | 2255 (88.8) |
| Width (W) | mm (in) | 1130 (44.5) | 1400 (55.1) | 1130 (44.5) | 1530 (60.2) | 1400 (55.1) |
| Height (H) | mm (in) | 1200 (47.2) | 1290 (50.8) | 1230 (48.4) | 1540 (60.6) | 1290 (50.8) |
| Mass, dry | kg (lbs) | 1980 (4365) | 2795 (6162) | 2240 (4938) | 3590 (7915) | 3275 (7220) |
| **Dimensions and masses – with gearbox** | | | | | | |
| Gearbox model, standard | | ZF 2000 | on request, please contact your MTU dealer | ZF 3000 | on request, please contact your MTU dealer | on request, please contact your MTU dealer |
| Gearbox model, alternative | | on request | | on request | | |
| Length (L1) | mm (in) | 2080 (81.9) | | 2365 (93.1) | | |
| Width (W) | mm (in) | 1130 (44.5) | | 1130 (44.5) | | |
| Height (H1) | mm (in) | 1225 (48.1) | | 1305 (51.4) | | |
| Mass, dry | kg (lbs) | 2590 (5710) | | 3050 (6724) | | |
| **Engine main data** | | | | | | |
| No. of cylinders | | 8 | 12 | 10 | 8 | 16 |
| Bore/ stroke | mm (in) | 135/156 (5.3/6.1) | 130/150 (5.1/5.9) | 135/156 (5.3/6.1) | 165/185 (6.5/7.3) | 130/150 (5.1/5.9) |
| Displacement, total | l (cu in) | 17.9 (1093) | 23.9 (1458) | 22.3 (1361) | 31.7 (1933) | 31.8 (1943) |
| Classification, unrestricted service | | X | X | X | X | X |

1) Including recreational crafts EU 94/25 EC
2) Certification on request

# Diesel engines for fast vessels with high load factors

## Series 2000
## Series 396
## Series 4000

Average load: 60 - 80% of rated power
Rated power: 1080 kW - 1740 kW

10V 2000



| Engine model | | 12V 2000 M72 | 16V 2000 M72 | 12V 396 TE74L | 12V 4000 M70 | 12V 4000 M70 |
|---|---|---|---|---|---|---|
| **Rated power ICFN** | **kW (bhp)** | **1080 (1450)** | **1440 (1930)** | **1500 (2012)** | **1680 (2250)** | **1740 (2333)** |
| **Speed** | **rpm** | **2250** | **2250** | **1900** | **2000** | **2000** |
| **Exhaust optimization** | | IMO II/EPA 2/ EU IIIA[1)] | IMO II/EPA 2/ EU IIIA[1)] | IMO II compliant[2)] | IMO II/EPA 2 | IMO I |
| **Fuel consumption** | | | | | | |
| at rated power | g/kWh | 208 | 206 | 214 | 215 | 201 |
| | l/h (gal/h) | 270.7 (71.5) | 357.4 (94.4) | 386.7 (102.2) | 435.2 (115.0) | 421.4 (111.3) |
| Optimum value | g/kWh | 195 | 195 | 203 | on request | on request |
| **Dimensions and Masses – engine** | | | | | | |
| Length (L) | mm (in) | 1870 (73.6) | 2285 (89.6) | 2275 (89.6) | 2835 (111.6) | 2835 (111.6) |
| Width (W) | mm (in) | 1295 (51.0) | 1295 (51.0) | 1530 (60.2) | 1520 (59.8) | 1520 (59.8) |
| Height (H) | mm (in) | 1350 (53.1) | 1390 (54.7) | 1600 (63) | 1835 (72.2) | 1835 (72.2) |
| Mass, dry | kg (lbs) | 2810 (6195) | 3380 (7452) | 4830 (10648) | 6940 (15300) | 6940 (15300) |
| **Dimensions and masses – with gearbox** | | | | | | |
| Gearbox model, standard | | ZF 3050 | ZF 5000 | on request, please contact your MTU dealer | on request, please contact your MTU dealer | on request, please contact your MTU dealer |
| Gearbox model, alternative | | on request | on request | | | |
| Length (L1) | mm (in) | 2685 (105.7) | 3243 (127.7) | | | |
| Width (W) | mm (in) | 1295 (51.0) | 1364 (53.7) | | | |
| Height (H1) | mm (in) | 1385 (54.5) | 1459 (57.4) | | | |
| Mass, dry | kg (lbs) | 3680 (8113) | 4363 (171.8) | | | |
| **Engine main data** | | | | | | |
| No. of cylinders | | 12 | 16 | 12 | 12 | 12 |
| Bore / stroke | mm (in) | 135/156 (5.3/6.1) | 135/156 (5.3/6.1) | 165/185 (6.5/7.3) | 165/190 (6.5/7.5) | 165/190 (6.5/7.5) |
| Displacement, total | l (cu in) | 26.8 (1635) | 35.7 (2179) | 47.5 (2900) | 48.7 (2972) | 48.7 (2972) |
| Classification, unrestricted service | | X | X | X | X | X |

1) Including recreational crafts EU 94/25 EC
2) Certification on request

# Diesel engines for fast vessels with high load factors

## Series 396
## Series 4000

### Average load: 60 - 80% of rated power
### Rated power: 1850 kW - 2240 kW

16V 4000



| Engine model | | 12V 4000 M71 | 12V 4000 M73 | 16V 396 TE74L | 12V 4000 M73L | 16V 4000 M70 |
|---|---|---|---|---|---|---|
| **Rated power ICFN** | **kW (bhp)** | **1850 (2481)** | **1920 (2575)** | **2000 (2682)** | **2160 (2895)** | **2240 (3000)** |
| **Speed** | **rpm** | **2000** | **1970** | **1900** | **2050** | **2000** |
| **Exhaust optimization** | | IMO I | IMO II/ EPA 2 | IMO II compliant[1)] | IMO II/ EPA 2 | IMO II/ EPA 2 |
| **Fuel consumption** | | | | | | |
| at rated power | g/kWh | 209 | 212 | 212 | 213 | 223 |
| | l/h (gal/h) | 465.8 (123.1) | 490.4 (129.5) | 510.8 (135) | 554.3 (146.3) | 601.8 (159.0) |
| Optimum value | g/kWh | 196 | 210 | 199 | 210 | on request |
| **Dimensions and masses – engine** | | | | | | |
| Length (L) | mm (in) | 2910 (114.6) | 2870 (113) | 3070 (120.9) | 2870 (113) | 3380 (133.1) |
| Width (W) | mm (in) | 1520 (59.8) | 1850 (72.8) | 1530 (60.2) | 1850 (72.8) | 1520 (59.8) |
| Height (H) | mm (in) | 1835 (72.2) | 2185 (86.0) | 1660 (65.4) | 2185 (86.0) | 1835 (72.2) |
| Mass, dry | kg (lbs) | 6975 (15377) | 8460 (18651) | 6140 (13536) | 8460 (18651) | 8170 (18012) |
| **Dimensions and masses – with gearbox** | | | | | | |
| Gearbox model, standard | | on request, | ZF 7600 | on request, | ZF 7600 | on request, |
| Gearbox model, alternative | | please | on request | please | on request | please |
| Length (L1) | mm (in) | contact your | 3910 (153.9) | contact your | 3910 (153.9) | contact your |
| Width (W) | mm (in) | MTU dealer | 1850 (72.8) | MTU dealer | 1850 (72.8) | MTU dealer |
| Height (H1) | mm (in) | | 2240 (88.2) | | 2240 (88.2) | |
| Mass, dry | kg (lbs) | | 2240 (88.2) | | 9810 (21627) | |
| **Engine main data** | | | | | | |
| No. of cylinders | | 12 | 12 | 16 | 12 | 16 |
| Bore / stroke | mm (in) | 165/190 (6.5/7.5) | 170/190 (6.7/7.5) | 165/185 (6.5/7.3) | 170/190 (6.7/7.5) | 165/190 (6.5/7.5) |
| Displacement, total | l (cu in) | 48.7 (2972) | 51.7 (3155) | 63.4 (3868) | 51.7 (3155) | 65.0 (3967) |
| Classification, unrestricted service | | X | X | X | X | X |

1) Certification on request

# Diesel engines for fast vessels with high load factors

## Series 4000

20V 4000

### Average load: 60 - 80% of rated power
### Rated power: 2320 kW - 3600 kW

| Engine model | | 16V 4000 M70 | 16V 4000 M71 | 16V 4000 M73 | 16V 4000 M73L | 20V 4000 M73 | 20V4000M73L |
|---|---|---|---|---|---|---|---|
| **Rated power ICFN** | **kW (bhp)** | **2320 (3111)** | **2465 (3306)** | **2560 (3435)** | **2880 (3860)** | **3200 (4290)** | **3600 (4830)** |
| **Speed** | **rpm** | **2000** | **2000** | **1970** | **2050** | **1970** | **2050** |
| **Exhaust optimization** | | IMO I | IMO I | IMO II/ EPA 2 | IMO II/ EPA 2 | IMO II/ EPA 2 | IMO II/ EPA 2 |
| **Fuel consumption** | | | | | | | |
| at rated power | g/kWh | 201 | 209 | 218 | 220 | 213 | 212 |
| | l/h (gal/h) | 561.8 (148.4) | 620.7 (164.0) | 672.4 (177.5) | 763.4 (201.5) | 821.2 (217.0) | 919.5 (242.9) |
| Optimum value | g/kWh | 196 | 196 | 205 | 205 | 210 | 210 |
| **Dimensions and masses – engine** | | | | | | | |
| Length (L) | mm (in) | 3380 (133.1) | 3380 (133.1) | 3510 (138.2) | 3510 (138.2) | 4040 (159.1) | 4040 (159.1) |
| Width (W) | mm (in) | 1520 (59.8) | 1520 (59.8) | 1850 (72.8) | 1850 (72.8) | 1470 (57.9) | 1470 (57.9) |
| Height (H) | mm (in) | 1835 (72.2) | 1835 (72.2) | 2185 (86) | 2185 (86) | 2440 (96.1) | 2440 (96.1) |
| Mass, dry | kg (lbs) | 8170 (18012) | 8170 (18012) | 9890 (21803) | 9890 (21803) | 12900 (28439) | 12900 (28439) |
| **Dimensions and masses – with gearbox** | | | | | | | |
| Gearbox model, standard | | on request, | on request, | ZF 7650 | ZF 9050 | ZF 9055 | ZF 24000 |
| Gearbox model, alternative | | please | please | on request | on request | on request | on request |
| Length (L1) | mm (in) | contact your | contact your | 4770 (187.8) | 4930 (194.1) | 5650 (222.4) | 5720 (225.2) |
| Width (W) | mm (in) | MTU dealer | MTU dealer | 1850 (72.8) | 1850 (72.8) | 1470 (57.9) | 1470 (57.9) |
| Height (H1) | mm (in) | | | 2240 (88.2) | 2345 (92.3) | 2610 (102.5) | 2250 (88.6) |
| Mass, dry | kg (lbs) | | | 10965 (24173) | 11380 (25088) | 14395 (31735) | 15585 (34358) |
| **Engine main data** | | | | | | | |
| No. of cylinders | | 16 | 16 | 16 | 16 | 20 | 20 |
| Bore / stroke | mm (in) | 165/190 (6.5/7.5) | 165/190 (6.5/7.5) | 170/190 (6.7/7.5) | 170/190 (6.7/7.5) | 170/190 (6.7/7.5) | 170/190 (6.7/7.5) |
| Displacement, total | l (cu in) | 65.0 (3967) | 65.0 (3967) | 69.0 (4210) | 69.0 (4210) | 86.2 (5260) | 86.2 (5260) |
| Classification, unrestricted service | | X | X | X | X | X | X |

# Diesel engines for fast vessels with high load factors

## Series 1163

20V 1163

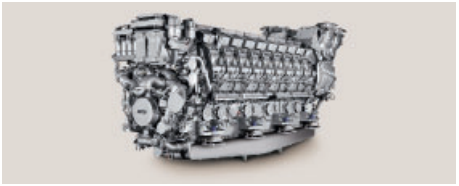


### Average load: 60 - 80% of rated power
### Rated power: 3600 kW - 6500 kW

| Engine model | | 12V 1163 M74 | 16V 1163 M74 | 16V 1163 TB73L | 20V 1163 TB73 | 20V 1163 M74 | 20V 1163 TB73L |
|---|---|---|---|---|---|---|---|
| **Rated power ICFN** | **kW (bhp)** | **3600 (4828)** | **4800 (6437)** | **5200 (6975)** | **6000 (8045)** | **6000 (8045)** | **6500 (8715)** |
| **Speed** | **rpm** | **1250** | **1250** | **1230** | **1200** | **1250** | **1230** |
| **Exhaust optimization** | | IMO II | IMO II | IMO I | IMO I | IMO II | IMO I |
| **Fuel consumption** | | on request, | on request, | | | on request, | |
| at rated power | g/kWh | please | please | 220 | 220 | please | 220 |
| | l/h (gal/h) | contact your | contact your | 1378 (364) | 1590 (420) | contact your | 1723 (455) |
| Optimum value | g/kWh | MTU dealer | MTU dealer | 208 | 209 | MTU dealer | 209 |
| **Dimensions and masses – engine** | | | | | | | |
| Length (L) | mm (in) | 3965 (156.1) | 4547 (179.0) | 4668 (183.8) | 5353 (210.8) | 5237 (206.2) | 5353 (210.8) |
| Width (W) | mm (in) | 1942 (76.5) | 1942 (76.5) | 1898 (74.8) | 1898 (74.8) | 1942 (76.5) | 1898 (74.8) |
| Height (H) | mm (in) | 2925 (115.6) | 2925 (115.2) | 3078 (121.2) | 3172 (124.9) | 2925 (115.2) | 3172 (124.9) |
| Mass, dry | kg (lbs) | 16490 (36354) | 20560 (45327) | 19700 (43431) | 22300 (49163) | 24480 (53969) | 22800 (50265) |
| **Dimensions and masses – with gearbox** | | | | | | | |
| Gearbox model, standard | | on request, | on request, | on request, | on request, | on request, | on request, |
| Gearbox model, alternative | | please | please | please | please | please | please |
| Length (L1) | mm (in) | contact your | contact your | contact your | contact your | contact your | contact your |
| Width (W) | mm (in) | MTU dealer | MTU dealer | MTU dealer | MTU dealer | MTU dealer | MTU dealer |
| Height (H1) | mm (in) | | | | | | |
| Mass, dry | kg (lbs) | | | | | | |
| **Engine main data** | | | | | | | |
| No. of cylinders | | 12 | 16 | 16 | 20 | 20 | 20 |
| Bore / stroke | mm (in) | 230/280 | 230/280 | 230/280 | 230/280 | 230/280 | 230/280 |
| | | (9.1/11.0) | (9.1/11.0) | (9.1/11.0) | (9.1/11.0) | (9.1/11.0) | (9.1/11.0) |
| Displacement, total | l (cu in) | 139.6 (8519) | 186.1 (11357) | 186.1 (11357) | 232.7 (14200) | 232.7 (14200) | 232.7 (14200) |
| Classification, unrestricted service | | X | X | X | X | X | X |

# Diesel engines for fast vessels with high load factors

## Series 8000



20V 8000



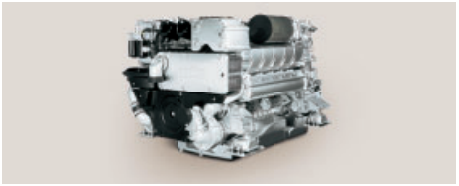
### Average load: 60 - 80% of rated power
### Rated power: 7200 kW - 9100 kW

| Engine model | | 20V 8000 M71R | 20V 8000 M71 | 20V 8000 M71L |
|---|---|---|---|---|
| **Rated power ICFN** | **kW (bhp)** | **7200 (9655)** | **8200 (10995)** | **9100 (12205)** |
| **Speed** | **rpm** | **1150** | **1150** | **1150** |
| **Exhaust optimization** | | IMO II | IMO II/EPA 2 | IMO II/EPA 2 |
| **Fuel consumption** | | | | |
| at rated power | g/kWh | 193 | 190 | 196 |
| | l/h (gal/h) | 1674.2 (442.2) | 1877.1 (495.8) | 2149.0 (567) |
| Optimum value | g/kWh | 184 | 184 | 185 |
| **Dimensions and masses – engine** | | | | |
| Length (L) | mm (in) | 6645 (261.5) | 6645 (261.5) | 6645 (261.5) |
| Width (W) | mm (in) | 2040 (80.3) | 2040 (80.3) | 2040 (80.3) |
| Height (H) | mm (in) | 3375 (132.8) | 3375 (132.8) | 3375 (132.8) |
| Mass, dry | kg (lbs) | 46200 (101853) | 46200 (101853) | 46200 (101853) |
| **Dimensions and masses – with gearbox** | | | | |
| Gearbox model, standard | | on request, please contact your MTU dealer | on request, please contact your MTU dealer | on request, please contact your MTU dealer |
| Gearbox model, alternative | | | | |
| Length (L1) | mm (in) | | | |
| Width (W) | mm (in) | | | |
| Height (H1) | mm (in) | | | |
| Mass, dry | kg (lbs) | | | |
| **Engine main data** | | | | |
| No. of cylinders | | 20 | 20 | 20 |
| Bore / stroke | mm (in) | 265/315 (10.4/12.4) | 265/315 (10.4/12.4) | 265/315 (10.4/12.4) |
| Displacement, total | l (cu in) | 347.4 (21200) | 347.4 (21200) | 347.4 (21200) |
| Classification, unrestricted service | | X | X | |
| Classification, restricted service | | | | X |

# Diesel engines for fast vessels with intermittent load factors

# Diesel engines for fast vessels with intermittent load factors

## Series 2000



10V 2000

### Average load: ≤ 60% of rated power
### Rated power: 810 kW - 1630 kW

| Engine model | | 8V 2000 M84 | 8V 2000 M84L | 10V 2000 M84 | 12V 2000 M84 | 16V 2000 M84 |
|---|---|---|---|---|---|---|
| **Rated power ICFN** | **kW (bhp)** | **810 (1085)** | **895 (1200)** | **1015 (1360)** | **1220 (1635)** | **1630 (2185)** |
| **Speed** | **rpm** | **2450** | **2450** | **2450** | **2450** | **2450** |
| **Exhaust optimization** | | IMO II/EPA 2/ EU [1), 2)] | IMO II/EPA 2 | IMO II/EPA 2/ EU [1), 2)] | IMO II/EPA 2/ EU [1), 2)] | IMO II/EPA 2/ EU [1), 2)] |
| **Fuel consumption** | | | | | | |
| at rated power | g/kWh | 221 | 228 | 215 | 217 | 214 |
| | l/h (gal/h) | 215.7 (57) | 245.9 (65) | 262.9 (69.4) | 319 (84.3) | 420.3 (111) |
| Optimum value | g/kWh | 195 | 195 | 190 | 198 | 195 |
| **Dimensions and masses – engine** | | | | | | |
| Length (L) | mm (in) | 1416 (55.7) | 1416 (55.7) | 1600 (63.0) | 1900 (74.8) | 2315 (91.1) |
| Width (W) | mm (in) | 1130 (44.5) | 1130 (44.5) | 1135 (44.7) | 1295 (51.0) | 1295 (51.0) |
| Height (H) | mm (in) | 1200 (47.2) | 1200 (47.2) | 1250 (49.2) | 1370 (53.9) | 1410 (55.5) |
| Mass, dry | kg (lbs) | 1980 (4365) | 1980 (4365) | 2240 (4938) | 2810 (6195) | 3380 (7452) |
| **Dimensions and masses – with gearbox** | | | | | | |
| Gearbox model, standard | | ZF 665 | ZF 665 | ZF 2050 | ZF 3000 | ZF 3060 |
| Gearbox model, alternative | | on request | on request | on request | on request | on request |
| Length (L1) | mm (in) | 2078 (81.8) | 2055 (80.9) | 2135 (84.1) | 2440 (96.1) | 2950 (116.1) |
| Width (W) | mm (in) | 1130 (44.5) | 1130 (44.5) | 1135 (44.7) | 1295 (51.0) | 1295 (51.0) |
| Height (H1) | mm (in) | 1200 (47.2) | 1200 (47.2) | 1245 (49.0) | 1320 (52.0) | 1400 (55.1) |
| Mass, dry | kg (lbs) | 2360 (5203) | 2360 (5203) | 2660 (5864) | 3270 (7209) | 4010 (8840) |
| **Engine main data** | | | | | | |
| No. of cylinders | | 8 | 8 | 10 | 12 | 16 |
| Bore / stroke | mm (in) | 135/156 (5.3/6.1) | 135/156 (5.3/6.1) | 135/156 (5.3/6.1) | 135/156 (5.3/6.1) | 135/156 (5.3/6.1) |
| Displacement, total | l (cu in) | 17.9 (1093) | 17.9 (1093) | 22.3 (1361) | 26.8 (1635) | 35.7 (2179) |
| Classification, unrestricted service | | X | X | X | X | X |

1) Recreational crafts EU 94/25 EC
2) EU IIIA/RheinSchUO (CCNR) on request

# Diesel engines for fast vessels with intermittent load factors

## Series 1163

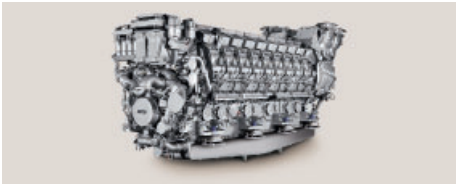
20V 1163

### Average load: ≤ 60% of rated power
### Rated power: 3900 kW - 6500 kW

| Engine model | | 12V 1163 M84 | 16V 1163 M84 | 20V 1163 M84 |
|---|---|---|---|---|
| **Rated power ICFN** | **kW (bhp)** | **3900 (5230)** | **5200 (6975)** | **6500 (8715)** |
| **Speed** | **rpm** | **1280** | **1280** | **1280** |
| **Exhaust optimization** | | IMO II | IMO II | IMO II |
| **Fuel consumption** | | | | |
| at rated power | g/kWh | on request, | on request, | on request, |
| | l/h (gal/h) | please | please | please |
| Optimum value | g/kWh | contact your MTU dealer | contact your MTU dealer | contact your MTU dealer |
| **Dimensions and masses – engine** | | | | |
| Length (L) | mm (in) | 3965 (156.1) | 4547 (179.0) | 5237 (206.2) |
| Width (W) | mm (in) | 1942 (76.5) | 1942 (76.5) | 1942 (76.5) |
| Height (H) | mm (in) | 2925 (115.6) | 2925 (115.2) | 2925 (115.2) |
| Mass, dry | kg (lbs) | 16490 (36354) | 20560 (45327) | 24480 (53969) |
| **Dimensions and masses – with gearbox** | | | | |
| Gearbox model, standard | | on request, | on request, | on request, |
| Gearbox model, alternative | | please | please | please |
| Length (L1) | mm (in) | contact your | contact your | contact your |
| Width (W) | mm (in) | MTU dealer | MTU dealer | MTU dealer |
| Height (H1) | mm (in) | | | |
| Mass, dry | kg (lbs) | | | |
| **Engine main data** | | | | |
| No. of cylinders | | 12 | 16 | 20 |
| Bore / stroke | mm (in) | 230/280 | 230/280 | 230/280 |
| | | (9.1/11.0) | (9.1/11.0) | (9.1/11.0) |
| Displacement, total | l (cu in) | 139.6 (8519) | 186.1 (11357) | 232.7 (14200) |
| Classification, unrestricted service | | X | X | X |

# Diesel engines for fast vessels with intermittent load factors

## Series 8000



20V 8000

### Average load: ≤ 60% of rated power
### Rated power: 7200 kW - 8200 kW

| Engine model | | 20V 8000 M81R | 20V 8000 M81 |
|---|---|---|---|
| **Rated power ICFN** | **kW (bhp)** | **7200 (9655)** | **8200 (10995)** |
| **Speed** | **rpm** | **1150** | **1150** |
| **Exhaust optimization** | | IMO II | IMO II/EPA 2 |
| **Fuel consumption** | | on request, | on request, |
| at rated power | g/kWh | please | please |
| | l/h (gal/h) | contact your | contact your |
| Optimum value | g/kWh | MTU dealer | MTU dealer |
| **Dimensions and masses – engine** | | | |
| Length (L) | mm (in) | 6645 (261.5) | 6645 (261.5) |
| Width (W) | mm (in) | 2040 (80.3) | 2040 (80.3) |
| Height (H) | mm (in) | 3375 (132.8) | 3375 (132.8) |
| Mass, dry | kg (lbs) | 49600 (109348)[1)] | 49600 (109348)[1)] |
| **Dimensions and masses – with gearbox** | | | |
| Gearbox model, standard | | on request, | on request, |
| Gearbox model, alternative | | please | please |
| Length (L1) | mm (in) | contact your | contact your |
| Width (W) | mm (in) | MTU dealer | MTU dealer |
| Height (H1) | mm (in) | | |
| Mass, dry | kg (lbs) | | |
| **Engine main data** | | | |
| No. of cylinders | | 20 | 20 |
| Bore / stroke | mm (in) | 265/315 (10.4/12.4) | 265/315 (10.4/12.4) |
| Displacement, total | l (cu in) | 347.4 (21200) | 347.4 (21200) |
| Classification, unrestricted service | | X | X |

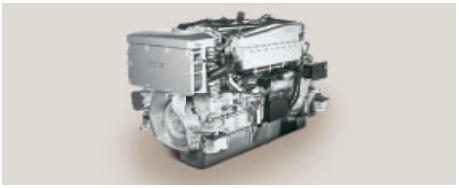
1) With highly resilient mounting system

