



Series 4000 Diesel Engines _____
for Marine Applications



The Engine of Your Success.

MTU Friedrichshafen in Germany and the Detroit Diesel Corporation in the USA - two DaimlerChrysler companies - have combined their off-highway operations. The combination of the MTU and Detroit Diesel product ranges, supplemented by Mercedes-Benz and VM Motori off-highway engines, has created a **leading global supplier** of engines and systems for marine, rail, power generation applications, the agricultural and construction sectors as well as for heavy-duty vehicles.

Especially within the **marine sector**, the company has established a long and successful partnership with tens of thousands of engines in operation around the globe. Based on its innovative capabilities, its reliability and system competence, MTU has unique **drive-system knowhow** and offers a large range of **products of excellent quality**.

Together with MTU's full product and customer services, **greatest availability** is achieved no matter where you are.

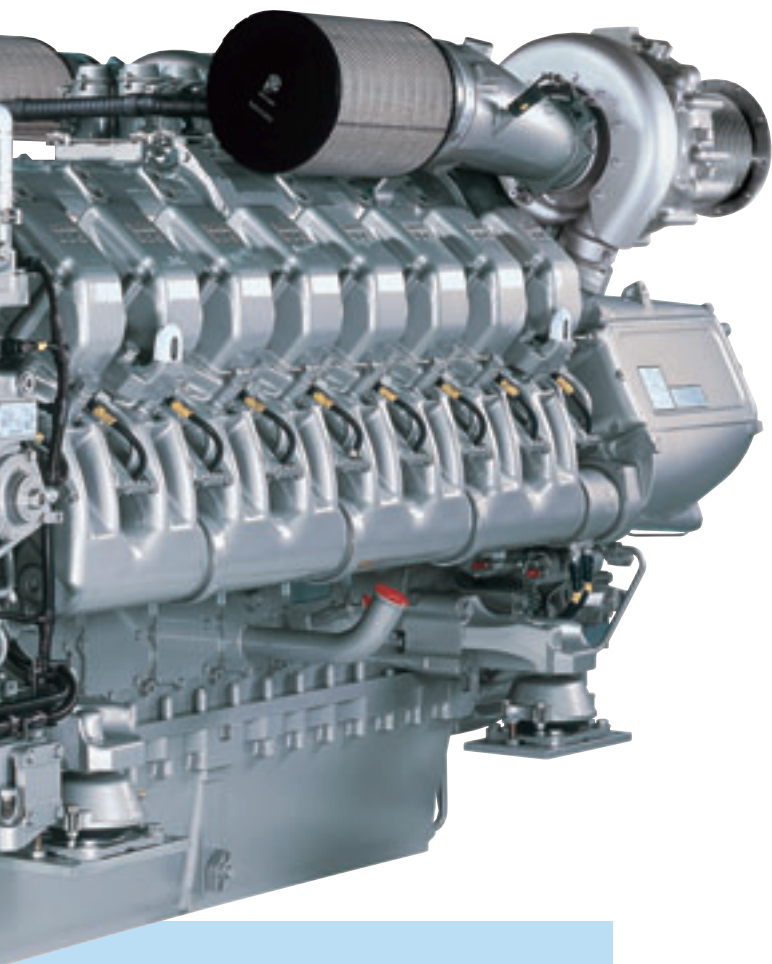
A network of subsidiaries, agencies and support centers all around the world as well as a large force of product-support specialists trained by MTU assure expert **service** and provide best maintenance for our engines that meets with highest expectations, 24 hours a day.



Series 4000

Wherever there is a demand for utmost **reliability, ease of maintenance and compact dimensions**, Series 4000 engines are the first choice: in yachts as well as in workboats and ferries or in government vessels, police craft and patrol boats.

Another typical advantage of the "4000" engine is its **high efficiency** which is based not only on low consumption but also on the attractive price and a long service life.



