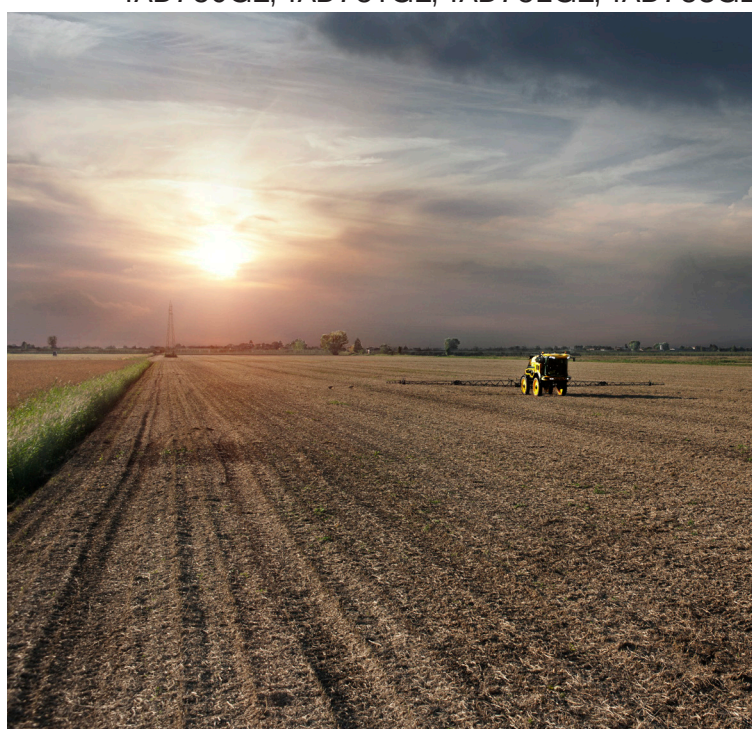


OPERATOR'S MANUAL

TAD550GE, TAD551GE

TAD750GE, TAD751GE, TAD752GE, TAD753GE, TAD754GE





WARNING! Operating, servicing and maintaining an engine can expose you chemicals including engine exhaust, carbon monoxide, phthalates, and lead which are known to the State of California to cause cancer and birth defects or other reproductive harm.

Breathing diesel engine exhaust exposes you to chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

To minimize exposure, avoid breathing exhaust when operating, servicing and maintaining the engine.

- Always start and operate the engine in a well-ventilated area.
- If in an enclosed area, vent the exhaust to the outside.
- Wear gloves or wash your hands frequently when servicing the vessel.
- Do not modify or tamper with the exhaust system.
- Do not idle the engine except as necessary.

For more information go to

www.P65warnings.ca.gov

www.p65warnings.ca.gov/products/diesel

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Foreword

Welcome!

Volvo Penta engines are designed to fulfill Volvo's core values; quality, safety and environmental care. After more than 100 years as an engine manufacturer, the Volvo Penta brand has also become a symbol of reliability, technical innovation, top-of-the-range performance and long service life. Volvo Penta engines are used all over the world, in all possible operating conditions.

Make sure to thoroughly read through the Operator's Manual regarding operating and maintenance. It contains the information you need to be able to operate and maintain the engine safely and correctly. Pay careful attention to the safety instructions included in the manual.

As the owner of a Volvo Penta engine, you become part of a worldwide network of dealers and service workshop that assist you with technical advice, service requirements and replacement parts. Contact your nearest authorized Volvo Penta dealer for assistance.

It is possible to buy additional literature about your Volvo Penta engine, e. g. the Service & Maintenance manual. More information on how to do this can be found at www.volvopenta.com.

Information about your closest Volvo Penta dealer and other useful news and information can be found at www.volvopenta.com and by following Volvo Penta on Facebook.



www.volvopenta.com



www.facebook.com/volvopenta

Safety Information

This chapter describes how safety precautions are presented in the manual and on the product. Read the chapter through very carefully before you start the engine or do any maintenance or service. It has to do with your safety; an incorrect operation can lead to personal injury and damage to products or property. It also gives you an introduction to the basic safety rules for using and looking after the engine.

If anything remains unclear or if you are unsure of something, contact your Volvo Penta dealer for assistance.

IMPORTANT:

Always follow local safety instructions and regulations.

Safety texts have the following order of priority:

DANGER!

Indicates a hazardous situation, which, if not avoided, result in death or serious injury.

WARNING!

Indicates a hazardous situation, which, if not avoided, could result in death or serious personal injury.

CAUTION!

Indicates a hazardous situation, which, if not avoided, could result in minor or moderate personal injury.

IMPORTANT:

Indicates a situation, which, if not avoided, could result in property damage.

NOTICE! Used to draw attention to important information that facilitates work or operations.



This symbol is may be used on the product to call your attention to the fact that this is safety information. Always read such information very carefully.

Make sure that warning and information symbols on the engine are clearly visible and legible. Replace symbols that have been damaged or have been painted over.



In some cases, this symbol is used on our products and refers to important information in the Operator's Manual.

Most chemicals such as engine and transmission oils, glycol, petrol and diesel oil and chemicals used in workshops such as degreasing agents, paint and solvents are harmful to health.

Carefully read the instructions on the product packaging! Always follow the safety regulations, such as the use of protective masks, goggles, gloves, etc. Make sure that other personnel are not exposed to substances that are hazardous to health. Ensure good ventilation.

Manage used and leftover chemicals in the prescribed manner.

Daily Checks

⚠ WARNING!

Do not start the engine if there is reason to suspect fuel leaks or if there is explosive material nearby.

Make it a habit to give the engine and engine compartment a visual check before the engine is started and after operations, once the engine has stopped. This helps you to quickly discover fuel, coolant or oil leakages or any other abnormality that has occurred, or is about to occur.

Personal safety equipment

⚠ CAUTION!

Always use appropriate safety equipment. Personal protective equipment does not eliminate the risk of injury but it will reduce the degree of injury if an accident does happen.

Some examples are ear protection, eye and face protection, protective footwear, personal protective equipment, head protection, protective clothing, gloves and respirators.

⚠ WARNING!

Ensure that all machine guards and safety devices are in place and are functional.

⚠ CAUTION!

Never use tools or products that show signs of damage.



P0024482

Protect your eyes

⚠ CAUTION!

Wear safety glasses.

Always wear safety glasses if there is a risk of splintering, sparks and spray from the electrolyte (so-called battery acid), or other chemicals. Your eyes are very delicate and damage can result in loss of sight!

Protect your skin

⚠ CAUTION!

Risk of skin damage.

Avoid getting oil on your skin! Prolonged or repeated exposure to oil can dry out the skin. Thereafter, irritation, dryness and eczema and other skin problems may occur.

Use protective gloves and avoid oil-soaked clothes and rags. Wash regularly, especially before eating. Wear suitable protective creams to prevent skin from drying out and to facilitate cleaning.

Fire safety

⚠ WARNING!

Fire and Explosion Risk!

Accidental spark could ignite fuel vapors.

All fuels – as well as many lubricants and chemicals – are flammable. Do not allow open flames or sparks near them. **Smoking forbidden!** Hydrogen from the batteries is also very flammable and explosive in certain mixture with air.

Ensure that the workplace is well ventilated and take the necessary precautions before welding or grinding begins. Always ensure that there is a fire extinguisher close at hand in the work area.



P0024470

Spare parts — safety

⚠ WARNING!

Always use spare parts with the same quality as genuine Volvo Penta parts to minimize the risk of an explosion or fire.

Components in fuel systems and electrical systems on Volvo Penta engines are designed and manufactured to minimize the risk of explosions and fire, in accordance with applicable legal requirements.

Used oils, filters and chemicals etc.

⚠ WARNING!

Risk of fire.

Store fuel soaked rags and other flammable material so that there is no danger of them catching fire.

Oil-soaked rags can spontaneously ignite under certain circumstances.

IMPORTANT:

Used fuel and oil filters are environmentally hazardous waste and must be taken to an approved waste management facility for correct handling, as must any used lubricating oil, contaminated fuel, paint residue, solvents, degreasers and wash residue.

Prevent start of the engine

⚠ WARNING!

Immobilize the engine by turning off the power supply with the main switch(es) and lock it (them) in the off position before starting work. Place a warning notice at the main switch.

If the engine is equipped with BMS (Battery Management System), always disconnect both battery cables from the battery terminals.

Ventilation when running the engine

⚠ WARNING!

Only start the engine in a well-ventilated area. If operating the engine in a closed area ensure that there is exhaust ventilation leading out of the work area to remove exhaust gases and crankcase ventilation emissions.

The engine must not be operated in areas where there are explosive materials or stored gas.



P0024481



P0024808

Rotating parts and hot surfaces

⚠ DANGER!

Working with or approaching a running engine is a safety risk. Watch out for rotating components and hot surfaces.

If the engine is in operation and operates another device, you must not, under any circumstances, staying close to the engine.

Work on running engines is strictly prohibited. There are however adjustments that require the engine to be run. Approaching a running engine is a safety risk. Loose clothing and long hair can get caught in the rotating parts; careless movements or a dropped tool can lead to serious personal injury.

Be careful to avoid hot surfaces (exhaust pipes, turbochargers, charge air manifolds, start elements etc.) and hot fluids in pipes and hoses on engines that are running or have just stopped. Re-install all protective covers that were removed during maintenance work before starting the engine.

Information on the engine

IMPORTANT:

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



P0024483

Prohibition on use of start spray

⚠ WARNING!

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



P0024688

Before start of engine

⚠ WARNING!

Never start the engine if there is reason to suspect fuel and/or gas leaks, or if there is explosive material nearby.

IMPORTANT:

Only start the engine with the air filter and protective caps fitted. Foreign objects in the inlet line could cause machine damage. Also make sure that no tools or other parts have been left next to the engine.

⚠ WARNING!

Never start the engine with the valve cover removed. There is a risk of personal injury. For engines with turbochargers, the rotating compressor turbine can in addition cause serious personal injuries.

Before any work on the electrical system

⚠ WARNING!

Always stop the engine first. Then disconnect the current at the main switches and any external power supply before working on the electrical system – to minimize the risk of electrical hazards.

IMPORTANT:

Never disconnect the current using the main switches when the engine is running or by disconnecting the battery cables. The alternator and electronics could be damaged.

Avoid damage to the engine control module and other electronics

IMPORTANT:

Switch off the main switch before connecting or disconnecting a connector.

Before welding work

IMPORTANT:

Before any work with electric weld can begin, the connection to all control units must be disconnected. After finished welding, re-connect the connection to all control units before connecting any battery cable.

Before any work on the cooling system

⚠ WARNING!

Stop the engine and let it cool before starting work on the cooling system. Hot fluids and hot surfaces can cause burns.

Hot coolant under pressure

⚠ CAUTION!

Hot coolant can cause burns. Avoid opening the filler cap for the coolant when the engine is still hot. Steam or hot coolant can spray out and system pressure is lost.

Open the filler cap slowly and release the pressure in the cooling system if the filler cap or valve must be opened – or if a plug or a coolant hose must be removed from a hot engine.

Hot oil under pressure

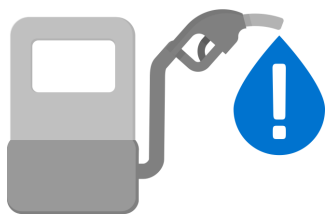
⚠ CAUTION!

Hot oil can cause burns. Avoid getting hot oil on the skin. Ensure that the lubrication system is not pressurized before starting any work. Never start or operate the engine without the oil filler cap is on. There is a risk that hot oil can spray out.

Refueling

⚠ WARNING!

There is always a risk of fire and explosion during refueling. Smoking is forbidden and the engine must be stopped.



P0024477

Proper fuel quality

IMPORTANT:

Always use the fuel recommended by Volvo Penta. See *Technical Data* in Operator's Manual. Other fuel can damage the engine. Wrong fuel quality can also lead to higher service costs.

⚠ WARNING!

Risk of personal injury. Wrong fuel quality in a diesel engine can cause the fuel control mechanism to bind which can cause the engine to overspeed!

Legal requirements to use proper fuel

IMPORTANT:

To meet regulatory requirements for certified emission levels must always recommended fuel according to *Technical Data* in the Operator's Manual be used.



P0024488

At any leak detection on the fuel system

⚠ WARNING!

Wear safety goggles! Be extremely careful when searching for leaks in the fuel system high-pressure circuits. There is very high pressure in the jet from pipes and injectors. The fuel may penetrate the tissue and cause serious risk of blood infection (septicemia).

Handling of fuel pipes

IMPORTANT:

High pressure pipes for fuel must not be bent or straightened under any circumstances. Cracks may occur. Damaged pipes must be replaced.

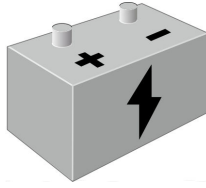
Safe handling of batteries

⚠ WARNING!

Risk of fire and explosion. Never allow an open flame or electric sparks near the batteries.

A spark caused by an incorrectly connected battery can be enough for the battery to explode with serious injuries.

Do not touch the connections during start attempts. Sparking hazard! Do not lean over batteries.



P0024468

Correct polarity of the batteries

IMPORTANT:

Make sure that the positive (+) and negative (–) battery cables are correctly connected to the corresponding battery terminals. Wrong connection may cause severe damage to electrical equipment.

Risks of electrolyte in batteries

⚠ WARNING!

Always wear protective goggles when charging or handling batteries.

Battery electrolyte is highly corrosive.

Rinse immediately with copious amounts of water if the electrolyte gets in your eyes. Search directly after the rinsing help by medical staff.

If it comes electrolyte to unprotected skin, wash immediately with soap and water.

Layout of the battery compartment

IMPORTANT:

Make sure the battery compartment is designed according to current safety standards.

Cleaning the engine and components

IMPORTANT:

Never use a high pressure washer for cleaning of engine or engine components.



P0024486

Cleanliness for sensitive components

IMPORTANT:

Observe meticulous cleanliness when handling system components.

Even minimal amounts of dirt could cause a breakdown.

Adjustment of the clutch

⚠ CAUTION!

Clutch adjustments must be carried out with the engine stopped.

Introduction

Check that you have received the correct operator's manual before continuing reading. If not, please contact your Volvo Penta dealer. Read the Operator's Manual carefully and learn to handle the engine, controls and other equipment in a safe manner before you start the engine.

For engine designations, refer to *Engine*. The designation is stated on the engine plate, refer to *Identification Numbers*.

The illustrations in this book may cover several product types, which means that there may be slight differences between the illustrations and the purchased product. This does, however, not affect the validity of the information and/or instructions in the manual. Volvo Penta reserves the right to make alterations to specifications, design features, and illustrations without prior notice.

At service, software can be updated that affects the functionality described in this manual.

About this manual

This Operator's Manual contains the information required for the correct, safe operation and maintenance of your Volvo Penta engine. Read the Operator's manual carefully and learn to handle the engine and other equipment in a safe manner before you start the engine.

Warranty

Your new Volvo Penta engine is covered by a limited warranty, subject to the conditions compiled in the Warranty Information. Note that AB Volvo Penta's liability is limited to the specification in the Warranty Information (included CD) and Emission Control System Warranty Statement.

Read the information carefully, as soon as possible after delivery. It includes important information about service and maintenance; the owner is responsible for being familiar with, checking and implementing these. Otherwise AB Volvo Penta may deny its warranty obligations in part or in full.

Contact your Volvo Penta dealer if you have not received the Warranty Information or Service Book.

Running in the engine

The engine must be run in during its first 10 operating hours, as follows:

Run the engine in normal operations. However, full load may not be applied other than for short periods. Never run the engine for long stretches at constant speeds during this period.

Higher oil consumption is normal during the first 100–200 hours of operation. For this reason, check the oil level more frequently than the normal recommendation.

When a disengageable clutch is installed, it should be checked more carefully during the first days. Adjustments may be necessary to compensate bedding-in of the friction plates.

Fuel, oils and coolant

Only use the fuels and oils recommended in the Operator's Manual, since other grades may cause malfunctions, increased fuel consumption, and possibly shorten the life of the engine.

Always change the oil, oil filters, and fuel filter at the specified maintenance intervals.

Make sure to always use suitable and correctly mixed coolant.

Future warranty claims related to engine and accessories may be denied if an unsuitable coolant has been used, or if the instructions for coolant mixture have not been followed.

Maintenance and replacement parts

Volvo Penta engines are designed for maximum reliability and long life and built to withstand a demanding environment. The engines also are designed to have a minimal environmental impact. These qualities will be maintained through regular servicing and the use of spare parts with the same quality as genuine Volvo Penta parts. If reliable and purpose-built parts are not used, your safety, health, and the machine's function may be compromised. Volvo Penta has a world-wide network of authorized dealers.

The authorized dealers are Volvo Penta product specialists, and have the accessories, genuine parts, test equipment and special tools needed for high quality service and repair work. Always observe the maintenance intervals in the manual, the complete Service Protocol can be found at volvopenta.com. Remember to note the engine / transmission identification number when you **order service and spare parts**.

Excessive strain on a product and components

Volvo Penta products and components are not dimensioned for external loads. Never stand or step onto an engine, transmission or its components. Loads can bring about damage and the malfunction of a product or property.

Environmental care

Environmental care is a core value at Volvo Penta. Energy efficiency and low emissions are among the most important product related aspects and priority focus areas for Volvo Penta business. Several of the global challenges the world faces are directly or indirectly related to power industries and transports. We recognize that Volvo Penta is part of the environmental problems, but we are also convinced that we are a part of the solution.

Volvo Penta currently has a broad engine program in which great advances have been made in reducing exhaust emissions in the same time as the fuel consumption has been improved. Through regular maintenance, the Volvo Penta engines retain its low fuel consumption and low emissions. We hope that you will be keen to preserve these qualities.

Always follow the directions in the Operator's Manual regarding fuel grades, operation and maintenance to avoid unnecessary environmental impact. Contact your Volvo Penta dealer if you notice any changes such as increased fuel consumption or exhaust smoke.

Remember always to hand in environmental hazardous waste such as drained oil, coolant, old batteries, etc. for treatment at a recycling facility. Our united efforts can make a valuable contribution to the environment.

Certified engines

If you own an emission-certified engine used in an area where exhaust emissions are regulated by law, this places special demands on the care and maintenance you provide your engine.

NOTICE! Neglects or failure to follow the points listed here may invalidate the engine emission certificate. This means AB Volvo Penta can no longer guarantee engine conformity with the certified model. Volvo Penta is not responsible for damages or costs arising as a result of this.

- Certification means that an engine type has been checked and approved by the relevant authority. The engine manufacturer guarantees that all engines of the same type are equivalent to the certified engine.
- It is the responsibility of the operator/user to ensure that no intentional misuse of the engine takes place.
- Volvo Penta maintenance and service intervals must be complied with.
- Any case of malfunction must be rectified without delay.
- Only use genuine Volvo Penta parts or spare parts with the same quality as genuine Volvo Penta parts.
- Volvo Penta recommends that service to injection pumps, pump settings and injectors always are carried out by a qualified workshop.
- The engine must not be converted or modified in any way, except with accessories and service kits that Volvo Penta has approved for the engine.
- No installation changes to the exhaust pipe and engine air inlet ducts may be made.
- No warranty seals (where present on the product) may be broken by unauthorized persons.
- The general instructions in the Operator's Manual concerning operation, service and maintenance apply.

