

Fuel Injection; Idle Speed Control (continued)

Idle Speed Control

Idle speed is regulated by the motorized idle speed control valve that controls throttle bypass air. The control valve is driven by the ECM. The ECM uses inputs received from ignition ON, the crankshaft sensor, coolant temperature sensor and throttle position sensor as well as inputs for gear position, air conditioning compressor operation and road speed to control idle speed.

ECM idle speed control occurs at closed throttle when road speed is less than 3 mph. The programmed idle speed accounts for engine temperature and the loads placed on the engine by the transmission (gear position N, D, etc.), and air conditioning compressor clutch operation.

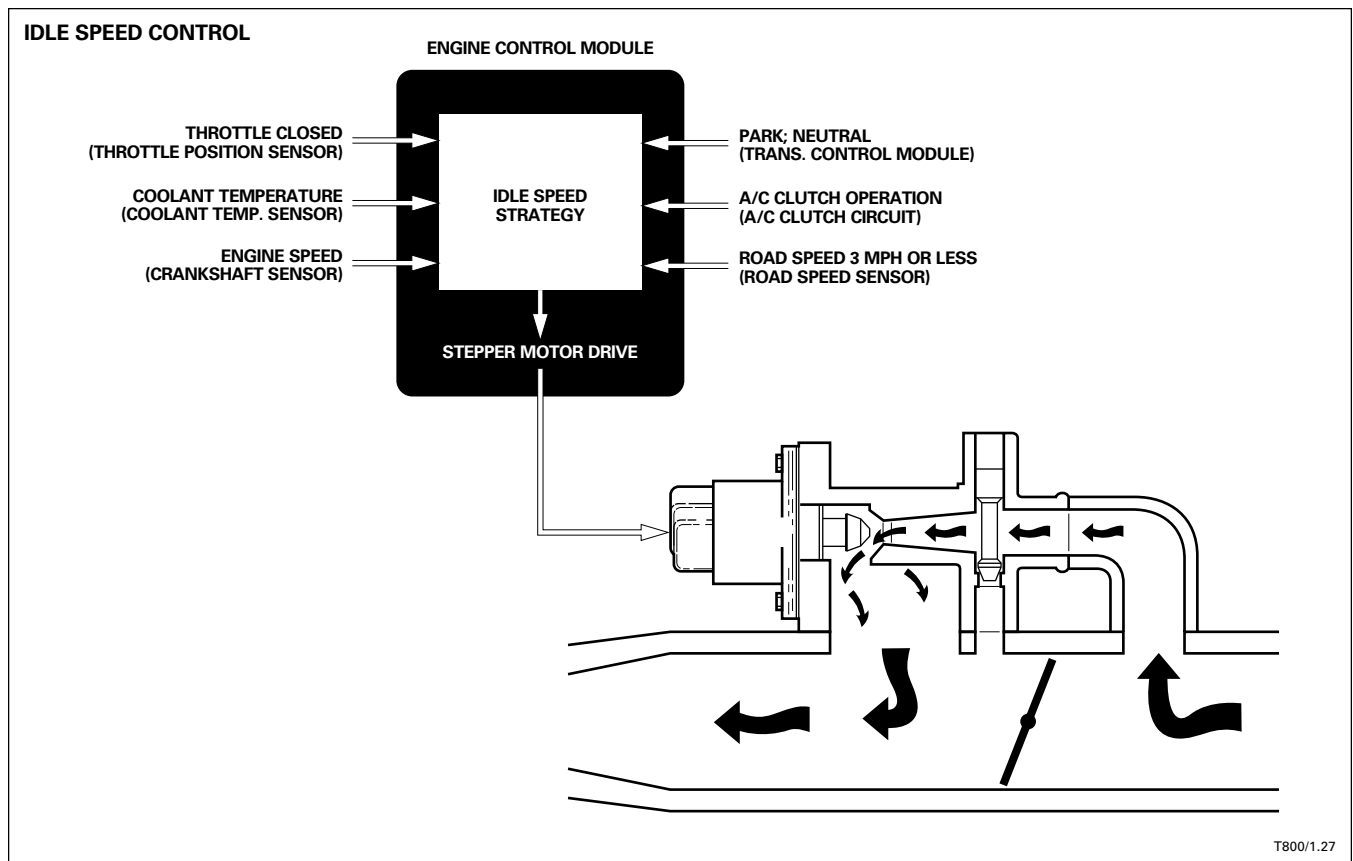
Typical controlled engine idle speeds

Cold engine (68°F [20°C]) / Neutral	800 rpm
Cold engine (68°F [20°C]) / Drive	650 rpm
Warm engine (193°F [90°C]) / Neutral	700 rpm
Warm engine (193°F [90°C]) / Drive	580 rpm

An ECM software function allows for a correction to the idle speed “base line” as the engine base idle changes with age. The automatic adjustment values are held in RAM within the ECM and will be retained or updated as long as the ECM is connected to battery voltage. If battery voltage is removed for any reason, the stored correction values will be lost. The values will be relearned only after the battery is reconnected, the engine operated from cold to normal operating coolant temperature at idle, and the vehicle driven for approximately 50 yards above 3 mph.

NOTE: At road speeds above 3 mph, the idle speed control valve is opened to limit overrun intake manifold pressure. The amount that the valve is opened is based on engine speed and throttle opening.

The ECM monitors its output signal to the idle speed control valve for on-board diagnostics.



Engine start-up

ECM idle speed control begins shortly after the engine is started, provided the throttle is closed (throttle position sensor at idle) and the road speed is less than 3 mph. The stepper motor in the control valve is closed in stages until the target idle speed is reached.

Gear position

When the gear selector is moved to Park or Neutral from drive, the engine management ECM receives a ground signal from the transmission rotary switch (XJS) or transmission decoder (XJ6 Sedan). The ECM then closes the idle speed control valve a predetermined number of steps in anticipation of the reduced engine load. When the engine is at normal operating temperature, the ECM maintains idle speed at 700 rpm in P or N and at 580 rpm in R, D, 2 or 3.

Air conditioning compressor clutch operation

When the air conditioning compressor clutch is energized, a parallel circuit inputs battery voltage to the engine management ECM. The ECM opens the idle speed control valve a predetermined number of steps to anticipate the change in engine load.

Ignition switched OFF

When the ignition is switched OFF, the control valve indexes to a known parked position. On 1990 model year vehicles, the reference is from the fully opened position. On later vehicles, the reference is from the fully closed position, 7 seconds after the ignition is switched OFF.