



1113 BR

VOLVO PENTA MARINE DIESEL ENGINE • 58 H.P.

The Volvo Penta type 1113 BR marine diesel engine is a three-cylinder, fresh-water cooled, four-stroke unit with direct injection.

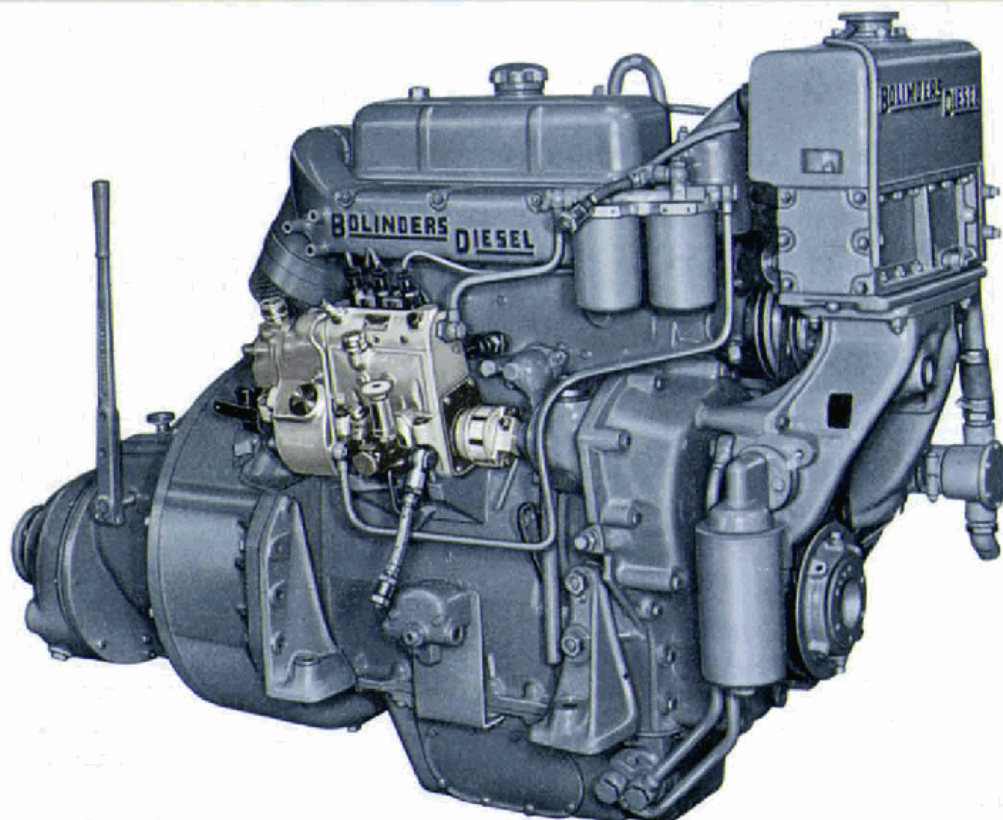
Standard equipment includes fresh-water cooling with a thermostat controlled system, pre-filter and double fuel filters, water-cooled exhaust manifold, fuel injection pump with centrifugal governor, lubricating oil filter, oil sump pump, inspection cover in lower part of crankcase to facilitate servicing of connecting rods, bearings, etc. The electrical equipment includes a 12 V starter motor with an output of 4 h.p. and a 130 W dynamo.

The instrument panel includes an electric revolution counter, oil pressure gauge, cooling water temperature gauge and a mechanical stop control.

The engine can be fitted with a Capitol mechanical reverse/reduction gear with a ratio of 2:1 or 3:1 which gives the same direction of rotation as the crankshaft, i.e. a propeller with a left-hand thread. The 1113 BR has an exceptionally efficient fuel filtering system and the fuel goes through no less than five cleaning processes before it reaches the injectors. The outstandingly robust and well-dimensioned design of the engine as a whole ensures smooth and dependable operation. The 1113 BR requires minimum maintenance and starts immediately—even when air temperatures are very low. The 1113 BR has very low fuel and lubricating oil consumption while its reliability also contributes to keeping maintenance costs to a minimum.

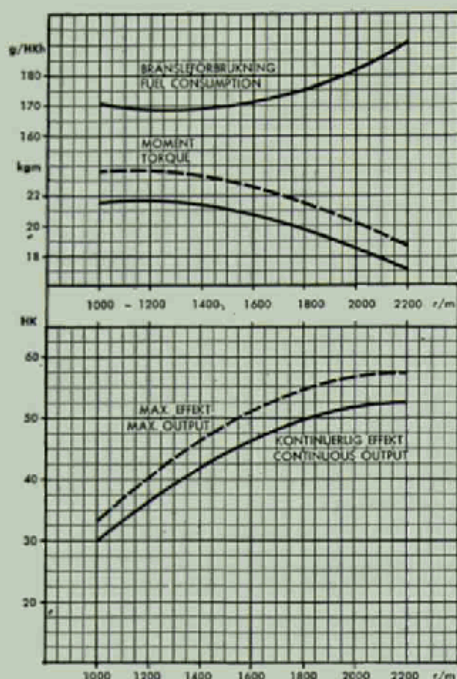
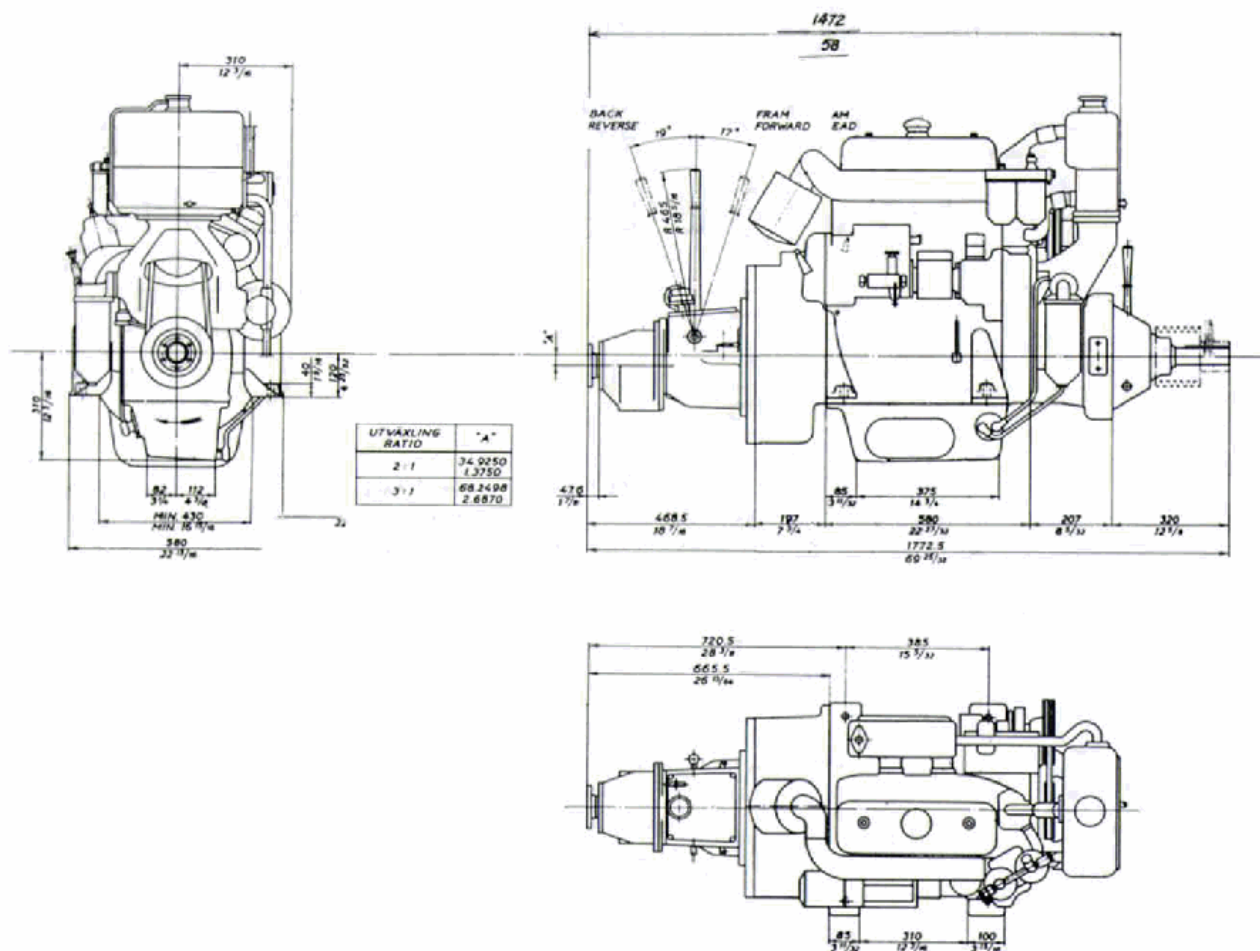
A power take-off consisting of a friction clutch with or without a reduction gear can be fitted on the front end of the engine to drive winches, bilge pumps, extra dynamos and compressors.

Many years of research as well as extensive experience from test beds and practical operation make this engine a dependable and economical power unit for small working boats.



VOLVO PENTA MARINE DIESEL ENGINE, TYPE 1113 BR

Dimension drawings



Data

- *) Maximum output 58 h.p. at 2200 r.p.m.
- Marine output 44 h.p. at 1500 r.p.m.
- 50 h.p. at 1800 r.p.m.
- Marine torque 21.5 kgm (156 lb.ft.) at 1000 r.p.m.
- Number of cylinders 3
- Total displacement 3.78 litres (230.8 cu.in.)
- Bore 111.12 mm (4.375")
- Stroke 130 mm (5.12")
- Cylinder liners, replaceable, type Wet
- Direction of rotation of engine,
viewed from flywheel end Anti-clockwise
- Max. permissible inclination of engine
with boat under way 15°
- Weight of engine with reverse gear,
approx. 735 kg (1620 lb.)

*) Maximum output can be utilized after consultation with AB Volvo Penta.

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VOLVO PENTA

MD 1



Volvo Penta MD 1 is a 1-cylinder, 4-stroke diesel engine with direct injection. The exceptionally compact outer dimensions and the considerably powerful propeller thrust make the engine specially suitable for installation in small fishing boats, work boats and pleasure boats. The low weight, compact design and construction make the MD 1 also ideal for use as an auxiliary unit in sailing craft.

Direct injection ensures immediate starting on diesel fuel oil without any preheating, for example, with glow plugs.

The MD 1 is very economical and the fuel consumption is as low as about 1 litre (1 quart) of fuel per hour of operation. To a great extent this is due to the effective design of the combustion chamber and also to the fact that the fuel injection pump is fitted with a centrifugal-type governor, which always supplies the engine with the correct fuel quantity for the varying loads and speeds.

The engine is supplied with the following alternative equipment:

1. With manual starter and reduction/reverse gear ratio 1.87:1.
2. With electrical starter and reduction/reverse gear ratio 1.87:1.

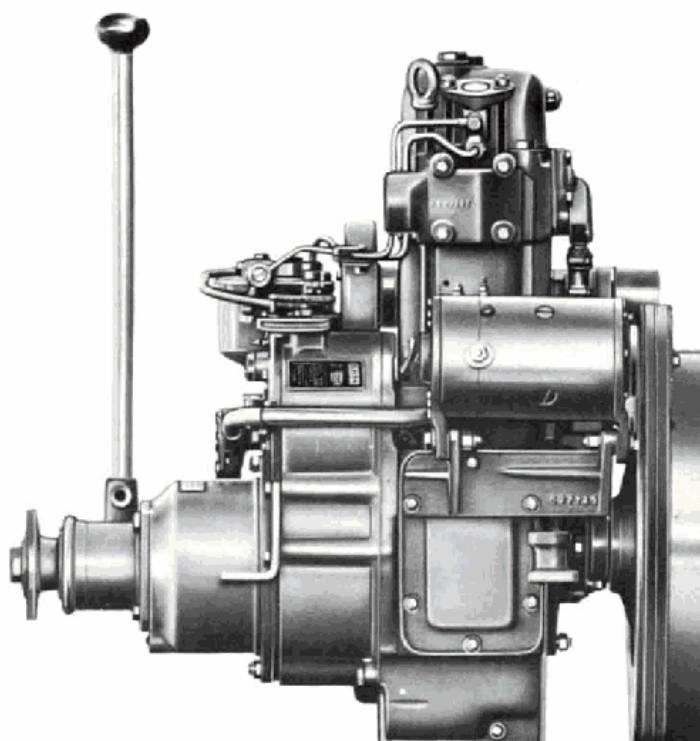
3. With electrical starter and friction clutch with reduction ratio 1.87:1 for adjustable propeller equipment.

Here are some of the outstanding features included in the standard equipment:

- Thermostat-controlled sea-water cooling system means that the engine always runs at its most favourable operating temperature.
- Effective intake silencer.
- Sea-water pump with an impeller made of neoprene rubber which is practically insensitive to sludge and sand in the water.
- Decompression device and raised starting crank facilitate manual starting and the cold starting device also provides easy starting in cold weather.
- Closed circuit type crankcase ventilation — a built-in filter above the valve tappets evacuates the crankcase gases and feeds them into the engine intake manifold. This means no fumes in the engine compartment.

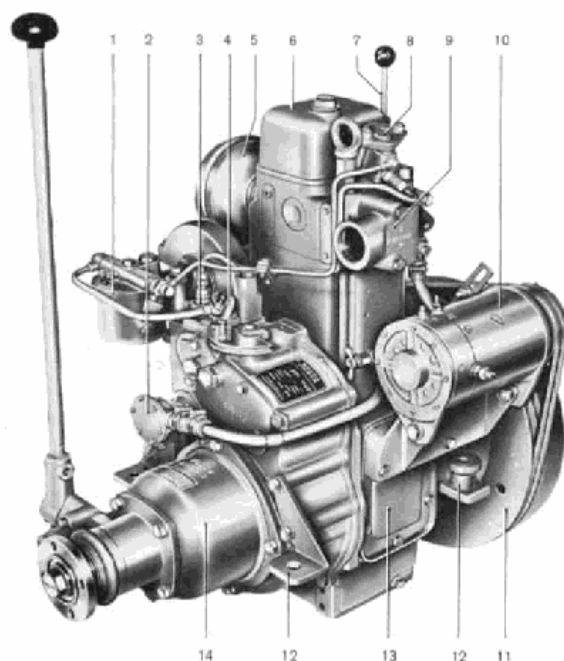
VOLVO PENTA
one-cylinder,
four-stroke
Diesel engine

7 h.p.



VOLVO PENTA MARINE DIESEL ENGINE TYPE MD 1

1. Fuel filter
2. Sea-water pump
3. Fuel injection pump
4. Speed control
5. Air silencer
6. Rocker arm casing
7. Decompression device handle
8. Injector
9. Water-cooled exhaust manifold
10. Starter generator (only on engines with elec. equipment)
11. Flywheel
12. Engine mounting
13. Inspection cover
14. Reduction/reverse gear (ratio 1.87:1)



Instrument panel (included as standard on elec. equipped engines)

EXTRA EQUIPMENT

Water-cooled exhaust elbow
Flexible engine mounting
Flexible propeller shaft coupling
Fuel tank
Pulley
Water-cooled exhaust pipe

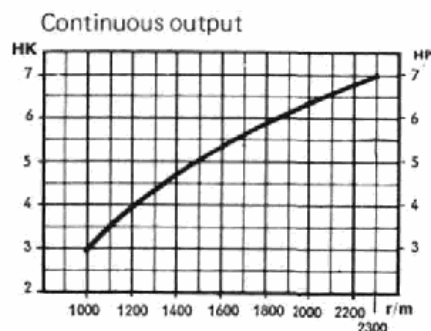
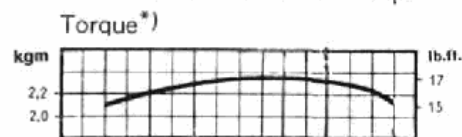
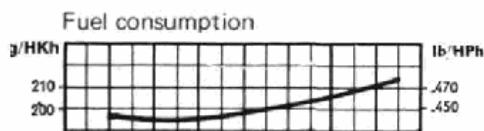
Dry exhaust pipe
Bottom connection parts
Remote control cold-start control
Elec. bilge pump
Propellers, shafts and sleeves
Controls and cables
Water separator for fuel

DATA

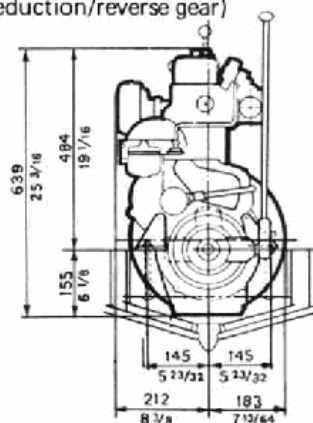
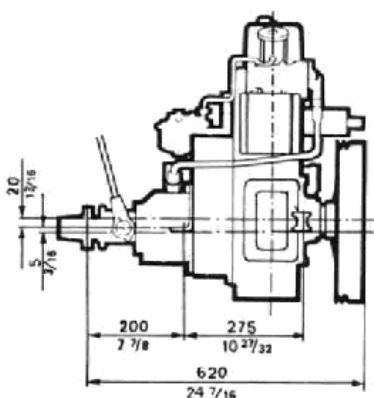
Operation: 4-stroke diesel with direct injection

Continuous output, h.p. (SMMT) at r.p.m.	7/2300
Max. torque kpm (lb.ft.)/r.p.m.	2.35 (17.0)/1800
Propeller speed at 2300 r.p.m. engine speed	1230
Reduction ratio, reduction/reverse gear	1.87:1
Bore, mm (in.)	79.37 (3.125)
Stroke, mm (in.)	90 (3.54)
Capacity, c.c. (cu.in.)	445 (27)
Valves	Overhead
Max. inclination while running	15°
Net weight, including reduction/reverse gear, approx. kg (lb.)	130 (285)

DIMENSION DRAWINGS (engine with reduction/reverse gear)



*) Note. The torque of the propeller shaft through the red./reverse gear is 1.87 times the curve.



We reserve the right to carry out modifications



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VOLVO PENTA MD 1 B

Ref. 6086A



Volvo Penta MD 1 B is a 1-cylinder, 4-stroke marine diesel engine with direct injection. The exceptionally compact outer dimensions and the considerably powerful propeller thrust make the engine specially suitable for installation in small fishing boats, work boats and pleasure boats. The low weight, compact design and construction make the MD 1 B also ideal for use as an auxiliary unit in sailing craft.

MD 1 B is a further development of the well-known MD 1 engine. It has many components in common with MD 2 B and MD 3 B, which gives special advantages from the viewpoint of service and parts supply.

Direct injection ensures immediate starting on diesel fuel oil without any preheating, for example, with glow plugs.

The MD 1 B is very economical. To a great extent this is due to the effective design of the combustion chamber and also to the fact that the fuel injection pump is fitted with a centrifugal-type governor, which always supplies the engine with the correct fuel quantity for the varying loads and speeds.

MD 1 B is delivered with the easy operating "Mono-Shift" reverse gear which requires specially small forces.

The reverse gear is built on the cone clutch in the wellknown aquamatic drives. Both speed and reverse gear are operated with the same control lever so called "fingertip control".