Volvo Penta Dealer Network

The Volvo Penta global network of authorized dealers is at your service. We strongly recommend that you take your product to an authorized Volvo Penta dealer for service and repair. They are specialists in Volvo Penta products and have the accessories, genuine Volvo Penta parts, the special tools and the latest service information for high quality service and repair work.

Dealer Locator Services

Locate the nearest Volvo Penta dealer through our dealer locator on **www.volvopenta.com** or download the dealer locator app to your smartphone.

Volvo Penta Action Service

Our global dealer network, your first line of contact, is backed up by Volvo Penta Action Service, a phone based breakdown and support service providing assistance 24 hours a day, every day of the year.

How it works

A dedicated operator will support you all the way through your case and keep you updated on status and progress.

Whenever on-site assistance or technical support is needed, the operator will put you in contact with the closest Volvo Penta dealer that can support your product.

Phone numbers

Find your Volvo Penta Action Service phone number and more information on **www.volvopenta.com**.



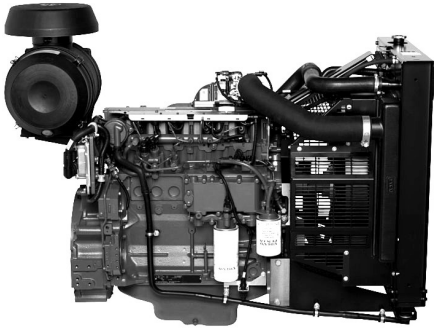
Presentation

Engines

This Operator's Manual refers to TAD550GE, TAD551GE, TAD750GE, TAD751GE, TAD752GE, TAD753GE, and TAD754GE industrial engines.

These engines are in-line, direct injected 4-cylinder and 6-cylinder diesel engines. The engines are equipped with common rail fuel injection systems, electronically controlled fuel management (EMS 2), turbochargers, thermostatically controlled cooling systems and electronic speed control.

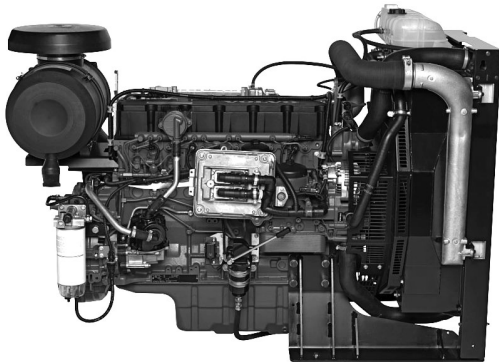
TAD550–51GE and TAD750–51GE engines are fitted with internal EGR (Exhaust Gas Recirculation). TAD752–54GE engines are equipped with external EGR (Exhaust Gas Recirculation).



TAD550-551GE



TAD750-51GE



TAD752-54GE

EMS (Engine Management System)

EMS is an electronic system with CAN communication (Controller Area Network) for diesel engine control. The system was developed by Volvo and includes fuel control and a diagnostic function.

Summary

The system comprises such items as a control unit, sensors and injectors. The sensors send input signals to the control unit, which in turn controls the injectors.

The information from the sensors gives exact data about prevailing operating conditions and allows the processor in the control module to calculate the correct injection amount, injection timing and check engine health.

Input signals

The control unit receives input signals about engine operating conditions from the following components:

- coolant temperature sensor
- charge air pressure and temperature sensor
- rpm sensor, camshaft
- rpm sensor, flywheel
- coolant level sensor
- oil pressure sensor
- fuel pressure sensor
- water-in-fuel indicator
- fuel pressure in distributor manifold

Output signals

The control module uses the input signals to control the following components:

- unit injectors
- starter motor
- main relay
- pre-heating relay
- MPROP, high pressure fuel pump

Fuel control

The engine fuel requirement is analyzed up to 100 times per second. The amount of fuel injected into the engine and the injection advance are fully electronically controlled via fuel valves on the unit injectors.

This means that the engine always receives the correct volume of fuel in all operating conditions, which provides lower fuel consumption and minimal exhaust emissions etc.

Diagnostic Function

The task of the diagnostic function is to detect and locate disturbances within the EMS 2 system, to protect the engine, and to provide information about problems that arise.

If a malfunction is detected, it is announced by warning lamps, a flashing diagnostic lamp or in plain language on the instrument panel, depending on the equipment used. If a fault code is obtained as a flashing code or in plain language, it is used for guidance in any fault tracing. Fault codes can also be read by the Volvo VODIA tool at authorized Volvo Penta workshops.

If there is a serious malfunction, the engine will shut down altogether, or the control unit will reduce the power output (depending on application). Here too, a fault code is set for guidance in any fault tracing.

Instruments and Controls

Display Control Unit

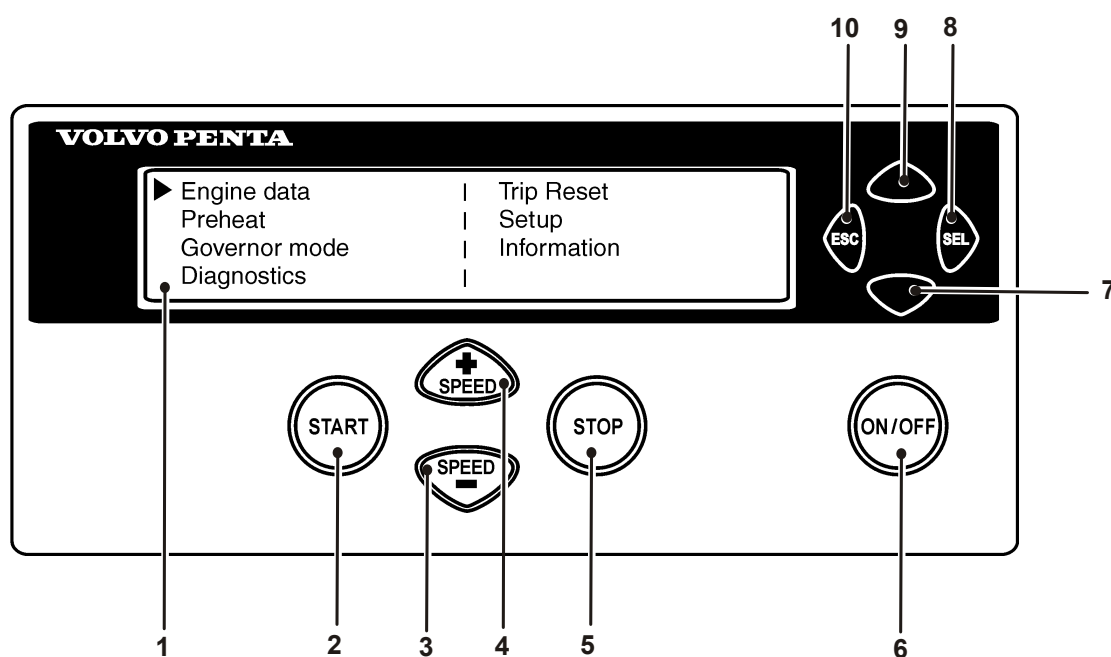
The DCU control panel is available as an optional accessory for the EMS (Engine Management System) electronic control system.

The DCU is a digital instrument panel which communicates with the engine control unit. The DCU has several functions, such as engine control, monitoring, diagnostics, and parameter setting.

The menus in the DCU system can be used to check, and in some cases to set, a number of different functions in the EMS system.

NOTICE! Settings and what engine data that appears in the display may vary depending on installation and engine model.

NOTICE! The menus and illustrations shown here are the English version. The language can be changed, however; refer to the *Setup* menu.



P0002062

Start

When the DCU panel is started, the “Engine Data” menu is displayed; press “ESC” to come to the main menu.

- | | |
|---------------------------------|---|
| 1 LED display | 6 ON/OFF. Starts and stops the system |
| 2 START. Starts the engine | 7 Scroll downwards in menus |
| 3 SPEED - . Reduces engine rpm | 8 SEL. Selects in menus |
| 4 SPEED +. Increases engine rpm | 9 Scroll upwards in menus |
| 5 STOP. Stops the engine | 10 ESC. Return to previous menu selection |

► Engine data		Trip Reset
Preheat		Setup
Governor mode		Information
Diagnostics		

P0002063

► Eng speed	rpm		Boost prs	kpa
Cool tamp	c		Boost tmp	C
Oil pres	kpa		Oil temp	C
Eng hours	h		Batt Volt	V

P0002064

Menus

There are several sub-menus under each main menu. There is not space for all the menu choices on the display. To scroll through the menus, use the **7** and **9** buttons on the display. Press the **SEL** button **8** to make a selection. Refer to the illustration on the previous page.

NOTICE! The **Setup** menu can be used to select the language that you want to use on the display.

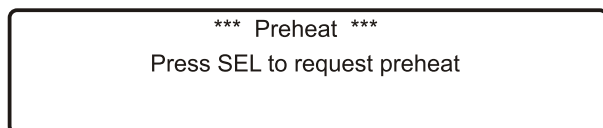
Main menu

- **Engine data**, current engine data
- **Preheat**, manual activation of pre-heating. Must be activated with temperatures below 0°C (32°F)
- **Governor mode**, activation of droop
- **Diagnostics**, shows fault codes as text
- **Trip reset**, resets trip data
- **Setup**, parameter setting
- **Information**, shows the currently applicable hard/software, data sets and engine identification for the engine and DCU data

Engine data

shows relevant engine data.

- Engine speed, can be controlled with the **SPEED+** and **SPEED-** buttons (rpm)
- Charge pressure (kPa)
- Coolant temperature (°C)
- Charge air temperature (°C)
- Oil pressure (kPa)
- Oil temperature (°C)
- Engine hours (h)
- Battery voltage (V)
- Fuel consumption (l/h)
- Instantaneous fuel consumption (trip fuel) (l)



P0002065

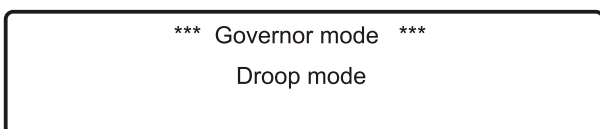
Preheat

manual activation of pre-heating. When it is activated, the EMS system senses at start-up if pre-heating is needed. For automatic pre-heating, refer to the *Setup / Preheat on ignition* menu.

NOTICE! Must be activated with temperatures below 0°C (32°F).

The pre-heating time is adjusted to suit the engine temperature, and can last for up to 50 seconds both before and after starting. Refer also to *Starting procedure EMS 2*.

- Press **SEL**, the text **Preheat requested** will be shown
- The display automatically returns to the **Engine Data** menu.

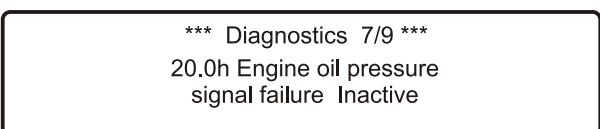


P0002066

Governor mode

activates/shuts off droop. To set the droop level, refer to the *Setup / Governor gradient or Governor droop* menu.

- Select **Isochronous mode** or **Droop mode** with the SEL button.

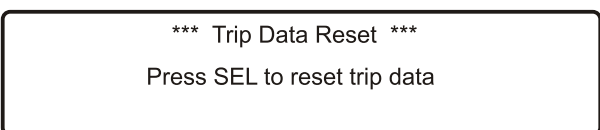


P0002067

Diagnostics

shows the error list containing the 10 latest active and inactive faults. The fault codes are shown as text on the display.

- Scroll through the fault list with the arrow keys.



P0002068

Trip Data reset

resets trip data, such as fuel consumption.

- Press the **SEL** button to reset trip data

Setup	
► Set Application :	(Versatile)
Units :	(metric)
Language :	(English)

P0002069

Setup

parameter setting in the engine's control systems. Different menus appear under **Customer parameter**, depending on whether **Versatile** or **Gen set** has been selected from **Set application**. See below.

The parameters that can be set/selected (choice is made with the SEL button) are:

- **Set application**, setting **Versatile** or **Gen set**. Depending on the selection made here, different menus will appear under **Customer parameter**.
- **Unit**, setting of units (metric or US imperial).
- **Language**, setting the language used on the display. Choose between English, French, German and Spanish.
- **Stop energized to**, setting of external stop input. Activated by **Stop** or **Run**.
Stop: The stop input must be connected to voltage to stop the engine.
Run: The stop input must be connected to voltage to run the engine.
- **Customer parameter**, setting alarm limits. Refer to *Customer parameter / Versatile and Customer parameter / Gen set*.
- **Throttle input setting**, setting of engine-speed control and voltage limits. Refer to *Throttle input setting*.
- *Display setting*, setting the display. refer to *Display setting*.

Customer parameter / Versatile

- **Idle engine speed** - setting idle speed.
- **Preheat on ignition** - activation of automatic pre-heating. The engine control system senses if pre-heating is needed and activates it directly at switch-on.
- **Governor gradient (Nm/rpm)** - setting of droop level, when activated. For activation, refer to *Governor droop* in the main menu.
- **Oil temp warning limit (°C)** - setting alarm limit for oil temperature.
- **Coolant temp warning limit (°C)** - setting alarm limit for coolant temperature.

Set up (Versatile)	
► Idle engine speed :	rpm
Preheat on ignition :	
Governor gradient :	Nm/pm

P0002070

Set up (Gen set)	
► Primary engine speed :	
Preheat on ignition :	
Governor droop :	

P0002071

Customer parameter / Gen set

- **Primary engine speed** - selection of engine rpm, 1500 or 1800 rpm.
- **Preheat on ignition** - activation of automatic pre-heating. The engine control system senses if pre-heating is needed and activates it directly at switch-on.
- **Governor droop (%)** - setting of droop level, when activated. For activation, refer to "Governor droop" in the main menu.
- **Overspeed limit (%)** - setting of limit for overspeed alarm, % of set engine rpm.
- **Overspeed shutdown** - activation of engine shut-down with overspeed alarm. Refer to "Overspeed limit" to activate the alarm limit for the excess rpm alarm.
- **Oil temp warning limit (°C)** - setting alarm limit for oil temperature.
- **Coolant temp limit (°C)** - setting alarm limit for coolant temperature.

Setup(Throttle)	
Setup throttle mode : *** OFF ***	

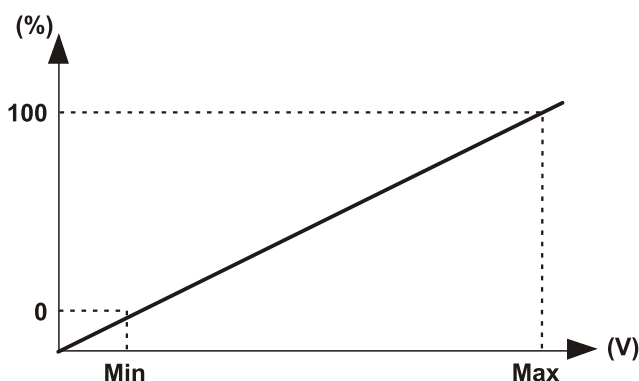
Setup(Throttle)	
► Set throttle mode :	
Set idle voltage :	
Set mx voltage :	

P0002955

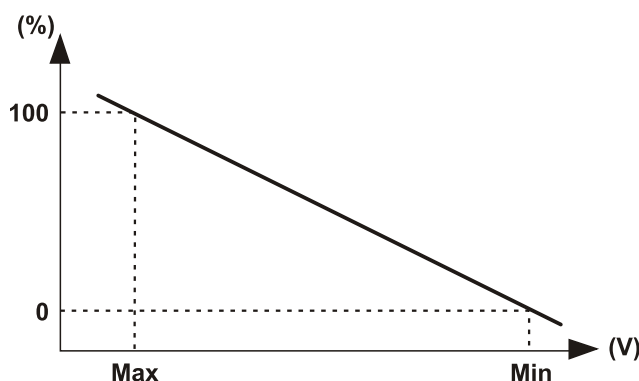
Throttle input setting

rpm control setting (throttle operation).

- **Set throttle mode** - OFF - engine rpm is controlled via the DCU panel.
ext throttle input - engine speed is controlled with a potentiometer (accelerator).
ext voltage input - engine rpm is controlled by an external unit.
- **Set idle voltage (V)** - idle voltage level setting.
- **Set max voltage (V)** - full throttle voltage level setting.



P0002074



Setup(Display)		
► Set contrast	:	60%
Set backlighttime	:	5 sec
Set backlight brightness	:	10

P0002075

*** Information ***		
► Engine hardware Id	:	
Engine software Id	:	
Engine Dataset1 Id	:	

P0002076

Display setting

settings for the display. Adjustment is made with the **7** and **9** buttons; see DCU panel illustration.

- **Set contrast (%)** - contrast setting.
- **Set backlight time (sec)** - time setting (in seconds) for display backlighting on, lighting is then shut off if the panel is not used.
- **Set backlight brightness** - display backlighting brightness setting.

Information

shows the data for the engine and DCU.

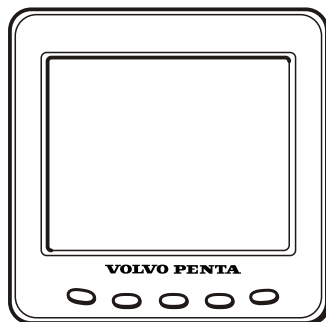
- **Engine hardware Id** - engine control unit part number.
- **Engine software Id** - engine control unit software part number.
- **Engine dataset1 Id** - engine data set 1 part number.
- **Engine dataset2 Id** - engine data set 2 part number.
- **Vehicle Id** - chassis number.
- **DCU hardware Id** - DCU part number.
- **DCU software Id** - DCU software part number.
- **DCU dataset1 Id** - DCU data set 1 part number.
- **DCU dataset2 Id** - DCU data set 2 part number.

DU (Display Unit)

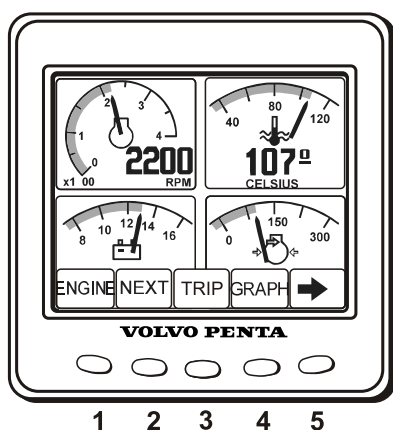
The DU is an computerized instrument panel which shows engine working values on an LCD screen. In the display it is possible to show multiple windows with different information, i. g. engine rpm, coolant temperature, fuel consumption and fault messages.

At start up, the display performs a self-test. If an constant signal is heard, the system has discovered a malfunction. The display will work but may act in an unexpected way.

The DU is connected between the engine control unit and the CIU or DCU.



