A·B·R·I·T·E·S
automotive solutions

ABRITES DIAGNOSTICS FOR FCA



User manual
version 1.5

Important notes

The Abrites software and hardware products are developed, designed and manufactured by Abrites Ltd. During the production process we comply to all safety and quality regulations and standards, aiming at highest production quality. The Abrites hardware and software products are designed to build a coherent ecosystem, which effectively solves a wide range of vehicle-related tasks, such as:

Diagnostic scanning;
Key programming;
Module replacement,
ECU programming;
Configuration and coding.

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Safety information

The Abrites products are to be used by trained and experienced users in diagnostics and reprogramming of vehicles and equipment. The user is assumed to have a good understanding of vehicle electronic systems, as well as potential hazards while working around vehicles. There are numerous safety situations that cannot be foreseen, thus we recommend that the user read and follow all safety messages in the available manual, on all equipment they use, including vehicle manuals, as well as internal shop documents and operating procedures.

Some important points:
Block all wheels of the vehicle when testing. Be cautious when working around electricity.
Do not ignore the risk of shock from vehicle and building-level voltages.
Do not smoke, or allow sparks/flame near any part of the vehicle fuel system or batteries.
Always work in an adequately ventilated area, vehicle exhaust fumes should be directed towards the exit of the shop.
Do not use this product where fuel, fuel vapours, or other combustibles could ignite.

In case any technical difficulties occur, please contact the
Abrites Support Team by email at support@abrites.com.

Table of contents

1. Introduction

2. Using the Abrites diagnostic for Fiat/Alfa/Lancia

3. Standard diagnostic functions

- 3.1 Module identifications
- 3.2 Reading and clearing of diagnostic trouble codes (DTC)
- 3.3 Data Display
- 3.4 ECU identification and configuration
- 3.5 Actuators

4.BCM, RFH and Key manager

- 4.1 Key Learning
- 4.2 Key learning 2020+ (keyless)

5. Instrument cluster data manager

- 5.1 Cluster Calibration 2

6. Engine Control Unit Flash Manager

7. ECU configuration manager

8. Proxi alignment

List of revisions

Date	Chapter	Description	Revision
01.10.2015	ALL	Document created	1.0
24.08.2018	4.0	RFH PIN reading update	1.1
27.03.2020	4.1	Key Learning	1.2
08.10.2021	8	Proxi alignment	1.3
08.01.2022	4.2	Key learning 2020+ (keyless)	1.4
07.09.2023	5.1	Cluster Calibration 2 update, and general styling corrections	1.5

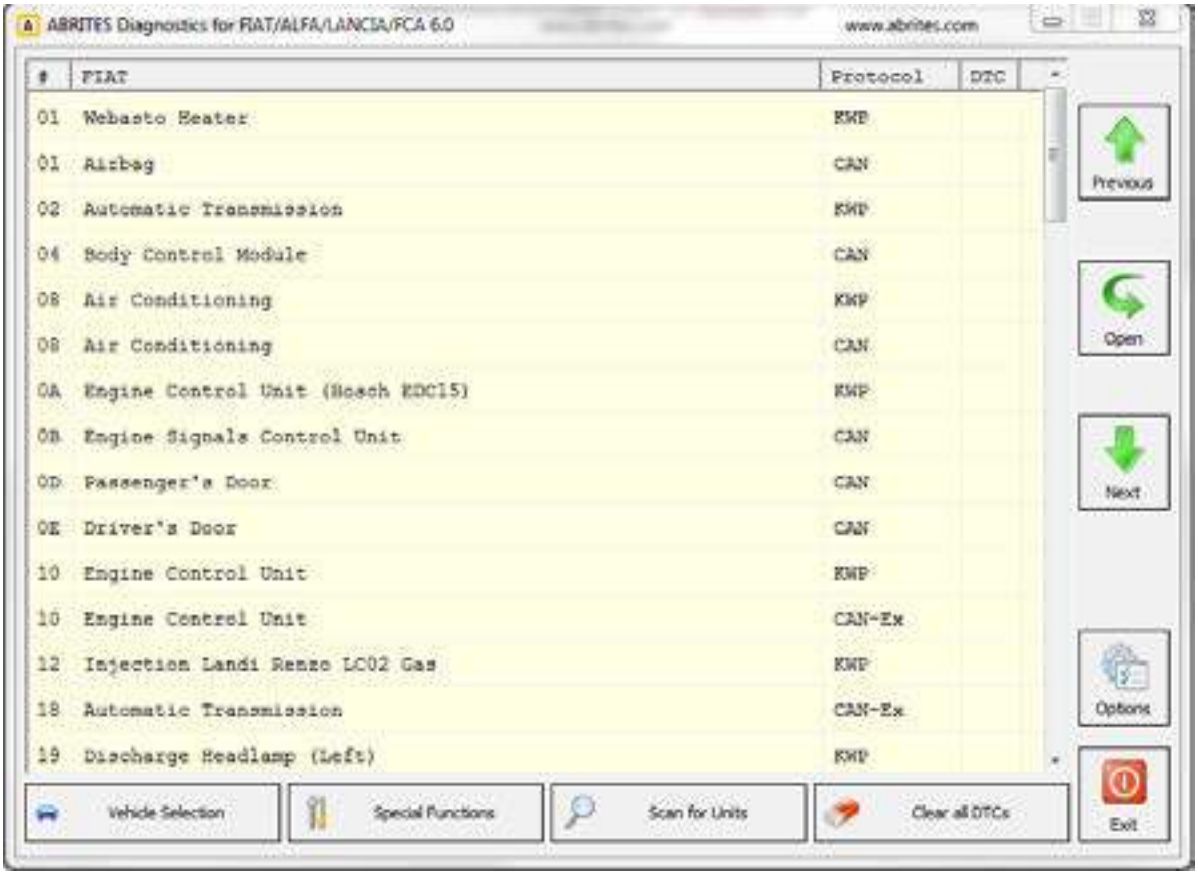
1. Introduction

"Abrites Diagnostics for Fiat/Alfa/Lancia/FCA" is a Windows PC based diagnostic software for Fiat/Alfa/Lancia/FCA vehicles. With the help of this software you can perform complete diagnostic operations of all vehicles. For proper operation of your diagnostic software you will need a corresponding interface for connection between your PC and vehicle named "AVDI". AVDI is an interface produced by Abrites Ltd. intended to act as an interface between the PC and the electronic control units. AVDI should be used with ABRITES software produced by Abrites Ltd. ABRITES is a trade mark of Abrites Ltd.

ABRITES Diagnostics for Fiat/Lancia/Alfa/FCA is an advanced diagnostic software application designed to work together with the Abrites Vehicle Diagnostic Interface to perform basic and advanced diagnostics in Fiat, Lancia and Alfa vehicles. It provides full module identification for the Fiat Chrysler Automobiles vehicles as well, it allows diagnostic trouble code reading and clearing, also the ability to perform actuator tests in order to determine the cause of an electrical or mechanical fault. The diagnostic functions provided allow it to be on par with OEM diagnostic equipment while applying the intuitive and simplistic approach typical for the Abrites diagnostic software. Abrites diagnostics software allows the user to work with almost 100% of the vehicles by Fiat, Alfa Romeo, Lancia and models from the FCA Group (Fiat, Alfa, Chrysler, Dodge and Jeep including models built after 2013).

2. Using the Abrites diagnostic for Fiat/Alfa/Lancia

The Abrites diagnostics for Fiat/Alfa/Lancia/FCA is installed together with the rest of the Abrites diagnostic software applications as a part of the Abrites diagnostic suite provided to the user via email
The user can start the software by clicking on the appropriate icon from the Abrites "Quick start" menu.
Once the Fiat/Alfa/Lancia/FCA icon is selected the software will start and the user will see the following screen:



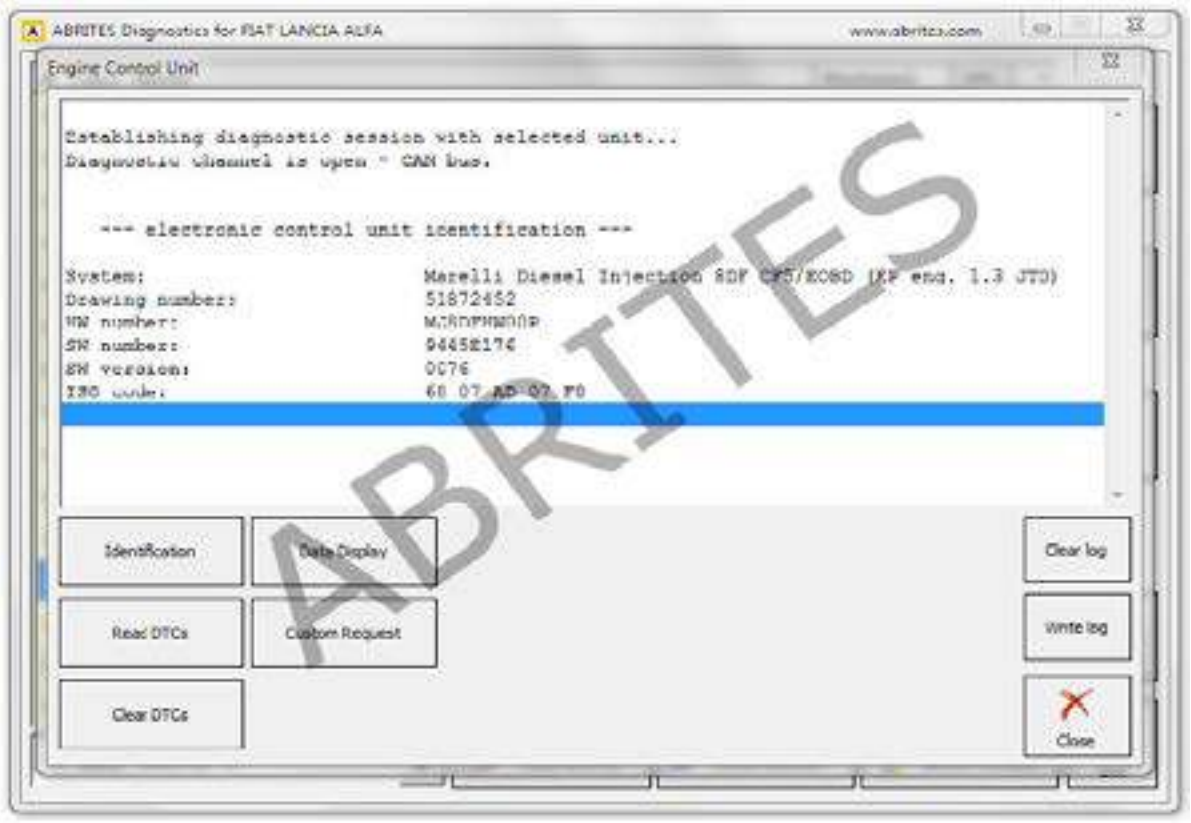
This is the main screen of the software and it shows all the navigation buttons as well as the ones for vehicle selection, scanning and general diagnostic trouble code (DTC) clearing.

