

Coding and flashing.

Many technicians have heard about coding ECU's (replacement) and re-flashing (updating software parts).

There are many myths and misconceptions about this topic.

We are really in the thick of it at AECS, so many problems in this field have already reared their heads, some of them properly preventable with a little knowledge.

In the newly made EMS 1-3 we deal with a good number of cases and samples of coding and re-flashing. Some of it learnt during software training attended by the AECS staff last May in Europe.

Below are a few nice cases where stuff went wrong. I will do my best to try to explain what went on inside the ECU with both cases. Both are really not that technical and are part of normal maintenance, so realise that jobs like these WILL end up on your door step.

Peugeot Service - dead

The AECS help desk had a phone call from a customer close to Auckland who had a late model 307 Peugeot (with a drive by wire system), on which he did a simple service.

He did not find in the scantool how to reset the service interval so reset the interval with the pushbuttons on the dash as described in a popular automotive data base program. Please note this push button service reset might be unrelated to the fault.

After he was finished going through the service interval reset by pushing the dashboard push buttons, the car would not start anymore. It would

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over but did not fire. It sounded like the cambelt had snapped, it seemed to have no compression. Upon further inspection, he found that the throttle butterfly was hard shut.

A fault code was set, throttle stop relearn; permanent. Resetting the fault code with the Launch Diagon made no difference, disconnecting the battery for 30 minutes did not help either.

Where to from here?

We asked the diagnostician to disconnect the throttle

did you know...?

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DIAGUN Owner

A reminder for you to update your scan tool. If you haven't done this in the last two months we recommend you update your tool, as there has been tons of updates to the software.

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The next EMS1-3 course is in 2015.. if you haven't enrolled yet, be quick two places left!
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motor connector (motor control wires and position sensors) and try to start the car. Most drive by wire throttle control motors will open the throttle a little to a limp home position (+/- 1200 RPM) when totally powered down.

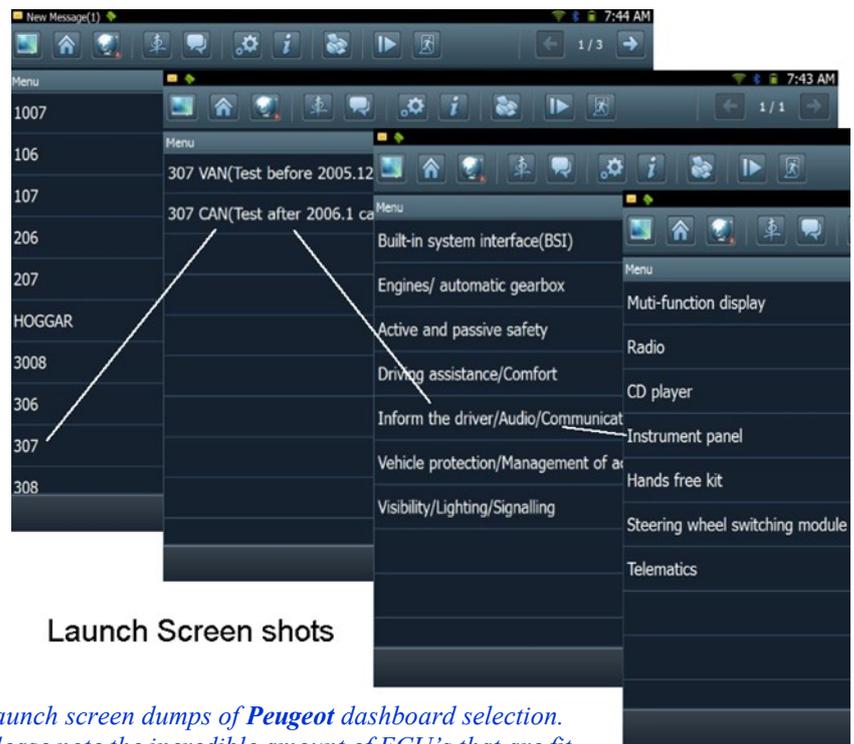
We expected this to set a whole range of fault codes, but importantly doing this will usually drop the throttle position learn values to default values, from wherever they were set.

The car did not run other than a couple of beats, this meant that the car at least tried to run, rather than not at all.

Mileage

Next, we followed the fault code reset procedure precisely as described on the Launch scantool screen, including writing the mileage with the tool into the ECU and turning the key on/off as indicated. Car started and ran all right again with no fault codes left. After a run of about 5 km's or so the car was idling and ran perfectly again (throttle position relearned).

I have read (but am not sure) that the mileage needs to be written into the ECU with the scantool while resetting the fault codes to check if the ECU is the legitimate ECU in the car. I have heard about people being careless with this writing of the mileage disabling the ECU, but have no further evidence of this.



Launch Screen shots

Launch screen dumps of Peugeot dashboard selection. Please note the incredible amount of ECU's that are fitted to this car.

DPF or no DPF?

AECS had a call from an ex trainee, who knows his business, but even this case baffled us at the AECS help desk and a whole lot of others!

