All partied out in Ibiza

With the advent of engine management, most engine running problems are presumed to be electrical rather than mechanical, particularly when engine management warning lights are present. However, this is not always the case.

This example relates to a Seat Ibiza with the three cylinder 12 valve engine.

A diagnostic trouble code (DTC) check was carried out, and the following codes were present:

- (P0106) - Intake manifold air pressure signal improbable
- (P0301) - Combustion failure cylinder one detected
- (P0303) - Combustion failure cylinder three detected
- (P0300) - Combustion failure detected

This sounded like a simple misfire or an air leak. Sure enough, a quick check of the vacuum lines soon uncovered a split in the brake servo vacuum hose. This was replaced and the fault codes were cleared.

However, after road testing the vehicle it appeared to be lacking in power and was stalling frequently at road junctions, so this needed further investigation.

Diagnosis:

On further investigation, the misfire fault codes were ruled out.

Using a diagnostic tool, and looking at live data readings from the intake manifold pressure sensor during idle, readings of 360 mbar were received when warm. When the engine was revved and the throttle valve was open, the vacuum would decrease as expected. However, as the engine returned to idle it would try to stall.

The engine management was taking over and opening the throttle to increase the injector duration briefly, before settling down to idle.

Was this an engine management problem, or was it a mechanical problem that was being masked by electronic fault codes?

The next thing to be checked was the static engine timing, which is a relatively easy task on this engine.

The air cleaner housing was removed, followed by the cylinder number one spark plug and the two camshaft caps which are located at the end of the cylinder head and secured by 10mm bolts.

The engine was turned over by hand until the number one piston was at top dead centre (TDC). As there were no timing marks, this was checked by inserting an appropriate rod into the spark plug hole to check if the piston is at its highest position.

If the timing is correct, the offset slots in the camshafts should align with the casting of the cylinder head. If they are not aligned, then the timing is incorrect and the camshafts are not in the correct position.

Carrying out a quick visual inspection, it was instantly possible to tell that the timing chain had jumped. The exhaust camshaft (Fig.1) was clearly not lined up with the horizontal castings on the cylinder head, where the inlet camshaft was. (Fig.2)

The cause of poor performance and stalling was due to the camshaft timing being out of synchronisation, causing inconsistent valve timing.

Note: Visually check if there has been any valve to piston contact. If so, replace any damaged components as per vehicle manufacturer's recommendations.

Image 1

Image 2

The Investigation and repair

With this engine, it is essential to use the correct aligning tools to ensure correct engine timing and alignment of the crank and camshafts. There are no key-ways or alignment marks on the camshaft sprockets or crankshaft pulley.

The engine oil was drained and belts, pulleys, pipes, engine mount, wiring loom, timing chain cover, engine sump, and the oil pump chain were removed according to the manufacturer's recommendations, to gain access to the timing chain for inspection.

The crankshaft alignment tool was fitted, but as the camshafts were misaligned, it was not possible to fit the tools as you would normally do from the start, if the chain had not jumped.

After removing and inspecting the timing chain, it was found that the timing chain, sprockets and guides were all worn. This was causing the timing chain to slip, leading to the exhaust camshaft moving two teeth and causing the poor running issues. A new timing chain kit would be required. (Fig 3)

Since this engine was manufactured, there has been an updated timing chain kit available to reduce the risk of slipping, as it was proved to be a common issue and was fitted to many Volkswagen, Seat and Skoda models.

The new timing chain kit (febi Part No. 30607) includes camshaft and crankshaft sprockets and new bolts, chain, crankshaft pulley bolt, updated hydraulic tensioner and longer modified guides to stop the chain from jumping in the future. (Fig 4)

Before replacing any components, clean all mating surfaces of the engine sump, timing cover and engine. Then proceed to fit the new timing chain kit to manufacturer's instructions.

Refit the oil pump chain, sprocket and tensioner. Tighten the sprocket bolt, then refit the oil pump chain cover. Replace the crankshaft pulley seal (febi part No.32471) then apply the silicone gasket to the timing chain cover and engine sump mating surfaces, before fitting these to the engine. Refit the crankshaft pulley and tighten the new bolt.

Refit the alternator, water pump pulley, serpentine belt guide, tensioner and belt, plus the engine mount and coolant expansion tank.

It is recommended with any engine repair to replace the engine oil and oil filter. Prime the filter housing with fresh oil to supply the hydraulic tension on first start-up.

Refit the air cleaner housing and any other parts removed during this procedure.

With the engine started and running smoothly, raise the vehicle and allow the engine to idle. Check for oil leaks, then switch off and check the engine oil level – top up as necessary.

Check and delete any old fault codes and then road test thoroughly.

With the new timing chain kit fitted, the Ibiza was back to full performance.

Rely on tested, OE-matching quality replacement parts from febi. The entire range of timing chain replacement parts

Image 3

Image 4

can be found at:
partsfinder.bilsteingroup.com

The febi brand is part of the bilstein group, the umbrella organisation for several other strong brands. Further information is available at:
www.bilsteingroup.com

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