

# **INSTRUCTION BOOK**

**TAMD63L/P, TAMD71B,  
TAMD73P/WJ, TAMD74C/L/P**



## Structure of this Instruction Book

The first part of this Instruction Book contains important information on functions, fuel, oils and coolants. The operating instructions are important even if you know what you are doing. They may contain some information which is different to what you are used to. Read through the first part before you take your boat out the first time.

The rest of the manual – “Technical description and maintenance” – can be read once you have had time to acquaint yourself with your boat. This section will give you more information on the design and operation of your engine. Here you will also find a kind of “Do-It-Yourself” description of many aspects of maintenance.

## Contents

<b>Safety Precautions</b> .....	2	<b>Maintenance and care</b>	
<b>General Information</b> .....	4	Periodic care and maintenance .....	34
Running-in .....	4	<b>Maintenance schedule</b> .....	36
Warranty .....	5		
Certificated engines .....	6		
<b>Introduction</b> .....	8	<b>Technical description</b>	
<b>Instrumentation</b> .....	11	Engine .....	43
Key switch, starter keys .....	16	Lubrication system .....	47
<b>Controls</b> .....	16	Fuel system .....	51
Calibrating controls, (TAMD73P, -74C/L/P) .....	18	Cooling system .....	56
<b>Operation</b>		Electrical system .....	65
Before starting .....	22	<b>Wiring Diagrams</b> .....	73
Starting the engine .....	23	<b>Inhibiting</b> .....	94
Checks during operation .....	25	Launching procedures .....	94
Maneuvering during operation .....	25	Bringing out of storage .....	95
After operation .....	28	<b>Fuel, Oils, Coolant</b> .....	96
Safety systems (TAMD73P, -74C/L/P) .....	29	<b>Fault-tracing</b> .....	97
Action when there is a risk of freezing .....	32	<b>Technical Data</b> .....	106
		<b>Accessories</b> .....	115

### 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.

# Safety Precautions

## Introduction

This Instruction Book contains the information you need to operate the engine correctly. Check that you have the correct Instruction Book for your engine.

**Read the book carefully before operating or servicing the engine.** Incorrectly undertaken operations could result in personal injury, or damage to property or the engine.

**If you do not understand or are uncertain about any operation or information in this manual, please contact your Volvo Penta dealer who will be able to help you with an explanation or will demonstrate the operation.**

## Important

In this book and on the engine you will find the following special warning symbols.



**WARNING!** Possible danger of personal injury, damage to property or mechanical malfunction if the instructions are not followed.



Read the Instruction Book.

Below is a summary of the risks and safety precautions you should always observe or carry out when operating or servicing the engine.



Check that the warning or information decals on the engine are always clearly visible. Replace decals that have been damaged or painted over.



Always turn the engine off before starting service procedures. Avoid burns. Take precautions to avoid hot surfaces and liquids in supply lines and hoses when the engine has been turned off immediately prior to starting work on it and it is still hot.

Reinstall all protective parts removed during service operations before starting the engine. Make a point of familiarizing yourself with other risk factors, such as rotating parts and hot surfaces (turbocharger, charge pipe, starter element, charge air cooler, intake pipe exhaust pipe etc.).

Approaching a running engine is dangerous. Loose clothing or long hair can fasten in rotating parts and cause serious personal injury.

If the service operation requires that the engine is operating let your Volvo Penta authorized dealer carry out the work. If working in proximity of a running engine, careless movements or a dropped tool can result in personal injury.



Immobilize the engine by turning off the power supply to the engine at the main switches so it is impossible to start, and lock them in the OFF position before starting work. Set up a warning notice at the engine control point or helm.



Never start the engine without installing the air cleaner (ACL). The rotating compressor in the Turbo can cause serious personal injury. Foreign objects entering the intake ducts can also cause mechanical damage.



Never use start spray or similar to start the engine. The start spray may cause an explosion in the inlet manifold. Danger of personal injury.



Avoid opening the coolant filler cap when the engine is hot. Steam or hot coolant can spray out as system pressure is lost. Open the filler cap slowly and release coolant system pressure, if the filler cap or a drain cock/venting cock must be opened, or if a plug or engine coolant line must be removed on a hot engine. It is difficult to anticipate in which direction steam or hot coolant can spray out.



Stop the engine and close the sea cock before carrying out operations on the engine cooling system.




Only start the engine in a well-ventilated area. If operating the engine in an enclosed space, ensure that exhaust gases and crankcase ventilation emissions are ventilated out of the working area.





Anti-corrosion agents are hazardous to health. Read the instructions on the product packaging!




Antifreeze agents are hazardous to health. Read the instructions on the product packaging!


 Certain engine conservation oils are inflammable. Some of them are also dangerous if inhaled. Ensure that ventilation in the work place is good. Use a protective mask when spraying.


 Hot oil can cause burns. Avoid skin contact with hot oil. Ensure that the lubrication system is not under pressure before commencing work on it. Never start or operate the engine with the oil filler cap removed, otherwise oil could be ejected.


 Never allow an open flame or electric sparks near the batteries. Never smoke in proximity to the batteries. The batteries give off hydrogen gas during charging which when mixed with air can form an explosive gas – oxyhydrogen. This gas is easily ignited and highly volatile. Incorrect connection of the battery can cause a single spark which is sufficient to cause an explosion with resulting damage. Do not shift the connections when attempting to start the engine (spark risk) and do not lean over any of the batteries. Refer to instructions in the Instruction Book.


**Never** interfere with the terminals when the engine is running. A high energy pulse may be generated which will damage the electrical system.

 Never mix up the positive and negative battery terminals when installing. Incorrect installation can result in serious damage to electrical equipment. Refer to wiring diagrams.

 Always use protective goggles when charging and handling batteries. The battery electrolyte contains extremely corrosive sulfuric acid. If this should come in contact with the skin, immediately wash with soap and plenty of water. If battery acid comes in contact with the eyes, immediately flush with plenty of water and obtain medical assistance without delay.

 Turn the engine off and switch off power at the main switches before carrying out work on the electrical system.

 Clutch adjustments, where a clutch is fitted, must be carried out with the engine turned off.

 Use the lifting eyes mounted on the engine/reverse gear when lifting the drive unit. Always check that the lifting equipment used is in good condition and has the load capacity to lift the


engine (engine weight including reverse gear and any extra equipment installed).

To ensure safe handling and to avoid damaging engine components on top of the engine, use a lifting beam to raise the engine.


All chains and cables should run parallel to each other and as perpendicular as possible against the side of the engine.


If extra equipment is installed on the engine which alters its center of gravity a special lifting device is required to obtain the correct balance for safe handling.


Never carry out work on an engine which is only supported on a hoist.


 **WARNING!** The components in the electrical system and in the fuel system on Volvo Penta products are designed and manufactured to minimize the risk of fire and explosion.


The engine must not be run in areas where there are explosive materials.

 Fuel filter replacement should be carried out on a cold engine to avoid the risk of fire caused by fuel spilling onto the exhaust manifold. Always cover the generator (alternator), if it is located under the fuel filters. The generator (alternator) can be damaged by spilled fuel.

 **WARNING!** TAMD63, TAMD73 and TAMD74 have pretensioned delivery pipes. These pipes must under no circumstances be bent. Damaged pipes should be replaced.

 Always use protective gloves when tracing leaks. Liquids ejected under pressure can penetrate body tissue and cause serious injury. There is a danger of blood poisoning.

 Always use fuels recommended by Volvo Penta. Refer to the Instruction Book. The use of lower quality fuels can damage the engine. On a diesel engine poor quality fuel can cause the control rod to seize and the engine to over-rev with the resulting risk of damage to the engine and personal injury. Poor fuel quality can also lead to higher maintenance costs.

 Observe the following rules when cleaning with high-pressure water jets. Never direct the water jet at seals, rubber hoses or electrical components. Never use a high pressure jet when washing the engine.

# General Information

## Welcome aboard

Thank you for choosing a Volvo Penta marine engine.

Volvo Penta have been building marine engines since 1907. Quality, operating reliability and innovation have made Volvo Penta a world leader in the marine engine industry.

As owner of a Volvo Penta marine engine we would also like to welcome you to a worldwide network of dealers and service workshops to assist you with technical advice, service requirements and replacement parts. Please contact your nearest authorized Volvo Penta dealer for assistance.

We would like to wish you many pleasant voyages.

## AB VOLVO PENTA Technical Information

## Your new boat

Every new boat has its own special characteristics. Even experienced boat owners are advised to note carefully how the boat behaves at different speeds, weather conditions and loads.

If your boat and engine combination permit high-speed use, we strongly recommend that a safety breaker is fitted, regardless of the type of boat. If your boat is not fitted with a safety breaker contact your Volvo Penta dealer who can assist you in selecting one.

## Running-in

When the engine is new it should be run normally. Do not operate it at full load during the first 10 hours of operation except for short periods. **Unnecessary idling of an unloaded engine should always be avoided.**

Check the instrumentation extra carefully during this period so that any abnormal conditions may be discovered in good time.

Check also that there are no leaks.

**NOTE! With a new or reconditioned engine, the valve clearance should first be checked after 150 hours of operation.**

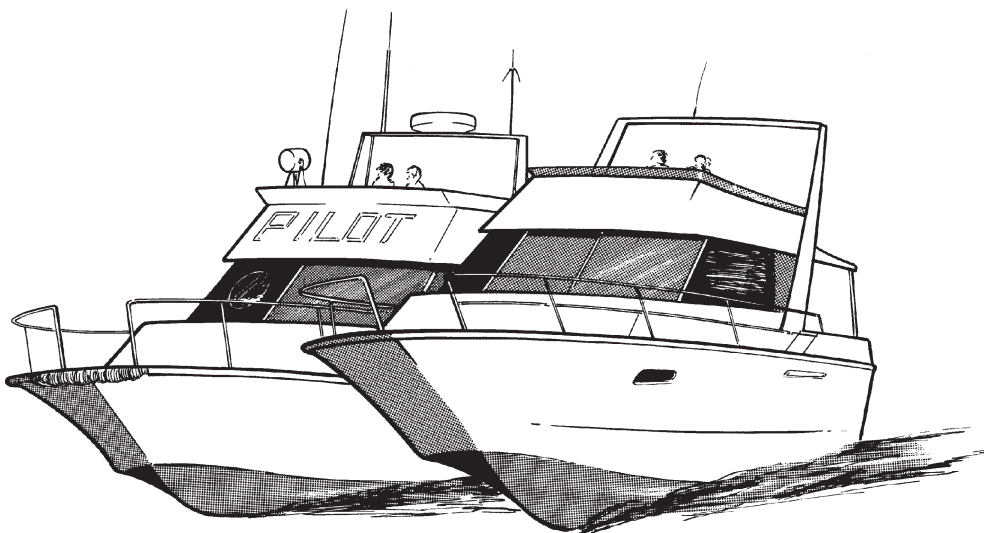
The oil and oil filter\* in the Twin Disc reverse gear should first be changed after a maximum of 50 hours operation. Remove and clean the reverse gear's oil screen at the same time. In the case of MPM reverse gears, the oil screen should be cleaned after 10 and 50 hours of operation, and the first oil and filter change\* should be made after 50 hours of operation.

The disengageable clutch should be checked more often during the first few days. It may be necessary to adjust it to compensate for wear to the laminate.

\* **Note.** Only the TD MG507-1 and MG507A-1 with a trolling valve, the TD MG5085A and the MPM IRM 301A and -302V have an oil filter.

## Fuel and lubricants

Only use lubricants and fuels recommended on page 96 or under "Technical Data". Use of other grades can cause malfunctions and reduced service life.



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## Spare parts



**WARNING!** The components in the electrical system and in the fuel system on Volvo Penta products are designed and manufactured to minimize the risk of fire and explosion.

Using non-original Volvo Penta parts which do not meet the above standards, can result in fire or explosion on board. Any type of damage which results from the use of non-original Volvo Penta replacement parts for the product will not be covered under any warranty provided by AB Volvo Penta.

## Safety

Everyone wants to have a problem-free and pleasant time when they take their boat out. To help you do this we have provided a pre-journey check-list below, of course extra items can be added to this list if you want. Important areas are the engine and its equipment and the general maintenance of the boat.

### Planning your trip

- Get out up-to-date charts for the route planned.
- Calculate distance and fuel consumption.
- Note places where you can refuel on your planned course.
- Tell friends or relatives about your trip plans.

### Boat equipment

- Rescue and emergency items such as life vests and signal rockets. Does everyone know where the equipment is stored on board?
- Spare parts on board, for example Kit with water pump impeller etc.
- TAMD73P and TAMD74C/L/P with Twin Disc reverse gear\* with electronic gear shifting:  
Check that the plug for emergency operation (manual engagement) of the reverse gear is kept in the bracket on the reverse gear. See page 31.
- The proper tools for the equipment.
- Fire extinguisher (checked and charged).

\*Not TD MG5075A.

## Joint responsibility

Volvo Penta continually commits a considerable part of its development resources towards minimizing the environmental impact of its products. Examples of areas where we are always looking for improvements are exhaust emissions, noise levels and fuel consumption.

Regardless of whether your Volvo Penta engine is installed in a boat used for pleasure or commercial operation, incorrect operation or improper maintenance of the engine will result in disturbance or damage to the environment.

In this instruction book there are a number of service procedures, which, if not followed will lead to an increase in the engine's impact on the environment and running costs and a reduction in service life. Always follow the recommended service intervals and make a habit of checking that the engine is operating normally every time you use it. One example is an excessively smoky exhaust. Contact an authorized Volvo Penta workshop if you cannot correct the fault yourself.

Bear in mind that most chemicals used on boats are harmful to the environment if used incorrectly. Volvo Penta recommends the use of bio-degradable degreasing agents for all cleaning. Always dispose of engine and transmission oil waste, old paint, degreasing agents and cleaning residue etc. at proper disposal areas so that they do not harm the environment.

Always operate the boat at a speed and distance from the shore that take account of the swell and noise which may cause harm to wildlife, moored boats, floating jetties etc. Always leave any mooring places and the areas you have been visiting as you would wish to find them.

## Warranty

A Service and Warranty book with conditions for Volvo Penta's International Limited Warranty is supplied with every engine. Contact your nearest Volvo Penta dealer or importer for your copy if you have not received one.

Some markets can have other warranty conditions depending on national legislation and regulations. These conditions are provided by the Volvo Penta importer or distributor for the market in question. If you wish to have a copy of the conditions please contact your local Volvo Penta representative.

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## Warranty Registration Card

The Warranty Registration Form (North American market) or Warranty Card (other markets) should always be filled out and sent in by the dealer. Make sure that this has been done, if no proof of the delivery date can be provided the warranty undertakings might not be honored.

## Volvo Penta Service

Volvo Penta has a comprehensive dealer network that offers both service and spare parts for Volvo Penta engines. These dealers have been carefully selected and trained to provide professional assistance for service and repairs.

They also have the special tools and testing equipment required for maintaining a high standard of service. Volvo Penta dealers and vendors must maintain a stock of original spare parts and accessories to cover most requirements of Volvo Penta owners.

When ordering a service or spare parts always quote the engine and drive/reverse gear complete type designation and serial number. You will find this information on the engine product plate and on a decal on the front valve cover (see page 8).

## Maintenance and care

- PDC (Pre-Delivery Commissioning) delivery undertaking for marine engines: The Pre-delivery Commissioning procedure ensures that Volvo Penta products operate correctly after installation. It also ensures that the new owner is given a proper introduction to the use and care of the product (refer to the Warranty and Service Handbook for a Checklist). The delivery undertaking “PDC” is carried out at the time of the delivery of the boat to the end-user. There is no charge for the work undertaken which is covered by the Volvo Penta International Limited Guarantee.
- **First Service inspection:** A first service inspection must be carried out after running the engine for 100 hours (TAMD63, TAMD73 and TAMD74) or 150–300 hours (TAMD71) or within 180 days from the date of delivery or the end of the first season, whichever comes first. Labor and material costs in connection with the First Service Inspection are **not** covered by the Volvo Penta International Limited Guarantee (for checklist see your Warranty and Service book).

Regular maintenance should be carried out after the First Service Inspection in accordance with the maintenance scheme in this book. Any work carried out in addition to maintenance services should be documented (refer to the Warranty and Service book).

It is an absolute condition for the Volvo Penta International Limited Guarantee to apply that the Pre-Delivery Commissioning and First Service Inspection have been carried out by an authorized Volvo Penta service dealer.

## Certificated engines

**If you own an engine certificated for any area where exhaust emissions are regulated by law, the following is important:**

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

**This places special requirements for maintenance and service as follows:**

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



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



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

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

## Identification number

Immediately after you have taken delivery of your boat, make a note of the serial number and model designation of the engine and reverse gear and the dataset number (EDC)\*. Refer to next page for location of type plates. Include the serial number and model designation of the boat and any extra equipment. This information is necessary when you contact your Volvo Penta or boat sales representative for service and spare parts. Take a copy of the information and keep it in a safe place so it is available should the boat be stolen.

\* Applies to TAM73P and TAM74C/L/P.

Engine type .....

Serial No. ....

Dataset (EDC) No. ....

Reverse gear type .....

Serial No. ....

Propeller designation .....

Boat, type designation .....

Serial No. ....

Disengageable clutch, type designation .....

Serial No. ....

Other equipment .....

Serial No. ....

# Introduction

## TAMD63L, -P, TAMD71B, TAMD73P, -WJ, TAMD74C, -L, -P

The engines are four-stroke, 6 cylinder in-line marine diesel engines with direct injection. They are equipped with turbochargers, charge air coolers (CACs) and heat exchangers for thermostat-controlled freshwater cooling.

The charge air cooler (CAC), which is seawater-cooled, lowers the temperature of the inlet air to the engine after compression in the turbocharger. This permits a high power output while keeping the combustion and exhaust gas temperatures to appropriate levels.

**TAMD71B:** To reduce exhaust emissions when operating at low load, e.g. after (cold-) starting, there is a by-pass valve which closes the air passage through the charge air cooler (CAC) and instead channels the air directly into the engine's inlet manifold via the electrical preheating element.

This equipment is not necessary in the TAMD63, TAMD73 and TAMD74 as they have a different specification, for example, higher compression, a different combustion chamber, and a modified injection system.

The TAMD73P ("TAMD73 EDC") and TAMD74C/L/P ("TAMD74 EDC") are equipped with an electronically controlled governor, Electronic Diesel Control ("EDC").\* This further reduces exhaust emissions.

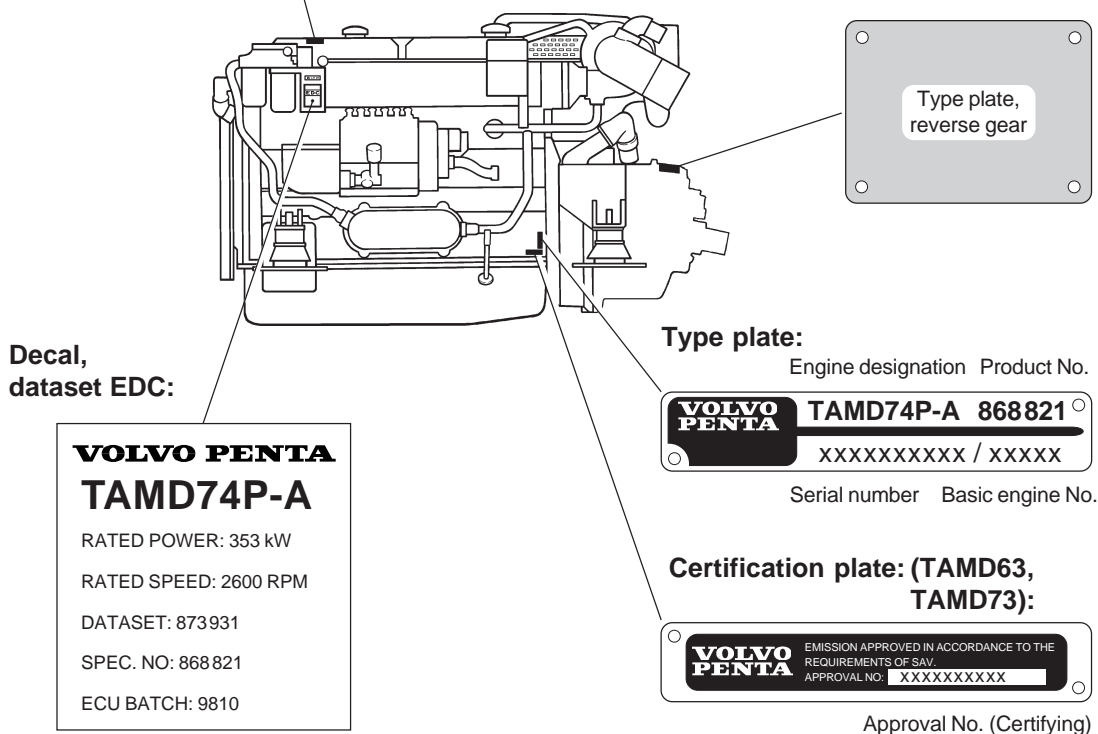
The exhaust manifold and turbocharger are freshwater-cooled to reduce the radiant heat to the engine compartment.

For a more detailed description of the engine, its fuel, lubrication, and cooling systems, etc., see "Technical descriptions" on pages 43–70.

\* **Note.** EDC = "Electronic Diesel Control".

## Location of type plates

### Type plate (decal):



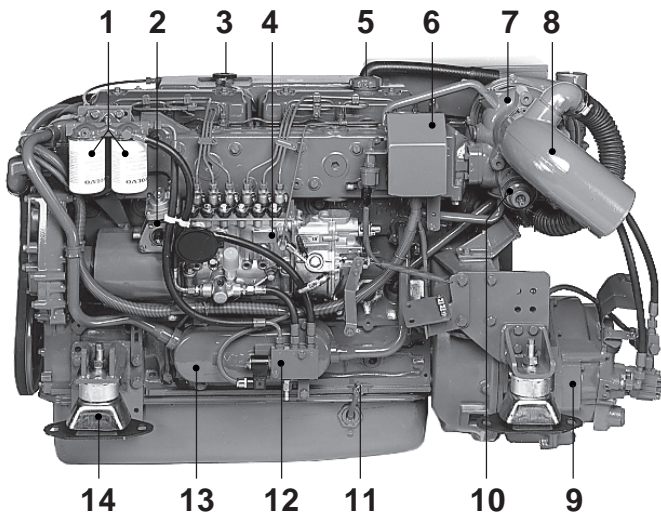


Fig. 1. TAMD63L-A, TAMD63P-A

1. Fine fuel filters
2. Smoke limiter
3. Engine coolant filler cap
4. Injection pump
5. Oil filler cap
6. Terminal box with semi-automatic fuses
7. Turbocharger
8. Water-cooled exhaust bend (accessory)
9. Reverse gear MPM IRM 220A-1
10. TAMD63P: Wastegate valve (by-pass valve)
11. Oil dipstick, engine
12. Solenoid valve (fuel cut-off valve) for stopping engine
13. Oil cooler, engine
14. Flexible engine mounting (accessory)

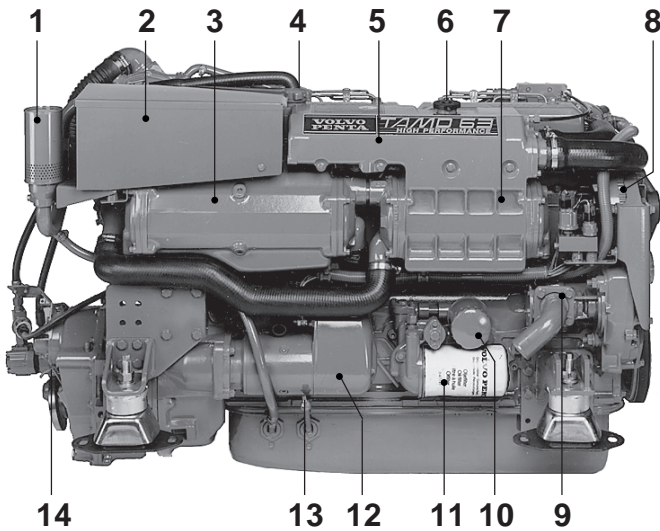


Fig. 2. TAMD63L-A, TAMD63P-A

1. Crankcase ventilation filter
2. Air Cleaner (ACL)
3. Charge air cooler (CAC)
4. Oil filler cap
5. Expansion tank
6. Engine coolant filler cap
7. Heat exchanger
8. AC generator
9. Seawater pump
10. By-pass filter for lubricating oil
11. Lubricating oil filter, engine
12. Starter motor
13. Oil dipstick, engine
14. Oil dipstick, reverse gear.

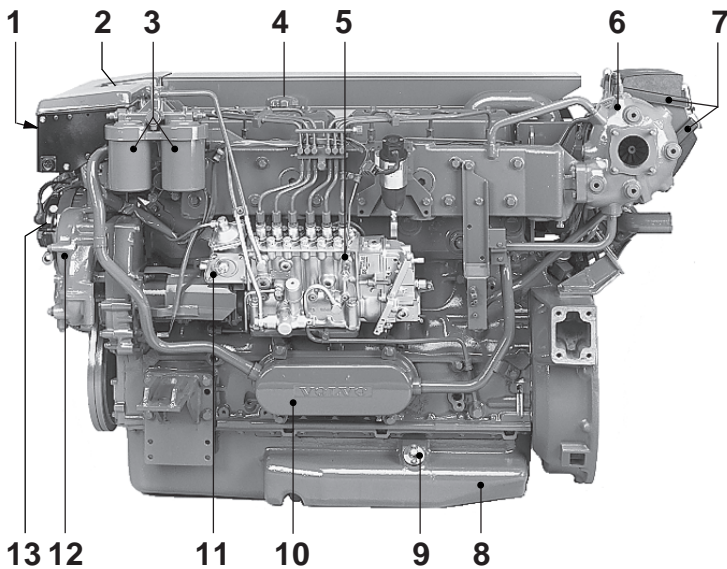


Fig. 3. TAMD71B (auxiliary engine variant)

1. Terminal box with semi-automatic fuses
2. Engine coolant filler cap
3. Fine fuel filters, interchangeable
4. Oil filler cap
5. Injection pump
6. Turbocharger
7. Air Cleaner (ACL)
8. Oil sump
9. Alt. location of oil dipstick
10. Oil cooler, engine
11. Smoke limiter
12. Circulation pump
13. AC generator

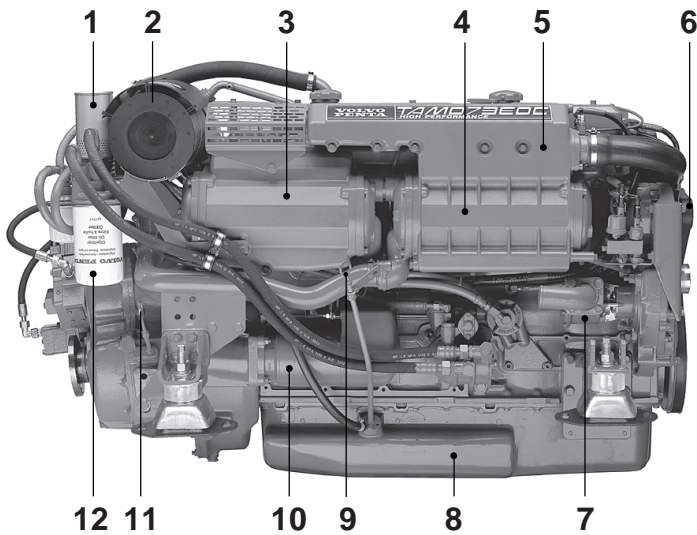


Fig. 4. TAMD73P-A (“TAMD73EDC”)

1. Filter for crankcase ventilation
2. Air Cleaner (ACL)
3. Charge air cooler (CAC)
4. Heat exchanger
5. Expansion tank
6. AC generator
7. Seawater pump
8. Oil sump
9. Oil dipstick, engine
10. Starter motor
11. Oil dipstick, TD MG507A reverse gear
12. Alt. location of lubricating oil filter, engine (accessory)  
Std. location same as for TAMD74 (fig. 6)

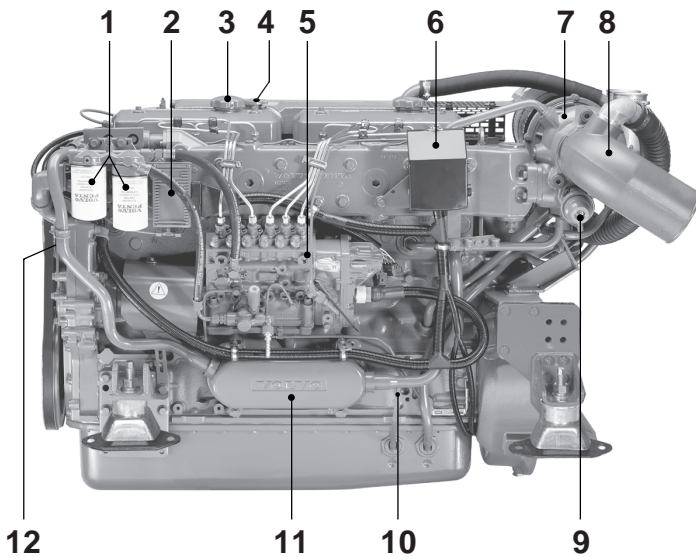


Fig. 5. TAMD74C-A, TAMD74L-A, TAMD74P-A (“TAMD74EDC”)

1. Fine fuel filters
2. Electronic Diesel Control (EDC) control module box
3. Oil filler cap
4. Engine coolant filler cap
5. Injection pump
6. Terminal box with semi-automatic fuses
7. Turbocharger
8. Water-cooled exhaust bend (accessory)
9. Wastegate valve (boost pressure control (BPC) valve)
10. Oil dipstick, engine
11. Oil cooler, engine
12. Circulation pump

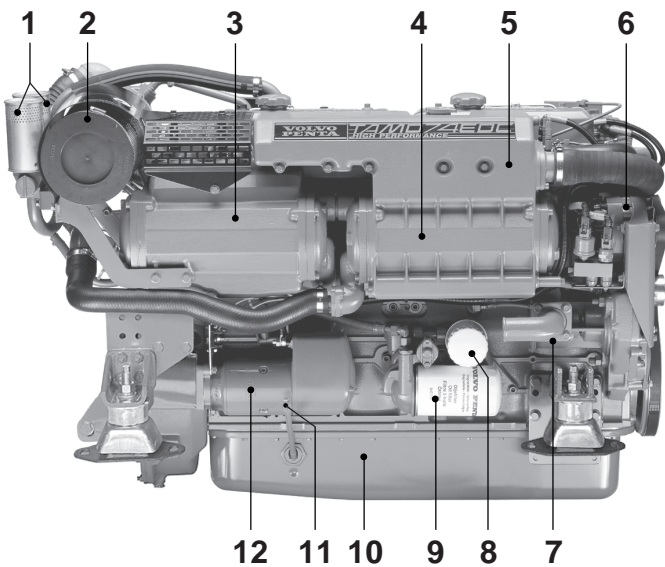


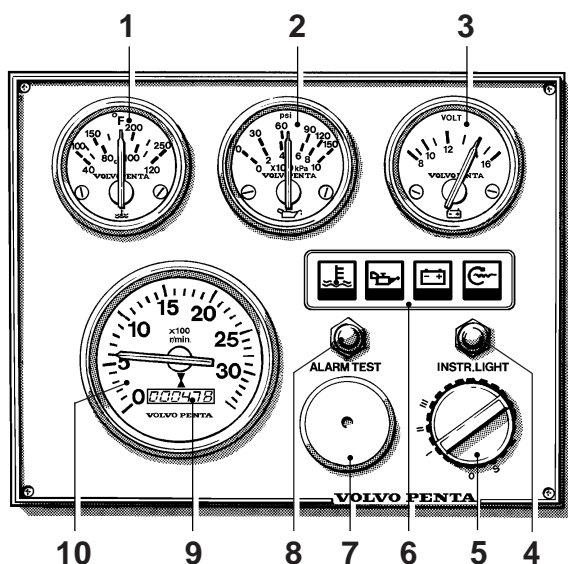
Fig. 6. TAMD74C-A, TAMD74L-A, TAMD74P-A (“TAMD74EDC”)

1. Filters for crankcase ventilation
2. Air Cleaner (ACL)
3. Charge air cooler (CAC)
4. Heat exchanger
5. Expansion tank
6. AC generator
7. Seawater pump
8. By-pass filter for lubricating oil
9. Lubricating oil filter
10. Oil sump
11. Oil dipstick, engine
12. Starter motor

# Instrumentation

The instrument panels used are the main panel, the Flying Bridge (instrument panel for alt. control position), an auxiliary panel and an extra alarm panel. For the TAMD73P and TAMD74C/L/P there is also an EDC control panel.

The instrumentation is also supplied separately in sets if Volvo Penta instrument panels are not used. These sets include three smaller panels for starting, stopping and alarm functions.



## Main panel

1. Engine coolant temperature gauge.
2. Oil pressure gauge, engine.
3. Voltmeter. Displays start battery voltage.
4. Pressure switch for instrument lighting.
5. Key switch (start lock) with start and stop functions and a built-in restart inhibitor (starter motor protection).

The start lock prevents restarting unless the key has first been returned to the stop position (S).

6. Alarm panel with warning symbols (positions 11–14).
7. Alarm (siren) fault detection warning. Sounds when lubricating oil pressure is too low (engine), when coolant temperature is too high or there is a loss of charge.
8. Pressure switch for testing alarm functions or acknowledging alarms.
  - **No alarm:** Alarm test (all warning lights are on and the siren sounds).
  - **If the alarm sounds:** Alarm acknowledgment.\*
9. Operating time meter. Displays the engine's operating time in hours and tenths of an hour.
10. Tachometer, engine speed. Multiply this value by 100 for revolutions per minute

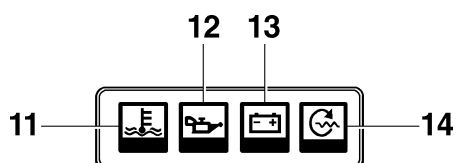
\* The siren stops but the warning lamps continue flashing until the malfunction has been corrected. If there is a new alarm the siren sounds again at the same time as the next warning lamp starts to flash etc.

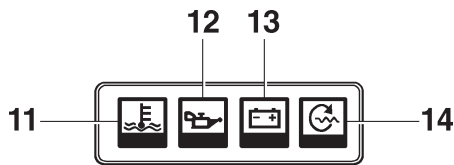
## Alarm panel

This panel has four "windows". If the acoustic alarm sounds, one of the windows "11–13" starts to flash (red) to show the cause of the alarm.

11. Warning lamp – high coolant temperature.
12. Warning lamp – low lubricating oil pressure, engine.
13. Warning lamp – comes on if the charging current from the generator stops.
14. TAMD71B: Indication lamp – preheating on (starter element).\*

\* **Note.** Only TAMD71B has a starter element.





**Note** This lamp (14) also works as a bulb failure warning sensor for the starter element.\* The lamp comes on even when the key switch is in the I position (operating position) if there is a fault in the starter element (break).

\***Note.** Only TAMD71B has a starter element.

### Electronic Diesel Control (EDC) control panels (TAMD73P and TAMD74)

There are two panels for the TAMD73P and TAMD74 engines for maneuvering and monitoring the functions of the EDC system. For single installations with one or more control points the panel has three combined pressbuttons and indicating lights for each control position. For double installations with one or more control points the panel has six buttons/lights.

15. "Neutral" (green). With the starter key in the operating position (I) the indicator light comes on (text on the button) with a steady light when the control is in the neutral position.

**For safety reasons the engine can only be started with the control in the neutral position.**

**Note.** When used with the electronic Volvo Penta control unit there is also a function for controlling the engine speed with the engine disengaged. (This function must **not** be operated during starting).

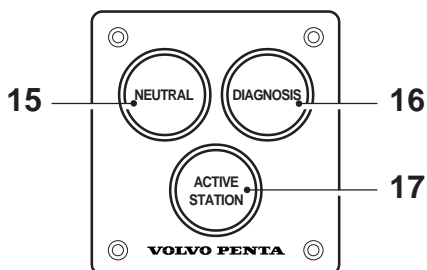
Press the button in and hold it down while moving the control lever to the shift position. The indicator light will flash when this function is engaged.

16. Diagnostics (yellow). The indicator lamp will start flashing if the EDC system receives abnormal signals, or if there are technical problems with the EDC system.

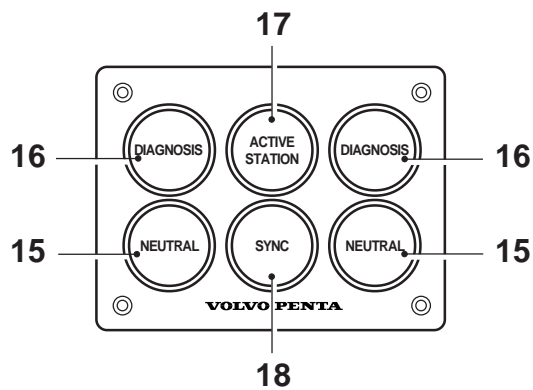
**Note.** If the button is pressed when the light is flashing a diagnostic readout is given to indicate what is causing the malfunction (the light flashes a two-digit Diagnostic Trouble Code (DTC)).\*

17. "Active station" (red). This button is used to update the EDC system on which control station is to be connected.

\*For Diagnostic Trouble Codes (DTC) refer to the section: "Reading off Diagnostic Trouble Codes (DTC)" page 102.



TAMD73P and TAMD74: EDC control panel – Single engine, one or more control stations



TAMD73P and TAMD74: EDC control panel for one or more control stations (double installation)

The flashing red lamp indicates that the control station has a fault (uncalibrated controls, a control or controls not in neutral position (neutral and idle position for double controls), fault on potentiometer).

For information on changing the control position, refer to page 26.

18. “Sync” (blue). This button is used for engaging and disengaging the synchronization function.

For information on synchronization, refer to the reference below.

### Synchronizing engine speed (TAMD73P and TAMD74 – twin installation)

If the boat is equipped with twin engines comfort can be improved by synchronizing the engines to the same engine speed. To make this process easier there is an integral synchronization function which automatically sets the engines to the same engine speed (RPM).

**The synchronization function is always activated when the engines are started (the light in the blue Sync button is on).**

**The following conditions must be met for operation of the engine speed synchronization function:**

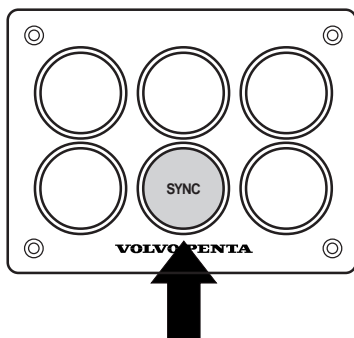
- A. The engine speed on both engines must be more than 800 rpm.
- B. The controls for both engines must be set so that the difference between the two engines is not more than 50–200 rpm when they are running at 800–1000 rpm or less than 200 rpm at 1000–2500 rpm.

If these conditions are met the engine speed of the starboard engine (the slave) will automatically be adjusted to the speed of the **port engine (master)**.

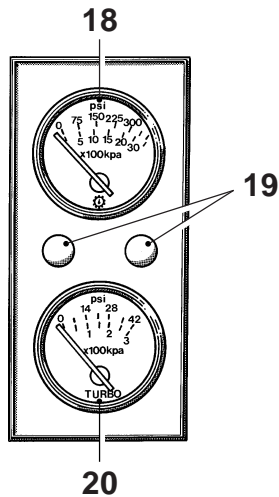
**If either condition A or B no longer applies then the synchronization function will automatically disengage.**

Engine speed synch will also be disengaged if engine speed exceeds 2500–2510 rpm.

Pressing the blue Sync button for at least 2 seconds will cause the Sync light to go out, and the synchronization function to be disengaged after 5 seconds. Repeating this procedure will result in the synchronization function being re-engaged.



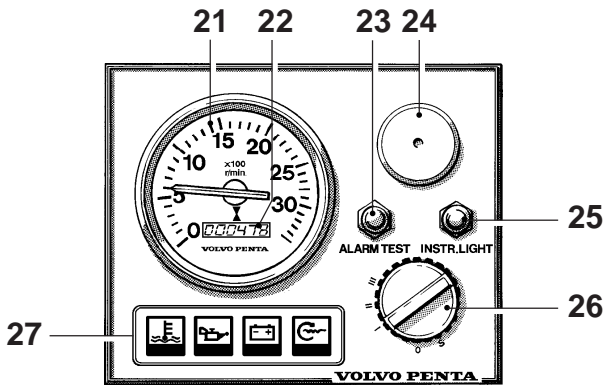
TAMD73P and TAMD74: EDC control panel for one or more control stations (double installation)



## Auxiliary panel

- 18. Oil pressure gauge for reverse gear.
- 19. Blank panel plugs. Space for extra switch etc.
- 20. Pressure gauge for turbocharger boost pressure.

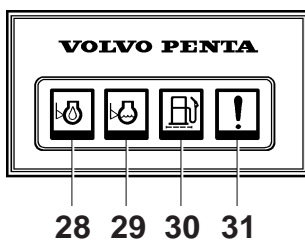
## Flying Bridge panel



- 21. Tachometer, engine speed. Multiply this value by 100 for revolutions per minute
- 22. Operating time meter. Displays the engine's operating time in hours and tenths of an hour.
- 23. Pressure switch for testing the alarm function.
- 24. Alarm for malfunctions, corresponding to alarm on main panel.
- 25. Pressure switch for instrument lighting.
- 26. Key switch (start lock) with start and stop functions and a built-in restart inhibitor (starter motor protection).  
The start lock prevents restarting unless the key has first been returned to the stop position (S).
- 27. Alarm panel with warning symbols corresponding to main panel.

## Extra alarm panel

This panel has four "windows". If the acoustic alarm comes on, one of the windows starts to flash (red) to show the cause of the alarm.



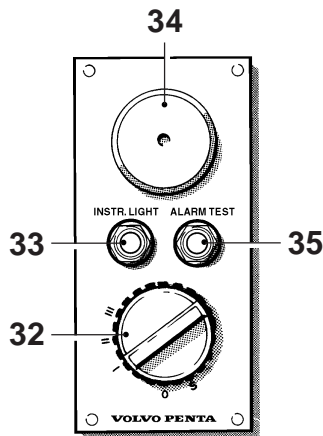
- 28. Oil level too low.\* Fill oil to correct level before starting.
- 29. Engine coolant level low.\* Top up engine coolant to correct level before starting.
- 30. Water in extra fuel pre-filter. Drain off water in filter. See maintenance schedule on page 38 (item 12).
- 31. Extra alarm.

\* **Note.** Alarms for low level with engine stopped and with starter key in position I – (Operation position).

## Instrument kits

Instruments are also available as individual items in kits. There are also the following three smaller panels for starting and stopping the engine and using the alarm functions.

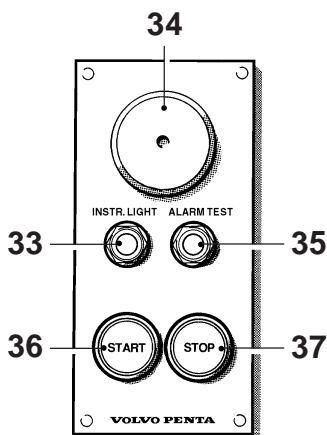




## Control panel for pilot house (main panel)

32. Key switch (start lock) with start and stop functions and a built-in restart inhibitor (starter motor protection).  
The start lock prevents restarting unless the key has first been returned to the stop position (S).
33. Pressure switch for instrument lighting.
34. Alarm (siren) fault detection warning. Sounds when lubricating oil pressure is too low (engine), when coolant temperature is too high or there is a loss of charge.
35. Pressure switch for testing alarm functions or acknowledging alarms.
- **No alarm:** Alarm test (all warning lights are on and the siren sounds).
  - **If the alarm sounds:** Alarm acknowledgment.\*

\* The siren stops but the warning lamps continue flashing until the malfunction has been corrected. If there is a new alarm the siren sounds again at the same time as the next warning lamp starts to flash etc.



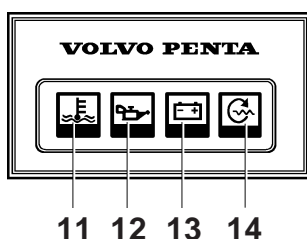
## Control panel for alt. operating position

Position numbers refer partly to the equivalent functions in the pilot house panel above.

**Note:** The key switch in the pilot house control panel must be in position I (operating position) for starting to be carried out from the secondary operating position.

**TAMD71:** The starter element may be engaged only via the key switch on the panel in the pilot house.

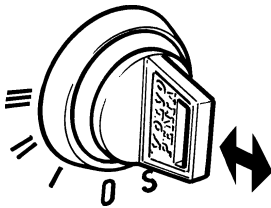
36. Starter button. The starter motor is engaged when this button is pressed. Release the button as soon as the engine has started.
37. Stop button. The stop valve (fuel cut-off valve) is engaged when this button is pressed.



## Alarm panel

The alarm panel has warning symbols corresponding to those on the main panel (pos. 11–14).

# Controls



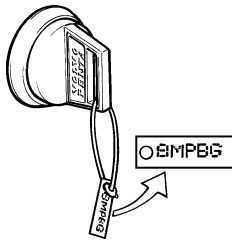
## Key switch

The key switch has five positions, including the 0 position:

- Pos. 0 = The key can be inserted and removed.
- S = Stop position (stop functions engaged).  
The key springs back automatically to the 0 position after stopping.
- I = Operating position. The key springs back automatically to the operating position after pre-heating or start.
- II = Pre-heating position (starter element engaged).\*
- III = Starting position (starter motor engaged).

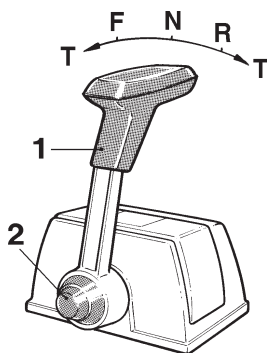
See also instructions for starting.

\* **Note.** The TAMD63 and TAMD73 have no starter element.



## Starter keys

The starter keys are tagged with a key code. Use this code when ordering new keys. Do not keep the tag on your boat. The code must not be divulged to unauthorized persons.



VP single lever control

Lever (1) for reversing maneuvers and controlling engine speed

### Position N – Neutral

From N to F – reverse gear engaged for forward movement.

From N to R – reverse gear engaged for reverse movement

T – control of engine speed (rpm)

### Disengaging the reverse gear from the control:

Push the button (2) when the lever is in neutral, then push the lever forwards. The lever can then be used as a throttle control with disengaged reverse gear. **Take care not to engage the reverse gear unintentionally.**

The shift function is engaged automatically when the lever is moved to the Neutral position.

## Controls

Volvo Penta uses two types of controls, single lever and dual lever. With single lever controls, both acceleration and reverse gear maneuvers are controlled using one lever, while the dual lever controls have a separate lever for each function.

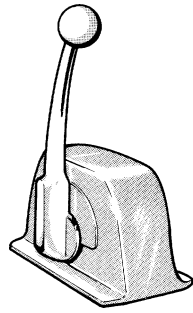
The TAMD73P, -74 also have an electric control.

### Single lever control:

Volvo Penta single lever controls have functions for acceleration and reverse gear maneuvers combined in one lever. When starting, for example, the shift function can be easily disengaged so that only the engine speed (rpm) is affected by the lever. When maneuvering the boat astern or ahead the control mechanism in the unit ensures that the engine speed drops to idle speed at the moment shifting occurs.

The control lever has an adjustable friction brake. A neutral position switch which only permits the engine to be started when the reverse gear is disengaged is available as an accessory.

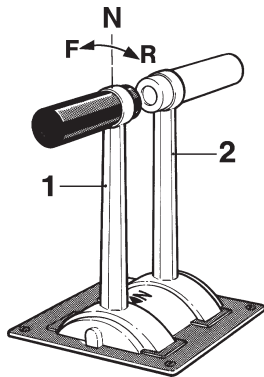
A double single-lever unit is available for use with twin engine installations.



Type S controls for maneuvering trolling valve

Single lever controls with a single function are suitable for controlling a trolling valve\*, if fitted. One of these is the type S control.

\*The trolling valve is an accessory for the Twin Disc reverse gear MG507(A)-1.



VP dual lever controls

1. Lever for reverse gear maneuvers (black handle)

**Position N – Neutral**

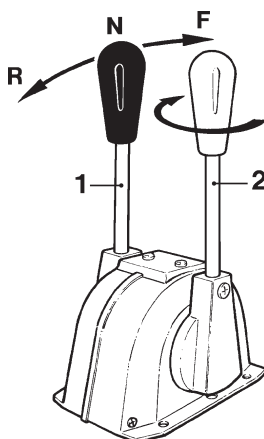
**From N to F** – reverse gear engaged for forward movement

**From N to R** – reverse gear engaged for reverse movement

2. Lever for controlling engine speed (rpm) (red handle)

### Dual lever control

These controls have separate levers for acceleration and shifting. A mechanical lock means you can shift only when the acceleration lever is in the idling position. The controls have a neutral switch to prevent starting with the reverse gear engaged. Both control levers have separately adjustable friction brakes.



NB dual controls

1. Lever for reverse gear maneuvers (black handle)

**Position N – Neutral**

**From N to F** – reverse gear engaged for forward movement

**From N to R** – reverse gear engaged for reverse movement

2. Lever for controlling engine speed (rpm) (red handle)

One brake can be adjusted by turning this handle in order to counteract the regulator power

### Electronic controls (TAMD73P and TAMD74)

The Volvo Penta electronic, single-lever control combines the functions of a throttle and reverse gear operation in one control lever unit. When starting, for example, the shift function can be easily disengaged so that only the engine speed (rpm)\* is affected by the lever.

The Neutral Position switch built in to the control unit only allows the engine to be started with the reverse gear disengaged.

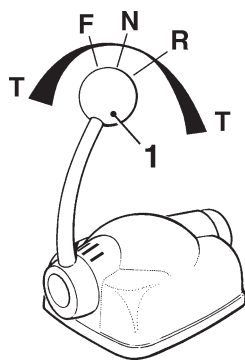
A double single-lever unit is available for use with twin engine installations.

\***Note.** The engine speed is limited to max. 2000 rpm in this position.

### Calibration

Before the engine is started for the first time the control must be calibrated according to the instructions on the next page.

**NOTE! If the calibration is not carried out the engine cannot be started.** (Diagnostic Trouble Code (DTC) 1.6 or 1.7 will be flashed – “Control calibration not done”).



VP EDC control (electronic)

Lever (1) for reversing maneuvers and controlling engine speed

**Position N – Neutral**

**From N to F** – reverse gear engaged for forward movement

**From N to R** – reverse gear engaged for reverse movement

**T** – control of engine speed (rpm)

#### Disengaging the reverse gear from the control:

Press the green button (15 see page 12) marked “Neutral” on the control panel with the lever in the Neutral position. Keep the button pressed in and push the lever to the shift position. The lever can then be used as a throttle with disengaged reverse gear. **Take care not to engage the reverse gear unintentionally.**

The shift function is engaged automatically when the lever is moved to the Neutral position.

## Calibrating the controls

(TAMD73P and TAMD74)

**NOTE!** If calibration is not carried out after installation, the engine cannot be started.

Calibrate first at the Master Control Station and only then at any secondary control position(s) installed.

**TAMD73P and TAMD74:** Activate the required control position by pressing the red button “Active Station” (indicator lamp comes on together with indicator lamp in the green Neutral button).

### Preparations

Before the control is calibrated the EDC system must be put into calibration mode as follows:

1. Position control lever in Neutral position (dual lever control put levers to Neutral and Idling position respectively).

2. Turn the starter key to the stop position “S” and release the key.

Press the **yellow** Diagnostics button and **hold it in** while turning the starter key to position “I” (operating position).

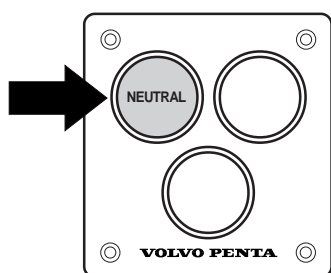
3. Erase stored diagnostic trouble codes (DTCs) by holding the button pressed for another 3 seconds. **Note.** Diagnostic trouble code (DTC) 1.6 (Master Control Station) or 1.7 (secondary control position) cannot be erased before the control is calibrated.

4. Turn the starter key to the stop position “S” and release the key.

Press the **green** Neutral button. Keep the button pressed and turn the key switch to position “I” (operating position)\*. Keep the button pressed in until the yellow lamp goes off. Release the button.

The **yellow** lamp starts to flash to confirm that the EDC system is in calibration mode.

\***Note.** Two persons are required for this operation, one to turn the key switch key on the main panel while the other calibrates the controls on a Flying Bridge position where the control panel does not have a key switch.



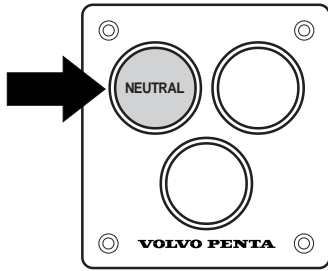
TAMD73P and TAMD74: EDC control panel – Single engine

## Calibrating electronic single lever control

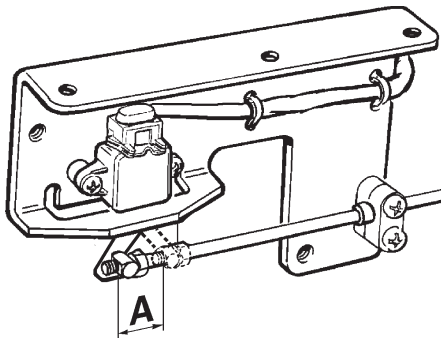
**NOTE!** Calibrate first at the Master Control Station followed by the other control stations(s).

