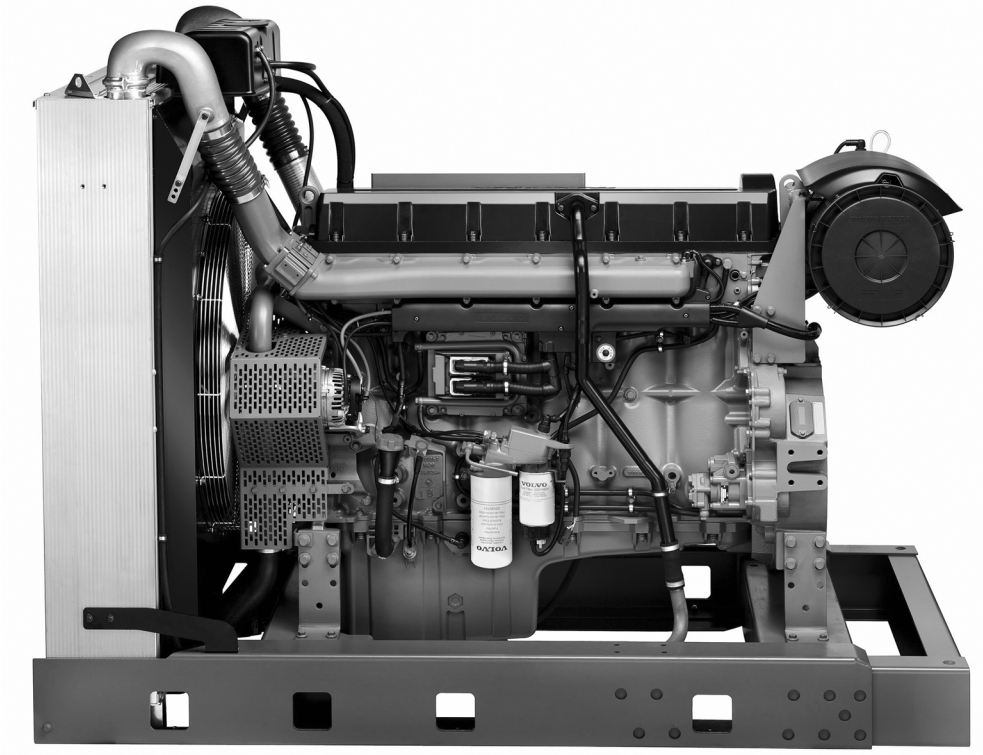
OPERATOR'S MANUAL

Generating set and industrial engines

16 liter (EMS 2)

VOLVO
PENTA



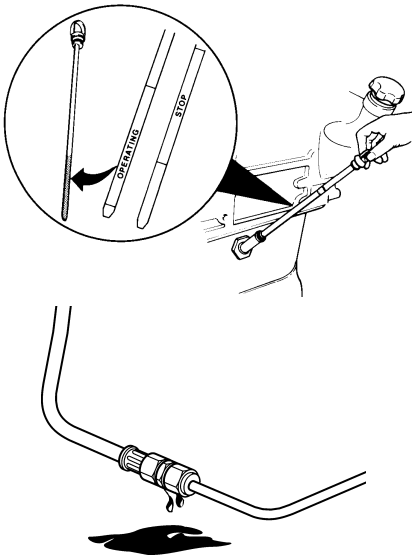
TAD1640GE, TAD1641GE, TAD1642GE

TAD1641VE, TAD1642VE

Starting the engine

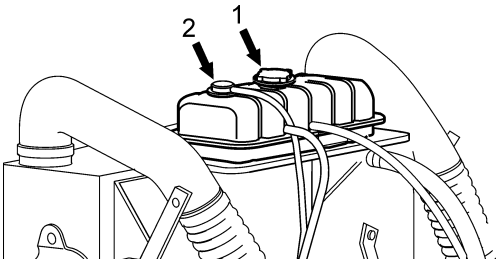
Make it a habit to give the engine and engine bay a visual check before starting. This will help you to discover quickly if anything abnormal has happened, or is about to happen. Also check that instruments and warning displays show normal values after you have started the engine.

⚠ **WARNING!** Never use start spray or similar products as a starting aid. Explosion risk!