P0002061



P0002382

Display modes

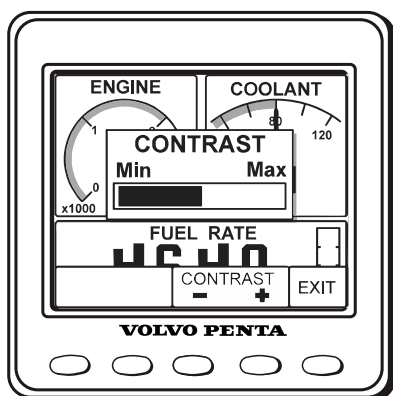
Press any of button 1–4 to view the function menu for the buttons, apperaring in the lower part of the display. To leave the menu, wait a few seconds or press button 5 (EXIT).

- 1 Engine
- 2 Multi
- 3 Trip
- 4 Graph
- 5 Exit

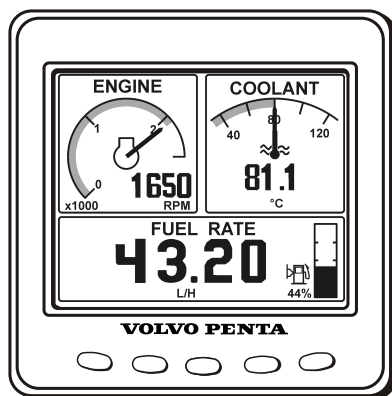
Contrast

In the display modes Engine, Trip and Graph, it is possible to adjust the contrast.

Press button 5 outside the menu and then + (button 4) or – (button 3) to adjust the contrast.



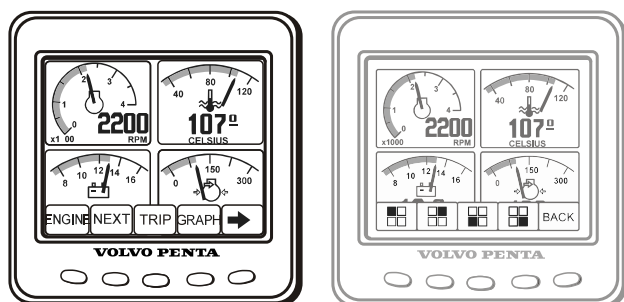
P0002403



P0002413

Engine

Rpm and coolant temperature is shown in the upper part of the display. In the lower part it will show trip computer and a fuel level indicator, if these function are installed.

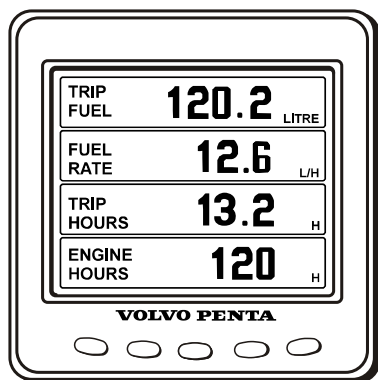


P0014208

Multi

In the multi mode, button 2, the information can be shown in four windows, analogue or digital. The display toggles between the two when button 2 is pressed repeatedly.

By pressing button 5, the right arrow, you choose what information to be shown in the different windows. Press repeatedly on the button that correspond to the window, until desired information is shown.



P0002418

Trip

To display the trip computer press button 3, Trip

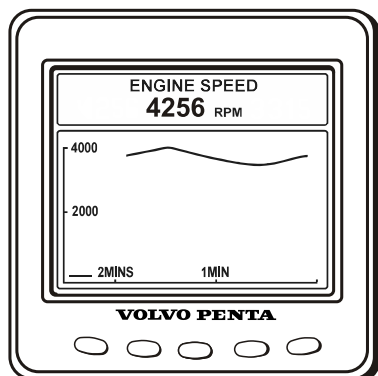
Trip Fuel, since last reset

Fuel Rate, fuel consumption

Trip hours, since last reset

Engine hours, total amount of operating hours

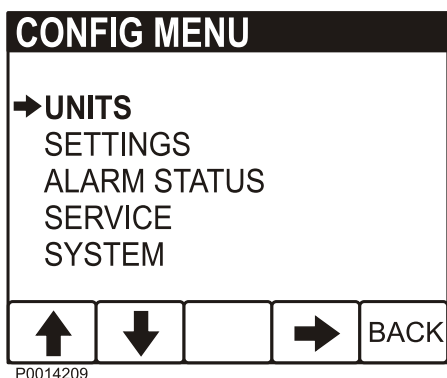
Reset by pressing button 3 for three seconds until a beep is heard.



P0014207

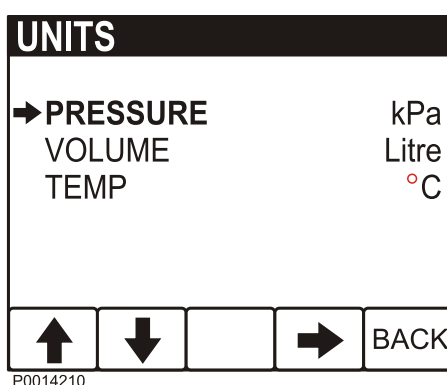
Graph

The information is shown as graphs. Press button 4 repeatedly to choose what information will be shown. The time interval is set in the Configuration menu. If the connection is broken there will be a straight line in the display.



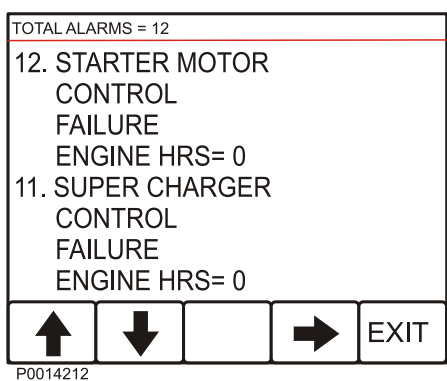
Configuration menu

Press button 5 for three seconds to enter the Configuration menu. Navigate with the up and down arrows, select with the right arrow.



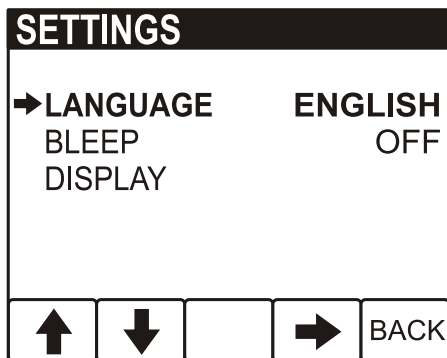
Units

- PRESSURE; kPa, PSI
- VOLUME; LITRE, GAL, Imperial GAL.
Fuel rate is adjusted according to volume unit, L/H, GAL/H, IGAL/H.
- TEMPERATURE; °C, °F



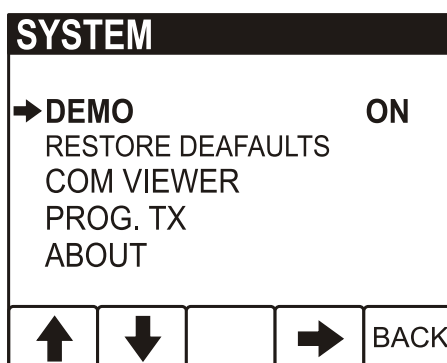
Alarm Status

List of active alarms, refer to *Reading fault codes via the DU (Display Unit)*



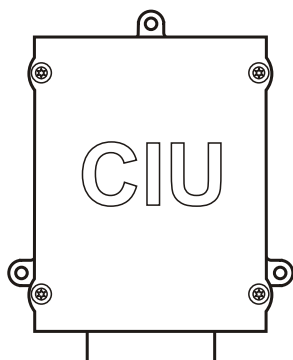
Settings

- LANGUAGE; setting of what language is to be used in the display.
- BLEEP; On/Off, setting if pressing the instrument buttons will be followed by a beep or not.
- DISPLAY; setting of ENGINE RPM gauges
RPM ENGINE, 2500–9000 RPM, in steps of 500 RPM
GRAPH RANGE, 2 minutes– 8 hours in the following steps,
2MINS, 10MINS, 30MINS, 60MINS, 2HRS, 4HRS, 8HRS



SYSTEM

- DEMO, switches the DEMO mode ON/OFF.
- RESTORE DEAFULTS, reset all configuration to default values.
- COM VIEWER, displays latest message on communication ports
- PROG TX, transfers content of the application on Flash memory to other CAN units on the same CAN bus.
- ABOUT, displays
ID NO – display serial number
EEPROM – number of write on EEPROM
VERS – software version number
CHK – Flash memory checksum
PART No – Volvo software part number
SOURCE – source of received data
LABEL – Allocated Label on the same bus.



P0002060

CIU (Control Interface Unit)

The CIU is a "translator" between the control unit (EMS) and the customer's own control panel. The CIU has two serial communication links, one fast and one slow.

The fast one is a so-called CAN link. All data related to instruments, indication lamps, connectors and potentiometers is controlled by this link.

The slow link manages diagnostic information for flashing codes etc.

Easy Link Instruments

The following Easy Link instruments are available:

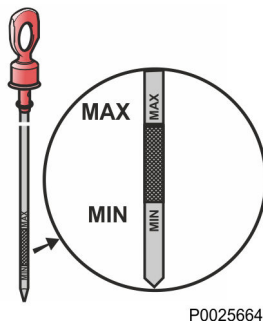
- Tachometer / hours counter (fault codes are also displayed on the tachometer display when the diagnostic button is pressed)
- Coolant temperature
- Oil pressure
- Oil temperature
- Battery voltage
- Alarm panel
- Turbo pressure

Starting

Make it a habit of giving the engine and engine room a visual check before starting. This will help you to discover quickly if anything abnormal has happened, or is about to happen.
Also check that instruments and warning displays show normal values after you have started the engine.

⚠ WARNING!

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



Before Starting

- Check that the oil level is between the MIN and MAX marks. Refer to *Oil level, checking and topping up*.
- Check the fuel pre-filter; refer to *Draining condensate, fuel system, page 60*.
- Check that no leakage of oil, fuel or coolant is present.
- Check the coolant level and that the radiator is not blocked externally. Refer to *Coolant Level, Checking and Topping Up, page 66* and *Charge Air Cooler, External Cleaning, page 70*.

⚠ WARNING!

Do not open the coolant filler cap when the engine is hot, except in emergencies as this could cause serious personal injury. Steam or hot fluid could spray out.

- Turn the main switch on.

IMPORTANT:

Never break the circuit with the main switch while the engine is running.
Alternator and electronics could be damaged.

- Move the engine speed control to idle, and open the disengageable clutch/gearbox if installed.

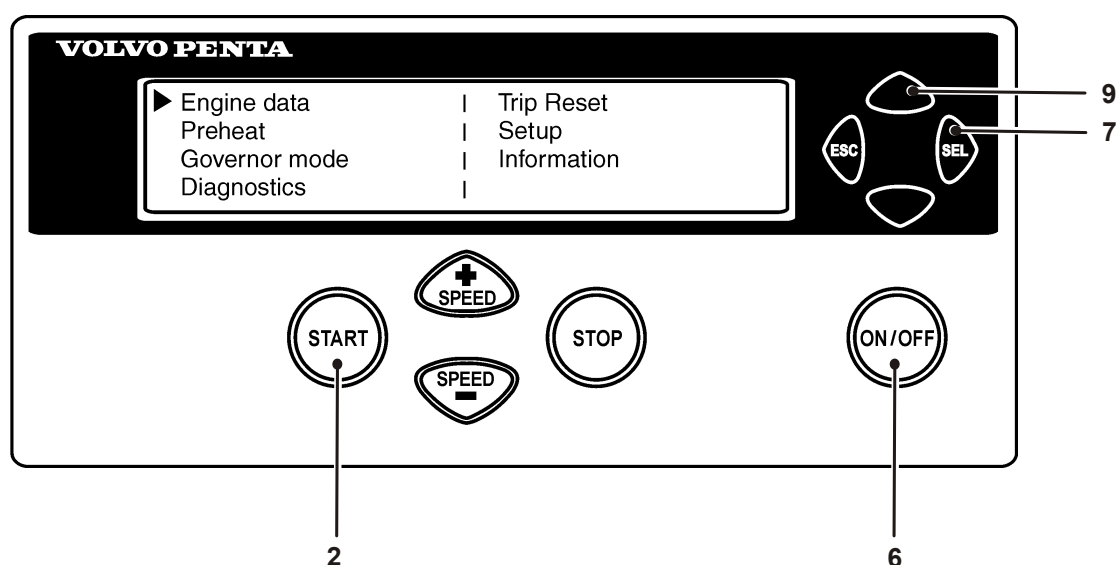
Starting the Engine

DCU (Display Control Unit)

The pre-heating time is adjusted to suit engine temperature, and may last up to 50 seconds both before and after starting.

The starter motor connection time is maximized to 20 seconds. After that, the starter motor circuit is cut for 80 seconds to protect the starter motor against overheating.

NOTICE! Preheat must be activated when the temperature is below 0 °C (32 °F)



P0008961

With preheating

- 1 Press the **ON/OFF** button (6).
- 2 Press the **SEL** button (7) to come to the main menu.
- 3 Navigate to **Preheat** with the browse button (9). Press the **SEL** button (7)
- 4 In the **Preheat** menu, press the **SEL** button (7) to select pre-heating; the text "Preheat active please wait" is shown in the display.
- 5 Wait until the text disappears and then press the **START** button (2).

Without pre-heating

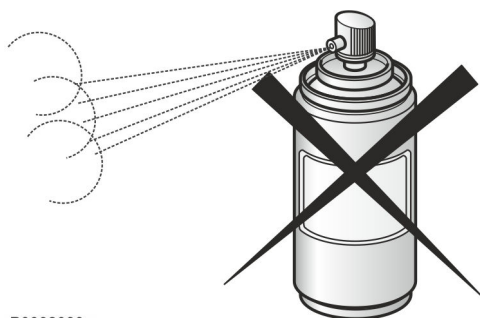
- 1 Press the **ON/OFF** button (6).
- 2 Press the **START** button (2).

Warm through the engine at idle (1,500/1,800 rpm).

Starting in Extreme Cold

Certain preparations must be made to enable engine starting in extreme cold, and in some cases to make starting possible at all:

- Use a winter grade fuel (of a well-known make) that is approved for the prevailing temperature. This reduces the risk of paraffin wax precipitation in the fuel system. At extremely low temperatures, we recommend the use of a fuel heater.
- Use a synthetic engine oil of a viscosity recommended for the prevailing temperature to achieve satisfactory lubrication. Refer to *Viscosity, page 76*. Synthetic lubricants are able to handle a wider temperature range than mineral-based lubricants.
- Pre-heat the coolant with a separately-installed electric engine heater. In extreme cases, a diesel-fired engine heater may be necessary. Ask your Volvo Penta dealer for advice.
- Make sure the cooling system is filled with a coolant mixture. Refer to *Maintenance, page 65*.
- The batteries must be in good condition. Cold weather reduces battery capacity. Increased battery capacity may be necessary.



P0002080

Never Use Start Spray

⚠ WARNING!

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

Starting Using Auxiliary Batteries

⚠ WARNING!

Explosion hazard. Batteries contain and give off an explosive gas which is highly flammable and explosive. A short circuit, open flame or spark could cause a violent explosion. Ventilate well.

- 1 Check that the auxiliary batteries are connected (series or parallel) so that the rated voltage corresponds to the engine system voltage.
- 2 First connect the red (+) jumper cable to the auxiliary battery, then to the flat battery. Then connect the black (-) jumper cable to the auxiliary battery and to a location that is **somewhere away from the discharged battery**, e.g. the main switch negative terminal or the negative terminal on the starter motor.
- 3 Start the engine.

⚠ WARNING!

Do not touch the connections during the start attempt: Risk of arcing.
Do not bend over any of the batteries either.

- 4 Remove the cables in the reverse order.

IMPORTANT:

The ordinary cables to the standard batteries must not under any circumstances be loosened.

Operation

Correct operating technique is very important for both fuel economy, environmental protection and engine life. Always let the engine warm up to normal operating temperature before operating at full power. Avoid sudden throttle openings and operation at high engine speed.

Reading the Instruments

Check all instruments directly after starting, and then regularly during operation.

NOTICE! On engines in continuous operation, it is recommended that the lubrication oil level is checked at least every 24 hours. Refer to *Oil level, checking and topping up*.

Alarms

If the EMS receives abnormal signals from the engine, the control unit generates fault codes and alarms, in the form of lamps and audible warnings. This is done by means of CAN signals to the instrument.

More information about fault codes and fault tracing can be found in the chapter *Fault handling, page 43*.

Maneuvering

Operation at low load

Avoid long-term operation at idle or at low load. It takes a long time for the engine to reach working temperature, resulting in high viscosity of the oil and large clearances in the engine mechanics. In cold climate, it takes even longer.

The combustion temperature and cylinder pressure can become so low that an effective combustion cannot be ensured. At these conditions unburned fuel could dilute the lubricant oil. Because of the low cylinder pressure, the piston ring performance could be affected causing oil from the crankcase to pass the rings and go further out with the exhaust gases. This mixture of unburned fuel and oil in exhaust gases is referred to as "slobber". A new engine produces more "slobber" at low load compared to an engine with more hours of operation.

At low load, the pressure in the turbocharger is low and oil could seep past the turbocharger seals and mix with the air into the engine. The consequences can be carbon build-up on valves, piston crowns and the exhaust turbine, which could affect engine performance.

Both conditions can lead to increased oil consumption and eventually external oil leakage from joints in the exhaust system. For example, leakage could be seen at the exhaust manifold, before and after the turbo, around the muffler and in worse case even in the exhaust end pipe. Consequences could lead to clogged exhaust gas recirculation systems and exhaust aftertreatment systems.

Signs of oil leaking caused by "slobber" do not indicate an engine problem but indicates low load operation. To minimize the risk of malfunctions caused by operation at low load, follow these points as a complement to normal maintenance:

- Run in the engine as soon as possible.
- Load the engine so it reaches working temperature as soon as possible.
- Turn off the engine instead of running on idle for longer periods.
- Avoid load levels below 20% as constant operation.
- If the engine is regularly tested without load, limit the duration of the operation to 5 minutes. Run the engine at full load for about 4 hours once a year, for

the carbon deposits in the engine and exhaust system to burn off.

- If visible slobber has occurred, it can be burned off by running the engine on at least 30% load for about 40-60 minutes.

Engine Shutdown

During longer breaks in operation, the engine must be warmed up at least once every two weeks. This prevents corrosion in the engine. If you expect the engine to remain unused for two months or more, it must be preserved: Refer to the chapter *Storage*.

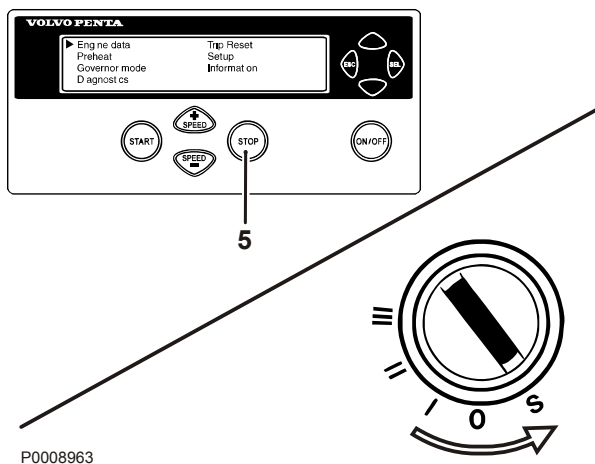
Before Engine Shutdown

Let the engine run at high idle (1500 or 1800rpm) for a minimum of 5 minutes before the shutdown after normal use. Normal use is defined as minimum 50% load. After use with less than 50% load, high idle for approximately 3 minutes is sufficient. This allows engine temperature equalization and prevents boiling once stopped and also allows the turbochargers to cool down. This contributes to long, fault-free service life.