1. Set the EDC system to calibration mode according to instructions in “Preparations”.
2. Move the control lever to the position where forward gear should start. Hold lever in this position.

Acknowledge the position by pressing in the **green** button (Neutral) for at least 3 seconds.

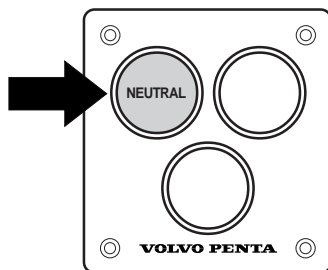


TAMD73P and TAMD74: EDC control panel – Single engine



Throttle potentiometer bracket when using mechanical control

A. Control cable movement (throw)



TAMD73P and TAMD74: EDC control panel – Single engine

3. Move the lever to the wide open throttle (WOT) position ahead (forward) movement. Hold the lever in this position.  
Acknowledge the position by pressing in the **green** button for at least three seconds.
4. Move the control lever to the position where astern gear is engaged. Hold the lever in this position.  
Acknowledge the position by pressing in the **green** button for at least three seconds.
5. Move the lever to the wide open throttle (WOT) astern position. Hold lever in this position.  
Acknowledge the position by pressing in the **green** button for at least three seconds.
6. Return the lever to the Neutral position. Hold the lever in this position.  
Acknowledge the position by pressing in the **green** button for at least three seconds.
7. Finish calibration by pressing down the **green** button again (the yellow and green buttons then stop flashing).

### Calibrating mechanical single lever control

**NOTE!** Certain other makes of control have been shown to have greater travel (A) with full throttle opening with the reverse gear disengaged than with wide open throttle (WOT) with the reverse gear engaged.

Measure the movement (A) at the potentiometer bracket at wide open throttle (WOT) and with the reverse gear engaged. Note the result.

**NOTE!** Calibrate first at the Master Control Station followed by the other control stations(s).

1. Set the EDC system to calibration mode according to instructions in "Preparations" (see page 18).
2. Press in the button (2) on the control unit (to disengage gearshift function – see illustration on page 16). At the same time move the lever forward to wide open throttle (WOT) position. Hold the lever in this position.

Acknowledge the position by pressing in the **green** button (Neutral) for at least 3 seconds.

**Single lever control from other manufacturers:** Disengage the shift function and at the same time move the lever forward to WOT position. Hold the lever in this position.

**NOTE!** Check that the control cable movement does not exceed the value noted earlier.

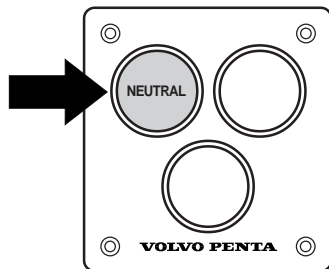
Acknowledge the position by pressing in the **green** button for at least three seconds.

3. Move the lever to neutral position. Hold the lever in this position.

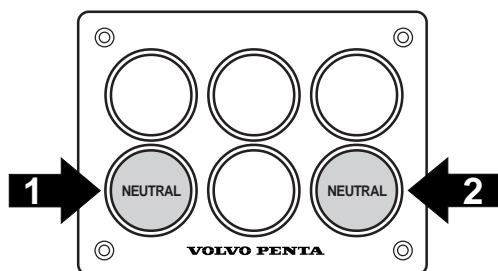
Acknowledge the position by pressing in the **green** button for at least three seconds.

4. Move the control lever to the position where throttle ahead (forward) movement is to start. Hold the lever in this position.

Acknowledge the position by pressing in the **green** button for at least three seconds.



TAMD73P and TAMD74: EDC control panel – Single engine



TAMD73P and TAMD74: EDC control panel for one or more control stations (double installation)

1. Port engine
2. Starboard engine

5. Move the control lever to the position where throttle astern (rearward) movement is to start. Hold the lever in this position.

Acknowledge the position by pressing in the **green** button for at least three seconds.

6. Return the lever to the Neutral position.

Acknowledge the position by pressing in the **green** button for at least three seconds.

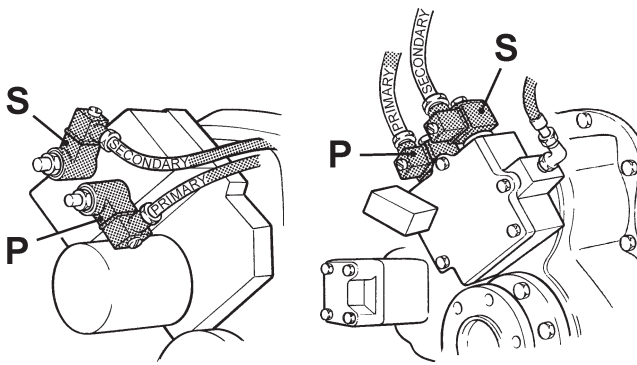
7. Finish calibration by pressing down the **green** button (the yellow and green buttons then stop flashing).

### Calibrating electronic/mechanical dual lever controls

**NOTE!** Ensure that the levers are parallel with each other. This is to avoid faults when calibrating.

**NOTE!** Calibrate first at the Master Control Station followed by the other control station(s).

1. Set the EDC system to calibration mode according to instructions in "Preparations" (see page 18).
2. Move the throttle lever to wide open throttle (WOT) position. Hold the lever in this position.  
Acknowledge the position by pressing in the **green** button (Neutral) for at least three seconds.
3. Move the lever to idling position. Hold the lever in this position.  
Acknowledge the position by pressing the **green** button. Hold for at least 3 seconds.
4. Move the shift function lever to the position at which the reverse gear is engaged for Ahead (forward) movement. Hold the lever in this position.  
Acknowledge the position by pressing the **green** button. Hold for at least 3 seconds.
5. Move the shift function lever to the position where the reverse gear is engaged for Astern (rearward) movement. Hold the lever in this position.  
Acknowledge the position by pressing the **green** button. Hold for at least 3 seconds.
6. Return the levers to neutral respectively idling position. Hold the levers in this position.  
Acknowledge the position by pressing the **green** button. Hold for at least 3 seconds.
7. Finish calibration by pressing the **green** button (the green and the yellow lamps stop flashing).



MPM

Twin Disc

TAMD73P and TAMD74: Cable connections to solenoids on the reverse gear with electronically controlled shifting

## Reverse gear with electronic shifting

**Note** If Ahead/Astern (Forward/Reverse) on the control unit do not correspond to Ahead/Astern on the boat swap the “P”/ “S” (Primary/Secondary) connectors between the reverse gear solenoids.

## Engine idling speed (rpm) adjustment (TAMD73P and TAMD74 engines)

The engine idle speed is adjusted at the factory to 600 rpm. If required the idle speed can be adjusted within the range 550–700 rpm.

**Note!** Adjustments to engine idle speed can only be made from the Master control station.\*

**Adjust idle speed with engine at normal operating temperature.\*\***

1. Set all controls to Neutral/Idle.
2. Turn the starter key to the stop position “S” and release the key.
3. Press the **green** Neutral button on the EDC system control panel. Keep the button pressed and turn the starter key to position “I” (operating position). Keep the button pressed in (at least 3 seconds) until the yellow indicator lamp goes off. Release the button.

The yellow Diagnostics lamps will flash, indicating that the EDC system is in calibration mode.

**NOTE!** With electrical shift the green lamp flashes to confirm that gear shift function is not activated. With mechanical shift the green lamp will not flash.

4. Start the engine.\*\*\* The engine idle speed can now be adjusted using the control lever (throttle lever) within the range 550–700 rpm (equivalent to the movement of the lever).

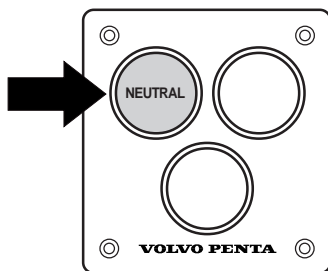
**Mechanical single lever control:** Disengage the reverse gear function before moving the control lever.

5. Set the engine idle speed required and press in the **green** Neutral button on the EDC control panel at least 3 seconds.
6. Return the lever to the Neutral position (idle). The green and yellow lamp will stop flashing. This will reengage gear shift function.

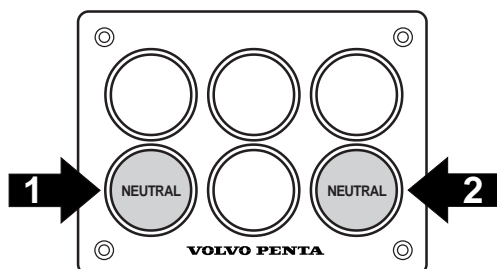
\* The active control position when the power is turned on (indicator lamp in the green button comes on).

\*\* At engine coolant temperatures below 15°C (59°F) the idle speed increases to 800 rpm for a maximum of 2 minutes.

\*\*\* **NOTE!** The engine cannot be started until the control unit has been calibrated. Refer to the instructions on Page 18.



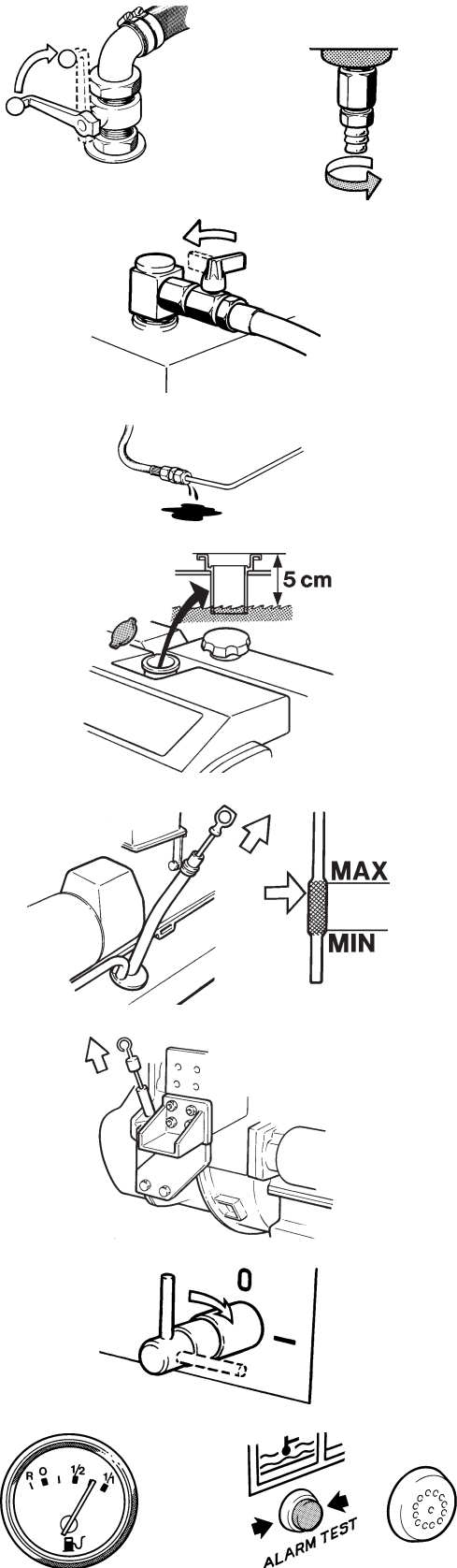
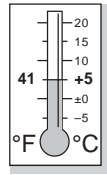
TAMD73P and TAMD74: EDC control panel – Single engine



TAMD73P and TAMD74: EDC control panel for one or more control stations (double installation)

1. Port engine
2. Starboard engine

# Operation



## Before starting

**Note:** To reduce exhaust emissions to a minimum during cold starts Volvo Penta recommends that a heater is installed to heat the engine room when temperatures fall below +5°C (41°F).

1. Open the cooling water intake sea cock.
2. Check that all the drain cocks are closed and all the drain plugs are installed.  
For the positioning of cocks/plugs, see the pictures on pages 32 and 33.
3. Open the fuel cocks
4. Check that no fuel, water or oil is leaking out.
5. Check coolant level on the engine when COLD. The level must be 5 cm (2") beneath the sealing surface of the filler cap, or between the MIN and MAX marks on the separate plastic expansion tank (accessory). For filling, see page 59.  
**⚠ Note. Do NOT open the pressure cap when the engine is hot. Steam or hot coolant can spray out and the system pressure will be lost.**
6. Check the engine oil level. This should be within the area marked on the dipstick.  
**The oil level must never be lower than the bottom mark.**
7. Check the oil level in the reverse gear.\*  
**\* Note.** Since the marks on the dipstick apply at operating temperature (with the engine idling and the control in neutral), the correct level before starting must be judged by experience.
8. Switch on the main switches
9. Check the amount of fuel.
10. Push the "Alarm test" button and check that the alarm sounds (warning lamps come on). The alarm will stop when the button is released.



## Starting the engine

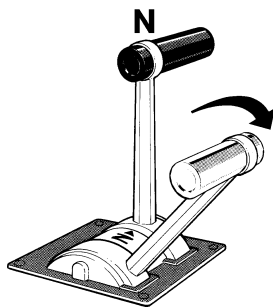
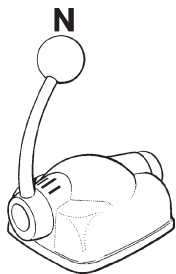
To keep smoke on starting to a minimum, the TAMD71B is fitted with air preheating (a starter element). This starter element is found in the inlet pipe, and its activation time is controlled by a timer relay. On the TAMD63, TAMD73 and TAMD74, which all have higher compression, different combustion chambers and a modified injection system, a starter element is not required.

The starter element should be on for approx. 50 s for preheating the inlet air before cold-starting. After starting, the element is switched on automatically for a further 50 s to reduce exhaust smoke during warming up and to make the engine run evenly.

**Note:** On the TAMD73P and TAMD74 the electronic diesel control (EDC) system minimizes exhaust emissions during starting. To raise the combustion temperature before starting the starter motor turns over the engine approx. 1–4 revolutions (temperature dependent) before fuel is injected.

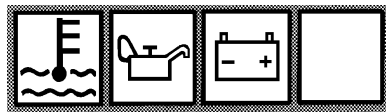
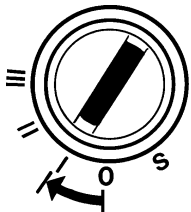
To ensure smoother running on a cold engine the idle rpm is increased to 800 rpm for a maximum of 2 minutes when the engine coolant temperature is below +15°C (59°F). When the coolant temperature rises above 15°C (59°F) the idle rpm is gradually reduced to normal idle speed.

**⚠ Warning!** Never use start spray or similar to start the engine. There may be an explosion in the inlet manifold. **Danger of personal injury.**

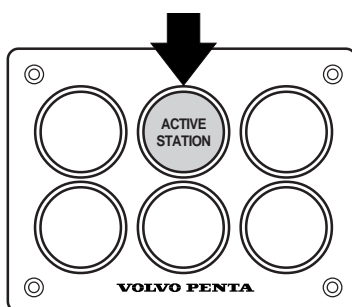
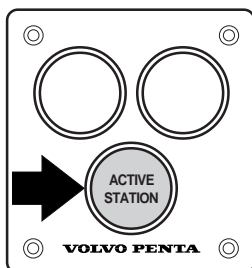


- 1. Single lever control:** Check that the lever is in neutral “N”. This means that the throttle control is set to idling and the reverse gear is disengaged.

**Dual lever control:** Move the forward/reverse lever into neutral in order to start. Pull the throttle lever right back (idling position).



- 2.** Insert the key in the key switch. Turn it to the “I” position (operating position). All warning lights will come on. (The high coolant temperature warning light will go off after 20 seconds).



- 3. TAMD73P and TAMD74:**  
**Activate the control position to be used by pressing the red “Active Station” button.** The red and green buttons (“Active Station” and “Neutral” respectively) light up to confirm that the control position is active.

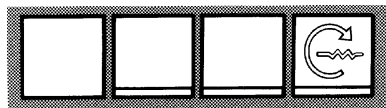
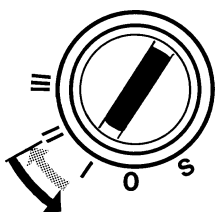
**NOTE!** If the red button is flashing, the control lever is not in neutral.

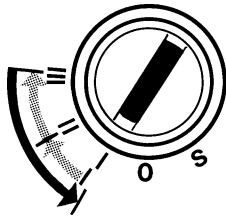
**⚠ NOTE!** For safety reasons, the control position can only be activated when the control lever is in the Neutral position. (The engine cannot be started until the control position is activated).

- 4. TAMD71B:**

**Cold engine:** Turn the key to position “II” (preheating). Release the key when the “starter element on” indicator lamp comes on. Activation time is approx. 50 secs. (timer relay). Do not attempt to start the engine until the indicator light has gone out.

**Hot engine:** Turn the key directly to position “III” to start.





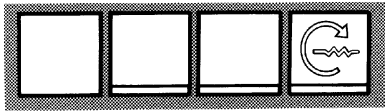
- Turn the key to position "III" to start\* the engine (after the indicator lamp has gone out in the case of engines with a starter element). Release the key as soon as the engine starts.

\* **NOTE!** The key switch has a restart inhibitor.

Always start repeated start attempts from position "S" (TAMD63 and TAMD71) or position "0" (TAMD73 and TAMD74).

**TAMD73P:** The control position must always be activated from the beginning according to point 3 before a new start attempt can be made.

**TAMD74:** If the key has been turned to position "S", the control position must be activated from the beginning according to point 3 before a new start attempt can be made.

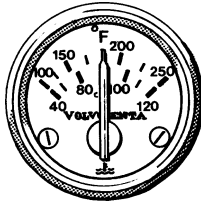


**TAMD71B:** After starting, the "Starter element on" indicator light will remain on for approx. 50 secs. (after-heating).

Warm up the engine at low speed and low load. **Do not race the engine while it is cold.**

**When warming up the engine, check that the instruments display normal values.**

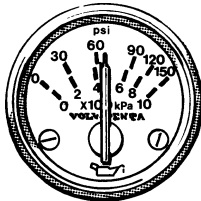
The needle on the temperature gauge should rise slowly to operating temperature, 75–95°C (167–203°F).



At operating speed, the engine's oil pressure gauge should show at least approx.:

300 kPa (43 psi) – TAMD63.

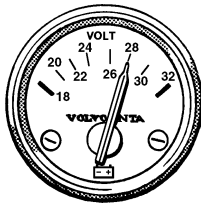
420 kPa (61 psi) – TAMD71, -73, -74



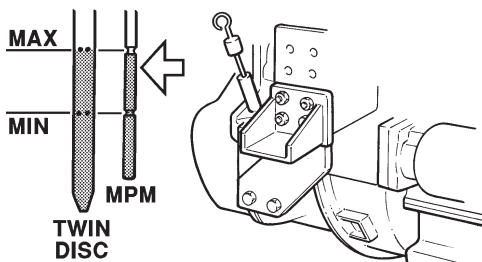
System voltage should be approximately 14V or 28V depending on whether the engine is equipped with a 12V or 24V system.

The warning lights should be off\* and the alarm off.

\* **TAMD71B:** The preheating indicator light goes off approx. 50 secs. after starting.



Check the oil level in the reverse gear when it has reached **operating temperature** (with the engine idling and the control in neutral). The oil level should reach the upper mark on the dipstick.



Checking oil level in the reverse gear

**WARNING!** Approaching a running engine is dangerous. Loose clothing or long hair can fasten in rotating parts and cause serious personal injury. Avoid burns. Take precautions to avoid hot surfaces.

**NOTE!** Never break the circuit with the main switches while the engine is running. The voltage regulator and generator may be seriously damaged.

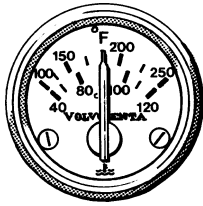
**TAMD63, TAMD71:** The starter motor must **never** be engaged while the engine is running\*. The starter motor and starter gear on the flywheel may be seriously damaged.

\* Not possible on TAMD73P and TAMD74.

## Checks during operation

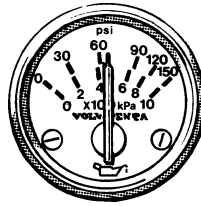
Check instruments. Normal operating values are:

### Engine coolant temperature



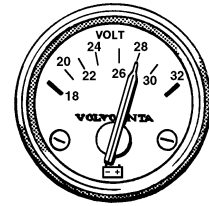
75–95°C  
(167–203°F)

### Oil pressure, engine



TAMD63: 300–550 kPa  
TAMD71, -73, -74: 420–650 kPa

### System voltage



approx. 14V (12V) or  
28V (24V)

If the oil pressure drops, the temperature rises above the permitted values or there is a loss of charge, the alarm will sound and one of the warning lamps will start to flash to indicate the source of the malfunction.

### If the alarm sounds:

- Engine coolant temperature too high. **Reduce the speed to idling (in neutral) until the temperature drops. Investigate the cause of the alarm** (e.g. blocked engine water intake). **Stop the engine if the temperature does not drop.**
- Engine oil pressure low. **Stop the engine immediately and investigate the cause of the alarm.**

If an extra alarm panel is fitted, the alarm will also sound if the lubricating oil or coolant levels are too low before starting or if there is water in the extra fuel pre-filter. An extra alarm function may also be connected.

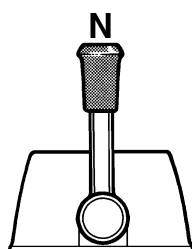
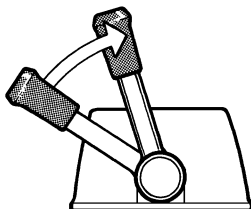
**Note!** When running the engine for long periods the engine oil level must be checked at least every 8 hours with the engine stopped (check after the engine has been stopped for approx. 3 minutes).

## Maneuvering during operation

For economic running it is necessary to select an optimal cruising speed. **The recommended cruising speed is the maximum speed which can be achieved at any given time minus 200 rpm.**

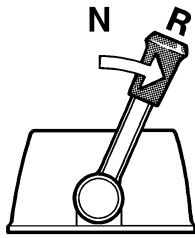
For information on synchronization (twin engines) see page 13.

All forward/reverse maneuvering should be done at idling speed. Maneuvering at higher speeds may damage the reverse gear and will also be uncomfortable for those on board. Maneuver as follows:



### Reverse gear

1. Reduce engine speed to idling and, if possible, let the boat lose most of its speed.
2. Move the reverse gear control lever quickly and firmly into the neutral position, then wait for a moment.



3. Move the control lever quickly and firmly into reverse, then increase the speed.

**Note!** If the boat has two engines, it is vital that both engines are running, particularly when maneuvering forwards and backwards. If one engine has not been started and the other is used to reverse, water may enter the stopped engine via the exhaust port and cause serious damage.

### Changing the control position (TAMD73P and TAMD74 engines)

**NOTE!** For safety reasons it is only possible to change the control point with the control in the Neutral/Idle position.

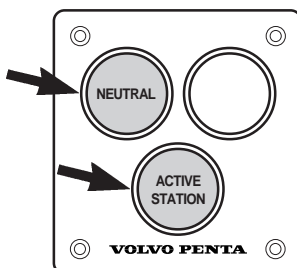
- Leave the control position with the control lever(s) in **Neutral** (the green button “Neutral” comes on).
- Check that the control lever(s) are also in Neutral in the new control position.
- Turn the key switch to operating position (I) and press the red button (“Active Station”) in the new control position.

#### **For a second control station with push-but-**

**tons:** Turn the key switch on the Main control station to operating position (I) and press the red button (“Active Station”) in the new control position.

The indicator lamps in both the red and green buttons light to confirm that the new control position is active.

**NOTE!** If the red button is flashing, the control lever is not in neutral.



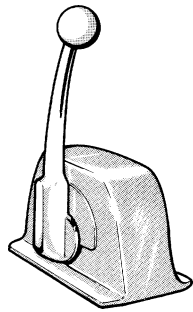
#### **Twin installation**

**⚠ WARNING!** Never leave the control position before the indicator lamps in the green buttons “Neutral” light.

If the control position is left with the control lever for the port engine, for example, in neutral, the port engine can be driven from the second control position when it has been activated (the indicator lamp in the green button “Neutral” lights).

**Note.** The red button (“Active Station”) flashes because the control position for **both** engines has not moved.

**Note.** The following equipment shown can be obtained only for propulsion engines in working boats.



Type S controls for trolling valve operation

### Trolling valve

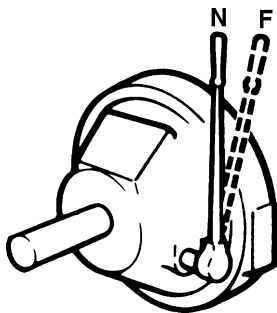
(Twin Disc MG507-1 and MG507A-1)

If the reverse gear has a trolling valve (accessory), this should be used when the boat is to move very slowly.

Engage the trolling valve to max. slip when the reverse gear control is in neutral. After selecting "Forward" or "Reverse", the trolling valve can then be set in the required trolling position within the permitted speed range.

**⚠ The engine speed must never exceed 1100 rpm when using the trolling valve.**

**Note!** For full propeller power during operation, the trolling valve control lever should always be in the "Disengaged" position when the valve is not in use.

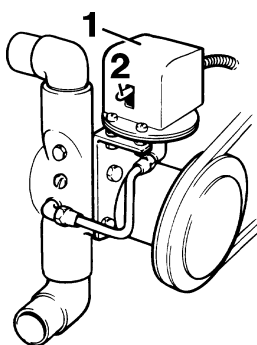


Disengageable clutch

F = Engaged  
N = Neutral

### Disengageable clutch (accessory, TAMD71)

The clutches have two positions on the control lever. Lever towards engine for engagement, away from it for neutral. **When engaging and disengaging the clutch, the engine speed must not exceed 800 rpm.**



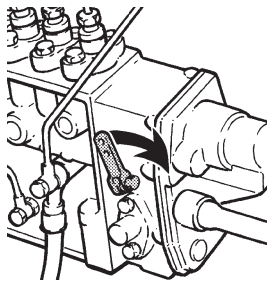
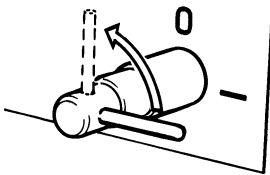
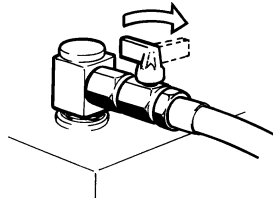
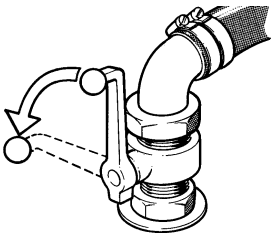
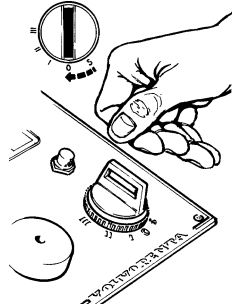
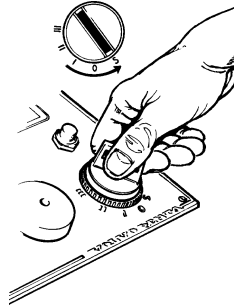
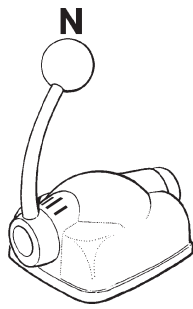
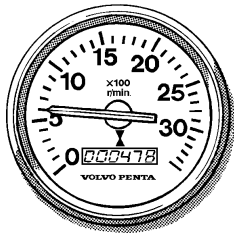
Bilge pump

1. Vacuum circuit breaker
2. Actuating lever

### Disengageable scavenging/bilge pump (accessory, TAMD71, 24V)

These pumps are engaged and disengaged via electromagnetic connections and switches on the instrument panel. The bilge pump has a vacuum switch which automatically disengages it when the level is so low that no water is being sucked into the pump. The vacuum switch also has a lever for manually engaging the pump.

The lever must be held down for approx. 20 seconds when engaging the pump.



## After operation

1. Let the engine idle for a few minutes with the reverse gear in neutral after landing. This will even out the engine temperature and prevent local overheating which may cause the coolant to boil.
2. Turn the key to **stop position "S"**. Release the key when the engine has stopped (key will spring back automatically into the 0 position). The key can then be taken out.

### Safety precautions:

3. Close the cooling water intake sea cock and the fuel cocks. For anti-freeze protection, see section "Precautions against freezing" on page 32.
4. Switch off the main switches if the boat is not to be used for some time.
5. Inspect the engine and engine compartment for any leaks.

### Emergency stop

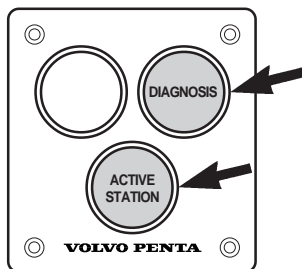
Pull the stop lever on the governor to the rear for manual stop (emergency stop).

## Safety systems (TAMD73P and TAMD74)


### Emergency operation of the engine

#### **IMPORTANT!**

The engines are equipped with an emergency operation function (“Limp-home”). The function engages automatically and makes it possible to continue running the engine and reach harbour if communication between the control and the engine is broken.




#### When the Limp-home function is connected:

- The red lamp (“Active Station”) and the yellow lamp (“Diagnosis”) flash in the control panel (EDC).
-  **WARNING! The control(s) for the affected engine do not function.**
- The engine speed is set to 1000 rpm and the reverse gear is set in Neutral for safety.

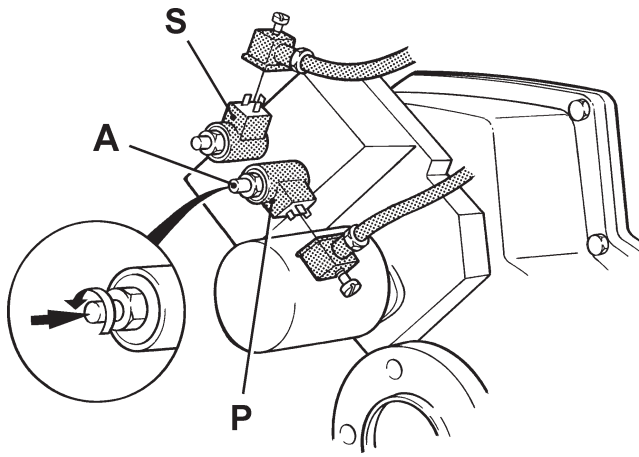
**Contact an authorised workshop for corrective action as soon as possible.**

#### If movement ahead (forward) is required – proceed as follows:

1. Stop the engine.
2. Engage reverse gear manually for Ahead movement. See the next section “Reverse gear emergency operation”.
3. Start the engine (propulsion engages immediately).

 **WARNING! In order to interrupt propulsion the engine must be stopped using the key switch or stop button, if applicable.**

**The control(s) for the affected engine do not function.**



MPM: Manual engagement of reverse gear (safety system)

A. Pushbutton

- P. Solenoid switch (Primary). Used normally for Ahead (forward) movement
- S. Solenoid valve (Secondary). Used normally for Astern (backward) movement

## Reverse gear emergency operation

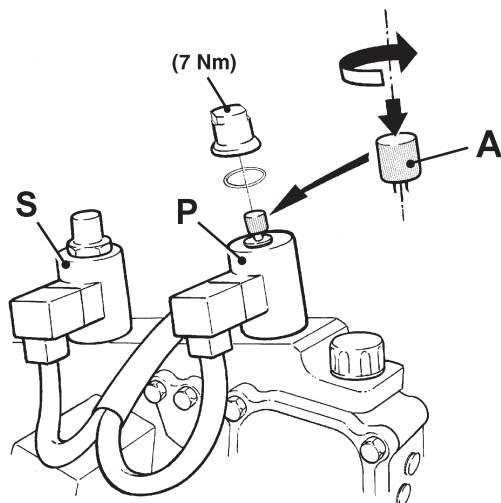
On MPM and Twin Disc reverse gears with electronically operated shifting there is a safety feature for manual engagement of Ahead (forward movement) should a malfunction occur on the reverse gear solenoid valve.

### MPM – Engagement

1. Stop engine and remove the key from the key switch.
2. Note to which solenoid valve (P or S) the wiring marked “Primary” is connected. Detach the connector from both solenoids.
3. Press in button (A) on the solenoid where the “Primary” cable was installed. Turn button half a turn **counter-clockwise** to locked position.



**WARNING! After engagement the reverse gear is locked for use Ahead and cannot be disengaged with the control.**



Twin Disc MG5075: Manual engagement of reverse gear (safety system)

A. Pushbutton

- P. Solenoid switch (Primary). Used normally for Ahead (forward) movement
- S. Solenoid valve (Secondary). Used normally for Astern (backward) movement

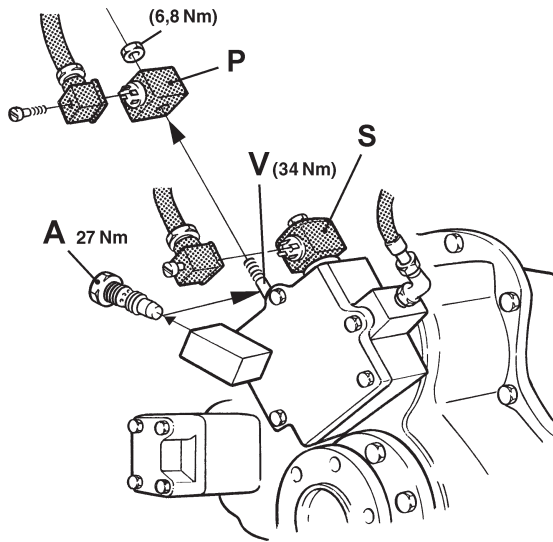
### Twin Disc MG5075 – Engagement

1. Stop engine and remove the key from the key switch.
2. Note to which solenoid valve (P or S) the wiring marked “Primary” is connected. Detach the connector from both solenoids.
3. Remove the covering nut on top of the solenoid valve where the “Primary” cable was installed.
4. Press in button (A) on the solenoid and turn the button half a turn **clockwise** until the catch point.



**WARNING! After engagement the reverse gear is locked for use Ahead and cannot be disengaged with the control.**





Other Twin Disc: Manual engagement of reverse gear (safety system)

A. Plug\*

- P. Solenoid valve (**P**Primary). Used normally for Ahead (forward) movement
- S. Solenoid valve (**S**Secondary). Used normally for Astern (backward) movement
- V. Valve body

\* **Tightening torque:** Max. 27 Nm (2.7 kpm = 19.9 lbf.ft).

### Other Twin Disc – Engagement

1. Stop engine and remove the key from the key switch.
2. Note to which solenoid valve (P or S) the wiring marked “Primary” is connected. Detach the connector from both solenoids.
3. Remove the solenoid and the valve body (V) on the valve where the “Primary” cable was installed.
4. Unscrew plug (A) from its holder on the reverse gear. Install the plug in the valve body hole as illustrated.

Tightening torque: Max. 27 Nm (2.7 kpm = 19.9 lbf.ft).



**WARNING!** After engagement the reverse gear is locked for use Ahead and cannot be disengaged with the control.

### Back-up power supply

If the battery voltage should for any reason drop below normal during operation (generator not charging or discharged batteries) the engine will stop.

A back-up system is required to start the engine. On pages 79, 81, 85 and 87 can be found a suggestion for installing a back-up starting system for 12V and 24V respectively.

The back-up system is activated by switching in using the main switch (“2B” in the wiring diagram) which brings the emergency/extra batteries on line with the starter batteries.

**NOTE!** The back-up system batteries must be in a charging circuit from the generator on the engine, for example, although this is not included in the engine wiring diagrams.

**Note.** This system is not factory installed from Volvo Penta, it must be installed during the engine installation.

**Check in the Instruction Book for the boat if there is some other type of back-up system supplied.**

**NOTE!** If there is a short-circuit in the electrical system, one or more of the semi-automatic fuses will trip and the engine will stop.\* The fault must be corrected before the engine can be re-started.

\* **Note.** Refer to page 69 for resetting the fuses.

### Propeller shaft brake

Under certain operating conditions, the propeller may make the propeller shaft rotate when the engine is stopped. This rotation may damage the reverse gear since its oil pump, which is driven by the integral shaft, stops when the engine stops.

The propeller shaft can be permitted to rotate with the engine stopped for up to 6–8 hours. After this time the engine must be started for at least 5 minutes to ensure the reverse gear is lubricated and cooled.

If the shaft is likely to rotate more quickly than during normal operation, e.g. during sailing, a temperature gauge should be fitted which monitors the temperature of the oil.

The max. permitted temperatures are 110°C (230°F) for Twin Disc and 95°C (203°F) for MPM reverse gears.

If the above conditions cannot be met a brake must be installed. A temporary solution is to lock the propeller carrier mechanically instead.

## Precautions against freezing

Check the antifreeze in the freshwater system after the engine has stopped if there is a risk of freezing. See under the heading. "Coolant" on page 94.

Drain the water from the seawater system as described below. Check that all the water has drained out.

Check batteries in accordance with instructions on page 72. A poorly charged battery can burst if it freezes.

### Draining coolant

**Before draining the coolant, the engine should be stopped, the filler cap unscrewed and the boat's sea cock closed.** Then open the drain cocks or remove the drain plugs of the engine's freshwater and seawater systems. See the illustrations below and on the next page.

Check that all the water runs out. There may be deposits by the cock/plug which must be removed. Otherwise there is a risk that water may remain in the system and cause serious damage.

Check whether the installation has any more cocks or plugs on the cooling water and exhaust pipes' lowest points.

**⚠ NOTE! To protect the environment please dispose of used coolant at a properly designated disposal site.**

Remove the cover from the seawater pump and the cover on any extra pump.

Close the cocks, fit the plugs and put the cover on the seawater pump (and any extra pump fitted). **Pump out the boat if required. Ensure that there are no leaks before you leave the boat.**

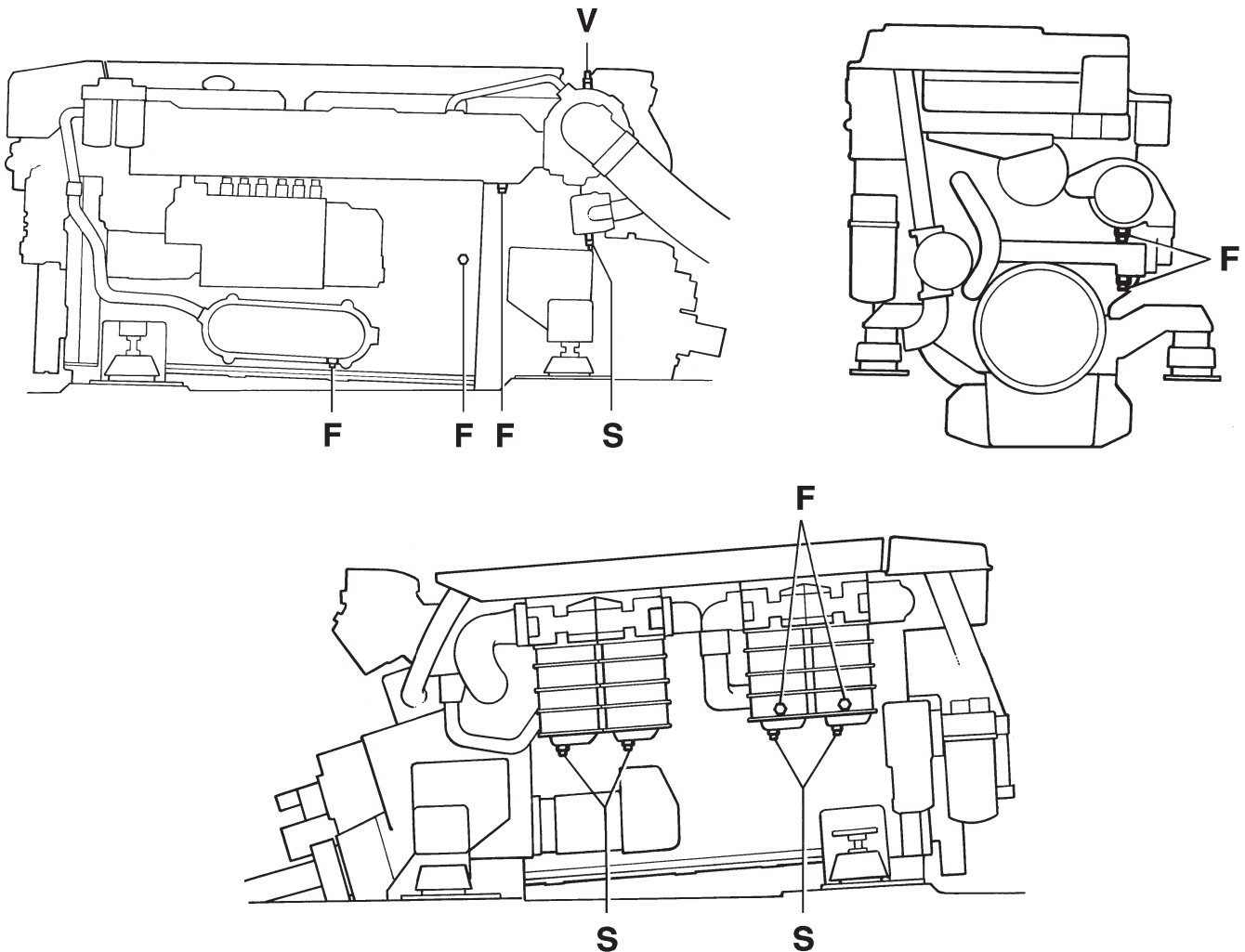
See the instructions on page 59 for topping up the coolant.

### TAMD71

F = Freshwater cocks/plugs

S = Seawater cocks/plugs

V = Venting cock



## TAMD63, TAMD73, TAMD74

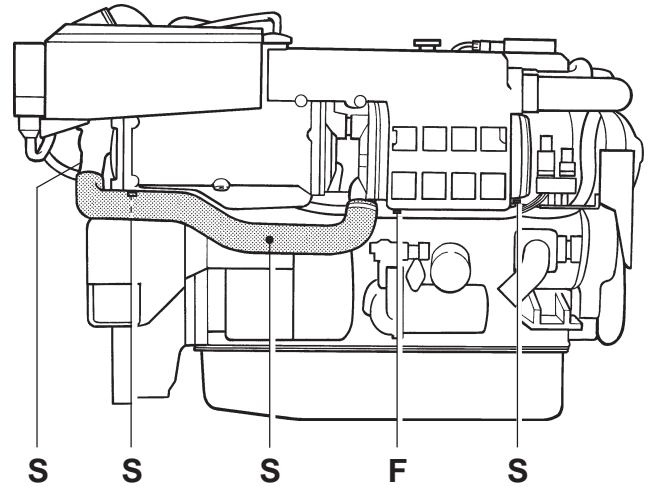
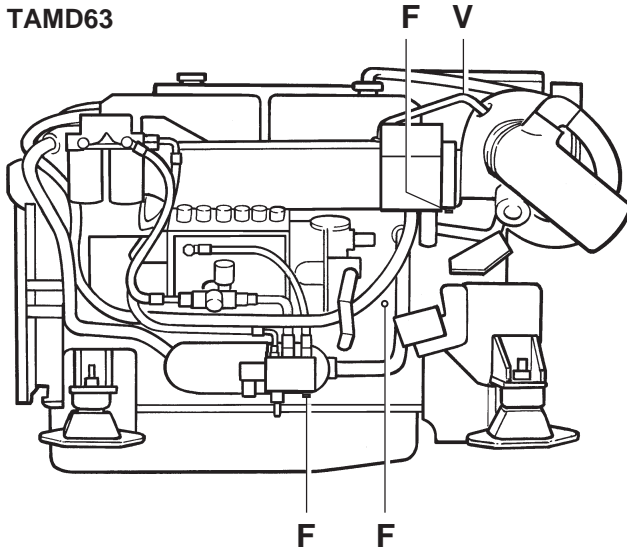
**Note:** Remove the cover on the seawater pump. Also remove the hose between the heat exchanger and the reverse gear's oil cooler, then drain off the water while draining the seawater system.

**F = Freshwater cocks/plugs**

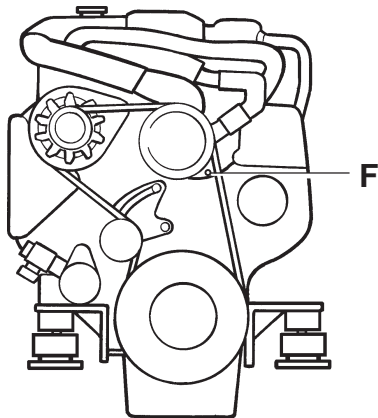
**S = Seawater cocks/plugs**

**V = Venting cocks**

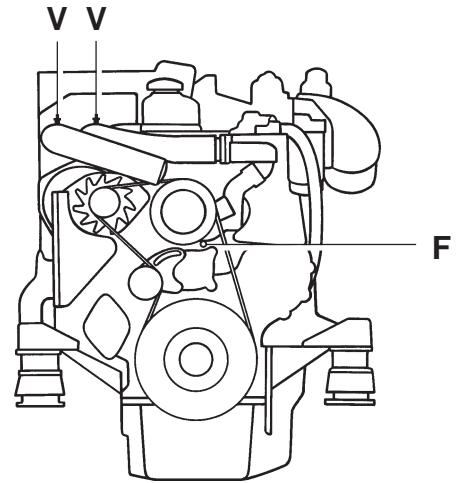
TAMD63



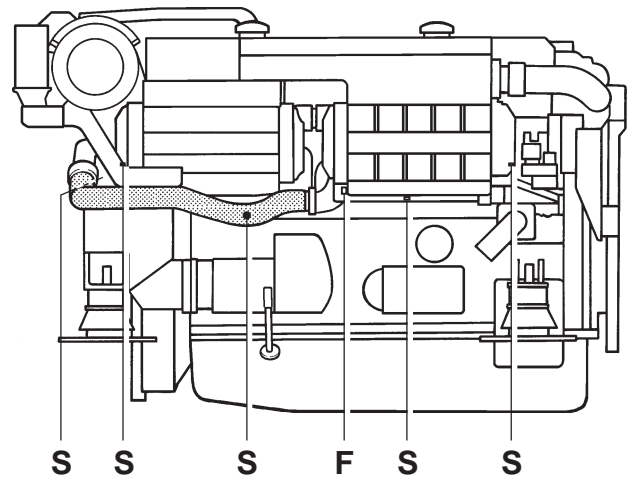
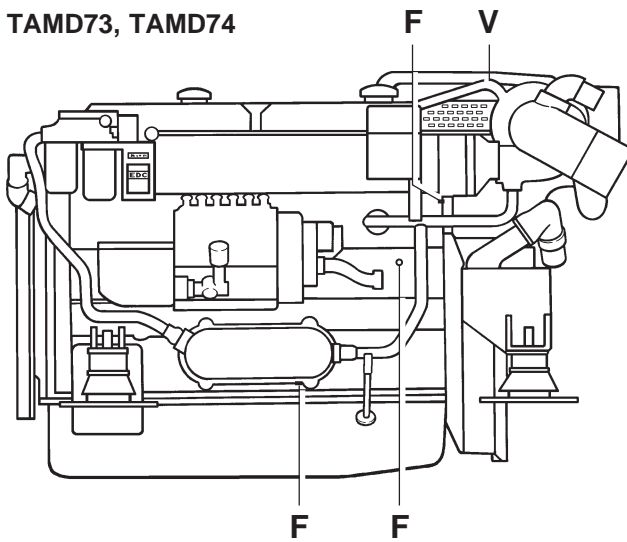
TAMD63



TAMD73,  
TAMD74



TAMD73, TAMD74



# Maintenance and care

## Periodic maintenance

If your engine and its fittings are to function reliably, periodic maintenance in accordance with the maintenance schedule is required. Several of the points below cover the replacement of consumables such as oil and fuel filters etc.

To ensure continued trouble-free use of your engine, it is important always to use original spares. Always state the type designation and serial number of your engine and its fittings when ordering parts.

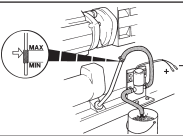
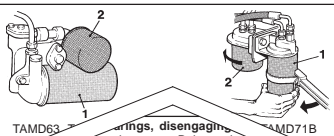
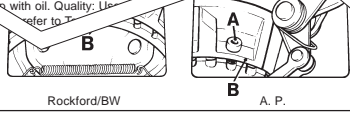
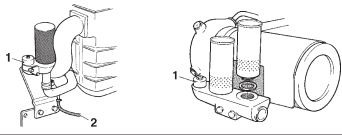
Some operations require professional experience and special tools. Therefore, get authorized service personnel to carry out more extensive work.

For further information, see under the heading "Maintenance" in accordance with the respective section in "Technical Description".

## New engine with reverse gear

See instructions. "Running-in" on page 4.

## Layout of the maintenance schedule

No.	Operation	Interval					Instructions	Info. page.
		50 Hrs	100 Hrs	250 Hrs	500 Hrs	1000 Hrs		
1.	<b>Changing the Engine oil.</b> Note. Refer to table on page 35 for information on oil grade/intervals between changes 1) For TAMD63, TAMD73 and TAMD74. 2) For TAMD71 engines.		1) 2)				 <p>Engine oil VDS or CD or CE as per API system. Drain or pump out oil while engine is hot. <b>Warning!</b> Hot oil can cause burns.</p>	49
2.	<b>Replace oil filter (1) and by-pass filter if fitted (2) at every other oil change.</b>						 <p>Lubricate gasket and screw on new filter by hand. Tighten 3/4 turn once gasket is tight. Top up oil, start, check for leaks. Stop engine and check oil level.</p> <p>TAMD63: ... springs, disengage ... TAMD71B</p>	49
	<b>Check/adjust disengageable clutch (if fitted).</b>						 <p>... with oil. Quality: Use ... A. P.</p>	
11.	<b>Replace filter(s) for crankcase ventilation.</b>						 <p>Screw on new filter by hand. Note: Replace filter earlier if air and oil mixture begins to come out of the valve (1). TAMD71: Check the drain hose (2) is not clogged.</p>	45

Shading denotes simpler operations which can be carried out by the boat owner personally.

Lines indicate operations which require experience and/or special tools. This work should therefore be left to authorized service personnel.

Under the heading "Instruction" is a brief summary of what should be rectified when carrying out the maintenance job in ques-

tion. Under the heading "Info. page" are references to the information pages at the back of this book. In most cases, these pages provide a more detailed description

## Preventive Maintenance

To achieve maximum operating safety and service life, it is vital to maintain the engine and its fittings in accordance with the maintenance schedule. This gives instructions on when and how to carry out maintenance. Always consult an authorized Volvo Penta service dealer, who will have the equipment and trained staff to help you.

A maintenance program well carried out gives better operating economy and fewer unplanned periods of non-operation.

### Engine, oil change intervals

Dependent on the fuel's sulfur content and the quality of the lubricating oil.

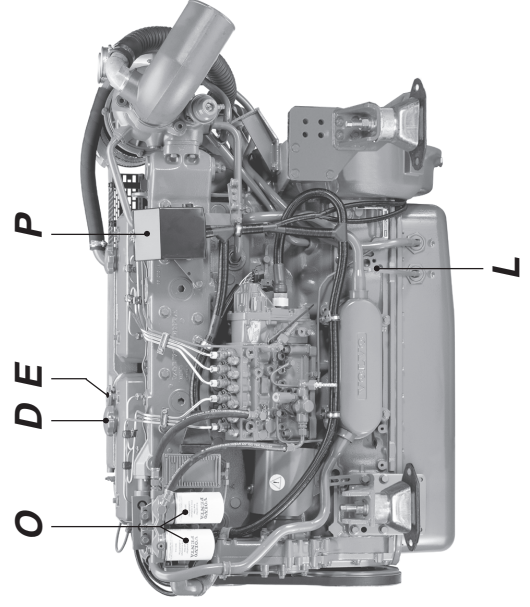
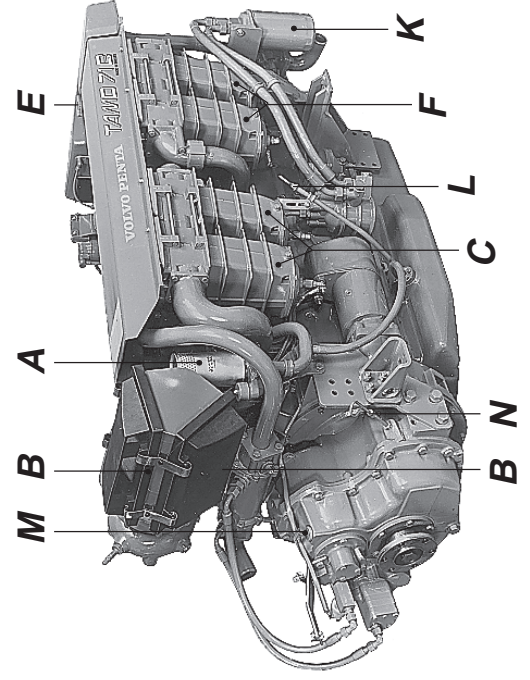
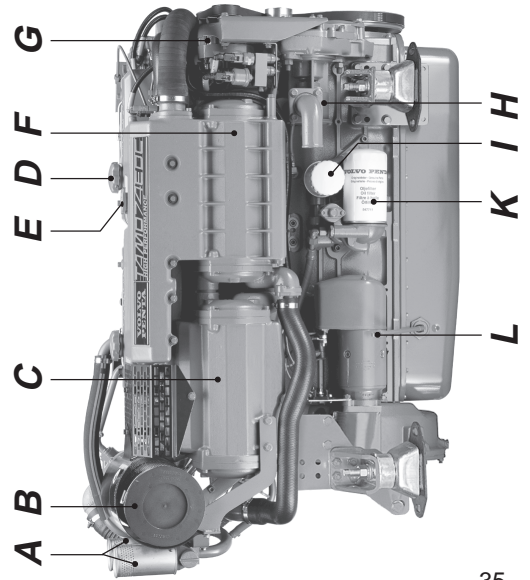
**Note.** However, the oil should always be changed at least once a year even if the operating times in the table are not achieved.

