NISSAN FIGARO FAULT CODES AND DIAGNOSTICS

The Nissan Figaro uses an engine management system with the acronym ECCS – you'll see it in large letters on the plenum box when you open the bonnet. It stands for "Electronically Controlled Combustion System" - though I've also seen it referred to as "Electronically Concentrated Control System"! Basically it's a system that controls the fuel and ignition system. The system is similar to that fitted to many other Nissan cars and is one of many types of engine management systems used by Nissan.

The beauty of ECCS is that it has self diagnostics that you can access without connecting to a diagnostic machine or a code reader - so it's easily used by the DIY motorist.

The slight negative is that this is 1980's technology – very advanced for it's time but does have its limitations.

The heart of ECCS is the ECU (engine control unit). Data is fed into the ECU from various sensors on the engine – the ECU then uses its internal programmes to generate output signals to control the fuel and ignition system.

The ECU has the ability to detect a variety of faults which cause engine malfunction. The sensors that feed information to the ECU may pick up a genuine fault, or the sensor itself may become faulty and generate a false reading which the ECU will interpret as a fault.

So how does all this help you identify engine faults on your Nissan Figaro? Basically the ECU identifies faults and displays these as fault codes using flashing LEDs. By interpreting the code displayed – you can then get to the root cause of a problem.

The ECU is located behind the kick panel adjacent to the passenger side door. The picture below shows the ECU with the panel removed – this is just for clarity – there's no need to remove the panel. If you open the passenger door and look at the panel adjacent to the hinge edge – you'll see two rubber plugs. Remove these plugs and just behind them you'll see:

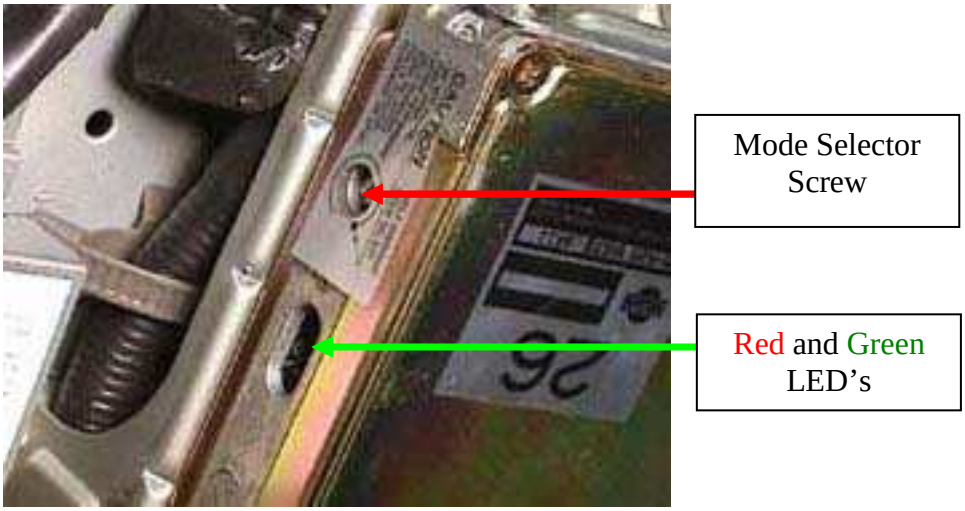
- **Top hole – the mode selector screw shown below**
- **Bottom hole – red and green LEDs**

It's better to view the LEDs in the shade or darkness – they're difficult to see in daylight and you might need to move your head around to see both of them.

The mode selector screw can be turned using a flat bladed screwdriver. Under normal circumstances the screw is turned fully anticlockwise and in diagnostic mode it's turned fully clock wise.

Use a small screwdriver – there's no need to use any force and don't attempt to turn the screw beyond it's stop.

Check that the screw is fully anticlockwise after finishing any diagnostic work!