NOTICE! Do not turn off the main switch within 30 seconds after turning off the ignition. This is in order to save engine data to the engine control unit.

Stop the Engine

- Disengage the clutch (if possible).
- Press the **STOP** button (5) / turn the key to **S**.



Auxiliary stop

TAD752GE, TAD753GE, TAD754GE

WARNING!

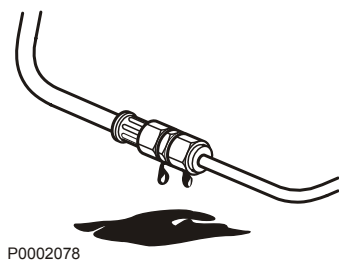
Working with or approaching a running engine is a safety risk. Watch out for rotating components and hot surfaces.

The auxiliary stop (AUX STOP) is located to the right of the steering unit.

NOTICE! The auxiliary stop may under no circumstances be used as the "routine" stop button.

After Engine Shutdown

- Check the engine and engine bay for leakage.
- Turn off the main switches before any long stoppage.
- Carry out maintenance in accordance with the maintenance schedule.



P0002078

Fault handling

Despite regular service in accordance with the planned maintenance schedule and perfect operating conditions, faults may occur that must be remedied before operations continue. This chapter describes the diagnostics function, simple fault tracing and the fault code register.

Diagnostic Function

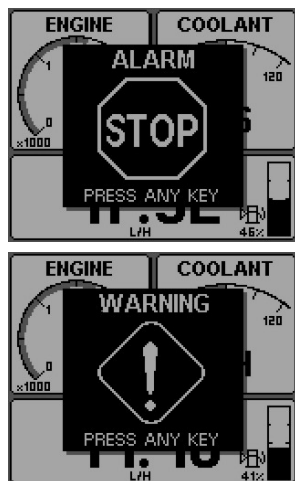
The purpose of the diagnostic function is to monitor, control and protect the engine and its surrounding system and components from damage, as well as to ensure a minimal environmental impact.

If a malfunction is detected the diagnostic function informs of the occurred fault in the form of a fault code. The fault code provides guidance when fault tracing. All fault codes and fault messages can be found in the *Fault Code Register*.

The operator is warned that there is a malfunction via the instruments. Depending on the instrumentation in use, the fault message is shown in various ways. Fault codes can also be read out by the Volvo Penta diagnostic tool.

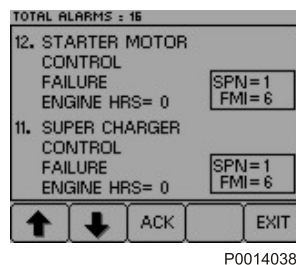
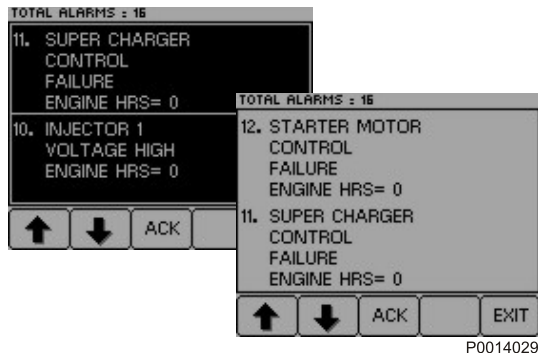
Depending on the severity of the fault, the diagnostic function will take various actions to protect the engine and limit emissions (e.g. torque derate, idle speed only, engine shut down etc.)

DU (Display Unit)



P0014030

- 1 If the system detects a fault, a pop-up is shown on the display. Depending on the severity of the fault the following text will appear
ALARM STOP / PRESS ANY KEY or
WARNING! / PRESS ANY KEY; a buzzer will sound.
- 2 Reduce engine speed to idle or shut down the engine.



- 3 Press the SEL button to get to the fault list. The fault list shows fault messages and the number of hours of operation when the fault occurred.
- 4 Press **ACK** to acknowledge the fault code. The display background changes color (and the buzzer stops). The fault must be acknowledged before it can disappear from the fault list.
- 5 Look up the fault code in the *Fault Code Register* and take the necessary actions.
- 6 Press button 4 for at least three seconds to view SPN and FMI codes.
- 7 Press **EXIT** to leave the fault list.

CIU (Control Interface Unit)

When the system detects a malfunction, the diagnostics lamp flashes. If the diagnostics button is pressed and then released, a fault code is flashed out.

The fault code consists of two groups of flashes, separated by a pause of two seconds. A fault code is obtained by counting the number of flashes in each group.

Example

☼ ☼ pause ☼☼☼☼ = fault code 2.4

The fault code is stored and can be read off as long as the malfunction remains. Information about causes, effects and actions required is available in the Fault Code chapter.

Do as follows to read off the fault code:

- 1 Press the diagnostics button.
- 2 Release the diagnostics button and note down the fault that is flashed out.
- 3 Repeat items 1–2. A new fault code will be flashed out if more faults are stored. Repeat until the first fault code reappears.

NOTICE! When the first fault code reappears, all fault codes have been read off.

If the diagnostics button is pressed after the fault has been rectified and the fault codes have been erased, code 1.1 “No fault” will be displayed.

Easy Link Instruments

- 1 When a malfunction is detected this is reported by the diagnostic lamp which starts to flash.
- 2 Press the diagnostics button. The fault code is shown as text in the tachometer display.
- 3 Look up the fault code in the *Fault Code Register* and take the necessary actions.
- 4 When the fault has been rectified, the fault code disappears from the display and the diagnostics lamp goes out.

Erasing fault codes

TAD550GE, TAD551GE, TAD750GE, TAD752GE, TAD753GE, TAD754GE

The memory of the diagnostic function is reset when the power to the engine is disconnected. When the power is switched on again, the diagnostic function will check if there are any malfunctions in the system. If so a new fault codes is registered.

If a malfunction has not been corrected it will be registered once again and has to be acknowledged again. The Volvo Penta diagnostic tool VODIA must be used to erase a fault code.

Fault Tracing

A number of symptoms and possible causes of engine malfunctions are described in the table below. Always contact your Volvo Penta dealer if any problems occur which you cannot solve by yourself.

IMPORTANT:

Read through the instructions for care and maintenance in before starting work.

Refer to *Safety precautions for maintenance and service operations*.

Symptoms and possible causes	
The diagnostics button indicator flashes	Refer to <i>Diagnostic Function</i>
Engine cannot be stopped	2, 5
Starter motor does not rotate	1, 2, 3, 4, 5, 6, 7, 24
Starter motor rotates slowly	1, 2
Starter motor rotates normally but engine does not start	8, 9, 10, 11,
Engine starts but stops again	8, 9, 10, 11, 13
Engine does not reach correct operating speed at full throttle	9, 10, 11, 12, 13, 21, 25, 26
Engine runs unevenly	10, 11
High fuel consumption	12, 13, 15, 25
Black exhaust smoke	12, 13
Blue or white exhaust smoke	15, 22
Lubrication oil pressure too low	16
Excessive coolant temperature	17, 18, 19, 20
Coolant temperature too low	20
No charge, or poor charge	2, 23

- 1 Discharged batteries
- 2 Poor contact/open circuit in cables
- 3 Main switch turned off
- 4 Main automatic breaker defective
- 5 Defective ignition switch
- 6 Defective main relay
- 7 Defective starter motor/solenoid valve
- 8 Lack of fuel:
 - fuel taps closed
 - fuel tank empty/wrong tank connected
- 9 Blocked secondary fuel filter/ primary filter (due to contamination, stratification due to low fuel level)
- 10 Air in the fuel system
- 11 Water/contaminants in fuel
- 12 Faulty injector
- 13 Insufficient air supply to engine:
 - blocked air filter
 - air leakage between turbo and inlet manifold
 - dirty compressor section in turbocharger
 - defective turbocharger
 - poor engine bay ventilation
- 14 Excessive coolant temperature
- 15 Coolant temperature too low
- 16 Oil level too low
- 17 Coolant level too low
- 18 Air in cooling system
- 19 Faulty circulation pump
- 20 Defective thermostat
- 21 Blocked charge air cooler
- 22 Oil level too high
- 23 Alternator drive belt slipping
- 24 Water entry into engine
- 25 High back pressure in exhaust system
- 26 Break in “Pot+” cable to pedal

Maintenance Schedule

Your Volvo Penta engine and its equipment are designed for high reliability and long life. The engines are built to have the smallest possible environmental impact. If given preventive maintenance, according to the maintenance schedule, these qualities will be retained and unnecessary malfunctions will be avoided. In order for the warranty to be valid, the owner must make sure that the services in the service intervals are performed.

NOTICE! For emission related warranty rights see Emission Control System Warranty Statement.

Service Intervals

Service intervals are shown below. The service content can be found in the Service Protocol available for download at www.volvopenta.com.

NOTICE! More information on how to perform service and maintenance can be found in the Service and Maintenance handbook. Information on how to purchase the Service and Maintenance handbook can be found at www.volvopenta.com.

Extended service intervals

The interval between engine oil changes may be extended in certain circumstances. To determine whether the service interval may be extended, Volvo Penta's conditions for extended service intervals must be met and an oil analysis performed. Contact your Volvo Penta dealer for further information.

Where both operational and calendar times are specified, perform the maintenance item at whichever time is the sooner.

Special Interval Service **S1** Every 125–600 hours / at least every 12 month⁽¹⁾⁽²⁾

Special Interval Service **S2** Oil analysis.

Special Interval Service **S3** After the first 500 hours.

Type A service	Every 500 hours of operation
Type B service	Every 1000 hours of operation
Type C service	Every 1500 hours of operation
Type D service	Every 2000 hours of operation
Type E service	Every 8000 hours of operation

1) Oil change intervals vary, depending on oil grade and sulfur content of the fuel. Refer to *Oil recommendations*.

2) Change oil filters every time the oil is changed.

Maintenance

This chapter describes the most common maintenance items. Refer to *Maintenance Schedule* for service intervals.

NOTICE! More information on how to perform service and maintenance can be found in the Service and Maintenance handbook. Information on how to purchase the Service and Maintenance handbook can be found at www.volvopenta.com.

CAUTION!

Read through the safety advice before starting any work.

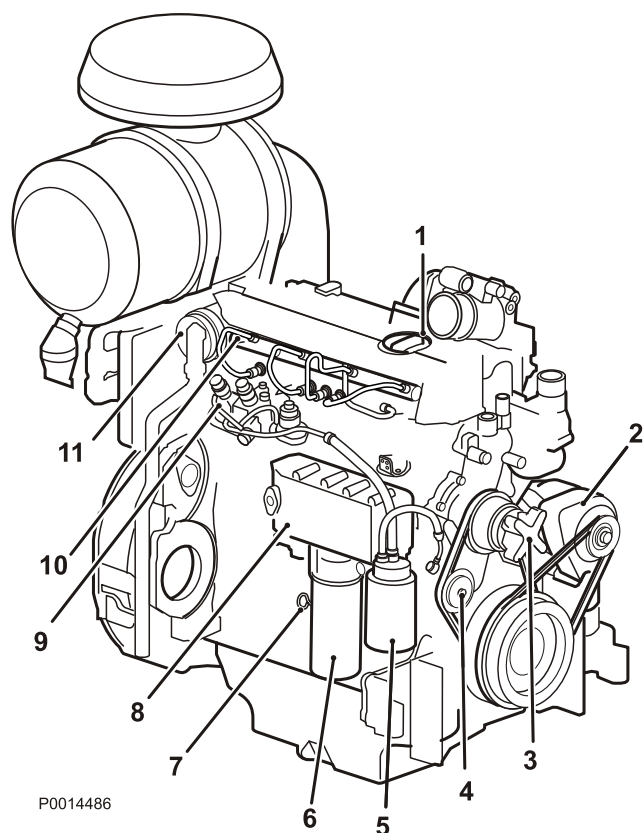
WARNING!

Care and maintenance work should be done with the engine stopped unless otherwise specified. Stop the engine before opening or removing the engine hatch/hood. Make it impossible to start the engine by removing the start key and cutting the system voltage with the main switches.

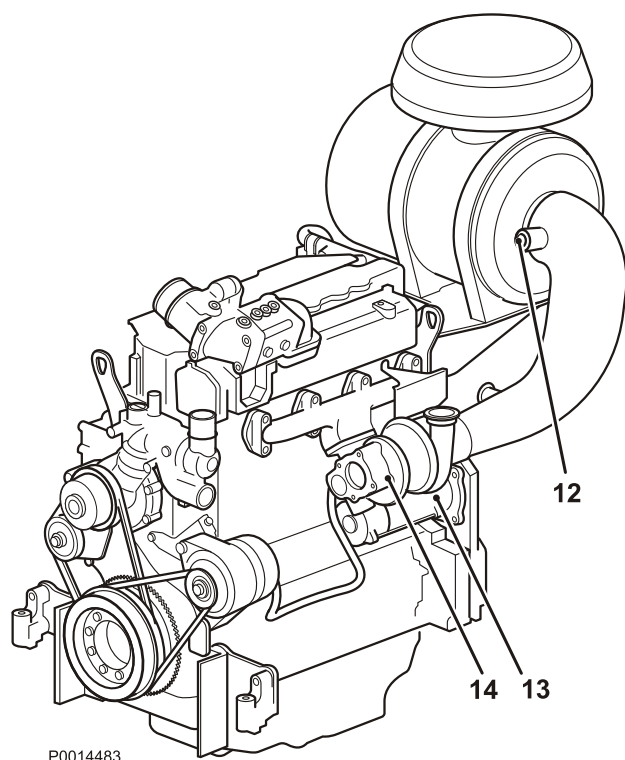
When ordering service or spare parts, always specify the engine and transmission identification number. Refer to *Technical Data*, page 82.

Orientation

TAD550GE, TAD551GE

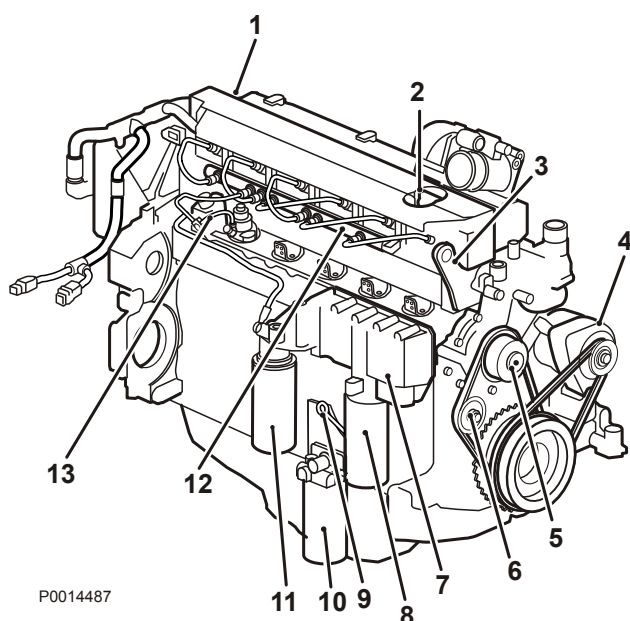


- 1 Oil filler cap, engine
- 2 Alternator
- 3 Coolant Pump
- 4 Fuel pump/Belt Tensioner
- 5 Fuel Filter
- 6 Oil filter
- 7 Oil dipstick, engine
- 8 Oil cooler
- 9 High-pressure pumps
- 10 Common rail-unit, with safety valve and rail-pressure sensor
- 11 Crankcase ventilation

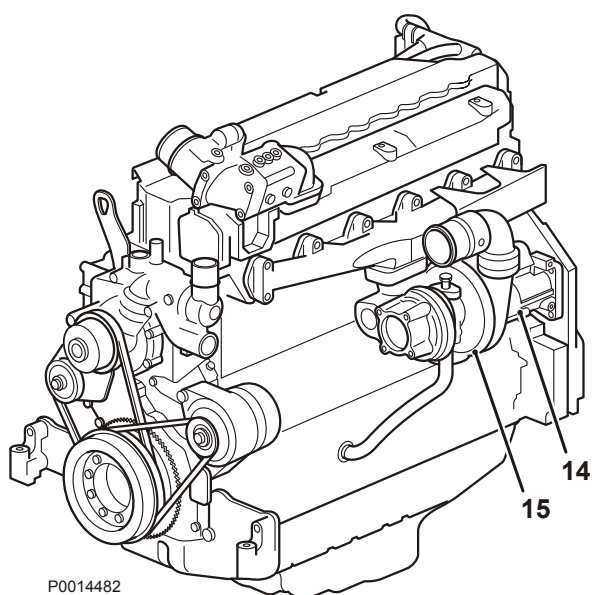


- 12 Air filter indicator
- 13 Starter motor
- 14 Turbo

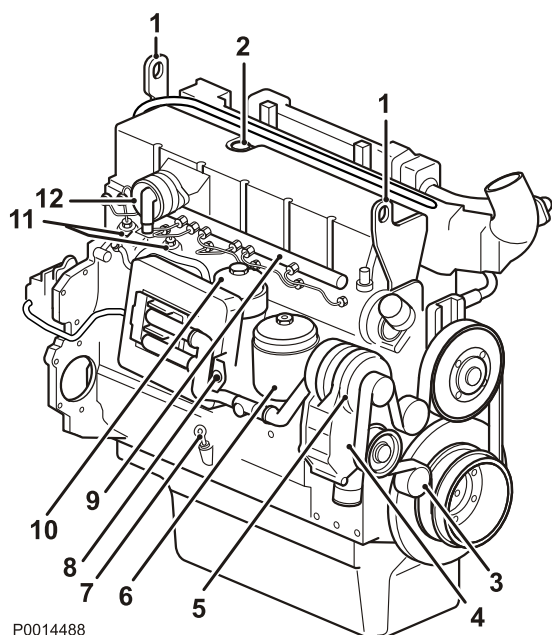
TAD750GE, TAD751GE



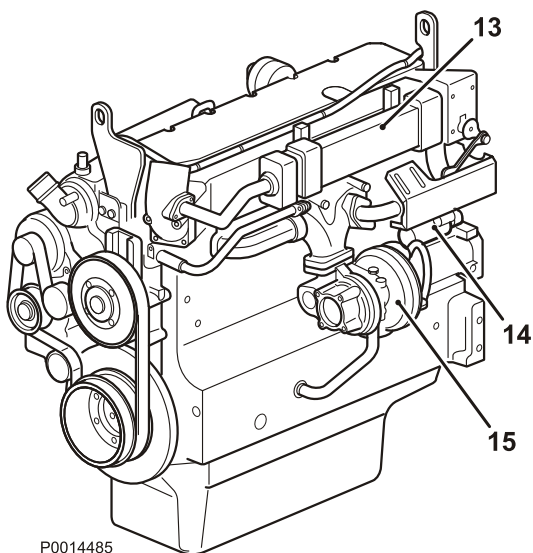
- 1 Crankcase ventilation
- 2 Oil filler cap, engine
- 3 Lifting eye
- 4 Alternator
- 5 Coolant Pump
- 6 Fuel pump/Belt Tensioner
- 7 Oil cooler
- 8 Oil filter
- 9 Oil dipstick
- 10 Fuel pre-filter
- 11 Fuel Filter
- 12 Common rail-unit, with safety valve and rail-pressure sensor
- 13 High-pressure pumps
- 14 Starter motor
- 15 Turbo



TAD752GE, TAD753GE, TAD754GE



- 1 Lifting eye
- 2 Oil filler cap, engine
- 3 Belt Tensioner
- 4 Coolant Pump
- 5 Alternator
- 6 Oil filter
- 7 Oil dipstick
- 8 Auxiliary stop
- 9 Common rail-unit, with safety valve and rail-pressure sensor
- 10 Fuel Filter
- 11 High-pressure pumps
- 12 Crankcase ventilation
- 13 External EGR
- 14 Starter motor
- 15 Turbo



Engine, General

General inspection

Make it a habit to give the engine and engine compartment a visual inspection before starting the engine and after operation once the engine has stopped. This will help you to discover quickly if anything abnormal has happened, or is about to happen.

