



MD 19

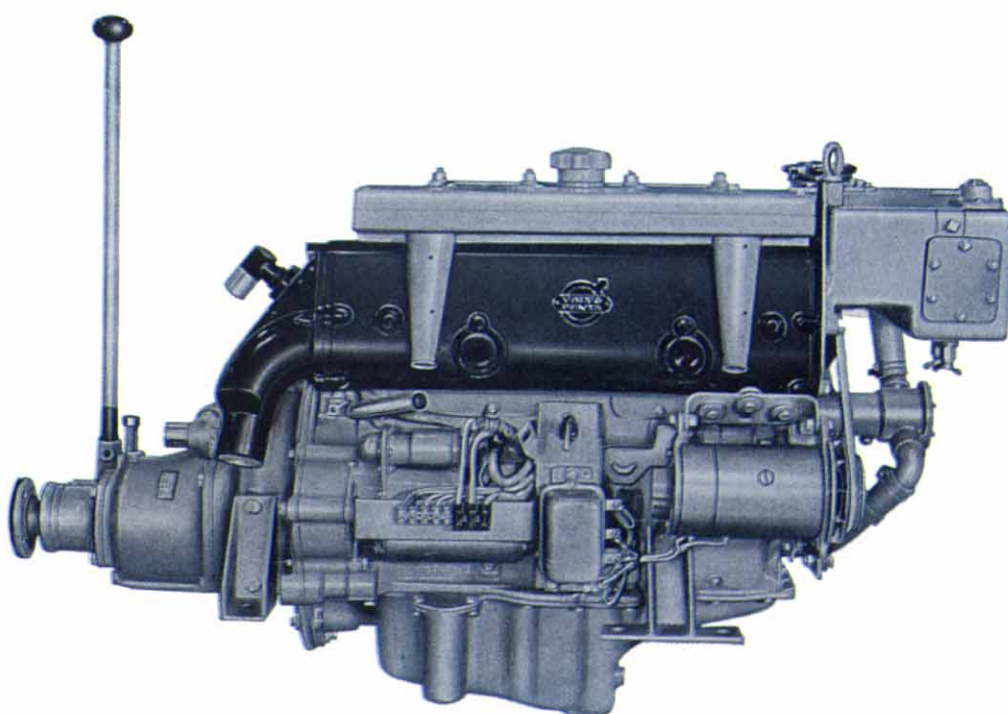
VOLVO PENTA MARINE DIESEL ENGINE • 68 H.P.

Volvo Penta's new marine Diesel engine, type MD 19, is one of the most modern Diesel engines on the market today. It is a marine conversion of the well-known Indenor/Peugeot 4-cyl. diesel engine.

Outstanding and valuable qualities of the MD 19 are its low consumption of fuel and lubricating oil, its small measurements and light weight in relation to the high output—68 h.p. (SAE) at 4500 r.p.m.

