Achieve the impossible

Abrites Diagnostics for Mercedes/Maybach/Smart
User Manual

Version: 4.0

www.ABRITES.com

Date	Chapter	Description	Revision
November.30 2015	ALL	Total update of the manual	2.1
February.02.2016	DAS manager	Total update of the chapter+ corrected pinouts	2.2
February.02.2016	DAS manager	Total update of the chapter+ corrected pinouts	2.3
March.14.2016	DAS manager	Abrites ESL emulator	2.5
April.20.2016	DAS manager	EZS password	2.6
May. 23. 2016	DAS manager	ESL Emulator	2.7
November. 24. 2016	DAS manager	New Pinouts added	2.8
July. 07. 2016	DAS manager	Emulator update/ section revision	2.9
August.08.2016	DAS manager/Appendix	Global update of DAS manager 5.17.1 and Appendix	3.0
September.10. 2016	DAS manager	Global update of DAS manager 5.17	3.1
October.26.2016	DAS manager	New Pinouts added/ 176/246/117 updated	3.2
January.09.2017	DAS manager	ZN051 Distribution Box	3.3
June.26.2017	DAS manager	Emulator update	3.4
Nov.16.2018	DAS manager	EZS personalization with FBS from ECU	3.5
Jan.29.2019	DAS manager	W164,W221 before the facelift password reading	3.6
Feb.04.2019	DAS manager	W220/W215 password extraction (using DSBox)	3.7
Feb.18.2019	DAS manager	EM004, EM005, EM006 and EM007	3.8
April.17.2019	DAS manager	W202/W208/W210 password reading from a working key hazards	3.9

Jan.09.2020	DAS manager	Added more EZS diagrams for password reading on bench	4.0

1. Introduction

The Abrites diagnostics for Mercedes/Maybach/Smart is a professional software for diagnostic of Mercedes-Benz, Maybach and Smart vehicles. It allows you to perform complete diagnostics of all 1995-present Mercedes-Benz models. It provides some unique functions, which are not supported by any other diagnostic tool.

Diagnostics is performed via the OBD-II connector or via the Mercedes-Benz proprietary 38-pin connector (only older cars, pre-2001). Since version 4.5 has beed added support for vehicles with a 14-Pin diagnostic link connector (these vehicles are accessible when for "Chassis Type" is selected "Trucks/Buses"). Our PC USB diagnostic interface supports over 26 multiplexed K-Lines and Mercedes-Benz diagnostics CAN-BUS interface (also known as CAN-D).

Standard diagnostic functions:

Read identification: Software Part Number, Hardware Part Number, Supplier and so on.

- Read extended identification: VIN, Software Version, Bootloader Version, CAN Driver version and so on.
- Read fault codes.
- Clear fault codes.
- Device scan - search for all available control units in the car.
- Display of Actual Values (Live Data).
- Actuator Tests.
- Reset of control unit (Hardware Reset).
- Control unit adaptations - Date and Clock adjustment, read/write ID, read/write SCN and so on.

Special functions:

Mileage Recalibration in Instrument Clusters and other control units (see the online manuals for comprehensive mileage recalibration).

- Read/Write Configuration (K-Line and CAN through the OBDII port and CAN through the plug of the dash).
- Airbag - read/write Configuration, clear crash data, lock/unlock the Airbag units to a car.
- Dump Tool - calculate mileage in dashboard, EZS (EIS), EDC-16, ESP; reset mileage values; make engine control modules virgin, clear crash data and so on.
- ECU - Read/Write Flash, Read/Write Configuration of Engine Control Units, Remove DPF/FAP.
- Transponder Generation - program transponders with the help of Abrites Transponder programmer.
- DAS 2 (FBS 2) Key generation - generation of key dumps by dump from IFZ.
- DAS 2A Programming of transponder keys - programming of transponder keys by Configuration dump from the WSP (Immobox).
- Immobilizer (DAS 2b) - Key Learning for Mercedes ML W163; Read/Write Full Configuration of AAM/EAM control modules; Learn radio code of transmitter keys; Deactivate/Reactivate keys.
- Program Smart Keys (DAS 3). The Mercedes Diagnostics software is capable of generating files for programming into the Configuration of infrared smart keys.
- Sprinter/Vito Start Error repair - generation of files for the WSP and ECU units to repair "Start Error".
- Renew of 7-Gearbox (722.9) and Intelligent Servo Module (ISM) control units.
- TV/AUX activation/deactivation.
- Seatbelt warning activation/deactivation.
- Adaptations for SMART - Key Teach-in, Softouch activation/deactivation. Air Conditioning activation/deactivation, Reflash of some units and so on.
- CGW Explorer: Read/Write the Configuration of Central Gateway (CGW) under CAN. From here you can also view/change ASSYST service history records.
- ASSYST PLUS - Change service maintenance records history.
- Reverse warning activation/deactivation.
- Activation/deactivation of Speed warning for Gulf States.

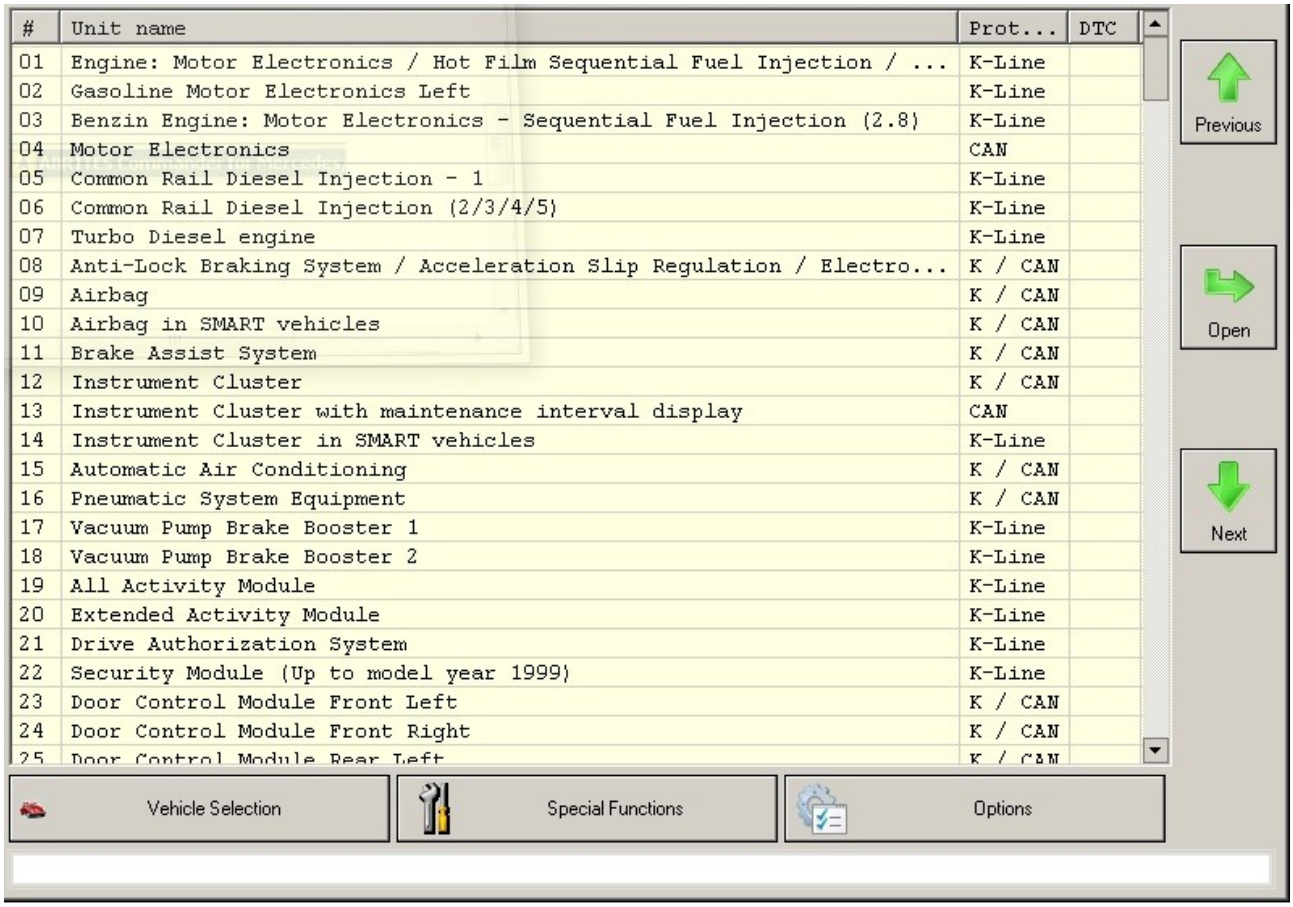
Advanced functions:

- Custom memory read/write
- Custom requests. With this advanced function the user can send requests to the electronic device.

Note: Depending on the version that you have purchased some of these functions may not be available in your software.

2. Getting started

When you run ABRITES diagnostics for Mercedes/Maybach/Smart it will automatically try to detect the appropriate hardware interface and will connect to it. If the interface is recognized and the software is ready for normal operations, you will have to select the appropriate cable type. After startup on the main screen of the ABRITES diagnostics for Mercedes/Maybach/Smart a list of all possible units is displayed. The user is able to connect to the listed devices by double-clicking on the desired device. Pressing the “Scan all” button will attempt to connect to each device currently displayed in the list. Depending on the configuration options, only the selected protocols will be used when scanning for the device.

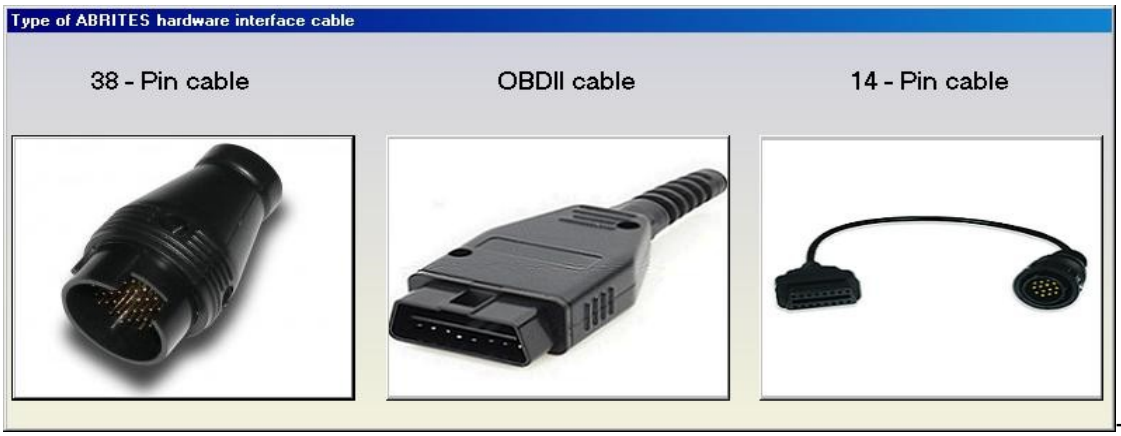


#	Unit name	Prot...	DTC
01	Engine: Motor Electronics / Hot Film Sequential Fuel Injection / ...	K-Line	
02	Gasoline Motor Electronics Left	K-Line	
03	Benzin Engine: Motor Electronics - Sequential Fuel Injection (2.8)	K-Line	
04	Motor Electronics	CAN	
05	Common Rail Diesel Injection - 1	K-Line	
06	Common Rail Diesel Injection (2/3/4/5)	K-Line	
07	Turbo Diesel engine	K-Line	
08	Anti-Lock Braking System / Acceleration Slip Regulation / Electro...	K / CAN	
09	Airbag	K / CAN	
10	Airbag in SMART vehicles	K / CAN	
11	Brake Assist System	K / CAN	
12	Instrument Cluster	K / CAN	
13	Instrument Cluster with maintenance interval display	CAN	
14	Instrument Cluster in SMART vehicles	K-Line	
15	Automatic Air Conditioning	K / CAN	
16	Pneumatic System Equipment	K / CAN	
17	Vacuum Pump Brake Booster 1	K-Line	
18	Vacuum Pump Brake Booster 2	K-Line	
19	All Activity Module	K-Line	
20	Extended Activity Module	K-Line	
21	Drive Authorization System	K-Line	
22	Security Module (Up to model year 1999)	K-Line	
23	Door Control Module Front Left	K / CAN	
24	Door Control Module Front Right	K / CAN	
25	Door Control Module Rear Left	K / CAN	

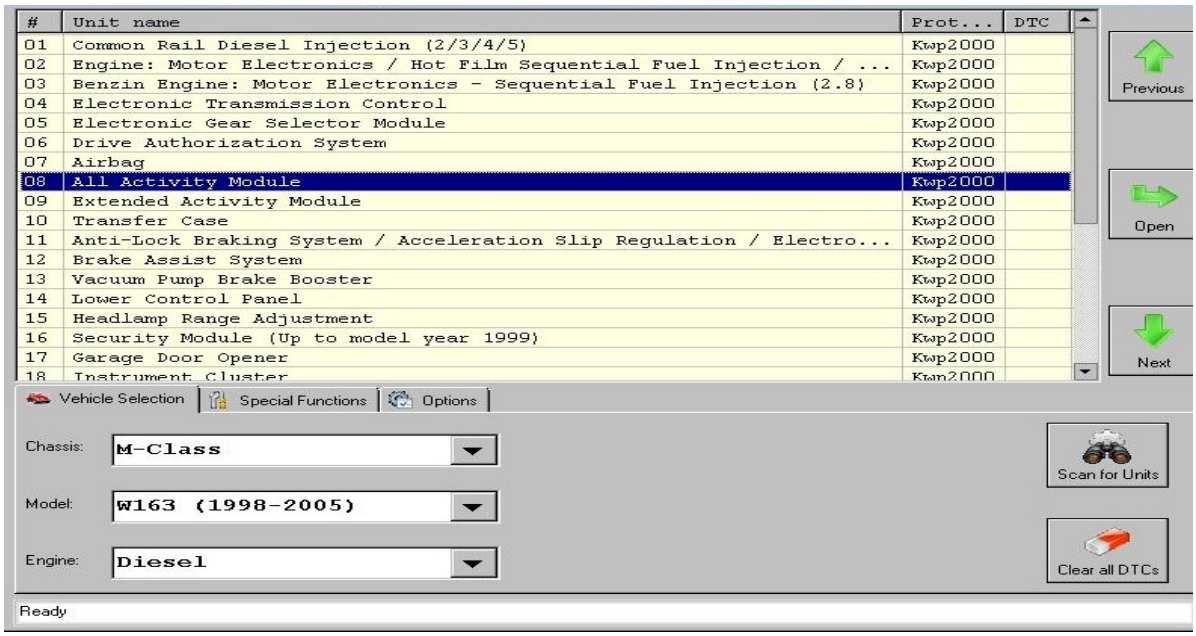
As soon as the software has detected the USB interface it will ask you to specify the type of the diagnostic connector. There are 3 options:

- 38-pin diagnostic link connector
- OBDII plug with 16 pins

14-pin diagnostic link connector

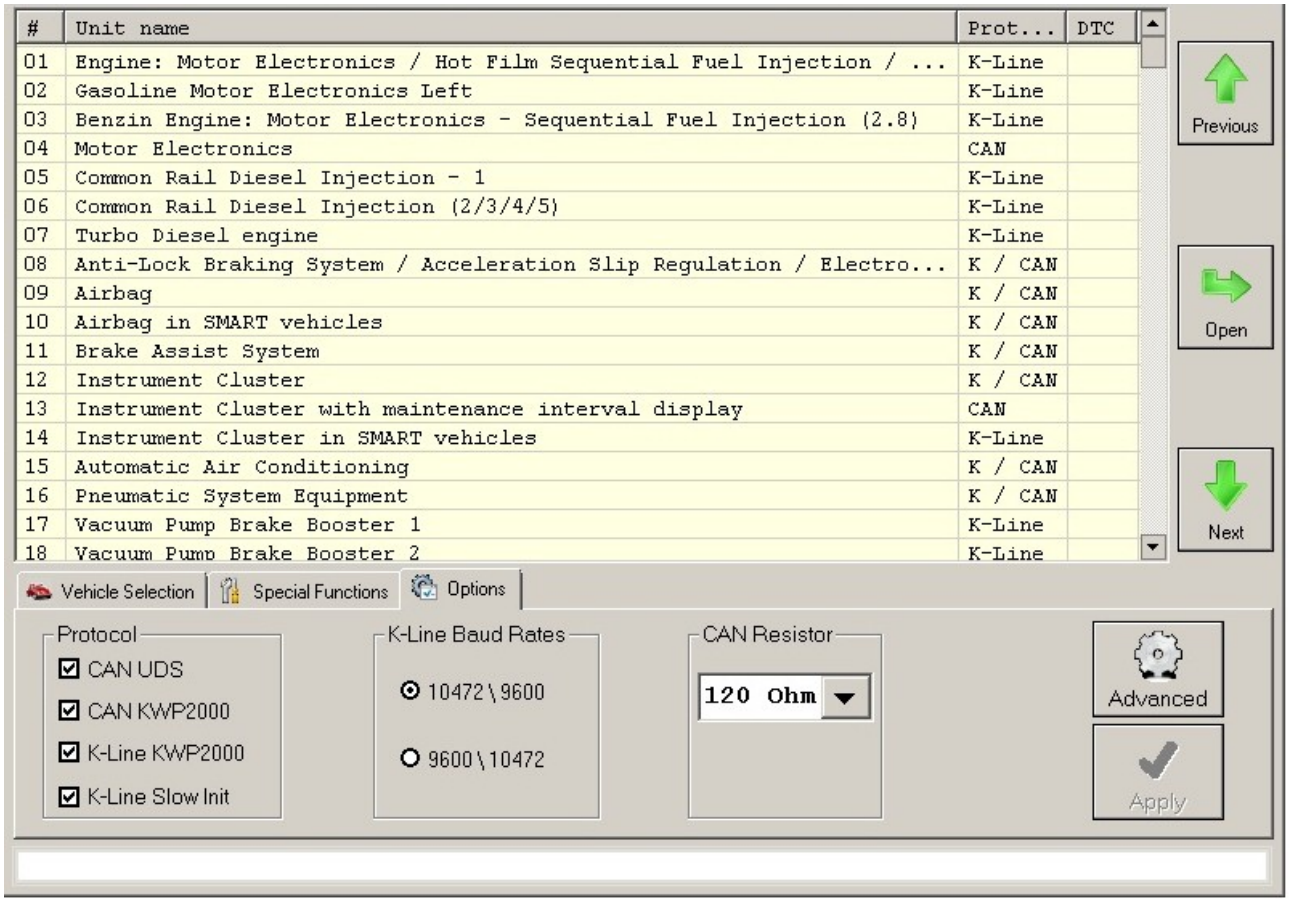


The following screen appears – this is the main screen of the Abrites Diagnostics for Mercedes application. You can open a standard diagnostic with any device that is listed in the main screen. The "Protocol" column contains the communication protocols that the specified device may use. For vehicles up to 2002 the communication is usually established via K-Line. After 2002 the control modules in the vehicles start using CAN. Vehicles produced after 2004 usually do not use K-Line for diagnostics any more.



3.Configuration

The “ABRITES Mercedes Diagnostics” can be configured by pressing the “Options” button from the main screen. The following dialogue is displayed:



Protocol

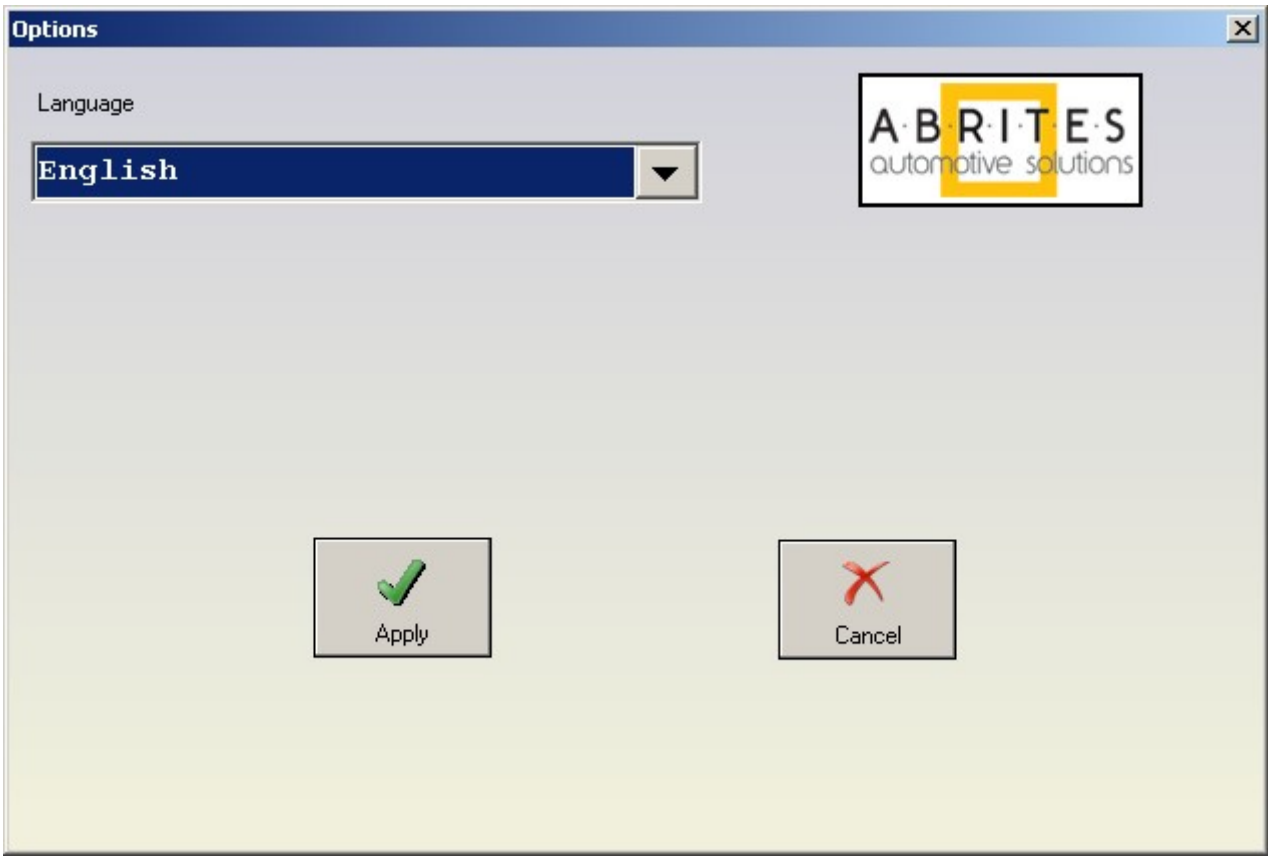
There are 4 options here:

- CAN UDS - if it is checked, the software will attempt to connect to the specified control unit using "UDS protocol with baud 500KB/s". The UDS protocol is used in control modules in newer vehicles - for example the Instrument Cluster of C-Class C204 uses this diagnostic protocol
- CAN - if it is checked, the software will attempt to connect to the specified control unit using “KWP2000 protocol with baud 500KB/s”
- K-Line KWP2000 – when trying to connect to the electronic control device the Diagnostics will try to connect to it using “KWP2000 over K-Line”

- K-Line Slow Init – when trying to connect to the electronic control device the Diagnostics will try to connect to it using "Slow Init". Slow Init means the software attempts to initialize the specified control unit using a baud rate of 5 bits per second. Disabling this option will significantly decrease the time it needs to find the available control modules in a complete vehicle when the button "Scan All" is pressed.
  It is recommended that you leave all options checked. But, if for example you wish to scan for all available devices in the vehicle you can uncheck one of them. This will make the scan process faster. Usually cars after year 2003 have some units that use the CAN protocol. However, even today there are vehicles in which some units work on the K-Line. Generally it is recommended to unchecked "K-Line KWP2000" and "K-Line Slow Init" when diagnosing vehicles produced after 2004.

K-Line baud rate settings
When trying to connect to the device over K-Line the Diagnostics will try to connect to it using one baud rate and if it doesn't succeed it will switch to another baud rate and try again. There are two baud rate values currently used: 10427 and 9600. Using the "10472 \ 9600" and "9600 \ 10247" radio-buttons within the options dialogue one can set the order in which these two baud rate values will be used. If "10472 \ 9600" is selected, then first the Diagnostics will try to connect to the device over K-Line using baud rate 10472 and if it doesn't succeed, it will switch to 9600 and try again with it. If "9600 \ 10472" is selected, then first the Diagnostics will try to connect to the device using baud rate 9600 and if it doesn't succeed it will switch to 10472 and try again with it.

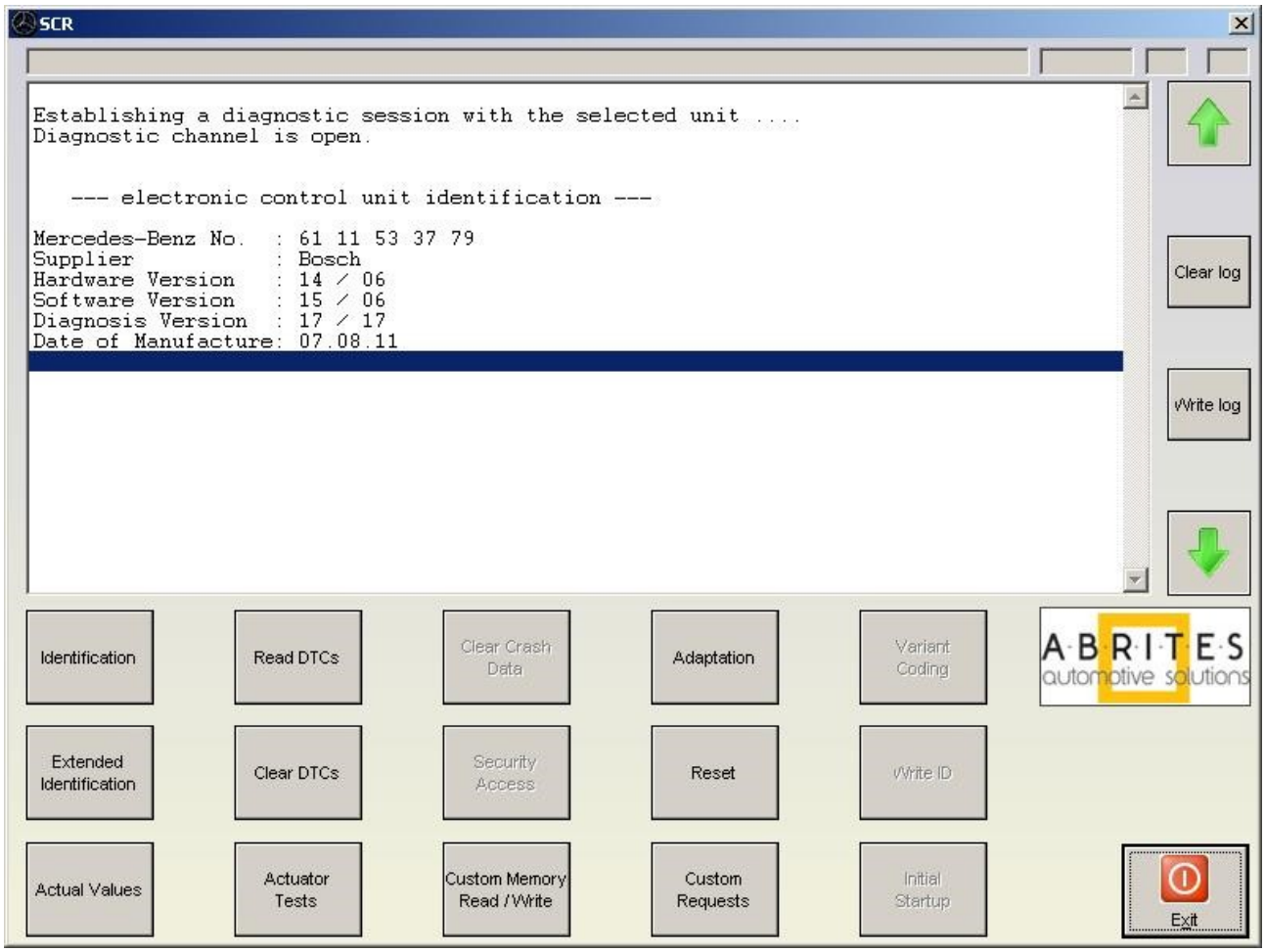
Advanced Options



Clicking on the "Advanced" button will present you with the following screen and from here you can select the language of the user interface of the Mercedes Diagnostics:

4. Diagnostics

The following diagnostic functions are supported:



Read identification

Displays the complete identification of the control unit - part number, software/hardware version, manufacturer.

Extended identification

Displays extended identification of the control unit - stored original VIN number, stored current VIN number, programming date, tester serial number, boot loader information and others.

Actuator test

Actuator tests command the ECU to activate components and systems, such as injectors, the throttle valve, adaptive strategy, or the fuel pump, horn activation, moving electrical mirrors, switching lamps ON/OFF etc. For many components, you can conduct an auditory test — a relay clicks or a pump vibrates. Be aware that actuators can be mounted anywhere in the vehicle, such as under the dashboard, hood, or trunk.

Read DTCs

Displays all stored and pending diagnostic trouble codes with their complete description (e.g. "9101 Fault in CAN communication with control unit ESP."). The software supports saving the information to a file.

Clear DTCs

This function clears all stored diagnostic trouble codes. The software will show a text as soon as it gets a confirmation from the tested control module that the errors have been erased. To verify that the errors have actually been erased the user may click on "Read DTCs".

Scan All

Detects all Mercedes-Benz ECUs (electronic control units) installed in the car and reads all diagnostic trouble codes.

Actual Values

The ABRITES Mercedes Diagnostics displays live data like Oil Temperature, Fuel Level, Engine Speed, Battery voltage, etc. Please, note that the actual values may differ between different vehicle models and in order to see the correct list you need to select the correct vehicle context from the main screen - for example E-Class, Diesel, 2007. If for some reason the actual values that the program displays are still not correct, please email us the corresponding log file, together with a screen shot of the displayed actual values.

Reset

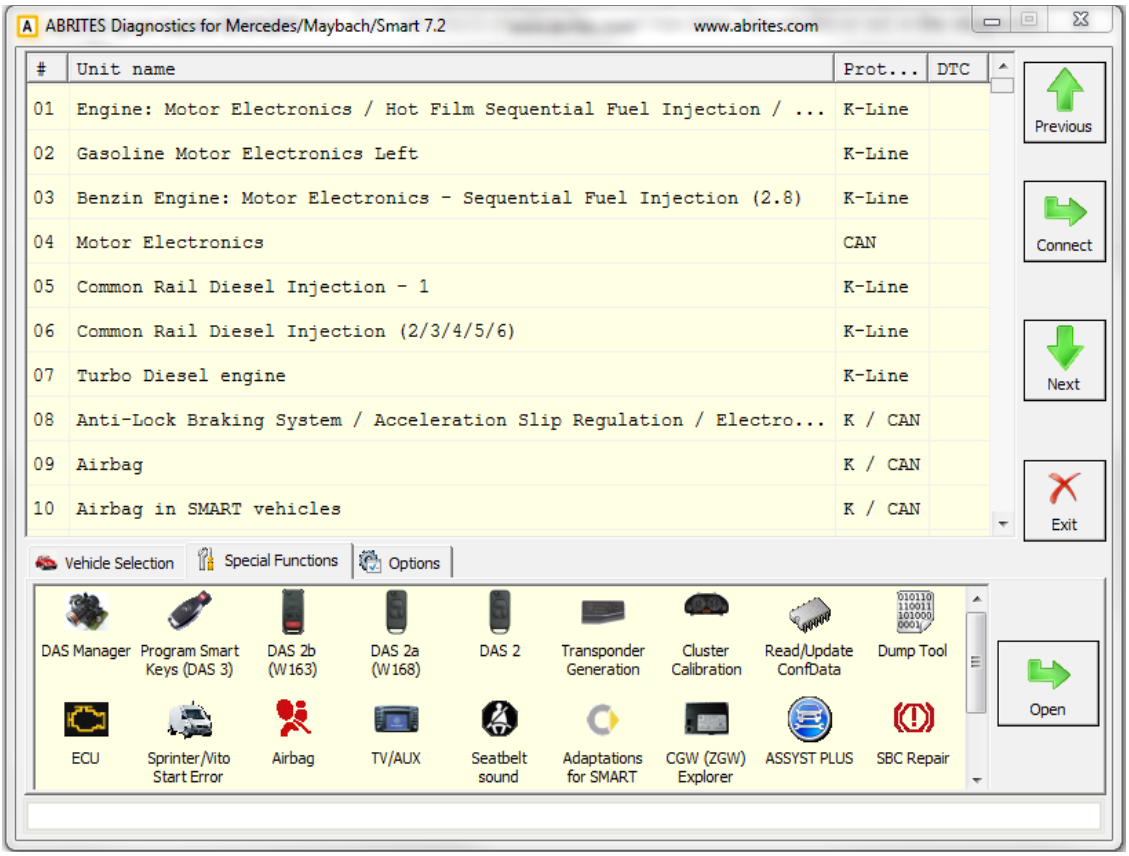
This functions performs a hardware reset of the control device that is being tested. Please, note that not all devices support this function. You can check whether the reset has been successful or not in the diagnostic log.

Make Virgin

This button is available only for Electronic Transmission Control (722.9) units and Intelligent Servo Module units. It should be used to renew these control units when they have accidentally locked to a vehicle.

5. Special Functions

The Abrites Diagnostics for Mercedes has some unique diagnostic functions, which are not supported by the official diagnostic testers. These functions are accessible from the "Special Functions" tab on the main screen. Please, note that depending on the version you have purchased some of these functions may not be available in your configuration. In this case a message will inform you that you need to acquire an additional license. For more information, or to obtain a license, please contact us.



The following special diagnostic functions are supported:

Instrument cluster/odometer correction

Changes the odometer, which is stored in the Instrument Cluster.

Configuration read/write

By using this function you can read/write Configuration memory in some electronic control unit. You can use this application for many different purposes - investigations, read/program flash memories (for example you can program by this dialog Configuration of VDO Instrument Clusters of all Mercedes vehicles between 1998-2003).

Airbag
Airbag sensors store all error memory and crash data information in the internal processor Configuration. With this special function one can:
- Read/Write Configuration memory of an airbag module
- Clear the crash data of an airbag module

Dump Tool
By using this special function you can calculate odometer values, reset odometer values, renew Engine Control Units and so on.

Engine Control Units
Read/Write flash memory of engine control units. For some ECUs read/write of the Configuration is also supported.

Transponder Generation and Programming
With this function you can program immobilizers with the use of the TANGO programmer and directly use them in the vehicle. The transponder that you wish to program should be **PCF 7935**. Attention: For all supported vehicles it is enough just to program the transponder. However, for Mercedes ML (W163) you need to learn the transponder after you have programmed it. You can do this by using the "Immobilizer" special function.

DAS 2
With this special function you can generate keys for vehicles, which use DAS 2 Immobilizer system. These are the vehicles, produced between 1995-1998: C-Class(W202), E-Class (W210), G-Class (W461).

Immobilizer (DAS 2b)
With this special function you can read/write AAM and EAM Configuration data. Using this application you can also learn a transponder to the DAS 2b immobilizer system. Simply specify the key number (it must be between 1 and 8) and press the button "Learn ML Transponder".

DAS Manager

Using this special function the DAS system components (EZS/EIS; ESL/ ELV) can be read, updated, locked, virginized etc.

Program Smart Keys (DAS 3)
This special function allows you to make keys for vehicles with DAS 3 immobilizer system – W202, W203, W210, W211, W219, W220, W215, W208, W209, W463.

Sprinter and Vito Repair
With this function you can repair message, which is very common in old Vito and Sprinter vehicles.

TV/AUX activation/deactivation
By using this special function you can have the TV/AUX screen in the head unit enabled even when you are driving. You can also disable TV/AUX screen display during driving, if it is currently enabled, but you do not want it.

Seatbelt sound
This special function allows you to completely disable the seatbelt warning: both the visual indication via a tell-tale in the instrument cluster and the sound, which you can hear when the car is moving and you haven't put your seatbelt on. You can also enable these warnings, if for some reason they have been deactivated.

Adaptations for SMART
This special function allows you to perform adaptations on control units in SMART vehicles. You can program keys, enable/disable SOFTOUCH and so on.

ASSYST PLUS
Models 164, 169, 171, 204, 211, 216, 219, 221, 245 and 251 are equipped with this control module. It automatically assigns to the next service the time and wear dependent maintenance items as well as the special equipment that should be maintained.

Central Gateway Explorer
With the help of this special function it is possible to read/write COMPLETELY the Configuration of the Central gateway (CGW, or ZGW) control unit.

Reverse Warning
This special function allows you to completely disable the reverse driving warning.

Deactivation of speed warning for Gulf States
This special function allows you to completely disable the speed driving warning for Gulf States countries.

Increment Odometer on CAN
This special function allows you to increment the odometer on CAN vehicles.

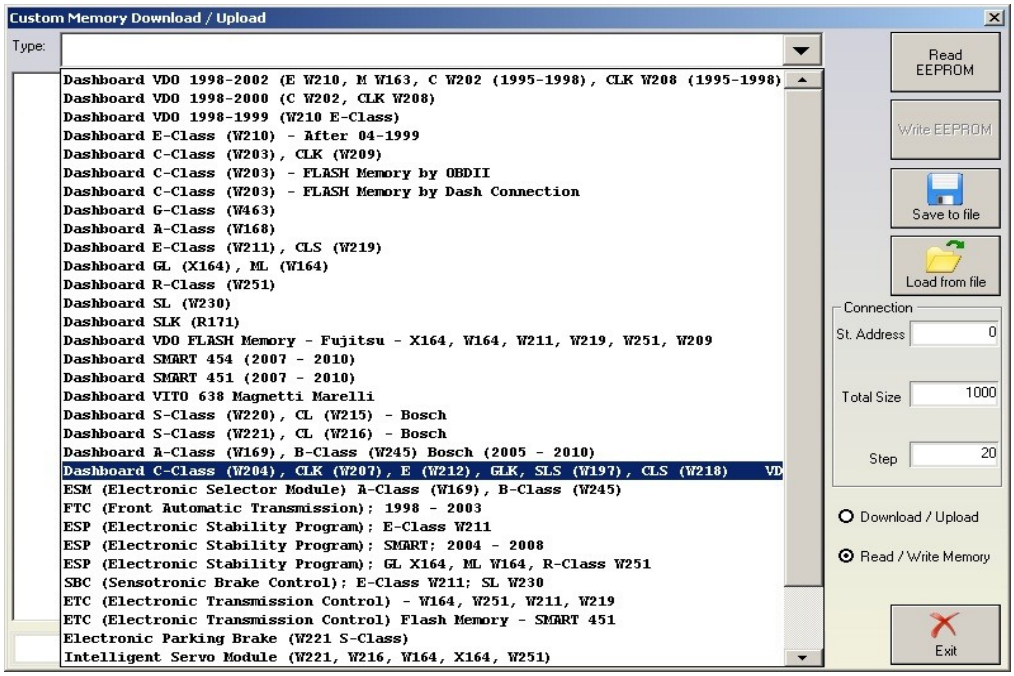
5.1 Mileage calibration

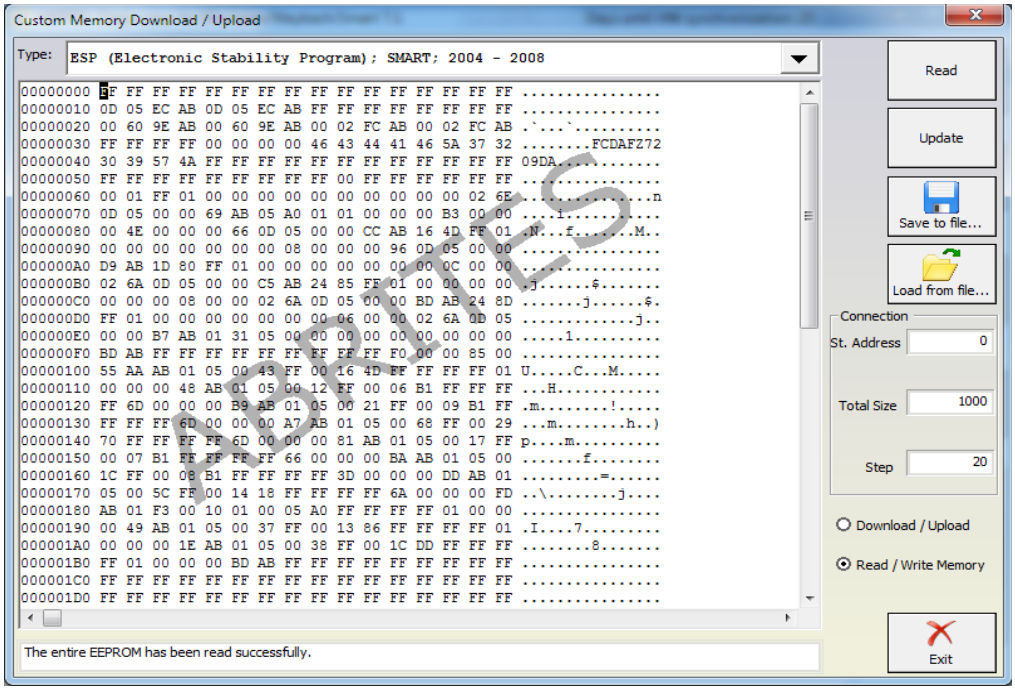
This function works on clusters, which use K-Line as databus as well as on almost all clusters, which use CAN. In the vehicles, which use K-Line the mileage is stored only inside the Instrument Cluster, so changing its value is enough. This is not the case with newer vehicles, where the mileage may be stored in several places like EZS and ECU. A complete separate manual is available on this topic.

5.2 Custom Memory Download/ Upload

By using this application you can read/program memory in some electronic control units.
You can use this application for many different purposes - investigations, read/program flash memories. When you access this screen from the 'Special functions' list you will be able to program the Configuration of Instrument Cluster of all Mercedes vehicles between 1998-2003, which are equipped with a VDO cluster.

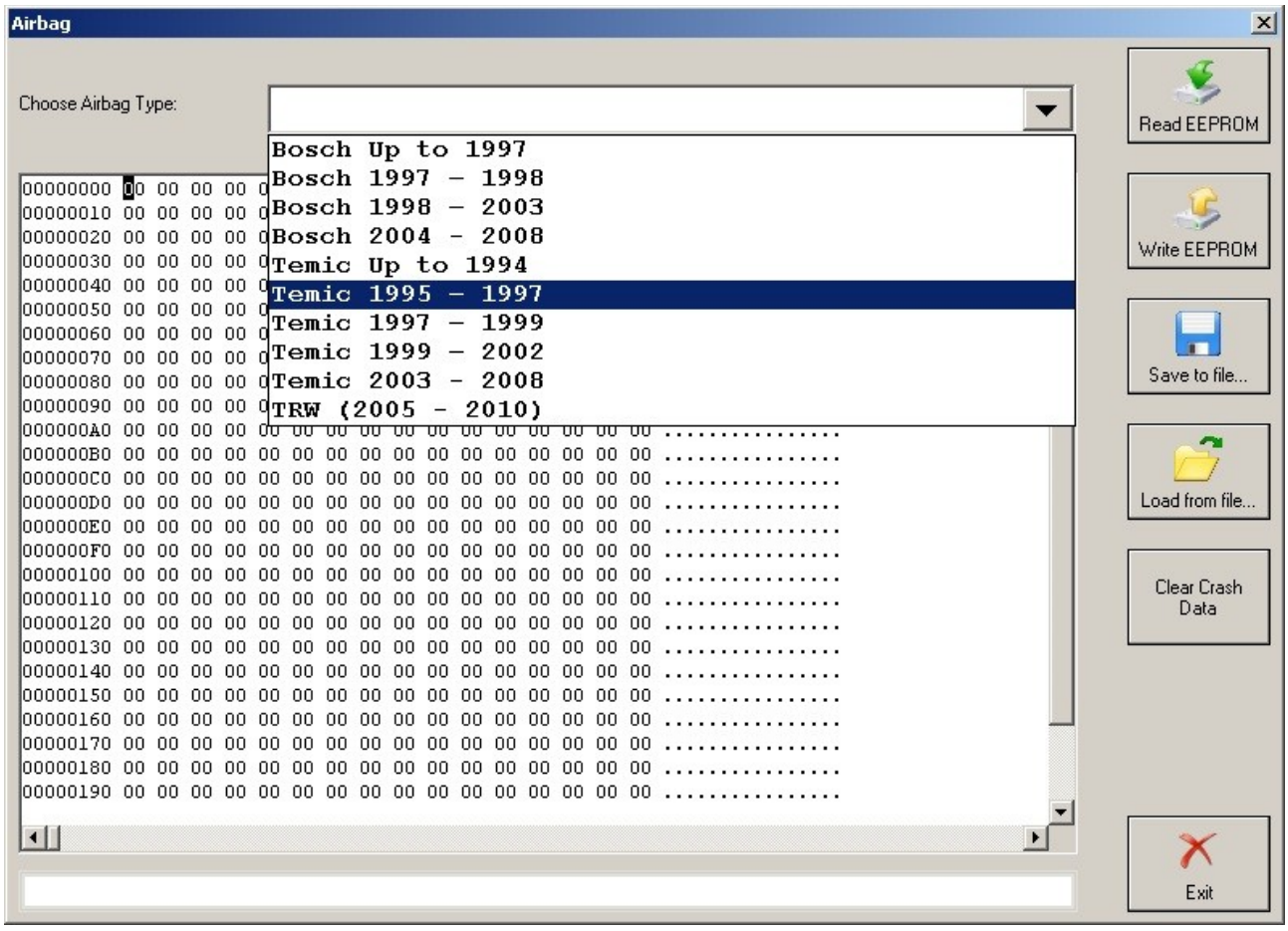
Attention: Note: Since version 3.9 for C-Class W203 and G-Class W463 it is possible to read/write the Configuration via the OBDII plug! It is no longer necessary to connect to the dashboard directly.





5.3 Airbag

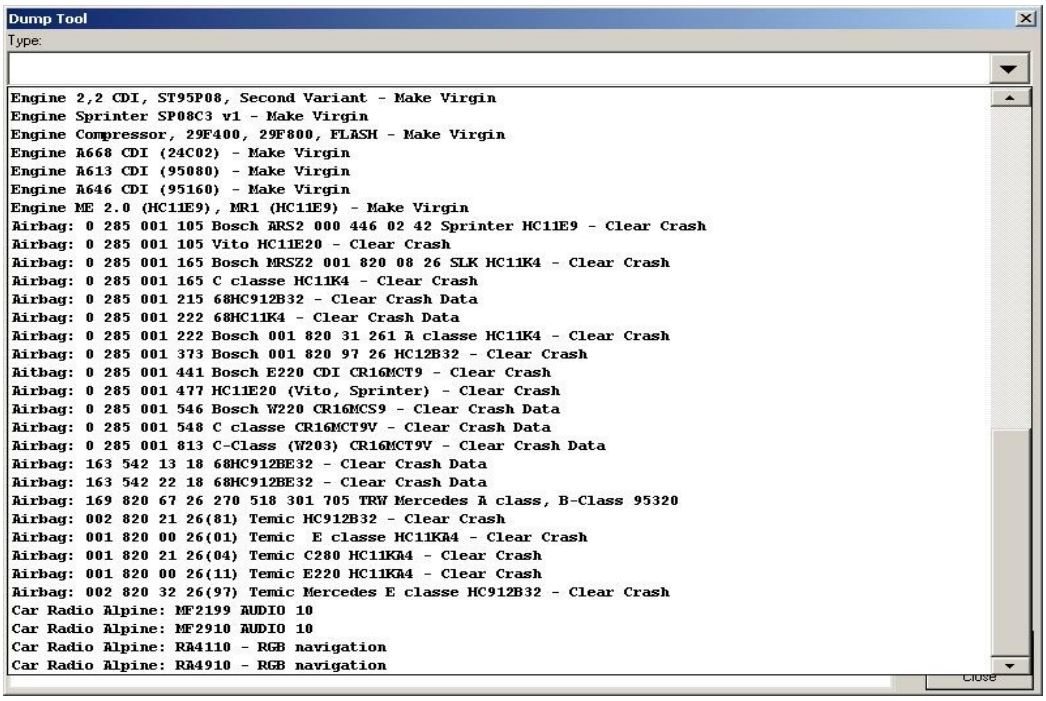
For some airbag models it is not enough to clear the trouble codes (using "Clear DTCs" diagnostic request), but the crash data stored into device's Configuration should also be cleared. For some models (see "Covered units:" below) crash data can be automatically cleared (using "Clear crash data" function) from device's Configuration, but for some models the user has to do this by hand (read Configuration memory (using "Read Configuration" function), find where crash data is stored, change data, write Configuration memory back(using "Write Configuration" function).



5.4 Dump tool

This application needs the Configuration dump, which has been saved as a file, from the corresponding unit. After the dump file is loaded, some modifications will be made and you need to store the dump as a new file, which you can program with a special programmer into the device that the dump is from.
The dump tool receives as input a dump file from the corresponding unit (input dump is loaded with the "Load dump" button). The dump file can be read either via OBDII but also with a programmer

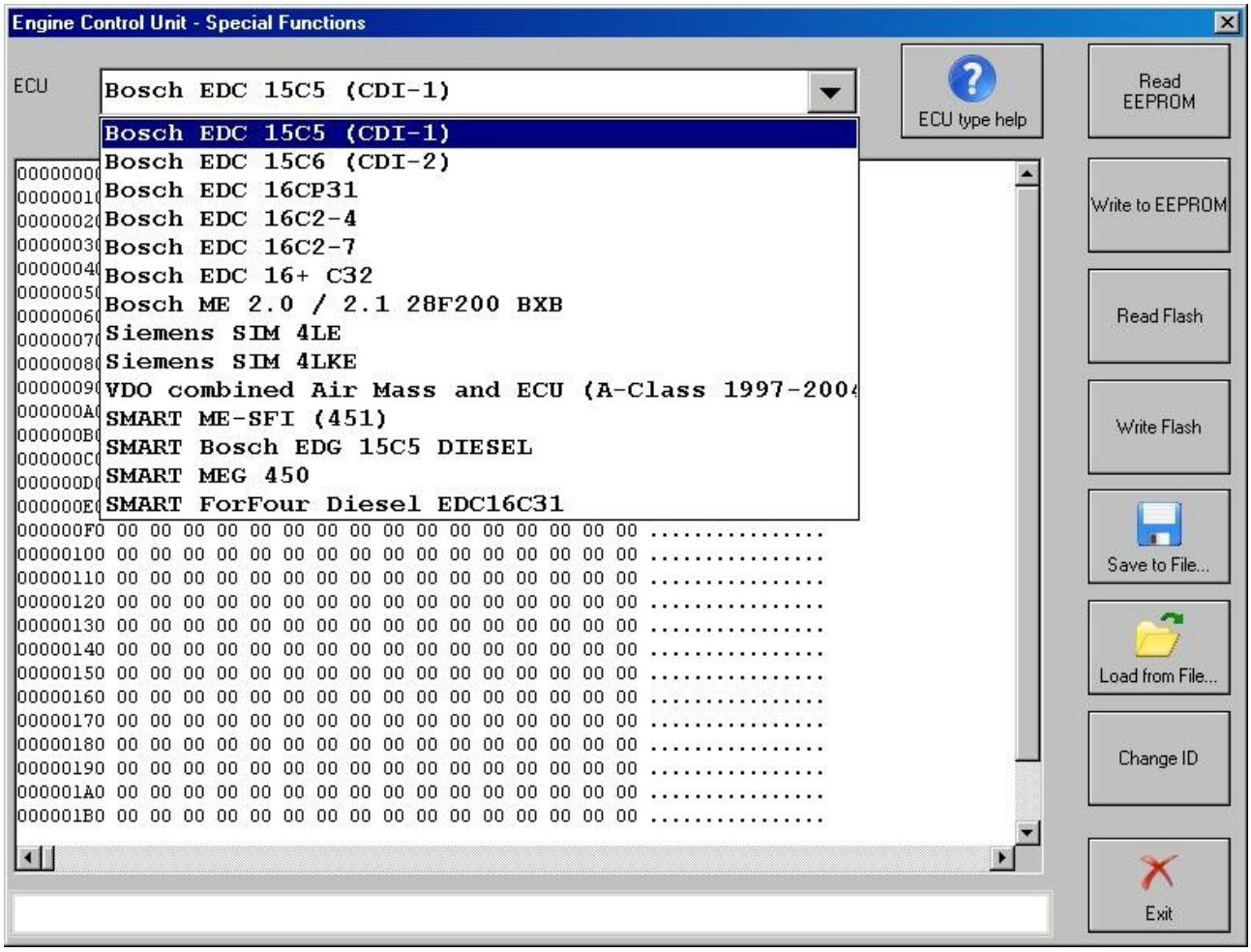
(especially for units where reading via OBDII is not possible). As output the dump tool displays some data extracted from the input file and/or makes some modifications to the input data. If modification were made (for some sub-functions there are no modifications made, only data are visualized) the user has to write the modified dump to desired file (with the "Save dump" button), and then this modified dump should be saved back to the device via OBDII or with a programmer. If data are read/written with a programmer the user must make sure that the proper byte order is used. Because most of the programmers are reading the data on 16bit words, the byte order in the dump depends on the used programmer - some programmers produce dumps starting with the least significant byte, and some produce dumps starting with the most significant byte. This means that for the same unit two different programmers can produce different dumps. For that purpose a button "Swap bytes" is provided. This buttons changes alternatively the byte order into the dump. So, if after loading the dump file into the dump tool data cannot be extracted or modified, please try to swap the bytes to get a correct result.



5.5 Engine Control Units

By using this special function it is possible to read/write the flash memory of some engine control units. For some engine modules it is also possible to read/write the Configuration memory. It is important to note that if when you start to re flash the Flash memory of an Engine Control unit for some reason the process does not finish successfully - you can always restart the flashing process. Always make sure that there is a good power supply connected to the battery of the car!

Otherwise, the fan of the Engine moves very fast during reading/writing and it may drain the battery very fast



5.6 Immobilizer

The Drive Authorization System (DAS) is the name for the Mercedes Immobilizer system combining vehicle access and drive authorization. Prior to 1996, DAS was separated from the engine control module, and ignition switch operation was based solely on a mechanical key. An early version of DAS was first introduced in approximately 1993 when Mercedes started networking DAS, the engine, transmission, ABS, and traction control systems on a common data

bus called CAN.
The Mercedes pneumatic control door lock system has been in existence since the early 1980s, and although now it is much more advanced, it is still in use today. It steadily became more sophisticated, adding features like central locking, starter lock-out, and steering lockout.

