### Marine Diesel Engines 16V 4000 M23/M33/M43

for on-board power generation and diesel-electric drives (3A/3B) – 50/60 Hz

<table>
<thead>
<tr>
<th>Engine</th>
<th>Dimensions (L x W x H) mm (in)</th>
<th>Mass, dry kg (lbs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>M23/M33/M43</td>
<td>3270 x 1570 x 2370 (128.7 x 61.8 x 93.3)</td>
<td>8950 (19731)</td>
</tr>
</tbody>
</table>

All dimensions are approximate, for complete information refer to the installation drawing.

<table>
<thead>
<tr>
<th>Engine</th>
<th>Bore/stroke mm (in)</th>
<th>No. of cylinders</th>
<th>Displacement, total l (cu in)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>170/210 (6.7/8.3)</td>
<td>16</td>
<td>76.3 (4656)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Engine Model</th>
<th>50 Hz</th>
<th>60 Hz</th>
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<tbody>
<tr>
<td>16V 4000 M23F</td>
<td>16V 4000 M33F</td>
<td>16V 4000 M43S</td>
</tr>
<tr>
<td>Application</td>
<td>3A</td>
<td>3B</td>
</tr>
<tr>
<td>Rated power ICXN kW (bhp)</td>
<td>1520 (2038)</td>
<td>1760 (2360)</td>
</tr>
<tr>
<td>Speed rpm</td>
<td>1500</td>
<td>1500</td>
</tr>
<tr>
<td>Optimization of exhaust emissions</td>
<td>IMO II/EPA 2/CCNR II</td>
<td>IMO II/EPA 2/CCNR II</td>
</tr>
</tbody>
</table>

1) IMO - International Maritime Organization (MARPOL)  
EPA - US Marine Regulation 40 CFR 94  
RheinSchUO-CCNR, Stage II

<table>
<thead>
<tr>
<th>Application</th>
<th>Power definition</th>
<th>3A</th>
<th>3B</th>
</tr>
</thead>
<tbody>
<tr>
<td>3A</td>
<td>Continuous oper., unrestricted</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3B</td>
<td>Continuous operation with variable load</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Loadfactor: 100%, operating hours: unrestricted, overload: 10 % capability (ICXN)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Loadfactor: &lt; 75 %, operating hours: unrestricted, overload: 10 % capability (ICXN)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Standard equipment

**Starting system**
Electric starter motor 24V, 2 pole

**Oil system**
Gear driven lube oil pump, non switchable oil filter, Centrifugal, lube oil extraction pump, lube oil heat exchanger, lube oil priming system, closed crankcase ventilation

**Fuel system**
Fuel delivery pump, duplex lube fuel filter with diverter valve, common rail fuel injection system with high-pressure pump, pressure accumulator and electronic fuel injection with cylinder cutout system, jacketed HP fuel lines, flame-proof hose lines, leak-off fuel tank level monitoring, fuel conditioning system with water separator

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

**Combustion air system**
Engine coolant temperature-controlled intercooler, turbocharging with 2 water-cooled turbochargers, on-engine seawater-resistant air filters

**Exhaust system**
Triple-walled, liquid-cooled, on-engine exhaust manifolds, 30° discharge elbow, exhaust bellows

**Mounting system**
Rigid engine mounting

**Auxiliary PTO**
Charging generator, 120A, 28V, 2 pole

**Engine management system**
Engine control and monitoring system (ADEC) engine interface module - EiM, engine mounted

**Engine safety system**
The scope of delivery for the engine fulfils SOLAS requirements for admissible surface temperature and shielding of fuel and lube oil lines

Optional equipment

**Starting system**
Coolant preheating system; air starter

**Oil system**
Oil level monitoring, automatic oil replenishment system with basic scope of monitoring switchable oil filter with extended scope of monitoring

**Fuel system**
Switchable pre-filter with water separator in conjunction with switchable additional secondary filter

**Cooling system**
Separate cooling system

**Combustion air system**
Intake air silencer

**Exhaust system**
90° discharge elbow

**Engine mounting**
Resilient engine mounting

**Auxiliary PTO**
Bilgepump, PTOs at free end of engine

**Engine management system**
Expansion In compliance with extended scope of monitoring (individual exhaust temperature monitoring)

**Classification**
ABS, BV, CCS, CR, DNV, GL, KR, LR, NK, RINA including necessary extensions to scope of supply

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**Fuel consumption**

<table>
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<tr>
<th>16V 4000 M23F</th>
<th>16V 4000 M33F</th>
<th>16V 4000 M23S</th>
<th>16V 4000 M33S</th>
<th>16V 4000 M43S</th>
</tr>
</thead>
<tbody>
<tr>
<td>at rated power</td>
<td>g/kWh</td>
<td>l/h (gal/h)</td>
<td>g/kWh</td>
<td>l/h (gal/h)</td>
</tr>
<tr>
<td>201</td>
<td>368.1 (97.3)</td>
<td>422.0 (111.5)</td>
<td>204</td>
<td>452.2 (119.5)</td>
</tr>
</tbody>
</table>

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

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