

# Electrically testing common rail injectors



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In today's market, more and more generalist workshops are seeing diesel passenger vehicles come through the door. However, many business owners don't realise that before they forward this business on to a diesel specialist, there are tests that they can do themselves.

To locate your local Bosch Diesel Center please check our website at [www.boschcarservice.com.au](http://www.boschcarservice.com.au) or call 1800 060 060.

Here we explain an example of one of these tests, which potentially can be an easy profit opportunity for those workshops with a scan tool and an oscilloscope: the practice of electrically testing common rail injectors. This is a quick and efficient test which eliminates any electrical faults within the injector circuit and provides the opportunity for generalist workshops to conduct simply testing on diesel vehicles.

**Example:** 2007 Hyundai Santa Fe, with a Bosch 16C39 Common Rail System.

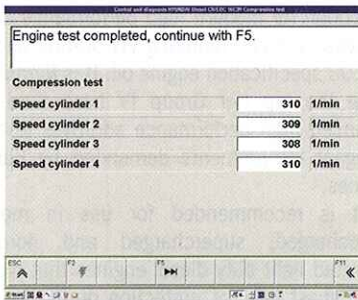
**Complaint:** The vehicle is running rough and lacking power

**Equipment Required:** A scan tool and an oscilloscope

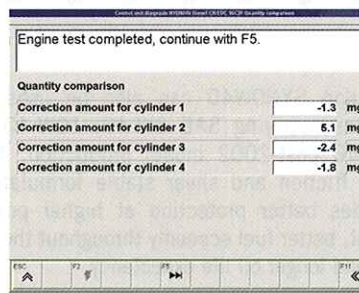
**Issue:** When a vehicle is hooked up to a scan tool, often a fault code is present. However, in this case, the workshop has hooked the car up to a Bosch KTS scan tool and found that there were no fault codes present. What to do now?

## Basic Function Tests

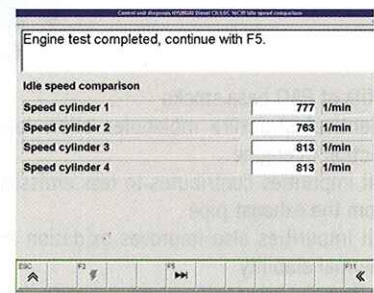
Basic 'function' tests with a scan tool, such as a Bosch KTS unit, should be performed to allow us to narrow down what cylinder the fault may be in. Several tests can be quickly performed (please be aware the tests available do vary between vehicle types).



**Compression Test** - The KTS informs the vehicle ECU to disable injection and whilst cranking, the effect of each cylinder on cranking RPM is measured. This eliminates any major mechanical issue with a cylinder affecting compression.



**Quantity Comparison** - The vehicle ECU adjusts the fuelling in each cylinder individually to even out the crankshaft power impulses and therefore reduce vibration and increase efficiency. The KTS shows if fuel is being added or subtracted from a cylinder to achieve this. The results show clearly that fuel is being added into cylinder number 2, as it is under performing. Therefore we know that cylinder two is faulty.



**Idle speed comparison** - The KTS requests the ECU to no longer smooth out the idle. This allows us to now see the contribution each cylinder is making to engine speed. Cylinder No. 2 is once again shown as the culprit.

Now that we know which cylinder the fault is in, we need to perform a quick and easy test to ascertain whether there are any electrical faults.

## Electrical Fault Testing

By far the best way to confirm operation of the electric side of common rail injectors is by measuring its current draw with a 'current clamp' and an oscilloscope. With the oscilloscope operating with the current clamp connected, we can then test if we have correct current flow. If so, it means the ECU operation, power supply circuit, switching circuit and injector continuity are proven okay in one simple test!



**Important:** Traditionally many people have been taught to conduct this testing by measuring the voltage, not current. However, using this method when testing CR injectors is fraught with difficulty. Both sides of the injectors are switched by the ECU (supply and ground) and injector pairs often share a common supply connection, creating complex patterns and interactions. Even an open circuit injector is difficult to detect. Bosch recommends using the above quick, simple method, to save time and get the most accurate, easy to understand reading. For more information on current clamps please call Bosch Diagnostics on 1300 783 031.

Having completed the above steps we can now be sure the electrical operation is satisfactory and can move onto conducting mechanical testing on the pumps and injectors, before making the decision as to whether the unit needs to be sent to a diesel specialist, such as a Bosch Diesel Center, for repair.