Workshop Manual

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Renoveringsdata
Overhaul data

MB10A

Renoveringsdata
Overhaul data

Marin motor
Marine engine
MB10A

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Safety Information

Introduction

The Workshop Manual contains technical data, descriptions, and repair instructions for the designated Volvo Penta products or product versions. Make sure that the correct workshop literature is used.

Read the following safety information and the *General Information* and *Repair Instructions* in the Workshop Manual carefully before starting service work.

Important

The following special warning symbols are used in the Workshop Manual and on the product.

WARNING! Warns of risk of bodily injury, serious damage to product or property, or that a serious malfunction can occur if the instructions are not followed.

IMPORTANT! Used to attract attention to things that can cause damage or malfunction to product or property.

NOTE! Used to attract attention to important information, to simplify work procedures or handling.

The following list provides an overview of the risks and cautionary procedures that should always be observed.

Prevent the engine from being started by disconnecting the power with the main switch (switches) and locking it (them) in disconnected mode before the service work is begun. Attach a warning sign in the cabin.

As a rule, all service work should be performed on an idle engine. Some work, e.g. certain adjustments, require the engine to be running. Approaching an engine that is running is a safety risk. Remember that loose clothes or long hair can fasten in rotating parts and cause severe injury.

A careless movement or dropped tool while working in the vicinity of an engine that is running, can in the worst case lead to injury. Observe caution on hot surfaces (exhaust pipe, turbo, charge air pipe, starter element etc.) and hot fluids in the lines and hoses of an engine that is running, or has just been started. Refit all guards dismantled during service work before starting the engine.

Make sure that the warning or information decals on the product are always clearly visible. Replace labels that have been damaged or painted over.

Never start the engine unless the air filter is fitted. The rotating compressor wheel in the turbo can cause severe injury. Foreign objects in the inlet pipe can also damage the machine.

Never use starter spray or the like. Explosion risk in the inlet pipe. Risk of personal injury.

Avoid opening the filler cap for coolant when the engine is hot. Steam or hot coolant can spray out. Open the filler cap slowly and release the overpressure in the cooling system. Observe extreme caution if the cock or plug, or coolant pipe, must be dismantled on a hot engine. Steam or hot coolant can flow out unexpectedly.

Hot oil can cause burn injuries. Avoid skin contact with hot oil. Make sure that the oil system is not pressurised before working on it. Never start, or run the engine with the oil filler cap removed in view of the risk of ejecting oil.

Stop the engine and close the bottom valve before working on the cooling system.

Only start the engine in a well-ventilated area. Exhaust fumes and crankcase gases should be led out of the engine compartment or workshop when working in closed environments.

Always use protective glasses for work where there is a risk of splintering, sparks, or splashing of acid or other chemicals. The eyes are extremely sensitive, and an injury can cause blindness!

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⚠ Avoid skin contact with oil! Prolonged or frequent skin contact with oil can degrease the skin, resulting in irritation, drying out, eczema, and other skin complaints. Used oil is more dangerous than new oil from the health care point of view. Use protective gloves and avoid oil drenched clothes and rags. Wash your hands regularly, especially before meals. Use special hand cream to counteract drying out, and to simplify cleaning the skin.

⚠ The majority of chemicals intended for the product (e.g. engine and timing gear oils, glycol, petrol and diesel oil) or chemicals for workshop use (e.g. degreasing agent, enamels and solvents) are hazardous to health. Read the instruction on the pack carefully. Always follow the given safety instructions (e.g. the use of breathing protection, protective glasses, or gloves, etc.) Make sure that other personnel are not exposed to hazardous substances, e.g. by inhaling the air. Make sure there is adequate ventilation. Handle consumed and surplus chemicals in the prescribed manner.

⚠ Observe extreme caution when tracing fuel leaks in fuel systems and when testing fuel nozzles. Wear protective glasses. The jet from a fuel nozzle has a very high pressure and penetrating force. The fuel can penetrate deeply into bodily tissue and cause serious injury. Risk of blood poisoning.

⚠ All fuels, in similarity with chemicals, are inflammable. Make sure that naked flames, or sparks, cannot lead to ignition. Petrol, certain thinners, and hydrogen from batteries, are extremely inflammable and explosive when mixed with air. Smoking is prohibited! Ventilate well and take the necessary precautions before conducting welding or grinding work in the immediate vicinity. Always have a fire extinguisher handy in the workshop.