We'll now detail three important diagnostic tests that can be carried out on the ECU – these are others which we'll discuss at some future date – but the so-called Mode 1, 2 and 3 tests are the most relevant

<u>Mode I - Exhaust Oxygen Sensor Monitor – The Lambda sensor</u>

Use Mode I to determine if the Lambda Oxygen Sensor is functioning properly. The Lambda sensor measures the oxygen in the exhaust gases and uses the information to continuously fine tune the fuel mixture. A malfunctioning Lambda will increase fuel consumption and may cause performance issues – it's highly unlikely to cause hesitation / misfire type problems. Most Figaros have Lambda sensors which are way beyond an expected life!!

Procedure:
Warm the engine to normal temperature.
Run the engine at 2000 RPM under no load while looking at the ECU. Make sure the GREEN LED goes on and off six to eight times during a ten second period at a steady 2000 RPM.
If the number of flashes are not more than five, replace the oxygen sensor – it's life expired. If the LED does not flash, check the sensor's circuit - the usual problem is the sensor disconnected or the cable shorted or severed as it enters the sensor

The ECU always reverts to Mode 1 when you start the engine – there's no need to turn the selector switch.

Mode II – Fuel Mixture Ratio Control Monitor

Use Mode II to determine if the air / fuel mixture is being optimised correctly ie the ECU is able to use the output of the Lambda sensor to achieve control.

Procedure:

Warm the engine to normal operating temperature.
Turn the mode selector screw on the ECU fully clockwise.
After the LED flashes twice, turn the dial fully counter clockwise. If you miss the 2nd flash – just turn the screw anticlockwise and go through the procedure again.
Run the engine above 2000 RPM under no load while looking at the ECU.
If the RED LED blinks simultaneously with the GREEN LED, the air/fuel mixture is modulating properly.

If the RED LED stays off, the mixture is more than 5% rich.
If the RED LED stays on, the mixture is more than 5% lean.
Both these conditions indicate a fault elsewhere that needs further investigation.

Remember that if the Mode 1 test indicates a Lambda issue – then this needs to be corrected if the results of Mode 2 tests are to be meaningful.

Mode III - Stored Fault Code Reporting

Use Mode III to retrieve all stored fault codes in ECU memory.

Procedure:

Turn the ignition switch on, but do not start the engine.
On the ECU, turn the diagnostic mode selector screw fully clockwise. Wait until the LED flashes 3 quick bursts, and then turn the screw fully counter clockwise. If you miss the 3rd flash – turn the screw anticlockwise, switch off the ignition and start again
The LED's will begin to flash fault codes. Red flashes are units of ten and green flashes are units of one. (red-3 flashes, green-1 flash = code 31). There may be more than one fault code stored so look out for a second or third code following on. After reaching the last stored code – the display loops back to the beginning and starts off with displaying the 1st code again.

To clear all stored codes, turn the screw fully clockwise (or turn the switch on). Wait until the LED flashes 4 quick bursts, then turn the

screw fully counter clockwise (or turn the switch off). To retain the codes in memory, simply turn the ignition off. Disconnecting the battery also clears any stored codes

Fault code descriptors:

The list at the end of this article covers the full list of codes for this particular ECU – many of these are not relevant to the Figaro. For example - the Figaro doesn't have a knock sensor so you'll never see a Code 37!

The no fault code for the Figaro is 44 (four red + four green) - this confuses many mechanics since the usual no fault code on Nissans is 55. Remember that 44 means no fault found within the diagnostic capability of the ECU – there will be faults that the ECU cannot detect. For example – the ECU cannot pick up a fault with a HT lead, a tracking distributor cap or a seized turbocharger.

INTERPRETATION OF FAULT CODES

The code will point you to the general area of the problem. A code for a temperature sensor may mean that the sensor has failed or more commonly that the connector is dirty or simply not connected. The two most common codes to arise on the Figaro are Codes 11 and 12 so we'll discuss these in a bit more detail.