# Diesel engines for fast vessels with low load factors

# Diesel engines for fast vessels with low load factors

## Series 60

### Average load: ≤ 60% of rated power
### Rated power: 466 kW - 615 kW

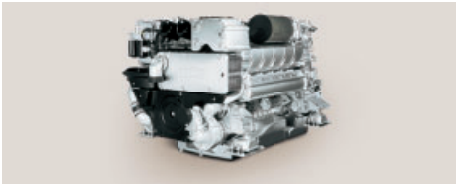


S60

| Engine model | | S60 | S60 | S60 | S60 | S60 |
|---|---|---|---|---|---|---|
| **Rated power ICFN** | **kW (bhp)** | **466 (625)** | **499 (670)** | **552 (740)** | **597 (800)** | **615 (825)** |
| **Speed** | **rpm** | **2300** | **2300** | **2300** | **2300** | **2300** |
| **Exhaust optimization** | | IMO II/EPA 2 | IMO II/EPA 2 | IMO II/EPA 2 | IMO II/EPA 2 | IMO II/EPA 2 |
| **Fuel consumption** | | | | | | |
| at rated power | g/kWh | 216 | 211 | 215 | 218 | 219 |
| | l/h (gal/h) | 121.0 (31.9) | 127.0 (33.5) | 143.1 (37.9) | 156.7 (41.4) | 162.4 (42.9) |
| **Dimensions and masses – engine** | | | | | | |
| Length (L) | mm (in) | 1850 (72.8) | 1850 (72.8) | 1850 (72.8) | 1850 (72.8) | 1850 (72.8) |
| Width (W) | mm (in) | 1035 (40.7) | 1035 (40.7) | 1035 (40.7) | 1035 (40.7) | 1035 (40.7) |
| Height (H) | mm (in) | 1160 (45.7) | 1160 (45.7) | 1160 (45.7) | 1160 (45.7) | 1160 (45.7) |
| Mass, dry | kg (lbs) | 1633 (3600) | 1633 (3600) | 1633 (3600) | 1633 (3600) | 1633 (3600) |
| **Dimensions and masses – with gearbox** | | | | | | |
| Gearbox model, standard | | MG 5114 A SC | MG 5114 A | MG 5114 A | MG 5114 A | MG 5114 A |
| Gearbox model, alternative | | on request | on request | on request | on request | on request |
| Length (L1) | mm (in) | 2036 (80.2) | 2039 (80.3) | 2039 (80.3) | 2039 (80.3) | 2039 (80.3) |
| Width (W) | mm (in) | 1035 (40.7) | 1035 (40.7) | 1035 (40.7) | 1035 (40.7) | 1035 (40.7) |
| Height (H1) | mm (in) | 1170 (46.1) | 1160 (45.7) | 1160 (45.7) | 1160 (45.7) | 1160 (45.7) |
| Mass, dry | kg (lbs) | 1941 (4279) | 1839 (4054) | 1839 (4054) | 1839 (4054) | 1839 (4054) |
| **Engine main data** | | | | | | |
| No. of cylinders | | 6 | 6 | 6 | 6 | 6 |
| Bore / stroke | mm (in) | 133/168 (5.2/6.6) | 133/168 (5.2/6.6) | 133/168 (5.2/6.6) | 133/168 (5.2/6.6) | 133/168 (5.2/6.6) |
| Displacement, total | l (cu in) | 14.0 (855) | 14.0 (855) | 14.0 (855) | 14.0 (855) | 14.0 (855) |
| Classification, restricted service | | X | X | X | X | X |

# Diesel engines for fast vessels with low load factors

## Series 2000



10V 2000

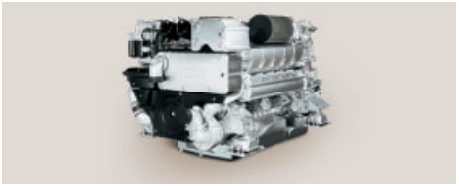
### Average load: ≤ 60% of rated power
### Rated power: 895 kW - 1340 kW

| Engine model | | 8V 2000 M93 | 8V 2000 M94 | 10V 2000 M93 | 10V 2000 M94 | 12V 2000 M93 |
|---|---|---|---|---|---|---|
| **Rated power ICFN** | **kW (bhp)** | **895 (1200)** | **932 (1250)** | **1120 (1500)** | **1193 (1600)** | **1340 (1800)** |
| **Speed** | **rpm** | **2450** | **2450** | **2450** | **2450** | **2450** |
| **Exhaust optimization** | | IMO II/EPA 2/ EU IIIA[1)] | IMO II/EPA 2/ EU[2), 3)] | IMO II/EPA 2/ EU IIIA[1)] | IMO II/EPA 2/ EU[2), 3)] | IMO II/EPA 2/ EU IIIA[1)] |
| **Fuel consumption** | | | | | | |
| at rated power | g/kWh | 215 | 226 | 214 | 218 | 213 |
| | l/h (gal/h) | 231.8 (61.3 ) | 253.8 (67) | 288.8 (76.3) | 313.3 (82.8) | 343.9 (90.9) |
| Optimum value | g/kWh | 195 | 195 | 195 | 190 | 193 |
| **Dimensions and masses – engine** | | | | | | |
| Length (L) | mm (in) | 1370 (53.9) | 1416 (55.7) | 1545 (60.8) | 1600 (63.0) | 1870 873.6) |
| Width (W) | mm (in) | 1130 (44.5) | 1130 (44.5) | 1130 (44.5) | 1135 (44.7) | 1295 (51.0) |
| Height (H) | mm (in) | 1200 (47.2) | 1200 (47.2) | 1230 (48.4) | 1250 (49.2) | 1350 (53.1) |
| Mass, dry | kg (lbs) | 1980 (4365) | 1980 (4365) | 2240 (4938) | 2240 (4938) | 2810 (6195) |
| **Dimensions and masses – with gearbox** | | | | | | |
| Gearbox model, standard | | ZF 550 | ZF 550 | ZF 2050 | ZF 2050 | ZF 2060 |
| Gearbox model, alternative | | on request | on request | on request | on request | on request |
| Length (L1) | mm (in) | 2055 (80.9) | 2055 (80.9) | 2255 (88.8) | 2285 (90.0) | 2580 (101.6) |
| Width (W) | mm (in) | 1130 (44.5) | 1130 (44.5) | 1130 (44.5) | 1130 (44.5) | 1295 (51.0) |
| Height (H1) | mm (in) | 1200 (47.2) | 1200 (47.2) | 1230 (48.4) | 1240 (48.8) | 1350 (53.1) |
| Mass, dry | kg (lbs) | 2360 (5203) | 2360 (5203) | 2660 (5864) | 2725 (6008) | 3270 (7209) |
| **Engine main data** | | | | | | |
| No. of cylinders | | 8 | 8 | 10 | 10 | 12 |
| Bore / stroke | mm (in) | 135/156 (5.3/6.1) | 135/156 (5.3/6.1) | 135/156 (5.3/6.1) | 135/156 (5.3/6.1) | 135/156 (5.3/6.1) |
| Displacement, total | l (cu in) | 17.9 (1093) | 17.9 (1093) | 22.3 (1361) | 17.9 (1093) | 26.8 (1635) |
| Classification, restricted service | | X | X | X | X | X |

1) Including recreational crafts EU 94/25 EC
2) Recreational crafts EU 94/25 EC
3) EU IIIA/RheinSchUO (CCNR) on request

# Diesel engines for fast vessels with low load factors

## Series 2000



10V 2000

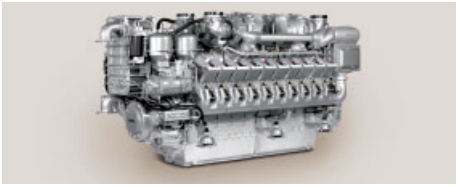
### Average load: ≤ 60% of rated power
### Rated power: 1432 kW - 1939 kW

| Engine model | | 12V 2000 M94 | 16V 2000 M91 | 16V 2000 M93 | 16V 2000 M94 |
|---|---|---|---|---|---|
| **Rated power ICFN** | **kW (bhp)** | **1432 (1920)** | **1492 (2000)** | **1790 (2400)** | **1939 (2600)** |
| **Speed** | **rpm** | **2450** | **2350** | **2450** | **2450** |
| **Exhaust optimization** | | IMO II/EPA 2/ EU [2), 3)] | IMO II/EPA 2/ EU IIIA[1)] | IMO II/EPA 2/ EU IIIA[1)] | IMO II/EPA 2/ EU [2), 3)] |
| **Fuel consumption** | | | | | |
| at rated power | g/kWh | 217 | 219 | 209 | 216 |
| | l/h (gal/h) | 374.4 (98.9) | 393.7 (104.0) | 450.7 (119.1) | 504.6 (133.3) |
| Optimum value | g/kWh | 197 | 194 | 191 | 194 |
| **Dimensions and masses – engine** | | | | | |
| Length (L) | mm (in) | 1900 (74.8) | 2255 (88.8) | 2285 (90.0) | 2315 (91.1) |
| Width (W) | mm (in) | 1295 (51.0) | 1400 (55.1) | 1295 (51.0) | 1295 (51.0) |
| Height (H) | mm (in) | 1370 (53.9) | 1290 (50.8) | 1390 (54.7) | 1410 (55.5) |
| Mass, dry | kg (lbs) | 2810 (6195) | 3275 (7220) | 3380 (7452) | 3380 (7452) |
| **Dimensions and masses – with gearbox** | | | | | |
| Gearbox model, standard | | ZF 2075 | on request, please contact your MTU dealer | ZF 3060 | ZF 3070 |
| Gearbox model, alternative | | on request | | Twin Disc[4)] | on request |
| Length (L1) | mm (in) | 2440 (96.1) | | 3105 (122.2) | 2950 (116.1) |
| Width (W) | mm (in) | 1295 (51.0) | | 1295 (51.0) | 1295 (51.0) |
| Height (H1) | mm (in) | 1320 (52.0) | | 1390 (54.7) | 1400 (55.1) |
| Mass, dry | kg (lbs) | 3270 (7209) | | 4010 (8840) | 4010 (8840) |
| **Engine main data** | | | | | |
| No. of cylinders | | 12 | 16 | 16 | 16 |
| Bore / stroke | mm (in) | 135/156 (5.3/6.1) | 130/150 (5.1/5.9) | 135/156 (5.3/6.1) | 135/156 (5.3/6.1) |
| Displacement, total | l (cu in) | 22.3 (1361) | 31.8 (1943) | 35.7 (2179) | 35.7 (2179) |
| Classification, restricted service | | X | X | X | X |

1) Including recreational crafts EU 94/25 EC
2) Recreational crafts EU 94/25 EC
3) EU IIIA/RheinSchUO (CCNR) on request
4) Twin Disc MGX-5147

# Diesel engines for fast vessels with low load factors

## Series 4000



20V 4000

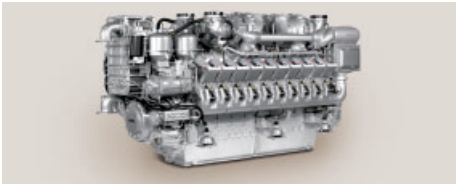
### Average load: ≤ 60% of rated power
### Rated power: 2040 kW - 3440 kW

| Engine model | | 12V 4000 M90 | 12V 4000 M93 | 12V 4000 M93L | 16V 4000 M90 | 16V 4000 M93 | 16V 4000 M93L |
|---|---|---|---|---|---|---|---|
| **Rated power ICFN** | **kW (bhp)** | **2040 (2736)** | **2340 (3140)** | **2580 (3460)** | **2720 (3648)** | **3120 (4185)** | **3440 (4615)** |
| **Speed** | **rpm** | **2100** | **2100** | **2100** | **2100** | **2100** | **2100** |
| **Exhaust optimization** | | IMO I | IMO II/ EPA 2 | IMO II/ EPA 2 | IMO I | IMO II/ EPA 2 | IMO II/ EPA 2 |
| **Fuel consumption** | | | | | | | |
| at rated power | g/kWh | 209 | 216 | 217 | 209 | 224 | 230 |
| | l/h (gal/h) | 513.7 (135.7) | 609.0 (160.8) | 674.5 (178.1) | 685 (181) | 842.0 (222.5) | 953.3 (251.9) |
| Optimum value | g/kWh | 195 | 205 | 205 | 197 | 205 | 205 |
| **Dimensions and masses – engine** | | | | | | | |
| Length (L) | mm (in) | 2835 (111.6) | 2870 (113) | 2870 (113) | 3380 (133.1) | 3510 (138.2) | 3510 (138.2) |
| Width (W) | mm (in) | 1520 (59.8) | 1850 (72.8) | 1850 (72.8) | 1520 (59.8) | 1850 (72.8) | 1850 (72.8) |
| Height (H) | mm (in) | 1835 (72.2) | 2185 (86) | 2185 (86) | 1835 (72.2) | 2185 (86) | 2185 (86) |
| Mass, dry | kg (lbs) | 6800 (14991) | 8460 (18651) | 8460 (18651) | 8030 (17703) | 9890 (21803) | 9890 (21803) |
| **Dimensions and masses – with gearbox** | | | | | | | |
| Gearbox model, standard | | on request, | ZF 7600 | ZF 7600 | on request, | ZF 9000 | ZF 9050 |
| Gearbox model, alternative | | please | on request | on request | please | on request | on request |
| Length (L1) | mm (in) | contact your | 3910 (153.9) | 3910 (153.9) | contact your | 4930 (194.1) | 4930 (194.1) |
| Width (W) | mm (in) | MTU dealer | 1850 (72.8) | 1850 (72.8) | MTU dealer | 1850 (72.8) | 1850 (72.8) |
| Height (H1) | mm (in) | | 2240 (88.2) | 2240 (88.2) | | 2345 (92.3) | 2345 (92.3) |
| Mass, dry | kg (lbs) | | 9810 (21627) | 9810 (21627) | | 11380 (25088) | 11380 (25088) |
| **Engine main data** | | | | | | | |
| No. of cylinders | | 12 | 12 | 12 | 16 | 16 | 16 |
| Bore / stroke | mm (in) | 165/190 (6.5/7.5) | 170/190 (6.7/7.5) | 170/190 (6.7/7.5) | 165/190 (6.5/7.5) | 170/190 (6.7/7.5) | 170/190 (6.7/7.5) |
| Displacement, total | l (cu in) | 48.7 (2972) | 51.7 (3155) | 51.7 (3155) | 65.0 (3967) | 69.0 (4211) | 69.0 (4211) |
| Classification, restricted service | | X | X | X | X | X | X |

# Diesel engines for fast vessels with low load factors

## Series 4000
## Series 1163

### Average load: ≤ 60% of rated power
### Rated power: 3900 kW - 5920 kW



20V 4000

| Engine model | | 20V 4000 M93 | 20V 4000 M93L | 12V 1163 TB93 | 12V 1163 M94 | 16V 1163 TB93 | 16V 1163 M94 |
|---|---|---|---|---|---|---|---|
| **Rated power ICFN** | **kW (bhp)** | **3900 (5230)** | **4300 (5766)** | **4440 (5955)** | **4440 (5955)** | **5920 (7940)** | **5920 (7940)** |
| **Speed** | **rpm** | **2100** | **2100** | **1300** | **1325** | **1300** | **1325** |
| **Exhaust optimization** | | IMO II/ EPA 2 | IMO II/ EPA 2 | IMO I | IMO II | IMO I | IMO II |
| **Fuel consumption** | | | | | | | |
| at rated power | g/kWh | 212 | 220 | 229 | on request, please contact your MTU dealer | 225 | on request, please contact your MTU dealer |
| | l/h (gal/h) | 996.1 (263.2) | 1139.8 (300.9) | 1225 (323.6) | | 1605 (424) | |
| Optimum value | g/kWh | 205 | 205 | 217 | | 210 | |
| **Dimensions and masses – engine** | | | | | | | |
| Length (L) | mm (in) | 4040 (159.1) | 4040 (159.1) | 3766 (148.3) | 3965 (156.1) | 4668 (183.8) | 4547 (179.0) |
| Width (W) | mm (in) | 1470 (57.9) | 1470 (57.9) | 1660 (65.4) | 1942 (76.5) | 1898 (74.8) | 1942 (76.5) |
| Height (H) | mm (in) | 2440 (96.1) | 2440 (96.1) | 2985 (117.5) | 2925 (115.2) | 3078 (121.2) | 2925 (115.2) |
| Mass, dry | kg (lbs) | 12900 (28439) | 12900 (28439) | 15865 (34976) | 16490 (36354) | 19700 (43431) | 20560 (45327) |
| **Dimensions and masses - with gearbox** | | | | | | | |
| Gearbox model, standard | | ZF 24000 | ZF 24000 | on request, please contact your MTU dealer | on request, please contact your MTU dealer | on request, please contact your MTU dealer | on request, please contact your MTU dealer |
| Gearbox model, alternative | | on request | on request | | | | |
| Length (L1) | mm (in) | 6025 (237.2) | 6025 (237.2) | | | | |
| Width (W) | mm (in) | 1470 (57.9) | 1470 (57.9) | | | | |
| Height (H1) | mm (in) | 2250 (88.6) | 2250 (88.6) | | | | |
| Mass, dry | kg (lbs) | 15587 (34363) | 15587 (34363) | | | | |
| **Engine main data** | | | | | | | |
| No. of cylinders | | 20 | 20 | 12 | 12 | 16 | 16 |
| Bore / stroke | mm (in) | 170/190 (6.7/7.5) | 170/190 (6.7/7.5) | 230/280 (9.1/11.0) | 230/280 (9.1/11.0) | 230/280 (9.1/11.0) | 230/280 (9.1/11.0) |
| Displacement, total | l (cu in) | 86.2 (5260) | 86.2 (5260) | 139.6 (8519) | 139.6 (8519) | 186.1 (11357) | 186.1 (11357) |
| Classification, restricted service | | X | X | X | X | X | X |

# Diesel engines for fast vessels with low load factors

## Series 1163
## Series 8000

### Average load: ≤ 60% of rated power
### Rated power: 7400 kW - 10000 kW

20V 1163

| Engine model | | 20V 1163 TB93 | 20V 1163 M94 | 20V 8000 M91 | 20V 8000 M91L |
|---|---|---|---|---|---|
| **Rated power ICFN** | **kW (bhp)** | **7400 (9925)** | **7400 (9925)** | **9100 (12205)** | **10000 (13410)** |
| **Speed** | **rpm** | **1300** | **1325** | **1150** | **1150** |
| **Exhaust optimization** | | IMO I | IMO II | IMO II/ EPA 2 | IMO II |
| **Fuel consumption** | | | on request, | | |
| at rated power | g/kWh | 225 | please | 196 | 199 |
| | l/h (gal/h) | 2006 (530) | contact your | 2149 (567) | 2397.6 (633.3) |
| Optimum value | g/kWh | 210 | MTU dealer | 192 | 192 |
| **Dimensions and Masses – engine** | | | | | |
| Length (L) | mm (in) | 5353 (210.8) | 5237 (206.2) | 6645 (261.5) | 6645 (261.5) |
| Width (W) | mm (in) | 1898 (74.8) | 1942 (76.5) | 2040 (80.3) | 2040 (80.3) |
| Height (H) | mm (in) | 3172 (124.9) | 2925 (115.2) | 3375 (132.8) | 3375 (132.9) |
| Mass, dry | kg (lbs) | 22800 (50265) | 24480 (53969) | 49600 (109348)[1)] | 49600 (109348)[1)] |
| **Dimensions and masses - with gearbox** | | | | | |
| Gearbox model, standard | | on request, | on request, | on request, | on request, |
| Gearbox model, alternative | | please | please | please | please |
| Length (L1) | mm (in) | contact your | contact your | contact your | contact your |
| Width (W) | mm (in) | MTU dealer | MTU dealer | MTU dealer | MTU dealer |
| Height (H1) | mm (in) | | | | |
| Mass, dry | kg (lbs) | | | | |
| **Engine main data** | | | | | |
| No. of cylinders | | 20 | 20 | 20 | 20 |
| Bore / stroke | mm (in) | 230/280 | 230/280 | 265/315 | 265/315 |
| | | (9.1/11.0) | (9.1/11.0) | (10.4/12.4) | (10.4/12.4) |
| Displacement, total | l (cu in) | 232.7 (14200) | 232.7 (14200) | 347.4 (21200) | 347.4 (21200) |
| Classification, restricted service | | X | X | X | X |

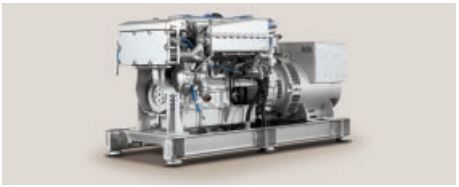
1) With highly resilient mounting system

# Diesel engines for on-board power generation and diesel-electric drives in unrestricted continuous operation

# Diesel engines for on-board power generation and diesel-electric drives in unrestricted continuous operation

## Series 1600
## Series 60
## Series 2000
## Series 396

Rated power: 269 kW - 680 kW



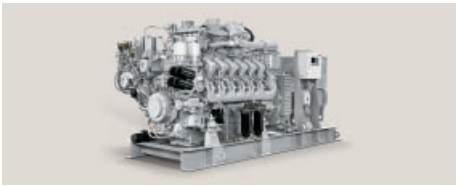
Generator Set
Series 60

| Engine model | | 6R 1600 M20F | S60 | 8V 2000 M51A | 12V 2000 M51A | 16V 2000 M51A | 8V 396 TE54 |
|---|---|---|---|---|---|---|---|
| | | 50 Hz | 50 Hz | 50 Hz | 50 Hz | 50 Hz | 50 Hz |
| **Rated power ICXN** | **kW (bhp)** | **269 (361)** | **298 (400)** | **332 (445)** | **498 (668)** | **664 (890)** | **680 (912)** |
| **Speed** | **rpm** | **1500** | **1500** | **1500** | **1500** | **1500** | **1500** |
| **Exhaust optimization**[1] | | IMO II | IMO I | IMO II | IMO II | IMO II compliant[2] | IMO II |
| **Fuel consumption** | | | | | | | |
| At 100% power | g/kWh | 201 | 200 | 203 | 203 | 205 | 202 |
| | l/h (gal/h) | 65.1 (17.2) | 71.8 (19.0) | 81.1 (21.4) | 121.8 (32.2) | 163.4 (43.2) | 165.5 (43.7) |
| At 75% power | g/kWh | 204 | 199 | 208 | 210 | 210 | 207 |
| | l/h (gal/h) | 49 (12.9) | 53.6 (14.2) | 62.4 (16.5) | 94.2 (24.9) | 125.5 (33.2) | 127.2 (33.6) |
| **Dimensions and masses** | | | | | | | |
| Length (L) | mm (in) | 1560 (61.4) | 1842 (72.5) | 1430 (56.3) | 2105 (82.9) | 2525 (99.4) | 2005 (78.9) |
| Width (W) | mm (in) | 1185 (46.7) | 1035 (40.7) | 1280 (50.4) | 1400 (55.1) | 1425 (56.1) | 1525 (60.0) |
| Height (H) | mm (in) | 1268 (49.9) | 1160 (45.7) | 1315 (51.8) 1290 | 50.8) | 1290 (50.8) | 1540 (60.6) |
| Mass, dry | kg (lbs) | 1448 (1392.3) | 1633 (3600) | 1870 (4122.6) | 2755 (6064) | 3270 (7209) | 3330 (7341) |
| **Engine main data** | | | | | | | |
| No. of cylinders | | 6 | 6 | 8 | 12 | 16 | 8 |
| Bore / stroke | mm (in) | 122/150 (4.8/5.9) | 133/168 (5.2/6.6) | 130/150 (5.1/5.9) | 130/150 (5.1/5.9) | 130/150 (5.1/5.9) | 165/185 (6.5/7.3) |
| Displacement, total | l (cu in) | 10.5 (640.7) | 14.0 (855) | 15.9 (970) | 23.9 (1458) | 31.8 (1943) | 31.7 (1933) |
| Classification, unrestricted service | | X | X | X | X | X | X |
| Engine mounted cooler | | X | X | X | X | X | X |
| Keel cooling | | X | X | X | X | X | X |
| Radiator cooling | | | | | | | |

1) Other emissions on request
2) Certification on request

# Diesel engines for on-board power generation and diesel-electric drives in unrestricted continuous operation

## Series 396
## Series 4000



Generator Set
Series 4000

## Rated power: 760 kW - 1520 kW

| Engine model | | 8V 4000 M23F | 12V 396 TE54 | 12V 4000 M23F | 16V 4000 M23F |
|---|---|---|---|---|---|
| | | 50 Hz | 50 Hz | 50 Hz | 50 Hz |
| **Rated power ICXN** | **kW (bhp)** | **760 (1019)** | **1030 (1382)** | **1140 (1529)** | **1520 (2038)** |
| **Speed** | **rpm** | **1500** | **1500** | **1500** | **1500** |
| **Exhaust optimization**[1] | | IMO II | IMO II compliant[2] | IMO II | IMO II |
| **Fuel consumption** | | | | | |
| At 100% power | g/kWh | 209 | 202 | 202 | 203 |
| | l/h (gal/h) | 191.4 (50.5) | 250.7 (66.2) | 277.4 (73.3) | 371.8 (98.2) |
| At 75% power | g/kWh | 201 | 205 | 213 | 212 |
| | l/h (gal/h) | 138.0 (36.5) | 190.8 (50.4) | 219.4 (58) | 291.2 (76.9) |
| **Dimensions and masses** | | | | | |
| Length (L) | mm (in) | 2040 (80.3) | 2535 (99.8) | 2520 (99.2) | 2990 (117.7) |
| Width (W) | mm (in) | 1615 (63.6) | 1525 (60.0) | 1850 (72.8) | 1850 (72.8) |
| Height (H) | mm (in) | 2195 (86.4) | 1695 (66.7) | 2185 (86) | 2180 (85.8) |
| Mass, dry | kg (lbs) | 5460 (12037) | 4445 (9800) | 7240 (15961) | 8590 (18937) |
| **Engine main data** | | | | | |
| No. of cylinders | | 8 | 12 | 12 | 16 |
| Bore / stroke | mm (in) | 170/210 (6.7/8.3) | 165/185 (6.5/7.3) | 170/210 (6.7/8.3) | 170/210 (6.7/8.3) |
| Displacement, total | l (cu in) | 38.2 (2331) | 47.5 (2900) | 57.2 (3491) | 76.3 (4656) |
| Classification, unrestricted service | | X | X | X | X |
| Engine mounted cooler | | X | X | X | X |
| Keel cooling | | X | X | X | X |
| Radiator cooling | | | | | |