3. Standard diagnostic functions

The features of the standard diagnostic functions of the Abrites diagnostics for Fiat/Alfa/Lancia/FCA include, but are not limited to Reading and clearing of DTCs, Module identifications, Data display, ECU identification, ECU configuration, sensor monitoring, BUS inputs, LIN data, BUS outputs, Line graphs, Actuator tests and others.

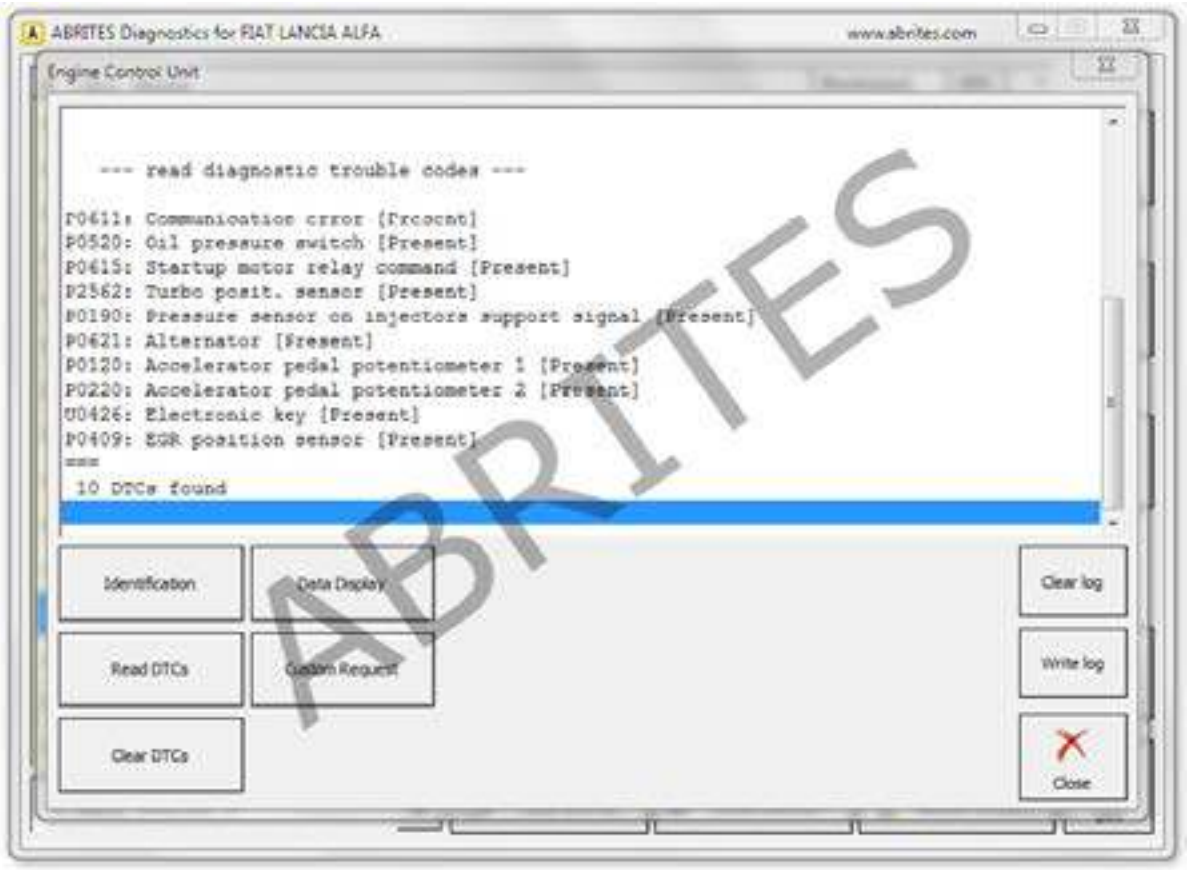
3.1 Module identifications

The module identifications function can be used to determine all the details about an electronic module – the manufacturer, hardware number, software number, software version, ISO codes and others.



3.2 Reading and clearing of diagnostic trouble codes (DTC)

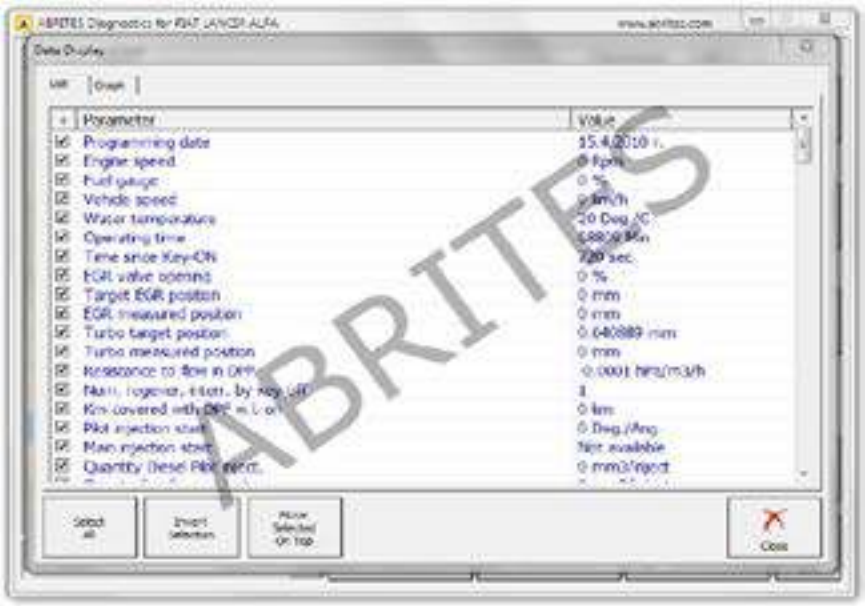
This function allows the user to read the diagnostic trouble code, analyses it, find the cause of the issue, repair the damage and clear the DTC

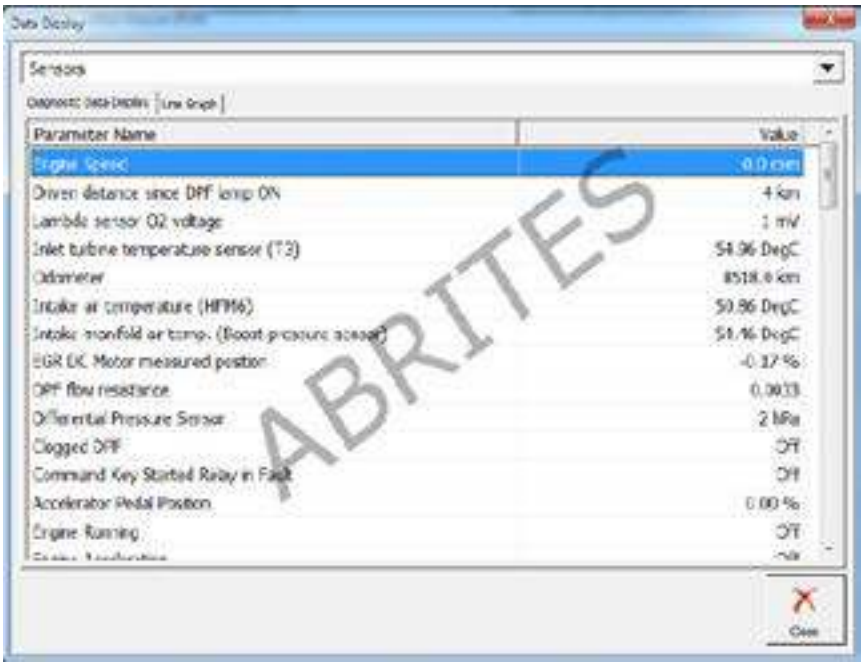


This is displayed in full details throughout the range of supported vehicles.

3.3 Data Display

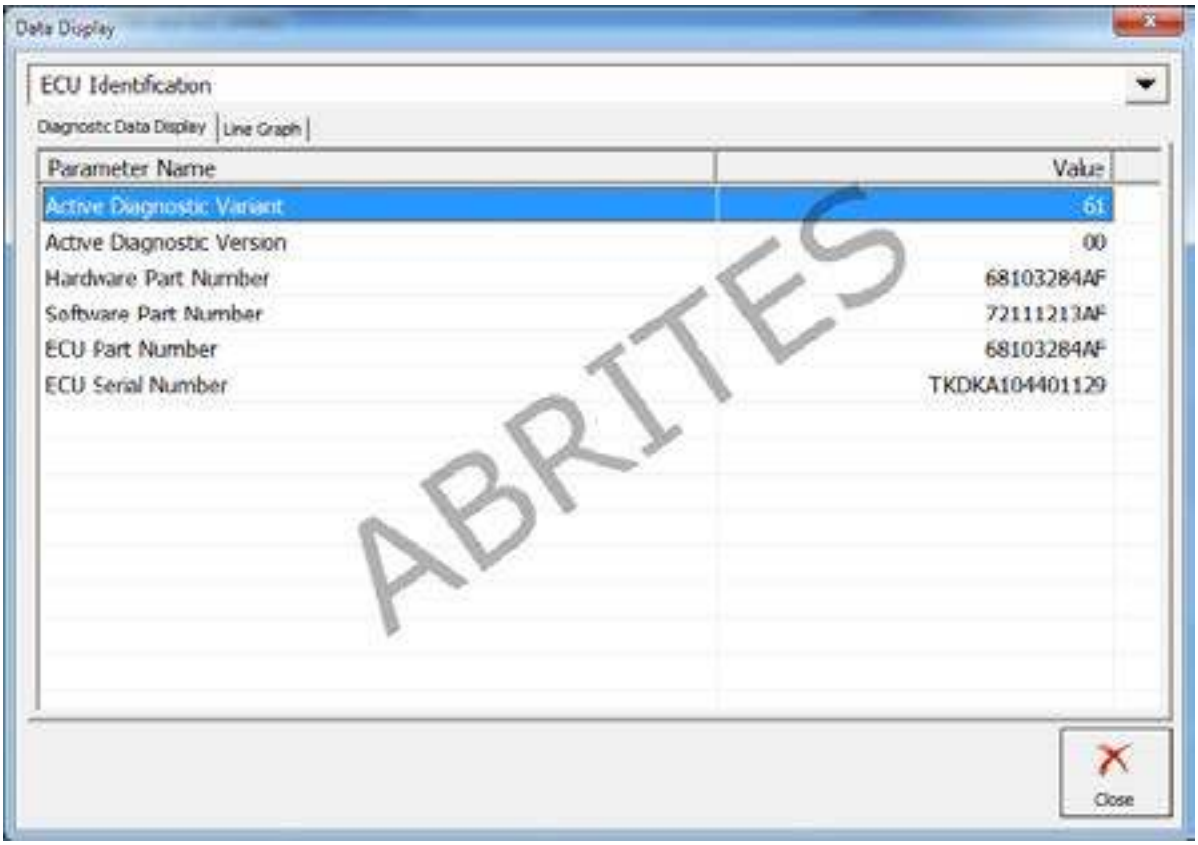
The Data display option shows details about the live data being read from the sensors within the vehicles. It allows monitoring of the values measured by these sensors and is an obligatory part of determining the cause of a fault with the vehicles.