The engine is supplied with the following alternative equipment:

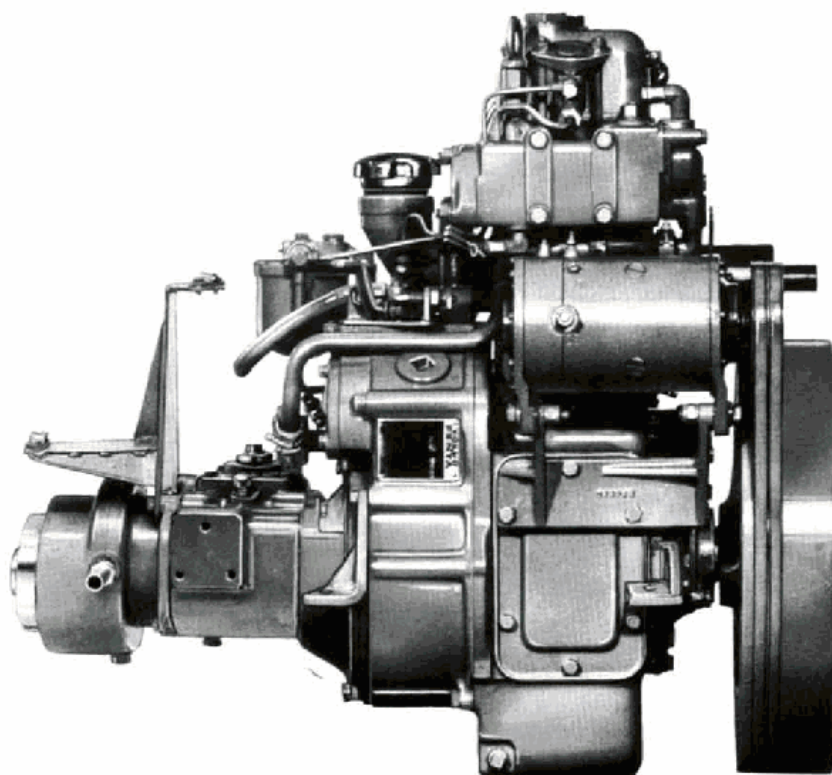
1. With manual starter and reduction/reverse gear type RB ratio 1.87:1.
2. With electrical starter and reduction/reverse gear type RB ratio 1.87:1.
3. With electrical starter and reduction/reverse gear type M.S. ratio 1.91:1.

Here are some of the outstanding features included in the standard equipment:

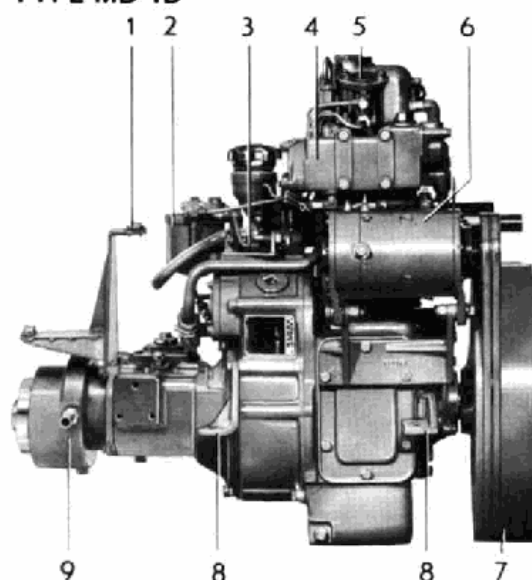
- Feed pump with hand primer for fuel and with effective fuel filter. This makes it possible to locate the fuel tank lower than the engine.
- Built in injection pump with all speed governor for accurate speed governing. The governor requires only small manoeuvre forces from the speed control.
- Full-flow lubricating oil filter of the "Spin-On" type — easy to change.
- Thermostat-controlled cooling system means that the engine always runs at its most favourable operating temperature. Sea-water pump with an impeller made of neoprene rubber.
- Effective intake silencer.
- Decompression device and raised hand starter facilitate manual starting and the cold starting device also provides easy starting in cold weather.

VOLVO PENTA
1-cylinder, 4-stroke
marine diesel engine
with direct injection

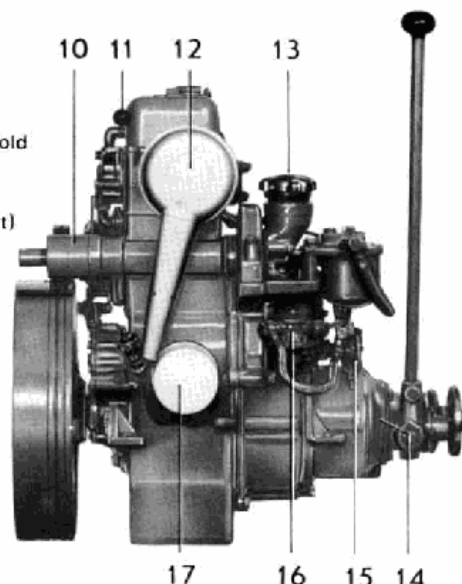
10 h.p.



VOLVO PENTA MARINE DIESEL ENGINE TYPE MD 1B



1. Bracket for manoeuvring cables
2. Fuel filter
3. Fuel injection pump
4. Water-cooled exhaust manifold
5. Injector
6. Starter generator (only engines with elec. equipment)
7. Flywheel
8. Engine mounting
9. Reduction/reverse gear type M.S. ratio 1.91:1



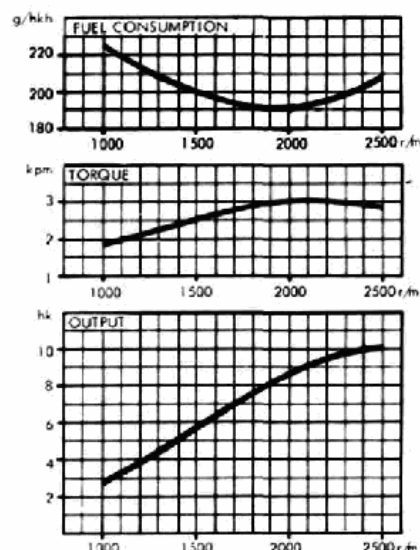
EXTRA EQUIPMENT

Water-cooled exhaust elbow
Flexible engine mounting
Flexible propeller shaft coupling
Fuel tank
Pulley
Water-cooled exhaust pipe
Dry exhaust pipe

Bottom connection parts
Alternator 12V-38A
Remote control cold-start control
Elec. bilge pump
Propellers, shafts and sleeves
Controls and cables
Water separator for fuel
Elevated hand start

Instrument panel is included as standard on elec. equipped engines

ENGINE DIAGRAM



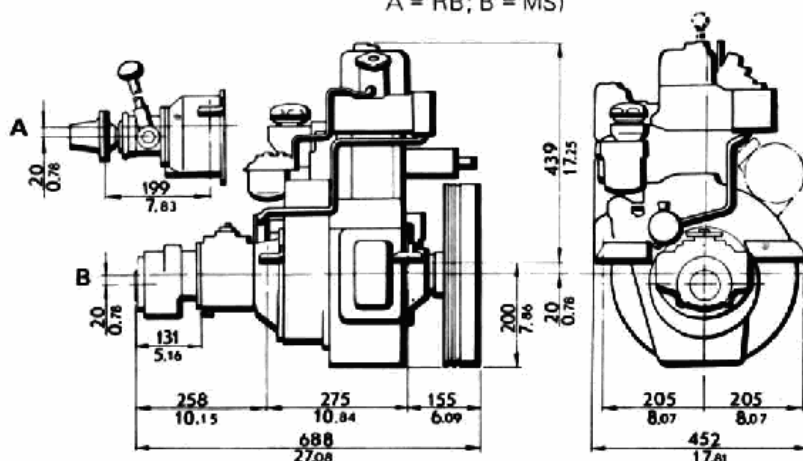
1) Outputs according to DIN 6270
Leistung B

We reserve the right to carry out modifications

DATA

Operation: 4-stroke diesel with direct injection
Continuous output, h.p. (DIN) ¹⁾ at r.p.m. 10/2500
Max. torque kpm (lb.ft.)/r.p.m. 3.0 (21.7)/2000
Bore, mm (in.) 88.9 (3.5)
Stroke, mm (in.) 90 (3.54)
Capacity, cm³ (cu.in.) 560 (34.2)
Valves Overhead
Compression ratio 17.5:1
Max. inclination while running 15°
Net weight, including reduction/reverse gear, approx. kg (lb.) 165 (364)

DIMENSION DRAWINGS (engine with reduction/reverse gear type: A = RB; B = MS)



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MB 1 B



Fig. 1. MB 1 B with reverse gear type RB, ratio 1.65:1

- | | |
|------------------------------------|--------------------------------|
| 1. Control lever | 19. Decompression lever |
| 2. Compression shaft for fuel pump | 20. Valve cover |
| 3. Control rod, engine | 21. Fuel line |
| 4. Intake valve | 22. Fuel pump |
| 5. Igniter | 23. Oil pressure sending unit |
| 6. Water cooled exhaust manifold | 24. Oil filter |
| 7. Thermostat housing | 25. Oil drainage, engine |
| 8. Drive | 26. Alternator |
| 9. Oil pump | 27. Exhaust generator |
| 10. Fuel injection pump | 28. Injection valve |
| 11. Exhaust line | 29. Oil drainage, reverse gear |
| 12. Oil cooler pump | 30. Oil filter, reverse gear |
| 13. Reverse gear type RB | 31. Water drainage, (Schubert) |
| 14. Auxiliary water pump | 32. Reduction gear type RB |

TECHNICAL DATA

ENGINE

General

Type designation	800-80	800-80	800-80
Output (kW) at 4000 (2400) rpm, kW(hp)	7.4 (10)	18.8 (26)	24.8 (34)
Number of cylinders	3	3	3
Bore, mm (in.)		66.0 (2.6)	
Stroke, mm (in.)		60.0 (2.4)	
Displacement (dm ³) (cu. in.)	0.56 (34.2)	1.12 (68.4)	1.68 (102.6)
Compression ratio		17.2:1 (8.1:1)	
Compression pressure (static testing engine with warmer water, kg/cm ²) (psi)		30.34 (284–347)	
Direction of rotation, view from flywheel		Clockwise	
High idling speed (r/min) (p.m.)		40–5000	
Low idling speed, r/min (p.m.)		9.2–10.8 (550–600)	

MD 2

MARINE DIESEL ENGINE 15.5 h.p.



The Volvo Penta MD 2 is a two-cylinder, four-stroke diesel engine with direct injection and it is suitable for use in small fishing boats, work boats, pleasure boats and as an auxiliary engine in sailing yachts.

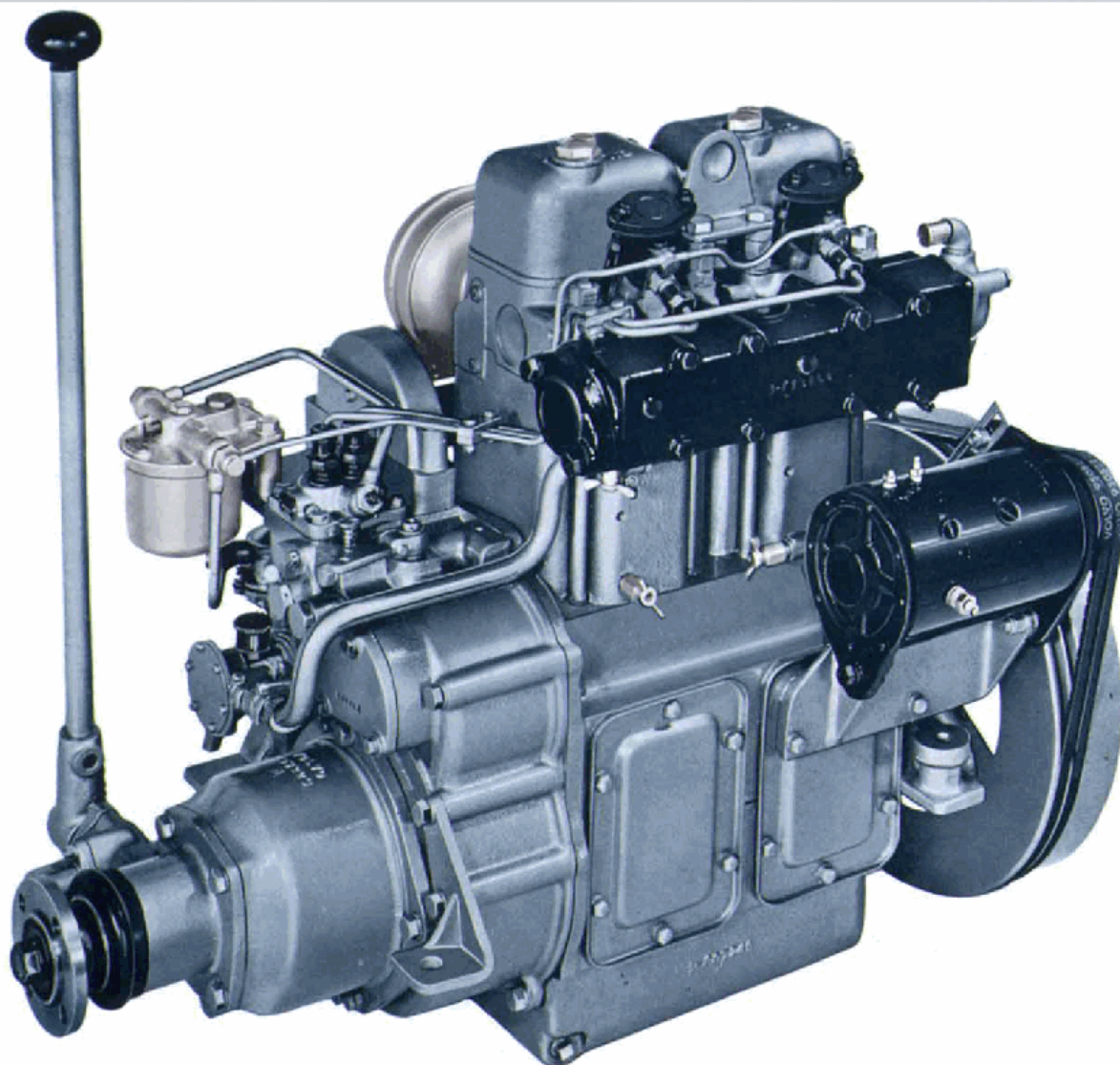
The MD 2 is based on the same components as those used in the Volvo Penta one-cylinder MD 1 engine and its output is 15.5 h.p. at 2300 r.p.m. The MD 2 has the same outstanding qualities as the MD 1 and has low fuel consumption as well as dependable and smooth running properties. This is indeed a light-weight engine since the MD 2 weighs only 190 kg (420 lbs) including the reduction/reverse gear. The compact dimensions are really well worth noting as well: total length 762 mm (30") and height only 640 mm (25 1/4"). This makes possible installation in a boat even when the space is extremely limited.

Here are some of the features which are included in the standard execution:

- Feed pump with hand primer for fuel. This eliminates the necessity of locating the fuel tank at a higher level than the engine to ensure a gravity feed.
- Full-flow lubricating oil filter of the "spin-on" type—easy to change.
- Thermostat-controlled cooling means that the engine always runs at its most favourable operating temperature.
- Easily adjustable overhead valves.
- Sea-water pump with an impeller made of neoprene rubber which is practically insensitive to sludge and sand in the water.
- Decompression device and raised hand starter facilitate manual starting and the cold starting device also provides easy starting in cold weather.
- The Volvo Penta patented self-adjusting reduction/reverse gear with a ratio of 1.87:1 is extremely compact and has a great reputation for dependable operation. In the neutral position there is no friction in the reverse gear which can make the propeller rotate and in the case of a sailing craft the propeller "free-wheels".
- Closed circuit type crankcase ventilation—a built-in filter above the tappets evacuates the crankcase gases and feeds them into the engine induction manifold. This means no fumes in the engine compartment.

Standard equipment includes a speed control device as well as an oil pressure gauge, oil jump pump and tool kit.

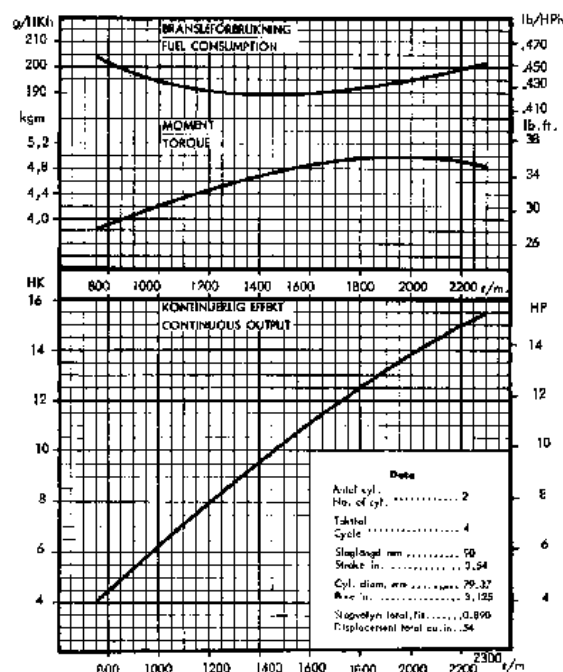
Extra equipment available for the MD 2 includes a 12 V starter/dynamo (1 h.p.—90 W) with instrument panel. A pulley for extra power take-off can be supplied fitted on the flywheel.



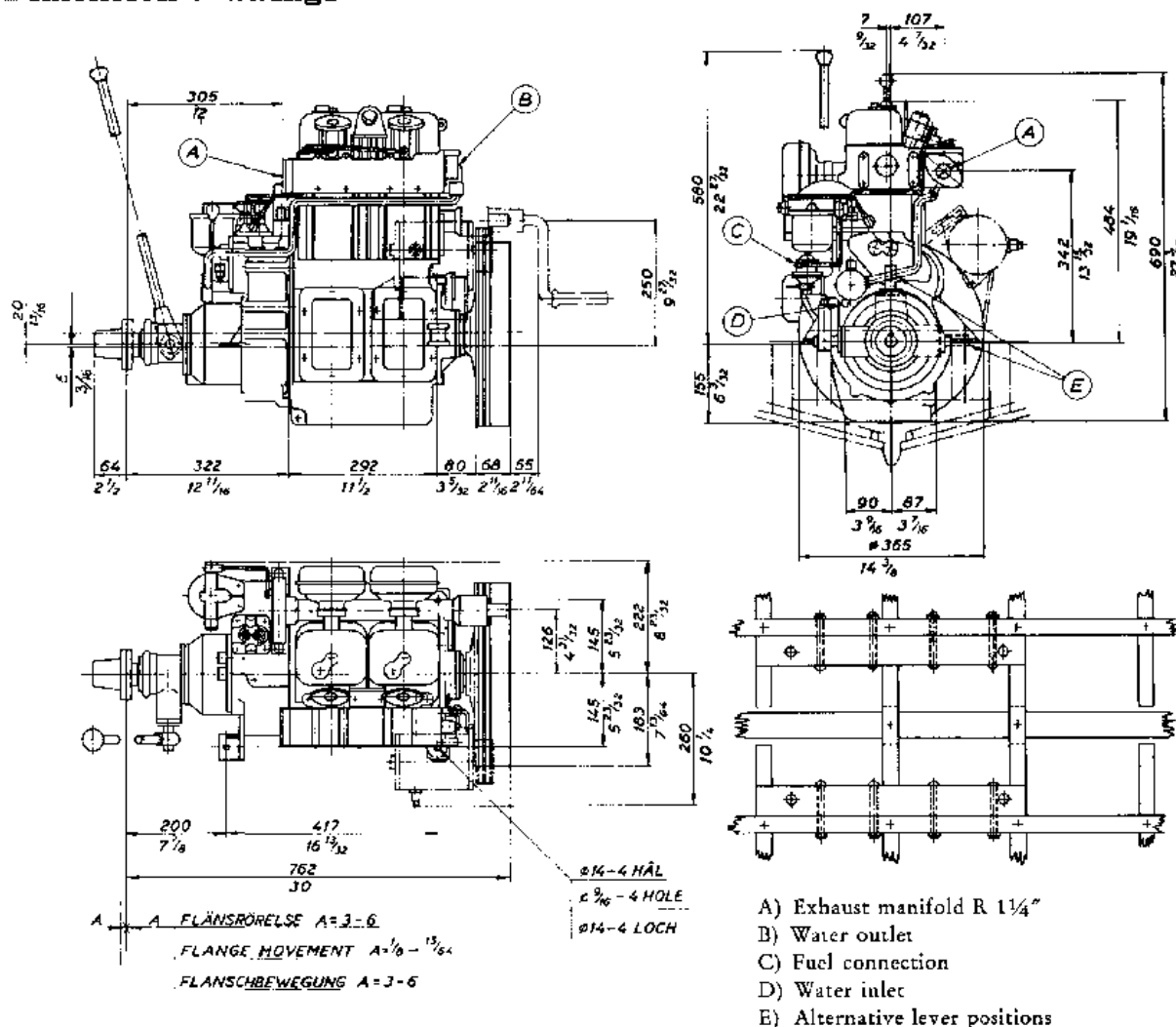
MD 2

Data

Output, h.p.	15.5
Engine speed, r.p.m.	2300
Max. torque kgm (lb.ft.)/r.p.m.	5.0(36)/1900
Propeller speed at 2300 r.p.m. engine speed	1230
Ratio, reduction/reverse gear	1.87:1
Bore, mm (in.)	79.37 (3.085")
Stroke, mm (in.)	90 (3.54")
Capacity, c.c. (cu. in.)	890 (54)
Propeller	Left hand thread
Max. inclination with boat under way	15°
Net weight, including reduction/reverse gear, kg (lb.)	190 (420)



Dimension drawings



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För distribution enligt SFS 529/1961 p. 2.