1.1 Year/Model	***1.2 1998 170/129/140/ 163***	***1.3 1998 210/208/202/220/ 215/203***
1.4 DAS system	***1.5 DAS 2b***	***1.6 DAS 3***
1.7 Triggered by	***1.8 Transponde r in key***	***1.9 Micro-processor in key***
1.10 Signal type	***1.11 Inductively coupled RF***	***1.12 IR***
1.13 Authorization checked by	***1.14 RFL (N54/3) AAM/DAS (163)***	***1.15 EIS (N73)***
1.16 Unauthorized start result	***1.17 No fuel – may crank briefly***	***1.18 No fuel – ignition switch locked, steering or shifter locked (chassis dependent)***

DAS 3 is the most sophisticated and advanced generation of DAS. DAS 3 was introduced on the C, E and CLK class in 1997 and the S class in 1998 (210/208/202), increasing each year with more models phased in. This system has all the same features of DAS 2b except that the ignition switch is now fully electronic (the mechanical key is used only for vehicle access). This means that with DAS 3, both access and drive authorization are fully electronic.
Access authorization using the remote key uses both infra-red and radio transmission, but the electronic key drive authorization only uses infra-red. The electronic key transfers a radio wave code to the electronic ignition and starter switch (EIS).

With this special function you can read/write AAM and DAS Configuration data. For Mercedes ML you can program a transponder using the "Transponder Generation" function.

After this you can learn the already programmed transponder to the immobilizer system. Simply specify the key number (it must be between 1 and 8) and press the button "Learn ML Transponder".

Note the following when working on DAS 3 systems:
- The electronic key is completely separate from the remote key access system and does not require the transmitter battery of the remote control. Instead, it is powered by the EIS, which means that the electronic key can be used to start the vehicle even if the remote control battery is dead.
- The side of the electronic key also contains a slide out emergency mechanical key which allows access to the vehicle if the remote battery is dead. It also can be used to lock the glove compartment and the trunk.

From this screen you can access the "DAS Adaptations" screen. It allows to revocably, or irrevocably deactivate/reactivate keys. This function would be useful if, for example, you have lost one of your keys - then you can irrevocably deactivate it.

Also from this screen you can access the "Learn Radio Code of a new Transmitter Key" screen. It allows to teach a new remote control transmitter key.

5.7 Transponder generation and programming

With this function you can program immobilizers with the use of the Transponder programming device from Abrites and directly use them in the vehicle.

Attention: For all vehicle models, except SMART the transponder should be **PCF 7935**. For SMART vehicles the transponder must be **PCF7936 and it should be configured to be in Cipher mode**. This change can be done by changing the first byte in the Config page of the Hitag transponder to **0E** (in Password mode this byte is set to **06**).

For Mercedes ML (W163) you need to learn the transponder after you have programmed it. You can do this by using the "Immobilizer" special function. Also, for SMART vehicles you should learn the key by using the "SMART Key Teach-In" Special Function.

For C, E and G Class the transponders are self-learning. This means they can be used in the car right after they have been programmed.

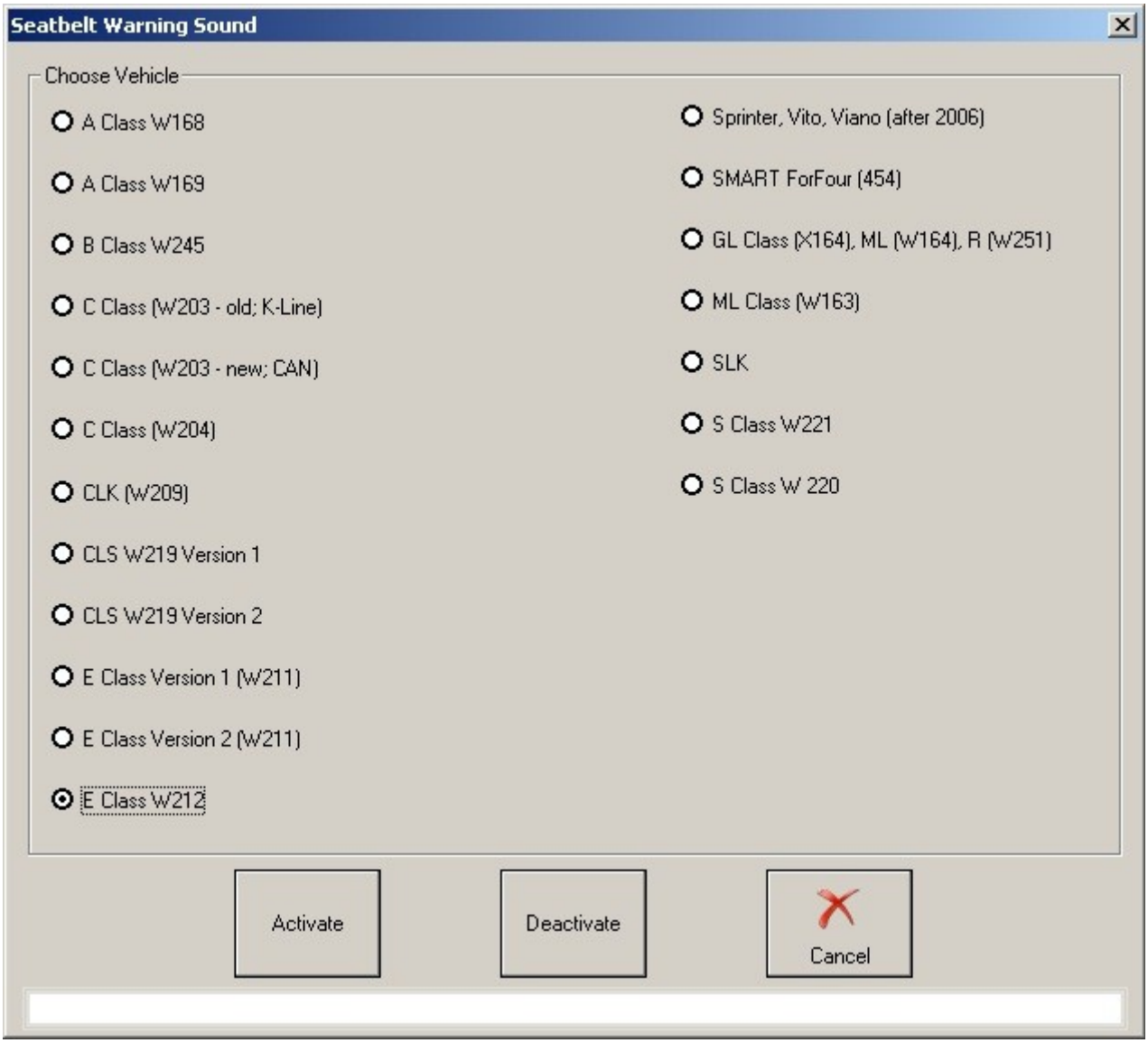
5.8 TV/AUX Activation/Deactivation

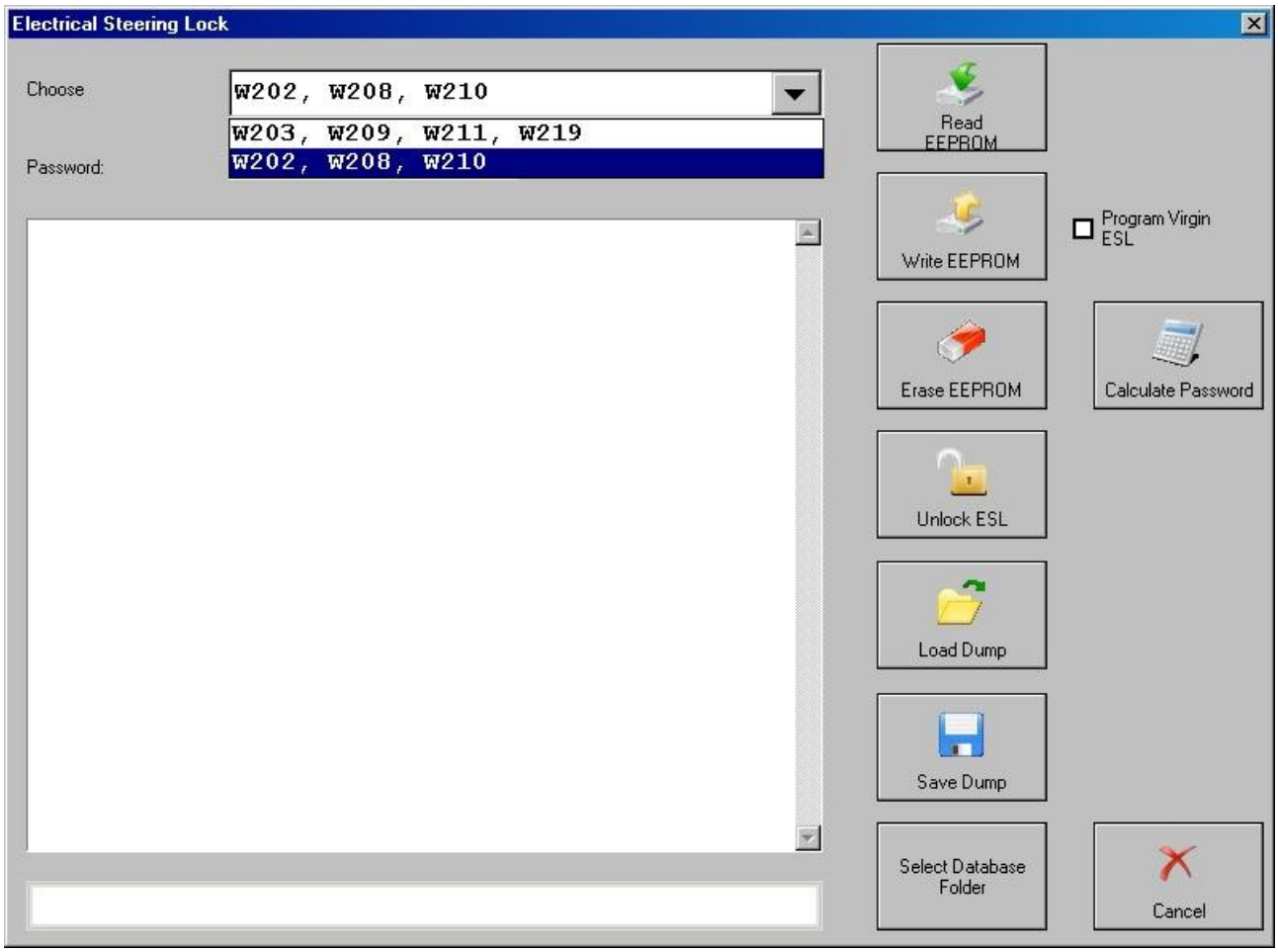
By using this special function you can have the TV/AUX screen in the head unit enabled even when you are driving. You can also disable TV/AUX screen display during driving, if it is currently enabled, but you do not want it.

5.9 Seatbelt Warning

This special function allows you to completely disable the seatbelt warning: both the visual indication via a tell tale in the instrument cluster and the sound, which you can hear when the car is

moving and you haven't put your seatbelt on. You can also enable these warnings, if for some reason they have been deactivated.

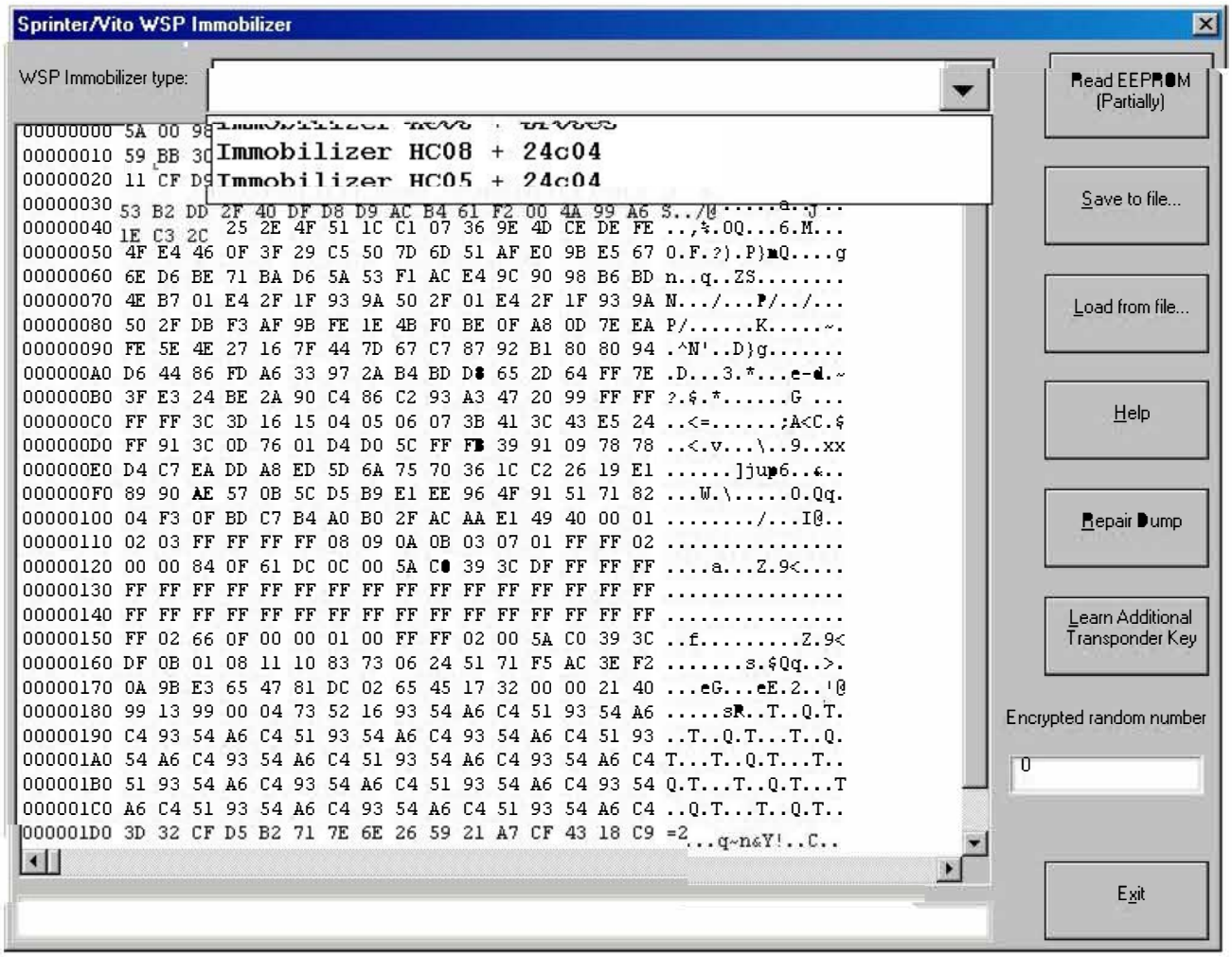


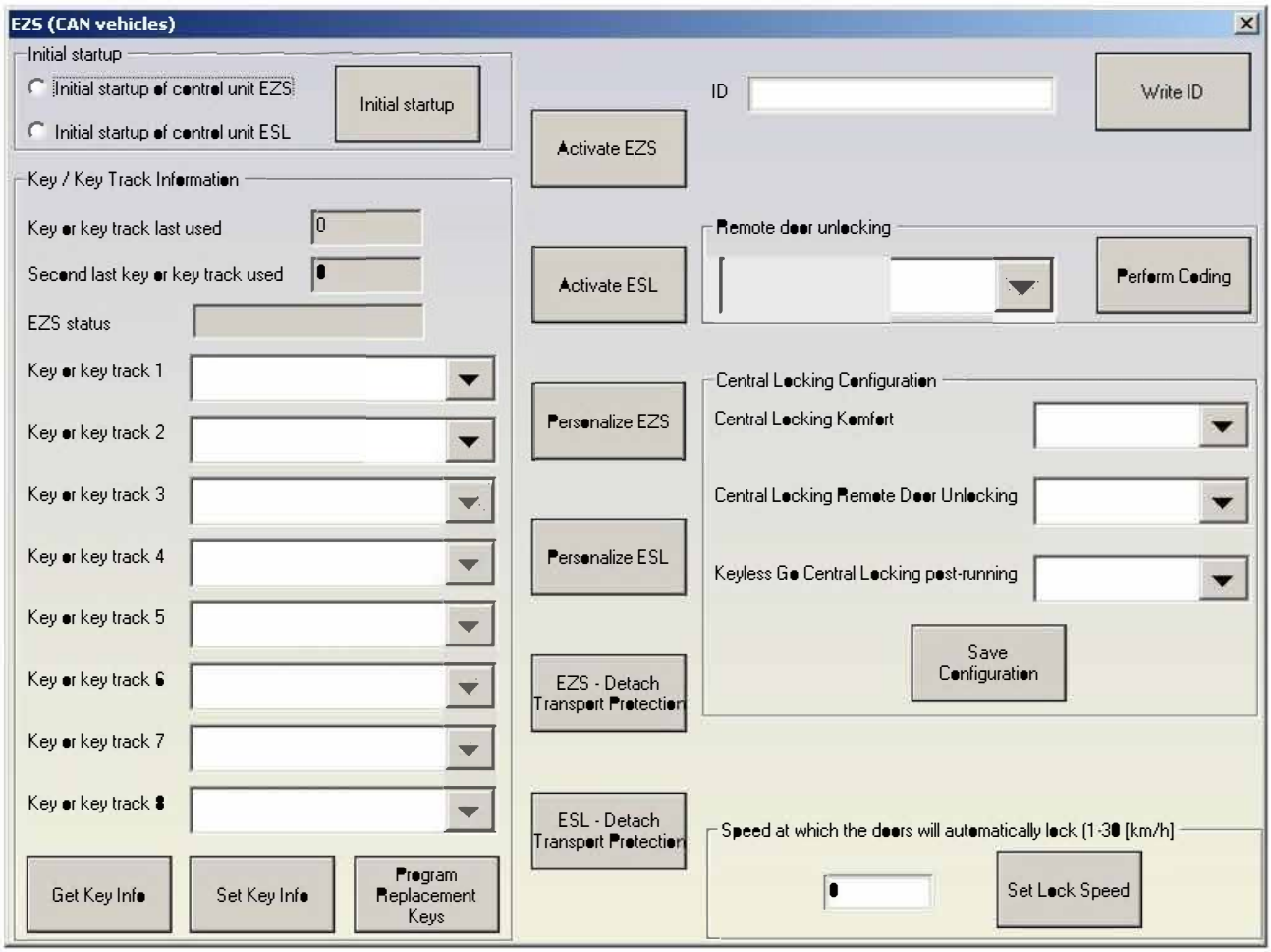


For some vehicles it is possible to replace the NEC ESL with a Motorola ESL. Such vehicles are Vito 639 and Mercedes Sprinter 906.

5.10 Sprinter and Vito “Start error” repair

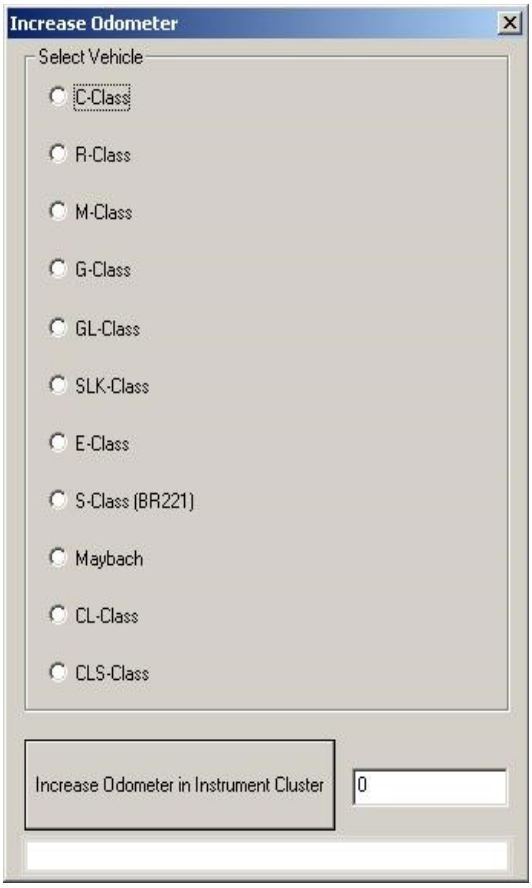
This special function guides you through the process of repairing "Start Error" problem, which is very common for Sprinter and Vito (638) vehicles.


Sprinter/Vito WSP Immobilizer
WSP Immobilizer type:
Immobilizer HC08 + 24c04
Immobilizer HC05 + 24c04
Read EEPROM (Partially)
Save to file...
Load from file...
Help
Repair Dump
Learn Additional Transponder Key
Encrypted random number
0
Exit


EZS (CAN vehicles)
Initial startup
Initial startup of control unit EZS
Initial startup of control unit ESL
Initial startup
Key / Key Track Information
Key or key track last used
Second last key or key track used
EZS status
Key or key track 1
Key or key track 2
Key or key track 3
Key or key track 4
Key or key track 5
Key or key track 6
Key or key track 7
Key or key track 8
Get Key Info
Set Key Info
Program Replacement Keys
Activate EZS
Activate ESL
Personalize EZS
Personalize ESL
EZS - Detach Transport Protection
ESL - Detach Transport Protection
ID
Write ID
Remote door unlocking
Perform Coding
Central Locking Configuration
Central Locking Komfort
Central Locking Remote Door Unlocking
Keyless Go Central Locking post-running
Save Configuration
Speed at which the doors will automatically lock (1-30 [km/h]
Set Lock Speed

5.11 Increment Odometer (CAN)

This special function allows you to increment the odometer on CAN vehicles.



5.12 Assyst Plus

Models 164, 169, 171, 204, 211, 216, 219, 221, 245 and 251 are equipped with this control module. It automatically assigns to the next service the time and wear dependent maintenance items as well as the special equipment that should be maintained.
With the help of this special function you can view/modify the maintenance history that has been saved inside the ASSYST Plus control unit.

Service 2: Every 30 000 km/2 years. Vehicle front, vehicle rear. Check condition and operation of trailer hitch.

Service 3: Every 60 000 km/2 years. Engine compartment.
- Check visible area of poly-V belt for wear

- Replace compressor poly-V belt
- Replace air-cleaner insert
- Turn air filter element by 180 degrees around the longitudinal axis - once when performing service 3 for the first time

Service 4: Every 60 000 km/2 years. Engine compartment.
- Replace combination filter

Service 5: Every 60 000 km/2 years. Engine compartment
- Replace dust filter
- Replace combination filter
- Passenger compartment - replace activated charcoal filter

Service 6: Every 2 years
- Check bodywork for paintwork damage
- Underside of vehicle - check for damage and corrosion chassis and load-bearing body components.

Service 7: Every 5 years. Passenger compartment
- Tilting/sliding roof: clean slide rails and slide shoes

Service 8: Every 3 years. Passenger compartment
- Panoramic sliding roof - clean and lubricate guide mechanism

Service 9: Every 80 000 km/4 years. Engine compartment
- Replace air-cleaner insert
- Replace fuel filter
- Replace spark plugs

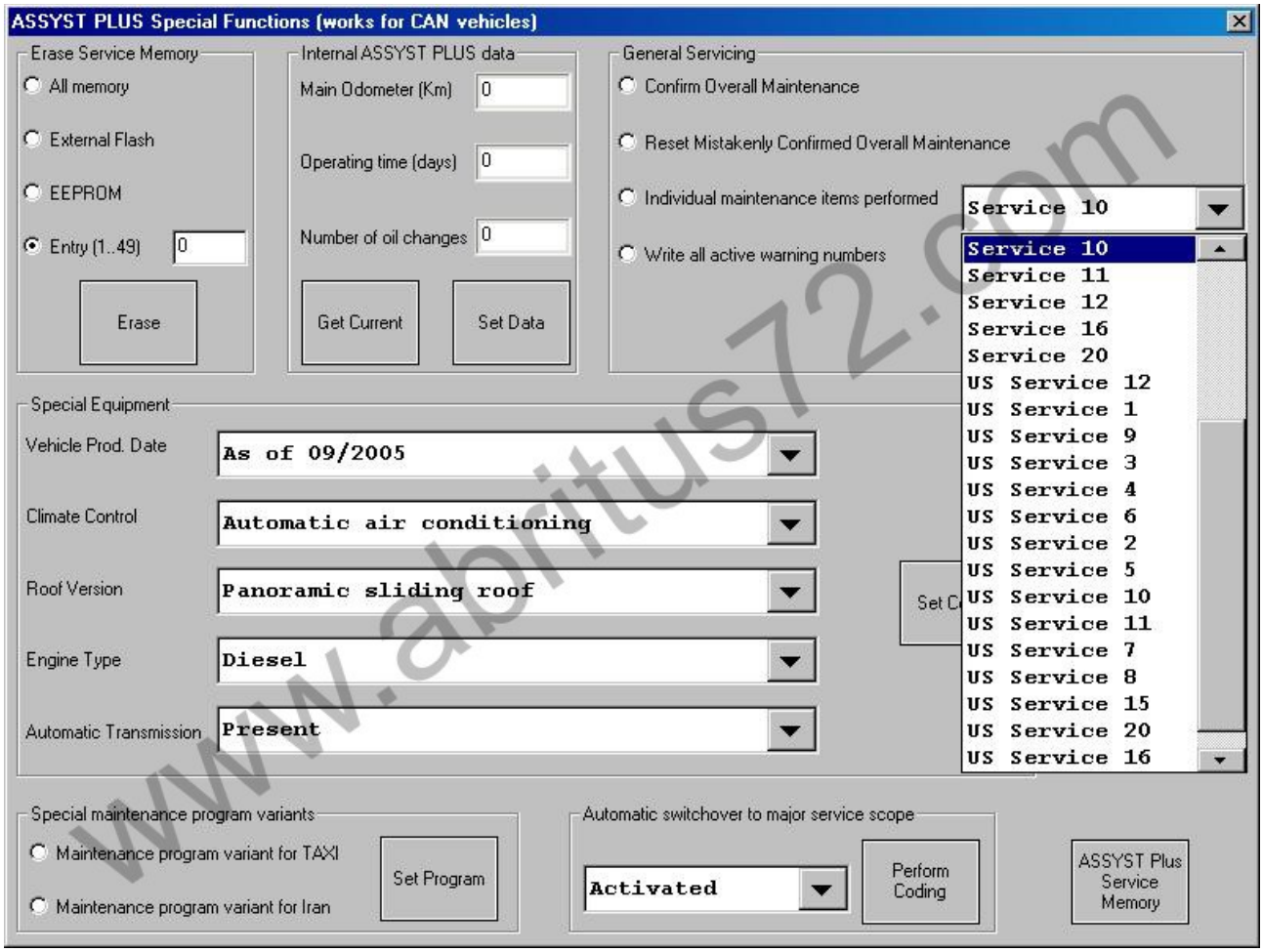
Service 10: Every 100 000 km/4 years. Engine compartment
- Replace spark plugs

Service 11: Every 120 000 km/4 years. Engine compartment - Replace air-cleaner insert

Service 12: Every 250 000 km/15 years. Engine compartment - Passenger compartment: Replace fuel filter
- Engine compartment: Replace coolant. Pay attention to coolant composition.

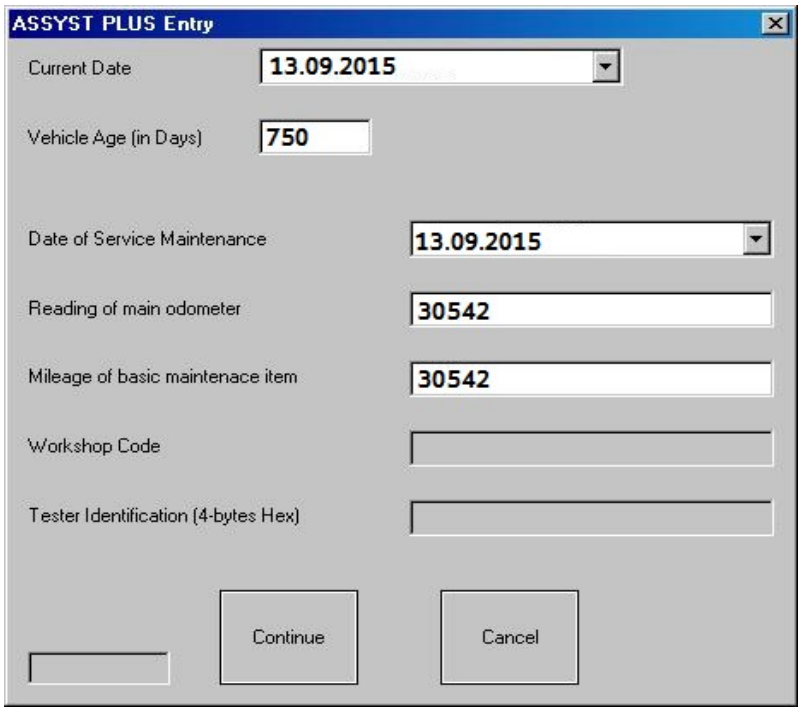
Service 13: At each service. Engine compartment
- Engine oil and filter change.

Service 20: Once at 60 000 km. Underside of vehicle.
- Transfer case - oil change.
- Automatic transmission - oil and filter change



How to view and change service history, stored in ASSYST PLUS:

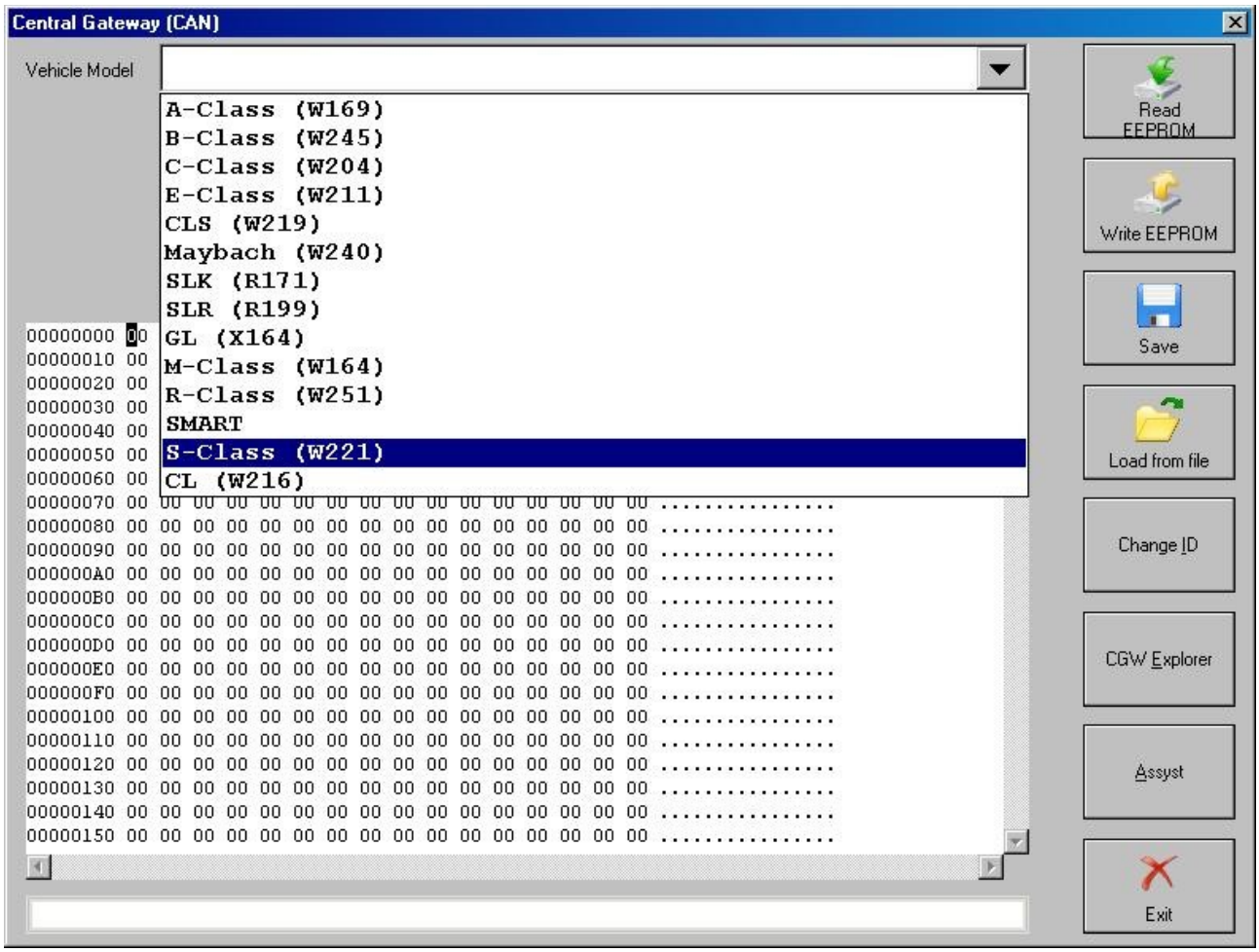
1. Press the "Get Current" button. The currently stored information in the ASSYST PLUS should be displayed.
2. Set the information, which you want to be stored in the ASSYST PLUS device in the "Main Odometer (Km)", **"Operatin**g time (days)" and "Number of Oil changes" fields.
3. Press the "Set Data" button. If the number of oil changes that you have specified is more than 0, the following screen will appear:



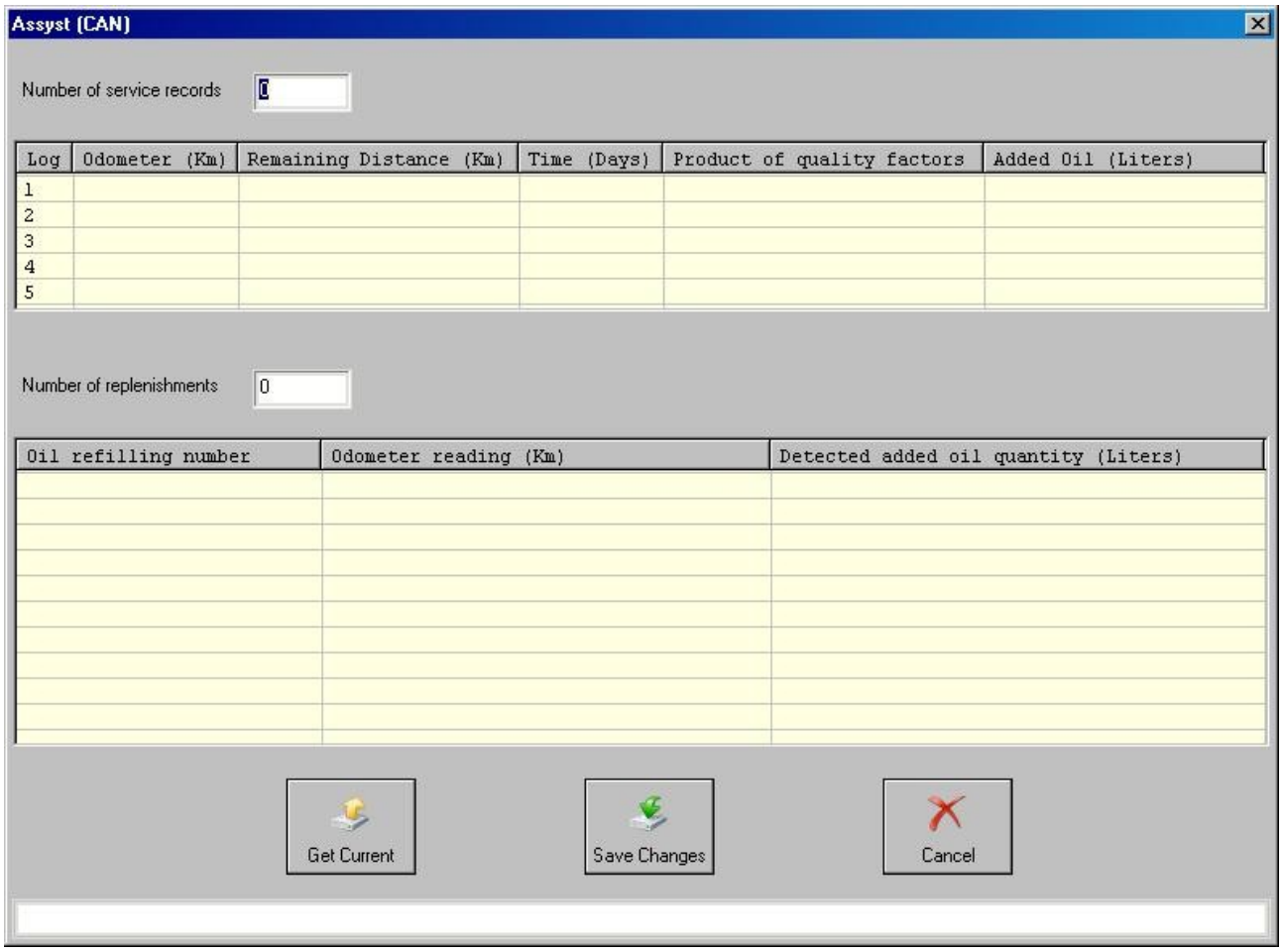
4. Set the data for all individiual service maintenance items and press "Continue".
5. If everything is OK, you should see a text message "Operation finished successfully".

5.13 Central Gateway Configuration read/ update

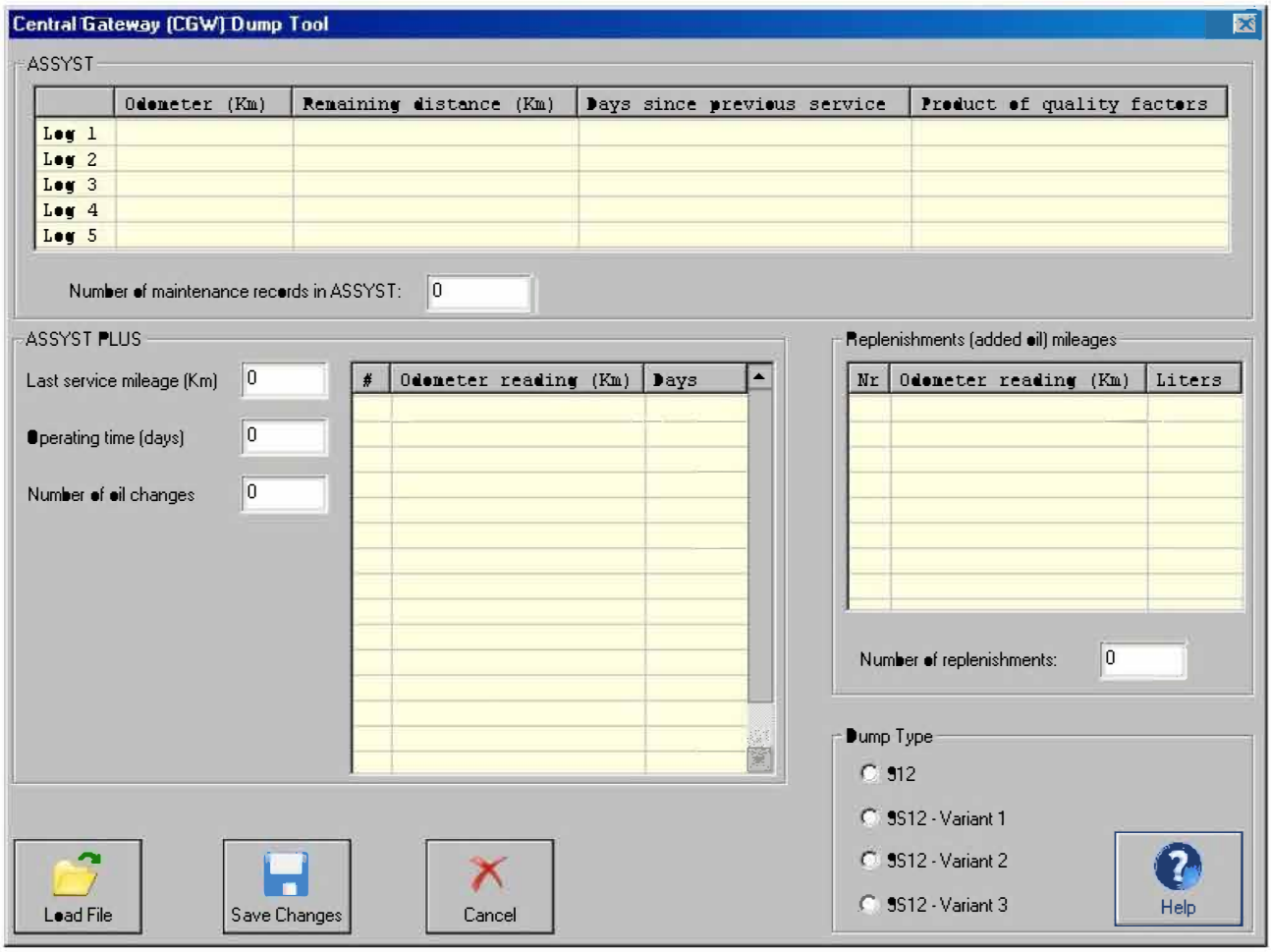
CGW is the primary gateway between CAN C and CAN B. CGW contains service maintenance programs. With the help of this special function it is possible to read/write the Configuration of the Central gateway (CGW) control unit COMPLETELY.



From this screen you can view/modify the service history records that are stored inside the ASSYST. There are up to 5 records in the ASSYST. The ASSYST device also keeps history of up to 16 times when oil has been added. All these records hold the main odometer at which the event happened. With the help of this special application it is possible to modify this history.



It is also possible to view/modify all service history related information, which is stored in the Configuration of Central Gateway. You can access this screen, by pressing the "CGW Explorer" button. From this screen you can change the history in both ASSYST and ASSYST PLUS devices.
Important: You can always verify the results from the changes you have made, by opening a standard diagnostic session with both ASSYST and ASSYST PLUS from the main screen and observing their "Actual Values".


Central Gateway (CGW) Dump Tool
ASSYST
Odometer (Km)
Remaining distance (Km)
Days since previous service
Product of quality factors
Log 1
Log 2
Log 3
Log 4
Log 5
Number of maintenance records in ASSYST:
0
ASSYST PLUS
Last service mileage (Km)
0
Operating time (days)
0
Number of oil changes
0
#
Odometer reading (Km)
Days
Replenishments (added oil) mileages
Nr
Odometer reading (Km)
Liters
Number of replenishments:
0
Dump Type
S12
S12 - Variant 1
S12 - Variant 2
S12 - Variant 3
Load File
Save Changes
Cancel
Help

5.14 Electronic transmission Control (722.9) and Intelligent Servo Module (ISM) control units

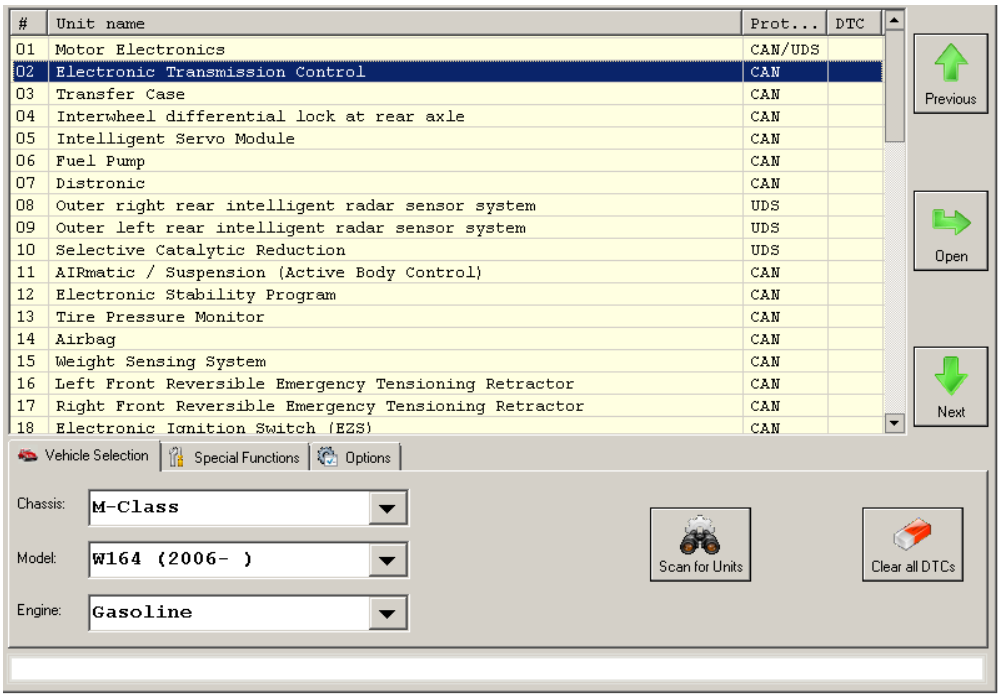
With the help of this special function it is possible to renew 722.9 and ISM control units when they have already been adapted to a car.

Important: When you receive update from your supplier you should also receive a link to download the latest version of the renew database files!

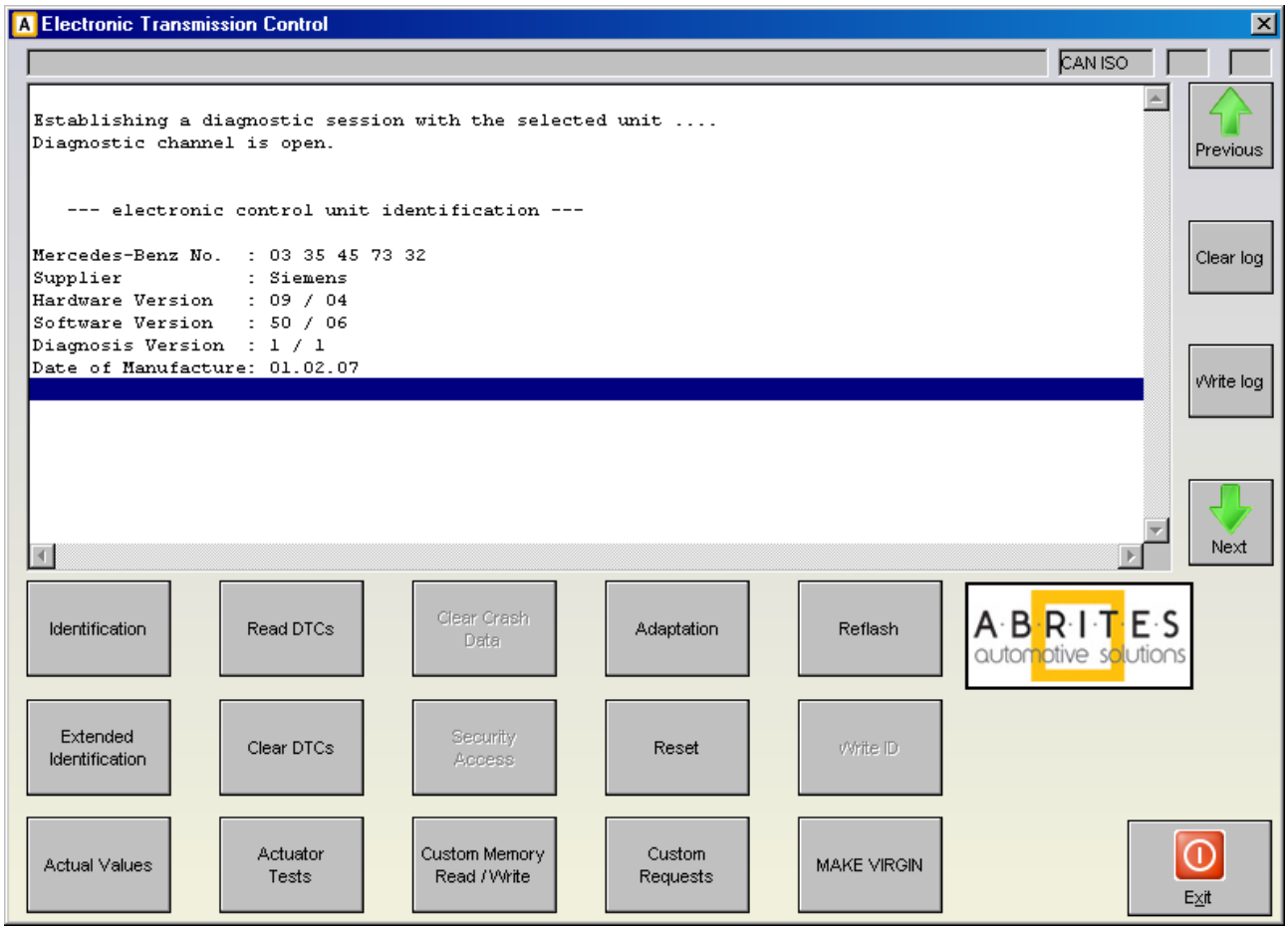
5.14.1. Renew of Electronic Transmission Control Units (722.9)

The 7-Gear control units (722.9) may be renewed either in or out of a car. In order to renew a specific 7-Gear control unit out of the car it is necessary only to connect the CAN pins of the 7-Gear unit, as well as the GND and +12V pins. The wiring of the 7-Gear units is the following:
Pin1: CAN-H
Pin2: CAN-L
Pin4: +12V
Pin5: GND

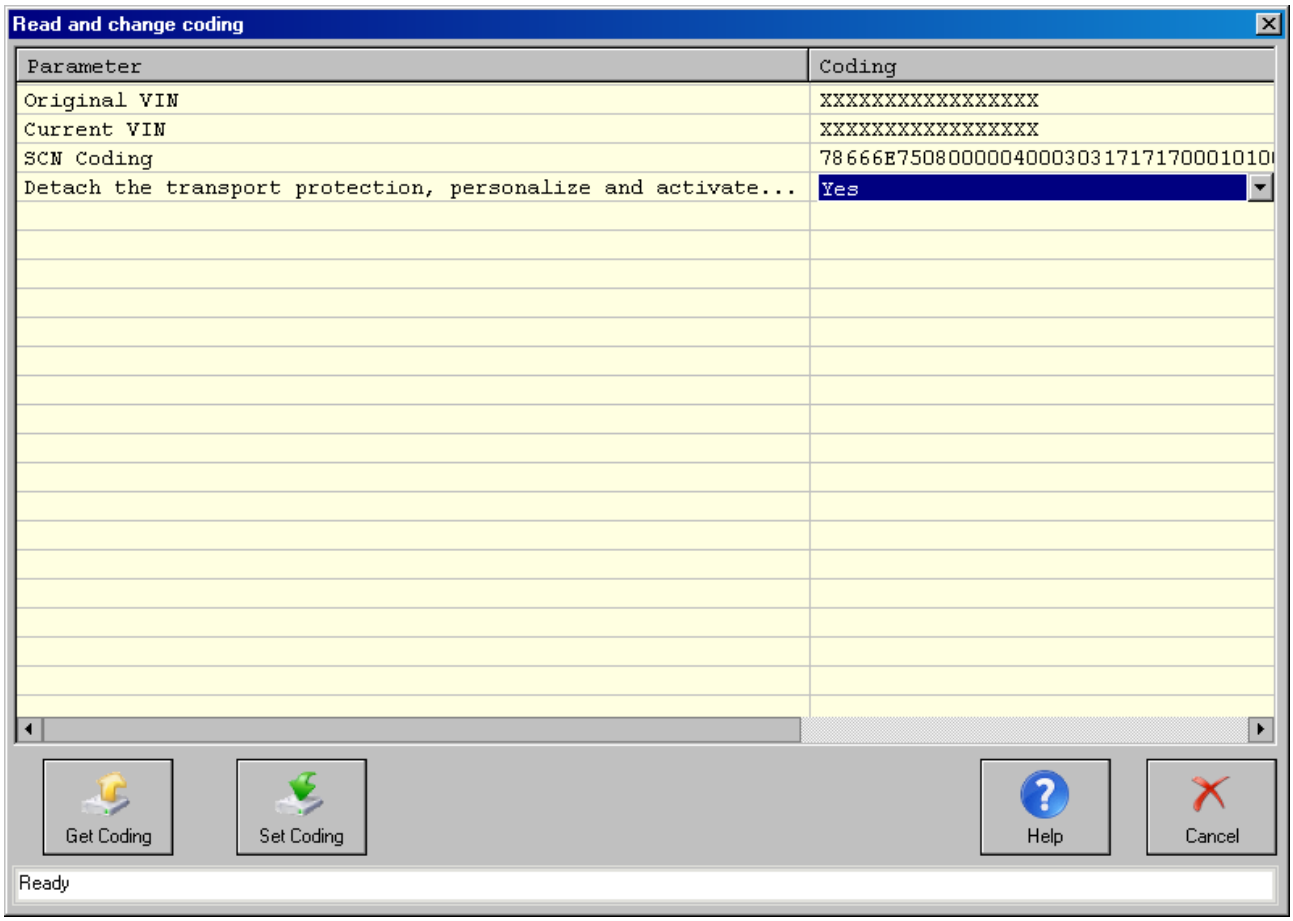
1.1. Select vehicle and connect to the Electronic Transmission Control unit.



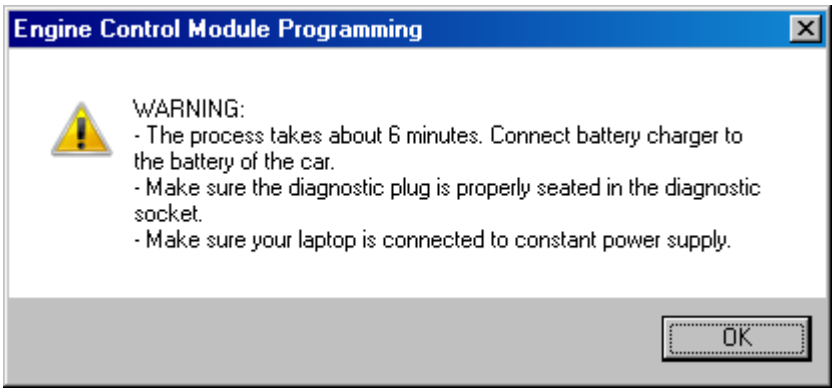
1.2 The Mercedes Diagnostics will show the identification of the control unit.