Look especially carefully at oil, fuel and coolant leakage, loose bolts, worn or poorly tensioned drive belts, loose connections, damaged hoses and electrical cables. This inspection only takes a few minutes and can prevent serious malfunctions and expensive repairs.

⚠ WARNING!

Risk of fire.

Remove all accumulations of fuel, oil and grease when detected on the engine or in the engine room.

⚠ WARNING!

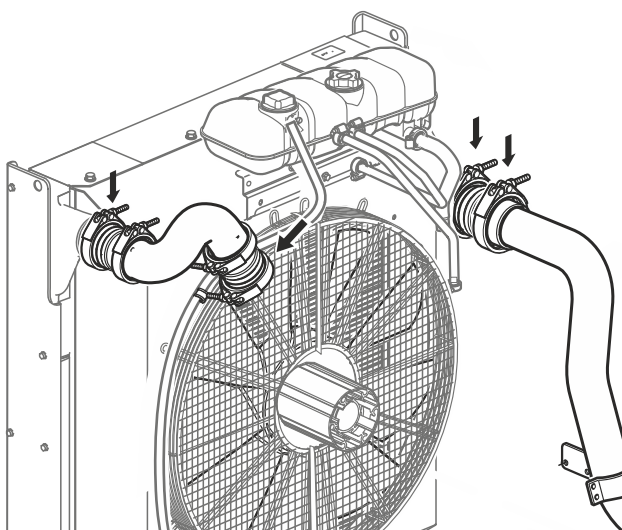
If an oil, fuel or coolant leak is detected, the cause must be investigated and the fault rectified before the engine is started.

IMPORTANT:

Washing with a power washer: Never aim the water jet at radiators, charge air cooler, seals, rubber hoses or electrical components.

Charge Air Pipe, Leakage Check

Inspect the condition of the charge air hoses, hose unions and clamp condition for cracks and other damage. Change as necessary.

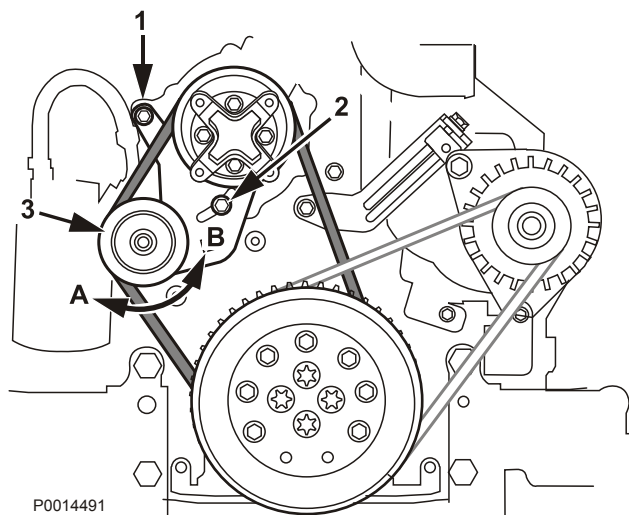


P0019135

Drive belt, check and change

TAD550GE, TAD551GE, TAD750GE, TAD751GE

IMPORTANT!



Always change a belt which is oily, worn or damaged. Belts which operate in pairs must be changed together.

IMPORTANT!

Check, tension and change drive belts only when the engine is stopped. Replace the drive belt guard.

NOTICE! The belt tension is correct when you can press the belts down 10 mm (0.4") between the pulleys.

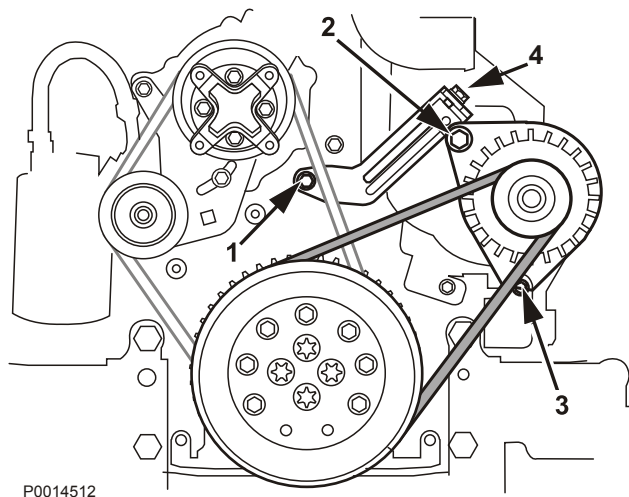
Drive belt, fuel pump and coolant pump

Adjustment

- 1 Loosen the screws 1 and 2.
- 2 Push the fuel pump in direction A until the correct belt tension is obtained.
- 3 Retighten the screws 1 and 2.

Replace

- 1 Remove the alternator drive belt.
- 2 Push the coolant pump in direction B.
- 3 Remove the drive belt. Check and clean the drive belt. Check the pulleys for wear..
- 4 Fit the new belt.
- 5 Push the fuel pump in direction A until the correct belt tension is obtained.
- 6 Retighten the screws 1 and 2.



Drive belt, alternator

Adjustment

- 1 Loosen the screws 1, 2 and 3.
- 2 Adjusting screw, 4, until the proper belt tension is obtained
- 3 Retighten the screws 1, 2 and 3.

Replace

- 1 Loosen the screws 1, 2 and 3.
- 2 Remove the old drive belt.
- 3 Fit the new drive belt.
- 4 Adjusting screw, 4, until the proper belt tension is obtained
- 5 Retighten the screws 1, 2 and 3.

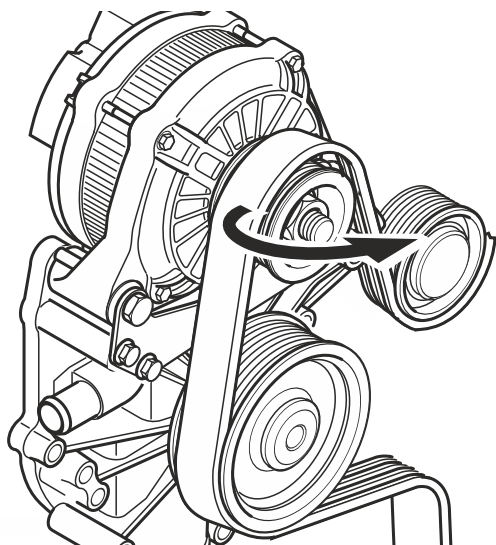
Drive belt, check and change

TAD752GE, TAD753GE, TAD754GE

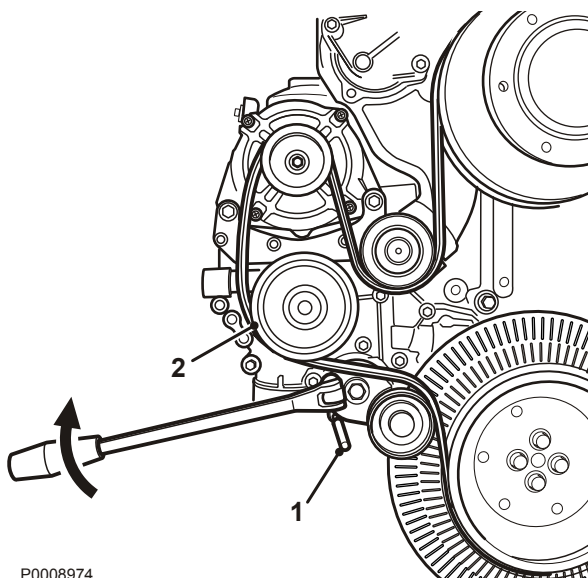
IMPORTANT!

Always change a belt which is oily, worn or damaged. Belts which operate in pairs must be changed together.

Inspection should be carried out after operation, when the belt is hot. It should be possible to depress the drive belt about 3-4 mm (0.12–0.16") between the pulleys. The drive belt has an automatic belt tensioner and therefore does **not** need to be adjusted.



P0003350



P0008974

- 1 Release the belt tensioner and lock it in place with a drift (1).
- 2 Remove the belt from the coolant pump (2) first. Install the new belt. Remove the belt tensioner and the drift (1). Check that the belts are correctly aligned in their grooves and are correctly tensioned.

Lubrication System

Oil change intervals may vary according to the lubrication oil grade, fuel sulfur content and running conditions. Refer to *Technical Data*, page 76.

The oil change interval may under certain conditions be increased. To see if the engine complies Volvo Penta oil analysis needs to be performed. Contact your Volvo Penta dealer for further information.

NOTICE! Oil change intervals must never exceed a period of 12 months.



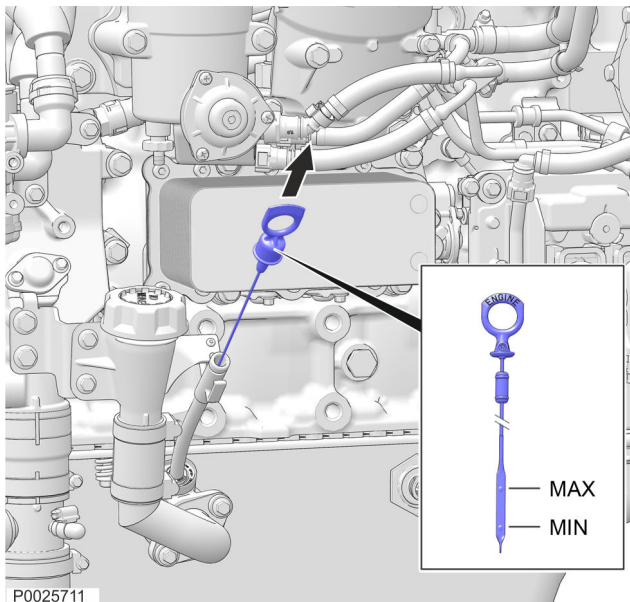
P0002089

Oil level, checking and topping up

⚠ WARNING!

Working with or approaching a running engine is a safety risk. Watch out for rotating components and hot surfaces.

- When checking the oil level the vehicle should stand on level ground.
- Only use a recommended grade of oil; refer to *Technical Data*, page 76.
- Make sure that the oil level is between the MIN and MAX marks. Do **not** fill above the maximum oil level.



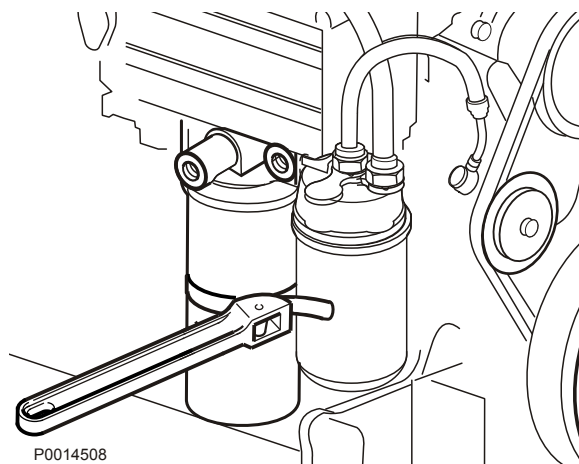
P0025711

Oil filter, Change

TAD550GE, TAD551GE, TAD750GE, TAD751GE

WARNING!

Hot oil and hot surfaces can cause burns.



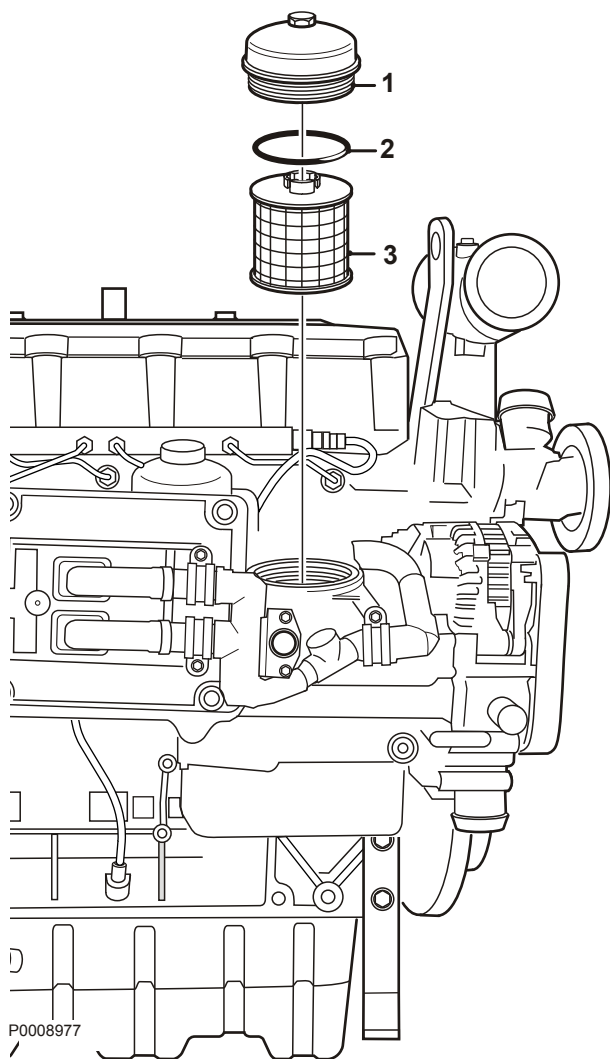
NOTICE! Always follow the recommendation of oil change intervals. Always change the oil filter at the same time as the oil change. Refer to *Oil Grade and Oil Change Interval*.

- 1 Clean the oil filter holder thoroughly to avoid dirt entry when the new filter(s) is/are installed.
- 2 Remove the filter (1). Check that the gasket has not been left behind on the engine.

NOTICE! Place a container under the filter so that the oil spillage.

- 3 Apply a light coat of engine oil on the new oil filter seal rings. Screw the filters on by hand until the gaskets just touch the mating surface. Then turn the filter a further half turn. **Not more!**
- 4 Start the engine and let it idle. Check that the oil pressure is normal.
- 5 Stop the engine. Check that no oil leakage occurs around the filters. Top up with oil as necessary.

NOTICE! Collect the old oil and old filters and hand them to a re-cycling station for destruction.



Oil filter, Change

TAD752GE, TAD753GE, TAD754GE

Change the oil filters during each oil change.

⚠ WARNING!

Hot oil and hot surfaces can cause burns.

Removal

- 1 Drain the oil according to the instructions in *Engine Oil, Change, page 59*.

NOTICE! Position a suitable vessel underneath the filter to avoid oil spillage.

- 2 Clean around the oil filter.
- 3 Carefully remove the oil filter cover (1) and filter.
- 4 Remove the O-ring (2) and filter (3)
- 5 Let the oil drip off into a collection vessel.

Installation

- 6 Install a new filter (3) and a new O-ring (2).
- 7 Install the filter cover (1) and filter.
Torque to: 40 Nm (29.5 lbf.ft.)
- 8 Fill with required volume of oil, see *Engine Oil, Change, page 59*.

Carry out a function test

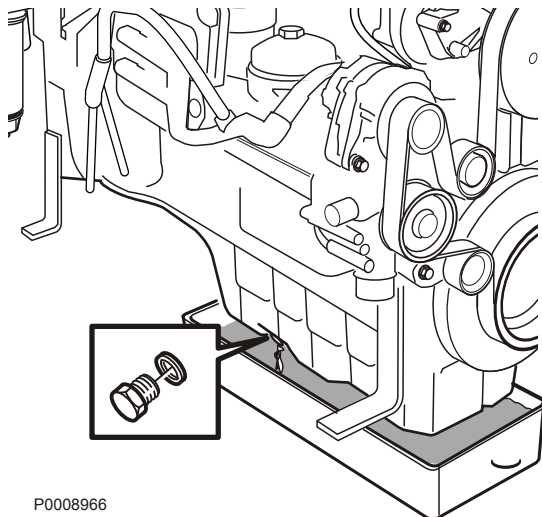
- Start the engine.
- Check that there is no oil leakage from the oil filter or drain nipple.
- Turn off the engine.
- Check the oil level after a few minutes.
- Top up with oil as necessary.

Engine Oil, Change

Always follow the recommended oil change interval and always change the oil filter in connection with oil changes. On static engines the drain plug must **not** be removed. Use an oil drain pump to pump the oil out.

WARNING!

Hot oil and hot surfaces can cause burns.



P0008966

- 1 Run the engine until warm.
- 2 Remove the drain plug. Drain the oil.

NOTICE! Collect the old oil and old filters and hand them to a re-cycling station.

- 3 Install the drain plug with a new gasket.
- 4 Change the oil filter according to the *Oil filter, Change, page 57* instruction.

- 5 Fill oil to the correct level.

NOTICE! Do not fill above the MAX level.

- 6 Start the engine and let it idle. Check that the oil pressure is normal.
- 7 Stop the engine. Check that there is no oil leakage around the filters. Top up with oil as necessary.

Fuel System

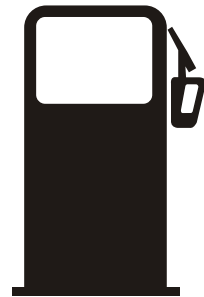
WARNING!

Fire hazard. When carrying out work on the fuel system make sure the engine is cold. A fuel spill onto a hot surface or an electrical component can cause a fire. Store fuel soaked rags so that they cannot cause fire.

Store fuel-soaked rags so that they cannot cause fire.

IMPORTANT:

Always observe the greatest cleanliness during refueling and work on the fuel system. Only use the grades of fuel recommended in the fuel specification.

