Having a good process

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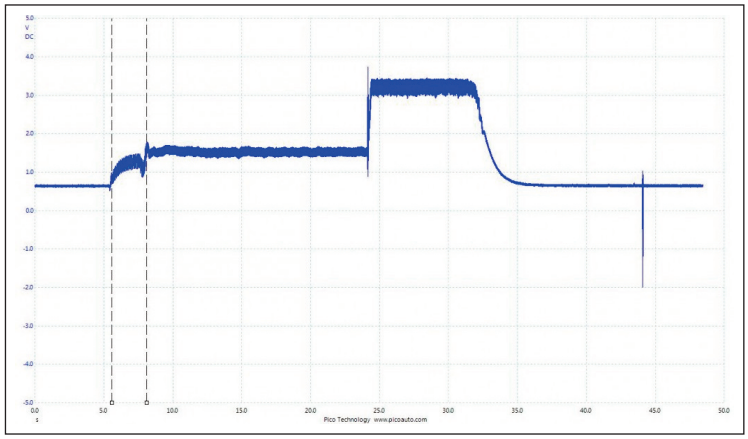
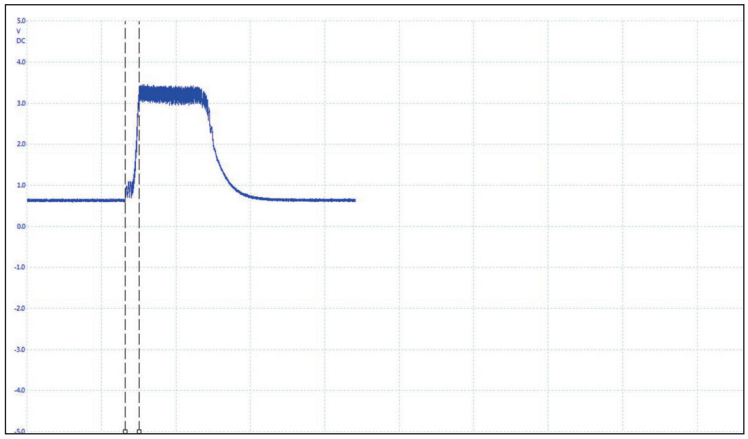
If a car doesn't have any Diagnostic Trouble Codes (DTCs), does that mean that there isn't a problem? A long cranking Polo didn't have any DTCs, but there was obviously something wrong. Autoinform's Frank Massey explains his diagnostic process to get this Polo starting faster.

A VW Polo TSI was dropped off suffering a problem with delayed crank starting. A local independent dealer had presented the car to a friend working in the local dealership, following which, a report of no fault found was made. I can only assume this deliberation came from the absence of any DTCs – are there technicians simply not trained to examine actual data, simply not trusted or worse, allowed to think outside the box?

Perhaps it's just me, but I couldn't exist in an environment where technical pride, respect and ambition are suppressed. The dealerships offer some excellent training programmes, not withstanding their access to the relevant technical repair information. So where and why does it so often go wrong?



DELAY: The old pump took three full seconds to build pressure



REPLACED: A new pump brought the figures back to the expected times

The start

I promised the guys on a recent weekend training course to conclude the tests we carried out with a repair solution. For the benefit of everyone else, let's start at the beginning. The Polo 1.4 GTI DSG employs a recent variant of the direct petrol injection system, MED17.9.

The initial first look confirmed no DTCs but the vehicle did suffer an extended cranking prior to starting. Once started, it ran smoothly. Some ten years ago I developed a process of testing hydraulic high pressure pumps, using analysis from the pressure sensor profile. This was initially used on common rail and later adapted for petrol high pressure systems. Having no test data on this system variant, it presented a perfect challenge to the diagnostic process.

Direct petrol injection is very similar to common rail diesel control and the initial test sequence began by looking at the key critical requirements, firstly the ignition drivers, secondly injector drivers and third, rail pressure. The result of this composite observation, and we can now reveal our involvement in developing the new 'Rainbow' Pico scope, confirmed an unusually slow pressure build-up.

Normally pressure build (I refer to this as rise time) should take no longer than 600 milliseconds and as little as 300 milliseconds – our vehicle took up to three whole seconds.

Checking

The next stage in the process involves intrusive tests. This part of our past development programme was designing a low pressure test gauge. The requirement was to monitor suction or positive pressure priming systems, together with flow and the ability to conduct pump proof testing under real load conditions. Applying this test confirmed excellent low pressure priming, with 6 bar available to maintain high pressure pump pressure.

The most interesting aspect of our initial observations, unique so far for petrol systems, was that until a certain pressure was reached, no triggering of fuel or spark took place. We also noted that no driver outputs were present at the high pressure control valve, so no current was present either. This further confirmed our training group's findings that the valve is actually a volume control device. Proving this theory also follows our common rail pump proof process; removing current at 2,000 rpm immediately caused the pump to run at full pressure, 115 bar. The other intriguing part of the waveform profile was the accelerated decay time, not normal for this pump type.

An outcome

The decision? You need a new pump mate, with just one caveat – check the camshaft drive lobes and follower. Other non-relevant issues found included a reduced burn-time on coil three and no current transition across the wideband sensor.

Replacing the pump reduced the rise time to 630 milliseconds. It was also noted via TPS that the pump had undergone several part number updates.

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