

# Idle Speed Control Valve

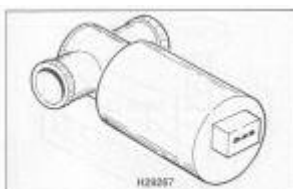
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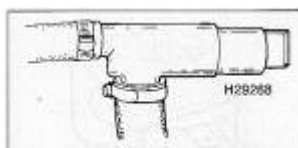
Created: 20 Jan 2002  
Revision 1

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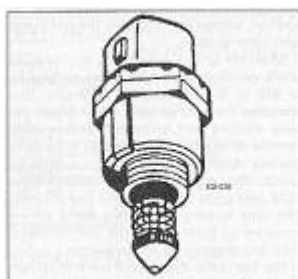
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2.29 Idle speed control valve (ISCV), three-wire  
Bosch 3-pin ISCV motor model.



2.30 Idle speed control valve (ISCV), two-wire  
Bosch 2-pin ISCV solenoid model.



2.31 Idle control, stepper motor  
Typical stepper motor ISCV.



5.8 Idle speed control valve (arrowed), seen from underneath vehicle - two-wire Motronic 2.8 (GM)

Location of ISCV if under the inlet manifold.

## What is a 'Idle Speed Control Valve'?

When an engine is idling, it means that it is under no load (apart from its own internal friction of mechanics, i.e. the crankshaft etc.). Otherwise the engine is doing no work. At this point, making an engine idle is quite difficult and this idle speed needs to be controlled otherwise it will simply stall. On modern engines with a EMU (Engine Management Unit), a idle speed control valve (ISCV) is utilised to do this task.

This means the process is automatic and no or very little adjustment is possible. Where it is possible to adjust, the only option available is to set the idle base speed with a by-pass idle speed air screw which bleeds some air from the system. Hence ISCV are not found on carburettor engines as they use a different method for idling.

## How does a ISCV work?

Basically the ISCV's are either stepper motors or solenoid action valves. They simply 'squeeze' the air pipe and hence adjust the amount of air entering the engine. When the engine is under full load (i.e. accelerating), the ISCV is no longer in use.

In more detail a small volume of air is allowed to by-pass the throttle plate. This air usually passes through a pipe or through a port on the inlet manifold. The ISCV is therefore mounted in situ and controls the amount of air travelling passed it. If the amount of air in this by-pass area is varied, so is the idle speed.

## What 'types' of ISCV's are there?

There are typically Bosch 3-wire, Bosch 2-wire and a stepper motor model.

### Bosch 3-wire:

The Bosch 3-wire type uses a DC motor in its housing which could turn both clockwise and anticlockwise. The DC motor is supplied by a +12v source and the other 2 pins are the grounds to control the rotation, which are earthed inside the EMU. When the EMU earths one of the direction pins, the motor will rotate in one direction and visa-versa. This prevents the valve being fully open or fully closed. Normally the bias would be towards the open position. By varying the time that each circuit is energised the EMU can control the precise position required.

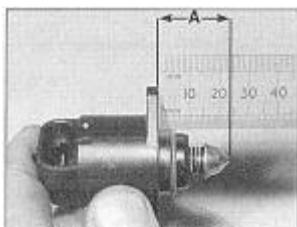
### Bosch 2-wire:

The Bosch 2-wire type uses a solenoid which opposes a strong spring. The solenoid is again supplied by a +12v source and the 2nd pin is the earth which is controlled by the EMU. When the solenoid is earthed it will override the force of the spring and move open and stay there until the earth is removed, where the spring will once again force it back down again (closed). The solenoid is therefore held at the fail safe 'closed' position.



12.45b ... and withdraw the idle speed control motor. Note C-ring (arrows!)

Location of the stepper motor ISCV.



12.46 Measure the distance (A) between the end of the idle speed control motor piston and the end face of the motor body flange

Check the length of the stepper motor.



Bosch 2-pin ISCV as fitted on C20XE 2L 16v engines.

However, even when closed there is always a small amount of air allowed to travel through the valve, giving low idle speed. The longer time the EMU energises the solenoid (holds open), the further open it will be. So to control the open time, the EMU pulses the solenoid. This frequency is typically very quick and by varying this frequency the EMU is able to control the ISCV at an exact position for idling.

### Stepper Motor Control:

The stepper motor uses a phased DC motor which has a 'pincher' on the shaft. As the motor rotates, the pincher protrudes into the air by-pass passage, hence varying the amount of air flow. The motor typically has 4 earth poles on which the EMU controls and one +12v source. By varying the pattern of earthing, the motor can be stepped clockwise or anticlockwise, to a exact required position.

### Where is the ISCV located on the engine?

Depends on what model of engine it is. Some are very easy to find and get to where there are others are only accessible from under the car. The stepper motor type is usually found on the entrance to the throttle body and therefore easily to get at. The other types require access to the air by-pass pipe and on some models are accessible from the top of the engine. However on some 16v and V6 models, they are located underneath the inlet manifold, which is at the back of the engine, and can only be accessed from underneath the car. See your cars Haynes Book for further details.

*Article based on text in the [Haynes Books](#) series and peoples personal experiences.*

