Automotive Electronic Control Systems

AECS
Training, Equipment and Data for Automotive Diagnostic Specialists

Introducing...

AECS's brand new Seminar.

AECS has made a new training seminar over the summer period. It's called the **EMS 1-3,** to fit in with the rest of our training program.

This new seminar is exciting, cutting edge and deals with nice new modern technologies in current cars. The focus is as always on maintenance, diagnostics and repairs, not just how it works.

To get straight to the point, the content is about:

Variable cam timing. Intake cam shafts and some exhaust cam shafts can be phase adjusted by the engine ECU. We deal with various brands and designs, from Nissan VVL to BMW Vanos. How the system works mechanically and electronically is described in great detail with the use of lots of pictures and cut away models of the real thing.

At the end of this chapter it will be perfectly clear how fault codes will be set and how drivability problems occur when you stick to the super long service intervals, the marketing department of vehicle manufacturers' demand.

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Advanced

Retarded

Variable valve lift. Most car manufacturers have, or soon will have, variable valve lift on all of their vehicles. This is a system where the intake valve height is altered, to control the amount of air flowing into the engine. We deal with petrol engines in this training, although a number of truck manufacturers are using it on their Diesel trucks also. These car engines run with the throttle blade in the wide open position even when the engine is idling. We deal with the mechanical side (with cut away models) and the electronic workings of the system. We even go

as deep as, how the software in the ECU deals with variable conditions so you understand the system and to make diagnostics easier. At the end of this chapter you will be able to diagnose drivability problems as a result of, for example mechanical wear with a scan tool and oscilloscope. We deal with a number of manufacturers but the BMW system (around since 2002) is at the core of this chapter.

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Direct injection. Almost all car manufacturers have direct injection petrol engines, like for example the D4, GDI, FSI, TSI, SIDI, etc. Many late model systems are already developing problems, while some of the older systems are having all sorts of known issues. We will deal with the mechanical side, the layout of some real late model systems and the electronics plus control systems on those late model vehicles, for example looking at the double closed loop pressure control in late model TSI vehicles.

We also deal with some of the known issues on older systems. I have a cut away GDI injector which had an incorrect spray pattern causing surging. We will look at for example the double coil Nissan injectors (3-wire) and the high voltage and current control on FSI injectors.

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Direct injection EGR. Direct injection engines proportionally need a very high EGR quantity. EGR systems are notorious for causing trouble. I have some really nice trouble cases where for example an aftermarket EGR valve has dropped the valve dish in the intake manifold. How do you diagnose this with a quick measurement decisively? We also look at the patterns and fault codes of such problem cars.

Proximity switches. Most vehicles use for ABS wheel speed sensors and CVT gearboxes 2 wire current proximity switches. Lovely sensors! learn a whole new way of diagnosing these sensors and their circuit. We deal with positive and negative controlled sensors. We look at how fault codes are set in the ECU and how live data in the scan tool deals with incorrect signals. You will learn what to measure when there is a short, or bad connection, before a fault code is set is covered.
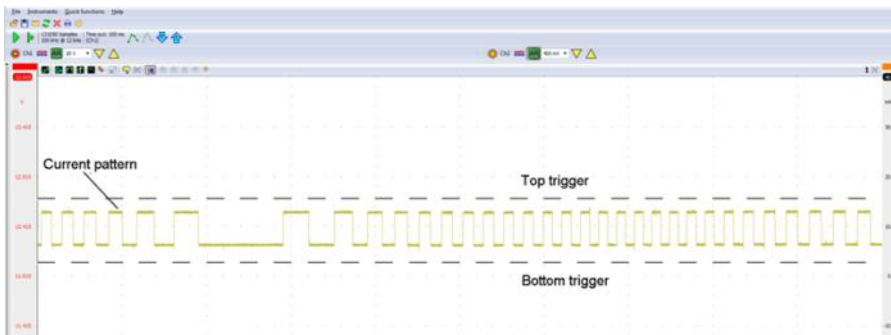
Multiple ECU structure with multiple CAN databus systems. This is where we deal with one late model vehicle with 27 ECU's on board connected to 3 CAN data bus systems (which is not uncommon). We look at each ECU, its role and what sensors are attached for direct inputs. We also look how each ECU has indirect inputs via CAN, and why. Each ECU has direct outputs but some have also outputs via CAN. It is important to understand why and how this works. Some indirect signals (output and inputs) cross multiple CAN bus systems. A subject which can be a true nightmare if you are not conversant with this technology. How can a faulty sensor on one ECU, not even directly connected to another ECU cause a series of problems? We deal with real nice simple examples like how a brake fluid pressure sensor's signal connected to the ESP ECU affect and what for example the rear signal acquisition module does with the brightness of the tail lights through duty cycle control. We also deal with some real complex software relations, where a number of ECUs creates a head on crash instead of a T-bone crash to increase passenger safety.