1.3. Pressing the button “Adaptation” will show the available adaptations including the SCN coding string. You may save the SCN coding string from a damaged control unit and then you can save this saved SCN coding in the donor 722.9 control unit:

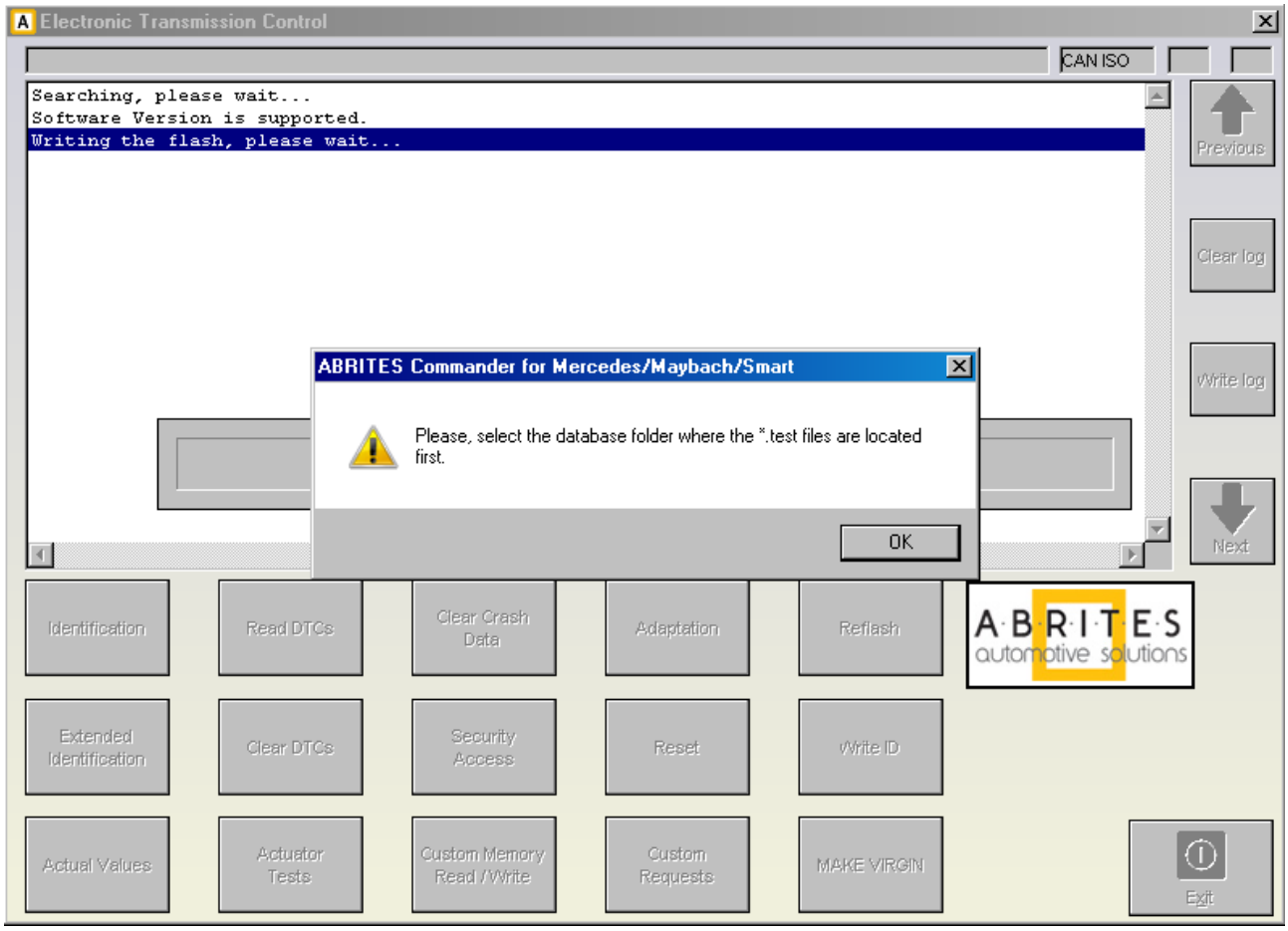


1.4. Pressing the button “Make Virgin” will show you the following screen



Follow these recommendations:
– Connect a battery charger to the battery of the car.
– Plug the diagnostic connector and make sure it is correctly seated in the diagnostic socket.
– If you are using a laptop – connect it to constant power supply. It is also recommended to stop any screen savers, anti virus and other programs, which may affect the performance of the system.

1.5. The first time that you use this function, the software will ask you for the location of the database files for 7-Gear renew. Please, browse to the folder where you have extracted these files and select it.



1.6. A progress bar will appear showing you the time and the completed percentage. Please, wait until the procedure is complete.

1.7. When the procedure is complete you may check the “Actual Values” and verify that the Electronic Transmission Control unit reports that it is renewed.

1.8. Now, you should put the 722.9 unit in the car in which you wish to adapt it and once again connect to it and press the button “Adaptations”. Press the button “Get Coding”. Then for the option “Detach the transport protection, personalize and activate the control unit” select “Yes” and press the button “Set Coding”. Go back

and check the actual values. If everything is OK the 7G unit should report that now it is personalized and you should be able to see the hashes of the keys.

1 9. If you have the old control unit available you may read the SCN coding and then write this SCN coding in the do not control unit.

5.14.2. Renew of Intelligent Servo Modules (ISM)

The ISM control units can be renewed inside the car using internal CAN connection or Outside connected to on a bench. The procedure is the same as described above, except for the following:

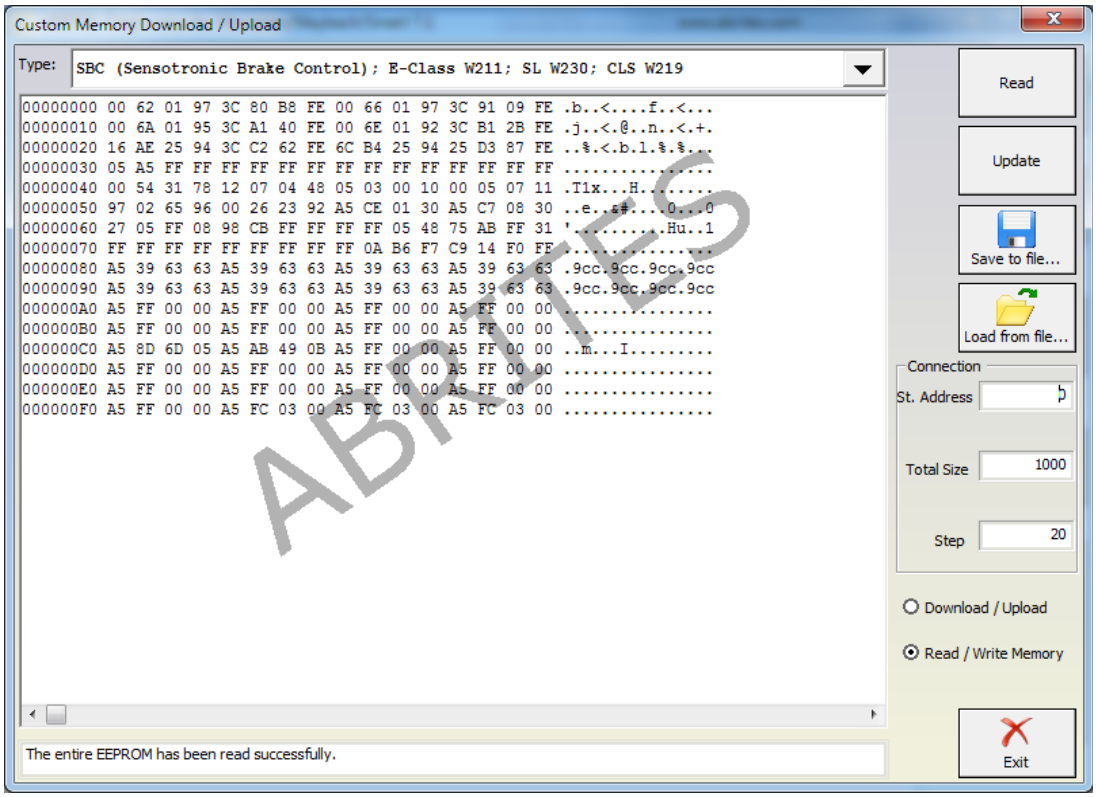
2.1 When the renew procedure is complete, the MB Diagnostics will ask you to unplug the AVDI cable from the OBD diagnostic port of the car and to lock the car for 2 minutes.

Please, follow the instructions carefully. The car should go to sleep – do not touch anything after you lock the car.

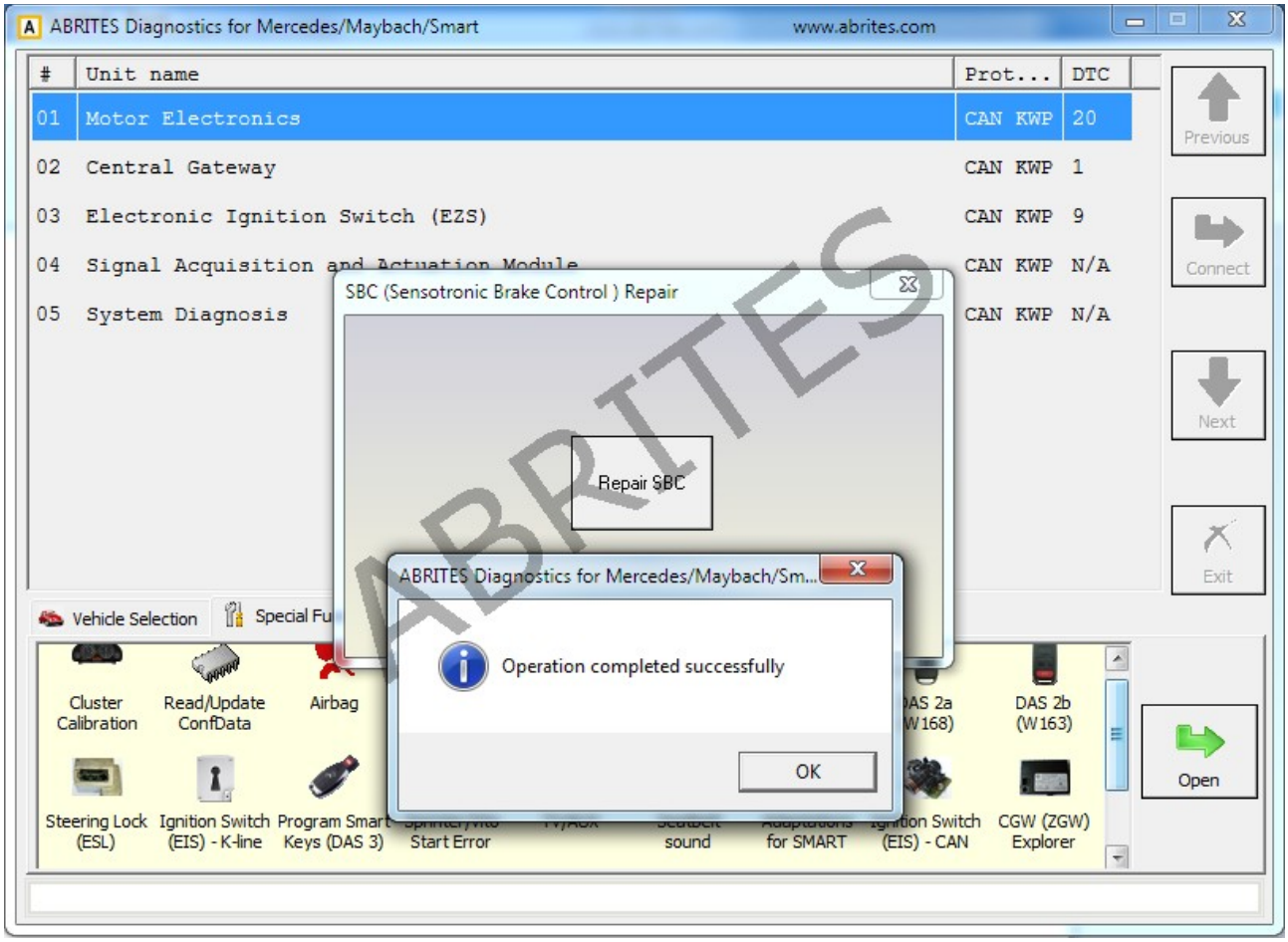
2.2 After the 2 minutes have passed you can unlock the car and then you can adapt the ISM unit.

5.15 SBC repair

The SBC repair special function is very useful when repairing the problematic Sensotronic Brake Control system. It is also included in the custom memory download and upload. There it gives you the ability to read the Configuration of this unit, save it to a file, load it and update it to the unit. It also

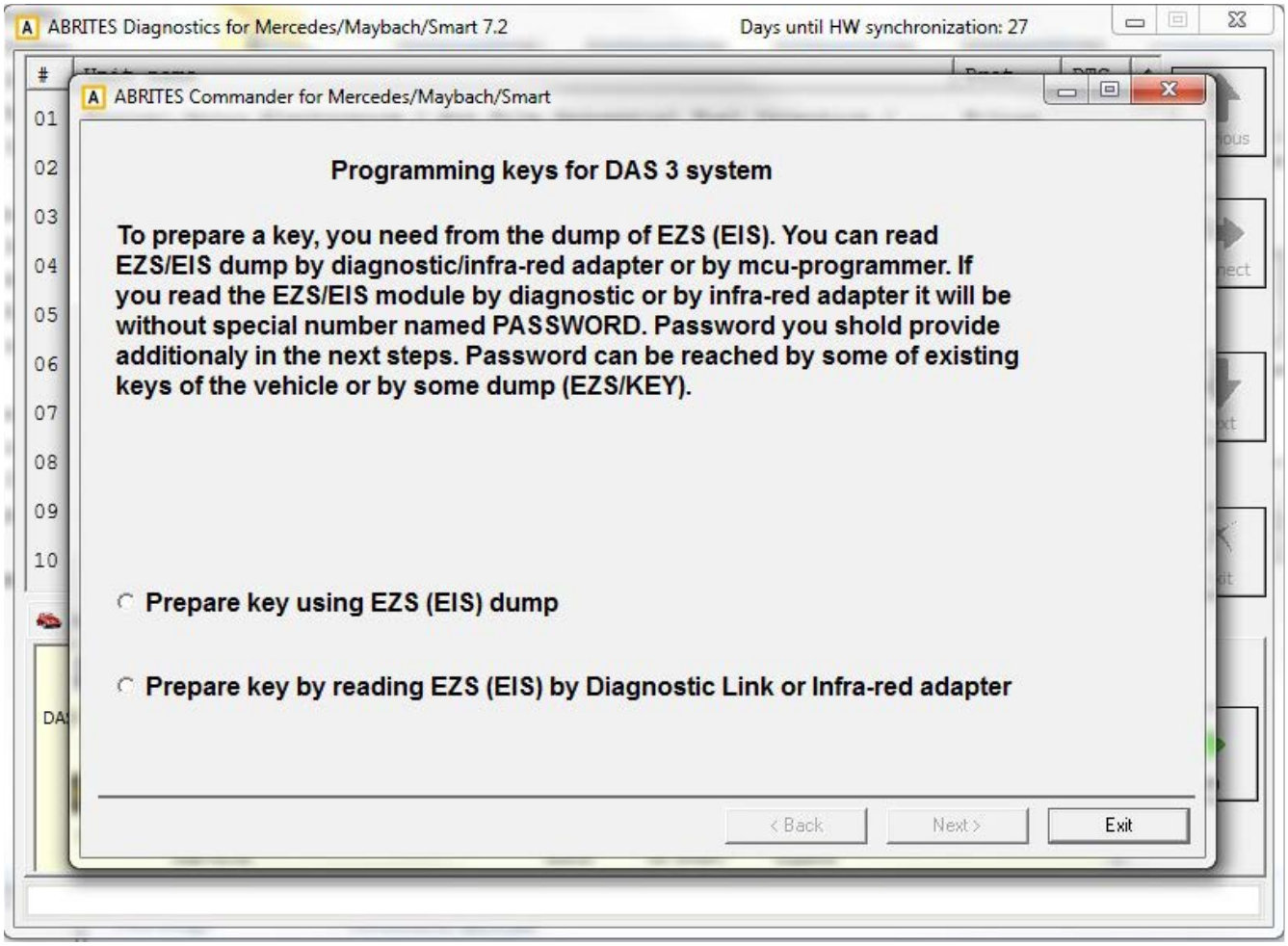


The special function for SBC repair has the ability to repair the SBC unit's software directly by OBD:



5.16 DAS 3 Smart key learning

Using this special function you can perform key learning for vehicles using the DAS 3 system.
When selecting the DAS 3 special function you will see the following screen:



The first screen provides a description on the possibilities of key learning that you have. The first item you will need is the EZS (EIS) dump. You can obtain this dump using one of three manners:

- You can read the dump using an EEPROM programmer.
- The dump can be read by OBD (using the Abrites diagnostics for Mercedes/ Maybach/ Smart.

The dump is read without the password.

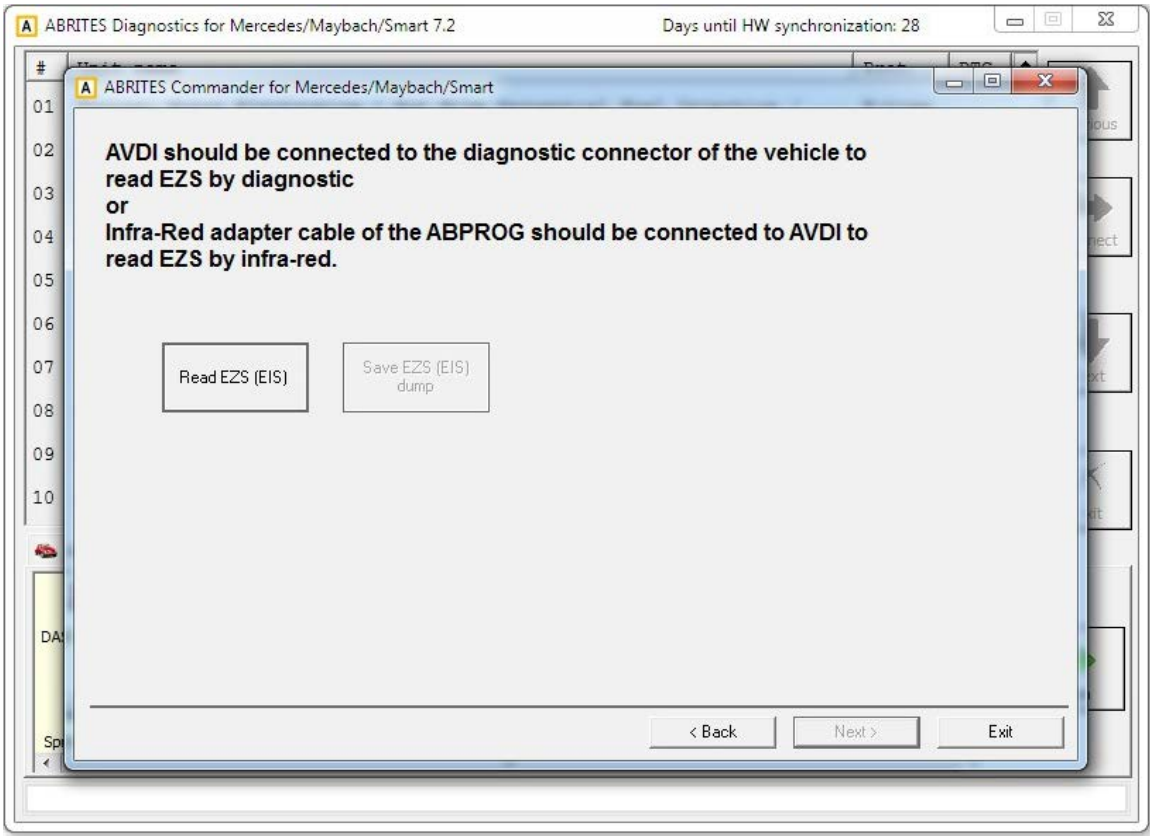
- It can also be obtained using the Abrites Infra-Red (IR) adapter.

The dump is read without the password.

If at this point you have read the EZS (EIS) dump you can select the corresponding option.

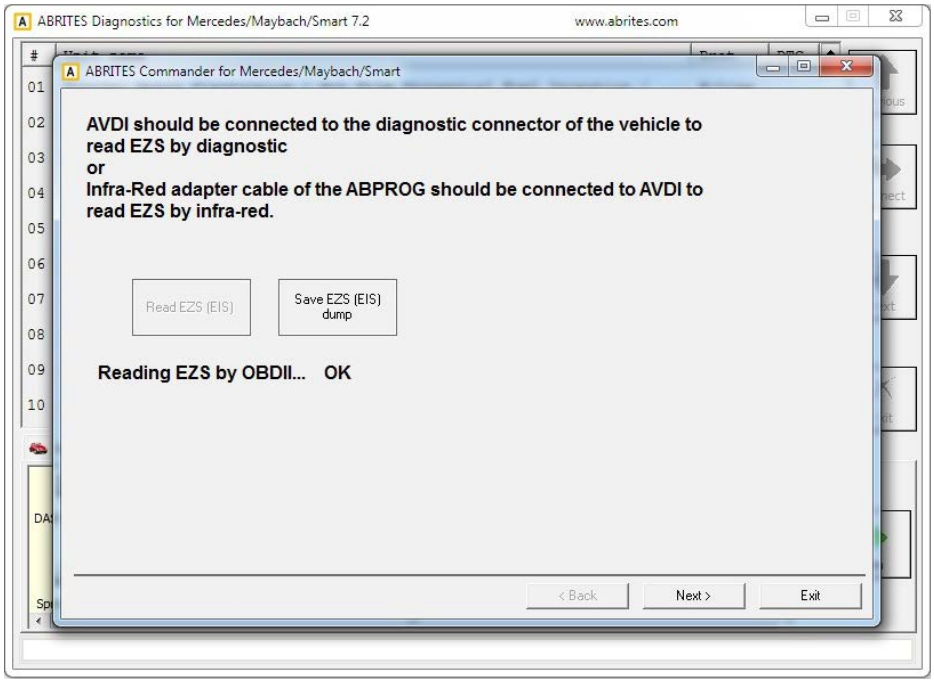
A window will open to prompt you to select the dump that has previously been saved on your computer and load it in order to continue.

If you have not yet read the dump you can proceed with reading it either by diagnostics or using the IR adapter.

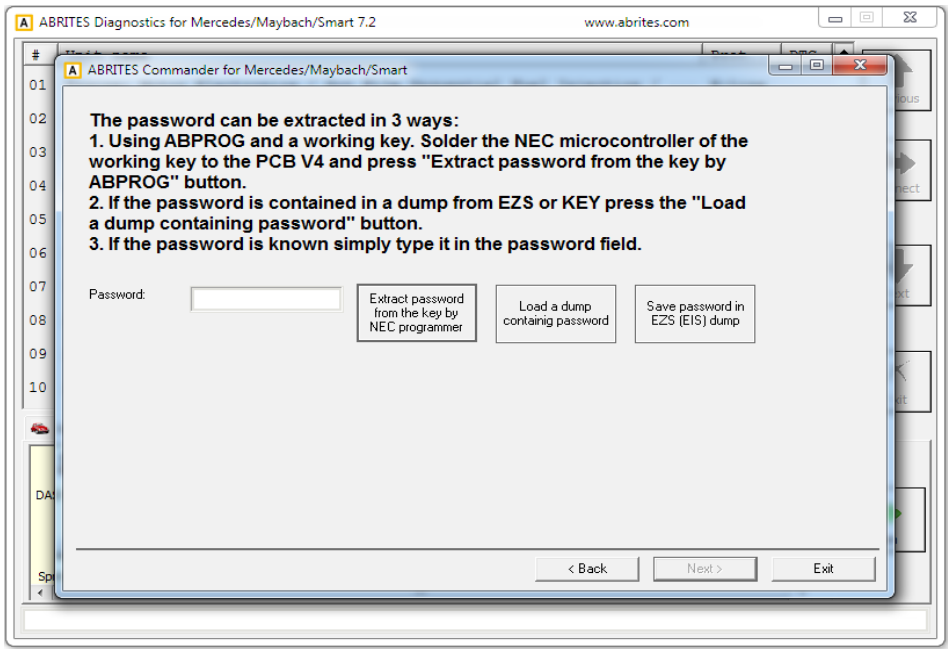


At this point the software will explain what needs to be done in order to read the EZS (EIS) dump either by OBD or by the IR adapter.

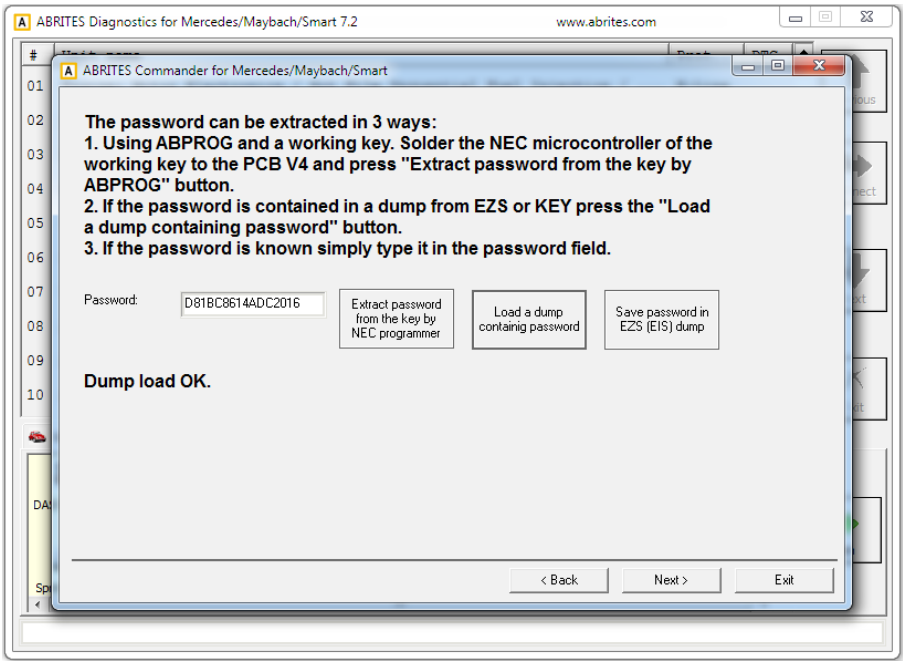
When you have selected one of the two methods and completed the requirements the “read EZS (EIS)“button needs to be pressed and the reading begins:



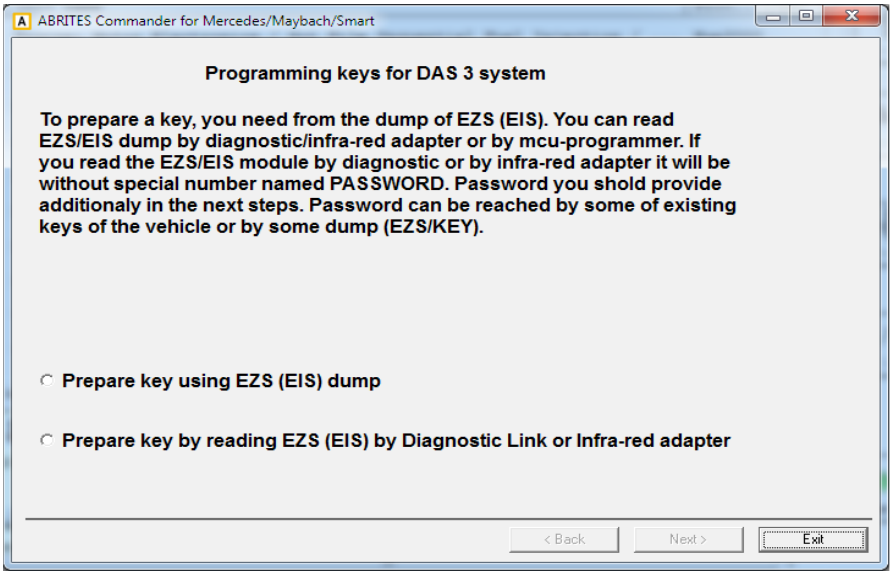
The EZS (EIS) Configuration data reading completes with success and you can now save the dump using the “Save EZS (EIS)” button. Once you have the EZS (EIS) dump you can proceed to the next step. This is where the password for key learning needs to be extracted. This is done in the following manners:



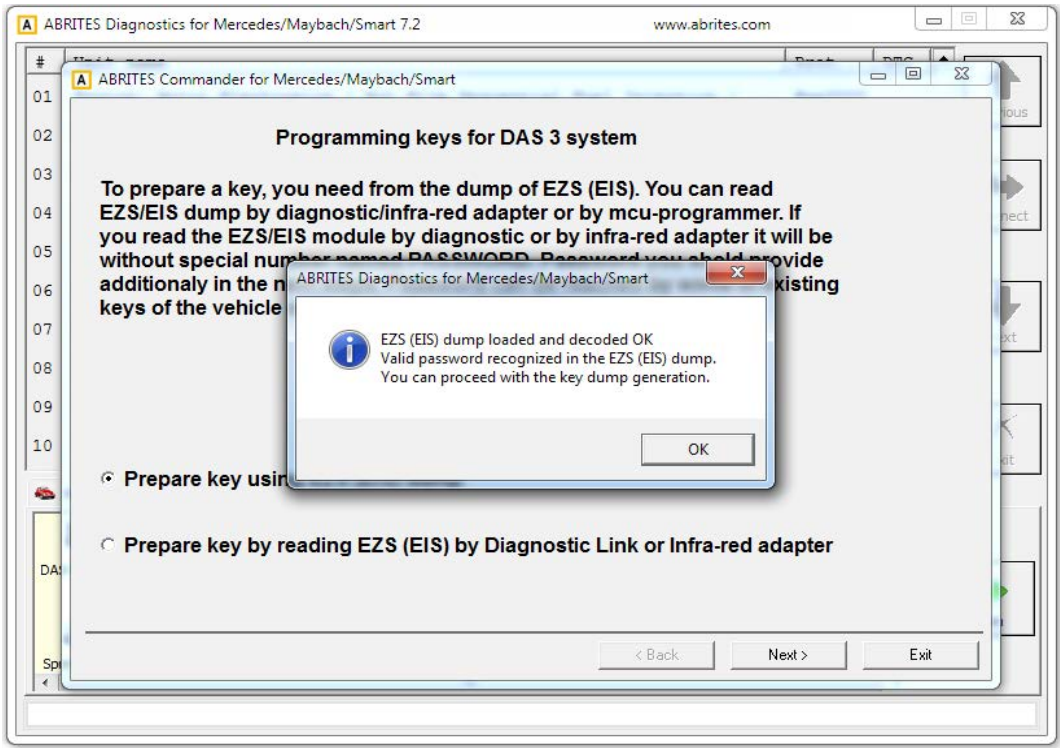
1. You can use Abprog programmer and solder the NEC MCU of a working to it in order to read the password from it. (explained in details in the message on the screen)
2. If you have a dump which contains the password in itself.
3. If you know the password you can type it in the password field.



If the EZS (EIS) dump has been read by a programmer – please select the option and load the dump:



The Abrites diagnostics for Mercedes/ Maybach/ Smart confirms the conditions needed and shows you that you can proceed:

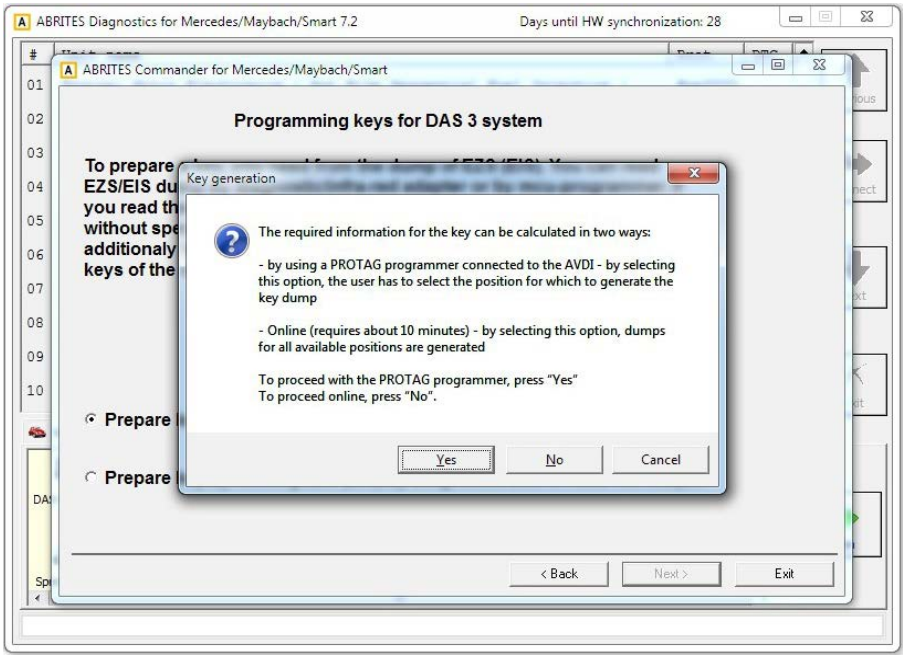


At this point you can press “OK”.

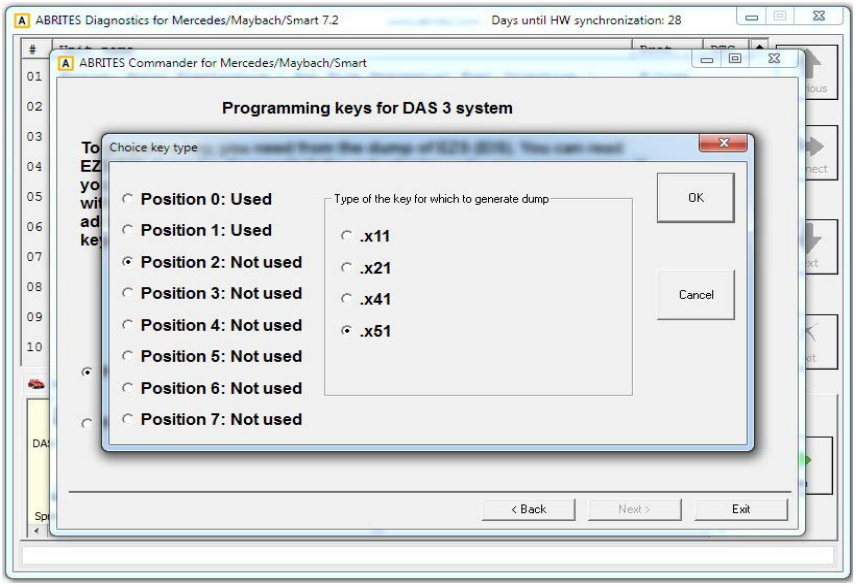
Either way you obtain the EZS (EIS) dump and password the software will inform you that there are two ways in which the required information can be obtained.

The first method is by using the PROTAG programmer, connected to your AVDI – by doing that you will need to manually select the position where the new key dump needs to be generated.

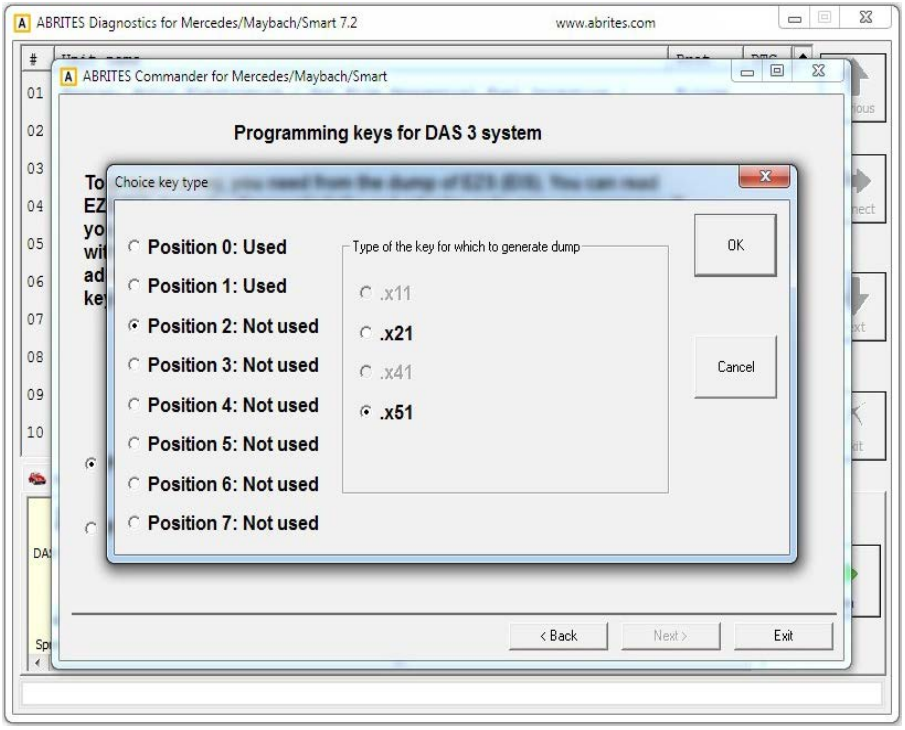
Alternatively you can opt to perform the calculation online. This process takes about 10 minutes to complete. It will generate dumps for ALL key positions.



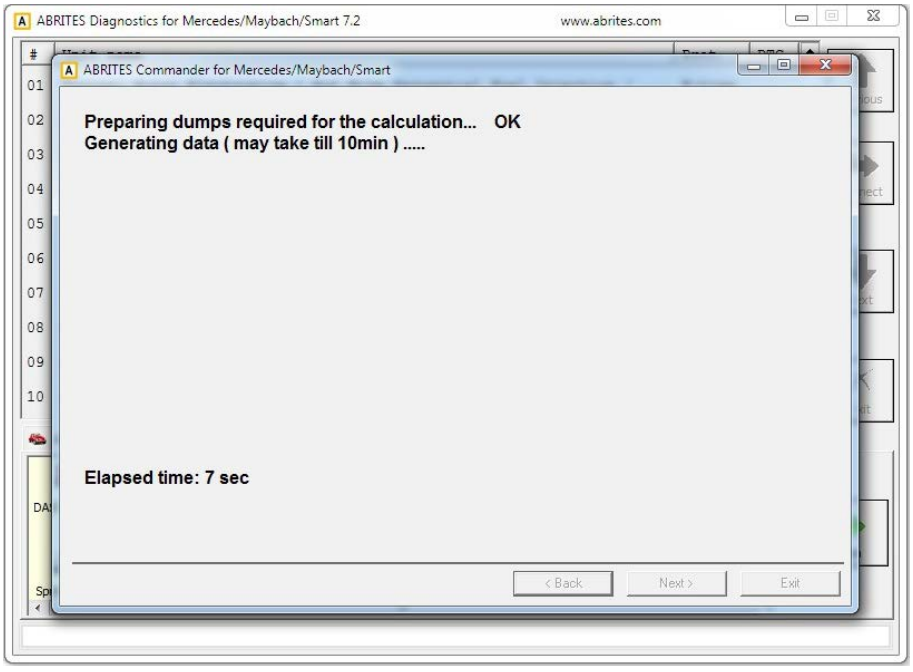
If you choose to perform the generation of the dump using a PROTAG programmer you will have the option to choose a position:



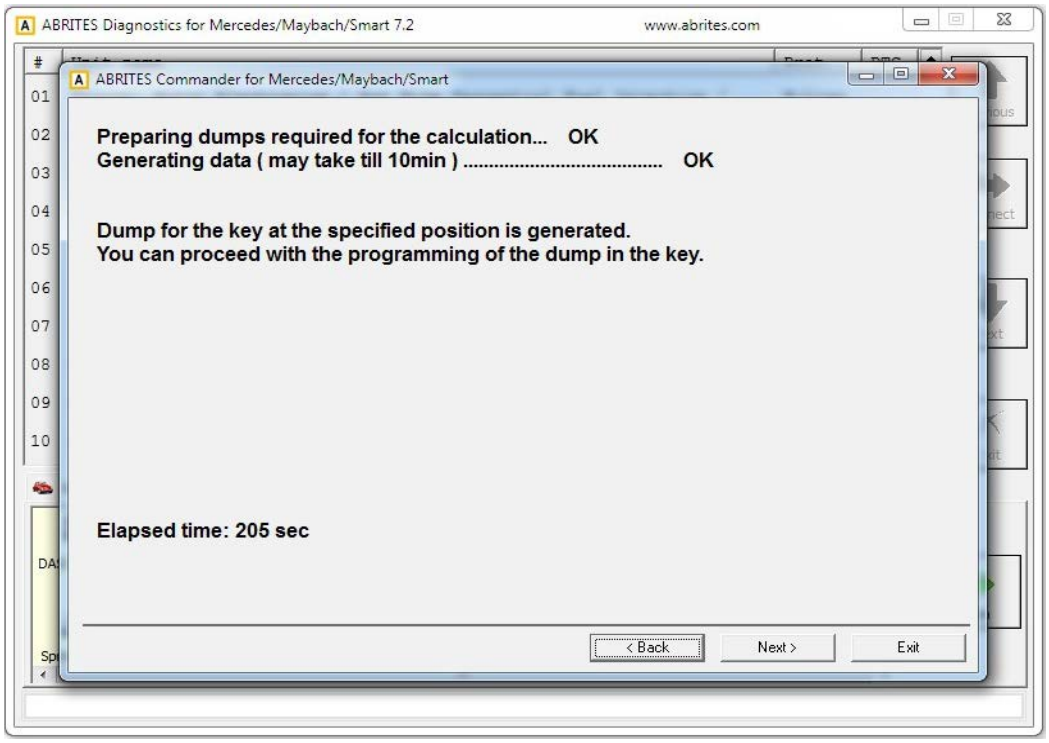
If the online method is selected the choice is made by the software:



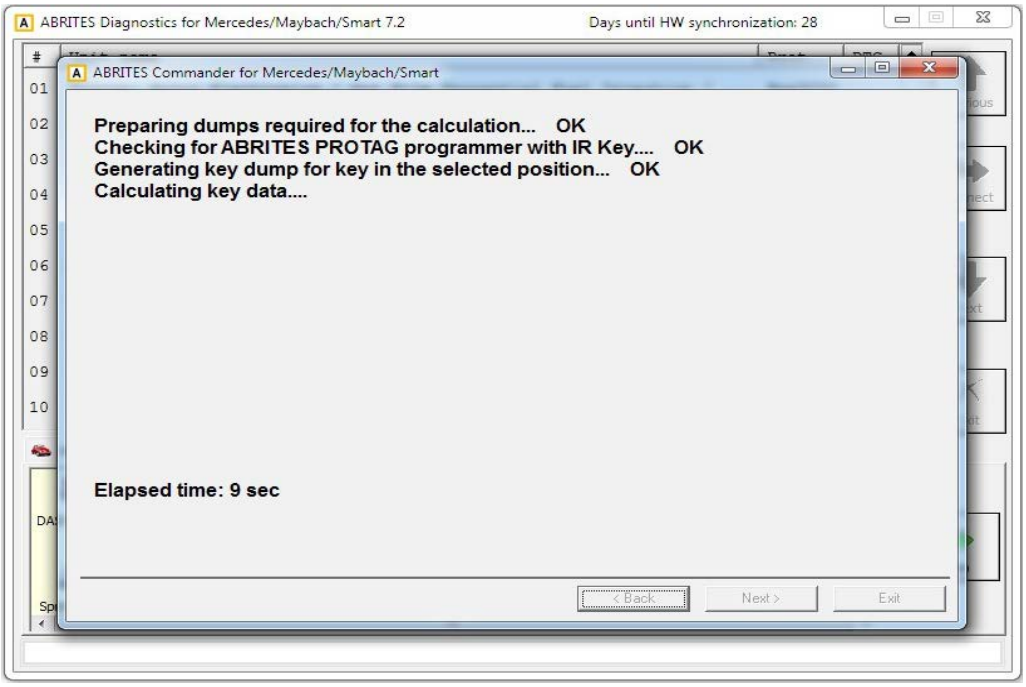
At this point the online calculation begins:



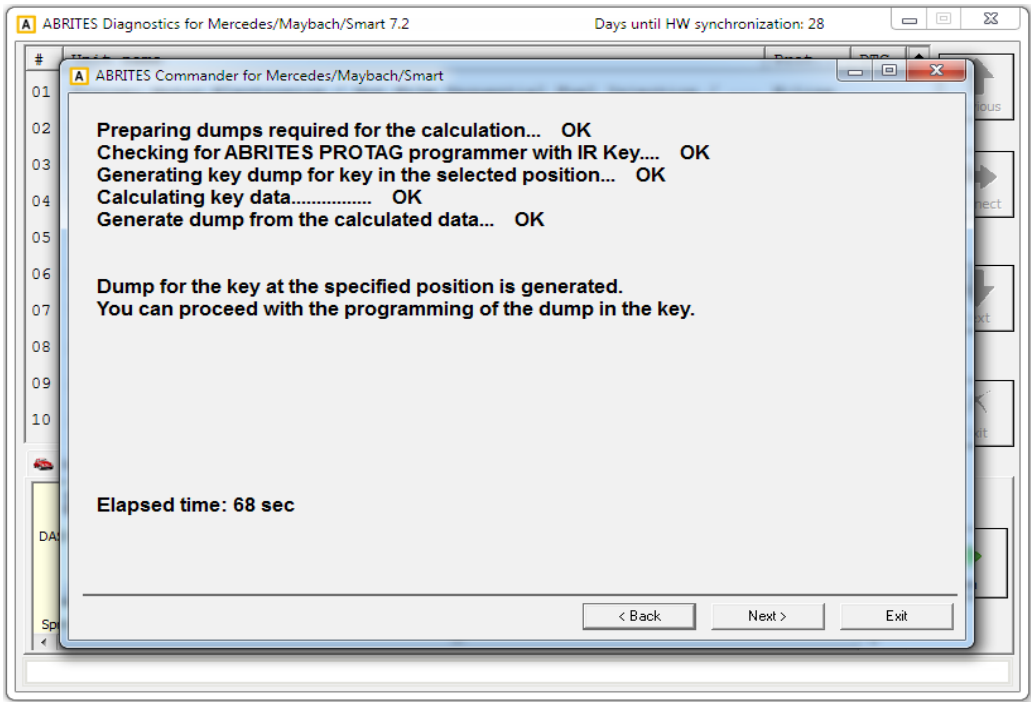
The procedure completes successfully and the following screen appears:



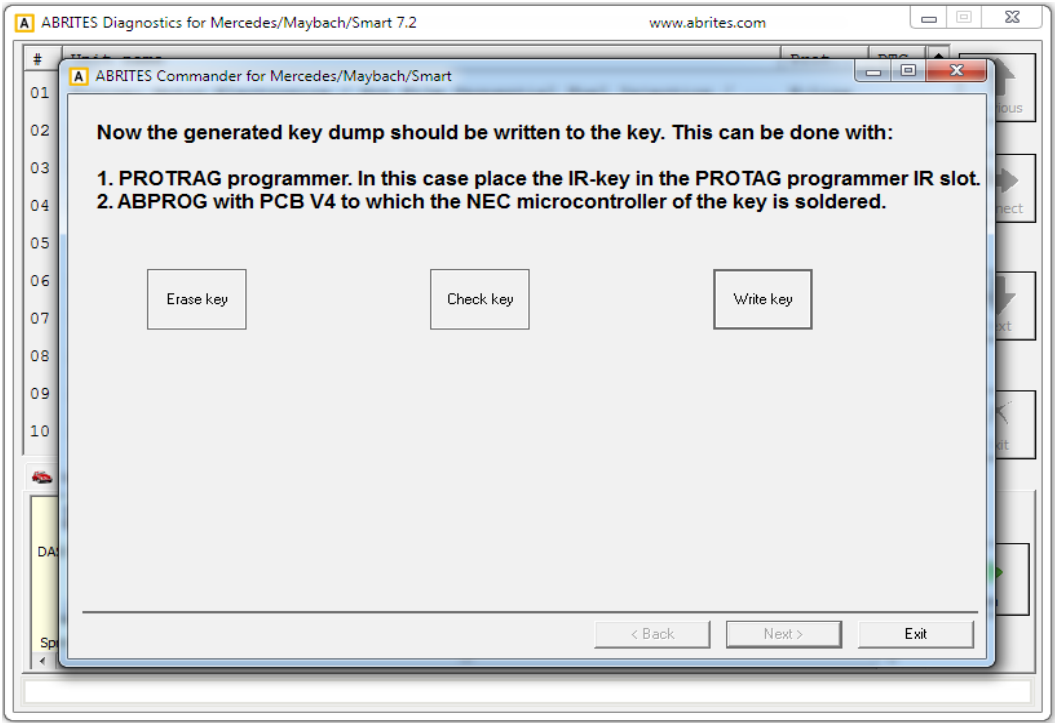
If the PROTAG programmer method is selected the generation of the dump will start:



In usually about 70 seconds the new dump is generated:



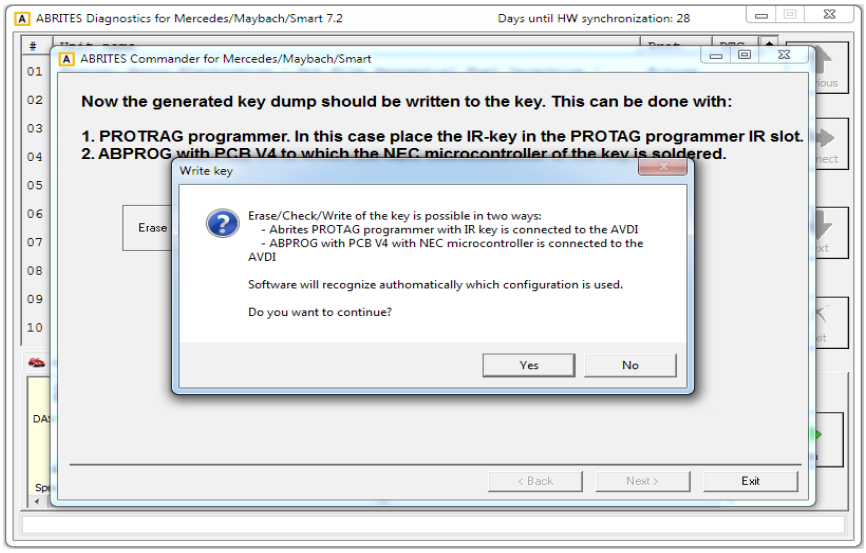
Once the generated dump is prepared it needs to be written to the key. There are 2 ways this can be performed.



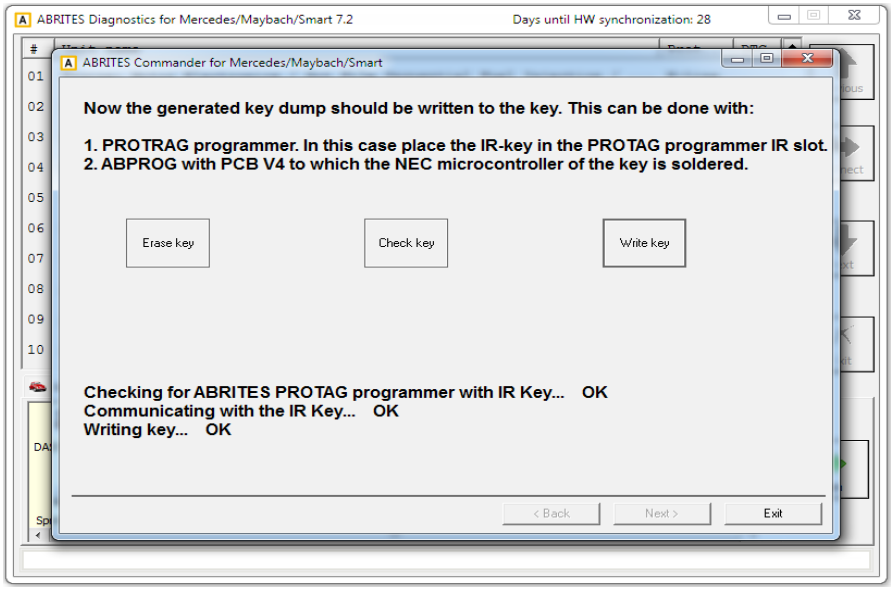
1. Using the PROTAG programmer's IR port. An IR key needs to be placed in the IR key slot of the programmer.

2. Using ABPROG V4 (ZN033) to which you have soldered he NEC MCU of the key.

The software will recognize the procedure you have selected automatically and will continue with the writing after your confirmation.



Once you confirm the writing will be performed:



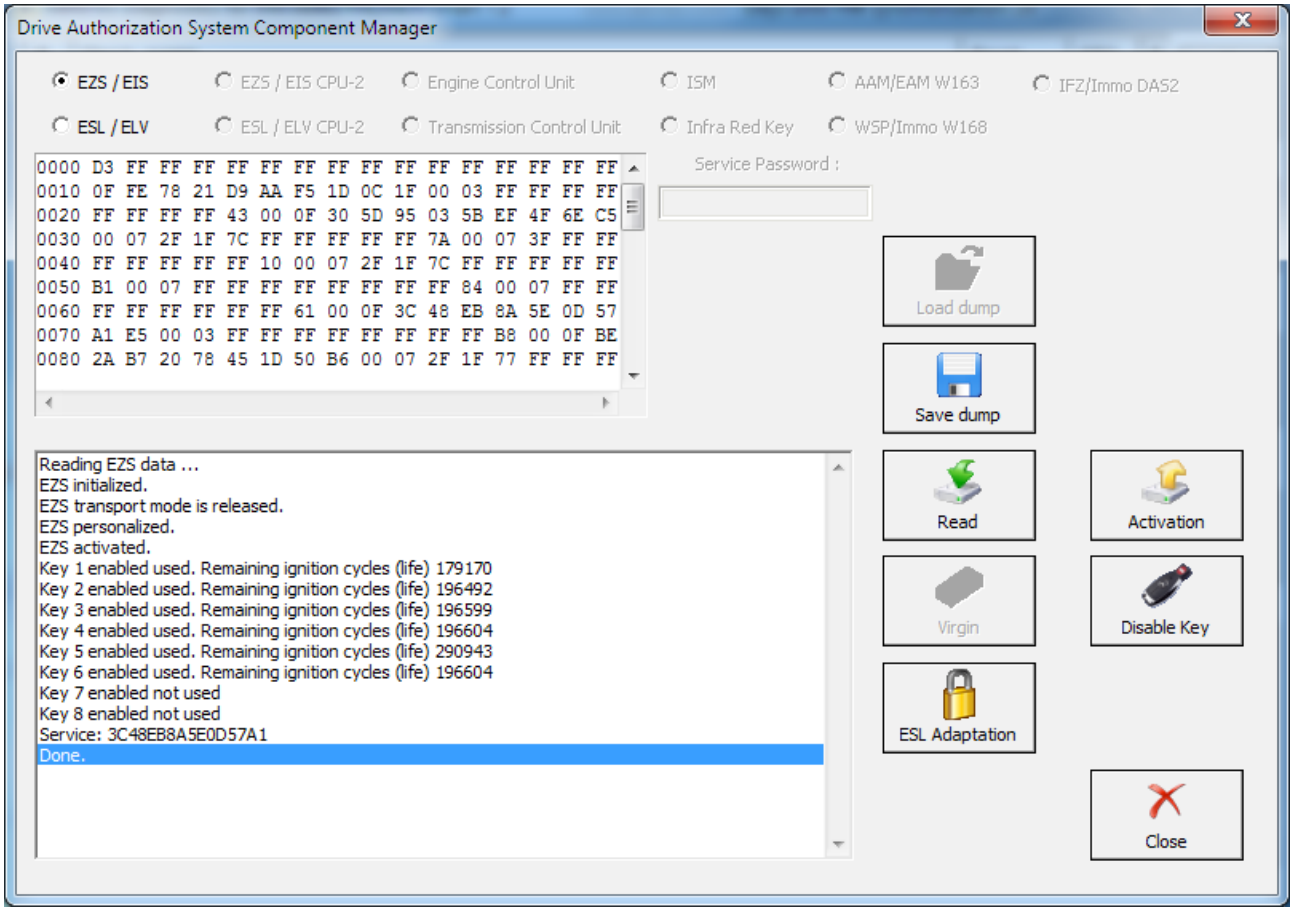
N.B. Key dumps are generated in C:\Users\user name\Documents\ABRITES software for ID XXXXXX where "XXXXXX" is your AVDI ID\Mercedes.