Model **16V 4000**

Add to this its **low emissions** - Series 4000 complies with the exhaust limits set by IMO and the RheinSchUO [Rhine-river emission regulations] for inland-waterway vessels - and its acceptance by classification societies. With this **convincing performance profile**, the “4000” engine has firmly established itself in the market - where it has a share of approx. 40% for passenger ferries of less than 50 meters length, for example.



Your Benefits:

Economy

- > Low life-cycle costs
- > Long service life
- > Attractive price
- > Ease of maintenance

Engine characteristics

- > High performance
- > Unrestricted low-load operation

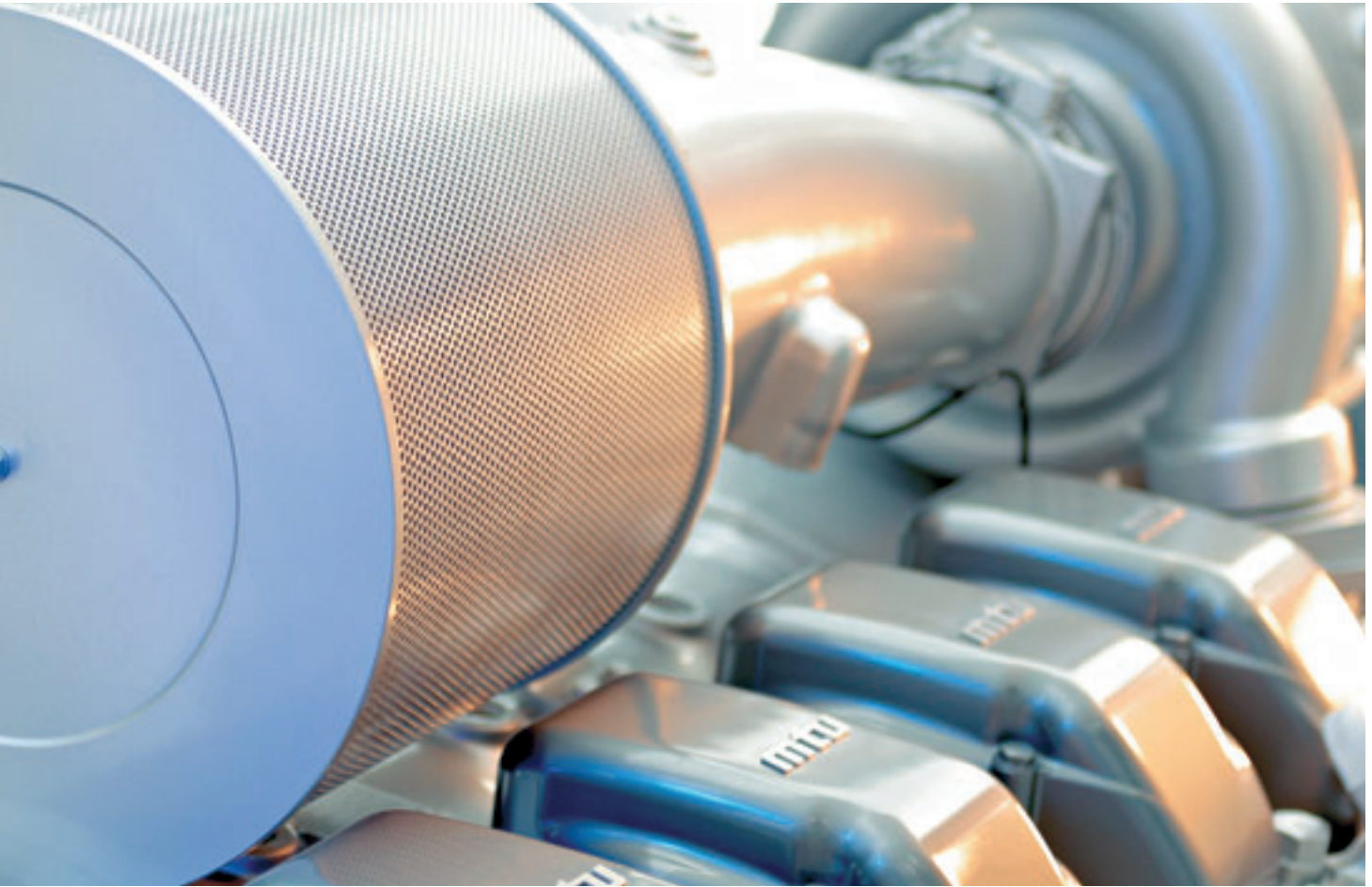
Environmental safety

- > Low fuel consumption
- > Low exhaust and noise emissions

Service

- > Round the clock
- > Worldwide

Superior Technology: Module for Module.



Cylinder Head

Individual 4-valve cylinder heads of special cast iron with centrally located injector

Benefits:

- > Design allows high cylinder pressure
- > Low fuel consumption
- > Low exhaust emissions

Exhaust System

Triple-wall water-cooled manifold

Benefits:

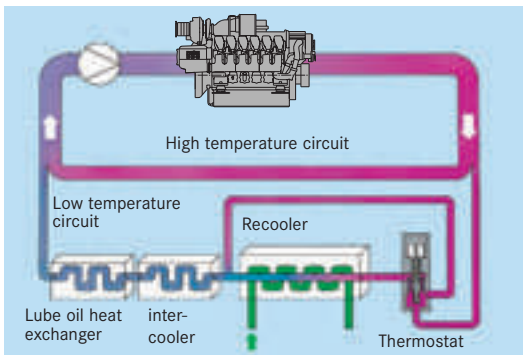
- > Low surface temperature