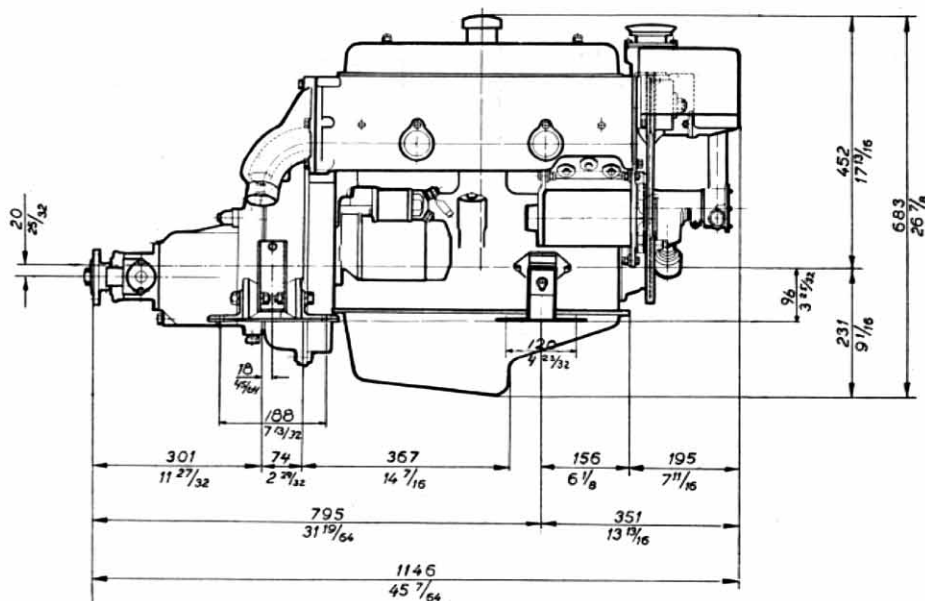
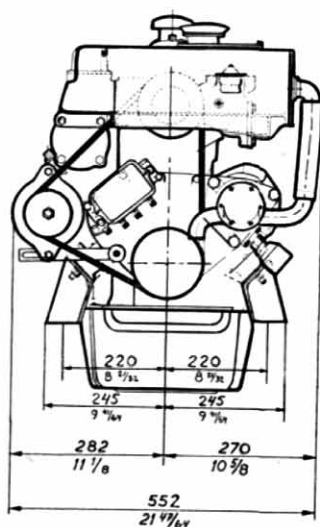
MD 19 is fitted with: five-bearing crankshaft, a guarantee of long operational life and vibration-free running. Thermostatically controlled fresh water cooling. Fully water-cooled exhaust manifold outlets and exhaust manifold bend. Fuel injection pump with distributing type single plunger injection pump and fitted with a hydraulic governor and built-in feed pump. Combustion chambers designed after the Ricardo turbulence chamber system with glow plug. Oil cooler which can be easily cleaned. Fullflow "Spin-On" type lubricating oil filter. 12 V electrical equipment with 240 W (max. 360 W) dynamo and 2.7 h.p. starter motor. Instrument panel with electrical revolution counter, electrical temperature gauge, control lamps for oil pressure and charging, and stop control. All electrical wires are mounted in a plug-in cable between the engine and the instrument panel. This simplifies installation considerably.

MD 19 is fitted with Volvo Penta's mechanical reduction reverse gear, reduction ratio 1.9:1, or a hydraulically operated reverse gear, type Velvet Drive (Borg & Warner), with ratio 1.9:1 (right-hand rotation), 2.1:1 and 2.9:1 (left-hand rotation).

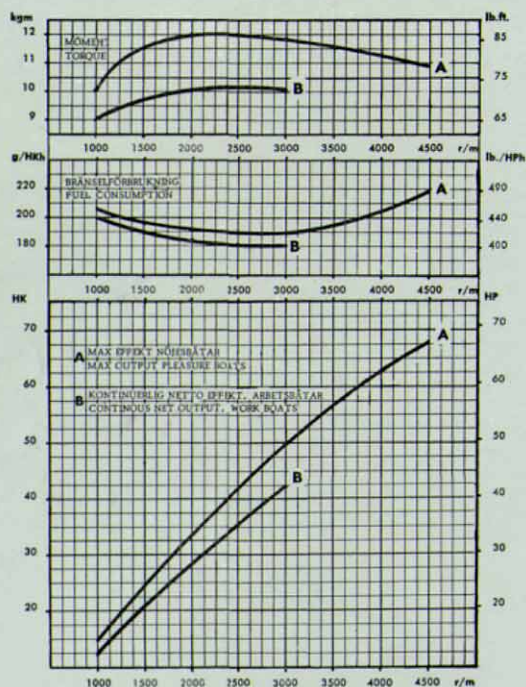


VOLVO PENTA MARINE DIESEL ENGINE, TYPE MD 19

Dimension drawings



"A" "A" FLÄNSRÖRELSE VID INKOPPLING
AV FRAM "F" RESP BACK "B"
"A" NORMAL = 3 MAXIMALT = 6
"B" "F" FLANGE MOVEMENT WHEN AHEAD "F" AND ASTERN "B"
RESPECTIVELY ARE ENGAGED
"A" NORMAL = 3 MM MAXIMUM = 6 MM 1/8 RESP 15/64



DATA

Max. output (SAE), pleasure boats . . . 68 h.p. at 4500 r.p.m.¹⁾

Continuous net output (SMMT),
work boats 42 h.p. at 3000 r.p.m.