VOLVO PENTA MD 2B



Volvo Penta MD 2 B is a 2-cylinder, 4-stroke marine diesel engine with direct injection. The exceptionally compact outer dimensions and the considerably powerful propeller thrust make the engine specially suitable for installation in small fishing boats, work boats, pleasure boats and as an auxiliary unit in sailing craft.

MD 2 B is a further development of the well-known MD 2 engine. It has many components in common with MD 1 B and MD 3 B, which gives special advantages from the viewpoint of service and parts supply.

Direct injection ensures immediate starting on diesel fuel oil without any preheating, for example, with glow plugs.

The MD 2 B is very economical. To a great extent this is due to the effective design of the combustion chamber and also to the fact that the fuel injection pump is fitted with a centrifugal-type governor, which always supplies the engine with the correct fuel quantity for the varying loads and speeds.

MD 2 B is delivered with the easy operating "Mono-Shift" reverse gear which requires specially small forces.

The reverse gear is built on the cone clutch in the wellknown aquamatic drives. Both speed and reverse gear are operated with the same control lever e.g. "fingertip control".

The engine is supplied with the following alternative equipment:

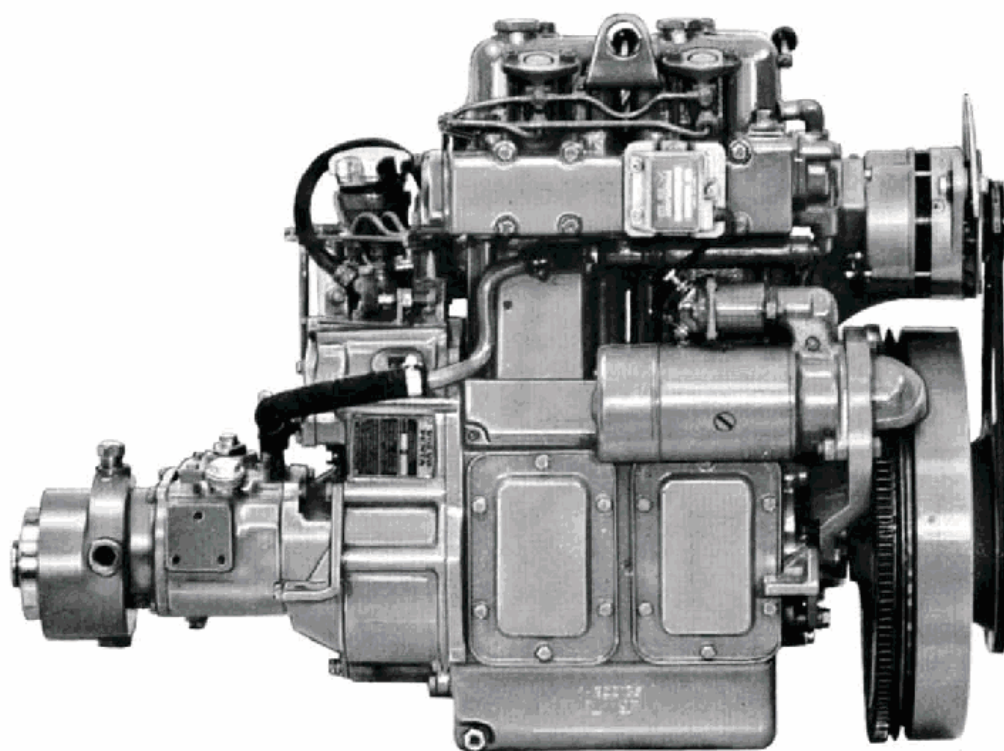
1. With manual start and reduction/reverse gear type RB ratio 1.87:1.
2. With starter-generator and reduction/reverse gear type RB ratio 1.87:1.
3. With starter motor, alternator and reduction/reverse gear type MS ratio 1.91:1.
4. With starter generator and reduction/reverse gear type RB ratio 3.42:1.

Here are some of the outstanding features included in the standard equipment:

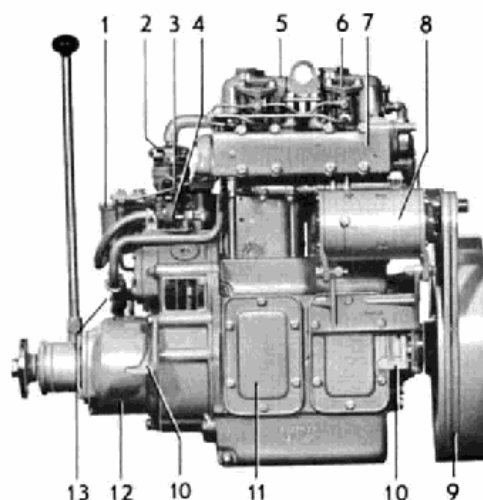
- Feed pump with hand primer for fuel and with effective fuel filter. This makes it possible to locate the fuel tank lower than the engine.
- Built in injection pump with all speed governor for accurate speed governing. The governor requires only small manoeuvre forces from the speed control.
- Full-flow lubricating oil filter of the "Spin-On" type — easy to change.
- Thermostat-controlled cooling system means that the engine always runs at its most favourable operating temperature. Sea-water pump with an impeller made of neoprene rubber.
- Effective intake silencer.
- Decompression device and raised hand starter facilitate manual starting and the cold starting device also provides easy starting in cold weather.

VOLVO PENTA
2-cylinder, 4-stroke
marine diesel engine
with direct injection

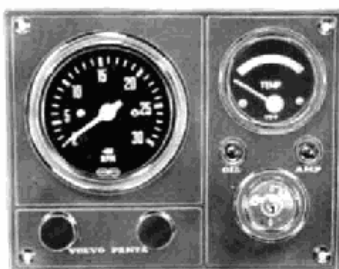
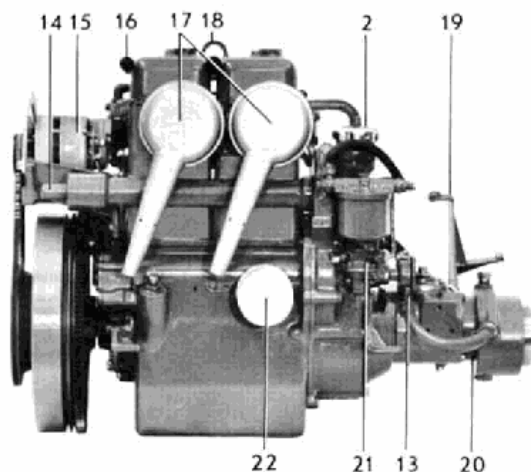
25 h.p.



VOLVO PENTA MARINE DIESEL ENGINE TYPE MD 2B



1. Fuel filter
2. Filler cap for oil
3. Fuel injection pump
4. Speed control
5. Rocker arm casing
6. Injector
7. Water-cooled exhaust manifold
8. Starter generator (only engines with elec. equipment)
9. Flywheel
10. Engine mounting
11. Inspection cover
12. Reduction/reverse gear type RB (ratio 1.87:1)
13. Sea-water pump
14. Hand start shaft
15. Alternator (included as standard on engines with MS Red/reverse gear)
16. Decompression device
17. Air silencer
18. Lifting eyelet
19. Bracket for manoeuvring cables
20. Reduction/reverse gear type MS (ratio 1.91:1)
21. Feed pump
22. Spin on oil filter



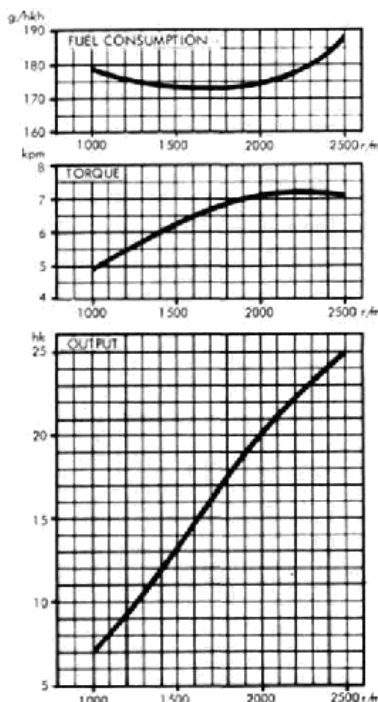
Instrument panel is included as standard on elec. equipped engines

EXTRA EQUIPMENT

Water-cooled exhaust elbow
Flexible engine mounting
Flexible propeller shaft coupling
Fuel tank
Pulley
Water-cooled exhaust pipe
Dry exhaust pipe

Bottom connection parts
Alternator 12V-38A
Remote control cold-starting control
Elec. bilge pump
Propellers, shafts and sleeves
Controls and cables
Water separator for fuel
Elevated hand start

ENGINE DIAGRAM



1) Outputs according to DIN 6270
Leistung B

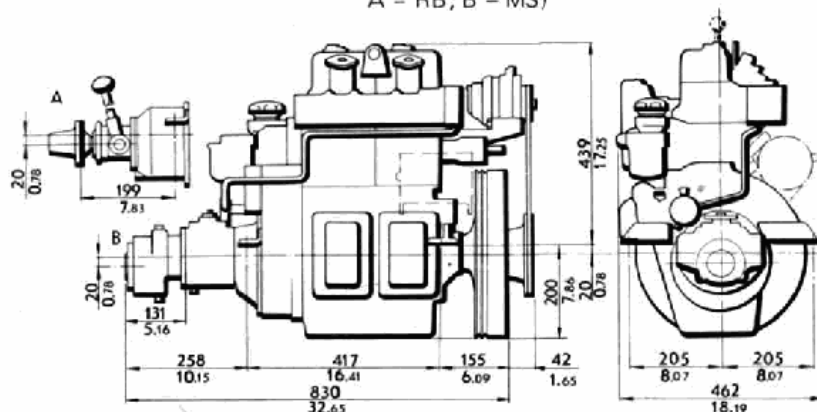
We reserve the right to carry out modifications

DATA

Operation: 4-stroke diesel with direct injection

Continuous output, h.p. (DIN) ¹⁾ at r.p.m. 25/2500
Max. torque kpm (lb.ft.)/r.p.m. 7.2 (52)/2000
Bore, mm (in.) 88.9 (3.5)
Stroke, mm (in.) 90 (3.54)
Capacity, cm³ (cu.in.) 1120 (68.4)
Valves Overhead
Compression ratio 17.5:1
Max. inclination while running 15°
Net weight, including reduction/reverse gear, approx. kg (lb.) 220 (485)

DIMENSION DRAWINGS (engine with reduction/reverse gear A = RB; B = MS)



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NOTES ON THE ENGINE DIAGRAM

Abstract



Age Group	Male (%)	Female (%)
18-24	~15	~15
25-34	~25	~25
35-44	~35	~35
45-54	~45	~45
55-64	~55	~55
65-74	~65	~65
75-84	~75	~75
85+	~85	~85

10

[illegible]

References



100

Firm's financial reporting system		
Firm's stock price response to stock market fluctuations		
Financial No. of returns		β
Highly rated Firm's return	1990-91	1.346 (0.4)
Highly rated Firm's return	1992-93	1.08 (0.5)
Highly rated Firm's return	1993-94	1.01 (0.5)
Highly rated Firm's return	1994-95	0.73 (0.3)
Lowly rated Firm's return	1990-91	0.64 (0.3)
Lowly rated Firm's return	1992-93	0.64 (0.3)
Lowly rated Firm's return	1993-94	0.64 (0.3)
Lowly rated Firm's return	1994-95	0.64 (0.3)





Fig. 2. 1-8) with injection pump (145), with 120.1 (120.2) (120.3) (120.4) (120.5) (120.6) (120.7) (120.8) (120.9) (120.10) (120.11) (120.12) (120.13) (120.14) (120.15) (120.16) (120.17) (120.18) (120.19) (120.20) (120.21) (120.22) (120.23) (120.24) (120.25) (120.26) (120.27) (120.28)

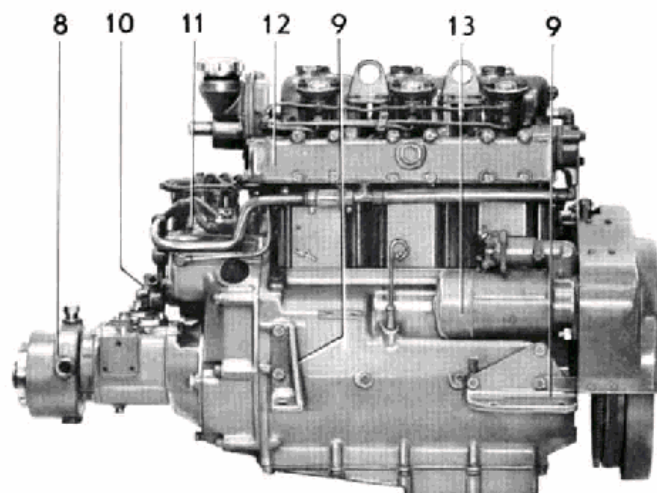
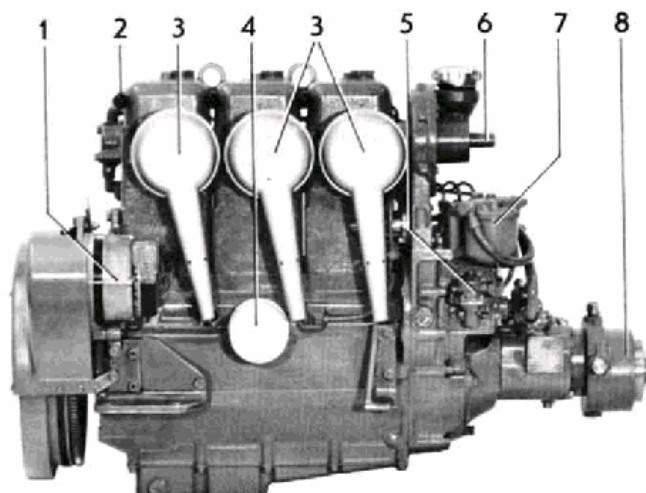


MD 3B



3-cylinder, 4-stroke marine diesel engine with direct injection

Propeller shaft output 26 kW (35 hp)



STANDARD EQUIPMENT

ENGINE BODY — Cylinder block and heads made of cast iron. Pistons made of light-alloy with 3 compression rings and one oil scraper ring. Crankshaft journalled in 4 bearings.

Decompression handle (2)

Recess for starting crank handle (6)

Tool kit with starting crank handle is supplied with engine.

FUEL SYSTEM — Piston-type injection pump with centrifugal governor for accurate speed regulation (11).

Feed pump with hand primer (5) and flexible hose with fuel pipe connection.

Effective fuel filter (7).

Manual cold-starting device.

COOLING SYSTEM — Thermostat-controlled sea-water cooling. Sea-water pump with neoprene rubber impeller (10). The reverse gear reduction gear is water-cooled.

LUBRICATING SYSTEM — Pressure-lubrication system with full-flow lubricating oil filter of the spin-on type (4). Sealed crankcase ventilation.

INTAKE SYSTEM — Intake silencers (3) with filter.

EXHAUST SYSTEM — Sea-water cooled exhaust manifold of cast iron with R 1 1/4" connection (12).

ELECTRICAL SYSTEM — Corrosionproof 12 V electrical system, with complete instrument panel. Alternator 35 A, 420 W (1). Starter motor output 1.5 kW (2 h.p.) (13).

The instrument panel is provided with a key switch, rev counter, temperature gauge, warning lamps for battery charging and oil pressure, a switch for instrument lighting and 1 extra switch. Cable harness, 4 m (13 ft.) in length, with connector. Main fusing with built-in spare fuse is mounted on engine.



ENGINE MOUNTING — The engine is supplied with engine brackets for fixed suspension (9).

POWER TRANSMISSION — MS (Mono-Shift) type reverse gear. Single control lever for both speed and operating the reverse gear. Bracket for control cables included. Propeller shaft flange for 30 mm propeller shaft. Reverse gear type MS red. ratio 1.91:1, L-H prop. (8).

FUEL SYSTEM

COOLING SYSTEM

Sea-water filter complete with attachment
Cooling water intake complete with
cock and hose

EXHAUST SYSTEM

Water-cooled exhaust elbow
Hull through fitting
Exhaust rubber hose
Water-cooled silencer, complete
Vacuum valve
Exhaust boot

**Silencer
Compensator**

ELECTRICAL SYSTEM AND INSTRUMENTS

Charging distributor for charging 2-
battery system
Alternator 12 V 38 A
Electric-hourmeter
Master switch
Cable harness extension
Instrument panel for extra instrument
Automatic alarm for oil pressure and
water temperature

ENGINE MOUNTING

Flexible engine mounting

BOAT ACCESSORIES

Electrically operated bilge pump
Original paint
Oils

CONTROLS AND CONTROL SYSTEM

- VP single-control lever for both speed and forward-reverse operation, top-mounted or side-mounted.
- Neutral-position switch — automatic safety interlock for VP controls
- Push-pull controls
- Control cables
- Steering gears
- Steering wheels
- Steering cables
- Ball joint and fork kit for steering cables

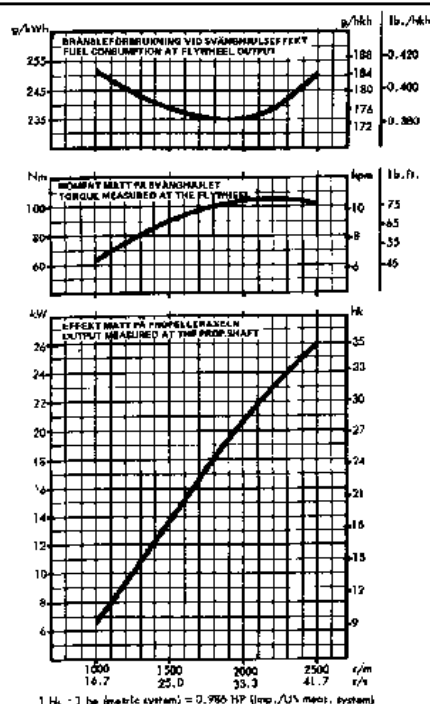
PROPELLER EQUIPMENT

Flexible coupling
Clamp coupling
Propeller shafts
Propeller shaft sleeves
Propellers

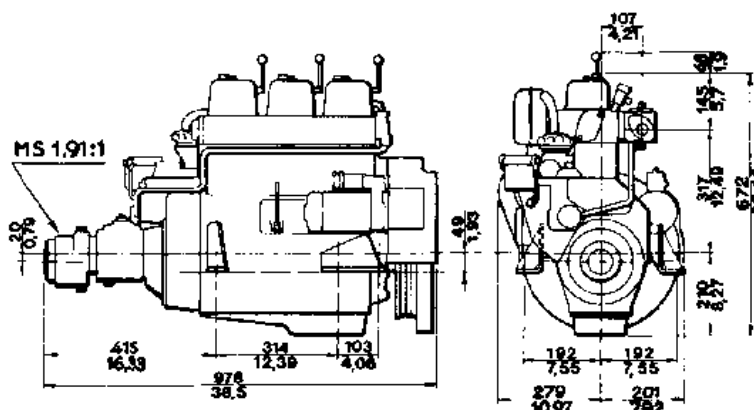
DATA

Type of operation	4-stroke diesel engine with direct injection
Designation	MD3B
Propeller shaft output ¹⁾	26 kW at 41.7 r/s (35 hp at 2500 rpm)
Number of cylinders	3
Capacity, dm ³ (in ³)	1.680 (102)
Bore, mm (in)	88.9 (3.5)
Stroke, mm (in)	90 (3.54)
Valves	overhead
Weight, engine with MS rev. gear 1.91:1, kg (lb), approx	290 (640)

1) The diagram indicates the propeller shaft output for a run-in engine with mechanical reverse gear according to DIN 6270 Leistung B für Dauerbetrieb. The engine flywheel output is approx. 3% higher.



