**Marine**

**DIESEL ENGINES 12V/16V 2000 M93**

for fast vessels with low load factors (1DS)

![Engine image](image_url)

Optional equipment and finishing shown. Standard may vary.

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<table>
<thead>
<tr>
<th>Engine with gearbox</th>
<th>Dimensions (L x W x H) mm (in)</th>
<th>Mass, dry kg (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12V/ZF 2060</td>
<td>2573 x 1295 x 1350 (101.3 x 51.0 x 53.1)</td>
<td>3235 (7132)</td>
</tr>
<tr>
<td>16V/ZF 3060</td>
<td>3105 x 1295 x 1390 (122.2 x 51.0 x 54.7)</td>
<td>3978 (8770)</td>
</tr>
</tbody>
</table>

Typical applications: Fast yachts, fast patrolboats, police craft and fire-fighting vessels

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### Engine type

<table>
<thead>
<tr>
<th>Engine type</th>
<th>12V 2000 M93</th>
<th>16V 2000 M93</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated power ICFN kW (bhp)</td>
<td>1340 (1800)</td>
<td>1790 (2400)</td>
</tr>
<tr>
<td>Speed rpm</td>
<td>2450</td>
<td>2450</td>
</tr>
<tr>
<td>No. of cylinders</td>
<td>12</td>
<td>16</td>
</tr>
<tr>
<td>Bore/stroke mm (in)</td>
<td>135/156 (5.3/6.1)</td>
<td>135/156 (5.3/6.1)</td>
</tr>
<tr>
<td>Displacement, total l (cu in)</td>
<td>26.8 (1635)</td>
<td>35.7 (2179)</td>
</tr>
<tr>
<td>Flywheel housing</td>
<td>SAE 0</td>
<td>SAE 0</td>
</tr>
<tr>
<td>Gearbox type</td>
<td>ZF 2060</td>
<td>ZF 3060</td>
</tr>
<tr>
<td>Optimization of exhaust emissions</td>
<td>I = 1.2 – 2.5</td>
<td>I = 1.3 – 3.0</td>
</tr>
</tbody>
</table>

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1) IMO – International Maritime Organisation
EU – Nonroad Directive 97/88/EC
2) Recognitation through the RheinshUO (CCNR II)
### Standard equipment

**Starting system**
- Electric starter 24 V

**Auxiliary PTO**
- Alternator, 80A, 28V, 2 pole

**Oil system**
- Gear driven lube oil pump, lube-oil duplex filter with diverter valve, lube-oil heat exchanger, handpump for oil extraction

**Fuel system**
- Fuel feed pump, fuel hand pump, fuel pre-filter, fuel main filter with diverter valve, on-engine fuel oil cooler, HP fuel pump, jacketed HP fuel lines, injection nozzles (CR system), flame proof hose lines, leak-off fuel tank level monitored

**Cooling system**
- Coolant-to-raw water plate core heat exchanger, self priming centrifugal raw water pump, gear driven coolant circulation pump

**Combustion air system**
- Sequential turbocharging with 2 water-cooled exhaust-gas turbochargers, on-engine intake air filters

**Exhaust system**
- Triple-walled, liquid-cooled, on-engine exhaust manifolds, single centrally located exhaust outlet, 1 exhaust bellows vertical discharge

**Mounting system**
- Resilient mounts at free end

**Engine management system**
- Engine control and monitoring system (ADEC)

### Optional equipment

**Auxiliary PTO**
- Alternator, 140A, 28V, 2 pole, bilgepump, on-engine PTOs

**Oil system**
- Centrifugal oil filter, oil replenishment system

**Fuel system**
- Duplex fuel pre-filter

**Cooling system**
- Coolant preheating system, integr. seawater gearbox piping

**Exhaust system**
- 1 exhaust bellows horizontal discharge

**Mounting System**
- Resilient mounts at driving end

**Engine Management System**
- In compliance with Classification Society Regulations

**Monitoring/Control System**
- smartline, blueline, bluevision, BlueVision|NewGeneration, Callosum

**Power Transmission**
- Torsionally resilient coupling

**Gearbox Options**
- Reverse reduction gearbox, el. actuated, gearbox mounts, trolling mode for dead-slow propulsion, free auxiliary PTO, hydraulic pump drives

**Classification**
- ABS, BV, CCS, DNV, GL, KR, JG, LR, NK, RINA

### Reference conditions:
- Power definition according ISO 3046
- Intake air temperature 25°C / Sea water temperature 25°C
- Intake air depression 15 mbar / Exhaust back pressure 30 mbar
- Barometric pressure 1000 mbar
- Power reduction at 45°C / 32°C: none

Specifications are subject to change without notice. All dimensions are approximate. For complete information refer to installations drawing. For further information consult your MTU distributor/dealer.

### Performance & fuel consumption

<table>
<thead>
<tr>
<th></th>
<th>12V 2000 M93</th>
<th>16V 2000 M93</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speed rpm</td>
<td>2450 2200 2000 1200</td>
<td>2450 2200 2000 1200</td>
</tr>
<tr>
<td>Maximum power kW</td>
<td>1340 1270 1150 600</td>
<td>1750 1700 1550 790</td>
</tr>
<tr>
<td></td>
<td>1800 1705 1540 805</td>
<td>2400 2280 2080 1060</td>
</tr>
<tr>
<td>Power on propeller curve kW</td>
<td>1340 970 740 170</td>
<td>1790 1300 980 205</td>
</tr>
<tr>
<td></td>
<td>1800 1300 990 230</td>
<td>2400 1745 1315 275</td>
</tr>
<tr>
<td>Fuel consumption g/kWh</td>
<td>213 215 225 216</td>
<td>209 214 217 218</td>
</tr>
<tr>
<td>on propeller curve l/_hr</td>
<td>343.9 251.3 200.6 44.2</td>
<td>450.7 335.2 250.2 53.8</td>
</tr>
<tr>
<td></td>
<td>90.8 66.4 53.0 11.7</td>
<td>119.1 88.6 67.7 14.2</td>
</tr>
</tbody>
</table>

1) Tolerance +5% per ISO 3046, Diesel fuel to DIN EN 590 with a min L.H.V. of 42800 kJ/kg (18390 BTU/lb)