

# **OPERATOR'S MANUAL**

**TAMD63L/P, TAMD74A**

**VOLVO  
PENTA**

This operator's manual is also available in the following languages:

GER

**Diese Betriebsanleitung ist auch auf Deutsch erhältlich.**

Ein Bestellcoupon ist am Ende der Betriebsanleitung zu finden.

DUT

**Dit instructieboek kan worden besteld in het Nederlands.**

De bestelcoupon vindt u achter in het instructieboek.

FRE

**Ce manuel d'instructions peut être commandé en français.**

Vous trouverez un bon de commande à la fin du manuel d'instructions.

DAN

**Denne instruktionsbog kan bestilles på dansk.**

Bestillingskupon findes i slutningen af instruktionsbogen.

SPA

**Este libro de instrucciones puede solicitarse en español.**

El cupón de pedido se encuentra al final del libro.

FIN

**Tämän ohjekirjan voi tilata myös suomenkielisenä.**

Tilauskuponki on ohjekirjan lopussa.

SWE

**Den här instruktionsboken kan beställas på svenska.**

Beställningskupong finns i slutet av instruktionsboken.

POR

**Este manual de instruções pode ser encomendado em português.**

O talão de requerimento encontra-se no fim do manual.

ITA

**Questo manuale d'istruzioni può essere ordinato in lingua italiana.**

Il tagliando per l'ordinazione è riportato alla fine del manuale.

GRE

**Αυτό το εγχειρίδιο χρήσης διατίθεται στην αγγλική γλώσσα.**

Για να παραγγείλετε ένα αντίτυπο, συμπληρώστε τη φόρμα που βρίσκεται στο τέλος αυτού του εγχειριδίου χρήσης.

## CALIFORNIA

### Proposition 65 Warning

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.



## Foreword

Volvo Penta marine engines are used all over the world today. They are used in all possible operating conditions for professional as well as leisure purposes. That's not surprising.

After more than 90 years as an engine manufacturer and after delivering over 500,000 marine engines, the Volvo Penta name has become a symbol of reliability, technical innovation, top of the range performance and long service life. We also believe that this is what you demand and expect of your Volvo Penta engine.

We would like you to read this operator's manual thoroughly and consider the advice we give on running and maintenance before you cast off on your maiden voyage so that you will be ensured of fulfilling your expectations.

With warm regards

**AB VOLVO PENTA**



**IMPORTANT!** These instructions do not contain descriptions of controls or operation for boats with waterjet. If your boat is equipped with Volvo Penta waterjet, this information can be found in the operator's manual that came with the waterjet.

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# Safety information

Read this chapter thoroughly. It concerns your safety. This section describes how safety information is presented in this manual and on the product. It also includes a summary of basic safety regulations for boat trips and maintenance of the engine.


**Make sure you are in possession of the right operator's manual before reading on. If this is not the case, please get in touch with your Volvo Penta dealer.**




**Incorrect handling can cause personal injury or damage to the product and/or property. Consequently, please read this operator's manual thoroughly before starting the engine or carrying out maintenance and service. If anything is still not clear or if you are not sure of any points, please get in touch with your Volvo Penta dealer for assistance.**

 This symbol is used throughout the operator's manual and on the product to bring your attention to points of safety-related information. Always read such information thoroughly.

Warnings in the operator's manual have the following order of priority:

 **WARNING!** Warns for the risk of physical injury, severe damage to the product or other property or serious malfunctions that may occur if the instructions are not followed.

 **IMPORTANT!** Used to call your attention to points that may cause malfunctions or damage to the product or other property.

**NOTE!** Used to call your attention to important information that can facilitate working methods or handling.



This symbol is used in certain cases on our products to refer to important information found in the operator's manual. Make sure all warning and information symbols on the engine and transmission are easily visible and legible. Replace symbols that have been damaged or painted over.

## Safety regulations for boat trips

### The new boat

Read operator's manuals and other information accompanying the new boat thoroughly. Accustom yourself with handling the engine, controls and other equipment in a safe and correct manner.

If this is your first boat or if it is a type you are not used to, we recommend practising manoeuvring the boat in a peaceful environment. Learn the sea-going and manoeuvring characteristics at different speeds and in varying weather and load conditions before casting off on your "real" maiden voyage.

Remember that when operating a boat, you have a legal responsibility to be aware of and follow regulations concerning traffic and safety at sea. Inform yourself of the regulations that apply to you and your waters by getting in touch with the relevant authorities or marine safety organisation.

Attending some kind of boat handling course is a good idea. We recommend getting in touch with a regional boat or marine safety organisation to help you locate a suitable course.

### Accidents and other incidents

Sea rescue statistics show that deficient maintenance of boats and engines together with defective safety equipment often causes accidents and other incidents at sea.

Make sure your boat and engine are maintained in accordance with directions in the operator's manuals and that the safety equipment on board is in good working order.

### Daily inspection

Make a habit of visually inspecting the engine and engine room before starting (**before starting the engine**) and after stopping (**when the engine has been turned off**). This will help you to quickly detect any fuel, coolant or oil leaks and any other abnormalities that have occurred or are about to occur.

### Manoeuvring

Avoid violent and rapid rudder movement and gear shifting. There is a risk of the passengers falling down or falling overboard.

A rotating propeller can cause serious injury. Make sure there is nobody in the water before engaging forward/reverse. Never run close to bathers or in places where you have reason to believe there are people in the water.

### Filling fuel

There is a risk of fire and explosion when filling fuel. Smoking is prohibited and the engine must be turned off.

Never overfill the tank. Close the filler cap securely.

Use only fuel recommended in the operator's manual. The incorrect grade of fuel can disturb operation or cause breakdown. This can also lead to the control rod jamming on diesel engines, which will overrev the engine and risk damaging machinery and causing personal injury.

### Do not start the engine

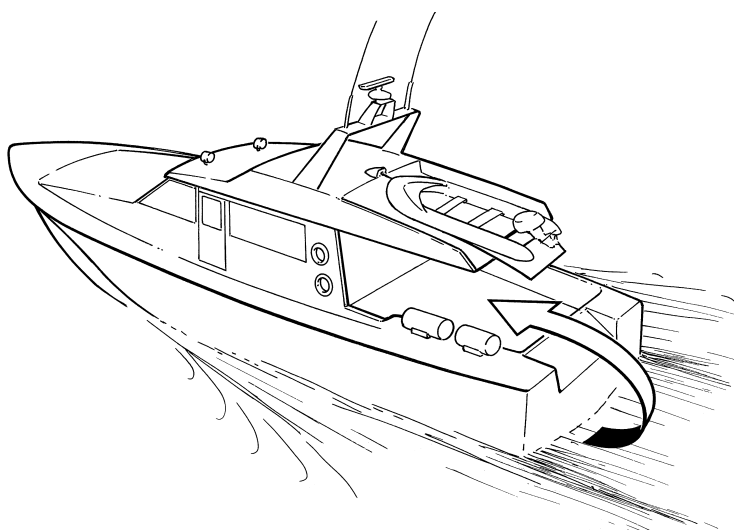
Do not start or run the engine with a suspected fuel or LPG leak in the boat, nor when you are close to or in a discharge of explosive media, etc. There is risk for fire and/or explosion in explosive surroundings.

## **⚠ Carbon monoxide poisoning**

When a boat is moving forward, it will cause a certain vacuum to form behind the boat. In unfortunate circumstances, the suction from this vacuum can be so great that the exhaust gases from the boat are drawn into the cockpit or cabin and cause carbon monoxide poisoning.

This problem is most prevalent on high, wide boats with abrupt stern. In certain conditions, however, this suction can be a problem on other boats, e.g. when running with the cover up. Other factors that can increase the effect of the suction are wind conditions, load distribution, swells, trim, open hatches and portholes, etc.

Most modern boats, however, are designed in such a way that this problem is very rare. If suction should arise anyway, do not open hatches or portholes at the fore of the boat. Surprisingly, this will otherwise increase the suction. Try changing speed, trim or load distribution instead. Try taking down/opening or in any other way changing the setup of the cover as well. Get in touch with your boat dealer for help in obtaining the best solution for your boat.



## **⚠ Remember**

Safety equipment: life jackets for everyone on board, communication equipment, distress rockets, approved fire extinguisher, bandages, life buoy, anchor, paddle, torch, etc.

- Spare parts and tools: Impeller, fuel filter, fuses, adhesive tape, hose clips, engine oil, propeller and tools for tasks it may be necessary to perform.
- Plan your desired route from the charts. Calculate distance and fuel consumption. Listen to weather reports.
- Inform relations of your planned route for long trips. Remember to inform of changed plans or delays.
- Inform the people on board of where the safety equipment is located and how it works. Make sure there is more than one person on board that knows how to start and manoeuvre the boat safely.

This list should be supplemented with necessary safety equipment depending on the type of boat, where and how it is being used, etc. We recommend you get in touch with a regional boat or marine safety organisation to obtain more detailed marine safety information.

## Safety directions for maintenance and service

### Preparations

#### Knowledge

The operator's manual contains directions for performing normal maintenance and service in a safe and correct manner. Read the directions carefully before starting work.

More detailed service literature is available from your Volvo Penta dealer.

Never perform a task unless you are absolutely sure how it is to be carried out, call your Volvo Penta dealer for assistance instead.

#### Stop the engine

Stop the engine before opening or dismantling the engine hatch/hood. Maintenance and service must be carried out with the engine stationary unless stated otherwise in the instructions.

Prevent inadvertent start of the engine by removing the starter key and turning off the power with the main switch, locking it in the off position. Place a warning sign in the driver position stating that service is in progress.

Working on or approaching a running engine is a safety hazard. Loose clothing, hair, fingers or a dropped tool can fasten in rotating parts and cause serious bodily injury. Volvo Penta recommend leaving all work requiring the engine to be running to an authorised Volvo Penta service centre.

#### Lifting the engine

Always use the lifting eyes mounted on the engine (or reverse gear) when lifting the engine. Always make sure lifting equipment is in good condition and constructed for the lift (engine weight together with possible reverse gear and extra equipment). Use an adjustable lifting boom to ensure safe handling when lifting the engine. All chains and wires must run parallel with each other and as much at right-angle as possible to the top of the engine. Note that any extra equipment mounted on the engine can change the centre of gravity. Special lifting devices may be required to obtain the right balance and safe handling. Never perform service on an engine suspended only from a lifting device.

#### Before starting

Refit all guards and covers that have been removed before starting the engine. Make sure there are no tools or other objects left on the engine.

A turbocharged engine must never be started without the air filter fitted. The rotating compressor wheel in the turbocharger can cause severe personal injury. There is also a risk of foreign objects being drawn in and causing mechanical damage.

### Fire and explosion

#### Fuel and lubricants

All fuel, most lubricants and many chemicals are flammable substances. Always read and follow the directions on the packaging.

Work performed on the fuel system must be done on a cold engine. Fuel leaks and spills on hot surfaces or electrical components can cause fires.

Keep oil- and fuel-drenched rags and other hazardous materials where they are safe in case of fire. Oil drenched rags can self-ignite in certain conditions.

Never smoke when refuelling, topping up with oil or when in the vicinity of the fuel station or engine room.

#### Non-original parts

Components in fuel, ignition and electrical systems on Volvo Penta engines are designed and manufactured to minimize the risk of explosion and fire in compliance with existing legislation.

The use of non-original parts can result in explosion or fire.

#### Batteries

Batteries contain and generate oxyhydrogen gas, especially when charging. Oxyhydrogen is easily ignited and extremely explosive.

Smoking, naked flames and sparks must never occur in or close to the batteries or battery compartment.

A faulty battery connection or jumper cable can generate sparks which can cause the battery to explode.

#### Start spray

Never use start spray or similar start help. Explosions can occur in the intake manifold. Risk for personal injury.



### **Hot surfaces and fluids**

A hot engine always involves risk for burn injuries. Take care with hot surfaces. E.g.: exhaust manifold, turbocharger, oil pan, charge air pipe, starting heater, hot coolant and warm lubricant in pipes and hoses.

### **Carbon monoxide poisoning**

Start the engine in well ventilated spaces only. When running in confined spaces, the exhaust gases and crankcase gases must be evacuated.

### **Chemicals**

Most chemicals such as glycol, anti-corrosion agent, preservatives, degreasing agent, etc., are hazardous to health. Always read and follow the directions on the packaging.

Certain chemicals such as preservatives are flammable and harmful to inhale. Provide good ventilation and use breathing protection when spraying. Always read and follow the directions on the packaging.

Store chemicals and other hazardous materials out of reach of children. Leave left over or used chemicals to a destruction plant.

### **Cooling system**

There is a risk of water entering when working on the seawater system. Therefore, stop the engine and close the sea cock before starting work.

Avoid opening the coolant filler cap when the engine is warm. Steam or hot coolant may spurt out and cause burn injuries.

If the filler cap, coolant pipe, cock, etc., must nevertheless be opened or dismantled while the engine is warm, the filler cap must be opened carefully to release the pressure before removing it completely and starting work. Note that the coolant can still be hot and cause burn injuries.

### **Lubricating system**

Hot oil can cause burn injuries. Avoid skin contact with warm oil. Make sure the lubricating system is depressurised before starting work. Never start or run the engine with the oil filler cap removed or there will be a risk of the oil being thrown out.

### **Fuel system**

Always protect your hands when carrying out leak detection. Escaping fluids under pressure can pierce bodily tissue and cause serious injury. Risk of blood poisoning.

Always cover the alternator if it is located under the fuel filter. Fuel spills can damage the alternator.

### **Electrical system**

#### **Turn off the power**

Before starting work on the electrical system, the engine must be stopped and the power turned off with the main switch/switches. Shore power to the engine heater, battery charger or other extra equipment fitted to the engine must be disconnected.

#### **Batteries**

Batteries contain a highly corrosive electrolyte. Protect your eyes, skin and clothing when charging and handling batteries. Always use protective goggles and gloves.

In case of splashes on the skin, wash with soap and plenty of water. In case of splashes in the eyes, rinse immediately with plenty of water and call a doctor.

# Introduction

The operator's manual has been produced to give you the greatest benefit of your Volvo Penta marine engine. It contains the information necessary to handle and maintain your engine in a safe and correct manner. We would like you to read this operator's manual thoroughly and learn how to handle the engine, controls and other equipment in a safe manner before casting off for your maiden voyage.

Keep the operator's manual handy at all times. Keep it safe and do not forget to hand it over to the new owner if you ever sell your boat.

## Care of the environment

We would all like to live in a clean and healthy environment. Somewhere where we can breathe clean air, see healthy trees, have clean water in our lakes and oceans, and are able to enjoy the sunshine without being worried about our health. Unfortunately, this cannot be taken for granted nowadays but is something we must work together to achieve.

As a manufacturer of marine engines, Volvo Penta has a special responsibility, why care of the environment is a core value in our product development. Today, Volvo Penta has a broad range of engines where progress has been made in reducing exhaust emissions, fuel consumption, engine noise, etc.

We hope you will take care in preserving these qualities. Always follow any advice given in the operator's manual concerning fuel grades, operation and maintenance and you will avoid causing unnecessary interference to the environment. Get in touch with your Volvo Penta dealer if you notice any changes such as increased fuel consumption exhaust smoke.

Adapt speed and distance to avoid wash and noise disturbing or injuring animal life, moored boats, jetties, etc. Leave islands and harbours in the same condition as you want to find them. Remember to always leave hazardous waste such as waste oil, coolant, paint and wash residue, flat batteries, etc., for disposal at a destruction plant.

Our joint efforts will make a valuable contribution to our environment.

## Running in

The engine must be "run in" during the first 10 hours of operation as follows:

Run the engine under normal operation. Do not run it at full power except for short periods. Never run the engine for long periods at constant rpm during this time.

A high consumption of lubricant is normal during the running in period. Therefore, check the oil level more often than recommended.

The prescribed warranty inspection "First Service Inspection" must be carried out during this first period of operation. For more information: See Warranty and Service Book.

## Fuel and oil

Use only fuel and oil grades as recommended in the operator's manual. Other grades can cause operational problems, increase fuel consumption and have long-range effects on engine service life.

Always change oil, oil filter and fuel filter according to prescribed intervals.

## Service and spare parts

Volvo Penta marine engines are designed for high operational reliability and long service life. They are constructed to withstand the marine environment while also affecting it as little as possible. Through regular service and the use of Volvo Penta original spare parts, these qualities will be retained.

The worldwide Volvo Penta network of authorised dealers is at your service. They are specialists in Volvo Penta products and stock accessories, original spare parts, test equipment and the special tools required to perform high-quality service and repairs.

Always follow the maintenance intervals specified in the operator's manual and remember to specify the engine/transmission number when ordering service and spare parts.

## Certified engines

It is essential that owners and operators of emission certified engines used in areas where exhaust emissions are regulated by law are aware of the following points:

A certification involves the engine type being checked and approved by applicable authorities. Engine manufacturers guarantee that all engines of the same type correspond with the certified engine.

### This puts special demands on the maintenance and service of your engine:

- Maintenance and service intervals recommended by Volvo Penta must be followed.
- Only Volvo Penta original spare parts may be used.
- Service of injector pumps, pump settings and injectors must always be performed at an authorised Volvo Penta workshop.

- The engine must not be modified in any way with the exception of accessories and service kits approved by Volvo Penta for use on the engine.
- Installation modifications must not be made to the engine exhaust pipe or inlet channels.
- Any sealed sections must not be broken by anyone other than authorised personnel.

Otherwise, the general directions concerning running, care and maintenance given in the operator's manual apply.

**⚠ IMPORTANT!** Neglected or deficient maintenance/service and the use of non-original spare parts will entail Volvo Penta renouncing any responsibility for the engine corresponding to the certified version. Volvo Penta will not compensate for damage and/or costs arising from the above.



## Warranty

Your new Volvo Penta marine engine is covered by a limited warranty complying with the conditions and instructions given in the Warranty and Service Book.

Note that AB Volvo Penta's responsibility is limited to what is specified in the Warranty and Service Book. Read it carefully as soon as possible after delivery. It contains important information concerning the warranty card, service, maintenance and what the owner is responsible to be aware of, check and perform. Warranty liability will otherwise be declined completely or fully by AB Volvo Penta.

**Get in touch with your Volvo Penta dealer if you have not received a Warranty and Service Book or a copy of the warranty card.**

Identification number

Type plates with identification number can be found on the engine and transmission. This information must always be used as a reference when ordering service and spare parts. Similar plates can probably be found on your boat and its equipment. Make a note of the information in the space below and make a copy of this page so the information is available even if the boat should be stolen.

The appearance and location of the type plates is shown below. The numbers in brackets refer to the location of the identification number on the type plate.