DIMENSION DRAWING



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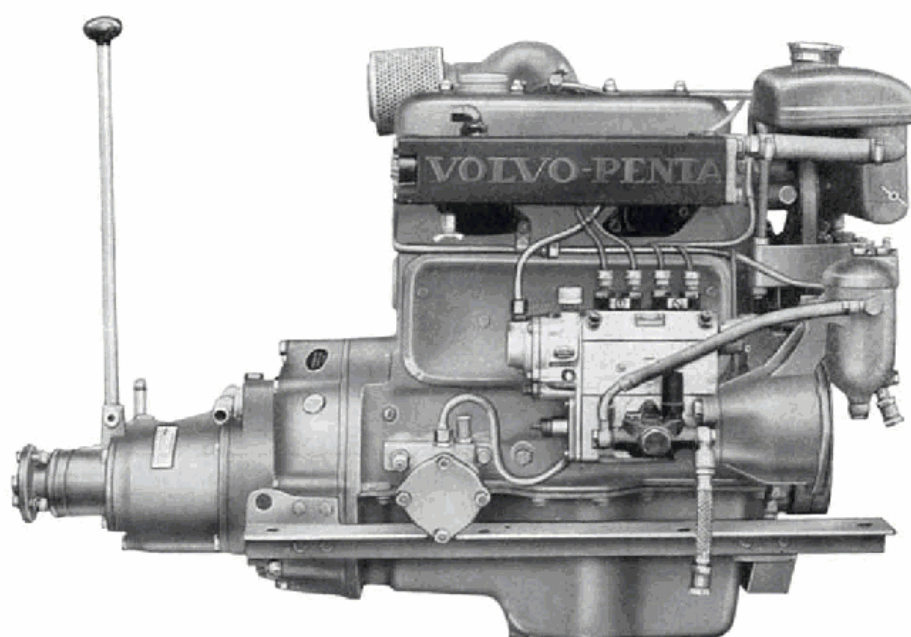
Fig. 10. 1000-hr isothermograms for 1000°C: (a) 1000°C, 1000-hr isothermogram; (b) 1000°C, 1000-hr isothermogram; (c) 1000°C, 1000-hr isothermogram.



MD 4

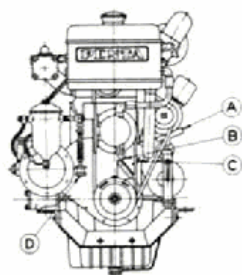
VOLVO PENTA MARINE DIESEL ENGINE • 39 H. P.

The Volvo Penta type MD 4 is a four-stroke, fresh-water cooled Diesel engine, based on a Daimler-Benz engine, fitted with the new Penta-reduction-reverse gear (ratio 1.91:1). An injection pump and glow plugs ensure easy starting even in cold weather. A 12-volt electrical system is standard and includes a 1.8 h.p. starter motor and a 130 W dynamo. The instrument panel is supplied together with a mechanical revolution counter, temperature gauge, charging control, instrument lighting and key switch. The rugged construction of the MD 4 as well as its high power-weight ratio make it very suitable for boats used both in work and leisure.

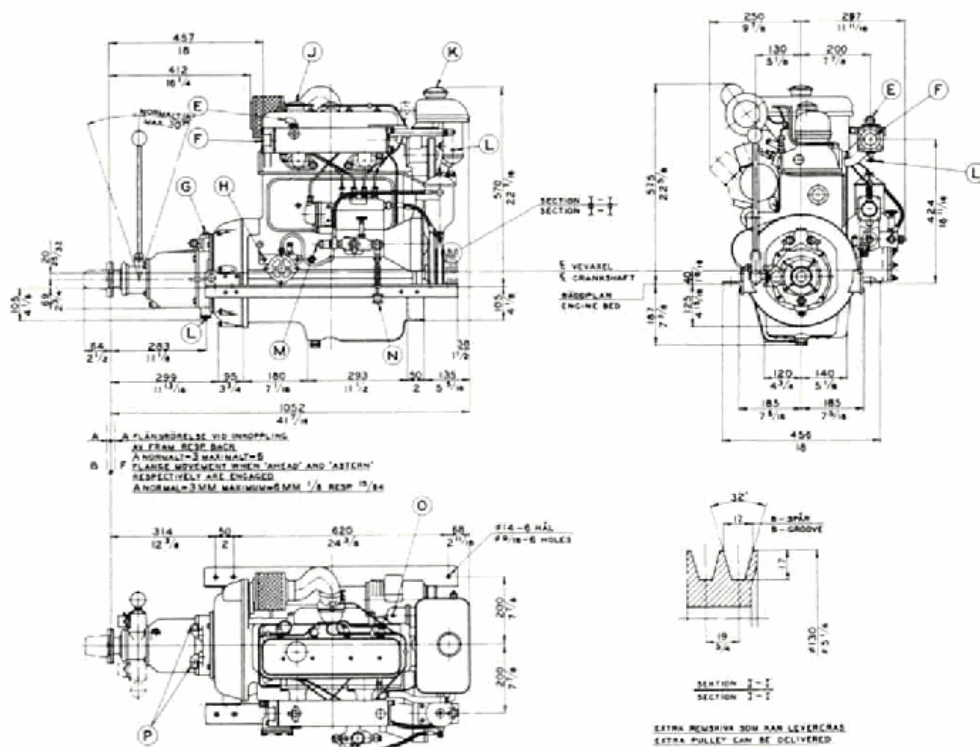


VOLVO PENTA MARINE DIESEL ENGINE, TYPE MD 4

Dimension drawings



- A. Oil scavenging pump
- B. Sea water inlet, nipple for $\frac{3}{4}$ " hose
- C. Fresh water drain
- D. Fuel return for $\frac{1}{8}$ " o. d. pipe
- E. Sea water outlet, nipple for $\frac{1}{4}$ " hose
- F. Exhaust outlet $1\frac{1}{2}$ " pipe
- G. Oil filler, reverse gear
- H. Oil pressure gauge connection
- J. Oil filler, engine
- K. Fresh water filler
- L. Sea water drain
- M. Revolution counter connection
- N. Fuel inlet for $\frac{1}{8}$ " o. d. pipe
- O. Remote mounted cooling water thermometer connection
- P. Cooling water connection, reduction gear, nipples for $\frac{1}{4}$ " hose



Data

Output	19 h.p. at 1500 r.p.m.
	25 h.p. at 2000 r.p.m.
	30 h.p. at 2500 r.p.m.
	39 h.p. at 3300 r.p.m.
Capacity	1.77 litres (108 cu.in.)
Number of cylinders	4
Bore	75 mm (2.951")
Stroke	100 mm (3.94")
Valves	Overhead
Compression ratio	19:1
Weight, including reverse gear, approx.	240 kg (529 lb.)

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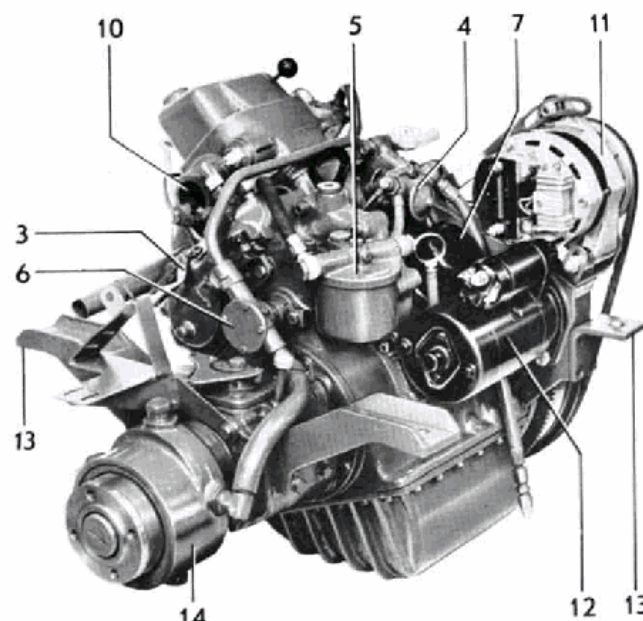
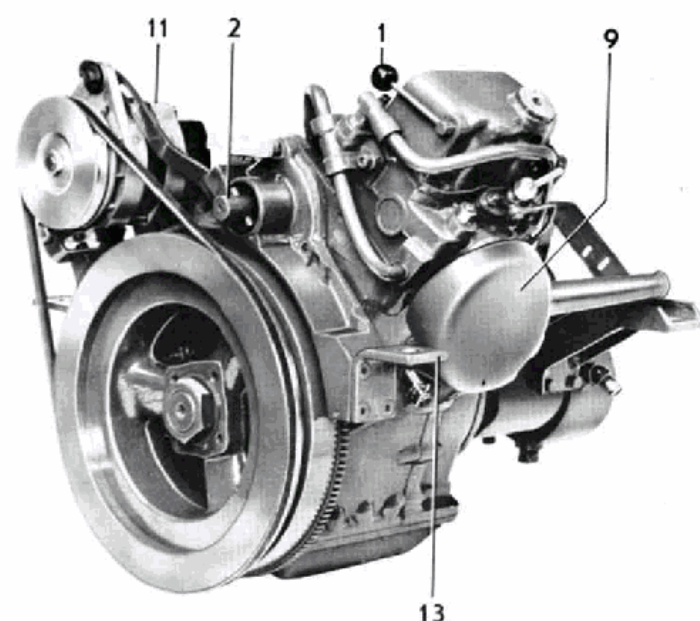
Cables: Penta



MD 5A



1-cylinder, 4-stroke marine diesel engine with overhead valves and direct injection. Cylinder inclination 45°
Propeller shaft output 5.5 kW (7.5 hp)



STANDARD EQUIPMENT

ENGINE BODY — Cylinder block and head made of cast iron. Piston made of light-alloy with 2 compression rings and one oil scraper ring. Cylinder inclination 45°.

Decompression handle (1)

Recess for starting crank handle (2)

Tool kit with starting crank handle is supplied with engine.

FUEL SYSTEM — Piston-type injection pump with centrifugal governor for accurate speed regulation (3)

Feed pump with hand primer (4) and flexible hose with fuel pipe connection for suction line

Effective fuel filter (5)

Manual cold-starting device with control bracket and lever mounted

COOLING SYSTEM — Thermostat-controlled sea-water cooling. Sea-water pump with neoprene rubber impeller (6). The reverse gear reduction gear is water-cooled.

LUBRICATING SYSTEM — Pressure-lubrication system with full-flow lubricating oil filter of the spin-on type (7). Sealed crankcase ventilation.

INTAKE SYSTEM — Intake silencer (9) with filter.

EXHAUST SYSTEM — Exhaust outlet in rear of cylinder head with R 1 1/4" connection flange (10).

ELECTRICAL SYSTEM — Corrosionproof 12 V electrical system, with complete instrument panel. Alternator 35 A, 420 W (11). Starter motor output 0.8 kW (1.1 hp) (12).

The instrument panel is provided with a key switch, warning lamps for battery charging, cooling water temperature and oil pressure, and 2 extra switches.

Automatic alarm with buzzer for low oil pressure and high cooling water temperature. Also wired for indicating the respective warning lamps.

Recess for extra instrument (diam. 52 mm = 2") covered with dummy plug.

Cable harness, 4 m (13 ft.) in length, with connector.

Main fusing, with built in spare fuse, is mounted on engine.



ENGINE MOUNTING — Engine is supplied with engine brackets for fixed suspension (13).

POWER TRANSMISSION — MS (Mono-Shift) type reverse gear. Single-control lever for both speed and operating the reverse gear. Bracket for control cables included. Propeller shaft flange for 25 mm (1") propeller shaft. Reverse gear type MS red. ratio 1.91:1, L- H prop. (14)

EXTRA EQUIPMENT

FUEL SYSTEM

Electrically operated fuel pump
Water-separating filter with or without flexible hoses
Fuel tank
Fuel line kit with copper piping and installation parts

COOLING SYSTEM

Sea-water filter complete with attachment
Cooling water intake complete with cock and hose

EXHAUST SYSTEM

Water-cooled exhaust elbow
Hull through fitting
Exhaust rubber hose
Water-cooled silencer, complete
Vacuum valve

Exhaust boot
Silencer
Compensator

ELECTRICAL SYSTEM AND INSTRUMENTS

Charging distributor for charging 2-battery system
Electric-hourmeter
Master switch
Cable harness extension
Instrument panel for extra instrument

ENGINE MOUNTING

Flexible engine mounting

BOAT ACCESSORIES

Electrically operated bilge pump
Original paint
Oils

CONTROLS AND CONTROL SYSTEM

VP single-control lever for both speed and forward-reverse operation, top-mounted or side-mounted.
Neutral-position switch — automatic safety interlock for VP controls
Push-pull controls
Control cables
Steering gears
Steering cables
Ball joint and clevis kit for steering cables

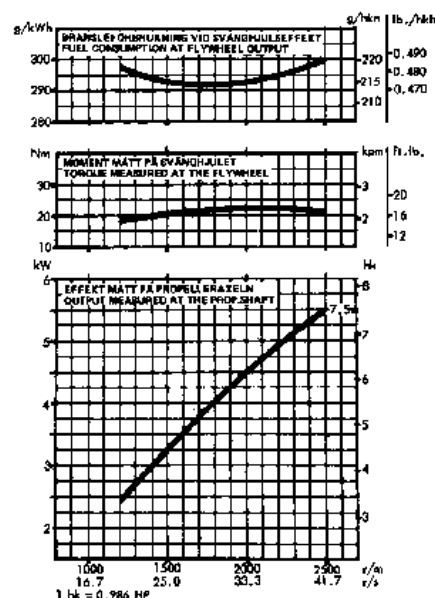
PROPELLER EQUIPMENT

Flexible coupling
Clamp coupling
Propeller shafts
Propeller shaft sleeves
Propellers

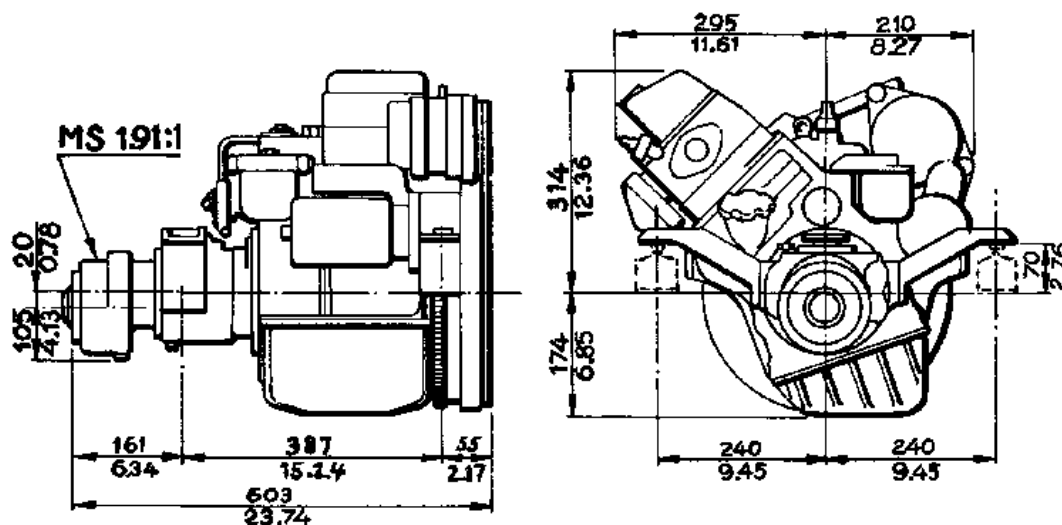
DATA

Type of operation 4-stroke diesel engine with direct injection
Designation MD5A
Propeller shaft output¹⁾ 5.5 kW at 41.7 r/s (7.5 h.p./2500 r.p.m.)
Number of cylinders 1
Cylinder inclination 45°
Capacity, dm³ (cu.in) 0.443 (27)
Bore, mm (in) 84 (3.31)
Stroke, mm (in) 80 (3.15)
Valves overhead
Weight, engine with MS rev. gear, kg (lb), approx 111 (245)

1) Propeller shaft output for a run-in engine with mechanical reverse gear according to DIN 6270 Leistung B für Dauerbetrieb. The engine flywheel output is approx. 9 % higher.



DIMENSION DRAWING



AB VOLVO PENTA

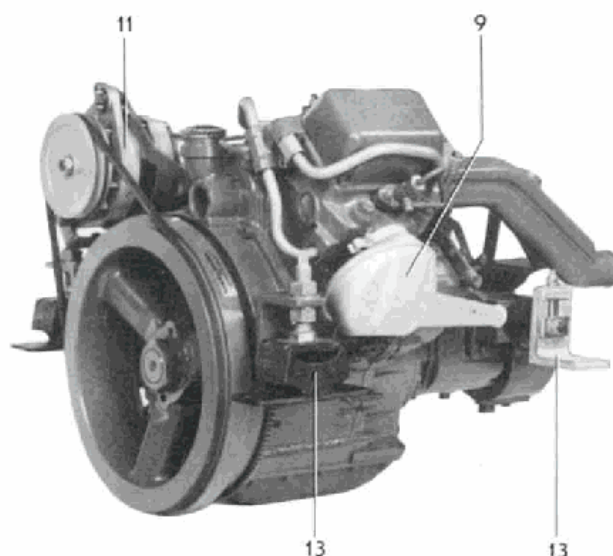
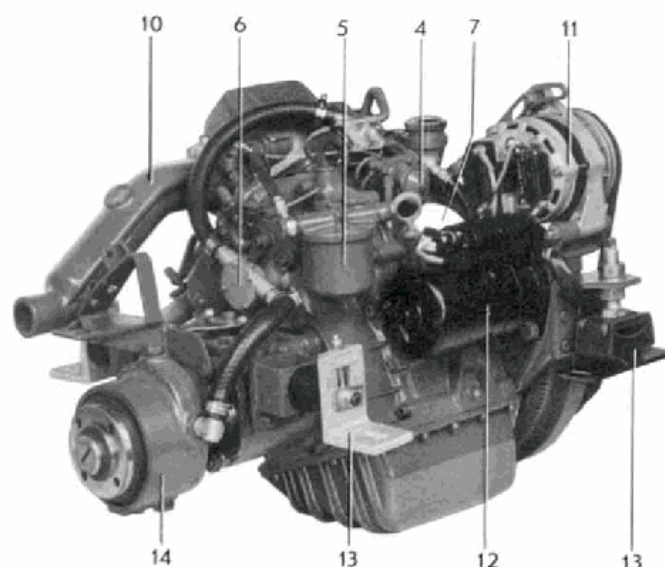
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MD 5B



1-cylinder, 4-stroke marine diesel engine with overhead valves and direct injection. Cylinder inclination 45° Propeller shaft output 7.5 hp (5.5 kW)



STANDARD EQUIPMENT

ENGINE BODY – Cylinder block and head made of cast iron. Replaceable cylinder liner. Piston made of light-alloy with 2 compression rings and one oil scraper ring. Cylinder inclination 45°.

Without hand starting device.

Tool kit is supplied with engine.

FUEL SYSTEM – Piston-type injection pump with centrifugal governor for accurate speed regulation

Feed pump with hand primer (4) and flexible hose (approved by DNV, LR, GL and BV) with fuel pipe connection for suction line

Effective fuel filter (5)

Manual cold-starting device with control bracket and lever mounted

COOLING SYSTEM – Thermostat-controlled sea-water cooling. Sea-water pump with neoprene rubber impeller (6). The reverse gear reduction gear is water-cooled.