Engine	Oil grade	Fuel sulfur content, % by weight	
		Hours	Hours
TAMD71B TAMD63, TAMD73, -74	VDS or VDS-2*	<0.5	0.5–1.0
	VDS or VDS-2*	500	250
TAMD71B TAMD63, TAMD73, -74	API: CD or CE	200	100
	API: CD or CE	250	125
		100	50

\*VDS = "Volvo Drain Specification"

- A. Filter(s) for crankcase ventilation.
- B. Air Cleaner (ACL).
- C. Charge air cooler (CAC)
- D. Engine oil. Cap for filling.
- E. Coolant. Cap for checking and topping up.
- F. Heat exchanger.
- G. Generator.
- H. Seawater pump.
- I. By-pass filter for lubricating oil.

- K. Lubricating oil filter, engine (alt. located at the back of the engine)
- L. Oil dipstick, engine.
- M. Lubricating oil, reverse gear. Cap for filling.
- N. Oil dipstick, reverse gear. (Alt. locat. on left or right side, depending on type of reverse gear).
- O. Fine fuel filters.
- P. Terminal box with semi-automatic fuses. Press button in if a fuse has tripped.



# Maintenance schedule

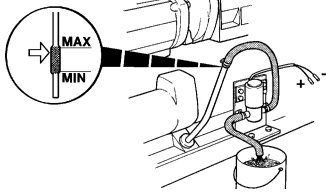
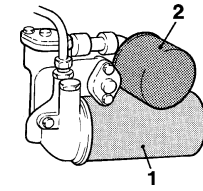
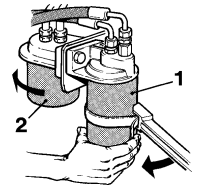
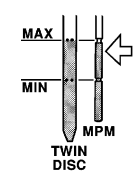
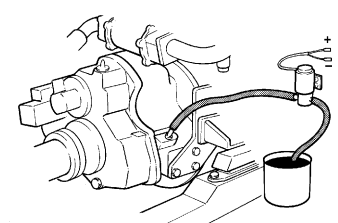
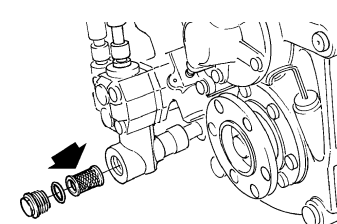
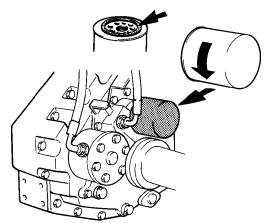
The description applies generally for all engines unless otherwise stated.

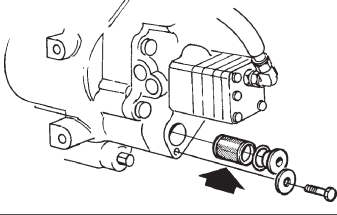
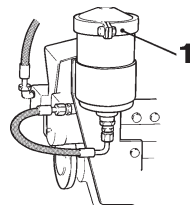
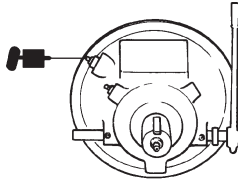
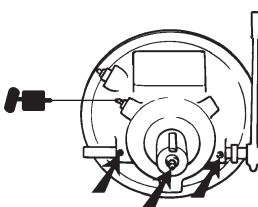
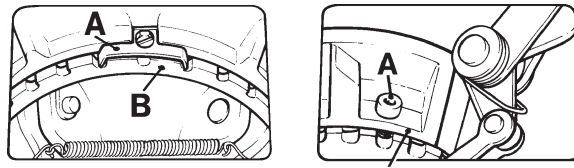
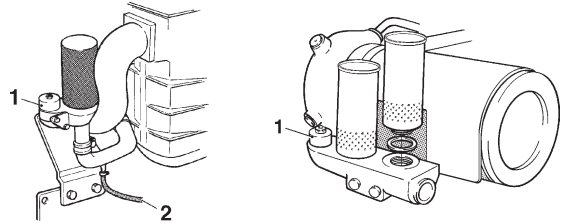
If longer intervals are required than those stated below the oil's condition must be tested regularly by the oil manufacturer.

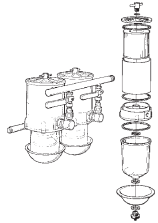
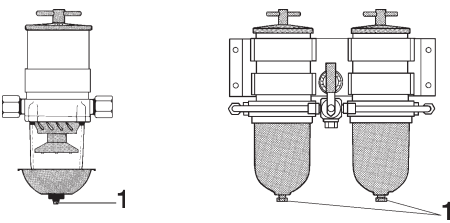
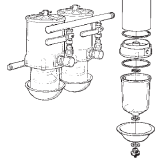
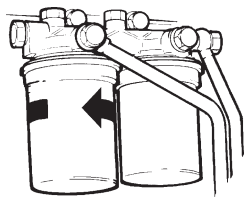
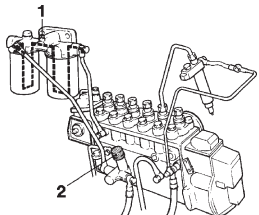
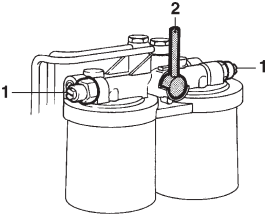
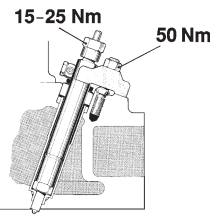
The time intervals are guides which apply to normal operating conditions. For new or reconditioned engines see under the heading. "Running-in" on page 4.

All operations below with the exception of points 17, 21 and 32 must be carried out at least once per year even if the operating time in the schedule has not been reached. Operations 17, 21 and 32 must be carried out at least once every other year.

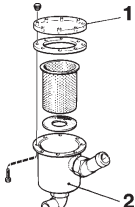
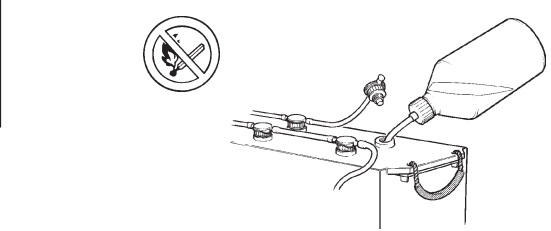
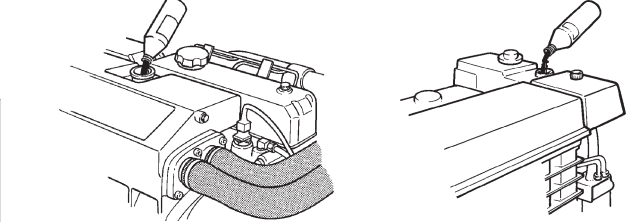
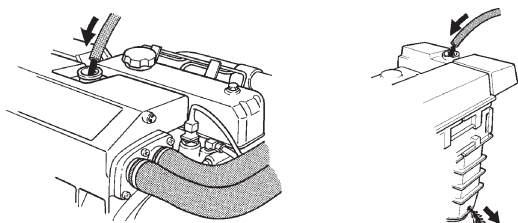
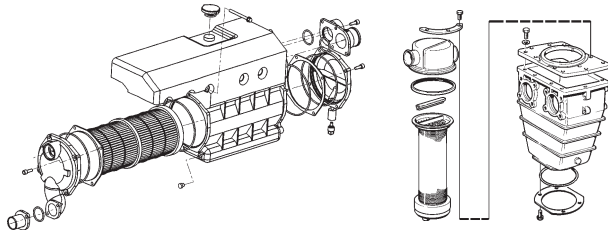
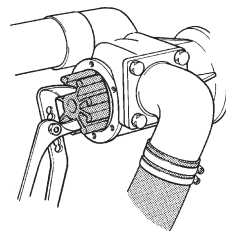
**⚠ NOTE! Always turn the engine off before starting service procedures (except operation 16)!**

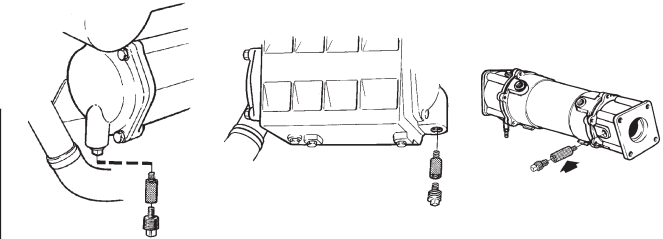
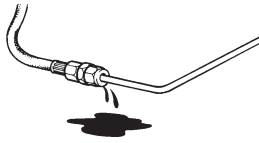
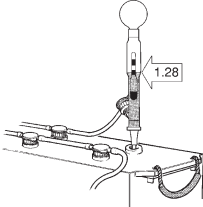
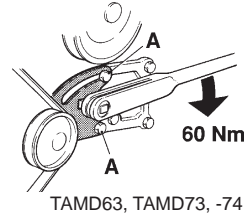
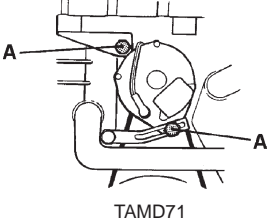
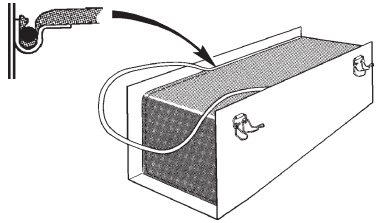
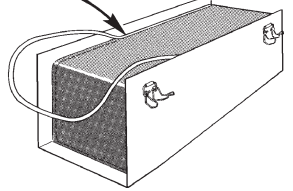
No.	Operation	50 Hrs	100 Hrs	250 Hrs	500 Hrs	1000 Hrs	2000 Hrs	Instructions	Info. pge.	
1.	<b>Changing the Engine oil.</b> <b>Note.</b> Refer to table on page 35 for information on oil grade/intervals between changes. 1) For TAMD63, TAMD73 and TAMD74. 2) For TAMD71 engines.		1)	2)				 <p>Engine oil VDS or CD or CE as per API system. Drain or pump out oil while engine is hot.  <b>⚠ Warning! Hot oil can cause burns.</b></p>	49	
2.	<b>Replace oil filter (1) and by-pass filter if fitted (2) at every other oil change.</b>							Lubricate gasket and screw on new filter by hand. Tighten by 3/4 turn once gasket is tight. Top up oil, start, check for leaks. Stop engine and check oil level.	  <p>TAMD63, TAMD73, TAMD74 TAMD71</p>	49
3.	<b>Change oil in reverse gear.</b> 3) MPM (ZF). 4) Twin Disc.				3)	4)		Fill up with oil. Quality: Use CD, CE or CC engine oil, <b>but not multigrade oil</b> . For viscosity refer to Technical Data. Check the oil level. <b>Note:</b> The markings on the dipstick refer to levels at <b>operating temperature</b> (with the engine idling and the control in neutral).	  <p>TWIN DISC</p>	50
4.	<b>MPM reverse gear: Remove and clean reverse gear oil screen.</b>			*					Remove plug and oil screen. Clean screen and reinstall components removed. Start engine (after filling with oil) and check for leaks.	50
5.	<b>Replace oil filter on MPM IRM 301A and 302V reverse gears.</b>								Lubricate gasket and screw on new filter by hand. Tighten by 3/4 turn once gasket is tight. Top up with oil. Start engine, check for leaks. Check oil level (point 3 above).	—
<p>* <b>Note.</b> Special recommendations apply for new or reconditioned engines. See instructions "Running-in" on page 4.</p>										

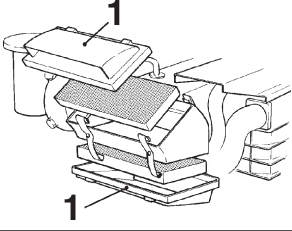
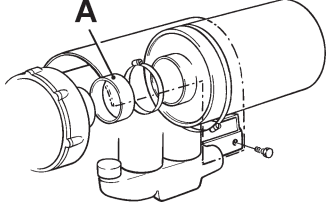
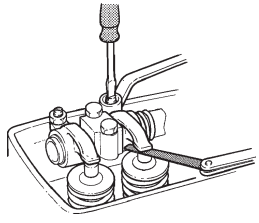
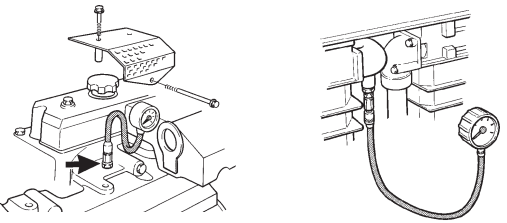

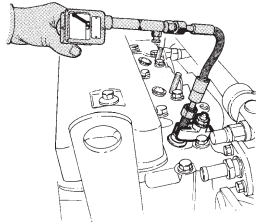
No.	Operation	50 Hrs	250 Hrs	500 Hrs	1000 Hrs	2000 Hrs	12 months	Instructions	Info. pge.
					*				
6.	Twin Disc reverse gear: Remove and clean reverse gear oil screen.				*			 <p>Remove plug and oil screen. Clean screen and reinstall components removed. Start engine (after filling with oil) and check for leaks.</p>	50
7.	Replace oil filter in reverse gear Twin Disc MG 507(A)-1 with trolling valve and MG 5085.				*			 <p>Remove clamp (1). Remove cover and take out filter. Clean filter holder and install new filter. Check oil level (point 3 above).</p>	—
8.	Lubricate release bearing on disengageable clutch (if fitted).							<p><b>Note.</b> Every 50 hours, applies when clutch operations per day exceed 15–20 operations. Otherwise every 500 hours. Use grease sparingly so that it is not pressed out. Use lithium-based lubricating grease: Mobilux EP2, Statoil Uniway EP2N, Texaco Multifak EP2, Q8 Rembrandt EP2.</p> 	—
9.	Lubricate disengageable clutch (if fitted).							 <p>Lubricate inner support bearing (when a grease nipple is fitted), main bearings, disengaging shaft and moving parts of clutch. Lubricate sparingly (20–30 g for main bearings). Quality: see point 8 above. A few drops of oil on inner link arms.</p>	—
10.	Check/adjust disengageable clutch (if fitted).						*	 <p><b>⚠ WARNING! Engine must be stopped when adjustment is carried out.</b> Remove the inspection cover. Release the catch (A) and turn the adjuster ring (B) counterclockwise (Rockford/BW), or clockwise (A.P.). Engage the catch. The clutch plates must not slip after engagement.</p>	—
11.	Replace filter(s) for crankcase ventilation.							 <p>Screw on new filter(s) by hand. <b>Note:</b> Replace filter(s) earlier if air and oil mixture begins to come out of the valve (1). <b>TAMD71:</b> Check the drain hose (2) is not clogged.</p>	45
<p>* <b>Note.</b> Special recommendations apply for new or reconditioned engines. See instructions "Running-in" on page 4.</p>									

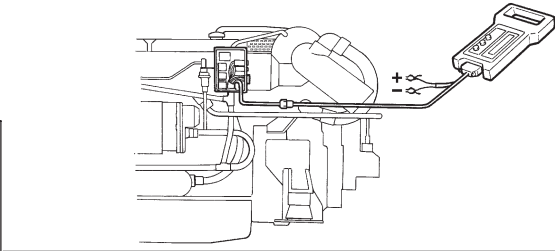
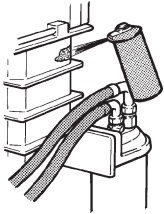
No.	Operation	50 Hrs	250 Hrs	500 Hrs	1000 Hrs	2000 Hrs	12 months	Instructions	Info. pge.
12.	Check/drain extra fuel filter.							<p>A few hours after stopping engine: Drain off water or contaminants through cock/plug (1).</p>  	53
13.	Replace insert(s) in extra coarse fuel filter.							 <p><b>Close the fuel cocks</b> at the tank before dismantling the single filter or replacing the inserts of the double filter with the engine off. See also instructions on page 53.</p>	53
14.	Replace fine fuel filters.							 <p>Screw on new filters by hand. Tighten by 1/2 turn once gasket is tight. Cleanliness! The fuel in the system must not become contaminated. Vent system – see point 15 below.</p>	54
15.	Vent fuel system.							<p>Open vent screw (1). Pump with hand pump (2) until fuel containing no air flows out. Close screw while fuel is flowing out. Then pump a further 10–20 times. Check for leaks.</p> 	54
16.	<b>Replace adjustable fuel filters.</b> (For TAMd71 auxiliary engine)							<p>Lever (2) on <b>right</b> – replace <b>left</b> filter. Lever up – vent left filter. Venting nipple (1). Replace the right side filter in the same way. For filter installation refer to point 14 above.</p> 	54
17.	<b>Have authorized service personnel check injectors.</b>							 <p>Hand in injectors to authorized service dealer (or replace with adjusted injectors). Tightening torques: Injectors 50 Nm (5 kpm/37 lbf.ft.), pressure pipes 15–25 Nm, (1.5–2.5 kpm/11.1–18.5 lbf.ft.). <b>NOTE!</b> Pressure pipes on TAMd63, TAMd73 and TAMd74 must <b>NOT</b> be bent. Replace damaged pressure pipes.</p>	55



No.	Operation	50 Hrs	250 Hrs	500 Hrs	1000 Hrs	2000 Hrs	12 months	Instructions	Info. pge.
18.	<b>Check/clean seawater filter.</b> <b>Note.</b> The time must be judged by experience after running the engine for a while.							 <p><b>Close the sea cock.</b> Remove cover (1) and lift up insert. Clean insert and housing (2). Reinstall components. Open the sea cock and check for leaks.</p>	60
19.	<b>Check batteries.</b>							<p><b>Use protective goggles!</b> Battery fluid approx. 10 mm (0.39") over cell plates.</p> <p><b>⚠ Warning!</b> The batteries contain oxyhydrogen gas and extremely corrosive sulfuric acid. Naked flames/sparks close to batteries may cause an explosion.</p> 	72
20.	<b>Top up anti-corrosive agent in freshwater system.</b>							<p>Add 1/2 liter anti-corrosion agent to the freshwater system (P/N 1141526-2). <b>NOTE!</b> Only when glycol is <b>not used</b> in the cooling system.</p> 	96
21.	<b>Clean cooling system. Change coolant.</b> <b>* Note!</b> At least once every other year.							<p><b>*</b></p>  <p><b>Close sea cock</b> and drain the water from the seawater and freshwater systems. Flush via holes for drain cocks and plugs until clean water runs out.</p>	32, 59
22.	<b>Check/clean heat exchanger, charge air cooler (CAC), and reverse gear oil cooler.</b>							 <p><b>Close sea cock</b> and drain the water from the seawater and freshwater systems. See also instructions on pages 60–63.</p>	32, 60
23.	<b>Check/replace pump impeller in seawater pump and extra bilge pump (if installed).</b>							<p><b>Close the sea cock</b> and drain the water from the seawater system. See also instructions on page 64.</p> 	32, 64

No.	Operation	50 Hrs	250 Hrs	500 Hrs	1000 Hrs	2000 Hrs	12 months	Instructions	Info. pge.
24.	Inspect/replace zinc anode(s)							<p>Close sea cock before starting work. Drain the water from the seawater system. Replace the anode if more than 50% of it has been used. When fitting, ensure that there is good metallic contact between the anode and the material.</p> 	32, 63
25.	Check for oil, fuel or water leaks.							 <p>Check all connections and check for leaks. The rubber hoses should not be cracked or damaged, and all hose clips and connections should be tightened properly.</p>	-
26.	Check the batteries' charge condition.							<p>Check the batteries' charge condition using a hydrometer. At an ambient temperature of approx. +25°C (77°F) the battery electrolyte density should be 1.28 g/cm<sup>3</sup> (1.24 g/cm<sup>3</sup> with tropical acid). Charge the batteries if the density has dropped by 0.04 g/cm<sup>3</sup>.</p> 	72
27.	Check/tension drive belt(s).							<p>Check for wear. Belts which work in pairs should be replaced at the same time. Undo screws (A) before tensioning the belt(s).  <b>TAMD63, -73, -74:</b> Tension belt to 60 ±3 Nm (6 ±0.3 kpm/44 ±2 lbf.ft.).  <b>TAMD71:</b> It should be possible to depress the belts 10 mm (0.4") between the pulleys.</p>  	45
28.	Check electrical connections.							<p>Clean the batteries' terminal posts and cable clips, lubricate them with Vaseline and tighten them. Also check that all other connections are properly tightened and have good contact. If necessary, spray these connections with a moisture-repellent spray.</p> 	72
29.	TAMD63: Clean air cleaner (ACL).							 <p>Wash the insert in clean diesel. Squeeze it out and place it in the filter housing. Fix the insert by pushing the O-ring down into the groove around the outer edge of the insert.  <b>NOTE!</b> Replace the filter insert if it is damaged.</p>	-

No.	Operation	50 Hrs	250 Hrs	500 Hrs	1000 Hrs	2000 Hrs	12 months	Instructions	Info. pge.
30.	TAMD71: Replace air cleaner (ACL) filter inserts.							 <p>Undo the clamps (x 6) for the covers (1). Remove the covers and replace the filter inserts. Check that the rubber hose against the turbocharger is undamaged and that the new filters are scrupulously clean. Reinstall components.</p>	-
31.	TAMD73, TAMD74: Replace air cleaner (ACL).							<p>Lift out and remove the filter for disposal. Take care that no contaminants enter the engine. Install new air cleaner (ACL) – (TAMD73WJ: together with rubber ring "A") and tighten the hose clamps.</p> 	-
32.	Have authorized personnel check valve clearance.							<p>Get authorized service personnel to check/adjust the valve clearance. This should be done with the <b>engine off</b>, cold or at operating temperature!</p> 	46
33.	TAMD63, TAMD73, -74: Get authorized personnel to check turbo charging pressure.							 <p>Get authorized service personnel to check the turbocharger's charging pressure.</p>	-
34.	TAMD63P, TAMD73P, -74P: Get authorized personnel to check function of wastegate valve.							<p>Get authorized service personnel to check the function of the wastegate valve.</p> 	-
35.	Get authorized personnel to carry out a general check of engine and fittings.							<p>Get authorized service personnel to check the condition of the turbocharger and carry out a general check of the engine and its fittings.</p> 	-
<p>* <b>Note.</b> Special recommendations apply for new or reconditioned engines. See instructions "Running-in" on page 4.</p>									

No.	Operation	50 Hrs	250 Hrs	500 Hrs	1000 Hrs	2000 Hrs	12 months	Instructions	Info. pge.
36.	TAMD73P and TAMD74: Check the EDC system.							<p data-bbox="734 236 1384 284">Have authorized service personnel check the EDC system using a diagnostic tool.</p> 	-
37.	Check surface finish of engine and reverse gear.							 <p data-bbox="1413 496 2063 544">Improve external corrosion protection by painting over any abraded parts with original paint.</p> <p data-bbox="1413 544 2078 592"><b>⚠ WARNING!</b> Never use high-pressure jets when washing the engine. Never point the water jet at seals, rubber hoses or electrical components.</p>	-

# Technical description

## Engine

These engines are four-stroke, straight six marine diesel engines with overhead valves. They are fluid-cooled and equipped with turbochargers. The inlet air to the engine is cooled by a seawater-cooled charge air cooler (CAC) after compression in the turbo.

The engines have piston cooling (oil-cooled pistons). The lubrication system has a full flow oil filter, and the TAMD63, TAMD73 and TAMD74 engines also have a partial flow (by-pass) filter. This by-pass filter is an accessory on the TAMD71 engines.

The cooling system is divided into a freshwater and a seawater system. The seawater cools the freshwater system via a heat exchanger (TAMD71 has double heat exchangers).

## Cylinder heads

The engines have two cylinder heads, each of which covers three cylinders. A special alloy cast iron material is used for the cylinder heads. The cylinder head gaskets are made of solid sheet steel and have special rubber sealing rings inside for oil and coolant channels.

## Valve system

The camshaft is journalled in seven bearings and is driven by the timing gears. The camshaft actuates the inlet and outlet valves in the cylinder heads via lifters, push rods and rockers.

In the TAMD71, TAMD73 and TAMD74, these valves have double valve springs.

## Cylinder block

The cylinder block is made of special alloy cast iron and cast in one piece. The cylinder liners are of the wet type and are replaceable. The liners have a flame guard bevel which considerably increases the service life of the cylinder head gaskets.

## Crankshaft

The heavy-duty crankshaft is extremely strong and is journalled in seven main bearings. This shaft is statically and dynamically balanced and tempered according to a special method (nitrocarburization). This increases the fatigue strength and gives the bearing journals an extremely hard surface.

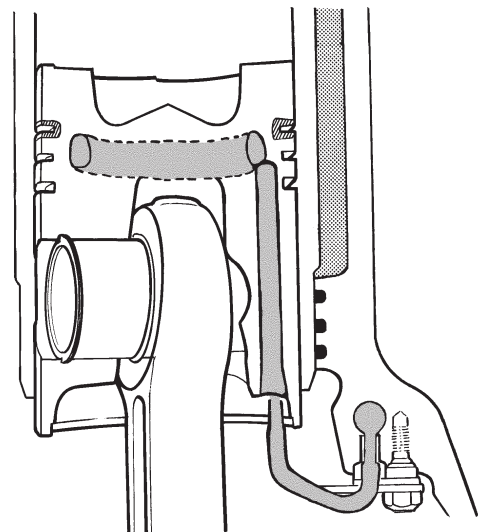
The journal at the front of the crankshaft has been ground to a polygonal shape. A polygon joint can withstand the stresses from the vibration damper (extra pulley or disengageable clutch) considerably better than a keyed joint.

## Pistons

The pistons, which are made of an aluminum alloy, have two compression rings and one oil ring. The compression rings are coated (upper compression ring in the TAMD63), which helps reduce oil consumption and the risk of ring seizing.

To reduce carbonization at high engine loads the pistons are oil cooled. Piston cooling increases the service life of pistons, piston rings and cylinder liners and reduces oil consumption.

The engine's combustion chambers are entirely confined to the piston crowns.

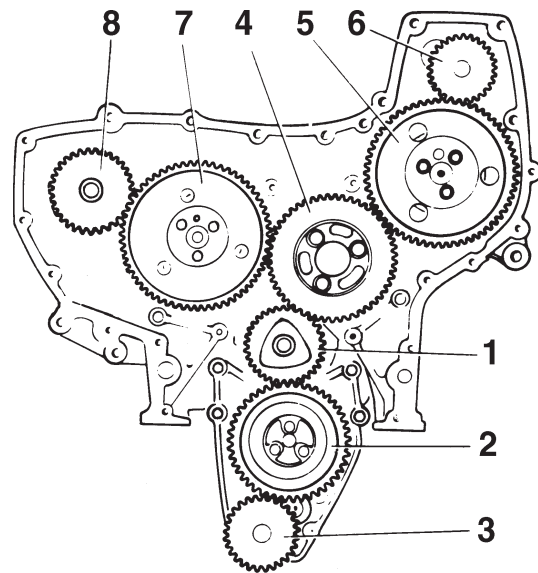


Piston cooling

## Timing gears

The camshaft, oil pump, injection pump, circulation pump (TAMD71), seawater pump and hydraulic pump (if fitted) are driven by the crankshaft via helical spur gears.

Helical spur gear wheels are used in order to keep engine noise to a minimum.



Timing gears

- |                                       |   |
|---------------------------------------|---|
| 1. Crankshaft drive gear              | 6. TAMD71: Drive gear for coolant pump                          |
| 2. Intermediate gear for oil pump     | 7. Drive gear for camshaft                                      |
| 3. Drive gear for oil pump            | 8. Drive gear for seawater pump/power take-off/power servo pump |
| 4. Intermediate drive gear            |   |
| 5. Drive gear for fuel injection pump |   |

## Crankcase ventilation

The engines have ventilation devices to prevent overpressure and to run off diesel fumes, steam and other gaseous products of combustion. These are fitted on the rear of the engine in connection to the air cleaner (ACL).

Crankcase gases are passed through a replaceable filter cartridge which removes any oil mist before the gases are led out. Any oil is returned to the oil sump (by a drainage hose on TAMD71). On the filter casing is also a relief valve which opens if the pressure in the crankcase becomes too high due to a blocked filter.

## Air Cleaner (ACL)

The air cleaner prevents harmful particles from being sucked into the engine.

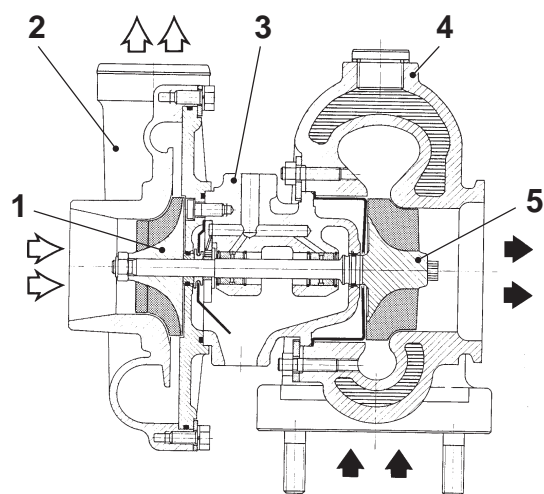
TAMD63 engines have a washable filter insert.

TAMD71, TAMD73 and TAMD74 engines however have a dry filter with a disposable filter element of folded paper.

It is important that filter replacement/cleaning is carried out according to the recommended maintenance schedule. A blocked filter causes smoke in the exhaust gases and reduced engine power.

## Turbocharger

The engines are fitted with a turbo charger driven by the exhaust gases which ensures a flow of air to the engine under pressure and thereby increases the amount of oxygen to the engine. The compressor, which is fitted to the exhaust manifold at the rear of the engine, is lubricated and cooled by the engine's lubricating oil.



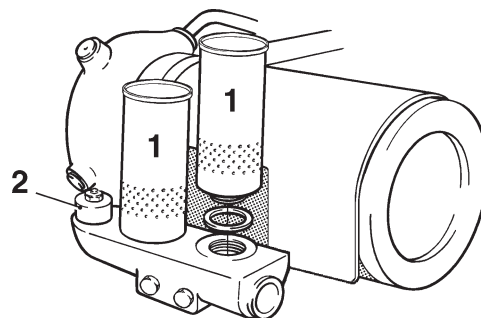
Turbocharger

- |                       |  |
|-----------------------|--|
| 1. Compressor wheel   | 4. Turbine housing (freshwater cooled) |
| 2. Compressor housing | 5. Turbine and shaft                   |
| 3. Bearing housing    |  |

## Maintenance – Engine

### Replacing crankcase ventilation filter(s)

1. Remove the old filter by unscrewing it counter-clockwise. **Note!** TAMD73 and TAMD74 have two filters.
2. Check the rubber gasket in the mounting, replace if necessary. Screw on the new filter by hand.
3. **TAMD71:** Check the drain hose is not clogged.



TAMD73, TAMD74: Crankcase ventilation filters

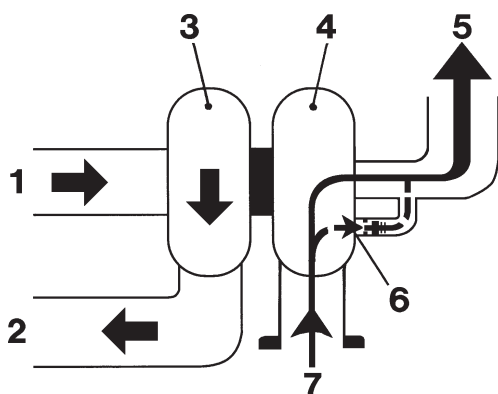
1. Filter
2. Relief valve

TAMD63P, TAMD73P and TAMD74 also have a wastegate valve (boost pressure control (by-pass) valve) installed in the turbine housing.

The wastegate valve means that the turbocharger is optimized for high charging pressure even at low engine speeds. The engine's low-speed torque is thereby improved greatly, while it also reacts more quickly to load changes.

At higher engine loads, the wastegate valve opens and forces some of the exhaust gases past the turbo and directly out into the exhaust pipe.

The turbocharger is freshwater cooled to reduced radiant heat in the engine room.



TAMD63P, TAMD73P and TAMD74: Basic diagram of turbocharger with wastegate valve

1. Air from air filter
2. Compressed air to engine
3. Compressor housing
4. Turbine housing
5. Exhaust gases outlet
6. Exhaust gas flow past turbine via wastegate valve at high engine loads
7. Exhaust gases from engine

### Checking/tensioning drive belt(s)

Check the belt(s) for wear. Replace belt(s) when necessary. Belts which work in pairs should be replaced at the same time.

Undo screws (A) before tensioning the belt(s).

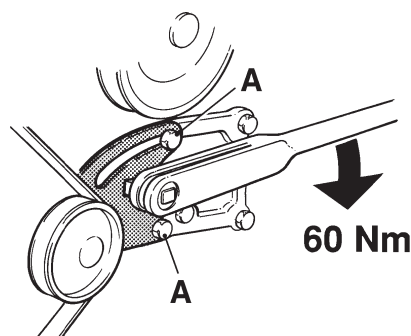
**TAMD63, TAMD73 and TAMD74:** Place the stud of a torque wrench in the square hole in the tensioning pulley bracket. Tension belt to 60 ±3 Nm (6 ±0.3 kpm/44 ±2 lbf.ft.).

Tighten screws (A).

### Charge air cooler (CAC)

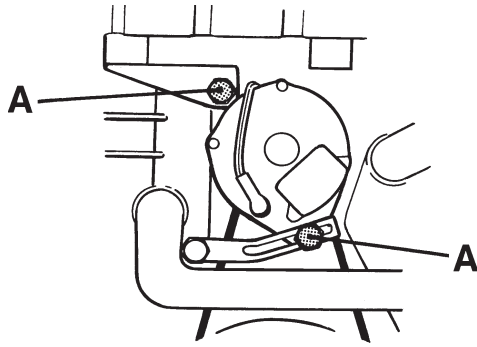
The inlet air passes through the charge air cooler(s) after compression in the turbocharger. The charge air cooler lowers the temperature of the air and thereby considerably improves the output ratio as the volume of the air is reduced. More air (oxygen) can therefore be forced into the engine's cylinders and burn more fuel per compression stroke; thus increasing output. Charge air cooling also helps reduce the thermal load on the engine.

See also under the heading "Heat exchanger and charge air cooler" on page 58.

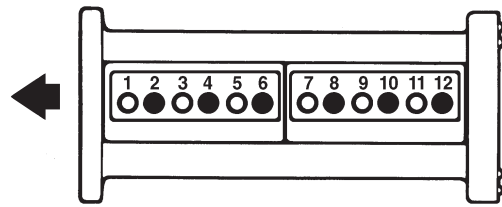


TAMD63, TAMD73, TAMD74: Tensioning drive belt

- A. Locking screws



TAMD71: Tensioning drive belts  
A. Locking screws



Valve location  
○ Intake ● Exhaust

**TAMD71:** It should be possible to depress the belts 10 mm (0.4") between the pulleys at the correct tension.

Tighten screws (A).

### Checking valve clearance


**This check should be left to authorized service personnel.**

**Note! The clearance must never be checked with the engine running – the engine must be stopped – cold or at operating temperature.**

### Checking the Turbocharger (TC)

**This check should be left to authorized service personnel.**

However, a **quick** check of the turbocharger when cleaning/replacing the air cleaner may be carried out as follows:

1. Remove air cleaner (ACL).
2.  **Warning! Check that the turbocharger's impeller is stationary before checking.**
3. Check if the shaft is stiff or if the turbine or compressor wheels are touching their housings. Turn the shaft using light pressure, followed by pulling it gently in the axial plane.

If the rotor is difficult to turn, the turbocharger must be replaced or reconditioned as soon as possible.

**Note.** If the turbocharger unit is to function satisfactorily, it is vital that the engine's lubrication system be maintained according to the maintenance schedule and that the correct type of lubricating oil be used in the engine.

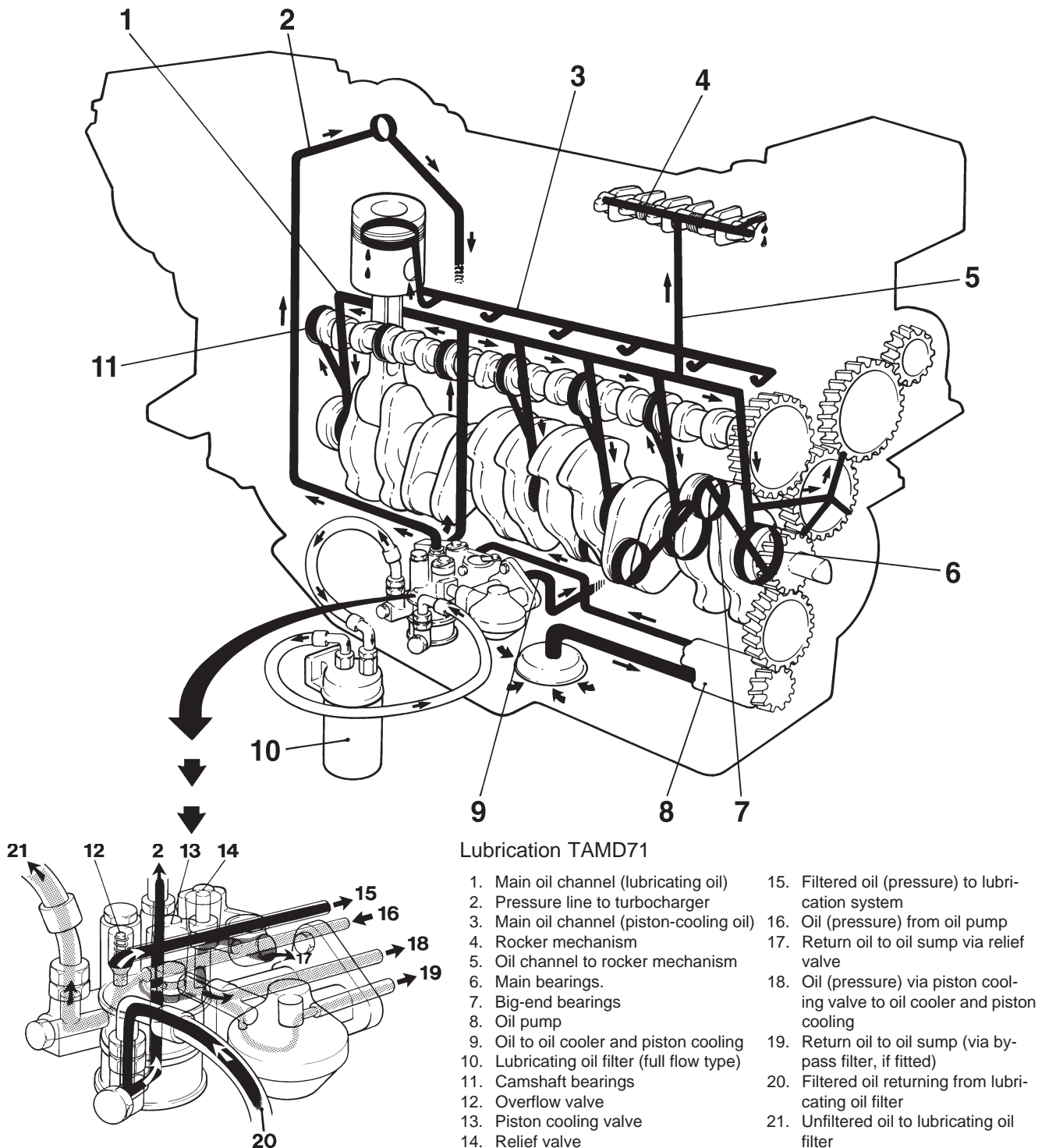


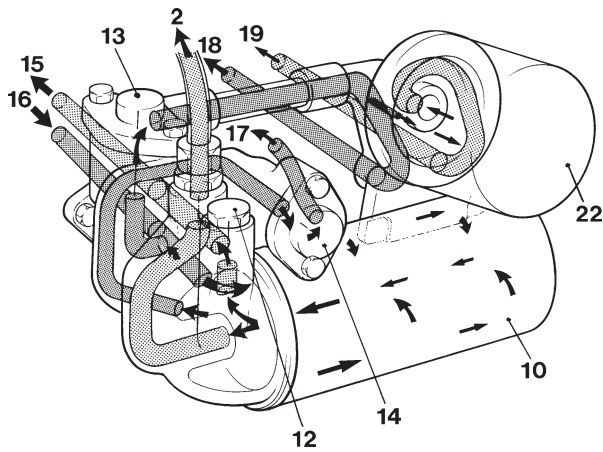
# Technical description

## Lubrication system

These engines have a forced lubrication system and piston cooling (see "Pistons" on page 43). The oil pump is of the gear-wheel type and is located at the front of the oil sump. This pump is driven by the engine's timing gears.

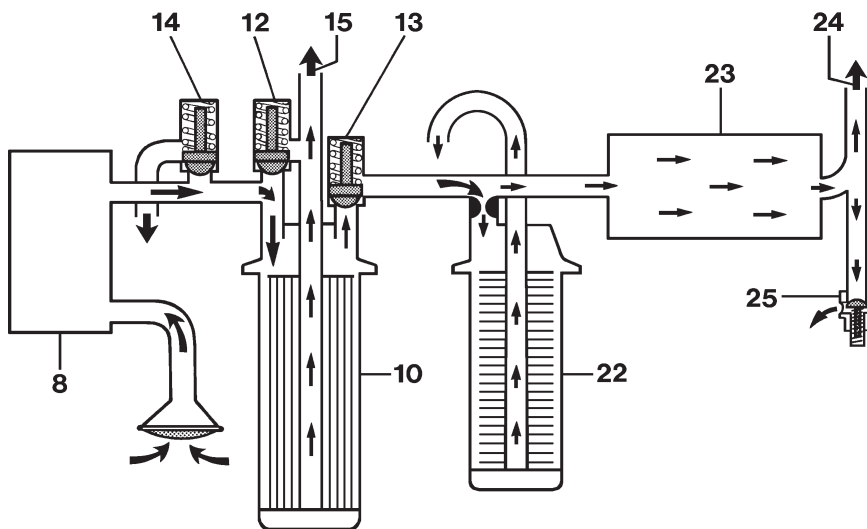
The oil pump sucks oil up from the oil sump and then forces it out into two main channels in the cylinder block (see basic diagram on next page). The oil passes through the lubricating oil filter and then on into the engine's oil channels for the forced lubrication of the engine, injection pump and turbocharger. The oil also passes through via the piston cooling valve. From here a small amount of oil is channelled off, which then passes through a by-pass filter (in the TAMMD63, TAMMD73 and TAMMD74 – accessory in the TAMMD71) before being returned to the oil sump. The rest of the oil continues through the oil cooler and out to the piston cooling jets.





Lubrication system (sectioned, filter housing) TAMD63 TAMD73 and TAMD74

- 2. Pressure line to turbocharger
- 10. Lubricating oil filter
- 12. Overflow valve
- 13. Piston cooling valve
- 14. Relief valve
- 15. Filtered press. oil to lubrication system
- 16. Oil (pressure) from oil pump
- 17. Return oil to oil sump via relief valve
- 18. Oil (pressure) via piston cooling valve to oil cooler and piston
- 19. Return oil to oil sump (via by-pass filter)
- 22. By-pass filter



Basic diagram, lubrication system

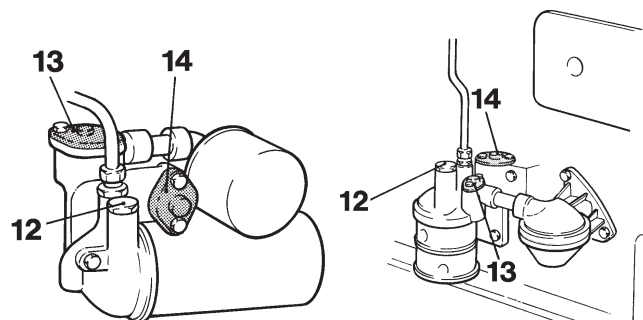
- 8. Oil pump
- 10. Lubricating oil filter
- 12. Overflow valve
- 13. Piston cooling valve
- 14. Relief valve
- 15. Filtered oil (pressure) to lubrication system
- 22. By-pass filter\*
- 23. Oil cooler
- 24. Oil under pressure for piston cooling
- 25. By-pass valve

\* Note. By-pass filter is an accessory on the TAMD71 engines.

## Valves in the lubrication system

The oil flow in the engine is controlled by four spring-loaded valves. Three of these are located in a mounting on the right of the engine and one at the lower edge of the cylinder block on the left of the engine.

- The relief valve (14) limits system oil pressure in the engine. This valve opens if the pressure is too high and allows oil back to the oil pan at high speeds or if the engine is cold and the lubricating oil is more viscous.
- The overflow valve (12) opens and allows oil past the lubricating oil filter if the resistance through the filter is too great. This way oil can flow into the engine lubrication system even if the filter is clogged. But the oil entering the system is unfiltered. So it is important that the filter is replaced according to the intervals recommended in the maintenance schedule.
- The piston cooling valve (13) regulates the flow of oil through the oil cooler and on to piston cooling.
- The by-pass valve (25) permits increased oil flow through the oil cooler. The valve opens and returns excess oil not required for piston cooling back to the oil sump.



TAMD63, TAMD73, TAMD74

TAMD71

Valves in the lubrication system

- 12. Overflow valve
- 13. Piston cooling valve
- 14. Relief valve

## Maintenance – Lubrication System

### Oil cooler

See the description in the “Cooling system” section on pages 58–59 for information on the oil cooler.

### Oil filter

The oil filter filters contaminants from the oil. The engine oil filter is of full flow type, which means that all the oil is filtered before it enters the lubrication system. The filter element is made of folded filter paper.

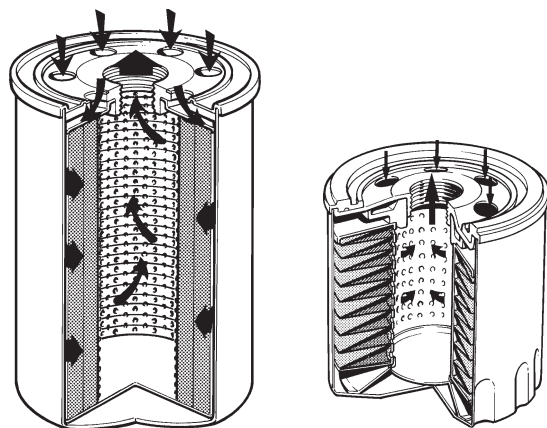
In the TAMD63, TAMD73 and TAMD74, the filter is located in front of the starter motor on the right of the engine. TAMD71\* engines have the filter located at the front of the engine.

On all marine propulsion engines the filter can alternatively be located at the rear of the engine (accessory).

The TAMD63, TAMD73 and TAMD74 engines also have a by-pass (partial flow) lubricating oil filter located above the engine oil filter. A by-pass filter can be obtained as an accessory for TAMD71 engines. This filter is located behind the lubricating oil filter at the front of the engine.

As only a small amount of oil passes through the by-pass filter, the flow rate is relatively low. The filter is therefore able to separate even very small particles from the oil. The filter element is made of folded filter paper.

\* **Note.** In the TAMD71 classifiable auxiliary engine, the filter is located in front of the starter motor on the right of the engine.



Lubricating oil filter

By-pass filter

### Oil Change – Engine

The oil should be changed when the engine is hot.

**⚠ Warning! Hot oil can cause burns.**

Engines with oil scavenging pump (accessory): Remove the oil dipstick and connect the suction pipe to the dipstick tube. Start the pump and collect the oil in a container.

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

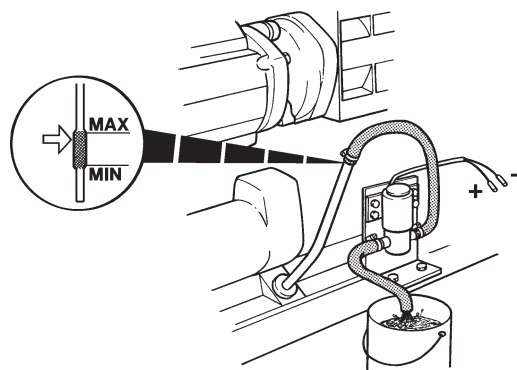
Fill oil through the filler on the front valve cover or the filler tube at the front of the engine (accessory on TAMD71 engines). Oil quality: refer to page 96. Quality and capacity, refer to “Technical Data” on page 108.

The oil level should be within the area marked on the dipstick. **The level must never be allowed to drop beneath the lower mark.**

The scavenging pump can also be used to add oil (the + and – cables are swapped on the electrical scavenging pump). Refer to the Wiring Diagrams on pages 75, 77 or 83.

**NOTE! Collect up the old oil and deposit at a proper site for disposal. Never dump oil overboard into the water.**

\* **Note.** The TAMD63 has no drain plug.



Draining oil from the engine

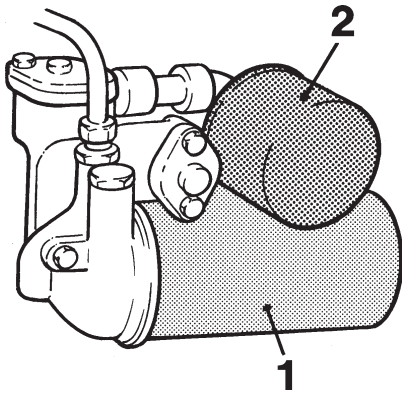
### Replacing the engine oil/by-pass filter

**Note: Place a container beneath the filter when removing to avoid spillage.**

1. Unscrew the oil filter (1) or by-pass filter (2) using special tool. Discard the old filters.

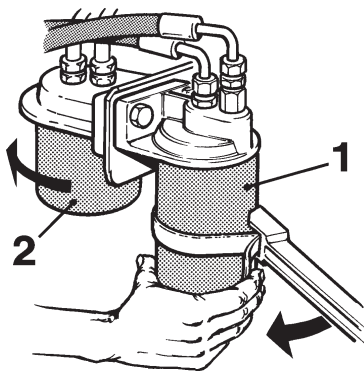
**⚠ Warning! Hot oil can cause burns.**

2. Lightly oil the new filter's rubber gasket and check its mating surface on the mounting.



TAMD63, TAMD73 and TAMD74

1. Lubricating oil filter
2. By-pass filter



TAMD71

1. Lubricating oil filter
2. By-pass filter (accessory)

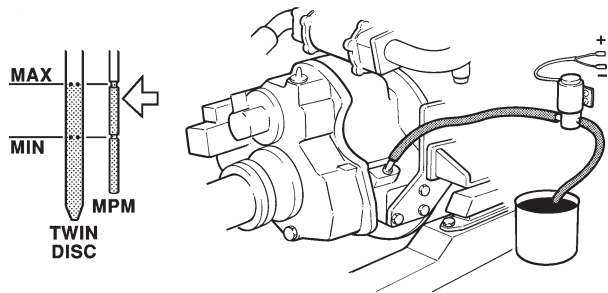
3. Screw on the new filter by hand until the gasket is in contact with the sealing surface. Then tighten the filter a further 3/4 of a turn.
4. Fill with oil, start the engine and check for leaks. Stop engine and check the oil level.

### Oil Change – Reverse Gear

Connect a hose from the oil scavenger pump to the dipstick tube on the reverse gear. Or the oil can also be drained after removing the drain plug.

See also instructions under. "Oil Change – Engine".

1. Fill with oil through the filler opening on the top of the reverse gear. For Oil quality and capacity refer to "Technical data" on pages 110–113.

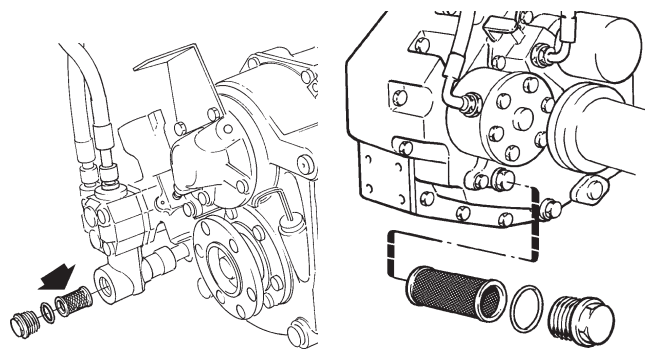


Draining oil from the reverse gear

2. Start the engine and run it until the reverse gear reaches **operating temperature**.
3. Check the oil level with the engine idling and with the neutral position selected.

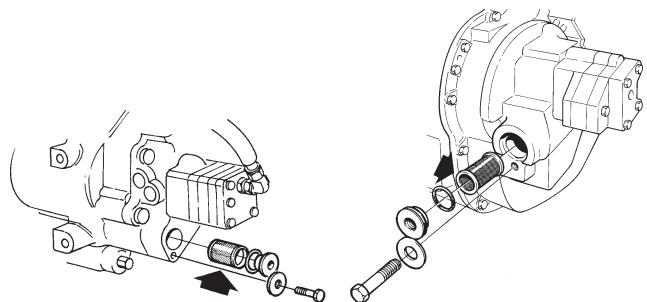
The oil level should reach the upper mark on the dipstick. Top up if required.

