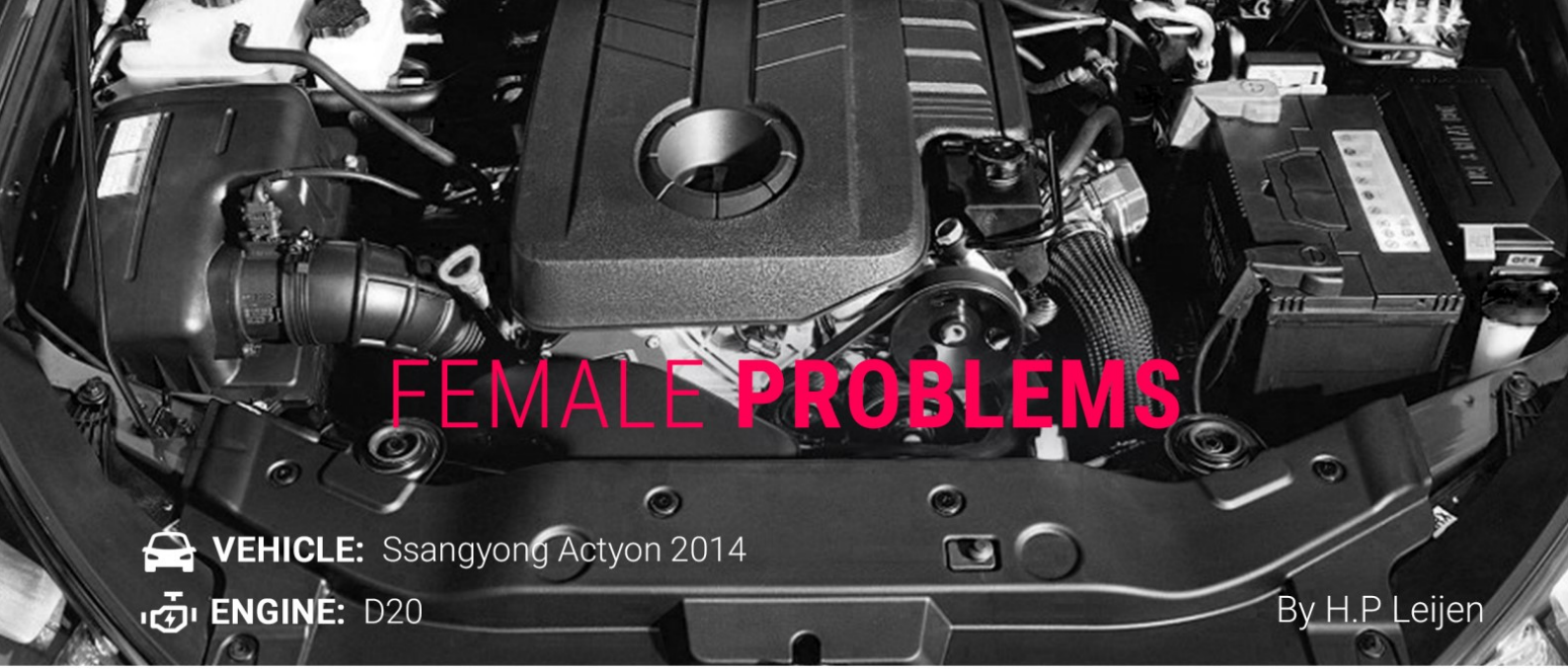
AECS TECHNIC

DECEMBER 2019

+ FEMALE **PROBLEMS**

+ 2020 TRAINING DATES
+ DPF FAIL
+ LAUNCH CHRISTMAS

AECS
AUTOMOTIVE DIAGNOSTIC TRAINING & EQUIPMENT



FEMALE **PROBLEMS**

VEHICLE: Ssangyong Actyon 2014

ENGINE: D20

By H.P Leijen

This AECS article takes you through the diagnostic process our technical support team use with problematic vehicles. We look at the issues involved and share how we resolved the problem. This an inside look, from the profound to everyday issues automotive workshops encounter.

PROBLEM PRESENTED TO OUR TECHNICAL SUPPORT TEAM

We received this vehicle from another workshop on the back of a tow truck.
It has a 2nd hand ECU fitted and coded, a new injector pump, the common rail injectors are tested and working, however the vehicle is still winding over but not firing up.

What the workshop have found so far:

I found the EFI relay is not switching off when the ECU switched off the relay, the switch gear seems fused. I have replaced the relay, which now switches on and off as normal. To me it seems that the original fault was the relay and that the newly fitted 2nd hand ECU has been smoked also.