5.17 DAS Manager

The DAS manager special function is designed to combine the special functions previously used when working with EZS/ EIS and ESL/ ELV both by CAN and K-line protocols

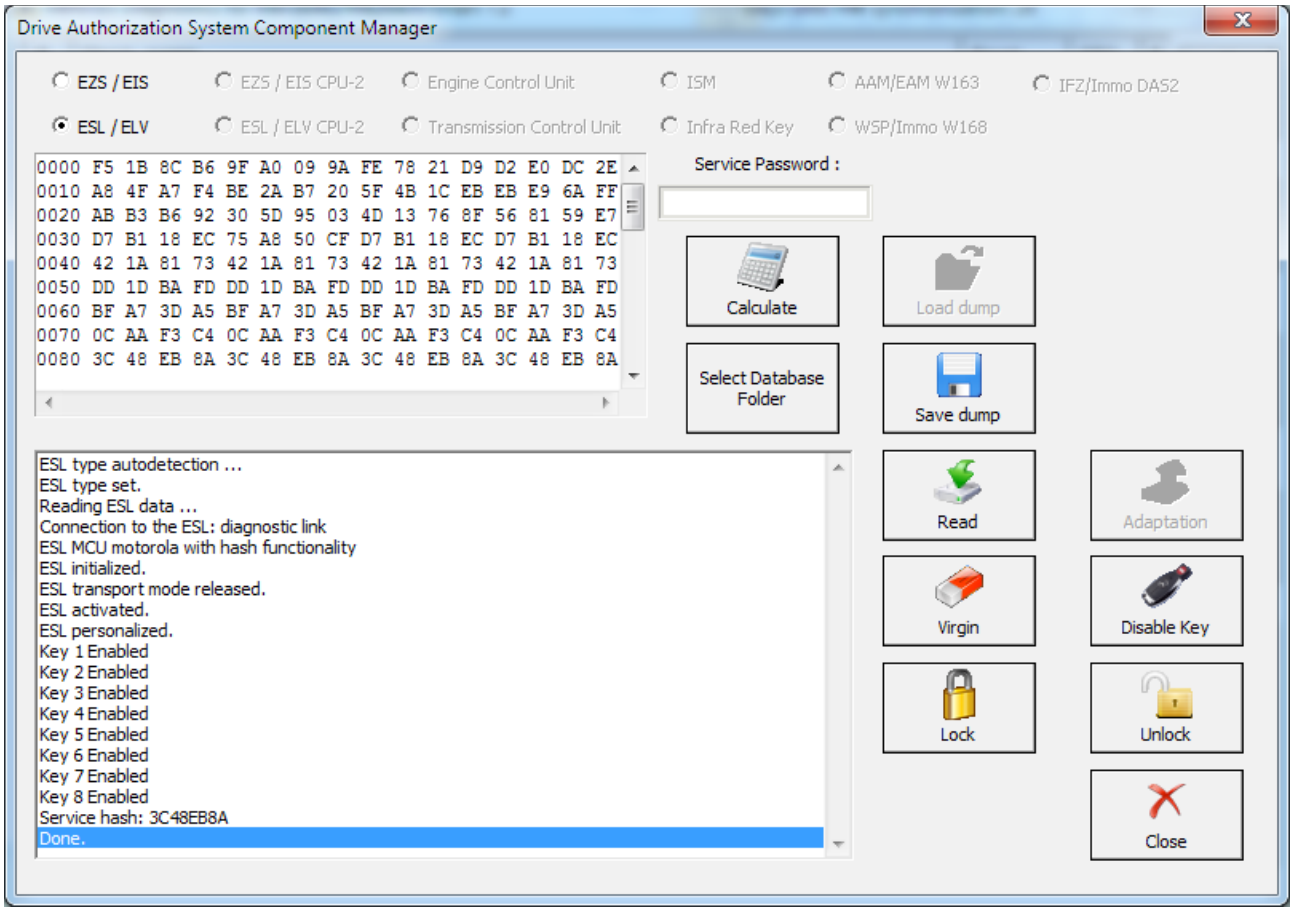
Using these functions you can perform reading, activation, key enabling, adaptations, virginizations and others with the Drive Authorization System (DAS) related electronic modules.

Once the EZS (EIS) is read the software will open the following window where the actions available for the module are shown:



The required component of the system needs to be selected.

In the window below the ESL/ ELV Configuration data options are shown:



Using the options from the list you can perform all needed adaptations to the ESL/ELV.

With this option you can also reset, unlock the electronic steering lock, make it virgin, extract the service password and many other functions.

5.17.1 EZS (EIS) Password Extraction by IR Connector, DAS manager, Abrites cable set.

The DAS manager can also be used to extract the EZS (EIS) password. You can do this by using the ZN036 IR adaptor.

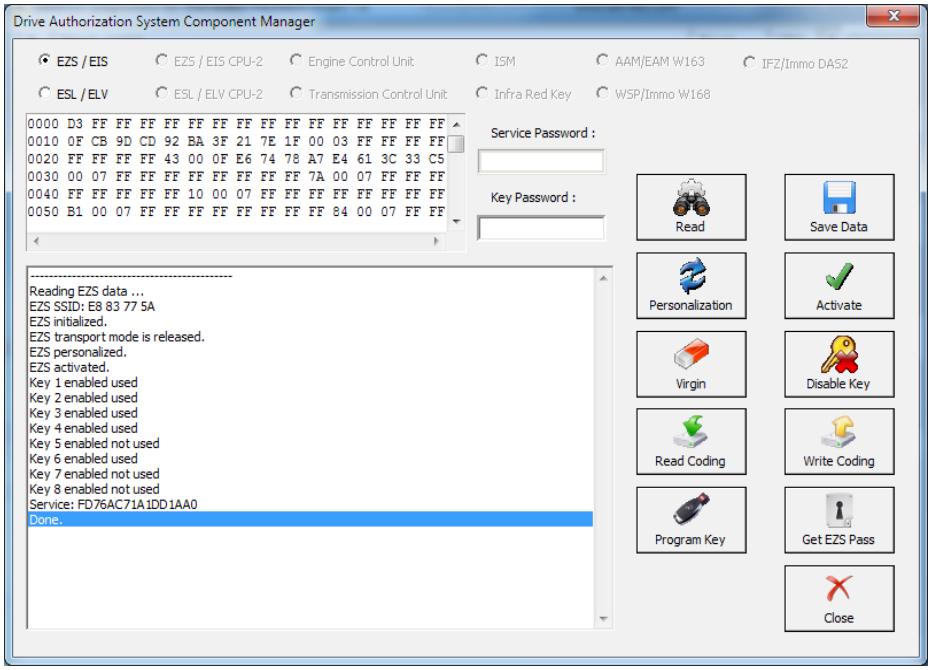
Using the ZN036 adaptor you need to connect to the ZN030 (ABPROG) to the AVDI as per the picture.

Depending on the situation you can use different methods of password extraction. If you have a working key you can use your working key with your PROTAG programmer in order to easily extract the password. When you use this method you need to put the key in the EZS and in the PROTAG in a sequence. The software will give you the needed instructions.

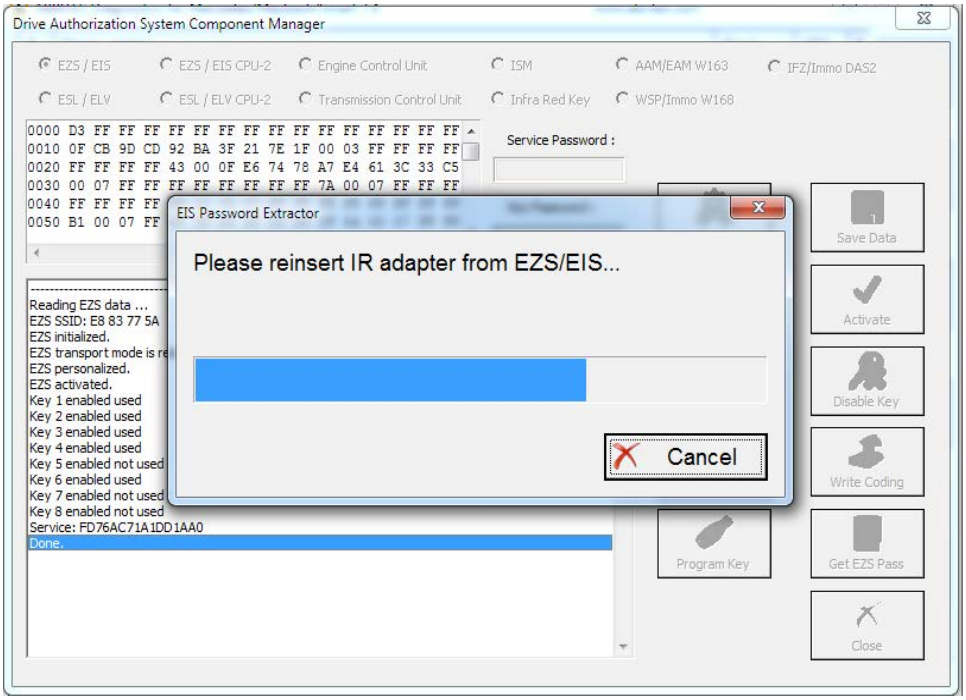
In the cases where you need to work on a car where all keys are lost the best way to do this is to follow the table in the appendix of the manual (DAS Manager Table 1*) in order to better understand how to go about with the different models of Mercedes – Benz vehicles.

Abrites has developed a system of cables to work together with the DAS Manager software to help you with your work with the vehicles. As easy as we have tried to make the system work it requires your attention and patience.

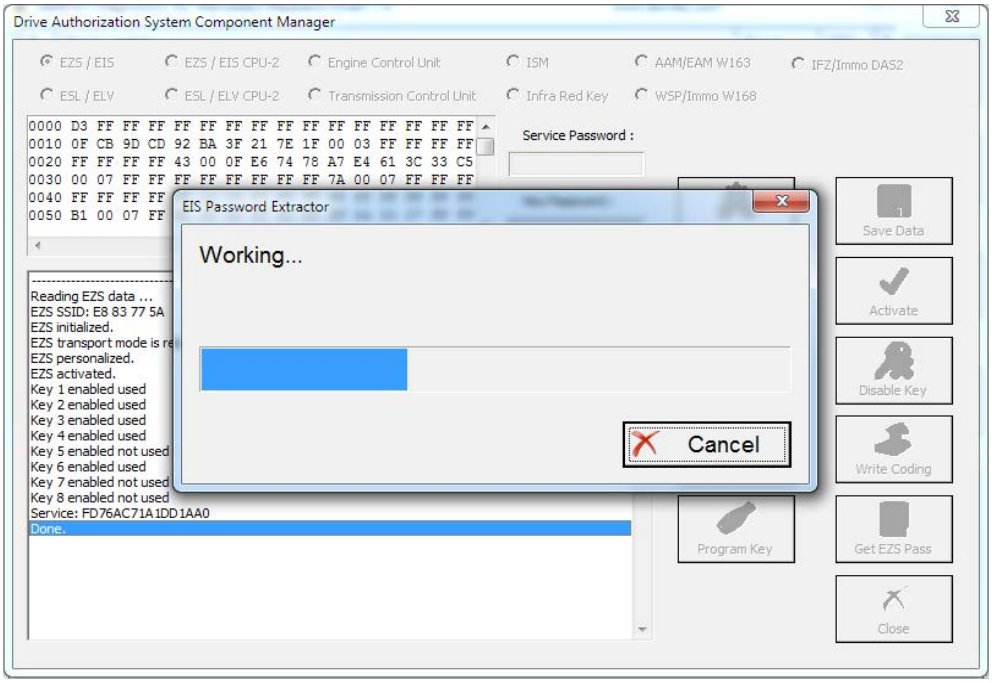
Go to the DAS manager special function and read the EZS:



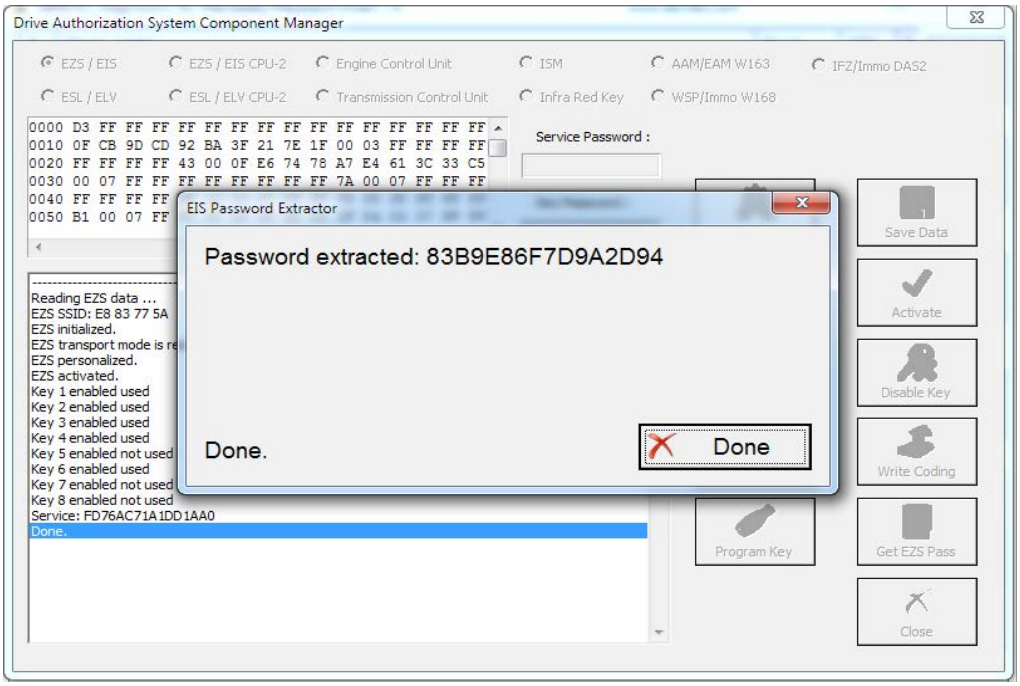
After reading the EZS you can go ahead and take the IR key out of the slot, then reinsert it and press “GET EZS Pass”.



Then the procedure for reading the password will start working:



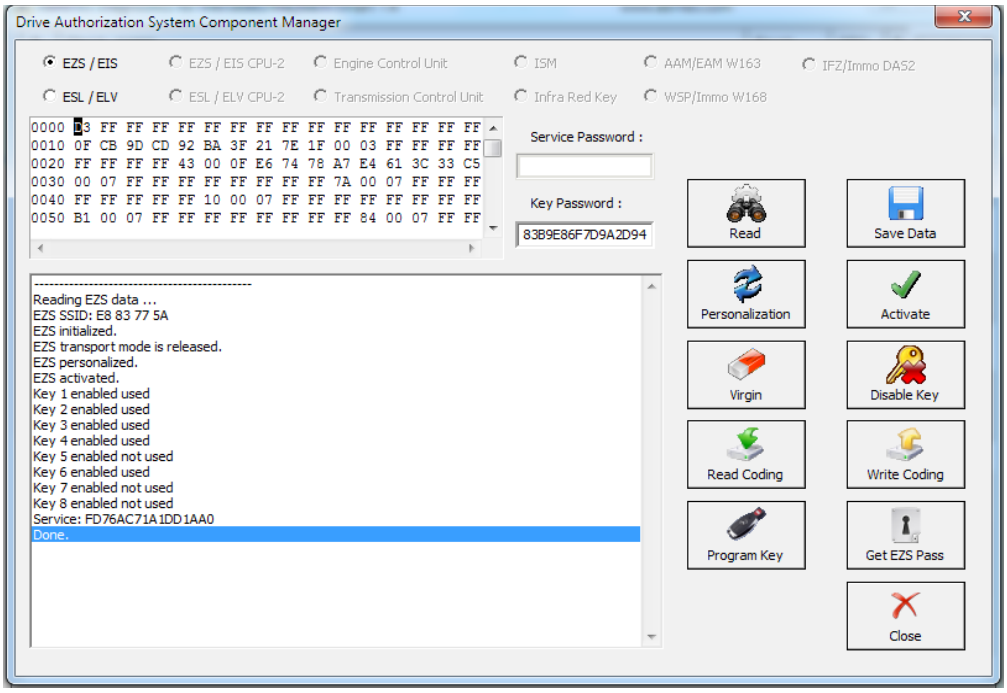
Please wait for the reading to finish:



NOTE:
When doing all key lost situations we suggest that you forbid your PC to sleep as this will slow down the password extraction, have constant power to both it and the car you are working on. When ALL keys are lost the software will ask you to connect to the LIN of the EZS (connect it to PIN7 of the OBD). This is done because it speeds up the calculation. Please note that the easiest way is to disconnect the ESL's connector and connect the LIN to it on one end and the other to PIN7 of the OBD. Note that there is a Pinout for the DB25 connector on the AVDI in the common user manual.

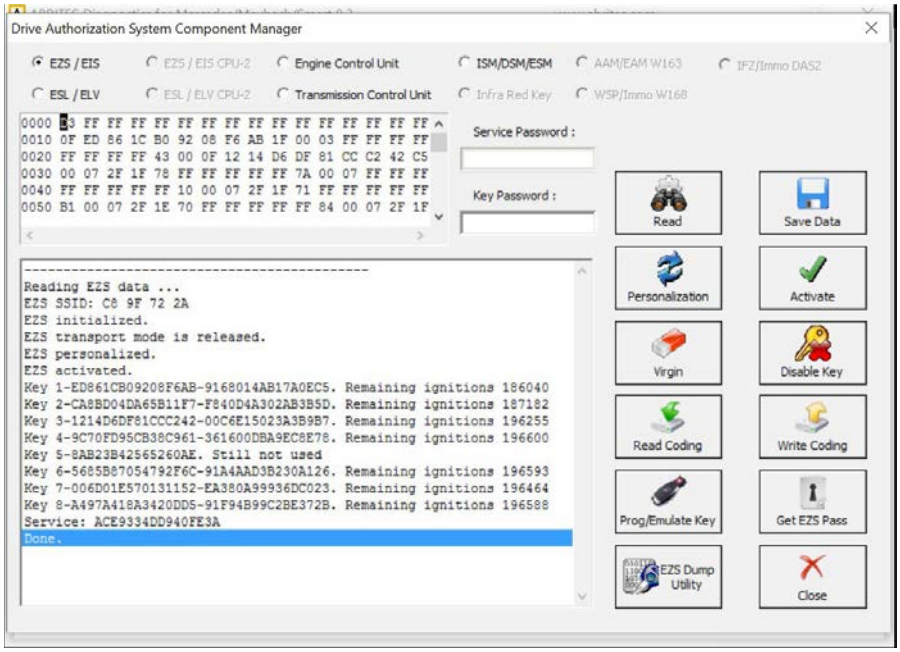
Attention: When reading password for W639, you may need to connect the K-Line 1 of the Distribution box to CAN HI 3 of the EZS.

The password is now extracted and is already filled in the "Key password" field.

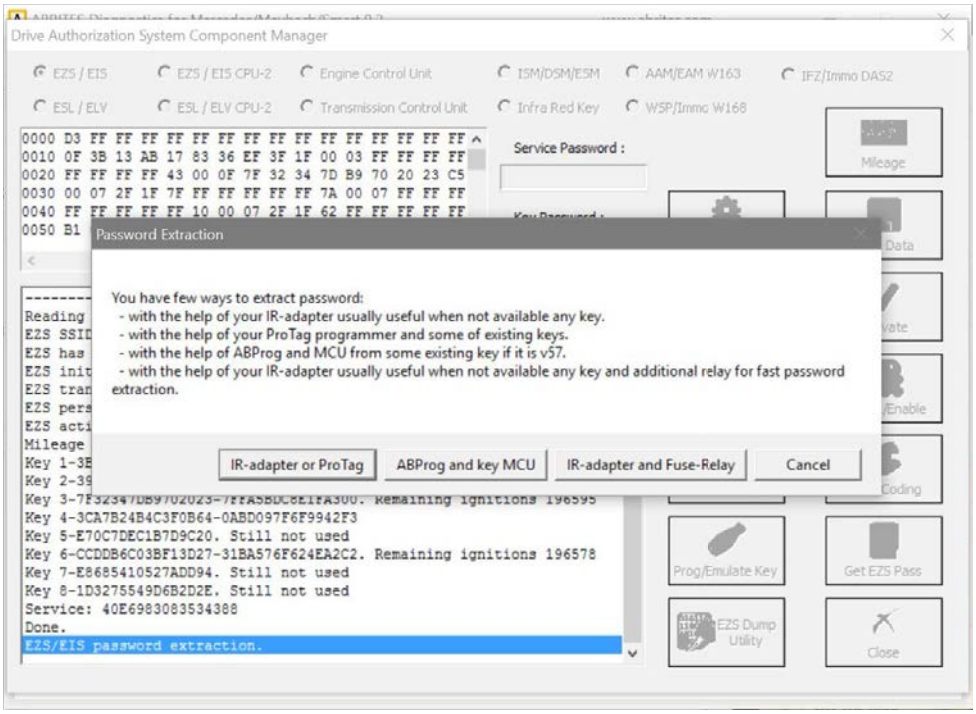


The procedure can also be performed with the ZN036 attached to the AVDI via the ZN030 and your Protag programmer attached to your computer. Please note that you will need to have internet connection to the laptop computer. You can read the password from the existing key (BGA type as well).

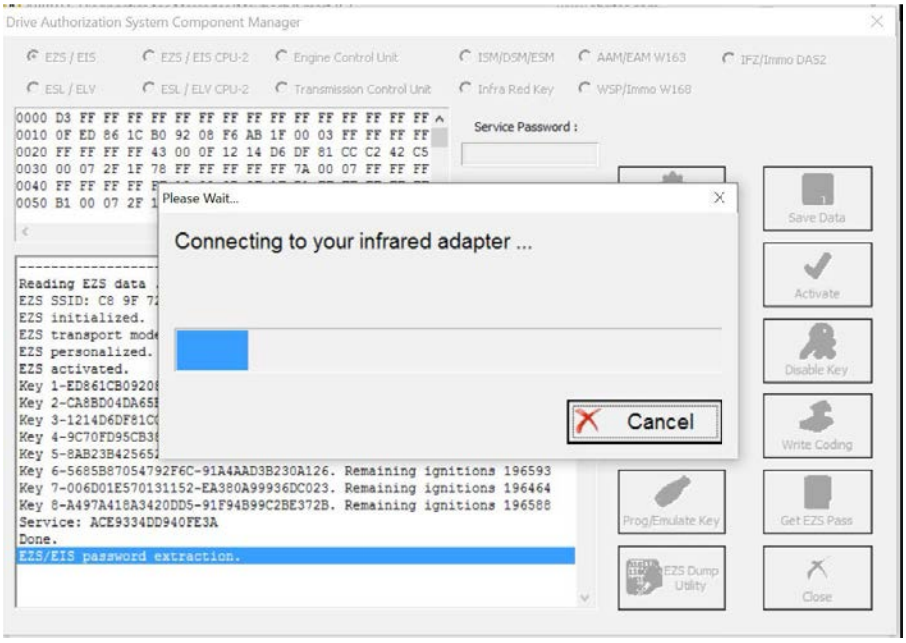
- The first step is to read the EZS (EIS)



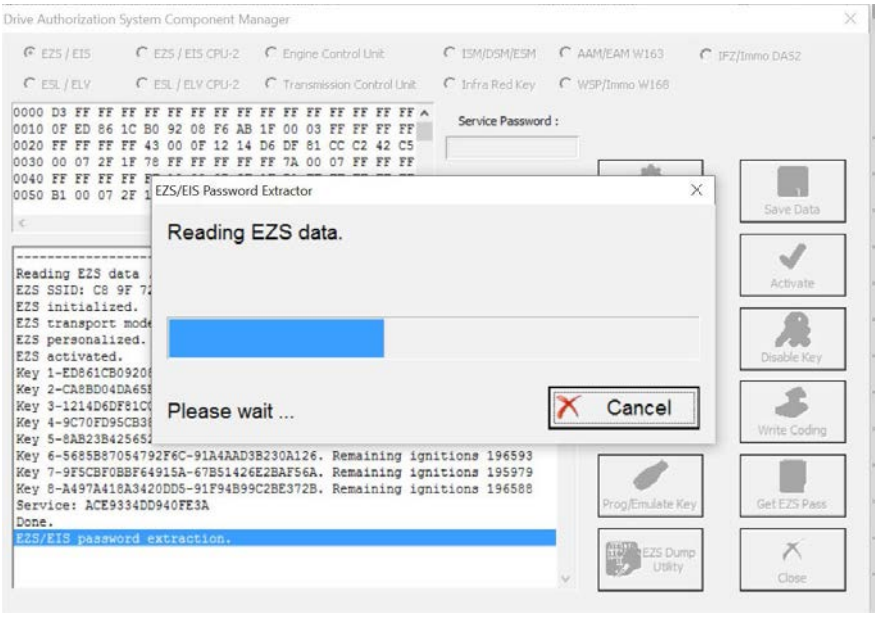
- In step two you can select a method of password extraction:



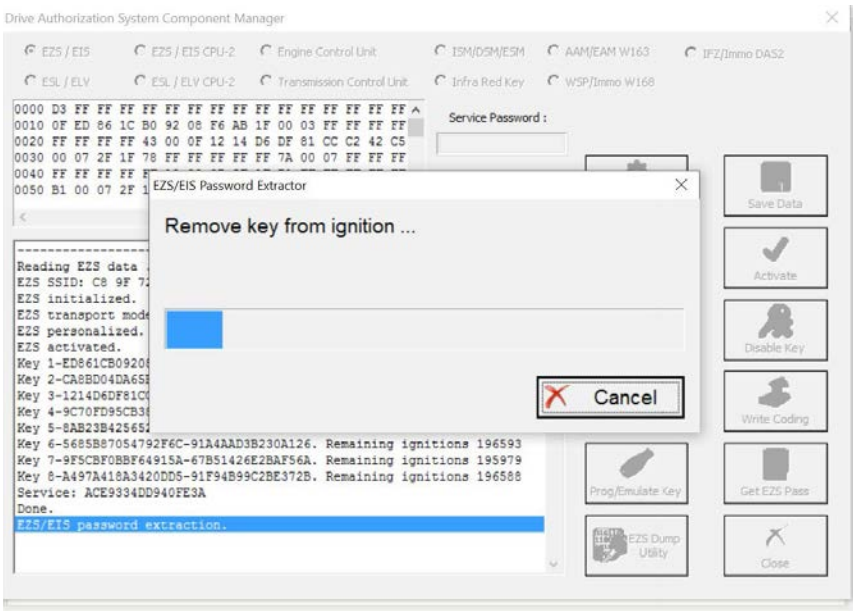
When you select the IR adapter or Protag option the software will connect to them:



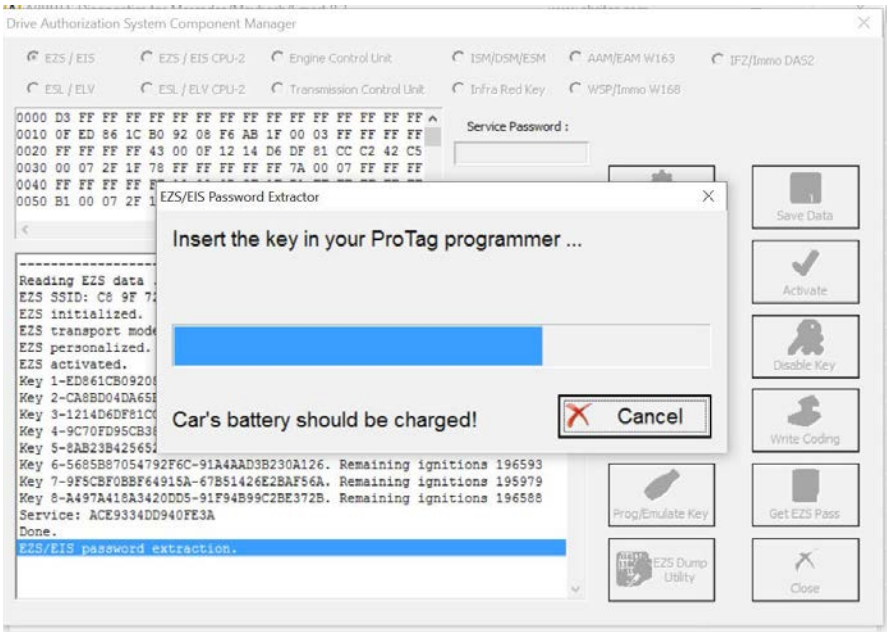
-It will then read the EZS (EIS).



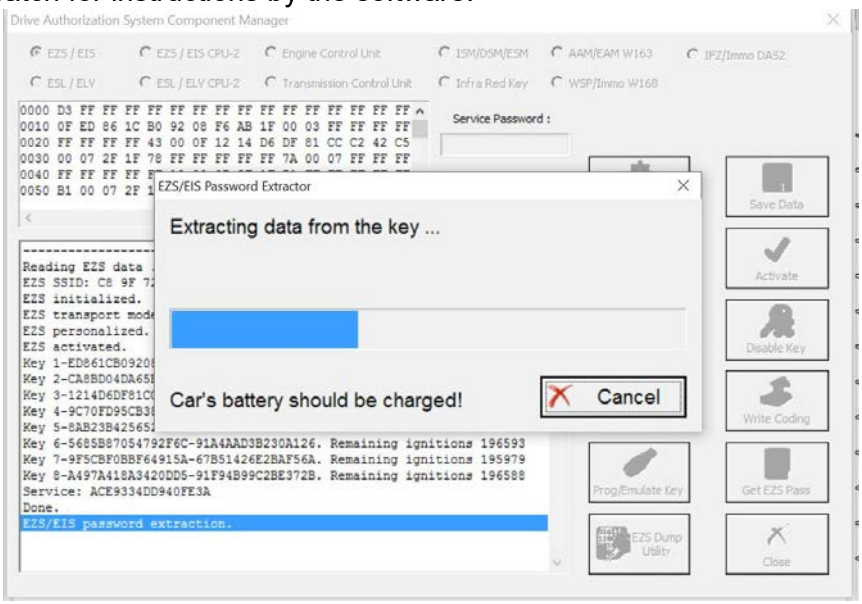
-It may ask you to take the key out of the EZS and insert it into the Protag or back in the EZS a few times. Follow the instructions closely:



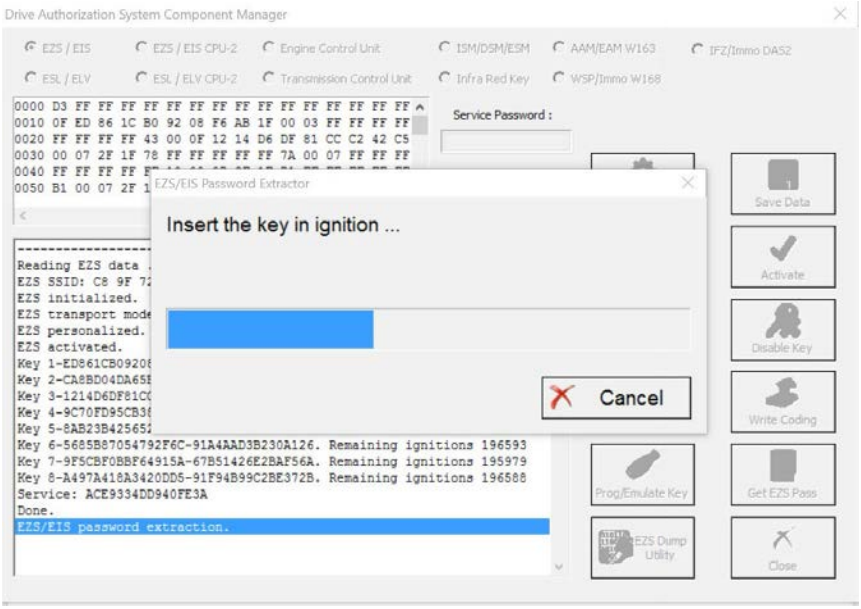
- If by now you have not attached an external power supply please make sure to do so at this point. The password extraction may take up to an hour.

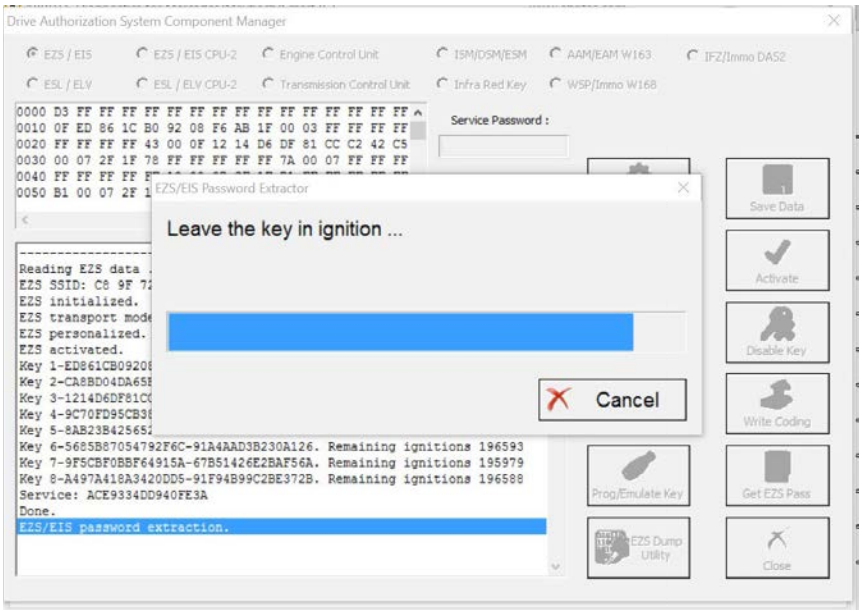


- Make sure to watch for instructions by the software.

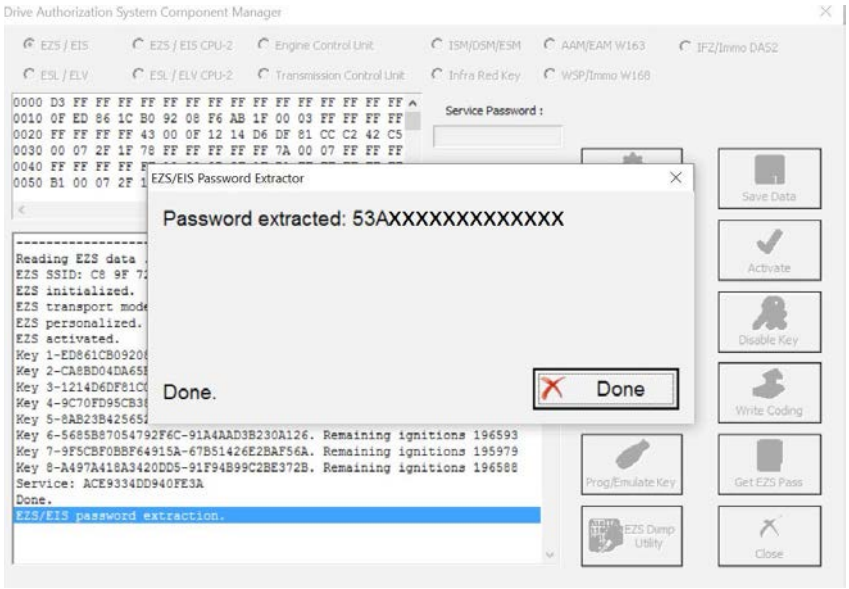


Follow the steps it gives you:





-Once the software manages to extract the password you will be able to see it, it will also be populated in the password field of the DAS manager main screen.



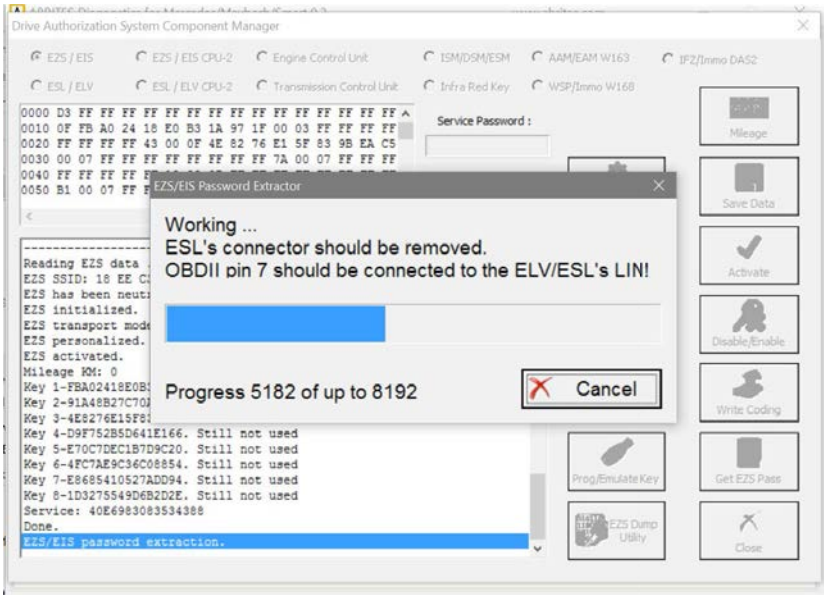
When you select the method with the Abrites IR adapter and fuse relay you will need to connect the fuse relay to the ignition fuse. ***Please check the appendix for the Abrites cables we can provide in order to assist with your work.*** The example below is with the W204 Mercedes C-class as it provides a clear way of understanding the way the procedure works:

When working on a W204 car for all keys lost for example you can open the front SAM module on the driver side and see fuse number "27" - disconnect it, connect your ABRITES FUSE RELAY CONNECTOR and plug your relay and proceed to start the All keys lost procedure. Make sure that the ZN036 is in the EZS and that it is in the ignition "ON" position.
The ignition fuse is different for the different models so a wiring diagram may be useful.

W204 Fuse "27" (ignition fuse).

Once the Abrites fuse connector is placed you can connect the Abrites fuse relay.

The procedure of extracting the password will be up to 10 times faster than usual.



We suggest you use the ABRITES FUSE RELAY in ALL KEY LOST situations when possible because this method saves a lot of time

5.17.1.1 W164/W221 before the facelift password extraction when all keys are lost

Extracting an EZS EIS password from the W221, W216, W164, W251 before facelift via DAS manager and the IR adapter when all keys are lost.

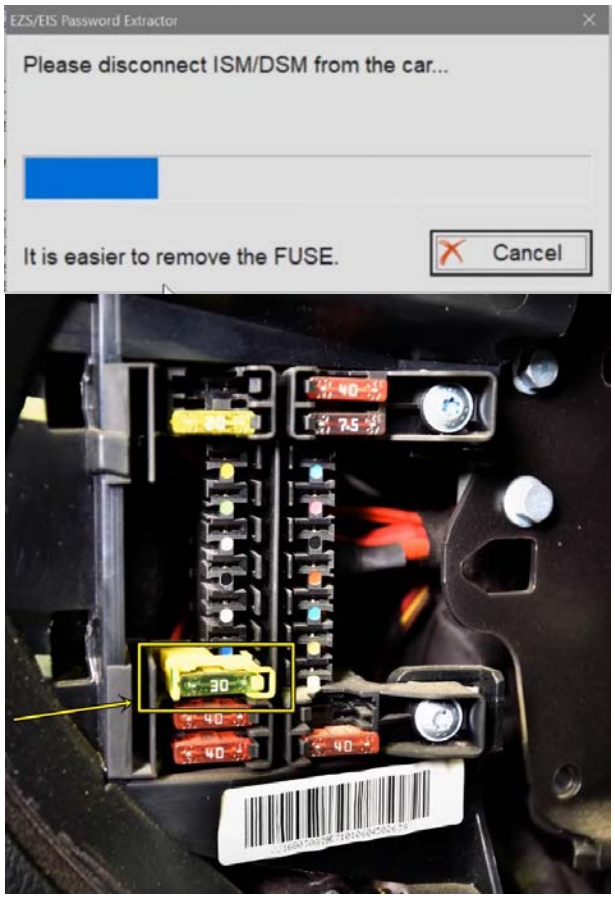
In order to complete this operation you will be required to do the following:

1. Connect the ZN051 distribution box to your AVDI and make sure you have your purple cable set connected to CAN H and CAN L (3-11). Connect the OBD cable to the ZN051. Connect your IR adapter to the AVDI and leave it aside.
2. Locate the internal power train CAN (Green/ White – CAN H; Solid Green – CAN L) and connect the purple connection cables to the internal power train CAN using the supplied pinch needle connectors.(fig.2)
3. Start the password extraction process as you would do for any other car – Read the in DAS manager, press “Get EZS pass”, Select IR adapter and PROTAG.
4. The procedure will start and will suggest that you remove the ISM/DSM. It is always easier to just take the fuse out. Locate and remove the fuse. For W221– passenger side No.83, 30A.(fig.4). For W164- Remove ECU fuse if prompted in engine compartment, right front (Petrol- fuses 103,105, Diesel- fuses 101,103,105)
Fig.4.1. W164 EZS fuse can be found on socket 14 in the passenger side fuse box. You need to connect the fuse adapter to the fuse socket and connect the adapter to the DS-Box Relay- Fig. 4.2
The W221 EZS fuse can be found in the front SAM, fuse 37(7.5A). This fuse is responsible for the backup power of the ISM/DSM. - Fig. 4.3 and its socket is connected to the DS-Box Relay via the Fuse Adapter.
5. You will be required to wait for around 5 minutes until the ISM/ DSM is discharged without a fuse.
6. The process for password extraction will be started and you will start seeing the extracts in the bottom of the window.
7. You will require active AMS and internet connection and as always, once the password is extracted, you can program a key to the car via PROTAG.

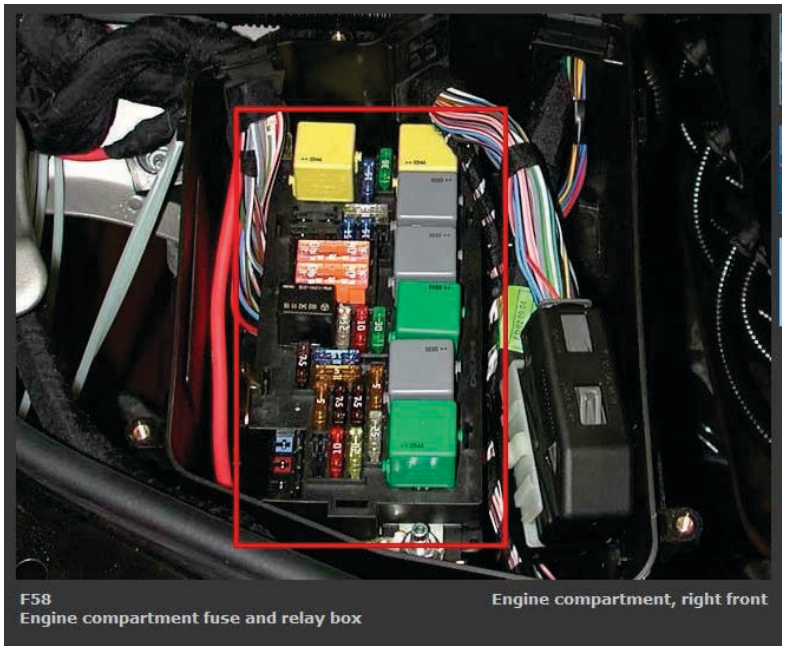
2

Fig. 4.3

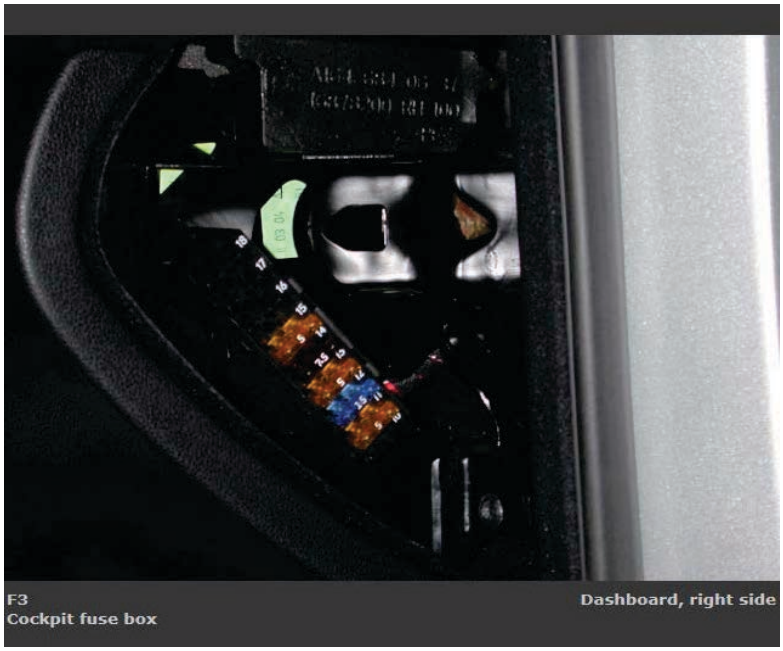
4



4.1 (Petrol- fuses 103,105, Diesel- fuses 101,103,105)

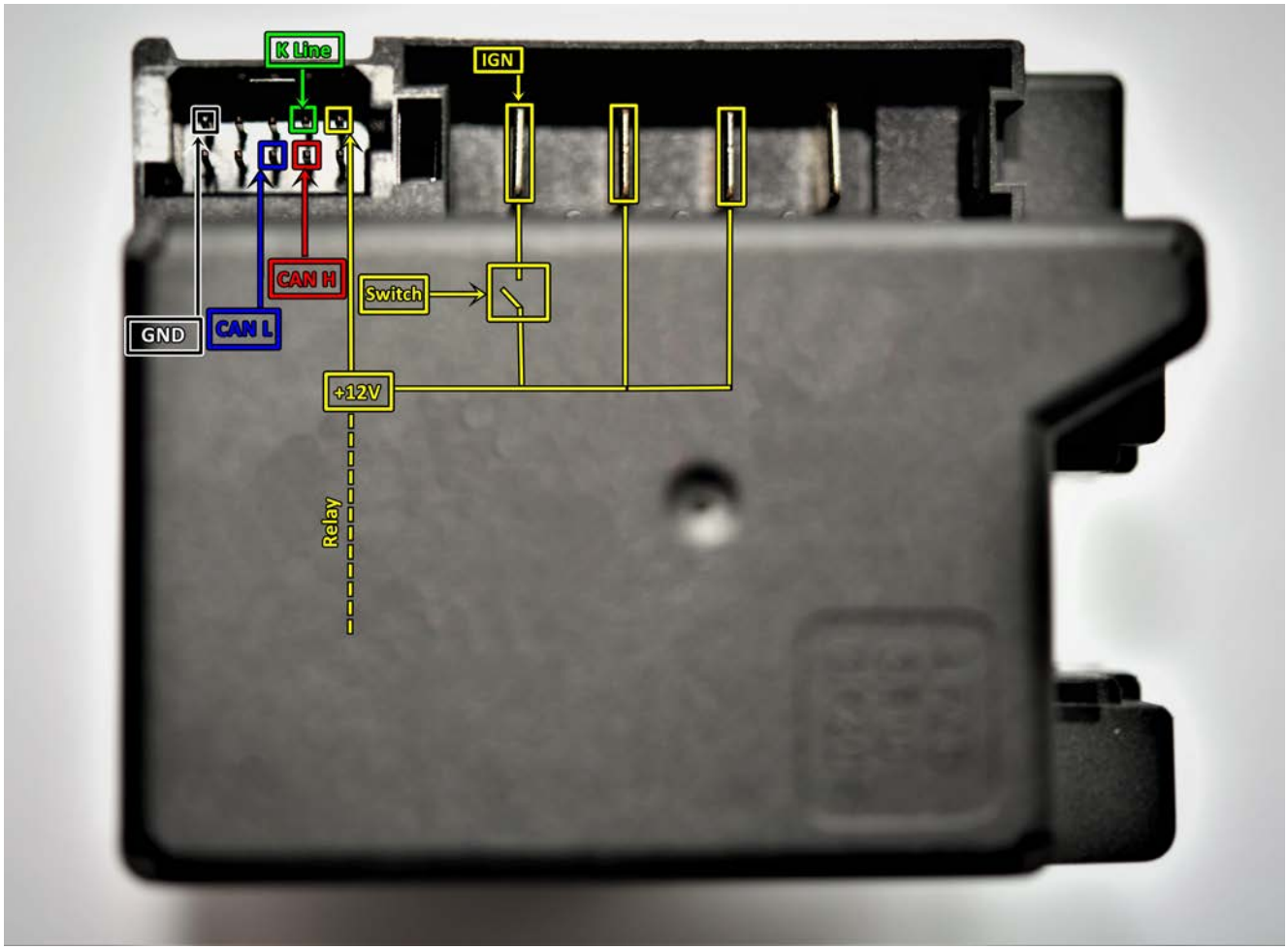


4.2 - W164 passenger fuse box. EZS fuse is socket 14



5.17.1.2 W220/W215/R230 password extraction using ZN051 DS-Box

To read the password from the W220/W215/R230 models you need to use the DAS Manager as with any other Mercedes that uses Infra-Red EZS. The option that needs to be selected is the Relay method once prompted. You can work both in the car or on bench. Below you can see the bench connections of the EZS.



The EZS can be easily connected on bench with 3 methods, using the ZN051 DS-Box or the ZN041 Relay cables with a DB-25 connector or an OBD cable.

Method 1:
Connecting the EZS directly to a ZN051 DS-Box. You need to prepare a couple of cables used to connect:

- GND of the EZS goes to **GND** of the DS-Box. **GND** from the power supply is also connected to the **GND** socket
- CH and CL of the EZS go to **CAN 3-11** on the DS-Box
- K-Line goes to **K1** of the DS-Box
- +12V from the EZS goes to the **2nd relay socket (right)**.
- Additionally, you need to power-up the DS-Box and the EZS with +12V using the **B+** socket and the **1st Relay socket (left)**.

Method 2:
Connecting the EZS to the DS-Box Relay and a DB25 connector:

- GND of the EZS goes to DB25 **pin5** and **pin6**
- CH and CL of the EZS go to DB25 **pin4(CH)** and **pin12(CL)**
- K-Line of the EZS goes to DB25 **pin2**
- +12V of the EZS goes to DS-Box **2nd relay socket (right)**
- The DS-Box itself needs to be powered using the **B+** and **GND** sockets
- Pin17 of the DB25 goes to the **1st Relay socket (left)** on the DS-Box

Method 3:
Connecting the EZS to the DS-Box Relay and an OBDII cable connector:

- GND of the EZS goes to OBD **pin4** and **pin5**
- CH and CL of the EZS go to OBD **pin3(CH)** and **PIN11(CL)**
- K-Line of the EZS goes to OBD **pin1**
- +12V of the EZS goes to OBD **2nd relay socket (right)**
- The DS-Box itself needs to be powered using the **B+** and **GND** sockets
- Pin 16 of the OBD connector goes to the **1st Relay socket (left)** on the DS-Box

*Note: All of the above mentioned methods require a switch to be connected(the switch is used to turn on IGN when prompted by the software).

*Note if using the ZN041 Relay Cable set, make sure to connect K1 of the Relay to K7 of the DB25 cable.

5.17.1.3 W202/W208/W210 password reading from a working key hazards

For the the older Mercedes models such as W202, W208 and W210 it is advisable to use the IR-Adapter to read the password from the EZS. Reading the password from a working key in these models poses a threat for the working key, the EZS and the ESL. The processors in these units and keys may stop functioning due to their low capability of calculating the complexity of data that is needed to read the password. If a working key is used to read the password and the process does not complete or gets stuck in one place, this means the key or the EZS have stopped functioning. The car battery can be disconnected for 4-5 minutes and then reconnected. This will usually reset the EZS but the working key may stop functioning. If this happens, the IR-Adapter should be used to read the password.

5.17. 2 Module Exchange, Virginizing, Personalization and Activation using DAS Manager

The DAS Manager special function allows many modifications to the different units within the vehicles. Using this function the ECU, TCU, ISM, ELV and EZS can be returned to a virgin state, adapted to a vehicle, personalized, activated and coded. This function is extremely useful when using the DAS Manager to exchange used electronic modules in Mercedes – Benz vehicles.

In most cases these procedures are done by both OBD and internal CAN connection and generally speaking require you to bring the electronic unit to a virgin state, personalize it to the car, code it, and activate it. In order to better understand the meaning of this procedure we need to understand what the different terms used above mean.

1. Virgin – This is the state of the module when it is initially produced by the manufacturer and is ready to install in the vehicle.

2. Personalize – This is the state, when the electronic unit is adapted to the vehicle but this adaptation is not permanent (In this state the unit can be coded with previously read information).

This can be used in order to test if a used module is working with the vehicle but not committing to its installation in that vehicle.

3. Activation – When the “Activate” option is used the module adaptation to the vehicle is complete.

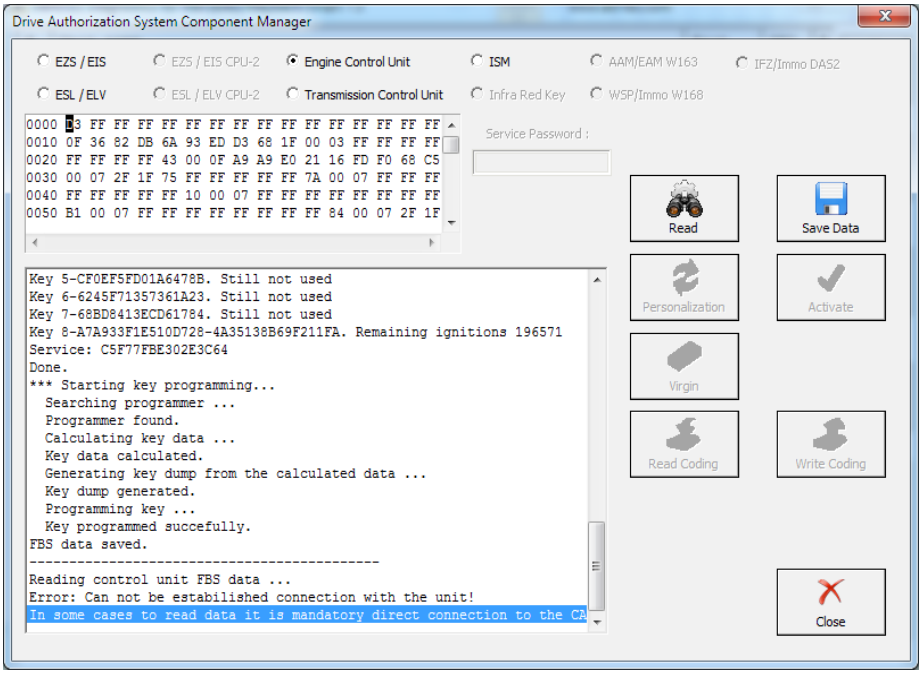
When the Activation is done the coding cannot be written to the module.

Using this option we commit to the personalization and coding we have made.