### Cleaning the reverse gear's oil screen



MPM IRM 220, -280

MPM IRM 301, -302V



TD MG5061, MG5062V,  
MG5075A, MG5085

TD MG507(A)-1

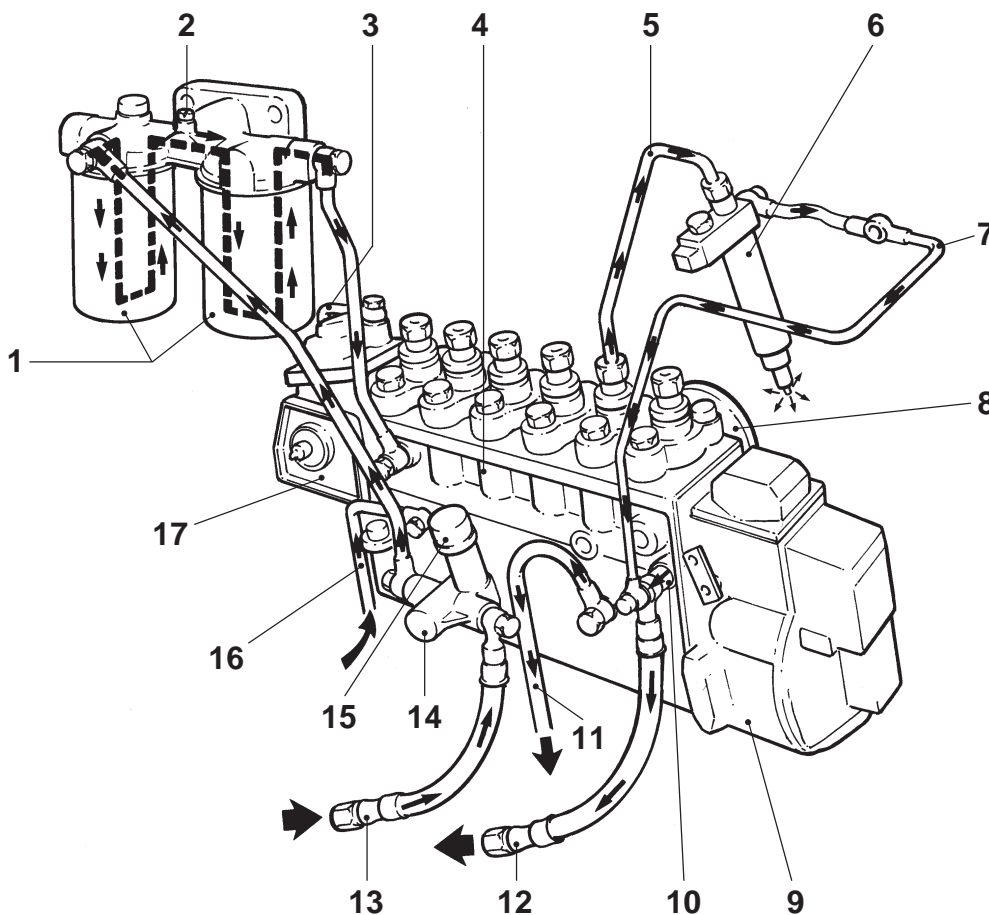
# Technical description

## Fuel system

The fuel is drawn up by the feed pump from the fuel tank through the pre-filter(s) and is forced through the fine filters to the injection pump. Excess fuel escapes via the overflow valve back to the tank. This valve is located on the injection pump. This means that the return fuel flushes through (cools) the injection pump's fuel chamber. This evens out fuel temperature so it is the same for all the cylinders and prevents gas bubbles forming in the fuel line.

The injection pump then forces the fuel under high pressure to the injectors, which atomize the fuel when it is sprayed into the engine's combustion chambers.

Return fuel from the injectors returns to the tank via the overflow valve.



Fuel system

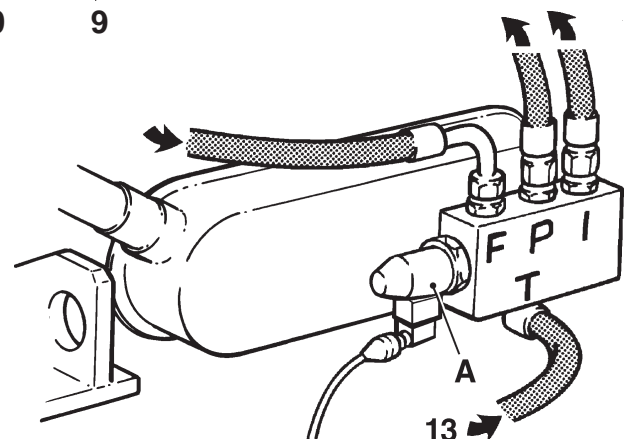
1. Fine fuel filters
2. Venting nipple
3. Pressure pipe from inlet manifold (charging pressure)
4. Injection pump
5. Pressure pipe
6. Injectors
7. Fuel return line
8. Pressure equalizer
9. Centrifugal governor
10. Overflow valve
11. Return pipe, lubricating oil
12. Return line to fuel tank
13. Fuel line, intake
14. Feed pump
15. Hand pump
16. Engine oil pipe, inlet
17. Smoke limiter

TAMD63 and TAMD71, -73WJ: Solenoid valve (fuel shut-off valve) for stopping engine

A. Solenoid valve

Connections in valve housing, markings:

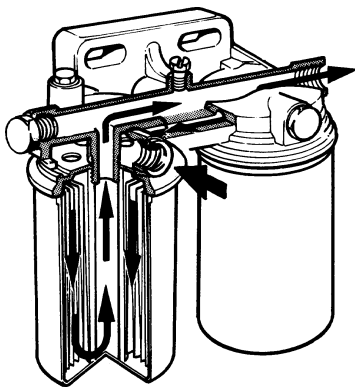
- T. Inlet from fuel tank (Tank)
- P. Outlet to feed pump (Pump)
- F. Inlet from fuel filters (Filter)
- I. Outlet to injection pump (Injection pump)



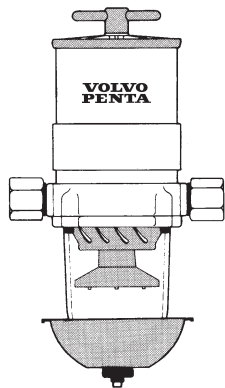
The fuel system has two fine fuel filters connected in parallel have the same cover. These filters are disposable, and the filter insert is made of a spirally wound paper filter.

A single or double (connected in parallel) water-separating pre-filter is also available as an accessory. The inserts of the double pre-filter can be replaced while the engine is running if necessary.

It is important that the fuel filters are replaced according to the maintenance schedule. Blocked filters make the engine difficult to start and contribute to loss in engine output.



Fine fuel filters



Extra pre-filter (single)

## Injection pump

The injection pump is of the piston type and located on the left of the engine. It is driven by the timing gears.

On TAMD63, TAMD71 and TAMD73WJ engines the pump is equipped with a centrifugal governor. The governor controls both fuel supply to the engine to maintain the engine speed set at the throttle control and also limits the engines maximum speed if the load at high throttle openings suddenly should reduce.

On TAMD73P and TAMD74 engines the mechanical centrifugal governor is replaced by an electromagnetic actuator. The actuator is controlled by a control module which receives information from a number of sensors on the engine and throttle control.

## Pressure-dependent full load stop (smoke limiter)\*

### TAMD63, TAMD71, TAMD73WJ

The injection pump has a pressure-dependent full load stop (smoke limiter) which is located at the front of the pump. Its job is to reduce sooty exhaust gases during hard acceleration from low speeds when the flow of exhaust gases through the turbocharger is too small to provide the full amount of air to amounts of fuel injected by the injection pump. The smoke limiter is connected to the inlet manifold via a plastic tube.

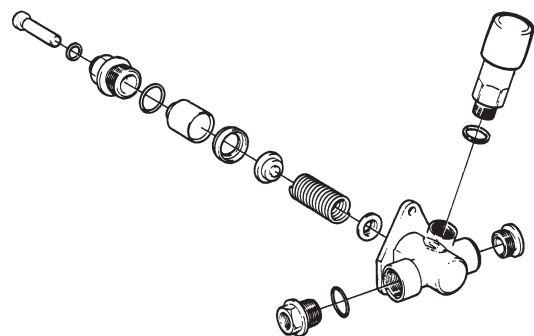
\* **Note.** TAMD73P and TAMD74P engines are not equipped with a smoke limiter. The equivalent function is integrated in the Electronic Diesel Control (EDC) system.

## Feed pump

If the injection pump is to work, it requires a supply of fuel at pressure. This is provided by the feed pump, which is of piston type. The feed pump is located on the injection pump and is driven by the injection pump's camshaft.

The feed pressure is determined by an overflow valve located on the injection pump. This valve both limits the feed pump pressure and ensures continuous venting of the fuel system.

The feed pump's hand pump can be used on a stopped engine to pump fuel to the filters and injection pump when venting the fuel system, for example after replacing the fuel filters.



Feed pump

## Maintenance – Fuel system

### Fuel pre-filter. Checking/draining

Check the fuel filter and drain off any water and contaminants through the drain plug(s) (5). See illustration on next page.

The engine should be off and allowed to stand for a few hours before carrying out this check. Reinstall the plugs.

### Fuel pre-filter. Installing new insert(s)

**Double filter:** As a rule, the filter inserts should be replaced when the pressure gauge indicates a vacuum of 6–10 in. Hg\* (idle) or 16–20 in. Hg respectively, (max. rpm, loaded engine). However, filters must be replaced after every **1000 operating hours**.

Close the fuel cocks at the tank before dismantling the single filter or replacing the inserts of the double filter with the engine off.

**Double filter:** If inserts are to be replaced when the engine is running, shut off the filter unit with the insert to be replaced by turning the valve handle (1) to the horizontal position. See illustration on next page.

\***Note:** In. Hg = Inches of mercury.

#### Positions of the valve knob



**Up:** Normal operating position. Both filters are on-line.



**Right:** Left-hand filter insert can be replaced.



**Left:** Right-hand filter insert can be replaced.



**Down:** Both filters are off line.

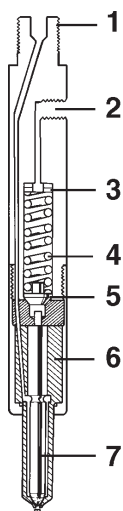
1. Position a container under the fuel filter. Remove the cover (4) and lift out the insert by rotating it. See illustration on next page.
2. Drain off any water or contaminants through the drain plug (5).
3. Install new filter insert and fill container with clean diesel oil. Install the cover with a new gasket and tighten by hand.  
**Note.** Moisten the gasket with diesel oil before installation. **Cleanliness!** The fuel in the system must not become contaminated.
4. **Double filter:** Replace the other filter insert in the same way.
5. Dry off any diesel fuel spilt on the heat shield.
6. **Double filter:** Both filter units on-line (turn the knob (1) up to the vertical position).
7. Open the fuel cocks and check that there are no leaks.

## Injectors

The job of the injectors is to atomize and spray the fuel, metered precisely by the injection pump, into the engine's combustion chambers. This injection takes place under extremely high pressure so that atomization and combustion of the fuel takes place as effectively as possible.

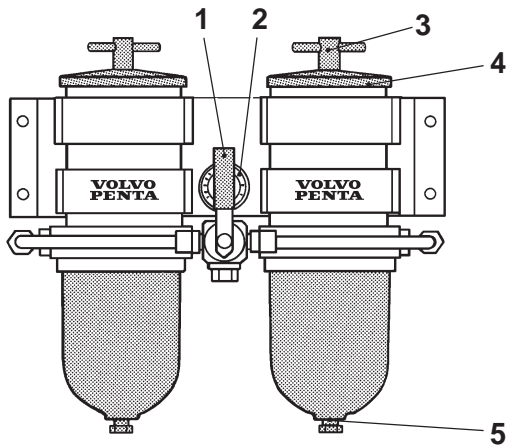
Each injector basically comprises a nozzle holder and a nozzle (jet). When the fuel pressure increases to a set value (opening pressure), the nozzle needle (7), which is pressed in its seat by the pressure spring (4), is raised, and atomized fuel is sprayed into the engine through carefully calibrated holes in the nozzle body. The tension of the pressure spring determines the opening pressure of the injector.

The injectors should be checked regularly by authorized personnel, refer to maintenance schedule. An incorrect opening pressure or faulty nozzle will result in smoky exhaust gases and lower engine output.



#### Injectors

1. Pressure line connection
2. Connection for fuel leak-off pipe
3. Shims for setting the opening pressure
4. Thrust spring
5. Thrust pin
6. Jet
7. Nozzle needle



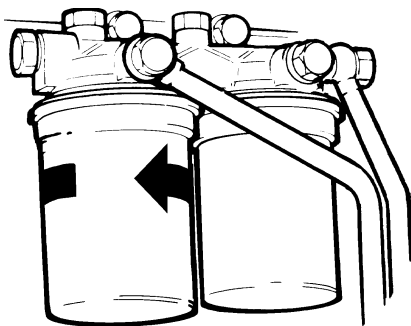
Double pre-filters

- |   |                    |
|---|--------------------|
| 1. Valve knob (both filters on-line in this position) | 3. Retaining screw |
| 2. Pressure gauge                                     | 4. Cover           |
|   | 5. Drain plug      |

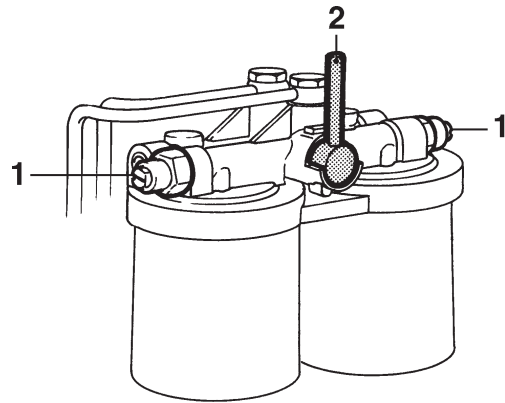
The inserts can be cleaned and replaced while the engine is running.

## Fine fuel filters. Replace

1. Clean the filter mounting carefully.  
**Note.** Place a plastic bag around the filter to prevent fuel spills in the boat.
2. Unscrew the old fuel filters and discard. Use special tool to remove filter if necessary.
3. Check that the new filters are absolutely clean and that the gaskets are undamaged. Lightly moisten the gaskets with oil.
4. Screw on the new filters by hand until the gaskets come into contact with the filter mounting. Then tighten a further **half turn** by hand.
5. Vent the fuel system according to the instructions on this page. Start the engine and check for leakage around the filters.



Replacing the fine fuel filters



Replacing the switchable fine fuel filters

1. Vent screw for left and right filters
2. Valve knob (normal operating position)

## Switchable fine fuel filters\*

(replacement while engine is running)

1. Place a container beneath the fuel filters. Clean the filter mounting carefully.
2. Turn lever (2) for the valve in the filter cover in its **right** end position.
3. Unscrew the **left** fuel filter and discard it. Use special tool to remove filter if necessary.
4. Screw on the new filter by hand until the gasket comes into contact with the filter mounting. Then tighten it a further **half turn** by hand.
5. Open left vent screw (1) on the filter mounting. Move lever (2) vertically (operating position). Close the vent screw when no more air bubbles are visible in the fuel.
6. Lever in its **left** end position and replace the **right** fuel filter in the same way.

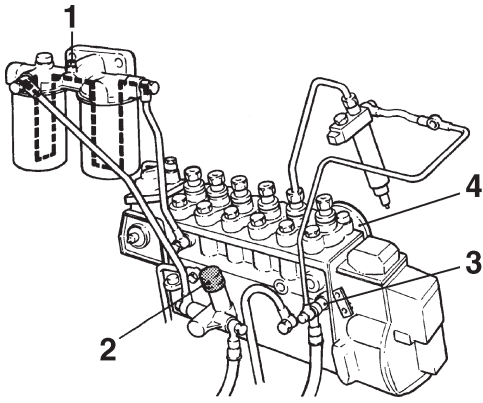
\* Accessory for TAM71 as an auxiliary engine.

## Venting the fuel system

The fuel system must be vented after the fuel filters have been replaced or after refilling the fuel tank after it has been run dry.

1. Place a container beneath the fuel filters. Open vent screw (1) on the filter mounting.
2. Pump up fuel using the feeder pump hand pump (2) until the fuel is free from air bubbles. Retighten the screw while the fuel is flowing out.





Venting the fuel system

- |                                     |                       |
|-------------------------------------|-----------------------|
| 1. Venting screw on filter mounting | 3. Overflow valve     |
| 2. Hand pump                        | 4. Pressure equalizer |

- Pump a further 10–20 strokes with the vent screw closed so that sufficient feed pressure is obtained. **Further venting is not normally required.**

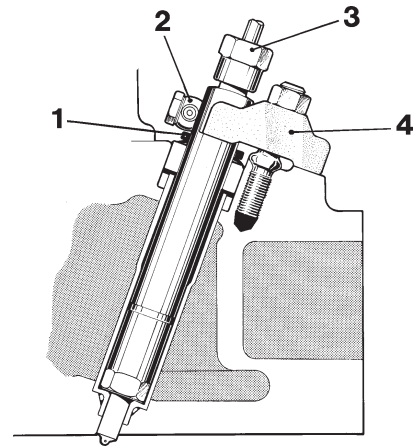
If the injection pump still needs venting, unscrew the connection for the overflow valve (3) at the pump and continue hand pumping until no more air bubbles are visible in the fuel flowing out. Tighten the connection while the fuel is flowing out. Pump a further 10–20 strokes so that sufficient feed pressure is obtained.

- Check for leaks.

## Injectors. Check



**NOTE! TAMD63, TAMD73 and TAMD74 have pretensioned delivery pipes. These pipes must under no circumstances be bent. Damaged pipes should be replaced.**



Injectors

- |                        |                             |
|------------------------|-----------------------------|
| 1. Guard ring (rubber) | 3. Pressure line connection |
| 2. Fuel leak-off line  | 4. Mounting yoke            |

- Clean around the injectors.
- Remove the delivery line and the return fuel line. Remove the mounting yoke on the injectors.
- Turn the injector carefully backwards and forwards using a wrench (size 15 mm), pulling it up at the same time.

**Note:** If the injector is stuck, you must use a special tool to remove it. The copper sleeve around the injector may otherwise be pulled out as well, with water in the engine as a consequence.

The coolant in the freshwater system can be drained as an extra safety measure before removing the injectors.

- Hand in the injectors to a an authorized service workshop for checking.
- Install protective ring on the injectors (1). Tightening torque 50 Nm (5 kpm/36 lbf.ft.).
- Reinstall the fuel leak-off line. Install pressure line. Check they are straight, then tighten the nuts. Tightening torque 15–25 Nm (1.5–2.5 kpm/ 11–18 lbf.ft.).
- Refill the engine with coolant if system was drained. Start the engine and check for leaks.

# Technical description

## Cooling system

These engines are fluid-cooled and have a closed circuit cooling system. The system has two circuits. In the inner circuit (the freshwater system), coolant is pumped around by a centrifugal-type coolant pump (circulation pump). In the TAMD63, TAMD73 and TAMD74, this pump is driven by the vibration damper via a belt. On the TAMD71 engines, the coolant pump is gear driven via the timing gears.

From the coolant pump, the coolant is pumped out into a distribution channel in the cylinder block and conveyed around the cylinder liners and on up through the cylinder heads.

From each cylinder head and from the turbocharger's turbine housing, the coolant is fed back to the thermostat housing, where a thermostat regulates its temperature. Coolant from the engine's oil cooler is also fed to the thermostat housing.

While the coolant is cold, the thermostat shuts off the flow to the heat exchanger. The coolant then passes through a by-pass line beneath the thermostat and directly back to the pump's suction side. When the coolant temperature has risen to a certain value, the thermostat opens and allows coolant to pass to the heat exchanger and the by-pass line closes.

In the heat exchanger, heat from the coolant is transferred to the seawater before the coolant is sucked back into the coolant pump.

Large amounts of heat are also removed by the lubricating oil, which channels off the heat to the freshwater system via the oil cooler. The lubricating oil is also used to dissipate heat from the pistons in the engine (see "Pistons" on page 43).

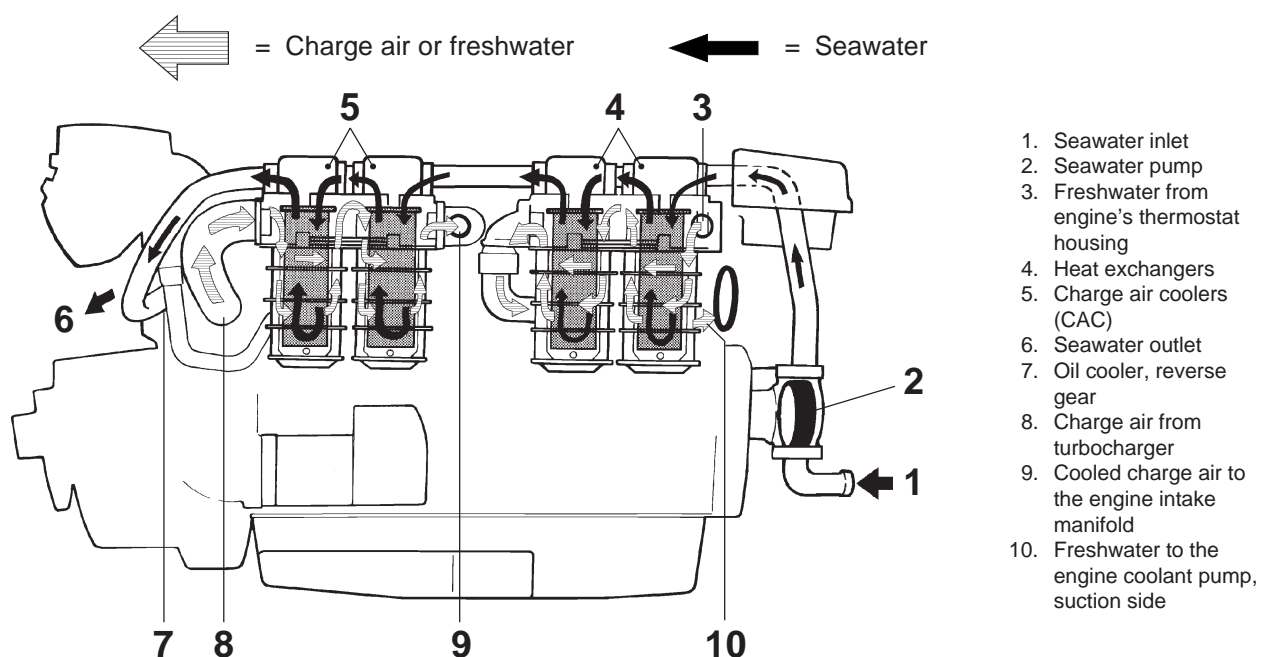
The cooling system may operate with a small amount of overpressure. The risk of boiling is thereby reduced if the temperature is high. If the pressure is higher than normal, a pressure valve in the filler cap opens.

The flow in the seawater system is maintained by a gear-wheel driven impeller (blade-type) pump which is located at the front of the engine. The seawater passes through the engine's charge air cooler (CAC)\* and heat exchanger and the reverse gear's oil cooler. A zinc anode is fitted in the reverse gear's oil cooler as protection against galvanic corrosion. The TAMD63, TAMD73 and TAMD74 also has a zinc anode in the heat exchanger and the charge air cooler (CAC).

It is important to check the condition of the zinc anode(s) according to the maintenance schedule to prevent corrosion damage.

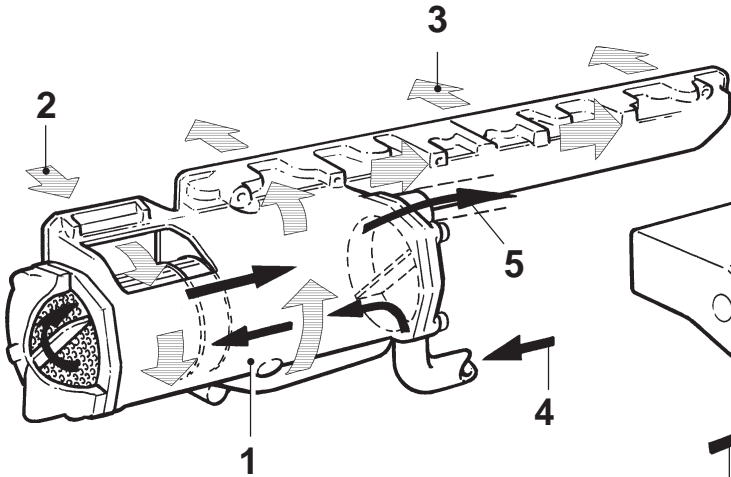
The engine may have a separate expansion tank as an accessory.

\* **Note.** In the TAMD71 the seawater passes the heat exchangers before being fed to the charge air coolers and the reverse gear's oil cooler.



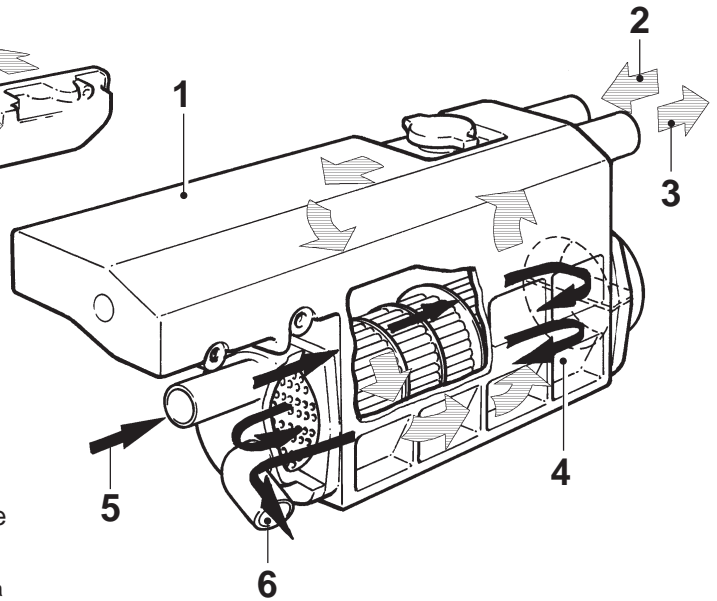
Flow through heat exchangers and charge air coolers (CAC) in the TAMD71

← = Charge air or freshwater      ← = Seawater



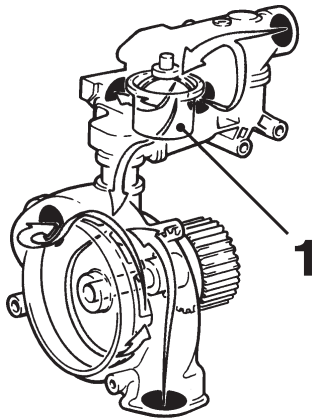
TAMD63, TAMD73, TAMD74: Flow through charge air cooler (CAC)

- |  |   |
|--|---|
| 1. Charge air cooler (CAC)                               | 4. Seawater inlet (from sea water pump) |
| 2. Heated charge air from turbocharger                   | 5. Seawater outlet (to heat exchanger)  |
| 3. Cooled charge air to the engine's combustion chambers |   |



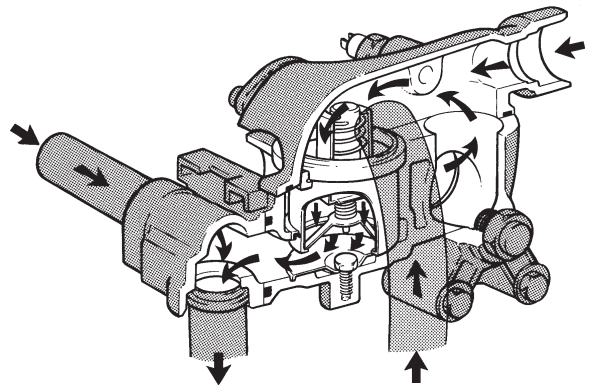
TAMD63, TAMD73, TAMD74: Flow through heat exchanger

- |   |   |
|---|---|
| 1. Expansion tank                               | 4. Heat exchanger                               |
| 2. Hot coolant from engine's thermostat housing | 5. Seawater inlet (from charge air cooler)      |
| 3. Coolant to coolant pump suction side         | 6. Seawater outlet (to reverse gear oil cooler) |

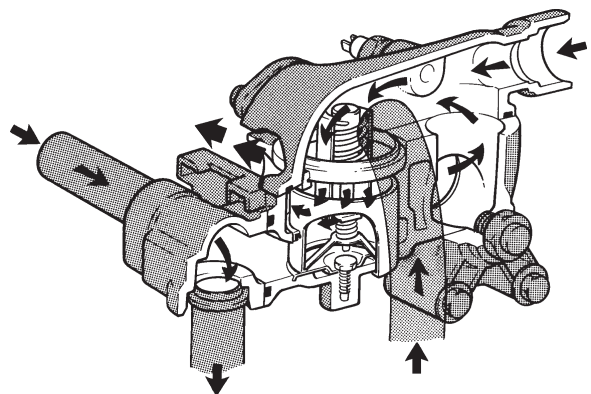


TAMD71: Engine coolant pump (circulation pump) and thermostat housing

1. Piston thermostat



Thermostat function, cold engine



Thermostat function at operating temperature

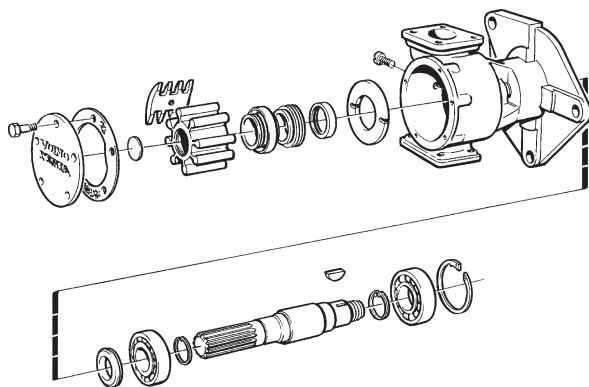
## Thermostat

The engines have a piston thermostat which has a bulb filled with wax. When the engine is cold, the thermostat keeps the route to the heat exchanger completely closed. The coolant is then fed directly back to the engine through a by-pass line. After the engine has warmed up, the volume of the wax increases and the thermostat subsequently opens the route to the heat exchanger, while the by-pass line is closed.

## Seawater pump

The seawater pump is fitted to the timing gear cover at the front of the engine. This pump is driven via the timing gears. The pump impeller is made of rubber and can be replaced.

**Note:** The impeller may be damaged if the pump is run dry.



Seawater pump

## Heat exchanger and charge air cooler (CAC)

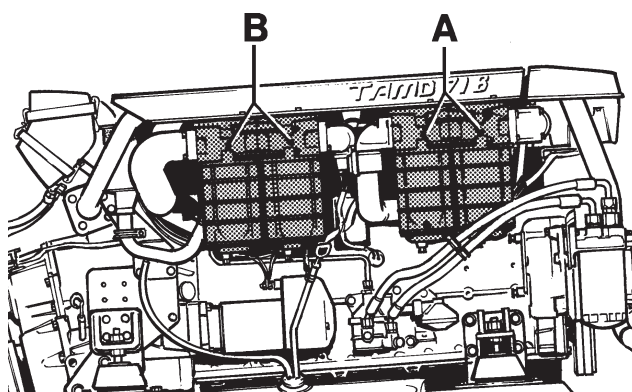
TAMD63, TAMD73 and TAMD74 are equipped with single while TAMD71 has double series connected heat exchangers and charge air coolers. The coolers are installed on the right of the engine with the heat exchanger(s) furthest forward.

In the heat exchanger, heat is transferred from the engine's inner cooling circuit (the freshwater system) to its outer circuit (the seawater system). In the CAC heat is transferred from the charge air from the turbocharger to the seawater. See also under "Charge air cooler" on page 45.

The cooler units are an aluminum housing with a tubular cooling insert.

The seawater passes through the pipes, while the freshwater (heat exchanger) or charge air (for CAC) passes between the pipes.

**Note.** On TAMD71 engines the heat exchanger and charge air cooler are identical, so the cooling inserts, for example, are interchangeable.

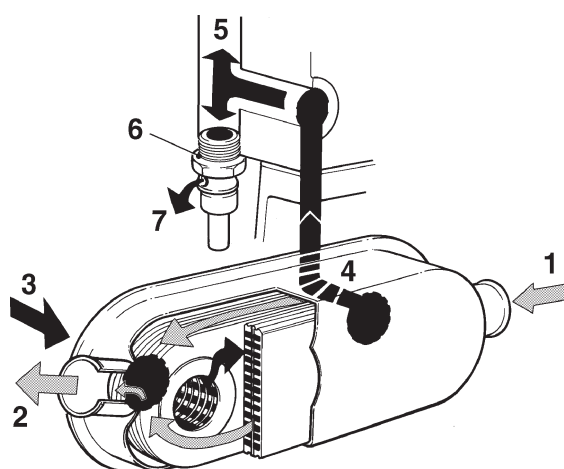


TAMD71: Heat exchangers (A) and charge air coolers (B)

## Oil cooler, engine

The lubricating oil transports heat from the high temperature parts in the engine and equalizes the temperature differences within the engine. Heat is removed from the lubricating oil in the oil cooler. This keeps the oil temperature lower at high load and speeds. This reduces engine wear as the oil's lubricating properties are impaired if the oil temperature gets too high. Lubricating oils of lower quality are most sensitive to high temperatures.

The engine's oil cooler is on the left side, below the injection pump. The engine oil circulates inside the cooler assembly while the coolant passes between the cell plates. The cooler is connected to the fresh-water system.

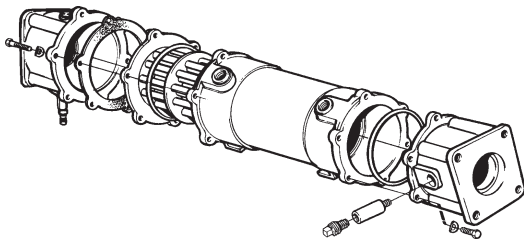


Engine oil cooler

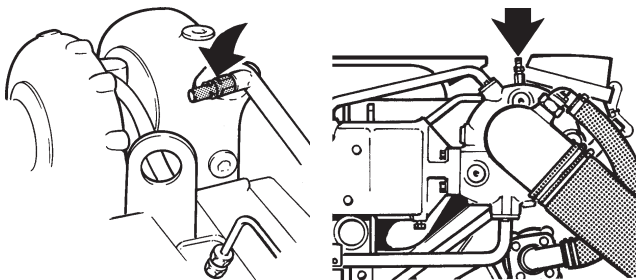
- |                   |                                  |
|-------------------|----------------------------------|
| 1. Coolant inlet  | 5. Oil to piston cooling         |
| 2. Coolant outlet | 6. By-pass valve                 |
| 3. Oil inlet      | 7. Excess oil return to oil sump |
| 4. Outlet, oil    |                                  |

## Oil cooler, reverse gear

The reverse gear's oil cooler is mounted on a bracket above the flywheel casing at the rear of the engine. The cooler is connected to the seawater system. The seawater passes through the pipes in the cooling core and draws heat off from the oil which passes between the pipes.



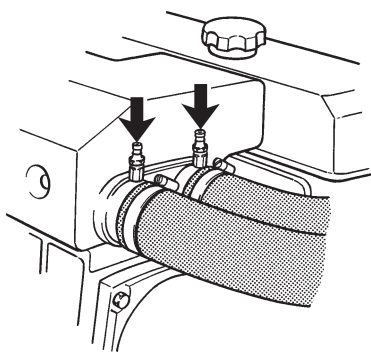
Oil cooler, reverse gear



TAMD63, TAMD73, TAMD74

TAMD71

Venting cock in cooling system



TAMD73, TAMD74: Venting cocks in cooling system

## Maintenance – Cooling System

### Antifreeze and anti-corrosion, cleaning

**⚠ Close sea cock before working on cooling system.**

To avoid loss of cooling performance caused by deposits in the cooling system the coolant must be changed at least once a year. Another reason for changing the coolant is the risk of damage from corrosion in freshwater systems due to corrosion inhibitor additives losing their effect over time.

The system should be flushed carefully with tap water when changing the coolant. Flush until the water which runs out of the draining holes is clean.

**NOTE! Certain parts of the coolant system in the engine are of aluminum. Chemical agents must not be used for cleaning the system.**

For information on draining the coolant, refer to: "Draining coolant", on page 32. For frost protection, see "Coolant" on page 96.

### Filling with coolant

**⚠ Note. Do NOT open the pressure cap or the venting nipples on a hot engine. Steam or hot coolant can spray out and the system pressure will be lost.**

**Filling should be carried out with the engine stopped.** Do not fill so quickly that air locks form in the system. Allow the air to flow out via the filling opening or vent cock(s).

When filling an empty system, or if the coolant level for some reason has dropped so low that it cannot be seen through the filling opening, open the vent cock(s) during filling.

The TAMD73 and TAMD74 have two venting cocks on the flange at the front of the heat exchanger. All engines also have a venting cock at the turbocharger.

**The engine must not be started until the system has been vented and completely filled.**

If a heater system is connected to the engine's cooling system, the heater control valve should be opened and the unit vented during filling.

Fill with coolant\* to 5 cm (2") beneath the sealing surface of the filler cap or to between the MIN and MAX marks on the separate plastic expansion tank (accessory).

\*Note. Cooling system capacity, approx.:

TAMD63: 27 liters (7.1 US gals)

TAMD71: 35 liters (9.3 US gals)

TAMD73, TAMD74: 34 liter (9.1 US gals)

For information about coolants refer to “Coolant” on page 96. When topping up, use the same coolant mixture as that already in the cooling system.

Allow engine to stand 1 hour after filling. Then top up the coolant if required, start the engine and warm it up. Check the coolant level.

### Seawater filter. Checking/cleaning

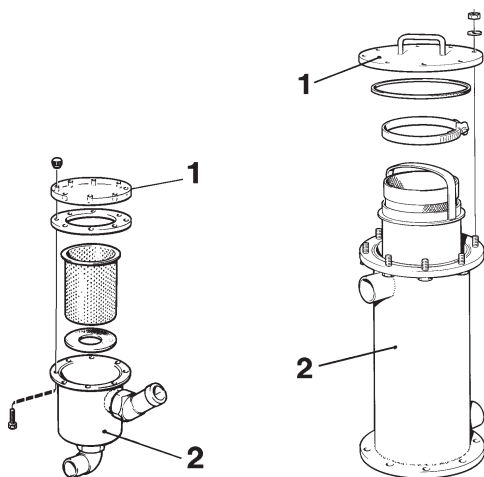
Volvo Penta offers two types of seawater filter. One is a smaller filter with a transparent perspex cover, and the other is larger and has a metal cover.

How often the filter is cleaned is dependent on the operating conditions. The interval can be decided based on experience after running the engine for a time. If necessary, clean the filter more often than specified in the maintenance schedule.

**It is vital that the flow of seawater is never restricted in any way.**

**⚠ Close sea cock before working on cooling system.**

1. Remove cover (1) and lift up insert.
2. Clean insert and housing (2).
3. Reinstall the parts as shown in the figures below. Check gaskets or O ring. Replace if required.
4. Open the sea cock and check for leaks.



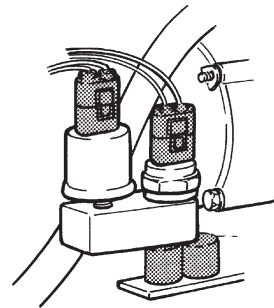
Seawater filter

### Cleaning the heat exchanger and charge air cooler (CAC)

TAMD63, TAMD73 and TAMD74

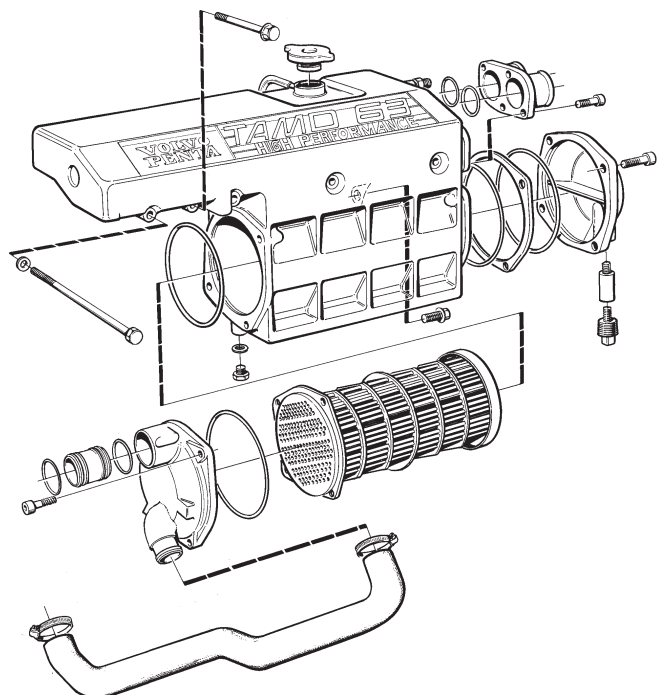
**⚠ Close the sea cock and drain the water from the seawater and freshwater systems before working on the cooling system.**

1. Remove both battery leads.
2. Remove the oil pressure sender and oil pressure switch complete with mounting bracket.

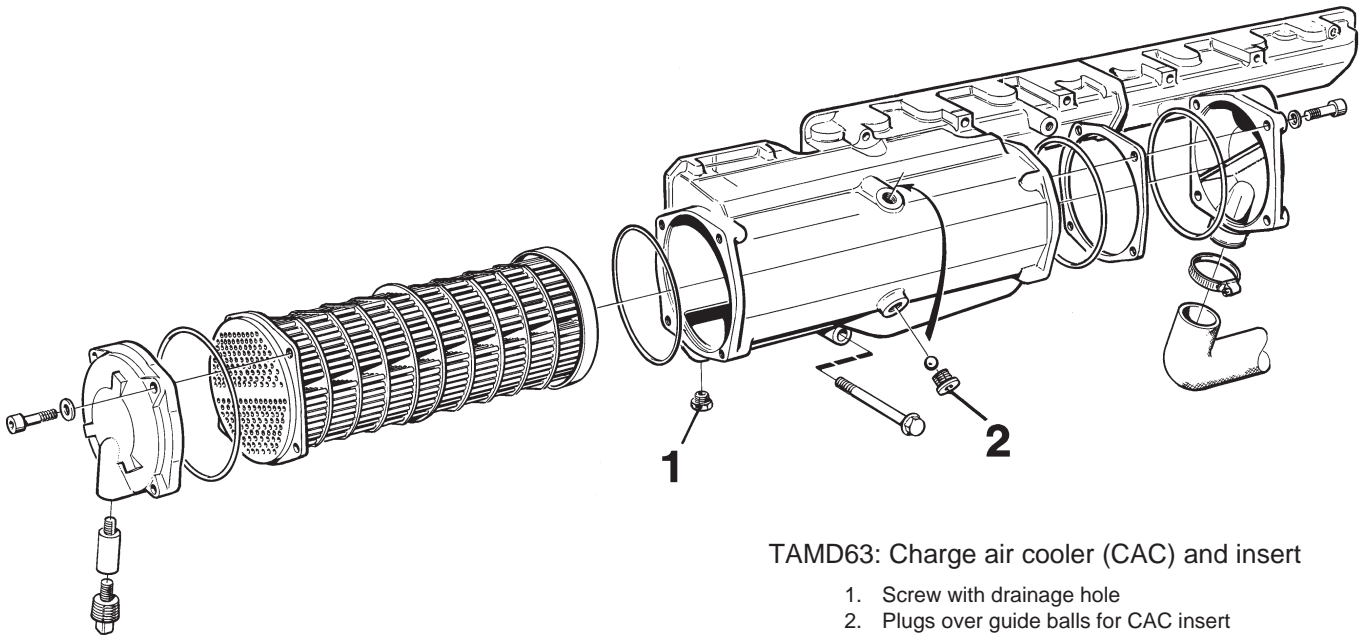


Bracket with oil pressure sender and switch

3. Remove the plastic pipe from the thermostat housing at the heat exchanger.
4. **TAMD73, TAMD74:** Remove wiring from the charge air cooler temperature sender to avoid damage.

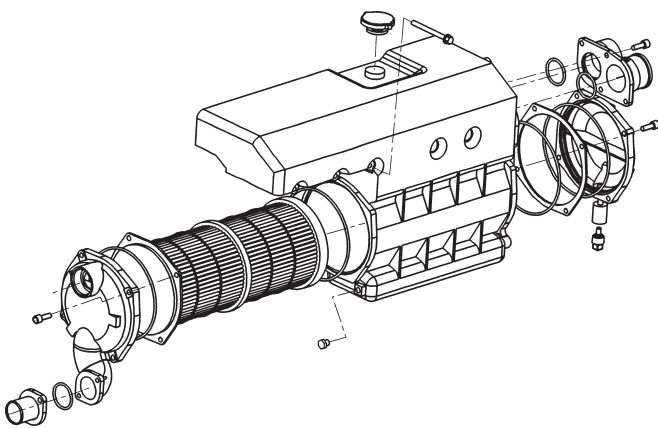


TAMD63: Heat exchanger and insert



TAMD63: Charge air cooler (CAC) and insert

1. Screw with drainage hole
2. Plugs over guide balls for CAC insert



TAMD73, TAMD74: Heat exchanger and insert

5. Remove the cooling water hoses to and from the heat exchanger/charge air cooler (CAC).
6. **TAMD73 and TAMD74:** Remove coolant pipe between seawater pump and charge air cooler (CAC).
7. **TAMD73 and TAMD74:** Undo brace at the heat exchanger front.
8. Remove the heat exchanger from the engine (6 screws).
9. Remove the end covers from the heat exchanger or CAC (6 mm Allen screw). Remove the O-rings and intermediate rings.
10. **TAMD63:** Unscrew plugs (2) over the two guide balls for the charge air cooler's insert a few turns (10 mm Allen screw).
11. Push out the inserts.

**Note.** The inserts can only be pushed out backwards as they have a flange at the rear.

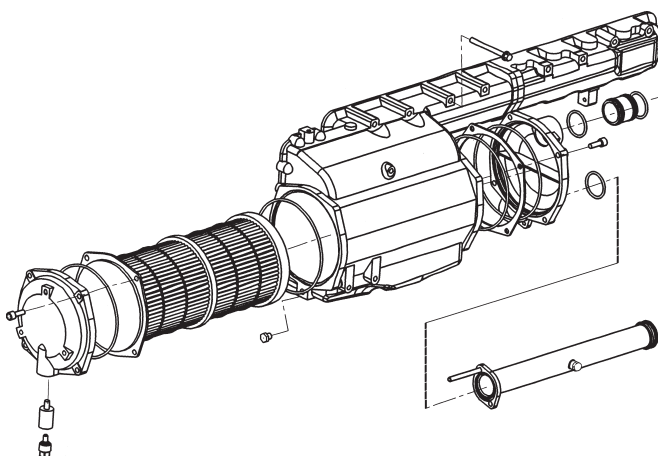
12. Flush and clean them internally and externally. Use suitable brushes. Also clean the housings and covers.

**Note.** Ensure that no contaminants enter the engine's inlet manifold via the charge air cooler.

Check that the drainage hole in screw (1) at the back of the charge air cooler is not blocked.

13. Install the inserts in the housings. Use new sealing rings.

**Note.** The intermediate rings should be fitted with the hole down. Inserts and intermediate rings can be fitted in only one position due to the distribution of holes.




TAMD73, TAMD74: Charge air cooler (CAC) and insert

14. Fit the end covers using new sealing rings.  
**TAMD63:** Tighten plugs (2) on the CAC.
15. Fit the heat exchanger on the engine and tighten it.
16. **TAMD73 and TAMD74:** Tighten the brace in place between the heat exchanger and the timing cover.
17. **TAMD73 and TAMD74:** Lubricate O-rings and install coolant pipe between seawater pump and charge air cooler (CAC).
18. Connect the cooling water hoses to the heat exchanger and charge air cooler (CAC). Tighten the hose clips.
19. Connect the plastic pipe from the thermostat housing to the heat exchanger.
20. **TAMD73 and TAMD74:** Reconnect wiring to charge air temperature sender.
21. Reinstall the oil pressure sender and oil pressure switch.
22. Reconnect the battery leads.
23. Fill the engine with coolant and vent the system as described on page 59.
24. Open the sea cock and start the engine. Check for leaks.

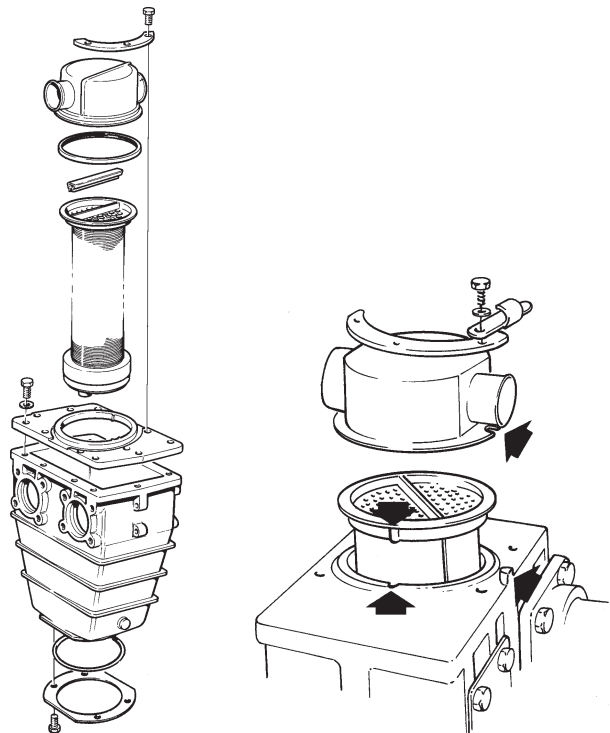
6. Install the inserts in the housings. **NOTE! Ensure that the inserts are installed in the correct position.** The locating lugs beneath the inserts' upper flange should face outwards (from the engine) and fit corresponding notches in the housings, see illustration.
7. Locate the sealing strips on the inserts' baffle plate and reinstall the covers together with the connecting pipes between the covers. Use new sealing rings.  
**Note.** The covers must be installed with the recess on the cover's flange facing forwards, see illustration.
8. Install the O-rings and clamping rings beneath the housings. Reinstall the coolant pipe between the seawater pump and the heat exchanger, or between the charge air cooler and the reverse gear's oil cooler. Use new sealing rings.  
Reinstall the cover plate over the heat exchanger and CAC.
9. Fill the engine with coolant and vent the system as described on page 59.
10. Open the sea cock and start the engine. Check for leaks.

### TAMD71

 **Close the sea cock and drain the water from the seawater and freshwater systems before working on the cooling system.**

1. Remove the cover plate over the heat exchanger and charge air cooler (CAC).
2. Remove the pipes between the seawater pump and the heat exchanger or between the charge air cooler (CAC) and the reverse gear's oil cooler.
3. Remove the covers over the heat exchangers and the charge air coolers (CAC). Remove the connecting pipes between the covers.
4. Remove the clamping rings beneath the housings. Remove the O-rings at the lower seal.
5. Lift the inserts. Flush and clean them internally and externally. Use suitable brushes. Clean the housings too.

**Note.** Ensure that no contaminants enter the engine's inlet manifold via the charge air cooler.



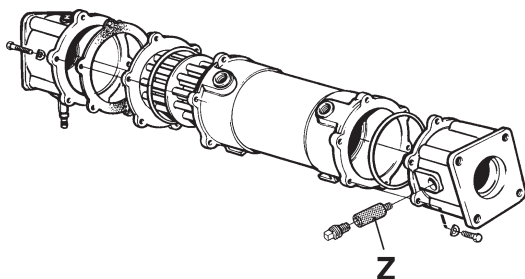
TAMD71: Heat exchanger/charge air cooler (CAC)



## Cleaning oil cooler, reverse gear

**⚠ Close sea cock before working on cooling system.**

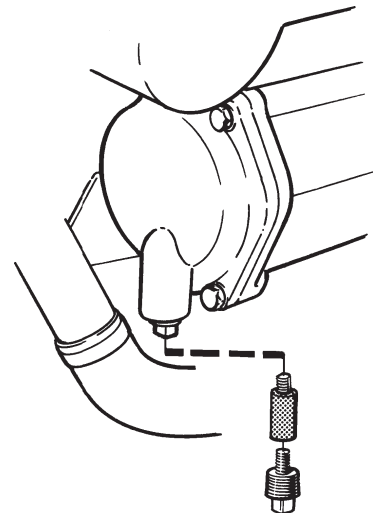
1. Open the drain cock on the oil cooler. Remove the cooling water pipes to and from the oil cooler.
2. Remove both end covers and push out the insert. (The insert can only be pulled out to the left as it has a flange on this side.)
3. Wash the insert in (e.g.) white spirit and blow it dry using compressed air (or let it stand and dry). Clean the tubes internally and the ends of the core using suitable brushes. Clean the housing too.
4. Reinstall all parts in the opposite order. Use new sealing rings.
5. Close the drain cock and open the sea cock. Start the engine and check for leaks.



Oil cooler, reverse gear  
Z. Zinc anode



TAMD63, TAMD73 and TAMD74: Zinc anode in heat exchanger's front end cover



TAMD63, TAMD73 and TAMD74: Zinc anode in CAC rear end cover

## Checking/replacing zinc anode(s)

**⚠ Close sea cock before working on cooling system.**

1. Open the drain cock on the reverse gear's oil cooler.
2. Unscrew the zinc anode (Z) on the oil cooler's right end cover.
3. **TAMD63, TAMD73 and TAMD74:** Unscrew the zinc anode in the heat exchanger's front end cover, or in the charge air cooler's rear end cover.  
**Note.** The seawater in the heat exchanger or charge air cooler should be drained at the same time.
4. Replace the anode if more than 50% of it has been consumed. Otherwise clean the anode with an emery cloth to remove the oxide layer.  
**NOTE!** Do not use a wire brush or other steel tools when cleaning, as these may damage the galvanic protection.
5. Install the zinc anode(s). Ensure that there is good metallic contact between the anode and the material.
6. Close the drain cock. Open the sea cock before starting the engine. Check for leaks.