LUBRICATING SYSTEM – Pressure-lubrication system with full-flow lubrication oil filter of the spin-on type (7). Sealed crankcase ventilation.

INTAKE SYSTEM – Intake silencer (9) with filter.

EXHAUST SYSTEM – Exhaust outlet in rear of cylinderhead with water-cooled exhaust elbow (10)

ELECTRICAL SYSTEM – Corrosionproof 12 V electrical system, with complete instrument panel. Alternator 35 A, 420 W (11). Starter motor output 0.8 kW (1.1 hp) (12)

The instrument panel is provided with a key switch, warning lamps for battery charging, cooling water temperature and oil pressure.

Automatic alarm with buzzer for low oil pressure and high cooling water temperature. Also wired for indicating the respective warning lamps.

Recess for extra instrument (diam. 52 mm = 2") covered with dummy plug.

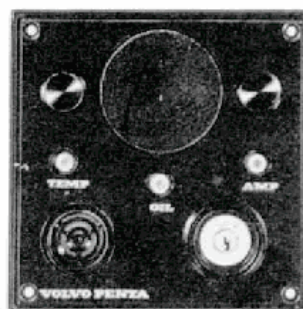
Cable harness, 4 m (13 ft) in length, with connector.

Main fusing, with built in spare fuse, is mounted on engine.

ENGINE MOUNTING – Engine is supplied with flexible engine mounting (13).

POWER TRANSMISSION – Reverse gear type MS-B (MonoShift) red. ratio 1.91:1, L-H prop. (14). Single-control lever for both speed and operating the reverse gear. Bracket for control cables included.

Delivered without propeller shaft flange.



EXTRA EQUIPMENT

FUEL SYSTEM

Electrically operated fuel pump
Water-separating filter with or without flexible hoses
Fuel tank
Fuel line kit with copper piping and installation parts

COOLING SYSTEM

Sea-water filter complete with attachment
Cooling water intake complete with cock and hose

EXHAUST SYSTEM

Connection flange R1 1/4"
Hull through fitting
Exhaust rubber hose

Water-cooled silencer, complete
Vacuum valve
Exhaust boot
Silencer
Compensator

ELECTRICAL SYSTEM AND INSTRUMENTS

Charging distributor for charging 2-battery system
Electric-hourmeter
Master switch
Cable harness extension
Instrument panel for extra instrument

BOAT ACCESSORIES

Electrically operated bilge pump
Original paint
Oils

CONTROLS AND CONTROL SYSTEM

VP single-control lever for both speed and forward-reverse operation, top-mounted or side-mounted.
Neutral-position switch — automatic safety interlock for VP controls
Push-pull controls
Control cables
Steering gears
Steering cables
Ball joint and clevis kit for steering cables

PROPELLER EQUIPMENT

Flexible coupling
Propeller shaft coupling, clamping type
Propeller shafts
Propeller shaft sleeves
Propellers

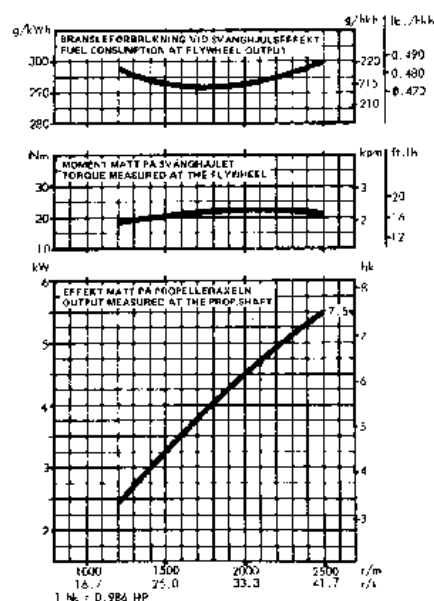
DATA

Type of operation	4-stroke diesel engine with direct injection
Designation	MD5B
Propeller shaft output ¹⁾	7.5 hp at 2500 r.p.m. (5.5 kW at 41.7 r/s)
Number of cylinders	4
Cylinder inclination	45°
Capacity	0.443 dm ³ (27 in ³)
Bore	84 mm (3.31 in)
Stroke	80 mm (3.15 in)
Valves	overhead
Weight, engine with MS rev. gear, approx	111 kg (245 lb)

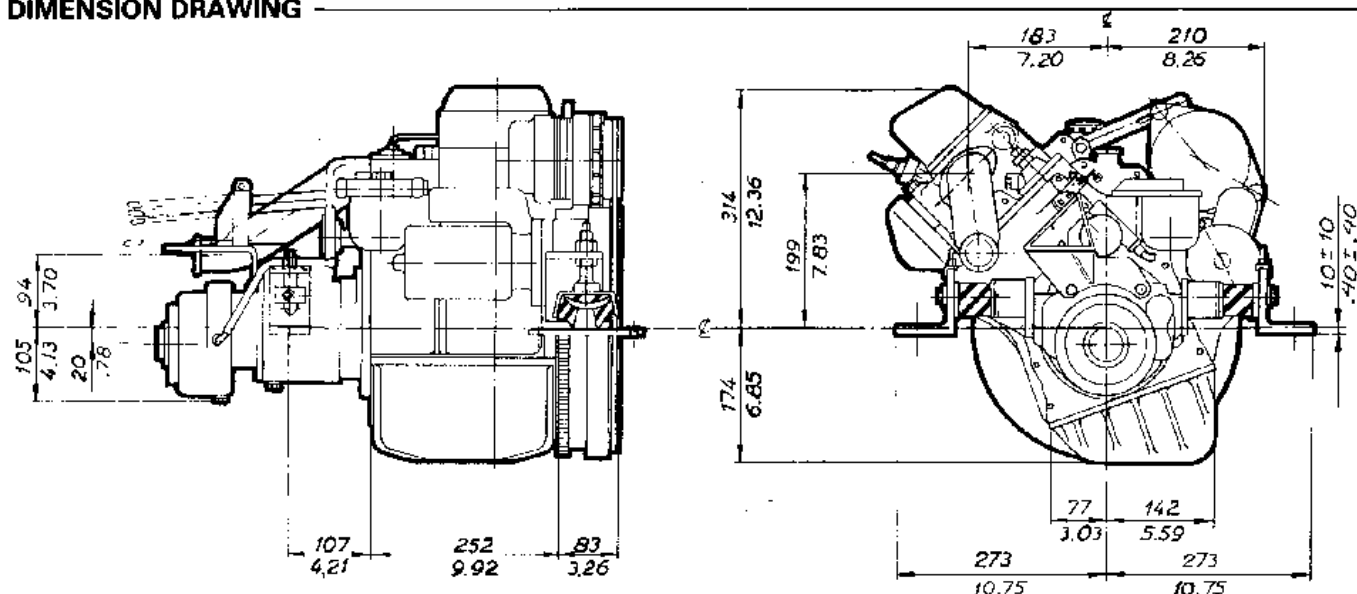
¹⁾ Propeller shaft output for pleasure craft duty with mechanical reverse gear according to DIN 6270 Leistung B für Dauerbetrieb. The engine flywheel output is approx. 4.5% higher.

All measurements apply to a run-in engine.

1 hk = 1 hp (metric system) = 0.986 HP (Imp./US meas. system)



DIMENSION DRAWING



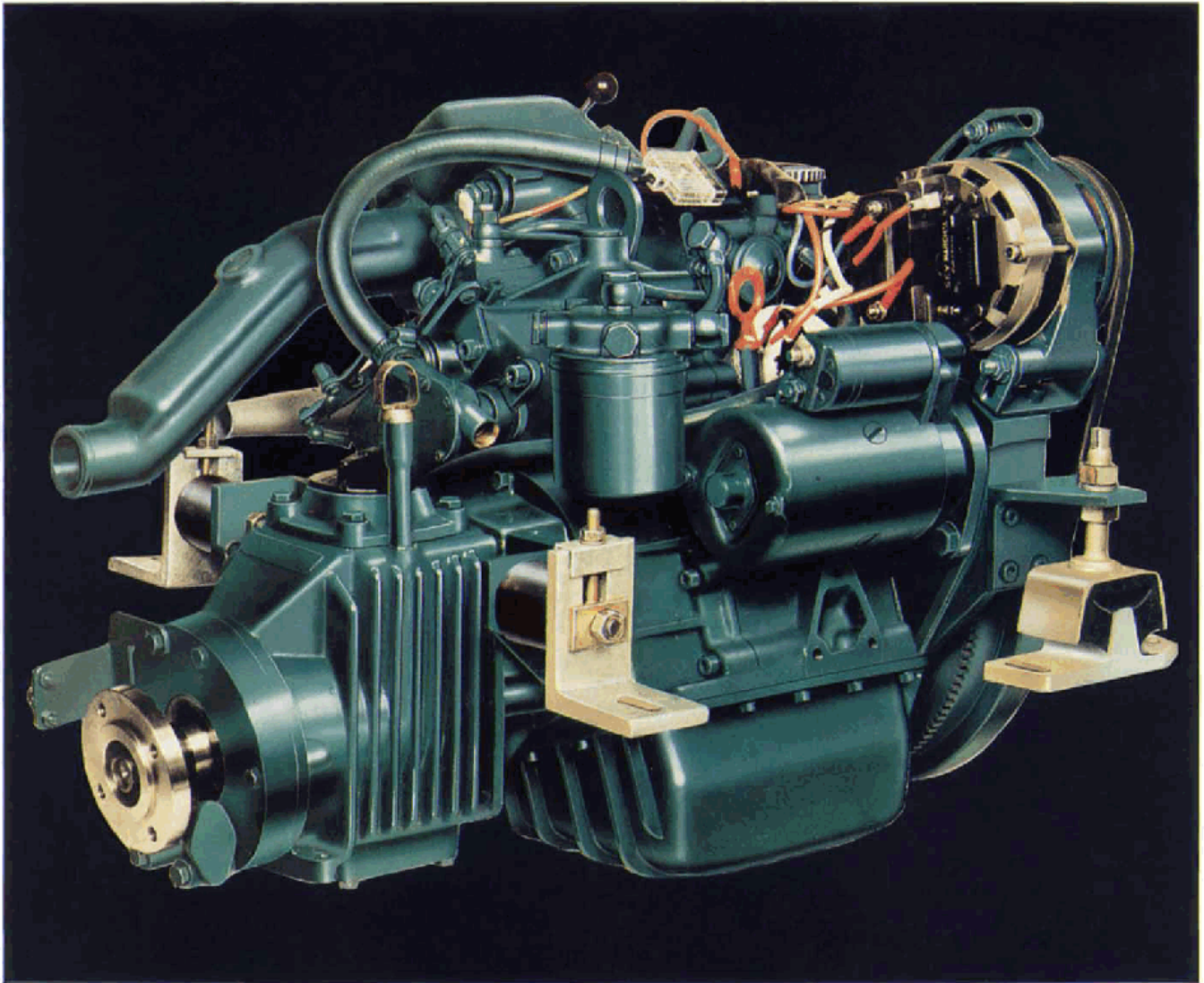
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**VOLVO
PENTA**

MD5C/MS2



1-cylinder marine diesel engine with direct injection. Propeller shaft output, pleasure craft — 7 kW (9.5 hp).

The new Volvo Penta MD5C with its higher speed (3.000 r/min) and greater output (9.5 hp) together with the latest and unique Volvo Penta transmission gives significant improvements in propeller thrust.

In practice this new combination means better manoeuvrability, better boat acceleration and, faster stopping plus reduced speed loss in heavy seas and high headwinds.

This robust purpose built marine engine with features like extra wall thickness in the cooling

passages and replaceable cylinder liner makes the MD5C very resistant to corrosion and wear.

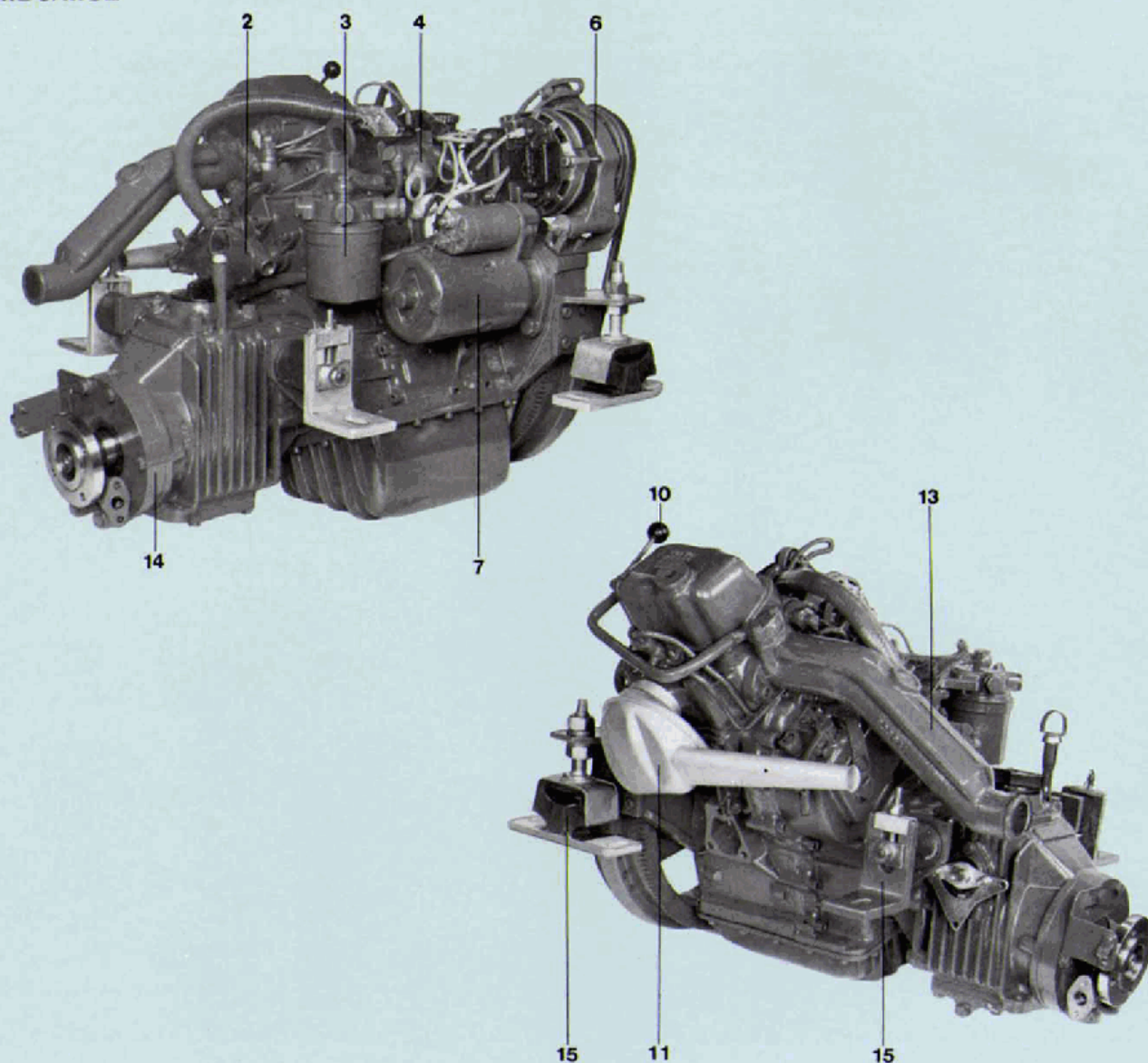
The very accurate fuel metering even at full throttle means extremely clean exhaust gasses and a miserly fuel consumption.

The new Volvo Penta reverse gear MS2 has a slip coupling built in and easy shift cone clutch.

An experienced and strategically placed network of authorised Volvo Penta workshops ensures you of the best service and parts backup.

3000
SERIES

MD5/MS2



Standard equipment

ENGINE BODY

Engine block and cylinder head of cast iron. Replaceable wet cylinder liner. Cylinder inclination 45°.

FUEL SYSTEM

Piston type injection pump with centrifugal governor for accurate speed regulation, manual cold starting device. Stop lever with bracket for push-pull mechanism. Exchangeable fuel filter (3). Feed pump with hand primer (4). Flexible fuel suction hose (approved by DNV, LR, GL and BV) for copper pipe unions.

COOLING SYSTEM

Thermostatically controlled seawater cooling. Sea-water pump (2) with easily replaceable pump impeller.

LUBRICATING SYSTEM

Pressurized lubricating system with exchangeable oil filter. Closed-circuit crankcase ventilation.

INTAKE SYSTEM

Intake silencer (11) with cleanable air filter.

EXHAUST SYSTEM

Exhaust manifold elbow (13) with coolant outlet for connection to rubber exhaust hose.

REVERSE REDUCTION GEAR

MS2 ratio 2,4:1 (14). Seawater cooled. Output shaft downward angle 7°. Supplied without propeller shaft flange.

ENGINE MOUNTING

Flexible mountings for optimal quiet and vibration-free running with adjustable height feature (15).

ELECTRICAL SYSTEM

12V corrosion-proof electrical system complete with instrument panel. Alternator (6) 50 A, 600 W, approved for marine use. Voltage regulator with fast-charge mode. Alternator prepared for retrofitting of twin diode kit which gives automatic distribution of charge current to two or more batteries.

STARTING SYSTEM

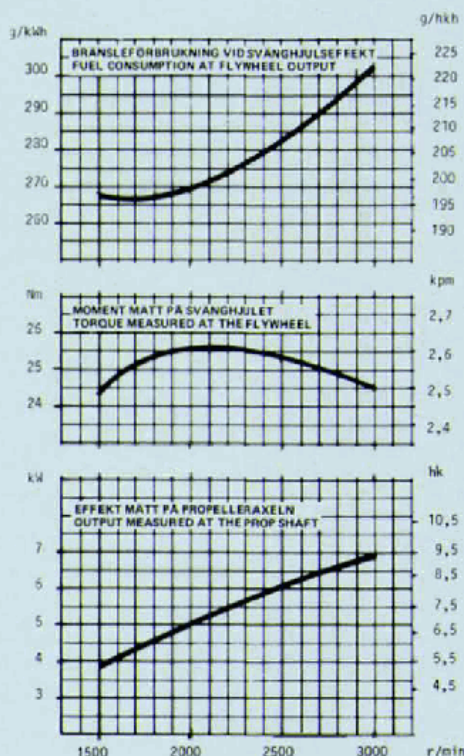
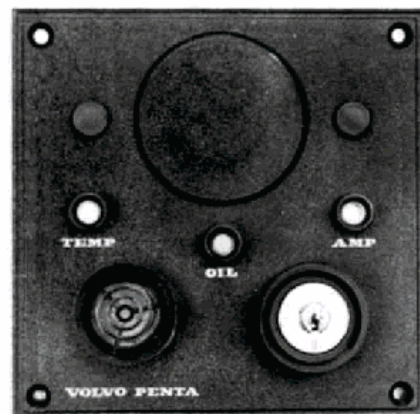
Electric starter motor (7), output 0.8 kW (1.1 hp). Manual starting crank for extra security with decompression lever (10) for easier cranking.

INSTRUMENT PANEL

Complete with ignition key starter switch, warning lamps for charging, cooling water temperature and oil pressure. Automatic alarm with buzzer for low oil pressure and high cooling water temperature. Recess for extra instrument (diam. 52 mm) with blind cover. Master fuse with built in spare fuses. Cable harness, length 4 m, (13 ft), with connector.

TOOL KIT

Sufficient for minor repair work.