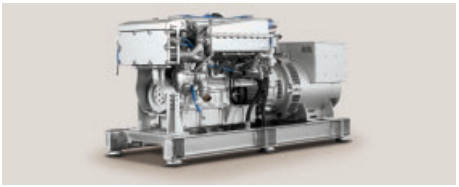
1) Other emissions on request
2) Certification on request

3A - 50 Hz

# Diesel engines for on-board power generation and diesel-electric drives in unrestricted continuous operation

## Series 60
## Series 1600
## Series 2000
## Series 396

Rated power: 271 kW - 790 kW



Generator Set
Series 60

| Engine model | | S60 | S60 | 6R 1600 M20S | 8V 2000 M51B | 12V 2000 M51B | 8V 396 TE54 |
|---|---|---|---|---|---|---|---|
| | | 60 Hz | 60 Hz | 60 Hz | 60 Hz | 60 Hz | 60 Hz |
| **Rated power ICXN** | **kW (bhp)** | **271 (363)** | **322 (432)** | **323 (433)** | **400 (536)** | **600 (805)** | **790 (1059)** |
| **Speed** | **rpm** | **1800** | **1800** | **1800** | **1800** | **1800** | **1800** |
| **Exhaust optimization**[1] | | IMO II/EPA 2 | IMO II/EPA 2 | IMO II, EPA Tier 3 | IMO II | IMO II | IMO II compliant[2] |
| **Fuel consumption** | | | | | | | |
| At 100% power | g/kWh | 197 | 197 | 204 | 207 | 208 | 205 |
| | l/h (gal/h) | 64.3 (17.0) | 76.4 (20.2) | 79.4 (20.9) | 99.8 (26.4) | 149.8 (39.6) | 195.1 (51.5) |
| At 75% power | g/kWh | 200 | 200 | 213 | 211 | 212 | 209 |
| | l/h (gal/h) | 49.0 (12.9) | 58.2 (15.4) | 62 (17.9) | 76.3 (20.1) | 114.5 (30.3) | 149.2 (39.4) |
| **Dimensions and masses** | | | | | | | |
| Length (L) | mm (in) | 1842 (72.5) | 1842 (72.5) | 1560 (61.4) | 1435 (56.5) | 2105 (82.9) | 2005 (78.9) |
| Width (W) | mm (in) | 1035 (40.7) | 1035 (40.7) | 1185 (46.7) | 1280 (50.4) | 1400 (55.1) | 1525 (60.0) |
| Height (H) | mm (in) | 1160 (45.7) | 1160 (45.7) | 1268 (49.9) | 1315 (51.8) | 1290 (50.8) | 1540 (60.6) |
| Mass, dry | kg (lbs) | 1633 (3600) | 1633 (3600) | 1448 (1392.3) | 1870 (4122.6) | 2755 (6064) | 3800 (8377) |
| **Engine main data** | | | | | | | |
| No. of cylinders | | 6 | 6 | 6 | 8 | 12 | 8 |
| Bore / stroke | mm (in) | 133/168 (5.2/6.6) | 133/168 (5.2/6.6) | 122/150 (4.8/5.9) | 130/150 (5.1/5.9) | 130/150 (5.1/5.9) | 165/185 (6.5/7.3) |
| Displacement, total | l (cu in) | 14.0 (855) | 14.0 (855) | 10.5 (640.7) | 15.9 (970) | 23.9 (1458) | 31.7 (1933) |
| Classification, unrestricted service | | X | X | X | X | X | X |
| Engine mounted cooler | | X | X | X | X | X | X |
| Keel cooling | | X | X | X | X | X | X |
| Radiator cooling | | | | | | | |

1) Other emissions on request
2) Certification on request

3A - 60 Hz

# Diesel engines for on-board power generation and diesel-electric drives in unrestricted continuous operation

## Series 2000
## Series 396
## Series 4000

### Rated power: 800 kW - 1380 kW

Generator Set
Series 396

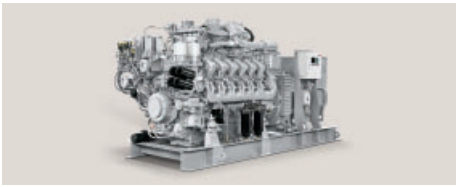
| Engine model | | 16V 2000 M51B | 8V 4000 M23S | 8V 4000 M24S | 12V 4000 M24S | 12V 396 TE54 | 12V 4000 M23S |
|---|---|---|---|---|---|---|---|
| | | 60 Hz | 60 Hz | 60 Hz | 60 Hz | 60 Hz | 60 Hz |
| **Rated power ICXN** | kW (bhp) | **800 (1073)** | **920 (1234)** | **895 (1200)** | **1193 (1600)** | **1200 (1609)** | **1380 (1851)** |
| **Speed** | rpm | **1800** | **1800** | **1800** | **1800** | **1800** | **1800** |
| **Exhaust optimization**[2] | | IMO II | IMO II/EPA 2 | EPA 3/IMO II | EPA 3/IMO II | IMO II compliant[3] | IMO II/EPA 2 |
| **Fuel consumption** | | | | | | | |
| At 100% power | g/kWh | 204 | on request, | 212 | on request, | 205 | 207 |
| | l/h (gal/h) | 195.9 (51.8) | please | 252 (66.6) | please | 296.4 (78.3) | 344.2 (90.9) |
| At 75% power | g/kWh | 210 | contact your | 215 | contact your | 210 | 217 |
| | l/h (gal/h) | 151.3 (40.0) | MTU dealer | 191 (50.5) | MTU dealer | 227.7 (60.1) | 270.6 (71.5) |
| **Dimensions and masses** | | | | | | | |
| Length (L) | mm (in) | 2525 (99.4) | 2040 (80.3) | 2386 (93.9) | 2638 (103.9) | 2535 (99.8) | 2520 (99.2) |
| Width (W) | mm (in) | 1425 (56.1) | 1615 (63.6) | 1613 (63.5) | 1690 (66.5) | 1525 (60.0) | 1850 (72.8) |
| Height (H) | mm (in) | 1290 (50.8) | 2195 (86.4) | 1972 (77.6) | 2071 (81.5) | 1600 (63.0) | 2185 (86) |
| Mass, dry | kg (lbs) | 3270 (7209) | 5460 (12037) | 5680 (12522) | 7750 (17086) | 4900 (10803) | 7240 (15961) |
| **Engine main data** | | | | | | | |
| No. of cylinders | | 16 | 8 | 8 | 12 | 12 | 12 |
| Bore / stroke | mm (in) | 130/150 (5.1/5.9) | 170/210 (6.7/8.3) | 170/210 (6.7/8.3) | 170/210 (6.7/8.3) | 165/185 (6.5/7.3) | 170/210 (6.7/8.3) |
| Displacement, total | l (cu in) | 31.8 (1943) | 38.2 (2331) | 38.1 (2325) | 57.2 (3490.1) | 47.5 (2900) | 57.2 (3491 |
| Classification, unrestricted service | | X | X | X | X | X | X |
| Engine mounted cooler | | X | X | X | X | X | X |
| Keel cooling | | X | X | X | X | X | X |
| Radiator cooling | | | | | | | |

1) Separate-circuit charge-air cooling system
2) Other emissions on request
3) Certification on request

3A - 60 Hz

# Diesel engines for on-board power generation and diesel-electric drives in unrestricted continuous operation

## Series 396
## Series 4000



Generator Set
Series 4000

## Rated power: 1580 kW - 1840 kW

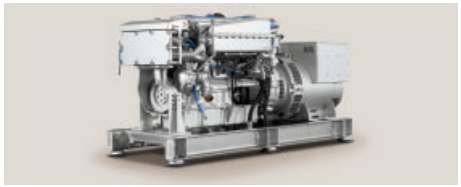
| Engine model | | 16V 396 TE54 | 16V 4000 M24S | 16V 4000 M23S |
|---|---|---|---|---|
| | | 60 Hz | 60 Hz | 60 Hz |
| **Rated power ICXN** | **kW (bhp)** | **1580 (2119)** | **1685 (2260)** | **1840 (2467)** |
| **Speed** | **rpm** | **1800** | **1800** | **1800** |
| **Exhaust optimization**[2] | | IMO II compliant[3] | EPA 3/IMO II | IMO II/EPA 2 |
| **Fuel consumption** | | | | |
| At 100% power | g/kWh | 206 | on request, | 206 |
| | l/h (gal/h) | 392.1 (103.6) | please | 456.7 (120.6) |
| At 75% power | g/kWh | 211 | contact your | 214 |
| | l/h (gal/h) | 301.3 (79.6) | MTU dealer | 355.8 (94) |
| **Dimensions and masses** | | | | |
| Length (L) | mm (in) | 3070 (120.8) | 3108 (122.4) | 2990 (117.7) |
| Width (W) | mm (in) | 1525 (60.0) | 1690 (66.5) | 1850 (72.8) |
| Height (H) | mm (in) | 1660 (65.3) | 2064 (81.3) | 2180 (85.8) |
| Mass, dry | kg (lbs) | 6000 (13228) | 8908 (19639) | 8590 (18937) |
| **Engine main data** | | | | |
| No. of cylinders | | 16 | 16 | 16 |
| Bore / stroke | mm (in) | 165/185 (6.5/7.3) | 170/210 (6.7/8.3) | 170/210 (6.7/8.3) |
| Displacement, total | l (cu in) | 63.4 (3868) | 76.3 (4656) | 76.3 (4656) |
| Classification, unrestricted service | | X | X | X |
| Engine mounted cooler | | X | X | X |
| Keel cooling | | X | X | X |
| Radiator cooling | | | | |

3) Certification on request

# Diesel engines for on-board power generation and diesel-electric drives in continuous operation with variable load

# Diesel engines for on-board power generation and diesel-electric drives in continuous operation with variable load

## Series 60
## Series 2000



Generator Set
Series 60

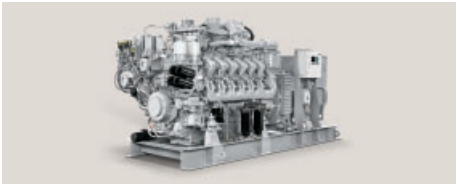
## Rated power: 354 kW - 770 kW

| Engine model | | S60 | 8V 2000 M41A | 12V 2000 M41A | 16V 2000 M41A |
|---|---|---|---|---|---|
| | | 50 Hz | 50 Hz | 50 Hz | 50 Hz |
| **Rated power ICXN** | **kW (bhp)** | **354 (475)** | **385 (516)** | **575 (771)** | **770 (1033)** |
| **Speed** | **rpm** | **1500** | **1500** | **1500** | **1500** |
| **Exhaust optimization**[1)] | | IMO I | IMO II | IMO II | IMO II |
| **Fuel consumption** | | | | | |
| At 100% power | g/kWh | 195 | 200 | 200 | 201 |
| | l/h (gal/h) | 83.2 (22.0) | 92.8 (24.5) | 138.6 (36.6) | 185.8 (49.1) |
| At 75% power | g/kWh | 197 | 204 | 207 | 206 |
| | l/h (gal/h) | 63.0 (16.6) | 70.6 (18.7) | 107.2 (28.3) | 142.8 (37.7) |
| **Dimensions and masses** | | | | | |
| Length (L) | mm (in) | 1842 (72.5) | 1435 (56.5) | 2105 (82.9) | 2525 (99.4) |
| Width (W) | mm (in) | 1035 (40.7) | 1280 (50.4) | 1400 (55.1) | 1425 (56.1) |
| Height (H) | mm (in) | 1160 (45.7) | 1315 (51.9) | 1290 (50.8) | 1290 (50.8) |
| Mass, dry | kg (lbs) | 1633 (3600) | 1870 (4122.6) | 2755 (6064) | 3270 (7209) |
| **Engine main data** | | | | | |
| No. of cylinders | | 6 | 8 | 12 | 16 |
| Bore / stroke | mm (in) | 133/168 (5.2/6.6) | 130/150 (5.1/5.9) | 130/150 (5.1/5.9) | 130/150 (5.1/5.9) |
| Displacement, total | l (cu in) | 14.0 (855) | 15.9 (970) | 23.9 (1458) | 31.8 (1943) |
| Classification, unrestricted service | | X | X | X | X |
| Engine mounted cooler | | X | X | X | X |
| Keel cooling | | X | X | X | X |
| Radiator cooling | | | | | |

1) Other emissions on request

# Diesel engines for on-board power generation and diesel-electric drives in continuous operation with variable load

## Series 4000



Generator Set
Series 4000

## Rated power: 880 kW - 1760 kW

| Engine model | | 8V 4000 M33F | 12V 4000 M33F | 16V 4000 M33F |
|---|---|---|---|---|
| | | 50 Hz | 50 Hz | 50 Hz |
| **Rated power ICXN** | **kW (bhp)** | **880 (1181)** | **1320 (1770)** | **1760 (2360)** |
| **Speed** | **rpm** | **1500** | **1500** | **1500** |
| **Exhaust optimization**[1)] | | IMO II | IMO II | IMO II |
| **Fuel consumption** | | | | |
| At 100% power | g/kWh | 208 | 199 | 201 |
| | l/h (gal/h) | 220.5 (58.2) | 316.5 (83.6) | 426.2 (112.5) |
| At 75% power | g/kWh | 216 | 207 | 207 |
| | l/h (gal/h) | 171.8 (45.4) | 246.9 (65.2) | 329.2 (87.0) |
| **Dimensions and masses** | | | | |
| Length (L) | mm (in) | 2040 (80.3) | 2520 (99.2) | 2990 (117.7) |
| Width (W) | mm (in) | 1615 (63.6) | 1850 (72.8) | 1850 (72.8) |
| Height (H) | mm (in) | 2195 (86.4) | 2185 (86) | 2180 (85.8) |
| Mass, dry | kg (lbs) | 5460 (12037) | 7240 (15961) | 8590 (18937) |
| **Engine main data** | | | | |
| No. of cylinders | | 8 | 12 | 16 |
| Bore / stroke | mm (in) | 170/210 (6.7/8.3) | 170/210 (6.7/8.3) | 170/210 (6.7/8.3) |
| Displacement, total | l (cu in) | 38.2 (2331) | 57.2 (3491) | 76.3 (4656) |
| Classification, unrestricted service | | X | X | X |
| Engine mounted cooler | | X | X | X |
| Keel cooling | | X | X | X |
| Radiator cooling | | | | |

1) Other emissions on request

# Diesel engines for on-board power generation and diesel-electric drives in continuous operation with variable load

## Series 60
## Series 2000



Generator Set
Series 60

## Rated power: 322 kW - 930 kW

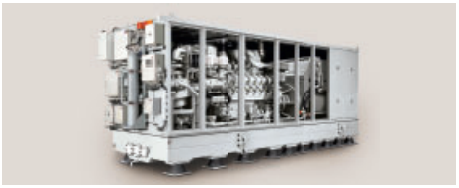
| Engine model | | S60 | S60 | 8V 2000 M41B | 12V 2000 M41B | 16V 2000 M41B |
|---|---|---|---|---|---|---|
| | | 60 Hz | 60 Hz | 60 Hz | 60 Hz | 60 Hz |
| **Rated power ICXN** | **kW (bhp)** | **322 (432)** | **370 (496)** | **465 (624)** | **695 (932)** | **930 (1247)** |
| **Speed** | **rpm** | **1800** | **1800** | **1800** | **1800** | **1800** |
| **Exhaust optimization**[1)] | | IMO II/EPA 2 | IMO II/EPA 2 | IMO II | IMO II | IMO II |
| **Fuel consumption** | | | | | | |
| At 100% power | g/kWh | 197 | 200 | 205 | 207 | 203 |
| | l/h (gal/h) | 64.3 (17.0) | 77.6 (20.5) | 98.8 (26.1) | 172.7 (45.6) | 226.6 (59.9) |
| At 75% power | g/kWh | 196 | 196 | 209 | 209 | 206 |
| | l/h (gal/h) | 57.0 (15.1) | 57.0 (15.1) | 75.5 (19.9) | 130.8 (34.5) | 172.5 (45.6) |
| **Dimensions and masses** | | | | | | |
| Length (L) | mm (in) | 1842 (72.5) | 1842 (72.5) | 1435 (56.5) | 2105 (82.9) | 2525 (99.4) |
| Width (W) | mm (in) | 1035 (40.7) | 1035 (40.7) | 1280 (50.4) | 1400 (55.1) | 1425 (56.1) |
| Height (H) | mm (in) | 1160 (45.7) | 1160 (45.7) | 1315 (51.9) | 1290 (50.8) | 1290 (50.8) |
| Mass, dry | kg (lbs) | 1633 (3600) | 1633 (3600) | 1870 (4122.6) | 2755 (6064) | 3270 (7209) |
| **Engine main data** | | | | | | |
| No. of cylinders | | 6 | 6 | 8 | 12 | 16 |
| Bore / stroke | mm (in) | 133/168 (5.2/6.6) | 133/168 (5.2/6.6) | 130/150 (5.1/5.9) | 130/150 (5.1/5.9) | 130/150 (5.1/5.9) |
| Displacement, total | l (cu in) | 14.0 (855) | 14.0 (855) | 15.9 (970) | 23.9 (1458) | 31.8 (1943) |
| Classification, unrestricted service | | X | X | X | X | X |
| Engine mounted cooler | | X | X | X | X | X |
| Keel cooling | | X | X | X | X | X |
| Radiator cooling | | | | | | |

1) Other emissions on request

# Diesel engines for on-board power generation and diesel-electric drives in continuous operation with variable load

## Series 396
## Series 4000





Generator Set
Series 4000

## Rated power: 1040 kW - 2080 kW

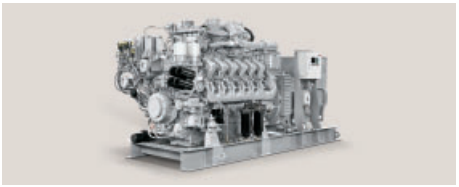
| Engine model | | 8V 4000 M33S | 12V 4000 M34S | 12V 4000M33S | 16V 396 TE54 | 16V 4000 M34S | 16V 4000 M33S |
|---|---|---|---|---|---|---|---|
| | | 60 Hz | 60 Hz | 60 Hz | 60 Hz | 60 Hz | 60 Hz |
| **Rated power ICXN** | kW (bhp) | **1040 (1395)** | **1398 (1875)** | **1560 (2092)** | **1850 (2481)** | **1999 (2681)** | **2080 (2789)** |
| **Speed** | rpm | **1800** | **1800** | **1800** | **1800** | **1800** | **1800** |
| **Exhaust optimization**[2] | | IMO II/EPA 2 | EPA 3/IMO II | IMO II/EPA 2 | IMO II compliant[3] | EPA 3/IMO II | IMO II/EPA 2 |
| **Fuel consumption** | | | | | | | |
| At 100% power | g/kWh | on request, | on request, | 208 | 206 | 202 | 201 |
| | l/h (gal/h) | please | please | 390.9 (103.2) | 459.2 (121.3) | 484 (127.9) | 503.7 (133) |
| At 75% power | g/kWh | contact your | contact your | 212 | 208 | 214 | 207 |
| | l/h (gal/h) | MTU dealer | MTU dealer | 298.8 (79.0) | 347.7 (91.8) | 385 (101.7) | 389.1 (102.8) |
| **Dimensions and masses** | | | | | | | |
| Length (L) | mm (in) | 2040 (80.3) | 2638 (103.9) | 2520 (99.2) | 3070 (120.8) | 3108 (122.4) | 2990 (117.7) |
| Width (W) | mm (in) | 1615 (63.6) | 1690 (66.5) | 1850 (72.8) | 1525 (60.0) | 1690 (66.5) | 1850 (72.8) |
| Height (H) | mm (in) | 2195 (86.4) | 2071 (81.5) | 2185 (86) | 1660 (65.3) | 2064 (81.3) | 2180 (85.8) |
| Mass, dry | kg (lbs) | 5460 (12037) | 7750 (17086) | 7240 (15961) | 6000 (13228) | 8908 (19639) | 8590 (18937) |
| **Engine main data** | | | | | | | |
| No. of cylinders | | 8 | 12 | 12 | 16 | 16 | 16 |
| Bore / stroke | mm (in) | 170/210 | 170/210 | 170/210 | 165/185 | 170/210 | 170/210 |
| | | (6.7/8.3) | (6.7/8.3) | (6.7/8.3) | (6.5/7.3) | (6.7/8.3) | (6.7/8.3) |
| Displacement, total | l (cu in) | 38.2 (2331) | 57.2 (3491) | 57.2 (3491) | 63.4 (3868) | 76.3 (4656.1) | 76.3 (4656) |
| Classification, unrestricted service | | X | X | X | X | X | X |
| Engine mounted cooler | | X | X | X | X | X | X |
| Keel cooling | | X | X | X | X | X | X |
| Radiator cooling | | | | | | | |

1) Separate-circuit charge-air cooling system
2) Other emissions on request
3) Certification on request

# Diesel engines for on-board power generation and diesel-electric drives in continuous operation with variable load

## Series 4000





Generator Set
Series 4000

## Rated power: 2200 kW - 3015 kW

| Engine model | | 16V 4000 M53B | 16V 4000 M43S | 20V 4000 M53B |
|---|---|---|---|---|
| | | 60 Hz | 60 Hz | 60 Hz |
| **Rated power ICXN** | **kW (bhp)** | **2200 (2950)** | **2240 (3004)** | **3015 (4043)** |
| **Speed** | **rpm** | **1800** | **1800** | **1800** |
| **Exhaust optimization**[1)] | | IMO I/IMO II | IMO II/EPA 2 | IMO II |
| **Fuel consumption** | | | | |
| At 100% power | g/kWh | 208 | 201 | 204 |
| | l/h (gal/h) | 551.3 (145.3) | 542.5 (143.2) | 741.0 (195.7) |
| At 75% power | g/kWh | 208 | 207 | 214 |
| | l/h (gal/h) | 413.5 (109.2) | 419.0 (110.7) | 583.0 (153.9) |
| **Dimensions and masses** | | | | |
| Length (L) | mm (in) | 3510 (138.2) | 2990 (117.7) | 4080 (160.6) |
| Width (W) | mm (in) | 1850 (72.8) | 1850 (72.8) | 1508 (59.7) |
| Height (H) | mm (in) | 2185 (86.0) | 2180 (85.8) | 2070 (81.5) |
| Mass, dry | kg (lbs) | 9890 (21803) | 8590 (18937) | 11750 (25904) |
| **Engine main data** | | | | |
| No. of cylinders | | 16 | 16 | 20 |
| Bore / stroke | mm (in) | 170/190 (6.7/7.5) | 170/210 (6.7/8.3) | 170/190 (6.7/8.3) |
| Displacement, total | l (cu in) | 69.0 (4210) | 76.3 (4656) | 86.2 (5263) |
| Classification, unrestricted service | | X | X | X |
| Engine mounted cooler | | X | X | X |
| Keel cooling | | | X | |
| Radiator cooling | | | | |

1) Other emissions on request

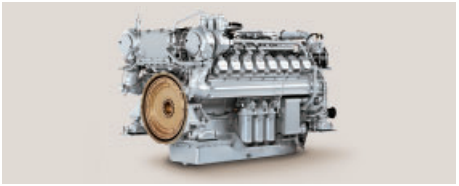
# Diesel engines for offshore power generation in unrestricted continuous operation




Photo: Øyvind Hagen / Statoil

# Diesel engines for offshore power generation in unrestricted continuous operation

## Series 2000 P



16V 2000 P



## Rated power: 498 kW - 664 kW

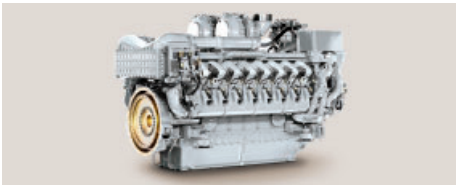
| Engine model | | 12V 2000 P62* | 16V 2000 P62* |
|---|---|---|---|
| | | 50 Hz | 50 Hz |
| **Rated power ICXN** | **kW (bhp)** | **498 (668)** | **664 (890)** |
| **Speed** | **rpm** | **1500** | **1500** |
| **Exhaust optimization** | | IMO I | IMO I |
| **Fuel consumption** | | | |
| At 100% power | g/kWh | 207 | 197 |
| | l/h (gal/h) | 123.8 (32.7) | 157.0 (41.5) |
| At 75% power | g/kWh | 209 | 199 |
| | l/h (gal/h) | 166.6 (44) | 119 (31.4) |
| **Dimensions and masses** | | | |
| Length (L) | mm (in) | 1882 (74) | 2180 (86) |
| Width (W) | mm (in) | 1580 (62) | 1580 (62) |
| Height (H) | mm (in) | 1580 (62) | 1580 (62) |
| Mass, dry | kg (lbs) | 2650 (5842) | 3060 (6746) |
| **Engine main data** | | | |
| No. of cylinders | | 12 | 16 |
| Bore / stroke | mm (in) | 130/150 (5.1/5.9) | 130/150 (5.1/5.9) |
| Displacement, total | l (cu in) | 23.9 (1458) | 31.8 (1947) |
| Classification, unrestricted service | | X | X |
| Engine mounted cooler | | | |
| Keel cooling | | | |
| Radiator cooling | | X | X |

* For marine applications only available as emergency generator set with radiator cooling.

Series 2000P02 engines can be used for operation onboard vessels for emergency operation with radiator cooling requirement.

