



AUDI A3 PROBLEM SOLVING PMM
"Things may not be as they seem"

I thought this month's topic should reflect a particular repair we were involved in recently. Many of the key issues I have written about over the years were very relevant in this particular repair.

- 1) Examine but don't respond to DTC's without qualifying further.
- 2) Never overlook preparation
- 3) Fix as you go **never** leave a known fault unattended attempting to predict its influence.
- 4) Never replace any component without detailed circuit testing with an oscilloscope.
- 5) Re-evaluate DTC's once repairs have been carried out.
- 6) Ensure adaptations are re-set.

The vehicle in question a Audi A3 1600 was referred to us from a local garage. The complaint included lacking power, and erratic drivability, cutting out or stalling. The vehicle presented was in a poor condition lacking correct service and repair. The general condition in the engine bay confirmed little quality attention; the engine has a complex wrap over inlet manifold. The spark plugs are difficult to access; the apertures were fouled with oil debris and grit. The HT leads and coil were badly fouled with similar dirty deposits. The oil filler and cam cover were soiled by oil from spillage or leakage.

We began by extracting DTC's 01177-00520-00533-00537

01177 engine control module defective

00520 wiring-MAF sensor

00533 intake leak-blockage, throttle valve light /sticking IAC valve or ISC actuator position sensor.

00537 Co adjustment, heating inop, intake exhaust leak, misfire, fuel level low , fuel pressure pump – injectors EVAP canister, purge valve, map sensor , MAF sensor burn-off, and lambda wiring error.

We began by taking a hard copy as a starting point, then clearing and re-checking if any returned.

Moving on to preparation, we took the decision to remove the plugs, leads and coil, initial visual examination confirmed the coil pack was cracked exposing the primary & secondary coil windings . The spark plug apertures were so badly contaminated we took the decision to remove the manifold to gain access for cleaning.

It's always good practice to examine components carefully whilst dismantling. We noted the O rings sealing the composite manifold to the alloy cylinder head were suspect, the witness marks indicated possible air leaks, this observation related to the DTC 00537. Once the manifold was removed cleaning the apertures and adjacent area was much easier. We also removed the intake hose to clean the throttle butterfly, checking the physical movement confirmed the disc was sticking due to carbon build up around the venture, possibly confirming DTC 00533, so far so good, the shopping list 4 new plugs, set of HT leads and a coil pack, total cost around £170.00

I removed the oil filler/breather for thorough washing. The cleaner element was replaced and the filter box vacuumed out.

Re-assembly was much easier having pre-cleaned all the components.

We decided to check the condition of the oil and were not surprised when none appeared on the dipstick. The engine was filled with approximately 3Lt of flushing oil prior to starting the engine.

At this point our initial interest lay in the manifold vacuum, ignition profile and Lambda sensor output.

Vacuum started at a promising 18 inhg and eventually reached a healthy 20 inhg .

The ignition profile can only be examined using an inductive pick-up around the HT leads due to the combined coil and power stage.

The inputs to the coil are low voltage triggering signals from the PCM.

The Lambda sensor also began switching normally once fully hot, by now the engine sounded quite sweet.

Once satisfied the engine was thoroughly flushed we replaced the oil and filter for quality synthetic oil.

We then re-set adaptation values before conducting a more punishing road test.

Apart from a few minor idle adaptation problems the car was crisp & responsive under all conditions.

Upon return we checked the rear tailpipe, emissions were excellent.

As for the DTC's 01177/00520 we have often experienced PCM module errors when adaptation values are exceeded or when spiked by RF induction, possibly as a result in the insulation problems found.

MAF sensor errors are common when an engine is running erratically or stalls, the calculated air flow when compared against the expected values are exceeded generating a 00520 DTC.

We naturally measured the load sensor with our scope and found it completely within spec.

DTC 00533 we dealt with during preparation, washing the throttle body and adjusting the cable, we completed by re-setting the adaptation for the idle control motor and test driving the vehicle.

DTC 00537 had several causes, the air leak on the manifold flange, coupled with the defective coil pack and badly contaminated leads would result in excessive oxygen content, therefore fooling the Lambda sensor into a go rich adaptation value.

In all the repair cost was around £550.00 inc vat proving that quality servicing isn't expensive it's priceless! and that not all diagnostic problems are complex or technical.