Type of engine 4 stroke

No. of cylinders 4

Displacement, total litres (cu.in.) 1.95 (119)

Bore, mm (in.) 88 (3.46)

Stroke, mm (in.) 80 (3.15)

Valve arrangement overhead

Weight, approx. kg (lb.) 260 (572)

¹⁾ Max. permissible engine speed during 1 hour — 4500 r.p.m.

" " " " " " more than 1 hour — 4200 r.p.m.

AB VOLVO PENTA

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Cables: Penta

Telex 20755

VOLVO PENTA

MD 21A



The MD 21A is one of the most modern Diesel engines on the market and provides an outstandingly advantageous combination of low weight, high output and good running economy.

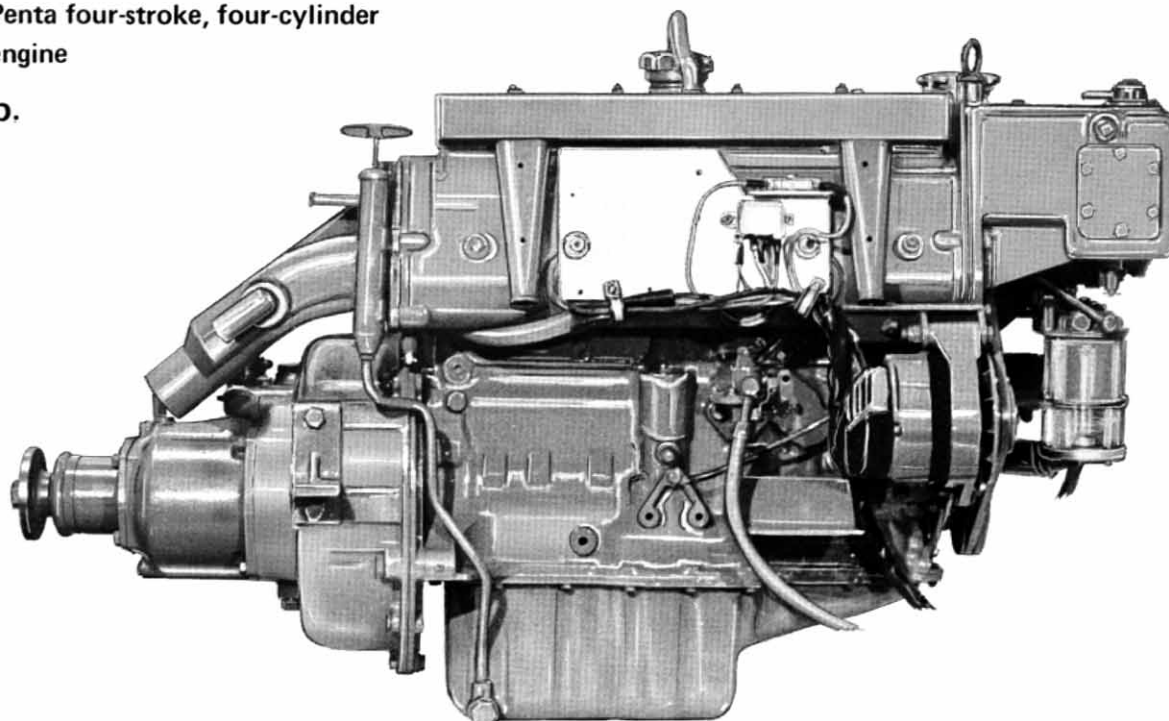
Because of its high output — 75 h.p. SAE at 4500 r.p.m. — in relation to its low weight, the MD 21A is equally suitable for light-weight planing boats as it is for boats of the displacement type. Its low consumption of Diesel fuel means that the MD 21A is a particularly economical engine, especially for use in boats which are in constant use during the season or work boats. In relation to its output, the MD 21A is one of the absolutely lightest and most compact marine Diesel units on the market. Its compact design means that the MD 21A is suitable even in confined space.