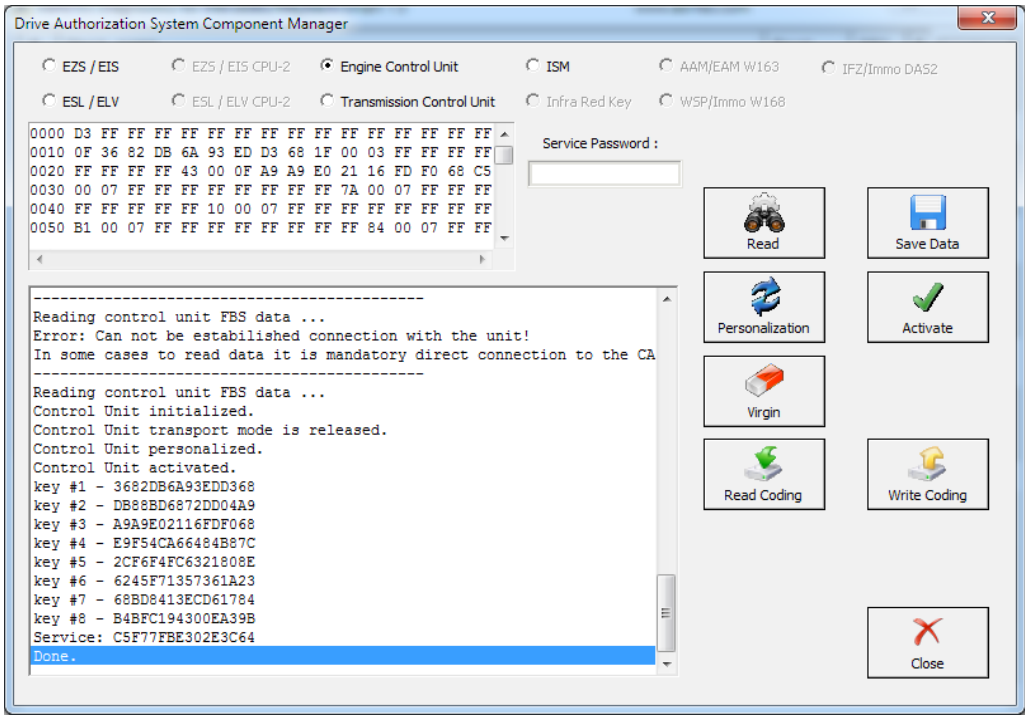
As an example we can use the functions of the DAS Manager in order to exchange multiple electronic control units in the Mercedes-Benz vehicles.When reading the ECU using the DAS Manager special function the reading process is always done via OBD. For other operations related to DAS manager you may need to use the internal CAN or LIN connection.

A good example of an internal CAN cluster is behind the ML 164's passenger foot well plastic guard:

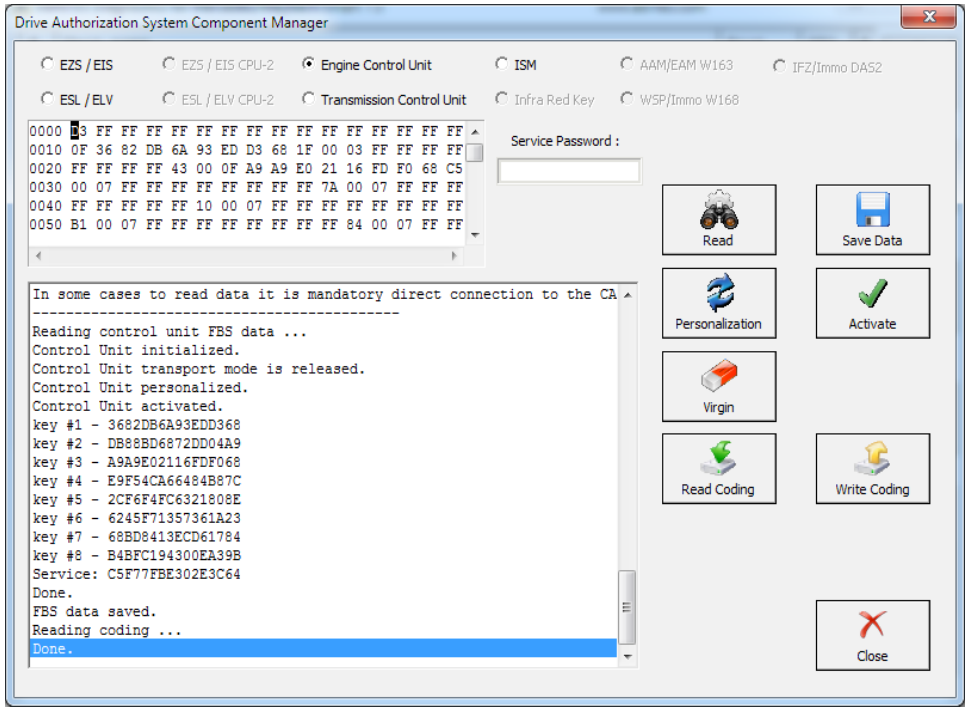
I. ECU



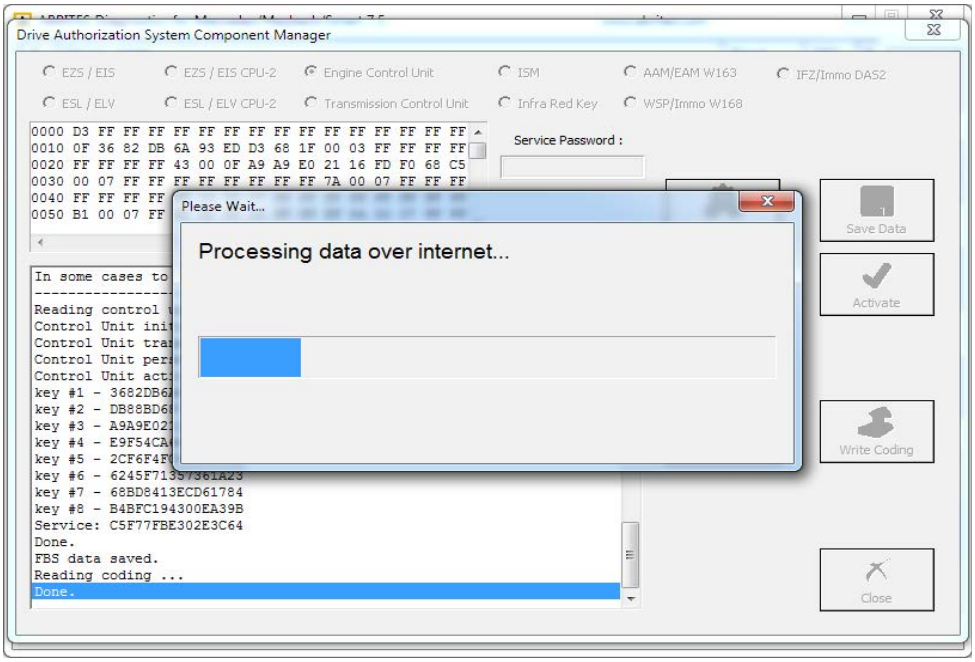
After connecting to the internal CAN we can retry the reading process. The following will appear:



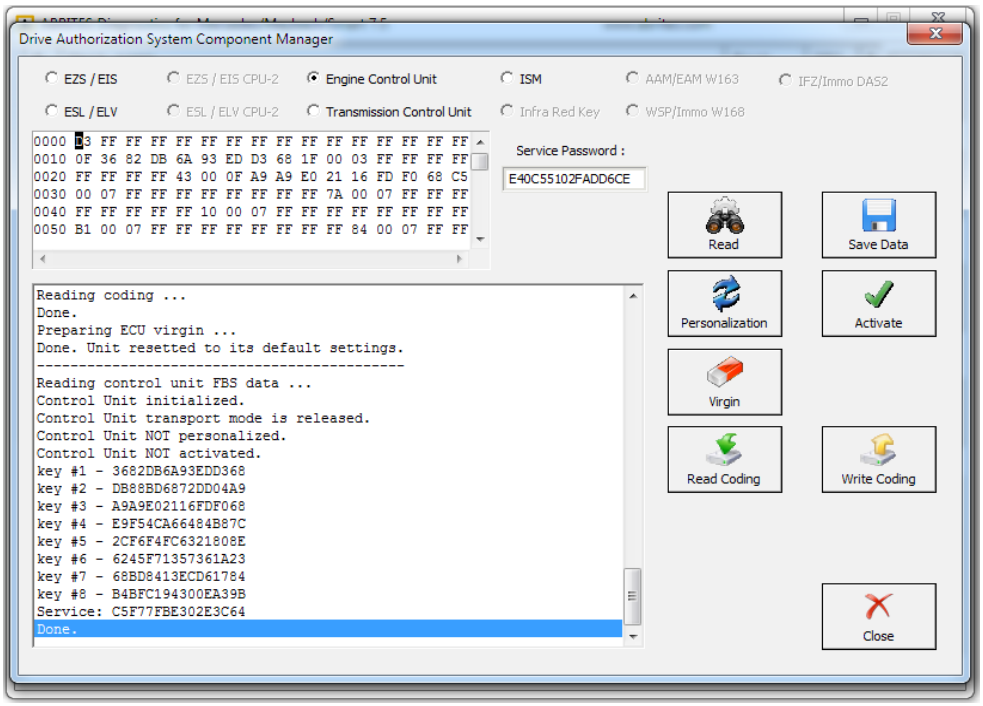
This means that the reading is done. After this you can read the existing coding of the unit and save it (this is not an obligatory step):



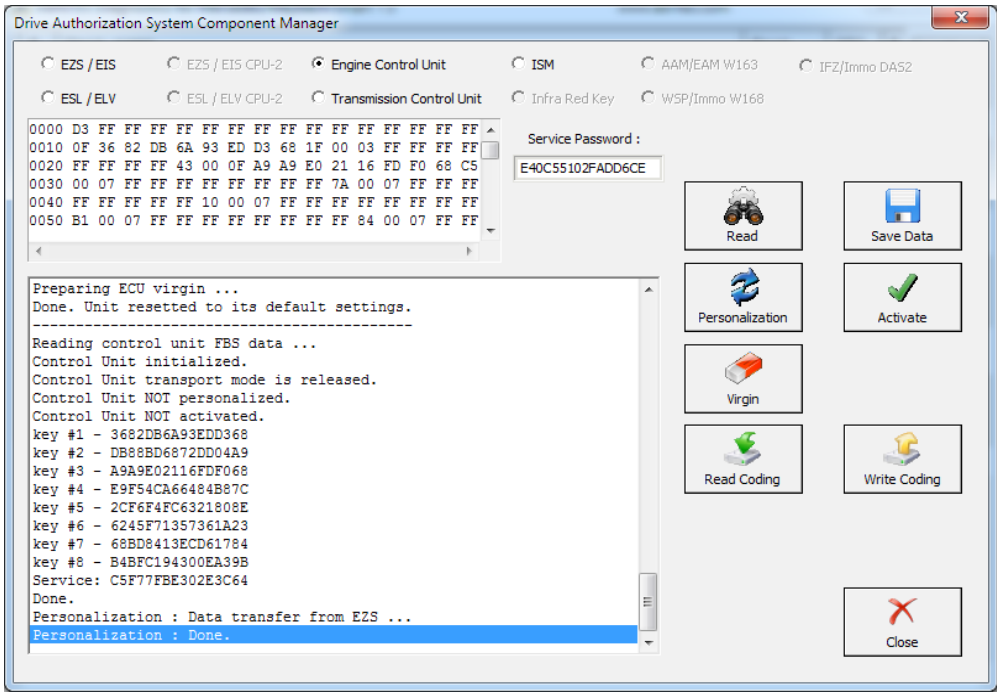
When the coding is saved you can make the ECU virgin. For this operation you will require internet connection:



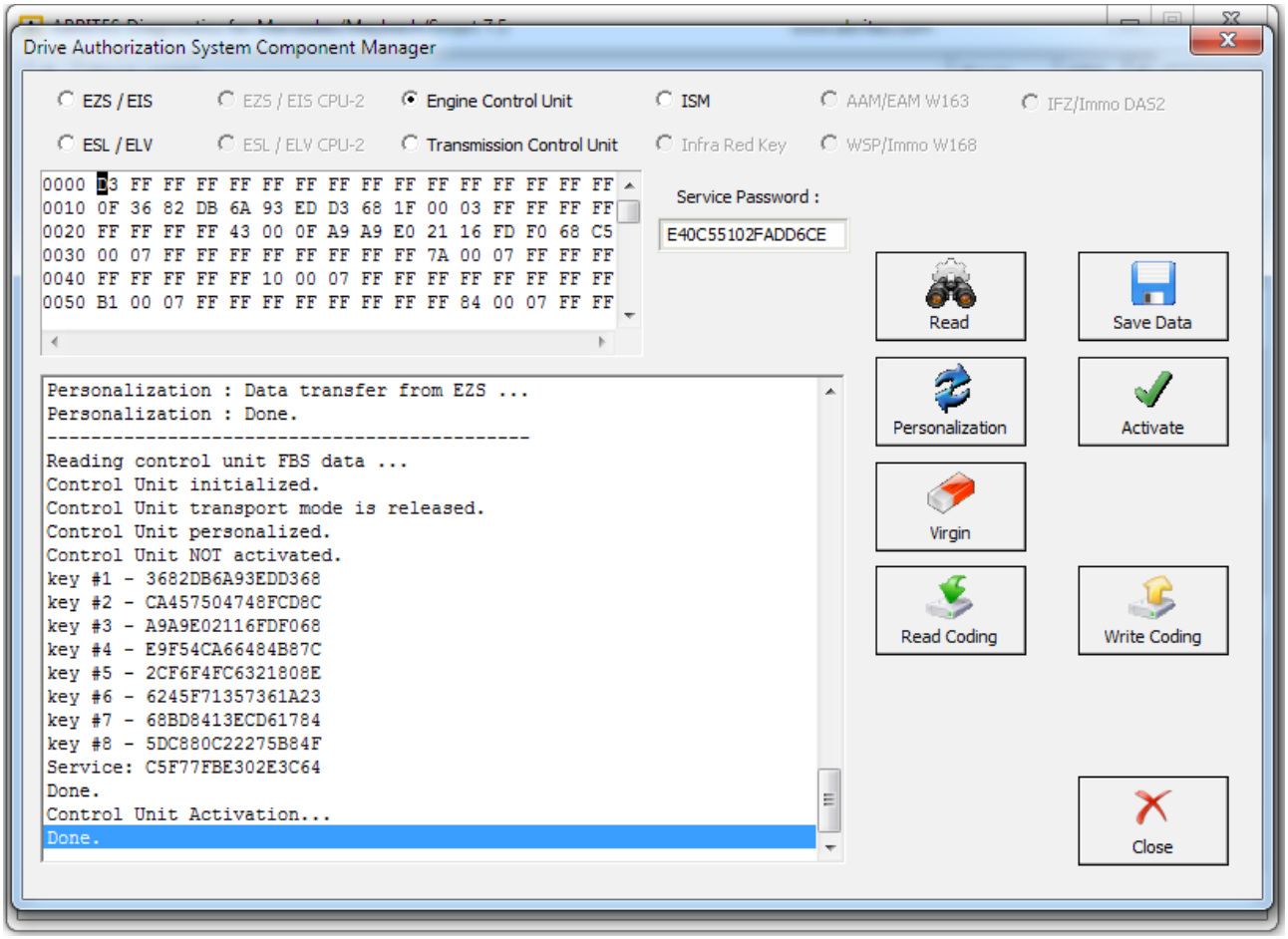
The virginization process is complete:



You can now proceed towards personalization of the unit. Please make sure to turn the ignition OFF and ON again. Personalize gets the data from the EZS and writes it to the ECU:



After this step you may need to turn the ignition OFF and ON again. Then you can activate the unit:

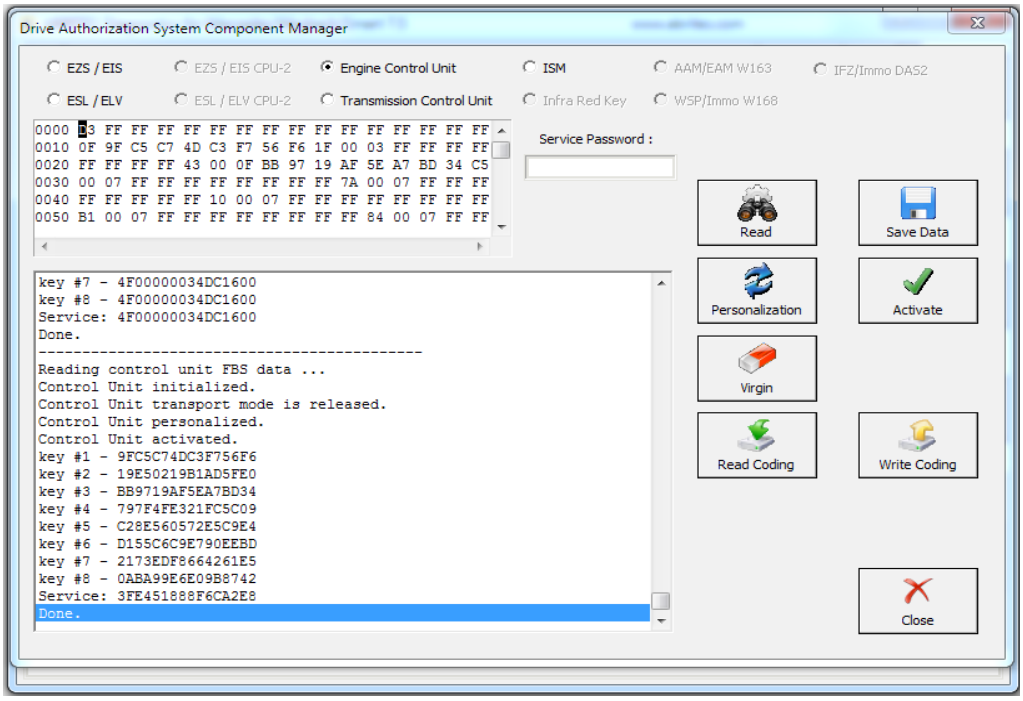


As you can see from the software's information window every step it takes is recorded and displayed so that you can see what step is done.

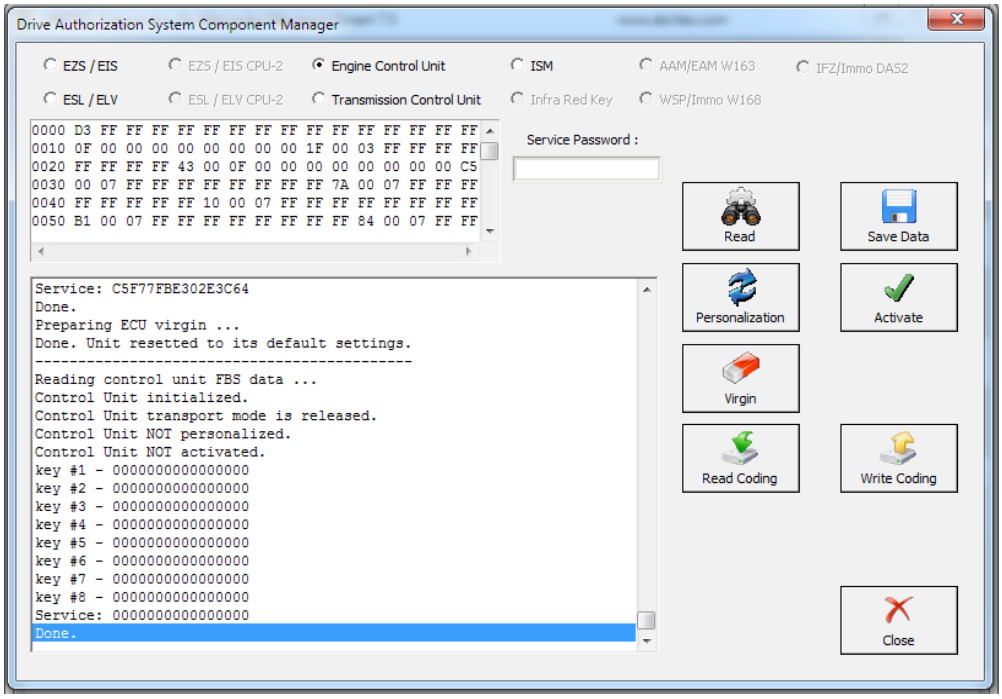
The software also tells you what steps you have to proceed with.

When a used ECU needs to be installed in the vehicle you can connect the ECU to the car and perform the following steps in order to adapt it to the car so that it replaces a broken unit:

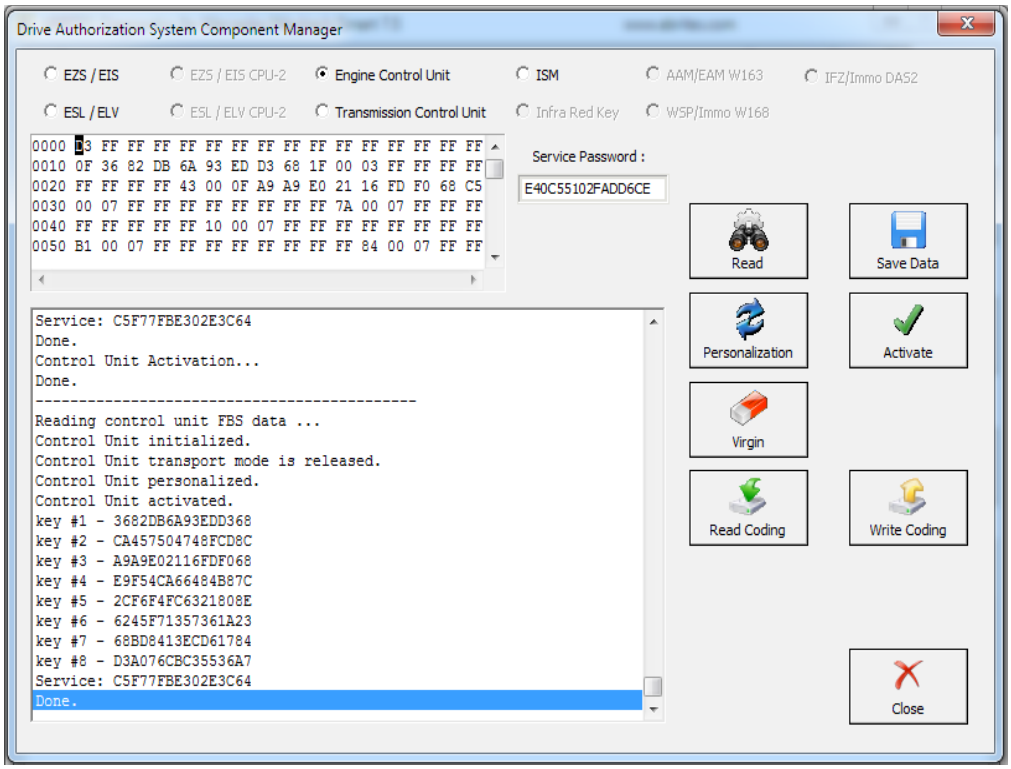
1. Read the used ECU (as in the above case the ECU may need to be read by internal CAN)



2. The used ECU is in a virgin state. You can turn the ignition OFF and ON again. Then press personalization:



3. The unit is personalized and ready to be activated. Press “Activate”:

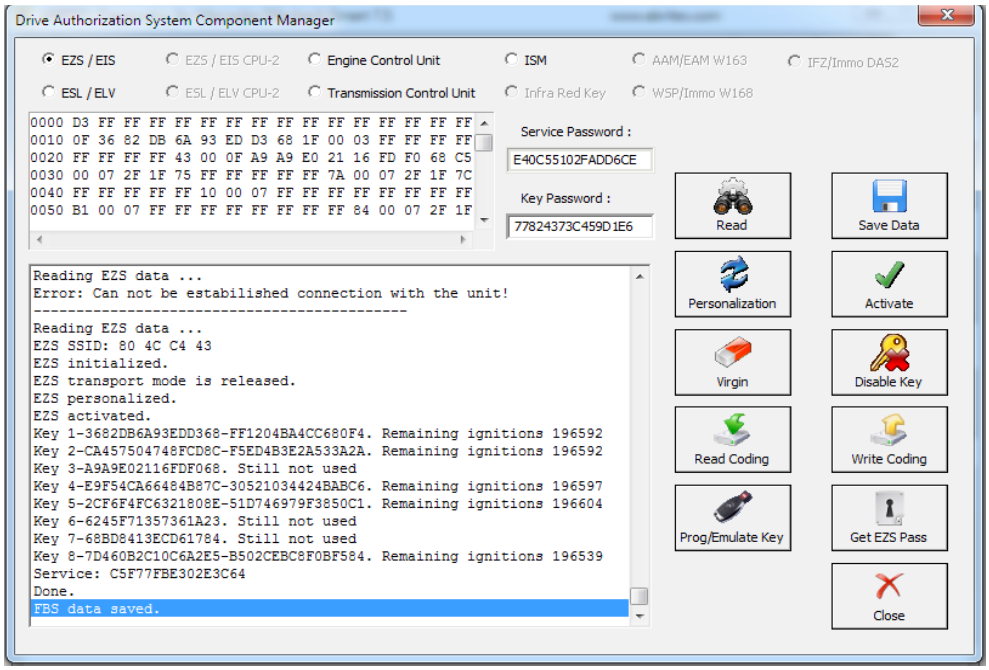


4. The activated ECU is ready to work in the vehicle.

NOTE: Please make sure to always turn the ignition OFF and ON again before Personalization of an Engine Control Unit.

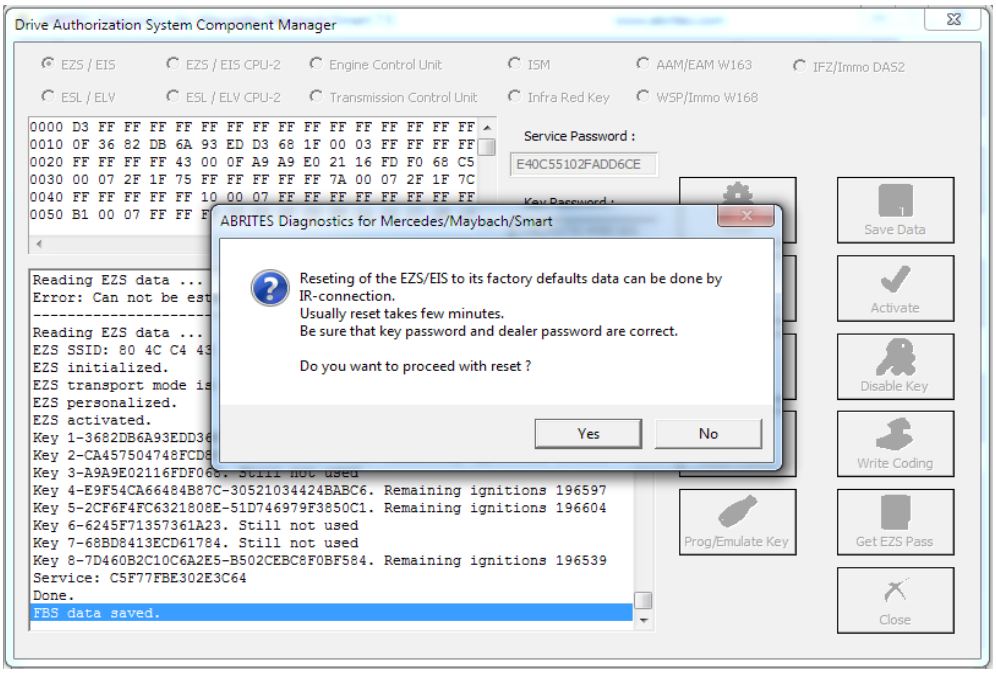
II. EZS

The Adaptation of used EZS modules goes through the same general steps. You need to select the EZS from the selection menu in the top of the DAS manager and read it:

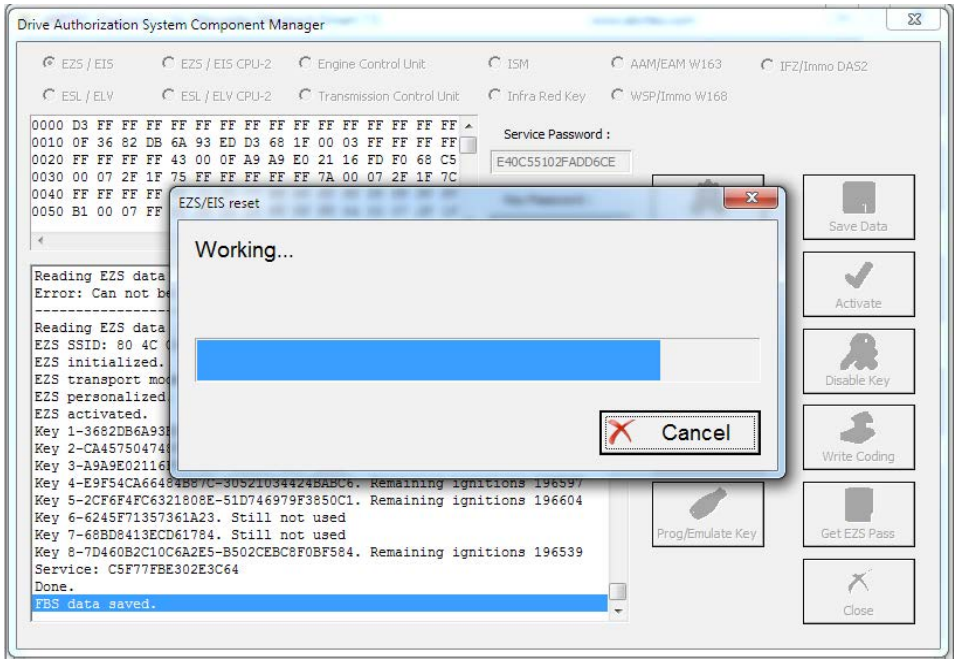


In this step we can GET the EZS password as per the methods described in 5.17.1.

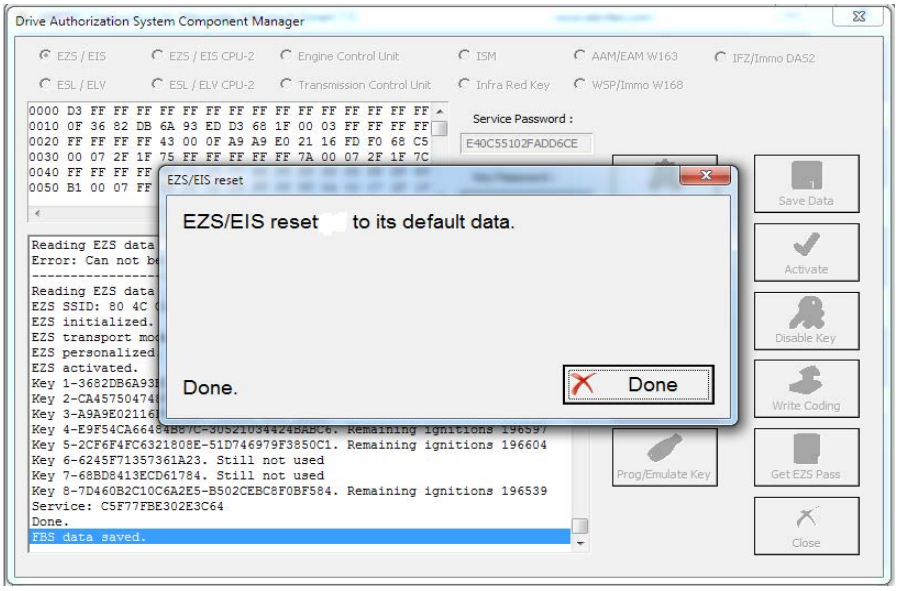
Now we can proceed to make the EZS virgin. You will need an IR adapter:



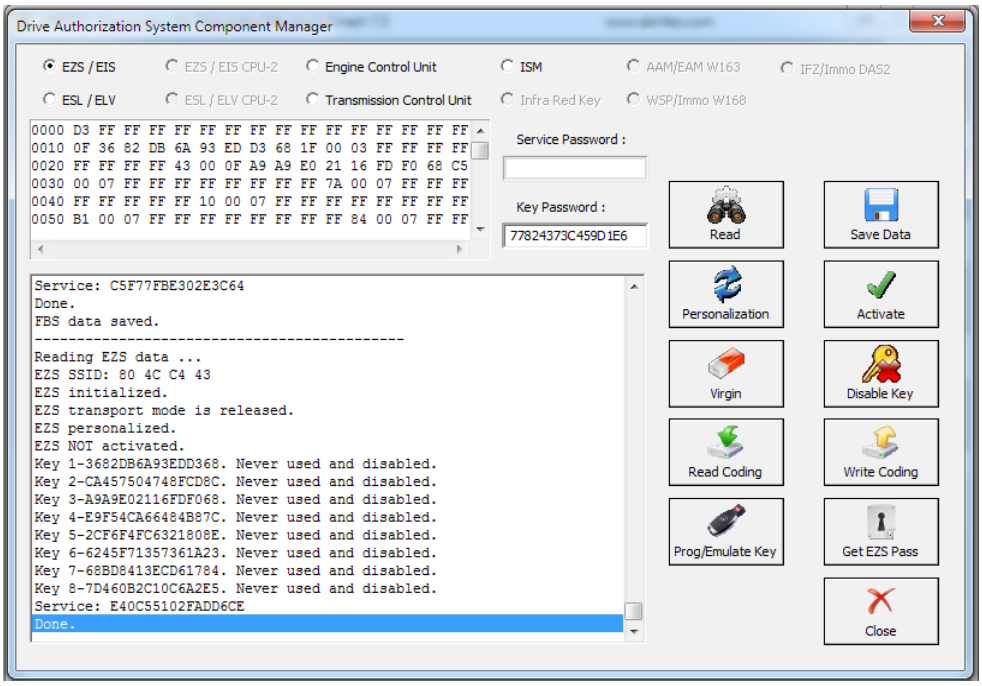
After confirming you can proceed to the next step. Do NOT forget to have your IR connector connected to the AVDI and ready to be plugged into the EZS when the software asks for it:



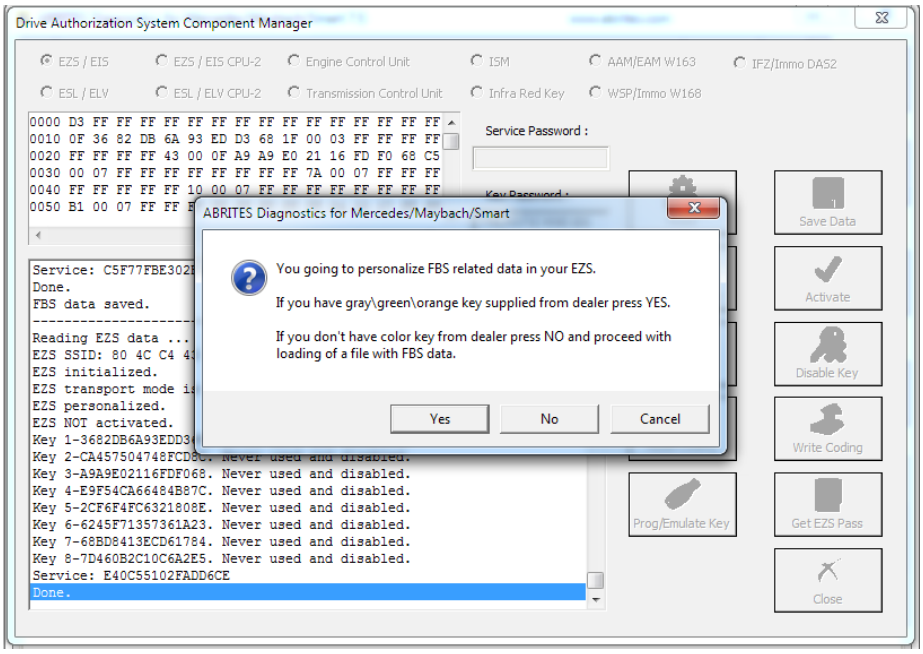
The restore to virgin state is completed.



Now we can proceed to the personalization of the EZS unit. First make sure to read the EZS and make sure that it is in a virgin state:



Then turn the ignition OFF and ON again. Press personalize:



If you do not have the service key the software will allow you to load previously saved data to this EZS and use it with the new (second hand) EZS. Alternatively you can record the Abrites default data. If you choose to do that – all previous keys will be lost and new ones need to be learned. This is the **FBS_Data_Abrites.bin** file. It is located in the following folder: C:\Program Files (x86) \ABRITES\Common\Mercedes in case you need to use it.

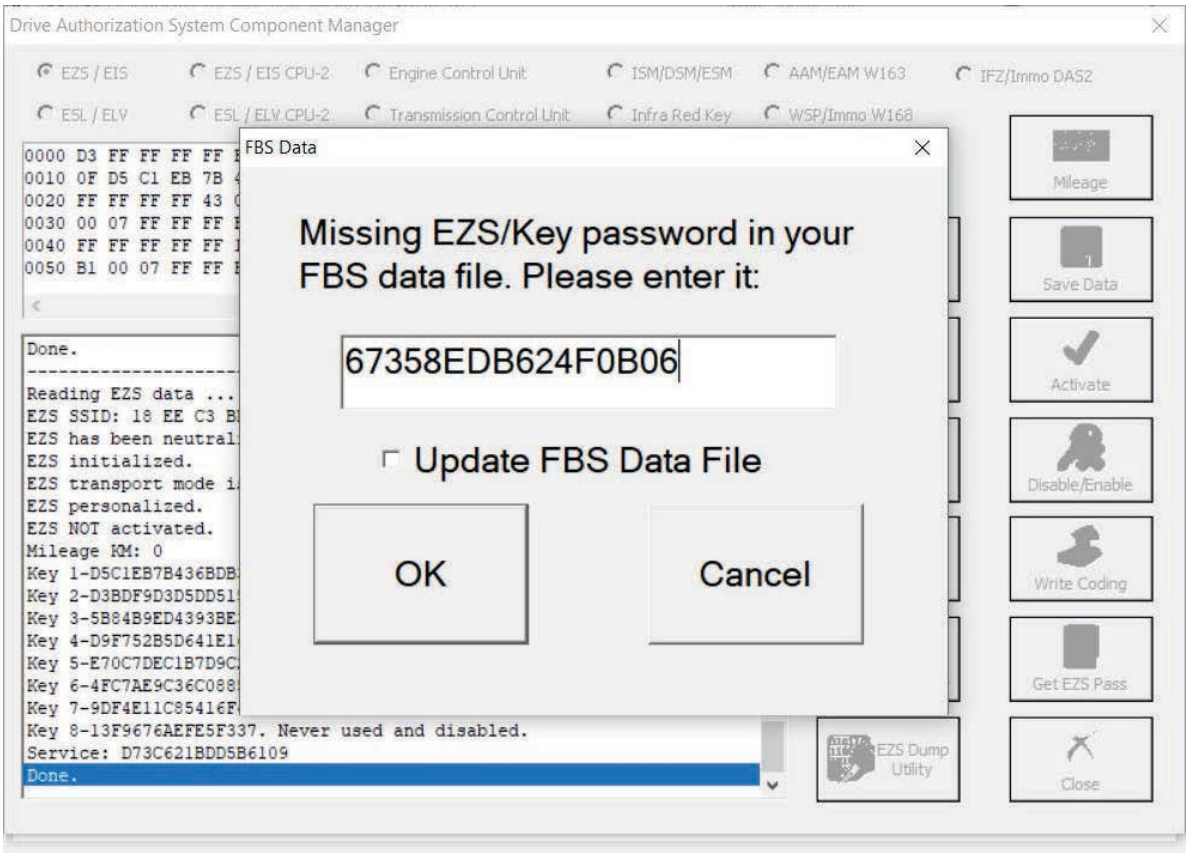
DAS manager can also calibrate the mileage counter in the EZS for the W(X)164 and W251 cars

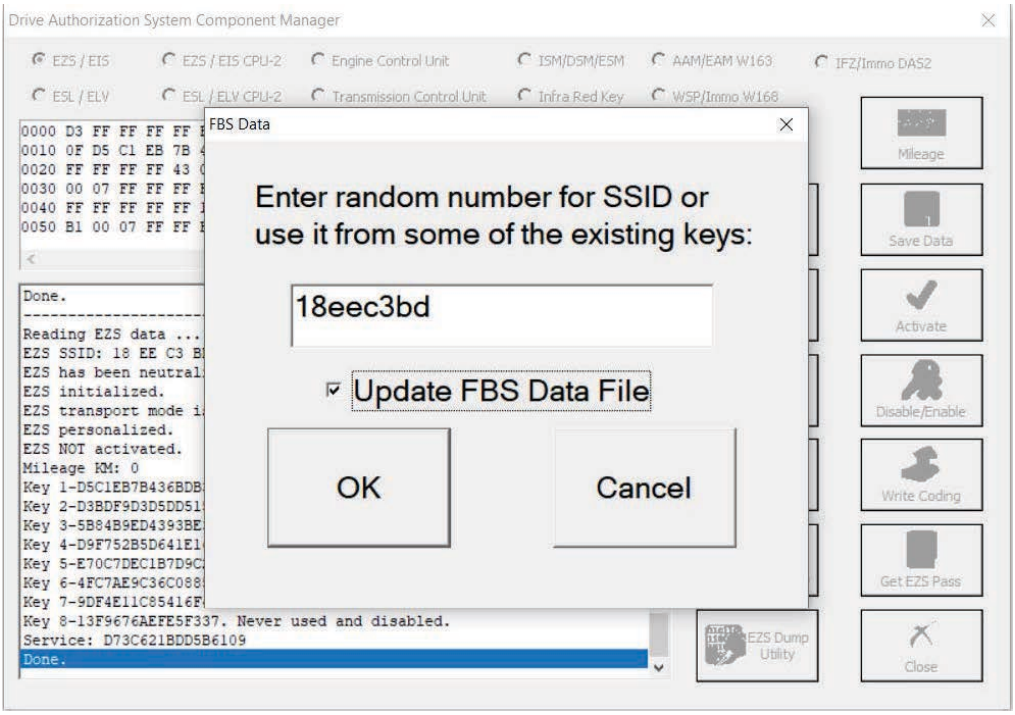
Personalizing an EZS (EIS) using the FBS data from an ECU.

With the help of the Abrites diagnostics for Mercedes and DAS manager you can personalize an EZS using the data from the ECU. This is very helpful when the original EZS from the car is missing or broken. In order to perform this procedure you need to have the following:
- Replacement EZS (EIS)
- Key password
- FBS data from an ECU.
- SSID (Engine Control Units) do not contain the SSID inside them but the SSID is vital to the operation of the EZS. For this reason you need to have an SSID.

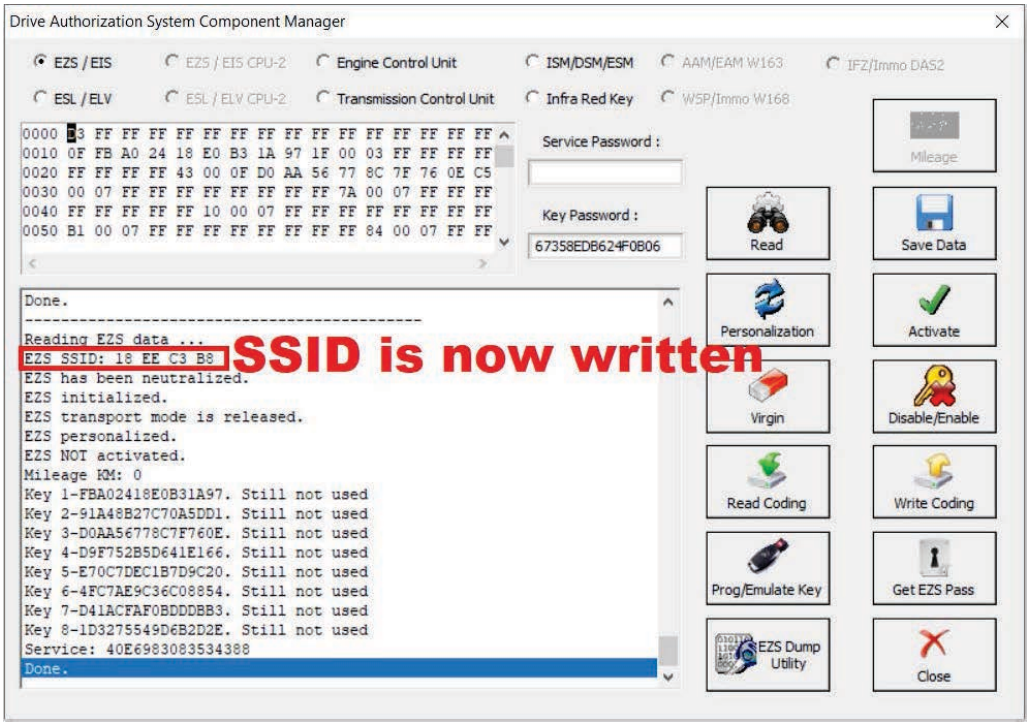
The steps you need to take are the following:

1. Read the key password.
2. Read the FBS data from the ECU
3. Make the EZS virgin
4. personalize the EZS with the data from the ECU.
5. Write the Key password
6. Write the SSID
7. In some cases you will be required to program the keys back to the car but this is not a problem because you already have the key password.
   When you personalize the EZS you input the password in the field and select the "Update FBS Data file" radio button:





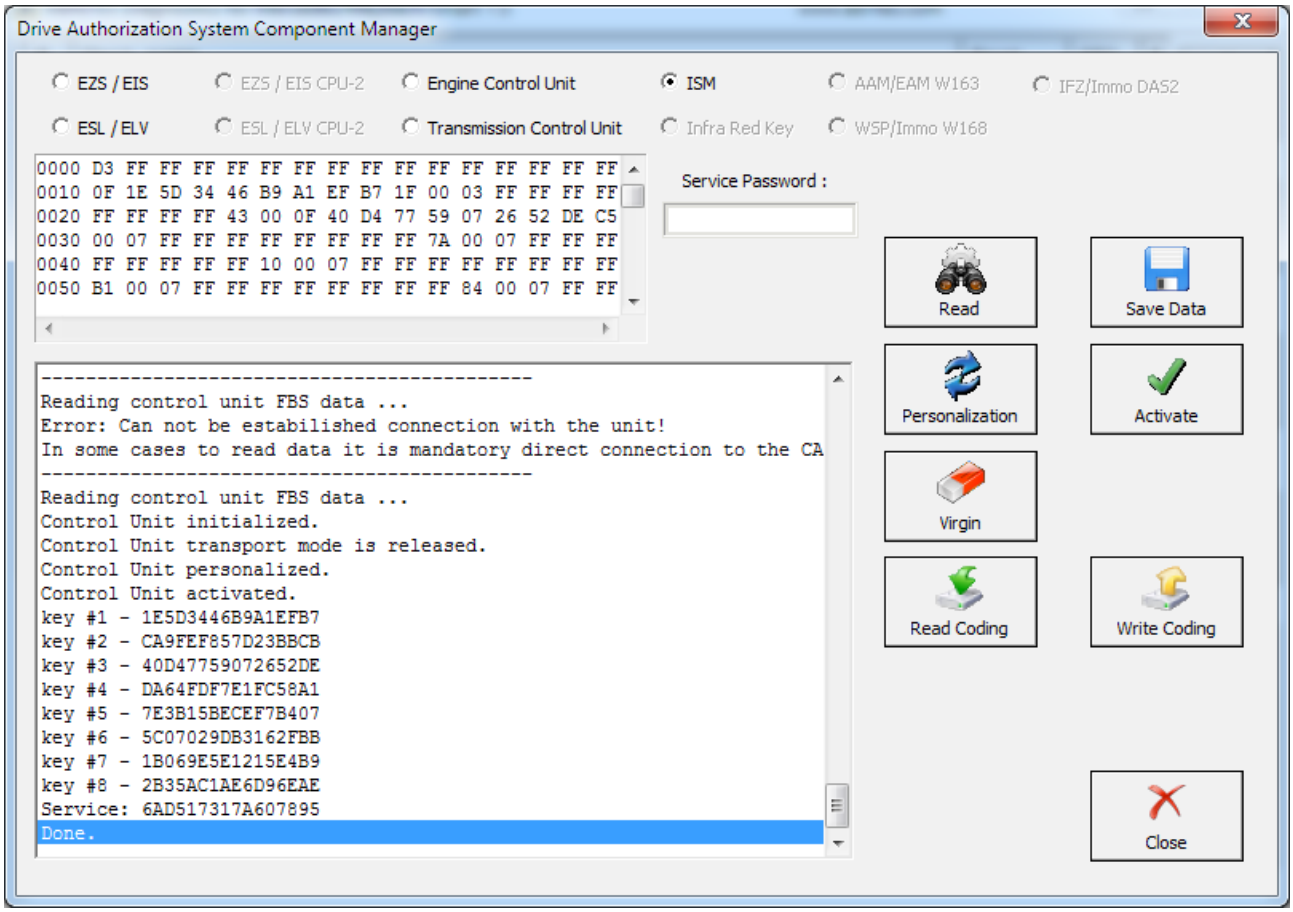
In this window you will see that the EZS is already personalized with the SSID:



At this point the procedure is finished and the EZS is personalized with the data from the ECU. The car starts and is back on the road.

III. ISM

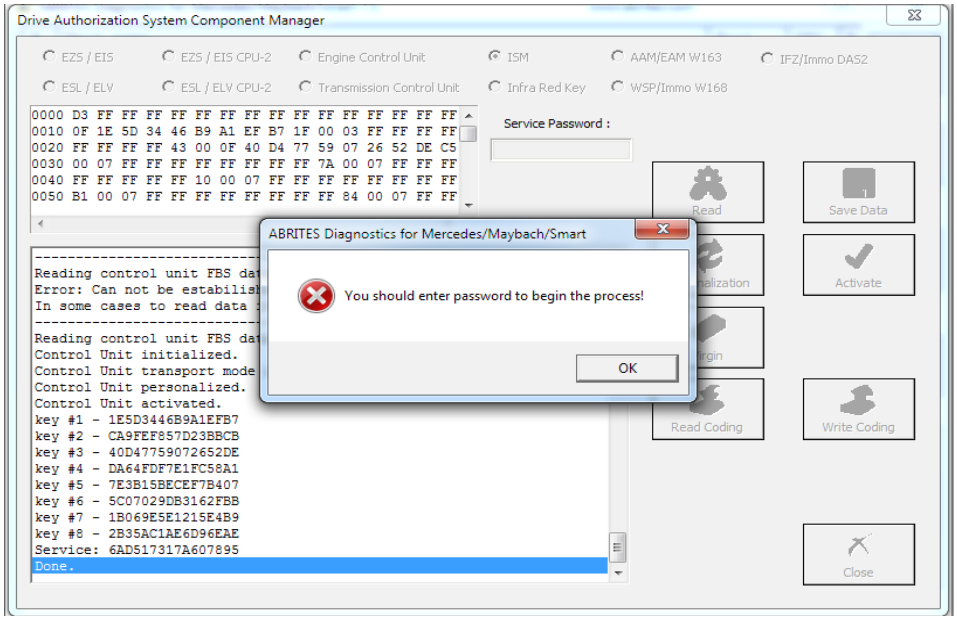
The Intelligent Servo Module can also be exchanged. It follows a similar procedure as the other control modules. You can select the ISM button and a press read:



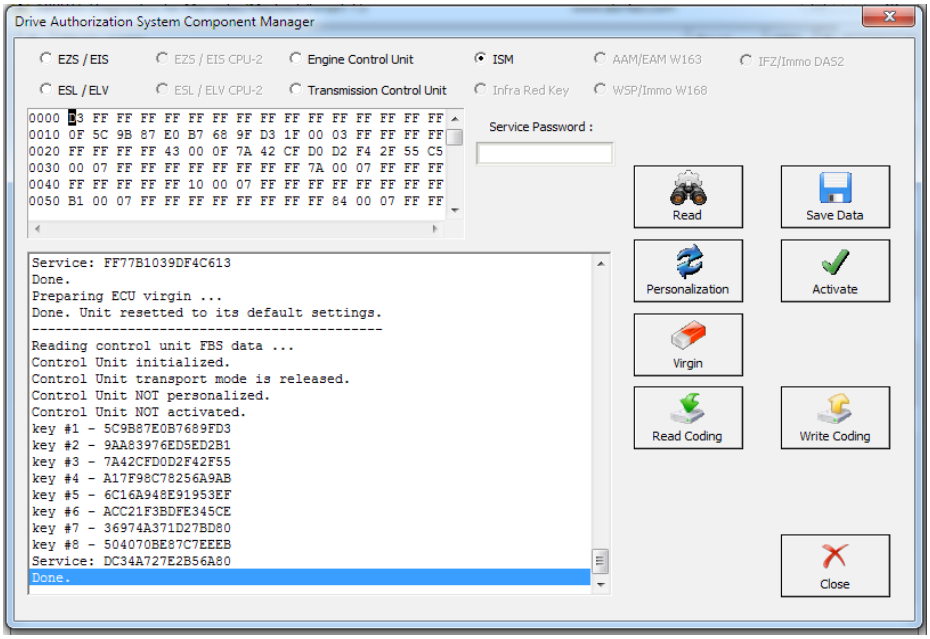
In the details window you can see the details in regards to the current state of the ISM.

You can proceed with resetting the ISM to a virgin state in case you would like to exchange it.