# Diesel engines for offshore power generation in unrestricted continuous operation

## Series 4000 P



16V 4000 P

3A - 50 Hz

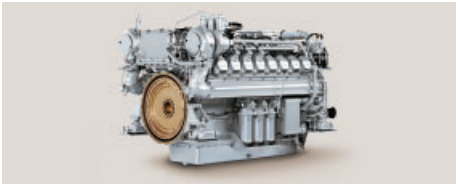
## Rated power: 1140 kW - 2245 kW

| Engine model | | 12V 4000 P61 | 12V 4000 P63 | 16V 4000 P61 | 16V 4000 P63 | 20V 4000 P63 |
|---|---|---|---|---|---|---|
| | | 50 Hz | 50 Hz | 50 Hz | 50 Hz | 50 Hz |
| **Rated power ICXN** | **kW (bhp)** | **1140 (1529)** | **1350 (1809)** | **1520 (2038)** | **1800 (2412)** | **2245 (3010)** |
| **Speed** | **rpm** | **1500** | **1500** | **1500** | **1500** | **1500** |
| **Exhaust optimization** | | IMO I | IMO II | IMO I | IMO II | IMO II |
| **Fuel consumption** | | | | | | |
| At 100% power | g/kWh | 205 | 204 | 203 | 198 | 207 |
| | l/h (gal/h) | 280.5 (74.1) | 330.6 (87.3) | 370.4 (97.8) | 427.8 (113) | 557.9 (147.4) |
| At 75% power | g/kWh | 208 | 204 | 205 | 201 | 210 |
| | l/h (gal/h) | 213.5 (56.4) | 248 (65.5) | 280.6 (74.1) | 325.8 (86.1) | 424.5 (112.1) |
| **Dimensions and masses** | | | | | | |
| Length (L) | mm (in) | 2400 (95) | 2530 (100) | 3470 (112) | 3117 (123) | 3647 (144) |
| Width (W) | mm (in) | 1510 (59) | 1580 (62) | 1520 (60) | 1581 (62) | 1511 (59) |
| Height (H) | mm (in) | 1840 (72) | 2065 (81) | 1850 (76) | 2065 (81) | 2049 (81) |
| Mass, dry | kg (lbs) | 6550 (14440) | 7300 (16100) | 7085 (15620) | 8800 (19400) | 10750 (23700) |
| **Engine main data** | | | | | | |
| No. of cylinders | | 12 | 12 | 16 | 16 | 20 |
| Bore / stroke | mm (in) | 165/190 (6.5/7.5) | 170/210 (6.7/8.3) | 165/190 (6.5/7.5) | 170/210 (6.7/8.3) | 170/210 (6.7/8.3) |
| Displacement, total | l (cu in) | 48.7 (2972) | 57.2 (3491) | 65.0 (3967) | 76.3 (4655) | 95.4 (5822) |
| Classification, unrestricted service | | X | X | X | X | X |
| Engine mounted cooler | | | | | | |
| Keel cooling | | X | X | X | X | X |
| Radiator cooling | | X | X | X | X | X |

Series 4000P03 engines can be used for operation onboard vessels where 2-circuit cooling systems are required.

# Diesel engines for offshore power generation in unrestricted continuous operation

## Series 2000 P



16V 2000 P

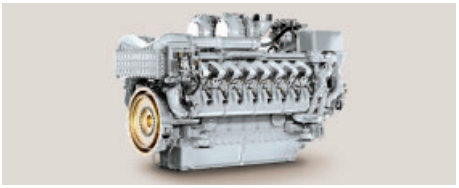
## Rated power: 600 kW - 800 kW

| Engine model | | 12V 2000 P82* | 16V 2000 P82* |
|---|---|---|---|
| | | 60 Hz | 60 Hz |
| **Rated power ICXN** | **kW (bhp)** | **600 (805)** | **800 (1073)** |
| **Speed** | **rpm** | **1800** | **1800** |
| **Exhaust optimization** | | IMO II/EPA 2 | IMO II/EPA 2 |
| **Fuel consumption** | | | |
| At 100% power | g/kWh | 214 | 214 |
| | l/h (gal/h) | 154.1 (40.7) | 205.5 (54.3) |
| At 75% power | g/kWh | 217 | 215 |
| | l/h (gal/h) | 117.2 (31) | 154.9 (40.9) |
| **Dimensions and masses** | | | |
| Length (L) | mm (in) | 1882 (74) | 2180 (86) |
| Width (W) | mm (in) | 1580 (62) | 1580 (62) |
| Height (H) | mm (in) | 1580 (62) | 1580 (62) |
| Mass, dry | kg (lbs) | 2650 (5842) | 3060 (6746) |
| **Engine main data** | | | |
| No. of cylinders | | 12 | 16 |
| Bore / stroke | mm (in) | 130/150 (5.1/5.9) | 130/150 (5.1/5.9) |
| Displacement, total | l (cu in) | 23.9 (1458) | 31.8 (1947) |
| Classification, unrestricted service | | X | X |
| Engine mounted cooler | | | |
| Keel cooling | | | |
| Radiator cooling | | X | X |

* For marine applications only available as emergency generator set with radiator cooling.

# Diesel engines for offshore power generation in unrestricted continuous operation

## Series 4000 P



16V 4000 P

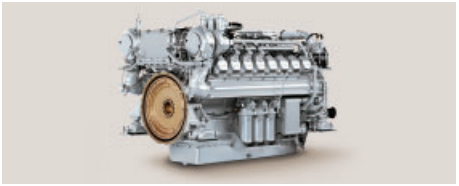
## Rated power: 1380 kW - 2425 kW

| Engine model | | 12V 4000 P81 | 12V 4000 P83 | 16V 4000 P81 | 16V 4000 P83 | 20V 4000 P83 |
|---|---|---|---|---|---|---|
| | | 60 Hz | 60 Hz | 60 Hz | 60 Hz | 60 Hz |
| **Rated power ICXN** | **kW (bhp)** | **1380 (1871)** | **1455 (1951)** | **1840 (2467)** | **1940 (2601)** | **2425 (3252)** |
| **Speed** | **rpm** | **1800** | **1800** | **1800** | **1800** | **1800** |
| **Exhaust optimization** | | IMO I | IMO II/EPA 2 | IMO I | IMO II/EPA 2 | IMO II/EPA 2 |
| **Fuel consumption** | | | | | | |
| At 100% power | g/kWh | 200 | 203 | 201 | 205 | 209 |
| | l/h (gal/h) | 331.3 (87.5) | 354.6 (93.7) | 444 (117.3) | 477.4 (126.1) | 608.4 (160.7) |
| At 75% power | g/kWh | 203 | 211 | 205 | 211 | 211 |
| | l/h (gal/h) | 252.2 (66.6) | 276.4 (73) | 339.6 (89.7) | 368.6 (97.3) | 460.7 (121.7) |
| **Dimensions and masses** | | | | | | |
| Length (L) | mm (in) | 2400 (95) | 2530 (100) | 3470 (112) | 3117 (123) | 3647 (144) |
| Width (W) | mm (in) | 1510 (59) | 1580 (62) | 1520 (60) | 1580 (62) | 1511 (59) |
| Height (H) | mm (in) | 1840 (72) | 2065 (81) | 1850 (76) | 2065 (81) | 2049 (81) |
| Mass, dry | kg (lbs) | 6550 (14440) | 7300 (16100) | 7085 (15620) | 8800 (19400) | 10750 (23700) |
| **Engine main data** | | | | | | |
| No. of cylinders | | 12 | 12 | 16 | 16 | 20 |
| Bore / stroke | mm (in) | 165/190 (6.5/7.5) | 170/210 (6.7/8.3) | 165/190 (6.5/7.5) | 170/210 (6.7/8.3) | 170/210 (6.7/8.3) |
| Displacement, total | l (cu in) | 48.7 (2972) | 57.2 (3491) | 65.0 (3967) | 76.3 (4655) | 95.4 (5822) |
| Classification, unrestricted service | | X | X | X | X | X |
| Engine mounted cooler | | | | | | |
| Keel cooling | | X | X | X | X | X |
| Radiator cooling | | X | X | X | X | X |

# Diesel engines for offshore power generation in continuous operation with variable load

# Diesel engines for offshore power generation in continuous operation with variable load

## Series 2000 P



16V 2000 P

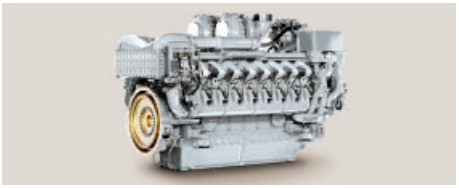
## Rated power: 575 kW - 770 kW

| Engine model | | 12V 2000 P62* | 16V 2000 P62* |
|---|---|---|---|
| | | 50 Hz | 50 Hz |
| **Rated power ICXN** | **kW (bhp)** | **575 (771)** | **770 (1033)** |
| **Speed** | **rpm** | **1500** | **1500** |
| **Exhaust optimization** | | IMO I | IMO I |
| **Fuel consumption** | | | |
| At 100% power | g/kWh | 205 | 197 |
| | l/h (gal/h) | 141.5 (37.4) | 182.1 (48.1) |
| At 75% power | g/kWh | 208 | 199 |
| | l/h (gal/h) | 107.7 (28.4) | 138 (36.5) |
| **Dimensions and masses** | | | |
| Length (L) | mm (in) | 1882 (74) | 2180 (86) |
| Width (W) | mm (in) | 1580 (62) | 1580 (62) |
| Height (H) | mm (in) | 1580 (62) | 1580 (62) |
| Mass, dry | kg (lbs) | 2650 (5842) | 3060 (6746) |
| **Engine main data** | | | |
| No. of cylinders | | 12 | 16 |
| Bore / stroke | mm (in) | 130/150 (5.1/5.9) | 130/150 (5.1/5.9) |
| Displacement, total | l (cu in) | 23.9 (1458) | 31.8 (1947) |
| Classification, unrestricted service | | X | X |
| Engine mounted cooler | | | |
| Keel cooling | | | |
| Radiator cooling | | X | X |

* For marine applications only available as emergency generator set with radiator cooling.

# Diesel engines for offshore power generation in continuous operation with variable load

## Series 4000 P



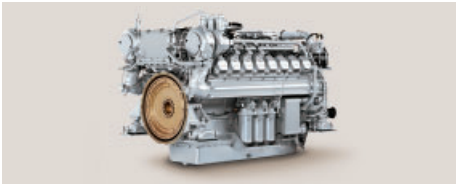
16V 4000 P

## Rated power: 1320 kW - 2600 kW

| Engine model | | 12V 4000 P61 | 12V 4000 P63 | 16V 4000 P61 | 16V 4000 P63 | 20V 4000 P63 |
|---|---|---|---|---|---|---|
| | | 50 Hz | 50 Hz | 50 Hz | 50 Hz | 50 Hz |
| **Rated power ICXN** | **kW (bhp)** | **1320 (1770)** | **1560 (2090)** | **1760 (2360)** | **2080 (2787)** | **2600 (3484)** |
| **Speed** | **rpm** | **1500** | **1500** | **1500** | **1500** | **1500** |
| **Exhaust optimization** | | IMO I | IMO II | IMO I | IMO II | IMO II |
| **Fuel consumption** | | | | | | |
| At 100% power | g/kWh | 199 | 202 | 202 | 197 | 211 |
| | l/h (gal/h) | 315.3 (83.3) | 378.3 (99.9) | 426.8 (112.7) | 491.9 (129.9) | 658.6 (173.9) |
| At 75% power | g/kWh | 202 | 202 | 202 | 199 | 206 |
| | l/h (gal/h) | 240.1 (63.4) | 283.7 (74.9) | 320.1 (84.5) | 372.7 (98.4) | 482.2 (127.4) |
| **Dimensions and masses** | | | | | | |
| Length (L) | mm (in) | 2400 (95) | 2530 (100) | 3470 (112) | 3117 (123) | 3647 (144) |
| Width (W) | mm (in) | 1510 (59) | 1580 (62) | 1520 (60) | 1581 (62) | 1511 (59) |
| Height (H) | mm (in) | 1840 (72) | 2065 (81) | 1850 (76) | 2065 (81) | 2049 (81) |
| Mass, dry | kg (lbs) | 6550 (14440) | 7300 (16100) | 7085 (15620) | 8800 (19400) | 10750 (23700) |
| **Engine main data** | | | | | | |
| No. of cylinders | | 12 | 12 | 16 | 16 | 20 |
| Bore / stroke | mm (in) | 165/190 (6.5/7.5) | 170/210 (6.7/8.3) | 165/190 (6.5/7.5) | 170/210 (6.7/8.3) | 170/210 (6.7/8.3) |
| Displacement, total | l (cu in) | 48.7 (2972) | 57.2 (3491) | 65.0 (3967) | 76.3 (4655) | 95.4 (5822) |
| Classification, unrestricted service | | X | X | X | X | X |
| Engine mounted cooler | | | | | | |
| Keel cooling | | X | X | X | X | X |
| Radiator cooling | | X | X | X | X | X |

# Diesel engines for offshore power generation in continuous operation with variable load

## Series 2000 P



16V 2000 P

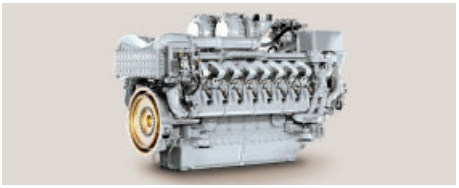
## Rated power: 695 kW - 980 kW

| Engine model | | 12V 2000 P82* | 16V 2000 P82* | 16V 2000 P82L* |
|---|---|---|---|---|
| | | 60 Hz | 60 Hz | 60 Hz |
| **Rated power ICXN** | **kW (bhp)** | **695 (932)** | **930 (1247)** | **980 (1314)** |
| **Speed** | **rpm** | **1800** | **1800** | **1800** |
| **Exhaust optimization** | | IMO II/EPA 2 | IMO II/EPA 2 | IMO II/EPA 2 |
| **Fuel consumption** | | | | |
| At 100% power | g/kWh | 214 | 223 | 224 |
| | l/h (gal/h) | 178.5 (47.2) | 249 (65.8) | 263.5 (69.6) |
| At 75% power | g/kWh | 216 | 210 | 211 |
| | l/h (gal/h) | 135.2 (35.7) | 175.8 (46.4) | 186.2 (49.2) |
| **Dimensions and masses** | | | | |
| Length (L) | mm (in) | 1882 (74) | 2180 (86) | 2180 (86) |
| Width (W) | mm (in) | 1580 (62) | 1580 (62) | 1580 (62) |
| Height (H) | mm (in) | 1580 (62) | 1580 (62) | 1580 (62) |
| Mass, dry | kg (lbs) | 2650 (5842) | 3060 (6746) | 3060 (6746) |
| **Engine main data** | | | | |
| No. of cylinders | | 12 | 16 | 16 |
| Bore / stroke | mm (in) | 130/150 (5.1/5.9) | 130/150 (5.1/5.9) | 130/150 (5.1/5.9) |
| Displacement, total | l (cu in) | 23.9 (1458) | 31.8 (1947) | 31.8 (1947) |
| Classification, unrestricted service | | X | X | X |
| Engine mounted cooler | | | | |
| Keel cooling | | | | |
| Radiator cooling | | X | X | X |

* For marine applications only available as emergency generator set with radiator cooling.

# Diesel engines for offshore power generation in continuous operation with variable load

## Series 4000 P



16V 4000 P

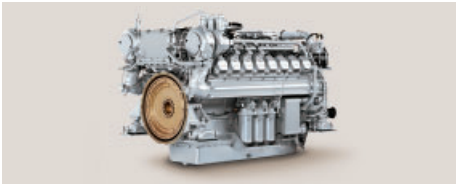
## Rated power: 1600 kW - 2800 kW

| Engine model | | 12V 4000 P81 | 12V 4000 P83 | 16V 4000 P81 | 16V 4000 P83 | 20V 4000 P83 |
|---|---|---|---|---|---|---|
| | | 60 Hz | 60 Hz | 60 Hz | 60 Hz | 60 Hz |
| **Rated power ICXN** | **kW (bhp)** | **1600 (2145)** | **1680 (2251)** | **2105 (2820)** | **2240 (3004)** | **2800 (3755)** |
| **Speed** | **rpm** | **1800** | **1800** | **1800** | **1800** | **1800** |
| **Exhaust optimization** | | IMO I | IMO II/EPA 2 | IMO I | IMO II/EPA 2 | IMO II |
| **Fuel consumption** | | | | | | |
| At 100% power | g/kWh | 201 | 207 | 203 | 204 | 215 |
| | l/h (gal/h) | 386.1 (102) | 417.5 (110.3) | 513 (135.5) | 548.6 (144.9) | 722.7 (190.9) |
| At 75% power | g/kWh | 201 | 207 | 202 | 205 | 209 |
| | l/h (gal/h) | 289.6 (76.5) | 313.1 (82.7) | 382.8 (101.1) | 413.4 (109.2) | 526.9 (139.2) |
| **Dimensions and masses** | | | | | | |
| Length (L) | mm (in) | 2400 (95) | 2530 (100) | 3470 (112) | 3117 (123) | 3647 (144) |
| Width (W) | mm (in) | 1510 (59) | 1580 (62) | 1520 (60) | 1581 (62) | 1511 (59) |
| Height (H) | mm (in) | 1840 (72) | 2065 (81) | 1850 (76) | 2065 (81) | 2049 (81) |
| Mass, dry | kg (lbs) | 6550 (14440) | 7300 (16100) | 7085 (15620) | 8800 (19400) | 10750 (23700) |
| **Engine main data** | | | | | | |
| No. of cylinders | | 12 | 12 | 16 | 16 | 20 |
| Bore / stroke | mm (in) | 165/190 (6.5/7.5) | 170/210 (6.7/8.3) | 165/190 (6.5/7.5) | 170/210 (6.7/8.3) | 170/210 (6.7/8.3) |
| Displacement, total | l (cu in) | 48.7 (2972) | 57.2 (3491) | 65.0 (3967) | 76.3 (4655) | 95.4 (5822) |
| Classification, unrestricted service | | X | X | X | X | X |
| Engine mounted cooler | | | | | | |
| Keel cooling | | X | X | X | X | X |
| Radiator cooling | | X | X | X | X | X |

# Diesel engines for offshore power generation in standby operation with variable load

# Diesel engines for offshore power generation in standby operation with variable load

## Series 2000 P



16V 2000 P

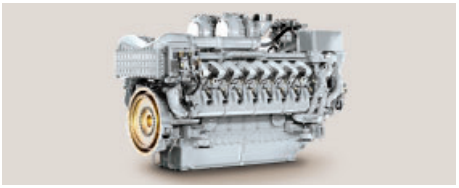
## Rated power: 575 kW - 770 kW

| Engine model | | 12V 2000 P62* | 16V 2000 P62* |
|---|---|---|---|
| | | 50 Hz | 50 Hz |
| **Rated power ICXN** | **kW (bhp)** | **575 (771)** | **770 (1033)** |
| **Speed** | **rpm** | **1500** | **1500** |
| **Exhaust optimization** | | IMO I | IMO I |
| **Fuel consumption** | | | |
| At 100% power | g/kWh | 205 | 197 |
| | l/h (gal/h) | 141.5 (37.4) | 182.1 (48.1) |
| At 75% power | g/kWh | 208 | 199 |
| | l/h (gal/h) | 107.7 (28.4) | 138 (36.5) |
| **Dimensions and masses** | | | |
| Length (L) | mm (in) | 1882 (74) | 2180 (86) |
| Width (W) | mm (in) | 1580 (62) | 1580 (62) |
| Height (H) | mm (in) | 1580 (62) | 1580 (62) |
| Mass, dry | kg (lbs) | 2650 (5842) | 3060 (6746) |
| **Engine main data** | | | |
| No. of cylinders | | 12 | 16 |
| Bore / stroke | mm (in) | 130/150 (5.1/5.9) | 130/150 (5.1/5.9) |
| Displacement, total | l (cu in) | 23.9 (1458) | 31.8 (1947) |
| Classification, unrestricted service | | X | X |
| Engine mounted cooler | | | |
| Keel cooling | | | |
| Radiator cooling | | X | X |

* For marine applications only available as emergency generator set with radiator cooling.

# Diesel engines for offshore power generation in standby operation with variable load

## Series 4000 P



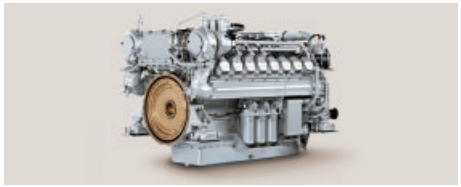
16V 4000 P

## Rated power: 1320 kW - 2600 kW

| Engine model | | 12V 4000 P61 | 12V 4000 P63 | 16V 4000 P61 | 16V 4000 P63 | 20V 4000 P63 |
|---|---|---|---|---|---|---|
| | | 50 Hz | 50 Hz | 50 Hz | 50 Hz | 50 Hz |
| **Rated power ICXN** | **kW (bhp)** | **1320 (1770)** | **1560 (2090)** | **1760 (2360)** | **2080 (2787)** | **2600 (3484)** |
| **Speed** | **rpm** | **1500** | **1500** | **1500** | **1500** | **1500** |
| **Exhaust optimization** | | IMO I | IMO II | IMO I | IMO II | IMO II |
| **Fuel consumption** | | | | | | |
| At 100% power | g/kWh | 199 | 202 | 202 | 197 | 211 |
| | l/h (gal/h) | 315.3 (83.3) | 378.3 (99.9) | 426.8 (112.7) | 491.9 (129.9) | 658.6 (173.9) |
| At 75% power | g/kWh | 202 | 202 | 202 | 199 | 206 |
| | l/h (gal/h) | 240.1 (63.4) | 283.7 (74.9) | 320.1 (84.5) | 372.7 (98.4) | 482.2 (127.4) |
| **Dimensions and masses** | | | | | | |
| Length (L) | mm (in) | 2400 (95) | 2530 (100) | 3470 (112) | 3117 (123) | 3647 (144) |
| Width (W) | mm (in) | 1510 (59) | 1580 (62) | 1520 (60) | 1581 (62) | 1511 (59) |
| Height (H) | mm (in) | 1840 (72) | 2065 (81) | 1850 (76) | 2065 (81) | 2049 (81) |
| Mass, dry | kg (lbs) | 6550 (14440) | 7300 (16100) | 7085 (15620) | 8800 (19400) | 10750 (23700) |
| **Engine main data** | | | | | | |
| No. of cylinders | | 12 | 12 | 16 | 16 | 20 |
| Bore / stroke | mm (in) | 165/190 (6.5/7.5) | 170/210 (6.7/8.3) | 165/190 (6.5/7.5) | 170/210 (6.7/8.3) | 170/210 (6.7/8.3) |
| Displacement, total | l (cu in) | 48.7 (2972) | 57.2 (3491) | 65.0 (3967) | 76.3 (4655) | 95.4 (5822) |
| Classification, unrestricted service | | X | X | X | X | X |
| Engine mounted cooler | | | | | | |
| Keel cooling | | X | X | X | X | X |
| Radiator cooling | | X | X | X | X | X |

# Diesel engines for offshore power generation in standby operation with variable load

## Series 2000 P



16V 2000 P

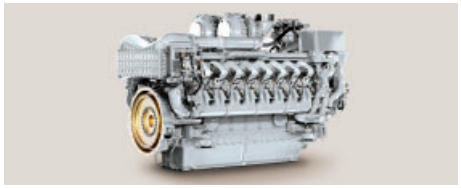
## Rated power: 695 kW - 980 kW

| Engine model | | 12V 2000 P82* | 16V 2000 P82* | 16V 2000 P82L* |
|---|---|---|---|---|
| | | 60 Hz | 60 Hz | 60 Hz |
| **Rated power ICXN** | **kW (bhp)** | **695 (932)** | **930 (1247)** | **980 (1314)** |
| **Speed** | **rpm** | **1800** | **1800** | **1800** |
| **Exhaust optimization** | | IMO II/EPA 2 | IMO II/EPA 2 | IMO II/EPA 2 |
| **Fuel consumption** | | | | |
| At 100% power | g/kWh | 214 | 223 | 224 |
| | l/h (gal/h) | 178.5 (47.2) | 249 (65.8) | 263.5 (69.6) |
| At 75% power | g/kWh | 216 | 210 | 211 |
| | l/h (gal/h) | 135.2 (35.7) | 175.8 (46.4) | 186.2 (49.2) |
| **Dimensions and masses** | | | | |
| Length (L) | mm (in) | 1882 (74) | 2180 (86) | 2180 (86) |
| Width (W) | mm (in) | 1580 (62) | 1580 (62) | 1580 (62) |
| Height (H) | mm (in) | 1580 (62) | 1580 (62) | 1580 (62) |
| Mass, dry | kg (lbs) | 2650 (5842) | 3060 (6746) | 3060 (6746) |
| **Engine main data** | | | | |
| No. of cylinders | | 12 | 16 | 16 |
| Bore / stroke | mm (in) | 130/150 (5.1/5.9) | 130/150 (5.1/5.9) | 130/150 (5.1/5.9) |
| Displacement, total | l (cu in) | 23.9 (1458) | 31.8 (1947) | 31.8 (1947) |
| Classification, unrestricted service | | X | X | X |
| Engine mounted cooler | | | | |
| Keel cooling | | | | |
| Radiator cooling | | X | X | X |

* For marine applications only available as emergency generator set with radiator cooling.

