OPERATOR'S MANUAL

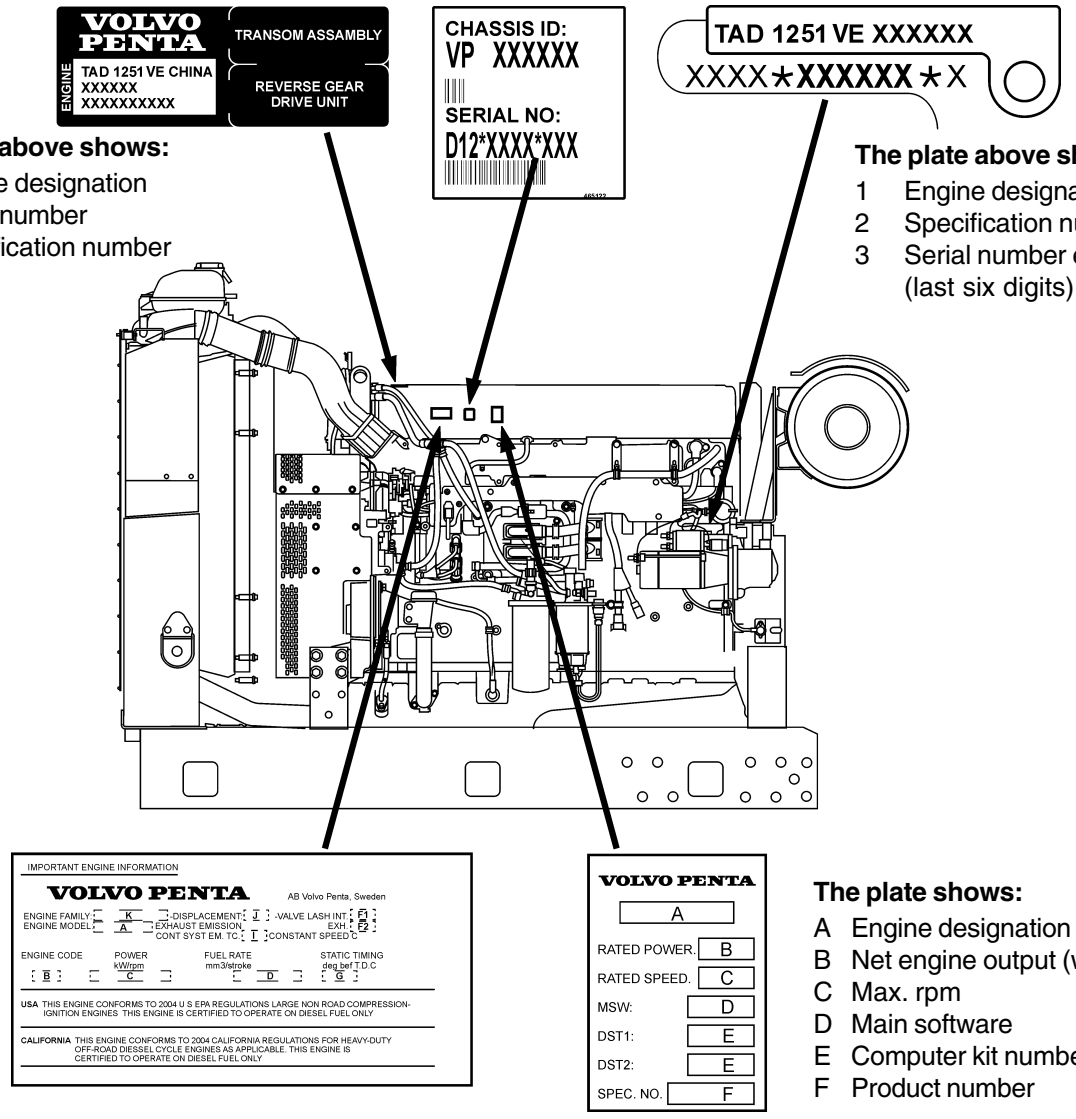
Industrial engines

12 liter (EMS 2)

VOLVO
PENTA

Identification numbers

Location of engine plates



The plate above shows:

1 Engine designation
2 Serial number
3 Specification number

The plate above shows:

1 Engine designation
2 Specification number
3 Serial number engine block (last six digits)

The plate shows:

A Engine designation
B Net engine output (without fan)
C Max. rpm
D Main software
E Computer kit number
F Product number

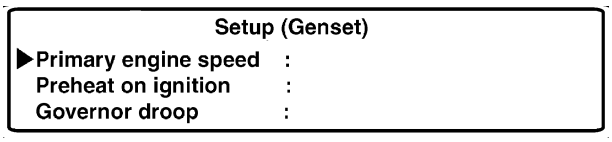
The above plate shows:

(K) Engine family
(J) Swept volume
(A) Engine designation
(F1) Valve clearance, inlet
(F2) Valve clearance, outlet
(I) Emission Control devices
(P) Only constant RPM
(E) Part number – decal
(B) Engine code (in engine family)
(C) Output/RPM
(D) Fuel quantity
(M) Engine speed
(H) Certification approval number (EU)

Explanation of engine designation:

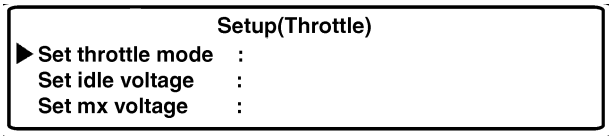
Ex. TAD1250VE

T – Turbo
A – Air-to-air Charge air cooler
D – Diesel engine
12 – Swept volume, liter
5 – Generation
0 – Version
V – Stationary and mobile operation
E – Emissions check



Customer parameter / Genset

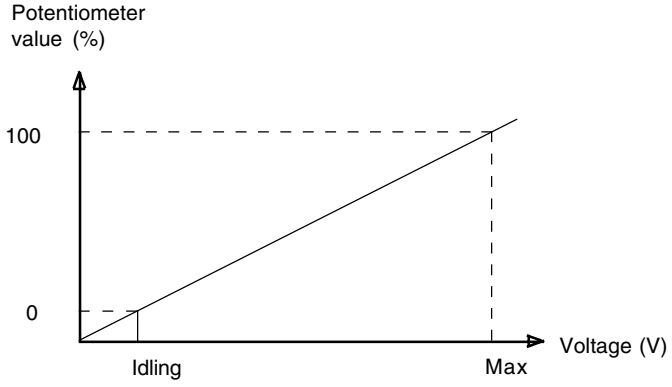
- **Primary engine speed** - selection of engine speed, 1500 or 1800 rpm.
- **Preheat on ignition** - activation of automatic pre-heating. The engine control system senses if pre-heating is needed and activates it directly when switched on.
- **Governor droop (%)** - setting the droop level, when this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

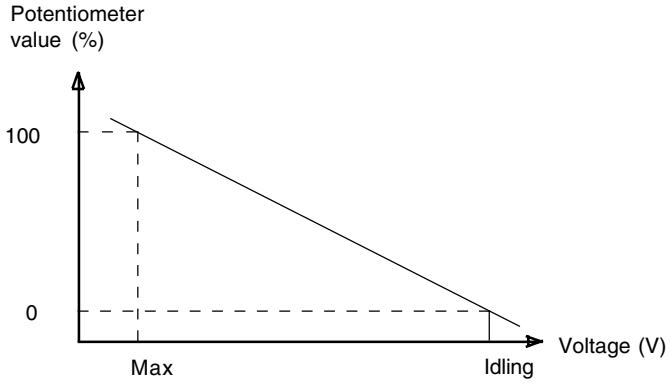


Throttle input setting

speed control setting (throttle operation).

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





Maintenance schedule

General

Your Volvo Penta engine and its equipment are built to provide a high degree of reliability and a long useful life. They are built to have the minimum possible effect upon the environment. Preventative maintenance according to the maintenance schedule and use of original Volvo Penta parts will preserve these qualities and help to avoid unnecessary operational disturbances.

MAINTENANCE SCHEDULE

⚠ **WARNING!** Prior to starting maintenance work the chapter ”Maintenance” should be read carefully. In it you will find instructions for how the work can be carried out in a safe and correct manner

⚠ **IMPORTANT!** When both operational and calendar times are given maintenance should be performed in accordance with the first interval to arrive. Maintenance points marked with ☐ should be performed by an authorized Volvo Penta service facility.

Daily, before the first start-up

- Engine and engine compartment, general inspection ..... page 31
- Air filter indicator, check [1] ..... page 33
- Oil level, check and add ..... page 35
- Coolant level, check level ..... page 39

[1] Change the air filter at least every 12th month.