Engine

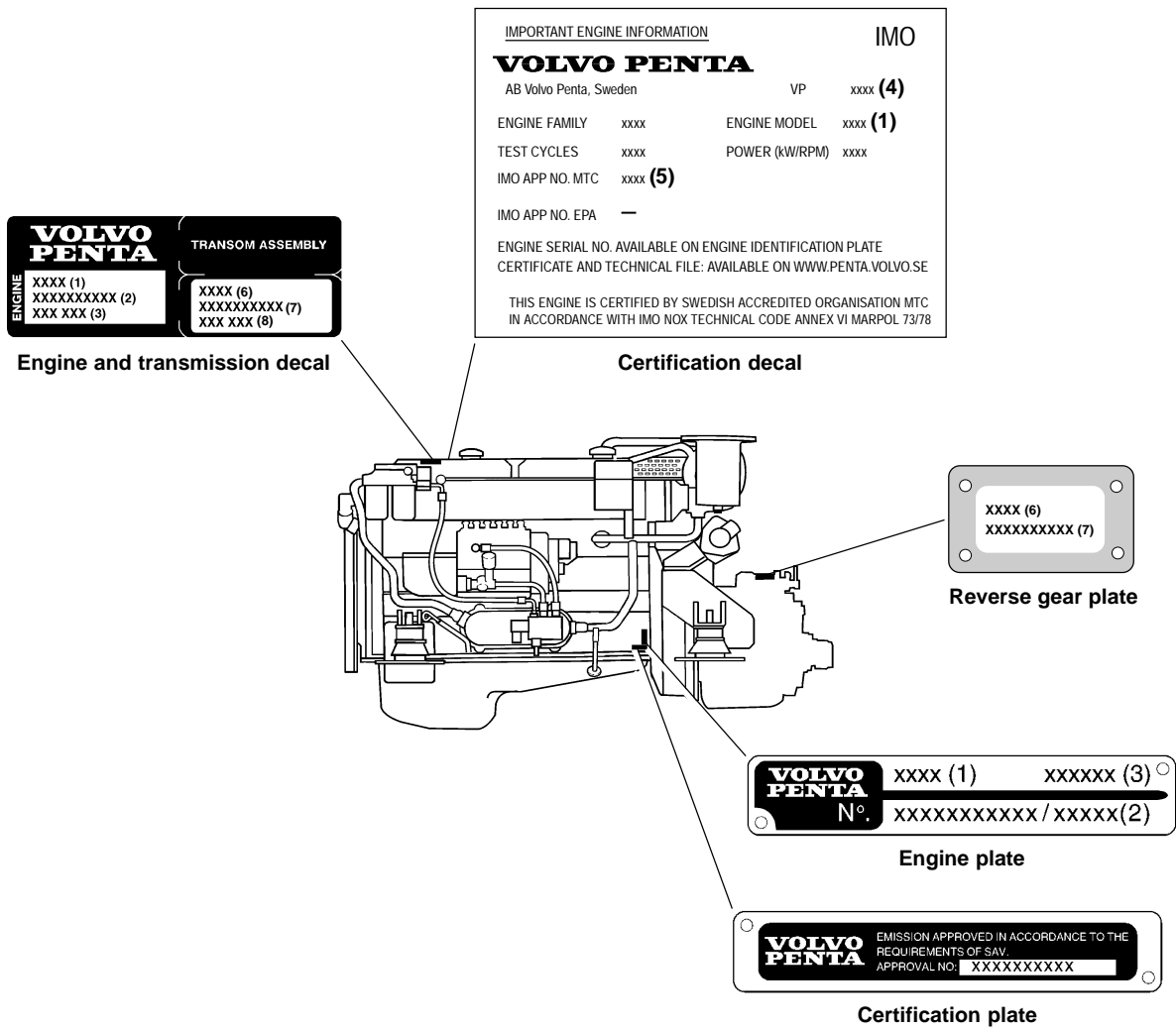
Product designation (1) .....  
Serial and basic engine number (2) .....  
Product number (3) .....

Certification, IMO

Decal, part No. (4) .....  
Approval No. (5) .....

Transmission

Product designation (6) .....  
Serial number (7) .....  
Product number (8) .....



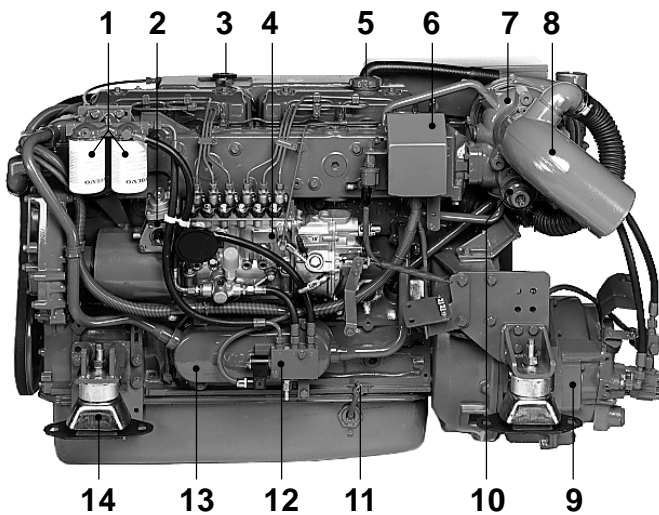
# Presentation

TAMD63L, TAMD63P and TAMD74A are in-line, direct injection, 6-cylinder, 4-stroke marine diesel engines. They are equipped with turbocharger and fitted with either a heat exchanger for thermostat-regulated freshwater cooling or connections for keel cooling.

The engines are equipped with a seawater cooled charge air cooler. The charge air cooler lowers the temperature of the inlet air to the engine after it has been compressed in the turbocharger. This allows high power output while keeping combustion and exhaust temperatures at a suitable level.

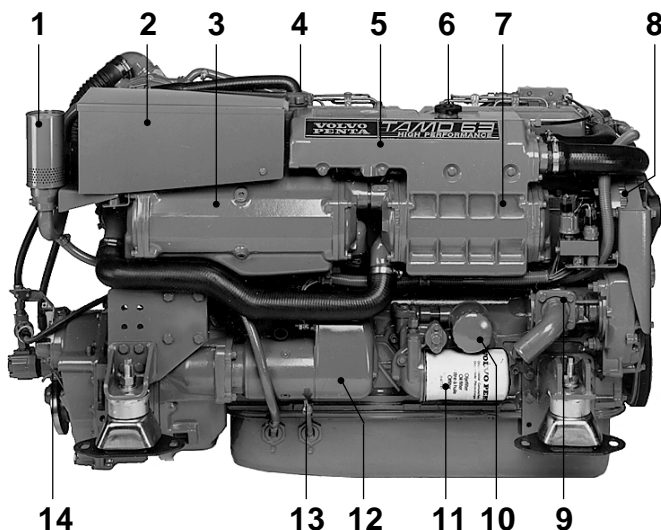
The exhaust manifold and turbocharger are fresh-water cooled to reduce heat radiation to the engine room.

These engines are equipped with mechanical fuel control.



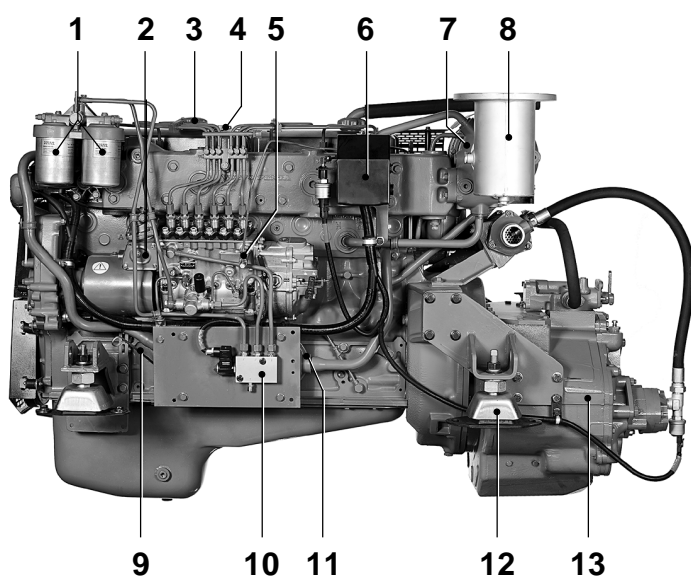
## TAMD63L-A, TAMD63L-B, TAMD63P-A

1. Fuel fine filters
2. Smoke limiter
3. Coolant filler cap
4. Injection pump
5. Oil filler cap
6. Distribution box with semi-automatic fuses
7. Turbocharger
8. Water cooled exhaust pipe elbow (option)
9. Reverse gear (ZF (MPM) IRM 220 A-1)
10. Wastegate valve (TAMD63P)
11. Oil dipstick, engine
12. Fuel shut-off valve
13. Oil cooler, engine
14. Flexible engine mounting (option)



## TAMD63L-A, TAMD63L-B, TAMD63P-A

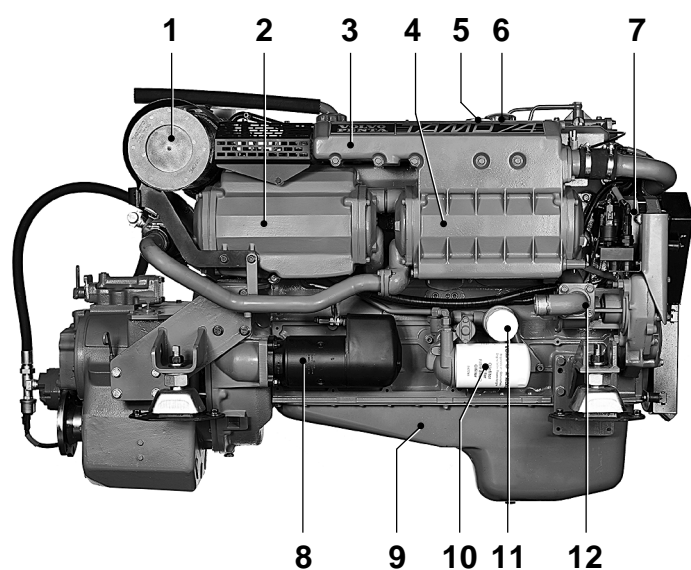
1. Filter for crankcase ventilation
2. Air filter
3. Charge air cooler
4. Oil filler cap
5. Expansion tank
6. Coolant filler cap
7. Heat exchanger
8. Alternator
9. Sea water pump
10. By-pass filter for engine oil
11. Oil filter, engine
12. Starter motor
13. Oil dipstick, engine
14. Oil dipstick, reverse gear



### TAMD74A-A, TAMD74A-B

1. Fuel fine filters
2. Smoke limiter
3. Oil filler cap
4. Coolant filler cap
5. Injection pump
6. Distribution box with semi-automatic fuses
7. Turbocharger\*
8. Exhaust pipe elbow
9. Oil dipstick, engine
10. Fuel shut-off valve
11. Oil cooler, engine
12. Flexible engine mounting (option)
13. Reverse gear (TD MG5091DC)

\* TAMD74A-B: With wastegate.



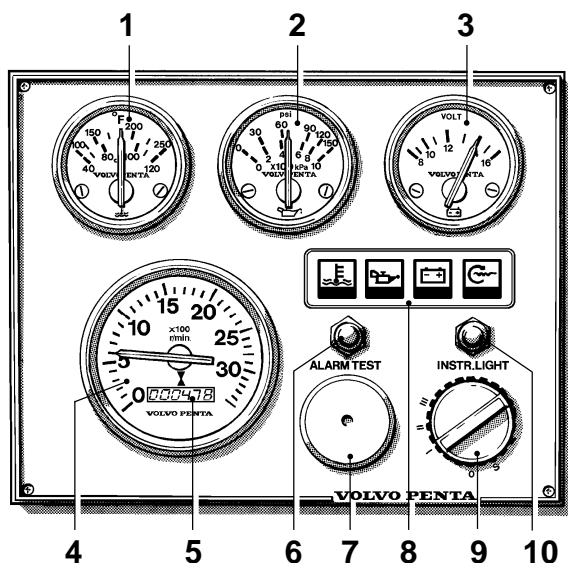
### TAMD74A-A, TAMD74A-B

1. Air filter
2. Charge air cooler
3. Expansion tank
4. Heat exchanger
5. Coolant filler cap
6. Oil filler cap
7. Alternator
8. Starter motor
9. Oil sump
10. Oil filter, engine
11. By-pass filter for engine oil
12. Sea water pump

# Instruments

This chapter describes the Volvo Penta instruments that are available for your engine. Note that that tachometer, oil gauge, temperature gauge, charge gauge, starting switch, etc., that are shown here as panel mounted may be mounted separately in some boats.

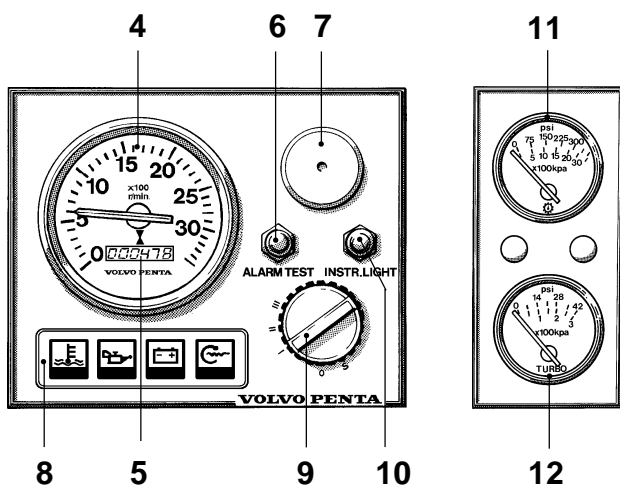
If your boat is fitted with instruments not described here and you are not sure of their function, please get in touch with your boat dealer.

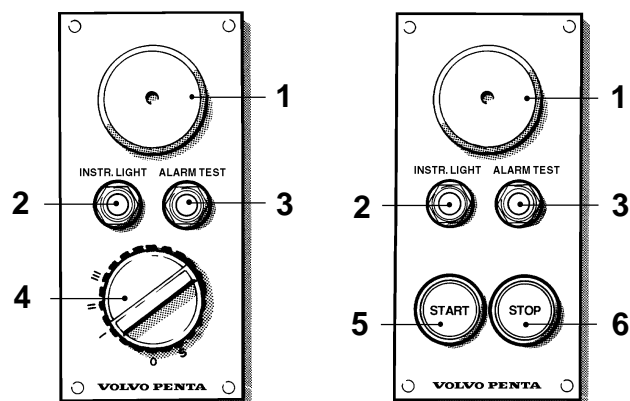


## Instrument panels

Instrumentation for the main control position and auxiliary control position.

1. Temperature gauge. Indicates the engine coolant temperature.
2. Oil pressure gauge. Indicates the pressure of the engine lubricant.
3. Voltmeter. Indicates the charge voltage from the alternator when the engine is running and the battery voltage when the engine is stopped.
4. Tachometer. Indicates the speed of the engine in rpm.
5. Hour counter. Shows the total number of engine running hours as a decimal number.
6. Press button for testing and acknowledging alarms (see next page "Warning displays").
7. Siren for acoustic alarm that sounds if one of the warning lamps comes on.
8. Warning display (see next page "Warning displays", pos 1–4).
9. Starting switch (see next page).
10. Press button for instrument illumination.
11. Oil pressure gauge. Indicates the oil pressure in the reverse gear.
12. Charge air pressure gauge. Indicates the turbo-charger boost pressure.





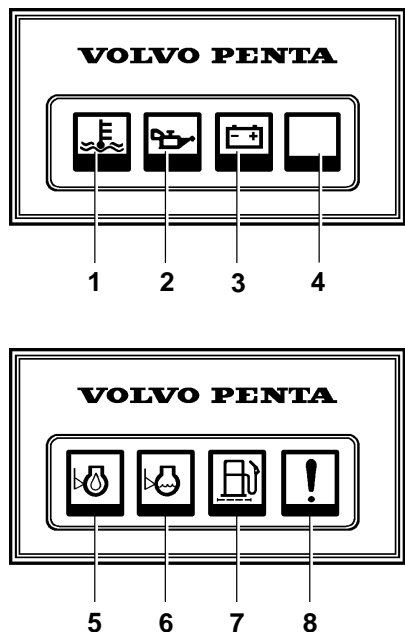
## Control panels

Control panels for the main control position and auxiliary control position.

1. Siren for acoustic alarm that sounds if one of the warning lamps comes on.
2. Press button for instrument illumination.
3. Press button for testing and acknowledging alarms (see "Warning displays" below).
4. Starting switch.
5. Start button.
6. Stop button.

## Warning displays

If the acoustic alarm sounds, one of the warning display lamps will immediately start to flash to indicate the cause of the alarm.



1. Coolant temperature too high.
2. Lubricant pressure too low.
3. Alternator not charging
4. Not used
5. Lubricant level too low\* (accessory).
6. Coolant level too low\* (accessory).
7. Water in fuel pre-filter (accessory).
8. Auxiliary (accessory).

\* Warns for low level with stationary engine and starter key in position I ("Drive position"). Refill to correct level before starting the engine.

### After an alarm

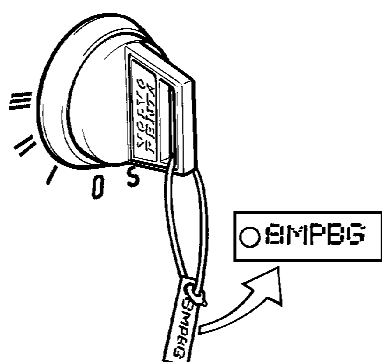
Press the "Alarm test" button to acknowledge and terminate the acoustic alarm. The relevant warning lamp will continue to flash until the fault has been rectified.

### Alarm test

After pressing the "Alarm test" button, the warning lamps will come on and the acoustic alarm will start to sound. Make a habit of always performing an alarm test before starting.







## Starting switch

Delivered with the starter keys is a plate containing the key code required when ordering additional starter keys. Do **not** keep the code where unauthorized persons can access it.

S = Stop position.

0 = Key can be inserted and removed.

I = Voltage on (drive position).

II = Not used

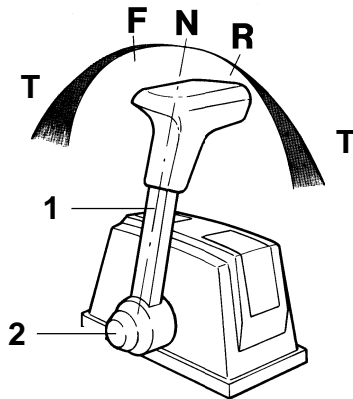
III = Start position.



**IMPORTANT!** Read the starting instructions in the chapter "Starting the engine".

# Controls

This chapter describes the Volvo Penta controls that are available for your engine. If your boat is fitted with controls not described here and you are not sure of their function, please get in touch with your boat dealer.



## Single lever control

### Manoeuvring

Single lever control operates shifting and engine speed from the same lever (1).

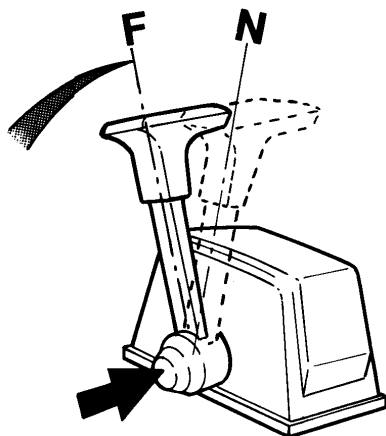
**N** = Neutral position (reverse disengaged and engine idling).

**F** = Reverse gear engaged for moving forwards.

**R** = Reverse gear engaged for moving backward.

= Engine speed control.

A neutral position switch is available as an accessory that allows the engine to be started only when the reverse gear is disengaged.



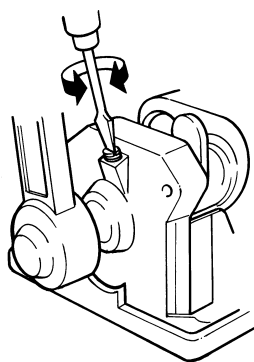
### Disengaging the shifting function

The shifting function can easily be disengaged so that the lever only affects the engine speed.