# Diesel engines for offshore power generation in standby operation with variable load

## Series 4000 P



16V 4000 P

## Rated power: 1600 kW - 2800 kW

| Engine model | | 12V 4000 P81 | 12V 4000 P83 | 16V 4000 P81 | 16V 4000 P83 | 20V 4000 P83 |
|---|---|---|---|---|---|---|
| | | 60 Hz | 60 Hz | 60 Hz | 60 Hz | 60 Hz |
| **Rated power ICXN** | **kW (bhp)** | **1600 (2145)** | **1680 (2251)** | **2105 (2820)** | **2240 (3004)** | **2800 (3755)** |
| **Speed** | **rpm** | **1800** | **1800** | **1800** | **1800** | **1800** |
| **Exhaust optimization** | | IMO I | IMO II/EPA 2 | IMO I | IMO II/EPA 2 | IMO II |
| **Fuel consumption** | | | | | | |
| At 100% power | g/kWh | 201 | 207 | 203 | 204 | 215 |
| | l/h (gal/h) | 386.1 (102) | 417.5 (110.3) | 513 (135.5) | 548.6 (144.9) | 722.7 (190.9) |
| At 75% power | g/kWh | 201 | 207 | 202 | 205 | 209 |
| | l/h (gal/h) | 289.6 (76.5) | 313.1 (82.7) | 382.8 (101.1) | 413.4 (109.2) | 526.9 (139.2) |
| **Dimensions and masses** | | | | | | |
| Length (L) | mm (in) | 2400 (95) | 2530 (100) | 3470 (112) | 3117 (123) | 3647 (144) |
| Width (W) | mm (in) | 1510 (59) | 1580 (62) | 1520 (60) | 1581 (62) | 1511 (59) |
| Height (H) | mm (in) | 1840 (72) | 2065 (81) | 1850 (76) | 2065 (81) | 2049 (81) |
| Mass, dry | kg (lbs) | 6550 (14440) | 7300 (16100) | 7085 (15620) | 8800 (19400) | 10750 (23700) |
| **Engine main data** | | | | | | |
| No. of cylinders | | 12 | 12 | 16 | 16 | 20 |
| Bore / stroke | mm (in) | 165/190 (6.5/7.5) | 170/210 (6.7/8.3) | 165/190 (6.5/7.5) | 170/210 (6.7/8.3) | 170/210 (6.7/8.3) |
| Displacement, total | l (cu in) | 48.7 (2972) | 57.2 (3491) | 65.0 (3967) | 76.3 (4655) | 95.4 (5822) |
| Classification, unrestricted service | | X | X | X | X | X |
| Engine mounted cooler | | | | | | |
| Keel cooling | | X | X | X | X | X |
| Radiator cooling | | X | X | X | X | X |

# Diesel engines for offshore mechanical drives in heavy duty operation - variable speed




Photo: Tommy Solstad / Jens Bang (Statoil)

# Diesel engines for offshore mechanical drives in heavy duty operation - variable speed



## Series 60

Series 60

## Rated power: 224 kW - 280 kW

| Engine model | | S60 | S60 | S60 | S60 | S60 | S60 |
|---|---|---|---|---|---|---|---|
| **Rated power ICFN** | **kW (bhp)** | **224 (300)** | **242 (325)** | **242 (325)** | **261 (350)** | **280 (375)** | **280 (375)** |
| **Speed** | **rpm** | **2100** | **2100** | **2100** | **2100** | **2100** | **2100** |
| **Exhaust optimization** | | EPA 2 | EPA 2 | EPA 3 | EPA 2 | EPA 2 | EPA 3 |
| **Peak Torque** | | | | | | | |
| | Nm | 1424 | 1559 | 1559 | 1831 | 1831 | 1831 |
| | lb-ft | 1050 | 1150 | 1150 | 1350 | 1350 | 1350 |
| | rpm | 1350 | 1350 | 1350 | 1350 | 1350 | 1350 |
| **Dimensions and masses** | | | | | | | |
| Length (L) | mm (in) | 1455 (57) | 1455 (57) | 1455 (57) | 1455 (57) | 1455 (57) | 1455 (57) |
| Width (W) | mm (in) | 925 (36) | 925 (36) | 925 (36) | 925 (36) | 925 (36) | 925 (36) |
| Height (H) | mm (in) | 1380 (54) | 1380 (54) | 1380 (54) | 1380 (54) | 1380 (54) | 1380 (54) |
| Mass, dry | kg (lbs) | 1291 (2846) | 1291 (2846) | 1215 (2680) | 1291 (2846) | 1291 (2846) | 1215 (2680) |
| **Engine main data** | | | | | | | |
| No. of cylinders | | 6 | 6 | 6 | 6 | 6 | 6 |
| Bore / stroke | mm (in) | 130/160 (5.1/6.3) | 130/160 (5.1/6.3) | 133/168 (5.2/6.6) | 130/160 (5.1/6.3) | 130/160 (5.1/6.3) | 133/168 (5.2/6.6) |
| Displacement, total | l (cu in) | 12.7 (775) | 12.7 (775) | 14 (885) | 12.7 (775) | 12.7 (775) | 14 (885) |
| Classification, unrestricted service | | X | X | X | X | X | X |
| Engine mounted cooler | | X | X | X | X | X | X |
| Keel cooling | | X | X | X | X | X | X |
| Radiator cooling | | | | | | | |

1) Available on request

# Diesel engines for offshore mechanical drives in heavy duty operation - variable speed



## Series 60

Series 60

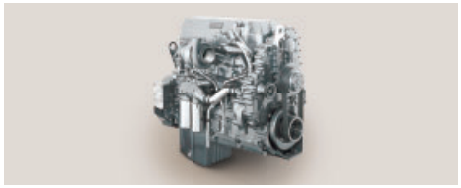
## Rated power: 298 kW - 336 kW

| Engine model | | S60 | S60 | S60 | S60 | S60 | S60 |
|---|---|---|---|---|---|---|---|
| **Rated power ICFN** | **kW (bhp)** | **298 (400)** | **298 (400)** | **298 (400)** | **298 (400)** | **317 (425)** | **336 (450)** |
| **Speed** | **rpm** | **2100** | **2100** | **2200** | **2100** | **2100** | **2100** |
| **Exhaust optimization** | | EPA 2 | EPA 2 | EPA 2 | EPA 3 | EPA 3 | EPA 2 |
| **Peak Torque** | | | | | | | |
| | Nm | 1898 | 2102 | 1830 | 1958 | 2000 | 2102 |
| | lb-ft | 1400 | 1550 | 1350 | 1444 | 1475 | 1550 |
| | rpm | 1350 | 1350 | 1350 | 1350 | 1350 | 1350 |
| **Dimensions and masses** | | | | | | | |
| Length (L) | mm (in) | 1455 (57) | 1455 (57) | 1455 (57) | 1455 (57) | 1455 (57) | 1455 (57) |
| Width (W) | mm (in) | 925 (36) | 925 (36) | 925 (36) | 925 (36) | 925 (36) | 925 (36) |
| Height (H) | mm (in) | 1380 (54) | 1380 (54) | 1380 (54) | 1380 (54) | 1380 (54) | 1380 (54) |
| Mass, dry | kg (lbs) | 1291 (2846) | 1291 (2846) | 1291 (2846) | 1215 (2680) | 1215 (2680) | 1291 (2846) |
| **Engine main data** | | | | | | | |
| No. of cylinders | | 6 | 6 | 6 | 6 | 6 | 6 |
| Bore / stroke | mm (in) | 130/160 (5.1/6.3) | 130/160 (5.1/6.3) | 130/160 (5.1/6.3) | 133/168 (5.2/6.6) | 133/168 (5.2/6.6) | 130/160 (5.1/6.3) |
| Displacement, total | l (cu in) | 12.7 (775) | 12.7 (775) | 12.7 (775) | 14 (885) | 14 (885) | 12.7 (775) |
| Classification, unrestricted service | | X | X | X | X | X | X |
| Engine mounted cooler | | X | X | X | X | X | X |
| Keel cooling | | X | X | X | X | X | X |
| Radiator cooling | | | | | | | |

# Diesel engines for offshore mechanical drives in heavy duty operation - variable speed



## Series 60



Series 60

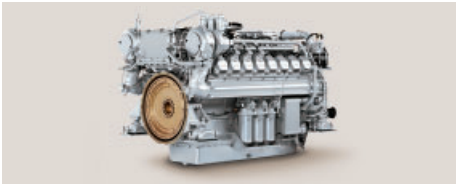
## Rated power: 336 kW

| Engine model | | S60 | S60 | S60 |
|---|---|---|---|---|
| **Rated power ICFN** | **kW (bhp)** | **336 (450)** | **336 (450)** | **336 (450)** |
| **Speed** | **rpm** | **2200** | **2100** | **2100** |
| **Exhaust optimization** | | EPA 2 | EPA 3 | EPA 2 |
| **Peak Torque** | | | | |
| | Nm | 2000 | 2102 | 2237 |
| | lb-ft | 1475 | 1550 | 1650 |
| | rpm | 1350 | 1350 | 1350 |
| **Dimensions and masses** | | | | |
| Length (L) | mm (in) | 1455 (57) | 1455 (57) | 1455 (57) |
| Width (W) | mm (in) | 925 (36) | 925 (36) | 925 (36) |
| Height (H) | mm (in) | 1380 (54) | 1380 (54) | 1380 (54) |
| Mass, dry | kg (lbs) | 1291 (2846) | 1215 (2680) | 1215 (2680) |
| **Engine main data** | | | | |
| No. of cylinders | | 6 | 6 | 6 |
| Bore / stroke | mm (in) | 130/160 (5.1/6.3) | 133/168 (5.2/6.6) | 133/168 (5.2/6.6) |
| Displacement, total | l (cu in) | 12.7 (775) | 14 (885) | 14 (885) |
| Classification, unrestricted service | | X | X | X |
| Engine mounted cooler | | X | X | X |
| Keel cooling | | X | X | X |
| Radiator cooling | | | | |

# Diesel engines for offshore mechanical drives in heavy duty operation - variable speed



## Series 2000 P
## Series 4000 P



16V 2000 P

## Rated power: 600 kW - 1760 kW

| Engine model | | 12V 2000 P12* | 16V 2000 P12* | 12V 4000 P11 | 16V 4000 P11 |
|---|---|---|---|---|---|
| **Rated power ICFN** | **kW (bhp)** | **600 (805)** | **800 (1073)** | **1320 (1770)** | **1760 (2360)** |
| **Speed** | **rpm** | **1800** | **1800** | **1800** | **1800** |
| **Exhaust optimization** | | IMO II/EPA 2 | IMO II/EPA 2 | IMO I | IMO I |
| **Peak Torque** | | | | | |
| | Nm | 3500 | 4770 | 8133 | 10844 |
| | lb-ft | 2580 | 3520 | 6000 | 7995 |
| | rpm | 1500 | 1425 | 1550 | 1500 |
| **Dimensions and masses** | | | | | |
| Length (L) | mm (in) | 2165 (85) | 2502 (99) | 2400 (95) | 2850 (112) |
| Width (W) | mm (in) | 1340 (53) | 1340 (53) | 1520 (60) | 1520 (60) |
| Height (H) | mm (in) | 1490 (58) | 1495 (59) | 1930 (76) | 1930 (76) |
| Mass, dry | kg (lbs) | 2650 (5842) | 3060 (6746) | 6045 (13325) | 7085 (15620) |
| **Engine main data** | | | | | |
| No. of cylinders | | 12 | 16 | 12 | 16 |
| Bore / stroke | mm (in) | 130/150 (5.1/5.9) | 130/150 (5.1/5.9) | 165/190 (6.5/7.5) | 165/190 (6.5/7.5) |
| Displacement, total | l (cu in) | 23.9 (1458) | 31.8 (1947) | 48.7 (2972) | 65.0 (3967) |
| Classification, unrestricted service | | X | X | X | X |
| Engine mounted cooler | | | | | |
| Keel cooling | | | | X | X |
| Radiator cooling | | X | X | X | X |

* For marine applications only available as emergency generator set with radiator cooling.

# Diesel engines for mechanical drives in medium duty operation - variable speed



# Diesel engines for mechanical drives in medium duty operation - variable speed

## Series 60

Series 60



### Rated power: 317 kW - 373 kW

| Engine model | | S60 | S60 | S60 | S60 | S60 | S60 |
|---|---|---|---|---|---|---|---|
| **Rated power ICFN** | **kW (bhp)** | **317 (425)** | **336 (450)** | **354 (475)** | **354 (475)** | **373 (500)** | **373 (500)** |
| **Speed** | **rpm** | **2100** | **2100** | **2100** | **2100** | **2100** | **2100** |
| **Exhaust optimization** | | EPA 2 | EPA 2 | EPA 2 | EPA 3 | EPA 2 | EPA 3 |
| **Peak Torque** | | | | | | | |
| | Nm | 2000 | 2102 | 2102 | 2102 | 2237 | 2102 |
| | lb-ft | 1475 | 1550 | 1550 | 1550 | 1650 | 1550 |
| | rpm | 1350 | 1350 | 1350 | 1350 | 1350 | 1350 |
| **Dimensions and masses** | | | | | | | |
| Length (L) | mm (in) | 1455 (57) | 1455 (57) | 1455 (57) | 1455 (57) | 1455 (57) | 1455 (57) |
| Width (W) | mm (in) | 925 (36) | 925 (36) | 925 (36) | 925 (36) | 925 (36) | 925 (36) |
| Height (H) | mm (in) | 1380 (54) | 1380 (54) | 1380 (54) | 1380 (54) | 1380 (54) | 1380 (54) |
| Mass, dry | kg (lbs) | 1291 (2846) | 1291 (2846) | 1291 (2846) | 1215 (2680) | 1291 (2846) | 1215 (2680) |
| **Engine main data** | | | | | | | |
| No. of cylinders | | 6 | 6 | 6 | 6 | 6 | 6 |
| Bore / stroke | mm (in) | 130/160 (5.1/6.3) | 130/160 (5.1/6.3) | 130/160 (5.1/6.3) | 133/168 (5.2/6.6) | 130/160 (5.1/6.3) | 133/168 (5.2/6.6) |
| Displacement, total | l (cu in) | 12.7 (775) | 12.7 (775) | 12.7 (775) | 14 (885) | 12.7 (775) | 14 (855) |
| Classification, unrestricted service | | X | X | X | X | X | X |
| Engine mounted cooler | | X | X | X | X | X | X |
| Keel cooling | | X | X | X | X | X | X |
| Radiator cooling | | | | | | | |

# Diesel engines for mechanical drives in medium duty operation - variable speed

## Series 60

Series 60



## Rated power: 391 kW - 429 kW

| Engine model | | S60 | S60 | S60 |
|---|---|---|---|---|
| **Rated power ICFN** | **kW (bhp)** | **391 (525)** | **410 (550)** | **429 (575)** |
| **Speed** | **rpm** | **2100** | **2100** | **2100** |
| **Exhaust optimization** | | EPA 2/EPA 3 | EPA 2/EPA 3 | EPA 2 |
| **Peak Torque** | | | | |
| | Nm | 2373 | 2373 | 2373 |
| | lb-ft | 1750 | 1750 | 1750 |
| | rpm | 1350 | 1350 | 1350 |
| **Dimensions and masses** | | | | |
| Length (L) | mm (in) | 1455 (57) | 1455 (57) | 1455 (57) |
| Width (W) | mm (in) | 925 (36) | 925 (36) | 925 (36) |
| Height (H) | mm (in) | 1380 (54) | 1380 (54) | 1380 (54) |
| Mass, dry | kg (lbs) | 1215 (2680) | 1215 (2680) | 1215 (2680) |
| **Engine main data** | | | | |
| No. of cylinders | | 6 | 6 | 6 |
| Bore / stroke | mm (in) | 133/168 (5.2/6.6) | 133/168 (5.2/6.6) | 133/168 (5.2/6.6) |
| Displacement, total | l (cu in) | 14 (885) | 14 (885) | 14 (885) |
| Classification, unrestricted service | | X | X | X |
| Engine mounted cooler | | X | X | X |
| Keel cooling | | X | X | X |
| Radiator cooling | | | | |

# Diesel engines for mechanical drives in short time duty operation - variable speed



Photo: Øyvind Hagen / Statoil

# Diesel engines for mechanical drives in short time duty operation - variable speed

## Series 60

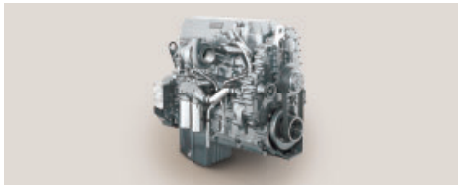
Series 60

## Rated power: 373 kW - 447 kW

| Engine model | | S60 | S60 | S60 | S60 | S60 | S60 |
|---|---|---|---|---|---|---|---|
| **Rated power ICFN** | **kW (bhp)** | **373 (500)** | **373 (500)** | **373 (500)** | **447 (600)** | **447 (600)** | **447 (600)** |
| **Speed** | **rpm** | **2100** | **2300** | **2100** | **2100** | **2100** | **2300** |
| **Exhaust optimization** | | EPA 2 | EPA 2 | IMO I/EPA 2 | IMO I/EPA 2 | EPA 2/EPA 3 | EPA 3 |
| **Peak Torque** | | | | | | | |
| | Nm | 2102 | 2102 | 2237 | 2576 | 2576 | 2576 |
| | lb-ft | 1550 | 1650 | 1650 | 1900 | 1900 | 1900 |
| | rpm | 1350 | 1350 | 1350 | 1350 | 1350 | 1350 |
| **Dimensions and masses** | | | | | | | |
| Length (L) | mm (in) | 1455 (57) | 1455 (57) | 1455 (57) | 1455 (57) | 1455 (57) | 1455 (57) |
| Width (W) | mm (in) | 925 (36) | 925 (36) | 925 (36) | 925 (36) | 925 (36) | 925 (36) |
| Height (H) | mm (in) | 1380 (54) | 1380 (54) | 1380 (54) | 1380 (54) | 1380 (54) | 1380 (54) |
| Mass, dry | kg (lbs) | 1291 (2846) | 1291 (2846) | 1291 (2846) | 1291 (2846) | 1215 (2680) | 1215 (2680) |
| **Engine main data** | | | | | | | |
| No. of cylinders | | 6 | 6 | 6 | 6 | 6 | 6 |
| Bore / stroke | mm (in) | 130/160 (5.1/6.3) | 130/160 (5.1/6.3) | 130/160 (5.1/6.3) | 130/160 (5.1/6.3) | 133/168 (5.2/6.6) | 133/168 (5.2/6.6) |
| Displacement, total | l (cu in) | 12.7 (775) | 12.7 (775) | 12.7 (775) | 12.7 (775) | 14 (885) | 14 (885) |
| Classification, unrestricted service | | X | X | X | X | X | X |
| Engine mounted cooler | | X | X | X | X | X | X |
| Keel cooling | | X | X | X | X | X | X |
| Radiator cooling | | | | | | | |

# Diesel engines for mechanical drives in short time duty operation - variable speed

## Series 60



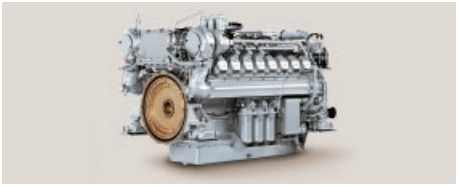
Series 60

## Rated power: 470 kW - 496 kW

| Engine model | | S60 | S60 |
|---|---|---|---|
| **Rated power ICFN** | **kW (bhp)** | **470 (630)** | **496 (665)** |
| **Speed** | **rpm** | **2100** | **2300** |
| **Exhaust optimization** | | EPA 2/EPA 3 | EPA 2/EPA 3 |
| **Peak Torque** | | | |
| | Nm | 2576 | 2576 |
| | lb-ft | 1900 | 1900 |
| | rpm | 1350 | 1350 |
| **Dimensions and masses** | | | |
| Length (L) | mm (in) | 1455 (57) | 1455 (57) |
| Width (W) | mm (in) | 925 (36) | 925 (36) |
| Height (H) | mm (in) | 1380 (54) | 1380 (54) |
| Mass, dry | kg (lbs) | 1215 (2680) | 1215 (2680) |
| **Engine main data** | | | |
| No. of cylinders | | 6 | 6 |
| Bore / stroke | mm (in) | 133/168 (5.2/6.6) | 133/168 (5.2/6.6) |
| Displacement, total | l (cu in) | 14 (855) | 14 (855) |
| Classification, unrestricted service | | X | X |
| Engine mounted cooler | | X | X |
| Keel cooling | | X | X |
| Radiator cooling | | | |

# Diesel engines for mechanical drives in short time duty operation - variable speed

## Series 2000 P
## Series 4000 P



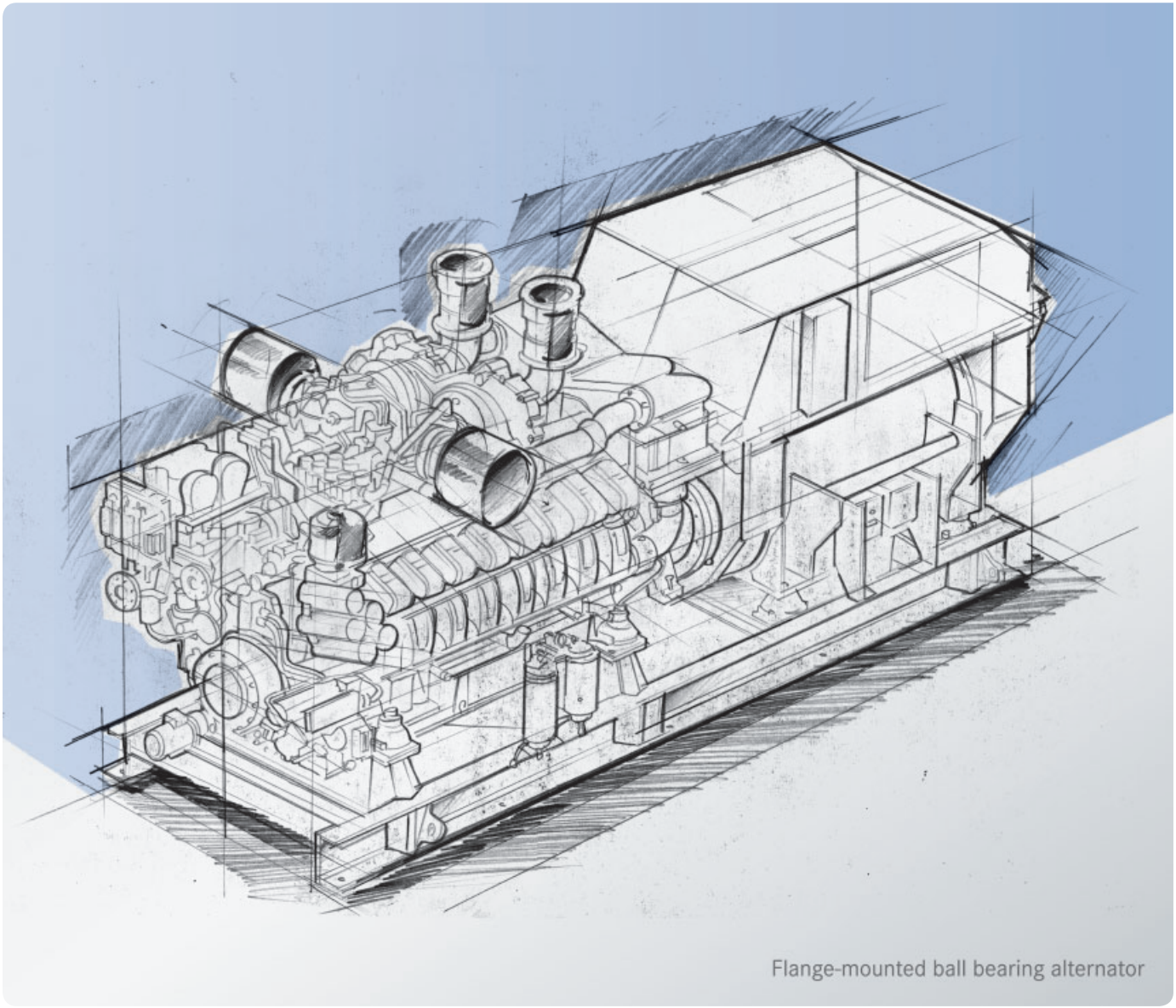
16V 2000 P

### Rated power: 675 kW - 2320 kW

| Engine model | | 12V 2000 P92R* | 12V 2000 P92* | 16V 2000 P92R* | 16V 2000 P92* | 12V 4000 P91 | 16V 4000 P91 |
|---|---|---|---|---|---|---|---|
| **Rated power ICFN** | **kW (bhp)** | **675 (905)** | **788 (1055)** | **900 (1205)** | **1050 (1408)** | **1740 (2330)** | **2320 (3110)** |
| **Speed** | **rpm** | **1800** | **2100** | **1800** | **2100** | **2000** | **2000** |
| **Exhaust optimization** | | IMO II/EPA 2 | IMO II/EPA 2 | IMO II/EPA 2 | IMO II/EPA 2 | IMO I | IMO I |
| **Peak Torque** | | | | | | | |
| | Nm | 4010 | 4010 | 5348 | 5348 | 9232 | 12309 |
| | lb-ft | 2960 | 2960 | 3945 | 3945 | 6810 | 9075 |
| | rpm | 1500 | 1500 | 1500 | 1500 | 1800 | 1800 |
| **Dimensions and masses** | | | | | | | |
| Length (L) | mm (in) | 2165 (85) | 2165 (85) | 2502 (99) | 2502 (99) | 2400 (95) | 2850 (112) |
| Width (W) | mm (in) | 1340 (53) | 1340 (53) | 1340 (53) | 1340 (53) | 1520 (60) | 1520 (60) |
| Height (H) | mm (in) | 1490 (58) | 1490 (58) | 1495 (59) | 1495 (59) | 1930 (76) | 1930 (76) |
| Mass, dry | kg (lbs) | 2650 (5842) | 2650 (5842) | 3060 (6746) | 3060 (6746) | 6045 (13325) | 7085 (15620) |
| **Engine main data** | | | | | | | |
| No. of cylinders | | 12 | 12 | 16 | 16 | 12 | 16 |
| Bore / stroke | mm (in) | 130/150 (5.1/5.9) | 130/150 (5.1/5.9) | 130/150 (5.1/5.9) | 130/150 (5.1/5.9) | 165/190 (6.5/7.5) | 165/190 (6.5/7.5) |
| Displacement, total | l (cu in) | 23.9 (1458) | 23.9 (1458) | 31.8 (1947) | 31.8 (1947) | 48.7 (2972) | 65.0 (3967) |
| Classification, unrestricted service | | X | X | X | X | X | X |
| Engine mounted cooler | | | | | | | |
| Keel cooling | | | | | | X | X |
| Radiator cooling | | X | X | X | X | X | X |

* For marine applications only available as emergency generator set with radiator cooling.