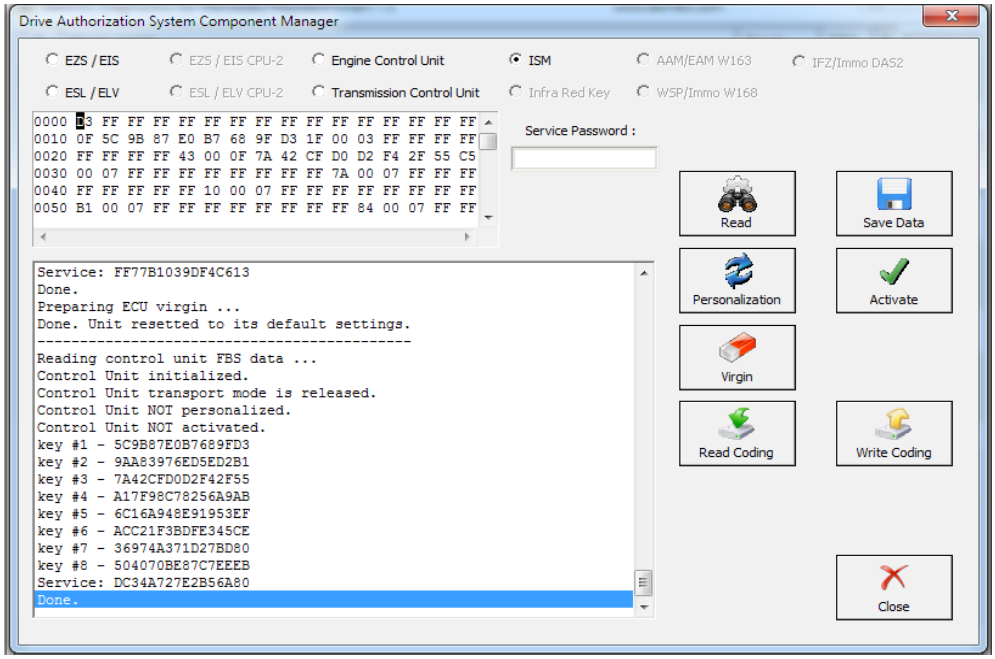
If the password cannot be calculated you will see this error:



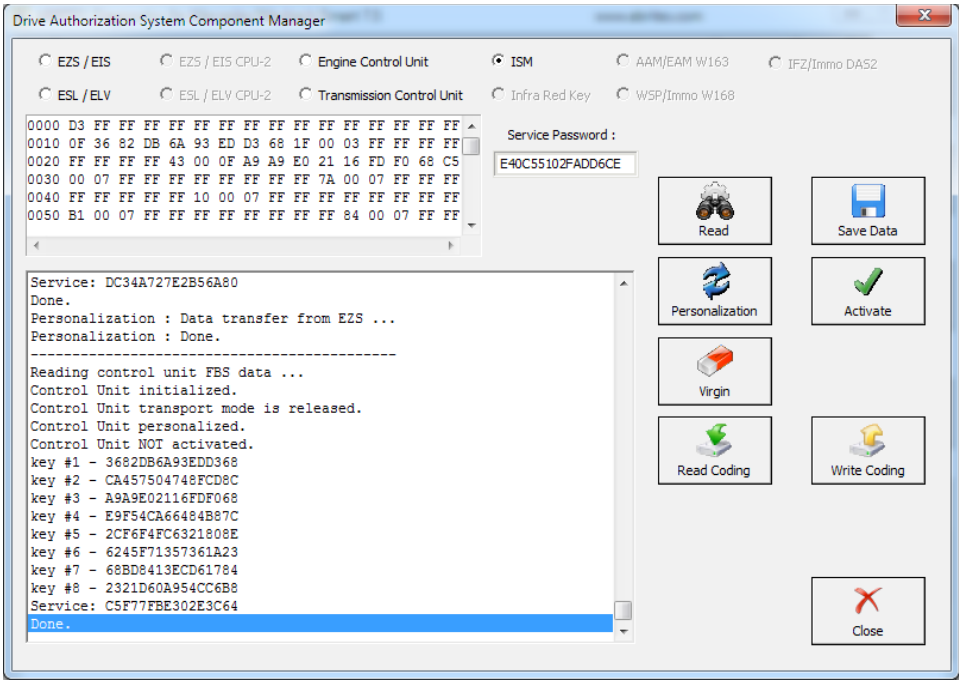
Once the service password is calculated the ISM can become virgin. This needs to happen inside the car via internal Can or outside connected on a bench rig. Also once the password is saved to your computer – you can use it indefinitely:



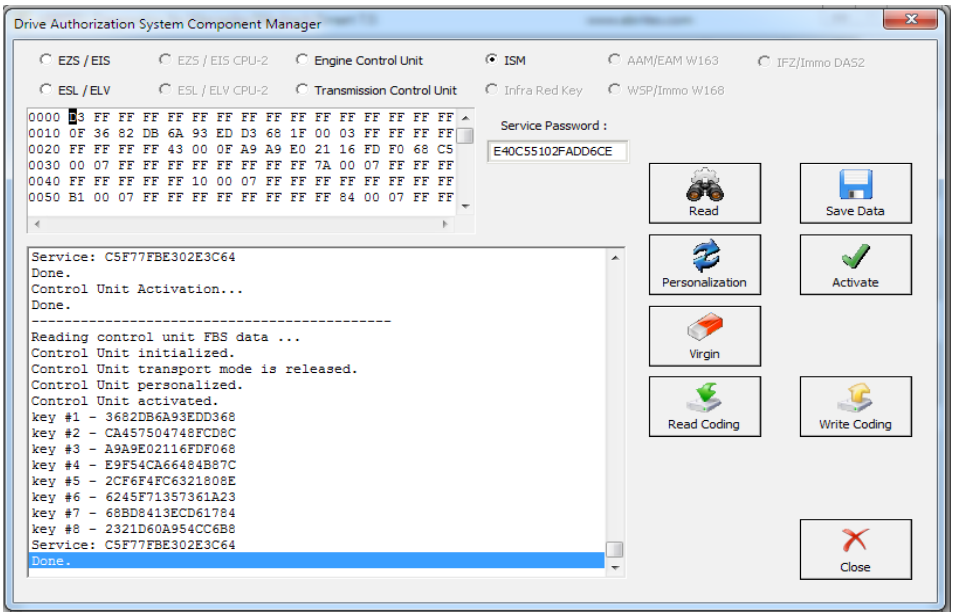
In order to personalize an ISM unit you have to either turn the ignition ON or reset the module. Now you can proceed. It is best to put the ignition ON:



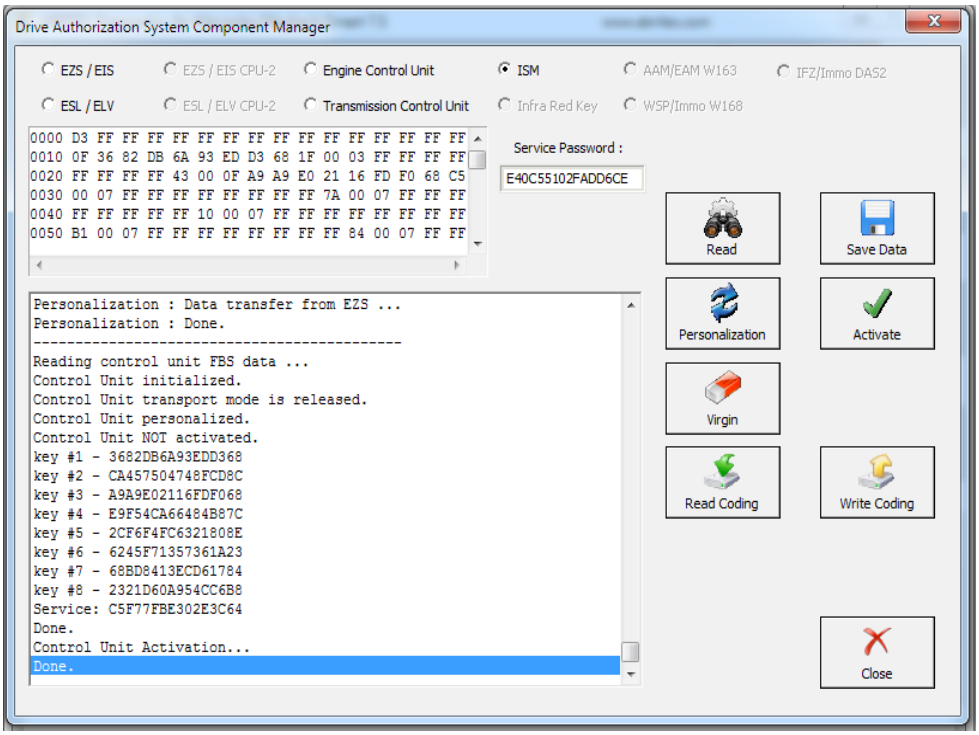
Then proceed to personalize automatically using the personalization button:



From this step on you can activate the unit:

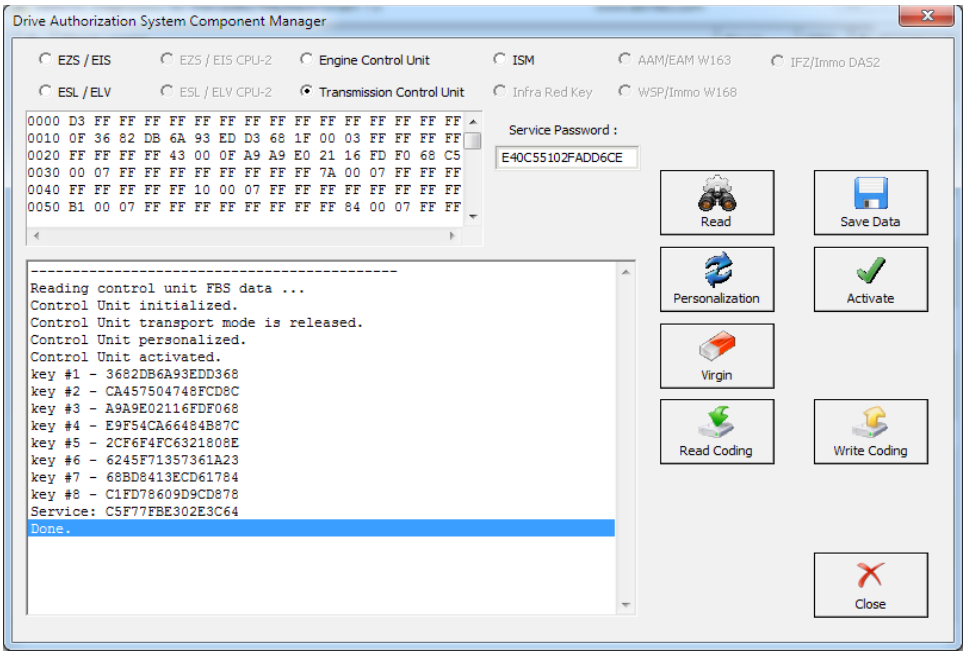


The Activation is now finished and the ISM is ready to be used:

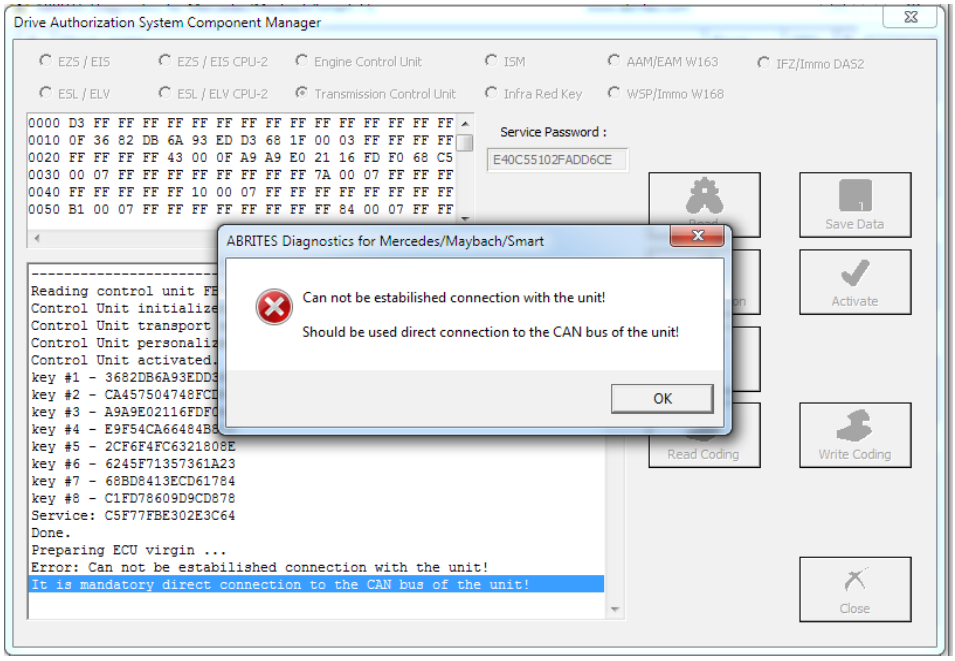


IV. TCU

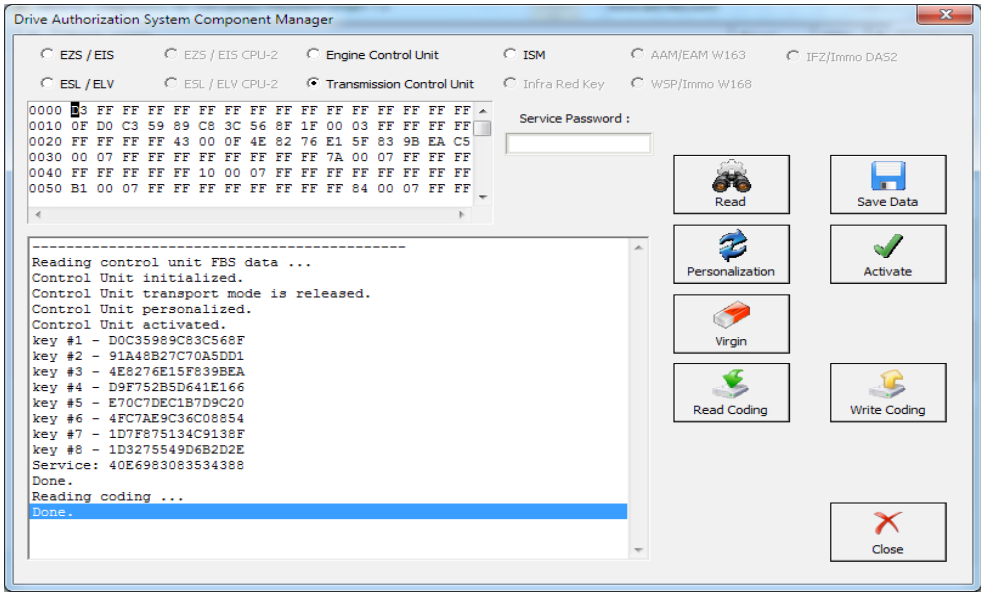
Transmission Control Units can also be adapted via the DAS Manager special function. The Process requires the Transmission control unit to be made virgin. Here is a used unit that is going to be adapted to the vehicle:



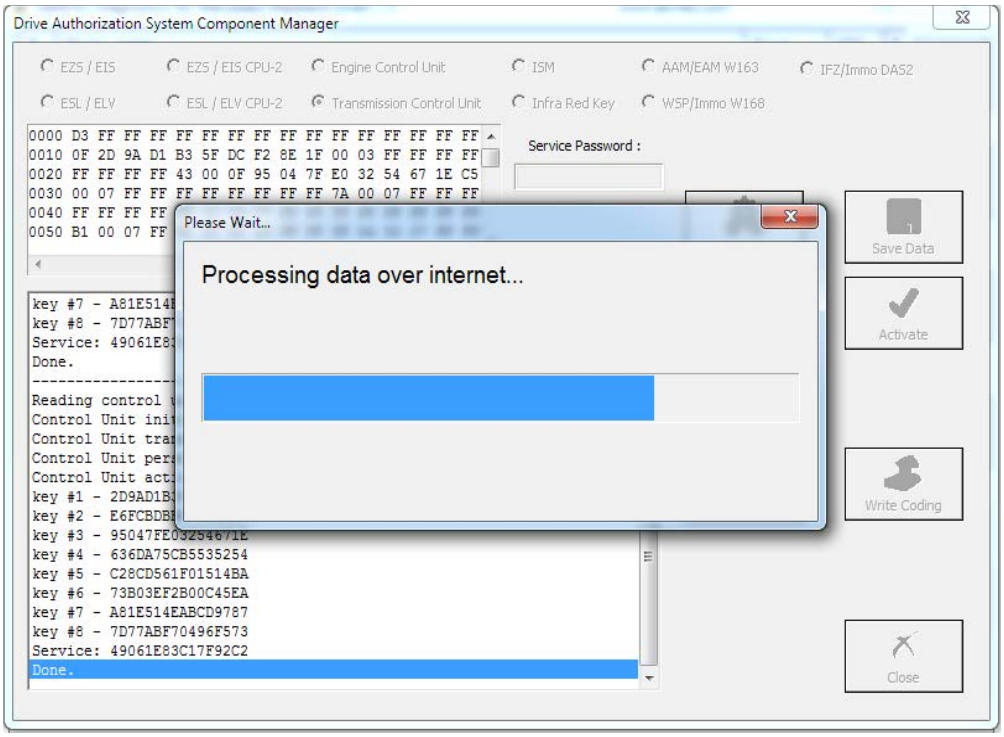
In some cases the TCU cannot be read by OBD and requires internal CAN connection:



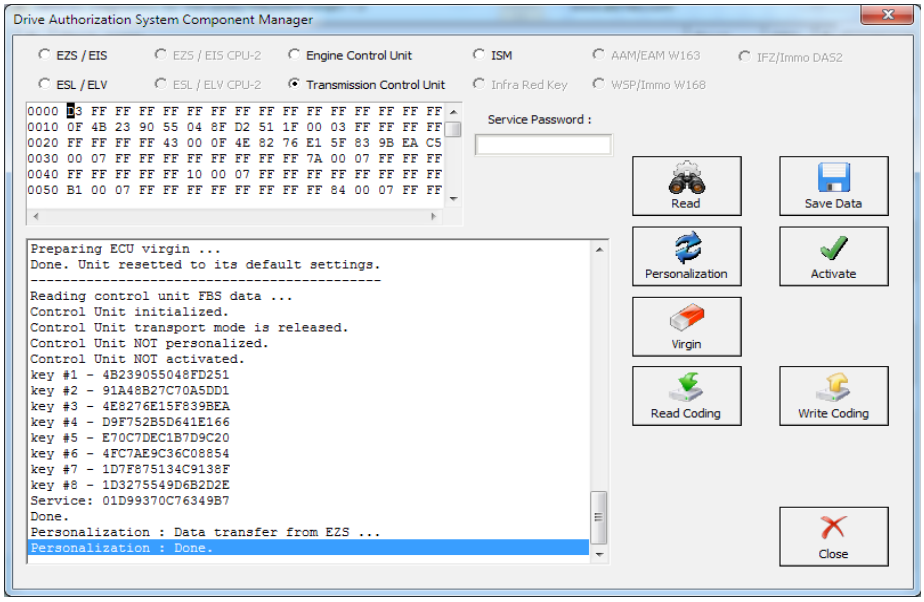
Then the TCU can be made virgin. Please note that for this step you will require internet connection:

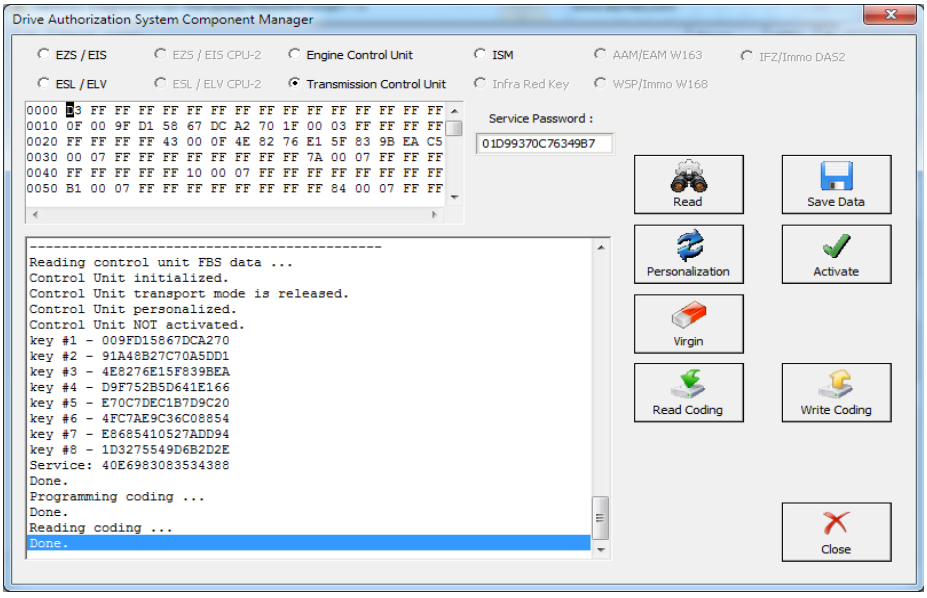


From here on you can proceed to personalize and activate the unit. Please make sure that the Coding is read and saved before making the TCU virgin. You can use it later.

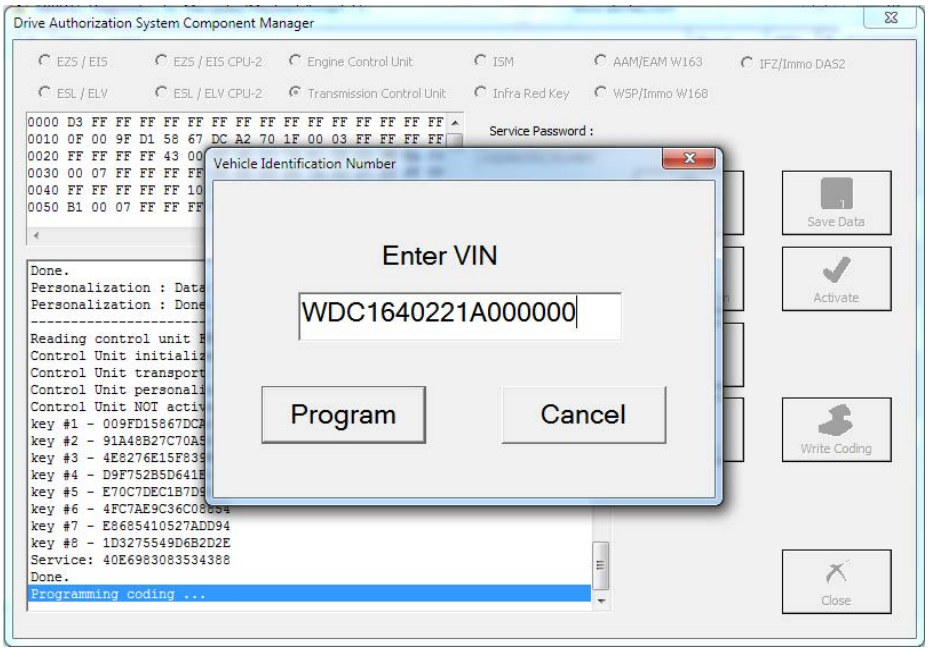


The personalization is the next step you need to take and after that you can write the coding you saved in the previous step.

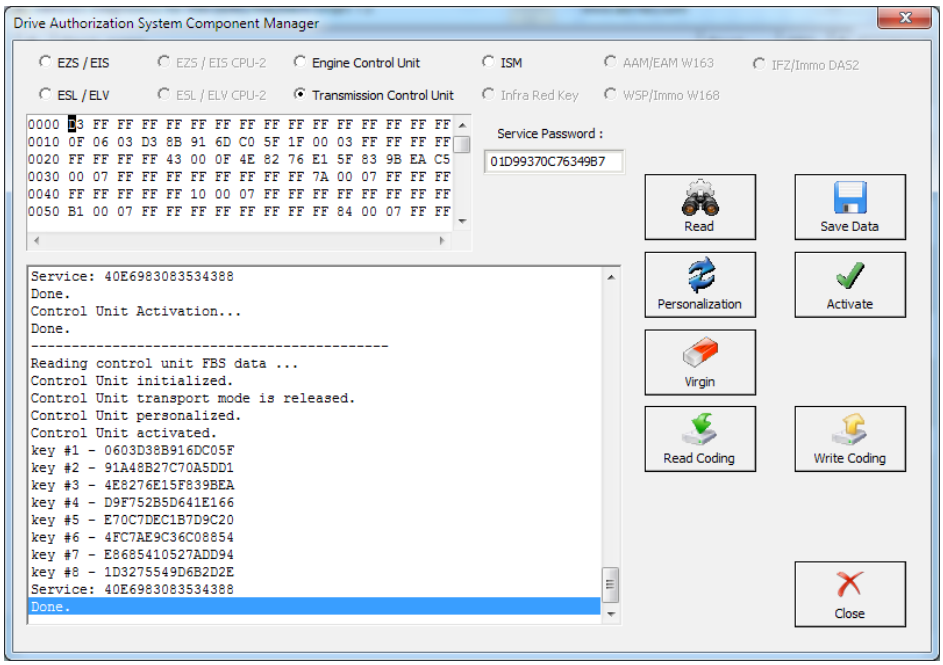




You will need to enter the VIN in this step so please go ahead and do that this point:

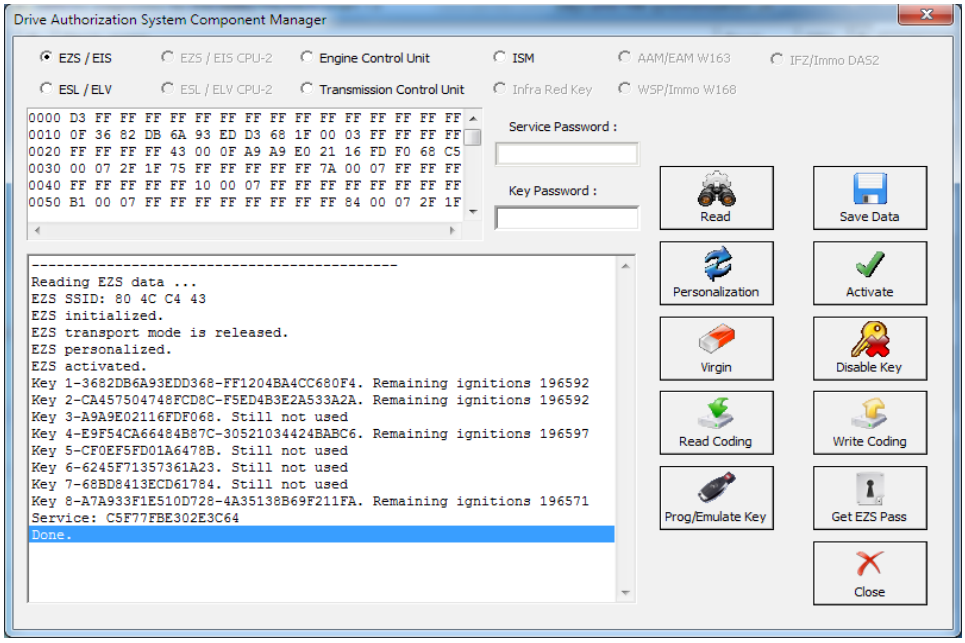


After that you can perform the latest step which is the activation. After that the TCU is ready to work in the car:

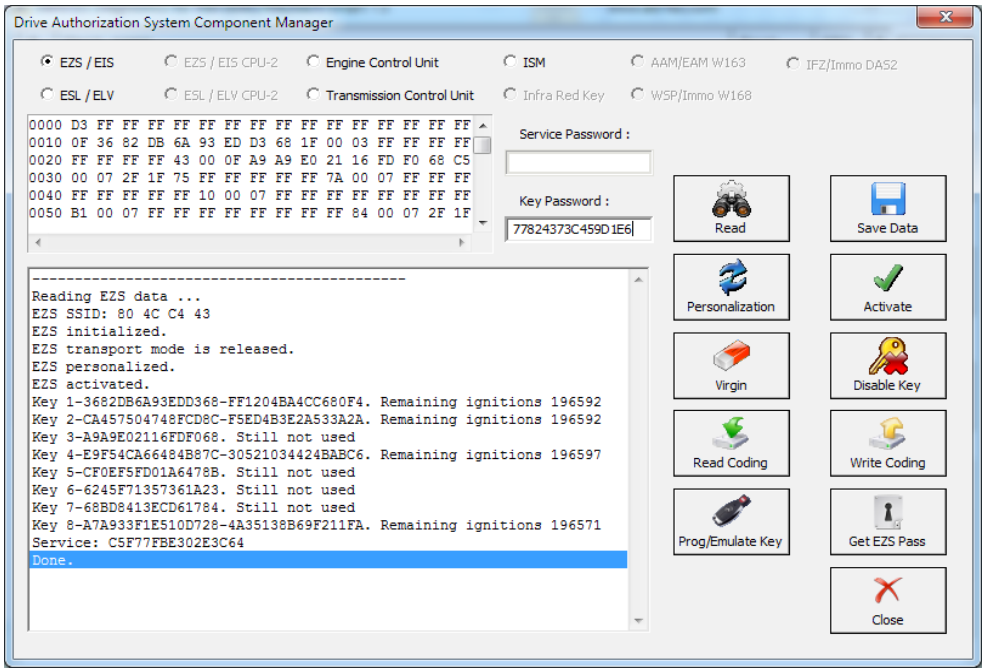


V. Key programming via DAS Manager.

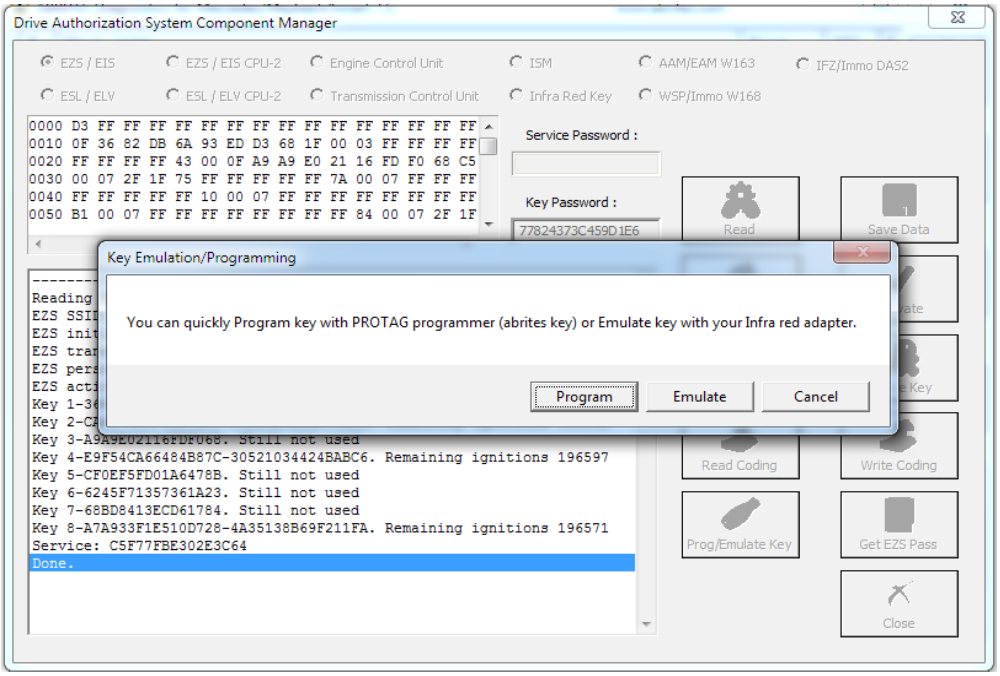
In order to program keys to a Mercedes-Benz vehicle via DAS Manager you will need to read the Electronic Ignition Switch:



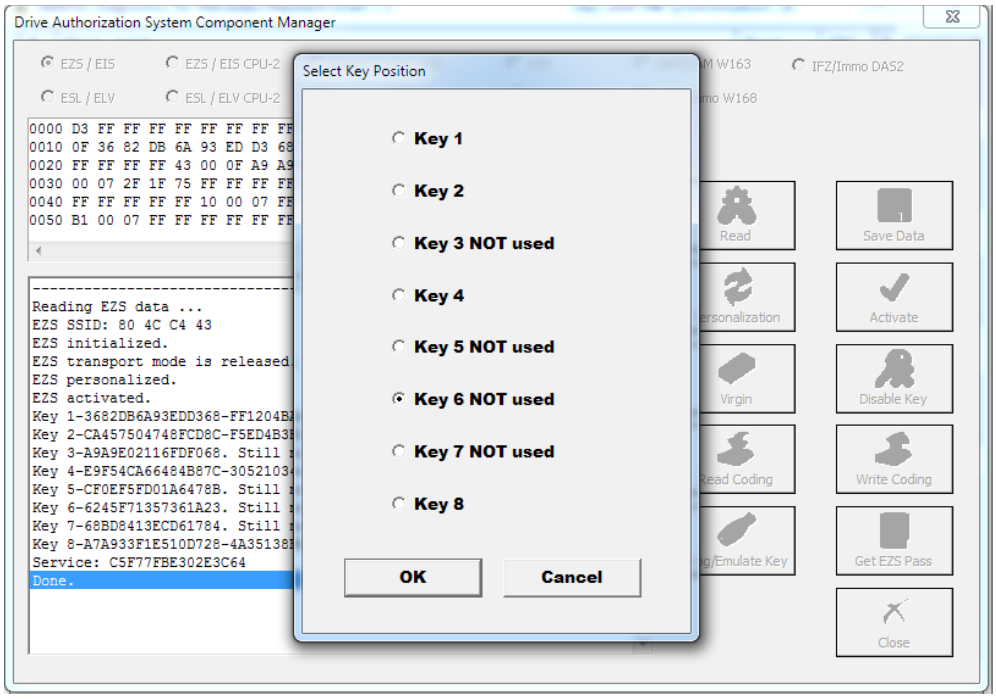
The next step is to add the key password. You can paste it.



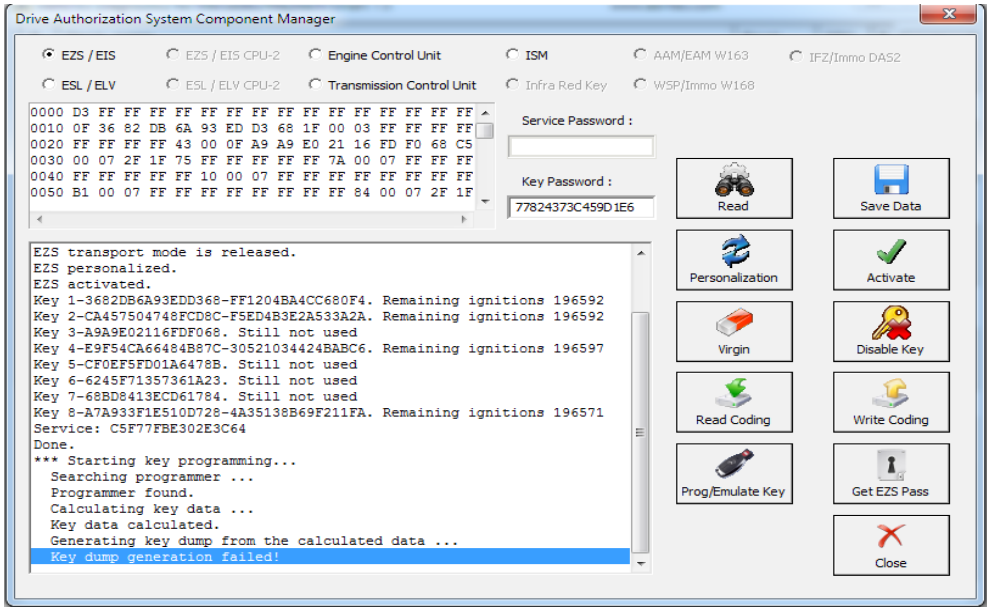
When the key password is added you can Program an Abrites key with PROTAG or Emulate a key with your IR adapter:



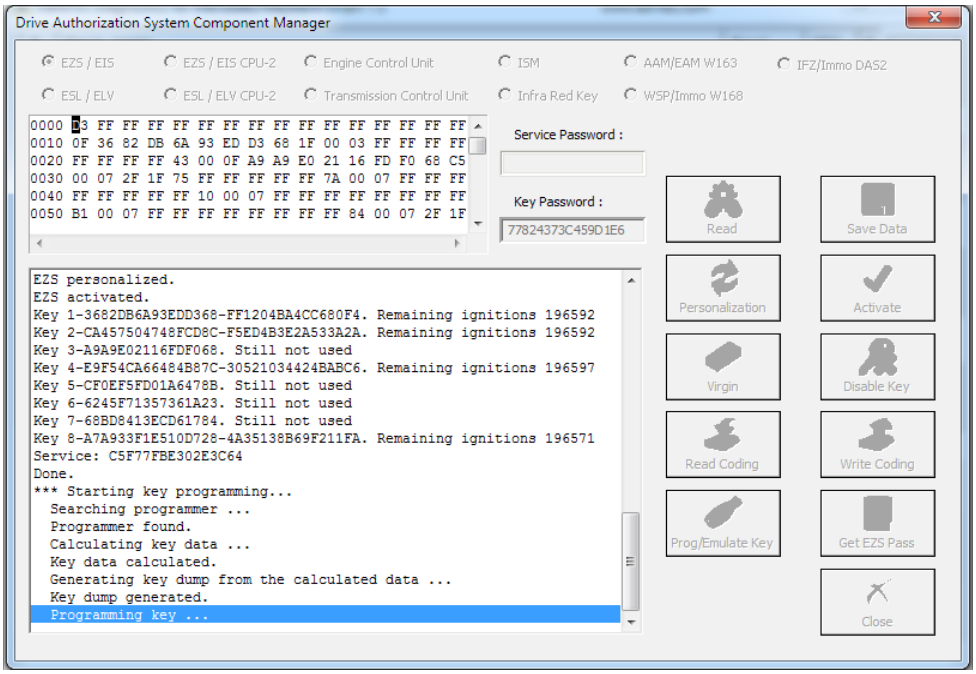
Next, you can choose the key position:



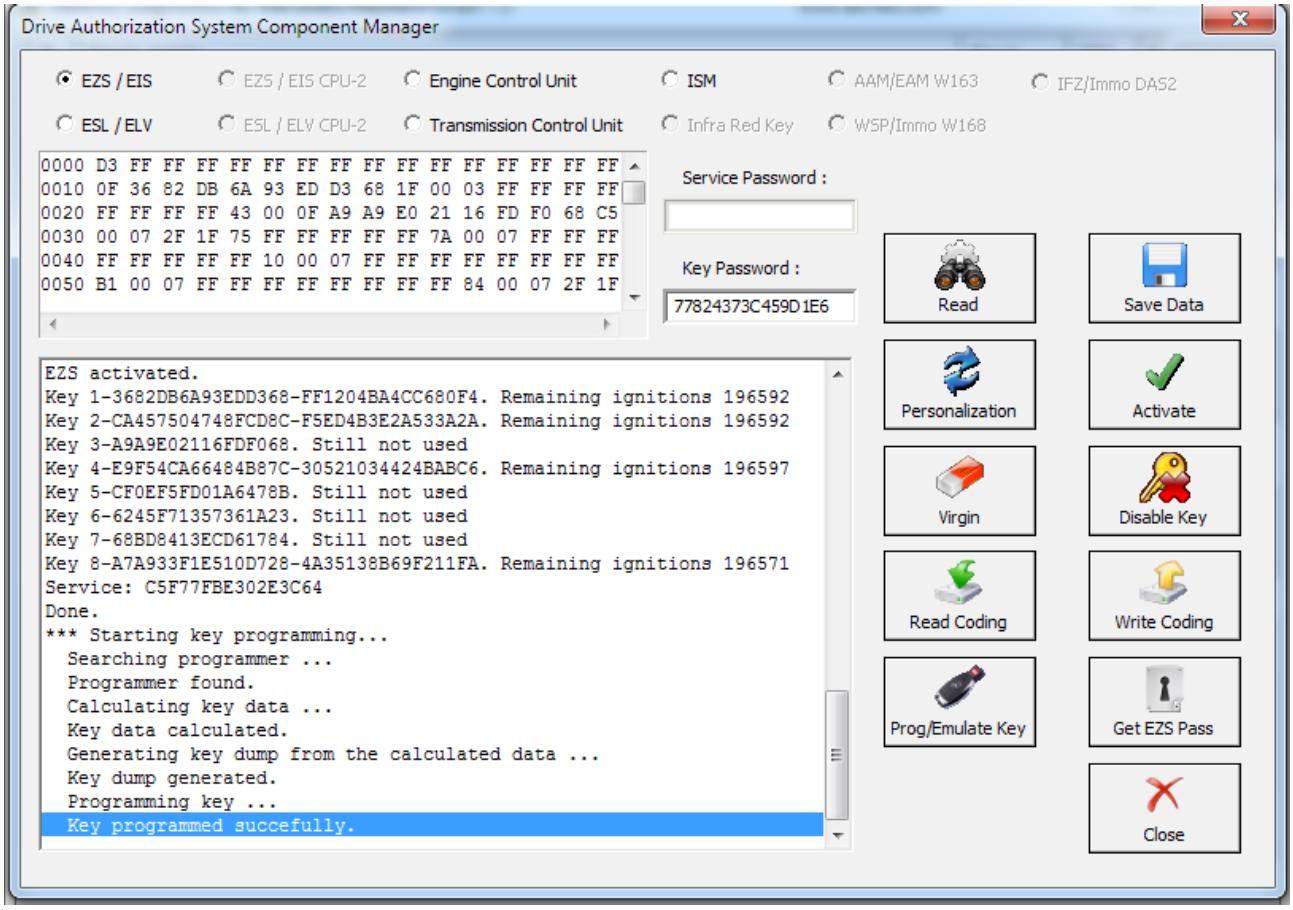
If you receive this message retry the procedure until you succeed.



The Key dump is generated and can be written:

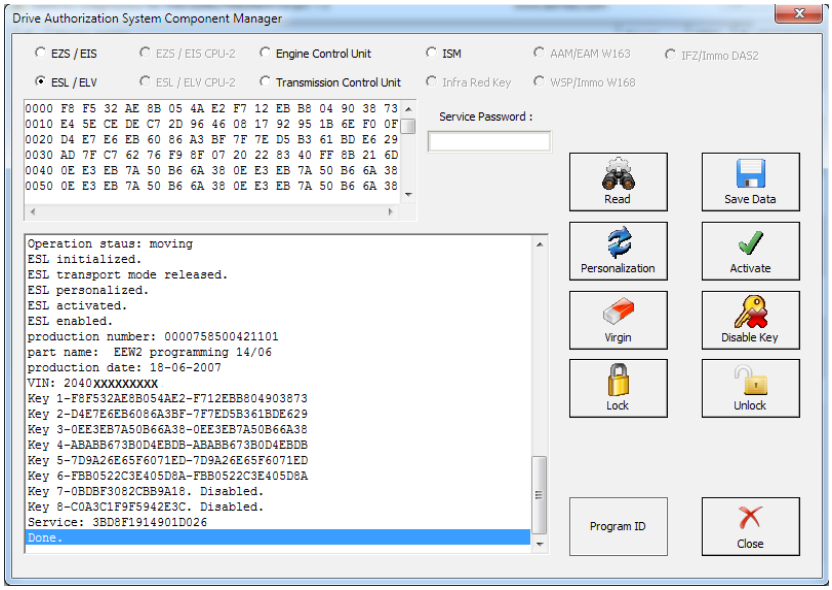


Then the Programming is completed:

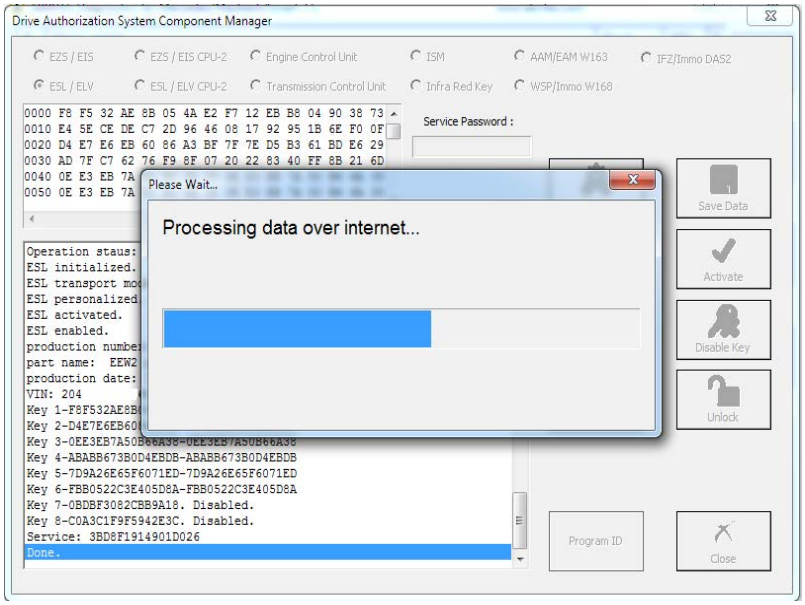


VI. ESL/ ELV

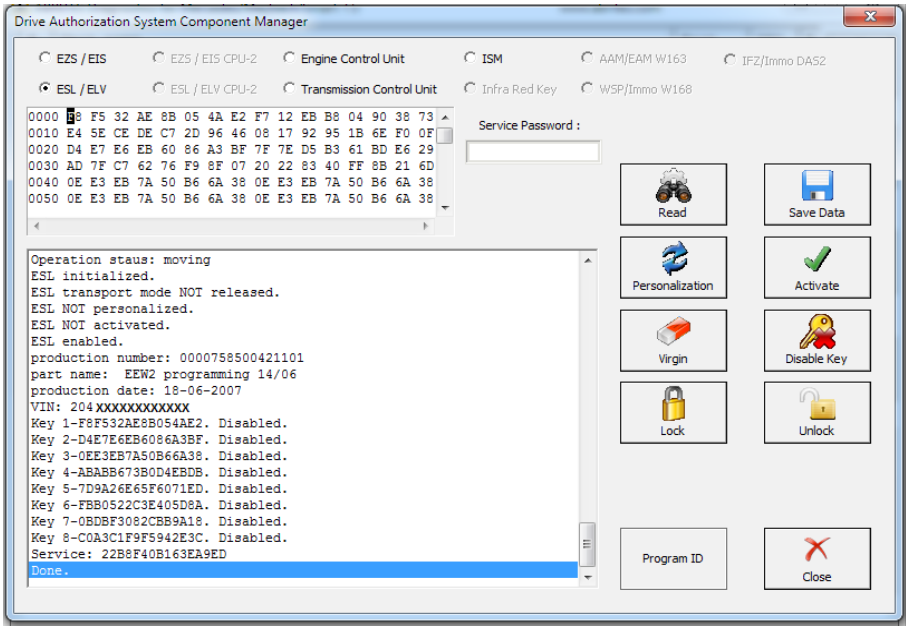
The Electronic Steering Lock is perhaps the most complicated module to work with within the Mercedes-Benz vehicles electronic modules. What needs to be done in order to replace the ESL/ELV is to read it first. Please be informed that to perform this adaptation you will need to bring the **EZS** to a virgin state:



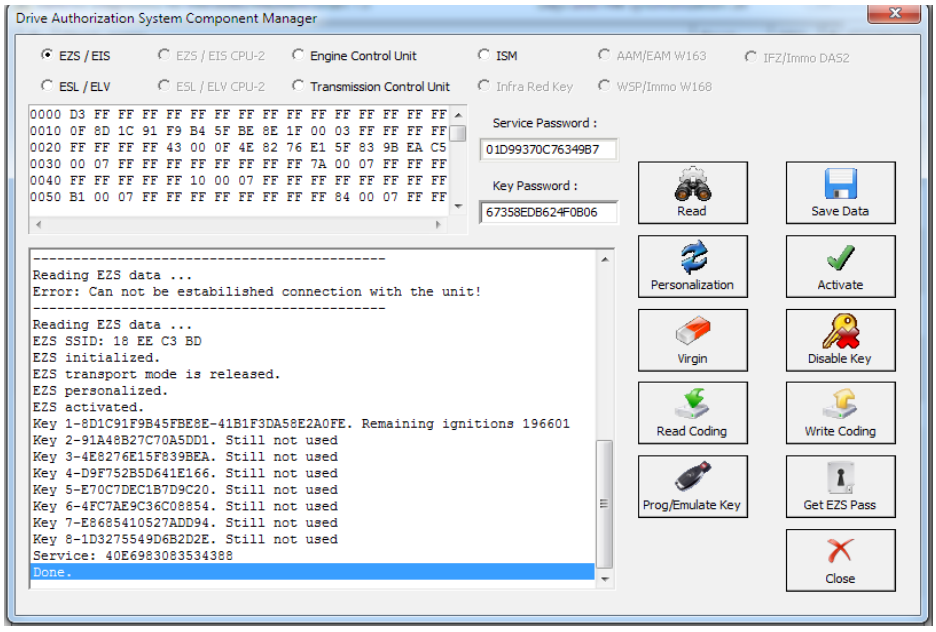
After that you make it virgin. You need internet connection for this part:



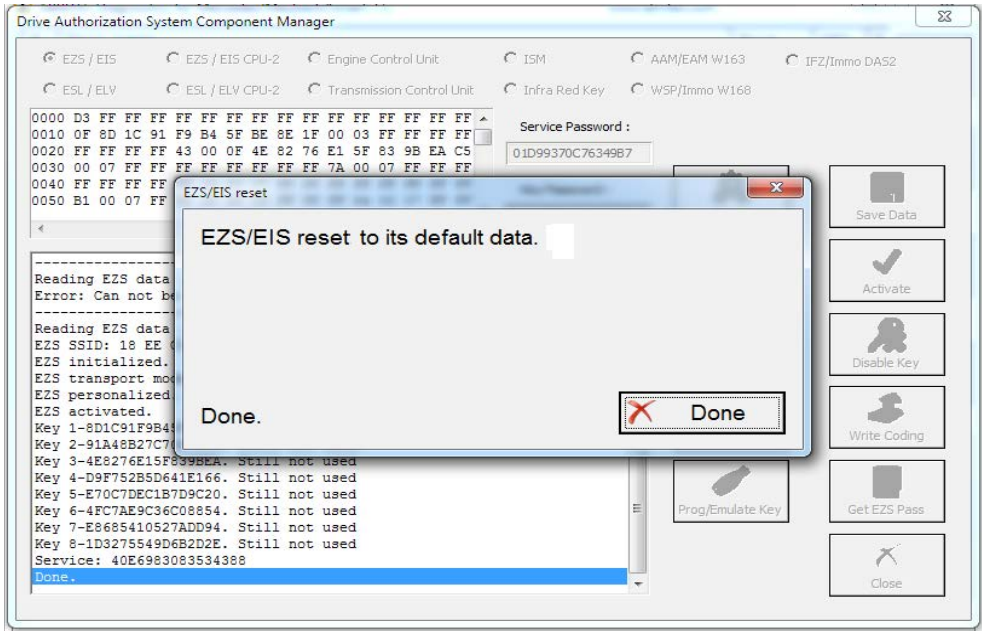
Once the process finishes you will see that making the ESL/ELV virgin is complete:



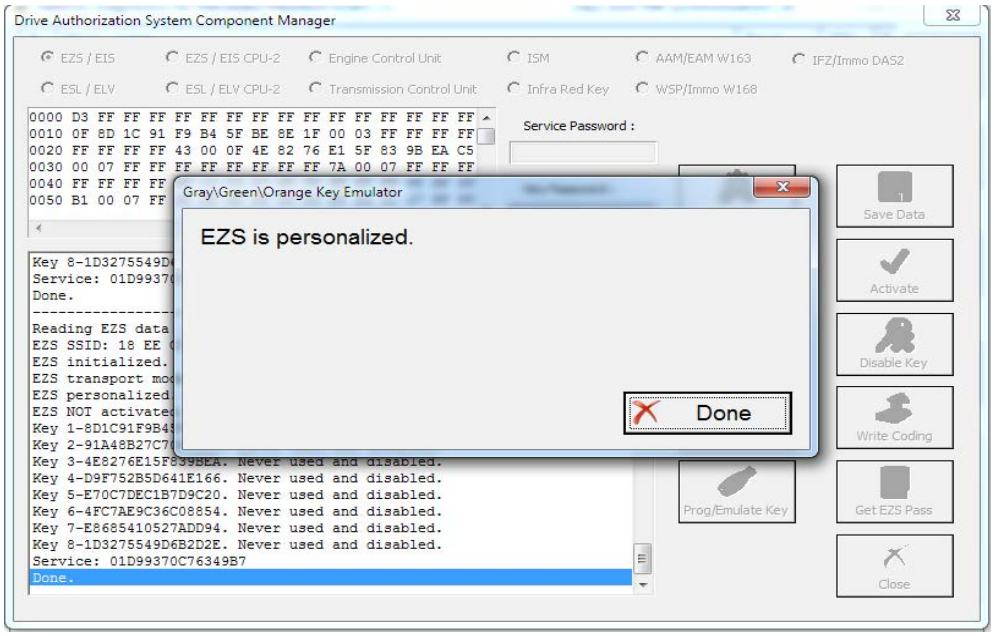
The next step is to read the EZS/ EIS.



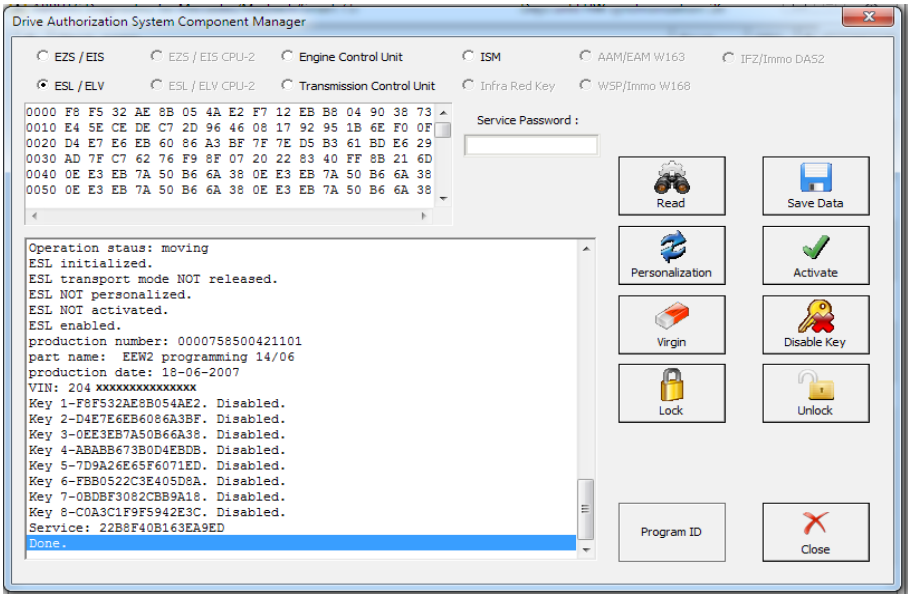
The EZS/EIS needs to be made virgin:



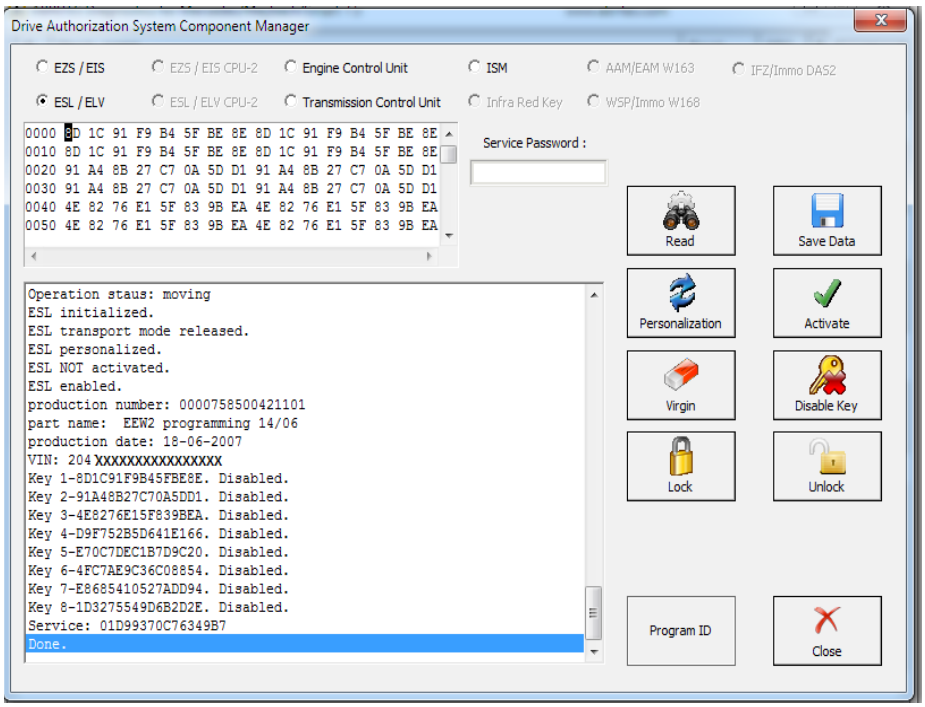
Personalize EZS with the Abrites data:



Then read the ESL before personalizing it:

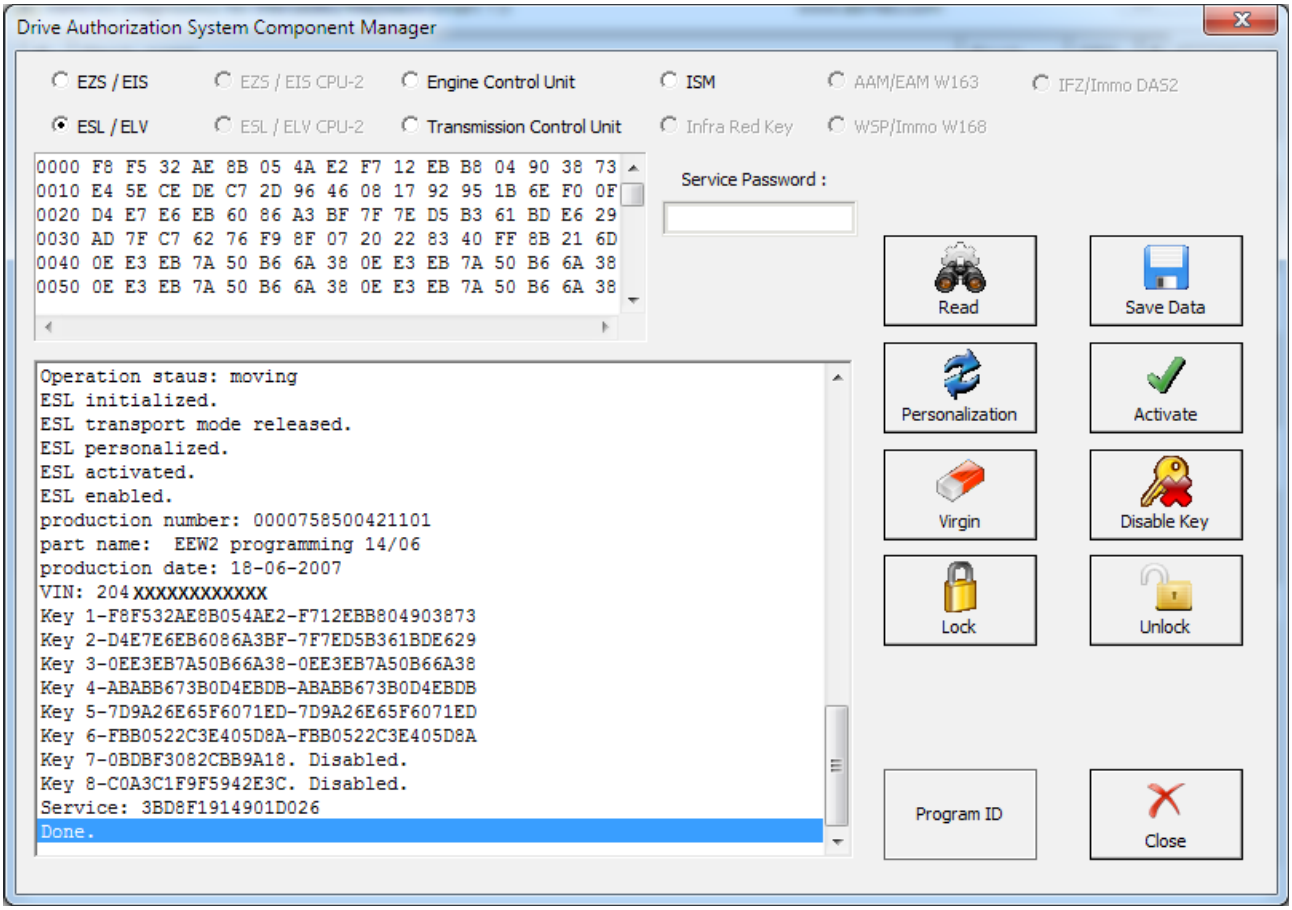


After that you can personalize the ESL/ELV:



Then you will need to program a key using the PROTAG programmer as per the steps above.

