

This case study applies to the Nissan Pulsar N16 1.6 and 1.8 DOHC 2000–2003

The engine would not idle or would idle too high or too low and the engine control module would not regulate the idle air controller (IAC) stepper motor.

The Nissan Pulsar N16 range of engines are fitted with an IAC stepper motor. They also have an extra air cut valve located at the throttle body which is used to provide additional bypass air when the engine is cold and requires a higher idle speed. The air cut valve is controlled by a bi-metallic spring in conjunction with the temperature of the engine coolant.

Failure of the IAC stepper motor is often attributed to engine coolant (used to heat the air cut valve metal spring) leaking through the aluminium housing and into the coil windings of the IAC motor, causing a short circuit.

In a majority of cases, when a short circuit fault occurs within the IAC coil windings, maximum current flow is then passed through the engine control module IAC



driver, in turn causing it to overheat and eventually cause damage to the ECM circuit board.

This type of fault is not limited to the N16, and is also very common throughout the Nissan Maxima range as well.

The diagnostic sequence requires removal of the harness connector plug from the IAC stepper motor, located at the throttle body.

Using a multimeter, check the resistance across terminals 1 and 2, 2 and 3, 4 and 5, and 5 and 6. All four measurements should read approximately 20–24 ohms at approximately 20°C.

Idle air controller stepper motor issues in the Nissan Pulsar



If one or more of the readings measures a short circuit (such as 0 to 5 ohms), it means the stepper motor is faulty.

The solution

If the IAC stepper motor resistance tests show one or more short circuits, the motor will need to be removed and replaced with a new assembly. A faulty IAC stepper motor can damage the ECM. It is also highly recommended to have the ECM's internal idle control circuit tested to ensure correct idle operation.

Injctionics can fully bench test your ECM along with your IAC motor, and also offers a repair service for this particular ECM fault. New IAC stepper motors are also stocked, and a range of exchange ECMs is available for the more popular part numbers within the Nissan N16 Pulsar range.

After replacing the IAC stepper motor you must carry out the idle air volume learning procedure which enables the ECM to learn the volume of air intake at idle. This procedure can be carried out manually or by using a scan tool and helps provide consistent idle quality whenever an IAC motor, throttle body or ECM has been replaced, or if the throttle body has been cleaned.

To enable learning, the following conditions must exist:

- idle speed and ignition timing correct
- battery voltage at idle – 12.9 V
- coolant 70°C – 99°C
- park/neutral signal detected at ECM
- cooling fan/s not operating
- vehicle stationary
- all electrical loads are off
- steering at rest
- transmission is hot (vehicle has been driven for about 10 minutes).

A compatible scan tool will provide confirmation.

For manual idle air volume learning use a watch to measure time intervals accurately:

1. Switch ignition **ON** for at least 1 second
2. Switch ignition **OFF** for 10 seconds
3. Start engine and bring to operating temperature
4. Switch ignition **OFF** for 10 seconds
5. Start engine and idle for at least 28 seconds
6. Disconnect throttle position sensor (brown in colour) connector
7. Within 5 seconds, reconnect throttle position sensor connector
8. Wait 20 seconds
9. Check that target idle speed is to specifications
10. Rev engine several times and allow to idle
11. Check idle speed and ignition timing are to specifications



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(TaT has covered this problem in TaT's a fact, NIS1601413. We have also mentioned this common issue a number of times at training events to highlight that all technicians should check complete systems when changing either an ECU or an idle speed control motor on Nissan Pulsars or any vehicle for that matter. Thanks to Injctionics for the information – it is well worth revisiting. Jeff Smit)