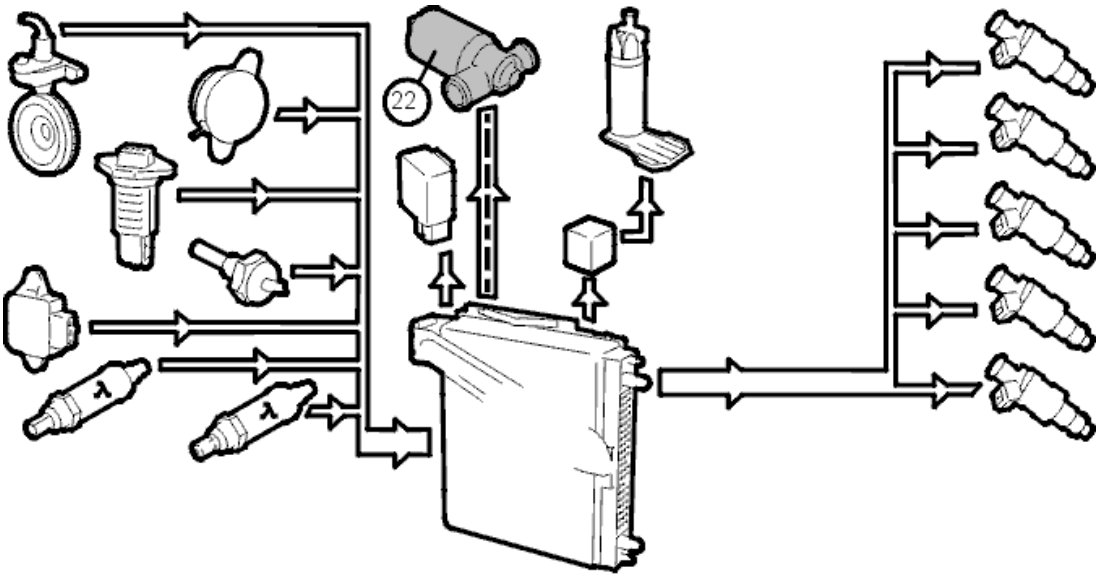
Idle air control (IAC)



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The idle air control (IAC) system tasks

To maintain a stable idling speed by directing the correct amount of air past the throttle.

To adapt the idling speed to different operating conditions.

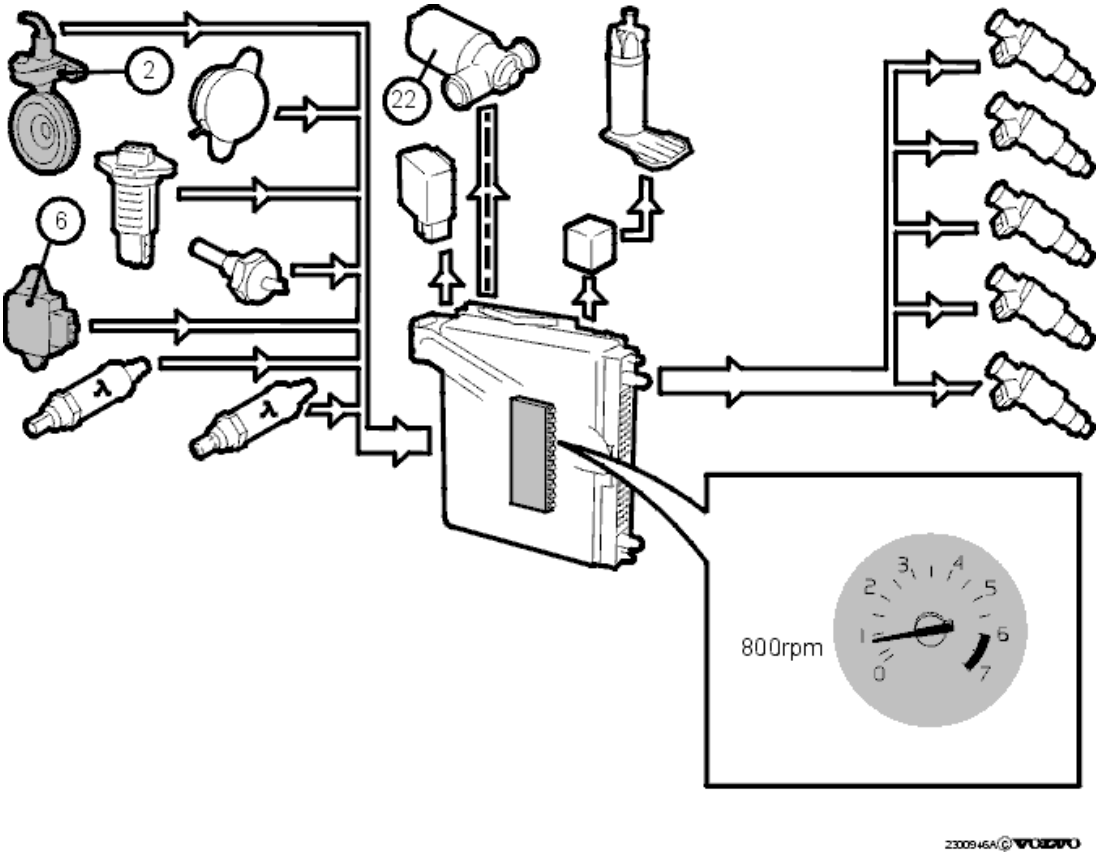
How is the idling speed controlled?