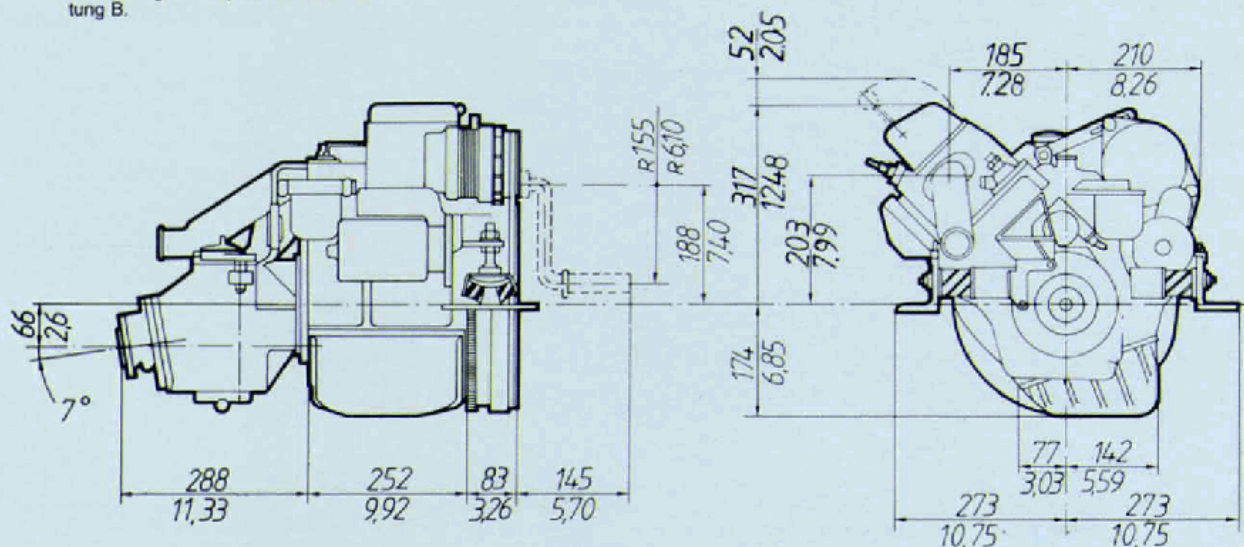


The diagrams show propeller shaft output for a run-in engine and reverse reduction gear as per DIN 6270 Leistung B.

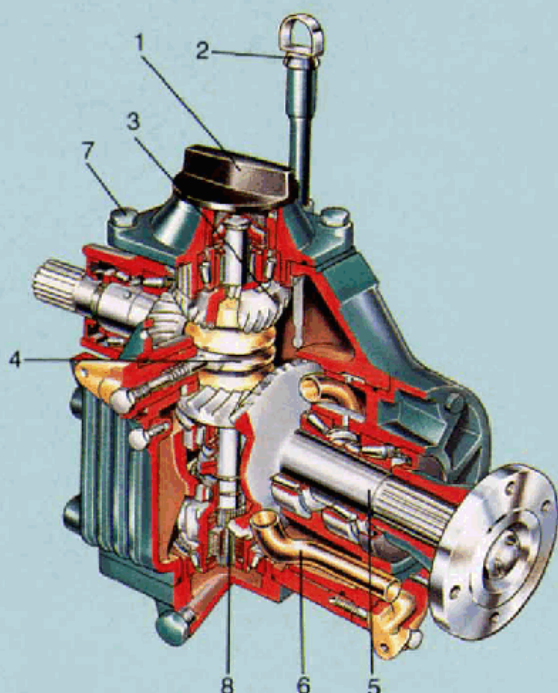
Data

Engine type 4-stroke diesel with direct injection
 Propeller shaft output*
 MD5C/MS2 7 kW (9.5 hp) at 3000 r/min
 No. of cylinders 1
 Cylinder inclination 45°
 Bore/stroke, mm (in) 84/80 (3.31/3.15)
 Swept displacement volume, dm³ (in³) 0.443 (27)
 Valve system Top
 Weight, engine with reverse gear MS2 approx. kg (lb) .. 116 (256)

* according to DIN 6270 Leistung B.



Reverse reduction gear MS2



1. Easy access oil filler
2. Oil dipstick
3. Spiral bevel gears for quiet, efficient operation
4. Volvo Penta's patented cone clutch gives smooth quiet engagement of forward and reverse.
Single lever control of both speed and forward/reverse
5. Output shaft with 7° downward angle. Horizontal installation of engine in less space
6. Coolant pipe for oil cooling
7. All joints have stainless steel screws in stainless steel thread inserts
8. In-built slip coupling which safeguards against over-loading (for running aground) thereby protecting the transmission

Accessories

FUEL SYSTEM

Electric fuel pump.
Water-trap and fine filter, with or without flexible hoses.
Water trap.
Fuel tank.
Cap with union for supply from fuel tank.
Copper fuel pipe kit complete with unions.

COOLING SYSTEM

Sea-water filter, complete with mountings.
Vacuum valve.

EXHAUST SYSTEM

Rubber exhaust hose.
Hull passthrough for exhaust pipe.
Water-cooled silencer, complete.

ELECTRICAL SYSTEM AND INSTRUMENTATION

Twin diode kit for charging of two or more batteries.
Extra instruments: Electric hour counter, fuel and water tank gauges, voltmeter and rudder indicator.
Master switch.
Cable harness extension.
Instrument panel for extra instruments.

BOAT ACCESSORIES

Electric bilge pump.
Genuine touch-up paint.
Oils.

CONTROLS AND STEERING SYSTEM

Volvo Penta single lever control for

speed and selection of forward/reverse, top or side-mounted.
Neutral-position switch for Volvo Penta control.
Push-pull control.
Control cables.
Steering gears.
Steering cables.
Ball joint and yoke for steering cables.

PROPELLER EQUIPMENT — MS2

Propeller shaft coupling.
Flexible coupling.
Clamping coupling.
Propeller shafts.
Propeller shafts sleeves.
Propellers.

**VOLVO
PENTA**

S-405 08 Göteborg, Sweden

VOLVO PENTA

MD 6A



Volvo Penta MD6A is a new compact marine diesel engine which is ideal from an installation and servicing point of view. The compact outer dimensions make the engine specially suitable as an auxiliary unit in medium size sailing crafts and for installation in small pleasure and work boats of the displacement type.

The two-cylinder four-stroke engine is fully balanced dynamically and this ensures smooth and vibration-free running. The MD 6 has direct injection, which makes for good cold starting and low fuel consumption — at full output it uses up only about 2 quarts of fuel per hour of operation.

The compact reverse gear type Mono Shift is designed on the well-known cone clutch in the Aquamatic drive and is particularly easy to manoeuvre. All operation of both the engine speed and reverse gear is done with a single control lever.

The engine is supplied with the following alternative equipment:

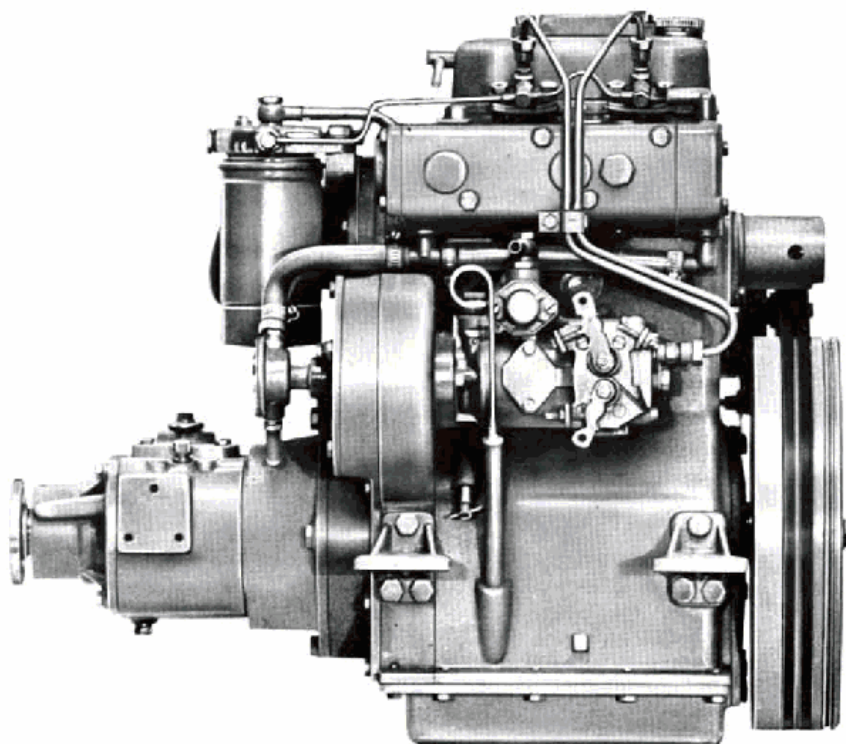
1. With starter-generator and reverse gear type MS, ratio 1:1.
2. With starter-generator and reduction-reverse gear type MS, ratio 1.91:1.
3. With starter-generator and reversing mechanism type Combi, ratio 1.42:1, complete with propeller equipment and 2-blade, adjustable propeller.

Other technical advantages which are characteristic for the Volvo Penta MD 6:

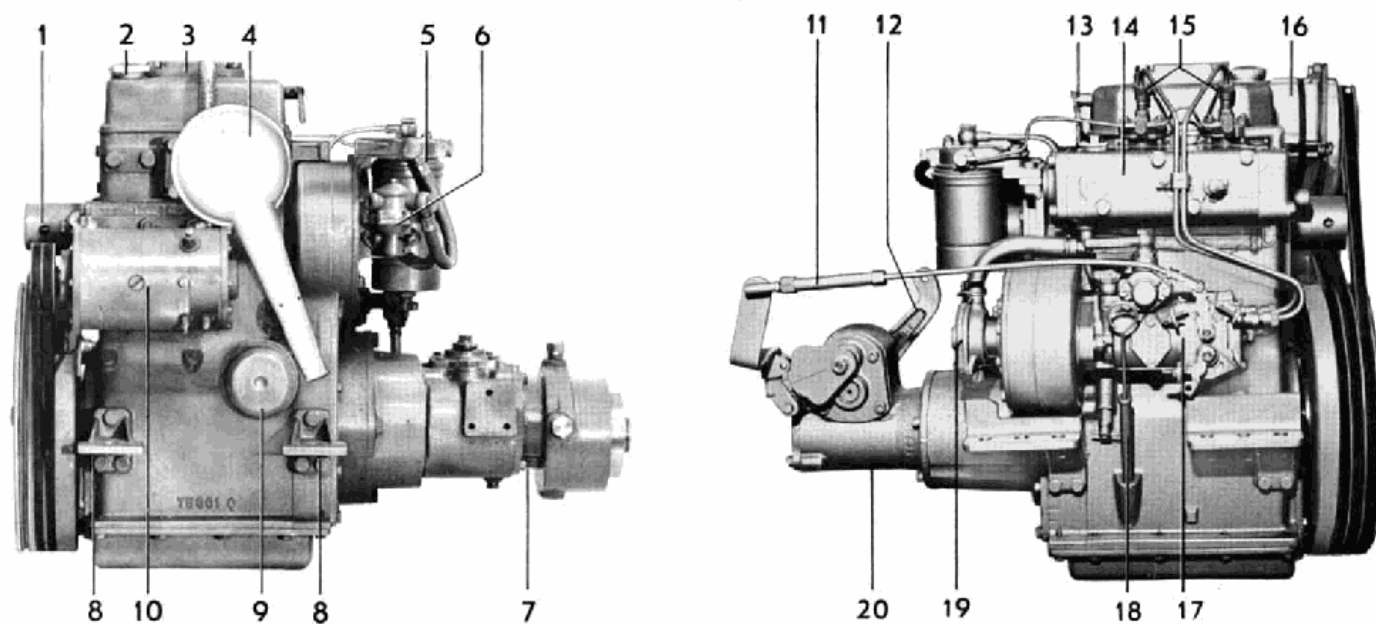
- Injection pump of rotor type with hydraulic governor for particularly accurate speed control.
- Feed pump with hand primer for fuel and with effective fuel filter.
- Automatic cold starting — makes starting easier in cold weather.
- Decompression device and recess for starting crank at front facilitates manual starting.
- Effective lubricating oil filter of the so-called "Spin-on" type — easy to change.
- Thermostat-controlled, sea-water cooling system means that the engine runs at its most favourable operating temperature. Easily accessible sea-water pump with impeller made of neoprene rubber.
- Effective intake silencer and particularly good balancing — gives us an engine with quiet and smooth operation.
- Special, marine type electrical system, complete instrument panel, starter-generator 135 W max. output and 1 h.p. starter motor output. A 12 V — 28 A (450 W) alternator can be fitted as extra equipment.

**Volvo Penta 2-cylinder, 4-stroke
marine diesel engine
with direct injection**

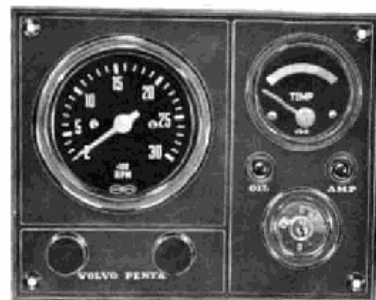
10 h.p.



VOLVO PENTA MARINE DIESEL ENGINE TYPE MD 6 A



- | | | |
|----------------------------------|---|---|
| 1. Recess for starting crank | 8. Engine brackets | 15. Injector |
| 2. Filler cap for oil | 9. Lubricating oil filter | 16. Alternator (extra equipment) |
| 3. Closed crankcase ventilation | 10. Starter-generator | 17. Fuel injection pump |
| 4. Intake silencer | 11. Trottle lever for reversing mechanism | 18. Oil dipstick |
| 5. Fuel filter | 12. Control lever for adjustable propeller device | 19. Sea-water pump |
| 6. Feed pump | 13. Decompression handle | 20. Combi reversing mechanism, ratio 1.42:1 |
| 7. Reverse gear MS, ratio 1.91:1 | 14. Water-cooled exhaust manifold | |



Instrument panel (included as standard)

DATA

Operation: 4-stroke diesel with direct injection

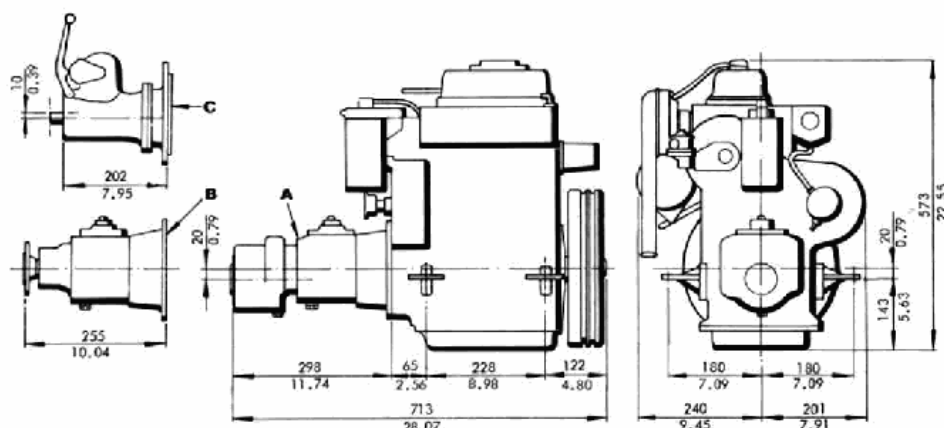
Continuous output, h.p. (DIN) ¹⁾ at r.p.m.	10/2400
Max. torque, kpm (lb.ft.)/r.p.m.	3.1(22.4)/1900
Number of cylinders	2
Bore, mm (in.)	70.0(2.75)
Stroke, mm (in.)	82.0(3.23)
Capacity, cm ³ (cu.in.)	631(38.5)
Valves	Overhead
Max. inclination while running	15°
Net weight, incl. MS reverse gear, approx. kg (lb.)	160(355)

¹⁾ Output acc. to DIN 6270 Dauerleistung B

DIMENSION DRAWINGS

Engine with:

- A. Reduction/reverse gear MS, ratio 1.91:1
- B. Reverse gear MS, ratio 1:1
- C. Reversing mechanism for adjustable pitch prop, ratio 1.42:1



We reserve the right to carry out modifications.



AB VOLVO PENTA

Box 392, S-401 26 Göteborg 1, Sweden

Telephone 031/23 54 60

Telegrams: Penta

Telex 207 55



MD 64 **MTU 12V 2000 L20 AM** **ENGINE DIAGRAM** 12V 2000 L20 AM 12V 2000 L20 AM

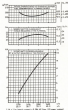
Order No. _____
 Date _____
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Item No. _____ Item No. 12 Item No. 12 Item No. 12



Additional Information

1. Engine speed (rpm) and load (kW) (hp) (kW) (hp)	
2. Fuel consumption (l/h) (kg/h) (l/h) (kg/h)	
3. Air intake (m³/h) (kg/h) (m³/h) (kg/h)	
4. Exhaust gas temperature (°C) (°C)	5. Exhaust gas pressure (bar) (bar)
6. Exhaust gas flow (m³/h) (m³/h)	7. Exhaust gas velocity (m/s) (m/s)
8. Exhaust gas density (kg/m³) (kg/m³)	9. Exhaust gas composition (vol %) (vol %)
10. Exhaust gas composition (wt %) (wt %)	11. Exhaust gas composition (mole %) (mole %)
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The diagram shows the engine's performance characteristics. The torque curve shows the engine's ability to produce torque at different speeds. The power curve shows the engine's ability to produce power at different speeds. The fuel consumption curve shows the engine's fuel consumption at different speeds.

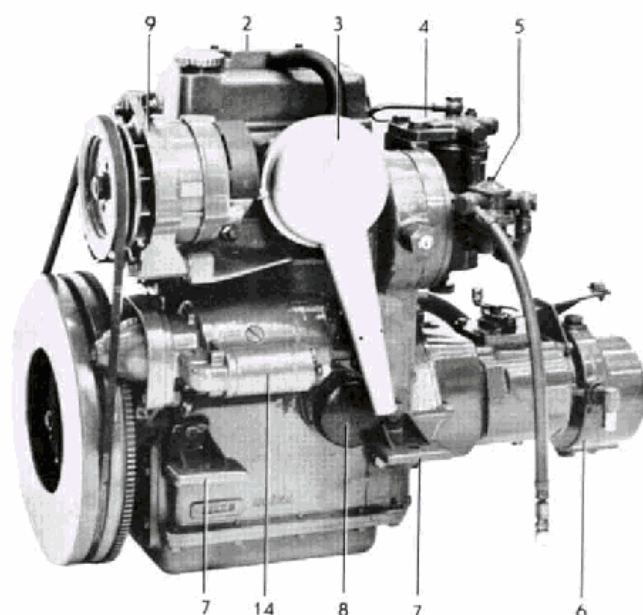
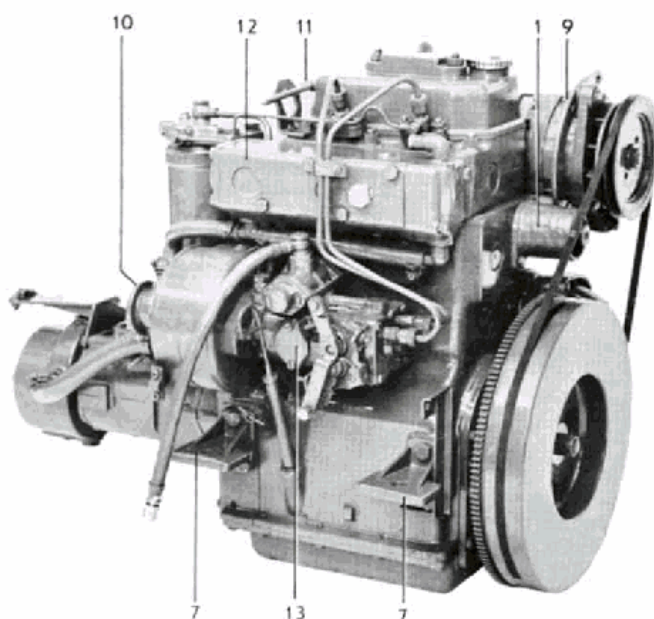
The diagram shows the engine's performance characteristics. The torque curve shows the engine's ability to produce torque at different speeds. The power curve shows the engine's ability to produce power at different speeds. The fuel consumption curve shows the engine's fuel consumption at different speeds.



