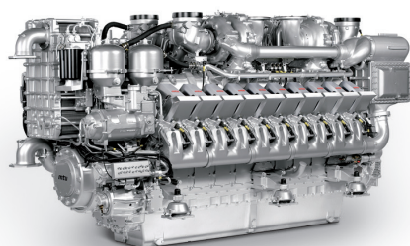




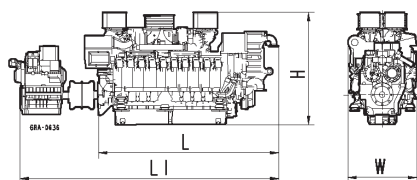
## Marine

# DIESEL ENGINES 20V 4000 M93/M93L

for fast vessels with low load factors (1DS)



Engine	Dimensions (LxWxH) mm (in)	Mass, dry kg (lbs)
M93/M93L	4015 x 1470 x 2440 (158.1 x 57.8 x 96.1)	12080 (26631)
Engine with gearbox	Dimensions (L <sub>x</sub> WxH <sub>x</sub> ) mm (in)	Mass, dry kg (lbs)
M93/M93L - ZF 23 560 C	5720 x 1470 x 2440 (225.2 x 57.8 x 96.1)	14785 (32595)



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

Optional equipment and finishing shown. Standard may vary.

Engine type	20V 4000 M93	20V 4000 M93L
Rated power ICFN	3900	4300
	(5230)	(5766)
Speed	2100	2100
No. of cylinders	20	20
Bore/stroke	170/190 (6.7/7.5)	170/190 (6.7/7.5)
Displacement, total	86.2 (5260)	86.2 (5260)
Flywheel housing	SAE 00	SAE 00
Gearbox type <sup>2)</sup>	ZF 9055	ZF 23 560 C
Optimization of exhaust emissions <sup>1)</sup>	IMO II/EPA 2	IMO II/EPA 2

1) IMO - International Maritime Organization (MARPOL)

EPA - US marine directive 40 CFR 94

2) gearbox variants "Down Angle (A)" and "V-Drive" available on request



A Rolls-Royce  
solution

Fuel consumption *		20V 4000 M93	20V 4000 M93L
at rated power	g/kWh	213	220
	l/hr	982.0	1103.0
	gal/hr	259.5	291.5

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

Standard equipment	
Starting system	Electric starter 24 V, 2 pole
Oil system	Gear driven lube oil pump, duplex lube oil filter with diverter valve, automatic lube oil filter with centrifuge lube oil heat exchanger, pump for lube oil extraction
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 pre-filter with water separator
Cooling system	<b>mtu</b> -split-circuit coolant system, electronically controlled thermostats, coolant-to-raw water plate core heat exchanger, self priming centrifugal raw water pump, engine mounted coolant expansion tank, gear driven coolant circulation pump, raw-water connection for gearbox cooling
Combustion air system	Water cooled charge air manifolds, engine coolant temperature-controlled intercooler, sequential turbocharging with 2 water-cooled turbochargers, on-engine seawater-resistant air filters
Exhaust system	Triple-walled, liquid-cooled, on-engine exhaust manifolds, exhaust bellows, horizontal discharge
Mounting system	Resilient mounts
Power transmission	Torsional and offset compensating couplings
Auxiliary PTO	Charging generator, 120A, 28V, 2 pole
Engine management system	Engine control and monitoring system (ADEC), interface to gearbox control, interface to remote control and monitoring system, local operating panel (LOP)
Electronics and instrumentation	The scope of delivery for the engine fulfills SOLAS requirements for admissible surface temperature without additional insulation

Optional equipment	
Starting system	Coolant preheating system, air starter
Oil system	Lube oil priming system, oil level monitoring, automatic oil replenishment system, automatic lube oil filter, main and connecting rod bearing temperature monitoring
Cooling system	Engine version for sealed engine coolant system in conjunction with ship's side recooling system
Auxiliary PTO	Bilge pump, PTOs at free end of engine
Engine management system	Expansion In compliance with classification society regulations
Monitoring/control system	Fuel consumption measurement device, <b>mtu</b> -monitoring and control systems MCS, remote control systems RCS
Gearbox options	Various reserve reduction gearbox models, elec. actuated, gearbox mounts, PTO for hydraulic pump at driving shaft or at mediate shaft, trolling, trailing pump, propeller shaft flange
Classification	ABS, BV, CCS, CR, DNV, GL, KR, LR, NK, RINA including necessary extensions to scope of supply.

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: 3%

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.