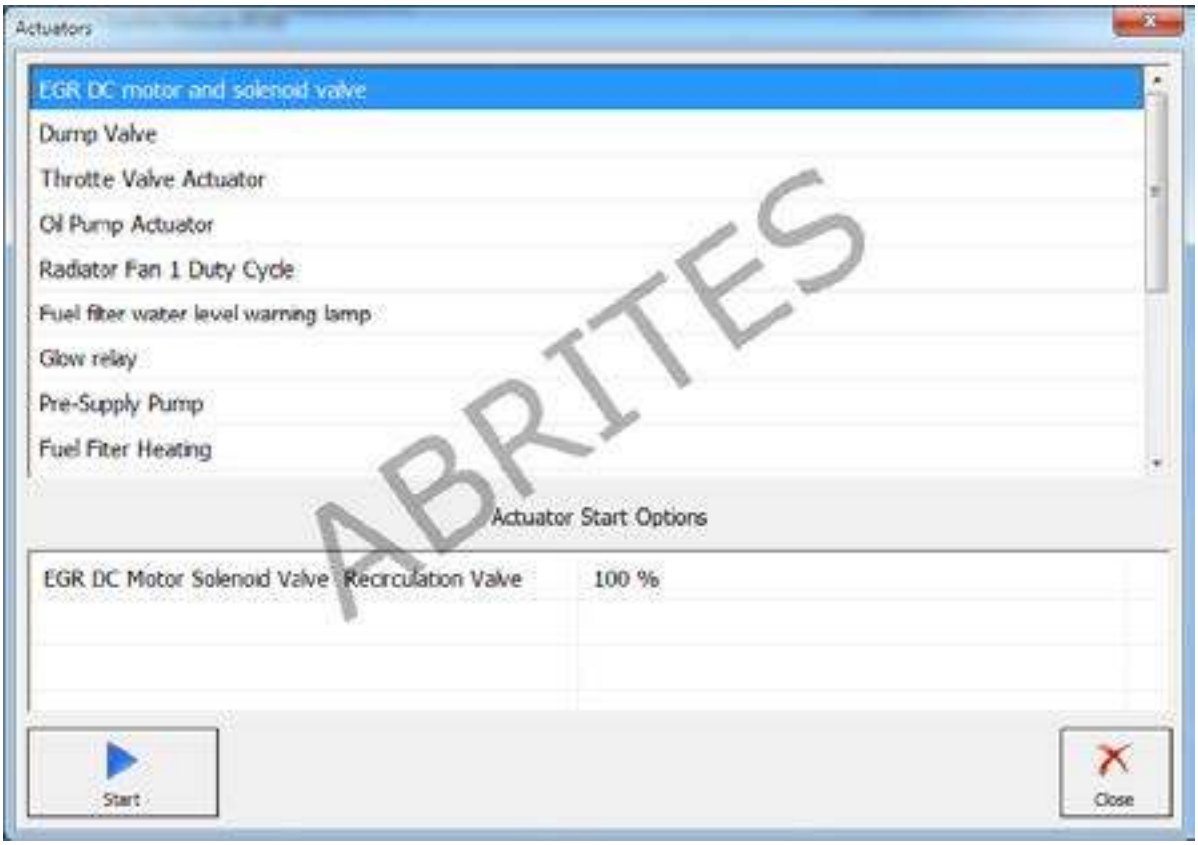
3.4 ECU identification and configuration

The ECU Identification allows the user to view the full details in regards to the Electronic Control Units within the vehicle. This includes Diagnostic variants, versions, part number (needed for finding a replacement), Software part numbers as well as serial numbers of the electronic modules.

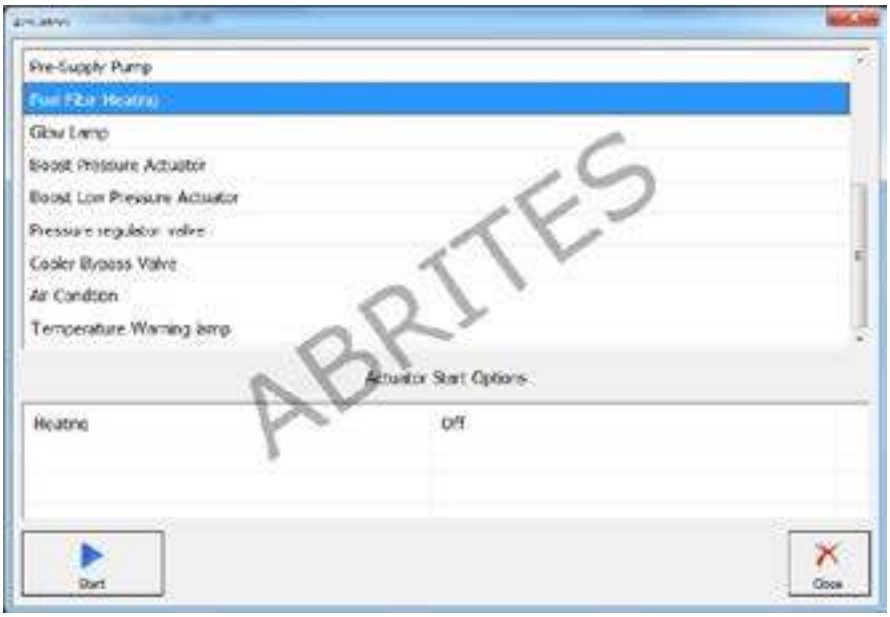


3.5 Actuators

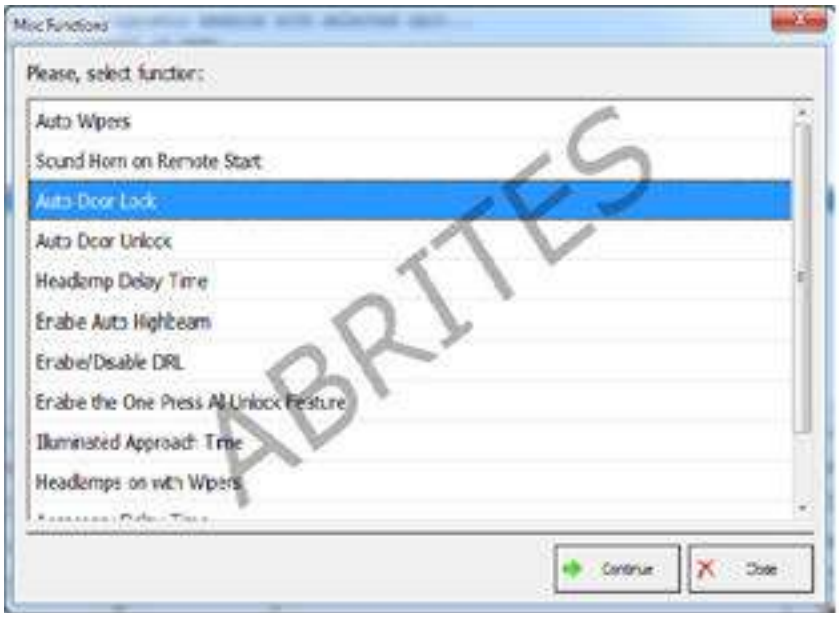
Actuator testing is perhaps one of the most important steps in resolving an issue with a faulty vehicle. This function is used to test the operation of separate systems within the car. For example the user can test the oil pump actuator separately without interfering with other actuators.



This function is started by selecting the desired actuator and pressing the start button.
It is important to let the actuator test end before exiting.



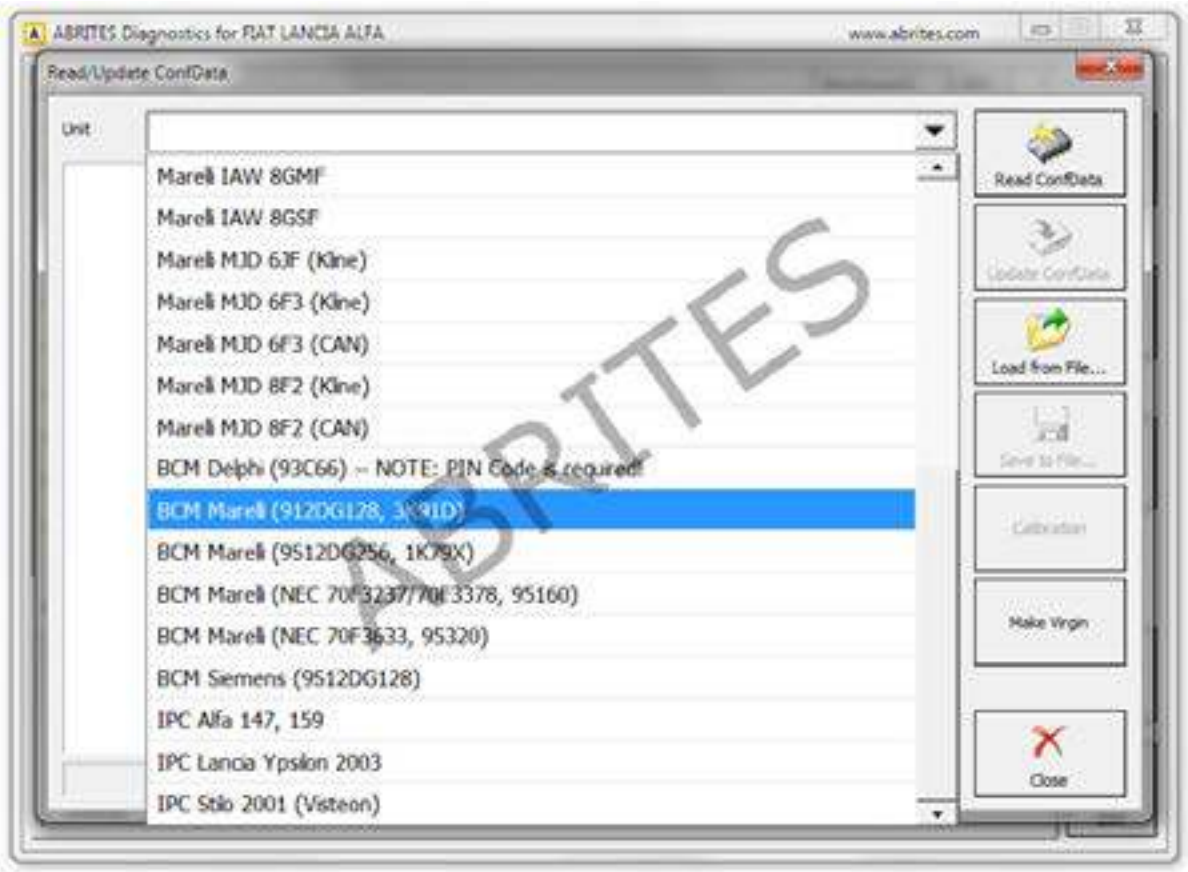
The Abrites diagnostics for Fiat/Alfa/Lancia/FCA currently supports almost 100% of the actuators that can be tested within a vehicle. Here is an example of the body control module's actuators.