1. Put the lever (1) in neutral position (N).
2. Press the button (2) while moving the lever forward.
3. Release the button. The lever now affects the engine speed only.

The disengagement will cease automatically when the lever is moved back to neutral position.

**⚠ IMPORTANT!** Take care not to engage the reverse gear unintentionally.



## Friction brake

The control is fitted with an adjustable friction brake for engine speed control.

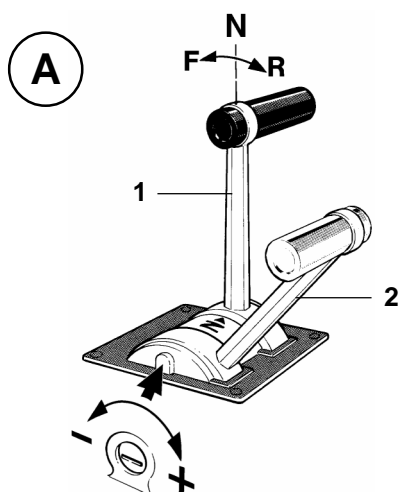
1. Remove the cover on the control.
2. Set the lever to half acceleration/reverse.
3. Adjust the friction brake. Turn clockwise for stiffer lever movement and anticlockwise for lighter movement.
4. Refit the cover.

## Dual lever control

### Manoeuvring

The dual lever control has separate levers for shifting (1) and engine speed control (2).

Control A has a mechanic detent so that shifting can be performed only when the engine speed lever is in idle speed position. A neutral position switch is available that allows the engine to be started only when the reverse gear is disengaged.



### Black lever (1):

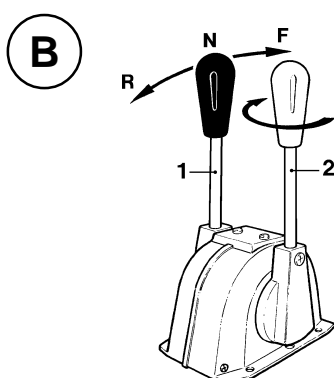
N = Neutral position. Reverse gear disengaged.

F = Reverse gear engaged for moving forwards.

R = Reverse gear engaged for moving backward.

### Red lever (2):

Engine speed control.



## Friction brake

The controls are fitted with an adjustable friction brake for engine speed control.

Adjust the friction brake by turning the screw (control A) or the lever (control B).

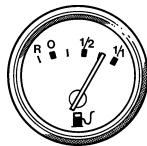
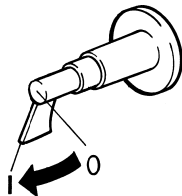
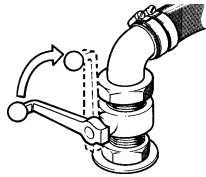
Turn clockwise (+) for stiffer lever movement and anticlockwise (–) for lighter movement.

# Starting the engine

Make a habit of “visually” inspecting the engine and engine room before starting. This will help you to quickly detect abnormalities that have occurred or are about to occur. Make sure instruments and warning displays indicate normal values after starting the engine.

We recommend installing a heater for the engine room to minimize start smoke when cold starting at temperatures below +5°C (41°F).

**⚠ WARNING!** Never use start spray or similar start help. Risk for explosion!



## Measures before start

- Open the fuel cock
- Open the seawater cock where appropriate
- Carry out the measures described in “Daily before first start” in the maintenance schedule.
- Turn on the main switch

**⚠ IMPORTANT!** Never turn the power off using the main switch while the engine is running. This can damage the alternator.

- Make sure there is enough fuel for the planned trip.

## Starting procedure

### 1. Disengage the reverse gear

Put the control lever into neutral and idle on all control positions

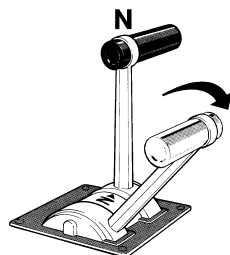
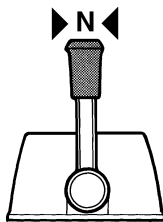
**⚠ WARNING!** If the boat is equipped with controls that allow starting the engine in gear, it is essential to check all control positions to make sure a gear is not engaged.

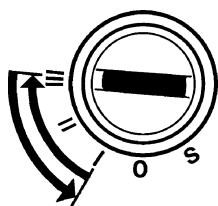
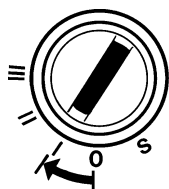
#### Single lever control

Make sure the lever is in neutral position “N”. This means the accelerator is in idle position and the reverse gear is disengaged.

#### Dual lever control

Put the forward/reverse lever in neutral position to enable starting. Move the accelerator all the way back (idle position).





## 2. Turn on the power

Turn on the power by putting the starter key in position "I".

## 3. Check warning lamps and alarms

Press the "Alarm test" button on the instrument panel to make sure the warning lamps come on and the acoustic alarm sounds.

## 4. Start the engine

### Start using the starting switch

Turn the key to position "III". Release the key so it returns to "I" immediately after the engine has started.

**! IMPORTANT!** If the starter motor has been engaged for the maximum time (30 seconds), it must be allowed to cool down for at least one minute before a new attempt is made at starting.

**NOTE!** The key must first be turned to "S" before making a new attempt at starting.

### Start using the start button

Press the start button. Release the button immediately after the engine has started (note that when starting from the alternative control position, the starter key at the main control position must be turned to "I").

### Start using auxiliary batteries

Refer to the description in the chapter "Troubleshooting".

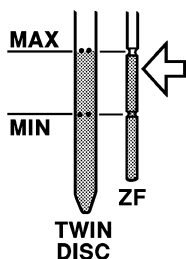
## 5. Check the instruments and run the engine warm

Let the engine idle for the first ten seconds and make sure the instruments and warning display show normal values. Then run the engine at low speed and low load so it attains normal operating temperature before using full power.

**! IMPORTANT!** Do not race the engine when it is cold.

## 6. Check the oil level in the reverse gear

The oil level should be checked once the reverse gear has attained operating temperature (see the description in the chapter "Maintenance" under the heading "Reverse gear").

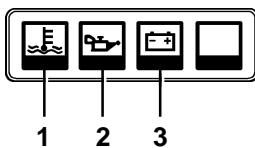
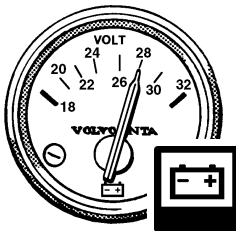
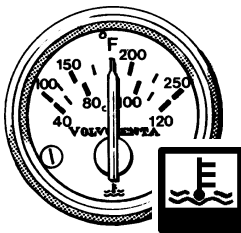
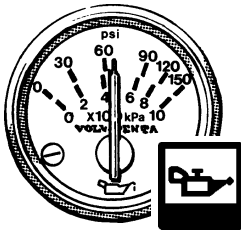


# Operation

Learn how to handle the engine, controls and other equipment in a safe and correct manner before casting off for your maiden voyage.

**⚠ WARNING!** Avoid violent and rapid rudder movement and gear shifting. There is a risk of the passengers falling down or falling overboard.

**⚠ WARNING!** A rotating propeller can cause serious injury. Make sure there is nobody in the water before engaging forward/reverse. Never run close to bathers or in places where you have reason to believe there are people in the water.



## Check the instruments

Check the instruments and warning display directly after start and regularly during operation.

### Oil pressure

During operation, the oil pressure gauge should show a reading of 300–550 kPa (43.5–79.8 psi) or 450–650 kPa (65.3–94 psi) for TAM63 respectively TAM74. A lower value is normal at idling speed. The acoustic alarm will sound automatically in case of low oil pressure.

### Coolant temperature

During operation, the temperature gauge should show a reading of 75–90°C (167–194°F). The acoustic alarm will sound automatically in case the coolant temperature is too high.

### Charging

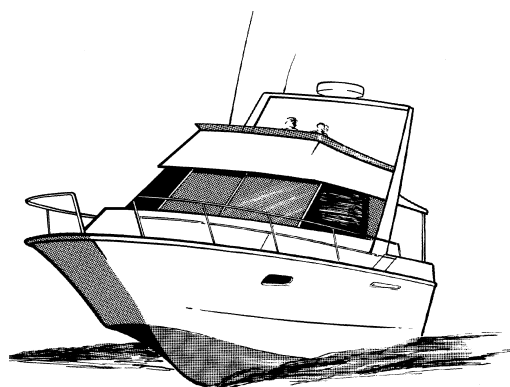
During operation, the charge voltage gauge should show a reading of 14V or 28V for a 12 respectively 24V system. The acoustic alarm will sound automatically in case the charge voltage is missing.

## Alarms and fault indication

If the acoustic alarm sounds, one of the warning display lamps will immediately start to flash to indicate the cause of the alarm: High coolant temperature (1), low oil pressure (2) and no charge voltage (3).

**⚠ IMPORTANT!** Stop the engine immediately after an alarm for low oil pressure. Investigate the cause and rectify it.

Slow the engine speed to idle/disengaged after an alarm for high coolant temperature. If temperature does not drop, the engine must be stopped. Investigate the cause and rectify it.



## Cruising speed

Avoid running at full speed to obtain the best operating economy. We recommend a cruising speed of at least 200 rpm lower than the maximum rpm at full speed (wide open throttle). The maximum rpm at full speed can vary depending on choice of propeller, load and sea conditions, etc., but should be within the wide open throttle range.

### Wide open throttle range:

TAMD63L-A/L-B (Rating 2) .....	2400–2500 rpm
TAMD63L-A/L-B (Rating 3) .....	2700–2800 rpm
TAMD63P-A (Rating 4, 5) .....	2700–2800 rpm
TAMD74A-A (Rating 1, 154 kW*) .....	1700–1800 rpm
TAMD74A-A (Rating 1, 160 kW*) .....	1900–2000 rpm
TAMD74A-A (Rating 1, 184 kW*) .....	2000–2100 rpm
TAMD74A-A (Rating 2) .....	2100–2200 rpm
TAMD74A-B (Rating 2) .....	2100–2200 rpm

\* Max. motor effect.

There could be several reasons for the engine failing to reach the wide open throttle range, see the chapter "Troubleshooting". Use a propeller with a greater pitch if the engine speed exceeds the wide open throttle range. Get in touch with your Volvo Penta dealer for advice.

## Manoeuvring

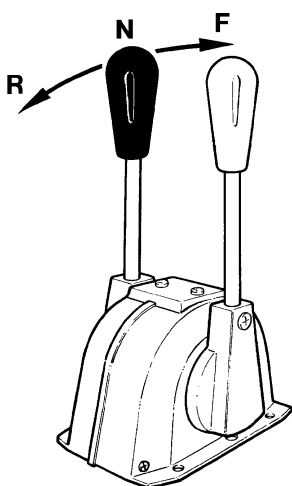
The chapter contains functional descriptions of the controls available from Volvo Penta.

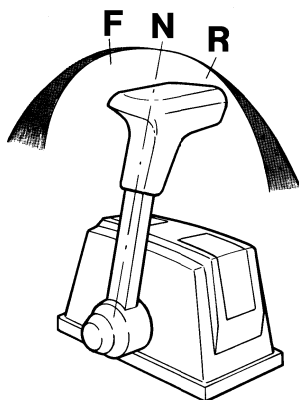
The reverse gear must be engaged at low idling speed. There must be a brief pause after engaging reverse gear before increasing the engine speed. The pause must be approximately two seconds long to ensure the reverse gear clutch plates are properly engaged.

**⚠ IMPORTANT!** If the boat is equipped with two engines, they must both be running while in reverse or there will be a risk of water entering the stationary engine (through the exhaust passage).

### Pulling away

1. Move the lever from neutral to the engagement position for the desired direction of travel. Wait for approximately two seconds.
2. Increase gradually to the desired engine speed.





### Forward–Reverse

1. Slow the engine speed to idling and allow the boat to loose most of its speed.
2. Move the lever to neutral. Wait for approximately two seconds.
3. Move the lever to reverse. Wait for approximately two seconds and then increase the engine speed gradually.

**⚠ IMPORTANT!** A direct forward–reverse manoeuvre can damage the transmission and engine. It is therefore always necessary to stop with the lever in neutral for a few seconds. Allow the boat to loose most of its speed as well before engaging. If the speed of the boat is too high, there is a risk of the propeller torque being so high that the engine will stop and start reversing, causing the engine to break down.

### Forced propeller rotation (E.g. when towing)

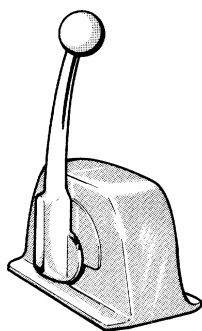
When towing, sailing, anchoring in strong currents, etc., the propeller can make the propeller shaft rotate even though the engine is stationary. This rotation may be uncomfortable and can damage the reverse gear.

**⚠ IMPORTANT!** The propeller shaft can be allowed to rotate with a stationary engine for up to 6–8 hours. After that period, the engine must be started and run for at least 5 minutes to enable lubrication and cooling of the reverse gear.

In cases where the propeller shaft may rotate faster than during normal operation, e.g. when sailing, a temperature gauge should be fitted to monitor the oil temperature. Max. permitted temperature is 110°C (230°F) for Twin Disc and 95°C (203°F) for ZF (MPM) reverse gear.

A shaft brake must be fitted if the above directions cannot be followed or if it is necessary to stop the shaft for reasons of comfort. On isolated occasions, the propeller shaft flange can be locked mechanically in a suitable manner.





## Accessories

### Trolling valve

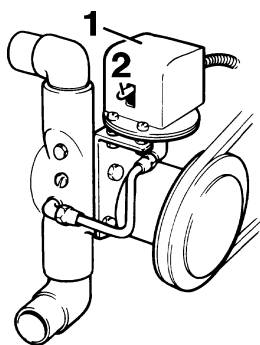
Certain Twin Disc reverse gears can be fitted with a trolling valve so that the lowest speed of the boat can be variably reduced by 1–80% at engine speeds up to 1100 rpm.

**⚠ IMPORTANT!** Risk of overheating the reverse gear if the trolling valve is used at higher engine speeds than 1100 rpm.

### Manoeuvring

Disengage the reverse gear and set the trolling valve for maximum slip. Engage “Forward” or “Reverse” and set the desired slip position within the permitted engine speed range.

In order to attain full propeller output, the trolling valve lever must always be in “disengaged” position when not being used.



### Flush and bilge pump

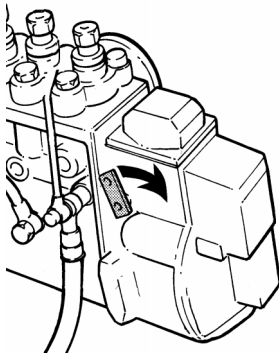
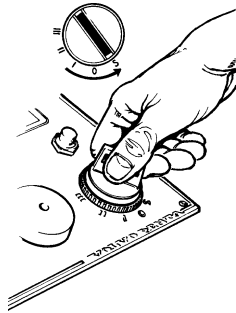
The bilge pump has a vacuum switch (1) that automatically disengages the pump when water is no longer being drawn into the pump.

The scavenging and bilge pump is engaged and disengaged from a switch that is normally located at the main control position. The bilge pump can also be engaged manually by holding down the lever 2 for about 20 seconds.

# Stopping the engine

Let the engine run at low idling speed (in neutral) for at least three minutes before turning it off. This will keep the engine temperature in balance and prevent it boiling.

**⚠ IMPORTANT!** The procedure described above is especially important if the engine has been run hard and/or exerted to heavy loads.



## Stop

1. Disengage the reverse gear by moving the lever to neutral position.
2. Turn the key to stop position "S" or press the stop button.
3. Hold the key/button in position until the engine has stopped (the key will return to "0" automatically when released and can then be removed).

## Emergency stop

If a fault occurs that prevents the engine being stopped by the normal method, it can be stopped manually using the lever on the injection pump. Pull back on the lever until the engine is stationary.

**⚠ WARNING!** Working on or approaching a running engine is a safety hazard. Beware of rotating parts and hot surfaces.

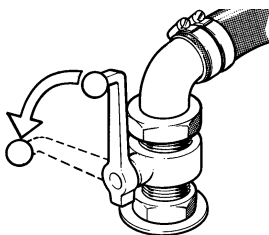
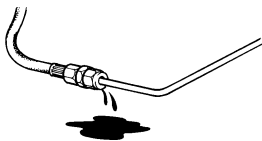
## After stopping

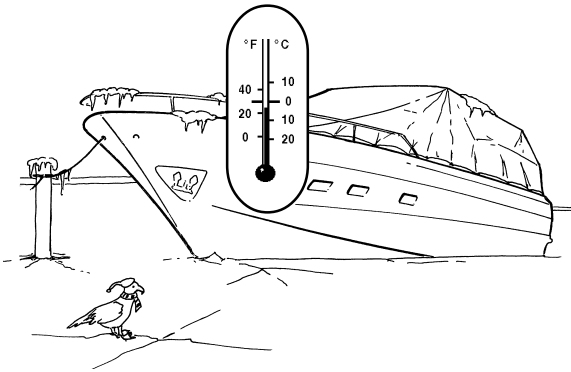
- Check the engine and engine room for leaks.
- Close the fuel cock and seawater cock.

**⚠ IMPORTANT!** Do not forget to open the cocks before starting the engine again.

- Read off the hour counter and carry out preventive maintenance according to the maintenance schedule.
- Turn off the main switch if the engine is not to be used for long periods.

**⚠ IMPORTANT!** Never turn the power off using the main switch while the engine is running. This can damage the alternator.





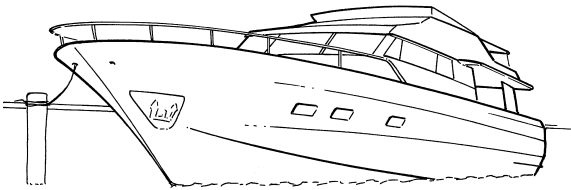
## Anti-freezing measures

If the engine room cannot be protected from frost, the seawater system must be drained and the coolant in the freshwater system must contain sufficient anti-freeze to prevent it from freezing. Refer to chapter Maintenance "Seawater system" and "Freshwater system" respectively.

**⚠ WARNING!** If the seawater system bursts due to freezing, it is possible for the boat to sink.

**⚠ IMPORTANT!** If the coolant does not give sufficient anti-freeze protection, it may cause costly damage to the engine.

Check the charge of the battery. A poorly charged battery can freeze and break.



## Breaks in operation

During breaks in operation when the boat is in the water, the engine must be run warm once a fortnight. This will prevent the engine from corroding.

**⚠ IMPORTANT!** The engine must be conserved if it is not to be used for longer than two months: Refer to: Inhibiting


# Maintenance schedule


Your Volvo Penta engine and associated equipment is designed to provide high operational reliability and long service life. They are constructed to withstand the marine environment while also affecting it as little as possible. Preventive maintenance in accordance with the maintenance schedule will ensure that it retains these qualities and avoid unnecessary operational disturbances.

## Warranty inspection

The prescribed warranty inspection "First Service Inspection" must be carried out at an authorised Volvo Penta workshop during this first period of operation. Directions for when and where this is to be carried out can be found in the **Warranty and Service Book**.