⚠ Make sure that rags drenched in oil and petrol, including old fuel and lubricant filters, are stored safety. Oil drenched rags can in certain conditions self-ignite. Old fuel and oil filters are environmentally hazardous waste, and together with spent lubricant, contaminated fuel, paint residue, solvent, degreasing agent and suds, should be handed in to a waste handling unit for destruction.

⚠ Batteries must never be exposed to naked flames or electrical sparks. Never smoke in the vicinity of batteries. Hydrogen develops when batteries are charged, which in combination with air forms an explosive gas. This gas is highly inflammable and very explosive. One spark from connecting the batteries incorrectly is sufficient to cause the battery to explode and cause injury. Do not touch the connection when starting (risk of spark) and do not lean over the batteries.

⚠ Never confuse the plus and minus terminals when fitting the batteries. This can cause serious damage to the electrical equipment. Check the wiring diagram.

⚠ Always use protective glasses when charging and handling batteries. The battery electrolyte contains strongly corrosive sulphuric acid. On skin contact, wash with soap and plenty of water. If battery acid gets into the eyes, rinse immediately with water, and contact a doctor without delay.

⚠ Stop the engine and switch off the power with the main switch (switches) before working on the electrical system.

⚠ Adjustment of the clutch should be conducted when the engine is idle.

⚠ Use the lifting hooks mounted on the engine/reversing gear when lifting the drive unit. Always check that the lifting equipment is in good condition and has the correct capacity for the lift (weight of engine plus reversing gear and extra equipment where appropriate).
For safe handling, and to avoid damaging the components mounted on top of the engine, the engine should always be lifted with a lifting bar adjusted to the engine. All chains or wires should run in parallel with each other and as perpendicular to the top of the engine as possible. Special lifting equipment may be required to ensure the right balance and safe handling if other equipment connected to the engine alters its centre of gravity.
Never carry out work on an engine only supported by lifting equipment.

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⚠ Never work alone when heavy components are to be dismantled, even when safe lifting (e.g. lockable block and tackle) equipment is used. In most cases, two persons are required even when lifting equipment is used: one to handle the equipment and one to make sure that components are not damaged. When working onboard a boat always make sure in advance that there is sufficient space to allow dismantling in situ, without the risk of personal injury or damage to materials.

⚠ **WARNING!** The components in the electrical system and in the fuel system on Volvo Penta products are designed and manufactured to minimise the risks of explosion and fire. The engine must not be run in environments surrounded by explosive media.

⚠ When cleaning with high-pressure wash, observe the following: Never point the jet of water at seals, rubber hoses, or electrical components. Never use the high-pressure function when washing the engine.

⚠ **NOTE!** Pressure pipes must not bent, turned, or exposed to other strain. Replace damaged pressure pipes.

⚠ Always use Volvo Penta recommended fuel. See the instruction handbook. The use of inferior quality fuel can damage the engine. The use of inferior fuel in a diesel engine can cause the control rod to jam and the engine to overspeed, with the risk of personal injury or damage to the machine. Inferior fuel can also lead to higher maintenance costs.

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General Information

About the Workshop Manual

This Workshop Manual contains technical information, descriptions, and repair instructions for the standard versions of the engine units MB10A.

The Workshop Manual may show work procedures conducted on an optional engine according to the above list. This implies that the illustrations and diagrams that present certain parts, may in some cases not agree with the other engines. The repair methods remain essentially the same, however. Wherever there is a difference, this is clearly indicated and important differences are reported separately. The engine designation and number are given on the number plate. The motor designation and number should always be given during all correspondence.

The Workshop Manual is primarily produced for Volvo Penta service workshops and their qualified personnel. It is therefore assumed that persons using this manual have a basic knowledge of marine drive systems, and can perform the relevant work of a mechanical and electrical nature.

Volvo Penta continuously develops its products, and therefore reserves the right to introduce modifications. All the information in this manual is based on product data available prior to publication. Any amendments or service methods of essential importance that have been introduced for the product after this date are confirmed in the form of Service Bulletins.