Other advantages provided by this engine include:

- Five-bearing crankshaft, guaranteeing a long lifetime and vibration-free running.
- Thermostat-controlled fresh-water cooling. Fully water-cooled exhaust manifold ports and water-cooled exhaust elbow.
- Fuel injection pump of the distributor type fitted with a mechanical governor and a separate feed pump. Ricardo swirl-type combustion chambers and glow plugs.
- Easily cleaned oil cooler. Full-flow lubricating oil filter of spin-on type.
- 12 V electrical equipment with 420 W alternator and a 1.8. h.p. starter motor.
- All the electric cables are collected in one single harness between the engine and the instrument panel — this facilitates installation considerably.
- The MD 21A is supplied with the patented Volvo Penta reduction/reverse gear, ratio 1.91:1 or a hydraulically operated reverse/reduction gear of the Borg Warner Velvet Drive type with ratio 2:1 (right-hand rotation) and 2:1 or 2.9:1 (left-hand rotation).
- Instrument panel with electric revolution counter, electric temperature gauge, warning lamps for charging and oil pressure, mechanical stop control (separate delivered), combined glow plug switch and starting key as well as a control resistor.

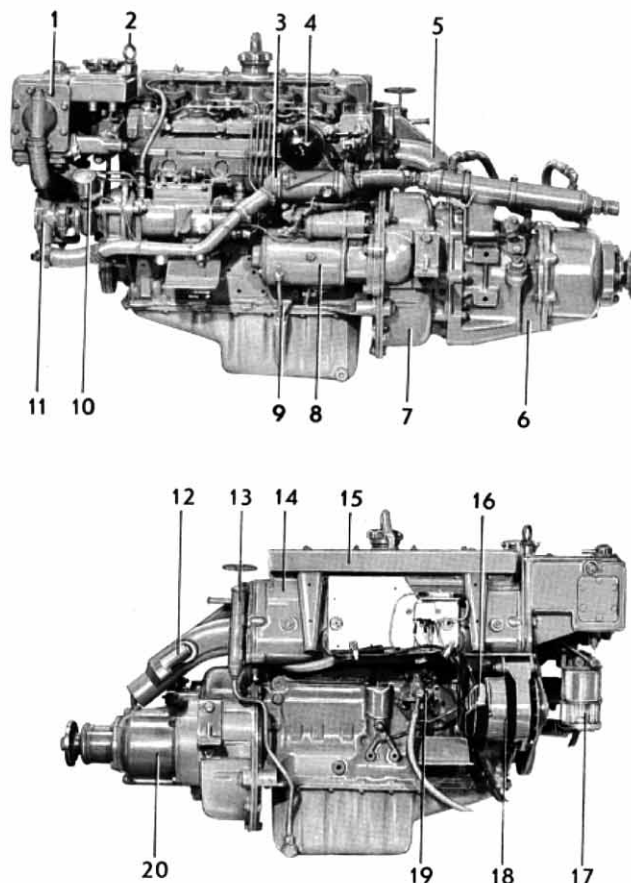
**Volvo Penta four-stroke, four-cylinder
Diesel engine**

75 h.p.

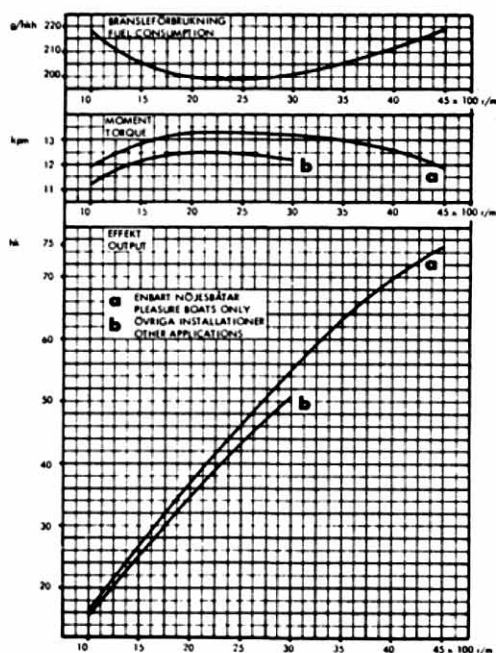


VOLVO PENTA MARINE DIESEL ENGINE TYPE MD 21 A

1. Heat exchanger
2. Lifting eyelet
3. Oil cooler
4. Full-flow spin-on oil filter
5. Exhaust elbow
6. Hydraulically operated reverse/reduction gear type "Velvet Drive"
7. Completely enclosed flywheel
8. Starter motor
9. Oil dipstick
10. Revolution counter sender
11. Sea-water pump
12. Outlet for surplus water
13. Oil scavenging pump
14. Exhaust manifold with fully cooled ports combined with intake manifold
15. Intake silencer
16. Charging regulator
17. Fuel filter with water trap
18. Alternator 12 V, 35 A
19. Feed pump
20. Reduction/reverse gear, type RB ratio 1.91:1



