RON Coding Plugs

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Figure 1
A RON plug valued A/B connected to a Calibra.

Figure 2
Location of a RON plug in the engine bay.

Figure 3
A Black 91/95 RON code plug fitted to a Nova GTE.

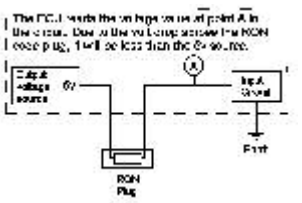

Figure 4
Block diagram of a RON code plug circuit.

What are 'RON coding plugs'?

A RON plug stands for "Research Octane Number" or also known as Octane Rating Plugs. These were introduced in 1987 on engines with fixed ignition distributors. That means you can no longer adjust the timing with a strobe gun as the ECU now automatically works out the advance or retard on the timing (usually with the help of a Knock Sensor). The RON plug value retards the timing a fixed amount.

What do these plugs do?

Their main function is to prevent detonation (otherwise known as 'pinking') when using unleaded fuel. The plug is wired into the ECU (Engine Control Unit) wire loom so that it can be fitted into one of two positions. You simply unplug the RON plug and turn it over to be another value.

Inside the plug are two different fixed value resistors. The ECU provides a 5v reference source to the RON plug connector (see figure 4). When this signal is connected to earth, via the RON plug fitted which has a resistor inside, a voltage level lower than the 5v source will be returned to the ECU. The ECU may modify both the basic timing and fuel injection maps. Hence this RON code plug will advance up the ignition at different rates. The amount of advance under load is approx. 5deg less when coded for unleaded (95) than for premium (98) leaded fuel.

What are the resistance values?

The resistance value also influences other functions and by using any of the 8 values available it is possible to make minor changes to the running of the engine.

The RON plugs come in nine different colours:

Resistance Value	RON plug colour & Octane rating
Zero ohms	Blue 95, Black 91
220 ohms	Brown 95, Black 95
470 ohms	Brown 98
750 ohms	Green 98, White 98, Orange 91
1200 ohms	Green 95 (part No. 90276398)
2200 ohms	Yellow 95, White 95, Violet 98
4700 ohms	Red 98 (part No. 90276399)
Meg ohms (Infinity)	Violet 95, Red 95, Orange 95, Yellow 91, Blue 91

So a 'Blue 95' RON plug is used with 95 Octane fuel or higher. You need to make sure that the octane rating of the fuel you use is at least as high as the number on the octane plug else you can damage your engine. As long as you keep to the above rule, the higher the number the better.

What are the fuel octane values?

Fuel = Octane:

Super Unleaded = 98 Octane.
Four Star (Leaded) = 98 Octane.
97 Unleaded = 97 Octane.
LRP = 97 Octane.
Premium Unleaded = 95 Octane.
Unleaded (and Two Star) = 91 Octane.

Where is the RON plug on my car?

The RON plug is typically found in the engine bay. Look for a 2" by 1" plastic block which follows one of the colours codes as described above. A engine will only have one RON plug. Note that only fuel injection engines will have a RON plug fitted because it has a ECU to control the ignition timing. Also newer engines like the Ecotec series no longer require the use of a RON plug, so there may be a connector for it, but no RON plug fitted.

How much are these RON plugs?

About £13 from your local Vauxhall dealer.

How do I change a RON plug?

Its very simple, if you can change a light bulb, you can change a RON plug. Simply locate the RON plug, disconnect it from its connector and replace it with another RON plug or turn it over (some have a different value on the opposite side).

I have a plug that says A and B on each side?

Some engine systems were fitted with these legends, instead of the actual Octane number printed on the side. These RON plugs are usually brown, which means you have a Brown 95/98 RON plug (i.e. A = 95, B = 98 setting).

Comparison Chart:

The table below shows the changes made by each resistance value -Vs-Octane rating for the three basic 8 valve engines, which where: -

1 = Basic value.
2 = Idle speed increase by 100rpm.
3 = +5% fuel acceleration enrichment.
4 = +5% fuel enrichment throughout range.
5 = Ignition retarded by 5deg throughout rev/load range.

2.0 NE non-cat	Resistance Value:
91 Ron	zero ohms = 1 Infinity ohms = 2
95 Ron	220 ohms = 1 1200 ohms = 3/4 2200 ohms = 2 4700 ohms = 2/3/4 750 ohms = 2/3/4/5
98 Ron	470 ohms =1
2.0 NE cat	Resistance Value:
	Zero ohms = 1

91 Ron	Infinity ohms = 2 750 ohms = 2/3/5
95 Ron	220 ohms = 1 1200 ohms = 3 2200 ohms = 2 4700 ohms = 2/3
98 Ron	N/A
2.0SE/ SER/ SEH non cat	Resistance Value:
91 Ron	N/A
95 Ron	220 ohms = 1 1200 ohms = 3/4 2200 ohms = 2 4700 ohms = 2/3/4 infinity ohms = 2/3/4/5
98 Ron	470 ohms = 1 750 ohms = 2

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