## MAINTENANCE SCHEDULE

 **WARNING!** Read the chapter "Maintenance" thoroughly before starting any maintenance work. It contains directions for performing maintenance in a safe and correct manner.

 **IMPORTANT!** When both operating time and calendar time is given, the one occurring first is to apply. Maintenance points marked with □ are to be carried out at an authorised Volvo Penta workshop.

### Daily before first start

- Engine and engine room. General inspection ..... page 29
- Engine oil. Check level ..... page 33
- Coolant. Check level ..... page 37
- Charge air cooler. Check the drain hole ..... page 46
- Reverse gear. Checking oil level (after start) ..... page 58

### After the first 10 operating hours

- Reverse gear (ZF/MPM). Clean oil strainer ..... page 58

### After the first 50 operating hours

- Reverse gear (Twin Disc and ZF/MPM). Clean oil strainer ..... page 58
- Reverse gear (Twin Disc and ZF/MPM). Changing oil ..... page 59

### Every 50 operating hours / at least every 12 months

- Fuel pre-filter. Check and drain ..... page 50

**Every 25–200 operating hours<sup>1)</sup> / at least every 12 months**

- Engine oil. Change <sup>1)</sup> ..... page 33
- Oil filter. Change <sup>2)</sup> ..... page 34

<sup>1)</sup> The oil change interval varies depending on the engine type, oil grade and sulphur content of the fuel. See page 32.

<sup>2)</sup> The oil filter is changed in every second oil change.

**After the first 100 operating hours**

- ☐ Valve clearances. Check ..... not illustrated

**Every 250 operating hours / at least every 12 months**

- Crankcase ventilation(TAMD63). Change filter ..... page 30
- Drive belts (not Poly-V). Check / Adjustment ..... page 30
- Air filter (TAMD63). Clean ..... page 31
- Seawater filter. Check/clean ..... page 45
- Zinc anodes. Check/Change ..... page 45
- Fuel pre-filter(Double filter). Check<sup>1)</sup> ..... page 49
- Electrical connections. Check/clean ..... page 52
- Reverse gear (ZF/MPM). Clean oil strainer ..... page 58

<sup>1)</sup> Concerns only double filters: Check the manometer and change filter if necessary, but change filter at least every 1000 operating hours or at least once at year.

**Every 500 operating hours / at least every 12 months**

- Drive belts(Poly V). Check / Adjustment ..... page 30
- Coolant (Anti-corrosion mixture). Topping up<sup>1)</sup> ..... page 36
- Battery. Ceck of electrolyte ..... page 53
- Reverse gear (ZF/MPM). Changing oil ..... page 59

<sup>1)</sup> This applies only if the cooling system is filled with an anti-corrosion mixture.

**Every 1000 operating hours / at least every 12 months**

- ☐ Valve clearances. Check/Adjust ..... not illustrated
- Air filter (TAMD74). Change ..... page 31
- Fuel filter. Change ..... page 48
- Fuel pre-filter. Change filter element ..... page 50
- Reverse gear (Twin Disc). Clean oil strainer ..... page 58
- Reverse gear (Twin Disc). Changing oil ..... page 59

**Every 2000 operating hours**

- ☐ Injectors. Pressure test ..... not illustrated

**Every 12 months**

- ☐ Turbocharger. Check ..... not illustrated
- ☐ Wastegate (TAMD63P, TAMD74A-B). Check ..... not illustrated
- ☐ Engine and reverse gear. General check ..... not illustrated
- ☐ Heat exchanger. Check / Clean ..... not illustrated
- ☐ Charge air cooler. Check / Clean ..... not illustrated
- ☐ Oil cooler (Reverse gear). Check / Clean ..... not illustrated
- Impeller (Seawater pump). Check / Change ..... page 44
- Impeller (Flush pump/Bilge pump). Check / Change ..... not illustrated
- Engine and reverse gear. Clean / Paint ..... not illustrated

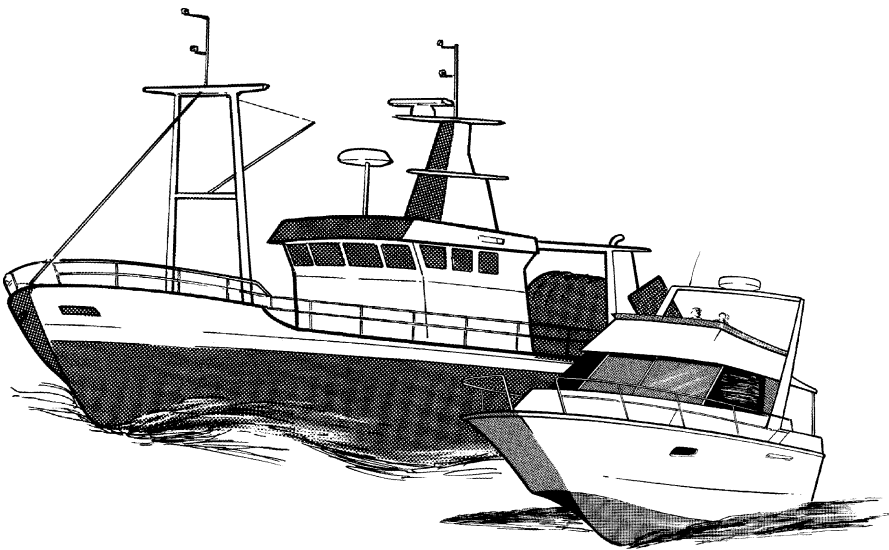
**Every 24 months**

- Coolant. Change ..... page 37
- Cooling system. Flushing ..... page 39

**Renovated engine:**

**After the first 100 operating hours**

- ☐ Valve clearances. Check ..... not illustrated



# Maintenance

This chapter contains general technical information and directions for carrying out the prescribed maintenance points. Read the directions carefully before starting work. The times at which the maintenance points are to be carried out can be found in the previous chapter "Maintenance schedule".

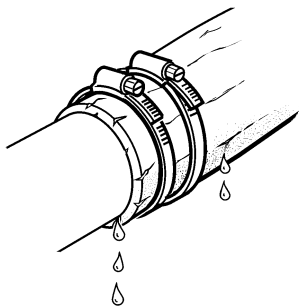
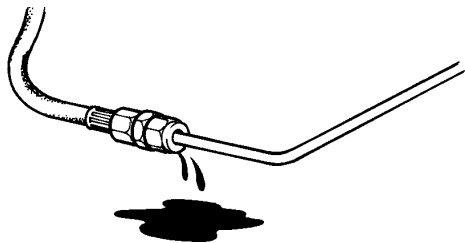
**⚠ WARNING!** Read the safety directions for maintenance and service in the chapter "Safety information" before starting work.

**⚠ WARNING!** Maintenance and service must be carried out on a stationary engine unless specified otherwise. Stop the engine before opening or dismantling the engine hatch/hood. Prevent inadvertent start of the engine by removing the starter key and turning off the power with the main switch.

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## Engine, general

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### General inspection

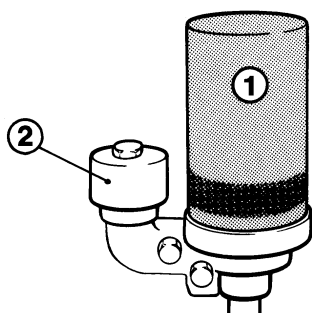
Make a habit of "visually" inspecting the engine and engine room before starting the engine and after stopping when the engine has been turned off. This will help you to quickly detect abnormalities that have occurred or are about to occur.

Look especially carefully for oil, fuel and coolant leaks, loose bolts, worn or slack drive belts, loose connections, damaged hoses and electric cables. This inspection takes only a few minutes but can prevent serious operating disturbances and costly repairs.

**⚠ WARNING!** Accumulations of fuel, oil and grease on the engine or in the engine room is a fire hazard and must be removed immediately they are detected.

**⚠ IMPORTANT!** If an oil, fuel or coolant leak is detected, the cause must be investigated and the fault rectified before the engine is started.

**⚠ IMPORTANT!** Never point high-pressure water jets directly at seals, rubber hoses or electrical components. Never use the high-pressure function when washing the engine.



## Crankcase ventilation. Change filter (TAMD63)

Change the filter (1) earlier than recommended if oil is forced out of the relief valve (2).

1. Dismantle the filter (1) by screwing it anti-clockwise.
2. Check the rubber gasket in the bracket and change if necessary. Screw on the new filter by hand.

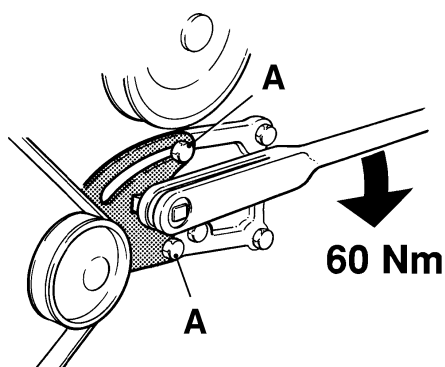
## Drive belts. Check/Adjust/Change

**⚠ WARNING!** Stop the engine before commencing maintenance work.

### General

Check belt tension and condition regularly. If the belt is too taut it can damage bearings and if it is too loose it may slip. Check and adjust after operation when the belt is warm.

**⚠ IMPORTANT!** Always change a belt that appears worn or is cracked (belts working in pairs must be replaced together).



### Poly-V belt

The alternator and circulation pump are driven by a Poly-V belt for best function and service life. A torque wrench must be used for adjustment.

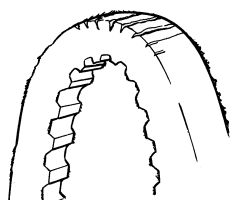
1. Undo screws (A) before you tension the belt.
2. Change the belt as necessary.
3. Put the torque wrench stub into the square hole in the jockey wheel bracket. Tension the belt with  $60 \pm 3$  Nm ( $6 \pm 0.3$  kpm/ $44 \pm 2$  lbf.ft).
4. Tighten screws (A).

### Other belts

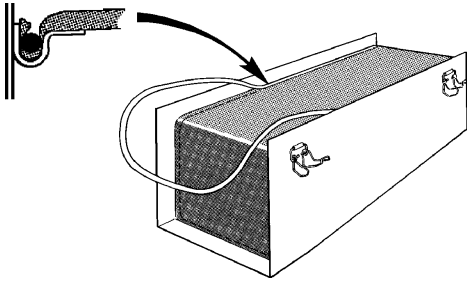
Also check the belts for the bilge and flushing pump, extra alternator etc. These are usually driven by conventional V- belts.

Adjust and change as necessary. It can generally be said that these belts are correctly tensioned if they can be pressed down 10 mm (3/8") by thumb pressure.

Clean the belt grooves before fitting a new belt.

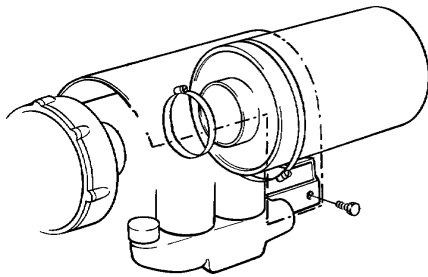




**Air filter. Cleaning (TAMD63)**

1. Remove the lid from the air filter housing.
2. Remove the insert and wash it in clean diesel oil.
3. Squeeze the insert out and put it back in the filter housing. Fix the insert by pressing the O-ring into the groove around the outside edge of the insert.

**⚠ IMPORTANT!** Change the insert if it is damaged.

**Air filter. Changing (TAMD74)**

1. Remove the old filter. Be careful to ensure that no contamination gets into the engine.
2. Install a new filter and tighten the hose clamps.

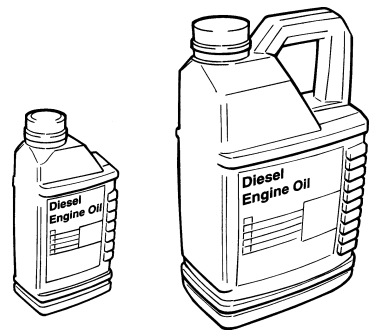
**⚠ IMPORTANT!** Scrap the old filter. It must not be cleaned.

Lubricating system

Oil change intervals can vary from 25 to 200 hours depending on engine type, grade of lubricant and the sulphur content in the fuel.

**IMPORTANT!** Oil change intervals must never exceed 12 months.

If you would like longer oil change intervals than those specified in the table below, samples of the lubricant must be sent regularly to the oil manufacturer for checking.

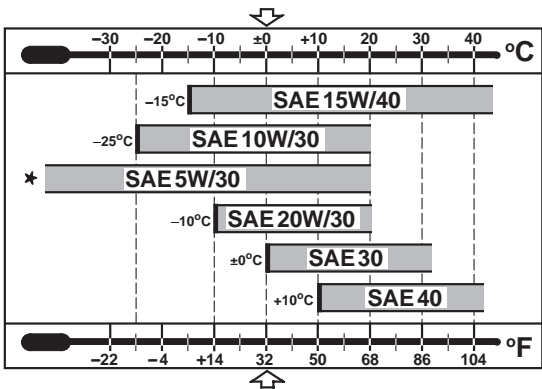


Oil grade	Fuel sulphur content in wt. %		
	up to 0.5 %	0.5 – 1.0 %	above 1.0 % <sup>1)</sup>
	Oil change interval <sup>2)</sup>		
VDS, VDS-2	200 hours	100 hours	50 hours
ACEA E3–96, E2–96 API CD, CE, CF, CF–4, CG–4	100 hours	50 hours	25 hours

**NOTE!** Mineral based synthetic or semi-synthetic oil can be used on condition that it meets the oil grades above.

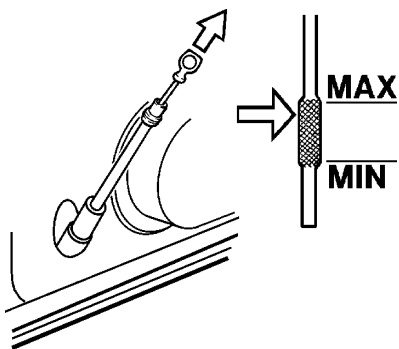
<sup>1)</sup> If the sulphur content in the fuel exceeds 1.0 wt.%, an oil with TBN14–20 must be used (TBN=Total Base Number)  
<sup>2)</sup> The oil must be changed at least once a year

VDS = Volvo Drain Specification  
ACEA = Association des Constructeurs Européenne d'Automobiles  
API = American Petroleum Institute



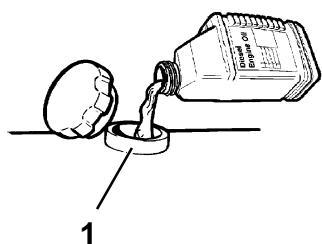
**Viscosity**  
Select the viscosity from the table for constant exterior temperatures.  
\*Refers to synthetic or semi-synthetic oil

**Oil change volume**  
See “Technical data”



## Engine oil. Check level

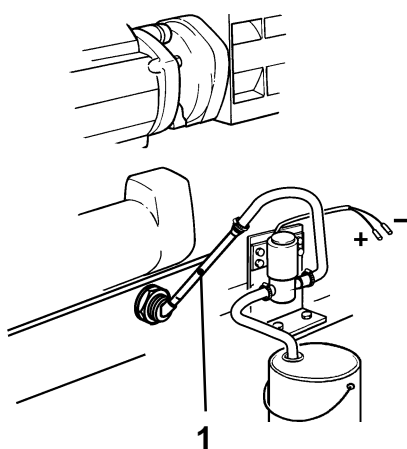
The oil level must be within the marked range on the dipstick and must be checked daily before starting the first time.



## Engine oil. Filling

Top up the oil through the filler opening (1) in the ventilation cover. Make sure the correct level is attained but wait a few minutes to allow the oil to run into the oil sump.

**⚠ IMPORTANT!** Do not fill above the maximum oil level. Use only oil of the recommended grade (see the previous page).



TAMD63

## Engine oil. Change

Always observe the recommended oil change interval. Use a manual or electric oil scavenging pump (optional equipment) to suck the oil out of the sump.

**⚠ IMPORTANT!** Only use recommended grades of oil (see previous page).

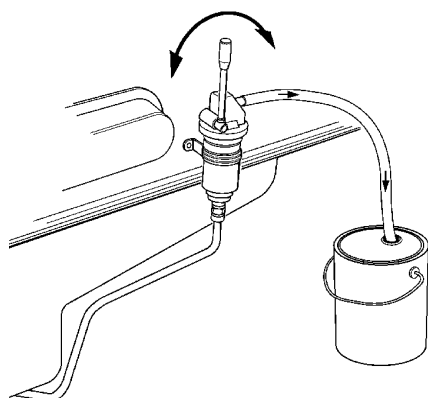
1. Warm the engine up (this makes it easier to suck the oil up from the sump). Then stop the engine.

**⚠ WARNING!** Hot oil and hot surfaces can cause burns.

2. TAMD63 (electric oil scavenging pump):  
Remove the dipstick. Connect the suction hose of the oil scavenging pump to the dipstick tube (1). Suck the oil out.

TAMD74 (manual oil scavenging pump):  
Connect a hose to the outlet pipe of the oil scavenging pump. Suck the oil out.

3. Change the oil filter and the by-pass filter at every second oil change (please refer to the instruction on the next page).
4. Fill up with oil to the correct level.



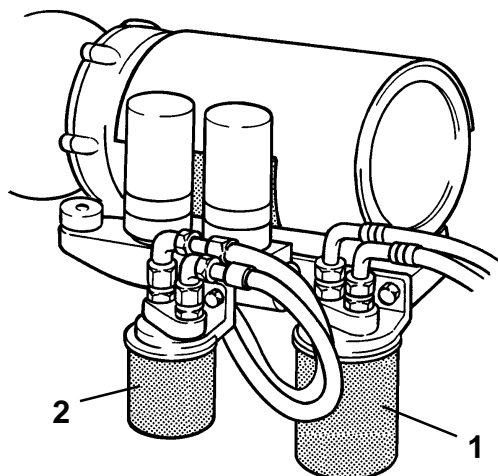
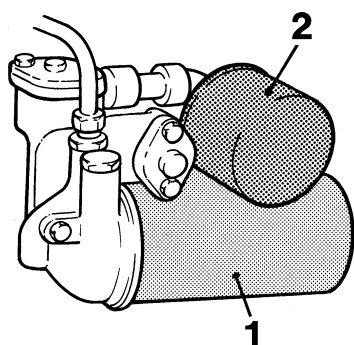
TAMD74

5. Start the engine and allow it to idle. Check that the low oil pressure warning lamp goes out and that there is no leakage by the filter.

**⚠ WARNING!** Approaching or working with a running engine is a safety risk. Be careful to avoid rotating components and hot surfaces.

6. Stop the engine. Wait a few minutes before you check the oil level. Top up as necessary.

**NOTE!** Process the old oil filter in accordance with local regulations.



### Oil filter and by-pass filter. Changing

Change the oil filter and by-pass filter every second oil change. Standard filter location is on the right side, but they can be located at the rear of the engine if necessary (option).