4.BCM, RFH and Key manager

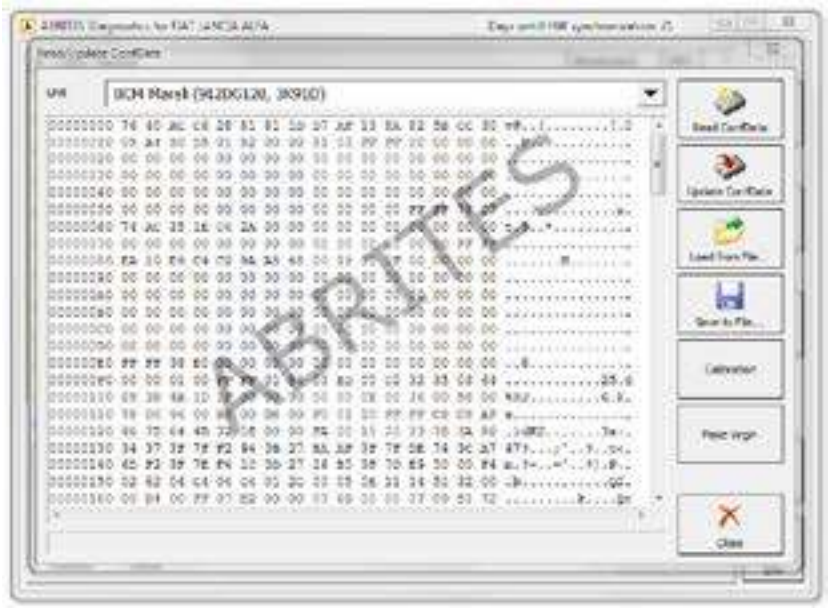
The Body Control Module (BCM) and key manager function is used in order to perform key programming and preparation, PIN code reading and updating, Component protection data

BCM configuration, reading and updating of the supported models by OBD.

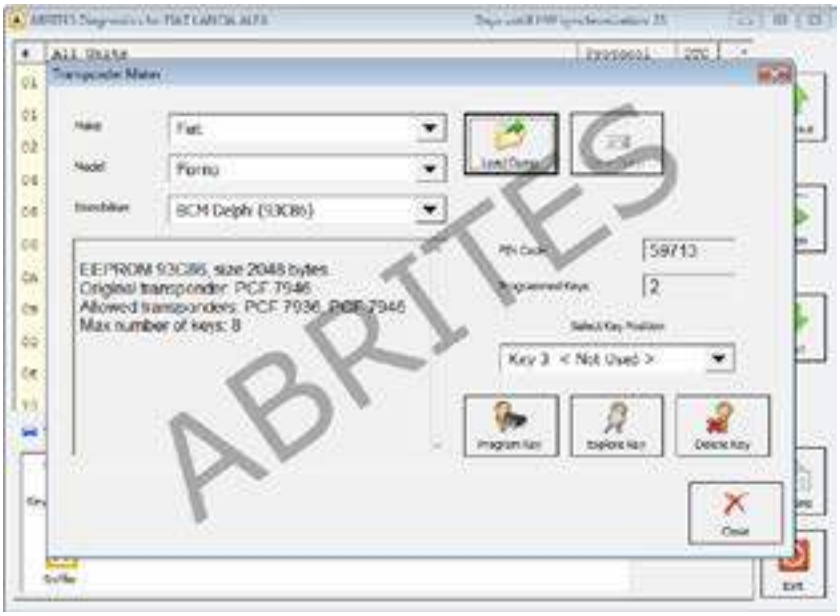


It allows the Configuration data to be saved locally to the user's computer, the loading of previously saved files is also supported.

Please check the full list at abrites.com



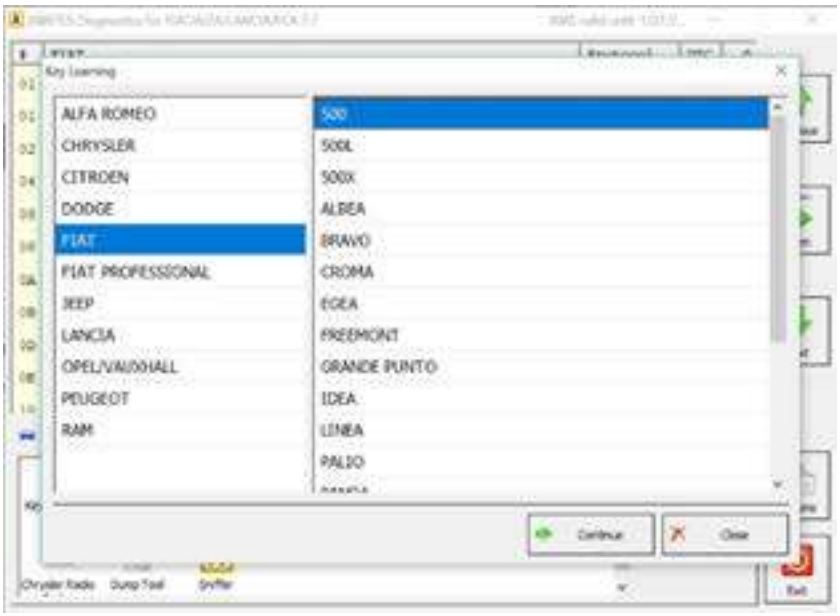
Transponder maker – Preparing transponder by dump of immobilizer to be ready for key programming.



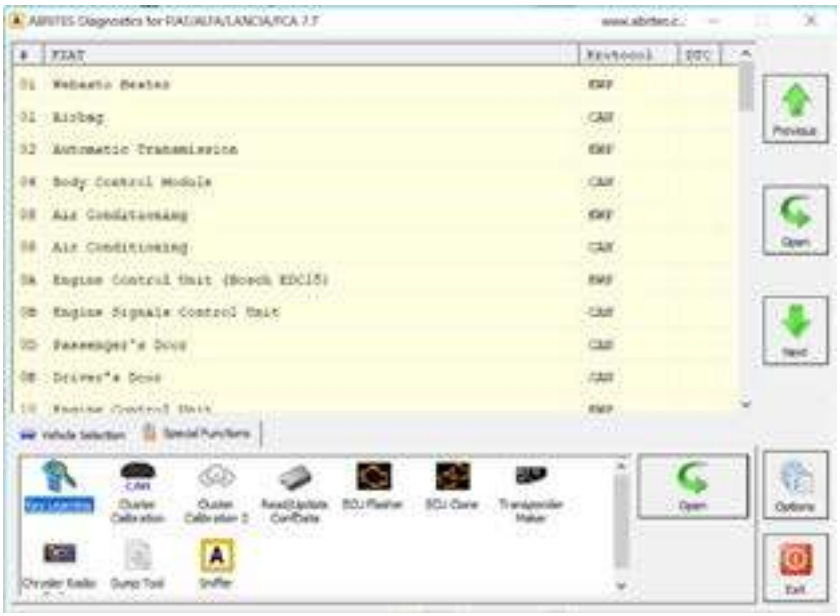
4.1 Key Learning

Key learning by OBD for many models produced by the FCA.
Once the PIN code is obtained the user will have the ability to select the model of the vehicle and perform key learning directly via the vehicle's diagnostic port.

1. Key Learning



2. Model selection



Please visit abrites.com for a full list of supported vehicles.

For the latest 2017/2018 models when a RFH module and a Gateway are present, the user has to connect to the Internal CAN-BUS in order to obtain the PIN code - either through the pin 6(CAN H) and pin 14(CAN L) of the AVDI Interface, or using a ZN051 Distribution box. The best option would be to connect to the CAN H and CAN L cables of the RFH's connector.

This is what the RFH module looks like:





Note: Some of the latest FCA models are equipped with the s.c. “Cyber-Security” which allows diagnostic manipulations to the models equipped with it to communicate with OEM FCA software only. The Cyber Security module is a box that is connected right after the OBDII connector. If communication to the car is not possible, this means the car is most probably equipped with this additional security by FCA. As stated above, direct CAN communication is needed and this can be done either by using the CB019 FCA Secure gateway cable, or the ZN051 Distribution Box.

4.2 Key learning 2020+ (keyless)

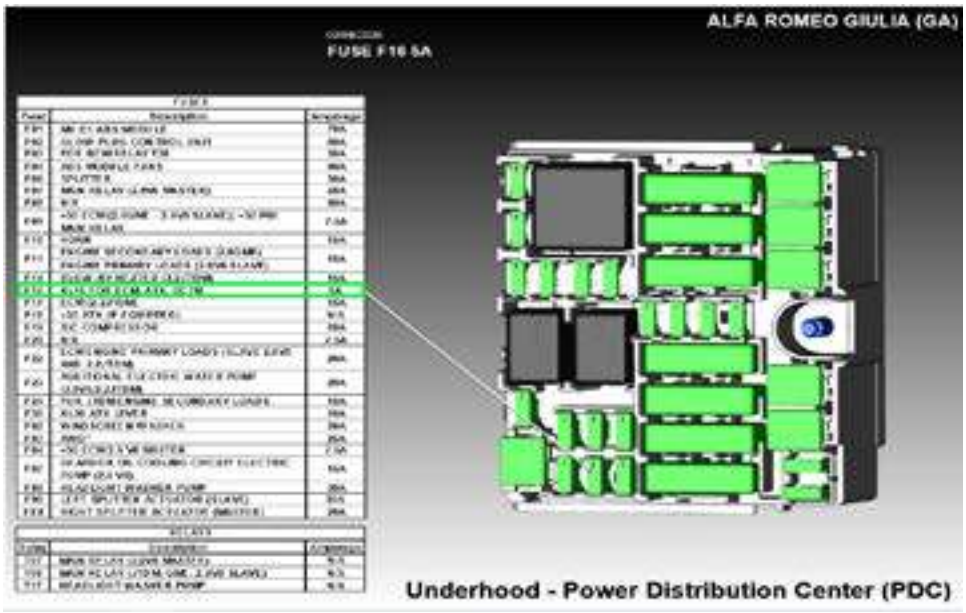
The latest FCA keyless models produced after 2020, in All Keys Lost situation, require an additional Abrites cable set (CB017), which has to be connected to the **relay socket of the ZN051 Distribution box** , and to the **Engine Control Unit fuse (KL15)**:

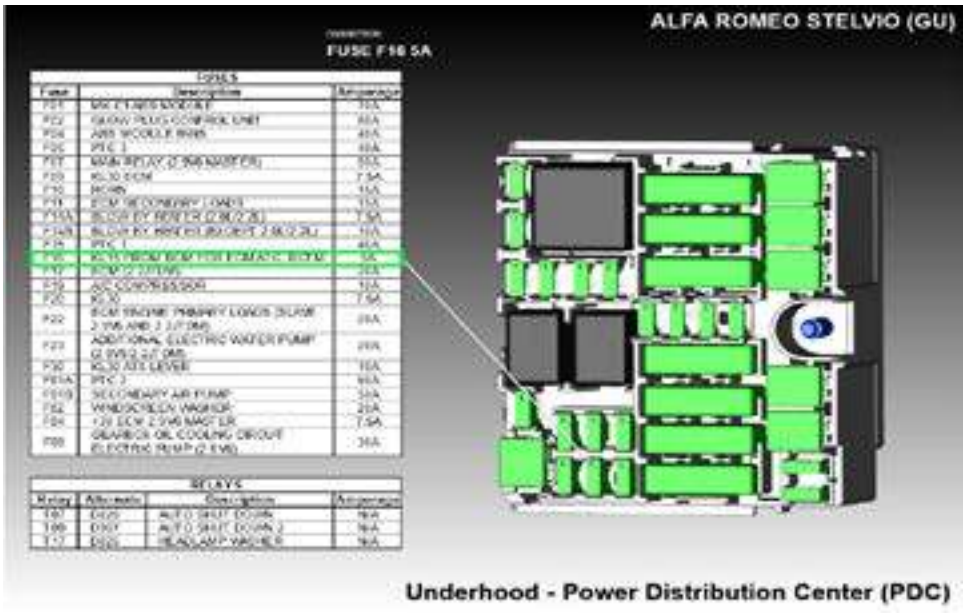
-the red cable with the smaller fuse should be connected to:
relay socket of ZN051 Distribution Box <-> Engine Control Unit (KL15) fuse location (see locations on next page)
-the red cable with a clip should be connected to:
relay socket of ZN051 Distribution Box <-> B+ (e.g. to the car battery (B+))

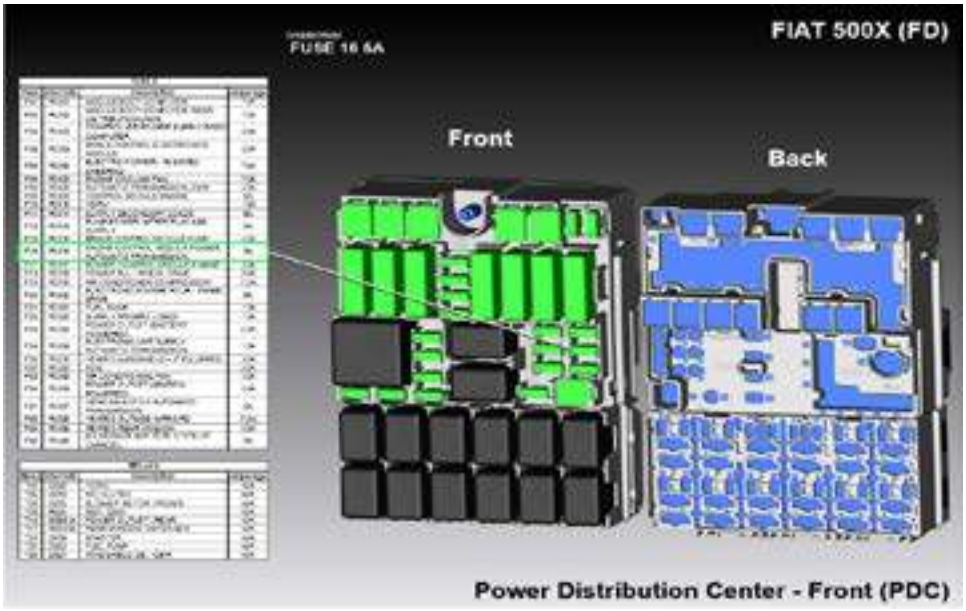


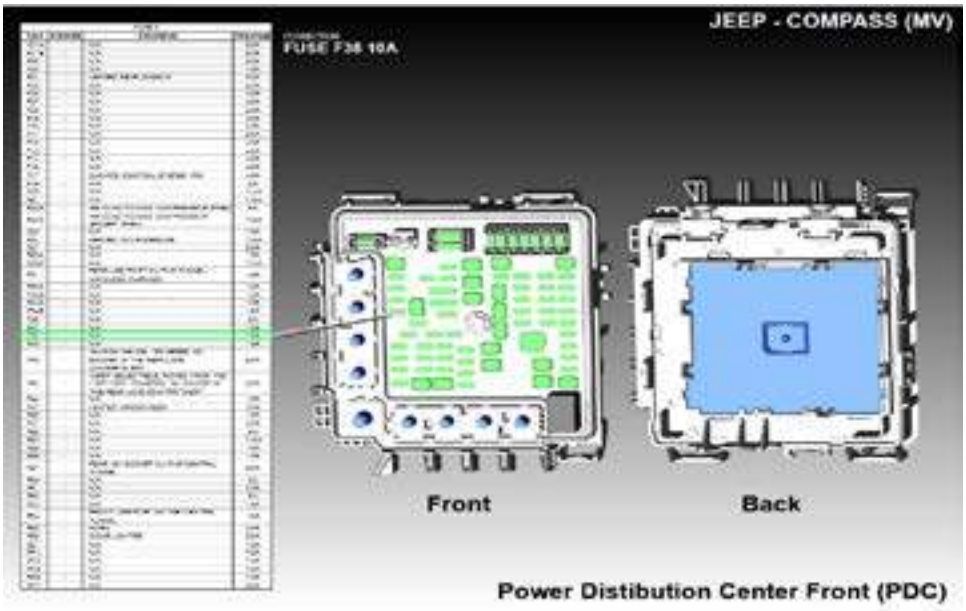


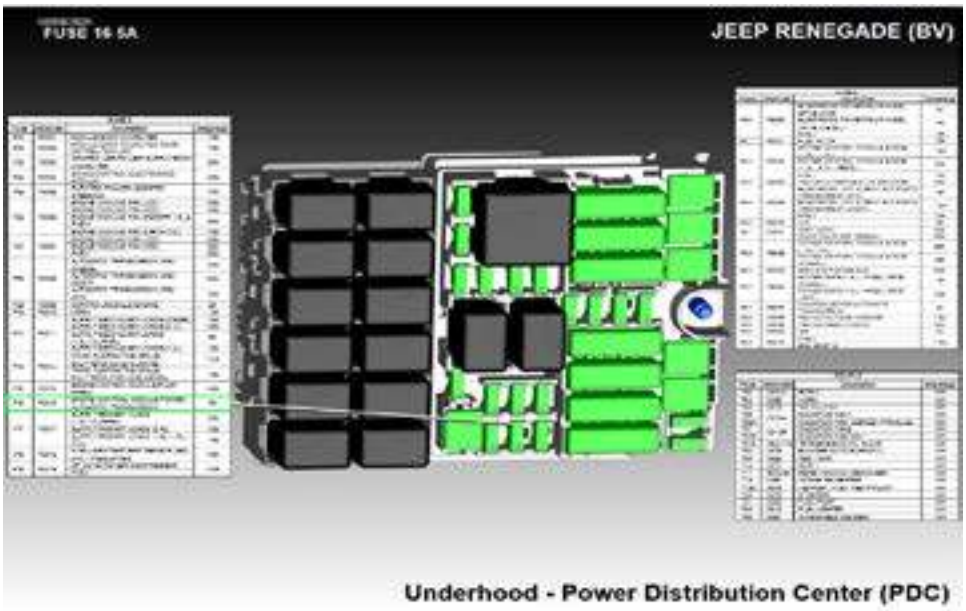
Here are some diagrams with ECU fuse location of some of the models:






FIAT 500X (FD)
Front
Back
Power Distribution Center - Front (PDC)


JEEP - COMPASS (MV)
Front
Back
Power Distibution Center Front (PDC)


FUSE 16 5A
JEEP RENEGADE (BV)
Underhood - Power Distribution Center (PDC)

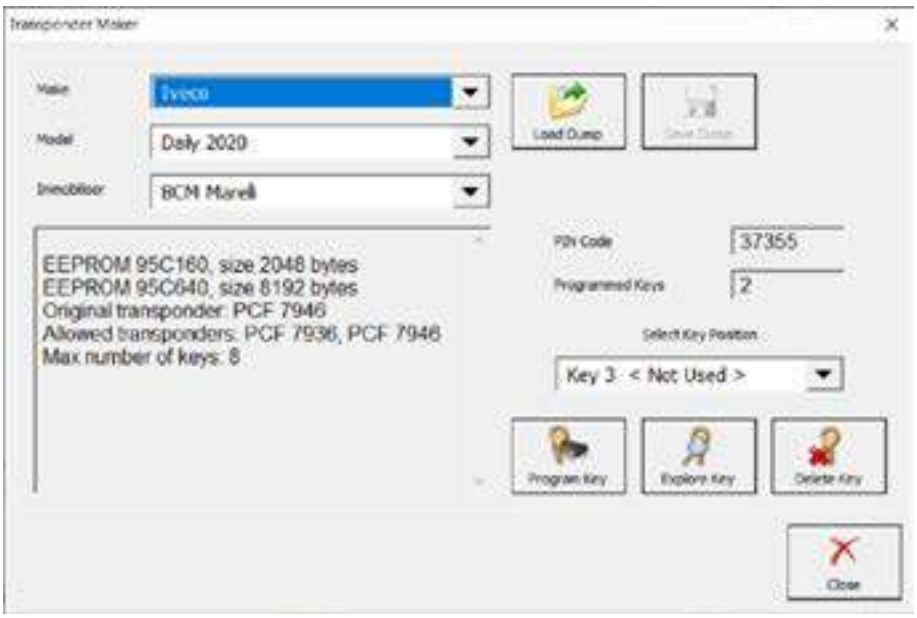
4.3 Key Learning Fiat Ducato, Fiat 500L, Iveco Daily 2020+

This is how you can program a key to Fiat Ducato, Fiat 500L, Iveco Daily 2020+:

1. You need to take out the BCM unit and open the plastic cover
2. Find the EEPROM and solder ZN057 as per the diagram on the next page
3. Read the SPI 95640 memory with ABProg - this will give you the PIN. This procedure is executed with the ZN030 ABProg programmer, and the ABProg upgraded software
4. Load the file into the FCA Software > Special Functions > Transponder Maker and prepare a transponder ID46 7936 (or 7946)
5. Proceed to Key Learning procedure

Required tools:

ZN030 ABProg programmer
ZN057 EEPROM wire extender for ABPROG EEPROM/BCM adapter
ZN002 or ZN003 ProTag Programmer
CB019 would be required if the vehicle is equipped with a security gateway module
In case there is a security gateway, but there is a problem with the communication with CB019 - ZN051 DS box and the CAN wires with the needle pinches need to be connected to the 6-14 ports of the DS Box and the internal CAN wires close to the BCM.