- > Reduced heat transfer to cooling system
- > Absolutely gas-tight

Turbocharging

Sequential turbocharging with charge air cooling (turbocharger cut in and out)

Benefits:

- > Turbochargers can more closely match and respond to the engine airflow requirements
- > High engine torque at low speed
- > Improved acceleration



Cooling System

Split-circuit cooling system using heat exchanger with titanium plates

Benefits:

- > Keeps engine coolant, oil and intake air at optimum temperature under all operating conditions
- > Higher temperature during idle or low-load operation
- > No seawater in the engine

Electronic Fuel Injection System

Common rail injection system with a high pressure pump, pressure accumulator and individual injectors

Benefits:

- > Continuously variable
 - injection timing
 - injection volume
 - injection pressure
- > Significant reduction of soot emission at low engine speeds
- > Low fuel consumption over the entire performance range
- > No mechanical adjustment required

Engine Mounting System

Four-point mounting system with resilient elements

Benefits:

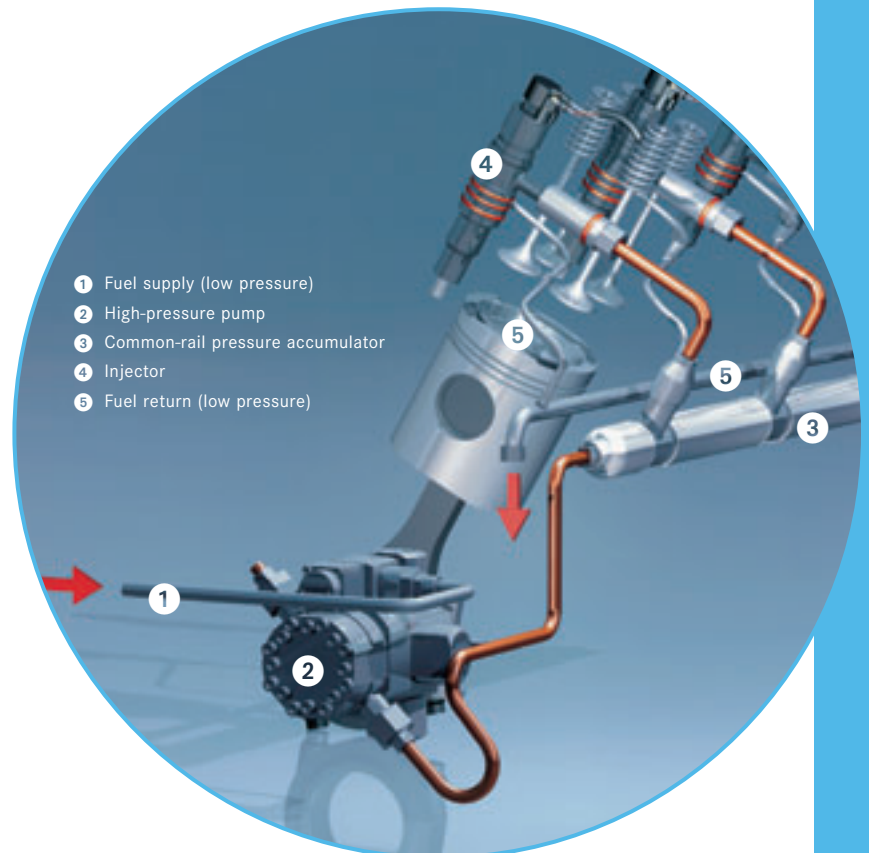
- > Good noise and vibration attenuation
- > Height adjustability