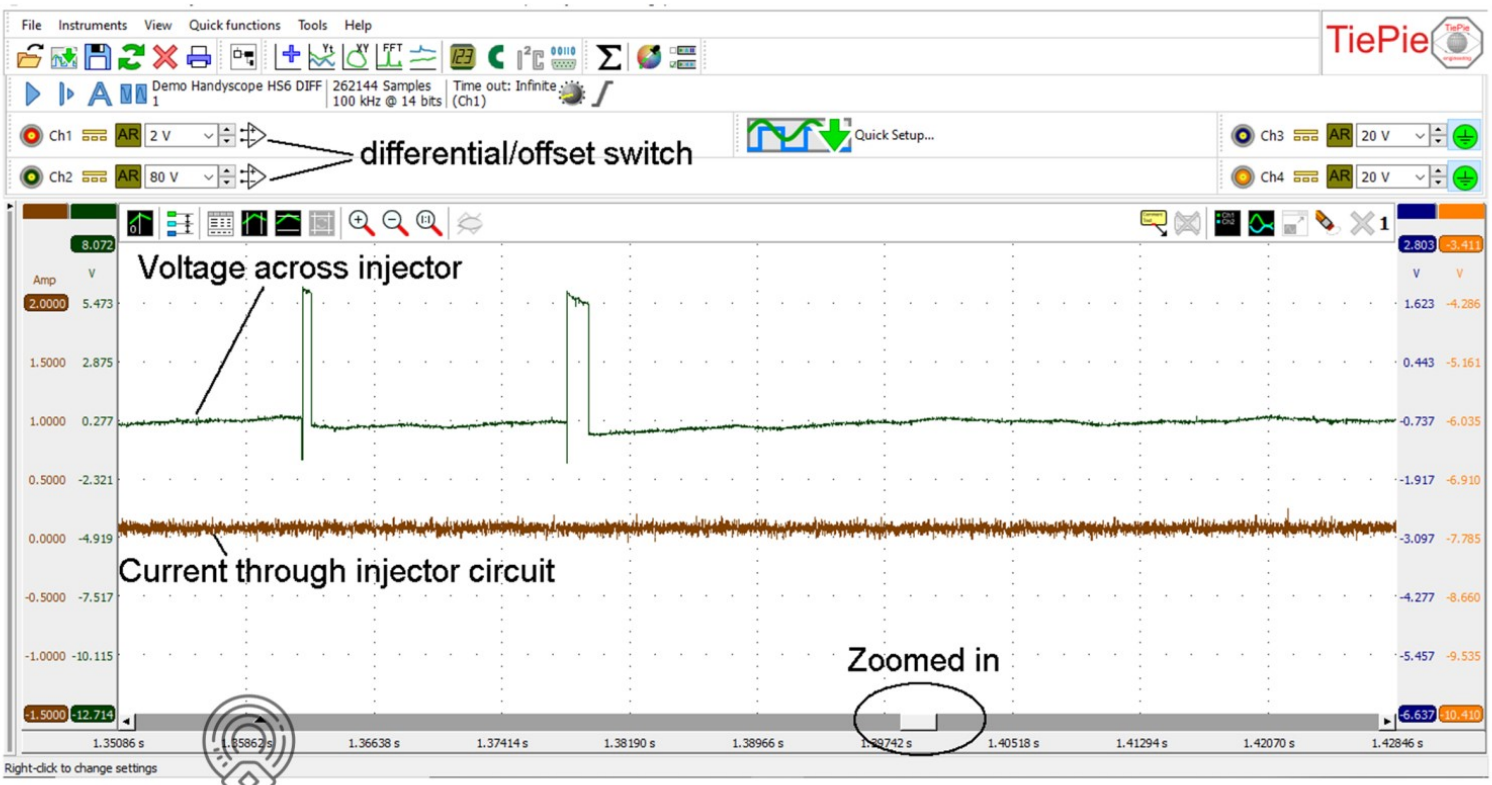
Please note: the 5V rail stays live during cranking, and there is a normal voltage drop across relay during cranking. I have no high voltage going to the injectors, which presumably stop the injectors from working and injecting Diesel (no start).

Could you guys please look over our notes and advice where to go next?

MEASURE

Thank god for people that invest in decent tools, that is the one thing that makes our life easy and jobs like this possible! This diagnostician is using the ATS 6004XM and the ATS 500XM.

