

TDi300 EDC Cold Starting Fix (temporary cure)

This details a temporary fix to my TDi300 1997 EDC model which was suffering from poor cold starting.

(See my posts on the long running saga of trying to cure the poor cold starting performance when temp drops)

In interim, I have made the following modification which transformed the cold start. It allows the car to start immediately I turn the key, without waiting for the glow light and in sub zero temps and with a knackered battery that has been half flattened by all the starting tests I've been doing

Also worth noting that if nothing else, I have proved that even in minus 8 degrees with a poor battery, the TDi300 is capable of starting in less than a second without the aid of the glow plugs, as these take at least 4 to 5 secs on the bench to really glow hard.

Before undertaking this mod, you should perform a quick test in cold conditions to see if this will be of any benefit, as follows:

Disconnect the connector to the ECU coolant temperature sensor on the cylinder head, under the sound proofing cover and insert a 10K ohm resistor into the connector pins (actual value not critical, just needs to be around 10K ohm). Try starting and if results in a quicker, better start then proceed with mod.

Parts required:

- 1 x 5.6K ohm resistor
- 1 x push to break single pole switch
- 2m twin wire (car speaker type wire ideal)

Background:

The modification is to insert an extra 5.6K resistance into the EDC feed from the coolant temperature sensor (which should read around 4.5K at -3 Deg C) to bring the total up to around 10K ohm. This is the sensor mounted on the cylinder head (not the thermostat sensor), which fools the EDC into thinking it is minus 30 deg C and thus advances the injection timing to get a good cold start. I fitted a switch on the dash to enable selective use of this extra boost as and when required.

During engine run, the injection timing is automatically adjusted by taking inputs from the various sensors, including an inductive pickup sensor on one of the injectors and engine position/speed sensor. With the exception of starting and on the overrun, when these signals are insufficient to be used.

It's worth noting that during starting (cranking), the ECU ignores all sensors apart from the coolant temperature sensor and the engine rotation/speed sensor. All others are ignored and of particular note being the injection timing pulse sensor mounted on injector no 4, which is ignored. Therefore, the ECU defaults to a pre-determined injection timing map and advances the timing, dependant on temperature. The amount of advance however, is also pre-determined by the static injection timing, in other words, if the timing is too retarded, even with the pre-set advance from the ECU, it would still be too far retarded. It is this aspect that I am continuing to work on, but in the mean time follow these instructions to make a temporary fix.

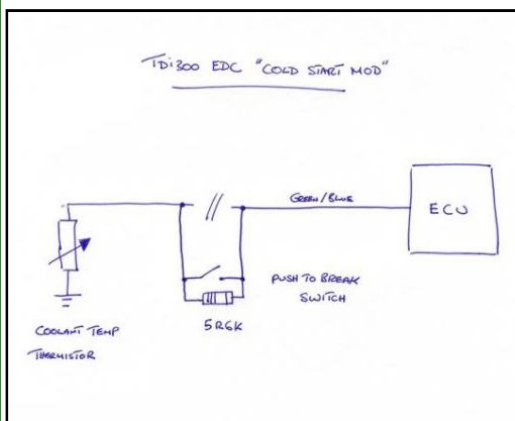
I spliced into the GREEN/BLUE wire feeding the ECU under the drivers side dash. It is one of many wires in a thick loom, covered in a plastic protective shield that goes to the ECU by the drivers foot well.

I cut the wire and soldered to each cut off, the twin wire and ran this up to behind the dash where I fitted the switch. The current/voltages involved are tiny so you don't need thick wire.

I used a push to break type push switch, but you could use a rocker type etc, just need to make sure you remember to switch it off when the engine has started.

The 5.6K resistor is soldered across the two contacts of the switch in parallel with the two wires. In normal operation, this results in the circuit current going across the internal switch contacts and not via the resistor and thus is not affecting the feed to the ECU. When operated, the push to break opens the contacts and the circuit current goes through the resistor to the ECU, in series with the existing resistance of the coolant sensor.

This is the circuit:



This is the finished job:



Finally thank you to all the forum members who have been helping me to date with a solution to this problem - you know who you are - cheers guys.

I'm still not completely done on chasing the actual root cause, which I believe to be due to the static injection timing being too far retarded.