After a key is programmed you can Activate the ELV by setting the ignition to the “ON” position:

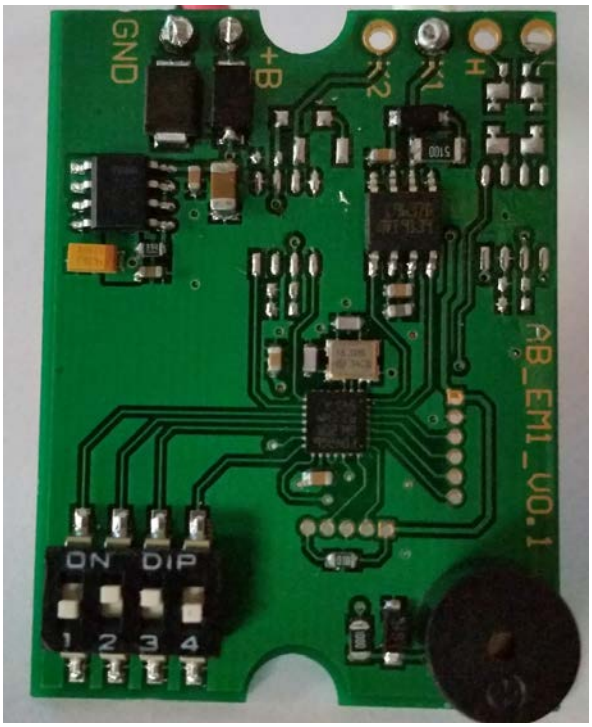


5.17. 3 Abrites ESL Emulator

Mercedes – Benz vehicles are well known for issues concerning the electronic steering lock.

The replacement price and effort creates the need for there to be an emulator, which resolves the issue with the ESL. For this reason we created an emulator to solve the issue.

The Abrites ESL Emulator is a simple to use solution which looks in the following way:



In the bottom left of the emulator you can see the switch board which is used to select the model you are working with.

To determine which switch applies to which model you will need to follow the switch table below.

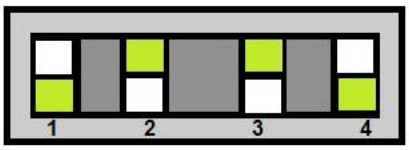
As you can see in the picture you have toggle switches `”1” to “4” and the different combinations between the switches allows you to set the ESL emulator for the different Mercedes- Benz vehicles.

Please follow the pictures closely and pay attention to the models you are working with.

Also please make sure that the switches are toggled and selected outside the car's network and disconnected from the power supply.

W203, W208, W209, W210, W211

W169,T 245(a.k.a W245 B-klasse)



W204, W207, W212,W176/ W246

Note:

The green square respresents the position of the toggle switch

Once
you have determined the model that the ESL emulator will apply to you need to make sure that you are connecting it to the ESL pins of the car in a correct manner. Below you will see some examples of the connection pinouts for the different Mercedes models:

***W176/ W246/ W117 are supported via version 24 + of EM001.**
***W906 Sprinter and W639 Vito are supported and configured as W203,W208, etc.**

5.17.4 ZN051 Distribution Box

The ZN051 Distribution Box is mainly used together with the MN026 Special function for Abrites Diagnostics For Mercedes. The main purpose is to export the password from the EZS 10 times faster than without the DS Box. It has a hidden relay, which cuts the ignition when needed and re-connects it once again automatically. The DS Box allows us to connect it clean between the AVDI and the OBD. In addition to the Fuse Relay that is now built into the Abrites Distribution Box, it's work can also be monitored by the built-in LED.
Using the ZN051 we also open the door for many new features. It allows us to work easily with boot mode on EDC17/ MED17 boot mode for the Abrites diagnostics for VAG and others as well.
The distribution box now also includes the option to be updated so all new future functions and features will be available immediately.

The ZN051 set contains 9 pieces, which are as follows:

Needle Connectors

DB25 Connector Cable

CAN HI and CAN LOW long cables

Fuse Adapter Cable and Crocks Cable

K-Line Cable

Distribution Box

DB15 Boot Mode Connector Cable

Pin Connectors (Used for EM001 update)

Distribution Box
connection ports:

1st two ports (Red and Blue) are for CAN HI and CAN LOW 6-14, the 2nd ports below them are for CAN HI and CAN LOW 3-11. These ports are mainly used when virginizing and adapting Mercedes TCUs and ECUs when using MN026.
Both Green ports K1 and K7 are used for the K-Line connection (K7 has to be used when exporting a password from Mercedes EZS whn using the Relay method).
B+ and GND ports are used when updating EM001 Emulator.
The Relay Ports are both in red and this is where the Fuse Adapter.

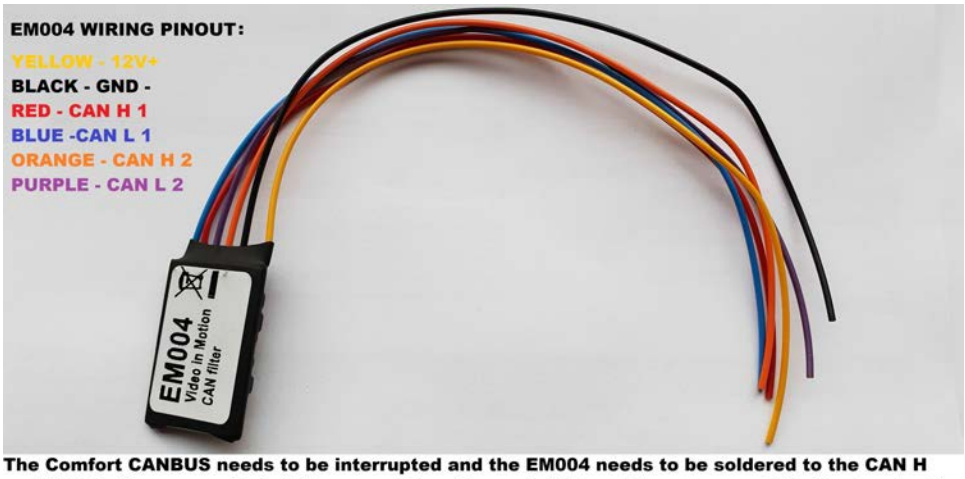
5.17.5 EM004, EM005, EM006 and EM007

1. EM004 emulator – Video in Motion CAN Filter 125k (W167 W292)
With the help of the Abrites EM004 you will be able to allow the video in motion to operate even when the vehicle's coding does not allow this to happen.
If the video in motion cannot be performed via coding you will need to install this emulator in order to allow the VIM to function.
This Emulator can be used for the cars where the video in motion CAN is at 125k speed.
2. EM005 emulator – Video in Motion CAN Filter 500k (W216 W221)
With the help of the Abrites EM004 you will be able to allow the video in motion to operate even when the vehicle's coding does not allow this to happen.
If the video in motion cannot be performed via coding you will need to install this emulator in order to allow the VIM to function.
This Emulator can be used for the cars where the video in motion CAN is at 500k speed.
3. EM006 emulator – Odometer calibration emulator (W204, W212)
The Abrites EM006 Emulator is designed to assist the calibration of vehicles when this cannot be achieved diagnostically.

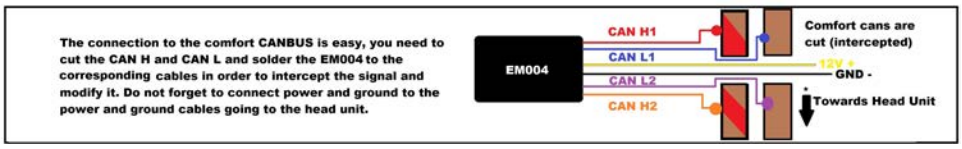
4. EM007 emulator – Odometer correction emulator with cable set (W204, W212)
The Abrites EM007 Emulator is designed to assist the calibration of vehicles when this cannot be achieved diagnostically.
It comes equipped with a cable set which is used to connect to the cluster.

*Note - All of the emulators use the connection diagram for EM004 except for EM007(it is equipped with a cable set)

Version 1

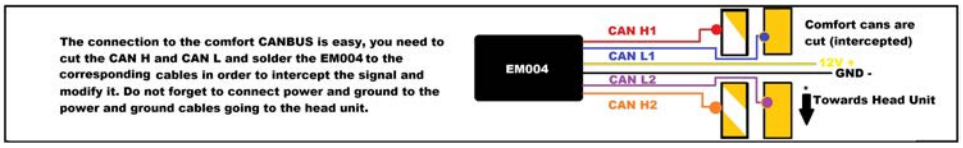


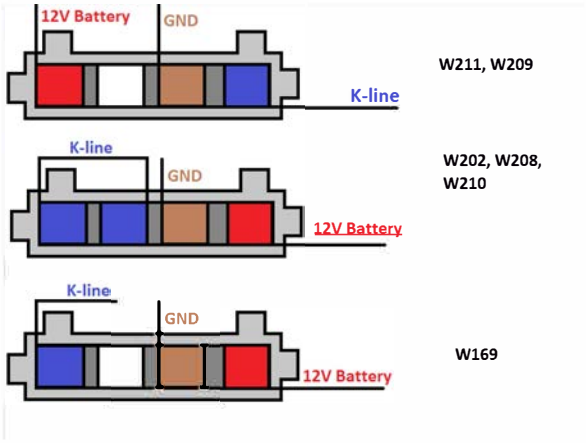
The Comfort CANBUS needs to be interrupted and the EM004 needs to be soldered to the CAN H and CAN L. You can easily tell them apart from the rest of the cables when you take the head unit out. The cables for the comfort CAN are BROWN/ RED and SOLID BROWN

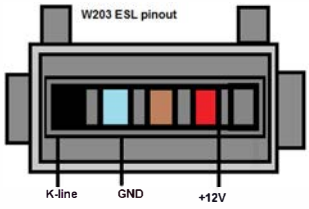


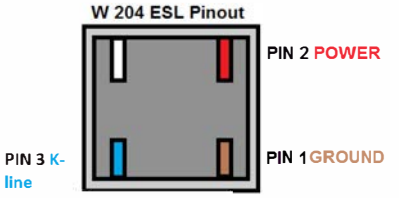
Version 2

The Comfort CANBUS needs to be interrupted and the EM004 needs to be soldered to the CAN H and CAN L. You can easily tell them apart from the rest of the cables when you take the head unit out. The cables for the comfort CAN are Yellow/ White for CAN H and Solid Yellow for CAN L



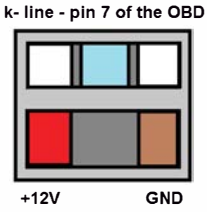




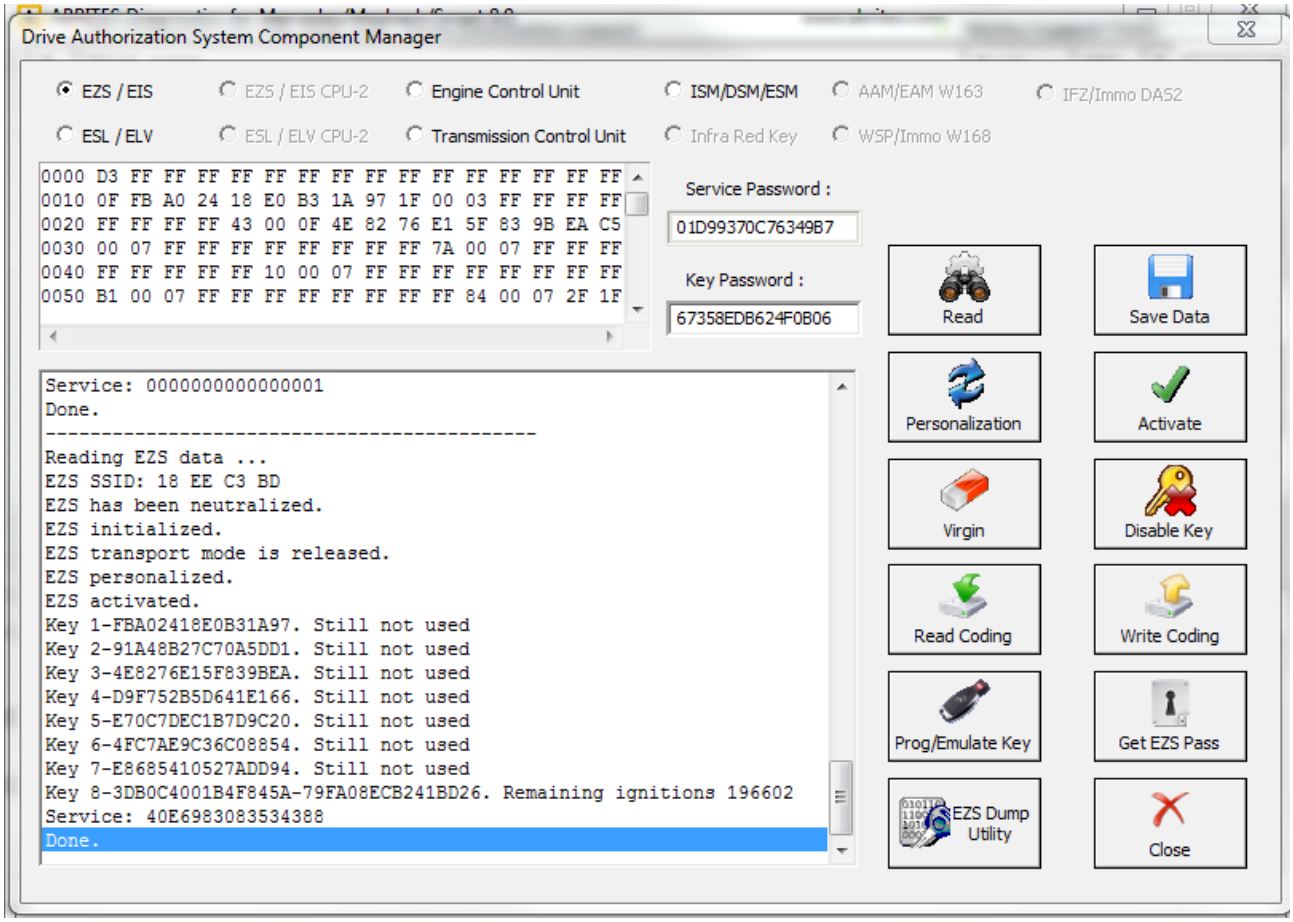


The pins on the W204/ W207/W212 are numbered.
Please pay attention to the digits next to each pin

W176/ W246 A class/ B class ESL connector pinout.

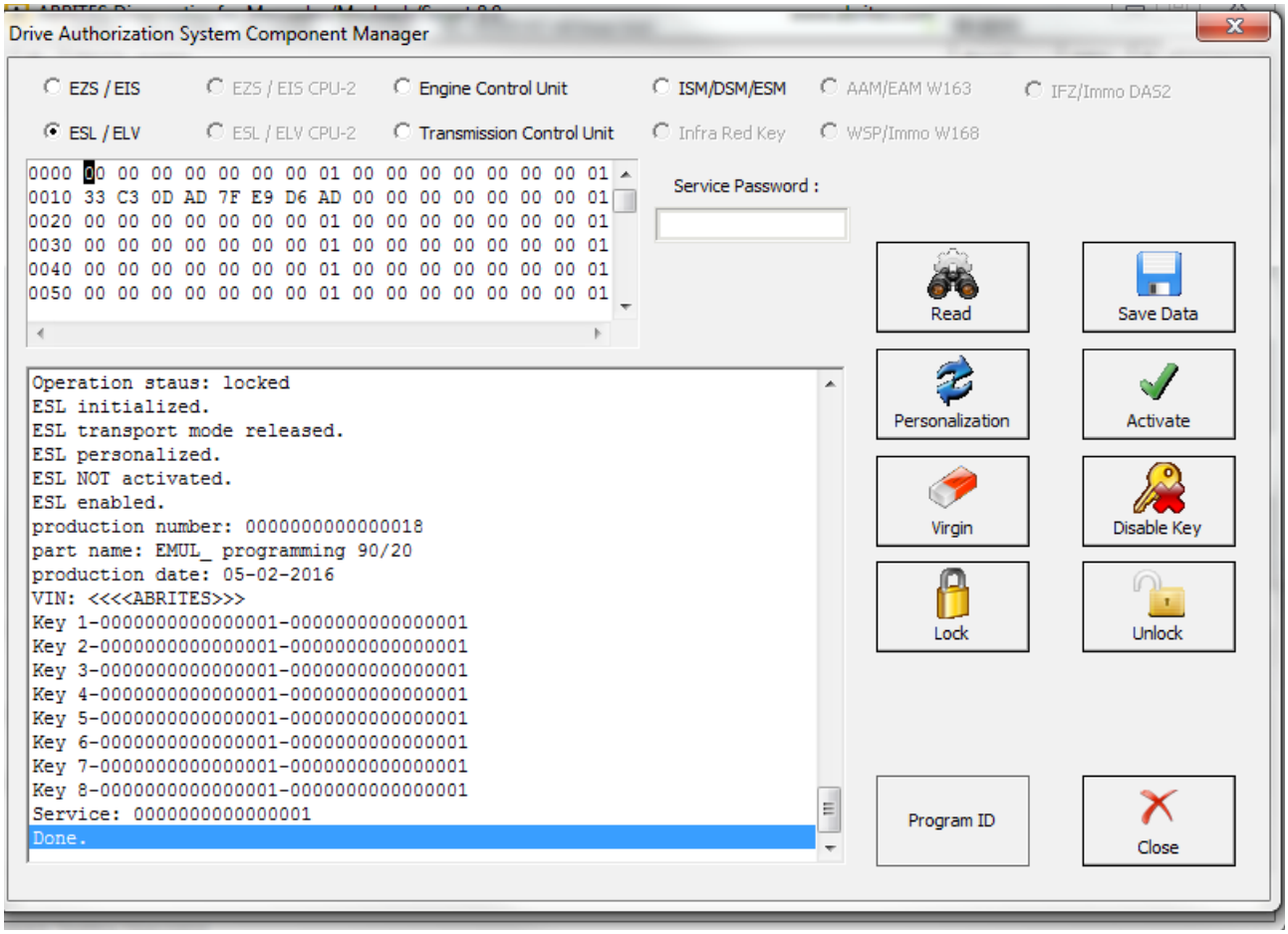


For most models it will be a direct plug in, but in the case of the W204, W207 and W212 for example you need to follow a procedure to perform the ESL emulator adaptation once you have the Key password. The EZS needs to **be read, then press SAVE DATA (this is the FBS/DAS data), save the data,** then make sure to save the coding and know where they are on your computer



***It is only after you have done this that you can move on to the ESL**

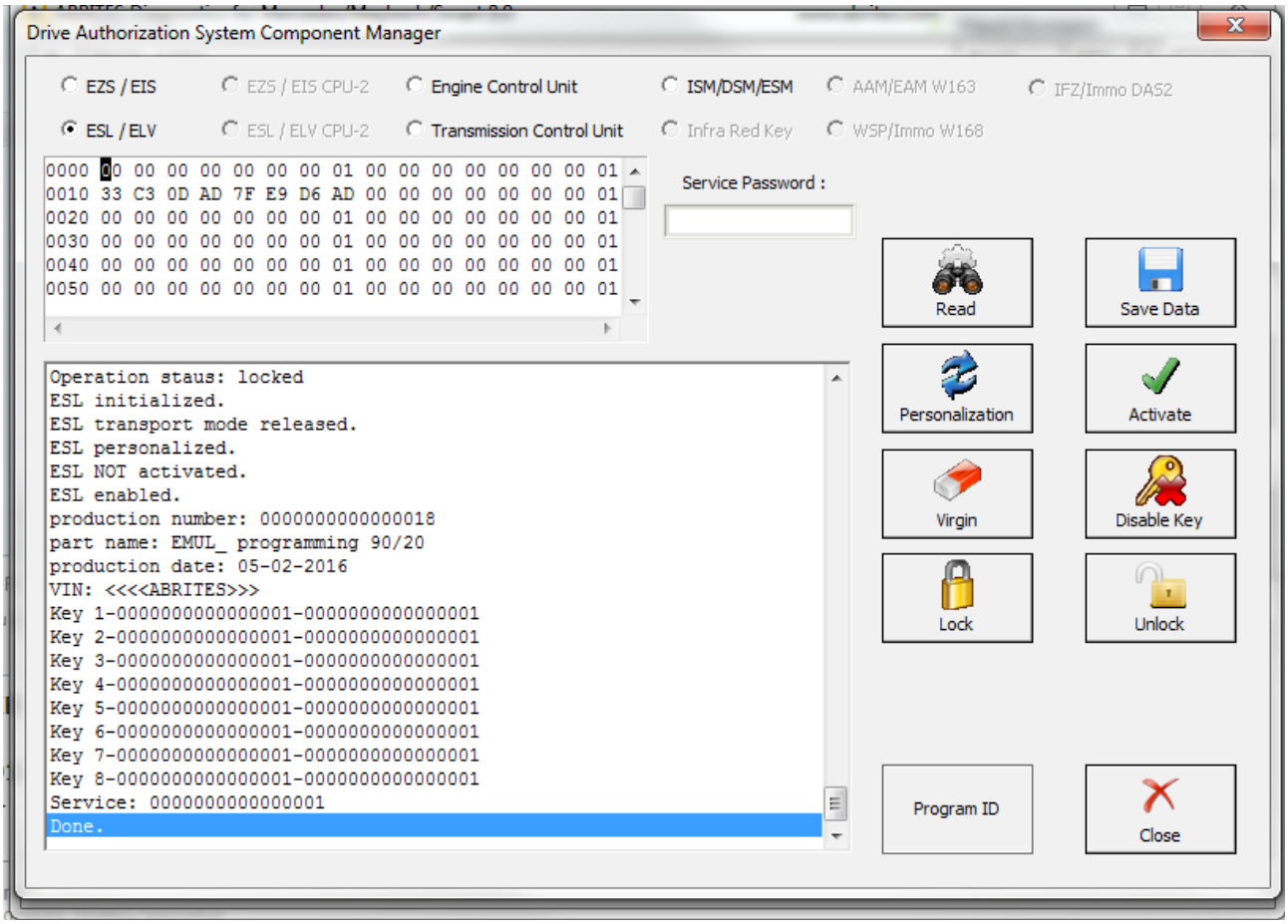
4. The ESL (**EMULATOR**) needs to be read



After that the software will ask you to connect the LIN to the ESL and you will have the option to personalize the ESL with the FBS/ DAS data that you saved from the EZS.

Note that the ESL of the car MUST be disconnected when adapting an Abrites emulator!

5. Then the ESL emulator needs to be personalized to the EZS using its data. Please make sure that there is no key in the EZS and that the EZS does not fall asleep during this. A good way to ensure that is to turn the key in the EZS before starting the procedure and then take it out. In almost all cases turning the lights on the car to the “ON” position will allow you to work with the car without the EZS falling asleep.



*** When you are done and the procedure for adaptation is completed the ESL emulator will beep longer when the ignition is being turned on and shorter when it is being turned off.**

*** If it is needed the Emulator can be updated. This is done by connecting the positive, negative and K-line of the emulator is connected to the AVDI and selecting the EMULATOR update function from the special function in the Abrites diagnostic software. Connect, select the function and wait for the EMULATOR to be updated.**

VII. Connecting via Internal CAN

In order to work with various components within the Mercedes-Benz vehicle range you will sometimes need access to the internal CAN and LIN network of the vehicles.

In the cases of the ELV units you need direct connection in order to bring the unit to a virgin state. Everything else is done via OBD.

We can recommend the usage of the following cable when connecting to the internal CAN network. The cable itself uses a DB25 connection and connects directly to the AVDI's DB 25 port.

On the DB 25 connector you need to follow this principal:
- PINs 5 and 6 – Ground
- Pin 7 – CAN H

- PIN 15 – CAN L

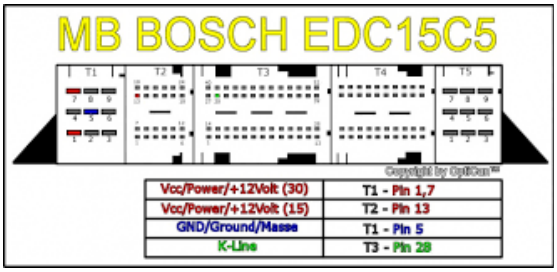
This is the connection that is required.

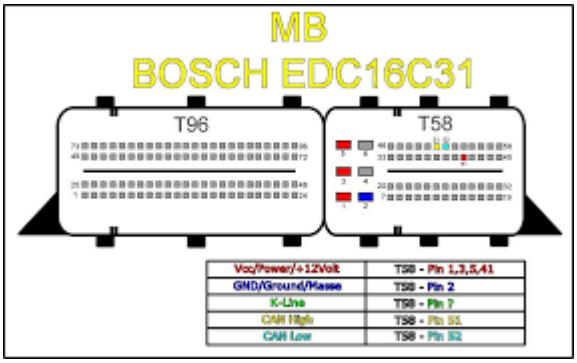
A good rule of thumb in the Mercedes-Benz vehicles is that in most cases the different CANs have similar colouring. For example with CAN C – usually the green wire is the LOW can and the green with white is the HIGH.

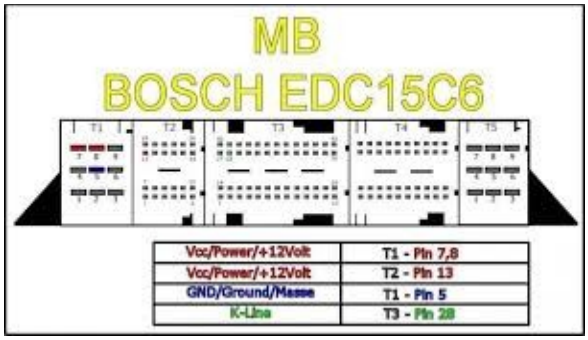
With CAN B – LOW is normally brown and HIGH is normally brown with red.

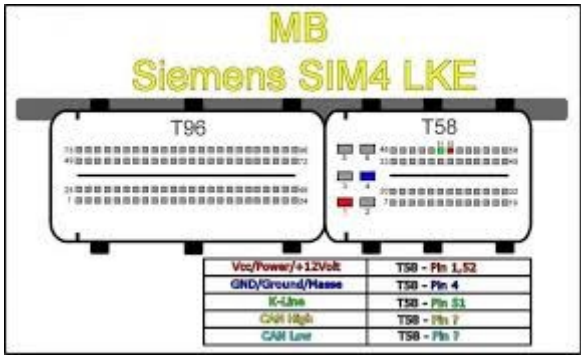
N.B. Whenever you are connecting modules on a bench you need to be mindful of the resistors described below and where to place them, Always make sure to work with a constant power supply of at least 12V and ALWAYS put your safety first. Make sure that the correct pinouts are used and that the exact connection is followed

Here are some common pinouts for various modules:

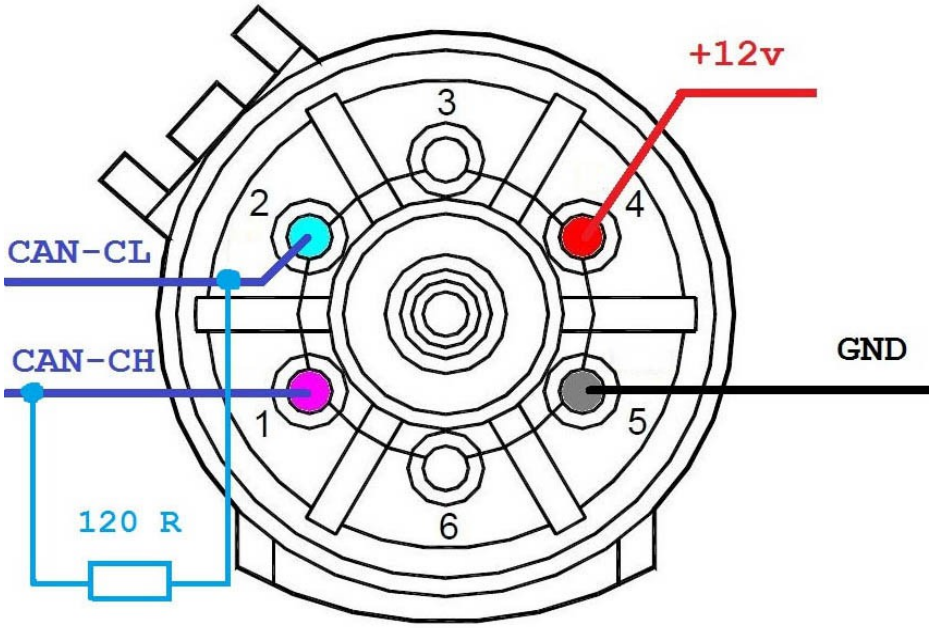




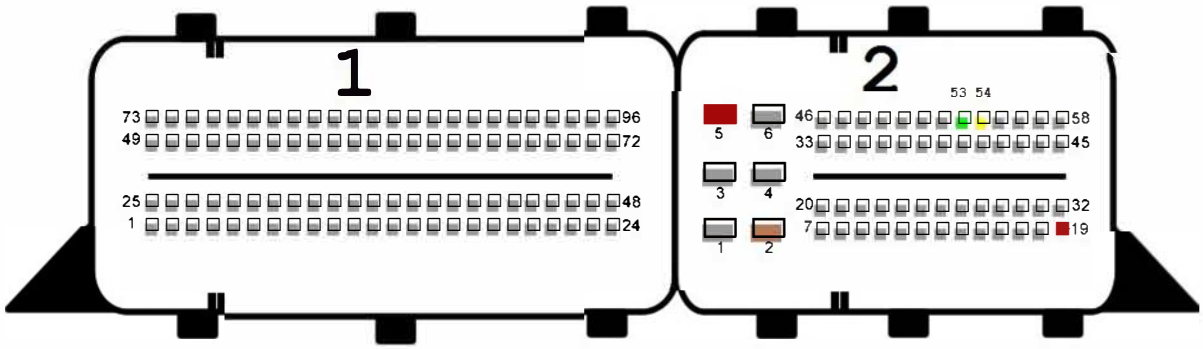


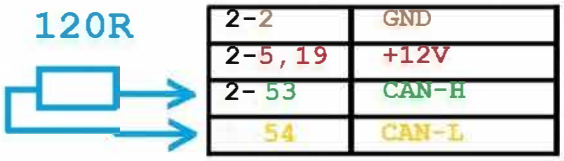


General 7G connection

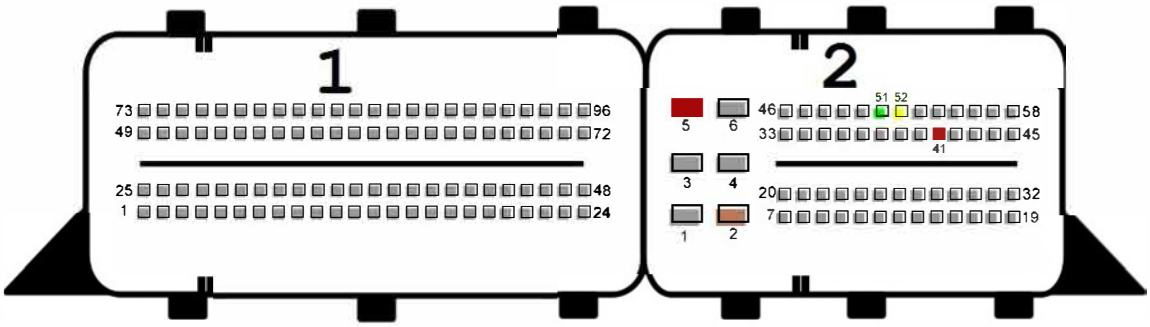


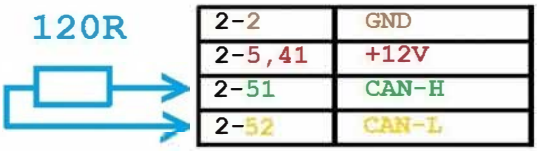
CR3.xx

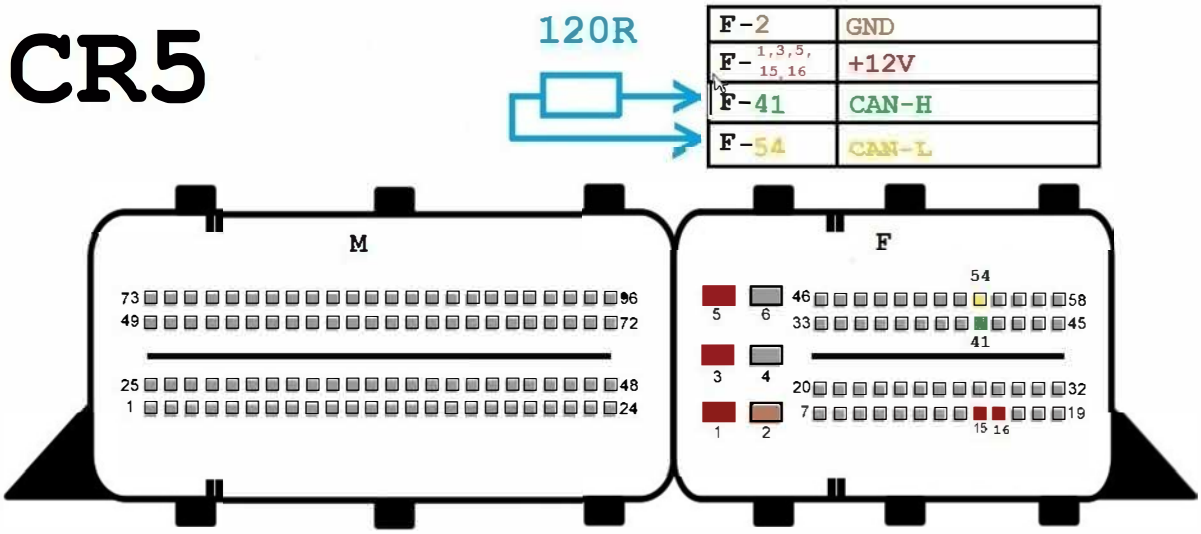

1
73
96
49
72
25
48
1
24
2
53 54
5
6
46
58
33
45
3
4
20
32
7
19
1
2

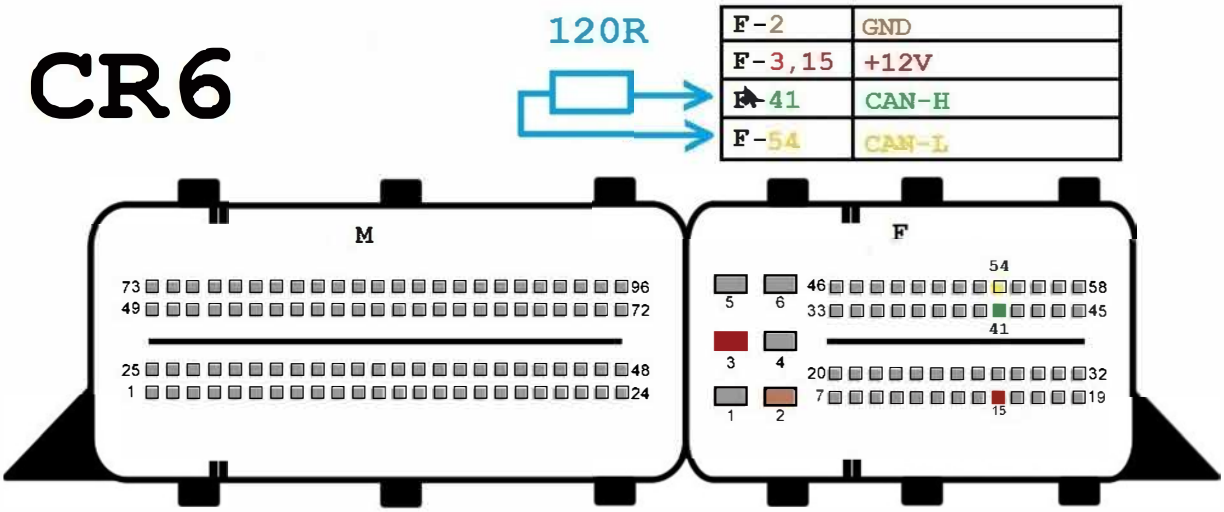

120R
2-2
GND
2-5,19
+12V
2- 53
CAN-H
54
CAN-L

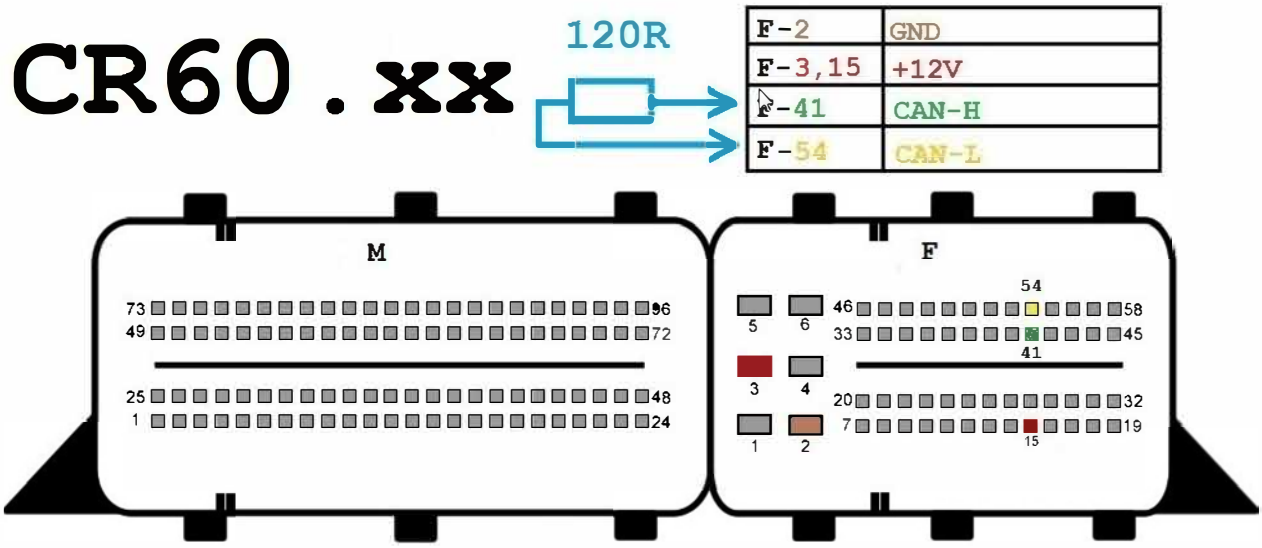
CR4.xx

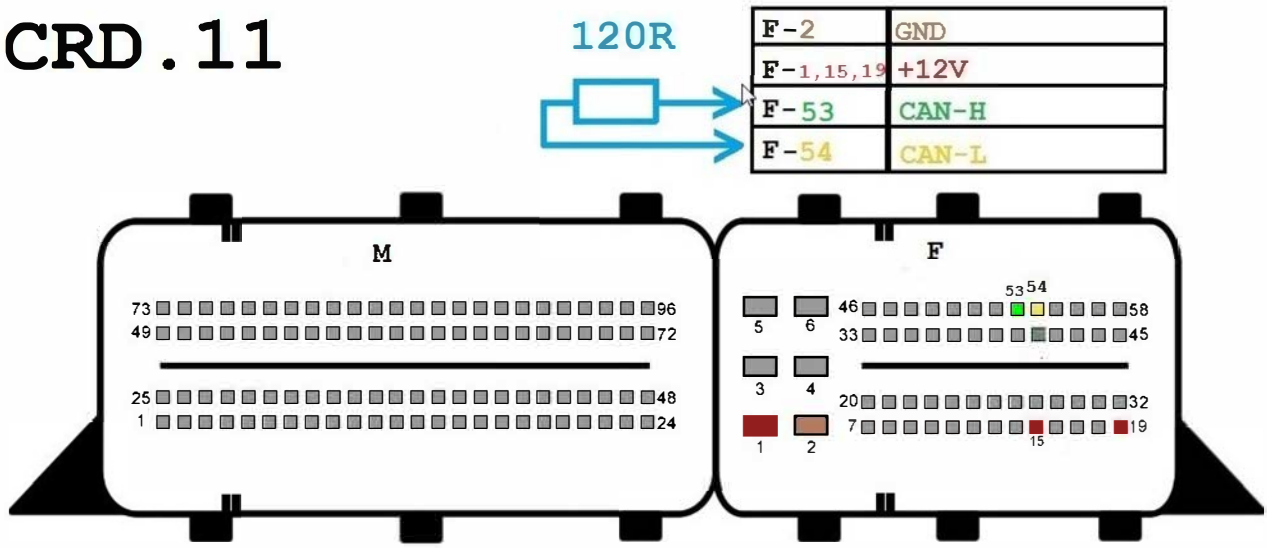

1
73
96
49
72
25
48
1
24
2
51 52
5
6
46
58
33
45
41
3
4
20
32
7
19
1
2

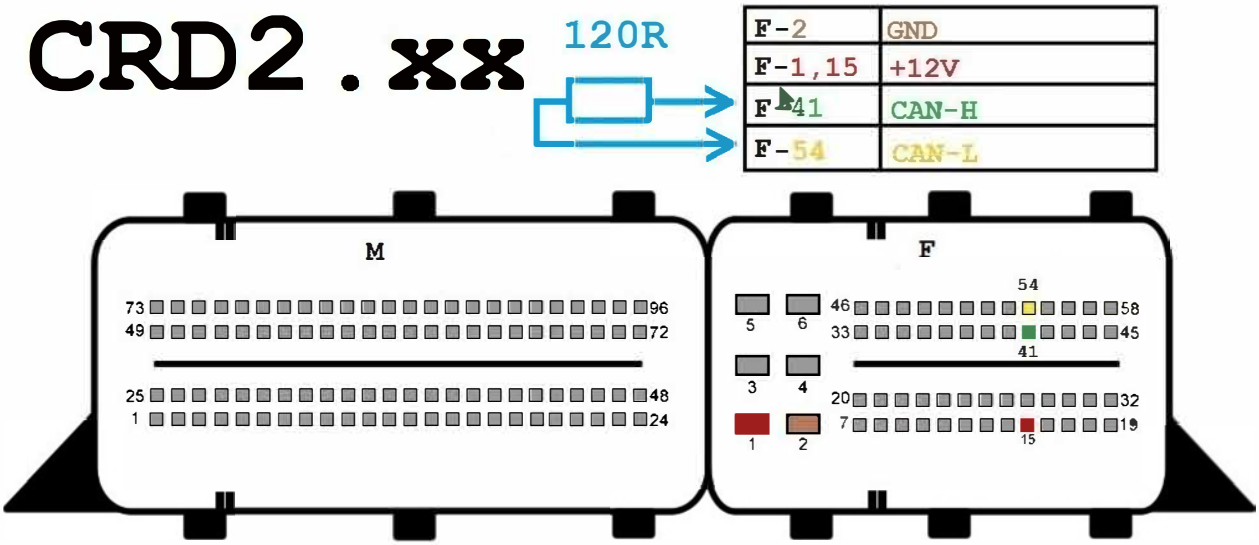

120R
2-2
GND
2-5,41
+12V
2-51
CAN-H
2-52
CAN-L


CR5
120R
F-2 GND
F-1,3,5,15,16 +12V
F-41 CAN-H
F-54 CAN-L
M
F
73
96
49
72
25
48
1
24
54
46
58
33
45
41
5
6
3
4
20
32
7
19
1
2
15 16


CR6
120R
F-2 GND
F-3,15 +12V
F-41 CAN-H
F-54 CAN-L
M
F
73
96
49
72
25
48
1
24
54
46
58
33
45
41
5
6
3
4
20
32
7
19
1
2
15


CR60.xx
120R
F-2 GND
F-3,15 +12V
F-41 CAN-H
F-54 CAN-L
M
F
73 96
49 72
25 48
1 24
54
46 58
33 45
41
5 6
3 4
20 32
7 19
1 2
15


CRD.11
120R
F-2 GND
F-1,15,19 +12V
F-53 CAN-H
F-54 CAN-L
M
F
73 96
49 72
25 48
1 24
53 54
46 58
33 45
5 6
3 4
20 32
7 19
1 2
15


CRD2.xx
120R
F-2 GND
F-1,15 +12V
F-41 CAN-H
F-54 CAN-L
M
F
73
96
49
72
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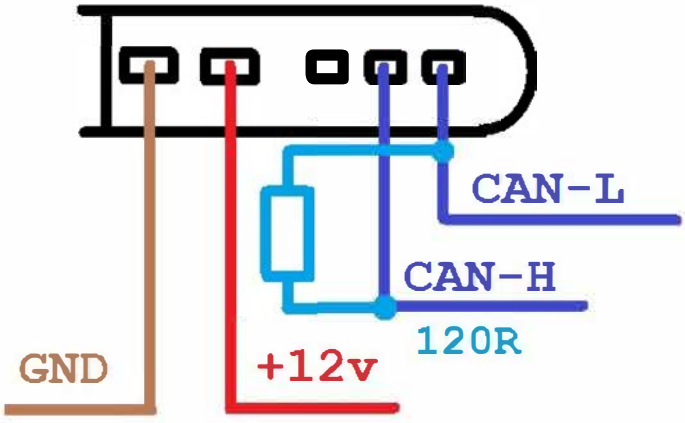
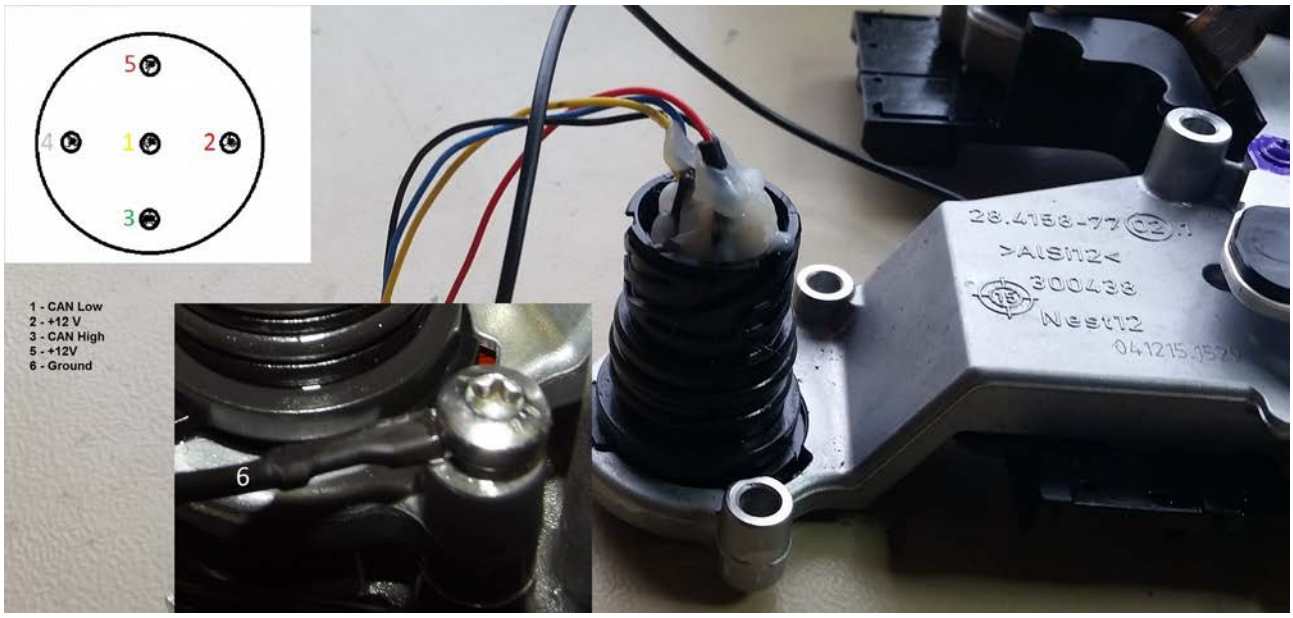
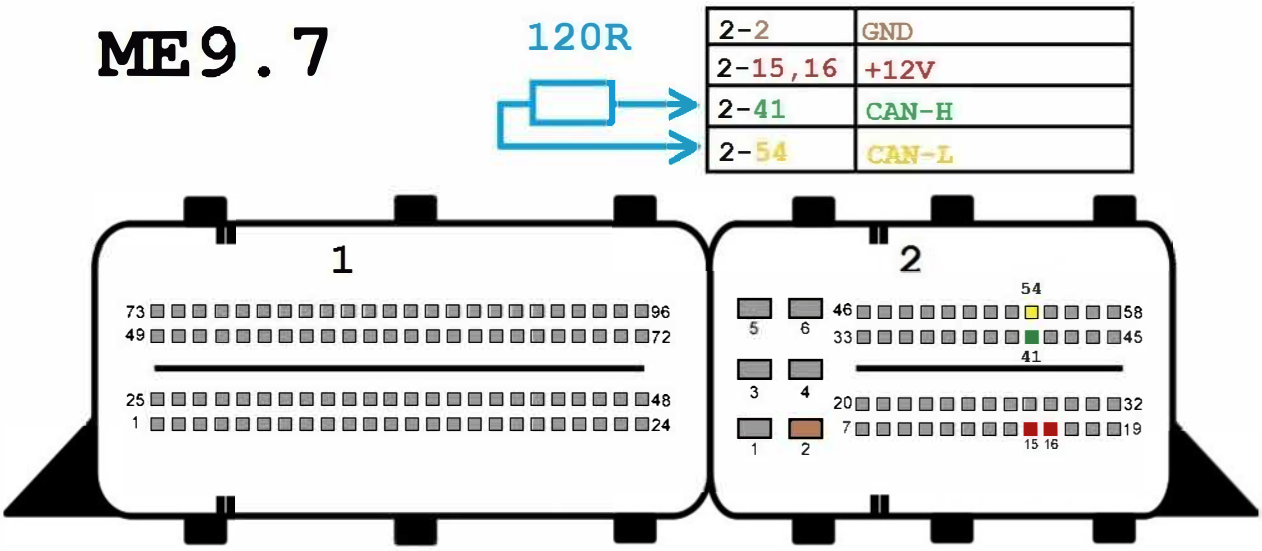
6
3
4
20
32
7
19
1
2
15


CAN-L
CAN-H
120R
GND
+12v



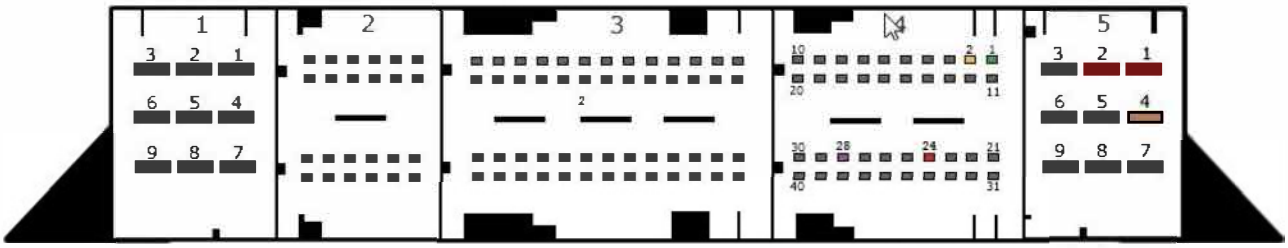
W117/W176/ W246 Double Clutch gearbox TCM

ME9.7



2-2	GND
2-15,16	+12V
2-41	CAN-H
2-54	CAN-L

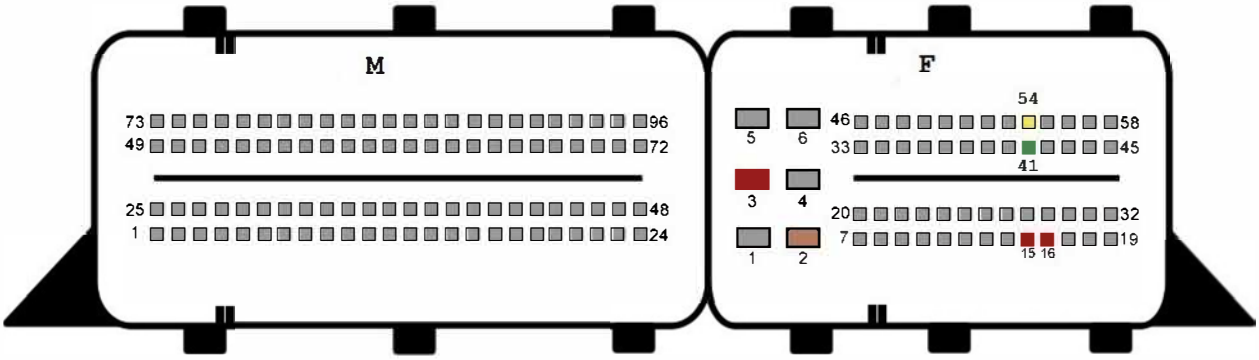
SIM4LE



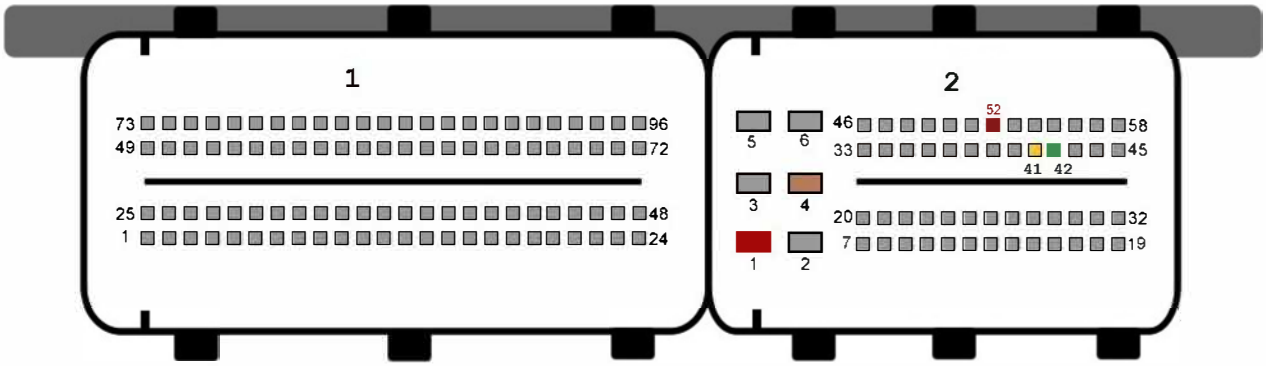
5-1,2,24	+12v
5-4	GND
4-28	K-LINE
4-1	CAN-H
4-2	CAN-L

SIM266

F-2	GND
F-3,15,16	+12V
F-41	CAN-H
F-54	CAN-L



SIM271KE2.0


1
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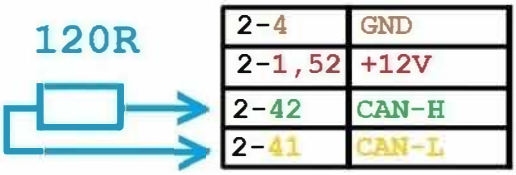
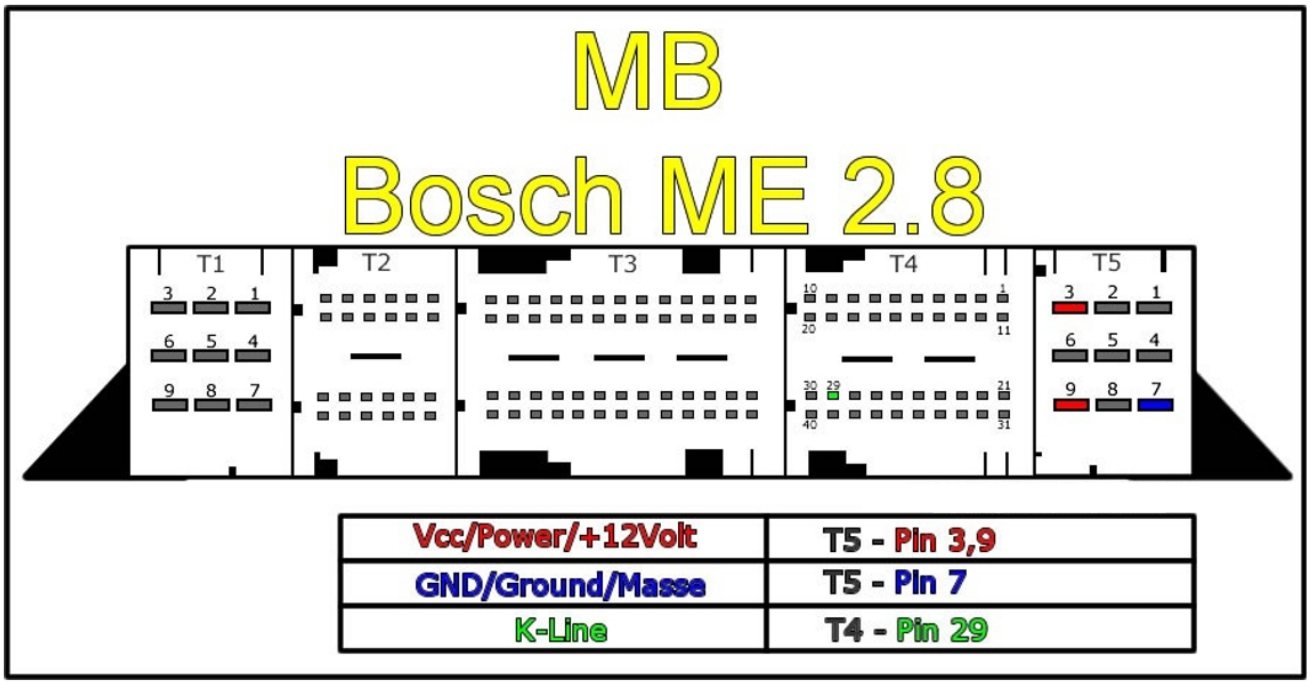
1
2


120R
2-4 GND
2-1,52 +12V
2-42 CAN-H
2-41 CAN-L



EIS/ EZS connection pinouts for bench connection.

