Air flow error but **air intake is OK**

Peter Kennedy, Kennedy's Garage

A 2018 Vauxhall Astra was brought to our garage, Kennedy's Garage, Portlaw, Waterford, with an unusual complaint. The Astra had been serviced at another garage a few days before the owner was heading off on a holiday. When he collected the car after the service, he thought that the car was not running normally and it seemed to be a little bit off. The next day when he was driving, the check engine light came on. He was heading to Dublin airport the next day for a holiday, but on his way thee, the Astra lost power. The recovery truck took him to the airport, and then took the car back to Waterford.

The MAP sensor was heavily sooted (left) and was cleaned (right)

An initial scan of the car showed a few trouble historical codes. The first trouble code was P0101 (Mass air flow (MAF) sensor performance). There were also some error codes for Cylinder 2 and 4 balance system, and a P151B (Engine oil life exceeded – forced limited engine power).

I initially decided to ignore the cylinder balance codes, and concentrate on the mass airflow sensor error code. I cleared three of the codes but I could not clear the Engine oil life exceeded code. Several attempts were made with my scan tool, but every attempt was unsuccessful. Each time the scan tool result was a warning "Conditions Not Satisfied", so the code could not be cleared.

On the engine oil dipstick, I could see that the oil level was slightly above the maximum level. I extracted some oil from the engine, to get the engine oil level down between the maximum and minimum marks on the dipstick. Care should be taken when measuring the oil level in any car, as some cars can be very temperamental or finicky when it comes to engine oil level.

An overfilled engine sump can cause other problems. For this reason, I never check the engine oil immediately after the engine is shut down. I would typically wait for at least 5 to 10 minutes from the time that the engine has come to a complete stop, until a final engine oil level check. If you check engine oil level immediately after engine shutdown, it will almost certainly be lower than it will be in a few minutes, after oil is allowed to drain down from the top of the engine and into the sump.

Even after the engine oil was at a proper level, it was not possible with my scan tool alone, to reset the engine oil life fault. I then cleared the fault code from the memory and only then was it possible to reset the engine oil service life, by using the Astra's on board manual menu.

I first concentrated on the MAF sensor. I could see that the MAF sensor had been recently replaced, but I always keep in mind that even if the part is new, it may not be functioning properly.

The matrix of the PDF had failed and was partially plugging the exhaust

From live data I could see that the differential pressure across the diesel particulate filter (DPF) was low side even, when the engine was well above idle. This led me to suspect that it was possible that the DPF had been altered or deleted in some way. The lines to both sides of the DPF differential pressure sensor were checked, and were found to be clean and clear. A Mityvac was used to apply pressure to one of the lines. The pressure applied by the Mityvac matched the live data, so I knew that the pressure sensor itself was functioning properly.

I then examined the manifold absolute pressure (MAP) sensor to see what it looked like. On removal, I could see it was heavily soiled with carbon, but not to the point where I thought it would have made a significant difference. I cleaned the MAP sensor and reinstalled it, but there was no difference in the live data readings from the mass airflow sensor.

I looked at the tip of the exhaust pipe. It was more sooty than it really should be. This made me think that the DPF was not functioning properly. Along with the lack of any significant pressure drop across the DPF at higher RPM's, my attention turned to the DPF itself.

I disconnected the exhaust pipe flange just downstream from the DPF. Once the exhaust pipe was moved, a clear view into the DPF was possible and the problem was very obvious. A large portion of the matrix material of the DPF had broken away, and was partially clogging the exhaust as it transitions from the DPF to the remaining portions of the exhaust system.

The exact cause of the failure of the DPF was not determined. That will be the work for another day. Whether it was a faulty injector (one had been recently replaced), or possibly excess oil in the sump compromising the DPF was not clear. What was clear was that the DPF had failed and was the cause of the mass airflow readings.

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