## Replacing the seawater pump impeller

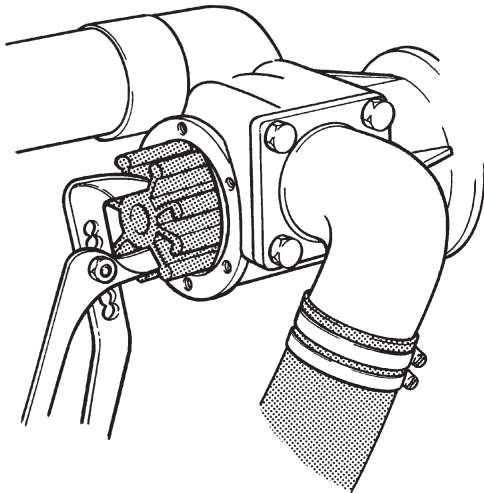
**⚠** Close sea cock before working on cooling system.

1. Remove the pump's end cover. Pull and twist out the pump impeller using pliers.\*
2. Clean inside the housing. Lubricate the pump housing and the inside of the cover with a small amount of natural soap.
3. Push in the new impeller with a rotating movement:  
TAMD63, TAMD73 and TAMD74 – **clockwise**.  
TAMD71 – **counterclockwise**.
4. Reinstall the cover together with a new gasket.

**Always keep a spare pump impeller and gasket on board.**

5. Open sea cock. Start the engine and check for leaks.

\***Note.** In certain installations it is easier to first remove the pump from the engine (see next section) and then replace the impeller.

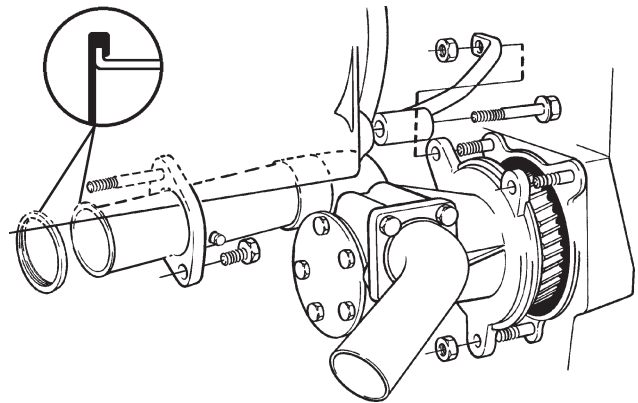


Removing the seawater pump impeller

## Removing the seawater pump

**⚠** Close sea cock before working on cooling system.

1. Drain the water from the seawater system.
2. Release the coolant pipes to and from the pump.
3. **TAMD73 and TAMD74:** Remove the brace between the heat exchanger and the timing cover (seawater pump).
4. Remove the pump from the timing cover.



TAMD73 and TAMD74: Removing the seawater pump

## Installing the seawater pump

1. Check that the O-ring is not damaged and that it is in place on the pump.
2. Install pump and tighten in position.
3. **TAMD73 and TAMD74:** Install brace between the heat exchanger and the timing cover (seawater pump).
4. Lubricate sealing rings and install coolant pipes to and from the pump.

**TAMD73 and TAMD74:** Check for leakage at the sealing against the charge air cooler (CAC).

## Electrical system

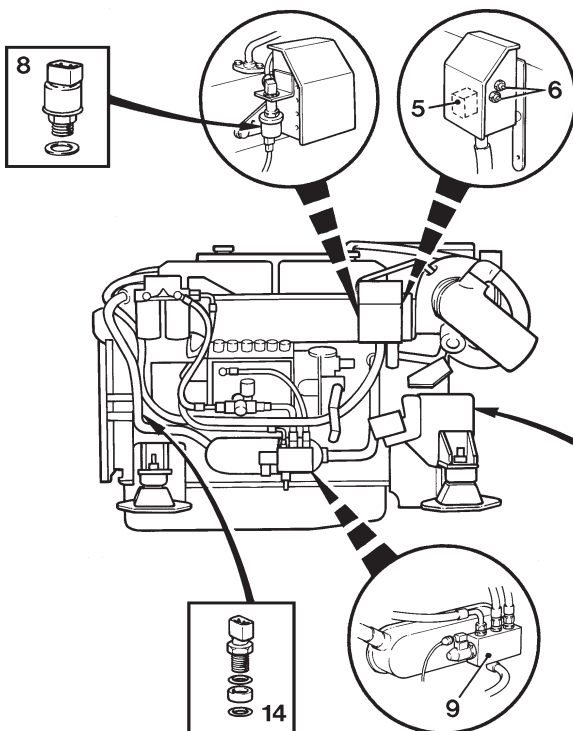
These engines have an electrical system with a generous generator capacity for a normal-sized boat. When a more powerful power supply is required, we recommend that you fit an extra generator or install a separate generator unit.

These engines have a two-pole electrical system with an AC generator. The system voltage is 12V or 24V. The TAMD71 has an electrical starter element (air preheating) fitted as standard. In these engines, the starter element facilitates starting a cold engine and reduces exhaust smoke when starting in cold weather. In the TAMD63, TAMD73 and TAMD74, which all have higher compression, different combustion chambers and a modified injection system, a starter element is not required.

The electrical system also includes senders for monitoring the engine's coolant temperature and oil pressure.

### Positions of electrical components in engine and reverse gear:

#### TAMD63

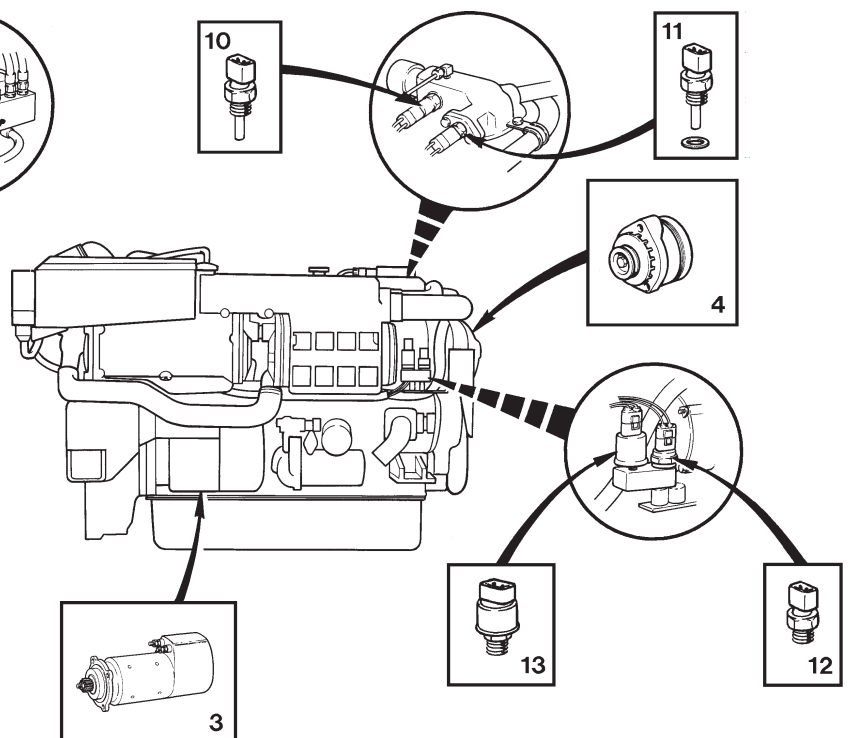


The electrical system is shown in two ways. The wiring diagrams (pages 73–93) shows the wiring, cable areas and cable colors. The positions of the respective parts in the engine/reverse gear are shown in the figures on pages 65–67.

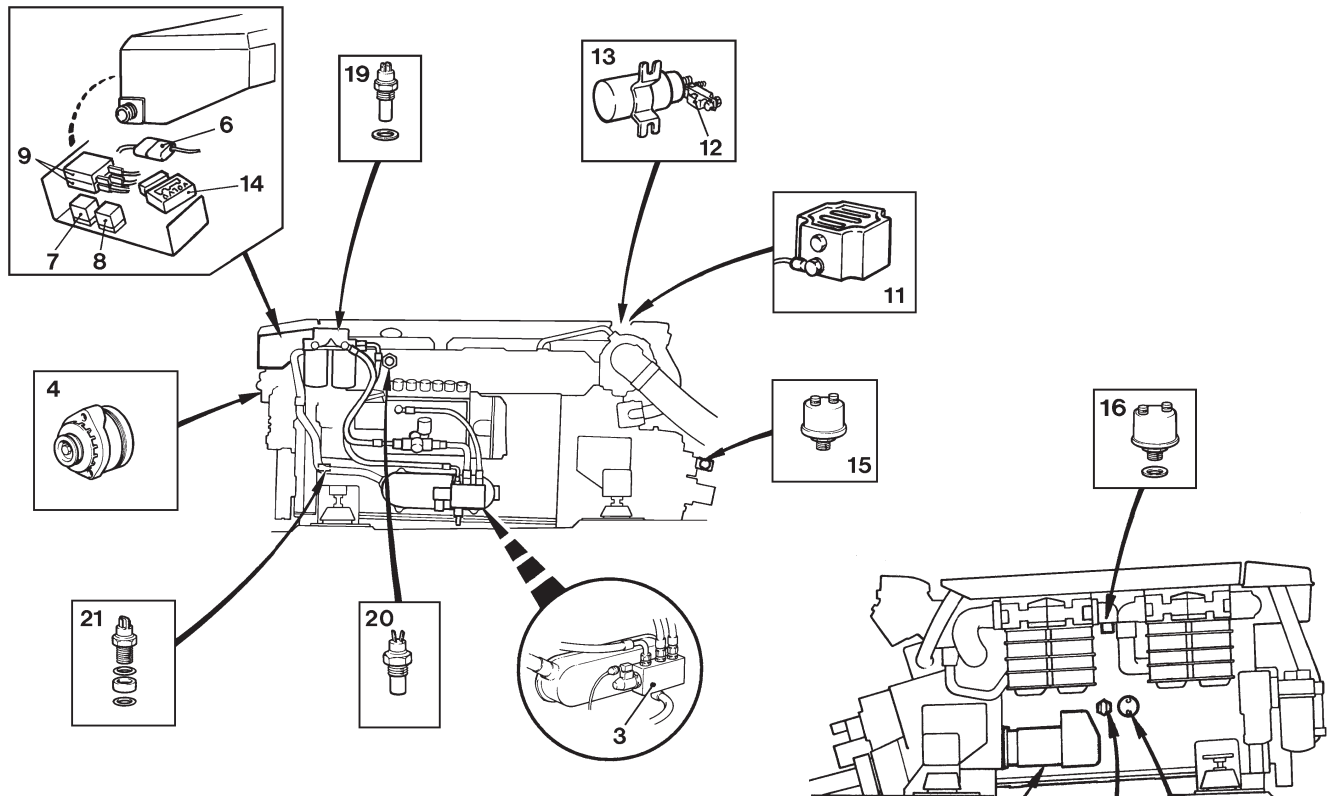
#### TAMD63

**Note.** The components in the figures are numbered the same as in the engine's wiring diagram on page 75.

3. Starter motor
4. Generator
5. Starter relay
6. Semi-automatic fuses
7. Oil pressure sender, reverse gear
8. Pressure sender, Turbo boost pressure
9. Solenoid valve (fuel cut off valve)
10. Coolant temperature switch
11. Engine coolant temperature sender
12. Oil pressure switch, engine
13. Oil pressure sender, engine
14. Engine speed (rpm) sender



## TAMD71B



## TAMD71B

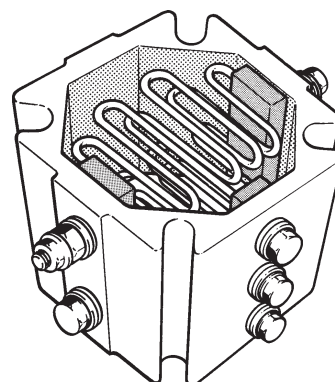
**Note.** The components in the figures are numbered the same as in the engine's wiring diagram on page 77.

- |                                   |   |
|-----------------------------------|---|
| 3. Solenoid (fuel shut-off valve) | 13. Relay for starter element             |
| 4. Generator                      | 14. Time relay                            |
| 5. Starter motor                  | 15. Oil pressure sender, reverse gear     |
| 6. Fuse for fuel shut-off valve   | 16. Pressure sender, Turbo boost pressure |
| 7. Stop relay                     | 17. Oil pressure sender, engine           |
| 8. Starter relay                  | 18. Oil pressure switch, engine           |
| 9. Semi-automatic fuses           | 19. Engine coolant temperature sender     |
| 11. Starter element               | 20. Coolant temperature switch            |
| 12. Fuse for starter element      | 21. Engine speed (rpm) sender             |

### Starter element (TAMD71B)

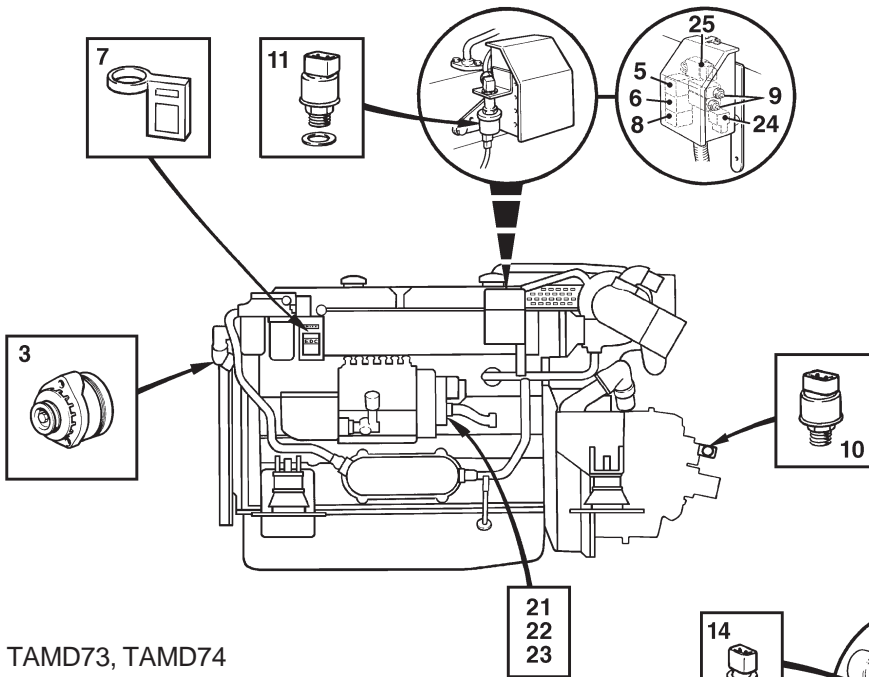
The starter element heats the inlet air to the engine. The element consists of three series connected wire elements installed in a connecting pipe. It is located between the turbocharger and the engine intake manifold. The element is automatically engaged when starting when the starter key is turned to and passes the pre-heating position (II). This sends a voltage pulse to a time relay, which in turn controls engagement of the element via a control relay. The engagement time is approx. 50 sec.

See wiring diagram on page 77.



Starter element

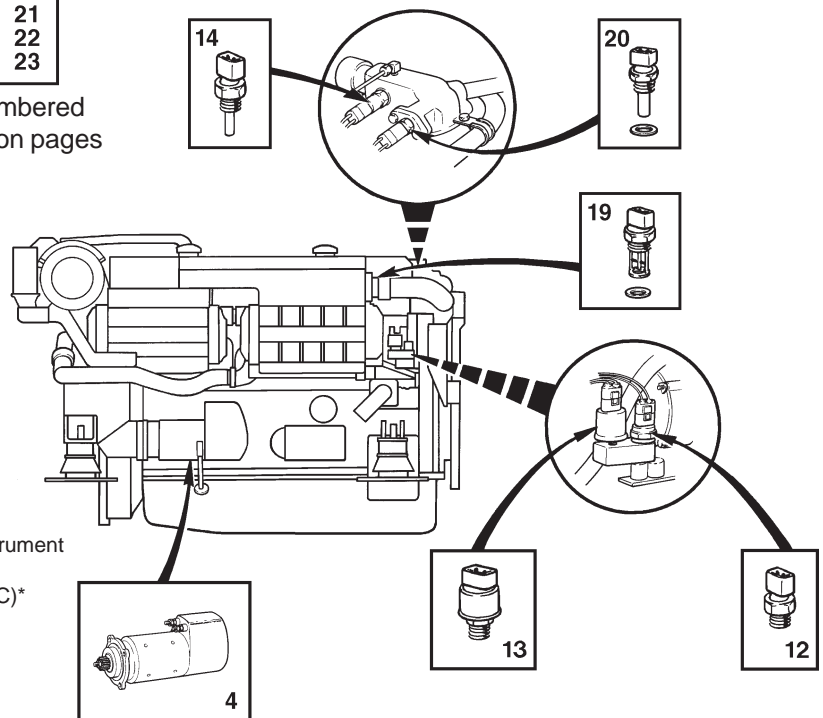
## TAMD73, TAMD74



## TAMD73, TAMD74

**Note.** The components in the figures are numbered the same as in the engine's wiring diagram on pages 79, 81, 83, 85 and 87.

3. Generator
4. Starter motor
5. Starter relay
6. Main relay
7. Electronic Diesel Control (EDC) control module box\* (incl. fuel temperature sender, EDC and turbo pressure sender, EDC)
8. Stop relay
9. Semi-automatic fuses
10. Oil pressure sender, reverse gear
11. Boost pressure sender, (instrument)
12. Oil pressure switch, engine
13. Oil pressure sender, engine
14. Engine coolant temperature (ECT) sender, instrument
19. Charge air temperature sender\*
20. Engine coolant temperature (ECT) sender (EDC)\*
21. Position sensor, control rod\*
22. Engine speed (RPM) sender\*
23. Electro-magnetic actuator, EDC\*
24. 2-pin connector, data link connector (DLC)\*
25. Fuse for EDC system (TAMD74)



\* **Note.** Apply to TAMD73P and TAMD74 engines.

### Electronic Diesel Control (EDC) system (TAMD73P and TAMD74)

The injection pump on the TAMD73P and TAMD74 engines has an electronic governor. The governor contains an electro-magnet which effects the injection pump control rod and so the amount of fuel injected (engine output).

The EDC system measures boost pressure and charge air temperature and calculates the available air mass. This determines the amount of fuel injected (smoke limiter function). To achieve minimal emissions at start the system measures the engine coolant temperature and adapts the amount of fuel required.

The system also determines the maximum torque available at the engine speed registered without risking damaging the engine. To protect the engine at high engine coolant temperatures, high charge air temperatures or excessive charge air pressure the EDC temporarily reduces the amount of fuel (reduced engine output) until the current values normalize.

The EDC control module also has a diagnostics system (On-board diagnostics OBD) which assists users/service technicians to quickly determine the cause of any malfunctions on the system using the diagnostic lamp or a diagnostic scan tool ("Diagnostic Key").

## Starter motor

The starter motor is mounted on the flywheel casing on the right of the engine.

When the starter motor is engaged, a drive on the starter motor's rotor shaft is moved in an axial direction so that it engages with a spur ring on the engine's flywheel. The drive's axial movement and the engagement of the starter motor are controlled by a control solenoid on the starter motor.

The starter motor's control solenoid is engaged in turn via the starter relay\* when the starter key is held in position III.

\* Pos. 5 on the overview illustration on pages 65 and 67 or pos. 8 on the illustration on page 66.

## AC generator

The generator is belt driven and located at the front of the engine.

The engine's standard generator can be fitted with a charge distributor as an accessory. Two independent battery circuits can then be charged simultaneously. The charge distributor separates the two groups from one another so that the engine's storage batteries are kept fully charged even if the "accessory batteries" are weak or almost discharged.

**Note.** The charging voltage from the 28V/60A generator is thermally compensated. The voltage increases at low temperatures and is reduced at higher temperatures.

## Voltage regulator with sensor system


The voltage regulator for the standard generator (14V/60A, or 28V/40A\* or 28V/60A) has a sensor system.

This sensor system compares the charging voltage between the generator's B+ and B- connections with the charging voltage between the batteries' positive and negative poles. The voltage regulator then compensates any drop in voltage in the leads between the generator and the batteries by increasing the charging voltage from the generator, if necessary.

When supplied by Volvo Penta, the sensor system is not activated. However, it is likely that it was connected when the engine was installed.

\* **Note.** The 28V/40A generator is for the TAMD63 engine.

## Connecting the sensor system

 **Turn the engine off and switch off power at the main switches before carrying out work on the electrical system.**

1. Disconnect the yellow sensor cable from the B+ connection on the generator.
2. Splice the cable (yellow, 1.5 mm<sup>2</sup>) and route it to the batteries. Connect the cable to the batteries' positive (+) pole.

## Charging control lamp (extra generator)

A separate charging control lamp (3W) can be connected to the extra 28V/100A generator.

A resistor (3) P/N 863400-8 (47Ω/25W) must also be connected as shown in a separate wiring diagram on page 73.

## Fuel shut-off valve

TAMD63, TAMD71B and TAMD73WJ engines are stopped via a solenoid valve (fuel shut-off valve) which is activated during stopping. The valve changes the direction of the fuel flow to and from the feed pump so that a vacuum is created in the fuel chamber of the injection pump. This makes it impossible for the pump element to fill up and the engine stops.

This valve is located on a bracket beneath the injection pump.

## Fuses

These engines have two semi-automatic fuses of approx. 8A. These fuses break the current in the event of overloading.\*

\* **TAMD73P, TAMD74:** If a fuse blows the engine stops.

In the TAMD71B the fuses are located in the front of the junction box on the left end of the expansion tank. The electrical starter element is also protected by a strip fuse (150A) between the element and the high tension relay.

The TAMD63, TAMD73 and TAMD74 have the junction box on the exhaust manifold at the rear left of the engine. The fuses are at the back of the box.

In the junction box there is also a replaceable safety fuse (8A) for the fuel shut-off valve on the TAMD71B and a replaceable safety fuse\* (7.5A) for the EDC power supply on the TAMD74.

See instructions on page 71 for resetting/replacing fuses.

**Make sure that you always have spare fuses on board.**

\*TAM74: If the fuse blows the engine stops.

## Relays

The relays are located in the junction box. This is located at the rear of the exhaust manifold on the left side of the engine (TAM63, TAM73 and TAM74) and on the left end of the expansion tank (TAM71B).

The start and stop\* functions are controlled via two change-over relays. These relays are identical and are therefore interchangeable if necessary.

On TAM71B engines there is also a timer relay in the junction box which controls the starter element's engagement time via a high tension relay (approx. 50 seconds). This high tension relay is located in front of the air cleaner (ACL) adjacent to the starter element.

\*Not TAM63 and TAM73WJ engines.

## General Information

### Electrolytic corrosion

Your boat and its engine/reverse gear have sacrificial anodes made of zinc as protection against galvanic corrosion. This protection may be rendered ineffective if there are any leakage currents from the electrical system due to faulty equipment or incorrectly connecting electrical components on the negative side (grounding, protector ground). The following should always be observed:

The main engine switches should be mounted on both the positive (+) and the negative (-) battery leads.

The main switches should break the current to all parts consuming electricity. Electrical leads should be routed so that they are not exposed to moisture and there is no risk of them being exposed to bilgewater in the keelson.

If there are several battery circuits, there must be separate switches for the extra equipment. There must also be a main switch between the extra battery's positive (+) pole and the fuse block for the boat's electrical equipment. The main switch for the extra battery circuit should break the current to all power consuming equipment connected to this circuit and be switched off when there is no requirement for extra current. The main switches to the engine must be switched off when the boat is not in use.

The propulsion unit must not be electrically connected with other equipment such as trim tabs, steps, etc. Neither may it be used as ground points for radio or navigation installations or other electrical equipment with separate ground cables. All separate ground connections should be collected together to form a joint ground connection which is separate from the propulsion package.

If shore power is connected, protector ground should not be connected to the engine or to any other ground on the boat.

Transformers connected to shore power must be installed so that the protective ground on the input side (120/220V) and the negative connection on the output side (12/24V) are not connected.



**Warning!** Electrolytic corrosion as a consequence of leakage currents may cause serious and expensive damage to your boat's equipment within a short time. Work on the boat's low tension circuit should only be carried out by qualified or experienced persons. Installation or work on the shore power equipment **must only** be carried out by electricians authorized to work with high-voltage installations.

## Electrical system – Important!



**Turn the engine off and switch off power at the main switches before carrying out work on the electrical system.**

### 1. Main ON/OFF power switches

Never break the circuit between the generator and batteries while the engine is running. In other words, the main switches must never be disconnected before the engine has stopped. If the circuit is broken while the engine is running, the voltage regulator may be destroyed and the generator seriously damaged.

Charging circuits must not be switched over while the engine is running, for the same reason.

To simultaneously charge two independent battery circuits, fit a Volvo Penta charge distributor to the regular generator (accessory).

## 2. Batteries

Never mix up the positive and negative battery terminals when installing. Incorrect installation can result in serious damage to electrical equipment. Refer to wiring diagrams. The battery terminal posts should always be well cleaned and the cable terminals well tightened and greased to prevent open circuits.

Avoid boost charging the batteries. If the battery must be booster charged, first remove both battery leads.

**NOTE!** Follow relevant safety regulations when charging batteries. When charging, unscrew filler plugs but leave them in their holes. Ventilation should be good, particularly if the batteries are being charged in an enclosed area. Always switch off the charging circuit **before** removing the battery charger connectors.

**Warning!** Never allow an open flame or electric sparks near the batteries. Never smoke in proximity to the batteries. The batteries give off hydrogen gas during charging which when mixed with air can form an explosive gas – oxyhydrogen. This gas is easily ignited and highly volatile.

**Always use protective goggles when charging and handling batteries.**

The battery electrolyte contains extremely corrosive sulfuric acid. If this should come in contact with the skin, immediately wash with soap and plenty of water. If battery acid comes in contact with the eyes, immediately flush with plenty of water and obtain medical assistance without delay.

3. See separate instructions on this page for how to start using auxiliary batteries.

### 4. Connecting accessories and extra equipment

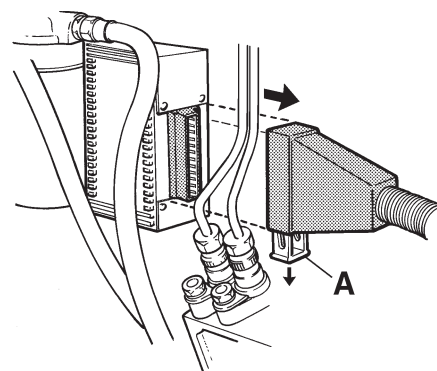
All extra equipment should be connected to a separate junction box and fused. Extra outlets directly from the instrument panels should be avoided. Permitted extra power take-off is however maximum **5A\*** (for all instrument panels together).

\*Note. For the TAMD73P and TAMD74 max. 2A apply.

### **Warning!** Arc welding

Remove the positive and negative leads from the batteries. Then remove all leads to the generator.

**TAMD73P and TAMD74:** Remove the connector from the EDC system control module (located behind the fine fuel filters). Pull down the red locking catch (A) below the connector while pulling the connector out at the same time.



TAMD73P and TAMD74: Removing the connector from the control module

A. Locking catch

Always connect the weld clamp to the component to be welded and as close to the welding point as possible. The clamp should never be connected to the engine or in such a manner that the current is able to pass over any bearings.

### When welding is complete:

**TAMD73P and TAMD74:** Press the connector into the control module for the EDC system while pushing the locking catch (A) upwards.

**Warning!** Always connect the leads to the generator **before** replacing the battery leads.

## Starting using auxiliary batteries

### **Warning!**

The batteries (auxiliary batteries in particular) contain extremely explosive oxyhydrogen gas. One spark, which may be formed if the auxiliary batteries are connected incorrectly, is sufficient to explode a battery and cause damage and injury.

1. Check that the auxiliary batteries are connected (in series or in parallel) so that their rated voltage is the same as the engine's system voltage.
2. First connect the red jump lead (+) to the auxiliary battery, then to the discharged battery. Then connect the black jump lead (-) to the auxiliary battery, then to a **spot a short distance from the discharged batteries**, for example at the main switch on the negative cable or at the negative cable's connection to the starter motor.
3. Start the engine. **NOTE! Do not shift the connections when attempting to start the engine (spark risk) and do not lean over any of the batteries.**
4. Remove the jump leads in exactly the opposite order to which you put them on. **NOTE! The normal leads to the standard batteries should under no circumstances be moved.**



## Maintenance – Electrical System

**⚠ NOTE!** Always stop the engine and break the current using the main switches before working on the electrical system.

Also read the section entitled “Electrical system – Important” on pages 69–70.

### Resetting/replacing fuses

Ensure that you use the correct rating for the fuse you are replacing. Never fit a more powerful fuse.

Make sure that you always have spare fuses on board.

**Note.** If the same fuse often trips or needs to be replaced, consult authorized service personnel so that they can investigate the cause of the overload.

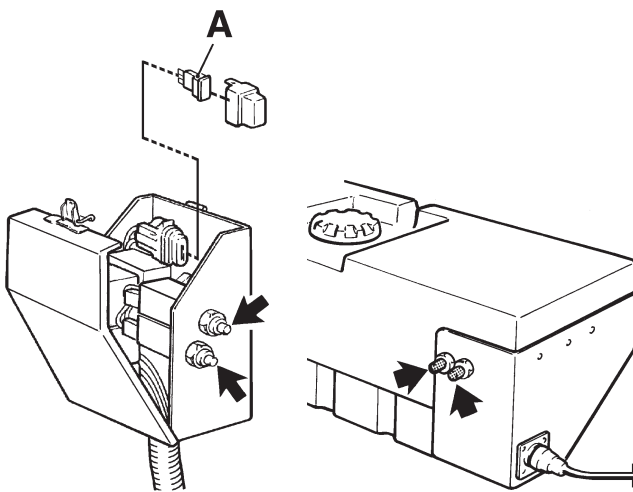
### Semi-automatic fuses

The semi-automatic fuses are reset by pressing the button on the fuse.

### Fuse for the EDC system\*

The fuse (7.5A) can be replaced after removing the cover of the terminal box.

\***Note.** For TAMD74 engines.



TAMD63, TAMD73, -74

TAMD71B

Terminal box with fuses

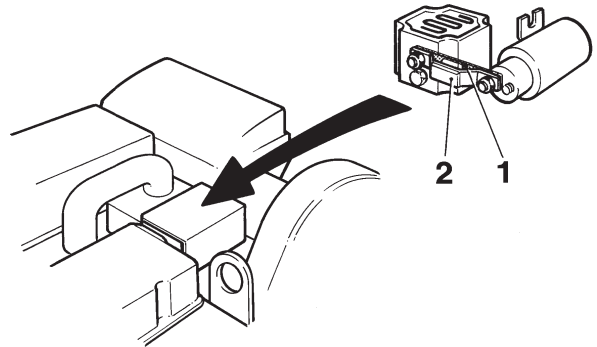
A. Fuse for the EDC system (TAMD74)

### Strip fuse for electrical starter element\*

**Note.** This work should be left to authorized service personnel.

1. Stop the engine and break the circuit using the main switches.
2. Remove the cover plate over the high power relay.

\* **Note.** For TAMD71B engines.

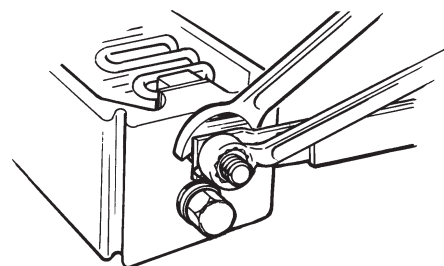


TAMD71B: Blade fuse (1) with support (2) for electrical starter element

3. Remove the old fuse (1) complete with holder (2).
4. Fit the new fuse and support as shown in the illustration. Reinstall the cover plate over the relay.

**Note!** When removing and tightening the nuts\* on the terminals on the starter element, these terminals must always be held tightly (see figure). Otherwise, the wire element may twist inside the starter element and cause a short circuit.

\* Tightening torque for terminal nuts = 11–14 Nm (1.1–1.4 kpm/ 8–10 lbf.ft.).

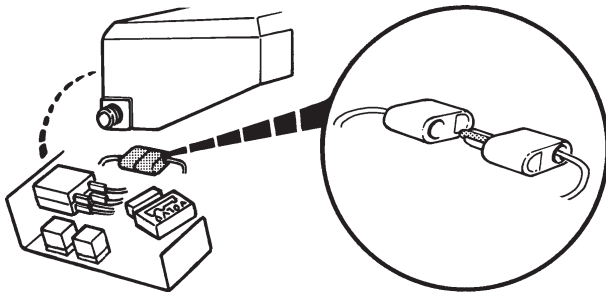


TAMD71B: Removal/tightening terminal nuts on starter element terminals

### Fuel shut-off valve fuse\*

1. Stop the engine and break the circuit using the main switches.
2. Detach the terminal box and pull it out.
3. Dismantle the fuse holder and replace the fuse with a new one (8A). See illustration.
4. Reinstall the terminal box.

\* **Note.** For TAMD71B engines.



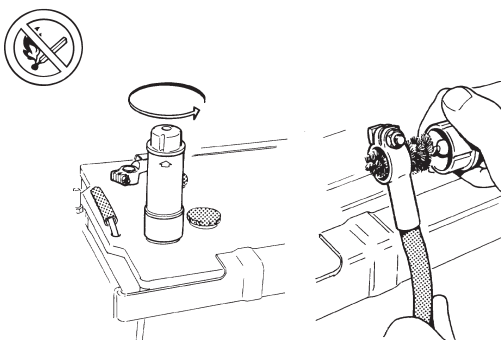
TAMD71B: Fuel shut-off valve fuse

### Checking batteries and electrical connections

**⚠ Read the section entitled “Electrical system – Important” on pages 69–70.**

The service life of your batteries depends largely on how they are maintained. Keep batteries dry and clean. Dirt on the batteries may cause tracking and discharge them, particularly in damp weather.

Clean the battery terminals and connections using suitable wire brushes. Poor contact may cause unnecessary voltage drops. Tighten the cable terminals well and spray the battery terminals and connections with anti-corrosive agent or coat them with Vaseline.



Cleaning the battery terminals

Check that the batteries are connected properly.

Also check that all other electrical connections are dry and free of oxidation and that there are no loose connections. If necessary, spray these connections with a water-repellent spray (Volvo Penta Universal oil).

### Charge condition

Check the batteries' charge condition using a hydrometer. The battery electrolytic density should be 1.28 g/cm<sup>3</sup>. \* Charge battery if reading has dropped to 1.24 g/cm<sup>3</sup>\* (approximately 75% charge).

**Note.** If an aerometer-type hydrometer (see illustration) is used, the value read off applies at a temperature of approx. +25°C (77°F). At other temperatures the reading must be compensated as follows:

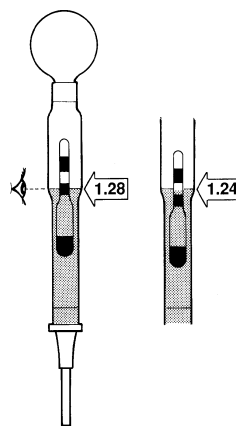
at -20°C (-4°F)	compensate by -0.03
at -5°C (23°F)	compensate by -0.02
at +10°C (50°F)	compensate by -0.01
at +40°C (104°F)	compensate by +0.01

Example: A value of 1.24 measured at -5°C (23°F) should be corrected to 1.22 which requires extra charging.

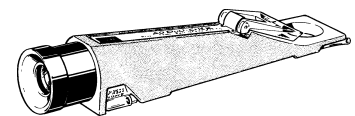
**Note.** An optical-type hydrometer is temperature compensated.

The various battery cells should display relatively even values. Uneven results may mean that the battery is more or less ready for replacement.

\* **Note.** For batteries with tropical acid substitute 1.24 g/cm<sup>3</sup>, and 1.20 g/cm<sup>3</sup>.



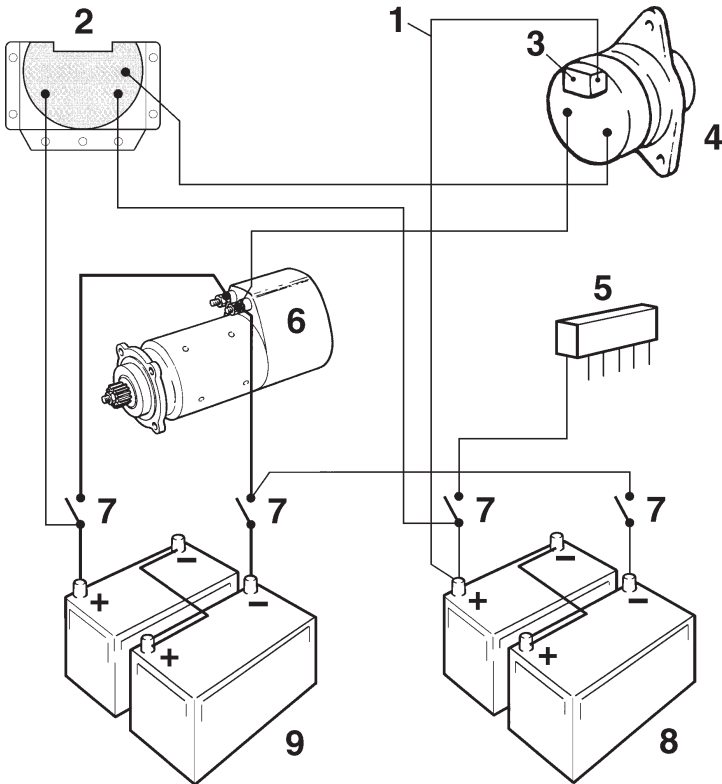
Aerometer-type



Optical-type

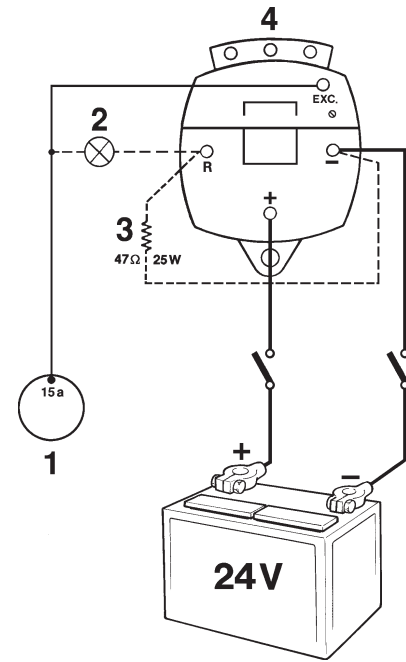
Hydrometers

# Wiring Diagrams



Connection of sensor system to standard generator, principle diagram

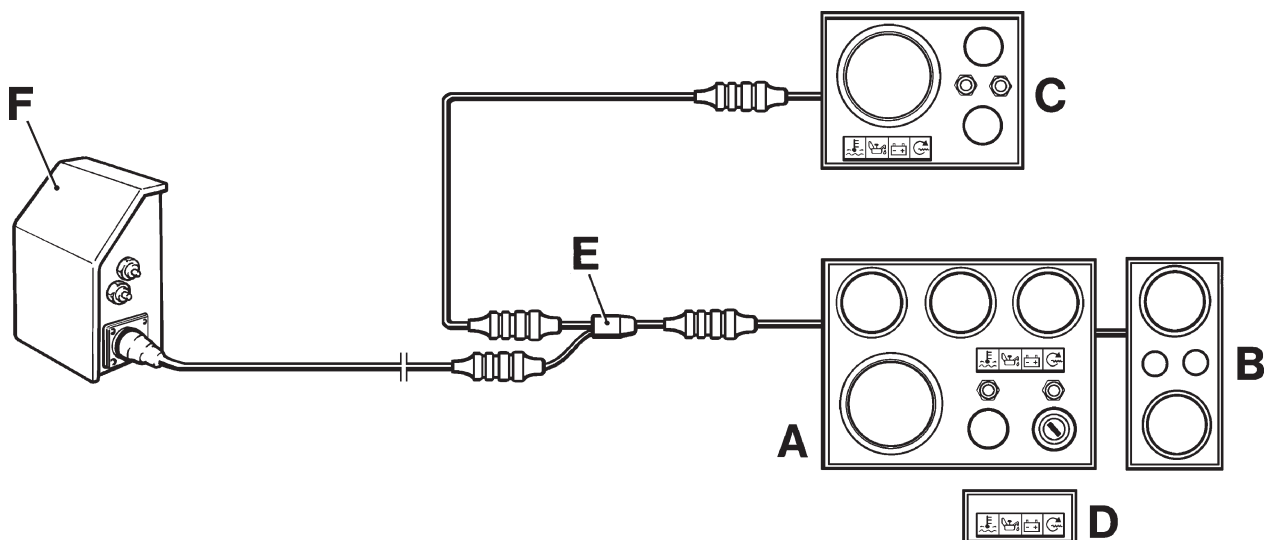
- |  |  |
|--|--|
| 1. Sensor cable (yellow, 1.5 mm <sup>2</sup> ) | 6. Starter motor                         |
| 2. Charge distributor (accessory)              | 7. Main ON/OFF power switch              |
| 3. Voltage regulator                           | 8. Accessory batteries (for accessories) |
| 4. Generator                                   | 9. Start batteries (engine)              |
| 5. Fuse panel (accessory)                      |  |



Connecting the charge indicator lamp

Extra generator 28V/100A

1. Key switch
2. Charge indicator light
3. Resistor (47Ω/25W), P/N 863400-8
4. Generator 28V/100A



Block diagram

- |                         |   |
|-------------------------|---|
| A. Main panel           | D. Alarm panel. (Used only when there is no main panel A) |
| B. Auxiliary panel      | E. Y connection   |
| C. Flying Bridge panel* | F. Junction box** with fuses                              |

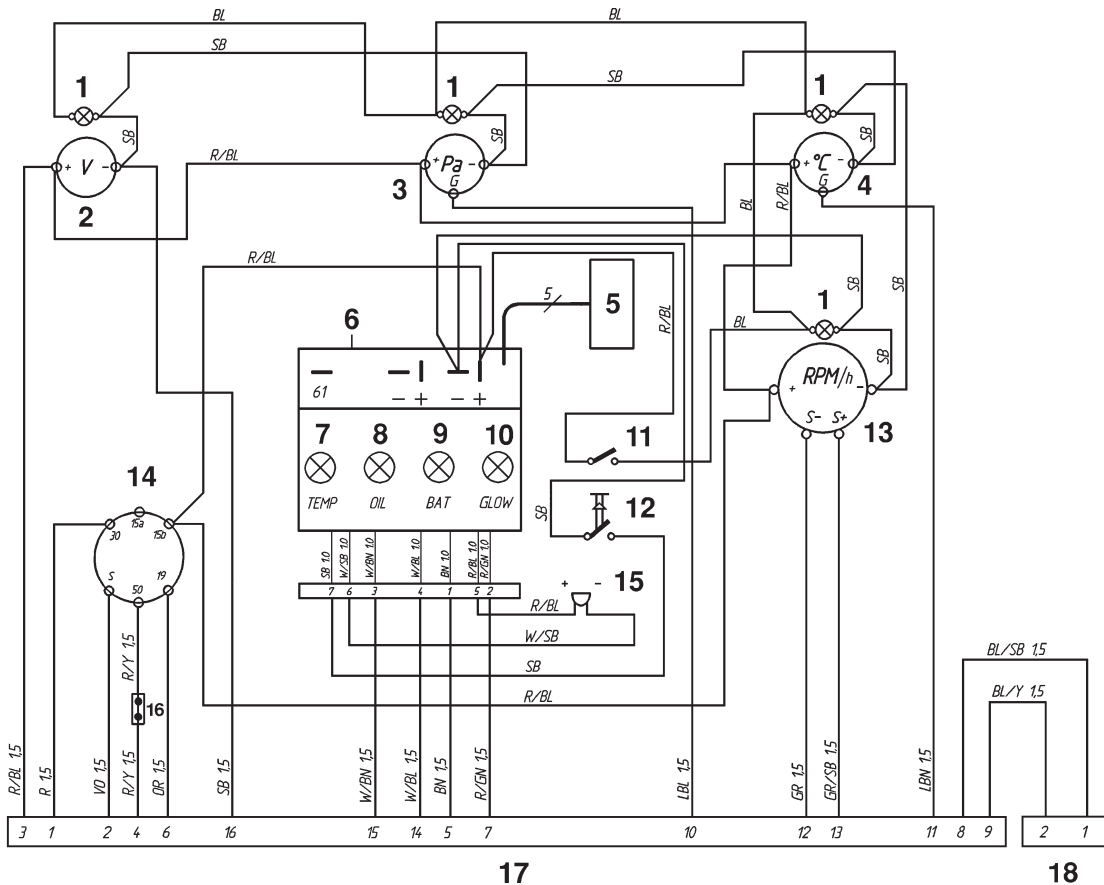
\* Main panel (A) may also be installed on the flying bridge control position.

\*\* Note. The picture shows the TAMD63, TAMD73 and TAMD74.

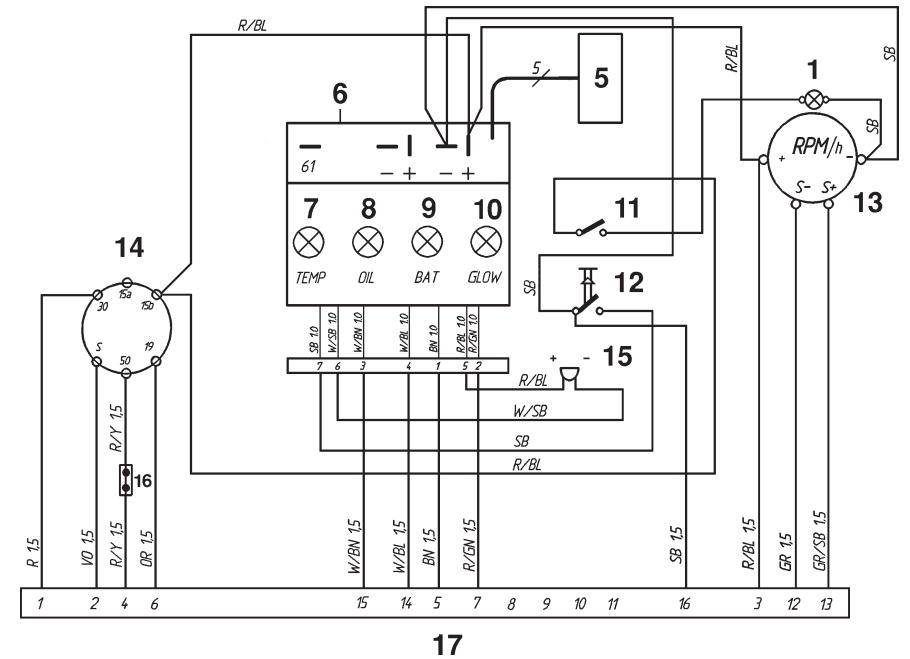
# TAMD63L-A, TAMD63P-A

Cable areas in mm<sup>2</sup> are given after the color codes in the wiring diagrams.  
The cable area is 1.0 mm<sup>2</sup> unless otherwise stated.

Instrument panel, (Master panel)

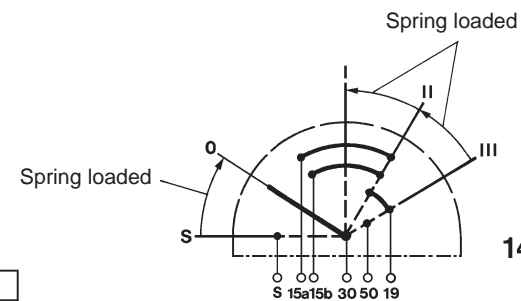


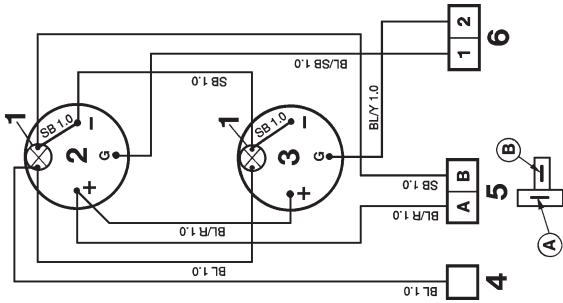
Control panel for auxiliary control position (Flying Bridge)



## Instrument panels

1. Instrument lighting
2. Voltmeter
3. Oil pressure gauge
4. Engine coolant temperature gauge
5. Connector for extra warning display (accessory)
6. Electronics module (alarm)
7. Engine coolant temperature warning lamp
8. Oil pressure warning lamp
9. Charge warning lamp
10. Indicator lamp (not used)
11. Switch, instrument panel lighting
12. Alarm test/acknowledgement switch
13. Tachometer with built-in hours run meter
14. Key switch
15. Alarm
16. Connector for connecting neutral position switch, if fitted (accessory)
17. 2-pin connector
18. 2-pin connector (for auxiliary panel, where installed)





### Auxiliary panel

1. Instrument lighting
2. Oil pressure gauge, reverse gear
3. Turbo charging pressure gauge
4. Connection to instr. light. on main panel
5. Connection to printed circuit card on main panel
6. Connection to connector (18) on main panel

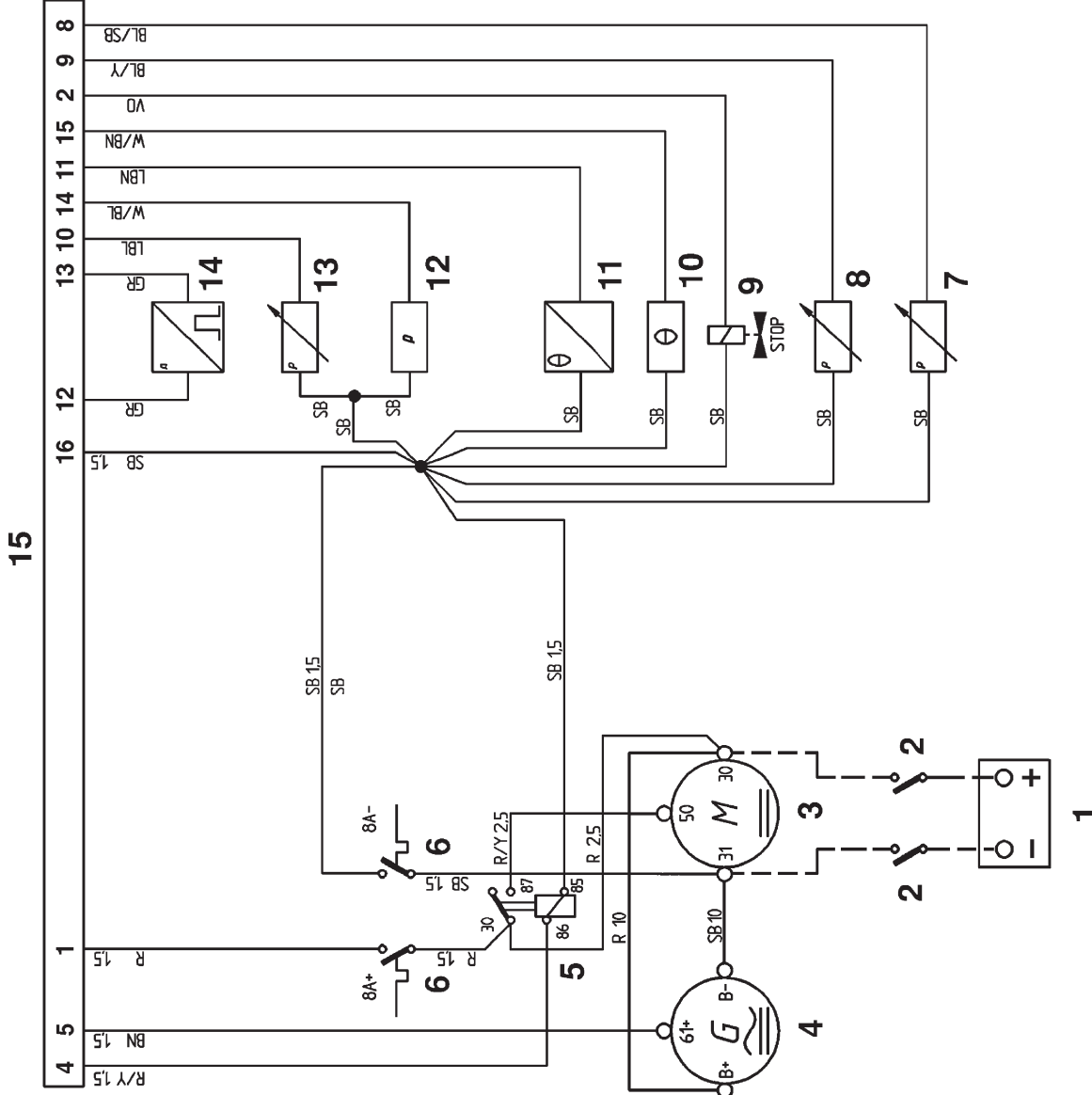
### Cable color

BL = Blue	OR = Orange
LBL = Light-blue	PU = Purple
BN = Brown	R = Red
LBN = Light-brown	SB = Black
GN = Green	W = White
GR = Gray	Y = Yellow

### Conversions mm<sup>2</sup>/AWG\*

\* American Wiring Gauge

mm <sup>2</sup>	0.75	1.0	1.5	2.5	10	16
AWG	18	16 (17)	15 (16)	13	7	5

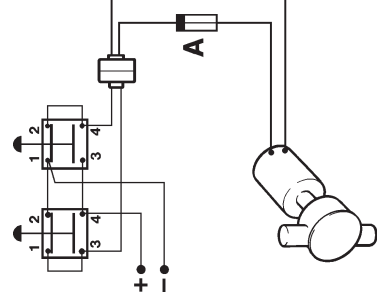


### Engine

**Note.** The components in the wiring diagram have the same numbers as shown in the key diagrams on page 65.

1. Battery
2. Main ON/OFF power switch
3. Starter motor
4. Generator
5. Starter relay\*
6. Semi-automatic fuses (8A) \*
7. Oil pressure sender, reverse gear (0 – 30 bar)
8. Turbo pressure sender (0 – 3 bar)
9. Solenoid valve (fuel cut off valve)
10. Engine coolant temperature (ECT) switch (97°C normally open – closes if fault occurs)
11. Engine coolant temperature (ECT) sender (40 – 120°C/104 – 248°F)
12. Oil pressure switch, engine (0.7 bar, normally open – closes if fault occurs)
13. Oil pressure sender, engine (0 – 10 bar)
14. Engine speed (rpm) sender
15. 16-pin connector

\* Located in the junction box



Cable areas in mm<sup>2</sup> are given after the color codes in the wiring diagrams.