*Only work outside the car when there is no other way. The margin for error is too high and the Abrites team cannot guarantee that the software will work correctly if you have different wiring. We always prefer to work in the car.

- W210 / W208 / W202. For these cars there are three separate connectors on the back side of the EIS/ EZS – A, B and C:

*** Connector A:**

pin 1: CAN H

pin 2: CAN L

*** Connector B:**

pin 3: GND

pin 4: ESL 1

pin 5: ESL 2

pin 7: +12V

pin 14: K-Line

*** Connector C:**

pin 2: **+12V**

pin 4: **+12V**

pin 5: **ELV B+**

pin 6: **+12V**

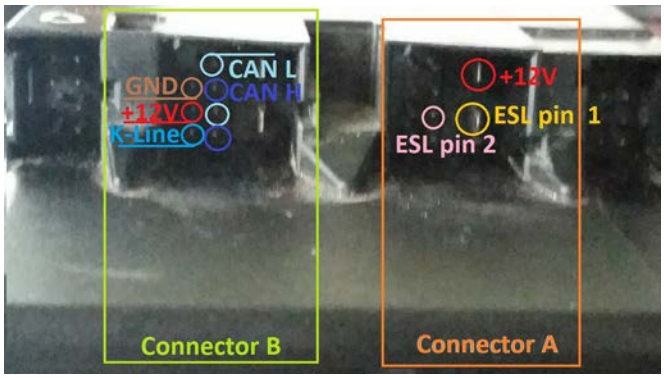
- W203 / VITO W639. These cars have 4 connectors but the ones you need are the two in the middle:

*** Connector A:**

pin 7: ESL 2

pin 9: +12V

pin 10: ESL 1



*** Connector B:**

pin 2: GND

pin 3: +12V

pin 4: K-Line

pin 5: CAN L

pin 6: CAN H

pin 7: CAN L

pin 8: CAN H

-W220 / W215. Here the connectors are two A and B:

*** Connector A:**

pin 1: +12V

pin 3: +12V

***Connector B:**

pin 1: +12V

pin 2: K-Line

pin 3: CAN L

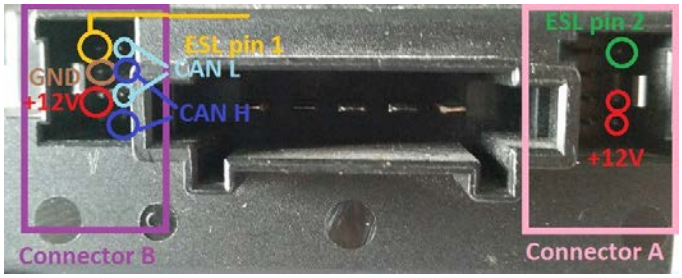
pin 4: CAN H

pin 5: GND

pin 7: CAN H

pin 8: CAN L

-W211 / W219 / W209. Three connectors, when they are at the bottom – the middle one is C, the one to the right is A and the one to the left is B. You need C and B



*** Connector B:**

pin 1: ESL 1

pin 2: GND

pin 3: +12V

pin 5: CAN L

pin 6: CAN H

pin 7: CAN L

pin 8: CAN H

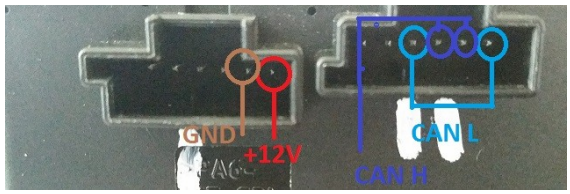
*** Connector C:**

pin 1: +12V

pin 2: +12V

pin 4: ESL 2

- W164 / R251 / W221 / W216. When the connectors are on top – the one on the left is A and the one on the right is B



*** Connector A:**

pin 5: GND

pin 6: +12V

*** Connector B:**

pin 3: CAN L 164

pin 4: CAN H 164

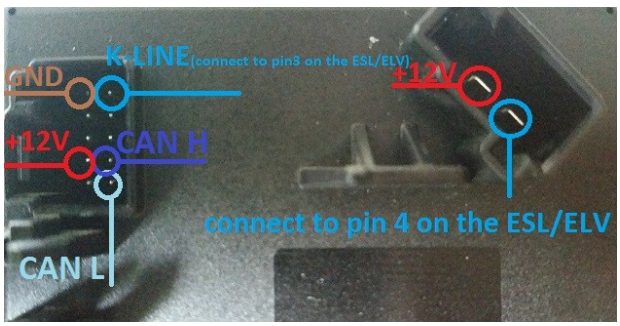
pin 5: CAN H pin

6: CAN L

***Note: W164 needs to have a ZGW connected to allow communication with the EIS/EZS.**

- W204 / W207 / W212. In this case there is only one **connector – A**. Please make sure it is on top:

pin 1: CAN L



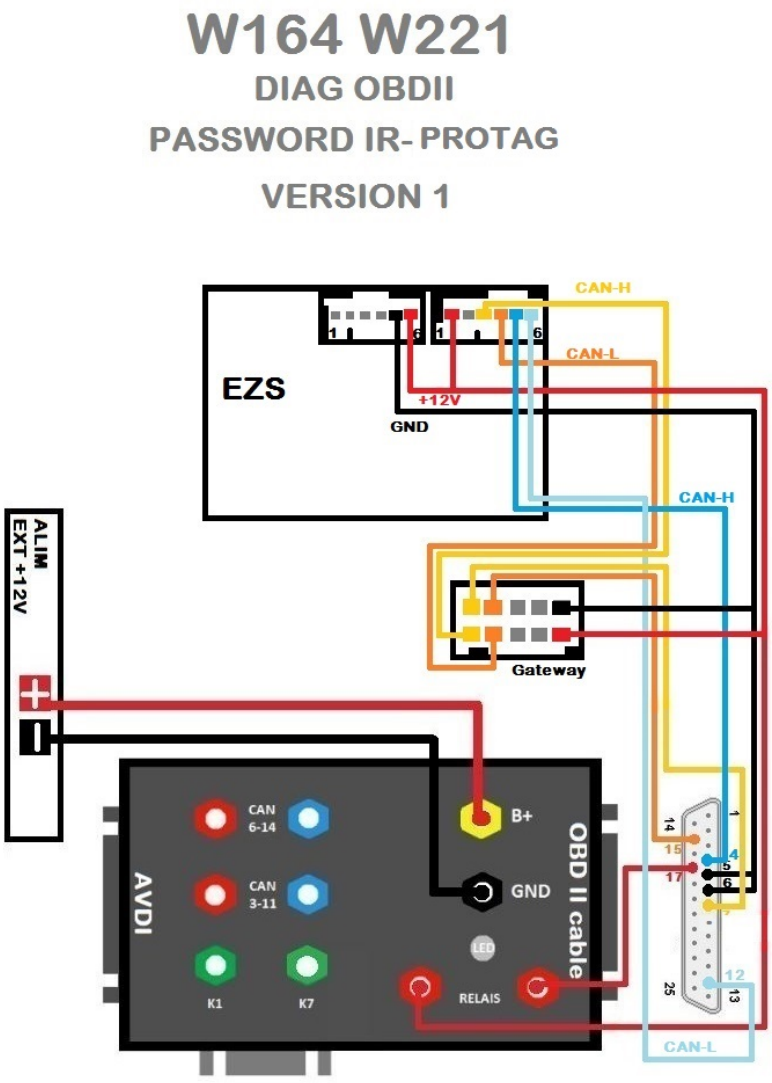
pin 2: CAN H

pin 7: +12V

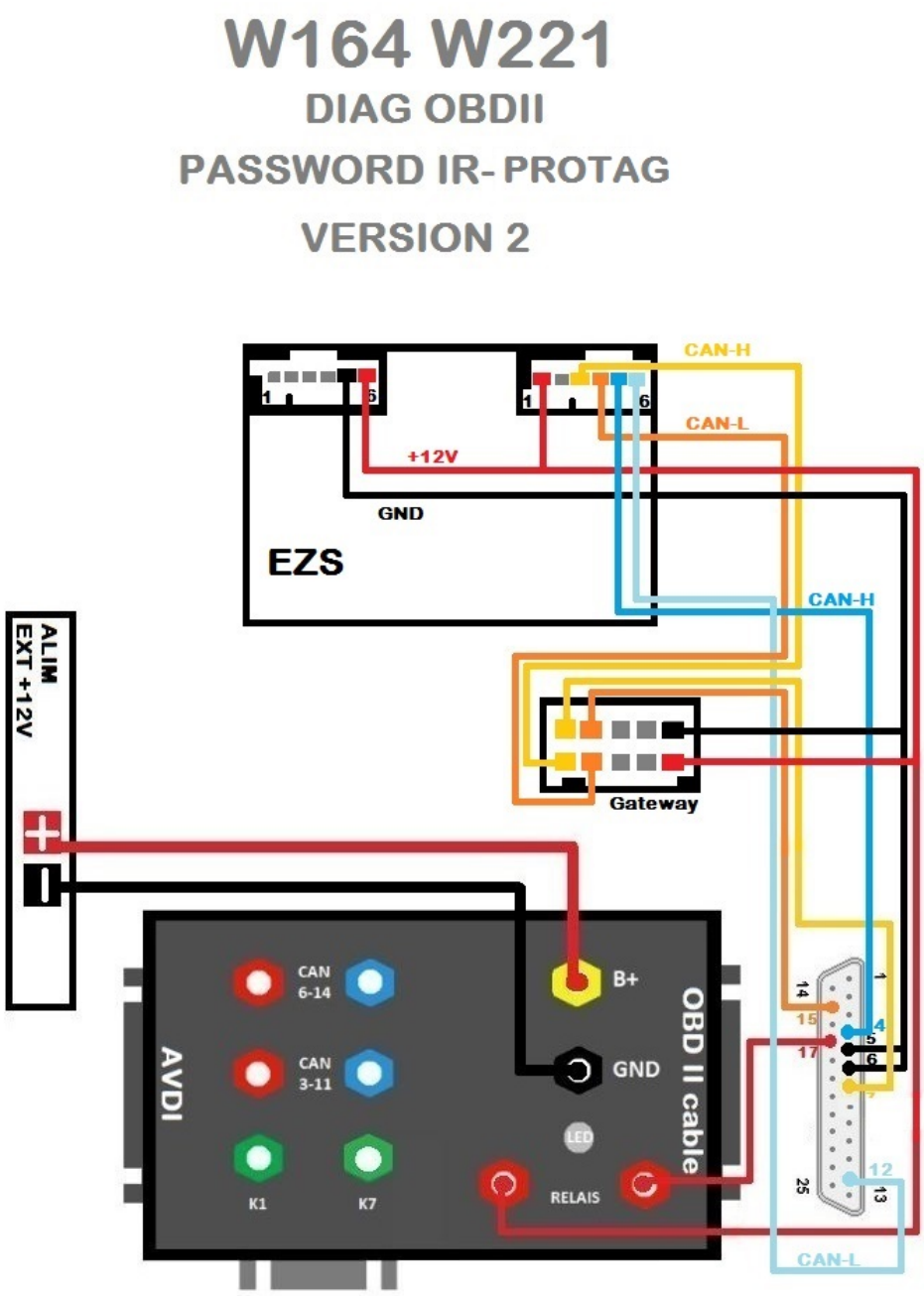
pin 10: GND

Connect pin 5 of the left connector to pin 3 of the ESL/ ELV and pin 2 of the right connector to pin 4 of the ESL/ ELV.

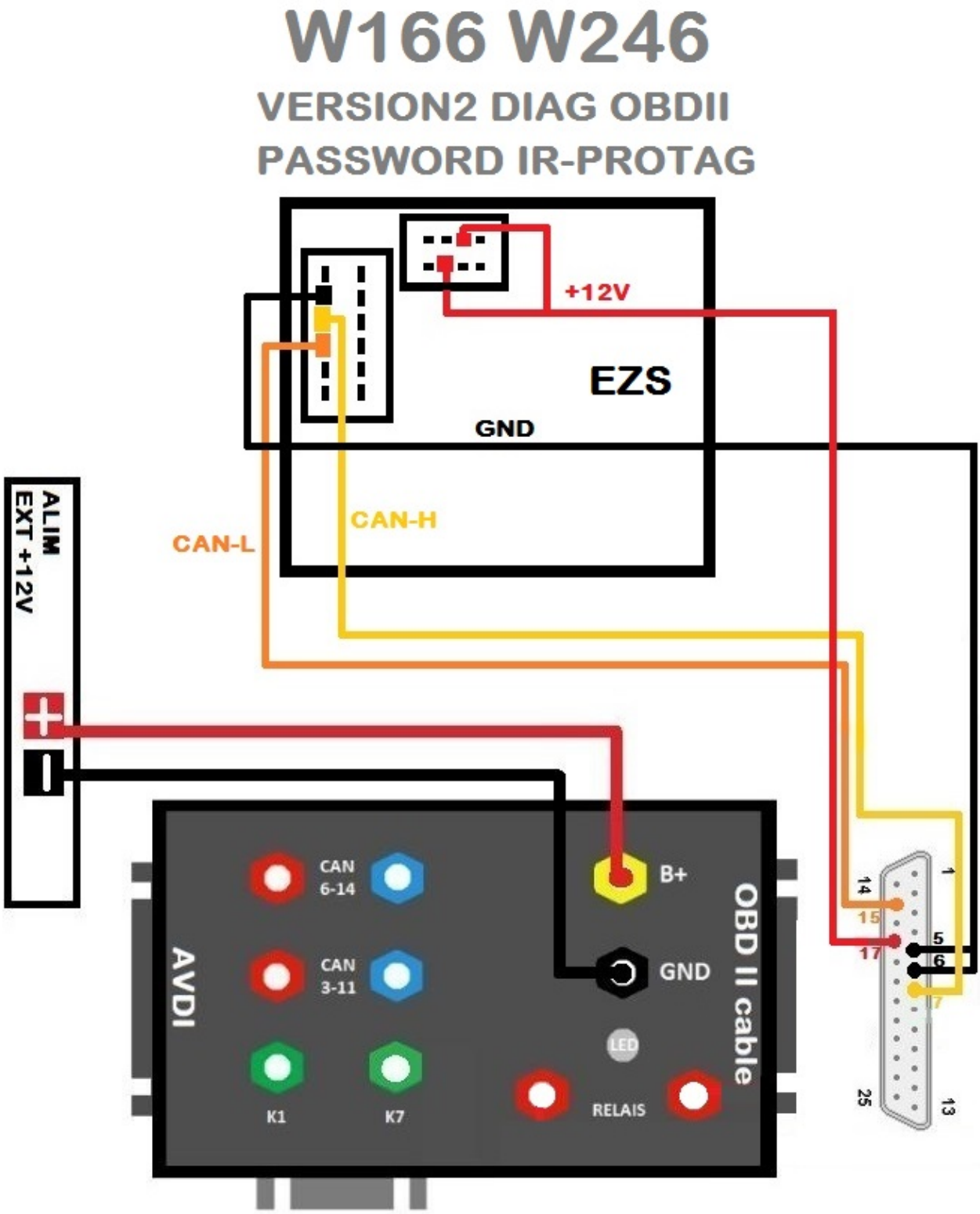
- W164 W221 EZS MERCEDES version 1:



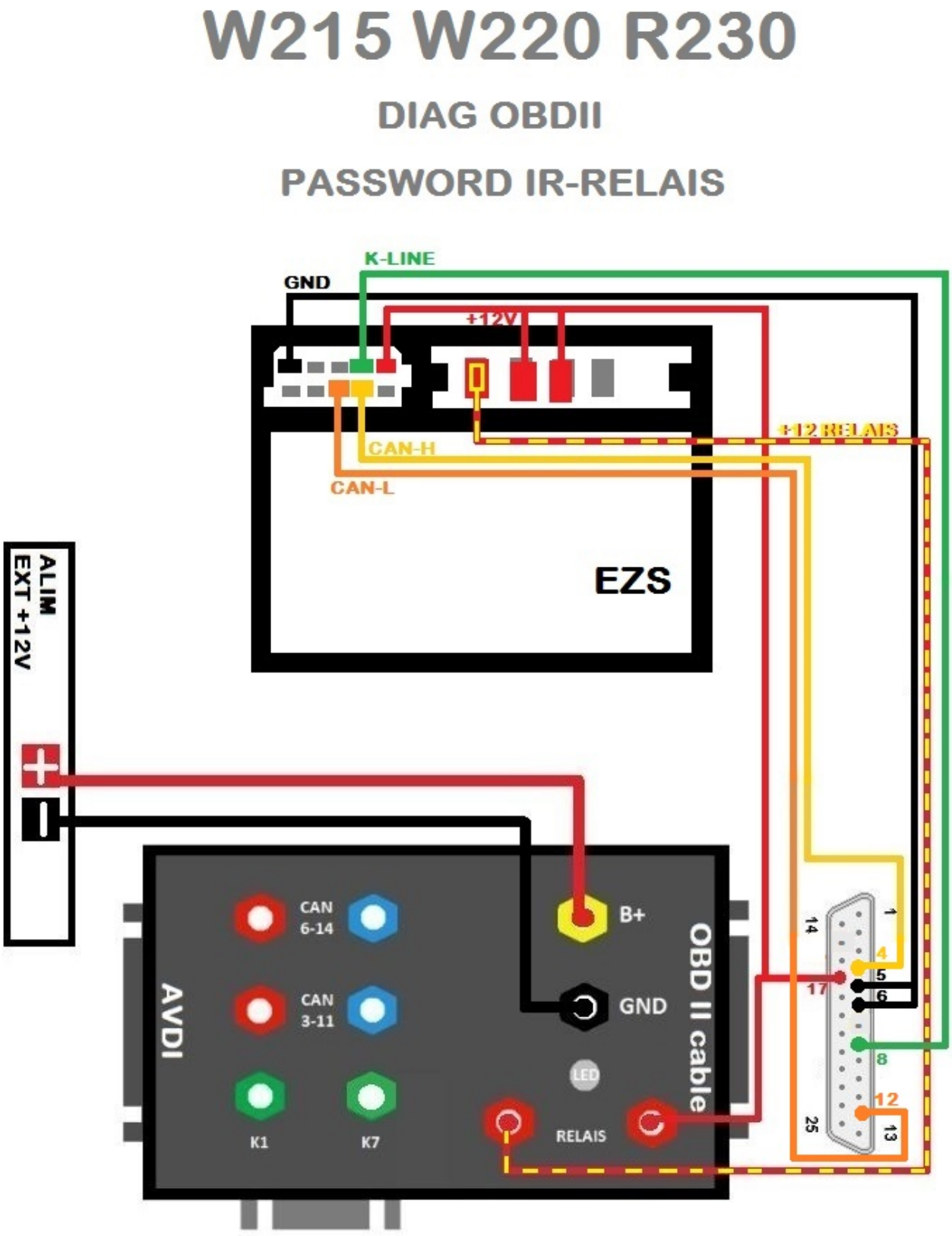
- W164 W221 EZS MERCEDES version 2:



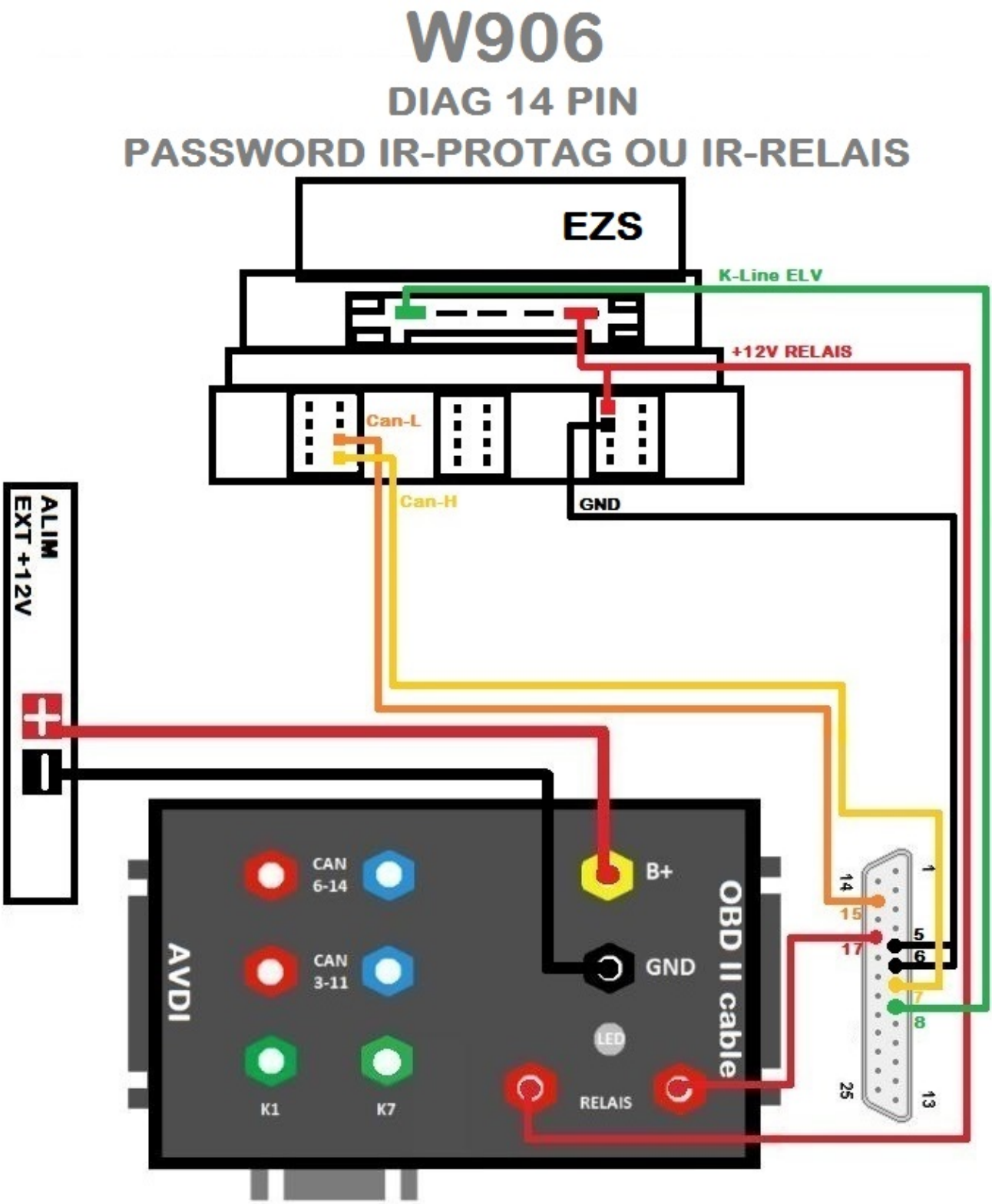
- W166 W246 EZS MERCEDES:



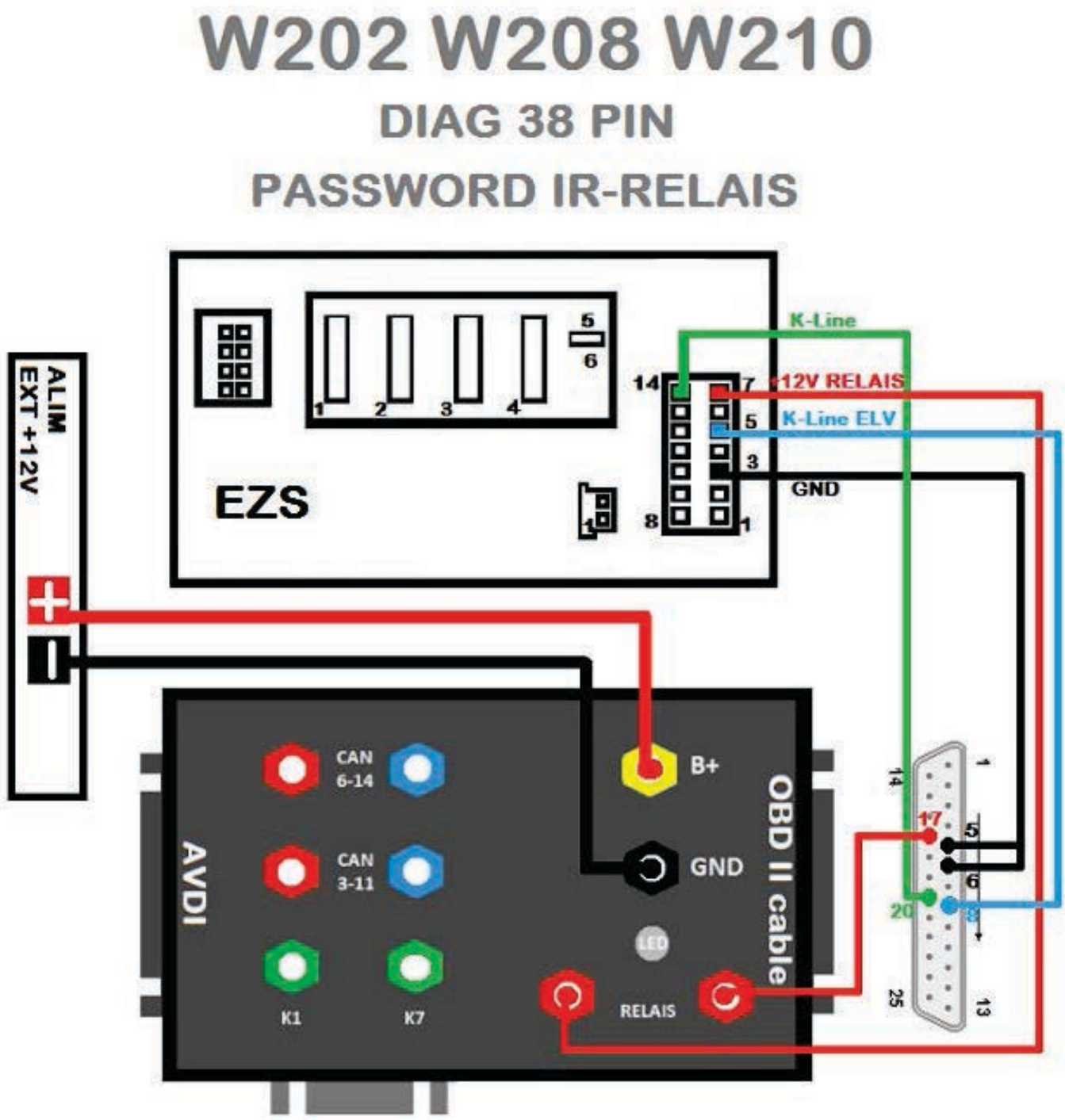
- W215 W220 R230 EZS MERCEDES:



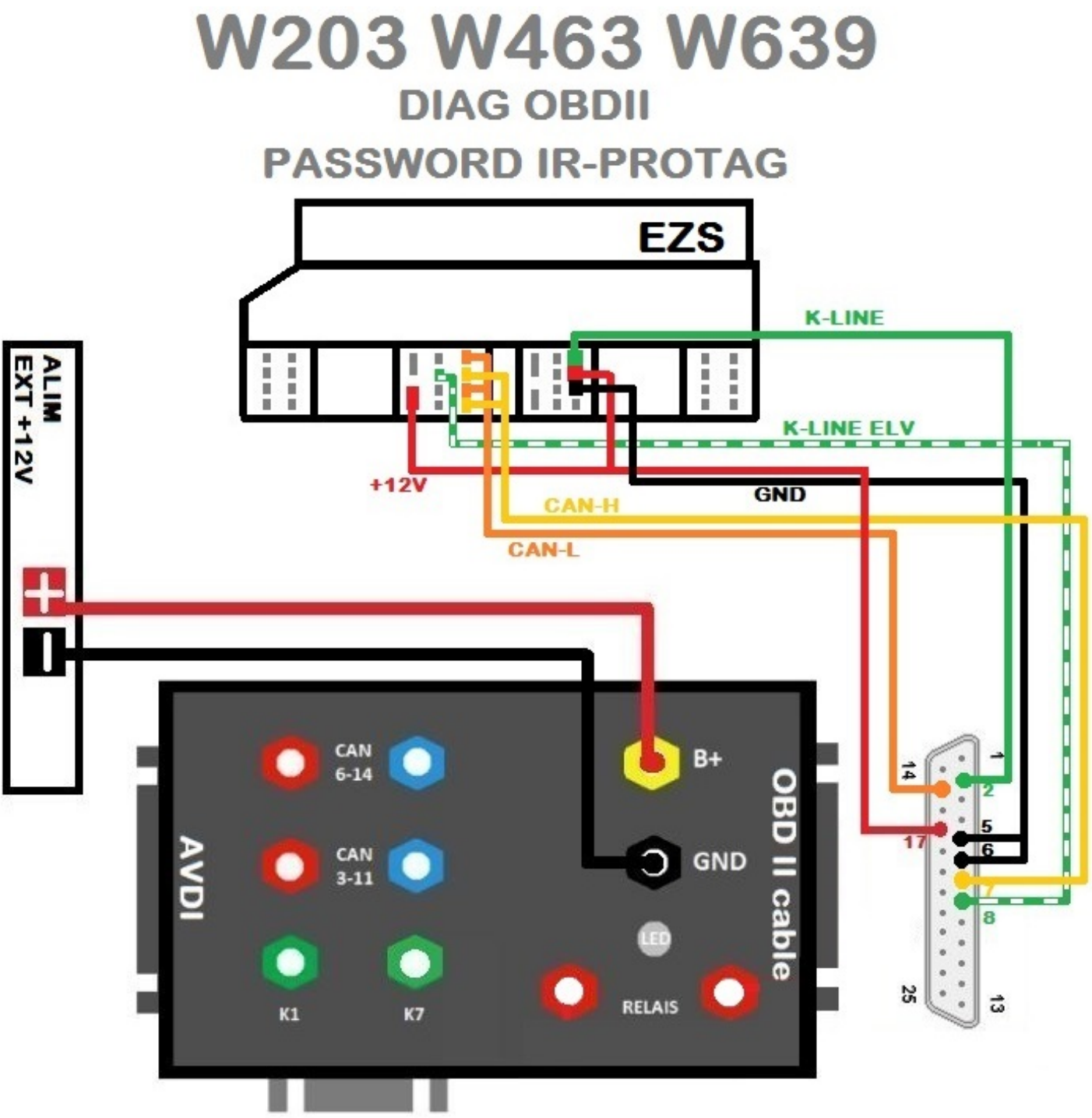
- W906 EZS MERCEDES:



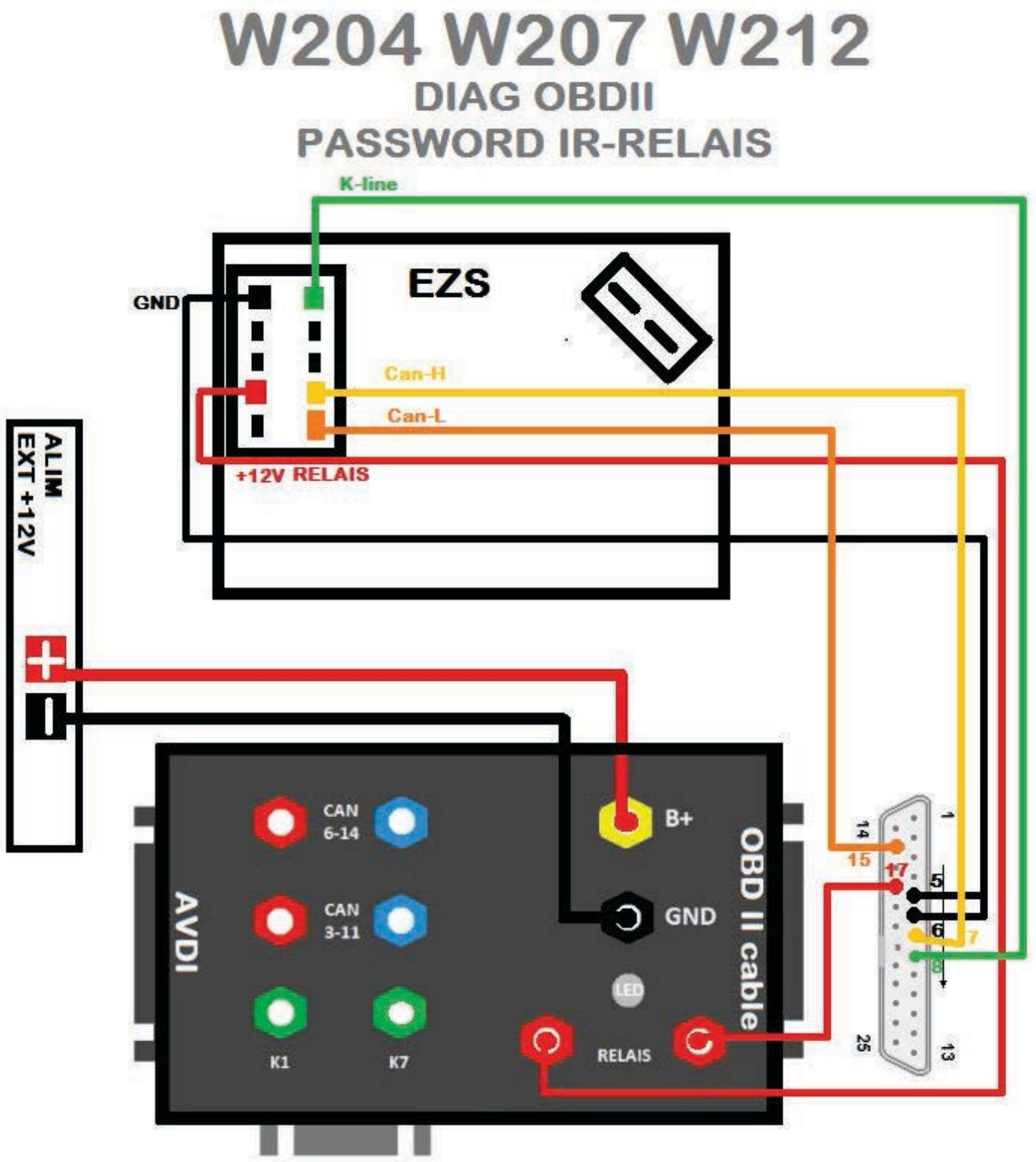
- MERCEDES W202 W208 W210 EZS:



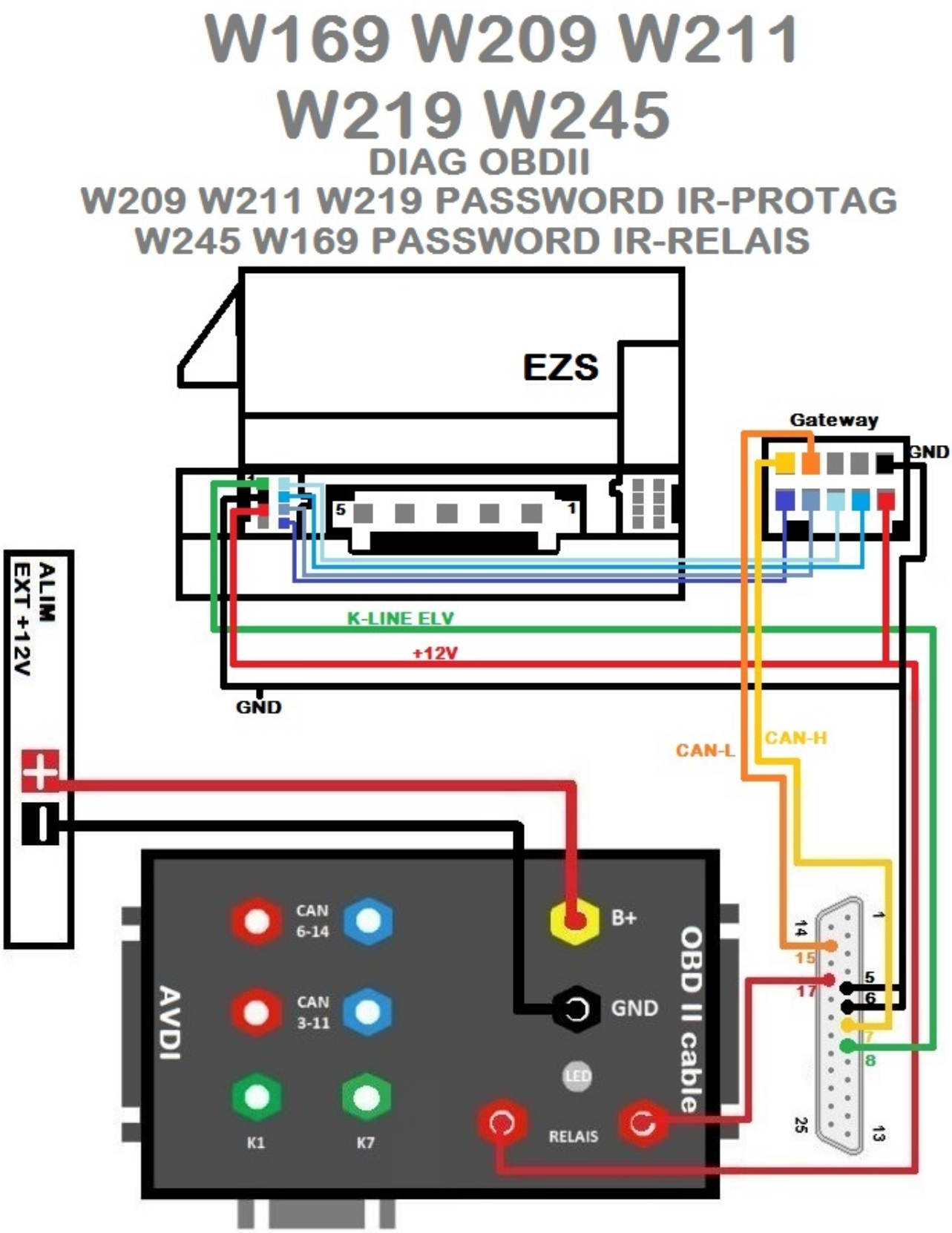
- MERCEDES W203 W463 W639 EZS:



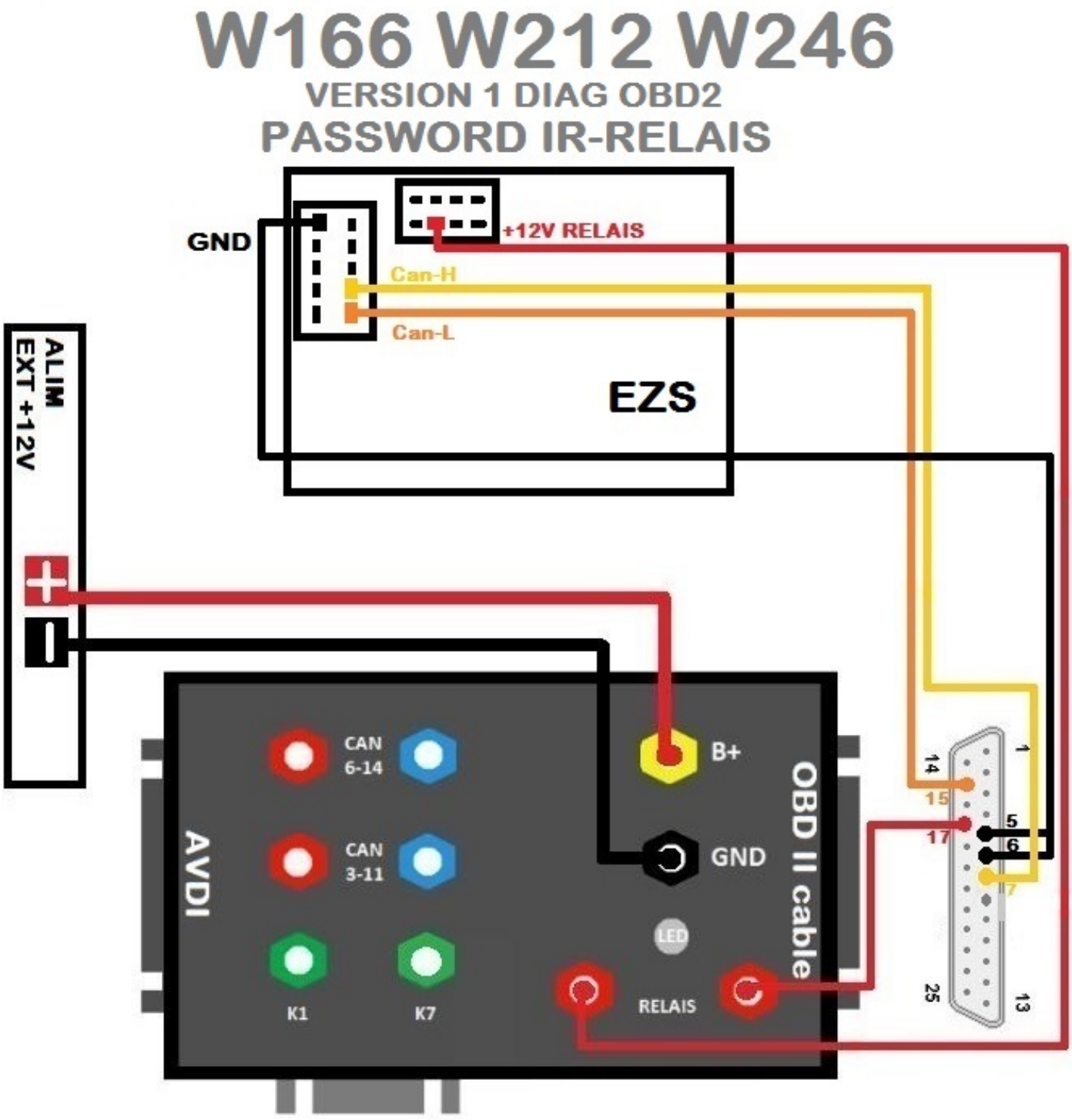
- MERCEDES W204 W207 W212 EZS:



- MERCEDES W209 W211 W219 W169 W245 EZS:



- W212 246 166 VERS1 EZS:



ESL/ ELV connection pinouts

-W203. For the W203 there a different ELV/ ESL types – please note the type you have.

*** 5 pin:**

pin 1: K-Line

pin 3: GND

pin 4: +12V

pin 5: N/C

*** 3 pin:**

pin 1: +12V

pin 2: GND

pin 3: K-Line

*** 4 pin:**

pin 1: K-Line

pin 2:

pin 3: GND

pin 4: +12V

-W210 / W208 / W202. Make sure to have the clips of the ESL/ ELV facing down.

pin 1: +12V

pin 2: GND

pin 3: K-Line

pin 4: K-Line

- W211 / W219 / W209

pin 1: K-Line

pin 2:

pin 3: GND

pin 4: +12V

- W212 / W207 / W204 / W906

pin 1: GND
pin 2: +12V
pin 3: ESL LINE / K-LINE
pin 4: +12V

Please refer to the pinouts above.

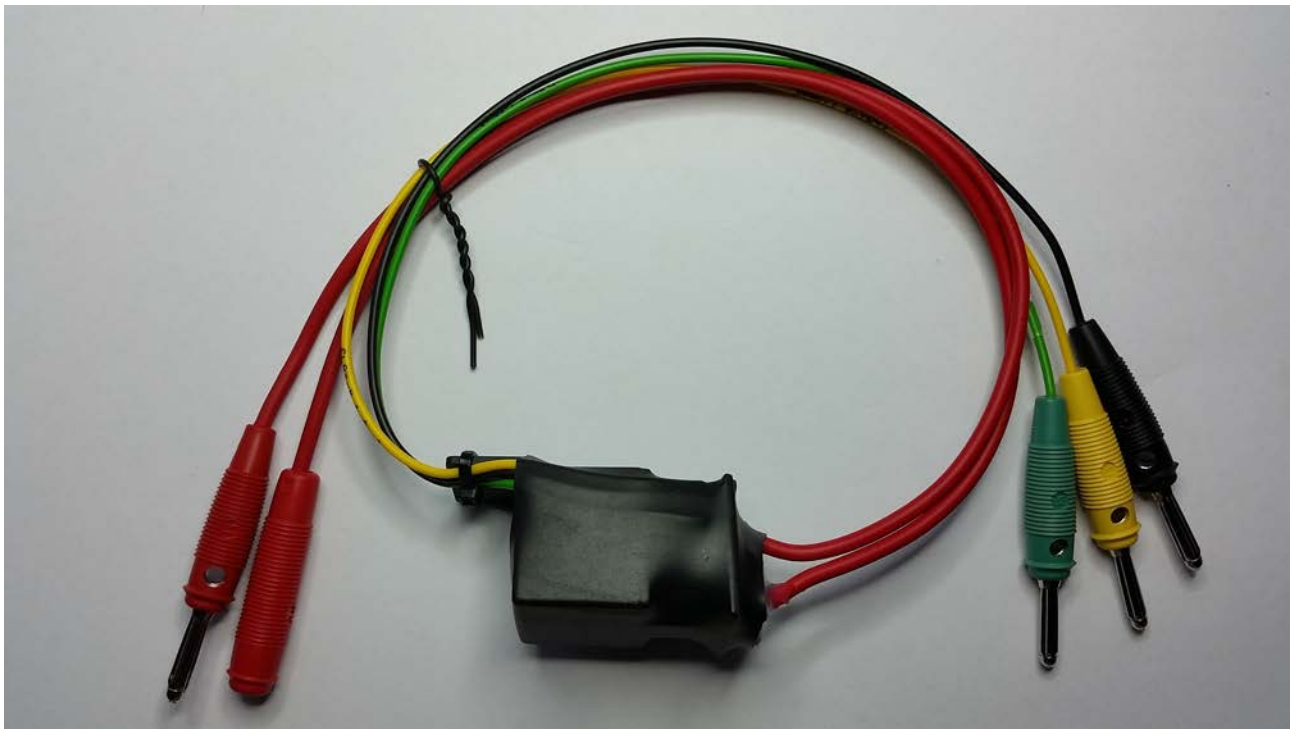
*****These pinouts may be different from year to year so ALWAYS work in a car.*****
Please make sure to watch the videos our team has made for your assistance.

6. Appendix

Here you can find the various cable solutions we provide in order to assist with your work on Mercedes – Benz vehicles:

1. The Abrites Mercedes Main Cable – Connects to the DB25 on the AVDI and allows you to connect to the rest of the cables provided as a part of our solution system.

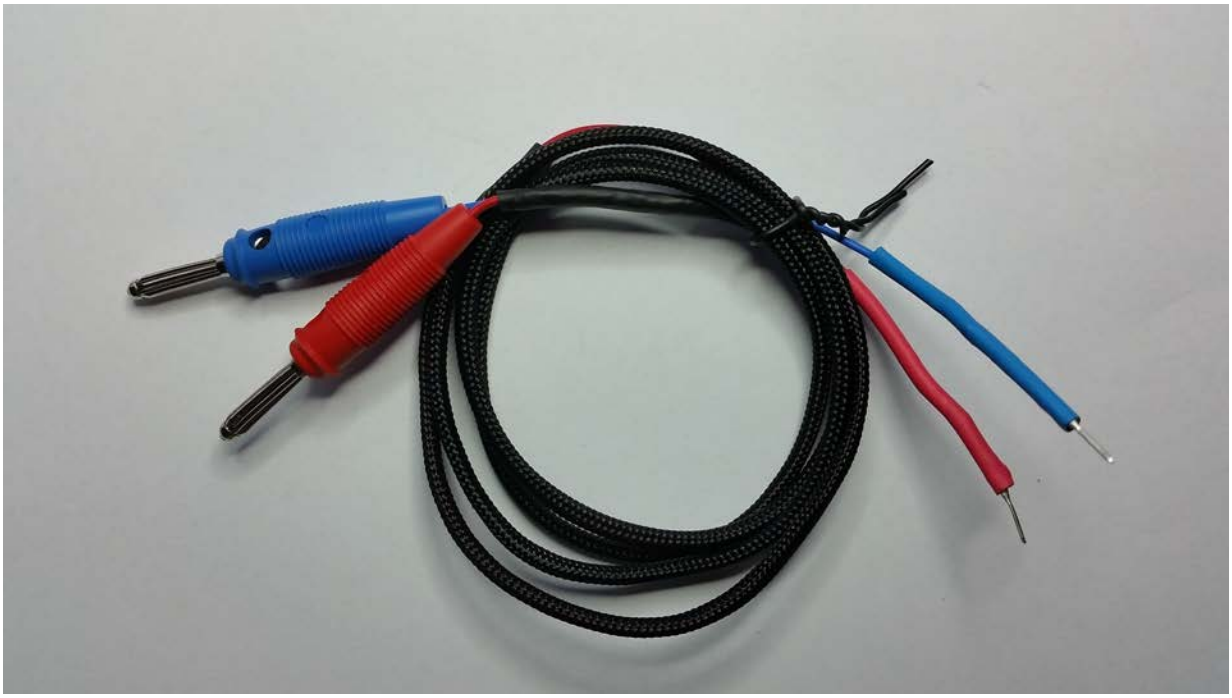
2. Abrites Switch Relay Cable. It allows the password extraction speed to be increased drastically when all keys are lost. It is used together with the Abrites Fuse Plug.



NB: DO NOT FORGET TO SUPPLY THE SWITCH RELAY WITH +12V AND GND IN ORDER TO OPERATE.

3. Abrites Fuse Plug. It is used to connect to the ignition fuse if one is available in the car.

4. Abrites CAN H (High), CAN L (Low) Connectors. Made to connect to the Abrites Mercedes Main Cable to perform virginization and module adaptation for ECUs,ISMs, etc.



5. Abrites LIN Connector. To be used together with the main cable to connect the K- line to PIN 7 of the OBD as per the DAS manager instructions.

Abrites DAS Manager Table 1 – please follow the link below. The table is located under: EIS/ EZS Coverage (FBS2/FBS3)

http://abrites.com/products/abrites-diagnostics/for-mercedes-maybach-smart