Service Module

Service components grouped at free end of engine with easily accessible interfaces for fuel and raw water and integrated accessories (pumps, filters, coolant header tank, PTO's)

Benefits

- > Easy servicing
- > Raw water only in heat exchanger and pump
- > Additional PTO's



Control, Monitoring and Management.

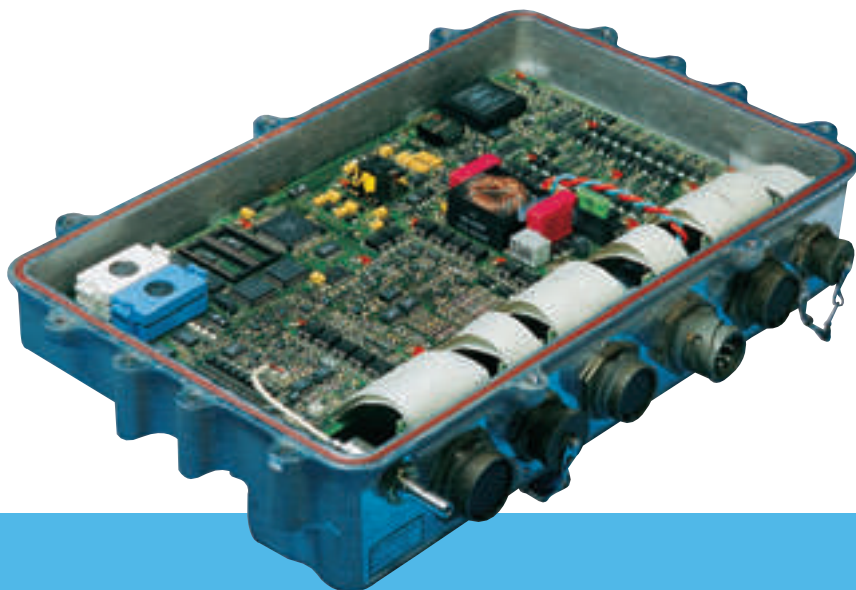


Electronic System

Electronic system for governing, monitoring and control with integrated safety and test system and interfaces to RSC (Remote Control System) and MCS (Monitoring and Control System)

Benefits:

- > High reliability through redundancy
- > Maintenance free



Diesel Engine Series 4000

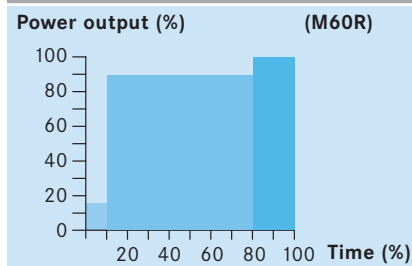
Configuration	
Bore/Stroke	mm
Swept volume	l/cyl.
Fuel specification	