Every 50th operational hour / at least every 12th month

- Fuel filter. Drain water/impurities ..... page 45

After the first 150 operational hours

- Engine oil, change [1] ..... page 35

[1] The oil change is recommended, the new engine oil should be one that is recommended by Volvo Penta. **NOTE!** Oil filter must be changed with every oil change.

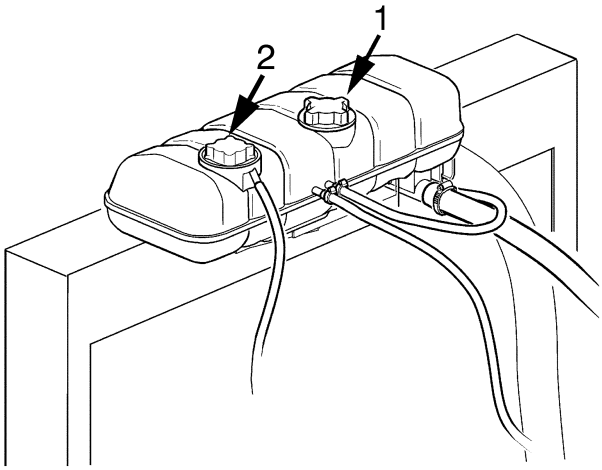
Every 50–600 operational hours / at least every 12th month

- Engine oil, change [1], [2] ..... page 35
- Oil filter/Bypass filter, change [2] ..... page 36

[1] Oil change intervals will vary depending upon the grade of the oil and the amount of sulfur in the fuel.
[2] **NOTE!** Oil filter must be changed with every oil change.

Every 400th operational hour / at least every 12th month

- Fuel tank (sludge collector), drain. ..... not shown
- Alternator belt, check/adjust ..... page 32
- Batteries, check electrolyte level ..... page 47

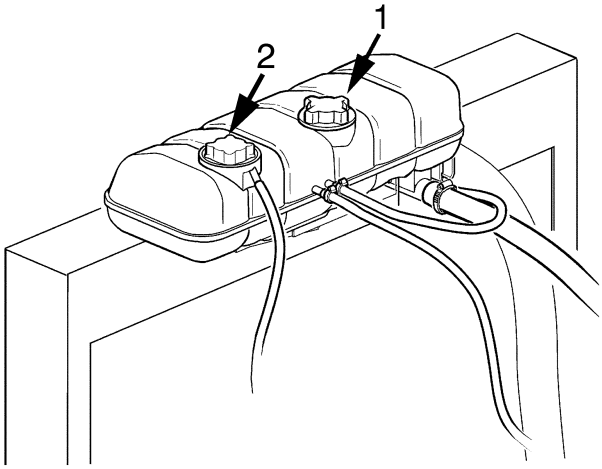


Coolant level, check

⚠ **WARNING!** Do not open the coolant filler cap (1) when the engine is warm. Steam or hot coolant can squirt out as pressure is released.

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

The coolant level should be above the MIN mark. Add coolant as needed according to the description in ”Adding, cooling system”.



Adding, cooling system

⚠ **WARNING!** Do not open the coolant filler cap (1) when the engine is warm. Steam or hot coolant can squirt out as pressure is released.

NOTE! Do not open the pressure cap.

1. Open the filler cap (1).

NOTE! Use only Volvo Penta recommended coolant and mixtures.

2. Mix the correct amount of coolant ahead of time (see the table below) so that it can be assured that the system has been filled.
   Filling must not be done so quickly that air pockets form in the system. Air must be given the chance to flow out through the filler opening and drain valves.

   When adding coolant, the coolant level should be between the MIN and MAX markings.
3. Start the engine when the cooling system has been bled of air and filled completely. If there is a heater attached to the engine’s cooling system the heater control valve should be opened and the unit should also be bled of air during filling.
4. Stop the engine after approximately 1 hour, check the coolant level and add coolant as needed.