Spare parts

Spare parts for the electrical and fuel systems are subject to different national safety requirements, e.g. U.S. Coast Guard Safety Regulations. Volvo Penta Genuine Spare Parts comply with these requirements. All types of damage resulting from the use of non genuine Volvo Penta spare parts for the product in question will not be regulated by the warranty undertakings of Volvo Penta.

Certificated engines

For service and repair on an engine certificated for any area where exhaust emissions are regulated by law, the following is important:

Certification means that an engine type is inspected and approved by the authorities. The engine manufacturer guarantees that all engines manufactured of that type correspond to the certified engine.

This places special requirements for maintenance and service as follows:

- The maintenance and service intervals recommended by Volvo Penta must be observed.
- Only genuine Volvo Penta replacement parts may be used.
- The service of injection pumps and injectors or pump settings must always be carried out by an authorized Volvo Penta workshop.
- The engine must not be modified in any way except with accessories and service kits approved by Volvo Penta.
- No modifications to the exhaust pipes and air supply ducts for the engine may be undertaken.
- Seals may only be broken by authorized personnel.

Otherwise the general instructions contained in the Instruction Book concerning operation, service and maintenance must be followed.

⚠ **IMPORTANT!** Late or inadequate maintenance/service or the use of spare parts other than Volvo Penta original spare parts will invalidate AB Volvo Penta's responsibility for the engine specification being in accordance with the certificated variant.

Volvo Penta accepts no responsibility or liability for any damage or costs arising due to the above.

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Renoveringsdata/Overhaul data

Allmänt/General

Typbeteckning Type designation	MB10A
Max effekt Max output	11 kW (15 hk) (15 hp)
Max varvtal Max speed	33 r/s (2000 r/m)
Kompressionsförhållande Compression ratio	6,5:1
Kompressionstryck vid startmotorvarv Compression pressure at starter motor speed	7,5 kp/cm^2 (107 p.s.i.)
Cylinderantal Number of cylinders	2
Cylinderdiameter Bore	88,9 mm (3.50 in.)
Slaglängd Stroke	82,0 mm (3.23 in.)
Slagvolym Displacement	1,018 dm^3 (l) (62.1 cu.in.)
Vikt utan olja och vatten, ca Weight wihtout oil and water, approx.	105 kg (232 lb.)
Tomgångsvarv Idling speed	10 r/s (600 r/m)

Cylinderblock/Cylinder block

Material	Gjutjärn
Material	Cast iron
Cylinderdiameter, standard Bore, standard	88,90–88,93 mm (3.5000–3.5012 in.)
Cylinderdiameter, överdim. 0,76 mm (0.0300 in.) Bore, oversize 0.76 mm (0.0300 in.)	89,66–89,69 mm (3.5299–3.5311 in.)
Max. cylinderdeformation Max. cylinder deformation	0,01 mm (0.0004 in.)

Kolvar/Pistons

Material	Lättmetall
Material	Light-alloy
Höjd, total Height, total	71,0 mm (2.795 in.)
Höjd från kolvtappscentrum till kolvtopp Height from gudgeon pin centre to piston top	46 mm (1.811 in.)
Kolvspel Piston clearance	0,03–0,05 mm (0.0012–0.0020 in.)
Kolvspel* Piston clearance*	0,01–0,03 mm (0.0004–0.0012 in.)

Kolvar finns som standard, standard + 0,03 mm och 0,76 mm överdim.
Pistons available as standard, standard + 0,03 mm (0.0012 in.) and 0.76 mm (0.0300 in.) oversize

Kolvdiameter skall mätas 12 mm från nedre kanten.
The piston diameter should be measured 12 mm (0.47 in.) from de lower edge.

* Gäller från motor nr 2779.
* Valid from engine No. 2779.

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Kolvringar/Piston rings

Kolvringsgap mätt i ringens öppning Piston ring gap measured in the opening of the ring	0,40–0,55 mm (0.0157–0.0217 in.)
Överdimension på kolvringar Piston ring oversize	0,76 mm (0.0300 in.)

Kompressionsringar/Compression rings

Märkta ”TOPP”. Övre ringen förkromad Marked “TOP”. Top ring chromed	
Antal på varje kolv Number on each piston	2
Höjd Height	1,98 mm (0.0780 in.)
Kolvringsspel i spår Piston ring clearance in groove	0,05–0,07 mm (0.0020–0.0028 in.)