**⚠ WARNING!** Hot oil and hot surfaces can cause burns!

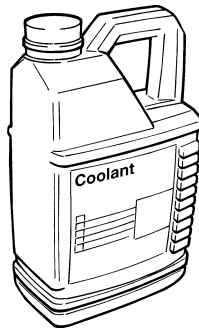
1. Drain the oil as in the “Engine oil changing” instruction on the previous page.
2. Put a vessel underneath the filter to avoid oil spillage. Unscrew the oil filter (1) and by-pass filter (2).
3. Check that the mating surfaces on the filter bracket are clean, and that no traces of the seal from the old oil filter remain.
4. Wipe some oil on the rubber seal for the new filter.
5. Screw the filters on by hand until the rubber seal just touches the mating surface of the filter bracket. Then turn it another half turn, and no more!
6. Fill up with oil as in the “Engine oil, changing” instruction on the previous page.

## Freshwater system

The freshwater system is the internal engine cooling system. It is a closed system and must always be filled with a coolant that protects it against internal corrosion and freezing when the climate demands.

The circulation pump ensure good circulation in the system. The thermostat will start to open at a certain temperature and will be fully open when the engine has attained normal operating temperature. When the thermostat opens, the warm coolant passes through the heat exchanger where it is cooled by the water in the engine's sea-water system.

In its standard version, the engine is fitted with an internal freshwater system. Volvo Penta also supply engines with the cooling system prepared for external cooling, e.g. keel cooling.



### Coolant. General

The freshwater system must always be filled with a coolant that protects it against internal corrosion and freezing when the climate demands.

Anti-corrosive additives become less efficient with age and the coolant must therefore be changed.

**⚠ IMPORTANT !** Never use only water as a coolant and change the coolant in accordance with the recommendations in the maintenance schedule.

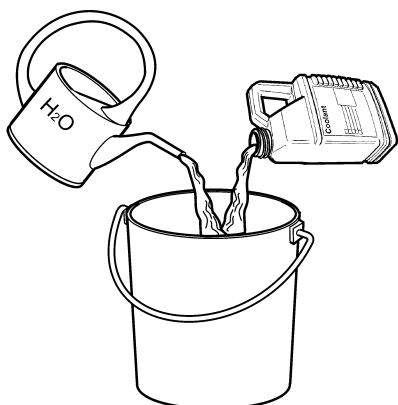
### Water quality

To avoid clogging the system, the coolant must be mixed with pure water in accordance with ASTM D4985. If there are doubts about the purity of the water, use distilled water or ready-mixed coolant instead.

#### ASTM D4985:

Total solid particles .....	< 340 ppm
Total hardness .....	< 9.5° dH
Chloride .....	< 40 ppm
Sulphate .....	< 100 ppm
pH-value .....	5.5–9
Silicon .....	< 20 mg SiO <sub>2</sub> /l
Iron .....	< 0.10 ppm
Manganese .....	< 0.05 ppm
Conductivity .....	< 500 µS/cm
Organic content, COD <sub>Mn</sub> .....	< 15 mg KMnO <sub>4</sub> /l





### Anti-freeze mixture

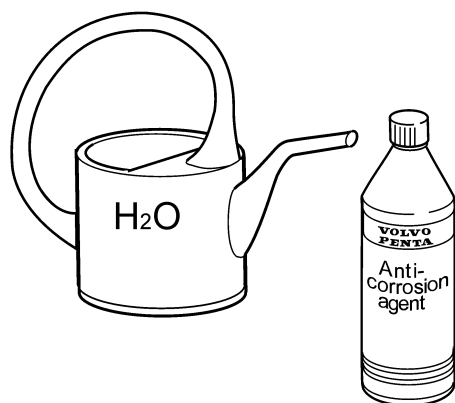
When there is risk of freezing, a mixture of 50% Volvo Penta anti-freeze (glycol) and 50% water (complying with ASTM D4985) must be used. This mixture will protect against freezing down to approx.  $-40^{\circ}\text{C}$  ( $-40^{\circ}\text{F}$ ) and is to be used all year round.

**⚠ IMPORTANT!** Even if the temperature never falls as low as  $-40^{\circ}\text{C}$  ( $-40^{\circ}\text{F}$ ), the mixture specified above should still be used to provide adequate anti-corrosive properties.

Mix the glycol with water in a separate container before filling the cooling system.

**⚠ WARNING!** Glycol is a health hazard (poison!).

**⚠ IMPORTANT!** Alcohol must not be used in the cooling system.



### Anti-corrosion mixture

Water (complying to ASTM D4985) mixed with Volvo Penta anti-corrosion agent can be used as a coolant when there is no risk of freezing.

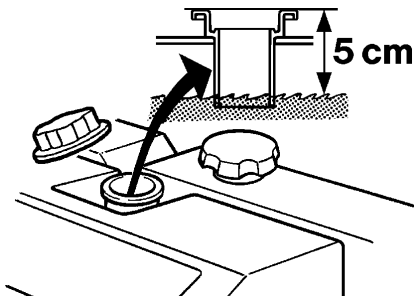
Using an anti-freeze mixture all year round is recommended, however, whatever the climate.

Mix as directed on the packaging. Run the engine warm after filling to obtain the best effect of the additive.

If the operating time exceeds 500 hours a year, the anti-corrosive protection in the coolant must be supplemented with 1/2 litre anti-corrosion agent every 500 hours.

**⚠ WARNING!** Anti-corrosion agent is a health hazard (poison!).

**⚠ IMPORTANT!** Never mix anti-corrosion agent with anti-freeze (glycol). Frothing can occur and severely impair the cooling properties.



## Coolant level. Check

**⚠ WARNING!** Never open the pressure cap when the engine is warm. Steam or hot fluid may spurt out.

**⚠ IMPORTANT!** Check the coolant level on a cold stationary engine.

Make sure the coolant level is approx. 5 cm (2") below the sealing surface of the filling cap. Fill as necessary as described below.

## Coolant. Filling

**⚠ CAUTION!** Stop the engine and allow it to cool down before filling. Hot oil and hot surfaces can cause burns.

### Topping up

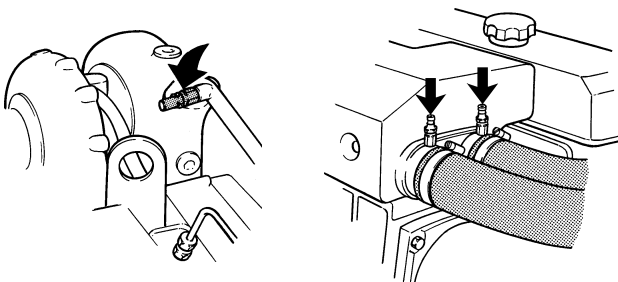
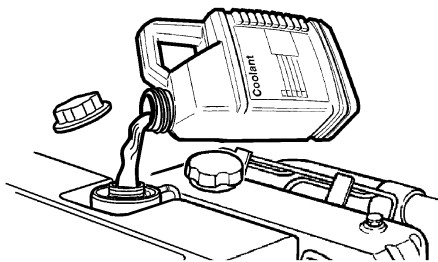
Fill with coolant to the correct level through the filler opening on the expansion tank. Fill slowly so that the evacuated air is able to pass through the filler opening.

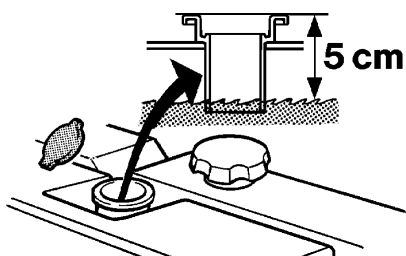
**⚠ IMPORTANT!** Use the same type of coolant that is already in the system.

**⚠ IMPORTANT!** If the heat exchanger is empty, the coolant must be filled according to the description "Filling the cooling system when empty".

### Filling the system when empty

1. Open the ventilation cocks by the turbocharger and the heat exchanger.
2. Make sure any other systems such as heater, water heater, etc., connected to the cooling system are also ventilated.
3. Fill with coolant through the filler opening on the expansion tank.
4. Fill slowly so that the evacuated air is able to pass through the ventilation cock/cks and the filler opening.

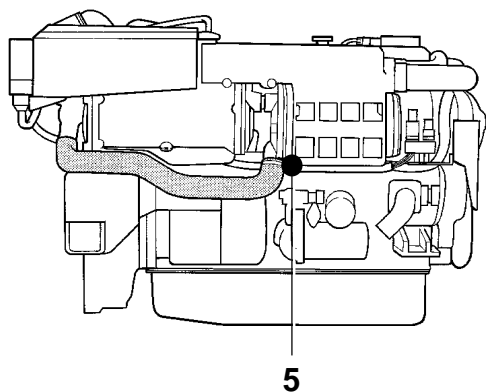
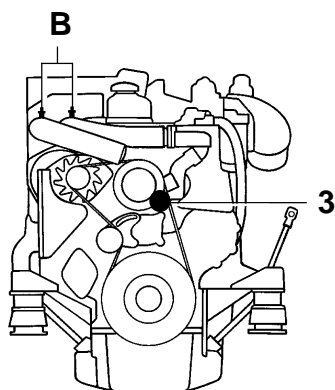
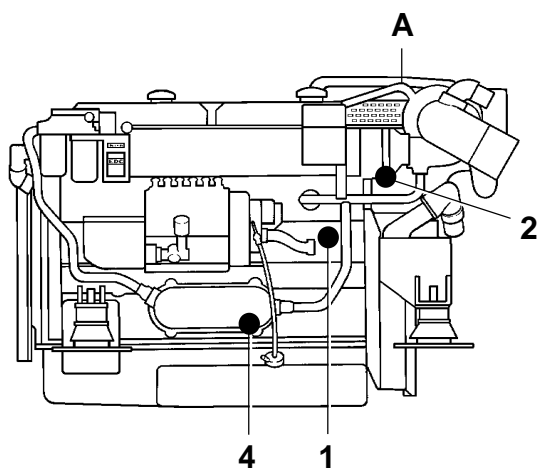




5. When coolant that is free from air flows out, the ventilation cocks must be closed.
6. Cease filling when the correct level is attained.
7. Start the engine and run it until it reaches operating temperature.

**⚠ IMPORTANT!** The engine must not be started before the system has been bled and filled.

8. Stop the engine and allow it to cool down. Check the coolant level and top up if needed.



### Coolant. Drain

**⚠ WARNING!** Stop the engine and allow it to cool down before draining. Hot coolant and hot surfaces can cause burns.

**⚠ WARNING!** Glycol is a health hazard (poison). Collect the old coolant and leave it to a destruction plant.

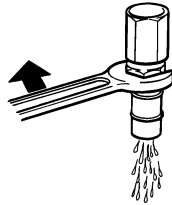
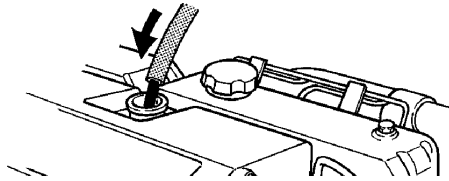
**⚠ IMPORTANT!** The coolant is drained via the taps (1–3) and the plugs (4, 5). Most of the coolant is drained via tap (1) but all drain points must be opened for all coolant to be drained.

1. Remove the filler cap on the expansion tank.
2. Open vent cock (A) and vent cocks (B) by the heat exchanger.
3. Connect a suitable hose to tap (1) on the cylinder block. Open the tap and let the coolant run out into a suitable vessel.

**IMPORTANT!** Check that the coolant really runs out. Deposits may need to be removed inside the drain plugs/taps.

4. Continue with the other drain points until all five have been opened and all coolant has been drained off.
5. Drain any other systems such as heater, water heater, etc., connected to the freshwater system too.
6. Close all drainage points.





### Freshwater system. Flushing

The system should be flushed before changing coolant to avoid inferior cooling performance due to deposits in the cooling system.

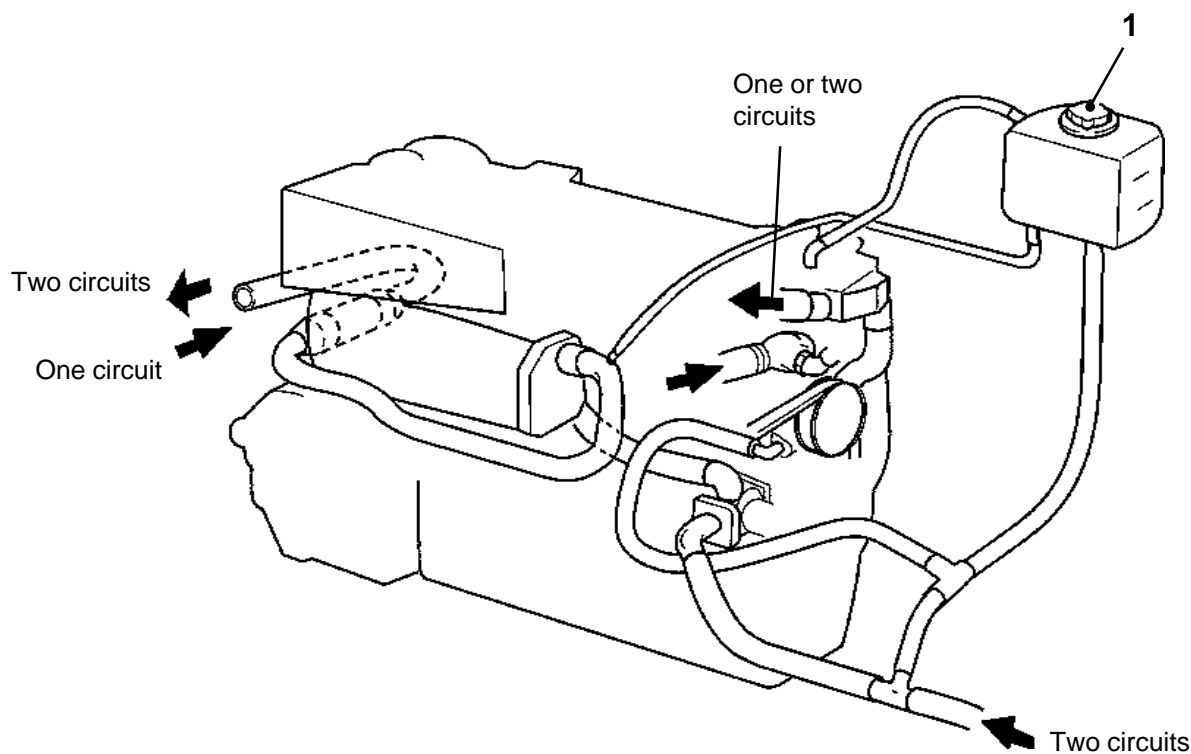
**⚠ IMPORTANT!** Certain parts of the system are made of light alloy. Chemical additives must therefore not be used when cleaning.

1. Drain the coolant as described earlier.
2. Insert a hose into the filler opening on the expansion tank and flush with fresh water.
3. Flush until the water running out of the drainage points is clean.
4. Close all drainage points when all the fresh water has run out.
5. Fill with coolant.

## Cooling system, external cooling

### Introduction

A cooling system with external cooling does not have a heat exchanger but is cooled by heat being transferred via one or two external cooling circuits. A single circuit system serves all the components being cooled. A dual circuit system has either two freshwater circuits or one freshwater circuit together with one seawater circuit. In both cases, one of the circuits cools the engine and the other circuit cools the charge air cooler and the oil coolers.



### Coolant level. Check

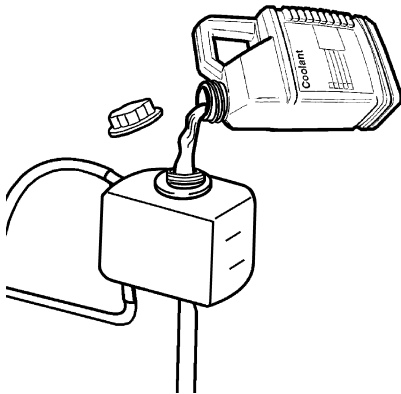
**⚠ WARNING!** Never open the filler cap when the engine is warm. Steam or hot fluid may spurt out.

Make sure the level ends up between the MIN and MAX marks. If there are no marks, the coolant level should be approx. 5 cm (2") below the sealing surface of the filling cap (1). Fill if necessary with the same type of coolant that is already in the system.

**⚠ IMPORTANT!** Check the coolant level on a cold stationary engine.

## Coolant. Filling

**⚠ WARNING!** Stop the engine and allow it to cool down before filling. Hot oil and hot surfaces can cause burns.

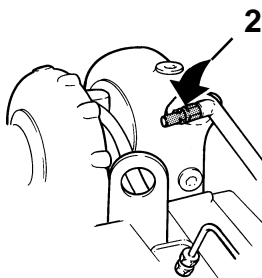


### Topping up

Fill with coolant to the correct level through the filler opening (1) on the expansion tank. Fill slowly so that the evacuated air is able to pass through the filler opening.

**⚠ IMPORTANT!** Use the same type of coolant that is already in the system.

**⚠ IMPORTANT!** If the heat exchanger is empty, the coolant must be filled according to the description "Filling the cooling system when empty".



### Filling the system when empty

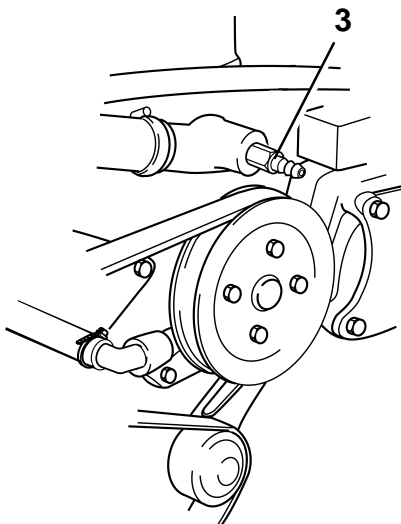
1. Open the vent tap by the turbocharger (2) and the keel cooler circuit return pipe (3).

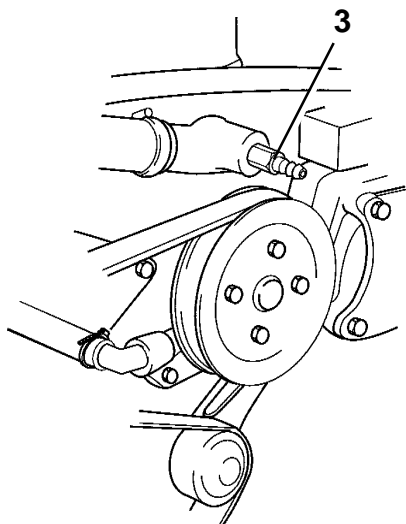
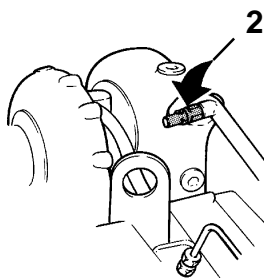
**NOTE!** Do not open the bleed screw by the charge air cooler if the circuit is part of the seawater system.

2. Make sure any other systems such as heater, water heater, etc., connected to the cooling system are also ventilated.
3. Fill with coolant via the filler opening on the expansion tank.
4. Fill slowly so that the evacuated air is able to pass through the ventilation cock/cock and the filler opening.
5. Close the ventilation cocks/cock as coolant that is free from air runs out of them.
6. Cease filling when the correct level is attained.
7. Start the engine and run it until it reaches operating temperature.

**⚠ IMPORTANT!** The engine must not be started before the system has been bled and filled.

8. Stop the engine and allow it to cool down. Check the coolant level and top up if needed.





## Coolant. Drain

**⚠ WARNING!** Stop the engine and allow it to cool down before draining. Hot oil and hot surfaces can cause burns.

**⚠ WARNING!** Glycol is a health hazard (poison). Collect the old coolant and leave it to a destruction plant.

1. Remove the filler cap.
2. Open the vent tap (2) by the turbocharger and at the keel cooling circuit return hose union (3).
3. Open the cocks shown in "Coolant. Drain" (standard system). Open also the cocks shown in "Sea-water system. Drain" on systems without seawater circuit. Collect the fluid in a suitable receptacle.