We asked the diagnostician to send a recording of the injector (measured differential = across the injector) dual channel with the current measured in one of the wires going to the injector.



ATS 6004XM DIFFERENTIAL/OFFSET SCOPE WITH ADJUSTABLE EARTH LOOP (SHORT CIRCUIT) PROTECTION.

In the recording which was posted on the AECS Technical Support Forum we could clearly see that the ECU was switching the injectors, albeit with a low voltage (6.1V). However, during the injector pulse (engine winding over), there was no current measured.

TEST EQUIPMENT

After running several tests with the current clamp which has an auto power down function, we concluded that the scope channel, the scope leads and the current clamp where all in good working order.

INJECTORS

Our initial response was that the coils in the injectors must be open loop. The diagnostician assured us that the injectors where all working on his Diesel test bench, so we could discount that possibility.

The thought of a short to ground or open loop in the loom started to creep into our minds. We had to consider the possibility. However unlikely it was that all 4 wires got into trouble at the same time. I can see why the diagnostician suspected the second ECU.

We asked for 2 more measurements;
1) 3-channel measurement, 2 times offset on both injector wires and one current measurement around the positive wire of the injector.

2) 3-channel measurement, 2 times offset on both injector wires and one current measurement around the negative wire of the injector.

2 X OFFSET AND CURRENT SCOPE RECORDING

The two recordings that where sent showed zero Amp when there was clearly a 10.4V difference across the injector. Yes, it's not the high voltage you would expect on a coil type of common rail system, but there should be a current all the same. The second measurement showed the same, no current.

RESISTANCE

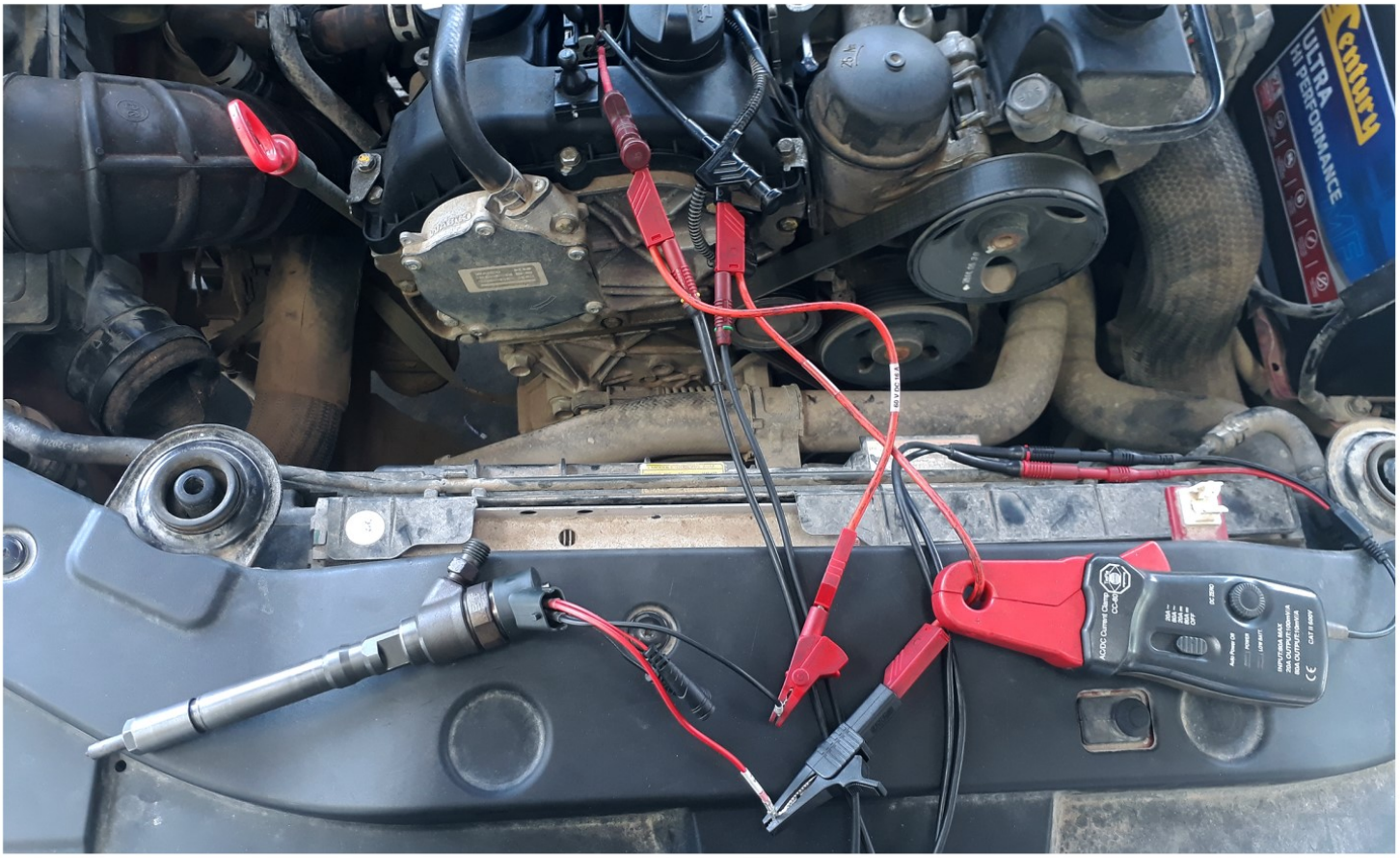
A resistance check was done with the injector disconnected to make 100% sure that we did not have open loop injectors. The diagnostician measured 0.3 Ohm. This could only mean that the open circuit was between the two points where the scope probes were fitted.