# Generator sets for on-board power generation, diesel-electric propulsion or combined systems



Flange-mounted ball bearing alternator

# Marine generator sets for on-board power generation, diesel-electric propulsion or combined systems

Generator Set
5 - 250 kWe

## Rated power: 5 - 250 kWe

**Description:**

– Two product lines of high quality generator sets for yacht and commercial applications are available on demand to complement MTU main propulsion engines. 50/60 Hz versions are available with options and accessories such as soundshields, control panels, safety switches, PTOs, ect.

**Benefits:**

– Global MTU service & logistics network comprising more than 1300 points of contact

**Standard scope of supply and options:**

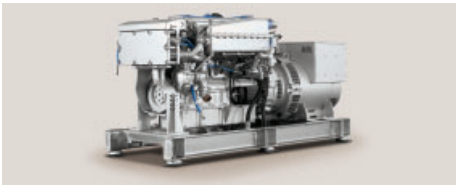
– Large, cast iron expansion tank
– Jacket-water colled, cast iron exhaust manifold with two pass collant flow
– Jacket-watercolled turbocharger for safety
– Welded steel base frame
– Closed loop crankcase vent to keep oil vapors in the engine for a cleaner engine room
– Clamp style fuel filter(s) with vent and drain
– Service side lube oil filters
– Center bonded vibration isolation mounts

| Genset with engine model[1] | | Commercial | Commercial | Yacht | Yacht | Emergency | Emergency |
|---|---|---|---|---|---|---|---|
| | | 50 Hz | 60 Hz | 50 Hz | 60 Hz | 50 Hz | 60 Hz |
| Rated power ICXN | kWe[2] | 16 - 125 | 20 - 250 | 4,5 - 155 | 5 - 185 | 33 - 80 | 40 - 165 |
| Rated power ICXN | kVA[2] (@cosphi 0.8) | 20 - 156 | 25 - 312 | 5,6 - 194 | 6,3 - 232 | 41 - 100 | 50 - 206 |
| Speed | rpm | 1500 | 1800 | 1500 | 1800 | 1500 | 1800 |

1) Emissions/Class societies on request
2) Rated power depends on ambient conditions and alternator specification. Other ratings are available on request

# Marine generator sets for on-board power generation, diesel-electric propulsion or combined systems

## Series 60



Generator Set
Series 60

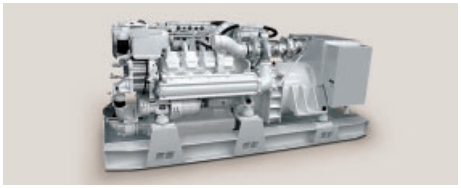
### Rated power: 257 - 305 kWe

| Genset with engine model | | S60 | S60 | S60 | S60 | S60 | S60 |
|---|---|---|---|---|---|---|---|
| | | 50 Hz | 50 Hz | 50 Hz | 60 Hz | 60 Hz | 60 Hz |
| | | 400 V/690 V | 400 V/690 V | 400 V/690 V | 450 V/690 V | 450 V/690 V | 450 V/690 V |
| Rated power ICXN | kWe[1)] | 257 | 283 | 305 | 257 | 283 | 305 |
| Rated power ICXN | kVA[1)] | | | | | | |
| | (@cosphi 0.8) | 321 | 354 | 381 | 321 | 354 | 381 |
| Speed | rpm | 1500 | 1500 | 1500 | 1800 | 1800 | 1800 |

1) Rated power depends on ambient conditions and alternator specification

# Marine generator sets for on-board power generation, diesel-electric propulsion or combined systems

## Series 2000



Generator Set
Series 2000

## Rated power: 300-725 kWe

**Description:**

– MTU gensets up to 875 kWe for basic (e.g. commercial) or advanced (e.g. yacht) requirements

**Benfits:**

– Global MTU service & logistics network comprising more than 1300 points of contact
– Cost-efficient standardized gensets with MTU proven quality and reliability
– Global component sourcing and worldwide manufacturing possibility to fullfil local content requirements

**Standard scope of supply and options:**

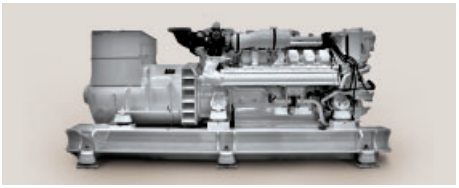
– Air- or water cooled alternator (50/60 Hz, 400 – 690 V)
– MTU designed baseframe for rigid installation
– Factory approved resilient mounting for engine and alternator (optional double resilient mounting)
– Factory approved torsional resilient coupling for flange mounted double bearing alternator
– Local operating panel (LOP genoline)
– Fuel prefilter with water separator
– Lube oil priming pump with control unit (PPC)
– Certification of all major classification societies
– Optional premium painting

| Genset with engine model[1] | | 8V 2000 M51A | 8V 2000 M41A | 12V 2000 M51A | 12V 2000 M41A | 16V 2000 M51A | 16V 2000 M41A |
|---|---|---|---|---|---|---|---|
| | | 50 Hz 400 V/690 V | 50 Hz 400 V/690 V | 50 Hz 400 V/690 V | 50 Hz 400 V/690 V | 50 Hz 400 V/690 V | 50 Hz 400 V/690 V |
| **Rated power ICXN** | **kWe[2]** | **300** | **355** | **470** | **540** | **620** | **725** |
| **Rated power ICXN** | **kVA[2] (@cosphi 0.8)** | **375** | **445** | **590** | **675** | **775** | **905** |
| **Speed** | **rpm** | **1500** | **1500** | **1500** | **1500** | **1500** | **1500** |
| **Dimensions and masses[3]** | | | | | | | |
| Length (L) | mm | 2800 | 2800 | 3400 | 3400 | 3840 | 3840 |
| Width (W) | mm | 1550 | 1550 | 1550 | 1550 | 1550 | 1550 |
| Height (H) | mm | 1400 | 1400 | 1500 | 1500 | 1800 | 1800 |
| Mass, dry | kg | 3600 | 3600 | 5100 | 5100 | 6350 | 6350 |

1) Project specific gensets also available with other engines models (e.g. S2000P) or other voltage ratings (e.g. 3,3 kV/6,6 kV)
2) Rated power depends on ambient conditions and alternator specification.
3) Dimensions and masses are based on basic version (for details see MTU Generator Sets brochures)

# Marine generator sets for on-board power generation, diesel-electric propulsion or combined systems

## Series 2000



Generator Set
Series 2000

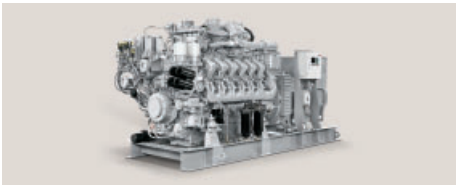
## Rated power: 365 - 875 kWe

| Genset with engine model[1] | | 8V 2000 M51B | 8V 2000 M41B | 12V 2000 M51B | 12V 2000 M41B | 16V 2000 M51B | 16V 2000 M41B |
|---|---|---|---|---|---|---|---|
| | | 60 Hz | 60 Hz | 60 Hz | 60 Hz | 60 Hz | 60 Hz |
| | | 450 V/690 V | 450 V/690 V | 450 V/690 V | 450 V/690 V | 450 V/690 V | 450 V/690 V |
| **Rated power ICXN** | **kWe[2]** | **365** | **430** | **560** | **650** | **750** | **875** |
| **Rated power ICXN** | **kVA[2]** | | | | | | |
| | **(@cosphi 0.8)** | **455** | **540** | **700** | **810** | **940** | **1100** |
| **Speed** | **rpm** | **1800** | **1800** | **1800** | **1800** | **1800** | **1800** |
| **Dimensions and masses[3]** | | | | | | | |
| Length (L) | mm | 2800 | 2800 | 3400 | 3400 | 3840 | 3840 |
| Width (W) | mm | 1550 | 1550 | 1550 | 1550 | 1550 | 1550 |
| Height (H) | mm | 1400 | 1400 | 1500 | 1500 | 1800 | 1800 |
| Mass, dry | kg | 3600 | 3600 | 5100 | 5100 | 6350 | 6350 |

1) Project specific gensets also available with other engines models (e.g. S2000P) or other voltage ratings (e.g. 3,3 kV/6,6 kV)
2) Rated power depends on ambient conditions and alternator specification.
3) Dimensions and masses are based on basic version (for details see MTU Generator Sets brochures)

# Marine generator sets for on-board power generation, diesel-electric propulsion or combined systems

## Series 4000



Generator Set
Series 4000

## Rated power: 720 - 1680 kWe

**Description:**

– MTU gensets up to 2900 kWe for basic (e.g. commercial) or advanced (e.g. yacht) requirements

**Benfits:**

– Global MTU service & logistics network comprising more than 1300 points of contact
– Cost-efficient standardized gensets with MTU proven quality and reliability
– Global component sourcing and worldwide manufacturing possibility to fullfil local content requirements
– High availability and long TBO of up to 40,000 h depending on operating profile

**Standard scope of supply and options:**

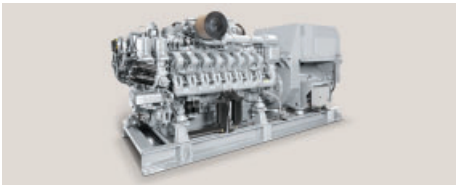
– Air- or water cooled alternator (50/60 Hz, 400 – 690 V)
– MTU designed baseframe for rigid installation
– Factory approved resilient mounting for engine and alternator (optional double resilient mounting)
– Factory approved torsional resilient coupling for flange mounted double bearing alternator (optional available with double sleeve bearing alternator)
– Local operating panel (LOP genoline)
– Fuel prefilter with water separator
– Lube oil priming pump with control unit (PPC)
– Certification of all major classification societies
– Optional premium painting

| Genset with engine model[1] | | 8V 4000 M23F | 8V 4000 M33F | 12V 4000 M23F | 12V 4000 M33F | 16V 4000 M23F | 16V 4000 M33F |
|---|---|---|---|---|---|---|---|
| | | 50 Hz 400 V/690 V | 50 Hz 400 V/690 V | 50 Hz 400 V/690 V | 50 Hz 400 V/690 V | 50 Hz 400 V/690 V | 50 Hz 400 V/690 V |
| **Rated power ICXN** | **kWe[2]** | **720** | **830** | **1080** | **1260** | **1460** | **1680** |
| **Rated power ICXN** | **kVA[2]** (@cosphi 0.8) | **900** | **1037** | **1350** | **1575** | **1825** | **2100** |
| **Speed** | **rpm** | **1500** | **1500** | **1500** | **1500** | **1500** | **1500** |
| **Dimensions and masses[3]** | | | | | | | |
| Length (L) | mm | 3900 | 4000 | 4400 | 4500 | 5400 | 5500 |
| Width (W) | mm | 1825 | 1825 | 1825 | 1825 | 1825 | 1825 |
| Height (H) | mm | 2225 | 2225 | 2285 | 2285 | 2285 | 2285 |
| Mass, dry | kg | 9000 | 9500 | 12000 | 12500 | 14500 | 15500 |

1) Project specific gensets also available with other engines models (e.g. S4000P/20V version) or other voltage ratings (e.g. 3,3 kV/6,6 kV)
2) Rated power depends on ambient conditions and alternator specification
3) Dimensions and masses are based on basic version (for details see MTU Generator Sets brochures)

# Marine generator sets for on-board power generation, diesel-electric propulsion or combined systems

## Series 4000



Generator Set
Series 4000

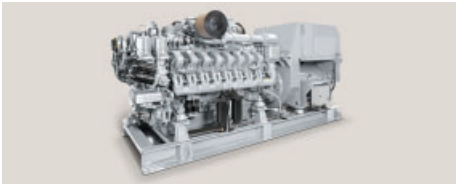
## Rated power: 870 - 1480 kWe

| Genset with engine model[1] | | 8V 4000 M23S | 8V 4000 M33S | 12V 4000 M23S | 12V 4000 M33S |
|---|---|---|---|---|---|
| | | 60 Hz | 60 Hz | 60 Hz | 60 Hz |
| | | 450 V/690 V | 450 V/690 V | 450 V/690 V | 450 V/690 V |
| **Rated power ICXN** | **kWe[2]** | **870** | **990** | **1320** | **1480** |
| **Rated power ICXN** | **kVA[2]** | | | | |
| | **(@cosphi 0.8)** | **1087** | **1237** | **1650** | **1850** |
| **Speed** | **rpm** | **1800** | **1800** | **1800** | **1800** |
| **Dimensions and masses[3]** | | | | | |
| Length (L) | mm | 3900 | 4000 | 4400 | 4500 |
| Width (W) | mm | 1825 | 1825 | 1825 | 1825 |
| Height (H) | mm | 2225 | 2225 | 2285 | 2285 |
| Mass, dry | kg | 9000 | 9500 | 12000 | 12500 |

1) Project specific gensets also available with other engines models (e.g. S4000P/20V version) or other voltage ratings (e.g. 3,3 kV/6,6 kV)
2) Rated power depends on ambient conditions and alternator specification.
3) Dimensions and masses are based on basic version (for details see MTU Generator Sets brochures)

# Marine generator sets for on-board power generation, diesel-electric propulsion or combined systems

## Series 4000



Generator Set
Series 4000

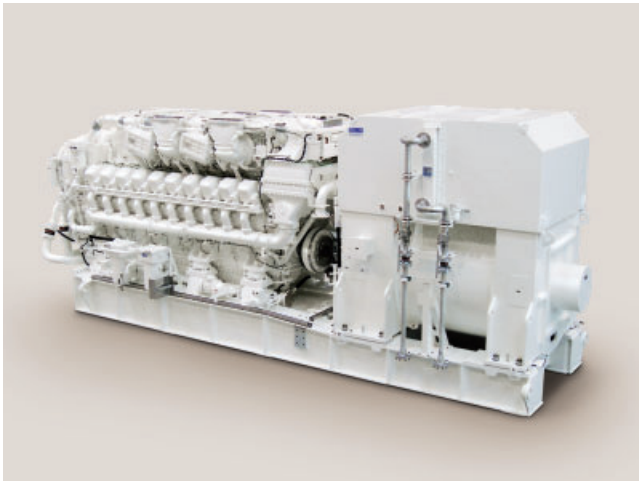
## Rated power: 1760-2280 kWe

| Genset with engine model[1] | | 16V 4000 M23S | 16V4000M33S | 16V 4000 M43S | 20V 4000 M53B |
|---|---|---|---|---|---|
| | | 60 Hz | 60 Hz | 60 Hz | 60 Hz |
| | | 450 V/690 V | 450 V/690 V | 450 V/690 V | 450 V/690 V |
| **Rated power ICXN** | **kWe[2]** | **1760** | **2000** | **2140** | **2280** |
| **Rated power ICXN** | **kVA[2]** | | | | |
| | **(@cosphi 0.8)** | **1087** | **1237** | **2675** | **3600** |
| **Speed** | **rpm** | **1800** | **1800** | **1800** | **1800** |
| **Dimensions and masses[3]** | | | | | |
| Length (L) | mm | 5400 | 5500 | 5600 | on request[1] |
| Width (W) | mm | 1825 | 1825 | 1825 | on request[1] |
| Height (H) | mm | 2285 | 2285 | 2285 | on request[1] |
| Mass, dry | kg | 145000 | 16000 | 16500 | on request[1] |

1) Project specific gensets also available with other engines models (e.g. S4000P/20V version) or other voltage ratings (e.g. 3,3 kV/6,6 kV)
2) Rated power depends on ambient conditions and alternator specification
3) Dimensions and masses are based on basic version (for details see MTU Generator Sets brochures)

# Offshore generator sets for on-board power generation, diesel-electric propulsion or combined systems

## Rated power: 1000 - 6000 kWe

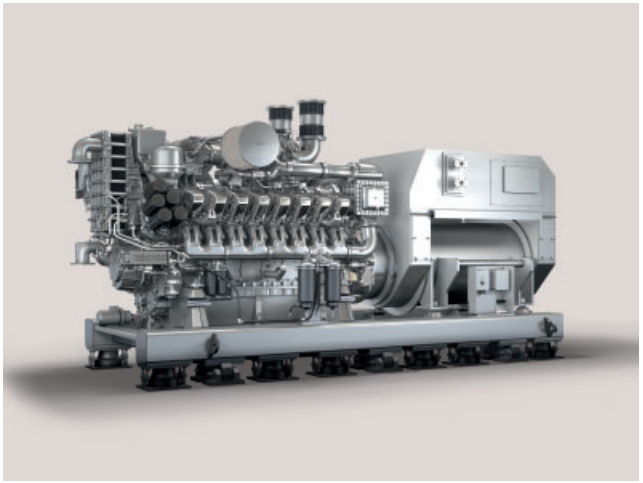


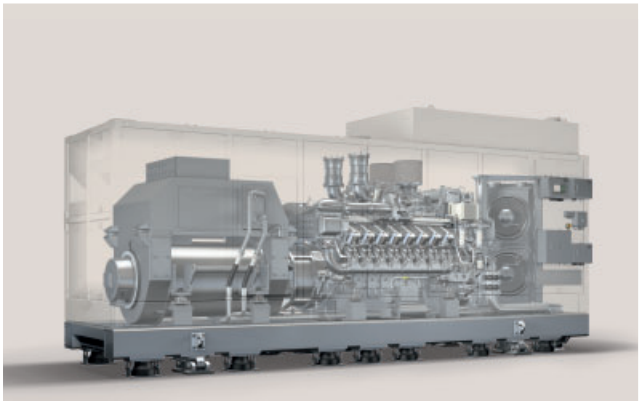
**MTU offshore product range includes diesel engines and systems for:**

- Generator sets for emergency, essential, auxiliary and main power
- Fire pump drivers for mechanical/hydraulic/electric installations
- Mud pump drivers
- Wellserve power packs
- Nitrogen units
- Cranes
- Cement pumps
- Hydraulic power packs

# Customized marine solutions for on-board power generation, diesel-electric propulsion or combined systems

## Power output up to 3000 kWe





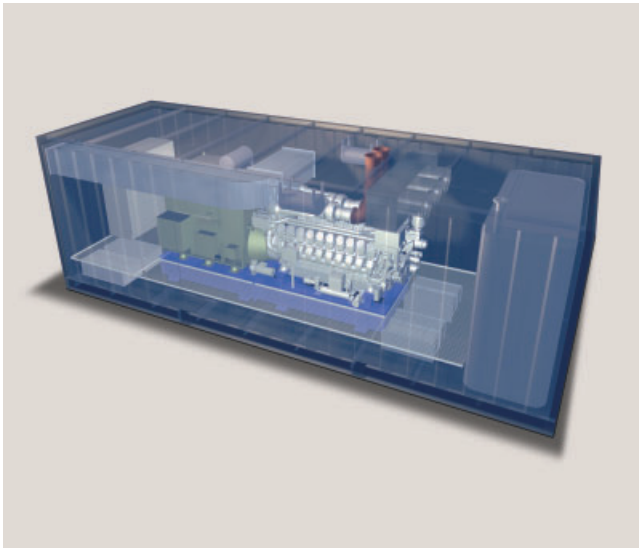
For higher demands, MTU offers complex systems with power output up to 3000 kWe. All solutions are customized for the respective yacht in order to fit the needs of the owner. Our complex systems make use of state-of-the-art technologies, utilize special concepts, and incorporate acoustic improvements.

**Benefits:**

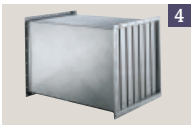
- Reduced vibrations during operation through double-elastic mounted systems
- Reduced noise during operation through the use of high-quality insulating capsules
- Highly fuel-efficient
- Lower emissions
- High operating safety through the use of multiple gensets, in most cases
- The design of the installation, its placement on the ship and its operating modes are all highly flexible
- Low life-cycle-costs

# Customized offshore solutions for on-board power generation, diesel-electric propulsion or combined systems

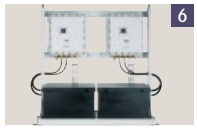
## Rated power: 1000 - 2700 kWe












1 Exhaust System
2 Fuel System
3 Cooling System
4 Combustion Air System
5 Lube Oil System
6 Starting System
7 Control Panel
8 Alternator

Built to meet the demands of the Offshore industry, these complete systems deliver high performance, efficiency and reliability in extreme conditions. MTU diesel engines and systems are fully integrated and allow for easy serviceability. Everything is designed to work together, which prolongs preventive maintenance and overhaul intervals.

**Benefits:**
- Complete system tailored to your precise project needs
- One complete system from one trusted source
- All components are developed to work together
- High performance, efficiency and reliability even under the toughest conditions
- Proven technology

# Systems solutions



# Systems solutions
## System expertise



MTU is one of the world's leading manufacturers of propulsion and power generation systems for vessels: MTU products are used on all the world's oceans and in all marine areas.

For MTU, being a systems supplier means taking complete care of our customer's needs at any point in the life cycle. Our key technologies in diesel engine development and manufacturing comprising:
- Turbo charging units
- Fuel injection systems
- Engine management systems
- Automation systems

are completed by validated and proven accessories like:
- Fuel treatment and filtration units
- Resilient engine mounts
- Resilient- and offset compensating couplings
- Gearboxes
- Exhaust silencers

**Noise reduction technology**
Double resilient mounting systems and active mounting systems are available for applications with the highest acoustic demands, such as comfort yachts or research vessels.

**Emissions reduction technology**
In addition to low emission diesel engines, MTU offers customized exhaust after treatment systems.
- Diesel particulate filters (DPF) with active regeneration:
  - Active filter regeneration via burner
  - Enabled for low load operation
  - Optimum in system reliabilty
  - PM-reduction up to 99 %
  - Class certified: LR, GL
  - Typical usage: yachts or commercial vessels with significant low load operation
- Diesel particulate filters (DPF) with passive regeneration:
  - Passive filter regeneration via DOC
  - Uncoated sinter metal filter
  - Compact and weight optimized design
  - PM-reduction higher than 95 %
  - Typical usage: commercial vessels with mainly high load operation like RoRo ferries
- Selective catalytic reduction (SCR) units
  - Reduction of $NO_x$ emissions of diesel engines
  - Enables customers to achieve IMO Tier 3 emission levels with current Tier 2 engines.
- Combined DPF+SCR
  The installation space required for conventional silencers can be reduced if the exhaust noise attenuation capabilities of the filter units and catalytic converters are taken into account.

**Gas-protected operation**
In order to maintain a high level of safety in dangerous, explosive environments, some engines in the 4000 and 8000 Series can be equipped for gas protection around flammable or explosive gases. Engines are equipped with a safety package that meets with the related operational conditions.

For further information, please contact your distributor or MTU contact.

**Propulsion systems**
MTU systems solutions include both standardized packages like the surface drive propulsion system "**mari***tune*" for high speed boats as well as customized solutions for complex main propulsion systems.

# Systems solutions
## Combined propulsion systems



Our engineering expertise and operating experience covers a large range of combined propulsion systems, such as:

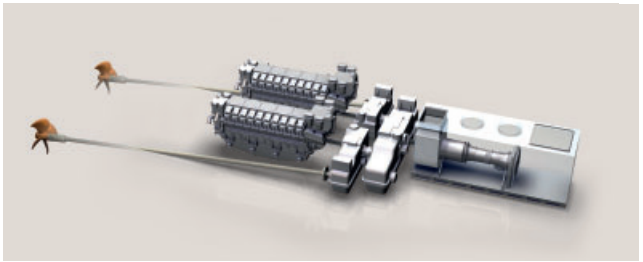
– Combined Diesel and Diesel (CODAD)
– Combined Diesel or Electric (CODOE)
– Combined Diesel and/or Gas Turbine (CODAG, CODOG)
– Combined Diesel-Electric and Gas Turbine (CODELAG)

The intelligent combination of diesel engines, electric motors and gas turbines allows optimal adaptation of the propulsion system to the various operational requirements of fast vessels.

**Propulsion Systems**

**Gas turbines** **Diesel engines** **Electric motors**

Application example of complete propulsion system



**All systems can drive various kinds of propulsors, e.g. FPP, CPP, WJ, Voith Schneider, also in combination with CODAD, CODOG, CODAG, COGAG, CODELAG hybrid-drives.**

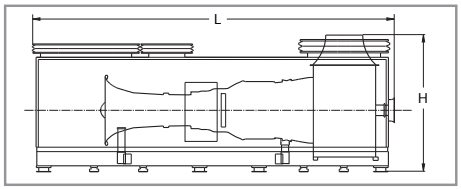
On request, we will serve as the general contractor, taking complete technical and commercial responsibility for the entire propulsion and power generation system as well as the automation system. From project engineering and project management to support and service, MTU is your single source partner for complete solutions.