Oljeringar/Oil rings

Antal på varje kolv Number on each piston	1
Höjd Height	4,74 mm (0.1866 in.)
Kolvringsspel i spår Piston ring clearance in groove	0,05–0,07 mm (0.0020–0.0028 in.)

Kolvtappar/Piston pins

Flytande lagrad. Låsring i båda ändar i kolven Floating fit. Circlips at both ends in piston	
Passning: I vevstake Fit: In connecting rod	Lätt tumtryck (noggrant löpande passning) Close running fit
Passing: I kolv Fit: In piston	Tumtryck (skjutpassning) Push fit
Diameter, standard Diameter, standard	22,00 mm (0.8661 in.)
Diameter, standard* Diameter, standard*	24,00 mm (0.9449 in.)
Diameter, överdim. Diameter, oversize	22,05 mm (0.8681 in.)
Diameter, överdim.* Diameter, oversize*	24,05 mm (0.9469 in.)

* Gäller från motor nr 2779.
* Valid from engine No. 2779.

Vevaxel/Crankshaft

Vevaxel, axialspel Crankshaft, end float	0,25–0,45 mm (0.0098–0.0177 in.)
Ramlager, radialspel Main bearings, radial clearance	0,05–0,10 mm (0.0020–0.0039 in.)
Vevlager, radialspel Big-end bearings, radial clearance	0,03–0,08 mm (0.0012–0.0031 in.)

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Ramlager/Main bearings

Ramlagertappar/Main bearing journals

Diameter, standard	54,93–54,95 mm (2.1626–2.1634 in.)
Diameter, standard	
0,50 mm underdim.	54,43–54,45 mm (2.1429–2.1437 in.)
0.50 mm (0.0200 in.) undersize	
1,0 mm underdim.	53,93–53,95 mm (2.1232–2.1240 in.)
1.0 mm (0.0400 in.) undersize	

Ramlager/Main bearings

Diameter, standard	55,00–55,03 mm (2.1654–2.1665 in.)
Diameter, standard	
0,50 mm underdim.	54,50–54,53 mm (2.1457–2.1496 in.)
0.5 mm (0.0200 in.) undersize	
1,0 mm underdim.	54,00–54,03 mm (2.1260–2.1272 in.)
1.0 mm (0.0400 in.) undersize	

Vevlager/Big-end bearings

Vevlagertappar/Big-end bearing journals

Lagerlägets breddmått	31,85–31,90 mm (1.2539–1.2559 in.)
Width of bearing recess	
Lagerlägets breddmått*	29,95–30,05 mm (1.1791–1.1831 in.)
Width of bearing recess*	
Diameter, standard	54,09–54,11 mm (2.1295–2.1303 in.)
Diameter, standard	
Diameter, standard*	53,95–54,00 mm (2.1240–2.1260 in.)
Diameter, standard*	
0,25 mm underdim.	54,84–54,85 mm (2.1591–2.1594 in.)
0.25 mm (0.0100 in.) undersize	
0,25 mm underdim.*	53,70–53,75 mm (2.1142–2.1161 in.)
0.25 mm (0.0100 in.) undersize*	
0,50 mm underdim.	53,58–53,60 mm (2.1094–2.1102 in.)
0.50 mm (0.0200 in.) undersize	
0,50 mm underdim.*	53,44–53,49 mm (2.1039–2.1059 in.)
0.50 mm (0.0200 in.) undersize*	

* Gäller från motor nr 2779.
* Valid from engine No. 2779.

Vevlagerskålar/Big-end bearing shells

Tjocklek, standard	1,83–1,84 mm (0.0720–0.0724 in.)
Thickness, standard	
Tjocklek, standard*	1,98–1,99 mm (0.0780–0.0783 in.)
Thickness, standard*	
0,25 mm underdim.	1,96–1,97 mm (0.0772–0.0776 in.)
0.25 mm (0.0100 in.) undersize	
0,25 mm underdim.*	2,11–2,12 mm (0.0831–0.0835 in.)
0.25 mm (0.0100 in.) undersize*	
0,50 mm underdim.	2,09–2,10 mm (0.0823–0.0827 in.)
0.50 mm (0.0200 in.) undersize	
0,50 mm underdim.*	2,23–2,24 mm (0.0878–0.0882 in.)
0.50 mm (0.0200 in.) undersize*	

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