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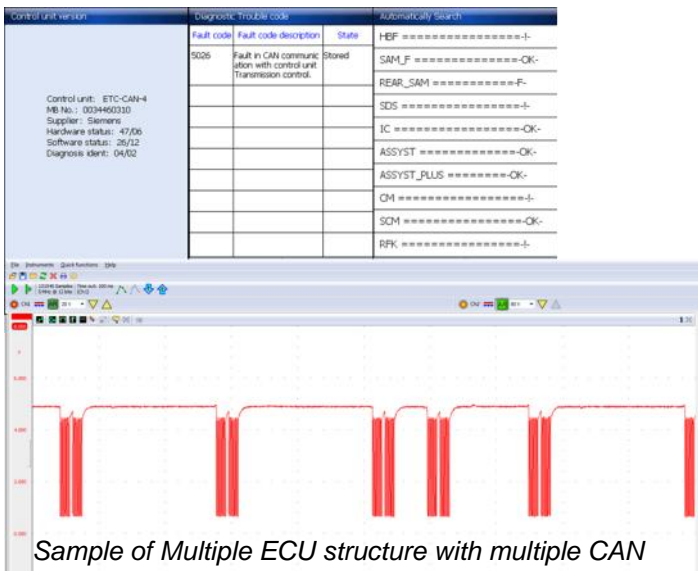
Sample of Multiple ECU structure with multiple CAN databus systems

Re-flashing ECU's and pass thru. This is a nice topic, where we cover the sense and non-sense in re-flashing ECU's and the difference between re-flashing and pass thru. There are many myths about on this subject. We cover in great detail how a dealer scan tool deals with this and the position of after-market scan tools. We have screen prints of the whole process on a late model (2012) car. We also deal step by step with coding a new ECU's which is different again from a re-flash and pass thru.

All in all a really nice training, and one that you without a doubt need if you want to be relevant in the next few years. Unfortunately we will only be running it in Auckland on the 7th & 8th November this year. We had the training calendar already planned and largely booked late last year before the new EMS 1-3 seminar got made. Next year (2014) we will be planning it in other areas. To say we are busy is an understatement!

AECS is catering for all levels of diagnosticians, with Training, Equipment and Tech support. Our technical help desk is our way to keep our feet on the ground and the best way to find out what problems are out there. It helps us improve and create training seminars like the EMS 1-3. You won't be bombarded with hours of boring theory, nor are we doing speed training (…). Our training is practical and most of all FUN.

For **AECS Ltd**:
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(trainer/research)
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AECS - Training Calendar

April	May	June
1 Easter Monday	1	1
2	2	2
3	3	3 Queens birthday
4	4	4
5	5	5
6	6	6
7	7 ChCh SCAN1	7
8	8 ChCh SCAN1	8
9	9 ChCh AED	9
10	10 ChCh AED	10
11	11	11
12	12	12
13	13 ChCh EMS 1-1	13
14	14 ChCh EMS 1-1	14 Private Training
15	15 ChCh ATS 1-1	15
16	16 ChCh ATS 1-1	16
17	17	17
18 Wellington SCAN1	18	18
19 Wellington SCAN1	19	19
20	20 Private Training	20
21	21	21
22	22	22
23	23	23
24	24	24
25 Anzac day	25	25 Hamilton DMS 1-3
26	26	26 Hamilton DMS 1-3
27	27	27 Rotorua AED
28	28	28 Rotorua AED
29	29	29
30	30	30
	31	

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For more information on the Training Key and course descriptors see **www.aecs.net**

**For enquiries or to register for any of these seminars contact
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Please note:
All effort has been made to ensure the training & course dates are correct, however please contact us first before publishing information from this calendar.

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