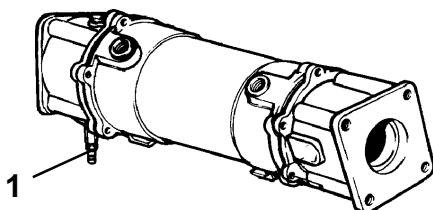
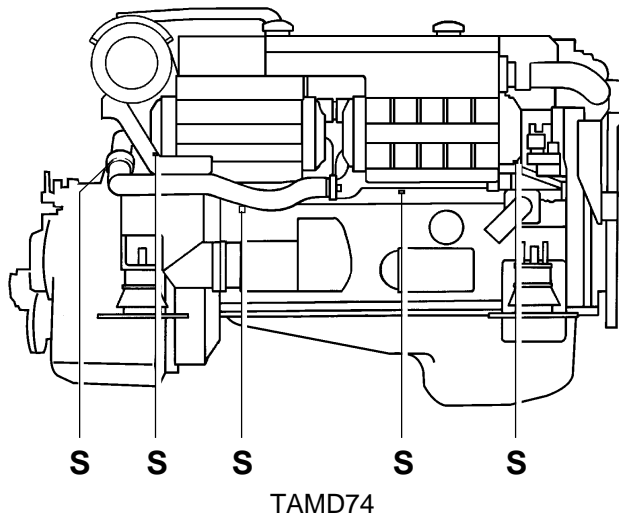
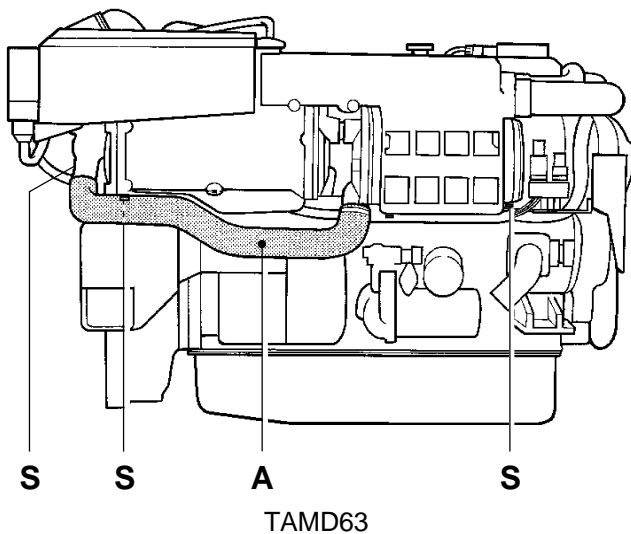
**⚠ IMPORTANT!** Make sure the coolant really runs out. It may be necessary to clean away deposits inside the drain cocks.

4. Drain any other systems such as heater, water heater, etc., connected to the freshwater system too.
5. Close all cocks.

## Seawater system

The seawater system is the engine's external cooling system. The seawater pump draws in water via the seawater intake and pump it on through the charge air cooler, heat exchanger and the reverse gear oil cooler. The system is protected against galvanic corrosion by zinc anodes located in the charge air cooler, heat exchanger and the reverse gear oil cooler.

**⚠ WARNING!** There is a risk that water will enter while working on the seawater system (if the boat is in the water). Water may flow into the boat if a hose, plug or similar object located below the waterline. So always close the seawater cock. If the boat does not have a seawater cock, the flow of water must be stopped in a safe manner. The boat must be brought up on land if this is not possible.



### Seawater system. Drain

The seawater system must be drained during cold weather when there is a risk of freezing to prevent the system from bursting.

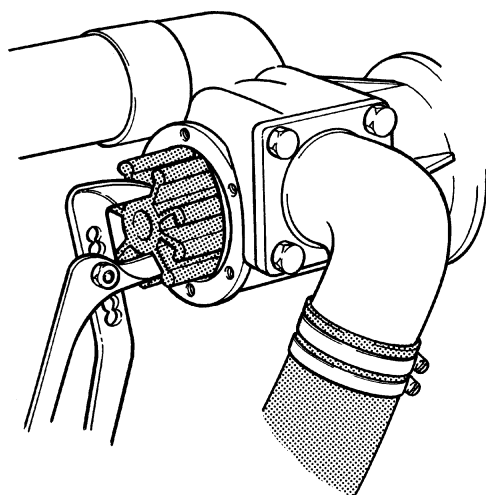
An alternative to draining is to keep the engine room free from frost using an approved heater fan.

**⚠ WARNING!** Risk of water entering. Close the seawater cock before starting work on the seawater system.

1. Close the seawater cock.
2. Remove the cover on the seawater pump and allow the water to run out.
3. Remove one drain plug (S) at a time and allow the water to run out until all drain points on the engine have been dismantled.

**⚠ IMPORTANT!** Make sure the coolant really runs out. It may be necessary to clean away deposits inside the drain cocks.

4. Drain the water from the reverse gear oil cooler by opening tap (1).
5. TAMD63: Undo the hose (A) between the heat exchanger and the reverse gear oil cooler, and empty out the water.
6. Drain/empty any extra equipment such as the sea water filter, bilge/flushing pump etc.
7. Install the cover on the sea water pump, connect all hoses and close/install all drain taps and plugs before you leave the boat.



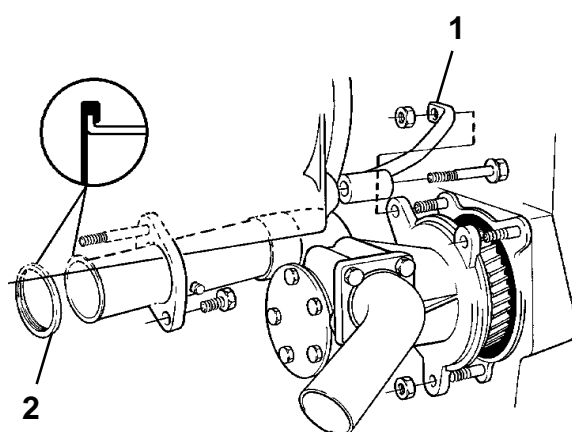
## Impeller. Check/Change

**⚠ WARNING!** Risk of water entering. Close the seawater cock before starting work on the sea-water system.

In some installations, it can be easier to first remove the sea water pump from the engine (see next chapter) and then change the impeller.

1. Remove the end cover of the pump. Pull and twist out the impeller with adjustable pliers.
2. Inspect the impeller. Change the impeller if there are any visible cracks or other defects.
3. Clean the inside of the housing. Lubricate the pump housing and the inside of the cover with a water-resistant grease (that is not aggressive on rubber).
4. Press in the impeller while rotating it (clockwise).
5. Fit the cover with a new gasket.
6. Open the seawater cock.

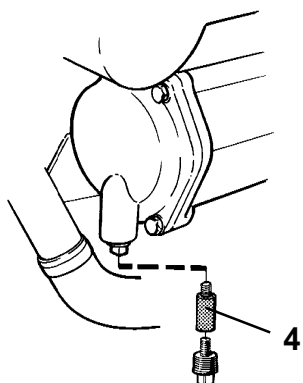
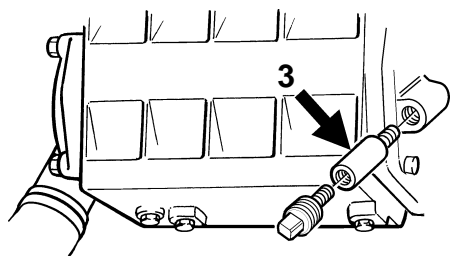
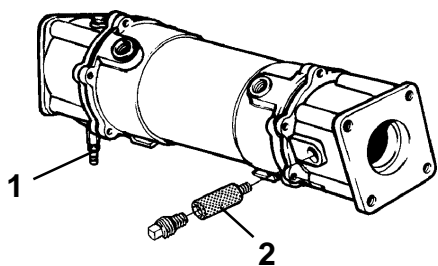
**⚠ IMPORTANT!** Always carry a spare impeller and gasket.



## Sea water pump. Removal and assembly

**⚠ WARNING!** Risk of water entry. Close the sea cocks before doing any work on the sea water system.

1. Drain the water from the sea water system (please refer to previous page).
2. Undo the coolant pipes to and from the pump and remove the stay (1) on the TAM74.
3. Remove the pump from the timing housing.
4. Check that the O-ring is undamaged and that it is correctly located on the pump.
5. Install the pump, tighten it and install the stay (1) on the TAM74.
6. Grease the seal rings and install the coolant pipes to and from the pump.
7. TAM74: Check that seal (2) seals correctly against the charge air cooler.



## Zinc anodes. Check/Change

**⚠ WARNING!** Risk of water entering. Close the seawater cock before starting work on the seawater system.

1. Close the seawater cock.
2. Open drain tap (1) on the reverse gear oil cooler and drain off the sea water.
3. Remove the zinc anode in the reverse gear oil cooler (2), in the heat exchanger (3) and in the intercooler (4).

**NOTE!** The sea water in the heat exchanger and intercooler is drained at the same time.

4. Change the anode if less than 50% of its original size. Otherwise, clean the anode with emery cloth to remove the layer of oxide.

**⚠ IMPORTANT!** Do not use a wire brush or other metal tool for cleaning as this can impair the galvanic protection.

5. Fit the zinc anodes. Make sure there is good contact between the anode and the metal goods.
6. Close the drain cock (S).
7. Open the seawater cock before starting the engine.
8. Make sure there are no leaks.

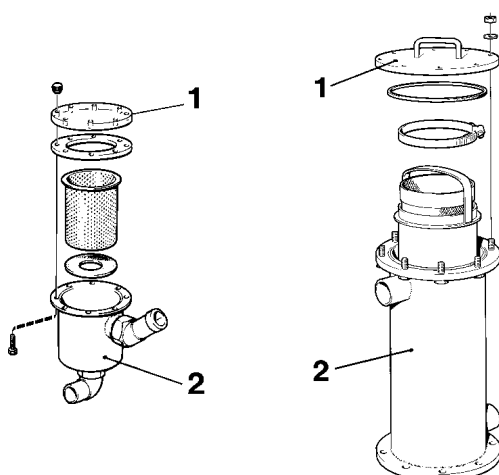
## Seawater filter. Check/Clean

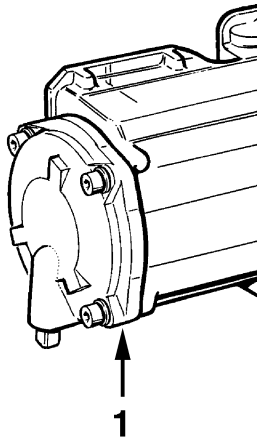
The seawater filter is an accessory and is available in two models.

If the water the boat is in is severely polluted, contains large amounts of seaweed, etc., the filter must be checked more often than is specified in the maintenance schedule. The filter can otherwise become clogged and the engine overheat.

**⚠ WARNING!** Risk of water entering. Close the seawater cock before starting work on the seawater system.

1. Close the seawater cock.
2. Remove the cover (1) and lift up the insert.
3. Clean the insert and the housing (2).
4. Assemble the parts as illustrated below. Inspect gaskets and O-ring. Change if necessary.
5. Open the seawater valve and check for leaks.





### Charge air cooler. Check the drain hole

Condensation can form in the charge air cooler during operation. The condensation can be drained from a nipple (1) on the bottom of the charge air cooler. Make sure the nipple is not blocked.

**⚠ IMPORTANT !** If considerable amounts of water run out of the drain hole, the insert must be removed and test pressurized. This must be done by an authorised workshop.

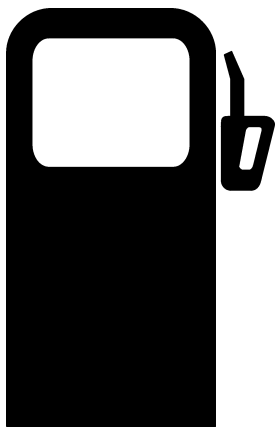


## Fuel system

Use only fuel recommended in the fuel specifications below. Always observe cleanliness when refuelling and working with the fuel system.

All work concerning the engine injection pump or injectors is to be carried out at an authorised workshop. Breaking the seal on the injection pump will void the warranty.

**⚠ WARNING!** Fire hazard. Work performed on the fuel system must be done on a cold engine. Fuel spill on hot surfaces or electrical components can cause fires. Keep fuel-drenched rags where they are safe in case of fire.



### Fuel specification

Fuel must comply with national and international standards at the least, e.g.:

**EN590** (with national environment and cold requirements)

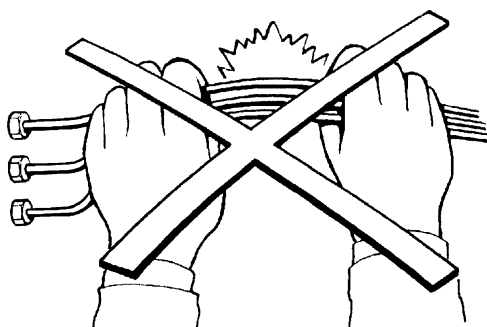
**ASTM-D975-No 1-D, 2-D**

**JIS KK 2204**

### Sulphur content

Complying with legal requirements in each country. If the sulphur content exceeds 0.5 wt%, service intervals must be changed, see "Maintenance: Lubricating system".

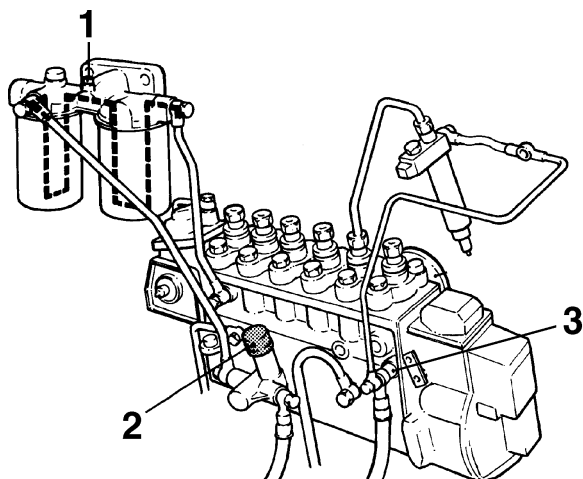
Fuels with low density (city diesel) can result in a loss of power by approx. 5% and an increase in fuel consumption of approx. 2–3 %.



### Fuel delivery pipes

The delivery pipes must not be bent, twisted or exerted to any other forces. Change delivery pipes that are damaged.

**⚠ WARNING!** Fire hazard! The fuel delivery pipes must not be bent, twisted or exerted to any other forces.



## Fuel system. Bleeding

The fuel system must be bled e.g. after changing fuel filter, if the fuel tank has been run dry and after long stops. Refer to the next page for bleeding when replacing a switchable fuel filter during operation.

1. Place a receptacle under the fuel filter and open the bleed screw (1) on the filter bracket.
2. Pump fuel using the hand pump (2) until the fuel running out is free from air bubbles. Tighten the bleed screw while fuel is running out.
3. Pump another 10–20 times with the bleed screw closed to attain a good feed pressure.
4. Make sure there are no leaks.

No other bleeding is normally required but if the engine will not start, the injection pump must be bled as follows:

1. Detach the connection (3) and pump with the hand pump until the fuel running out is free from air.
2. Tighten the connection while fuel is running out.
3. Pump another 10–20 times to attain a good feed pressure.

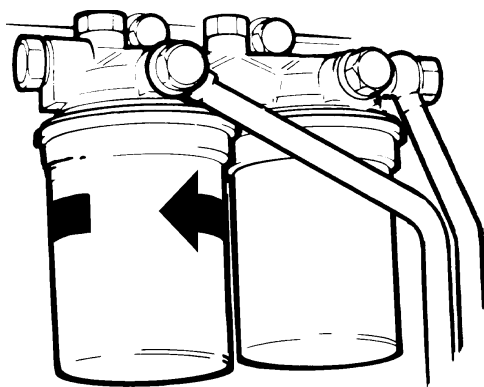
## Fuel filters. Change

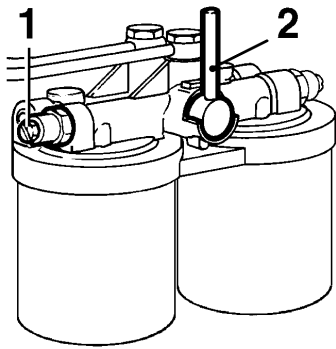
Clean the filter bracket and place a receptacle under the filters.

**NOTE!** Leave the old filters to a destruction plant.

### Standard fuel filters

1. Unscrew the filters.
2. Make sure the new filters are absolutely clean and that the gaskets are free from faults. Apply a little oil to the gaskets.
3. Screw on the filters by hand until they make contact with the sealing surface. Then screw a further half turn, not any more!
4. Bleed the fuel system as described above.
5. Start the engine and check for leaks.



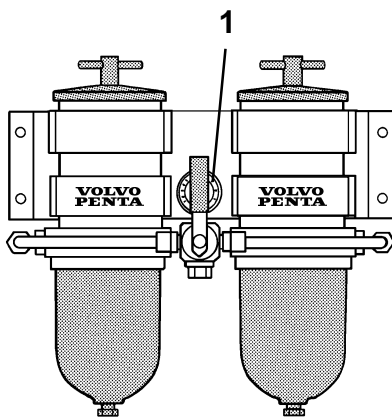


### Switchable type fuel filters

Switchable fuel filters can be changed while running as the flow of fuel can be cut off to one filter at a time.

**⚠ WARNING!** Working on or approaching a running engine is a safety hazard. Beware of rotating parts and hot surfaces.

1. Put the lever (2) in its right-hand end position.
2. Unscrew the left-hand fuel filter. Use a filter wrench if necessary.
3. Screw on the filters by hand until they make contact with the sealing surface. Then screw a further half turn, not any more!
4. Open the left-hand bleed screw (1) on the filter bracket. Put the lever in operating position (straight up). Close the bleed screw when the fuel running out is free from air.
5. Put the lever in its left-hand end position and change the right-hand fuel filter in the same way.



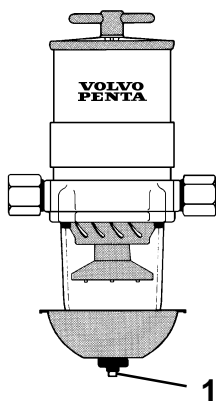
### Fuel pre-filter. Check

**⚠ WARNING!** Working on or approaching a running engine is a safety hazard. Beware of rotating parts and hot surfaces.

The fuel pre-filter/water separator are accessories and available as single or dual models.

The dual filter is equipped with a pressure gauge (1) indicating when it is time to change the filter insert.

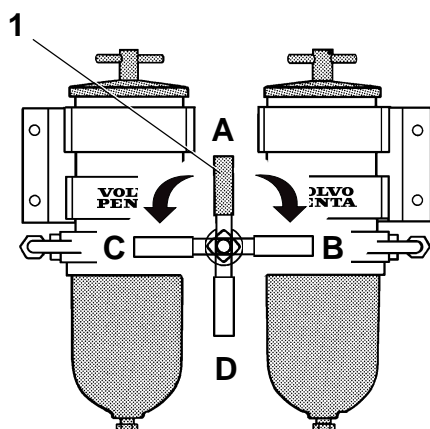
The filter inserts must be changed according to the maintenance schedule recommendations or earlier if the pressure gauge indicates a vacuum of 6–10 in. Hg at idling speed or 16–20 in. Hg at full engine speed/load.