A late model Hilux comes in for maintenance and replacement of the washers under the injectors. A technician took the injectors out, replaced the washers and while fitting he muddled up the sequence of

the injectors.

No problem, it only means you have to type in each code of each injector (30 digits x 4) on the scantool to write them in to the ECU (this is where a wireless scantool is ideal). He choose that rather than taking the injectors out again and swap positions. There were no fault codes present which needs to be checked before the coding of injectors takes place.

These Denso ECU do not accept grossly incorrect injector codes, to prevent for example that Nissan Injectors get used in a Mitsubishi, or that Hilux injectors get used in a Hiace.

Check light

All codes got accepted. The car was started, after which the check engine light came on. The fault code set was P1601 EEPROM injector correction value, DPF thermal degradation record. A non OBD code.

The code was in my view two parts, one informing the technician that the injector code written into the ECU's memory (EEPROM is part of the ECU) was faulty or that the memory itself was faulty, and two that Diesel particulate filter's temperature sensor's recording did not follow the Catalytic converter's temperature sensor's signal as predicted.



Datastream name	Value	Unit
MAF	80.07	gm/s
DPF No Activate	Activate	
DPF PM Block	Not Block	
Diff. Press. Sensor Corr.	-2.54	kPa
DPNR/DPF Status Reju(PM)	Standby	
Exhaust Temperature B1S1	527.48	degree C

Launch screen shot of DPF equipped Toyota recording (archive). Note temperature sensor before DPF value, this value gets only reached when regeneration is about to start, or when unburned Diesel enters the exhaust due to engine trouble.

The code made no sense as this vehicle has NO DPF, Together with the EEPROM error the ECU was immediate suspected by the senior technician of that workshop.



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Replacement ECU

A second hand ECU was ordered, fitted and paired with the immobiliser.

Car started fine drove fine, just to finish the job the injectors had to be coded into the ECU again.

All codes got accepted, the car was started, after which the check engine light came on.

Code set was P1601 EEPROM injector correction value DPF thermal degradation record. AGAIN!

AECS Help desk advice

At that stage the senior technician phoned the AECS help desk.

We advised to try with the original ECU first, to:

1. connect battery charger to car with all cables connected but with key off.
2. Leave the car on the charger for at least 30 minutes.
3. Turn the key on
4. Write injector codes again.
5. Disconnect charger and cycle the key
6. Start vehicle.

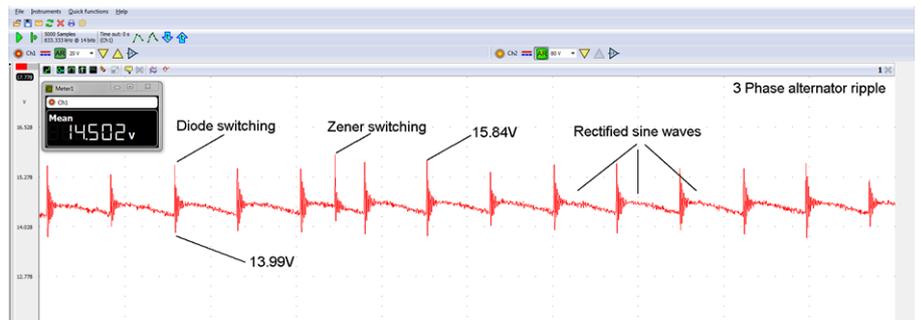
All good!

Writing into an ECU memory is a delicate process and

needs a really stable power supply to the ECU. When the car gets turned off after a drive the vehicle's battery voltage is high enough to carry the writing of volatile memory into the non-volatile part of the ECU, but when a car has been sitting for a while and the capacitance charge of the battery has well disappeared and the systems starts pulling energy out of the plates of the battery the voltage fluctuates with the load. The team at AECS have learnt over the years that writing software into chips needs ultra-stable power supply or else the software becomes unpredictable.

In this case, the battery voltage was too low (well below the 13.5 V as recommended by most manufacturers). Connecting simply to a battery charger would NOT have done the trick as most battery chargers have an awful ripple when under load, sometimes worse than an alternator ripple.

This is why the charger had to be



Picture 1: Actual normal alternator ripple of a running car ('06 Daihatsu). Battery voltage stable???

left for 30 minutes or so, to go over the 100% state of charge of the battery, into the capacitance charge of the battery (exceeding +/- 12.6V).

When the voltage becomes high enough a controlled charger will turn off and therefore reduce the ripple to almost zero volts.

Needless to say, that you cannot re-flash or code an ECU while the engine is running.

This shop did not have a scope so we could not check the charger's ripple which was still a risk.

Make sure you choose an equipment and training provider who can assist in solving the problems you encounter in your workshop. We at AECS are only too happy to help! There are many more 'inexplicable' ECU problems to come to your workshop.

Save yourself the heartache!!!

Do not ever write anything to any chip with dodgy power supply. Have a regulated power supply (charger), one that will lose its ripple when the battery is full.



Herbert

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