



## 4.23 Idle Speed Control Actuator

### 4.23.1 Description

The load on an idling engine is a combination of both internal and external engine loads such as engine friction, water pump, air conditioning etc., which all change with time and operating conditions. The idle speed control actuator is required to enable closed loop idle speed control to compensate for these changing conditions, by regulating the airflow into the engine.

The device consists of two coils which use opposing PWM signals to control the position of opening / closing of the rotary valve. If one circuit fails the other is switched off by the ECM as soon as it recognises the fault. This prevents the valve going to a maximum or minimum setting. There is a default position, which is determined by a permanent magnet. In the default condition the idle speed is raised and remains fixed at approximately 1200 rpm with no load.

There are eight idle speed control actuator diagnostic checks: -

1. Opening winding driver short circuit to battery positive, i.e. the driver voltage is greater than half the battery voltage when the driver is on.
2. Opening winding driver short circuit to ground, i.e. the driver voltage is less than one third of the battery voltage when the driver is off.
3. Opening winding driver open circuit, i.e. the driver voltage is greater than one third of the battery voltage but less than two thirds of the battery voltage when the driver is off.
4. Closing winding driver short circuit to battery positive, i.e. the driver voltage is greater than half the battery voltage when the driver is on.
5. Closing winding driver short circuit to ground, i.e. the driver voltage is less than one third of the battery voltage when the driver is off.
6. Closing winding driver open circuit, i.e. the driver voltage is greater than one third of the battery voltage but less than two thirds of the battery voltage when the driver is off.
7. Blocked Idle Air Control (IAC) valve – rpm error low, i.e. the engine speed is 100 rpm less than the target speed.
8. Blocked IAC valve – rpm error high, i.e. the engine speed is 180 rpm greater than the target speed.



### Idle Air Control Valve

Component/ System	Fault Codes	Monitoring Strategy Description	Malfunction Criteria	Threshold value	Secondary Parameter	Enable Conditions	Time Required	MIL Illumination
<b>Idle Air Control Valve</b>	P1510	circuit continuity - Open circuit	voltage - drive off	1/3 * Battery positive < voltage < 2/3 * Battery positive	engine speed	> 80 rpm	immediately/	two driving
	P1513	circuit continuity - short to ground	voltage - drive off	voltage < 1/3 * Battery positive	battery voltage	7.5V < Battery positive < 17V	continuous	Cycles
	P1514	circuit continuity - Short to battery positive	voltage - drive on	voltage > 1/2 * Battery positive				
closing	P1551	circuit continuity - open circuit	voltage - drive off	1/3 * Battery positive < voltage < 2/3 * Battery positive	vehicle speed ECT IAT altitude adaptation transfer gears engine load	= 0 mph > 80.25° C > -9.75° C > 0.712  high range < 2.5 m sec	2.0 to 3.0 sec/once per driving cycle	
	P1552	circuit continuity - short to ground	voltage - drive off	voltage < 1/3 * Battery positive				
	P1553	circuit continuity - short to battery positive	voltage - drive on	voltage > 1/2 * Battery positive				
	P0505	functional check	actual - desired RPM	> +180 rpm < -100 rpm				

If the above table does not include details of the following enabling conditions: - IAT, ECT, vehicle speed range, and time after engine start-up then the state of these parameters has no influence upon the execution of the monitor.