DUMMY

We asked the diagnostician to connect a 12V relay coil across the wires to the injector at the point where the scope was connected, just to put a dummy load in place.

2 X OFFSET MEASUREMENT WITH A RELAY COIL AS DUMMY LOAD.

This measurement proved to us that the ECU and the wiring was very likely okay.
It was time to test the ECU and the wiring with a spare 0.3 Ohm common rail injector instead of the relay dummy load.



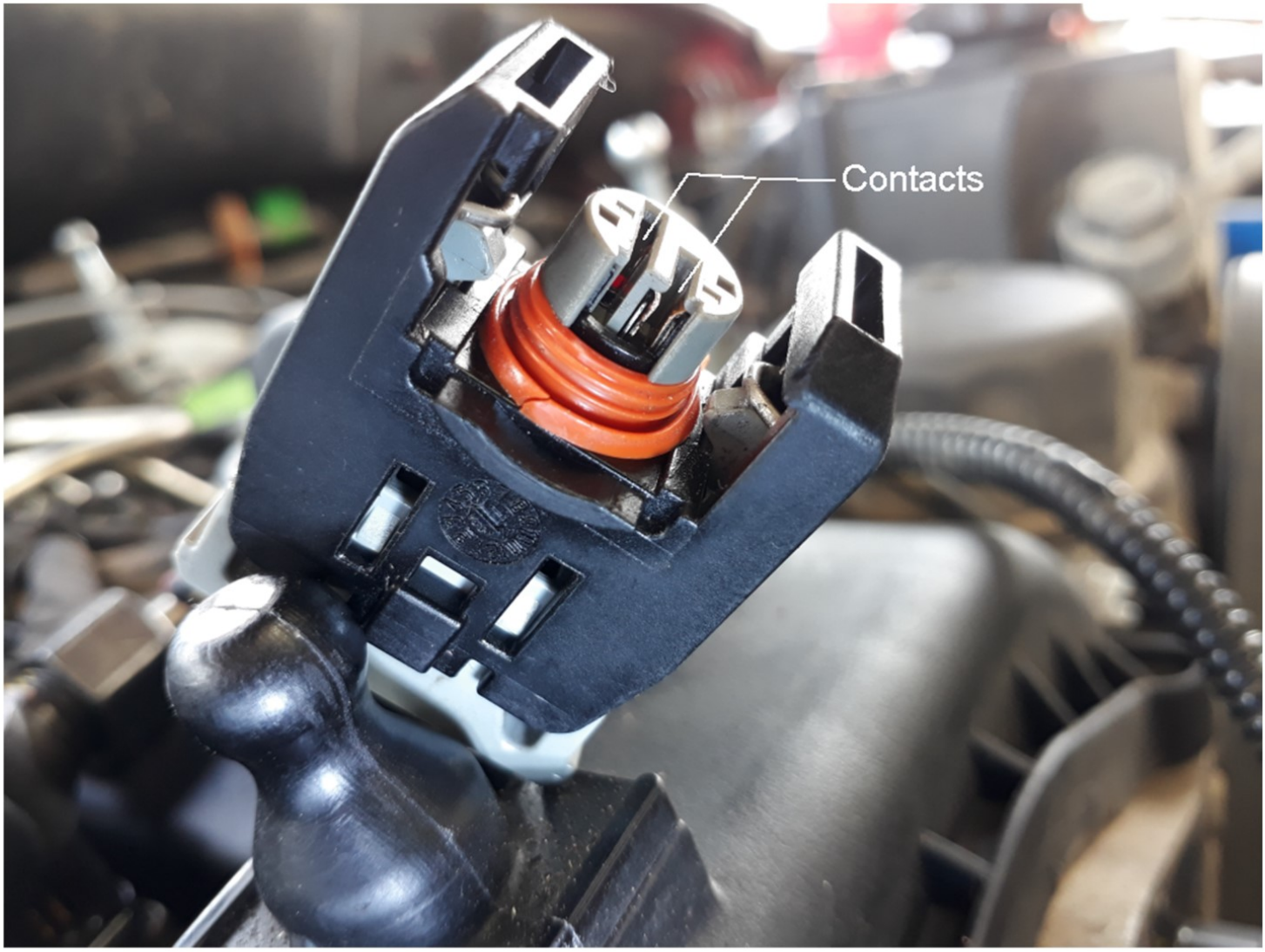
The following pattern was recorded:

DUMMY CR INJECTOR FITTED PARALLEL TO THE VEHICLE'S OWN INJECTOR.

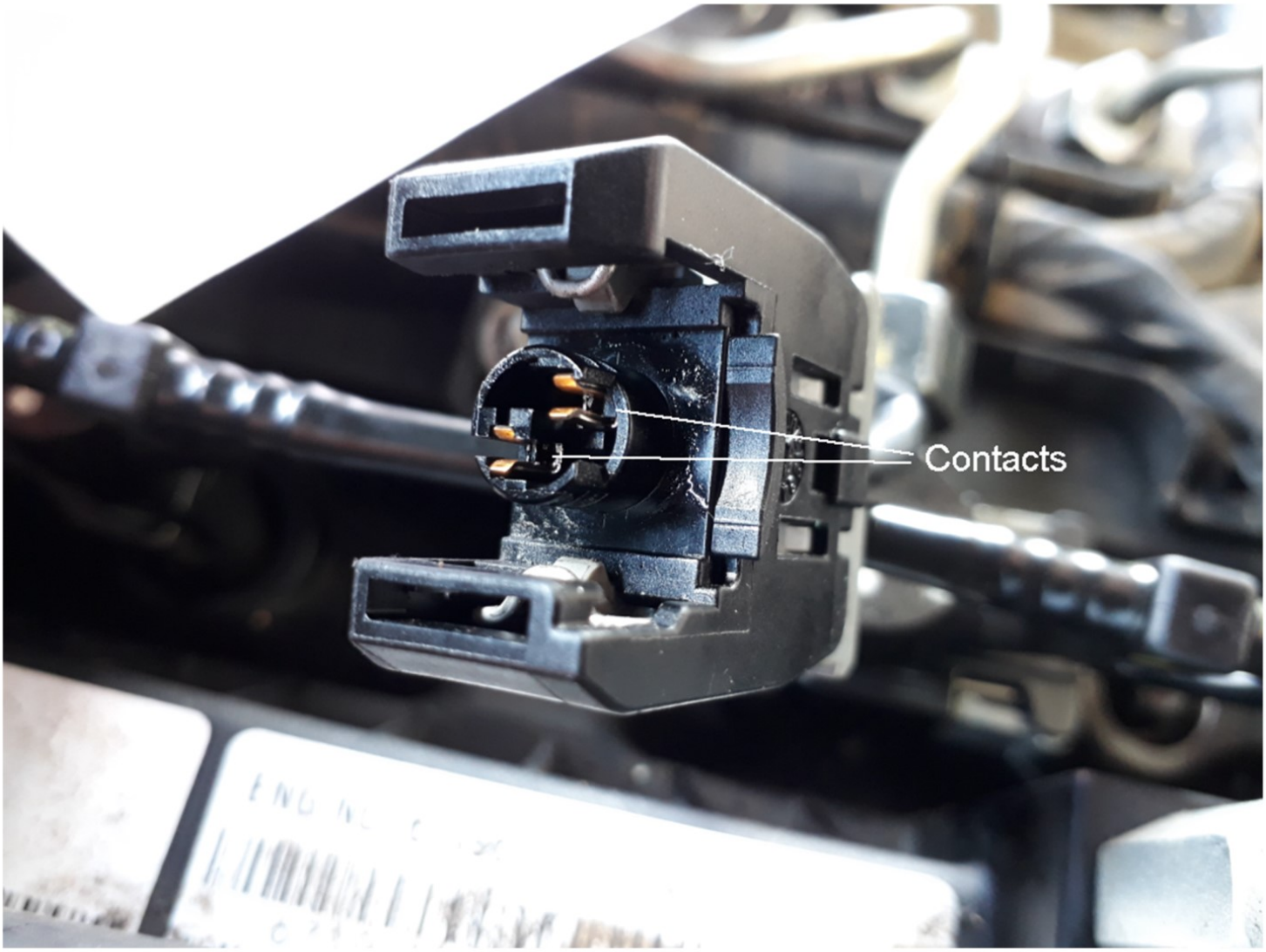
That gave us a pretty much prefect pattern!! This was 100% proof that the ECU and wiring are in order.