### Fuel pre-filter. Drainage

Place a receptacle under the filter. Drain off water and contaminants through the plug (1) in the bottom of the glass bowl.

**⚠ IMPORTANT!** Do not drain until a few hours after stopping.



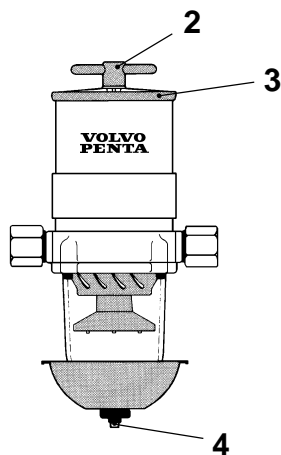
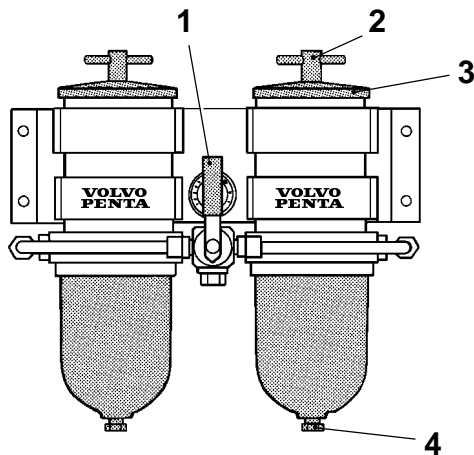
### Fuel pre-filter. Change filter elements

The fuel pre-filter/water separator are accessories and available as single or dual models.

The dual filter inserts can be changed while running as the flow of fuel can be cut off to one filter container at a time.

The flow of fuel is governed by putting the knob (1) in the following positions:

- A:** Normal running (both filters connected).
- B:** Left filter insert can be changed.
- C:** Right filter insert can be changed.
- D:** Both filters turned off.



### Change filter elements:

Close the fuel cocks on the tank or cut off the flow of fuel with the knob (1) for the filter insert to change if running.

**⚠ WARNING!** Working on or approaching a running engine is a safety hazard. Beware of rotating parts and hot surfaces.

1. Place a receptacle under the filter.
2. Undo the T-bolt (2) and remove the cover (3).
3. Take out the insert carefully while turning it.
4. Drain off water and contaminants through the drain plug (4).
5. Fit a new filter insert and fill the container with clean fuel.

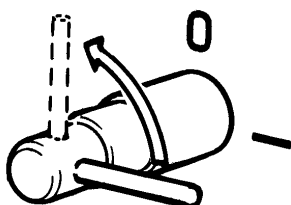
**⚠ IMPORTANT!** Cleanliness! No contaminants must be allowed in the fuel system.

6. Change the gasket on the cover and the O-ring on the T-bolt. Moisten the gasket and O-ring with fuel before assembling.
7. Fit the cover and tighten it by hand.
8. Wipe off any fuel from the heat shield.
9. Dual filter: Change the other filter insert in the same way.
10. Open the fuel cocks and put the knob (1) in position for normal running. Make sure there are no leaks.

## Electrical system

The engines are equipped with a bi-polar electrical system with alternating current generator. System voltage is 12 alternatively 24 V.

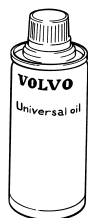
**⚠ WARNING!** Before starting work on the electrical system, the engine must be stopped and the powered turned off with the main switch/switches. Shore power to the engine heater, battery charger or other extra equipment fitted on the engine must be disconnected.



### Main switches

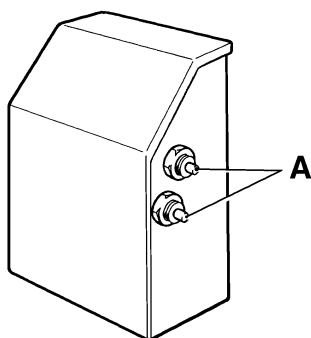
The main switches must never be turned off until the engine has been stopped. Breaking the circuit between the alternator and the batteries while the engine is running can damage the alternator. For the same reason, the charge circuits must never be switched while the engine is running.

**⚠ IMPORTANT!** Never turn the power off using the main switches while the engine is running.



### Electrical connections

Make sure electrical connections are tightened, dry and free from oxide. If necessary, spray these connections with water-repellant (Volvo Penta all-round oil).



### Fuses

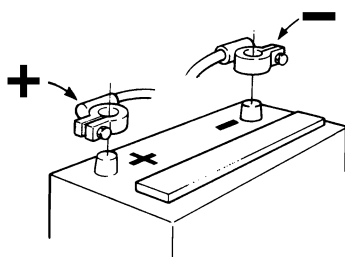
Two semi-automatic 8A fuses are located in the main electric terminal box. Fuses cut the current when there is an overload and are reset by pressing the buttons on the side of the main electrical terminal box. Determine the cause of the overload before re-setting the fuses.

## Battery. Maintenance

**⚠ WARNING!** Risk for fire and explosion. Never expose the battery to naked flames or sparks.

**⚠ WARNING!** Never reverse the polarity of the battery. Risk of sparks and explosion.

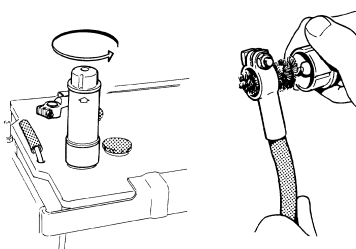
**⚠ WARNING!** Battery electrolyte is extremely corrosive. Protect eyes, skin and clothes when handling batteries. Always use protective goggles and gloves. In case of splashes on the skin, wash with soap and plenty of water. In case of splashes in the eyes, rinse immediately with plenty of water and call a doctor.



### Connecting and disconnecting

Connect the (+) cable (red) to the (+) terminal of the battery first. Then connect the (–) cable (black) to the (–) pole of the battery.

Disconnect the (–) cable (black) first and then the (+) cable (red).



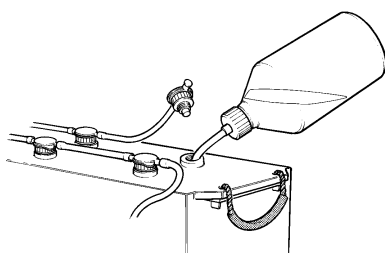
### Cleaning

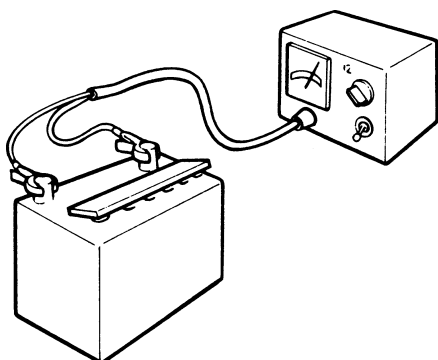
Keep batteries dry and clean. Contaminants and oxide on batteries and battery terminals can cause short-circuits, voltage drops and discharging, especially in damp weather. Clean oxide from battery terminals and cable shoes with a brass brush. Tighten cable shoes well and grease them with terminal grease or petroleum jelly.

### Electrolyte level

The electrolyte should be 5–10 mm (0.2–0.4") above the cell plates in the battery. If necessary, top up with **distilled water**. The battery should be charged for at least 30 minutes after filling by running the engine at idling speed.

**NOTE!** Special instructions must be followed for certain maintenance-free batteries.





## Battery. Charging

**⚠ WARNING!** Risk for explosion. Charging generates hydrogen gas (oxyhydrogen gas). A short circuit, naked flame or spark can cause a powerful explosion. Ventilate well.

**⚠ WARNING!** Battery electrolyte is extremely corrosive. Protect eyes, skin and clothes. Always use protective goggles and gloves. In case of splashes on the skin, wash with soap and plenty of water. In case of splashes in the eyes, rinse immediately with plenty of water and call a doctor.

Charge the battery if it has been discharged. If the boat is not to be used for a long time, the battery must be fully charged and then trickle-charged (refer to battery manufacturer's recommendations). The battery will be harmed if left discharged and can also freeze and crack in cold weather.

**⚠ IMPORTANT!** Follow the battery charger user instructions carefully. Disconnect the battery cables before connecting the battery charger to avoid electrochemical corrosion when using an external battery charger.

The battery plugs must be unscrewed but left in the holes while charging is in progress. Ventilate well, especially if batteries are being charged in confined spaces.

**⚠ WARNING!** Always cut the charging current before disconnecting the charger cables. Never reverse the polarity of the battery. Risk of sparks and explosion.

Special directions apply for rapid charging. Rapid charging can impair the service life of the battery and should be avoided.

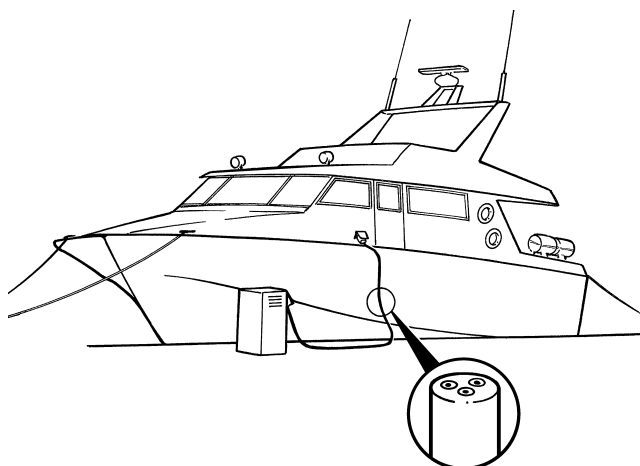
## Electric welding

Disconnect the positive and negative battery cables. Then disconnect all the leads to the alternator.

Always connect the weld clamp to the component being welded and as close to the welding point as possible. Never connect the clamp to the engine or in such a way as current can pass across a bearing.

**⚠ IMPORTANT!** When welding has ceased, connect the leads to the alternator **before** reconnecting the battery cables.





## Electrical installations

Defective electrical installations can generate stray current from the electrical system. Stray current can impair the galvanic protection for the propeller, propeller shaft, rudder, keel, etc. and cause damage due to electrochemical corrosion.

**⚠ IMPORTANT!** Service on the boat's low-current circuit should be carried out by a person with electrical training and experience. Installations or work with shore power equipment **must only** be performed by an electrician qualified for high-current installations.

The following points must always be taken into account:

1. If the shore power line is connected, it must have a protective earth on land, never in the boat. The shore power equipment must also be equipped with an earth fault breaker.

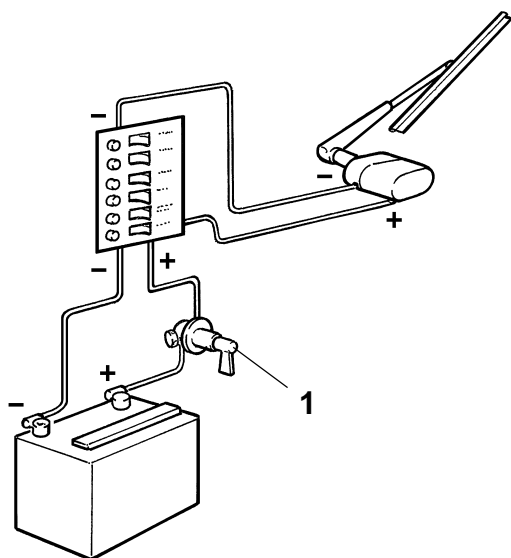
The shore power equipment (transformer, converter, battery charger, etc.) must be intended for marine use where the high-voltage section is galvanically isolated from the low-voltage section.

2. Electric cables must be run and clamped so there is no risk of it being exposed to chafing, moisture or bilge water in the keelson.
3. Protective earth for e.g. radio, navigation equipment, rudder, bathing ladder or other equipment in which there are separate cables for protective earth must be collected on an earth connection that is not connected to the engine, gear wheels or reverse gear.

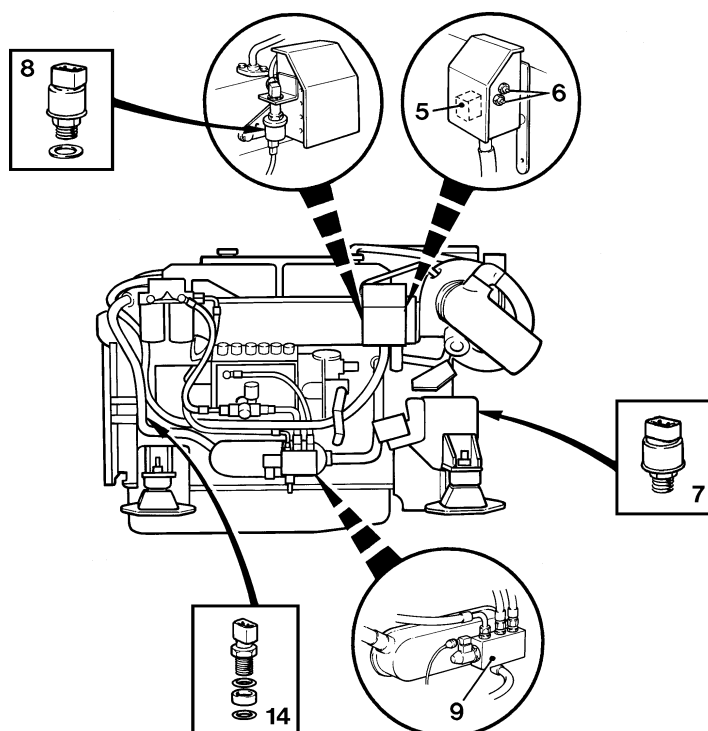
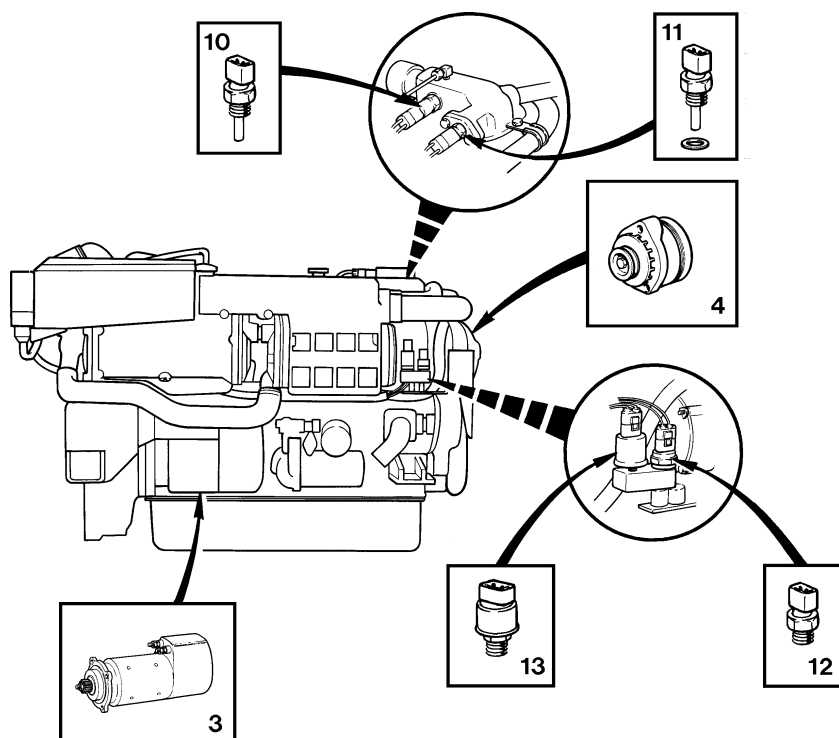
**⚠ IMPORTANT!** The engine or reverse gear must never be used as an earth connection.

4. The battery must have a main switch connected on the positive (+) side of the battery. The main switch isolates all consumers and is turned off when the boat is not in use.
5. If an extra consumer battery is used, there must be a main switch (1) between the (+) terminal of the consumer battery and the fuse strip for the boat's electric equipment. The main switch isolates all consumers connected to the consumer battery and is turned off when no longer needed. Equipment connected to the consumer battery must have separate switches.

For simultaneous charging of two independent battery circuits, there should be a separate charge distributor (accessory) fitted to the standard alternator.

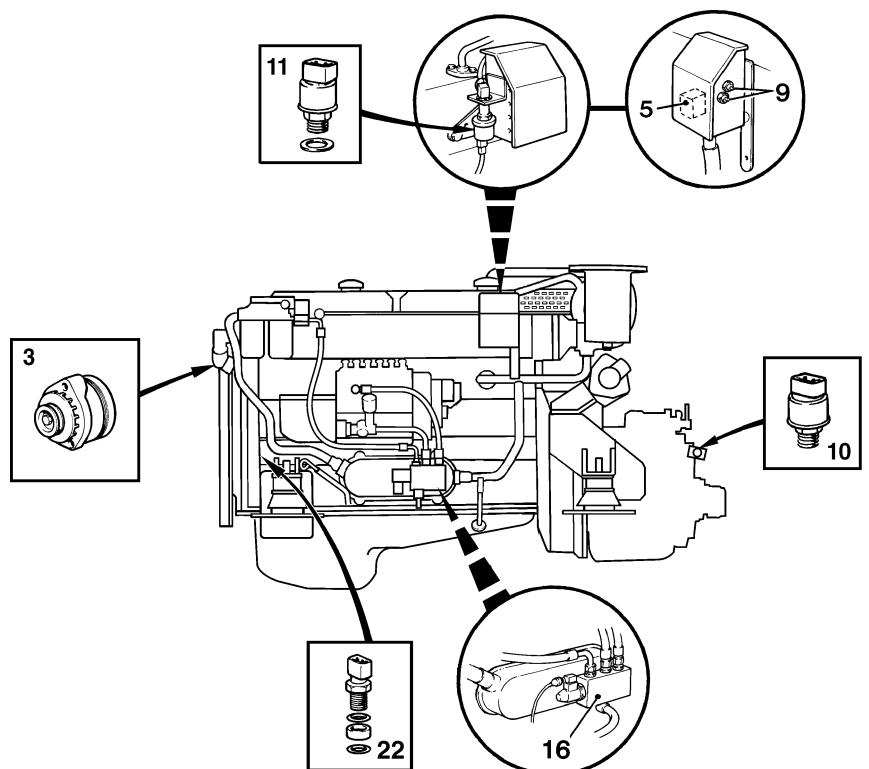
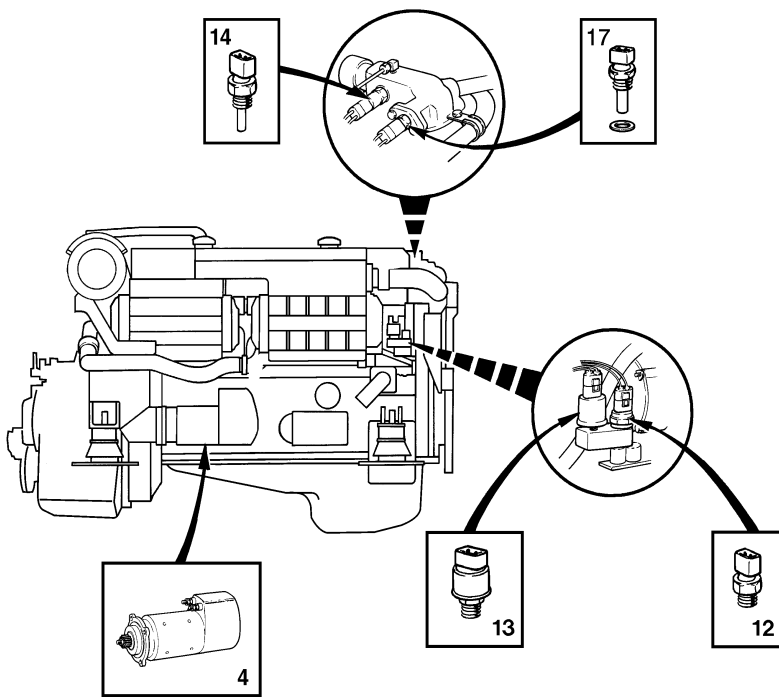


## Electrical component diagrams



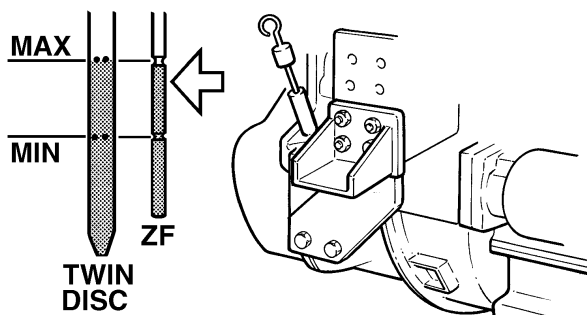
### TAMD63L, TAMD63P

3. Starter motor
4. Alternator
5. Starter relay
6. Circuit breakers
7. Oil pressure sensor, Reverse gear
8. Pressure sensor, turbo pressure
9. Solenoid valve (fuel shut-off valve)
10. Coolant temperature monitor
11. Coolant temperature sensor
12. Oil pressure monitor, engine
13. Oil pressure sensor, engine
14. Engine speed sensor

**TAMMD74A**

- 3. Alternator
- 4. Starter motor
- 5. Starter relay
- 9. Circuit breakers
- 10. Oil pressure sensor, reverse gear
- 11. Turbo pressure sensor
- 12. Oil pressure monitor, engine
- 13. Oil pressure sensor, engine
- 14. Coolant temperature sensor
- 16. Fuel shut-off valve (solenoid valve)
- 17. Coolant temperature monitor
- 22. Engine speed sensor

## Reverse gear



### Oil level. Check and filling

#### Check

The oil level should be checked once the reverse gear has attained operating temperature with the engine idling and the controls in neutral.