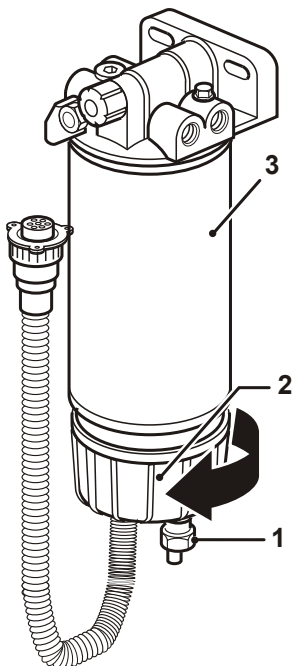


P0002101

Draining condensate, fuel system

TAD550GE, TAD551GE, TAD751GE

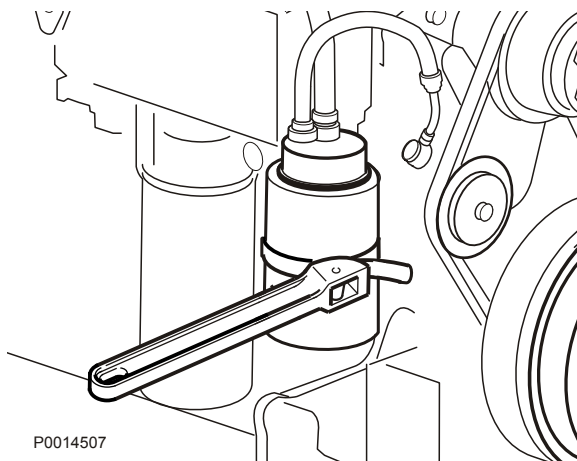
- 1 Stop the engine and close the fuel tap.
- 2 Place a collection vessel underneath the filter.
- 3 Open the drain valve (1) and drain off the fuel/water.
- 4 Unscrew the water reservoir (2) from the filter cartridge (3) by turning it clockwise.
- 5 Clean the reservoir and screw it back onto the filter cartridge.
- 6 Close the drain valve and open the fuel tap.
- 7 Purge the fuel system; refer to *Fuel system, bleeding*. Test run the engine and check that no leakage occurs.



P0002875

Engine Fuel Filter Replacement

TAD550GE, TAD551GE, TAD751GE



1 Clean around the fuel filter.

2 Tighten filterlocket (1).

NOTICE! The filter is self-draining (when the fuel tank is located under the engine); wait a couple of seconds before removing the filter cover and filter.

3 Remove the filter and O-ring.

4 Install a **new** filter and a **new** O-ring.

5 Purge the fuel system according to *Fuel system, bleeding*.

6 Warm up the engine and perform a function check in respect of any leakages.

Engine Fuel Filter Replacement

TAD752GE, TAD753GE, TAD754GE

Removal

- 1 Clean around the fuel filter.
- 2 **NOTE!** The filter is self-draining (when the fuel tank is located under the engine); wait a couple of seconds before removing the filter cover and filter.

If the fuel tank has a "higher" location:

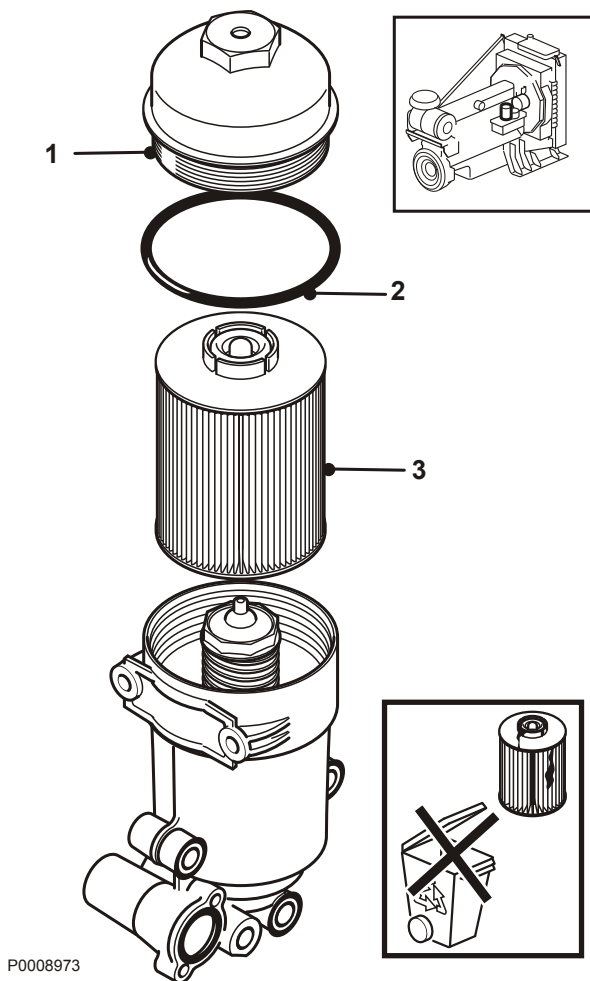
- 3 Close the cock on the return line to the tank. Place a suitable vessel underneath the filter. Disconnect the quick connector on the return line.
- 4 Remove the filter cover (1).
- 5 Remove the O-ring (2) and filter (3).

Installation

- 6 Install a new filter (3) and a new O-ring (2).
- 7 Install the filter cover (1) and filter.

If the fuel tank has a "higher" location:

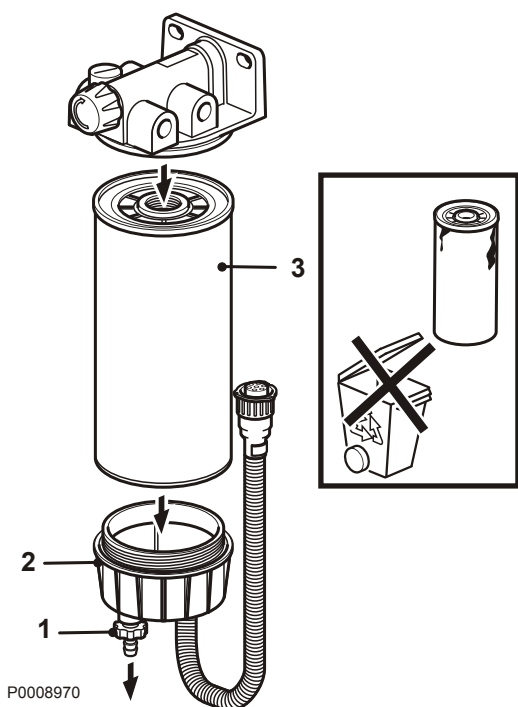
- 8 Reconnect the quick connector on the return line. Open the cock on the return line and remove the collection vessel.
- 9 Purge the fuel system according to the method, *Fuel system, bleeding*.
- 10 Warm up the engine and perform a function check in respect of any leakages.



Fuel Pre-filter, Change

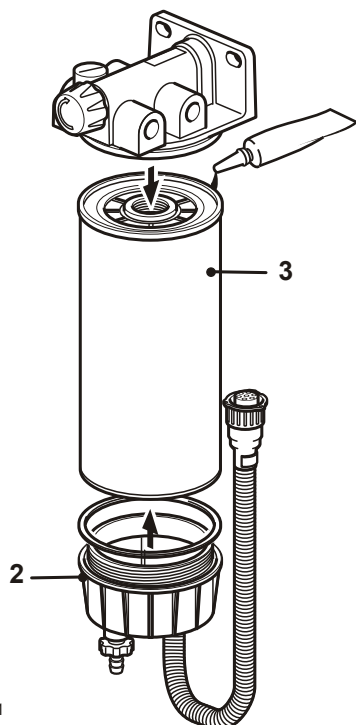
Removal

- 1 Clean around the pre-filter and the water separator.
Open the drain nipple (1) in the base of the water separator.
- 2 Tighten the drain nipple (1).
Remove the lower part of the water separator (2).
Remove the pre-filter (3); use a filter wrench.
- 3 Clean the mating surfaces.



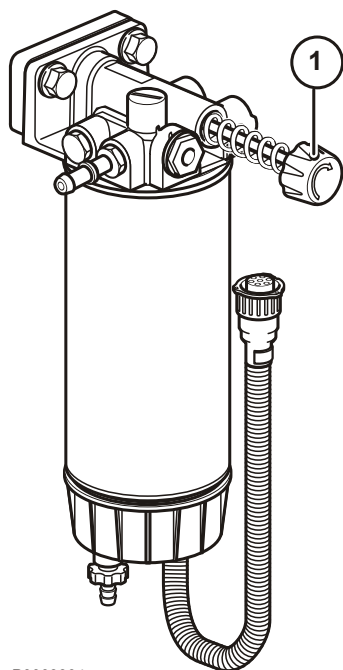
Installation

- 4 Grease the gasket surfaces.
Fit the **new** pre-filter (3).
Tighten according to the instructions on the filter.
- 5 Install the lower part of the water separator (2).
NOTICE! Use a **new** seal ring.
- 6 Open the fuel taps and purge the fuel system;
refer to *Fuel system, bleeding*.
- 7 Start the engine and check for leaks.



Fuel system, bleeding

TAD550GE, TAD750GE, TAD751GE, TAD752GE,
TAD753GE, TAD754GE



P0003304

- 1 Open the hand pump (1), by pressing it in and turning it counter-clockwise.
- 2 Purge the fuel system by pumping at least 250 strokes on the hand pump.
Pump rapidly, to maintain pressure in the pump.

NOTICE! Purging is **not** complete while resistance is felt in the pump.

- 3 Close the hand pump (1) by pressing it in and turning it clockwise.
- 4 Start the engine and let it idle for at least 5 minutes, before speed is increased.



P0013077

Cooling System

The cooling system ensures that the engine operates at the correct temperature. It is a closed system that should always be filled with a coolant mixture.

IMPORTANT:

Coolant of a suitable chemical composition must be used all year round to protect the engine against internal corrosion, cavitation and freeze bursting. This even applies when there is no risk for freeze damage, to make sure the engine always has a complete corrosion protection.

Therefore, the use of anti-corrosion agents alone, or water alone as a coolant, is not permitted in Volvo Penta engines.

The coolant must be based on Organic Acid Technology (OAT). Using an improper coolant or mixing with another coolant will rapidly reduce the performance and lifetime of the engine. Material incompatibility can lead to leakages, which - in the worst case - can cause engine breakdown.

Volvo Penta strongly recommend the use of our own coolants, "Volvo Penta Coolant VCS Ready Mixed" or the concentrate "Volvo Penta Coolant VCS", which ensure the protection of the cooling system components from corrosion, ageing, swelling and cracking, thereby ensuring optimal engine lifetime.

Over time the corrosion protection additives become less effective, and consequently the coolant must be changed at regular intervals to maintain sufficient protection of the engine. The latest Service Protocol that specifies service intervals can be found at volvopenta.com.

Coolant, Mixing

It is extremely important that the system is filled with the correct coolant concentration; refer to *Coolant, Mixing*.

The coolant should be mixed with distilled, deionized water. For Volvo Penta specified water requirements; refer to *Coolant, Mixing*.

NOTICE! If water quality can not be guaranteed, use ready mixed coolant.

Coolant Level, Checking and Topping Up

TAD550GE, TAD551GE, TAD750GE, TAD751GE

⚠ WARNING!

Do not open the coolant filler cap when the engine is hot, except in emergencies as this could cause serious personal injury. Steam or hot fluid could spray out.

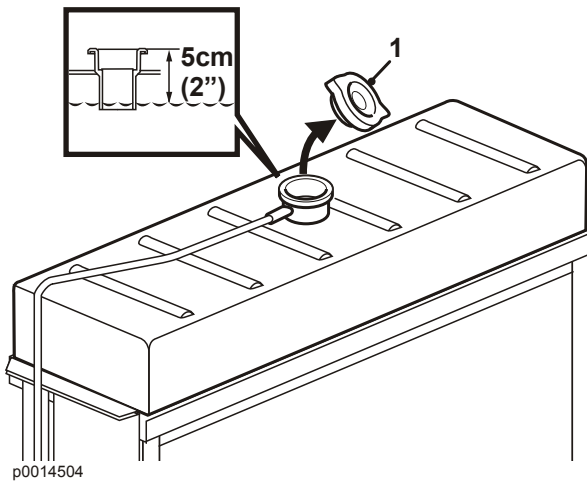
IMPORTANT!

Filling should be done with the engine stationary. Fill up slowly, to allow the air to flow out.

Coolant Level, Checking and Topping Up

NOTICE! Check the coolant level daily before starting. Only use coolant recommended by Volvo Penta.

- 1 Check that the coolant level is approx. 5 cm (2") under the top of the filler.

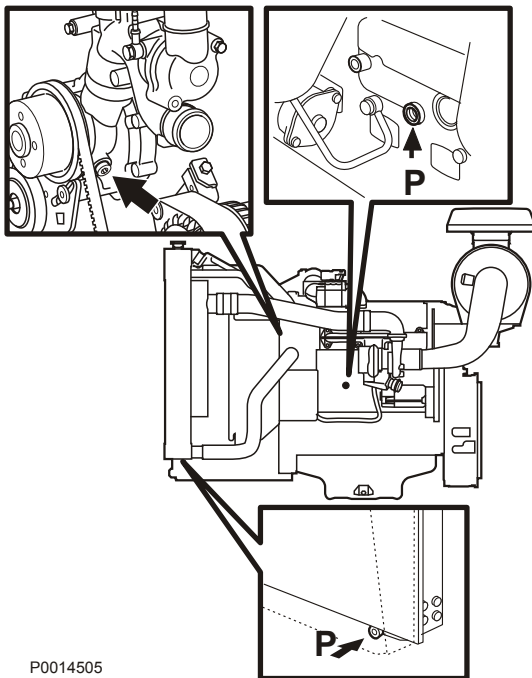


Filling an empty system

NOTICE! Mix the right amount of coolant is needed to ensure that the cooling system is completely filled. Refer to *Maintenance, page 65* and *Technical Data, page 80* for mixing and the right amount of coolant.

NOTICE! Don't start the engine until the engine is vented and completely filled.

- 1 Check that all drain taps are closed (P).
Fill coolant until the level is approx. 5 cm (2") under the to of the filler.
- 2 Vent by the venting nipple (1).
- 3 Top up until the system is completely filled.



Coolant Level, Checking and Topping Up

TAD752GE, TAD753GE, TAD754GE

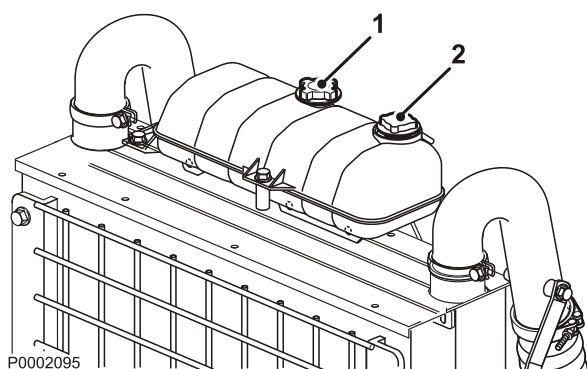
WARNING!

Do not open the coolant filler cap when the engine is hot, except in emergencies as this could cause serious personal injury. Steam or hot fluid could spray out.

IMPORTANT!

Only use coolant recommended by Volvo Penta. Fill up slowly, to allow the air to flow out.

NOTICE! Filling should only be done with the engine stationary. Check the coolant level daily before start.



Checking and filling up

- 1 Only open the filler cap (1). Do not open the pressure cap (2).
- 2 Check so that the coolant level is above the MIN marking on the expansion tank.
- 3 If necessary fill up coolant, the level should be between the MIN and MAX markings.

Filling an empty system

NOTICE! Mix the right amount of coolant is needed to ensure that the cooling system is completely filled. Refer to *Maintenance, page 65* and *Technical Data, page 80* for mixing and the correct amount of coolant.

- 1 Do not open the pressure cap (2).
- 2 Check that all draining taps are closed.
- 3 Open the filler cap (1).
- 4 Fill up coolant so that the coolant level is between the MIN and MAX markings.
- 5 Start the engine when the cooling system is vented and completely filled. Open any venting taps some while after starting, to allow shut-in air to escape.

NOTICE! The engine must not be started before the system is vented and completely filled.

- 6 Stop the engine after approx. an hour and check the coolant level, fill up if necessary.

Coolant, Draining

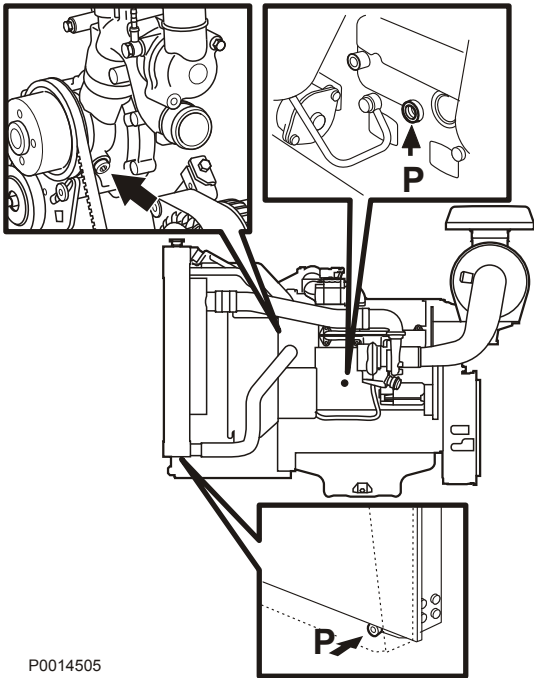
TAD550GE, TAD551GE, TAD750GE, TAD751GE

⚠ WARNING!

Do not open the coolant filler cap when the engine is hot, except in emergencies as this could cause serious personal injury. Steam or hot fluid could spray out.

⚠ WARNING!

All coolant is hazardous and harmful to the environment. Do not consume. Coolant is flammable.



P0014505

- 1 Stop the engine before draining.
Remove the filler cap.
- 2 Place a suitable container under the draining plugs (P) and loosen the plugs. Let the coolant pour out.
Location draining plugs (P):
 - under the radiator
 - at cyl. #3 and cyl. #5 (4 and 6 cylinder engines)
- 3 Vent the system by fully open the venting tap (1) on the coolant pump.

IMPORTANT!

Check that all coolant pours out. Deposits may be located inside the tap / plug that must be eliminated. Remaining coolant in the system is a risk and can cause severe damage.

Coolant, Draining

TAD752GE, TAD753GE, TAD754GE

Before draining, stop the engine and unscrew the filler cap.