I asked the diagnostician to look inside the injector and the injector plugs of all injectors to see if he could find any bent pins. The injectors had been out and on a test bench after all.

BINGO
What he found was astounding!



The injector plugs of this type common rail injector are very fragile. In the picture it is obvious that the tension of the female contacts was the problem. In the following image that is even more obvious.



It was clear that not the injectors were at fault, however the female contacts in the plugs. Not in one plug but in all four plugs! Bending all the female contacts into place, then plugging into the injectors made the car start first pop!

WHAT HAPPENED?
How is it possible that all eight of the female contacts in all four plugs were all bent to a degree that they made no contact with the injector pins anymore?

The workshop which had the car in the very first place, and whom we assume concluded that the ECU was faulty, had used their own a scope, which is brand we do not use or support. (In other words, it wasn't an ATS scope).

What they had done is back probed the injectors with some big probes that came with the hobby scope and damaged all the injector plugs. That is where the journey started.
In the end all that was really faulty with the car, was the power supply relay, not the ECU, not the pump, and nor the injectors.

CONCLUSION
This job got out of hand pretty much as soon as the car arrived in the very first workshop.
I think that the technician in that workshop knew that he had to check for injection, good on them. However, for whatever reason, he was not given the correct tools for the job and he certainly had a tool which did not came with our technical support. That only leads to costly 'give up' jobs. 'A give up job', leaves the workshop owner and the technician dissatisfied, not to mention the customer, which also doesn't bode well for one's reputation. Also, think about the confidence of the technician and how his next job will go.

Repairing modern cars is a skill, a valuable skill. There is no place for Google graduates. Many diagnostic equipment suppliers are too quick to refer technicians to the web as there is simply no or hardly any knowledge about automotive electronics present in most sales outfits.

At AECS we work very hard to make sure our knowledge gets passed on to technicians in the form of training and technical support. It is a lifeline. Our ATS scope, AECS Tech Support and an experienced, confident diagnostician, made this job quick and profitable. No arguments at the end of it.

By H.P. Leijen
Trainer/Research

NEWS
DID YOU KNOW

DPF FAIL

New WoF regulations dictate a removed DPF is a WoF fail. This has been highlighted in the latest VIRM...

11-2 Exhaust emissions

A diesel particulate filter (DPF) is not allowed to have been removed unless the vehicle's owner/registered person can prove the vehicle is still able to pass a prescribed metered emissions test*.

So how do you test for DPF removal? There is only one sure way to do this correctly and that is with an automotive emission tester. DPF delete kits have become all too common and while it's illegal to use a vehicle on the road with the DPF removed the sale of such delete kits is not illegal. (Yeah I know, go figure!). Simply knocking the filter out from the inside is another method the cowboys use so to just look underneath a vehicle at WOF time to see if it is there is not a good enough test. If you've had a DPF deleted in the past, feel free to contact the workshop that removed it and ask them to put it back on for free. I'm sure they'll be only too happy to help. A quality emission tester will test for the particulate matter (Soot) and NOx (Nitrous Oxides) and will give you the confidence you are not being tricked. We have Petrol and Diesel emission testing fully covered. Why not give Herbert or Paul a call to go through some of the options available.

* Credit: https://vehicleinspection.nzta.govt.nz

PAPERLESS

Starting 2020 we will start to go paperless across our two main areas of equipment and training. This will make our business more efficient and also reduce the amount of trees we go through. It is important that your email is updated so you recieve information that we send out especially when it comes to our training and invoices. If you need to update your details please email Lezanne at training@aecs.net.