MD 6B



2-cylinder, 4-stroke marine diesel engine with direct injection
Propeller shaft output 7.4 kW (10 hp)



STANDARD EQUIPMENT

ENGINE BODY — Cylinder block and head made of cast iron. Pistons made of light-alloy with 2 compression rings and one oil scraper ring. Crankshaft journalled in 3 bearings.

Decompression handle (11)

Recess for starting crank handle (1)

Tool kit with starting crank handle is supplied with engine.

FUEL SYSTEM — Distributor-type injection pump with hydraulic governor for accurate speed regulation (13)

Feed pump with hand primer (5) and flexible hose with fuel pipe connection for suction and return lines

Effective fuel filter (4)

Automatic cold-starting device

COOLING SYSTEM — Thermostat-controlled sea-water cooling. Sea-water pump with neoprene rubber impeller (10). The reverse gear reduction gear is water-cooled.

LUBRICATING SYSTEM — Pressure-lubrication system with lubricating oil filter of the spin-on type (8). Sealed crankcase ventilation (2).

INTAKE SYSTEM — Intake silencers (3) with filter.

EXHAUST SYSTEM — Sea-water cooled exhaust manifold of cast iron with R 1 1/4" connection (12).

ELECTRICAL SYSTEM — Corrosionproof 12 V electrical system, with complete instrument panel.

Alternator 35A, 420 W (9). Starter motor output 1.5 kW (2 h.p.) (14).

The instrument panel is provided with a key switch, warning lamps for battery charging, cooling water temperature and oil pressure, and 2 extra switches.

Automatic alarm with buzzer for low oil pressure and high cooling water temperature. Also wired for indicating the respective warning lamps.

Recess for extra instrument (diam. 52 mm) covered with dummy plug.

Cable harness, 4 m (13 ft.) in length, with connector.

Main fusing, with built in spare fuse, is mounted on engine.



ENGINE MOUNTING — The engine is supplied with engine brackets for fixed suspension (7).

POWER TRANSMISSION — MS-B (Mono-Shift) type reverse gear. Single control lever for both speed and operating the reverse gear should be used. Bracket for control cables included.

Propeller shaft flange for 25 mm propeller shaft.

Reverse gear type MS-B red. ratio 1.91:1, L-H prop. (6).

EXTRA EQUIPMENT

FUEL SYSTEM

Electrically operated fuel pump
Water-separating filter with or without flexible hoses
Water separator
Fuel tank
Cap with connections for fuel tank
Fuel line with copper piping and installation parts.

COOLING SYSTEM

Sea-water filter complete with attachment
Cooling water intake complete with cock and hose
Vacuum valve

EXHAUST SYSTEM

Water-cooled exhaust elbow
Hull through fitting
Exhaust rubber hose

Water-cooled silencer, complete
Exhaust boot
Silencer
Compensator

ELECTRICAL SYSTEM AND INSTRUMENTS

Charging distributor for charging 2-battery system
Extra instruments: Hourmeter, fuel- and water gauge, voltmeter, rudder indicator.
Master switch
Cable harness extension
Instrument panel for extra instrument

ENGINE MOUNTING

Flexible engine mounting

BOAT ACCESSORIES

Electrically operated bilge pump
Original paint
Oils

CONTROLS AND CONTROL SYSTEM

VP single-control lever for both speed and forward-reverse operation, top-mounted or side-mounted.
Neutral-position switch — automatic safety interlock for VP controls
Push-pull controls
Control cables
Steering gears
Steering lock
Steering wheels
Steering cables
Ball joint and fork kit for steering cables

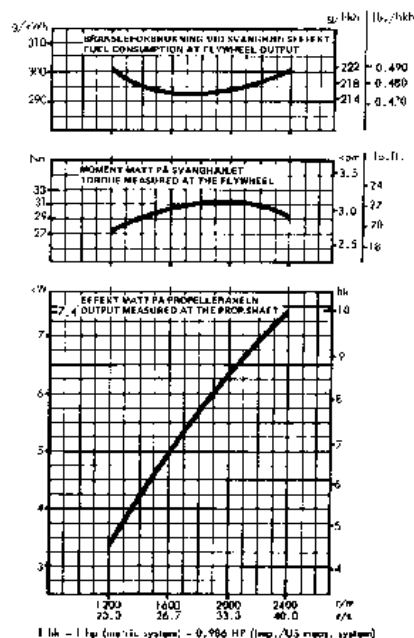
PROPELLER EQUIPMENT

Flexible coupling
Clamp coupling
Propeller shafts
Propeller shaft sleeves
Propellers

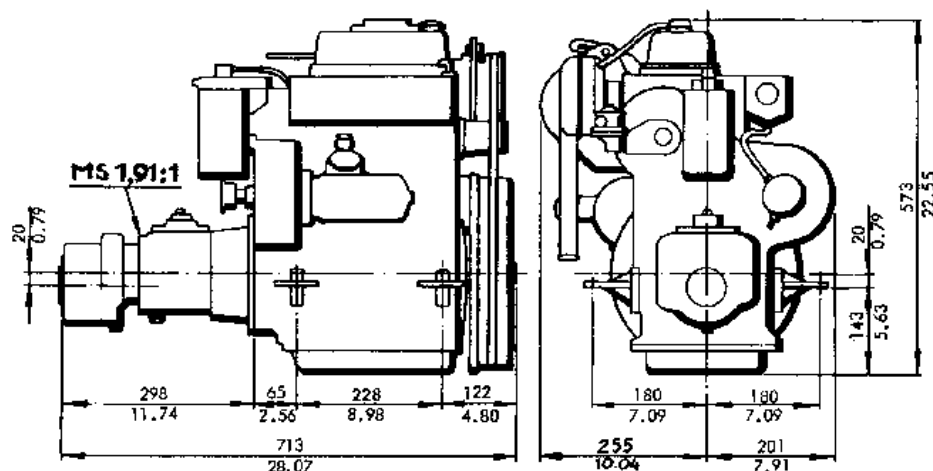
DATA

Type of operation 4-stroke diesel engine with direct injection
Designation MD6B
Propeller shaft output¹⁾ 7.4 kW at 40 r/s (10 hp at 2400 rpm)
Number of cylinders 2
Capacity, dm³ (in³) 0.631 (38.5)
Bore, mm (in) 70.0 (2.75)
Stroke, mm (in) 82.0 (3.23)
Valves overhead
Weight, engine with MS-B rev. gear 1.91:1, kg (lb), approx. . . . 175 (385)

1) The diagram indicates the propeller shaft output for a run-in engine with mechanical reverse gear according to DIN 6270 Leistung B für Dauerbetrieb. The engine flywheel output is approx. 4% higher.



DIMENSION DRAWING



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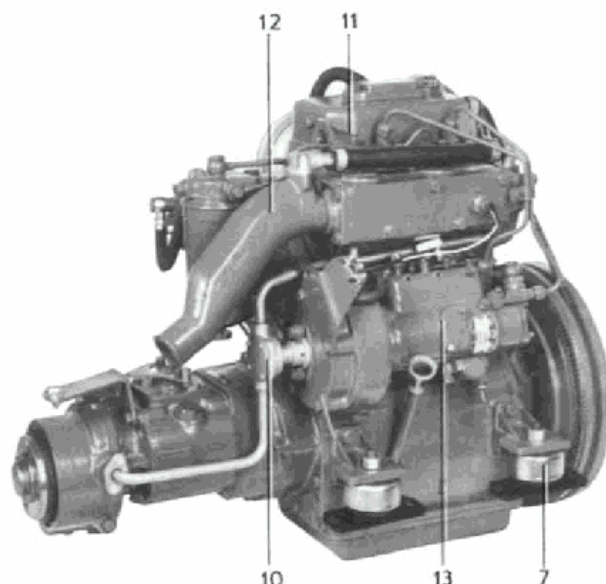
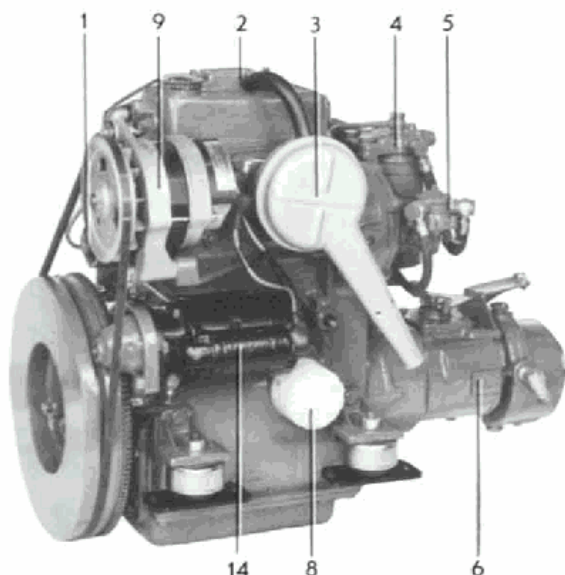
We reserve the right to carry out modifications



MD 7A



2-cylinder, 4-stroke marine diesel engine with direct injection
Propeller shaft output 13 hp (9.6 kW)



STANDARD EQUIPMENT

ENGINE BODY – Cylinder block and head made of cast iron. Pistons made of light-alloy with 2 compression rings and one oil scraper ring. Crankshaft journalled in 3 bearings.

Decompression handle (11)

Recess for starting crank handle (1)

Tool kit with starting crank handle is supplied with engine.

FUEL SYSTEM – Distributor-type injection pump with centrifugal governor for accurate speed regulation (13)

Feed pump with hand primer (5) and flexible hose (approved by DNV, LR, GL and BV) with fuel pipe connection for suction and return lines

Effective fuel filter (4)

Manual cold-starting device

COOLING SYSTEM – Thermostat-controlled sea-water cooling. Sea-water pump with neoprene rubber impeller (10). The reverse gear reduction gear is water-cooled.

LUBRICATING SYSTEM – Pressure-lubrication system with lubricating oil filter of the spin-on type (8). Sealed crankcase ventilation (2).

INTAKE SYSTEM – Intake silencers (3) with filter.

EXHAUST SYSTEM – Sea-water cooled exhaust manifold and exhaust manifold elbow of cast iron (12).

ELECTRICAL SYSTEM – Corrosionproof 12 V electrical system, with complete instrument panel.

Alternator 35A, 420 W (9), Starter motor output 0.8 kW (1.1 h.p.) (14).

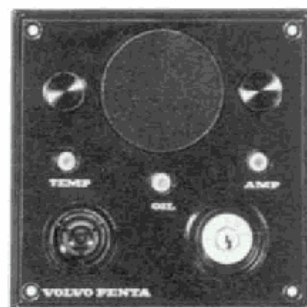
The instrument panel is provided with a key switch, warnings lamps for battery charging, cooling water temperature and oil pressure.

Automatic alarm with buzzer for low oil pressure and high cooling water temperature. Also wired for indicating the respective warning lamps.

Recess for extra instrument (diam. 52 mm) covered with dummy plug.

Cable harness, 4 m (13 ft.) in length, with connector.

Main fusing, with built in spare fuse, delivered with engine.



ENGINE MOUNTING – The engine is supplied with flexible suspension (7).

POWER TRANSMISSION – Reverse gear type MS-B (mono-Shift) red. ratio 1.91:1, L-H prop. (6). Delivered without propeller shaft flange. Single control lever for both speed and operating the reverse gear should be used. Bracket for control cables included.

EXTRA EQUIPMENT

FUEL SYSTEM

Electrically operated fuel pump
Water-separating filter with or without flexible hoses
Water separator
Fuel tank
Cap with connection for fuel tank
Fuel line with copper piping and installation parts.

COOLING SYSTEM

Sea-water filter complete with attachment
Cooling water intake complete with cock and hose
Vacuum valve

EXHAUST SYSTEM

Hull through fitting
Exhaust rubber hose

Water-cooled silencer
Exhaust boot
Silencer
Compensator

ELECTRICAL SYSTEM AND INSTRUMENTS

Charging distributor for charging 2-battery system
Extra instruments: Hourmeter, fuel- and water gauge, voltmeter, rudder indicator.
Master switch
Cable harness extension
Instrument panel for extra instrument

BOAT ACCESSORIES

Electrically operated bilge pump
Original paint
Oils

CONTROLS AND CONTROL SYSTEM

VP single-control level for both speed and forward-reverse operation, top-mounted or side-mounted.
Neutral-position switch — automatic safety interlock for VP controls
Push-pull controls
Control cables
Steering gears
Steering wheels
Steering cables
Ball joint and fork kit for steering cables

PROPELLER EQUIPMENT

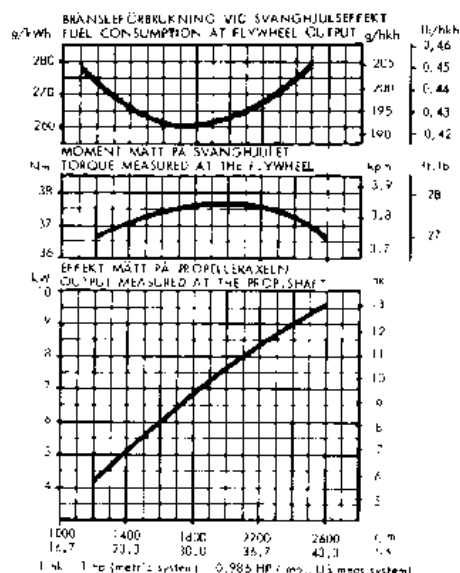
Propeller shaft coupling
Flexible coupling
Propeller shaft coupling, clamping type
Propeller shafts
Propeller shaft sleeves
Propellers

DATA

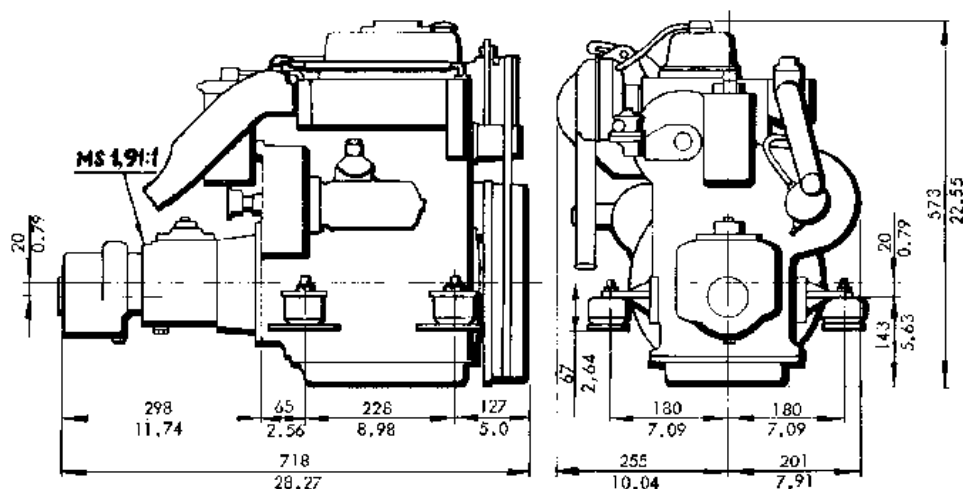
Type of operation 4-stroke diesel engine with direct injection
Designation MD7A
Propeller shaft output¹⁾ 13 hp at 2600 rpm (9.6 kW at 43.3 r/s)
Number of cylinders 2
Capacity 0.744 dm³ (45.4 in³)
Bore 76.0 mm (2.99 in)
Stroke 82.0 mm (3.23 in)
Valves overhead
Weight, engine with MS-B rev. gear 1.91:1, approx 175 kg (385 lb)

1) The diagram indicates the propeller shaft output for a run-in engine with mechanical reverse gear according to DIN 6270 Leistung B für Dauerbetrieb. The engine flywheel output is approx. 4% higher.

1 hk = 1 hp (metric system) = 0.986 HP (Imp./US meas. system)



DIMENSION DRAWING



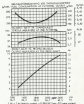
Rev. 1, 2, 3, 4, 5, 16, 18, 20

Motor
 Type: MD 7A

Rev. Aug 88

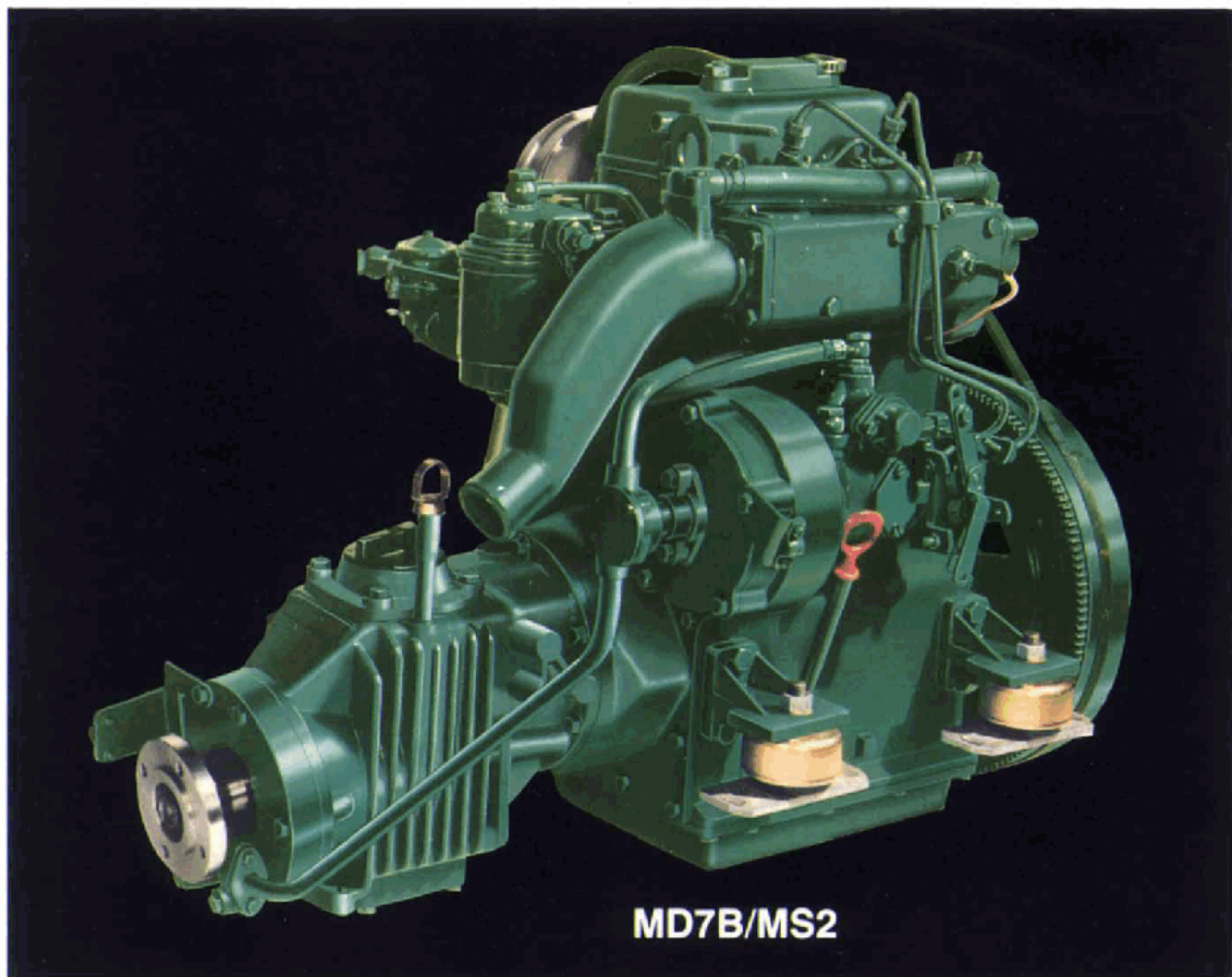
General Data **Model No.**

1. Engine displacement (liters) 2. Maximum horsepower 3. Fuel system (carburetor or injection) 4. Fuel pump (fuel pump or fuel pump)	
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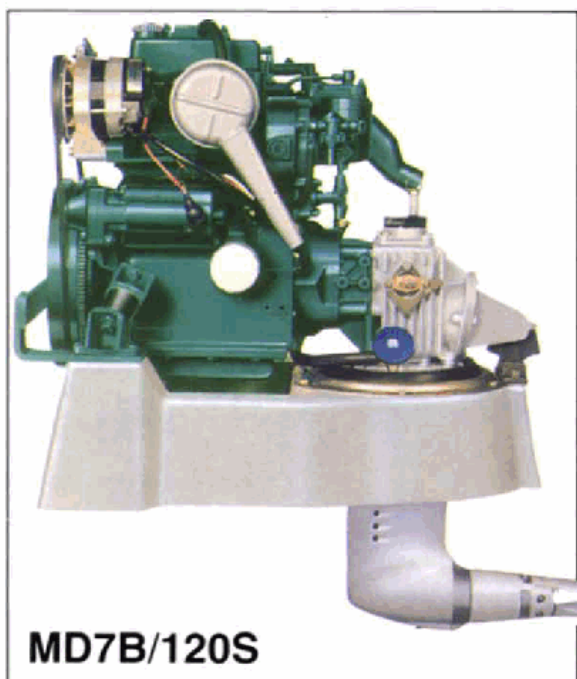


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**VOLVO
PENTA****MD7B****MD7B/MS2**

2-cylinder marine diesel engine with direct injection
Propeller shaft output, leisure craft — 12.5 kW (17 hp)

**MD7B/120S**

The new Volvo Penta MD7B with its higher speed (3.000 r/min) and greater output (17 hp) together with the latest and unique Volvo Penta transmission gives significant improvements in propeller thrust.