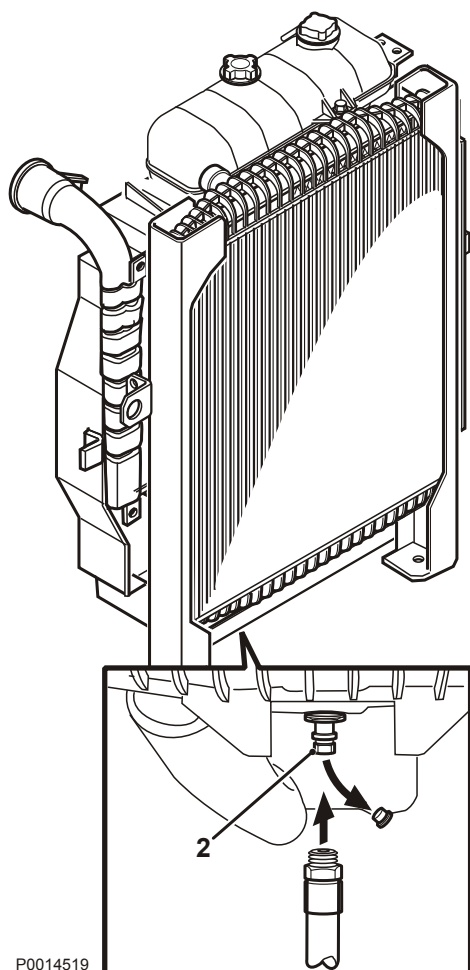
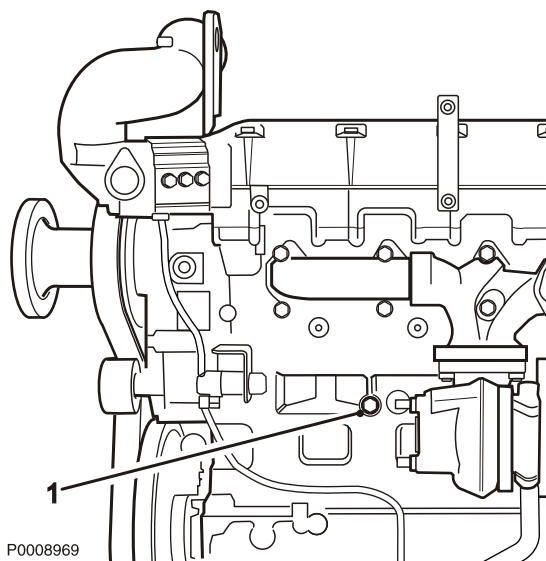
⚠ WARNING!

Do not open the coolant filler cap when the engine is hot, except in emergencies as this could cause serious personal injury. Steam or hot fluid could spray out.

⚠ WARNING!

All coolant is hazardous and harmful to the environment. Do not consume. Coolant is flammable.

There is a drain plug (1) in the engine block, and a drain nipple (2) under the radiator for draining coolant.

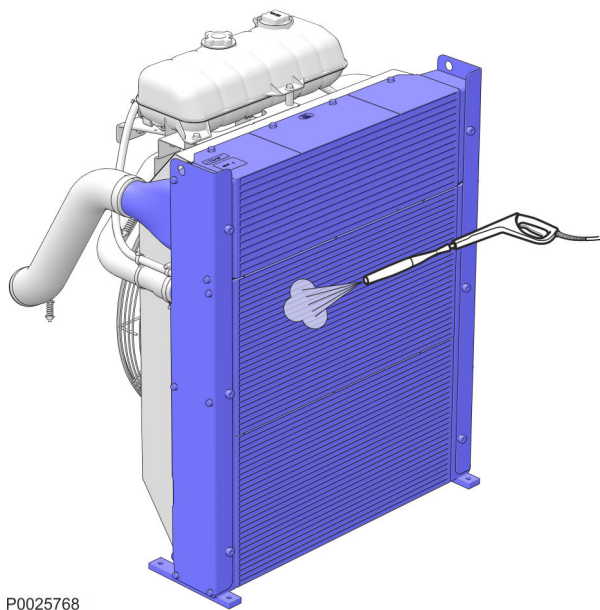


- 1 Put a suitable vessel underneath the drain plug (1) and undo the plug. Then put a suitable vessel underneath the radiator and remove the protective cap from drain nipple (2). Connect a suitable hose and drain off the coolant.

- 2 Let the coolant run out.

NOTICE! There may be deposits inside the drain plugs/taps; the deposits must be cleaned away. Check that all coolant has indeed drained out.

- 3 Screw the drain plug (1) back. Remove the hose from the drain nipple (2) and put its protective cap back on.



P0025768

Charge Air Cooler, External Cleaning

NOTICE! Regular inspect the charge air cooler visually.

- 1 Cover the engine before cleaning. The charged air cooler must be cold.
- 2 Clean with high pressure wash or compressed air. Be careful not to damage the radiator fins. If detergent is used, make sure that it is not corrosive to aluminum.

Cooling System, Cleaning

⚠ WARNING!

All coolant is hazardous and harmful to the environment. Do not consume. Coolant is flammable.

IMPORTANT:

Never clean the cooling system if there is any risk of freezing, since the cleaning solution does not have any antifreeze properties.

IMPORTANT:

It is extremely important that the correct concentration and volume of coolant is added to the system. Mix in a separate clean vessel before filling the cooling system. Make sure that the liquids mix.

IMPORTANT:

Always follow local safety instructions and regulations.

Cooling performance is reduced by deposits in the radiator and cooling galleries. The cooling system should be cleaned out when the coolant is changed.

- 1 Empty the cooling system. Refer to *Coolant, Draining*, page 68.
- 2 Put a hose into the expansion tank filling hole and flush with clean water, as specified by Volvo Penta—refer to section Water quality in *Technical Data*, page 80 until the water draining out is completely clear.
- 3 If there should still be some contamination left after flushing for a long time, cleaning can be done with coolant. Otherwise, continue as in item 8 below.

- 4 Fill the cooling system with 15-20 % mixture of concentrated coolant. Use only Volvo Penta recommended concentrated coolant mixed with clean water.
- 5 Drain the coolant after 1-2 days of operation. Remove the filler cap and possibly the lower radiator hose to increase the speed of emptying. To prevent suspended material from settling back in the system emptying should be done rapidly, within the space of 10 minutes, when the engine has not been standing still for a long time.
- 6 Flush the system immediately and thoroughly with clean hot water to prevent dirt from settling in the inner areas. Flush until the water that runs out is completely clean. Make sure that any heater controls are set to full heating during emptying.
- 7 If contamination should still be left after a long period of flushing, cleanout using Volvo Penta radiator cleaner, followed by finishing-off with Volvo Penta neutralizer. Carefully follow the instructions on the package. Otherwise, continue as in item 8 below.
- 8 When the cooling system is completely free from contamination, close the drain taps and plugs.
- 9 Fill up with Volvo Penta recommended coolant, following the instructions in the chapters entitled *Maintenance, page 65* and *Coolant Level, Checking and Topping Up, page 66*.

Electrical System

The engine is equipped with a 2-pole electrical system and an alternator.

⚠ WARNING!

Always stop the engine and break the current using the main switches before working on the engine.

IMPORTANT:

Contact a Volvo Penta dealer for information if any arc welding will be performed on the application. Arc welding can cause damage to the engine and the electronics.

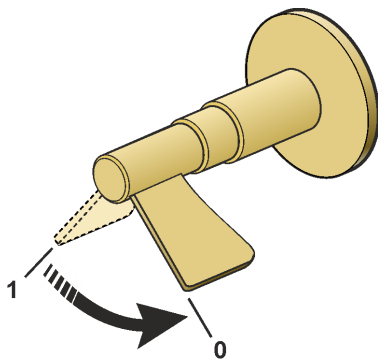
Main switch

IMPORTANT:

Never disconnect the current using the main switches when the engine is running or by disconnecting the battery cables.

The alternator and electronics could be damaged.

The main switches must never be switched off before the engine has stopped. If the circuit between the alternator and the battery is disconnected when the engine is running, the alternator and electronics may be damaged. For the same reason, the charging circuits must never be re-connected with the engine running.



P0002576

Fuses

Two circuit breakers are supplied with the engine wire harness. One 10 A to the EMS unit and one 150 A to the air intake heater element. No other circuit breakers are supplied with the engine.

If a circuit breaker trips the engine will stop. If the circuit breaker trips frequently, an authorized Volvo Penta workshop should be contacted to investigate the cause of the overload.

Electrical Connections

Check that electrical connections are dry, free from oxide, and that they are securely tightened.



P0002107

Battery

⚠ WARNING!

Risk of fire and explosion. Never allow an open flame or electric sparks near the batteries.

⚠ WARNING!

Battery electrolyte is a corrosive acid and should be handled with care. If you spill or splash electrolyte on any part of the body, immediately flush the exposed area with liberal amounts of water and seek medical attention as soon as possible.

⚠ WARNING!

Ventilate the engine compartment before working on batteries or battery connections.

IMPORTANT:

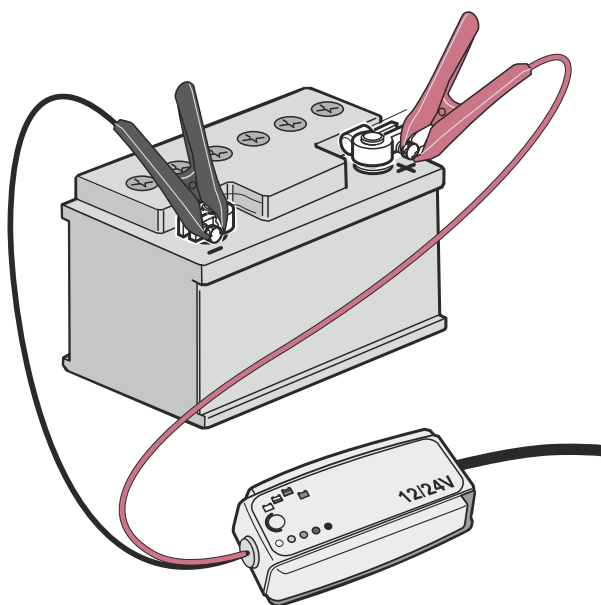
Batteries can be damaged if they are left discharged, and can also freeze and burst easier in cold weather. If the engine is not going to be used for a longer period of time, the batteries should be fully charged, trickle charged if possible.

Maintenance

It is important to always follow the battery manufacture's recommendation and instruction when replacing and charging batteries. Depending on battery type, the instructions for maintenance and charging may vary.

Modern batteries are normally maintenance free, but there are some actions that are recommended to increase the battery service life and avoid accidents:

- Keep the batteries clean and dry. Contamination and oxide on the batteries and battery poles can result in stray currents, voltage drop and discharge, especially in wet weather.
- Remove oxidation from the battery poles and terminals, using a brass brush.
- Tighten the terminals securely and grease them with terminal grease or petroleum jelly. Loose battery connections may cause damage to the engine's electrical system.
- Charge the battery regularly. A battery that is kept fully loaded has a maximum service life. The easiest way to check if a battery needs charging is to use a voltmeter.



P0022892

Replacing Battery

IMPORTANT:

Make sure that the new battery fulfills the specifications in *Technical Data*. Read the information supplied with the battery before you begin the installation.

IMPORTANT:

Do not disconnect the batteries with the engine running.
Sensitive electrical components can be immediately damaged.

⚠ WARNING!

Never confuse the positive and negative poles on the batteries. Risk of arcing and explosion.

Disconnecting (A)

- 1 Untighten the nut and remove the – cable (black).
- 2 Untighten the nut and remove the + cable (red).

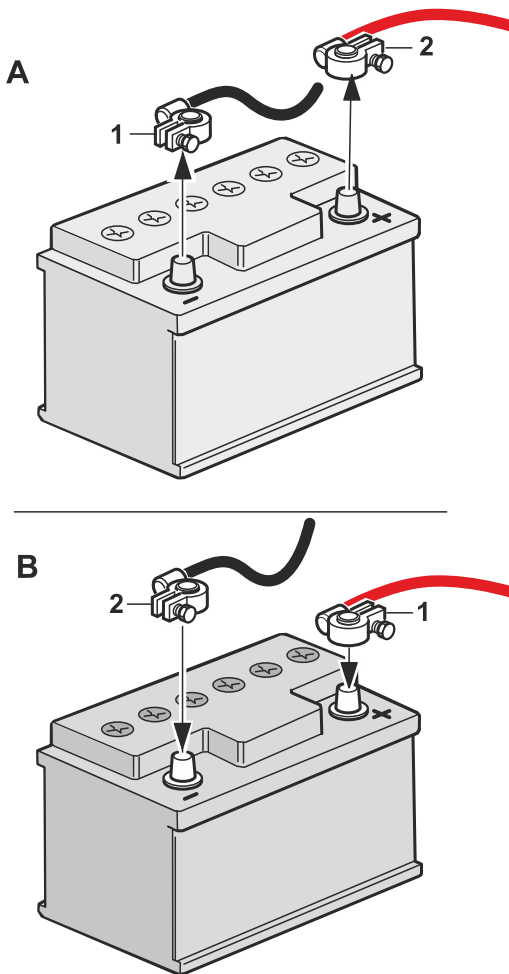
Remove the battery.

Connecting (B)

Place the new battery.

- 1 Connect the + cable (red) to the + pole on the battery and tighten the nut.
- 2 Connect the – cable (black) to the – pole on the battery and tighten the nut.

NOTICE! Hand in the old battery to a re-cycling station.



P0022893

Technical Data

Engines

Type designation	TAD550GE, TAD551GE	TAD750GE, TAD751GE
Engine Performance	Refer to the sales literature	
Max torque	Refer to the sales literature	
No. of cylinders	4	6
Bore	108 mm (4.25")	108 mm (4.25")
Stroke	130 mm (5.12")	130 mm (5.12")
Displacement	4,76 dm ³ (290.7 in ³)	7,15 dm ³ (436 in ³)
Weight, Engine	560 kg (1235 lbs)	770 kg (1698 lbs)
Weight, incl. cooling system and air filter	650 kg (1455 lbs)	945 kg (2083 lbs)
Firing order	1-3-4-2	1-5-3-6-2-4
Compression ratio	18:1	18:1

Type designation	TAD752GE, TAD753GE	TAD754GE
Engine Performance	Refer to the sales literature	
Max torque	Refer to the sales literature	
No. of cylinders	6	6
Bore	108 mm (4.25")	108 mm (4.25")
Stroke	130 mm (5.12")	130 mm (5.12")
Displacement	7,15 dm ³ (436 in ³)	7,15 dm ³ (436 in ³)
Weight, Engine	780 kg (1720 lbs)	780 kg (1720 lbs)
Weight, incl. cooling system and air filter	955 kg (2105 lbs)	955 kg (2105 lbs)
Firing order	1-5-3-6-2-4	1-5-3-6-2-4
Compression ratio	18:1	17:1

Lubrication System

	TAD550–51GE	TAD750–51GE	TAD752–54GE
Oil Change Volume incl. filter change	13 l (3.4 US gal)	23 l (6.1 US gal)	34 l (8.9 US gal)
Oil Sump	max. 11 l (2.9 US gal) min. 7 l (1.8 US gal)	max. 20 l (5.3 US gal) min. 16 l (4.2 US gal)	31 l (8.1 US gal) 25 l (6.5 US gal)
Oil temperature operating, max	125 °C (257 °F)		
Oil Pressure at rated engine rpm	300–500 kPa (44–73 psi)		
Oil filter Full flow filter	1 pc. (tighten 1/2–3/4 turn after it touches)		
Lube oil pump Type	Gear driven		

Oil recommendations

Engine	Oil grade	Sulfur content in fuel, by weight		
		up to 0,5 %	0,5 – 1,0 %	more than 1,0 % ¹⁾
		Oil change interval: Reached first in operation		
TAD550–51GE	VDS-3 VDS-2 ACEA:E7, E5, E3 ⁽²⁾ API:CI-4, CH-4	250 h / 12 months	125 h / 12 months	62 h / 12 months
TAD750–754GE	VDS-3 VDS-2 ACEA:E7, E5, E3 ⁽²⁾ API:CI-4, CH-4	500 h / 12 months	250 h / 12 months	125 h / 12 months

NOTICE! Mineral based oil, either fully or semi-synthetic, may be used on condition that it complies with the quality standards above.

1) If sulfur content is >1.0 % by weight, oil with TBN >15 must be used.

2) API: CG-4 or CH-4, is acceptable in markets outside Europe, instead of ACEA E3.

VDS = Volvo Drain Specification

ACEA = Association des Constructeurs Européenne d'Automobiles

API = American Petroleum Institute Global

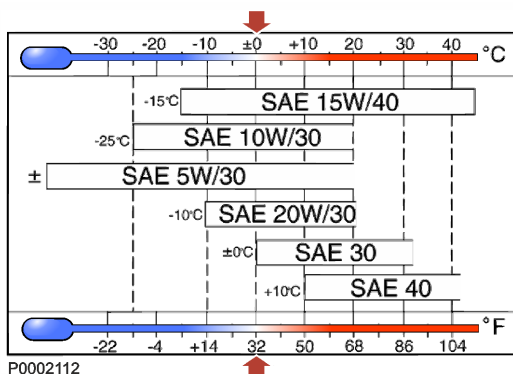
TBN = Total Base Number

Viscosity

Select the viscosity according to the table.

The temperature values refer to stable ambient temperatures.

* SAE 5W/30 refers to synthetic or semi-synthetic oils.



Fuel System

Feed pump	
Feed pressure at 600 rpm	min 100 kPa (14.5 psi)
Feed pressure at 1200 rpm	min 300 kPa (43,5 psi)
Feed pressure at full load	min 300 kPa (43,5 psi)
Bypass valve	
Opening pressure	400-550 kPa (58–80 psi)

Fuel specification

Fuel must comply with national and international standards for commercially supplied fuels.

NOTICE! Bio-diesel according to EN 14214, kerosene and light fuel oil may not be used.

The following fuel standards are approved:

EN 590 (with nationally adapted environmental and cold weather requirements)

ASTM D 975 No 1-D and 2-D

JIS KK 2204 (may only be used if lubricity corresponds to EN 590)

Sulfur content: According to current national legislation. If the sulfur content exceeds 0.5 weight-percent, the **oil change intervals** must be amended; *Technical Data, page 76*.

Extremely low sulfur content fuel (urban diesel in Sweden and city diesel in Finland) can cause a loss of up to 5% of power and an increase in fuel consumption of about 2–3 %.

General requirements

Volvo Penta diesel engines are certified for compliance with emission legislations with the diesel test fuels specified by law. These fuels correspond with diesel fuel standards EN 590, ASTM D975, JIS K2204 and paraffinic diesel fuel standard EN 15940. Volvo Penta guarantees compliance with emission legislation and fulfillment of expected lifetime as long as the specified restrictions are followed.

It is the responsibility of the fuel suppliers to always ensure that their fuels meet relevant requirements and are fit for their intended purpose. Their responsibility includes any use of additives for proper engine performance and function.

Special requirements are placed on cold-flow properties, that is, temperature limit values of fuel filterability during operation in winter conditions.

Restrictions for specified diesel fuels

- **Max density for ASTM D975 No 2-D: 860 kg/m³**
Insufficient density reduces the power and increases the fuel consumption. Excessive density endangers the durability and function of the fuel injection equipment.
- **Max lubricity (wsd 1.4) for JIS K 2204: 460 µm**
Sufficient fuel lubricity is essential to protect the fuel injection system against excessive wear.

Restrictions for other diesel fuels

Volvo Penta also approves the use of other diesel fuels as long as the here specified restrictions are followed. However Volvo Penta does not guarantee compliance with emission legislation or fulfillment of expected lifetime with these other diesel fuels.

NOTICE! Operators must check permission for usage of these fuels according to regional, national or local regulations.