ENGINE DIAGRAM



We reserve the right to carry out modifications

DATA

Type of operation. Four-stroke Diesel engine with turbulence chambers

Type designation MD 21 A

Max. output, pleasure boats (SAE)/r.p.m.x) 75 h.p./4500

Max. output, other installations (SMMT)/r.p.m. 51 h.p./3000x)

Number of cylinders 4 in line

Capacity, c.c. (cu.in.) 2112 (129)

Bore/stroke, mm(in) 90/83 (3.54/3.27)

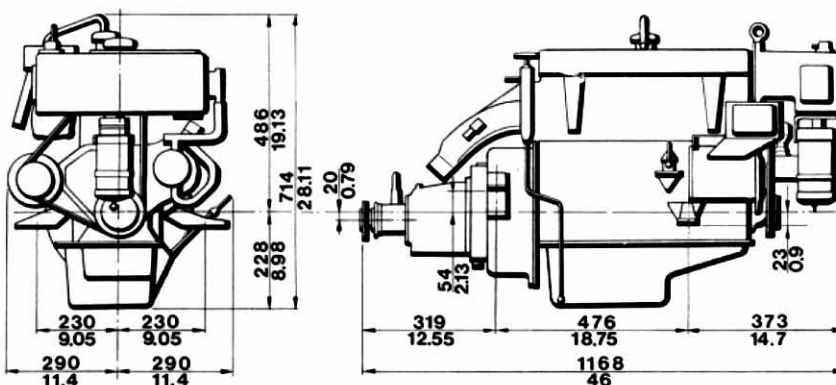
Valves Overhead

Total weight including RB reduction/reverse gear, approx. kg(lb.) 290 (640)

Max. engine inclination 18°

x) Max. output only permitted for short periods of time
Cruising speed is 200 r.p.m. lower than maximum engine speed

DIMENSIONS DRAWING (engine with RB reduction/reverse gear)



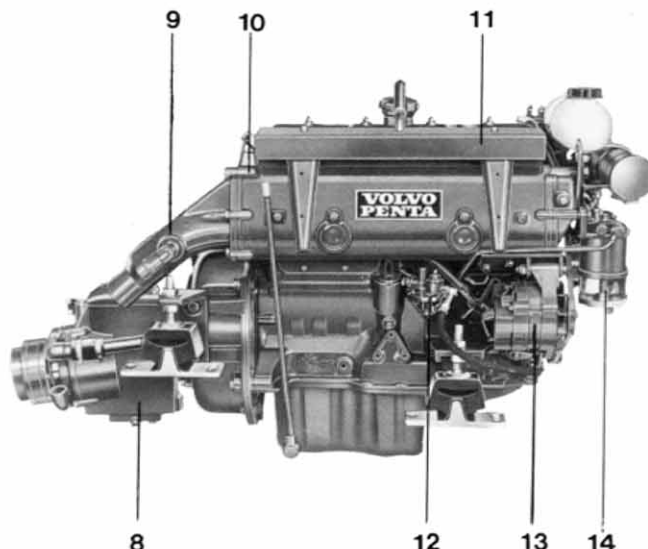
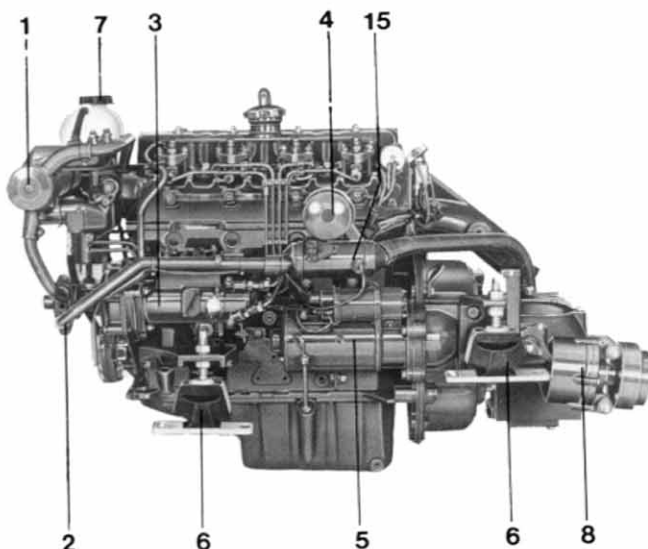
AB VOLVO PENTA