# Series LM2500
## for fast vessels

# 25060 kW - 35320 kW

Corvette
“Milgem”
1x LM2500

**Dimensions and masses: Gas turbine LM2500, LM2500+ and LM2500+G4 in basic configuration with acoustic enclosure**




— Reference conditions according ISO 2314:
- Ambient temperature: 15 °C
- Relative humidity: 60 %
- Ambient air pressure: 1013 mbar
- Inlet pressure drop: 0 mbar
- Exhaust pressure drop: 0 mbar

— For application related performance data, please contact your MTU distributor.

| Model | | LM2500 | LM2500+ | LM2500+G4 |
|---|---|---|---|---|
| **Output** | **kW (bhp)** | **25060 (33600)** | **30200 (40500)** | **35320 (47370)** |
| **Power turbine speed** | **rpm** | **3600** | **3600** | **3600** |
| **Fuel consumption**[1] | g/kWh | 227 | 215 | 214 |
| **Exhaust gas temperature** | °C | 566 | 518 | 549 |
| **Exhaust gas flow** | kg/s | 70.5 | 85.9 | 93 |
| **Dimensions and masses** | | | | |
| Length (L) | mm (in) | 8086 (318.3) | 8476 (333.7) | 8476 (333.7) |
| Width (W) | mm (in) | 2642 (104.0) | 2642 (104.0) | 2642 (104.0) |
| Height (H) | mm (in) | 2717 (107.0) | 2745 (108.1) | 2745 (108.1) |
| Mass, dry | kg (lbs) | 16081 (35452) | 17410 (38382) | 17410 (38382) |

1) Plus 3 % tolerance; fuel qualification according to Nato F76/F75 DIN 51601 with Lower Heating Value LHV of 42800 kJ/kg

The gas turbine monitoring and control set ECS-GT with LOP will be part of scope supply.

# Automation

# Automation

## Integrated ship automation systems
## System solution from the platform experts

Our comprehensive automation program enables us to offer you a professional solution for any type of vessel.

**Integrated ship automation system Callosum**
Modular, customized automation for highly integrated systems solutions. Callosum encompasses individual variants customized to the respective ships and requirements:

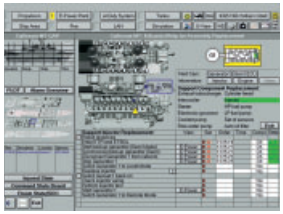
**Integrated Monitoring and Control System Callosum_MC**
While the ship is in operation, Callosum_MC monitors and controls.

- Propulsion system
- Onboard power generation
- General areas of the ship platform (tanks, bilges, HVAC, etc.)
- Delivery of optional systems such as:
  - Electric power management system
  - Closed circuit television system
  - Duty alarm system
  - Harbor duty system
  - Fire alarm and detecting system
  - Machinery telegraph system
  - Personnel localization and identification system

**Damage Control System Callosum_DC**
The system ensures the precise localization of any type of related damage to support incident management by several subsystems as:

- Fire alarm and detecting system
- Trim and ballast system
- Display functions and other functional elements specifically designed
- MTU 3-click technology for quick and assured navigation

**Maintenance Support System Callosum_MT**



- Based on information and reports of Callosum_MC and Callosum_DC
- Provides support for the maintenance and upkeep on board
- The system guides the user reliably and intuitively by professional support tools (e.g. alarm system, trending, reports and 3D videos)

**Onboard and Land-Based Training System Callosum_TS**
Callosum_TS allows training and further education of the crew during ship operation.

- Simulates real operating conditions
- Soft- and hardware for operator and maintainer training
- Simulation based training
- Implementation of the original MTU monitoring and control system

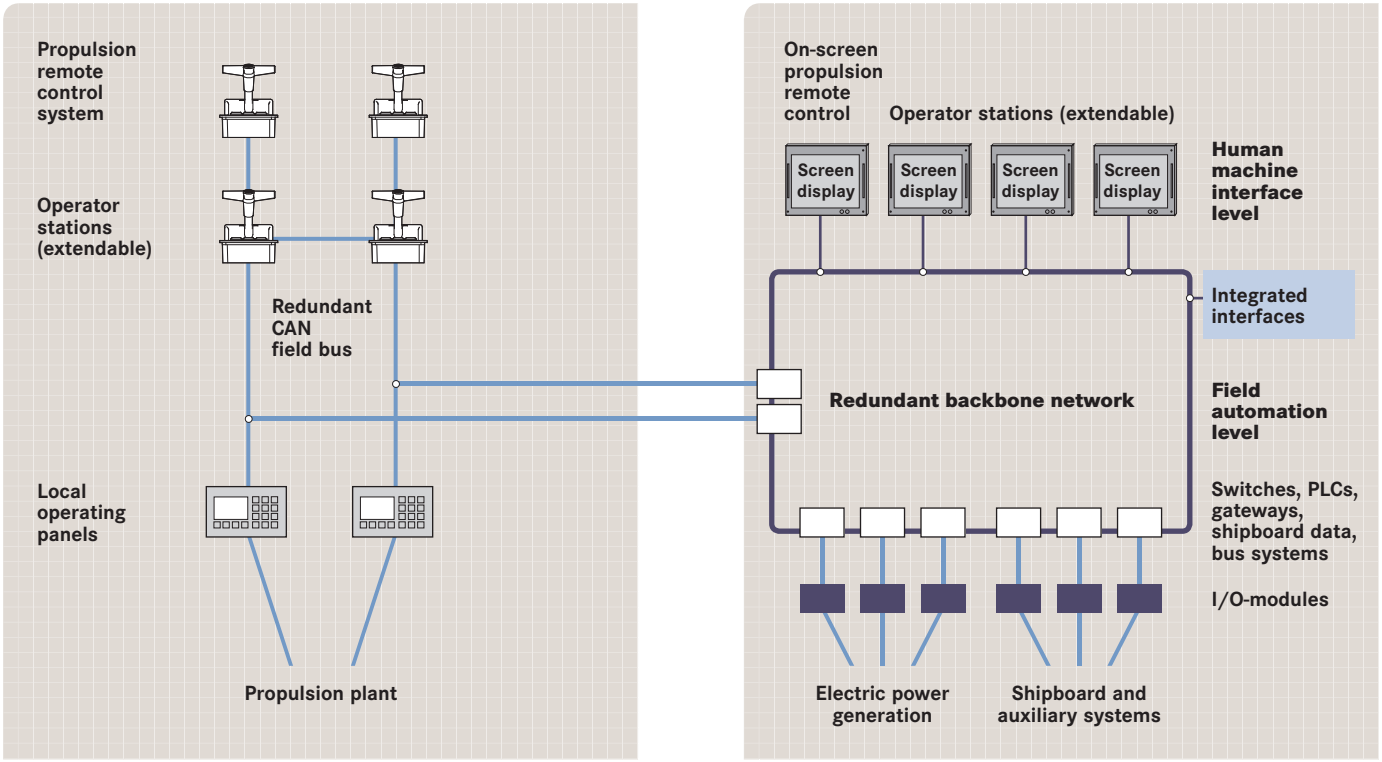
**Additional Systems**
MTU offers the following supplementary equipment:
- Control console
- Uninterruptible Power Supply (UPS)
- Sensors/actuators
- Interfaces for voyage data recorder
- Integrated bridge system

Further systems on request.

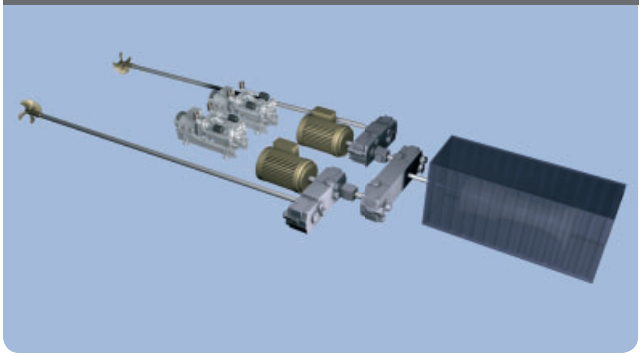
# Automation

## Integrated ship automation systems
## Callosum_MC – system structure

The integrated ship automation system Callosum provides optimal solutions for all types and sizes of ships to comply various requirements.




### Example: CODELAG propulsion plant



### Integrated systems

- > EPMS Electrical Power Management System
- > FDS Fire Detecting and Alarm System
- > CCTV Closed Circuit Television System
- > DAS Duty Alarm System
- > Network printer etc.

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- > Callosum_TS
  OBTS On-Board Training System
- > Callosum_DC
  Damage Control System
- > Callosum_MT
  Maintenance Support System

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I/O = Input/Output
PLC = Programmable Logic Controller

# Automation

## Standardized propulsion automation systems
## BlueVision | NewGeneration

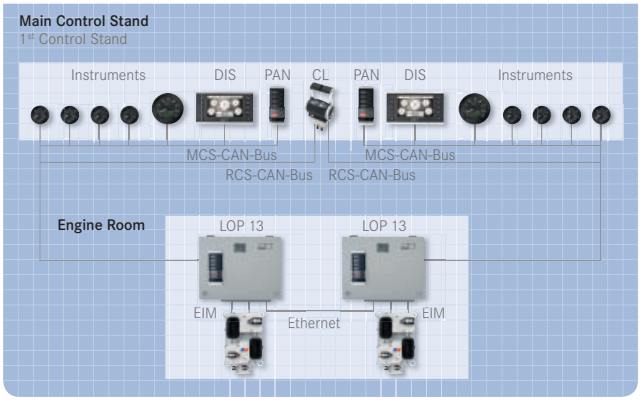
For many years, sophisticated MTU standard automation systems controlled, regulated and monitored the engine functions – always doing a perfect job!

**BlueVision | NewGeneration** automation solutions more convenient than ever before: easy to customize, easy to integrate, easy to operate.

**BlueVision | NewGeneration** is available both in the straightforward non-classifiable version **BlueVision_Basic | NewGeneration** and in the expanded classifiable version **BlueVision_Advanced | NewGeneration** – meeting different requirements according to boat design and customer budgets. The modular system design allows a flexible configuration; intelligent data bus technology ensures reliable data exchange and reduces cable efforts. Optimized interfaces between the propulsion and automation systems result in ideal total solutions that guarantee you security, efficiency and reliability.

With **BlueVision | NewGeneration** MTU offers you a complete and convenient system solution individually optimized for your ship, as well as comprehensive service – all from one source.

Thanks to “plug & play”, the system is as easily installed as it is operated.




Simple interfaces connect the Monitoring & Control System **BlueVision | NewGeneration** with the MTU diesel engine (via EIM) and the gearbox.

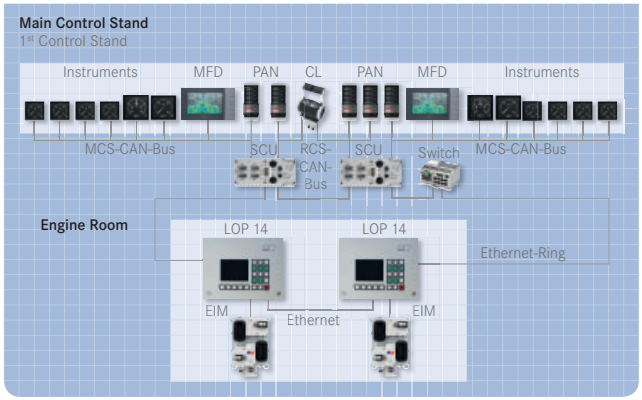
All components are type-approved und type-examination tested in shake / vibration / stress tests.

### Customer Benefits

**BlueVision_Basic | NewGeneration** and **BlueVision_Advanced | NewGeneration** are automation systems for propulsion plants in yachts and workboats with MTU Series 2000 or 4000 engines.

**BlueVision | NewGeneration** offers the following benefits:

- High operational availability and reliability of the propulsion plant
- High flexibility thanks to modular system structure and open architecture
- Simple, classifiable system in line with current directives
- Quicker and easier commissioning via structured user dialogue
- Type-tested components
- Development in accordance with current standards
- Optimized operation and visualization of the propulsion plant
- Uniform spare part concept across all MTU Series
- Global sales and service network
- Self-learning “Improved Crash-Stop” in order to stop the ship as quickly as possible



# Automation

## Standardized propulsion automation systems
## BlueVision | NewGeneration

**BlueVision_Basic | NewGeneration** is an MTU “non-classifiable” monitoring and propulsion remote control system for MTU Series 2000 and 4000 engines. It incorporates a deliberately simple design and provides a complete basic functionality. The system is available at particularly favorable conditions and quick to install.
An elementary feature of **BlueVision_Basic | NewGeneration** is its hardware compactness. As the central system component, the Local Operational Panel (LOP) integrates all basic functions available in this version, simplifying installation, operation and maintenance significantly.
This version is delivered with the Color Graphic Display Basic DIS as standard.

**Key features:**
- Compact hardware for easy installation and commissioning
- All control stand components installed throughout the ship are connected to the associated LOP via CAN bus
- Local Operating Panels (LOP) with basic functionality like start, stop, combined alarm/horn off, for installation in the engine room


1 Operating Panel (PAN)
2 Display Basic (DIS)
3 Control Lever (CL)
4 Local Operating Panel 13 (LOP)

**BlueVision_Advanced | NewGeneration** is an MTU “classifiable” monitoring and remote control system for yachts, offering a comprehensive standard automation system solution. It is available for MTU Series 2000 and 4000 engines.
An elementary feature of **BlueVision_Advanced | NewGeneration** is the system bus. The data transmission between the LOP and the commanding control stands is carried out via a redundant Ethernet based field bus. This ensures an absolutely secure communication on the one hand and highest flexibility of the overall system – also with regard to future upgrading – on the other.
This version is delivered with the Color Graphic Display MFD as standard, which has been optimized for the operation in classifiable ships.

**Key features:**
- Type-approved components, such as LOP, control lever, display and instruments
- Designed according to all major classification societies
- Data communication via redundant Ethernet ring bus
- Local Operating Panels (LOP) with color display and advanced functionalities like clutch and speed control


1 Operating Panel (PAN)
2 Multi Function Display (MFD)
3 Control Lever (CL)
4 Local Operating Panel 14 (LOP)

# Automation

## Standardized propulsion automation systems

## **smart***line* – **blue***line* – **blue***vision*

Perfectly balanced, standardized control and monitoring systems developed and manufactured inhouse by MTU, ensure that our proven marine propulsion technology functions exactly as you would expect it to. The integration of these cutting-edge automation systems provides optimum complete solutions which guarantee safety, efficiency and reliability. Without exception, MTU can always supply a complete system individually tailored to suit your vessel and backed up by a comprehensive service package – all from a single source.



**smart***line*
**Series 60/ 2000/ 4000-03**

Color display – 6,5”

Propulsion control lever

System for
- Non-classified applications
- Twin FPP engine installations
- CPP and WJ by interface

Options
- Extended to 6 control stands
- Palm Beach control lever
- Hand-held control unit

**blue***line*
**Series 2000/ 4000**

Color display – 7,0“

Propulsion control lever

System for
- Non-classified applications
- FPP and SDS propulsion plants
- CPP and WJ by interface
- One to four engine propulsion plants

Options
- Extended to 4 control stands
- Palm Beach control lever
- Hand-held control unit

**blue***vision*
**Series 2000/ 4000**

TFT color monitor

Propulsion control levers

System for
- Non-classified and classified applications
- FPP, CPP, WJ and VSP propulsion plants
- One to four engine propulsion plants

Options
- Extended to 6 control stands
- Printer
- Hand-held control unit

# Automation

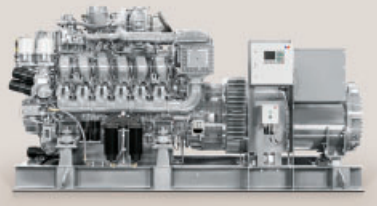
## Standardized and system solutions

## **geno***line*

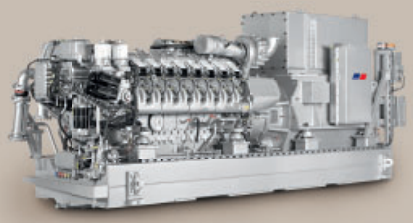
**geno***line* is an MTU non-classified and classified automation system for on-board power generation plants. The modular system design guarantees optimum adaptation of the diesel engine and generator to the diversity of operating conditions for the on board power generation. It is available for MTU Series 2000 and 4000 engines.

**geno***line* offers the following applications

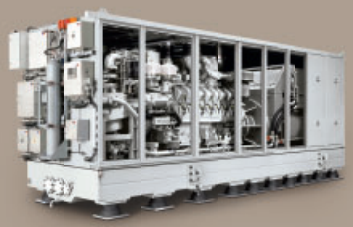
**On-board service power**
non-classified
and classified



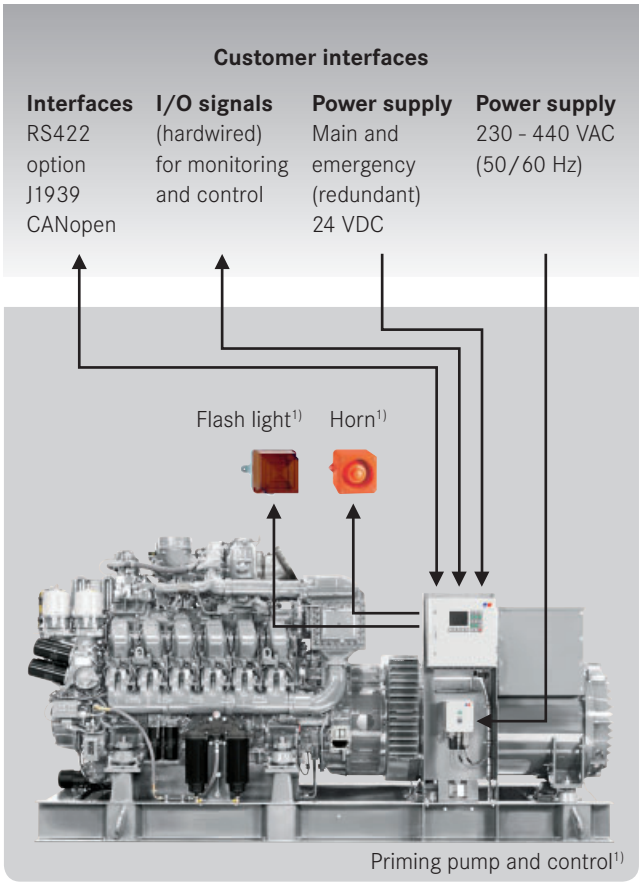
**Diesel-electric propulsion plant**
non-classified
and classified



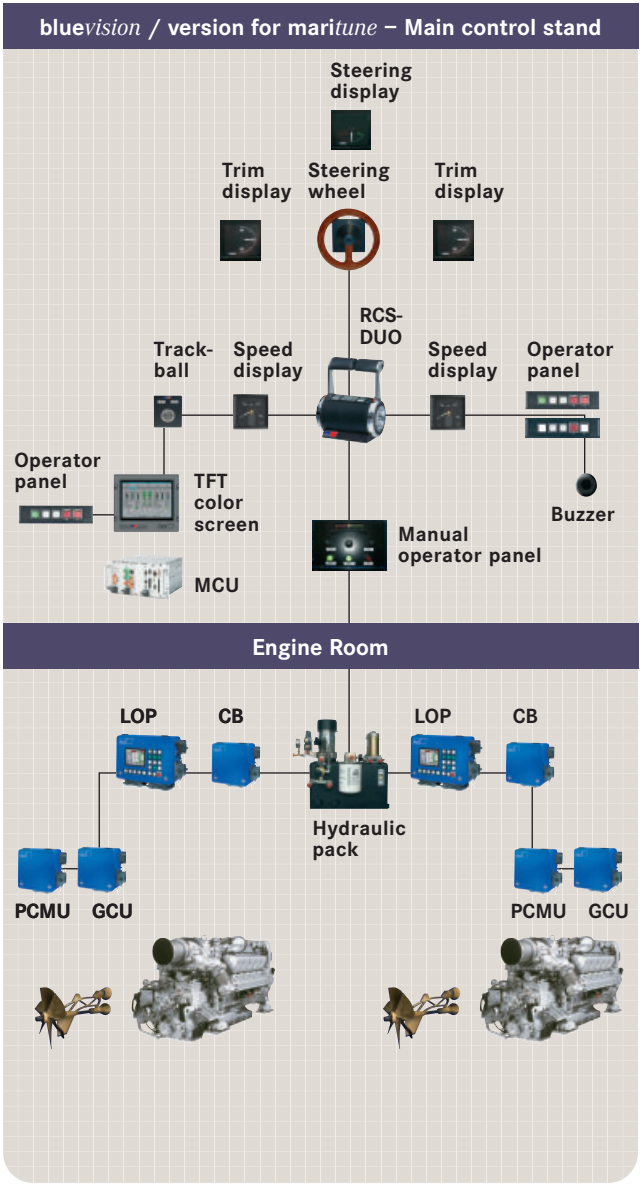
**Special applications**
- MIL
- Shock
- EMC
- etc.



**geno***line* automation system is an innovative high-end developed system available in two installation versions, with LOP (Local Operating Panel) or as version with switchboard interface.

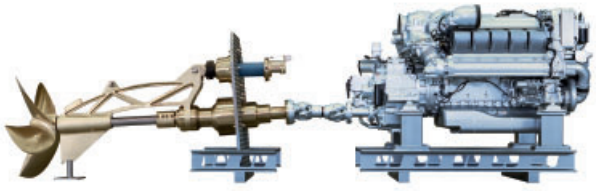



1) Optional features




**mari*tune* – MTU's surface drive propulsion system with Auto-Trim**

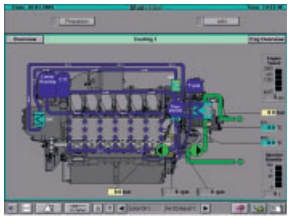
For fast pleasure craft and patrol boats up to approximately 70 t displacement, MTU offers complete propulsion systems including engine, gear, surface drive, hydraulic system as well as controls and monitoring. Systems integration, commissioning and long term service support are all expertly provided by MTU.



**Abbreviation list**

| | |
|---|---|
| CB | Connection Box |
| GCU | Gearbox Control Unit |
| LOP | Local Operating Panel |
| MCU | Management Computer Unit |
| PCMU | Propeller Control and Monitoring Unit |
| RCS | Remote Control System |
| SDS | Surface Drive System |
| TFT | Thin Film Transistor Technique |

**TFT color screen visualization example:**



# MTU **Value**Care

# MTU **Value**Care
## Keep going.

We have a strong commitment to our marine customers. With MTU **Value**Care, this focus extends beyond the sale of our engines and systems. From maintenance to spare parts to remanufactured products, MTU offers a full range of support to help you keep going.

Designed for maximum performance, uptime and value, MTU **Value**Care is a diverse portfolio of products and services that can help you get the most from your MTU engines and systems.

MTU **Value**Care includes three product lines:
- **Value**Service:
  Extensive global service and support to help you protect your investment
- **Value**Spares:
  Genuine spare parts and top-quality consumables designed specifically for MTU engines and systems
- **Value**Exchange:
  Remanufactured engines, systems and service parts engineered with the same high-quality standards as new products

MTU **Value**Care products and services are available anywhere in the world through our extensive network of authorized distributors and service dealers. For more information, please contact your local MTU service center or visit www.mtu-online.com.

# MTU **Value**Care
Keep going.

## **VALUE**SERVICE

### Customized Care
Unconditional engine reliability is important for optimizing lifecycle costs and protecting your investment. MTU is committed to your support. Customized Care – professional maintenance solutions from MTU – makes it easy to plan the cost of maintenance throughout your engine's lifecycle. The details, terms and periods of each package are precisely tailored to match your individual needs, ensuring cost certainty and maximum availability.

Customized Care offers a complete range of services. Professional maintenance is performed by MTU-certified technicians, using only genuine MTU new or remanufactured spare parts.

| Scope of Coverage | Customized Care | |
|---|---|---|
| | Preventive | All Inclusive |
| Engine Series | 2000/4000 | 2000/4000 |
| Parts and labor | ✓ | ✓ |
| Travel | ✓ | ✓ |
| Preventive maintenance | ✓ | ✓ |
| Major overhaul | ✓ | ✓ |
| Repairs | ✗ | ✓ |
| Duration of contract | Based on customer needs | Based on customer needs |
| Location for maintenance | 1 standard location or – as an option – multiple locations worldwide, to be determined | 2 standard locations or – as an option – multiple locations worldwide, to be determined |

✓ applicable ✗ not applicable

### Extended Coverage
Extended Coverage delivers peace of mind by providing coverage of unexpected repairs beyond your standard warranty, tailored specifically to meet your needs. During the extended coverage period, the cost of materials and labor are covered. Repairs with troubleshooting and fault clearance, provision of required components, and replacement of failed components are included. To ensure quality, all repairs are conducted by knowledgeable MTU professionals.

### Extended Propulsion Coverage
For additional peace of mind, Extended Propulsion Coverage (EPC) provides coverage for the propulsion system on your yacht beyond the standard warranty.

You'll feel confident knowing that unexpected repairs are covered, with service performed by personnel from an MTU-authorized service center. And if contractually required, MTU provides a free sea trial. The EPC package, an exclusive service for pleasure craft, is also transferable, which enhances resale value.

| Scope of Coverage | Extended Coverage | Extended Propulsion Coverage* |
|---|---|---|
| Engine Series | 60/2000/4000 | 60/396/2000/4000 |
| Parts and labor | ✓ | ✓ |
| Travel | ✓ | ✓ |
| Preventive maintenance | ✗ | ✗ |
| Major overhaul | ✗ | ✗ |
| Repairs | ✓ | ✓ |
| Duration of contract | Up to 5 years after the standard MTU warranty period | Up to 3 years after the standard MTU warranty period |
| Location for maintenance | MTU Authorized Service locations worldwide | |

✓ applicable ✗ not applicable

* (incl. MTU supplied standard main propulsion equipment)

# MTU **Value**Care

Keep going.

**Annual Check**

Annual Check is a yearly professional inspection of your MTU engines and systems by MTU experts, allowing you to identify and address problems early. It ensures effective preventive maintenance, helping you save on repairs or unexpected downtime and optimizing your engine's performance and longevity. MTU service technicians inspect the maintenance condition and determine whether any additional maintenance and repairs are required. The process includes visual engine inspection, test run and leak check, on-site engine oil and coolant analysis, and diagnostic evaluation and reporting.