NEW CHANGES

Over the past few years, we've seen a steady increase across the board in costs especially when it comes to our logistics and development of our training seminars. This includes accommodation, conference centres and let's not forget the ridiculous fuel prices, development of training equipment and R&D. Because of this, in 2020 our training seminar pricing will change. We haven't adjusted pricing for 2 years now, so it's not something we take lightly or do often. I hope understand where we are coming from.

If you are looking at training in 2020, it would be a good idea to book that in before the 20th December 2019, so we can still give you the 2019 pricing.

AUTOMOTIVE TRAINING

FEBRUARY-OCTOBER 2020

Location	Course Name	Course ID	Date	Time
February				
Auckland	Automotive Electronic Diagnostics	AED	19 Feb - 20 Feb	9:00 AM - 5:00 PM
Auckland	EV Customer Initiation	EV1-1	21 Feb	9:00 AM - 12:00 PM
Auckland	Hybrid/EV Safety	HVS1-1	21 Feb	1:00 PM - 4:00 PM
Auckland	Modern Truck Diagnostics	TRK 1-1	25 Feb - 26 Feb	9:00 AM - 5:00 PM
Auckland	EV Diagnostics & Maintenance: Part 1	EV2-1 (c)	27 Feb - 28 Feb	9:00 AM - 5:00 PM
March				
Christchurch	Automotive Electronic Diagnostics	AED	16 Mar - 17 Mar	9:00 AM - 5:00 PM
Christchurch	First-Line Diagnostics	EMS 1-1	18 Mar - 19 Mar	9:00 AM - 5:00 PM
Christchurch	EV Diagnostics & Maintenance: Part 1	EV2-1 (c)	23 Mar - 24 Mar	9:00 AM - 5:00 PM
Christchurch	Modern Truck Diagnostics	TRK 1-1	23 Mar - 24 Mar	9:00 AM - 5:00 PM
Christchurch	EV Diagnostics & Maintenance: Part 1	EV2-1	25 Mar - 26 Mar	9:00 AM - 5:00 PM
April				
Hamilton	First-Line Diagnostics	EMS 1-1	20 Apr - 21 Apr	9:00 AM - 5:00 PM
Auckland	Air Conditioning HV Service & Repair	ECAC 1-2 (c)	22 Apr	9:00 AM - 5:00 PM
Auckland	CAN databus	CAN 1 (c)	23 Apr	1:00 PM - 4:00 PM
Tauranga	Safety Restraint Systems	SRS1-1	29 Apr	9:00 AM - 5:00 PM
Rotorua	Air-Conditioning Systems	ECAC 1-1	30 Apr - 1 May	9:00 AM - 5:00 PM
May				
Wellington	Scan Tool - Level 1	SCAN 1-1	4 May - 5 May	9:00 AM - 5:00 PM
New Plymouth	Scan Tool - Level 2	SCAN 1-2	7 May - 8 May	9:00 AM - 5:00 PM
Christchurch	Comprehensive Scope Training - Level 1	ATS 1-1	19 May - 20 May	9:00 AM - 5:00 PM
Christchurch	Air Conditioning HV Service & Repair	ECAC 1-2 (c)	21 May	9:00 AM - 5:00 PM
Christchurch	Scan Tool - Level 1	SCAN 1-1	21 May - 22 May	9:00 AM - 5:00 PM
Christchurch	CAN databus	CAN 1 (c)	22 May	9:00 AM - 12:00 PM
Invercargill	Modern Truck Diagnostics	TRK 1-1	26 May - 27 May	9:00 AM - 5:00 PM
June				
Auckland	EV Diagnostics & Maintenance: Part 2	EV2-2 (c)	16 Jun - 17 Jun	9:00 AM - 5:00 PM
Hastings	Comprehensive Scope Training - Level 1	ATS 1-1	29 Jun - 30 Jun	9:00 AM - 5:00 PM
July				
Hastings	Air-Conditioning Systems	ECAC 1-1	1 Jul - 2 Jul	9:00 AM - 5:00 PM
Hastings	First-Line Diagnostics	EMS 1-1	1 Jul - 2 Jul	9:00 AM - 5:00 PM
Hamilton	Hybrid/EV Safety	HVS1-1 (c)	7 Jul	9:00 AM - 12:00 PM
Hamilton	EV Customer Initiation	EV1-1 (c)	7 Jul	1:00 PM - 4:00 PM
Hamilton	Automotive Electronic Diagnostics	AED (c)	8 Jul - 9 Jul	9:00 AM - 5:00 PM
Auckland	Comprehensive Scope Training - Level 1	ATS 1-1	21 Jul - 22 Jul	9:00 AM - 5:00 PM
Auckland	Air-Conditioning Systems	ECAC 1-1	23 Jul - 24 Jul	9:00 AM - 5:00 PM
Whangarei	Denso Common Rail Systems	DMS 1-3	27 Jul - 28 Jul	9:00 AM - 5:00 PM
Auckland	EV Battery Diagnostics & Repair	EV3-1 (c)	30 Jul - 31 Jul	9:00 AM - 5:00 PM
August				
Palmerston North	Automotive Electronic Diagnostics	AED (c)	18 Aug - 20 Aug	9:00 AM - 5:00 PM
Palmerston North	Automotive Electronic Diagnostics	AED (c)	25 Aug - 27 Aug	9:00 AM - 5:00 PM
September				
Blenheim	Air-Conditioning Systems	ECAC 1-1	1 Sep - 2 Sep	9:00 AM - 5:00 PM
Blenheim	Automotive Electronic Diagnostics	AED	3 Sep - 4 Sep	9:00 AM - 5:00 PM
Christchurch	EV Diagnostics & Maintenance: Part 2	EV2-2 (c)	7 Sep - 8 Sep	9:00 AM - 5:00 PM
Christchurch	EV Battery Diagnostics & Repair	EV3-1 (c)	9 Sep - 10 Sep	9:00 AM - 5:00 PM
Dunedin	Diesel Electronic Diagnostics	DED	14 Sep - 15 Sep	9:00 AM - 5:00 PM
Dunedin	Air-Conditioning Systems	ECAC 1-1	16 Sep - 17 Sep	9:00 AM - 5:00 PM
October				
Auckland	Broadband Oxygen Sensors Diagnostics	EMS 1-6	5 Oct - 7 Oct	9:00 AM - 5:00 PM
Auckland	Scan Tool - Level 2	SCAN 1-2	8 Oct - 9 Oct	9:00 AM - 5:00 PM