The cable area is 0.75 mm<sup>2</sup> unless otherwise stated.

A broken line indicates a non-Volvo Penta cable.

Suggested connection of oil scavenging pump (pumping and filling)

Cable area 1.5 mm<sup>2</sup>.

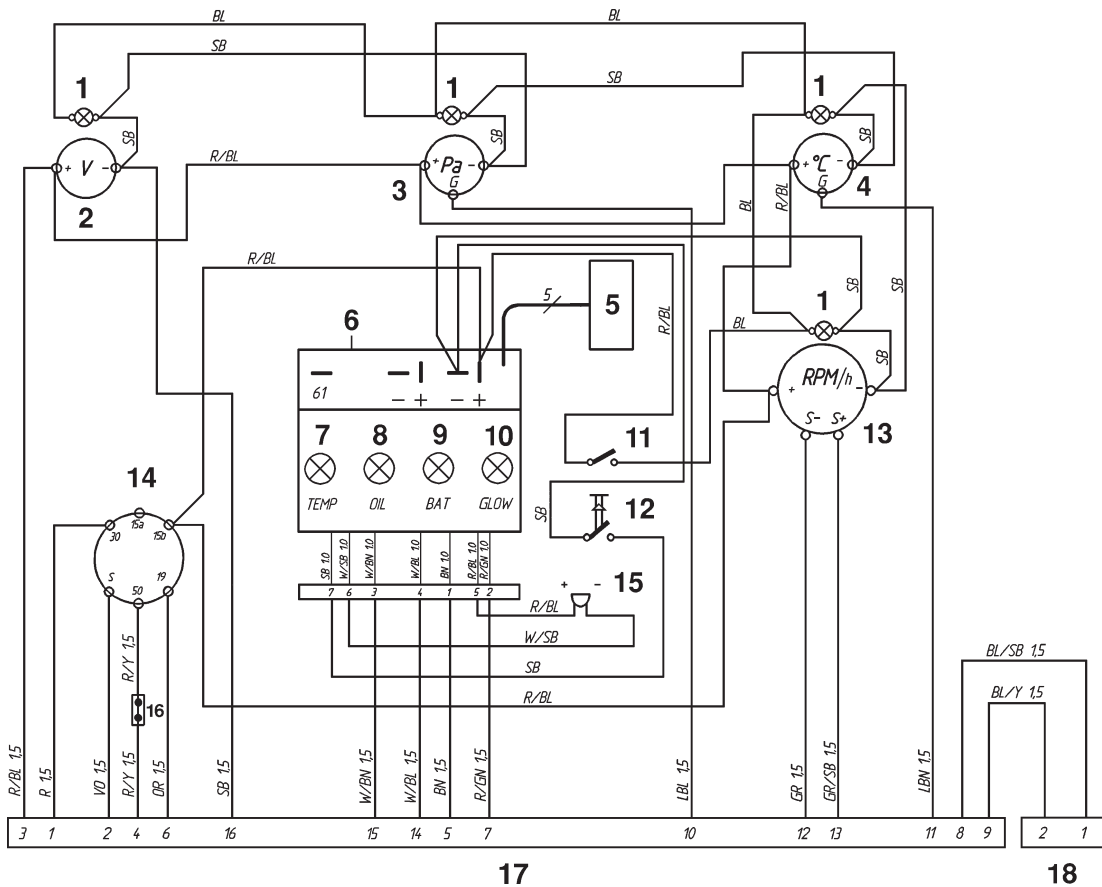
A. Fuse (8A/24V, or 15A/12V)

# TAMD71B

## Control panel for auxiliary control position (Flying Bridge)

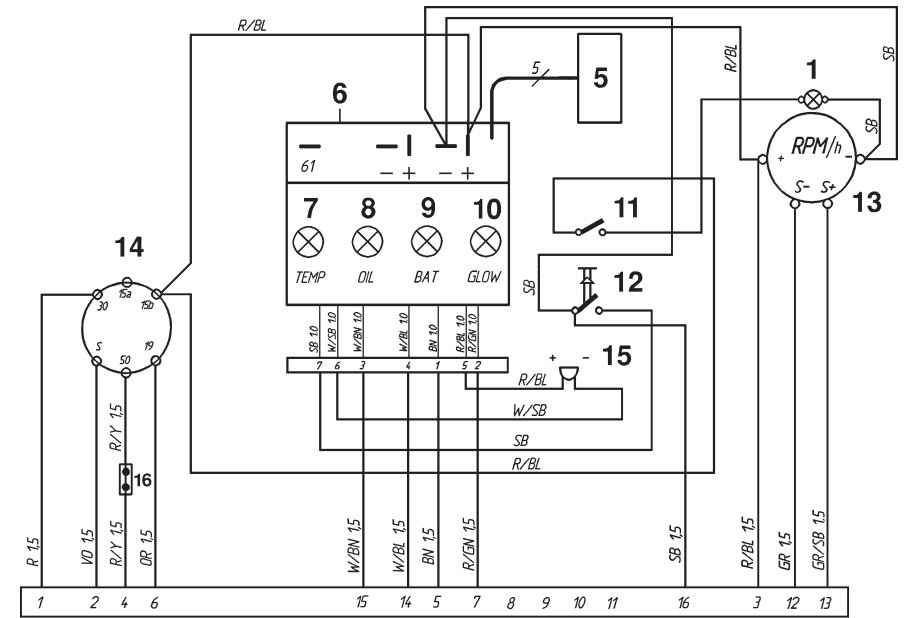
Cable areas in mm<sup>2</sup> are given after the color codes in the wiring diagrams.  
The cable area is 1.5 mm<sup>2</sup> unless otherwise stated.

### Instrument panel, (Master panel)



17

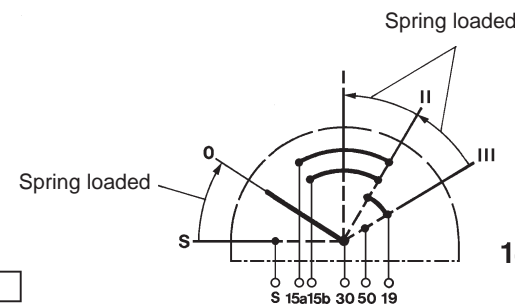
18



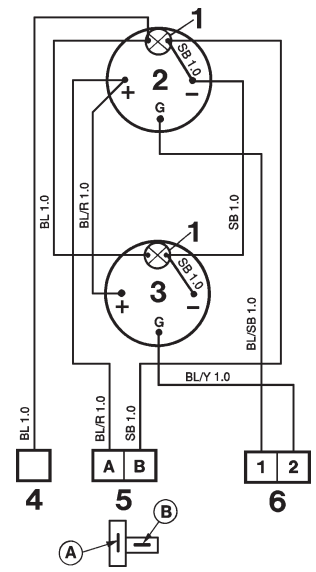
17

### Instrument panels

1. Instrument lighting
2. Voltmeter
3. Oil pressure gauge
4. Engine coolant temperature gauge
5. Connector for extra warning display (accessory)
6. Electronics module (alarm)
7. Engine coolant temperature warning lamp
8. Oil pressure warning lamp
9. Charge warning lamp
10. Control lamp, pre-heating
11. Switch, instrument panel lighting
12. Alarm test/acknowledgement switch
13. Tachometer with built-in hours run meter
14. Key switch
15. Alarm
16. Connector for connecting neutral position switch, if fitted (accessory)
17. 16-pin connector
18. 2-pin connector (for auxiliary panel where installed)



14



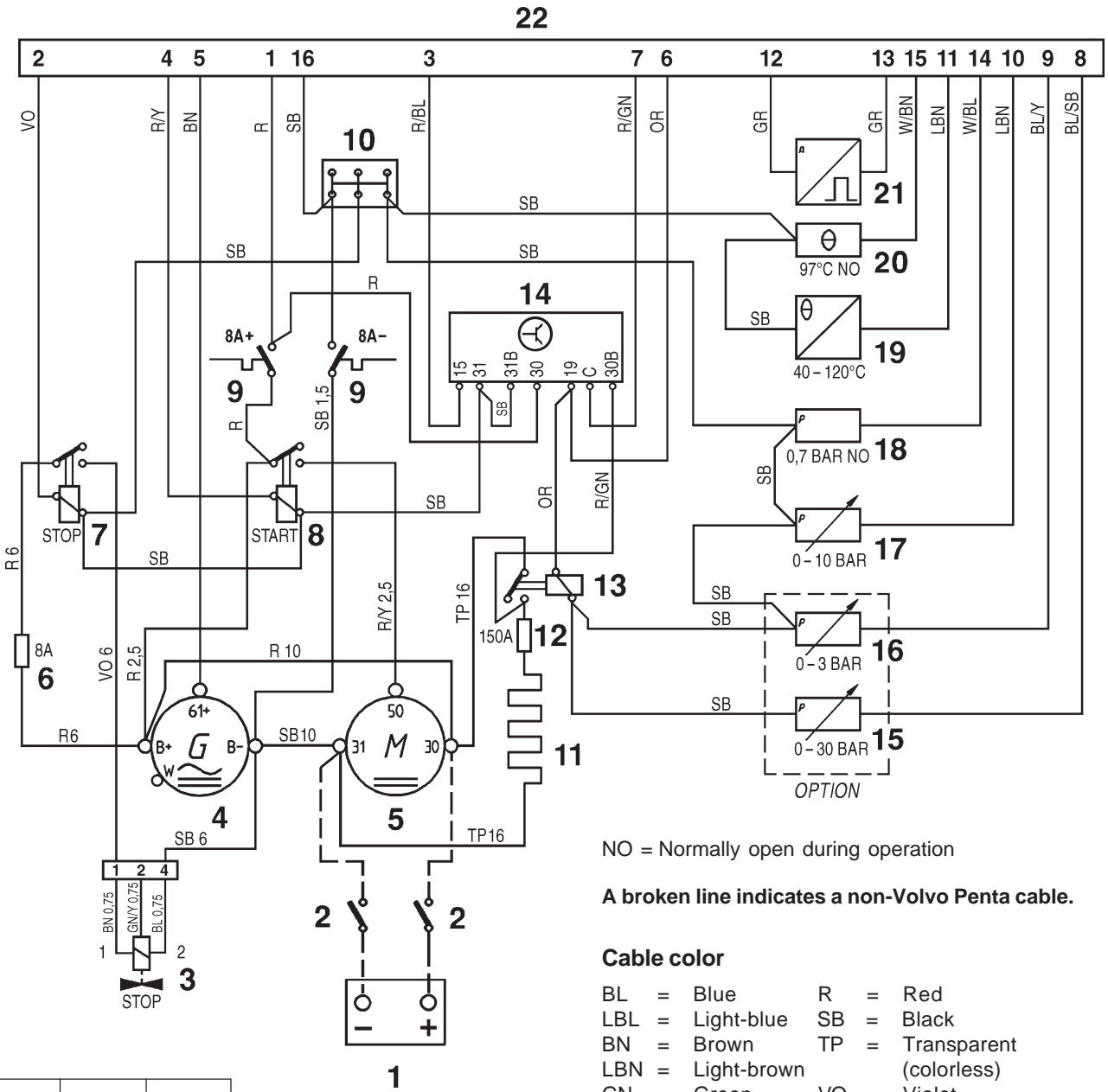
**Auxiliary panel**

1. Instrument lighting
2. Oil pressure gauge, reverse gear
3. Turbo charging pressure gauge
4. Connection to instr. light. on main panel
5. Connection to printed circuit card on main panel
6. Connection to connector (18) on main panel

**Conversions mm<sup>2</sup>/AWG\***

\*American Wiring Gauge

mm <sup>2</sup>	1.0	1.5	2.5	10	16
AWG	16 (17)	15 (16)	13	7	5



NO = Normally open during operation  
**A broken line indicates a non-Volvo Penta cable.**

**Cable color**

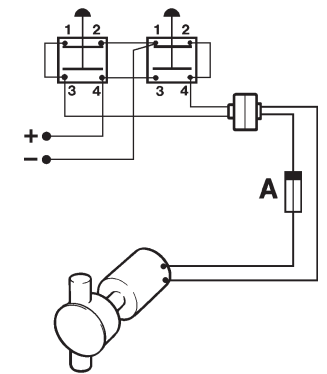
- |                   |                              |
|-------------------|------------------------------|
| BL = Blue         | R = Red                      |
| LBL = Light-blue  | SB = Black                   |
| BN = Brown        | TP = Transparent (colorless) |
| LBN = Light-brown | VO = Violet                  |
| GN = Green        | W = White                    |
| GR = Gray         | Y = Yellow                   |
| OR = Orange       |                              |

**Engine**

**Note.** The components in the wiring diagram have the same numbers as shown in the key diagrams on page 66.

1. Battery
2. Main ON/OFF power switch
3. Fuel shut-off valve
4. Generator
5. Starter motor
6. Fuel shut-off valve fuse (8A)
7. Stop relay\*
8. Starter relay\*
9. Semi-automatic fuses (8A) \*
10. Ground terminal\*
11. Starter element
12. Fuse (150A) for starter element
13. Relay for starter element
14. Time relay for starter element\*
15. Oil pressure sender, reverse gear
16. Pressure sender, Turbo boost pressure
17. Oil pressure sender, engine
18. Oil pressure switch, engine
19. Engine coolant temperature sender
20. Coolant temperature switch
21. Engine speed (rpm) sender
22. 16-pin connector\*

\* Located in the junction box



Suggested connection of oil scavenging pump (pumping and filling)

Cable area 1.5 mm<sup>2</sup>.

A. Fuse (8A/24V, or 15A/12V)

# TAMD73P-A (12V)

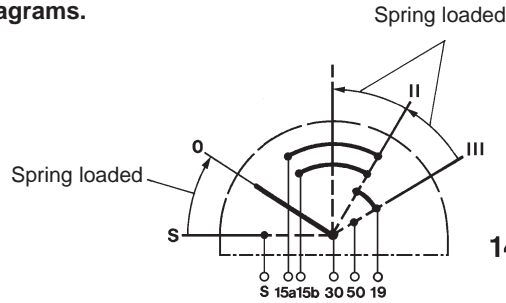
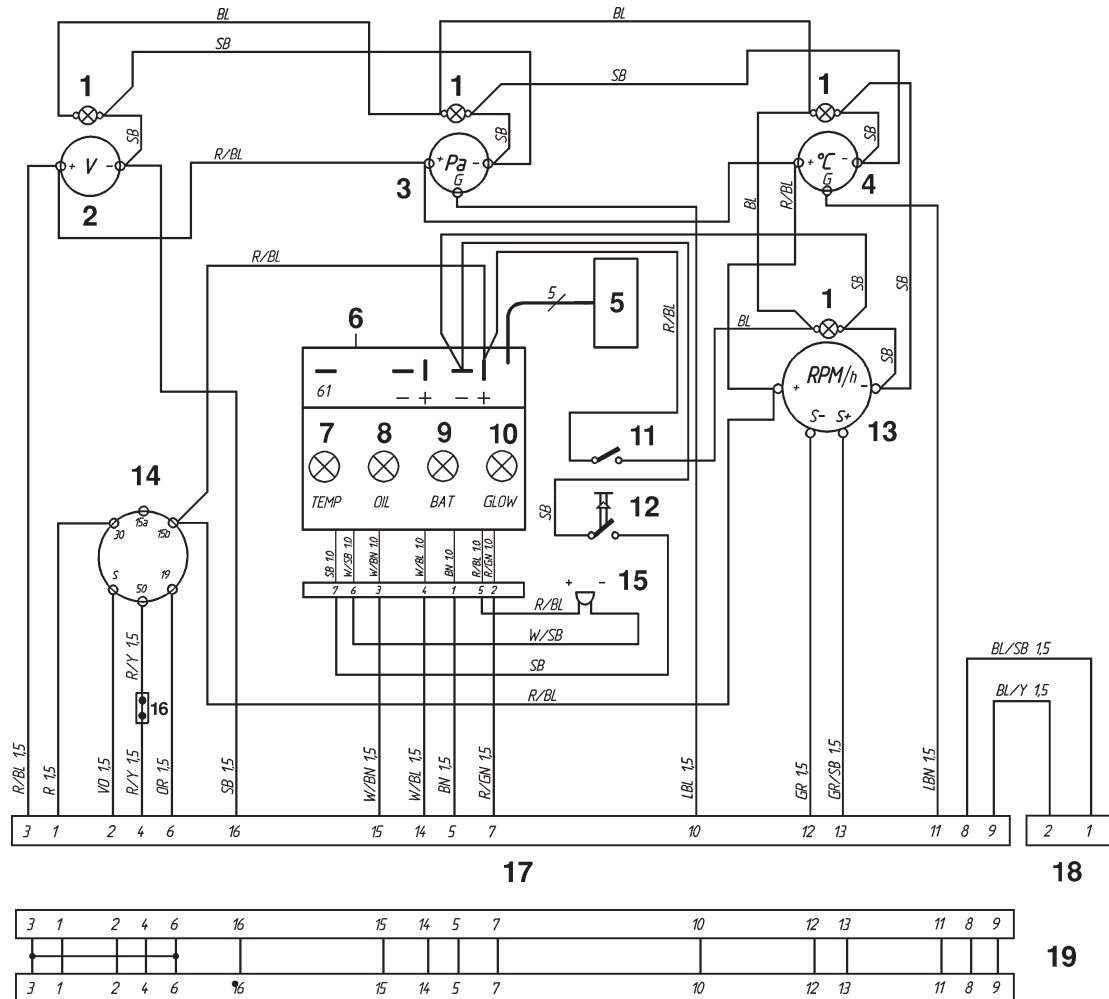
Cable areas in mm<sup>2</sup> are given after the color codes in the wiring diagrams.

The cable area is 1.0 mm<sup>2</sup> unless otherwise stated.

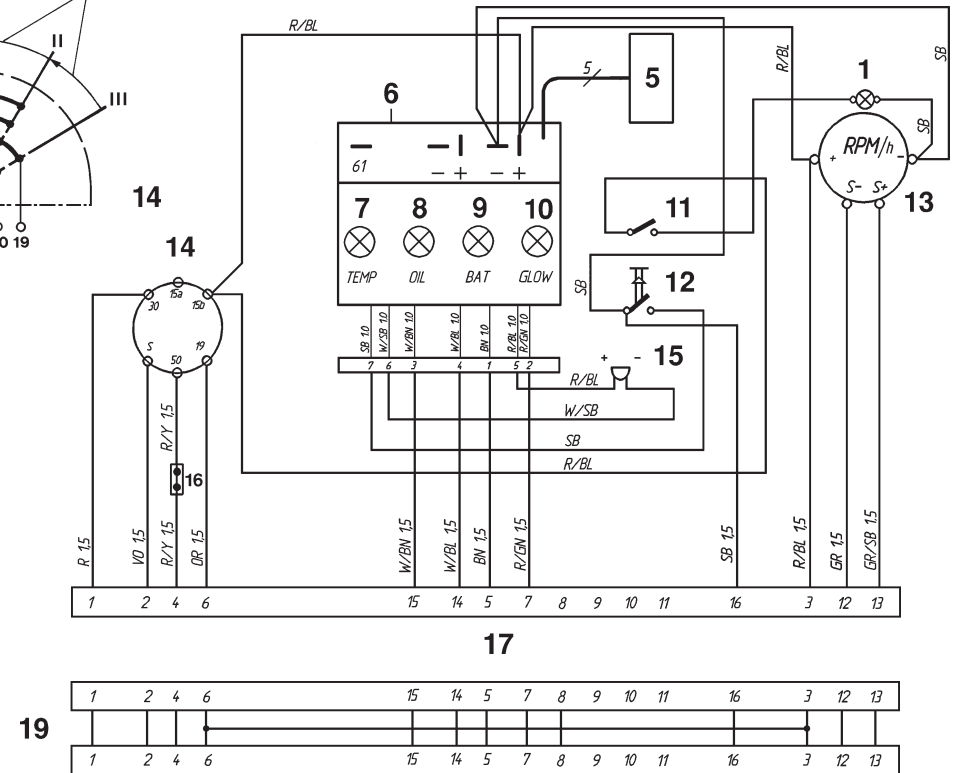
## Conversions mm<sup>2</sup>/AWG

mm <sup>2</sup>	0.5	1.0	1.5	2.5	6	10
AWG	20	16 (17)	15 (16)	13	9 (10)	7

## Instrument panel, (Master panel)



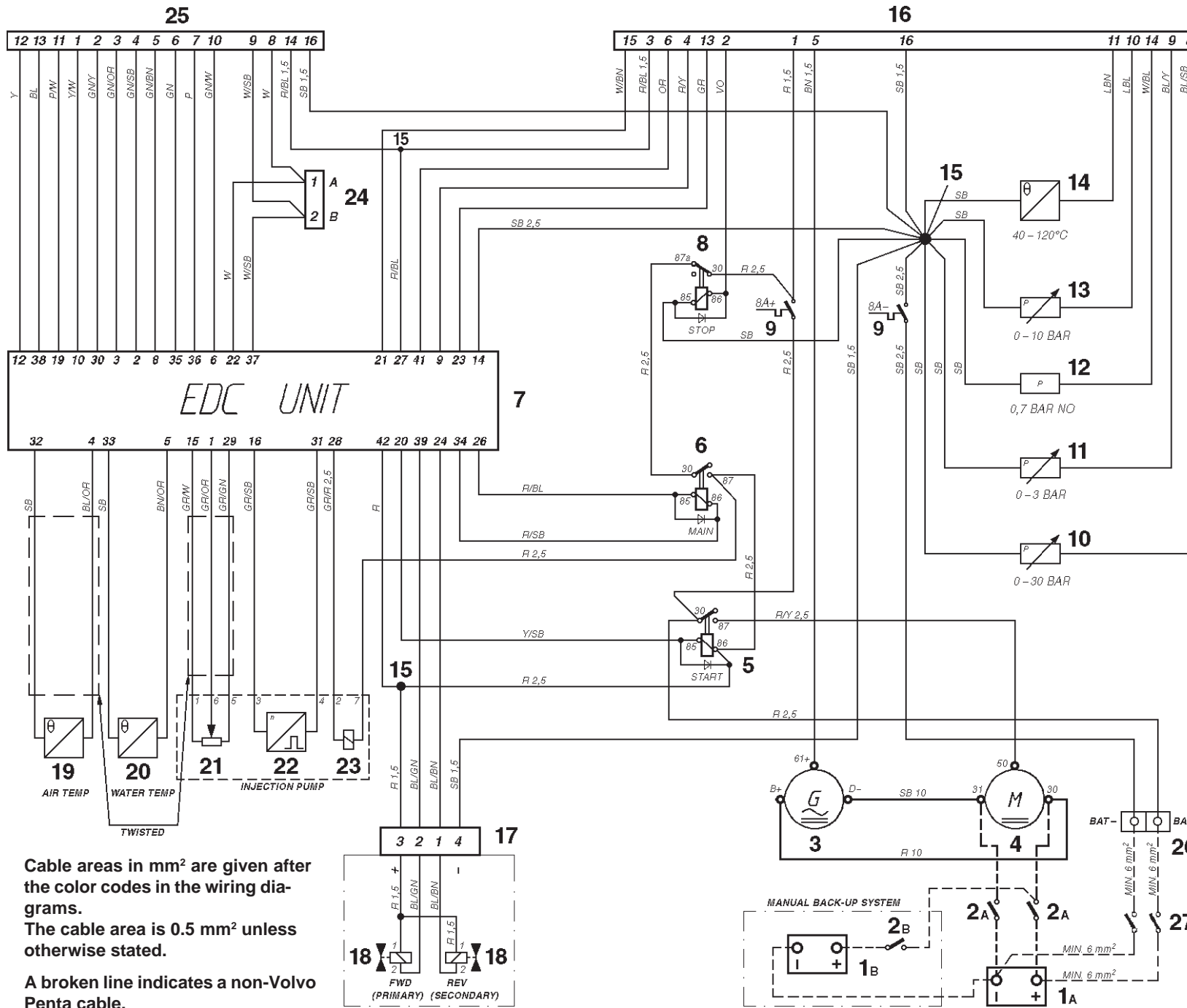
## Control panel for auxiliary control position (Flying Bridge)



## Instrument panels

- Instrument lighting
- Voltmeter
- Oil pressure gauge
- Engine coolant temperature gauge
- Connector for extra warning display (accessory)
- Electronics module (alarm)
- Engine coolant temperature warning lamp
- Oil pressure warning lamp
- Charge warning lamp
- Indicator lamp (not used)
- Switch, instrument panel lighting
- Alarm test/acknowledgement switch
- Tachometer with built-in hours run meter
- Key switch
- Alarm
- Connector for connecting neutral position switch
- 16-pin connector
- 2-pin connector (for auxiliary panel where installed)
- Adapter





Cable areas in mm<sup>2</sup> are given after the color codes in the wiring diagrams.  
 The cable area is 0.5 mm<sup>2</sup> unless otherwise stated.  
 A broken line indicates a non-Volvo Penta cable.

### Engine (12V system voltage)

**Note.** The components in the wiring diagram have the same numbers as shown in the key diagrams on page 67.

- 1A. Starter battery
- 1B. Emergency/auxiliary battery
- 2A. Main ON/OFF power switch
- 2B. Main ON/OFF power switch for back-up system
3. Generator
4. Starter motor
5. Starter relay\*
6. Main relay\*
7. EDC control module box
8. Stop relay\*
9. Semi-automatic fuses (8A)\*
10. Oil pressure sender, reverse gear
11. Pressure sender, Turbo boost pressure
12. Oil pressure switch, engine
13. Oil pressure sender, engine
14. Engine coolant temperature sender
15. Joint splice
16. 16-pin connector \* (instrument cable harness)
17. 4-pin connector (reverse gear)
18. Solenoid (reverse gear with electronic shifting)
19. Charge air temperature sender
20. Engine coolant temperature (ECT) sender (EDC)
21. Position sensor, \*\* control rod
22. Engine speed (rpm) sender\*\*
23. Electro-magnetic actuator, EDC\*\*
24. 2-pin connector, data link connector
25. 16-pin connector (control unit)
26. Connector
27. Main power switch (control-/instrument panels)

\* Located in the junction box  
 \*\* Located on the injection pump

NO = Normally open during operation

### Cable color

- |                   |             |
|-------------------|-------------|
| BL = Blue         | P = Pink    |
| LBL = Light-blue  | R = Red     |
| BN = Brown        | SB = Black  |
| LBN = Light-brown | VO = Violet |
| GN = Green        | W = White   |
| GR = Gray         | Y = Yellow  |
| OR = Orange       |             |

# TAMD73P-A (24V)

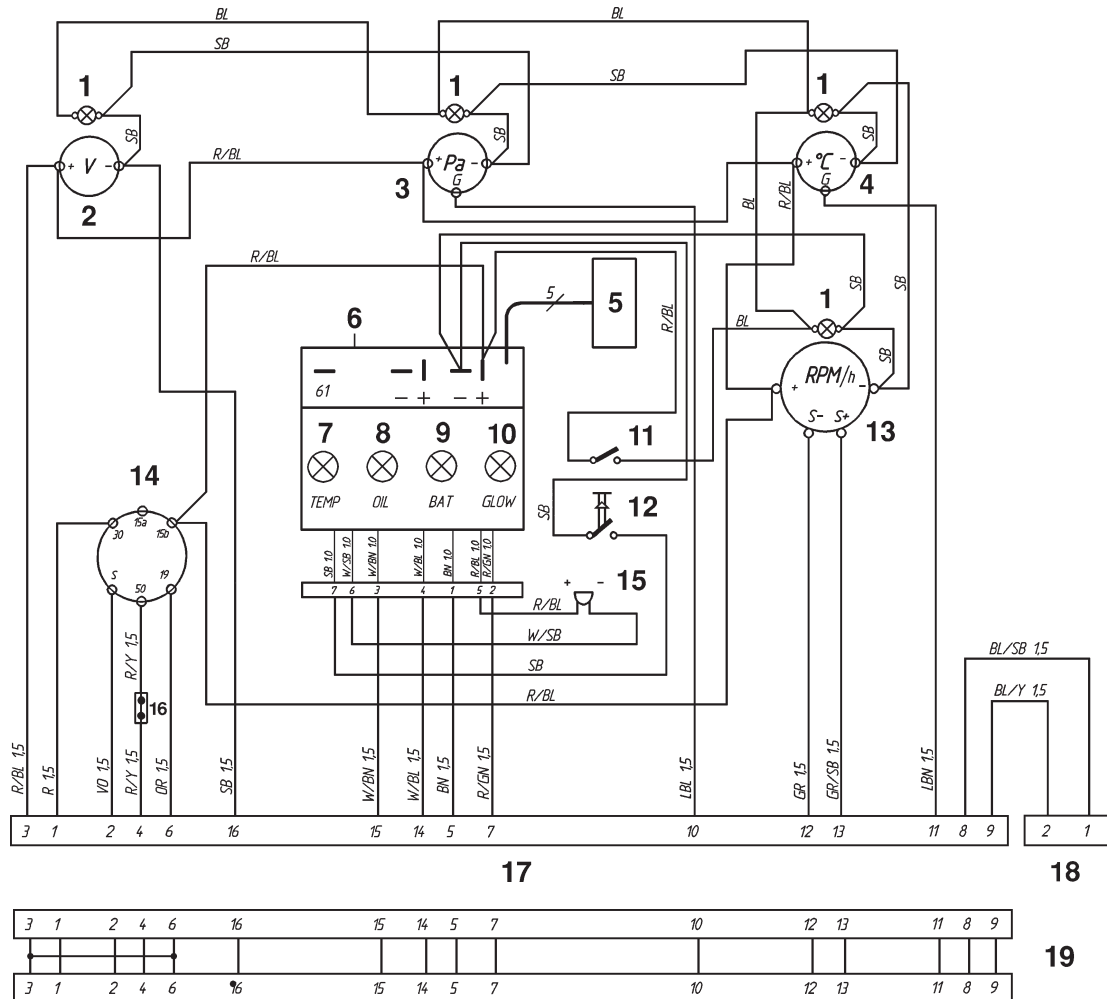
Cable areas in mm<sup>2</sup> are given after the color codes in the wiring diagrams.

The cable area is 1,0 mm<sup>2</sup> unless otherwise stated.

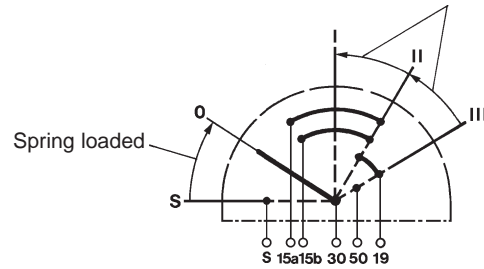
## Conversions mm<sup>2</sup>/AWG

mm <sup>2</sup>	0.5	1.0	1.5	2.5	10
AWG	20	16 (17)	15 (16)	13	7

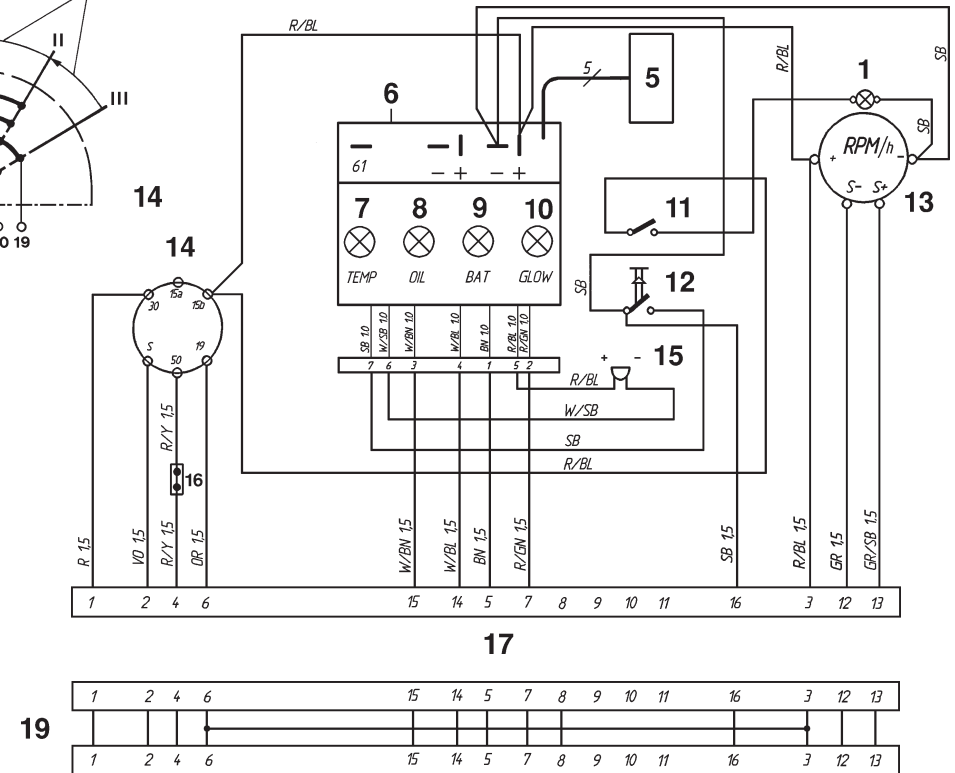
## Instrument panel, (Master panel)



Spring loaded

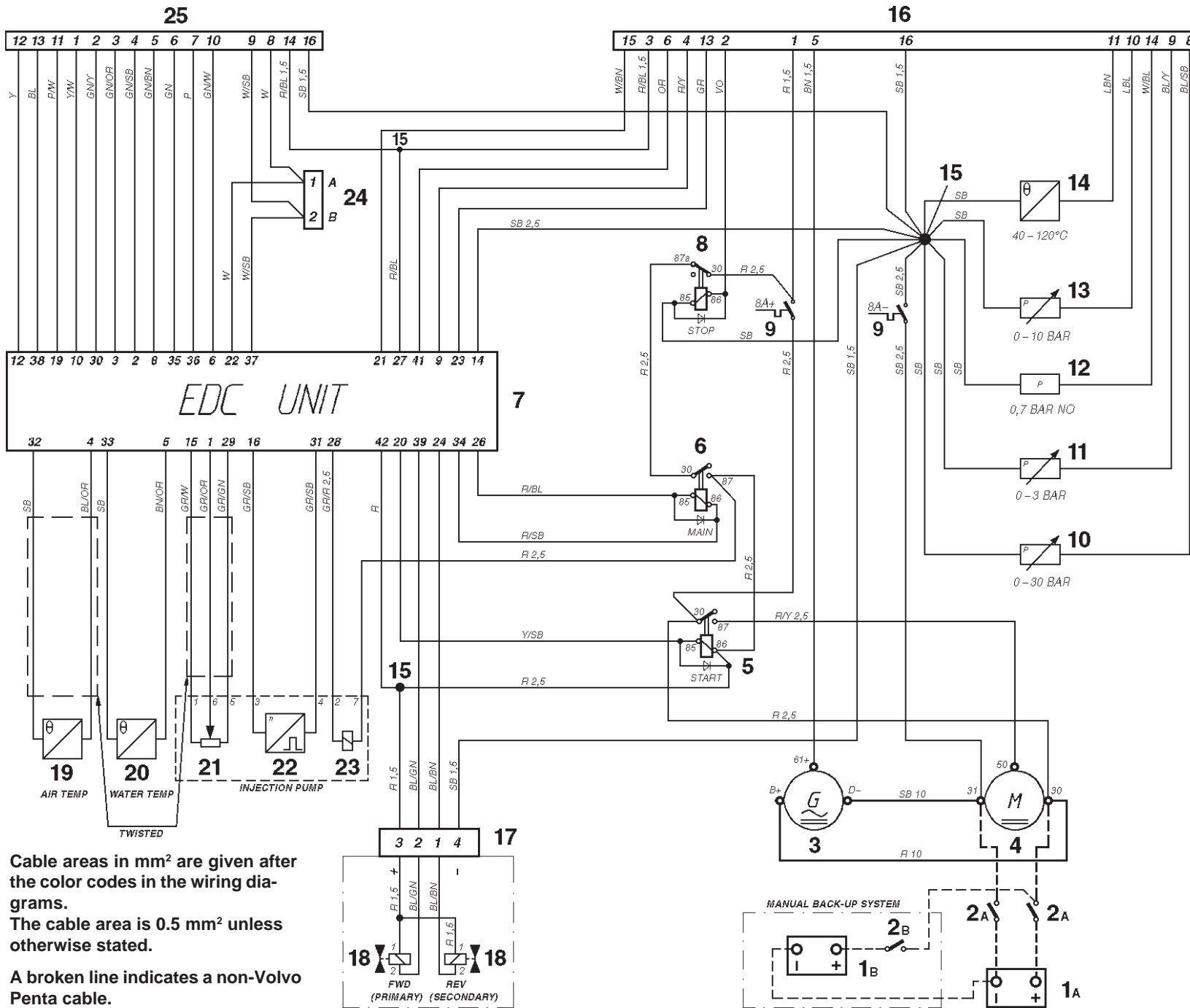


## Control panel for auxiliary control position (Flying Bridge)



## Instrument panels

- Instrument lighting
- Voltmeter
- Oil pressure gauge
- Engine coolant temperature gauge
- Connector for extra warning display (accessory)
- Electronics module (alarm)
- Engine coolant temperature warning lamp
- Oil pressure warning lamp
- Charge warning lamp
- Indicator lamp (not used)
- Switch, instrument panel lighting
- Alarm test/acknowledgement switch
- Tachometer with built-in hours run meter
- Key switch
- Alarm
- Connector for connecting neutral position switch
- 16-pin connector
- 2-pin connector (for auxiliary panel where installed)
- Adapter



### Engine (24V system voltage)

**Note.** The components in the wiring diagram have the same numbers as shown in the key diagrams on page 67.

- 1A. Starter battery
  - 1B. Emergency/auxiliary battery
  - 2A. Main ON/OFF power switch
  - 2B. Main ON/OFF power switch for back-up system
  - 3. Generator
  - 4. Starter motor
  - 5. Starter relay\*
  - 6. Main relay\*
  - 7. EDC control module box
  - 8. Stop relay\*
  - 9. Semi-automatic fuses (8A)\*
  - 10. Oil pressure sender, reverse gear
  - 11. Pressure sender, Turbo boost pressure
  - 12. Oil pressure switch, engine
  - 13. Oil pressure sender, engine
  - 14. Engine coolant temperature sender
  - 15. Joint splice
  - 16. 16-pin connector \* (instrument cable harness)
  - 17. 4-pin connector (reverse gear)
  - 18. Solenoid (reverse gear with electronic shifting)
  - 19. Charge air temperature sender
  - 20. Engine coolant temperature (ECT) sender (EDC)
  - 21. Position sensor, \*\* control rod
  - 22. Engine speed (rpm) sender\*\*
  - 23. Electro-magnetic actuator, EDC\*\*
  - 24. 2-pin connector, data link connector (DLC)
  - 25. 16-pin connector (control unit)
- \* Located in the junction box  
 \*\* Located on the injection pump

NO = Normally open during operation

### Cable color

- |                   |             |
|-------------------|-------------|
| BL = Blue         | P = Pink    |
| LBL = Light-blue  | R = Red     |
| BN = Brown        | SB = Black  |
| LBN = Light-brown | VO = Violet |
| GN = Green        | W = White   |
| GR = Gray         | Y = Yellow  |
| OR = Orange       |             |

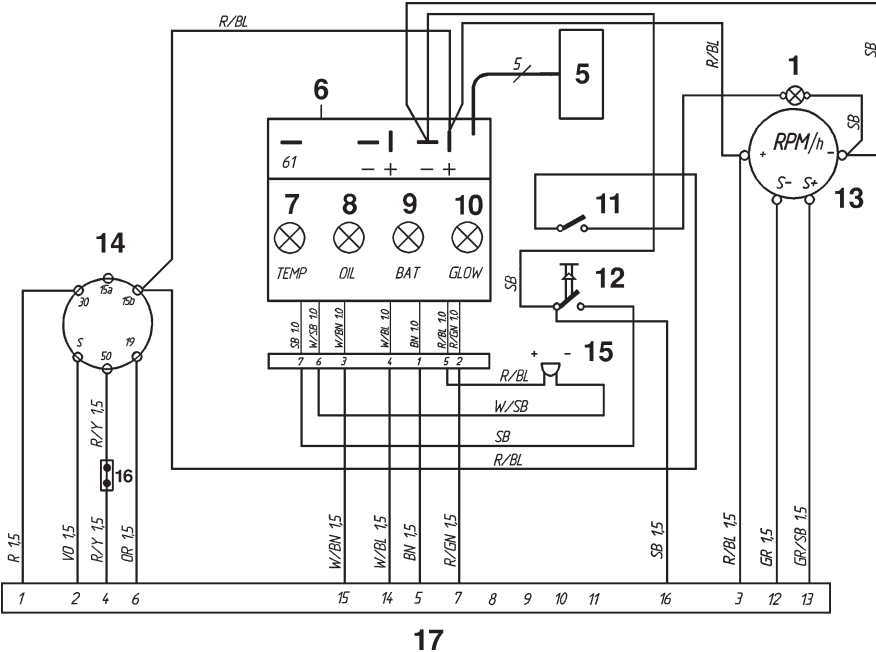
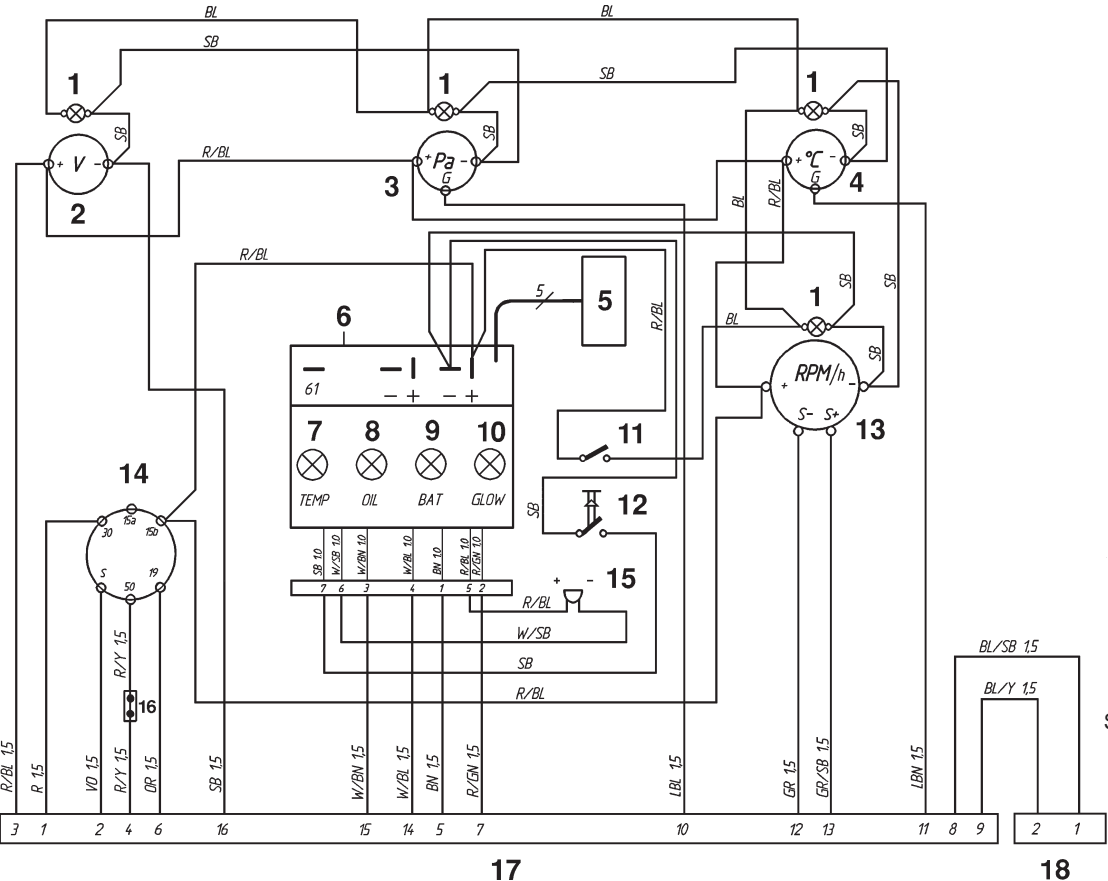
Cable areas in mm<sup>2</sup> are given after the color codes in the wiring diagrams.  
 The cable area is 0.5 mm<sup>2</sup> unless otherwise stated.  
 A broken line indicates a non-Volvo Penta cable.

# TAMD73WJ-A

## Control panel for auxiliary control position (Flying Bridge)

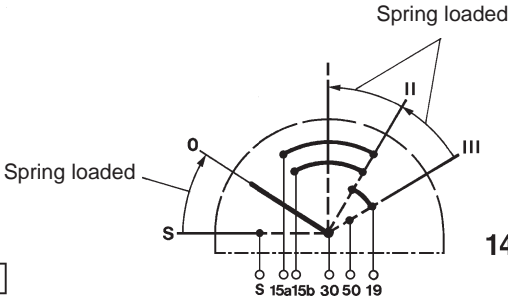
Cable areas in mm<sup>2</sup> are given after the color codes in the wiring diagrams.  
 The cable area is 1.5 mm<sup>2</sup> unless otherwise stated.

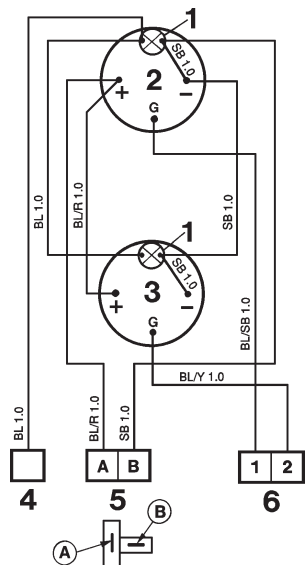
Instrument panel, (Master panel)



### Instrument panels

1. Instrument lighting
2. Voltmeter
3. Oil pressure gauge
4. Engine coolant temperature gauge
5. Connector for extra warning display (accessory)
6. Electronics module (alarm)
7. Engine coolant temperature warning lamp
8. Oil pressure warning lamp
9. Charge warning lamp
10. Control lamp (not used)
11. Switch, instrument panel lighting
12. Alarm test/acknowledgement switch
13. Tachometer with built-in hours run meter
14. Key switch
15. Alarm
16. Connector for connecting neutral position switch, if fitted (accessory)
17. 16-pin connector
18. 2-pin connector (for auxiliary panel where installed)





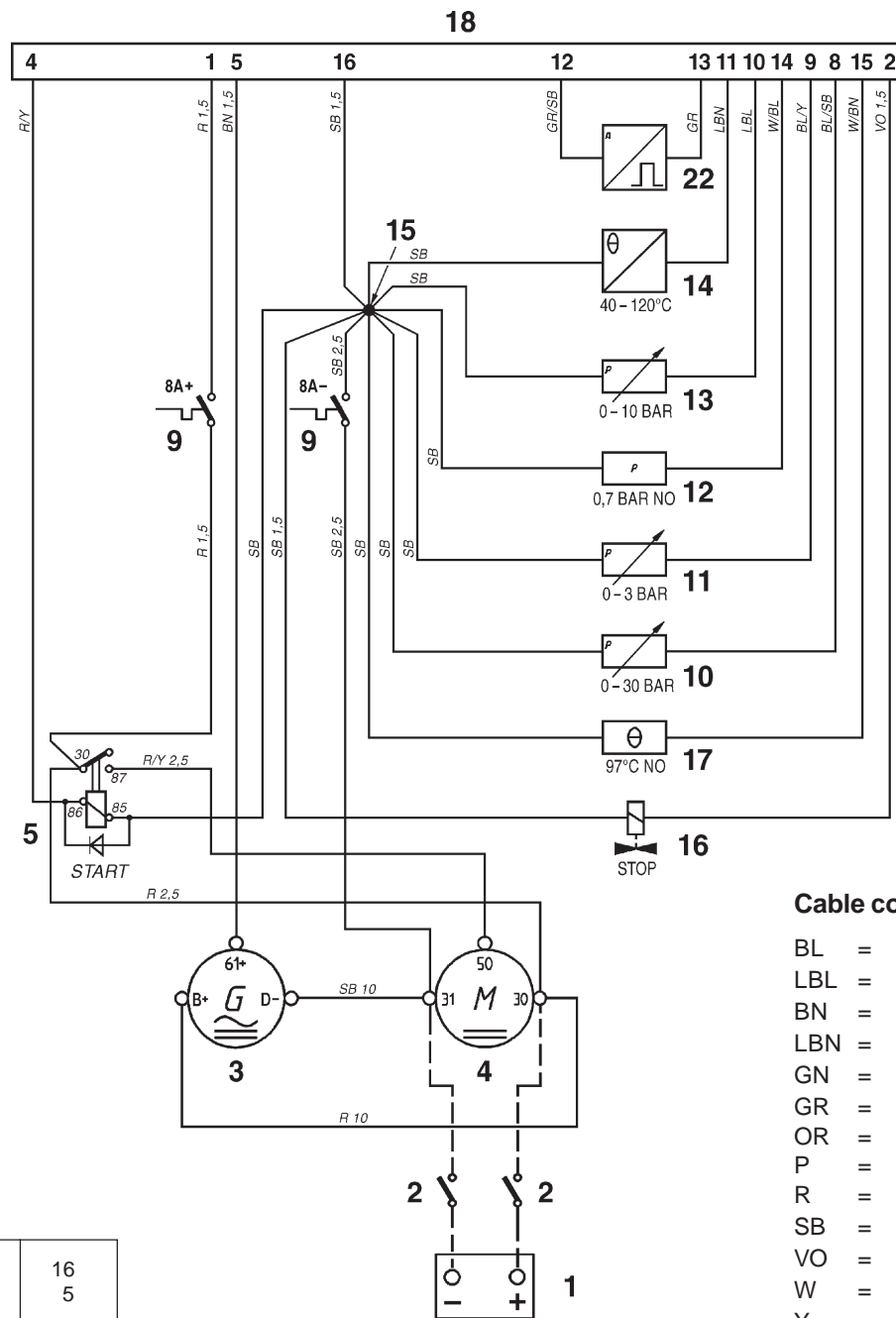
### Auxiliary panel

1. Instrument lighting
2. Oil pressure gauge, reverse gear
3. Turbo charging pressure gauge
4. Connection to instr. light. on main panel
5. Connection to printed circuit card on main panel
6. Connection to connector (18) on main panel

### Conversions mm<sup>2</sup>/AWG\*

\* American Wiring Gauge

mm <sup>2</sup>	1.0	1.5	2.5	10	16
AWG	16 (17)	15 (16)	13	7	5



### Cable color

- BL = Blue
- LBL = Light-blue
- BN = Brown
- LBN = Light-brown
- GN = Green
- GR = Gray
- OR = Orange
- P = Pink
- R = Red
- SB = Black
- VO = Violet
- W = White
- Y = Yellow

### Engine

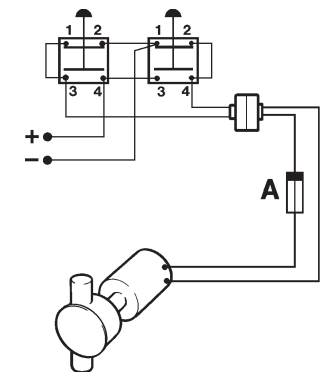
**Note.** The components in the wiring diagram have the same numbers as shown in the key diagrams on page 67.

1. Battery
2. Main ON/OFF power switch
3. Generator
4. Starter motor
5. Starter relay\*
9. Semi-automatic fuses (8A) \*
10. Oil pressure sender, reverse gear
11. Pressure sender, Turbo boost pressure
12. Oil pressure switch, engine
13. Oil pressure sender, engine
14. Engine coolant temperature sender
15. Ground terminal\*
16. Fuel shut-off valve
17. Coolant temperature switch
18. 16-pin connector\*
22. Engine speed (rpm) sender

\* Located in the junction box

NO = Normally open during operation

**A broken line indicates a non-Volvo Penta cable.**



Suggested connection of oil scavenging pump (pumping and filling)

Cable area 1.5 mm<sup>2</sup>.

