

## Can and Cannots

We often hear concerns from workshops over what they can and cannot do to a vehicle without having access to the vehicle manufacturer's diagnostic equipment. Some of it is fact; however some is fiction, so here we hope to provide advice and help remove some of the fears associated with modern vehicle systems.

As I am sure you are all aware, a number of years ago car theft was at a peak, however, because of the introduction of numerous ingenious immobiliser systems we are thankfully seeing great reductions in car crime statistics. Most immobilisers work by transmitting an encoded Personal Identification Number (PIN) from the key to the car or both ways, from the car to the key and from the key to the car. With the latter system the key will not give-up its code without first receiving a recognisable one from the vehicle, so therefore coding keys is now becoming almost impossible without having access to the vehicle manufacturer's data base in order to obtain that particular vehicle's PIN code. With some vehicles this PIN code is also used in the component protection system and it's this system that technicians may find confusing. So what exactly is component protection?

### Component protection

Component protection has been steadily appearing on high-end CAN-Bus cars for a number of years now. Its job is to improve the vehicle's security by making it impossible to steal the car by just simply replacing the car's immobiliser system with a different one.

Component protection also reduces the number of cars being stolen for spare parts. It's the numerous Electronic Control Units (ECUs) used on both the high and low speed CAN-Bus networks that are so valuable. To prevent such theft, many vehicles now pass a PIN code around the vehicle's CAN-Bus networks for validation from most of the car's primary ECUs. This "code sharing" happens as soon as the ignition is switched on &hellip; the code is received and read by as many as ten of the vehicle's ECUs. Only if the code from the network matches the code stored in each ECU will the ECU be allowed to function on the car. The system works very well, for example, if an ECU from another vehicle is installed on the car, then that ECU won't work - it's as simple as that, and very effective.

Component protection systems, however, have caused a number of myths to be born in the trade, for example a number of technicians are often anxious when disconnecting and reconnecting an ECU from a vehicle's network in case the code is lost and the vehicle system refuses to function! This is not the case, once the security code is stored into an ECU it is held in the units non-volatile memory and is therefore remembered even when the voltage to the ECU is removed.

The only time a problem occurs is when the removed ECU is installed onto another vehicle, in which case the codes will not match and the ECU will not function, but after all, this is exactly what the system is designed to prevent.

Another worry is what process to follow when replacing an ECU with a brand new one. In this case provided the ECU has not been previously installed to a vehicle it will have left the factory/production plant in a non-coded state, often known as (plant mode). When an ECU is in a non-coded state it can be fitted to any vehicle. Once fitted and the ignition switched on, the new ECU will adopt the vehicle's code from the CAN-Bus and then remember it, therefore fitting a new ECU is possible without the need for diagnostic equipment.

Due to component protection the days of diagnosing faults by swapping parts from one vehicle to another are fast disappearing, however, that method of diagnosis was never recommended!

By the way, it's possible to have a control unit returned to its as new "non-coded mode"; This is achieved by the main dealer who connects diagnostic equipment to the car, enters a security PIN and then re-sets the ECU. Dealers will do this at a reasonable charge; however, proof of ownership is obviously required!

### Fitting Sensors and Actuators:

Another question we are often asked is: When replacing parts, for example sensors and actuators, do I need to use diagnostic equipment?

The answer to this is yes and no, it depends on what sensor or actuator you are replacing. The normal rule of thumb is: if the actuator contains a motor and feed-back position sensor then yes you most likely do. For example, when changing an air flap actuation motor on a climate control system you often need to force the system's ECU through its basic setting or adaptation mode, this lets the ECU position the motor to a known position.

Another example is when replacing parking brake pads on vehicles that use electronic parking brakes. These systems require the use of diagnostic equipment to first of all extract the motors, which allows the pads to be removed and secondly to reposition/adapt the motors after replacing the pads, thus taking up the free play between the motor and the

new pad.

Another example is Piezoelectric injectors, which are being used on both Common Rail and PI Diesel systems. These injectors are coded, so when fitting new injectors, or for that matter an ECU, the injector IMA codes must be reprogrammed into the ECU.

See picture showing injector with IMA Code:

Conclusive Q & A:

Q: When replacing an ECU on a vehicle fitted with component protection, do I need to take the car to the main dealer?

A: No, not if the ECU is a new (out of the box) unit, if so it will be set to "plant mode" and will adopt the vehicle's PIN code upon start up.

Q: When refitting an ECU to a vehicle fitted with component protection, do I need to take the car to the main dealer?

A: No, the ECU will remember the vehicle's PIN code and can be refitted to the same vehicle as the one it was removed from.

Q: Can I swap an ECU from a vehicle fitted with component protection to one of the same model?

A: No, both vehicles will need to be taken to the main dealer, generic diagnostic equipment may be able to de-code an ECU, but you will need the security PIN.

Q: When replacing a set of pads from an electronic parking brake system, do I need to take the car to the main dealer?

A: No, there are a good number of generic diagnostic tools that are capable of performing this task, ask your equipment provider to advise you.

Q: When re-coding an ECU with an injector IMA code, do I need to take the car to the main dealer?

A: No, there are a good number of generic diagnostic tools that are capable of performing this task, ask your equipment provider to advise you.

Hopefully this has been useful information, as you can see when the security PIN is needed then the main dealer is needed, however provided you have proof of ownership all dealers will be able to help you.

Diagnostic equipment manufacturers are constantly striving to develop equipment, which provides the independent aftermarket with the tools it needs. For advice from a GEA member see the list of diagnostic equipment suppliers on the GEA website: [www.gea.co.uk](http://www.gea.co.uk)