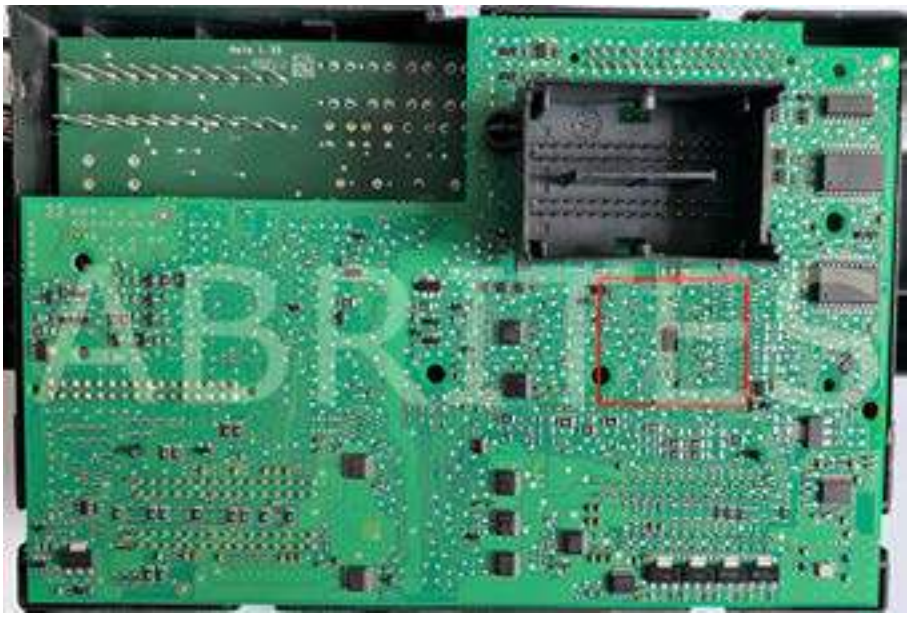


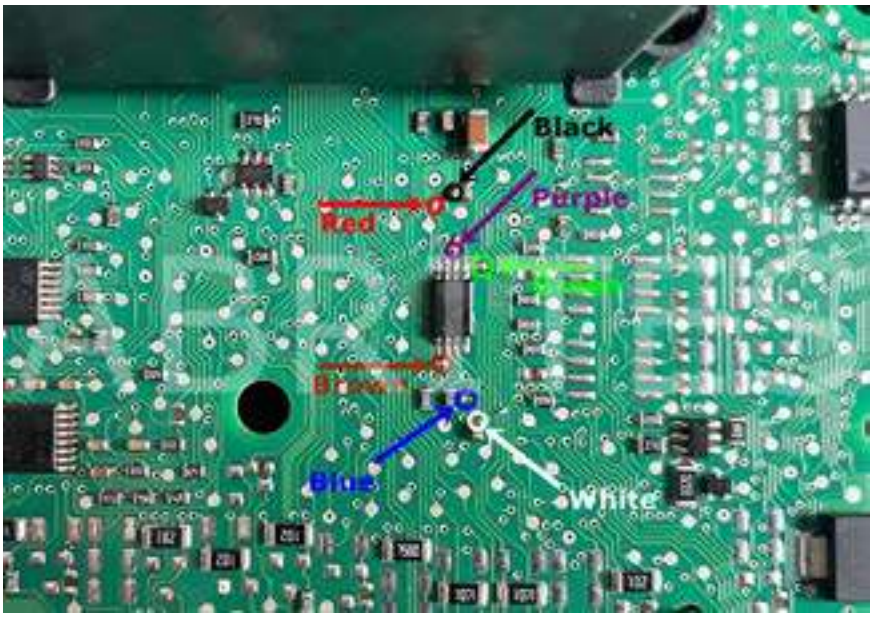
Internal CAN connection to the BCM, which is an alternative connection method for bypassing a gateway, whenever the procedure does not go trough when using the CB019.





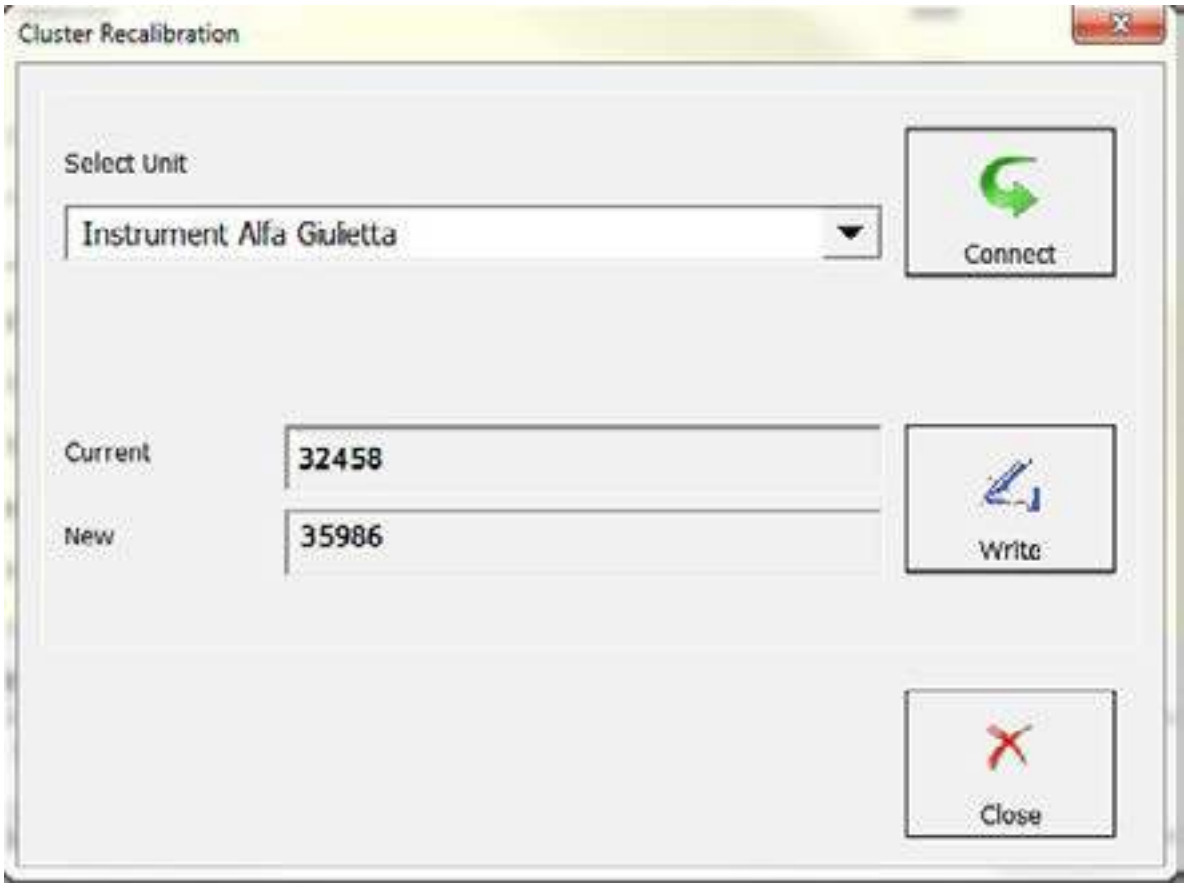
The picture below show you where and how you need to connect the ZN057 adapter in order to read this BCM unit.





5. Cluster Calibration Special Function

This function allows the update of Instrument Cluster working data Calibration by OBDII in cluster of CAN based vehicles. Please make sure to visit our website or web store for the full supported model list. Calibration can be used when the module has been replaced with a second hand unit in order to avoid mismatching and obstructions in the vehicle's operation. Please observe local regulations in regards to the calibration.



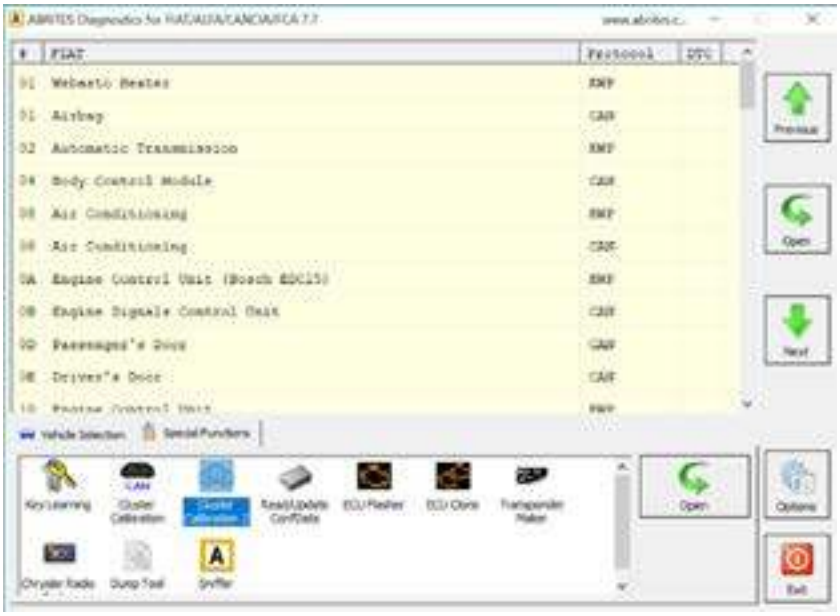
Calibration of Engine Control Unit – BOSCH EDC16 – Tested Version for now : Fiat Croma, Alfa 159, Fiat 16, New Fiat Bravo 1.6 JTD, New Lancia Delta 1.6 JTD, Alfa GTV 1.9 JTD

5.1 Cluster Calibration 2 Special Function

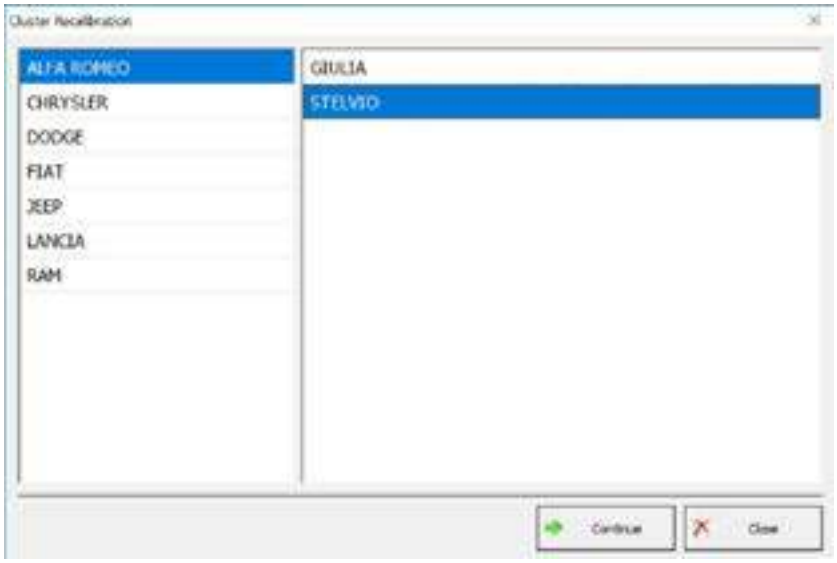
The "Cluster Calibration 2" function allows the calibration of some of the newer models in the FCA group.