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MD 21 B



4-cylinder, 4-stroke marine diesel engine with swirl chambers
Propeller shaft output 45 kW (61 hp)



STANDARD EQUIPMENT

ENGINE BODY – Cylinder block made of cast iron and cylinder head of light-alloy. Pistons made of light-alloy with three compression rings and one oil scraper ring. Crankshaft journalled in five bearings. Overhead valves with replaceable seats. Tool kit for minor adjustments supplied with engine.

FUEL SYSTEM – Rotor-type injection pump with mechanical governor for accurate speed regulation (3). Feed pump (12) with hand primer and flexible hoses with fuel pipe connection for suction and return lines. Fine filter (14) with water separator.

COOLING SYSTEM – Thermostat-controlled fresh-water cooling with heat exchanger (1) and circulation pump. Expansion tank for firm or separate mounting (7). Sea-water pump with neoprene rubber impeller (2). Cleanable sea-water filter supplied.

LUBRICATING SYSTEM – Pressure lubricating system with full-flow lubricating oil filter of the spin-on type (4). Cleanable, tubular-type oil cooler (15). Sealed crankcase ventilation.

INTAKE SYSTEM – Intake silencer (11) with filter.

EXHAUST SYSTEM – Sea-water cooled exhaust manifold (10) and exhaust manifold elbow of cast iron (9).

ELECTRICAL SYSTEM – Corrosionsproof 12 V electrical system, with complete instrument panel. Main fusing with built-in spare fuse is mounted on engine. Brushless alternator with built-in transistor regulator, 35 A, 420 W (13). Starter motor output 1.3 kW (1.8 h.p.) (5). Automatic alarm for oil pressure and water temperature.

The instrument panel is provided with a key switch, rev counter, temperature gauge, warning lamps for battery charging, oil pressure and for connection of glow plugs, switch for instrument panel light and one extra switch. Cable harness, 7 m (23 ft.) in length, with plug-in contact already fitted.



ENGINE MOUNTING – The engine is supplied with flexible suspension (6).

POWER TRANSMISSION – Reverse gear Borg Warner hydraulic type or reverse gear type MS3 B with cone clutch and 8° propeller shaft angle. The engine is supplied with reverse gear as follows:

- Alt. 1 Reverse gear type BW red. ratio 2:1, R-H prop.
- 2 Reverse gear type BW red. ratio 2:1, L-H prop.
- 3 Reverse gear type BW red. ratio 2.9:1, L-H prop. Propeller shaft flange, pre-drilled
- 4 Reverse gear type MS3 B red. ratio 1.93:1, L-H and R-H prop. (8). Without propeller shaft flange.
- 5 Reverse gear type MS3 B red. ratio 2.91:1, L-H and R-H prop. Without propeller shaft flange.

EXTRA EQUIPMENT

FUEL SYSTEM

Water-separating filter with or without flexible hoses
Fuel line kit with copper piping and installation parts

COOLING SYSTEM

Cooling water intake complete with cock and hose

EXHAUST SYSTEM

Exhaust manifold flange
Hull through fitting
Exhaust rubber hose
Exhaust boot

ELECTRICAL SYSTEM

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

POWER TRANSMISSION

Extra belt pulley

BOAT ACCESSORIES

Electrically operated bilge pump
Original paint
Oils
Electro-mechanical trim tabs

CONTROLS AND CONTROL SYSTEM

VP single-control lever for both speed and forward-reverse operation, top-mounted or side-mounted. Single or twin installation.
Neutral position switch – automatic safety interlock, VP controls
Two levers control – side mounted
Control cables
Steering gears
Steering wheels
Steering cables
Ball joint and fork kit for steering cable