The idle air control (IAC) valve (22) has power supply (+) via the system relay.

The control module regulates the engine speed (RPM) by grounding the idle air control (IAC) valve. The longer the ground pulse the more the valve opens (= greater airflow) and the greater the engine speed (RPM).

Usually the same control module is used to control both the quantity of fuel and the idling speed. Most of the sensors are common to both functions.

When is the idling speed correct?
Signals from a number of sensors are required in order for the control module to be able to calculate this. Which are the most important sensors for the control of idling speed?



Basic control of idling speed

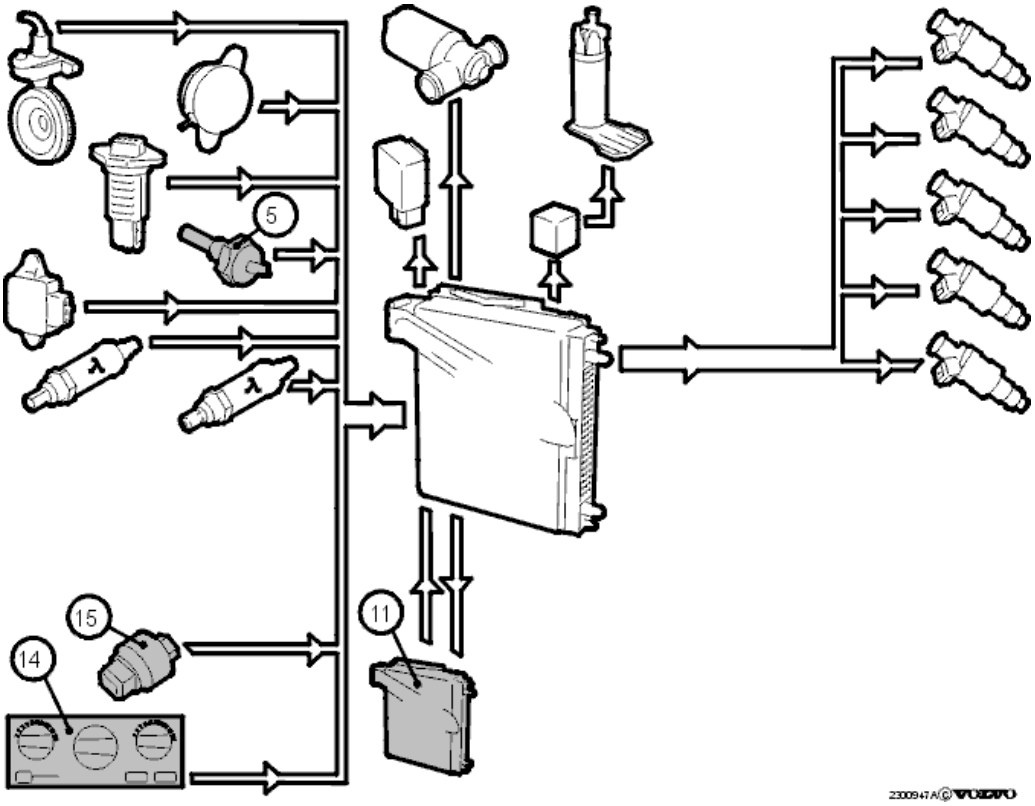
Two sensors are required for this. The throttle position (TP) sensor (6). This provides a signal indicating closed throttle position (CTP). The engine speed (RPM) sensor (2). This indicates that the engine speed (RPM) is low; in other words idling speed.
(Closed throttle + high engine speed (RPM) = engine braking)

The control module reads its own memory to check what the idling speed should be in the current operating condition.

The control module varies the length of the ground pulse to the idle air control (IAC) valve (22). This is so that the idling speed is correct and kept constant.

As soon as the throttle is opened slightly the idle air control (IAC) valve opens a little extra. This to avoid stalling when parking for example when the power steering increases the load on the engine.

During engine braking the valve is slowly closed to the normal idling speed. This means that the negative pressure in the intake manifold is limited. In turn this provides cleaner exhaust gases.



Compensating idling speed

In certain circumstances the idle air control (IAC) valve must open a little extra. This is to obtain the correct engine speed (RPM). Sometimes it must be able to react more quickly than normal.

Cold engine

When the engine is cold there is greater internal friction in the engine. Therefore an increased amount of fuel / air mixture is required. Some engine variants also require higher idling speed.

The engine coolant temperature (ECT) sensor (5) measures the temperature.

The control module reads its own memory to check how much more the idle air control (IAC) valve needs to be open for the idling speed to be correct despite the higher friction. Alternatively, on certain engine variants, the idling speed is raised slightly.

Variation in load at idling speed

When the load varies considerably at idling speed there is a risk of the engine speed (RPM) oscillating too much. In such circumstance increased preparation and quicker control are required.

On some systems the quantity of fuel is also increased temporarily when the load is

increased This helps the idle air control (IAC) valve to keep the idling speed as stable as possible.

When a gear is selected on cars with automatic transmission a signal is transmitted by the gear shift selector or the automatic transmission control module (TCM) (11).

When the air conditioning is selected a signal is transmitted by the A/C control (14). When the A/C compressor is engaged and disengaged signals are transmitted by the pressure switch (Pressostat) (15).
On some engine variants the idling speed is increased slightly when the A/C is selected. This is primarily to increase the power of the air conditioning system.

This was what was required for idle air trim.