A. Fuse (8A/24V, or 15A/12V)

# TAMD74C-A, TAMD74L-A, TAMD74P-A (12V)

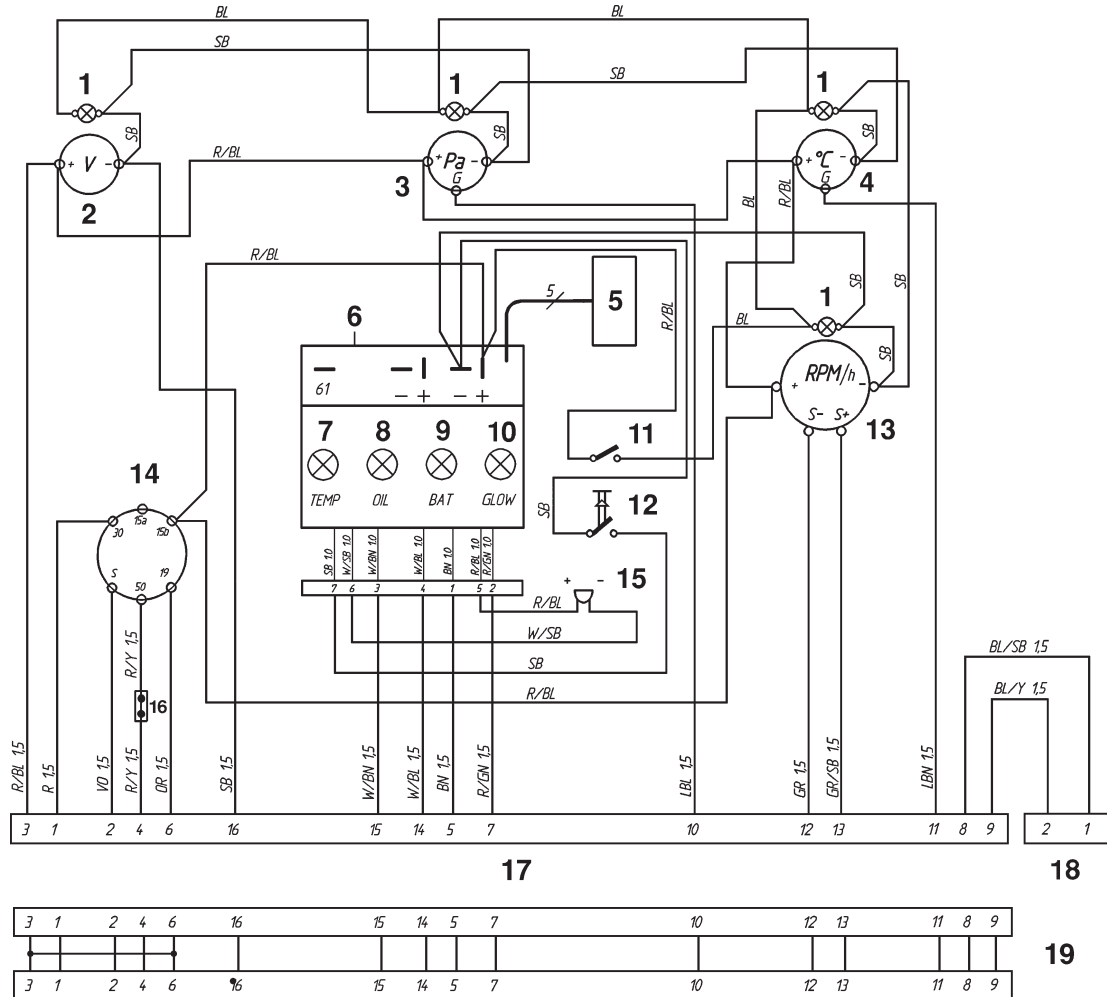
Cable areas in mm<sup>2</sup> are given after the color codes in the wiring diagrams.

The cable area is 1.0 mm<sup>2</sup> unless otherwise stated.

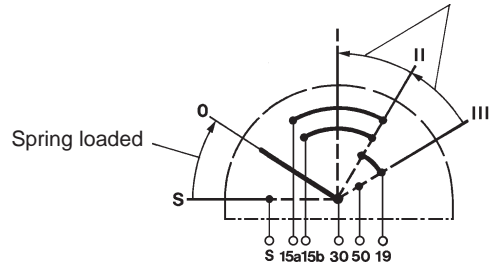
## Conversions mm<sup>2</sup>/AWG

mm <sup>2</sup>	0.5	1.0	1.5	2.5	10
AWG	20	16 (17)	15 (16)	13	7

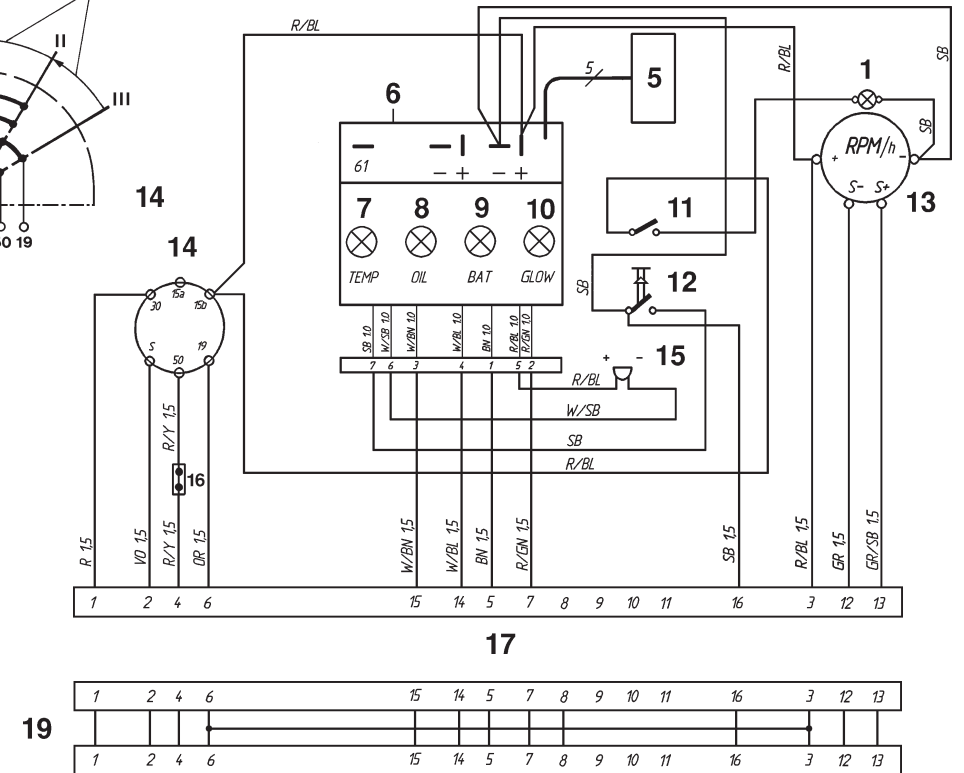
## Instrument panel, (Master panel)



Spring loaded



Control panel for auxiliary control position (Flying Bridge)



## Instrument panels

- Instrument lighting
- Voltmeter
- Oil pressure gauge
- Engine coolant temperature gauge
- Connector for extra warning display (accessory)
- Electronics module (alarm)
- Engine coolant temperature warning lamp
- Oil pressure warning lamp
- Charge warning lamp
- Indicator lamp (not used)
- Switch, instrument panel lighting
- Alarm test/acknowledgement switch
- Tachometer with built-in hours run meter
- Key switch
- Alarm
- Connector for connecting neutral position switch
- 16-pin connector
- 2-pin connector (for auxiliary panel where installed)
- Adapter



# TAMD74C-A, TAMD74L-A, TAMD74P-A (24V)

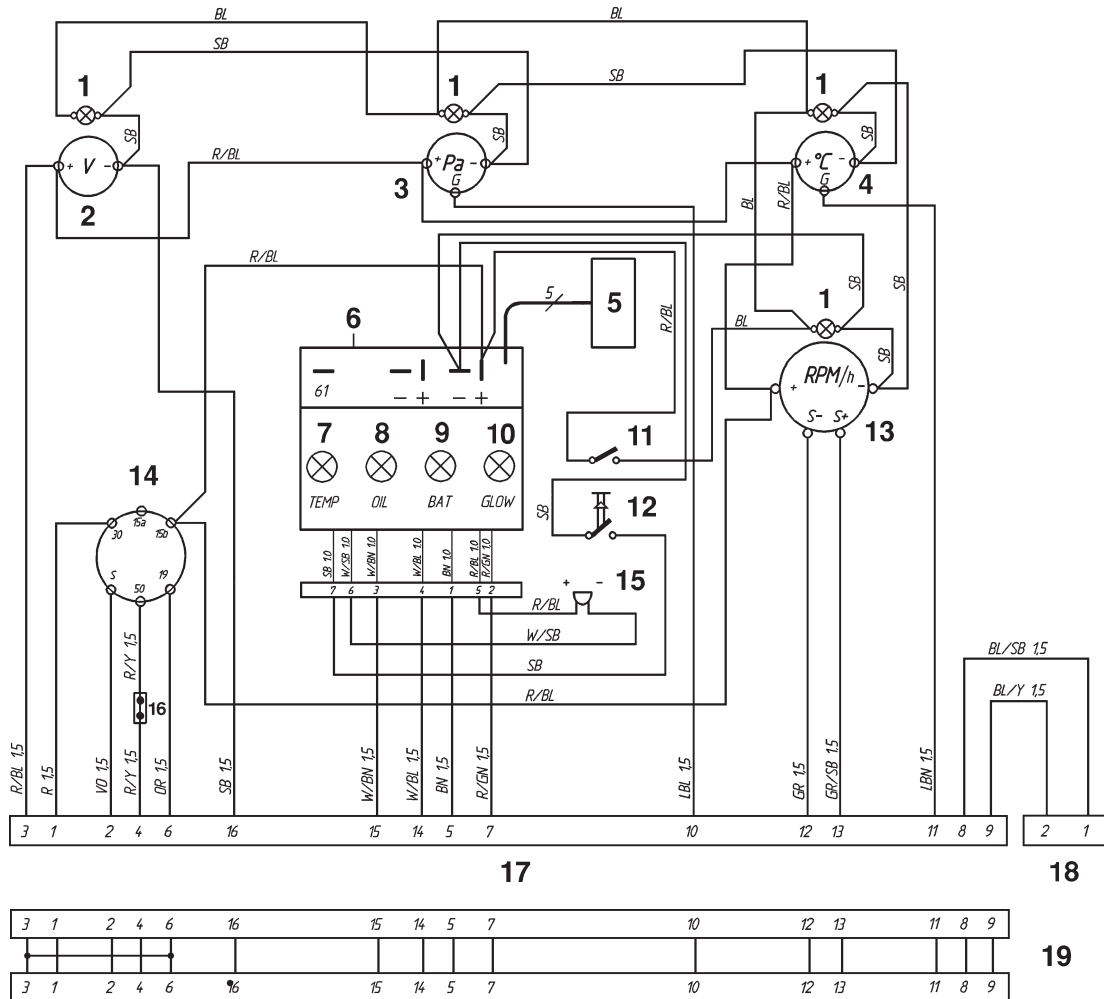
Cable areas in mm<sup>2</sup> are given after the color codes in the wiring diagrams.

The cable area is 1.0 mm<sup>2</sup> unless otherwise stated.

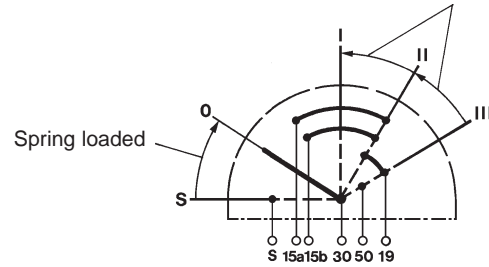
## Conversions mm<sup>2</sup>/AWG

mm <sup>2</sup>	0.5	1.0	1.5	2.5	10
AWG	20	16 (17)	15 (16)	13	7

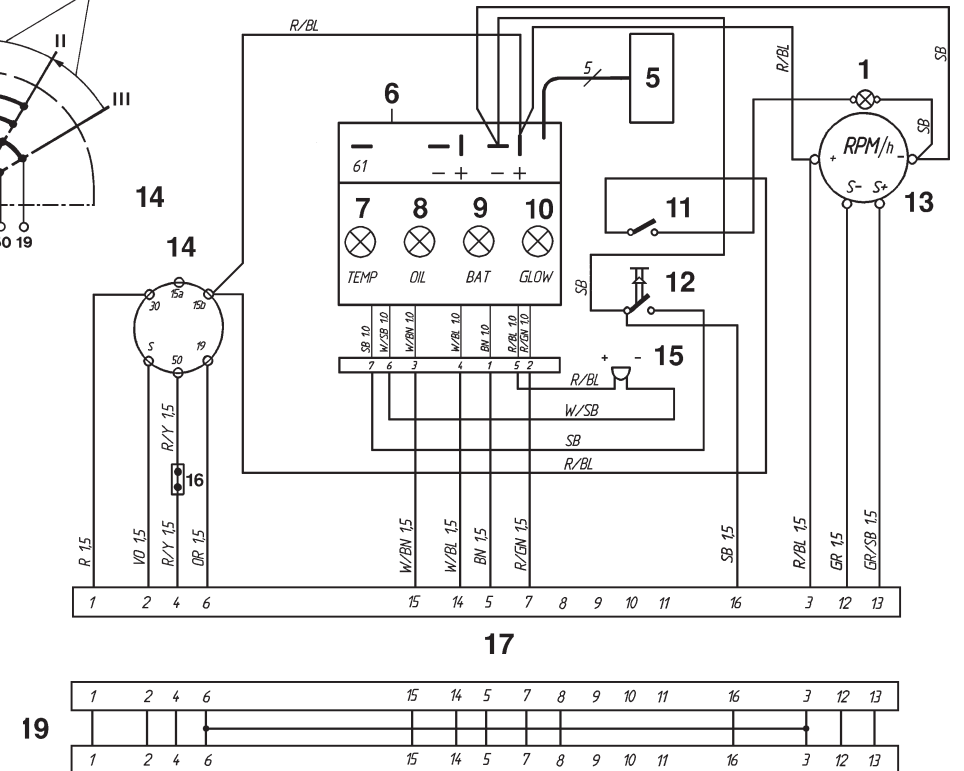
## Instrument panel, (Master panel)



Spring loaded



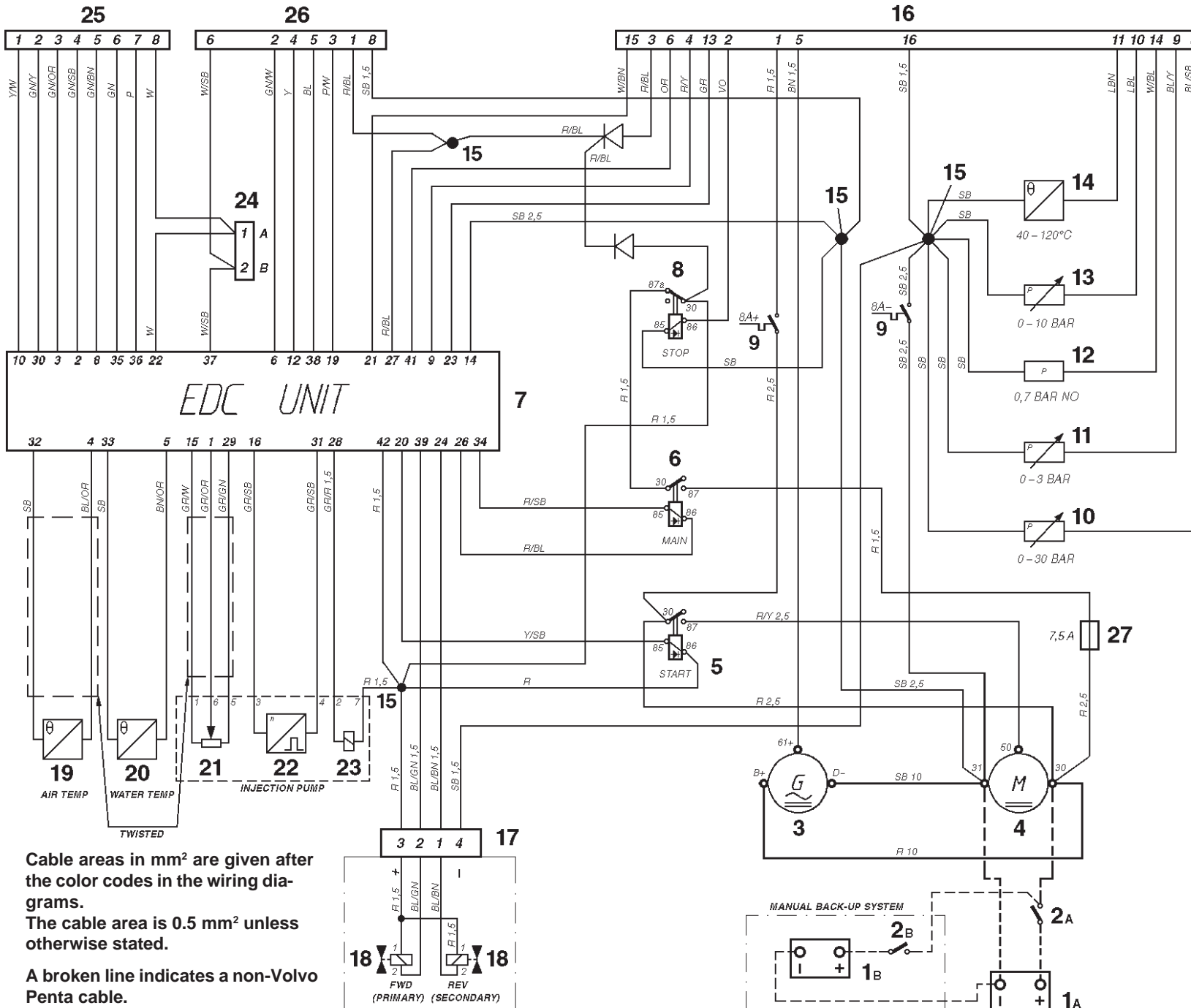
## Control panel for auxiliary control position (Flying Bridge)



## Instrument panels

- |  |   |
|--|---|
| 1. Instrument lighting                             | 11. Switch, instrument panel lighting                                       |
| 2. Voltmeter                                       | 12. Alarm test/acknowledgement switch                                       |
| 3. Oil pressure gauge                              | 13. Tachometer with built-in hours run meter                                |
| 4. Engine coolant temperature gauge                | 14. Key switch  |
| 5. Connector for extra warning display (accessory) | 15. Alarm   |
| 6. Electronics module (alarm)                      | 16. Connector for connecting neutral position switch, if fitted (accessory) |
| 7. Engine coolant temperature warning lamp         | 17. 16-pin connector  |
| 8. Oil pressure warning lamp                       | 18. 2-pin connector (for auxiliary panel where installed)                   |
| 9. Charge warning lamp                             | 19. Adapter   |
| 10. Control lamp (not used)                        |   |





### Engine (24V system voltage)

**Note.** The components in the wiring diagram have the same numbers as shown in the key diagrams on page 67.

- 1A. Starter battery
- 1B. Emergency/auxiliary battery
- 2A. Main ON/OFF power switch
- 2B. Main ON/OFF power switch for back-up system
3. Generator
4. Starter motor
5. Starter relay\*
6. Main relay\*
7. EDC control module box
8. Stop relay\*
9. Semi-automatic fuses (8A)\*
10. Oil pressure sender, reverse gear
11. Pressure sender, Turbo boost pressure
12. Oil pressure switch, engine
13. Oil pressure sender, engine
14. Engine coolant temperature sender
15. Joint splice
16. 16-pin connector, male\* (instrument cable harness)
17. 4-pin connector (reverse gear)
18. Solenoid (reverse gear with electronic shifting)
19. Charge air temperature sender
20. Engine coolant temperature (ECT) sender (EDC)
21. Position sensor, \*\* control rod
22. Engine speed (rpm) sender\*\*
23. Electro-magnetic actuator, EDC\*\*
24. 2-pin connector, data link connector
25. 16-pin connector, male (control unit)
26. 16-pin connector, female (control unit)
27. Fuse (7.5A)

\* Located in the junction box  
 \*\* Located on the injection pump

NO = Normally open during operation

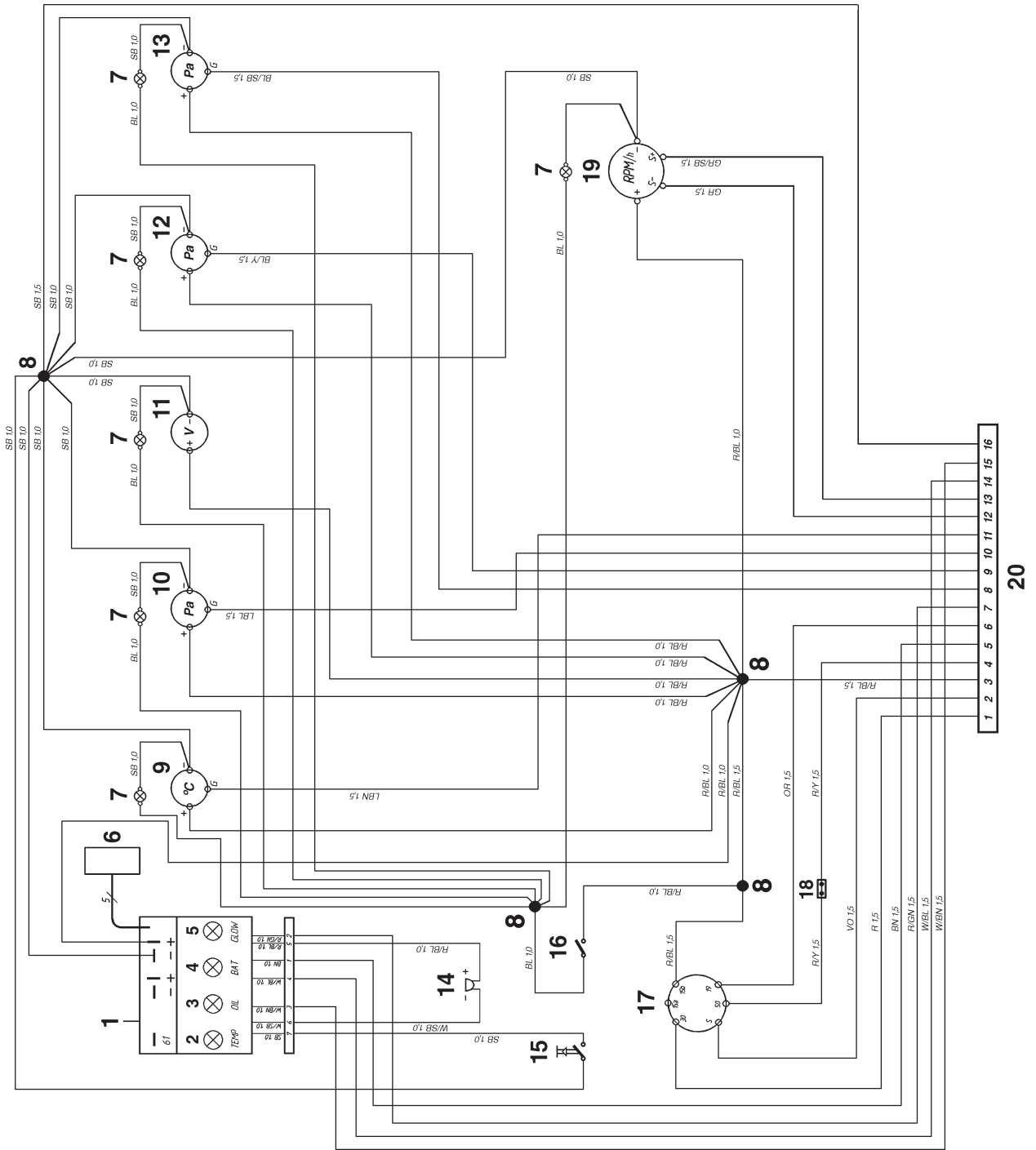
### Cable color

Refer to page 81.

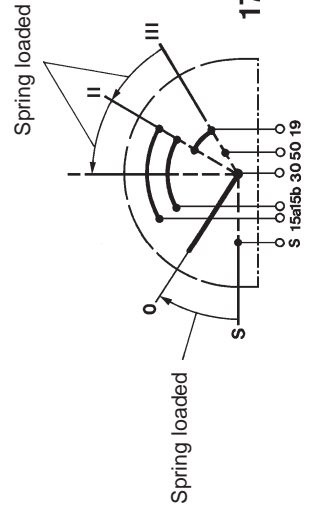
Cable areas in mm<sup>2</sup> are given after the color codes in the wiring diagrams.  
 The cable area is 0.5 mm<sup>2</sup> unless otherwise stated.  
 A broken line indicates a non-Volvo Penta cable.

# TAMD63, TAMD71, TAMD73, TAMD74

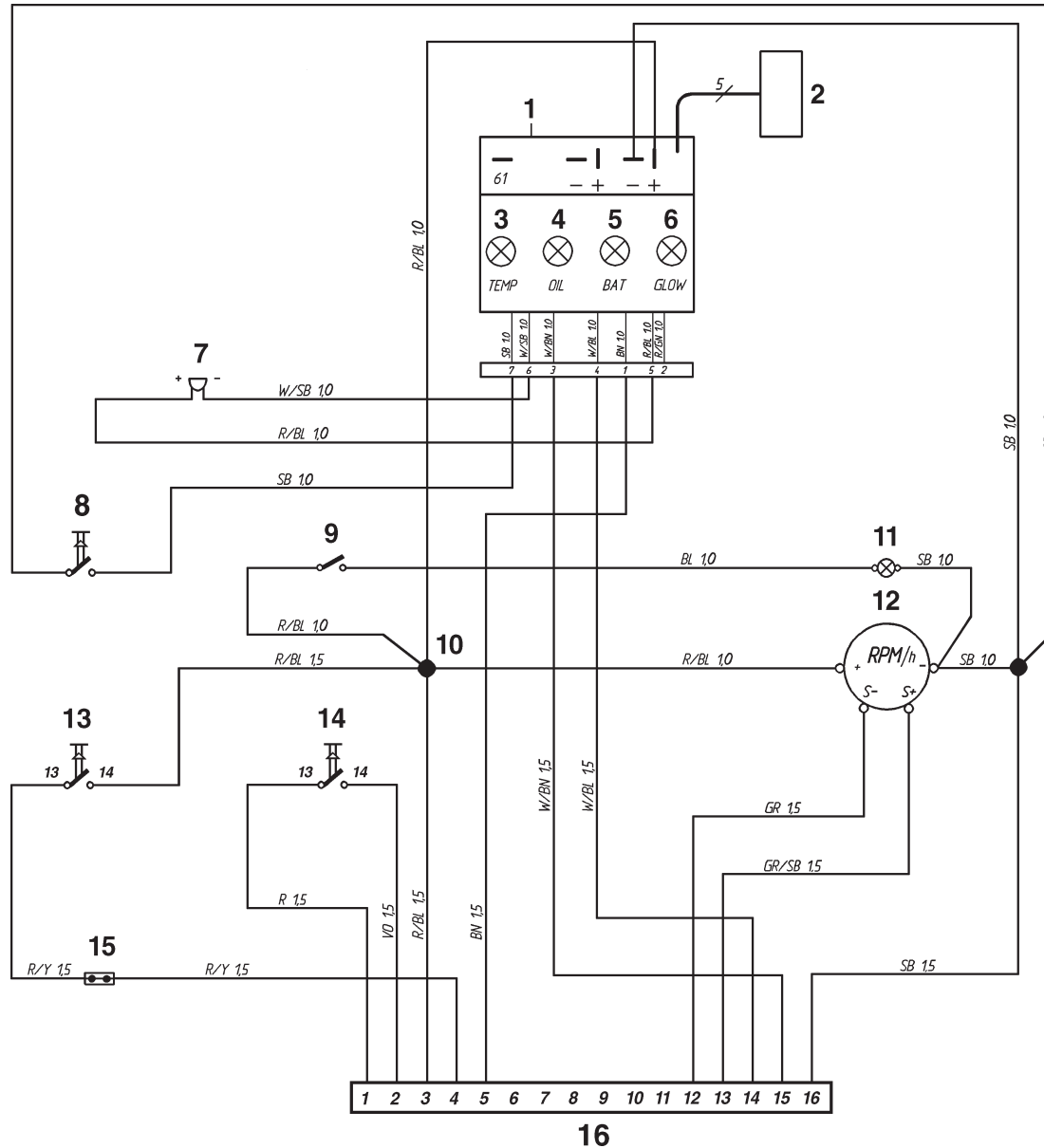
## Extra instrument kit for wheel house



1. Electronics module (alarm)
2. Engine coolant temperature warning lamp
3. Oil pressure warning lamp
4. Charge warning lamp
5. Control lamp, pre-heating (TAMD71B)
6. Connector for extra warning display (accessory)
7. Instrument lighting
8. Connector (cannot be opened)
9. Engine coolant temperature gauge
10. Oil pressure gauge
11. Voltmeter
12. Turbo charging pressure gauge
13. Oil pressure gauge, reverse gear
14. Alarm
15. Alarm test/acknowledgement switch
16. Switch, instrument panel lighting
17. Key switch
18. Connector for connecting neutral position switch, if fitted (accessory)
19. Tachometer with built-in hours run meter
20. 16-pin connector



## Flying Bridge instrument kit



1. Electronics module (alarm)
2. Connector for extra warning display (accessory)
3. Engine coolant temperature warning lamp
4. Oil pressure warning lamp
5. Charge warning lamp
6. Control lamp, pre-heating (TAMD71B)
7. Alarm
8. Alarm test/acknowledgement switch
9. Switch, instrument panel lighting
10. Connector (cannot be opened)
11. Instrument lighting
12. Tachometer with built-in hours run meter
13. Starter button
14. Stop button
15. Connector for connecting neutral position switch, if fitted (accessory)
16. 16-pin connector

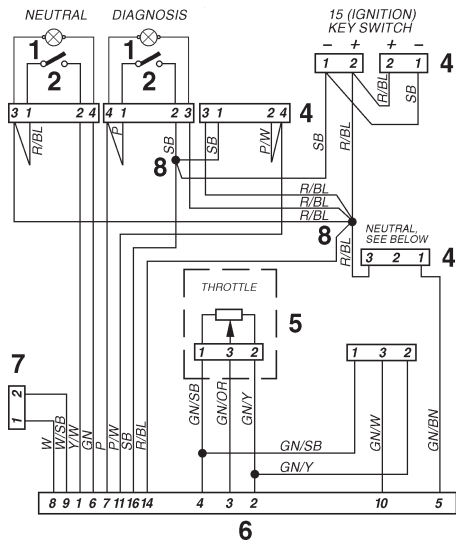
### Cable color

- BL = Blue
- LBL = Light-blue
- BN = Brown
- LBN = Light-brown
- GN = Green
- GR = Gray
- OR = Orange
- P = Pink
- R = Red
- SB = Black
- VO = Violet
- W = White
- Y = Yellow

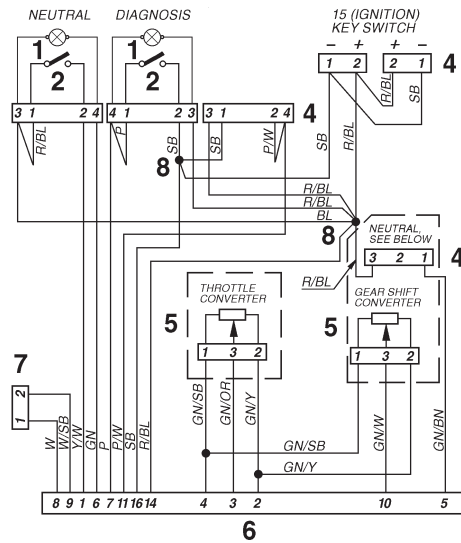
Cable areas in mm<sup>2</sup> are given after the color codes in the wiring diagrams.

# TAMD73P-A

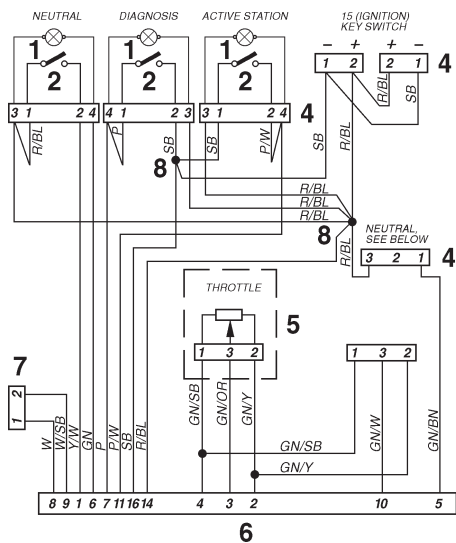
Single control position – Single or dual lever control (single installation)



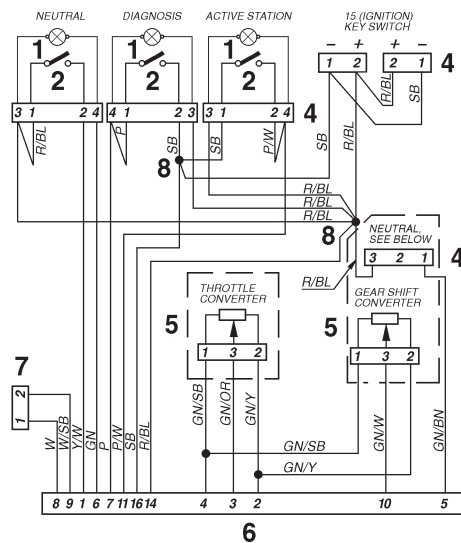
Single control position – Single or dual lever control with control adapters (single installation)



Multiple control positions – Single or dual lever controls (single installation)

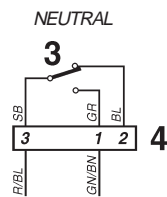


Multiple control positions – Single or dual lever controls with control adapters (single installation)

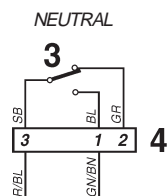


## VP controls:

Late model



Early model



## Cable color

- BL = Blue
- BN = Brown
- GN = Green
- OR = Orange
- P = Pink
- R = Red
- SB = Black
- W = White
- Y = Yellow

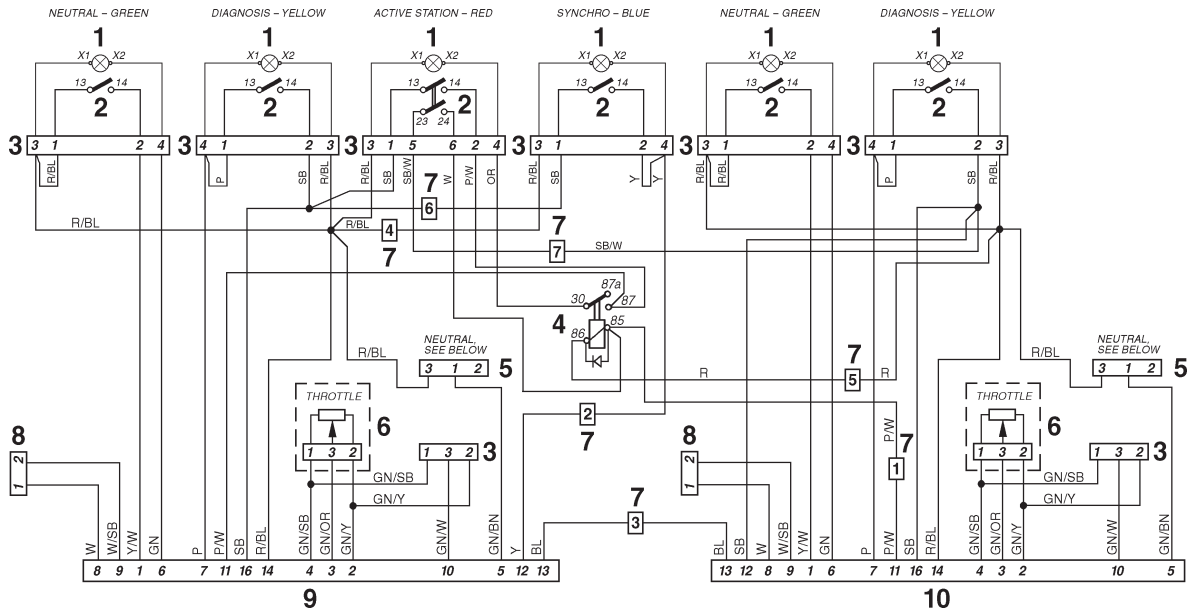
Cable areas = 0.75 mm<sup>2</sup>.

## Location diagram (all wiring diagrams)

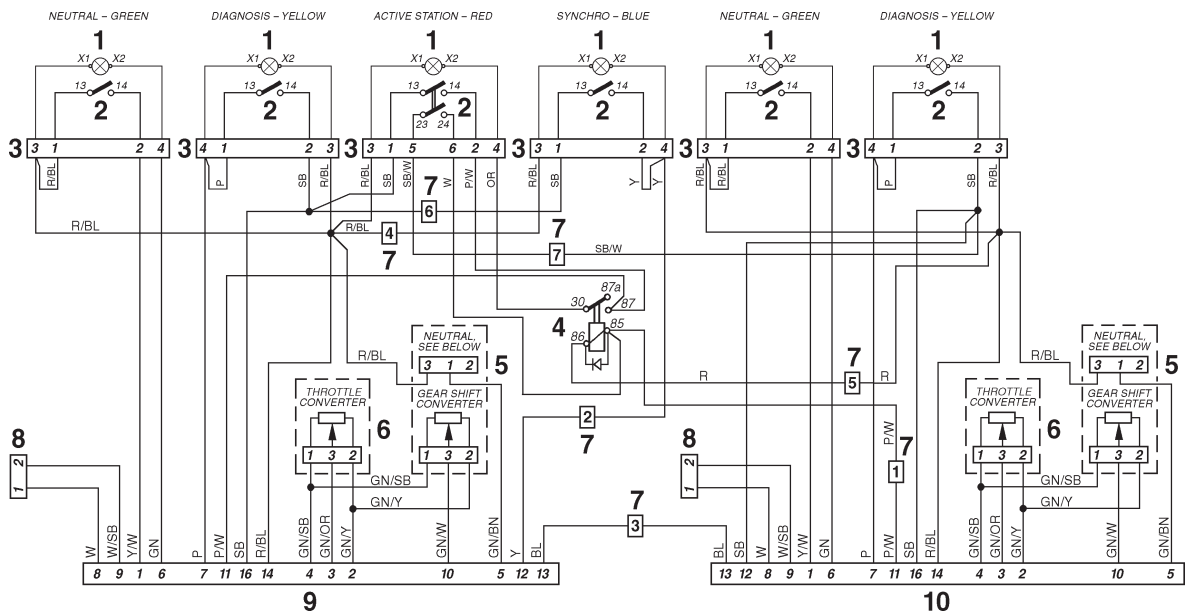
1. Indicator light
2. 1-pin switch
3. Position limiter switch
4. Connector
5. Potentiometer
6. 16-pin connector
7. 2-pin connector, data link connector (DLC)
8. Joint splice

# TAMD73P-A

## Multiple control positions – Single or dual lever controls (twin engine installation)



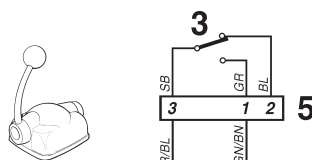
## Multiple control positions – Single or dual lever controls with control adapters (twin engine installation)



### VP controls:

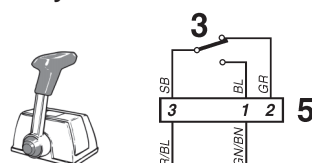
Late model

NEUTRAL



Early model

NEUTRAL



### Cable color

- BL = Blue
- BN = Brown
- GN = Green
- OR = Orange
- P = Pink
- R = Red
- SB = Black
- W = White
- Y = Yellow

Cable areas = 0.75 mm<sup>2</sup>.

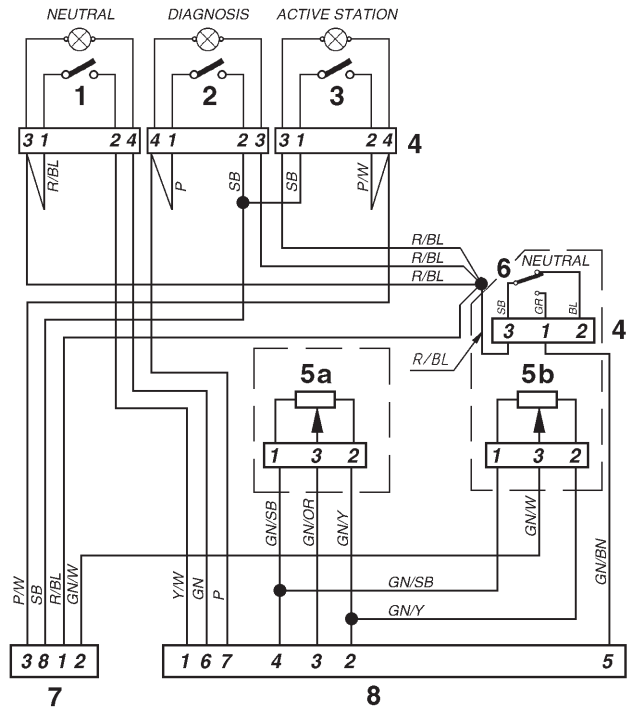
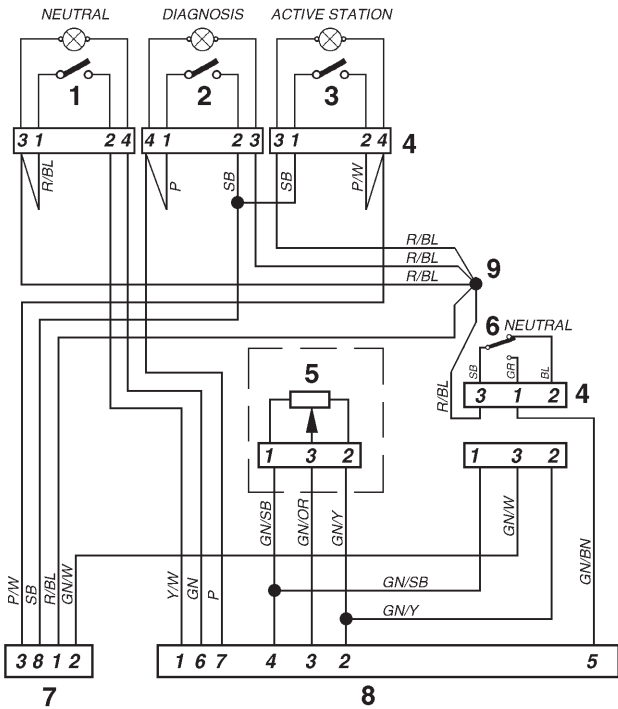
### Location diagram (both wiring diagrams)

1. Indicator light
2. Switch
3. Connector
4. Relay
5. Position limiter switch
6. Potentiometer
7. Connector, Port – Starboard cable harness
8. 2-pin connector, data link connector (DLC)
9. 16-pin connector, Port engine
10. 16-pin connector, Starboard engine

# TAMD74

**Electronic control**  
**Single engine installation.**  
**Single or dual control lever unit**

**Mechanical control**  
**Single engine installation. Single or dual control**  
**lever unit with control unit adapters**



## Cable colors

- BL = Blue
- BN = Brown
- GN = Green
- OR = Orange
- P = Pink
- R = Red
- SB = Black
- W = White
- Y = Yellow

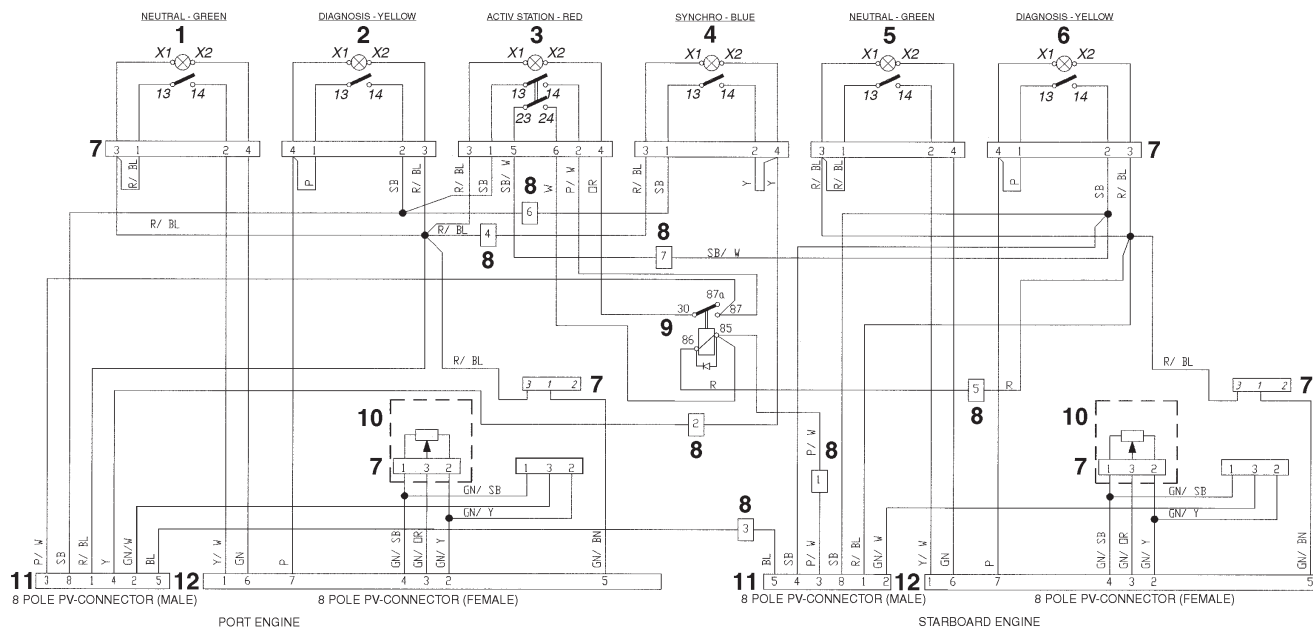
Cable areas = 0.75 mm<sup>2</sup>.

## Location diagram

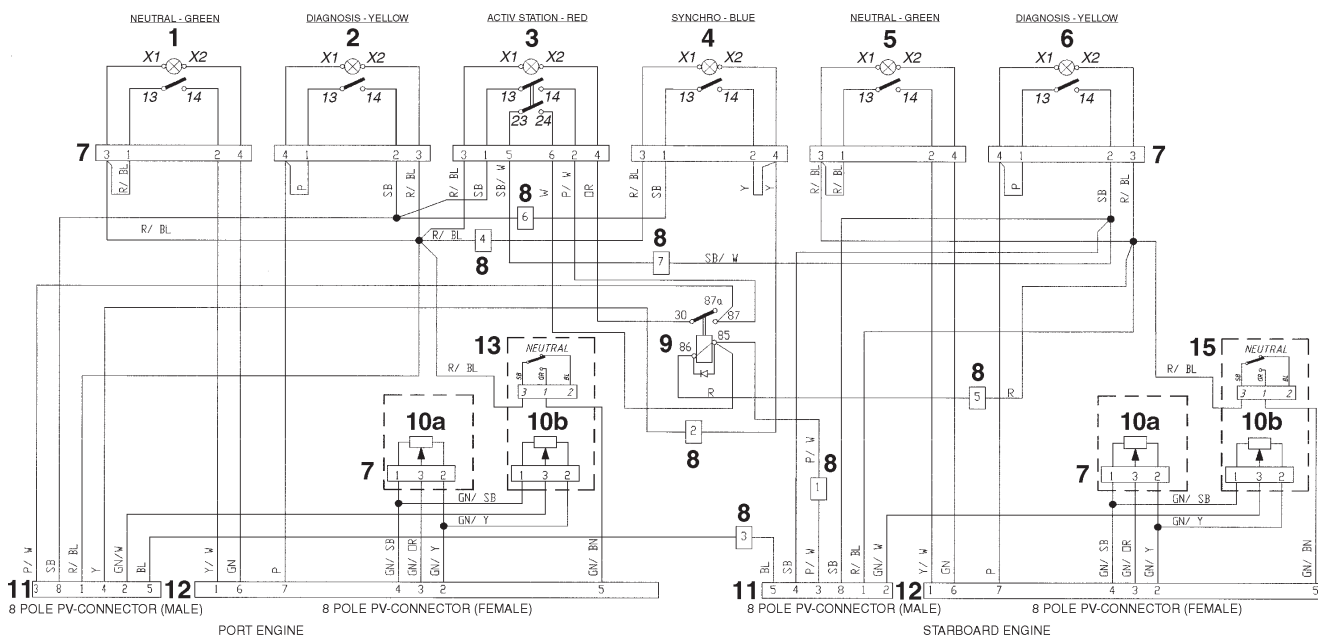
1. Push button with indicator light, neutral – green
2. Push button with indicator light, diagnostic – yellow
3. Push button with indicator light, active station – red
4. Connector
5. Potentiometer, throttle/shifting
- 5a. Control unit adapter, throttle
- 5b. Control unit adapter, shifting
6. Neutral switch
7. 8-pin connector (male)
8. 8-pin connector (female)
9. Joint splice

# TAMD74

## Electronic control Twin engine installation. Single lever twin control



## Mechanical control Twin engine installation. Single or dual lever twin control with control unit adapter



### Cable colors


BL = Blue  
 BN = Brown  
 GN = Green  
 OR = Orange  
 P = Pink  
 R = Red  
 SB = Black  
 W = White  
 Y = Yellow

Cable areas = 0.75 mm<sup>2</sup>.

### Location diagram (both wiring diagrams)

1. Push button with indicator light, Neutral – green
2. Push button with indicator light, Diagnostic – yellow
3. Push button with indicator light, Active station – red
4. Push button with indicator light, Synchro – blue
5. Push button with indicator light, Neutral – green
6. Push button with indicator light, Diagnostic – yellow
7. Connector
8. Connector, Port – Starboard cable harness
9. Relay
10. Potentiometer, throttle/shifting
- 10a. Control unit adapter, throttle
- 10b. Control unit adapter, shifting
11. 8-pin connector (male) – port engine
12. 8-pin connector (female) – starboard engine
13. Neutral switch

# Inhibiting

 **WARNING!** Observe the following rules when cleaning with high-pressure water jets. Never direct the water jet at seals, rubber hoses or electrical components. Never use a high pressure jet when washing the engine.

## Boat unused for up to two months

If the boat is not expected to be used for up to two months, it is sufficient to start the engine and warm it up once a fortnight.

If there is a danger of freezing, the cooling system's seawater circuit should be drained after stopping. Check/top up the freshwater system's antifreeze to prevent damage. Drain the freshwater tank if installed.

Remove the drain plug (if fitted) on the exhaust pipe condensed water collector. Drain the water from any low-lying parts on the exhaust pipe.

Check the batteries' charge condition. A discharged battery may easily burst.

## Boat unused for more than two months

1. Warm the engine up to normal operating temperature.
2. Check that the lubricating oil level in the reverse gear reaches the upper mark ("FULL") on the dipstick. Check the level with the engine idling and the control in neutral.
3. Stop the engine and drain or pump the lubricating oil from the oil sump.
4. **Boat unused for up to max. 8 months:** Replace the lubricating oil filter and fill with Volvo Penta lubricating oil to the normal level. Warm the engine up after changing the oil.
5. **Boat unused for more than 8 months:** Fill the engine with inhibiting oil to just above the lower part of the mark on the dipstick. The oil companies sell inhibiting oil.

Connect the fuel lines (suction and return) to a can filled with 1/3 inhibiting oil and 2/3 diesel. Some oil companies sell a ready-mixed oil for this purpose.

Vent the fuel system according to the instructions on page 54. Start the engine and run on fast idle until approx. 2 liters (0.5 US gals) have been used from the can.

Stop the engine and drain or pump the lubricating oil from the oil sump. Connect the regular fuel lines.

6. Check that the coolant in the freshwater system has sufficient antifreeze and top up if required. Or drain the coolant. Close the sea cock and drain the water from the seawater system. See pages 32–33.

Remove the seawater pump impeller.

7. Check that the batteries are kept well charged. A discharged battery may easily burst.

Batteries always have a certain amount of self-discharge which increases the higher the temperature. Batteries in storage should therefore be kept as cool as possible. They should be stored dry and clean and normally charged when the electrolyte density drops below 1.24 g/cm<sup>3</sup> (1.20 g/cm<sup>3</sup> for batteries with tropical acid).

You should preferably remove the batteries and hand them in for maintenance charging as instructed by the manufacturer.

**See also point 2 under the heading "Electrical System – Important" on page 70.**

8. When necessary, improve the external rust protection by brushing on anti-corrosion oil. The surfaces should be clean and dry before being treated.

**NOTE!** Certain engine conservation oils are inflammable. Some of them are also dangerous if inhaled. Ensure that ventilation in the work place is good. Use a protective mask when spraying.

9. Stick a label on the engine stating the date of inhibition, type of inhibition and the inhibiting oil used.
10. Cover the engine's air intake, exhaust port and the engine itself if so required.

## Launching procedures

Check the condition of the propeller(s). Damaged propellers should be reconditioned or replaced.



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### Bringing out of storage

1. Remove any protective cover over the engine, air intake and exhaust pipe.
2. Remove any external inhibitors using white spirit.
3. Close the drain cocks and fit the drain plugs. Fit the seawater pump impeller using a rotating movement:

TAMD63, TAMD73 and TAMD74 – **clockwise**.  
TAMD71 – **counterclockwise**.

Fill the freshwater system if the coolant has been drained. See “Filling coolant” on page 59. For coolant information, refer to page 96.

