Bosch KE2 Jetronic Fuel ECU pin-out measurements (Bentley Turbo R Early 89)

The Fuel ECU is the black box above the Accelerator pedal. The silver box is the ignition ECU.

To access the connections, turn battery power off!!!!!!
Remove the plug from the fuel ECU, the ignition ECU plug can remain connected. Undo the retainer screw at the end of the back shell of the plug. Fold back the rubber boot, being in the car they remain reasonably flexible and mine didn't tear. Undo the clamp screws, gently pull out the plug insert with some long nose pliers then rotate the backing shell out of the way.

The connector can then be reinserted in the fuel ECU with access to the signals. It will go in easily if you have the pins/sockets lined up. Don't force it!!!!!

Make sure the connector is firmly seated. Turn the battery power back on and run the engine.

To make life easier rotate the diagram below to figure out the connection orientation as the ECU is mounted upside down from the diagram. Note some of the signals will be different on warm up phase. The below measurements are at operating temperature.

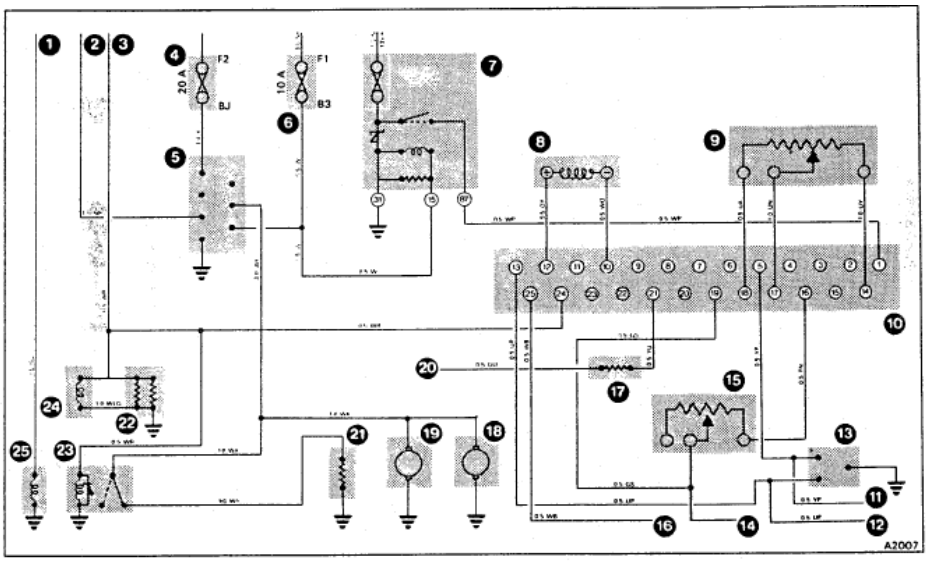


Fig. B3-19 Theoretical wiring diagram

1 From gearchange actuator
2 From starter
3 From gearchange actuator
4 Fuel injection fuse
5 Engine running sensor
6 Ignition fuse
7 Fuel injection control relay (with integral fuse)
8 Electro-hydraulic actuator
9 Air flow sensor potentiometer
10 Electronic control unit
11 To ignition system ECU
12 To ignition system ECU
13 Throttle position switch
14 To knock sensor ECU
15 Air pressure transducer
16 To ignition system ECU (engine speed)
17 Coolant temperature sensor
18 Fuel pump
19 Fuel pre-pump
20 To ignition system ECU
21 Auxiliary air valve heater
22 Thermal time switch
23 Inhibit relay
24 Cold start injector
25 Idle speed control solenoid

Pin 1 12V Supply from Ignition via Fuel Injection Relay, measured 14V
Pin 2 Latter Models have Black Pink wire (maybe Oxygen sensor) 10.6R measured (0V)

Pin 5 Full Load map position from Throttle Position Sensor, TPS. 12.7V idle position, Full throttle (can be done without engine running) 0V

Pin 10 EHA Voltage nominal 8V, current based on Fuel Mapping
Pin 12 EHA 8V less drop through EHA based on current mapping, Idle 7.8V
Pin 13 Idle or Part Load Map from TPS. 0R(aka 0V) on idle, nominal 8V any other accelerator position

Pin 14 0V Excitation to Air Flow Sensor Pot
Pin 15 Black pink Wire not indicated in diagram 2R measured (Ground point on engine near oil filler) Gnd measured 0V
Pin 16 Excitation for Air Pressure Transducer (APT) Nominal 5.25V
Pin 17 0.3V >> 4V depending on air flow from Air Flow Sensor Pot
Pin 18 Excitation for Air Flow Sensor Pot 7.7V
Pin 19 Signal from APT 0.7V Idle to over 2V depending on Boost

Pin 21 Signal from ECU through Engine Coolant sensor. Operating temperature 0.37V nominal

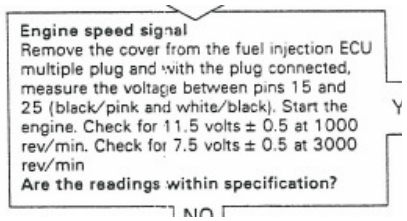
Pin 24 Signal from Gear change actuator, 0V doesn't seem to change in any gear position (maybe the kickdown)
Pin 25 Engine Speed from Ignition ECU Nominal 12V with 1 Pulse per Rev.

Notes on measurements.

A digital multi-meter was used and all readings are to chassis.

If you measure the current of the EHA then you will nee to be in series with the EHA.

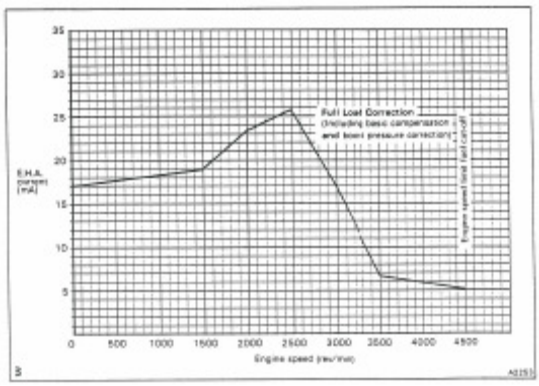
For the Engine RPM a CRO was used as there is 2V ripple on the 12V that coincides with the Ignition coils being turned on. A DMM will give readings that jump occasionally owing to this ripple. An analogue meter however would show stable readings across the RPM range and I think given the age of the manual I think they would assume an analogue meter. See below for an analogue meter.



Note
I have a problem with my car in that I appear to be operating on base fuel mapping of 5.8ma to the EHA. I am yet to determine the root cause of the problem but these measurements are a reasonable guide.

I will be replacing the TPS as my full load map never comes into play, the contacts are dud as adjustment makes no difference. Aside from that most cars with Oxygen sensors turn the car into limp mode if the ECU determines the 02 sensor is faulty. I have no idea if the KE2 does the same as most of the early KE2 didn't have the O2 sensors and the manual doesn't make reference to them in relation to the Turbo cars. The later motronic did have them as standard.

If the 02 sensors are the problem and the KE2 does revert to a default limp mode then it will account for my lack of performance and no change in current to the EHA irrespective of manifold or airflow pressures. The manual isn't clear on the part load mapping to the EHA nor if it changes when on part load mapping. Only the full load mapping, in either case my full load mapping does change to base 16.5ma (correct full load map) to the EHA on shorting the TPS contacts, but it doesn't change as per the below.



These notes are only my findings use at your risk.

I will be doing a simplified sheet of the turbo related systems once I sort the Fuel ECU issues.

Any comments, additions and omissions please send to Stefan@geckovision.com.au