Before starting

- Check that the oil level is between the MAX and MIN marks. Please refer to the “Maintenance, lubrication system” chapter:
- Open the fuel taps.
- Check that no leakage of oil, fuel or coolant- occurs.



- Check the coolant level and that the radiator is not blocked externally. Please refer to the “Maintenance, cooling system” chapter.

⚠ **WARNING!** Do not open the filler cap (1) when the engine is hot. Steam or hot fluid could spray out.

NOTE! Only open filler cap (1). Do not open filler cap (2).

- Turn the main switch(es) on.

⚠ **IMPORTANT!** Never disconnect the current with the main switch(es) when the engine is running. This can damage the alternator.

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

Drive belt / Alternator belt, inspection

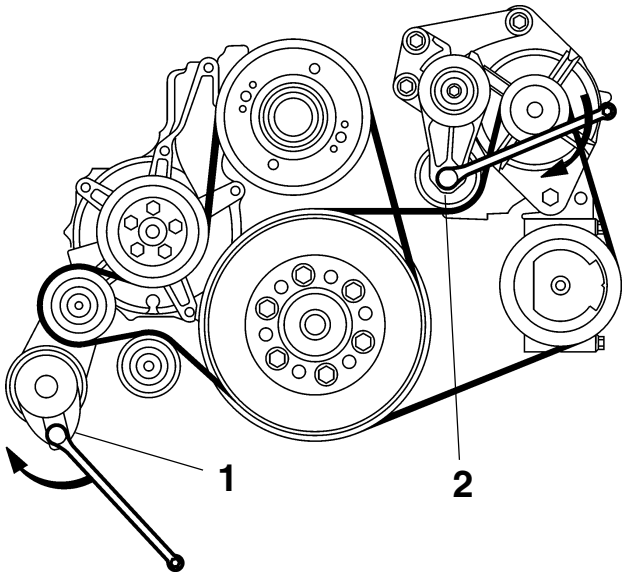
Inspection should be done after operation, when the belts are hot.

It should be possible to press the alternator belts and drive belts down about 3-4 mm (0,118-0,157 ") between the pulleys.

The alternator belts and drive belts have automatic belt tensioners and do not need to be adjusted. Check the condition of the drive belts. Change as necessary, please refer to “Alternator belt, change” and “Drive belt, change”.

Alternator belts, changing

⚠ **IMPORTANT!** Always change a drive belt which appears worn or cracked.



1. Disconnect the main switch(es) and check that the engine is not connected to system voltage.
2. Remove the fan guard and fan ring round the cooling fan.
3. Remove the belt guard.
4. Insert a 1/2” square wrench in the belt tensioner (1). Lift the wrench up and lift the water pump drive belt off.
5. Insert a 1/2” square wrench in the belt tensioner (2). Press the wrench down and remove the alternator belts.
6. Check that the pulleys are clean and undamaged.
7. Press the 1/2” wrench in the belt tensioner (2) down and install the new alternator drive belt.
8. Lift the 1/2” wrench in the belt tensioner (2) and install the new water pump drive belt.
9. Install the belt guards.
10. Install the fan guard and fan ring round the cooling fan.
11. Start the engine and do a function check.

Cooling system, cleaning

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

⚠ **IMPORTANT!** Cleaning must not be done if there is any risk of the cooling system freezing, since the cleaning solution does not have any frost prevention ability.

1. Empty the cooling system. Please refer to “Cooling system, draining”.
2. Put a hose into the filling hole in the expansion tank and flush with **pure** water, which complies with Volvo Penta specifications, please refer to the “Water Quality” chapter, until the water which runs 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. Only use Volvo Penta recommended concentrated coolant, mixed with **pure** water.
5. Drain the coolant after 1-2 days of operation.

NOTE! 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. Remove the filler cap and possibly the lower radiator hose to increase the speed of emptying.

6. Flush the system at once, very carefully, with **pure** hot water to stop dirt from settling on the inner surfaces again. 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, you can do a clean-out with 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 “Coolant, mixing” and “Coolant, filling”.

⚠ **IMPORTANT!** It is extremely important that the correct concentration and volume of coolant is put in the system. Mix in a separate clean vessel before filling the cooling system. Make sure that the liquids mix.

