Verifying fuel flow and pressure

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There are times when a call to the Autobiz Helpline requires knowing that the fuel delivery is adequate to start and run an engine. We find that during a diagnostic routine for fuel and emissions testing, one common test that is often overlooked is the fuel rate of flow, or fuel delivery.

Technicians usually concentrate on fuel pressure testing. If the fuel pressure is within the expected range, they would proceed without concern for low-pressure fuel delivery. This is a common mistake nearly everyone makes.

A better approach would be to test the flow in Litres per minute (LPM), and the delivery pressure, at the same time to confirm the low-pressure system integrity.

In the past, the prohibitive cost of flow and pressure test equipment designed for automotive use was a limiting factor. Flow testers are typically available in the US for almost $1,500, taking this out of reach of most technicians.

An inexpensive flow meter can be sourced for under €30 and then fitted

We have managed to find an alternative solution to the expensive automotive test gauges that could bring this as an affordable option. A relatively inexpensive liquid flow meter, suitable for both petrol and diesel, was sourced, that was capable of pressures up to 6 Bar, and available in various flow rates for under €30. Some simple adaptations can create an effective flow meter at a fraction of the cost.

An alternative method is to measure the pressure drop across the fuel filter, with a high drop indicating a filter restriction.

Using a scope, the current draw of the in-tank pump can be measured, and can be a good indicator of fuel flow. A scope can also record the pump speed by measuring the time the pump takes to rotate once and using the formula 60,000/ time of rotation. A normal healthy brushed pump can run @ 5000-5500 rpm. Slower pump speed can indicate a restricted filter or a fuel pump issue.

Low Flow Causes and Expected Values

The reason fuel flow could be compromised can be twofold: a failing in-tank low pressure delivery pump, or restricted filtration.

The expected flow rates can vary for petrol and diesel engines and engine capacity. Here are some basic values that should be looked on as a guideline.

- Small petrol engines 2 Litres/min
- Large petrol engine 2.5 Litres/min
- Small diesel engines 3 Litres/min
- Large diesel engines 3.5 litres/min

Pressure testing is also useful in diagnosing fuel problems. Here are some basic values that should be looked on as a guideline.

- Port injection petrol 3 - 4 Bar
- Direct injection petrol 5 - 6 Bar
- Diesel engine low pressure 2 - 6 Bar