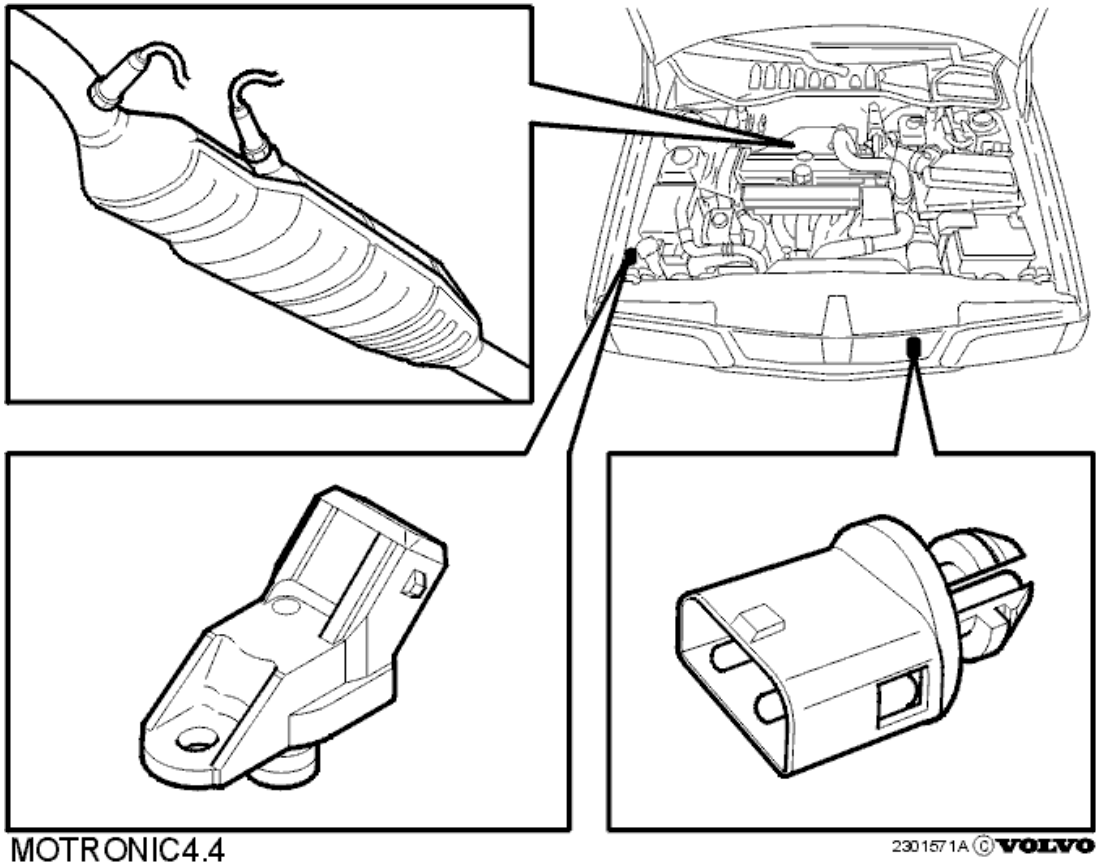


Motronic 4.4, New/modified sensor, B5254T 850



Atmospheric pressure sensor

Intention

The sensor is located by the right hood catch and provides information about air pressure to the engine control module (ECM). It provides the engine control module (ECM) with the car's height above sea level. When driving at high altitude the control module is affected by:

- Boost pressure
- Injection times when starting
- Certain diagnostic functions, by switching them off.

Boost pressure reduction

Using the sensor the control module adjusts boost pressure so that engine power is not affected by driving at high altitudes in a much more efficient way than previously by delaying the opening of the boost pressure control (BPC) valve.

The sensor is used by the control module to avoid over revving the turbocharger (TC). When driving at altitude there is otherwise a risk of over revving, because the thin air means that the turbine wheel rotation speed must be increased so that the power can be

maintained (thinner air ⇒ less oxygen ⇒ greater volume of air required.)

The above functions are also installed on other turbocharged engines with electronic boost pressure control, but are not as exact as on the B5254T, because those calculations are based on signals from the mass air flow (MAF) sensor (which in a turbo is located after the charge air cooler (CAC)).

Injection times when starting

To ensure good engine start at high altitude and also limit the exhaust emissions, the amount of injected fuel is reduced as a result of the air density.

At a height of approximately 2500m (8202 ft) above sea level approximately 25% less fuel is required than at sea level.

Certain diagnostic functions are switched off

The control module also uses the sensor signals to switch off the leakage and secondary air pump diagnosis if the car's height above sea level is more than approximately 2400 meters.

At these heights there is no requirement that the diagnostic functions should operate. It is therefore good to temporarily withdraw them from function, due to the difficulty in diagnosing accurately when the air is so thin. This is so that the pollution warning lamp does not light unnecessarily.

Function

The atmospheric pressure sensor contains a piezo-electric crystal in the shape of a diaphragm.

One side of this diaphragm is subject to atmospheric pressure, via an opening in the underside of the sensor. The other side is acted on by a contained gas.

The deformation of the piezo-electric diaphragm, and therefore its resistance is proportional to air pressure.

The control module measures the sensor but a stabilized 5V voltage and output signal varies between 0.4 and 4.75 V.

Lower air pressure gives a lower output signal: At sea level ≈ 100 kPa (14.5 psi) ⇒ approximately 4.5 V. 1000m (3280 ft) above

sea level \approx 90 kPa (13 psi) \Rightarrow approximately 3.2V.

Emergency programs

If the signal from the atmospheric pressure sensor is missing a diagnostic trouble code (DTC) is stored the warning lamp for exhaust cleaning lights and the control module will use a substitute value which corresponds to driving at sea level.

Outside temperature sensor (USA/CDN only)

Intention

The outside temperature sensor supplies the engine control module (ECM) with a signal describing the outside temperature. The outside temperature sensor is located on a double bracket together with the outside temperature sensor for the combined instrument panel.

The outside temperature sensor is used to switch off certain diagnostic function when the temperature is below $-7\text{ }^{\circ}\text{C}$ (19°F) when there are relaxations in the legal requirements over which diagnostic functions must be carried out. The diagnostic functions disabled are:

- Leak diagnostic
- Pulsed secondary air injection (PAIR) system diagnostic
- Misfire diagnostic

The above diagnostic functions can cause the lamps to light in cold weather even if it is a temporary problem caused by moisture that has frozen on a component.

Function

The outer temperature sensor contains a temperature sensitive resistor of the NTC type. The sensor is supplied with a stabilized voltage of 5V. The voltage across the sensor is a function of the outside temperature and, therefore, of sensor resistance, and can vary between 0.5 and 4.5V.

Emergency programs

If information is missing from the sensor or if it is incorrect a diagnostic trouble code (DTC) is stored, the CHECK ENGINE lamp is lit and the control module uses a substitute value which corresponds to $20\text{ }^{\circ}\text{C}$ (68°F).

Moved forward rear oxygen sensor (HO2S)

On the B5254T, which like all engines has a catalytic converter with an extra metal

monolith upstream of the ordinary ceramic monoliths, the rear Oxygen Sensor (O2S) is moved forward in comparison to the B5254S with Motronic 4.4.

Better diagnosis

By the new location the control module can diagnose if the front section of the catalytic converter is damaged. The catalytic converter ages starting at the front.

The front section of the catalytic converter is important in order to give low emissions after a cold start.

The engine management system can give faster fault warnings if the catalytic converter does not function to full effect.