c = closed/private training

06 874 9077 aecsltd aecs.net training@aecs.net

LATEST FROM AECS

AECS - OFFICIAL LAUNCH DEALER

a merry LAUNCH christmas

Start Christmas early with a new Launch Eurotab from AECS and get yourself or your team on one of our 2020 training seminars for free. Call Santa now (hoho) - 06 874 9077 or info@aecs.net

PRICE: EUROTAB $5350+GST

TRAINING* INCLUDED

LAUNCH EURO TAB + FREE TRAINING OF CHOICE*

OFFER ONLY AVAILABLE TILL 20 DEC 2019

FEATURES & SPECS

- Latest models covered including 100+ brands [EURO/AU/USA/ASIAN]
- ECU coding/programming.
- Re-programme modules, code injectors and keys, fast live data and accurate graphing.
- Smart docking and charging station.
- Module mapping to engine, transmission, ABS, SRS, door control, intel. key, IPDM, ETACS and many more.
- Easy 1 click updates (3 yrs included).
- Code troubleshooting and advice directly from the tool.
- 12-months AECS technical support $250.00 + gst/year (optional).
- AECS Technical support database directly accessible from the tool.
- In tool access to Haynes Pro Workshop Data* for comprehensive mechanical and electrical data. (optional)

SPECIAL FUNCTIONS

- Oil reset
- Anti-theft
- Battery matching
- DPF reset
- AT matching
- Gear learning
- Headlamp matching
- Throttle adaptation
- Steering angle reset
- ABS brake bleeding
- Injector parogramming
- Sunroof initialisation
- Electric park brake reset
- Suspension matching
- Tire pressure reset matching

AECS 06 874 9077 | INFO@AECS.NET
AUTOMOTIVE WORKSHOP EQUIPMENT

NEW 2020 TRAINING DATES.AECS.NET

* Free training of choice is a 2-day training seminar to be attended in 2020 anywhere in New Zealand at a value of $714.15 (incl.GST).

AECS.NET

new generation of aircon service equipment

www.air.aecs.net

AECS PREMIUM AUTOMOTIVE EQUIPMENT
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BRAINBEE CLIMA 9350

Onboard information database.
(Agriculture & construction database optional).

Remote control & service.
[iOS | Android | Windows]

Automated updates software/database (wifi).

Automatic recovering, recycling and recharging R134A refrigerant.
[1234yf / R513a ready]

Automatic oil separation measuring and injection.

Automatic UV leak-test dye injection.

BrainBee
WORKSHOP SOLUTIONS