Diagnostic function

The diagnostic function monitors and checks that the EMS 2 system functions normally.

The diagnostic function has the following tasks:

- Detecting and locating disturbances
- Reporting detection of disturbances
- Providing guidance when troubleshooting

Message regarding disturbance

If the diagnostic function discovers a malfunction in the EMS 2 system, this is reported by means of fault codes/fault cause on the instruments.

Both inactive (rectified) and active (un-mended) faults are stored in the control unit.

Please refer to the “Operation” heading for reading fault codes.

All fault codes are found in the fault code list, with information about the reason, reaction and measures to be taken. Please refer to the “Fault codes” chapter.

NOTE! All instruments are optional

Active faults

DCU (Display Control Unit) / DU (Display Unit)

- text” !! ENGINE WARNING !!” is shown on the display.

NOTE! It’s possible to choose which language the information will be presented in.

CIU (Control Interface Unit)

- the diagnostic lamp starts to flash.
- “Easy-link” instrument (requires a CIU)
  - warning lamp on the alarm panel lights up
  - after the diagnostic button has been pressed, the fault code is shown as text on the tachometer display.

DU (Display Unit)

- Either “WARNING!” or “ALARM STOP” (a buzzer sounds) will be shown on the display, depending on the severity of the fault.

NOTE! You can choose the language used for the information presented on the.

- Fault codes can also be read by means of the **VODIA** tool. Please refer to the “VODIA User’s Guide” for advice on use.

At the same time, the fault is stored in the control unit memory. When the fault has been attended to and the ignition is switched off and on again, the fault disappears as active.

Inactive faults

- DCU - the fault is indicated as passive
- CIU - the diagnostic lamp goes out
- DU - the fault message disappears (inactive faults can not be read)
- “Easy Link” - the warning lamp on the alarm panel turns off

Effect on engine

Engines are affected differently, depending on the severity of the fault discovered by the diagnostic function.

A fault message in the form of a fault code is always generated when a malfunction is discovered by the diagnostic function.

Engines are affected differently, depending on the severity of the fault.

- The engine is not affected
- Engine idles
- Engine torque is restricted to a certain amount
- Engine is stopped

Code 7.9, PID / SPN 172
Air temperature sensor, inlet

Cause:

- Shorted to plus (+) or minus (-).
- Break.

Reaction:

- None.

Remedy:

- Check that the air temperature sensor contact is correctly installed.
- Check that the cable harness to the air temperature sensor has not been damaged.
- Check the air temperature sensor functionality.
- Check the preheating relay.

Code 9.2. SID250 / SPN 608
Faulty data link (J1587)

Cause:

- Faulty data link.

Reaction:

- None.

Remedy:

- Check that the 8-pin connector is not damaged.
- Check that the cables between the CIU/DCU and the engine management unit are not damaged.

Code 9.3. SID 232 / SPN 620
Power supply to sensor

Cause:

- Shortcut.
- Fault in sensor.

Reaction:

- Faulty values in oil pressure and charge air pressure sensors.
- Fault code for oil pressure- and charge air pressure sensor.
- Low engine output.
- The instrument shows zero oil pressure and boost pressure.

Remedy:

- Check that the cable harness to oil pressure and charge air pressure sensor has not been damaged.
- Check oil pressure and charge air pressure sensors.

Code 9.8, SID 253 / SPN 630
Data set memory EEPROM, CIU

Cause:

- Internal fault in control module
- Programming faulty.

Reaction:

- Engine does not start.

Remedy:

- Re-program the control module. If the fault remains, change the control module.

Code 9.8. PPID 254 / SPN 629
Fault in control unit, CIU

Cause:

- Faulty EEPROM, CIU.
- Faulty flash memory, CIU.
- Fault in control module, CIU

Reaction:

- CIU returns to factory setting.
- Engine goes to idle.
- Engine can not be started.

Remedy:

- Re- program the unit
- Change CIU unit.

Code 9.9, SID 240 / SPN 639. Memory fault

Cause:

- Memory fault in engine management system.

Reaction:

- Engine might not start.

Remedy:

- Re-program the unit.