Rating definition

Designation

Speed	rpm
Power output 8V	kW (bhp)
Power output 12V	kW (bhp)
Power output 16V	kW (bhp)

Standard Load Profile 1A



Typical examples:

- work boats, tug boats
- barges, ferries
- sailing yachts
- commercial vessels

Technical Data

8V, 12V, 16V

165/190

4.06

EN 590

Marine Main Propulsion Rated Power ICFN

Unrestricted
continuous rating

Maximum
continuous
rating

High
performance
rating

Onboard Power Gen. and dieselel. drives Rated Power Output ICXN

Continuous
duty rating
50 Hz/60 Hz

Continuous duty
with variable load
50 Hz/60 Hz

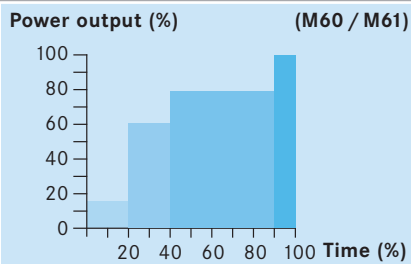
1A				1B		1DS	3A	3B
M60R	M61R	M60	M61	M70	M71	M90	M50A/M50B	M40A/M40B
1600	1600	1800	1800	2000	2000	2100	1500/1800	1500/1800
700	-	880	-	1160	-	-	760/920	880/1040
(940)	-	(1180)	-	(1555)	-	-	(1020/1235)	(1180/1395)
1050	-	1320	-	1740	1850	2040	1140/1380	1320/1560
(1410)	-	(1770)	-	(2335)	(2480)	(2735)	(1530/1850)	(1770/2090)
1400	1520	1760	2000	2320	2465	2720	1520/1840	1760/2080
(1875)	(2040)	(2360)	(2680)	(3110)	(3305)	(3650)	(2040/2465)	(2360/2790)

Power definitions by DIN/ISO 3046 at intake air temperature 25°C / Sea water temperature 25°C.

Rated power available at intake air temperature 45°C / Sea water temperature 32°C.

All engines fulfill IMO emission regulation, certificate on request / EPA certified.

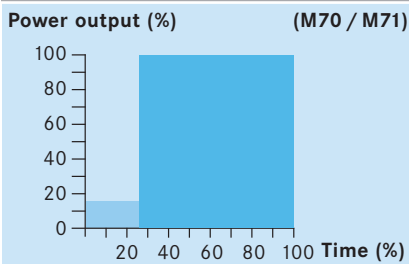
Standard Load Profile 1A



Typical examples:

- work boats, tug boats
- barges, ferries
- sailing yachts

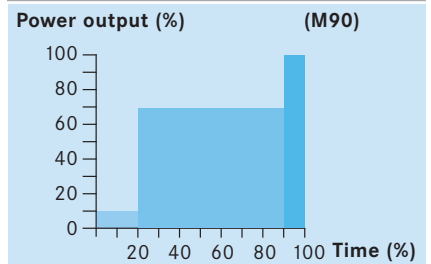
Standard Load Profile 1B



Typical examples:

- fast commercial vessels
- monohulls, hydrofoils
- catamarans, surface effect ships

Standard Load Profile 1DS



Typical examples:

- patrol boats, police craft, fireboat
- yachts

1A: Diesel engines for vessels with unrestricted continuous operation

1B: Diesel engines for fast vessels with high load factors

1DS: Diesel engines for fast vessels with low load factors

3A: Diesel engines for onboard power generation and dieselelectric drives – continuous operation

3B: Diesel engines for onboard power generation continuous operation variable load

ICFN

I = Power to ISO

C = Continuous power output

F = Fuel stop power

N = Available power

Accessories necessary for operation, engine driven

ICXN

I = Power to ISO

C = Continuous power output

X = Overload capability 10 %

N = Available power

Accessories necessary for operation, engine driven

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