4. If necessary, fill the engine with lubricating oil of the correct quality. Fit a new oil filter if this has not been done when changing the oil during inhibiting. Check the oil level in the reverse gear.
5. Check the batteries as described on page 72. Reconnect batteries.
6. Fit new fuel filters and vent the fuel system as described on pages 53–55.
7. Open sea cock. Start the engine (see “Operation”) and warm the engine up at a fast idle before loading the engine.
8. Check for any leaks of oil, fuel or cooling water.

# Fuel, Oils, Coolant

## Diesel fuels

The composition of the fuel is vital for operation of the engine, its service life, and emissions. To meet the performance specified and to run your boat cleanly and quietly, it is vital that you use fuel as recommended below.

### Fuel specification

Fuel must meet national and international standards. For example:

- EN 590 (with national environmental and cold weather standards)
- ASTM-D975 No. 1-D, 2-D
- JIS KK 2204

**Sulfur content:** According to statutory requirements.

**Note.** Large variations occur in merchant fuel specifications which have influence on engine power output and fuel consumption.

Declared power is measured with fuel acc. to ISO 3046 with a lower calorific value of 42.700 kJ/kg and a density of 840 g/liter at +15°C (59°F).

## Lubricating oil, engine

A lubricating oil of a quality as shown in the table below should be used:

Designation	Standard
VDS, VDS-2*	Volvo Drain Specification
CD, CE	API (American Petroleum Institute)
MIL-L-2104D	US Government's Military Spec.

\* **Note.** A VDS oil must be used if there is to be a long period between oil changes. See also the maintenance schedule and "Technical Data".

We do not advise that you run on an oil of a quality which does not meet the above requirements. This is a poor solution with respect to both economy and operating safety.

For viscosity and capacities, see "Technical Data" on page 108.

## Lubricating oil, reverse gear

For the reverse gear, a single grade oil of quality CC, CD or CE according to the API system should be used. Oil according to the MIL-L-2104D standard may also be used.

For quality and capacities, see "Technical Data" on pages 110–113.

## Oil for servo unit system, hydraulic pump (accessory)

ATF oil\* should be used in the servo unit system.

\* ATF = Automatic Transmission Fluid (oil for automatic gear-boxes).

## Coolant

The engine's internal cooling system (freshwater system) is filled with a mixture of freshwater and additives. **NOTE! Never** use freshwater without additives. The following recommendations should be followed to prevent frost and corrosion damage to your engine:

### If there is a risk of freezing

Use a mixture of 50% Volvo Penta antifreeze (glycol) and 50% pure water (as neutral as possible). **This mixture will protect against freezing to a temperature of approx. –40°C (–40°F) and should be used all year round.**

**Note.** There should be at least 40% antifreeze in the system for complete protection against corrosion.

 **NOTE! Glycol is harmful to health (dangerous if ingested).**

### If there is no risk of freezing

**When there is no risk of freezing water with added Volvo Penta anti-corrosion agent\* (P/N 1141526-2)** may be used unless an anti-freeze mixture is used all year round. Mixture ratio = 1:30.

See instructions on page 59 for topping up engine coolant. Run the engine once the coolant has been topped up to allow the additives to work.

 **NOTE! Anti-corrosive agents are harmful to health (danger if ingested).**

\* **Note.** Never mix antifreeze (glycol) and anti-corrosive agents. The two combined can produce foam and drastically reduce the coolant's effectiveness.

## Replacing the coolant

**The coolant should be replaced** and the system flushed at least once a year. See maintenance schedule.

## Volvo Penta products

See also under the heading "Accessories" on page 115.

## 1. Engine does not start

### Starter motor does not turn engine over

CAUSE	REMEDY
<ul style="list-style-type: none"> <li>The reverse gear is not disengaged (applies to control with neutral position switch)</li> </ul>	Put the reverse gear control lever into neutral
<ul style="list-style-type: none"> <li>TAMD73P and TAMD74: The controls have not been calibrated</li> </ul>	Calibrate controls as per instructions on pages 18–20
<ul style="list-style-type: none"> <li>Discharged batteries</li> </ul>	Charge/replace the batteries (or connect up auxiliary batteries as shown on page 70)
<ul style="list-style-type: none"> <li>Main switches off</li> </ul>	Switch on the main switches
<ul style="list-style-type: none"> <li>One of the semi-automatic fuses in the terminal box has tripped (see page 71 for instructions on resetting fuses)</li> </ul>	Reset the fuse by pressing in the button.
<ul style="list-style-type: none"> <li>Poor contact/open-circuit in wiring</li> </ul>	Rectify any open-circuits/loose connections. Check for oxidation on the contacts. If required, clean and spray connection with damp-inhibitor spray. See the wiring diagrams on pages 74–89.
<ul style="list-style-type: none"> <li>Key switch malfunction</li> </ul>	Replace key switch
<ul style="list-style-type: none"> <li>Faulty starter relay</li> </ul>	Replace start relay (or swap temporarily with stop relay*)
<ul style="list-style-type: none"> <li>TAMD73P and TAMD74: Faulty main relay</li> </ul>	Replace main relay (or swap temporarily with stop relay)
<ul style="list-style-type: none"> <li>Starter motor/solenoid (control solenoid) malfunction</li> </ul>	Contact an authorized Volvo Penta service mechanic
<ul style="list-style-type: none"> <li>Water in the engine</li> </ul>	Contact an authorized Volvo Penta service mechanic. Do not make repeated attempts to start the engine if you suspect water in the engine.

\* **Note.** TAMD63 and TAMD73WJ have no stop relay.

### Starter motor turns over slowly

CAUSE	REMEDY
<ul style="list-style-type: none"> <li>Discharged batteries</li> </ul>	Charge/replace the batteries (or connect up auxiliary batteries as shown on page 70)
<ul style="list-style-type: none"> <li>Poor contact, electrical cables</li> </ul>	Rectify any loose connections. Check for oxidation on the contacts. If required, clean them and spray connections with damp-inhibitor spray.

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**Starter motor turns over but the engine does not start**

<b>CAUSE</b>	<b>REMEDY</b>
<ul style="list-style-type: none"><li>• Air in fuel lines</li></ul>	Vent the fuel system as shown on page 54
<ul style="list-style-type: none"><li>• Lack of fuel<ul style="list-style-type: none"><li>– fuel taps closed</li><li>– fuel tank empty/wrong tank on line</li><li>– fuel filters clogged (due to contaminants/paraffin precipitation in the fuel as a result of low outside temperature)</li></ul></li></ul>	<p>Open the fuel cocks</p> <p>Fill with fuel/connect the correct fuel tank</p> <p>Fit new fuel filters (pre-filter and/or fine filters). Vent the system as shown on page 54</p>
<ul style="list-style-type: none"><li>• TAMD63, TAMD71, TAMD73WJ: Solenoid valve (fuel shut-off valve) incorrectly connected</li></ul>	Check solenoid valve has not been switched on unintentionally
<ul style="list-style-type: none"><li>• TAMD71B: Preheating insufficient<ul style="list-style-type: none"><li>– incorrect starting method</li><li>– starter element not in circuit</li></ul></li></ul>	<p>Try to start engine again according to instructions on page 23</p> <p>Check that none of the semi-automatic fuses in the terminal box has tripped (see page 71 for instructions on resetting fuses)</p> <p>Check the electrical leads and key switch, starter relay and high power relay (swap the starter relay temporarily with stop relay if required). Contact authorized service mechanic if the starter element needs to be replaced</p>
<ul style="list-style-type: none"><li>• TAMD73P and TAMD74: Faulty position sensor in the governor</li></ul>	Check for electronic diesel control (EDC) diagnostic trouble code (DTC) – refer to pages 102–105. Contact an authorized Volvo Penta service mechanic
<ul style="list-style-type: none"><li>• TAMD73P and TAMD74: Faulty rpm sensor in the governor</li></ul>	Check for electronic diesel control (EDC) diagnostic trouble code (DTC) – refer to pages 102–105. Contact an authorized Volvo Penta service mechanic
<ul style="list-style-type: none"><li>• TAMD73P and TAMD74: Faulty actuator in the governor</li></ul>	Check for electronic diesel control (EDC) diagnostic trouble code (DTC) – refer to pages 102–105. Contact an authorized Volvo Penta service mechanic

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## 2. Engine starts but stops again/runs unevenly

CAUSE	REMEDY
<ul style="list-style-type: none"><li>• Air in fuel lines</li></ul>	Vent the fuel system as shown on page 54
<ul style="list-style-type: none"><li>• Lack of fuel<ul style="list-style-type: none"><li>– fuel taps closed</li><li>– fuel tank empty/wrong tank on line</li><li>– fuel filters clogged (due to contaminants/paraffin precipitation in the fuel as a result of low outside temp.)</li></ul></li></ul>	<p>Open the fuel cocks</p> <p>Fill with fuel/connect the correct fuel tank</p> <p>Fit new fuel filters (pre-filter and/or fine filters). Vent the system as shown on page 54</p>
<ul style="list-style-type: none"><li>• TAM71B: Preheating insufficient<ul style="list-style-type: none"><li>– incorrect starting method</li></ul></li></ul>	<p>Try starting again as shown on page 23</p> <p>Check that none of the semi-automatic fuses in the terminal box has tripped (see page 71 for instructions on resetting fuses)</p>
<ul style="list-style-type: none"><li>– starter element not in circuit</li></ul>	Check the electrical leads and key switch, starter relay and high power relay (swap the starter relay temporarily with stop relay if required). Contact authorized service mechanic if the starter element needs to be replaced
<ul style="list-style-type: none"><li>• Insufficient air supply to engine<ul style="list-style-type: none"><li>– air cleaner filter clogged</li></ul></li></ul>	Fit a new air cleaner filter/clean air cleaner filter, check ventilation to engine compartment
<ul style="list-style-type: none"><li>• Pressure line rupture</li></ul>	Install new delivery pipe(s)

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## 3. Engine coolant temperature too high

CAUSE	REMEDY
<ul style="list-style-type: none"><li>• Coolant level in engine too low (air in system)</li></ul>	Fill the engine with coolant and vent the system as described on pages 59–60
<ul style="list-style-type: none"><li>• Thermostat malfunction</li></ul>	Install a new thermostat
<ul style="list-style-type: none"><li>• Faulty seawater pump (pump impeller)</li></ul>	Replace the seawater pump impeller as shown on page 64
<ul style="list-style-type: none"><li>• Sea cock closed</li></ul>	Open the boat's sea cock
<ul style="list-style-type: none"><li>• Seawater intake blocked</li></ul>	Clean the seawater intake
<ul style="list-style-type: none"><li>• Seawater filter blocked</li></ul>	Clean the seawater filter as shown on page 60
<ul style="list-style-type: none"><li>• Heat exchanger core clogged</li></ul>	Clean the insert(s) as shown on pages 60–62
<ul style="list-style-type: none"><li>• Faulty circulation pump</li></ul>	Contact an authorized Volvo Penta service mechanic

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#### 4. Coolant temperature too low

CAUSE	REMEDY
<ul style="list-style-type: none"><li>• Thermostat malfunction</li></ul>	Install a new thermostat

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#### 5. Engine does not reach correct speed at wide open throttle (WOT)

CAUSE	REMEDY
<ul style="list-style-type: none"><li>• Boat abnormally loaded</li></ul>	If possible, reduce/redistribute the load
<ul style="list-style-type: none"><li>• Fouling on underwater hull</li></ul>	Clean the bottom of the boat and treat it with anti-fouling paint
<ul style="list-style-type: none"><li>• Faulty/damaged propeller</li></ul>	Replace the propeller
<ul style="list-style-type: none"><li>• Insufficient fuel flow<ul style="list-style-type: none"><li>– fuel filters clogged (due to contaminants/paraffin precipitation in the fuel as a result of low outside temperature)</li></ul></li></ul>	Fit new fuel filters (pre-filter and/or fine filters). Vent the system as shown on page 54
<ul style="list-style-type: none"><li>• Water in fuel</li></ul>	Clean fuel tank. Drain water from pre-filter if installed
<ul style="list-style-type: none"><li>• Insufficient air supply to engine<ul style="list-style-type: none"><li>– air cleaner filter clogged</li><li>– air leak between turbo and engine's inlet manifold</li><li>– dirt in turbocharger compressor</li><li>– faulty turbocharger</li><li>– poor engine compartment ventilation</li></ul></li></ul>	Fit new air cleaner filter(s)/clean air cleaner filter Check the rubber hose between the turbo and the connecting pipe, plus other connections. Tighten the hose clips Contact authorized service personnel Contact authorized service personnel Check that the ventilating ducts to the engine compartment are not blocked
<ul style="list-style-type: none"><li>• Throttle controls incorrectly adjusted</li></ul>	Adjust the throttle controls
<ul style="list-style-type: none"><li>• Charge air cooler (CAC) clogged</li></ul>	Clean the insert(s) as shown on pages 60–62
<ul style="list-style-type: none"><li>• TAMD71B: Faulty by-pass valve</li></ul>	Contact an authorized Volvo Penta service mechanic
<ul style="list-style-type: none"><li>• High back pressure in exhaust system</li></ul>	Check that the exhaust pipe is not restricted in any way
<ul style="list-style-type: none"><li>• Injector malfunction</li></ul>	Get authorized service personnel to check the injectors
<ul style="list-style-type: none"><li>• TAMD73P and TAMD74: EDC system has temporarily reduced engine output due to alarm limit being exceeded.</li></ul>	Check any diagnostic trouble codes (DTC) set, see page 102. Correct malfunction cause
<ul style="list-style-type: none"><li>• Faulty setting of injection pump</li></ul>	Contact an authorized Volvo Penta service mechanic
<ul style="list-style-type: none"><li>• Fault in smoke limiter*<ul style="list-style-type: none"><li>– smoke limiter seizing</li><li>– pressure pipe between inlet manifold and smoke limiter leaking</li><li>– faulty diaphragm in smoke limiter</li><li>– faulty setting</li></ul></li></ul>	Contact an authorized Volvo Penta service mechanic Fit a new pressure line Contact an authorized Volvo Penta service mechanic Contact an authorized Volvo Penta service mechanic

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\* TAMD73P and TAMD74 engines are not equipped with a smoke limiter.

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## 6. Engine will not stop

CAUSE	REMEDY
<ul style="list-style-type: none"><li>• TAMD71B: Fuel shut-off valve fuse defective (see page 72 for changing fuse)</li></ul>	Replace fuse (8A)
<ul style="list-style-type: none"><li>• One of the semi-automatic fuses in the terminal box has tripped (see page 71 for instructions on resetting fuses)</li></ul>	Reset the fuse by pressing in the button
<ul style="list-style-type: none"><li>• Poor contact/open-circuit in wiring (loose connections, oxidation)</li></ul>	Rectify any open-circuits/loose connections. Check for oxidation on the contacts. If required, clean and spray connection with damp-inhibitor spray. See the wiring diagrams on pages 74–89.
<ul style="list-style-type: none"><li>• Key switch malfunction</li></ul>	Replace key switch
<ul style="list-style-type: none"><li>• Faulty stop relay*</li></ul>	Replace stop relay (or swap temporarily with start relay)
<ul style="list-style-type: none"><li>• Faulty solenoid valve (fuel shut-off valve)**</li></ul>	Contact an authorized Volvo Penta service mechanic

\* TAMD63 and TAMD73WJ have no stop relay.

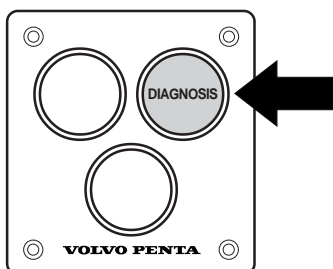
\*\* TAMD73P and TAMD74 have no fuel shut-off valve.

## Diagnostic functions – OBD system (TAMD73P and TAMD74)

The indicator lamp in the **yellow** Diagnostics button on the EDC system control panel starts to flash if the system receives abnormal signals or if there is a malfunction in the EDC system.

Press the button\* for at least one second in order to read off the Diagnostic Trouble Code (DTC) and to acknowledge the alarm. A DTC message is flashed as a two-stage code.

\* **Note.** When the engine is stopped the diagnostic trouble code (DTC) is flashed only after the EDC system is activated. To activate the EDC system turn the starter key to position “I” (operating position).



TAMD73P and TAMD74: EDC control panel – Single engine

If there are several diagnostic trouble codes (DTCs) stored the next code is flashed when the button is pushed again. When the first DTC is repeated, all the codes have been read off.

Diagnostic Trouble Code(s) (DTCs) are stored until erased. This should be done after the malfunction or source of the DTC has been identified and repaired.

**NOTE! If the On-board Diagnostics (OBD) system has triggered an event (for example stopped the engine) you must erase the DTC before the engine can be restarted. Refer to Erasing Diagnostic Trouble Codes (DTC) below.**

### Reading off Diagnostic Trouble Codes (DTC)

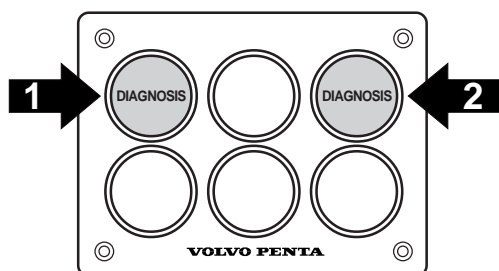
To get a read-out from the system of what the nature of the fault is that is causing the diagnostic trouble code (DTC), press the yellow Diagnostics button when the light is flashing. This results in the system flashing a two-part code.\* The first number of flashes are units of ten, followed by a short pause, then a series of new flashes (single units).

After the alarm has been acknowledged (DTCs have been read off) the light will go out. Stored DTCs can be read off again by pressing the yellow button.

Refer to the section EDC Diagnostic Trouble Codes (DTC) on pages 103–105 for an explanation of the flashed code sequences.

**Note.** Service technicians can obtain a more comprehensive DTC read-out in plain language using the diagnostics Scan Tool (Diagnostic Key).

\* **Example:** 2 flashes – pause – 6 flashes = DTC 2.6 Fault on the control unit potentiometer.



TAMD73P and TAMD74: EDC control panel for one or more control stations (double installation)

1. Port engine
2. Starboard engine

### Erasing stored Diagnostic Trouble Codes (DTC)

**Warning!** Diagnostic trouble codes must not be erased when the boat is in operation.

1. Turn the starter key to the stop position “S” and release the key.
2. Press the **yellow** Diagnostics button and **hold it in** while turning the starter key to the I (operating) position.

Erase the diagnostic trouble codes (DTCs) by keeping the button pressed down for another 3 seconds.

**Note.** If the diagnostics button is pressed again after clearing the diagnostic trouble codes (DTCs) code 1.1 (No DTC stored) will be flashed out by the system.



### EDC diagnostic Trouble Codes (DTC)

DTC	Explanation	Cause	Reaction	Action
1.1	No fault	On-board diagnostic (OBD) function activated.	–	–
1.2	Control calibration (neutral position switch)	Neutral position switch open or closed at wrong point in relation to potentiometer value.	–	Check operation of neutral position switch (closed in neutral position). <b>Erase DTC.</b> Recalibrate control.
1.3	Control calibration (difference too small)	Angle between start of throttle opening and full throttle too small.	–	Check potentiometer mounting. <b>Erase DTC.</b> Recalibrate control.
1.4	Control calibration (neutral position too short)	Neutral position switch closes within too short a range on the control.	–	Adjust neutral position switch. <b>Erase DTC.</b> Recalibrate control.
1.5	Control calibration (shift solenoid faulty)	Shift solenoid faulty, reverse gear (open-circuit, short-circuit). No current from main relay.	System does not enter calibration mode.	Check solenoid connections. Check solenoids for short/open circuit. <b>Erase DTC.</b> Recalibrate control. Check there is current from the main relay.
1.6	Control calibration, master control station (calibration not carried out)	New installation.	Starter motor cannot be activated.	Calibrate controls. DTC erased automatically.
1.7	Control calibration, secondary control position (calibration not carried out)	New installation.	Starter motor cannot be activated.	Calibrate controls. DTC erased automatically.
2.2	Control rod sensor	Control rod position sensor transmits abnormal values to the control module.	Engine stopped by system.	Check injection pump and control module connections. <b>Erase DTC.</b> Start the engine. Contact authorized workshop if fault persists.
2.3	Control rod actuator	Control rod actuator takes too much or little current. Open-circuit, connection 42.	Main relay opens (engine stops).	Check injection pump and control module connections. <b>Erase DTC.</b> Start the engine. Contact authorized workshop if fault persists.
2.4/ 2.5	Engine speed (rpm) sender	Engine speed (RPM) sensor transmits abnormal values to control module.	Engine stopped by system.	Check injection pump and control module connections. <b>Erase DTC.</b> Start the engine. Contact authorized workshop if fault persists.

DTC	Explanation	Cause	Reaction	Action
<b>2.6/2.7</b>	Control potentiometer	System receiving no signals from control potentiometer.	Engine runs at constant 1000 rpm.	Check control potentiometer wiring and connections and connections to control position. <b>Erase DTC.</b> Start the engine. If the fault persists shifting can be carried out directly on the reverse gear solenoids.
<b>3.1</b>	Shift control potentiometer	System receiving no signals from shift control potentiometer.	–	Check wiring/connections on shift control potentiometer and connections to control position. <b>Erase DTC.</b> Start the engine. If the fault persists shifting can be carried out directly on the reverse gear solenoids.
<b>4.6</b>	Starter motor relay	Short-circuit or open-circuit in wiring/ starter motor relay.	–	Check cabling and connections to starter relay in terminal box. Check starter relay. Position 5 on the location diagram, page 67. <b>Erase DTC.</b>
<b>5.1</b>	Main relay	Short-circuit or open-circuit in wiring/ main relay.	–	Check cabling and connections to main relay in terminal box. Check main relay. Position 6 on the location diagram, page 67. <b>Erase DTC.</b>
<b>5.2</b>	Neutral indication	Short-circuit or open-circuit in Neutral indication cabling. Bulb malfunction.	–	Check bulb in “Neutral” button. Check cabling and connections to control position. <b>Erase DTC.</b>
<b>5.4/5.5</b>	Shift – Forward/Reverse	Open or short-circuit in cabling or in reverse gear solenoid (actuator).	–	Check reverse gear cabling and solenoids (actuators). <b>Erase DTC.</b>
<b>5.6</b>	Boost pressure	The system receives too high or too low a boost pressure signal.	If the pressure is too high the system will reduce the volume of fuel injected until pressure has normalized (turbo protection).	Check air cleaner. Check the pressure line from the inlet manifold to the control module. <b>Erase DTC.</b> Contact authorized workshop for inspection of turbocharger (TC).
<b>6.4</b>	Fault in MS module (MS = “Multi-Station”)	Faulty values from potentiometers, controls not calibrated, communication faults.	–	Check potentiometers, wiring and connections to buttons on flying bridge panel. Recalibrate control if necessary. <b>Erase DTC.</b>
<b>8.1</b>	Control module	Faults in internal voltages in control module.	–	<b>Erase DTC.</b> Contact authorized workshop.
<b>8.3</b>	Read/write fault in control calibration	Internal fault in control module.	–	<b>Erase DTC.</b> Recalibrate control. Contact authorized workshop if recalibration cannot be carried out.

<b>DTC</b>	<b>Explanation</b>	<b>Cause</b>	<b>Reaction</b>	<b>Action</b>
<b>9.9</b>	Fatal error on control module	Internal fault in program memory.	System does not start.	Turn off power completely and wait 3 minutes before reconnecting. Contact authorized workshop if fault persists.
	Warning lamp – high engine coolant temperature (in instrument panel)	Engine coolant temperature too high.	If the engine coolant temperature is too high the system will reduce the volume of fuel injected until temperature has normalized.	Check the engine coolant system.

# Technical Data

## General

	<b>TAMD63L-A, TAMD63P-A</b>	<b>TAMD71B</b>
No. of cylinders .....	6	6
Swept volume .....	5.48 dm <sup>3</sup> (liters), (334 in <sup>3</sup> )	6.73 dm <sup>3</sup> (liters), (411 in <sup>3</sup> )
Low idle .....	600 ±20 rpm	600 ±30 rpm
Valve clearance, stopped engine, cold or at operating temperature:		
intake .....	0.50 mm (0.0197")	0.40 mm (0.0157")
exhaust .....	0.65 mm (0.0256")	0.55 mm (0.0217")
Compression pressure at starter motor speed (300 rpm) .....	2.2 MPa, (22 kp/cm <sup>2</sup> = 313 psi)	2.2 MPa, (22 kp/cm <sup>2</sup> = 313 psi)
Weight, engine with heat exchanger, without reverse gear or clutch, approx. ....	745 kg (1643 lbs)	880 kg (1940 lbs)
	<b>TAMD73P-A, TAMD73WJ-A</b>	<b>TAMD74C-A, TAMD74L-A, TAMD74P-A</b>
No. of cylinders .....	6	6
Swept volume .....	6.73 dm <sup>3</sup> (liters), (411 in <sup>3</sup> )	7.28 dm <sup>3</sup> (liters), (444 in <sup>3</sup> )
Low idle .....	600 ±10 rpm*	600 ±10 rpm*
Valve clearance, stopped engine, cold or at operating temperature:		
intake .....	0.50 mm (0.0197")	0.50 mm (0.0197")
exhaust .....	0.65 mm (0.0256")	0.65 mm (0.0256")
Compression pressure at starter motor speed (300 rpm) .....	2.2 MPa, (22 kp/cm <sup>2</sup> = 313 psi)	
Weight, engine with heat exchanger, without reverse gear or clutch, approx. ....	880 kg (1940 lbs)	860 kg (1896 lbs)

\* **Note!** For TAMD73WJ 600 ±50 rpm applies.

At delivery, the idling speed for the TAMD73P and TAMD74 is adjusted to 600 rpm. If needed, the speed can be adjusted within the range 550–700 rpm (refer to page 21).

Furthermore, the speed is increased to 800 rpm during max. 2 minutes at coolant temperatures below +15°C (59°F) on these engine.

## Cooling system

	<b>TAMD63L-A, TAMD63P-A</b>	<b>TAMD71B</b>	<b>TAMD73P-A, TAMD73WJ-A, TAMD74C-A, TAMD74L-A, TAMD74P-A</b>
Freshwater system capacity incl. heat exchanger, approx. ....	27 liters, (7.1 US gals)	35 liters, (9.3 US gals)	34 liters, (9.1 US gals)
Thermostat starts to open at (all engines) .....		73–77°C (163–171°F)	
fully open at (all engines) .....		86–90°C (187–194°F)	

## Fuel system

	<b>TAMD63L-A, TAMD63P-A</b>	<b>TAMD71B</b>
Injection pump, settings, TAMD63L and TAMD71B .....	16° ±0.5° BTDC	22° ±0.5° BTDC
TAMD63P .....	15° ±0.5° BTDC	–
Injectors, opening pressure, TAMD63L and TAMD71B .....	29 (+0.8) MPa, (295 (+8) kp/cm <sup>2</sup> = 4206 psi)	30 (+0.8) MPa, (306 (+8) kp/cm <sup>2</sup> = 4351 psi)
TAMD63P .....	30 (+0.8) MPa, (306 (+8) kp/cm <sup>2</sup> = 4351 psi)	–
Injectors, adjustment pressure (new spring): TAMD63L and TAMD71B .....	29.5 (+0.8) MPa, (300 (+8) kp/cm <sup>2</sup> = 4279 psi)	30.5 (+0.8) MPa, (311 (+8) kp/cm <sup>2</sup> = 4424 psi)
TAMD63P .....	30.5 (+0.8) MPa, (311 (+8) kp/cm <sup>2</sup> = 4424 psi)	–
	<b>TAMD73P-A, TAMD73WJ-A</b>	<b>TAMD74C-A TAMD74L-A TAMD74P-A</b>
Injection pump, settings, TAMD73P and TAMD74 .....	15° ±0.5° BTDC	11° ±0.5° BTDC
TAMD73WJ .....	18° ±0.5° BTDC	–
Injectors, opening pressure .....	29.5 (+0.8) MPa, (300 (+8) kp/cm <sup>2</sup> = 4279 psi)	29 MPa, (295 kp/cm <sup>2</sup> = 4206 psi)
Injectors, adjustment pressure (new spring) .....	29.5 (+0.8) MPa, (300 (+8) kp/cm <sup>2</sup> = 4279 psi)	29.5 (+0.8) MPa, (300 (+8) kp/cm <sup>2</sup> = 4279 psi)

## Turbocharger

**Charging pressure**, min. values (measured in the engine's inlet manifold at 100% load and wide open throttle (WOT), air temperature approx. +25°C (77°F). When measuring at a different temperature, the charging pressure measured must be corrected (see Workshop Manual).

If full power cannot be achieved, the pressure is considerably lower.

	<b>TAMD63L-A</b>	<b>TAMD63P-A</b>	<b>TAMD71B</b>
Rating 5:			
2400 rpm .....	–	200 kPa	–
2600 rpm .....	–	215 kPa	188 kPa
2800 rpm .....	180 kPa	225 kPa	–
Rating 4:			
2500 rpm .....	–	–	188 kPa
2600 rpm .....	–	–	188 kPa
Rating 3:			
2500 rpm .....	180 kPa	–	–
Rating 2:			
2500 rpm .....	120 kPa	–	–
	<b>TAMD73P-A</b>	<b>TAMD73WJ-A</b>	<b>TAMD74P-A</b>
Rating 5:			
2600 rpm .....	230 kPa	175 kPa	215 kPa
Rating 4:			
2500 rpm .....	230 kPa	–	–
2600 rpm .....	230 kPa	175 kPa	–
	<b>TAMD74C-A</b>	<b>TAMD74L-A</b>	
Rating 5:			
2500 rpm .....	–	205 kPa	
Rating 4:			
2600 rpm .....	210 kPa	–	
Rating 3:			
2500 rpm (316 kW) .....	205 kPa	–	
2500 rpm (294 kW) .....	195 kPa	–	

# Lubrication system

	TAMD63L-A, TAMD63P-A	TAMD71B	TAMD73P-A, TAMD73WJ-A, TAMD74C-A, TAMD74L-A, TAMD74P-A
Oil pressure, hot engine at normal running rpm ....	300–550 kPa (3.0–5.5 kp/cm <sup>2</sup> = 43–80 psi)		450–650 kPa (4.5–6.5 kp/cm <sup>2</sup> = 61–94 psi)
at idling rpm .....	min. 150 kPa (1.5 kp/cm <sup>2</sup> = 21 psi)		min. 150 kPa (1.5 kp/cm <sup>2</sup> = 21 psi)
Max. engine inclination when running .....	15°		15°

	TAMD63L-A, TAMD63P-A	TAMD71B
Oil capacity at oil change, without oil filter(s)*, approx.:		
no engine inclination, Max. ....	20 liters (5.3 US gals)	27 liters (7.1 US gals)
Min. ....	13 liters (3.4 US gals)	18 liters (4.8 US gals)
engine inclination 5°, Max. ....	16 liters (4.2 US gals)	23 liters (6.1 US gals)
Min. ....	10 liters (2.6 US gals)	15 liters (4.0 US gals)
engine inclination 10°, Max. ....	12 liters (3.2 US gals)	17 liters (4.5 US gals)**
Min. ....	7 liters (1.9 US gals)	12 liters (3.2 US gals)**

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

\*\* At a rearward engine tilt of >5° oil dipstick part No. 863166-5 should be used.

	TAMD73P-A, TAMD73WJ-A	TAMD74C-A, TAMD74L-A, TAMD74P-A
Oil capacity at oil change, without oil filters*, approx.:		
no engine inclination, Max. ....	28 liters (7.4 US gals)	25 liters (6.6 US gals)
Min. ....	19 liters (5.0 US gals)	18 liters (4.8 US gals)
engine inclination 5°, Max. ....	24 liters (6.3 US gals)	20 liters (5.3 US gals)
Min. ....	16 liters (4.2 US gals)	14 liters (3.7 US gals)
engine inclination 10°, Max. ....	18 liters (4.8 US gals)**	17 liters (4.5 US gals)**
Min. ....	16 liters (4.2 US gals)**	12 liters (3.2 US gals)**

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

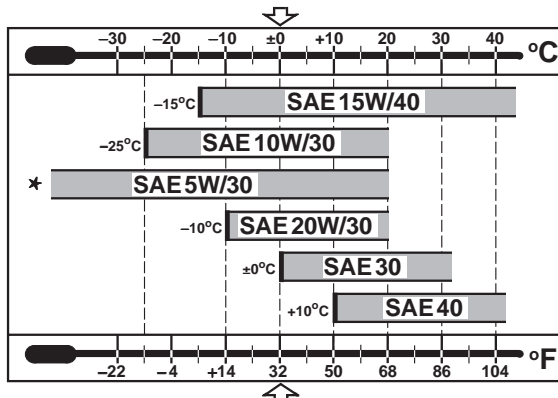
\*\* At a rearward engine tilt of >5° the following oil dipsticks should be used:

- TAMD73, part No. 863166-5.
- TAMD74, part No. 3827313-2.

Oil quality (all engines) .....

VDS (Volvo Drain Specification), or CD or CE in acc. with API system.

Viscosity at different ambient air temperatures .....  
(Temperature based on constant ambient air temperature).



\* Refers to synthetic or semi-synthetic oil.

**NOTE!** Only SAE 5W/30 may be used.

## Electrical system

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	TAMD63L-A, TAMD63P-A	TAMD71B TAMD73P-A, TAMD73WJ-A, TAMD74C-A, TAMD74L-A, TAMD74P-A
System voltage .....	12V (or 24V)	24V (or 12V)
AC generator, voltage/max. amperage .....	14V/60A (or 28V/40A)	28V/60A (or 14V/60A)
AC generator, output approx. ....	840W (or 1120W)	1700W (or 840W)
Alternative generator equipment (accessory):		
for 12V system, voltage/max. amperage .....	14V/130A	14V/130A
output approx. ....	1800 W	1800W
for 24V system, voltage/max. amperage .....	28V/100A	28V/100A
output approx. ....	2800W	2800W
Battery capacity:		
for 12V system .....	2 x 12 V connected in parallel, max. 110 Ah, (total max. 220 Ah)	2 x 12 V connected in parallel, max. 110 Ah, (tot. max. 220 Ah)
for 24V system .....	2 x 12 V connected in series, max. 143 Ah	2 x 12 V connected in series, max. 143 Ah
Battery electrolyte density at +25°C (77°F):		
fully charged battery .....	1,28 g/cm <sup>3</sup> (1,24 g/cm <sup>3</sup> )*	1,28 g/cm <sup>3</sup> (1,24 g/cm <sup>3</sup> )*
charge battery at .....	1,24 g/cm <sup>3</sup> (1,20 g/cm <sup>3</sup> )*	1,24 g/cm <sup>3</sup> (1,20 g/cm <sup>3</sup> )*

\* **Note:** Applies to batteries with tropical acid.

## Reverse gear

	TAMD63L-A, TAMD63P-A	TAMD71B	TAMD73P-A, TAMD74C-A, TAMD74L-A, TAMD74P-A
<b>MPM</b>			
Type designation .....	<b>IRM 220A-1</b>	<b>IRM 301 A-2</b>	—
Gear ratios .....	1.53:1; 1.75:1; 2.04:1	1.516:1; 2.006:1	—
Angle (output shaft) .....	10°	10°	—
Oil capacity, approx. ....	4 liters (1.05 US gals)	7.5 liters (2.0 US gals)	—
<b>Oil quality</b> (as per API system) .....	CC, CD, CE	CC, CD, CE	—
<b>Viscosity</b> .....	SAE30*	SAE30*	—
alternative for hot countries .....	SAE40*	SAE40*	—
Operating oil pressure .....	2.0–2.2 MPa, (20.4–22.4 kp/cm <sup>2</sup> = 290–319 psi)	2.1–2.3 MPa, (21.4–23.5 kp/cm <sup>2</sup> = 305–334 psi)	—
Approx. weight .....	53 kg (117 lbs)	155 kg (342 lbs)	—

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

Type designation .....	<b>IRM 220PL-E</b>	—	<b>IRM 280A2-E*</b>
Gear ratios .....	1.40:1	—	1.48:1; 1.77:1; 2.00:1
Angle (output shaft) .....	0°	—	7°
Oil capacity, approx. ....	5.3 liters, (1.4 US gals)	—	4.8 liters, (1.27 US gals)
<b>Oil quality</b> (as per API system) .....	CC, CD, CE	—	CC, CD, CE
<b>Viscosity</b> .....	SAE30**	—	SAE30**
alternative for hot countries .....	SAE40**	—	SAE40**
Operating oil pressure .....	2.5 MPa, (25.5 kp/cm <sup>2</sup> = 362 psi)	—	2.5 MPa, (25.5 kp/cm <sup>2</sup> = 362 psi)
Approx. weight .....	70 kg (154 lbs)	—	82 kg (181 lbs)

\* For TAMD74 engines.

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

Type designation .....	<b>IRM 220V-LD</b>	—	<b>IRM 301A-EB</b>
Gear ratios .....	1.53:1; 1.88:1	—	1.516:1; 2.005:1
Angle (output shaft) .....	12°	—	10°
Oil capacity, approx. ....	5.5 liters, (1.45 US gals)	—	7.5 liters, (2.0 US gals)
<b>Oil quality</b> (as per API system) .....	CC, CD, CE	—	CC, CD, CE
<b>Viscosity</b> .....	SAE30*	—	SAE30*
alternative for hot countries .....	SAE40*	—	SAE40*
Operating oil pressure .....	2.3–2.4 MPa, (23.4–24.5 kp/cm <sup>2</sup> = 334–348 psi)	—	2.1–2.3 MPa, (21.4–23.5 kp/cm <sup>2</sup> = 305–334 psi)
Approx. weight .....	86 kg (190 lbs)	—	155 kg (342 lbs)

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



	TAMD63L-A, TAMD63P-A	TAMD71B	TAMD73P-A, TAMD74C-A, TAMD74L-A, TAMD74P-A
Type designation .....	—	—	<b>IRM 302V-LD-EB*</b>
Gear ratios .....	—	—	1.651:1; 2.184:1
Angle (output shaft) .....	—	—	15°
Oil capacity, approx. ....	—	—	8.5 liters, (2.25 US gals)
<b>Oil quality</b> (as per API system) .....	—	—	CC, CD, CE
<b>Viscosity</b> .....	—	—	SAE 30**
alternative for hot countries .....	—	—	SAE 40**
Operating oil pressure .....	—	—	2.05–2.15 MPa, (20.9–21.9 kp/cm <sup>2</sup> = 297–312 psi)
Approx. weight .....	—	—	127 kg (280 lbs)

\* Reverse gear (V-drive) with electronically operated shifting.

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

## Twin Disc

	MG5061A	MG5061A	MG5061A-E*
Type designation .....	MG5061A	MG5061A	MG5061A-E*
Gear ratios .....	2.00:1	1.75:1; 2.00:1; 2.47:1	1.54:1; 1.75:1; 2.00:1
Angle (output shaft) .....	7°	7°	7°
Oil capacity, approx. ....	3.2 liters, (0.85 US gals)	3.2 liters, (0.85 US gals)	3.2 liters, (0.85 US gals)
<b>Oil quality</b> (as per API system) .....	CC, CD, CE	CC, CD, CE	CC, CD, CE
<b>Viscosity</b> at oil temp. of 66–85°C (151–185°F) ...	SAE30**	SAE30**	SAE30**
at oil temperature 85–100°C (185–212°F) .....	SAE40**	SAE40**	SAE40**
Working oil pressure at oil temperature of 82°C (180°F):			
engaged, 1800 rpm .....	2.3 MPa, (23.5 kp/cm <sup>2</sup> =334 psi)	2.3 MPa, (23.5 kp/cm <sup>2</sup> =334 psi)	2.3 MPa, (23.5 kp/cm <sup>2</sup> =334 psi)
at cruising speed, lowest .....	2.07 MPa, (21.1 kp/cm <sup>2</sup> =300 psi)	2.07 MPa, (21.1 kp/cm <sup>2</sup> =300 psi)	2.07 MPa, (21.1 kp/cm <sup>2</sup> =300 psi)
Approx. weight .....	113 kg (249 lbs)	113 kg (249 lbs)	113 kg (249 lbs)

\* For TAMD73P-A engines.

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

	TAMD63L-A, TAMD63P-A	TAMD71B	TAMD73P-A, TAMD74C-A, TAMD74L-A, TAMD74P-A
Type designation .....	<b>MG 5062V</b>	—	<b>MG 5062V-E*</b>
Gear ratios .....	1.83:1; 2.07:1	—	1.53:1; 1.77:1; 2.05:1
Angle (output shaft) .....	15°	—	15°
Oil capacity, approx. ....	5.6 liters, (1.5 US gals)	—	5.6 liters, (1.5 US gals)
<b>Oil quality</b> (as per API system) .....	CC, CD, CE	—	CC, CD, CE
<b>Viscosity</b> at oil temp. of 66–85°C (151–185°F) ..	SAE30**	—	SAE30**
at oil temperature 80–99°C (176–210°F) .....	SAE40**	—	SAE40**
Working oil pressure at oil temperature of 82°C (180°F):			
engaged, 1800 rpm .....	2.05–2.2 MPa, (20.9–22.4 kp/cm <sup>2</sup> =	—	2.05–2.2 MPa, (20.9–22.4 kp/
cm <sup>2</sup> =			
at cruising speed, lowest .....	297–319 psi) 1.9 MPa (19.3	—	297–319 psi) 1.9 MPa (19.3
	kp/cm <sup>2</sup> = 276 psi)		kp/cm <sup>2</sup> = 276 psi)
Approx. weight .....	142 kg (313 lbs)	—	142 kg (313 lbs)

\* Reverse gear (V-drive) with electronically operated shifting.

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

		<b>MG507-1</b>	<b>MG5075A-E*</b>
Type designation .....	—		
Gear ratios .....	—	1.10:1; 1.51:1; 1.77:1; 1.98:1; 2.54:1; 2.99:1	1.53:1; 1.77:1; 2.05:1
Angle (output shaft) .....	—	0°	7°
Oil capacity, approx. ....	—	6.7 liters, (1.8 US gals)	5.9 liters, (1.6 US gals)
<b>Oil quality</b> (as per API system) .....	—	CC, CD, CE	CC, CD, CE
<b>Viscosity</b> at oil temp. of 66–85°C (151–185°F) ..	—	SAE30**	—
at oil temperature 80–99°C (176–210°F) .....	—	SAE40**	—
<b>Viscosity</b> .....	—	—	SAE40**
Working oil pressure at oil temperature of 82°C (180°F):			
engaged, 1800 rpm .....	—	2.05–2.2 MPa, (20.9–22.4 kp/cm <sup>2</sup> = 297–319 psi)	2.28 MPa, (23.2 kp/cm <sup>2</sup> = 331 psi)
at cruising speed, lowest .....	—	1.9 MPa (19.3 kp/cm <sup>2</sup> – = 276 psi)	
Approx. weight .....	—	178 kg (392 lbs)	140 kg (309 lbs)

\* Reverse gear with electronically operated shifting.

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

	TAMD63L-A, TAMD63P-A	TAMD71B	TAMD73P-A, TAMD74C-A, TAMD74L-A, TAMD74P-A
Type designation .....	—	<b>MG507A-1</b>	<b>MG5085A-E*</b>
Gear ratios .....	—	1.51:1; 1.77:1; 1.98:1	1.47:1; 1.72:1; 2.04:1
Angle (output shaft) .....	—	7°	7°
Oil capacity, approx. ....	—	6.7 liters, (1.8 US gals)	4.4 liters, (1.2 US gals)
<b>Oil quality</b> (as per API system) .....	—	CC, CD, CE	CC, CD, CE
<b>Viscosity</b> at oil temp. of 66–85°C (151–185°F) ..	—	SAE30**	SAE30**
at oil temperature 80–99°C (176–210°F) .....	—	SAE40**	SAE40**
Working oil pressure at oil temperature of 82°C (180°F):			
engaged, 1800 rpm .....	—	2.05–2.2 MPa, (20.9–22.4 kp/cm <sup>2</sup> = 297–319 psi)	2.25 MPa, (22.9 kp/cm <sup>2</sup> = 326 psi)
at cruising speed, lowest .....	—	1.9 MPa (19.3 kp/cm <sup>2</sup> = 276 psi)	—
Approx. weight .....	—	178 kg (392 lbs)	140 kg (309 lbs)

\* Reverse gear with electronically operated shifting.

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

Type designation .....	—	—	<b>MG5085PL*</b>
Gear ratios .....	—	—	1.2:1
Angle (output shaft) .....	—	—	0°
Oil capacity, approx. ....	—	—	4.4 liters, (1.2 US gals)
<b>Oil quality</b> (as per API system) .....	—	—	CC, CD, CE
<b>Viscosity</b> at oil temp. of 66–85°C (151–185°F) ..	—	—	SAE30**
at oil temperature 80–99°C (176–210°F) .....	—	—	SAE40**
Working oil pressure at oil temperature of 82°C (180°F):			
engaged, 1800 rpm .....	—	—	2.25 MPa, (22.9 kp/cm <sup>2</sup> = 326 psi)
Approx. weight .....	—	—	130 kg (287 lbs)

\* Reverse gear with electronically operated shifting.

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

# Clutch

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## Disengageable clutches at front of engine (accessory TAMD71B)

### Rockford/Borg Warner

Type .....

Gear ratio .....

Size .....

Permitted engine speed, power take-off engaged

Approx. weight .....

### TAMD71B

Single plate clutch  
("over-center" type)

1:1

203 mm (8"), or  
254 mm (10")

900–1800 rpm

65 kg (143 lbs)

## Disengageable clutch at rear of engine (accessory, TAMD71B auxiliary engine)

### Automotive Products

Type .....

Gear ratio .....

Size .....

Approx. weight .....

Double plate clutch  
("over-center" type)

1:1

292 mm (11 1/2")

83 kg (183 lbs)

## Volvo Penta accessories

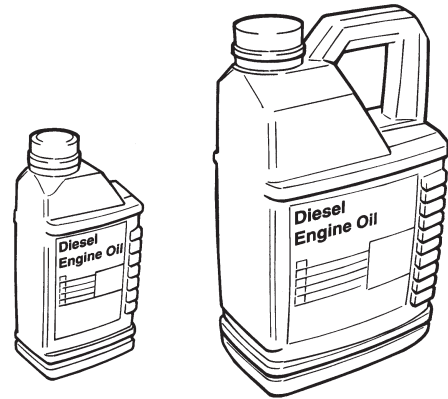
Below is a range of products which can be purchased as accessories

**Note: Not all accessories can be fitted to all engines. Ask your Volvo Penta service dealer for advice.**

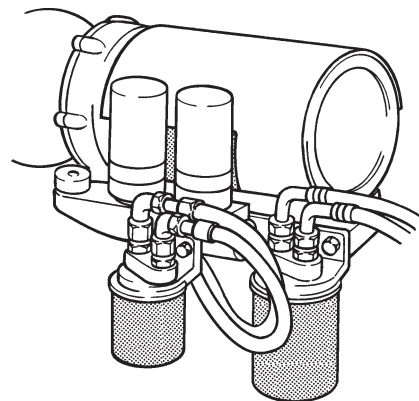
- Volvo Penta lubricating oils:
  - VDS-2\*, SAE 15W/40
- Volvo Penta antifreeze (glycol) for the freshwater system
- Volvo Penta anti-corrosive agent\*\* for the freshwater system
- Extra instrument panels:
  - Auxiliary panel
  - Panel for Flying Bridge (alternative operating position)
  - Extra alarm panel
- Extra generator incl. regulator to be fitted at the front of the engine:
  - 14V/130A (1800W)
  - 28V/100A (2800W)
- Extra fuel pre-filter with water separator:
  - Single or double
- Oil filter kit (alt. location of engine oil filters)
- TAMD71: By-pass filter for engine lubricating oil (standard on TAMD63, TAMD73 and TAMD74)
- Electric oil scavenging pump (12V or 24V).
- TAMD71 (Auxiliary engine variant): Manual oil scavenging pump
- Seawater filter
- Separate expansion tank
- Hot water outlet

\* VDS-2 oil allows longer intervals between oil changes (see "Engine, oil change intervals" on page 35).

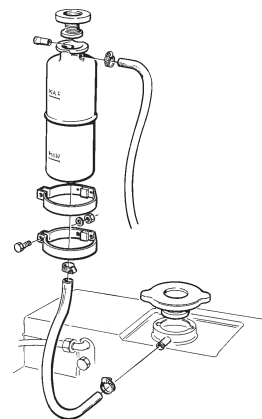
\*\* Must not be used together with antifreeze (glycol).



Volvo Penta VDS-2 oil



TAMD73, -74: Alt. location of engine oil filters (accessory)

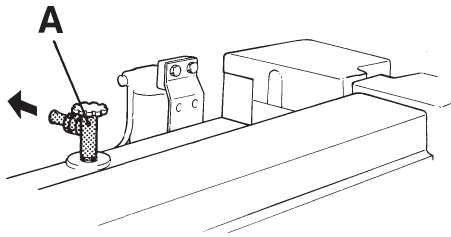


TAMD71: Connecting the supplementary expansion tank

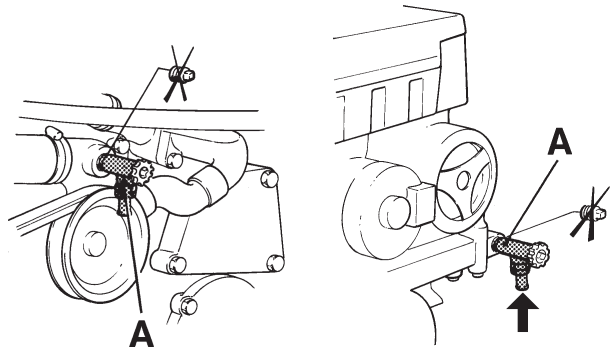
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**Hot water outlet:**

Location of angle nipples with cock (Thread: 1/2"-14 NPTF)



A. Angle nipple and cock (outlet)



TAMD63, TAMD73, -74

TAMD71

A. Angle nipple and cock (inlet)

- Exhaust riser
- Muffler
- Bilge/scavenging pumps, 24V (TAMD71 in commercial operation). Capacity at 1800 rpm and 3 m (9.8 ft) suction height:
  - 1 1/4" – 230 l/min.
  - 2" – 300 l/min.
- Hydraulic pump (only for engine with seawater pump)
- Trolling valve for Twin Disc reverse gears MG507-1 and MG507A-1
- Extra power take-off at the front of the engine (TAMD71B engines in commercial operation):
  - Pulley, mounted on crankshaft. Max. output 7.35 kW. Outer diameter Ø 158 mm (6.220").
  - Disengageable clutches, gear ratio 1:1.
    - Rockford BW 203 mm (8"). Max. output at 1800 rpm. 58 hp. Max. torque 226 Nm (23 kpm/166.7 lbf.ft.).
    - Rockford BW 254 mm (10"). Max. output at 1800 rpm. 80 hp. Max. torque 314 Nm (32 kpm/231.6 lbf.ft.).
- Toolkit

## Maintenance – Equipment, Accessories

### Controls (mechanical)

The control lever on Volvo Penta controls has an adjustable friction brake. This allows the lever weighting to be adapted to the personal needs of the owner.

Dual lever controls have individually adjustable friction brakes for each lever.

### Adjusting the friction brake

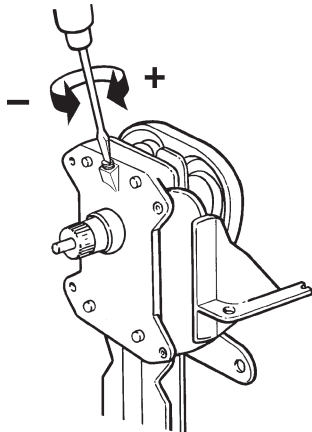
#### Single lever control

This brake is intended for controlling speed and is adjusted at **half throttle with the reverse gear engaged**. The brake does not affect shifting.

1. Remove the cover over the control.
2. Adjust the friction by turning the screw (see figure).

Turning the screw clockwise (+) makes the lever movement **stiffer**, while turning counterclockwise (-) consequently makes it **easier** to move the lever.

3. Reinstall the cover over the control.



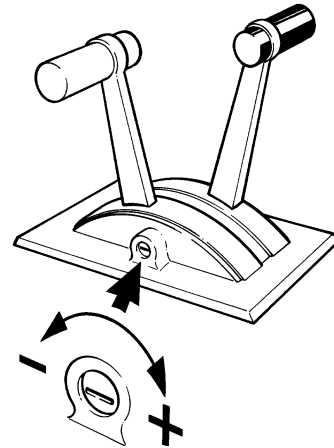
Adjusting the friction brake on single lever controls (single or dual)

#### Dual lever control

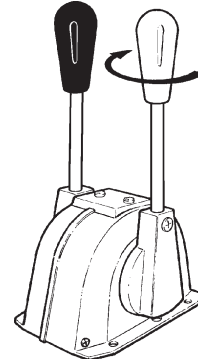
The brake is for the engine speed control.

Adjust the friction by turning the screw (see figure).

Turning the screw clockwise (+) makes the lever movement **stiffer**, while turning counterclockwise (-) consequently makes it **easier** to move the lever.



Adjusting the friction brake on dual lever controls



Adjusting the friction brake on NB dual controls

A brake can be adjusted by turning the red handle in order to counteract the regulator power.

## Notes

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## Notes

A series of horizontal dotted lines for writing notes.

***Owner***

Name: ..... Tel: .....

Address: .....

***Nearest Volvo Penta Service Dealer***

Name: ..... Tel: .....

Address: .....

***Engine information***

Engine type: .....

Serial No. ....

Reverse gear type/No. ....

Disengageable clutch type/No. ....