**Training**

Comprehensive training is a great way to get maximum efficiency from your equipment. From timely preventive maintenance to efficient diagnostics and repair, our training programs are available around the world and designed to make your service personnel proficient with MTU engines and systems.

MTU trainers are product experts who know how to pass along their invaluable knowledge to trainees. Whatever the product or application – we offer a wide range of customized training programs to maximize your return on investment. MTU training is available for all MTU engine series.

**Other Services**

MTU also offers other value-add services including:

- Maintenance, Repair and Overhaul
- Workshop and Test Bench solutions
- Service units

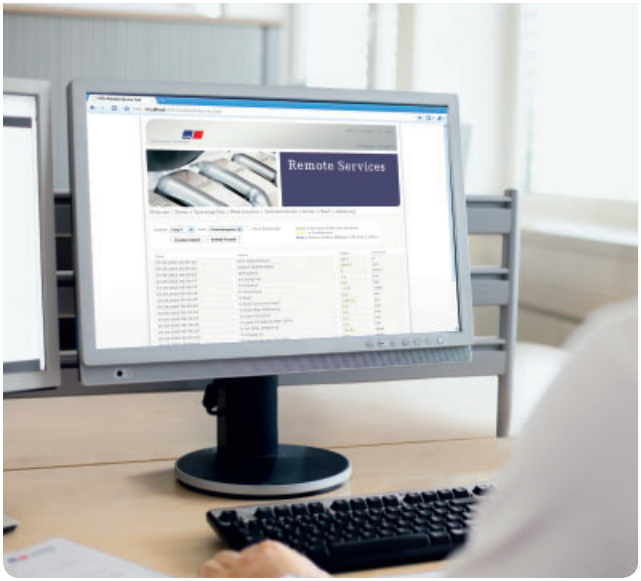
# MTU **Value**Care

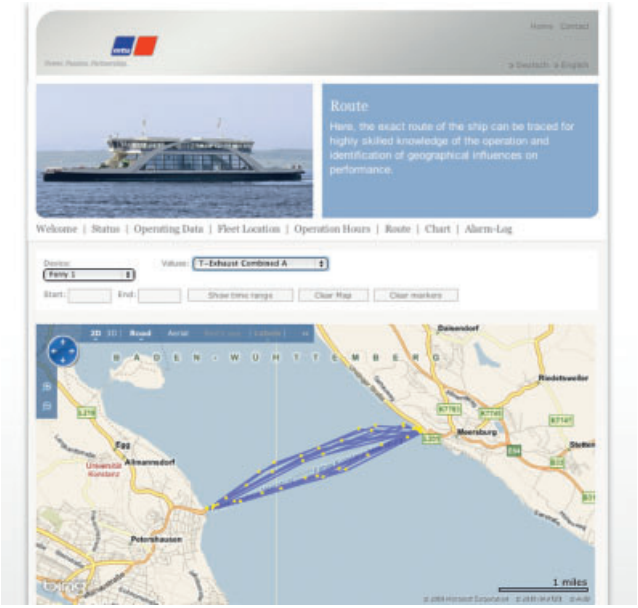
## Keep going.

**Remote Services**

Identifying faults as early as possible saves valuable service time and helps you make quick decisions regarding operational issues. Remote Services is a powerful diagnostic solution that links you directly to a record of the activity of your MTU engines and systems through a secure Internet connection.

Remote Services incorporates a telemetric device that stores selected information and then transmits it in near real-time or at predetermined intervals. Important engine data such as oil temperature, current location and hours of duty completed can be conveniently retrieved for analysis – even thousands of miles from the worksite.




| Function | Description |
|---|---|
| **Fleet location** | Locations of the fleet or individual engines/ systems on a satellite or map view |
| **Status** | Fleet information at a glance: displays current operating hours, fleet alarms, etc. |
| **Operating data and live job** | Near real-time and historical engine parameters on demand, including display of limits |
| **Operating hours** | Operating hours overview: daily, monthly or yearly |
| **Route** | Visual display of the engine location and the route of the vessel on a map or satellite image: daily overview for up to two months in the past |
| **Chart** | Charts of the desired engine/system parameters |
| **Alarm log** | Overview of current and past alarms |
| **MTU eCall** | Automatic e-mail alerts are available at no additional cost |
| **Position** | Location of the closest MTU service center to the engine shown on a map |
| **Data export** | Data can be analyzed with specific tools which might be available at the customer |
| **Tutorial** | Operating manuals and FAQs are also available as web-based training |
| **Remote desktop** | Screen display of the ships indicating instrument provides an insight into the current operating condition |
| **Scope of monitoring** | Control of all important devices, e.g. gear drive, vessel environment, actuation |

# MTU **Value**Care
Keep going.

## **VALUE**SPARES

### Genuine Parts
To ensure your equipment is always up and running, choose genuine **Value**Spares parts. Only MTU can guarantee parts that are custom designed, tested and approved specifically for MTU engines and systems. **Value**Spares parts maximize performance, prolong the life of your engine and meet today's strict requirements. **Value**Spares genuine parts are developed, manufactured and approved from a single, convenient source – MTU. Designed to your specific requirements for OEM parts and supplies, **Value**Spares genuine parts are readily available. We offer everything needed for a turnkey installation.

In addition to engine parts, **Value**Spares genuine parts can also maximize the performance of your gears, shafts, propellers, electronic monitoring and controls. Common and specialty tools are also available, so you have everything you need to maintain and repair your MTU engines and equipment. You've got our full support, with a large number of convenient locations. **Value**Spares genuine parts are available worldwide through our MTU service network.

### Consumables
MTU engines are engineered with the highest standards in the industry. Genuine **Value**Spares consumables are built with the same commitment to quality. A full range of filters, oil and coolant is available – from a single source – for your MTU engines and systems. An essential part of your preventive maintenance program, **Value**Spares consumables work in perfect harmony with your engine, maximizing engine performance, prolonging engine life and protecting your investment.

Only MTU can guarantee consumables that are custom designed, tested and approved specifically for MTU engines and systems. Other consumables which have not been tested by MTU can cause significant damage during an MTU engine's lifecycle. **Value**Spares consumables must pass rigorous testing to qualify for use in MTU engines. Superior design and top-quality materials result in maximum power, torque, longevity and low total cost of operation. As a result, **Value**Spares consumables enhance your peace of mind, increase uptime and lower maintenance costs. For added convenience, they are available worldwide through our MTU service network.



# MTU **Value**Care
Keep going.

## **VALUE**EXCHANGE

Whether replacing a single component or an entire engine, quality is essential. **Value**Exchange provides a full range of genuine remanufactured MTU products, engineered to ensure robust, reliable performance. Choose from remanufactured parts or engines and systems that utilize genuine new and remanufactured MTU parts. A rigorous reconditioning process ensures the same high standards of performance, service life and quality as new products – including design and model related updates. As a result, genuine **Value**Exchange products feature similar technological advancements as new products. The **Value**Exchange process is designed to save you time and money, while benefiting the environment through the reuse of existing materials. To help you work more efficiently, **Value**Exchange products are readily available. And for your convenience, they're offered worldwide from our MTU service network.

### Remanufactured Parts

**Value**Exchange parts are designed to deliver peace of mind. Whether it's fuel injectors, crankshafts, cylinder heads or crankcases, we put every part through a thorough reconditioning process. Design and model related updates are incorporated, so **Value**Exchange parts feature technological advancements similar to new parts. And for added confidence, we back our parts with a full manufacturer's warranty.

### Remanufactured Engines and Systems

The sooner your equipment is up and running, the sooner you can get back to business. As you explore your options, you must consider total costs, including downtime, service time, repair charges and warranty exposure. **Value**Exchange engines and systems offer you an efficient solution. Using original manufacturer parts and processes, we provide remanufactured products with proven MTU quality and durability – with warranty coverage and specifications identical to new MTU products.

**Value**Exchange engines and systems offer great value. They can put your equipment back to work faster compared to an individual overhaul, and they're less expensive than purchasing new products – since your "cores" still have value. The process is simple. Rather than waiting for your original product to complete an overhaul, you are supplied with a remanufactured unit – with a core credit upon receipt of your usable core. With our no-hassle core acceptance policy, we provide the total costs to replace your product upfront – preventing unplanned costs. It's that simple.

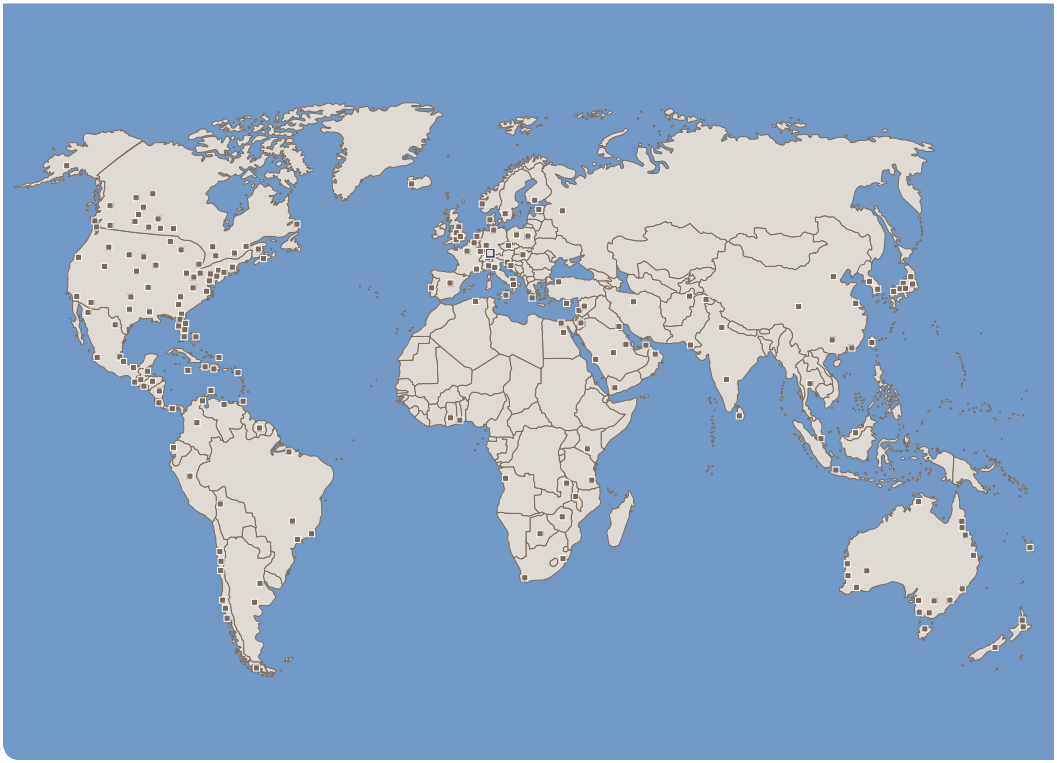
To maintain the highest standard of performance, we use only genuine MTU replacement parts in the remanufacturing process. All **Value**Exchange engines and systems are rigorously dynamometer tested using the same procedures as those used for new products. Design and model related updates are incorporated, so every product features technological advancements identical to new products.

# Local support. Worldwide.

The reliability and performance of your engines and systems are crucial for your success and competitiveness. We are committed to your support. Our convenient global service network provides you this assurance.

Whenever and wherever you need expert support, MTU specialists are available. This continuous and long-term care ensures high availability, dependability and efficiency throughout the lifecycle of your engines and systems.

To find your local MTU distributor, visit www.mtu-online.com.



**Local support. Worldwide.**
We ensure that you receive individualized support from our global network of more than 1,200 service centers – anywhere, anytime.

- Head Office
- Sales and Customer Service Center

# Exhaust emissions

# Exhaust emissions

**International shipping – IMO**

The MARPOL convention adopted by the International Maritime Organization (IMO) sets out regulations on the prevention of air pollution from ships. One of these regulations sets limits on the $NO_x$ emission from diesel engines with a power output of more than 130 kW installed on vessels whose keel is laid after January 1, 2000 and which do not operate exclusively in national waters.

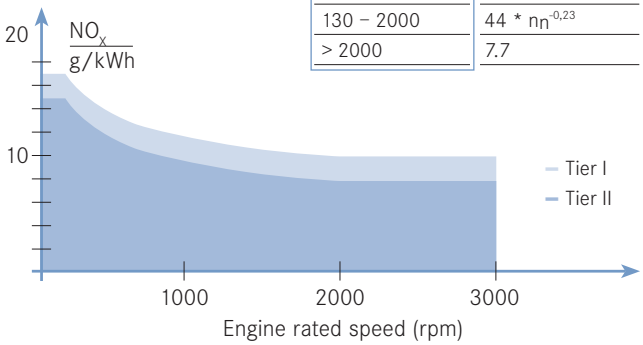
– $NO_x$ limit dependent on engine rated speed (nn)
– No limits for HC, CO, particulates and soot
– Test cycle: E2/E3/D2/C1 (acc. to engine operation)
– Test conditions: 25°C air temp./25°C water temp.

**Tier I (as of 2000)**

| $n_n$ (rpm) | NOx (g/kWh) |
|---|---|
| < 130 | 17 |
| 130 – 2000 | $45 * n_n^{-0,2}$ |
| > 2000 | 9.8 |

**Tier II, beginning from 1.1.2011** [1]

| $n_n$ (rpm) | NOx (g/kWh) |
|---|---|
| < 130 | 14.4 |
| 130 – 2000 | $44 * n_n^{-0,23}$ |
| > 2000 | 7.7 |




1) keel laying date of vessel

**USA – EPA marine regulation 40 CFR 94**

**Tier 2**

| Category | Cyl. displacem. Power | $NO_x$ + HC g/kWh | CO g/kWh | Particul. g/kWh | as of MY |
|---|---|---|---|---|---|
| 1 | $V_{h,z} < 0.9$ l, $P_n \geq 37$ kW | 7.5 | 5.0 | 0.4 | 2005 |
| | $0.9\text{ l} \leq V_{h,z} < 1.2$ l | 7.2 | 5.0 | 0.3 | 2004 |
| | $1.2\text{ l} \leq V_{h,z} < 2.5$ l | 7.2 | 5.0 | 0.2 | 2004 |
| | $2.5\text{ l} \leq V_{h,z} < 5$ l | 7.2 | 5.0 | 0.2 | 2007 |
| 2 | $5\text{ l} \leq V_{h,z} < 15$ l | 7.8 | 5.0 | 0.27 | 2007 |
| | $15\text{ l} \leq V_{h,z} < 20$ l, $P_n < 3300$ kW | 8.7 | 5.0 | 0.5 | 2007 |
| | $15\text{ l} \leq V_{h,z} < 20$ l, $P_n \geq 3300$ kW | 9.8 | 5.0 | 0.5 | 2007 |
| | $20\text{ l} \leq V_{h,z} < 25$ l | 9.8 | 5.0 | 0.5 | 2007 |
| | $25\text{ l} \leq V_{h,z} < 30$ l | 11.0 | 5.0 | 0.5 | 2007 |
| 3 | $V_{h,z} \geq 30$ l | no limits established to date | | | |

**Tier 3** [1]

| Category Power [kW] | Cyl. displacem. [L] | $NO_x$ + HC g/kWh | CO g/kWh | Particul. g/kWh | as of MY |
|---|---|---|---|---|---|
| 75-3700[2] | $1.2\text{ l} < V_h < 2.5$ l | 5.6[5] | 5.0 | 0.11[6] | 2014 |
| | $3.5\text{ l} < V_h < 7$ l | 5.8[5] | 5.0 | 0.11[6] | 2012 |
| 75-3700[3] | $1.2\text{ l} < V_h < 2.5$ l | 5.8 | 5.0 | 0.12 | 2014 |
| | $3.5\text{ l} < V_h < 7$ l | 5.8 | 5.0 | 0.11 | 2012 |
| < 3700[4] | $7\text{ l} < V_h < 15$ l | 6.2[5] | – | 0.14 | 2013 |
| | $15\text{ l} < V_h < 20$ l | 7.0[5] | – | 0.27[7] | 2014 |

1) Content of this table is reduced to mtu engines
2) For C1 marine diesel engines in commercial vessels (standard power density, < 35 kw/l).
3) For C1 marine diesel engines commercial and recreational (high power density, > 35 kw/l).
4) For C2 marine diesel engines. Option for C2: Tier 3 PM / $NO_x$ + HC at 0.10 / 5.8 g/bhp-hr (0.14/7.8 g/kW-hr) in 2012, and Tier 4 in 2015.
5) Tier 3 $NO_x$ + HC standards do not apply to 2000 - 3700 kW engines.
6) This standard level drops to 0.10 g/kWh in 2018 for < 600 kW engines.
7) For engines below 3300 kW in this group, the PM Tier 3 standard is 0.25 g/bhp-hr (0.34 g/kW-hr).

– Test cycle: ISO 8178-4, E2/E3/D2/C1 (acc. to engine operation)
– Test condition: air temperature 25°C / water temperature 25°C.
– For recreational crafts the test cycle E5, ISO 8187-4 is valid.
– NTE (Not to exceed): In certain sections of the engine performance map, emissions may not exceed 1.2 to 1.5 times the cycle limit. These requirements come into force with 2007 model year.
– ABT (Averaging, Banking and Trading): Emission credits ($NO_x$ + HC and particulates) can be averaged, banked or traded.
– Voluntary Standards: Engines, which meet clearly lower limits, may use the “Blue Sky Series” label. Therefore engines have to meet Tier 3. For engines with no Tier 3 standards a calculated level corresponding to a 40 % reduction beyond Tier 2 will be used.

# Exhaust emissions

**Rhine vessel inspection regulation**

The Rhine vessel inspection regulation (Rheinschifffahrts-Untersuchungsordnung - RheinSchUO) passed by the Central Commission for the Navigation on the Rhine (CCNR) sets out the following exhaust emission limits:

**Stage II (as of July 2007 [1])**

| Power $P_n$ kW | Speed $n_n$ rpm | $NO_x$ g/kWh | HC g/kWh | CO g/kWh | Particul. g/kWh |
|---|---|---|---|---|---|
| 19 – 37 | - | 8 | 1.5 | 5.5 | 0.8 |
| 37 – 75 | - | 7 | 1.3 | 5.0 | 0.4 |
| 75 – 130 | - | 6 | 1.0 | 5.0 | 0.3 |
| 130 – 560 | - | 6 | 1.0 | 3.5 | 0.2 |
| > 560 | ≥ 3150 | 6 | 1.0 | 3.5 | 0.2 |
| | 343 - 3150 | $45 * n_n^{-0,2-3}$ | 1.0 | 3.5 | 0.2 |
| | < 343 | 11 | 1.0 | 3.5 | 0.2 |

1) Date of putting in service of the ship

– Alternatively, the limits for marine engines of EU-Directive 97/68/EC, as amended by Directive2004/26/EC, may be applied (mutual recognition is agreed)
– Test cycle: ISO 8178-4, E2/E3/D2/C1 (acc. to engine operation)
– Test condition: 25°C air temp./25°C water temp.

**EU - Nonroad Directive 97/68/EC (as amended by 2004/26/EC)**

The emission limits apply to propulsion engines of inland vessels in EU-waters. The limits, as well as the engine categories correspond to the US-EPA marine regulation.

**EU IIIA**

| Category | Cyl. displacem. Power | $NO_x$ + HC g/kWh | CO g/kWh | Particul. g/kWh | as of MY |
|---|---|---|---|---|---|
| V 1:1 | $V_{h,z} < 0.9$ l, $P_n \geq 37$ kW | 7.5 | 5.0 | 0.4 | 2007 |
| V 1:2 | $0.9\text{ l} \leq V_{h,z} < 1.2$ l | 7.2 | 5.0 | 0.3 | 2007 |
| V 1:3 | $1.2\text{ l} \leq V_{h,z} < 2.5$ l | 7.2 | 5.0 | 0.2 | 2007 |
| V 1:4 | $2.5\text{ l} \leq V_{h,z} < 5$ l | 7.2 | 5.0 | 0.2 | 2009 |
| V 2:1 | $5\text{ l} \leq V_{h,z} < 15$ l | 7.8 | 5.0 | 0.27 | 2009 |
| V 2:2 | $15\text{ l} \leq V_{h,z} < 20$ l, $P_n < 3300$ kW | 8.7 | 5.0 | 0.5 | 2009 |
| V 2:3 | $15\text{ l} \leq V_{h,z} < 20$ l, $P_n \geq 3300$ kW | 9.8 | 5.0 | 0.5 | 2009 |
| V 2:4 | $20\text{ l} \leq V_{h,z} < 25$ l | 9.8 | 5.0 | 0.5 | 2009 |
| V 2:5 | $25\text{ l} \leq V_{h,z} < 30$ l | 11.0 | 5.0 | 0.5 | 2009 |

– Test cycle: ISO 8178-4, E2/E3/D2/C1 (acc. to engine operation)
– Test condition: 25°C air temp./25°C water temp.
– **Recreational craft** up to a length of 24 m are not covered by this Directive; for these craft a separate regulation is in force (see 94/25/EC)
– The limits apply to marine auxiliary engines above 560 kW. For other auxiliary engines the limits for nonroad mobile machinery apply
– Alternatively, the limits of the Rhine vessel inspection regulation may be applied (mutual recognition is agreed)
– Compliance with the limits must be guaranteed over the useful life period of the engine

# Exhaust emissions

**EU-Directive 94/25/EC (as amended by 2003/44/EC)**
Design regulations for recreational craft up to hull length of 24 m. As of 2006 the following emission limits apply:

| $NO_x$ g/kWh | HC g/kWh | CO g/kWh | Particulates g/kWh |
|---|---|---|---|
| 9.8 | $1.5 + 2P_n^{0,5}$ | 5.0 | 1.0 |

**Lake Constance shipping ordinance (BSO)**
**Since 1996** the following emission limits apply for diesel-powered craft:

| Power $P_n$ kW | $NO_x$ g/kWh | HC g/kWh | CO g/kWh |
|---|---|---|---|
| ≤ 100 | $10 * P_n^{-0.1505}$ | $30 * P_n^{-0,6505}$ | $400 * P_n^{-0.6505}$ |
| > 100 | 10 | $3.375 * P_n^{-0.1761}$ | 20 |

– Additionally, recreational craft with diesel engines may not exceed the following mass emissions per hour:
  - 1500 g/h for CO
  - 95 g/h for HC
  - 360 g/h for $NO_x$
– Test cycle: BSO-9-mode-test
– Test condition: 25°C air temp.
– Smoke limit (at full load): naturally aspirated engines 3.5 Bosch units, supercharged engines 2.5 Bosch units

**Norway**
Tonnage taxes for vessels registered in Norway are assessed in accordance with the vessel's impact on the environment.

**Sweden**
Fees for using the inland waterways are calculated in proportion to the $NO_x$-emissions of the ship at 75% load, on a linear scale from 2 g/kWh to 12 g/kWh. Additionally, harbors are authorized to charge harbor fees dependent on the $NO_x$ emission of the ships.

**Alaska**
Alaska has passed a regulation (Alaska Marine Vessel Visible Emission Standard, AAC 50.070) stating that the visible emissions of ocean going vessels at the exhaust outlet may not reduce visibility by more than 20%. Higher values are temporarily permissible during maneuvering.

# Notes

**Further special sales programs:**

– Rail
– PowerGen
– C&I, Agricultural, Mining
– Industrial, Stationary
– Oil & Gas Industry
– Onsite Energy



# Conversion table

| | | | |
|---|---|---|---|
| 1 kW | = 1.360 PS | g | = 9.80665 m/s$^2$ |
| 1 kW | = 1.341 bhp | π | = 3.14159 |
| 1 bhp | = 1.014 PS | e | = 2.71828 |
| 1 oz | = 28.35 g | | |
| 1 lb | = 453.59 g | 1 lb | = 16 oz |
| 1 short ton | = 907.18 kg | 1 short ton | = 2000 lbs |
| 1 lb/bhp | = 447.3 g/PSh | 1 ft lb | = 1.356 Nm |
| 1 lb/bhp | = 608.3 g/kWh | 1 ft/min | = 0.00508 m/s |
| 1 gal/bhp (US) | = 4264 g/kWh | pDiesel | = 0.85 kg/l |
| 1 kWh | = 860 kcal | 1 lb/sqin | = 0.069 bar (1 psi) |
| 1 cal | = 4.187 J | 1 mm Hg | = 1.333 mbar (133.3 Pa) |
| 1 BTU | = 1.055 kJ | 1 mm $H_2O$ | = 0.0981 mbar (9.81 Pa) |
| 1 inch | = 2.540 cm | T (K) | = t (°C) + 273.15 |
| 1 sq. inch | = 6.542 cm$^2$ | t (°C) | = 5/9 x (t (°F) -32) |
| 1 cu. inch | = 16.387 cm$^3$ | t (°C) | = 5/4 x t (°R) |
| 1 foot | = 3.048 dm | 1 foot | = 12 inches |
| 1 sq. foot | = 9.290 dm$^2$ | 1 yard | = 3 feet |
| 1 mile | = 1.609 km | 1 mile | = 5280 feet |
| 1 naut. mile | = 1.853 km | 1 naut. mile | = 6080 feet |
| 1 UK Gallon | = 4.546 l | | |
| 1 US Gallon | = 3.785 l | | |
| 1 US Barrel | = 0.159 m$^3$ | | |
| | = 42 US Gallons | | |

| | |
|---|---|
| Energy: | 1 J = 1 Ws = 1 VAs = 1 Nm |
| Power: | 1 W = 1 VA = 1 Nm/s |
| Force: | 1 N = 1 kgm/s$^2$ |
| Pressure: | 1 Pa = 1 N/m$^2$ (1 bar = $10^5$ Pa) |
| MEP (bar) | $= \frac{P_{cyl}(kW) \times 1200}{n(1/min) \times V_{cyl}(l)}$ |
| Torque (Nm) | $= \frac{P_{ges}(kW) \times 30000}{n(1/min) \times \pi}$ |

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