- **Min cetane number: 40**
An insufficient cetane number ("ignitability") leads to poor startability and increased exhaust emissions.
- **Max density at 15 °C: 860 kg/m³**
Insufficient density reduces the power and increases the fuel consumption. Excessive density endangers the durability and function of the fuel injection equipment.
- **Viscosity between 1.9 to 4.6 mm/s² at 40 °C**
Insufficient viscosity reduces the power and increases the fuel consumption. Excessive viscosity endangers the durability and function of the fuel injection equipment.
- **Max lubricity (wsd 1.4): 520 µm**
Sufficient fuel lubricity is essential to protect the fuel injection system against excessive wear.
- **Max FAME (biodiesel) content: 10% (V/V)**
FAME is blended into diesel fuel.
- **Max sulfur content: 5000 mg/kg**

Paraffinic fuels - HVO and GTL

Paraffinic diesel fuels ("Synthetic Diesel") have higher cetane numbers and lower densities than diesel fuels. HVO (Hydrotreated Vegetable Oils) is renewable paraffinic fuels. GTL (Gas-To-Liquid) is fossil paraffinic fuels.

Volvo Penta approves the use of paraffinic diesel fuels that complies with standard EN 15940. The fuel guarantees compliance with emission legislation and fulfills the expected lifetime as long as the service requirements are followed.

Volvo Penta also approves the use of fuel blends between these paraffinic fuels and diesel fuels that comply with the quality requirements.

Service requirements

- When shifting from diesel fuel to paraffinic fuel, the fuel hoses and sealings must be replaced.

Biodiesel fuels

Alternative fuels, including biodiesel, that are not substantially similar to the required test fuels may adversely affect engine emissions compliance. As a result, Volvo Penta does not warrant the engine will conform to applicable emissions limits when operated on, or having been operated on, biodiesel or other alternative fuels that are not substantially similar to specified test fuels used for certification.

The use of biodiesel up to maximum 10% (B10) in and of itself, will not affect the manufacturers mechanical warranty, provided the biodiesel used in blend conforms to EN590, EN16734, ASTM D975 and ASTM D7467. Other relevant local fuel standards that fulfill the above mentioned standards may also be used. A minor drop in engine power will occur when using biodiesel.

NOTICE! Biodiesel manufactured by FAME (Fatty Acid Methyl Esther) process is hygroscopic and therefore increase the risk of bacterial growth in the fuel. This may lead to blocked fuel filters. Engine not consuming a full fuel tank within 4 weeks must not use biodiesel.

Higher levels of biodiesel, up to B30, may be used with restrictions. Fuel according to EN 16709 or ASTM D7467, or relevant local fuel standards that fulfill mentioned biodiesel fuel standards, must be used. Volvo Penta does not warrant the engine will conform to applicable emissions limits when operated on biodiesel or another alternative fuels, that are not substantially similar to specified test fuels used for certification.

Service restrictions for diesel fuel with FAME content between 11% and 30% (B11 to B30)

- Lube oil quality VDS-4 or VDS-4.5 shall be used.
- Oil dilution may occur. Make sure that oil level is not exceeding maximum level, in that case change the oil.
- Lube oil change intervals shall be halved, or utilize oil sampling analysis.
- The engines should be fitted with fuel filters with water separators.
- A fuel heater is required, when high FAME diesel fuels are used below freezing point.
- Biodiesel is aggressive to some materials used in fuel system components. Inspect seals, hoses, rubber and plastic components daily. Replace any component that is damaged, softened or leaking. Clean biodiesel from painted surfaces immediately to prevent paint damage.
- Do not use these fuels for engines with long downtime periods.
- If the engine has not been used for a period of 4 weeks or more, the tank and the fuel system shall be flushed clean by running the engine on at least one full tank of diesel fuel.
- When shifting from diesel fuel to high FAME diesel fuel.
 - The fuel hoses and sealings shall be replaced.
 - The fuel tank shall be cleaned and the fuel filter shall be replaced after 50 h.

Cooling System

	TAD550–51GE	TAD750–51GE	TAD752–54GE
Type	Pressurized, sealed		
Pressure cap, max opening pressure	70 kPa (10.2 PSI)	100 kPa (14.5 PSI)	100 kPa (14.5 PSI)
Volume (engine)	7.5 liters (2,0 US gal)	9.8 liters (2.6 US gal)	10 liters (2.64 US gal)
Volume (engine with standard radiator and hoses)	22 liters (5.8 US gal)	23.1 liters (6.1 US gal)	34 liters (9.0 US gal)
Thermostat			
Qty / Type	1 / piston thermostat		
Opening temperature	86 °C (187 °F)	86 °C (187 °F)	83 °C (181 °F)
Fully open at	98 °C (208 °F)	98 °C (208 °F)	103 °C (217 °F)



P0013077

Coolant

Volvo Penta Coolant VCS and VCS Ready Mixed (yellow) are based on Organic Acid Technology, OAT.

IMPORTANT!

Different types of coolant must not be mixed with each other.



P0002094

Water Quality

ASTM D4985:

Total solid particles	<340 ppm
Total hardness	<9,5° dH
Chloride	<40 ppm
Sulfate	<100 ppm
pH value	5.5–9
Silica (acc. ASTM D859)	<20 mg SiO ₂ /l
Iron (acc. ASTM D1068)	<0.10 ppm
Manganese (acc. ASTM D858)	<0.05 ppm
Conductivity (acc. ASTM D1125)	<500 µS/cm
Organic content, COD _{Mn} (acc. ISO8467)	<15 mg KMnO ₄ /l

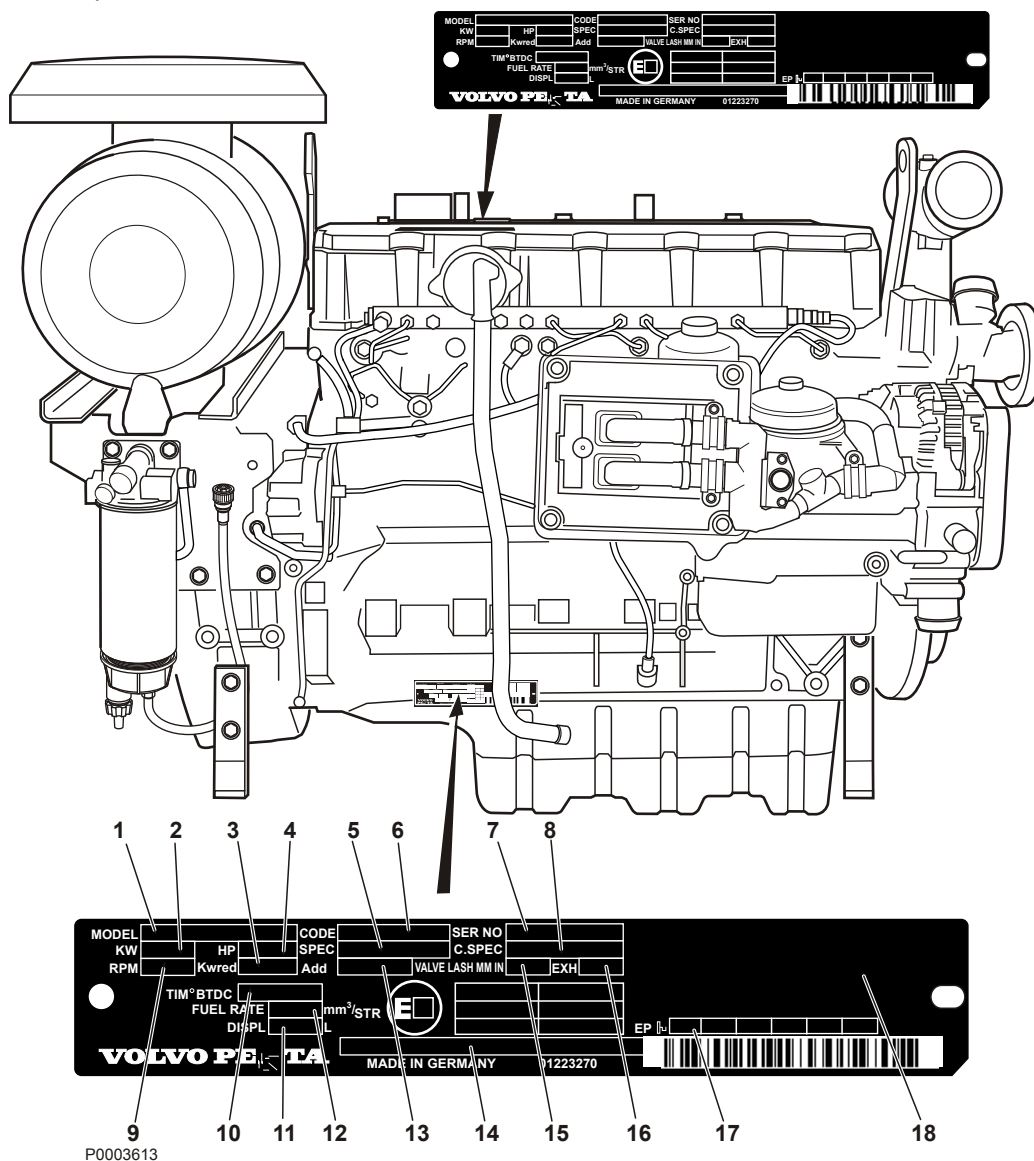
Electrical System

	TAD550-51GE	TAD750-51GE	TAD752-54GE
System voltage	24V	24V	24V
Alternator			
Voltage/max. current	28V/55A	28V/55A	28V/100A

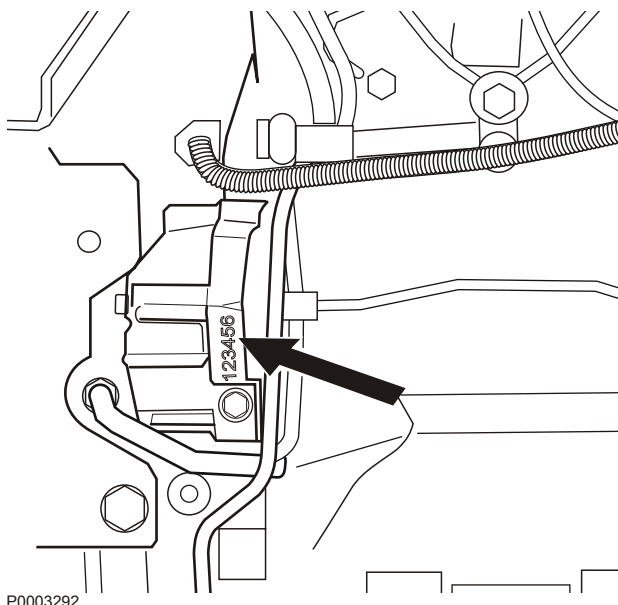
Identification Numbers

Location of engine plates

The engines are supplied with two engine plates, of which one is installed on the right side of the cylinder block and the other on top of the valve cover.



- | | |
|----------------------------------|---|
| 1 Engine Designation | 10 Injection angle and camshaft type |
| 2 Engine power, without fan (kw) | 11 Displacement, total |
| 3 Not in use | 12 Injection volume |
| 4 Engine power, without fan (hp) | 13 Not in use |
| 5 Not in use | 14 Certification approval number |
| 6 Manufacture's ID code | 15 Valve clearance, inlet valve (mm ³ /slag) |
| 7 Serial number (10 digits) | 16 Valve clearance, exhaust valve (mm ³ /slag) |
| 8 Engine specification number | 17 EP code for injection pump (cyl 1 först) |
| 9 Engine Speed | 18 Further information |



Engine serial number

The engine serial number is stamped on the engine block and the product plate. The serial number consists of 10 digits. Only the last eight digits are stamped on the engine block.

Engine data (refer to engine plate below)

Engine model (1):

Specification number (2):

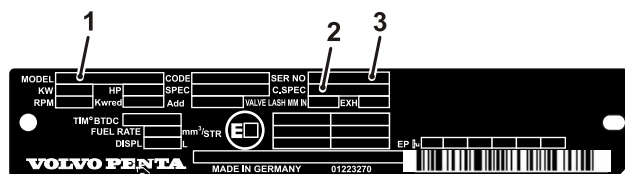
Serial number (3):

Nearest Volvo Penta workshop

Name:

Address:

Telephone:



VOLVO PENTA

Declaration for the installation of partially-completed machinery in accordance with
Machinery Directive 2006/42/EC

Engine Manufacturer:

AB Volvo Penta
Gropegårdsgatan
SE 405 08 Göteborg
Sweden

Description of engine 4-cycle diesel engine. Engine types covered by this declaration:

TAD560VE	TD520GE	TAD620VE	TAD720VE	TD720GE
TAD561VE	TAD530GE	TAD650VE	TAD721VE	TAD720GE
	TAD531GE	TAD660VE	TAD722VE	TAD730GE
	TAD532GE		TAD750VE	TAD731GE
	TAD550GE		TAD760VE	TAD732GE
	TAD551GE		TAD761VE	TAD733GE
			TAD762VE	TAD734GE
			TAD763VE	TAD750GE
			TAD764VE	TAD751GE
			TAD765VE	TAD752GE
				TAD753GE
				TAD754GE

Fundamental health and safety requirements applied to, and fulfilled by, the above-mentioned engines are described in the following items in Annex I:

1.6.1, 1.6.2, 1.6.4, 1.7.1, 1.7.1.1, 1.7.1.2, 1.7.4, 1.7.4.1, 1.7.4.3

The relevant technical documentations is compiled as described in part B of Annex VII.

Relevant information concerning the partially-completed machinery will be provided in suitable form upon justified requests from competent national authorities. The individual authorized to compile the relevant technical documentation is the signer of this declaration.

The partially-completed machinery also complies with the following relevant Directive:

2014/30/EU – Electromagnetic Compatibility (EMC) Directive.

Applied standards: EN 61000-6-1, EN 6100-6-2, EN 61000-6-3, EN 61000-6-4, EN 12895, EN-ISO 14982 and EN 13309.

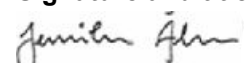
For engines equipped with the Volvo Penta Start/Stop System the responsibility for the functional safety of the system lies with the machine manufacturer performing the integration.

The engines covered by this declaration may not be put into operation before the completed machinery into which they are to be installed has been declared to conform with the provision of Machinery Directive 2006/42/EC.

Name and function:

Jennifer Åhlberg, Laws and Regulation
(The identity of the individual authorized to sign on behalf of the engine manufacturer or the latter's authorized representative.)

Signature and title:



Date and place of issue: (yyyy-mm-dd) 2016-08-30 Gothenburg

LR-21/16-01

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ENG

This Operator's Manual may be ordered in a different language free of charge up to 12 months after delivery, via internet.

<http://manual.volvopenta.com/coupon/>

If internet access isn't possible, please contact your Volvo Penta dealer.

GER

Diese Betriebsanleitung kann bis zu 12 Monate nach der Lieferung über Internet kostenlos in einer anderen Sprache bestellt werden.

<http://manual.volvopenta.com/coupon/>

Wenn Sie keinen Internet-Zugriff haben, kontaktieren Sie bitte Ihren Volvo Penta-Händler.

FRE

Ce manuel d'utilisation peut être commandé gratuitement sur Internet en différentes langues, jusqu'à 12 mois après la date de livraison.

<http://manual.volvopenta.com/coupon/>

Veuillez contacter votre Distributeur Volvo Penta si vous avez un problème d'accès à l'Internet.

SPA

El presente libro de instrucciones puede solicitarse en otro idioma diferente, libre de cargo, hasta 12 meses después de la entrega, mediante internet.

<http://manual.volvopenta.com/coupon/>

Si no se tiene acceso a internet, contacten al su concesionario Volvo Penta.

ITA

Il manuale per l'operatore può essere ordinato tramite Internet, in varie lingue e per consegna gratuita, entro 12 mesi dalla consegna del prodotto.

<http://manual.volvopenta.com/coupon/>

Se l'accesso a Internet risulta impossibile, contattare la concessionaria Volvo Penta.

SWE

Denna instruktionsbok kan beställas via internet på ett annat språk gratis i upp till 12 månader efter leverans.

<http://manual.volvopenta.com/coupon/>

Kontakta din Volvo Penta-återförsäljare om du inte har tillgång till internet.

DUT

Dit instructieboek kan gratis via internet in een andere taal worden besteld tot 12 maanden na aflevering.

<http://manual.volvopenta.com/coupon/>

Als toegang tot het internet niet mogelijk is, neem dan contact op met uw Volvo Penta dealer.

DAN

Denne instruktionsbog kan bestilles gratis på et andet sprog via Internettet i op til 12 måneder efter leveringen.

<http://manual.volvopenta.com/coupon/>

Hvis det ikke er muligt at bestille via Internettet, bedes du kontakte din Volvo Penta forhandler.

FIN

Tämä käyttöohjekirja on tilattavissa Internetin kautta veloituksesta eri kielillä 12 kuukauden ajan toimituksen jälkeen.

<http://manual.volvopenta.com/coupon/>

Jos sinulla ei ole Internet-yhteyttä, ota yhteys lähimpään Volvo Penta jälleenmyyjään.

POR

Este Manual do Operador pode ser encomendada em idiomas diferentes isento de custos até 12 meses após entrega, via internet.

<http://manual.volvopenta.com/coupon/>

Se não for possível aceder à internet, contacte o seu concessionário Volvo Penta.

GRC

Το παρόν Βιβλίο Χρήσης μπορεί να παραγγελθεί δωρεάν σε άλλη γλώσσα μέχρι 12 μήνες μετά την παράδοση, μέσω διαδικτύου.

<http://manual.volvopenta.com/coupon/>

Εάν δεν είναι δυνατή η πρόσβαση στο ιαδίκτυο, παρακαλούμε επικοινωνήστε με το δικό σας αντιπρόσωπο της Volvo Penta.

RUS

Данное руководство по эксплуатации можно бесплатно заказать на другом языке по Интернету в течение 12 месяцев после доставки.

<http://manual.volvopenta.com/coupon/>

Если доступ к Интернету отсутствует, обратитесь к своему дилеру компании Volvo Penta.

TUR

Bu Kullanım Kılavuzu, teslimden 12 ay sonrasına kadar Internet yoluyla ücretsiz olarak farklı bir dille sipariş edilebilir.

<http://manual.volvopenta.com/coupon/>

Internet mümkün değilse, lütfen Volvo Penta yetkili satıcınızla tmasa geçin.

CHI

本操作手册可通过互联网以不同的言进行订购，交付后可免费使用达12个月。

<http://manual.volvopenta.com/coupon/>

如果无法访问互联网，请与沃尔沃遍达经销商联系。

BZS

Este Manual de operador pode ser encomendado em um idioma diferente, gratuitamente, até 12 meses após a entrega, via internet.

<http://manual.volvopenta.com/coupon/>

Caso o acesso à internet não for possível, contatar seu distribuidor Volvo Penta.

JPN

このオペレーターズ マニュアルの他言語版が、発行後最高12か月間、インターネットより無料で発注可能です。

<http://manual.volvopenta.com/coupon/>

インターネットにアクセスできない場合は、担当のボルボペンタディーラーまでご連絡ください。

ARA

من الممكن طلب دليل المشغل بلغة أخرى مجاناً عبر الإنترنت لفترة تصل إلى ١٢ شهرًا من بعد التسليم.

[http:// manual.volvopenta.com/coupon](http://manual.volvopenta.com/coupon/)

إذا كان الوصول إلى الإنترنت غير متاح، فالرجاء الاتصال بوكيل Volvo Penta.



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