In practice this new combination means better manoeuvrability, better boat acceleration and, faster stopping plus reduced speed loss in heavy seas and high headwinds.

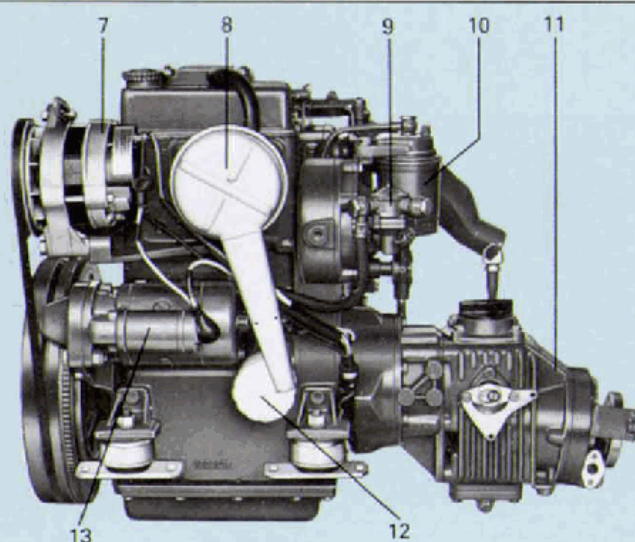
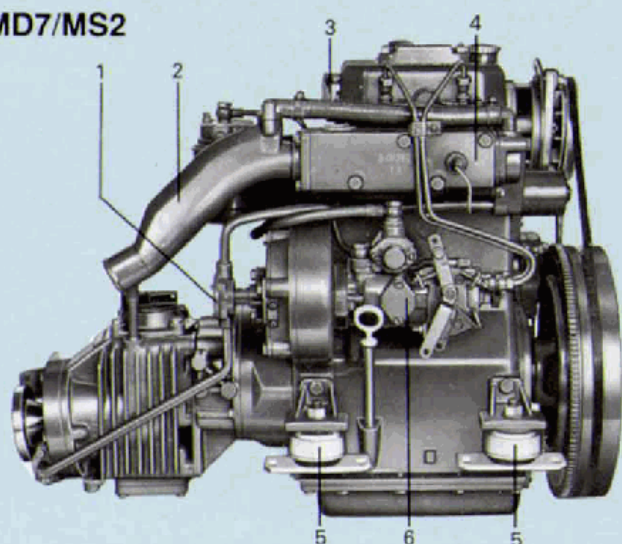
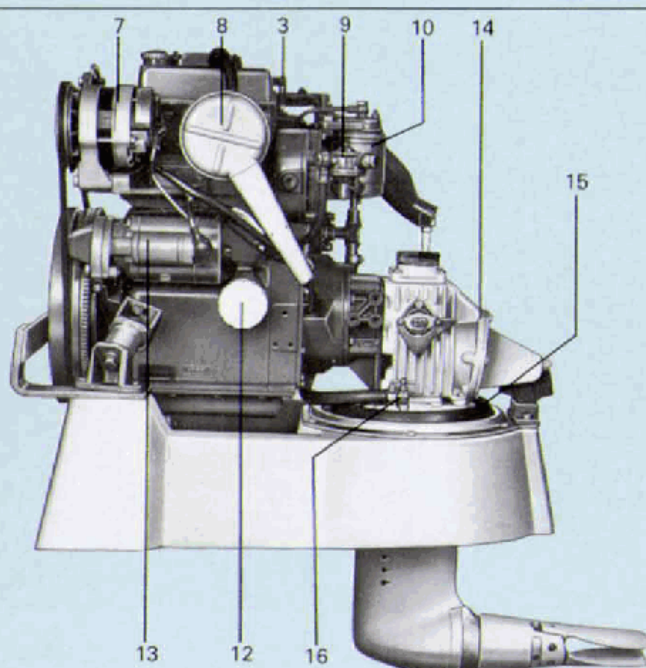
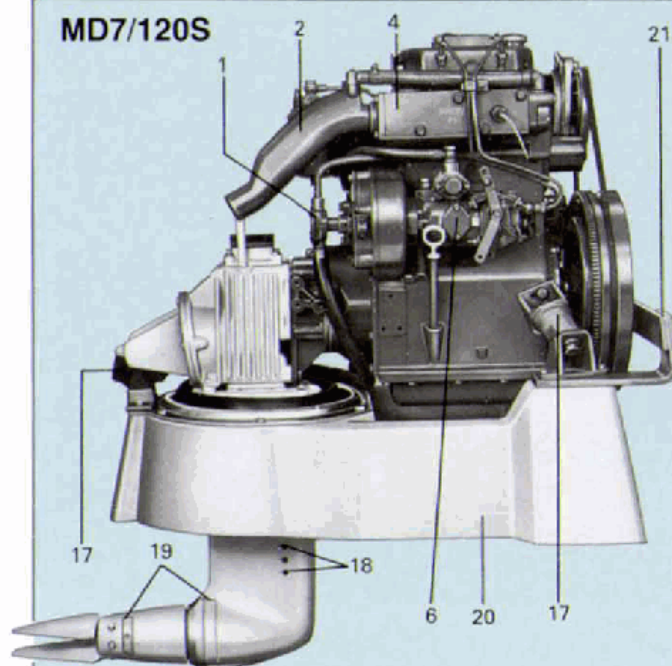
This robust purpose built marine engine with features like extra wall thickness in the cooling passages makes the MD7B very resistant to corrosion and wear.

The very accurate fuel metering even at full throttle means extremely clean exhaust gasses and a miserly fuel consumption.

The new Volvo Penta MS2 reverse reduction gear has a slip coupling built in and easy shift cone clutch, features also found in the model 120 S-drive.

An experienced and strategically placed network of authorised Volvo Penta workshops ensures you of the best service and parts backup.

3000
 SERIEN

MD7/MS2**MD7/120S**

Standard equipment

ENGINE BODY

Engine block and cylinder head of cast iron. 3-bearing crankshaft dimensioned for long service life.

FUEL SYSTEM

Distributor – type injection pump with centrifugal governor for accurate speed regulation (6). Automatic cold starting device. Stop lever with bracket for push-pull mechanism. Exchangeable fuel filter (10). Feed pump with hand primer (9). Flexible fuel hoses (approved by DNV, LR, GL and BV) with copper pipe unions for the suction and return lines.

COOLING SYSTEM

Thermostatically controlled sea-water cooling. Sea-water pump (1) with easily replaceable pump impeller.

LUBRICATING SYSTEM

Pressurized lubricating system with exchangeable oil filter (12). Closed-circuit crankcase ventilation.

INTAKE SYSTEM

Intake silencer (8) with cleanable air filter.

EXHAUST SYSTEM

Sea-water cooled exhaust manifold of cast iron (4). Exhaust manifold elbow (2) with coolant outlet for connection to rubber exhaust hose.

REVERSE REDUCTION GEAR

MS2 (11), ratio options 2.4:1 or 3.0:1. Sea-water cooled. Output shaft downward angle 7°. Supplied without propeller shaft flange.

DRIVE

Type 120S (14) ratio 2.2:1. Complete with rubber diaphragm, sealing ring and mounting collar (15) which fits to bed. Coolant inlet (18) in leg. Cock (16) for coolant. Sacrificial anode ring of zinc (19) to counteract corrosion.

ENGINE MOUNTING

Flexible mountings for optimal quiet and vibration-free running.

MD7B/MS2 – Engine/reverse reduction gear has engine mounting brackets (5) complete with rubber blocks.

MD7B/120S – S-drive for fitting directly to the engine. The engine/drive unit is insulated from the hull by a 3-point flexible mounting system (17) and a rubber diaphragm (15).

Bed of glassfibre reinforced plastics (20). Engine movement limiter (21) prevents excessive movement should the drive touch bottom. (Drive 120S).

ELECTRICAL SYSTEM

12V corrosion-proof electrical system complete with instrument panel. Alternator (7) 50 A, 600 W, approved for marine use. Voltage regulator with fast-charge mode. Alternator prepared for retrofitting of twin diode kit which gives automatic distribution of charge current to two or more batteries.

STARTING SYSTEM

Electric starter (13), output 0.8 kW (1.1 hp). Manual starting crank for extra security with decompression knob (3) for easier cranking.

INSTRUMENT PANEL

Complete with ignition key starter switch, warning lamps for charging, cooling water temperature and oil pressure. Automatic alarm with buzzer for low oil pressure and high cooling water temperature. Recess for extra instrument (diam. 52 mm) with blind cover. Master fuse with built in spare fuses.



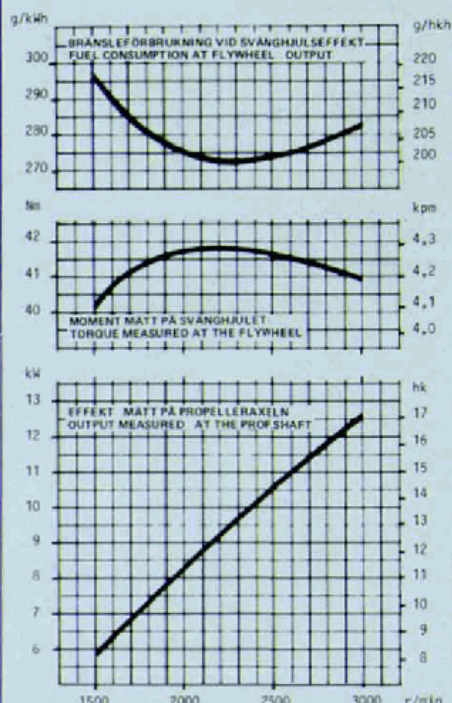
Cable harness, length 4 m, with connector.

TOOL KIT

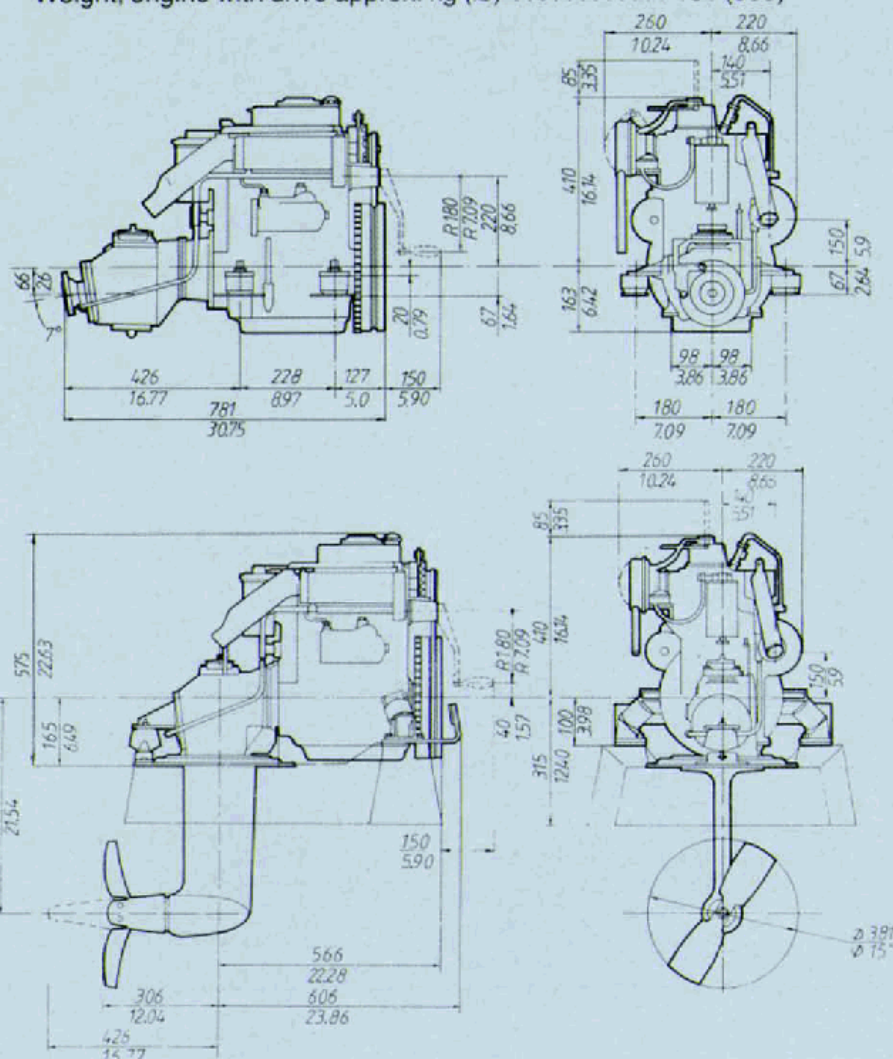
Sufficient for less extensive service work.

Data

Engine type 4-stroke diesel with direct injection
 Propeller shaft output*
 MD7B/MS2, MD7B/120S 12.5 kW (17 hp at 3000 r/min)
 No. of cylinders 2
 Bore/stroke, mm (in) 76/82 (2.99/3.23)
 Swept displacement volume, dm³ (in³) 0.744 (45.4)
 Valve system Top
 Reverse reduction gear type MS2, ratio 2.4:1 or 3.0:1
 Weight, engine with
 reverse/reduction gear approx. kg (lb) 166 (366)
 Drive type 120S ratio 2.2:1
 Weight, engine with drive approx. kg (lb) 181 (399)

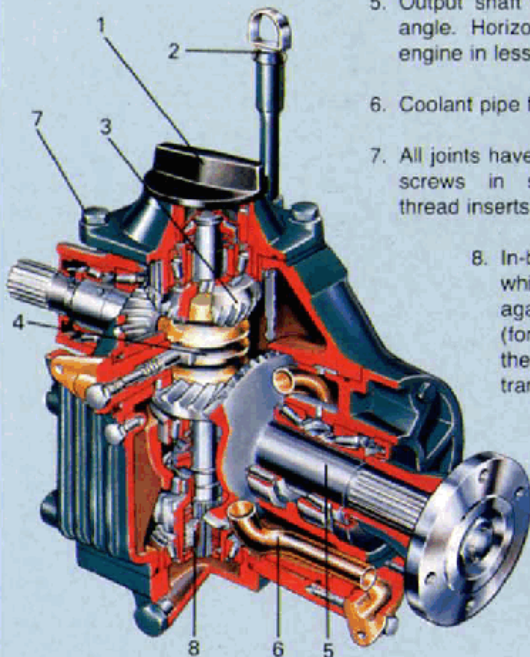


* The diagrams show propeller shaft output for a run-in engine and reverse reduction gear/drive as per DIN 6270 Leistung B für Dauerbetrieb.



Reverse reduction gear MS2

1. Easy access oil filler
2. Oil dipstick
3. Spiral bevel gears for quiet, efficient operation



4. Volvo Penta's patented cone clutch gives smooth quiet engagement of forward and reverse. Single lever control of both speed and forward/reverse.

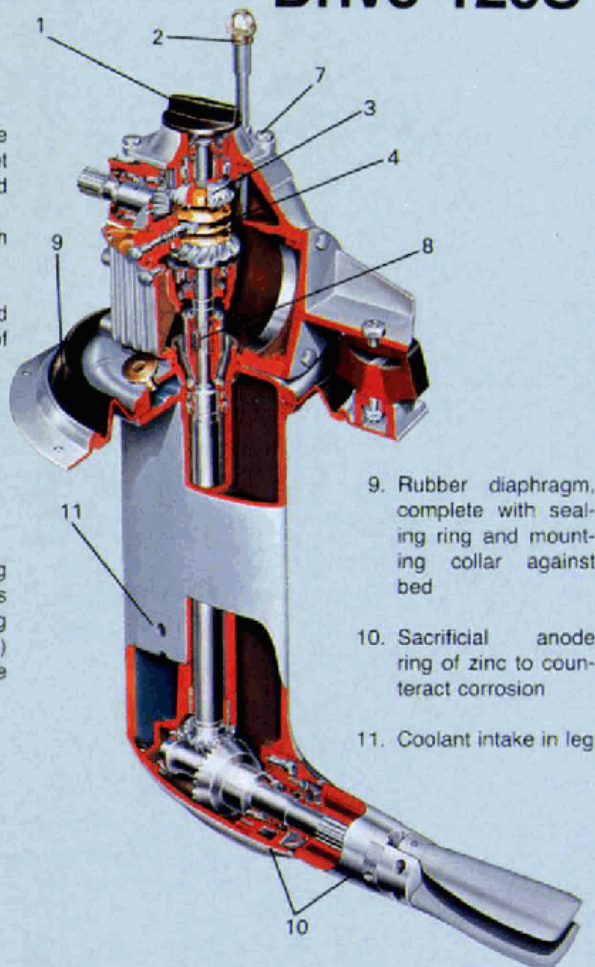
5. Output shaft with 7° downward angle. Horizontal installation of engine in less space.

6. Coolant pipe for oil cooling

7. All joints have stainless steel screws in stainless steel thread inserts

8. In-built slip coupling which safeguards against over-loading (for running aground) thereby protecting the transmission

Drive 120S



9. Rubber diaphragm, complete with sealing ring and mounting collar against bed

10. Sacrificial anode ring of zinc to counteract corrosion

11. Coolant intake in leg

Accessories

FUEL SYSTEM

Electric fuel pump.
Water-trap and fine filter, with or without flexible hoses.
Water trap.
Fuel tank.
Cap with union for supply from fuel tank.
Copper fuel pipe kit complete with unions.

COOLING SYSTEM

Sea-water filter, complete with mountings.
Vacuum valve.

EXHAUST SYSTEM

Rubber exhaust hose.
Hull passthrough for exhaust pipe.
Water-cooled silencer, complete.

ELECTRICAL SYSTEM AND INSTRUMENTATION

Twin diode kit for charging of two or more batteries.
Extra instruments: Electric hour counter, fuel and water tank gauges, voltmeter and rudder indicator.
Master switch.
Cable harness extension.
Instrument panel for extra instruments.

BOAT ACCESSORIES

Electric bilge pump.
Genuine touch-up paint.
Oils.

CONTROLS AND STEERING SYSTEM

Volvo Penta single lever control for

speed and selection of forward/reverse, top or side-mounted.
Neutral-position switch for Volvo Penta control.
Push-pull control.
Control cables.
Steering gears.
Steering cables.
Ball joint and yoke for steering cables.

PROPELLER EQUIPMENT — MS2

Propeller shaft coupling.
Flexible coupling.
Clamping coupling.
Propeller shafts.
Propeller shafts sleeves.
Propellers.

PROPELLERS — DRIVE 120S

2-blade, folding.
2-blade I.O.R. and 3-blade.

**VOLVO
PENTA**

S-405 08 Göteborg, Sweden