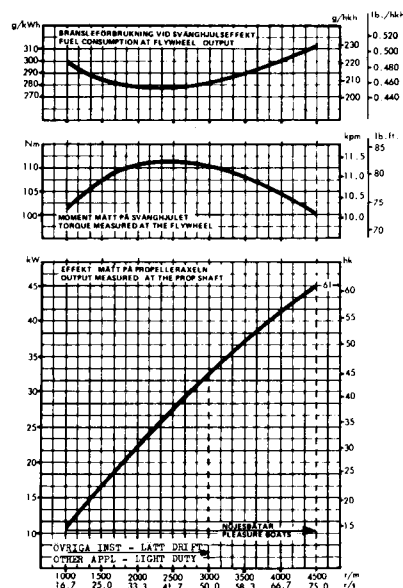
PROPELLER EQUIPMENT

Flexible coupling
Clamp coupling
Propeller shaft
Propeller shaft sleeves
Propellers

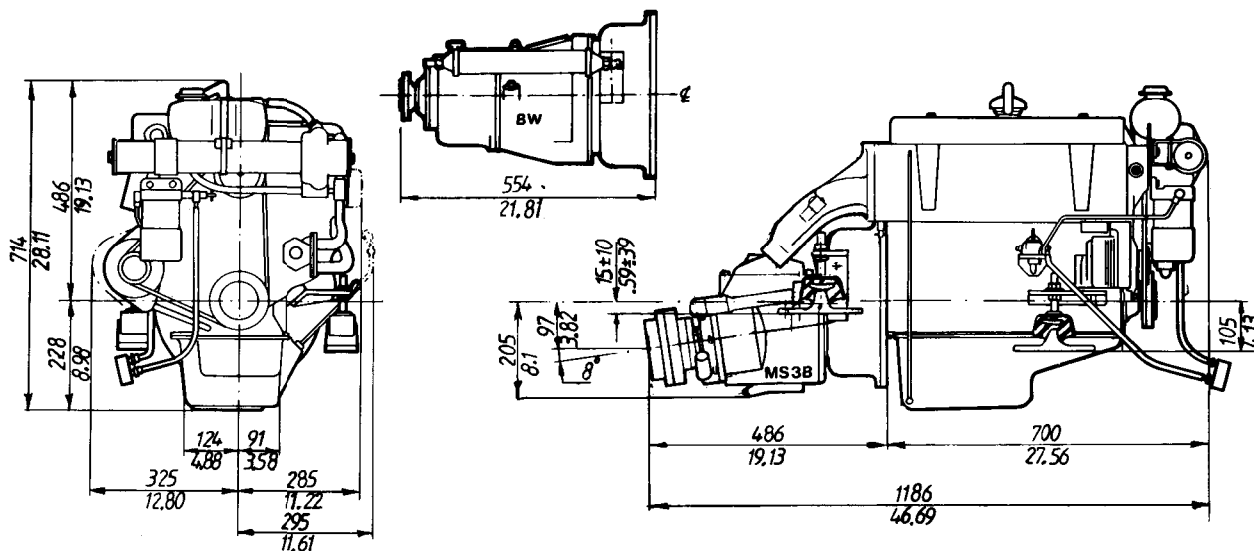
DATA

Type of operation	4-stroke diesel engine with swirl chambers
Designation	MD21B
Propeller shaft output ¹⁾	45 kW at 75 r/s (61 hp at 4500 rpm) 33 kW at 50 r/s (45 hp at 3000 rpm)
Number of cylinders	4 in-line
Capacity, dm ³ (in ³)	2.112 (129)
Bore/stroke, mm (in)	90.0/83.0 (3.54/3.27)
Valves	overhead
Weight, engine with MS3 B rev. gear, approx	285 kg (629 lb)
Weight, engine with BW rev. gear, approx	310 kg (684 lb)

1) The diagram indicates the propeller shaft output for a run-in engine with reverse gear type MS3 according to DIN 6270 Leistung B. The engine flywheel output is approx. 5% higher. To calculate the propeller shaft output with a hydraulic reverse gear type BW, reduce the indicated output by 17% at maximum speed. The engine is delivered to be used for pleasure boats adjusted to 75 r/s (4500rpm). For other installations – light operation, the engine is adjusted to 50 r/s (3000 rpm) according to the adjacent curve.