Code 11

The crank angle sensor flags up to the ECU that the engine is in it's firing position

Actually on the Figaro, it's a sensor in the distributor senses the camshaft (and hence crankshaft position) position in order to fire the engine at the correct time. The ECU is quite clever – it compares where the distributor sensor sees the firing position and also calculates where the position should be from the engine speed. If the two don't correspond then it generates a code 11. This could mean that the sensor is faulty or dirty, disconnected, or the distributor drive has become disconnected from the camshaft!

Code 12

A malfunction of the airflow meter can lead to difficult starting, rough running or hesitation. A faulty electronic module or a dirty / disconnected electrical connector will often generate a code 12. We've seen a code 12 where someone has accidentally bent a contact pin whilst checking the security of the electrical connector. OK so the code doesn't pinpoint the exact fault but you do know that the problem is in the area of the airflow meter – so it significantly cuts down on possibilities to investigate.

LIMP HOME MODE (LHM)

When the ECU encounters a fault – it will often attempt to control using default values as well as flagging up a fault code. This is known as Limp Home Mode and it's usually pretty obvious that there's something amiss.

RESTORE FACTORY SETTINGS

When a fault occurs and a fault code is flagged up – the ECU may store corrupted data - so once the fault has been corrected – it's important to clean the ECU memory – often known as Restore Factory Settings. It's easily done on the Figaro by disconnecting the battery overnight!

Once factory settings have been restored – the next time you drive the car you may find it behaving not quite right. It's just that the ECU needs to go through a re-learning phase as – it takes just a few miles of driving then all will be well!

WHEN SHOULD I CHECK FAULT CODES ETC?

You may be concerned about high fuel consumption so a check of Mode 1 and 2 is a good starting point in any investigation.

Again if the car won't start, runs badly etc then a quick check for fault codes is a good starting point. Remember that a code 44 means that the ECU hasn't identified a fault – there may well be a fault beyond the capability of the diagnostics!

A check of Modes 1, 2 and 3 should be carried out at the 12 month / 12000 mile service.

Lastly – remember that you can play around with Modes 1, 2, 3 to get the hang of things without causing damage or corrupting software – so go ahead and have a go! Just 2 things to remember

- **Treat the mode selector screw gently.**
- **Turn the screw fully anticlockwise when you've finished.**

NISSAN ECCS FAULT CODE DESCRIPTORS

11 Crank Angle Sensor/Camshaft Position Sensor
12 Air Flow Meter/Mass Air Flow Sensor
13 Engine Coolant Temperature Sensor
14 Vehicle Speed Sensor
21 Ignition Signal
22 Fuel Pump
23 Idle Switch
24 Throttle Valve Switch
25 Idle Speed Control Valve
28 Cooling Fan Circuit
31 ECU
32 EGR Function
33 Heated Oxygen Sensor
34 Knock Sensor
35 Exhaust Temperature Sensor
36 EGR Control-Back Pressure Transducer
37 Knock Sensor
38 Right hand bank Closed Loop (B2)
41 Intake Air Temperature Sensor
42 Fuel Temperature Sensor
43 Throttle Position Sensor.
44 No fault stored
45 Injector Leak
47 Crankshaft Position Sensor
51 Injector Circuit
53 Oxygen Sensor
54 A/T Control
76 Fuel Injection System Function right hand bank
77 Rear Heated Oxygen Sensor Circuit
82 Crankshaft Position Sensor
84 A/T Diagnosis Communication Line
85 VTC Solenoid Valve Circuit
86 Fuel Injection System Function right hand bank
87 Canister Control Solenoid Valve Circuit
91 Front Heated Oxygen Sensor Heater Circuit right hand bank
94 TCC Solenoid Valve
95 Crankshaft Position Sensor
98 Engine Coolant Temperature Sensor
101 Front Heated Oxygen Sensor Heater Circuit right hand bank
103 Park/Neutral Position Switch Circuit
105 EGR and EGR Canister Control Solenoid Valve Circuit
108 Canister Purge Control Valve Circuit