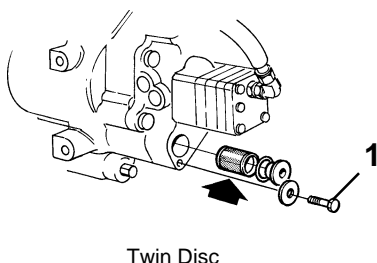
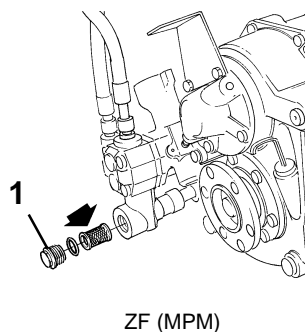
**⚠ WARNING!** Working on or approaching a running engine is a safety hazard. Beware of rotating parts and hot surfaces.

Pull out the dipstick, wipe it off and insert it back into the reverse gear. Pull out the dipstick again and check the oil level. The correct oil level is between the MAX and MIN marks.

#### Filling

If necessary, top up with oil in the filler opening on top of the reverse gear. Oil grades and capacity: See Technical Data.

**⚠ IMPORTANT!** Never overfill the reverse gear. The oil level must always lie within the recommended levels.



### Oil strainer. Cleaning

**⚠ WARNING!** Working on or approaching a running engine is a safety hazard. Beware of rotating parts and hot surfaces.

1. Remove the plug/screw and carefully take out the filter (1) from the filter housing.

**⚠ IMPORTANT!** Always observe the greatest cleanliness. Dirt must not enter the filter housing.

2. Clean the filter and other parts with paraffin.
3. Carefully refit all the parts.
4. Tighten the plug/screw.
5. Start the engine and check for leaks.

## Oil. Change

### Drain

1. Remove the dipstick. Connect a hose from the oil bilge pump (where applicable, the electric oil pump) to the dipstick pipe. Set the knob under the pump housing in position for pumping the reverse gear.
2. Pump the oil into a receptacle.
3. Replace the dipstick.

Alternatively, the oil can be drained after removing the drain plug.

### Filling

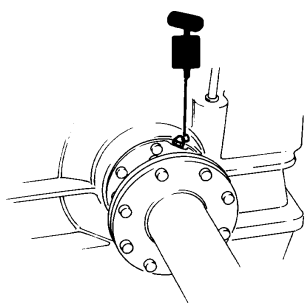
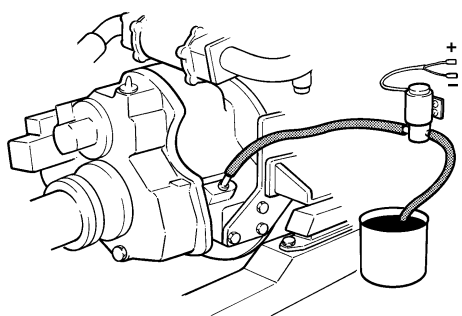
1. Fill with oil through the filler opening on top of the reverse gear. Oil grades and capacity, see Technical Data.



**IMPORTANT!** Never overfill the reverse gear.

2. Start the engine and run it until the reverse gear has attained operating temperature.
3. Check the oil level with the engine at low idling speed and the controls in neutral position.

The oil level must reach to the upper mark on the dipstick. Top up oil if needed.



## Seal. Lubrication

### Applies only to Twin Disc reverse gear\*

Lubricate the seal on the output shaft bearing using a hand gun and lithium-based grease such as Mobilux EP2, Statoil Uniway EP2N, Texaco Multifak EP2, Q8 Rembrandt EP2.

\* If a grease nipple is fitted.

# Inhibiting

To prevent the engine and other equipment from being harmed during breaks in operation of two months or longer, it must be conserved. It is essential that it be performed correctly and nothing must be left out. This is why we have compiled a checklist of the most important points.

Before taking the boat out of service for long periods, it should be left to a Volvo Penta workshop for an overhaul of the engine and other equipment. Have any faults and defects seen to so that the equipment is in good order when next started.

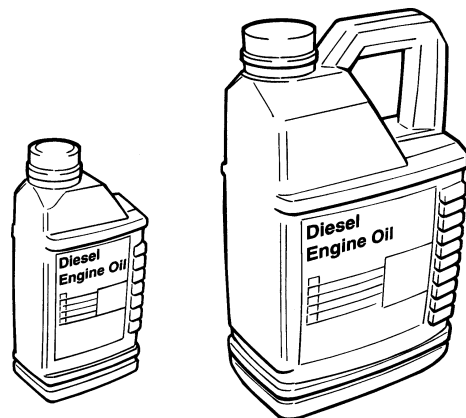
**⚠ WARNING!** Read the chapter "Maintenance" thoroughly before starting any maintenance work. It contains directions for performing maintenance in a safe and correct manner.

Certain preservatives are flammable. Some are also dangerous to inhale. Provide good ventilation. Use a protective mask when spraying.

**⚠ IMPORTANT!** The following must be considered when cleaning with a high-pressure water jet: Never point high-pressure water jets directly at seals, rubber hoses or electrical components. Never use the high-pressure function when washing the engine

## Inhibiting

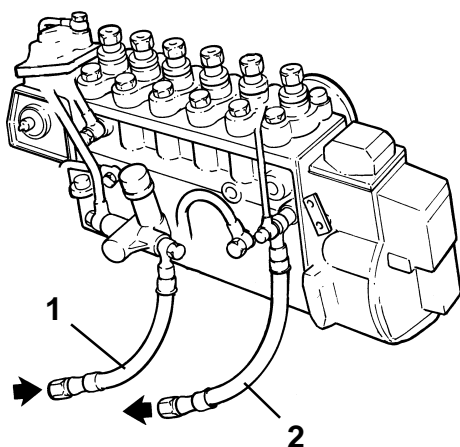
- Run the engine warm and make sure the oil level in the reverse gear reaches the MAX mark on the dipstick. Stop the engine.
- Stop up to eight months: Change oil and oil filter on the engine and then run it warm  
Stop over eight months: Treat the lubricating and fuel systems with preservative. See directions on next page.
- Make sure there is enough anti-freeze in the coolant. Add more if necessary. An alternative is to drain the coolant.
- Close the seawater cock and drain off the water in the seawater system.
- Remove the impeller from the seawater pump. Keep the impeller in a cool place in a closed plastic bag.
- Drain off any water and contaminant from the fuel tank. Fill the tank with fuel to avoid condensation.
- Disconnect the battery cables and clean and charge the batteries. Trickle charge during the storage period. A poorly charged battery can freeze and break.
- Clean the engine externally. Do not use high-pressure jets when cleaning the engine. Touch up any paint damage with Volvo Penta original paint.
- Spray electric system components with water repellent.
- Inspect all control cables and apply anti-corrosion agent.
- Affix a label on the engine giving the date, type of conservation and the preservative that was used.
- Cover the air intake to the engine, the exhaust aperture and the engine if necessary.



## Taking out of storage

- Remove any protection on the engine, air intake and exhaust pipe.
- Top up with lubricant of the correct grade in the engine if necessary. Fit a new oil filter if this was not done during conservation.
- Make sure there is oil in the reverse gear.
- Fit a new fuel filter and bleed the fuel system.
- Check drive belts.
- Check the condition of rubber hoses and check the tightness of all hose clips.
- Close the drain cocks and fit the drain plugs.
- Fit the impeller in the seawater pump.
- Check the coolant level and anti-freeze. Top up as necessary.
- Connect the fully charged batteries.
- Open the seawater cock.
- Start the engine (if the boat is in the water) and run the engine warm at idling speed before loading it.
- Check for oil, fuel or coolant leaks.
- Check the oil level in the reverse gear. Top up if necessary.

## Conserving the lubricating and fuel systems for stops longer than eight months:



- Drain the oil from the engine and fill with **preservative\*** to just over the MIN mark on the dipstick.
- Connect suction (1) and return fuel lines (2) to a fuel can filled with 1/3 **preservative\*** and 2/3 diesel fuel.
- Bleed the fuel system.
- Start the engine and run it at fast idling speed until approximately two litres of fuel have been consumed. Stop the engine and connect the normal fuel lines.
- Empty the preservative from the engine.
- Follow the directions on the previous page in other respects.

\* Preservatives are available from oil companies.

# Troubleshooting

A number of symptoms and possible causes for engine disturbances are described in the table below. If faults or hitches arise that you cannot solve alone, you must always get in touch with your Volvo Penta dealer.

**⚠ WARNING!** Read the safety directions for maintenance and service in the chapter "Safety information" before starting work.

Symptom and possible cause	
Engine can not be stopped	1, 2, 3, 5
Starter motor does not rotate	1, 2, 3, 4, 5
Starter motor rotates slowly	1, 2
Engine does not start	6, 7, 8, 9
Engine starts but stops again	7, 8, 9, 13
Engine is difficult to start	7, 8, 9, 13
Engine does not reach correct operating speed at full throttle	7, 8, 9, 10, 11, 12, 13, 18
Engine knocks	14
Engine run unevenly	7, 8, 9, 13, 14
Engine vibrates	18, 19
High fuel consumption	10, 11, 13, 15
Black exhaust smoke	13, 15, 18
Blue or white exhaust smoke	14, 15, 26
Oil pressure too low	16, 17
Coolant temperature too high	20, 21, 22, 23, 24, 25, 26
No charge, or poor charge	2, 27

- |   |   |   |
|---|---|---|
| 1. Flat batteries                       | 10. Boat abnormally loaded                | 19. Faulty engine mounting              |
| 2. Poor contact/broken electrical cable | 11. Fouled hull/propeller                 | 20. Not enough coolant                  |
| 3. Main switch turned off               | 12. Engine speed control wrongly adjusted | 21. Air in fresh water system           |
| 4. Engine control not in neutral        | 13. Insufficient air supply               | 22. Blocked sea water inlet/pipe/filter |
| 5. A fuse/circuit breaker has tripped   | 14. Too high coolant temperature          | 23. Circulation pump drive belt slips   |
| 6. Lack of fuel                         | 15. Too low coolant temperature           | 24. Defective impeller                  |
| 7. Blocked fuel filter/supply pump      | 16. Too low lubrication oil level         | 25. Defective/wrong thermostat          |
| 8. Air in fuel system                   | 17. Blocked oil filter                    | 26. Too high lubrication oil level      |
| 9. Water/contamination in fuel          | 18. Defective/wrong propeller             | 27. Alternator drive belt slips         |





## Start using auxiliary batteries

**⚠ WARNING!** Ventilate well. Batteries generate oxyhydrogen gas, which is extremely flammable and explosive. A short circuit, naked flame or spark can cause a powerful explosion.

Never reverse the polarity of the battery. Risk of sparks and explosion.

1. Make sure the rated voltage of the auxiliary battery is the same as the system voltage of the engine.
2. Connect the red auxiliary cable to the discharged battery's **+** **terminal** and then to the auxiliary battery's **+** **terminal**.
3. Connect the black auxiliary cable to the auxiliary battery's **-** **terminal** and ultimately to a place **away from the discharged batteries**, e.g. on the main switch negative lead or the negative lead connection on the starter motor.

**⚠ WARNING!** The black auxiliary cable (-) must not come in contact with the positive connection on the starter motor.

4. Start the engine and run at fast idling speed for about ten minutes to charge the batteries.

**⚠ WARNING!** Working on or approaching a running engine is a safety hazard. Beware of rotating parts and hot surfaces.

Do not touch the connections while attempting to start: Risk of sparks. Do not bend over the batteries either.

5. Stop the engine. Remove the auxiliary cables in the **exact** reverse order to connecting.

# Technical Data

## General

Engine designation	TAMD63L-A TAMD63L-B TAMD63P-A	TAMD74A-A TAMD74A-B
Number of cylinders .....	6	6
Displacement .....	5.48 dm <sup>3</sup> (334 in <sup>3</sup> )	7.28 dm <sup>3</sup> (444 in <sup>3</sup> )
Low idling speed .....	600 ±20 rpm	600 ±30 rpm
Valve clearance,		
inlet* .....	0.50 mm (0.0197")	0.50 mm (0.0197")
outlet* .....	0.65 mm (0.0256")	0.65 mm (0.0256")
Compression pressure** .....	2.2 MPa (319 psi)	2.2 MPa (319 psi)
Weight*** .....	745 kg (1642 lbs)	860 kg (1896 lbs)

\* Applies to cold or warm engine (stopped).

\*\* At starter motor speed (300 rpm).

\*\*\* With heat exchanger, without reverse gear or clutch.

## Lubricating system

Oil capacity, without oil filters*,		
No engine inclination .....	20 liters (5.3 US gals)	24 liters (6.3 US gals)
volume difference min. – max. ....	7 liters (1.8 US gals)	7 liters (1.8 US gals)
Engine inclination 5° .....	16 liters (4.2 US gals)	20 liters (5.3 US gals)
volume difference min. – max. ....	6 liters (1.6 US gals)	5 liters (1.3 US gals)
Engine inclination 10° .....	12 liters (3.23 US gals)	14 liters (3.7 US gals)
volume difference min. – max. ....	5 liters (1.3 US gals)	4 liters (1.1 US gals)
Oil pressure at operating speed .....	300–550 kPa (43.5–79.8 psi)	450–650 kPa (65.3–94 psi)
Oil pressure at idling speed .....	150 kPa (21.8 psi)	150 kPa (21.8 psi)

\* **Note.** Engine oil filter and by-pass filter have each a capacity of approx. 0.5 liter (0.5 quart).

## Cooling system

Capacity .....	27 liters (7.1 US gals)	34 liters (9.0 US gals)
----------------	-------------------------	-------------------------

## Fuel system

Engine designation	TAMD63L-A TAMD63L-B	TAMD74A-A
Injection pump, setting .....	16° ±0.5° BTDC.	15° ±0.5° BTDC.
Engine designation	TAMD63P-A	TAMD74A-B
Injection pump, setting .....	15° ±0.5° BTDC.	12° ±0.5° BTDC.

## Electrical system

Engine designation	TAMD63L-A TAMD63L-B TAMD63P-A	TAMD74A-A TAMD74A-B
System voltage .....	12V (or 24V)	24V (or 12V)
Battery capacity,		
12V system .....	2 pcs. coupled parallel 12V, max. 110 Ah/battery	
24V system .....	2 pcs. coupled in series 12V, max. 143 Ah	

## Reverse gear

### ZF (MPM)

Type designation	IRM 220A-1	IRM 220PL-E	IRM 220V-LD
Oil capacity, approx .....	4.0 liters (1.06 US gals)	5.3 liters (1.40 US gals)	5.5 liters (1.45 US gals)
Oil grade (to API system) .....	CC, CD, CE	CC, CD, CE	CC, CD, CE
Viscosity .....	SAE30*	SAE30*	SAE30*
alt. in tropical regions .....	SAE40*	SAE40*	SAE40*
Working oil pressure .....	2.0–2.2 MPa (290–319 psi)	2.5 MPa (363 psi)	2.3–2.4 MPa (334–348 psi)
Weight, approx .....	53 kg (117 lbs)	70 kg (154 lbs)	86 kg (190 lbs)

### Twin Disc

Type designation	MG 5061A	MG 5062V	MG 5075SC
Oil capacity, approx .....	3.2 liters (0.85 US gals)	5.6 liters (1.48 US gals)	5.9 liters (1.6 US gals)
Oil grade (to API system) .....	CC, CD, CE	CC, CD, CE	CC, CD, CE
Viscosity .....	SAE30*	SAE30*	SAE40*
alt. in tropical regions .....	SAE40*	SAE40*	
Oil pressure at oil temperature 82°C (180°F), engaged, 1800 rpm .....	2.3 MPa (334 psi)	2.05–2.2 MPa (297–319 psi)	2.28 MPa (331 psi)
at cruising speed, min. ....	2.07 MPa (300 psi)	1.9 MPa (276 psi)	
Weight, approx. ....	113 kg (249 lbs)	142 kg (313 lbs)	140 kg (309 lbs)

Type designation	MG 5091SC	MG 5091DC
Oil capacity, approx. ....	9 liters (2.38 US gals)	18 liters (4.75 US gals)
Oil grade (to API system) .....	CC, CD, CE	CC, CD, CE
Viscosity .....	SAE30*	SAE30*
alt. in tropical regions .....	SAE40*	SAE40*
Working oil pressure ** "Neutral" .....	0.207–0.634 MPa (30–92 psi)	
Working oil pressure ** "Forward" .....	1.57–1.63 MPa (228–236 psi)	
Weight, approx. ....	220 kg (485 lbs)	250 kg (550 lbs)

\* **Note!** Only **single-grade** lubricating oil (only **one** viscosity number) may be used in the reverse gear.

\*\* At oil temperature 82°C (180°F) and 1800 rpm.

## Notes

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## Notes

[illegible]

## Notes

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