Preparation for storage

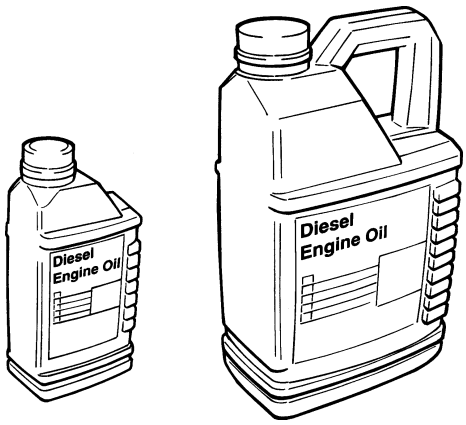
To prevent the engine and other equipment from suffering damage during periods of storage exceeding two months a preservation procedure should be performed. It is important that this be done correctly and that no part of it be forgotten. We have therefore created a checklist covering the most important points.

Before the engine is taken out of service for an extended period an authorized Volvo Penta service facility should perform a check.
Problems should be addressed at this point so that the equipment will be ready for use when needed next.

⚠ **WARNING!** Prior to starting maintenance work the chapter ”Maintenance” should be read carefully. In it you will find instructions for how the work can be carried out in a safe and correct manner

⚠ **WARNING!** Certain preservation oils are flammable. Some even produce dangerous fumes. Make sure that there is good ventilation. Use a protective mask when spraying.

⚠ **IMPORTANT!** When cleaning with a high-pressure sprayer the following instructions must be kept in mind: Never point the spray at seals, rubber hoses or electric components. Never use the high-pressure function while cleaning the engine.



Conservation

- **For periods of storage up to 8 months:**

  Change the engine oil and oil filter and then run until warm.

  For periods of storage longer than 8 months:

  Preserve the lubrication and fuel systems with preservation oil. **See instructions on next page**.
- Make sure that the coolant’s freeze protection is sufficient. Supplement as needed. As an alternative the coolant can be drained (drain also the coolant filter).
- Drain off any water and contamination from the fuel filter and the fuel tank. Fill the tank completely full with fuel to avoid building of condensation.
- Disconnect the battery cables and clean and charge the batteries. Maintenance charge the batteries periodically during the storage period. **A poorly charged battery can freeze and break.**
- Clean the engine externally. Do not use high-pressure spray when cleaning the engine. Touch-up paint damage using Volvo Penta original paint.
- Spray the electrical system’s components with a water displacing spray.
- Check and treat control cables using rust-preventative.
- Affix a note on the engine showing the date, type of preservation and type of preservation oil is provided.
- Cover the air filter, exhaust pipe and the engine if called for.

Code 5.8, PID / SPN 175. Oil temperature

Cause:

- Oil temperature is too high

Reaction:

- Warning indication.
- The engine control module limits engine output (unless protection has been turned off with the diagnosis tool VODIA).

Remedy:

- Check the oil level.
- Check the oil temperature.
- Check the oil temperature sensor function.

Code 5.9, PID / SPN 98. Oil level sensor

Cause:

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

Reaction:

- None.

Remedy:

- Check that the cable harness to the oil level sensor has not been damaged.
- Check the oil level sensor function.

Code 6.1, PID / SPN 110. Coolant temperature

Cause:

- Coolant temperature is too high.

Reaction:

- Engine control module reduces engine power (unless the protection has been shut off with the VODIA diagnostic tool).

Remedy:

- Check the coolant level.
- Check the intercooler (cleanliness).
- Check if there is air in the cooling system.
- Check the pressure cap on the expansion tank.
- Check coolant temperature sensor function.
- Check thermostat function.

Code 6.2, PID / SPN 105. Boost temperature

Cause:

- Boost temperature is too high.

Reaction:

- Engine control module reduces engine power (unless the protection has been shut off with the VODIA diagnostic tool).

Remedy:

- Check the coolant level.
- Check the intercooler (cleanliness).
- Check boost temperature sensor function.
- Check the function of the thermostat.

Code 6.4. PPID 231 / SPN 639. Data link (CAN). CIU

Cause:

- Faulty data link (CAN), CIU.

Reaction:

- Instruments and warning lamps stop working.

Remedy:

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

Code 6.5. PPID 231 / SPN 639. 2017 / PSID 201 Data link (CAN), EMS 2

Cause:

- Internal fault in control module.

Reaction:

- Engine not operating: engine can not be started. Engine operating: engine idles and can only be stopped with the auxiliary stop (AUX-stop).

Remedy:

- Check that the 8-pin connector is not damaged.
- Check that the cables between the CIU and the engine management unit are not damaged.
- Check that sleeves 11 and 12 in the connector on the CIU are not damaged.