DIMENSION DRAWING



VOLVO PENTA

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DATA

System Requirements	MSL 100
Configuration	4 channel, 1000/100/10/1000 Mbps, 128Kbps
Connectivity	1000/100/10/1000 Mbps
Processor and Output	ARMV7/100 Mbps
Storage capacity	1000 Mbps
Real-time processing	1000 Mbps
Memory	1000 Mbps
Power consumption	1000 Mbps
Connectivity options with MSL100 network ports	1000 Mbps

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TMD22

Pressure Duty (PD)

4-cylinder, diesel-powered, turbocharged marine diesel engine
Characteristic power 22.4 kW (30 hp)

1999 001 100 0000 000

The TMD22 is a four-cylinder 40 mm bore diesel engine featuring excellent fuel economy and low noise at 2000 rev/min (maximum).

Service life

The TMD22 is designed for long service life. The engine is built to withstand the stresses of operation in a constant and high-revving environment under all conditions.

Construction

It works in line with two low-pressure turbochargers in a two-stage flow system. It has a cast-iron block and high-strength cast-iron cylinder.

The TMD22 is a light-weight engine with a compact, horizontal construction. It can be easily installed in a variety of locations.

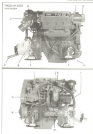
A standard fuel control system is available from an optional range of electronic controls.

Environment

An advanced air intake system is standard, reducing air resistance and noise. It also has a low-noise, air intake and exhaust system, allowing it to be used in a variety of locations.

Performance

The TMD22 is designed for high torque and maximum, variable-speed operation. It has a high torque output and a high torque output. It can be used in a variety of locations.



The TMD22 is a four-cylinder 40 mm bore diesel engine featuring excellent fuel economy and low noise at 2000 rev/min (maximum).

- | | |
|---------------------|----------------------|
| 1. Turbo | 6. Governor mode |
| 2. Exhaust manifold | 7. Fuel pump |
| 3. Exhaust manifold | 8. Fuel filter |
| 4. Exhaust manifold | 9. Exhaust pump |
| 5. Exhaust manifold | 10. Exhaust manifold |
| | 11. Exhaust pump |
| | 12. Exhaust pump |
| | 13. Exhaust pump |
| | 14. Exhaust pump |
| | 15. Exhaust pump |
| | 16. Exhaust pump |

1999 001 100 000 000

**VOLVO
PENTA**

Technical Data

Engine description	Volvo Penta
Maximum power (kW)	74 (100)
Maximum power (HP)	100 (100)
Maximum speed (km/h)	27.0 (16.8)
Maximum speed (mph)	16.8 (10.4)
Maximum torque (Nm)	21.0 (15.5)
Maximum torque (HP)	15.5 (10.4)
Stroke (mm)	100 (3.9)
Bore (mm)	60 (2.4)
Stroke (in)	3.9 (1.5)
Bore (in)	2.4 (0.9)
Compression ratio	12.5 (12.5)
Oil volume	10.0 (10.0)
Consumption (g/kWh)	200 (200)
Start rate	2.0 (2.0)

*Maximum power and torque are achieved at 2000 rpm.



Technical Description

Engine and drive

- Four-cylinder, four-stroke, water-cooled, diesel engine with turbocharger and intercooler.
- Direct injection.
- Electronic control system (ECS) with digital engine management.
- Automatic clutch.
- Mechanical drive.
- Mechanical drive.
- Mechanical drive.

Propulsion system

- Propulsion system with water-cooled, diesel engine with turbocharger and intercooler.
- Direct injection.
- Electronic control system (ECS) with digital engine management.
- Automatic clutch.
- Mechanical drive.
- Mechanical drive.
- Mechanical drive.

Steering system

- Steering system with water-cooled, diesel engine with turbocharger and intercooler.
- Direct injection.
- Electronic control system (ECS) with digital engine management.
- Automatic clutch.
- Mechanical drive.
- Mechanical drive.
- Mechanical drive.

Electrical system

- Electrical system with water-cooled, diesel engine with turbocharger and intercooler.
- Direct injection.
- Electronic control system (ECS) with digital engine management.
- Automatic clutch.
- Mechanical drive.
- Mechanical drive.
- Mechanical drive.

Exhaust system

- Exhaust system with water-cooled, diesel engine with turbocharger and intercooler.
- Direct injection.
- Electronic control system (ECS) with digital engine management.
- Automatic clutch.
- Mechanical drive.
- Mechanical drive.
- Mechanical drive.

*Maximum power and torque are achieved at 2000 rpm.

Dimensions (mm) (inches) (ft) (inches)