Note: Calibration can be used when the module has been replaced with a second hand unit in order to avoid mismatching and obstructions in the vehicle's operation. Please observe local regulations in regards to the calibration.

1. Cluster Calibration 2



2. Make and model selection window



For models equipped with a security gateway module you have to use the CB019 gateway cable.

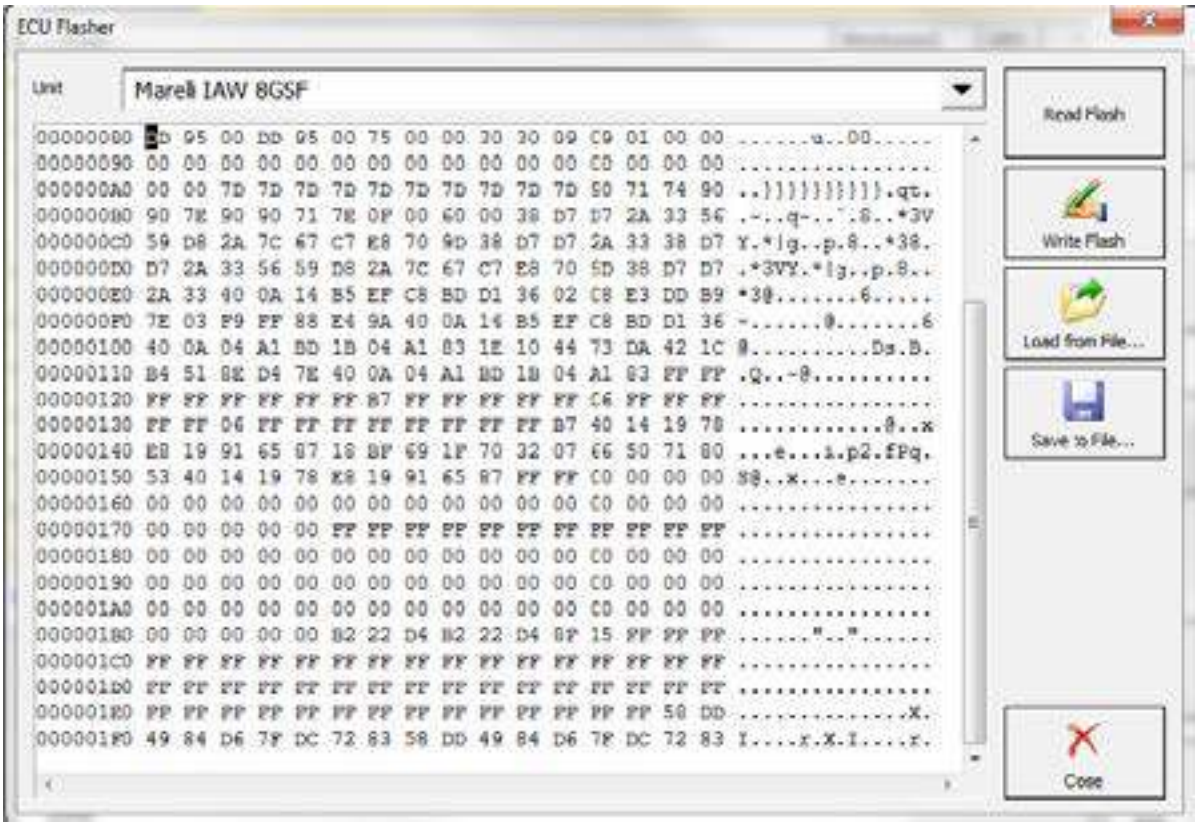
The latest addition of the supported models all require the CB019, includes the following:

- Jeep Wrangler (JL) 2018+,
- Jeep Gladiator (JT) 2020+,
- Maserati Levante - tested on 2022 hybrid face-lift,
- Jeep Grand Cherokee (WK2) 2011-2022
- Dodge RAM (DT) 2019+ - odometer and motor hours calibration.

6. Engine Control Unit Flash Manager

The ECU flash manager provides reading and Updating ECU's flash memory by diagnostic. ECUs supported: Marelli IAW 4AF/4EF/59F/5AF/5NF/6JF IAW 5SF3; BOSCH ME7.3H4/ME7.3.1/ME7.2.1 (BOOT MODE) MJD 6JF - IMMO OFF

It also allows storing of the flash files locally, as well as loading them into the unit.



7. ECU configuration manager

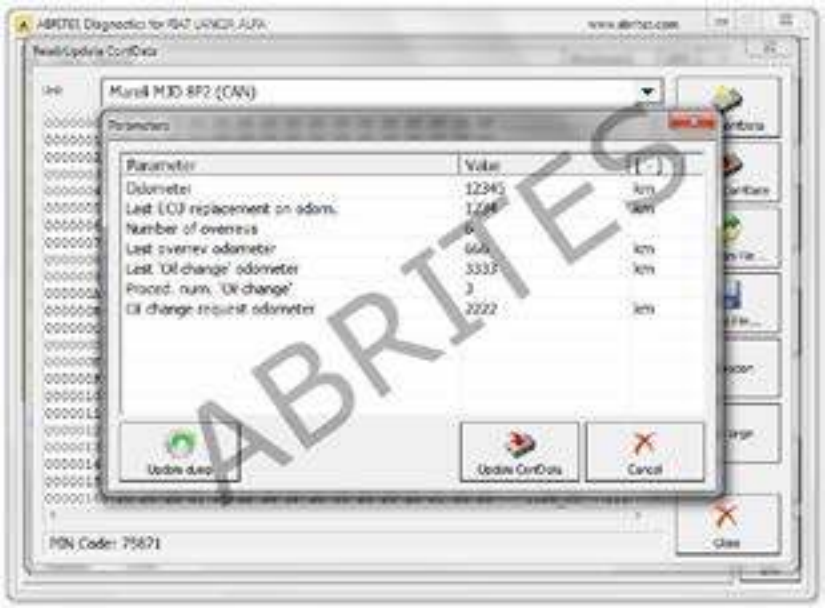
Reading and Updating ECU's configuration memory by diagnostic. Reset to factory new state option. ECUs supported: EDC15C5, EDC15C7, MJD 6JF/8F2; Marelli IAW 4AF, 4EF, 59F, 5AF, 5AM, 5NF, 5SF3, 8GMF, 8GSF; BOSCH ME7.3H4 (boot), ME7.3.1 (boot), ME7.2.1 (boot)

Read/update memory, Calibration by OBDII of Engine Control Unit - EDC15C5(EURO2), EDC15C7(EURO3). This model ECU have the following vehicles:

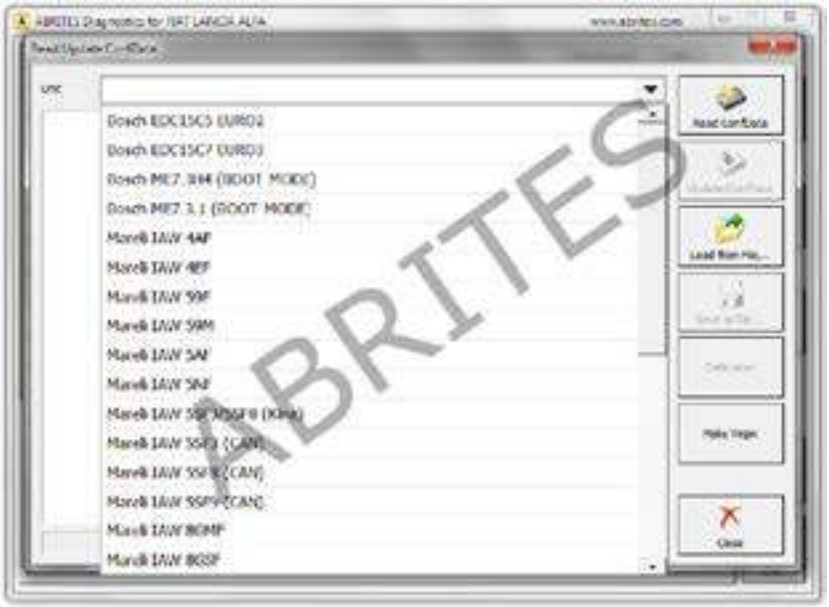
Alfa 145 - 1.9 JTD	Alfa 146 - 1.9 JTD	Alfa 147 - 1.9 JTD 16V; 1.9 JTD 8V	Alfa 156 - 1.9 JTD; 2.4 JTD
Alfa 166 - 2.4 JTD	Fiat Bravo - 1.9 JTD	Fiat Brava - 1.9 JTD	Fiat Doblo - 1.9 JTD
Fiat Ducato - 2.0 JTD; 2.3 JTD; 3.8 JTD	Fiat Marea - 1.9 JTD; 2.4 JTD	Fiat Marengo - 1.9 JTD	Fiat Multipla - 1.9 JTD
Fiat Punto - 1.9 JTD	Fiat Palio - 1.9 JTD	Fiat Stilo - 1.9 JTD	Fiat Siena - 1.9 JTD
Fiat Scudo - 2.0 JTD	Lancia K - 1.9 JTD	Lancia Lybra - 1.9 JTD; 2.4 JTD	Lancia Thesis - 2.4 JTD
Lancia Z - 1.9 JTD			

Read/update memory, Calibration, Make VIRGIN by OBDII of Engine Control Unit - Marelli Multijet MJD 6JF. This model ECU have the following vehicles:

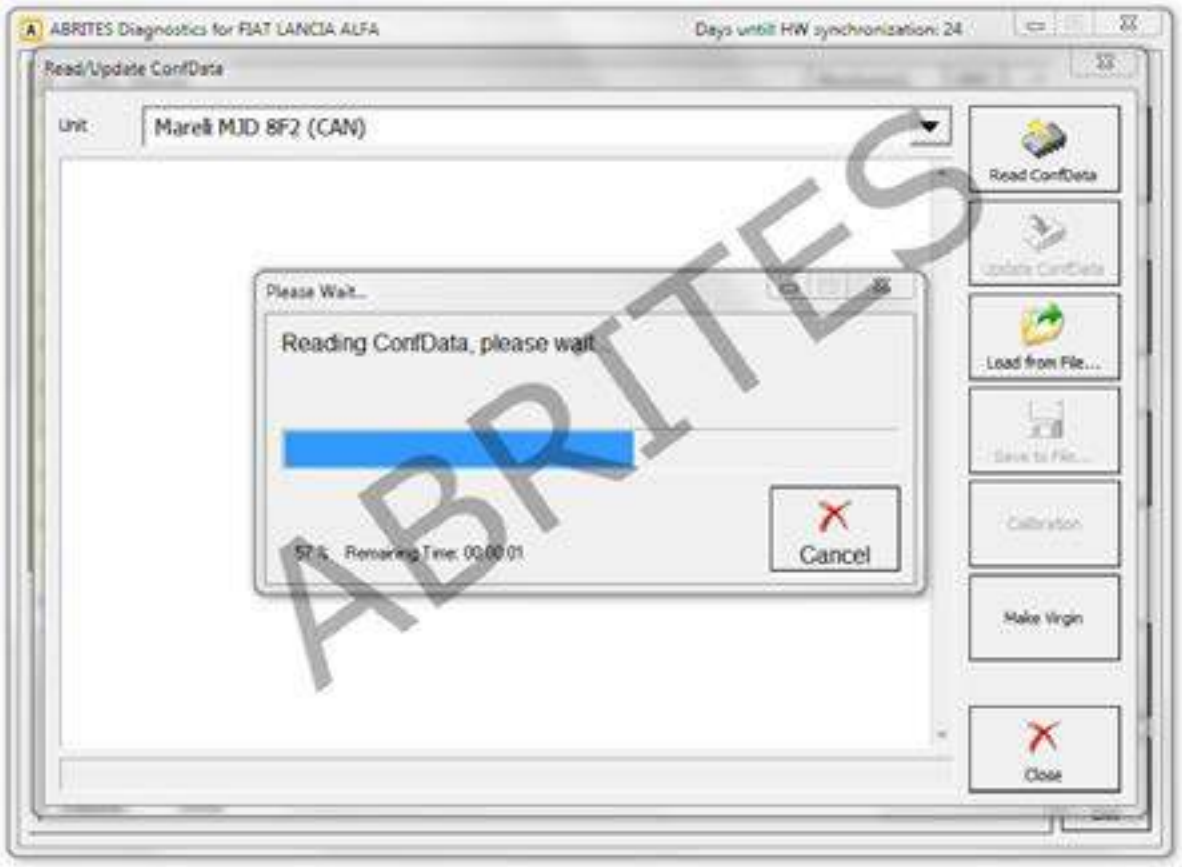
Fiat new Panda - 1.3 IAW Multijet MJD 6JF	Fiat Idea - 1.3 IAW Multijet MJD 6JF	Fiat Doblo - 1.3 IAW Multijet MJD 6JF	Fiat Punto - 1.3 IAW Multijet MJD 6JF
Fiat Grande Punto - 1.3 IAW Multijet MJD 6JF	Fiat Cinquecento - 1.3 IAW Multijet MJD 6JF	Lancia Musa - 1.3 IAW Multijet MJD 6JF	Lancia Ypsilon - 1.3 IAW Multijet MJD 6JF



Reading and updating Conf data, saving to files, loading from files :



Making the ECU virgin:



This function is vital for adaptation purposes in the cases where a second hand unit is used.

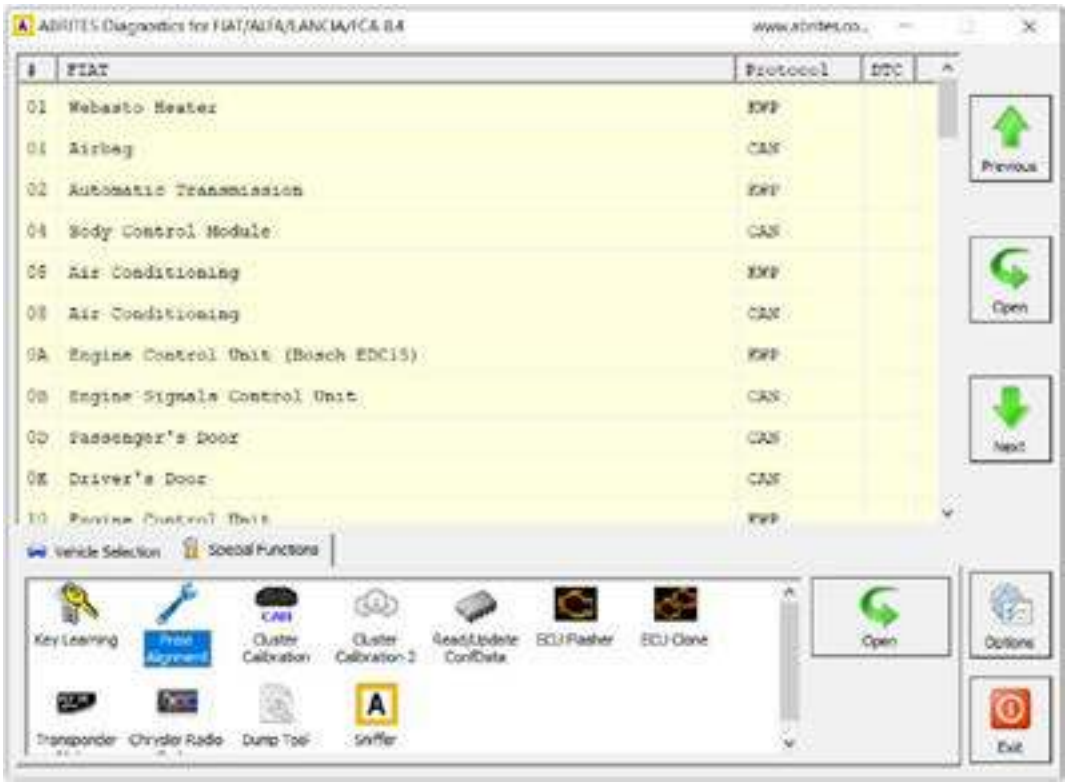
8. Proxi alignment

The Abrites Diagnostics for FCA allows you to perform Proxi alignment to both passenger and commercial FCA vehicles both on bench and inside the vehicle. Proxi alignment represents the process of the general configuration of the BCM (Body Control Module) of FCA vehicles. It is used to perform seamless replacement of modules related to the BCM as well as configuration of the behavior of the vehicle, what features it has, add and remove options and modules (retrofit) and literally "Align" the configuration from said vehicle in a simple and easy manner.

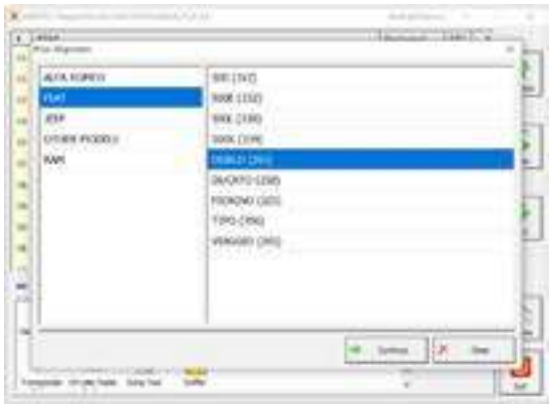
It is important to know that the IPC (Instrument Panel Cluster) module also contains the configuration. Here are some of the modules related to the Proxi alignment: BCM – Body Control Module, IPC – Instrument Cluster Panel, DSM – Display Screen Module, SDM – Sliding Door Modules (left and right), CTM – Convergence Telematic Computer and many others.

NB! The fact that the IPC contains the Proxi alignment data is important because it makes it possible to replace and align a BCM module also.

Start by opening the Proxi alignment feature in the Abrites diagnostics for FCA



Select the vehicle model from the list



The Abrites Diagnostics for FCA will then connect to the vehicle (or BCM if you are working on a bench)



Follow the instructions for ignition ON when working inside the vehicle.



Then you will have two options BCM alignment or IPC. The BCM option is the standard way to move forward. Use the IPC option when replacing the BCM with a new one

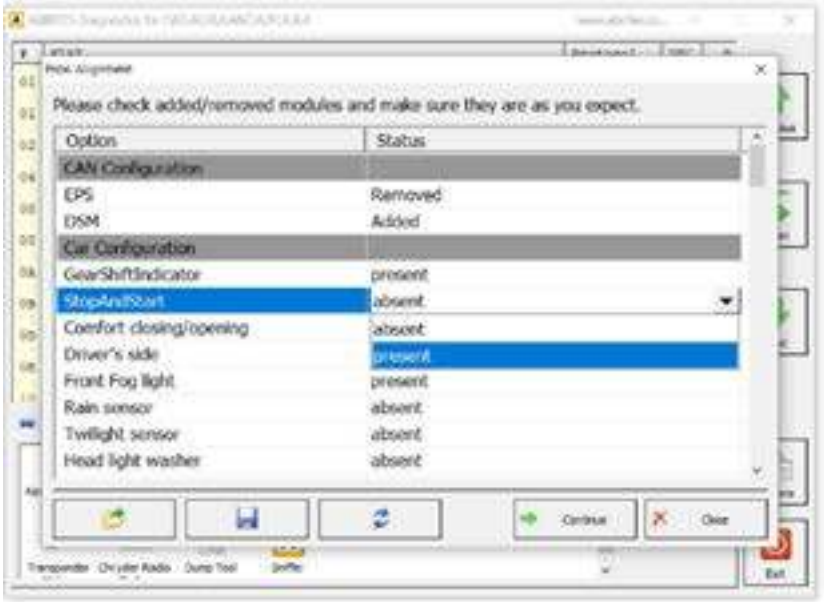


At this time the software will read the proxi alignment configuration and display it on the screen.





Once the Proxi alignment configuration is displayed you can modify the Proxi alignment according to your needs. To the left of the screen you can see the option list while to right side of the screen you can see the status of the option in the current configuration. The options here may vary according to the needs of the vehicle. It can be a simple “present” or “absent” or it can provide additional configuration, for example the sliding door can be changed from the left hand side of the vehicle to the right hand side if you are using a BCM from a LHD car on a RHD car and so on, certain features can be enabled or disabled, and even modules participating in the Proxi alignment can be removed or added to a vehicle in accordance to your particular needs. Once you click on the status of the option on the right hand side you will have a drop down menu which will allow you to modify it with a mouse click



Once you are done with the configuration as you need it you can save the configuration to a file on your computer which you can later load using the SAVE and FILE icons in the bottom left.

You can, of course save the original file or the modified one as well.

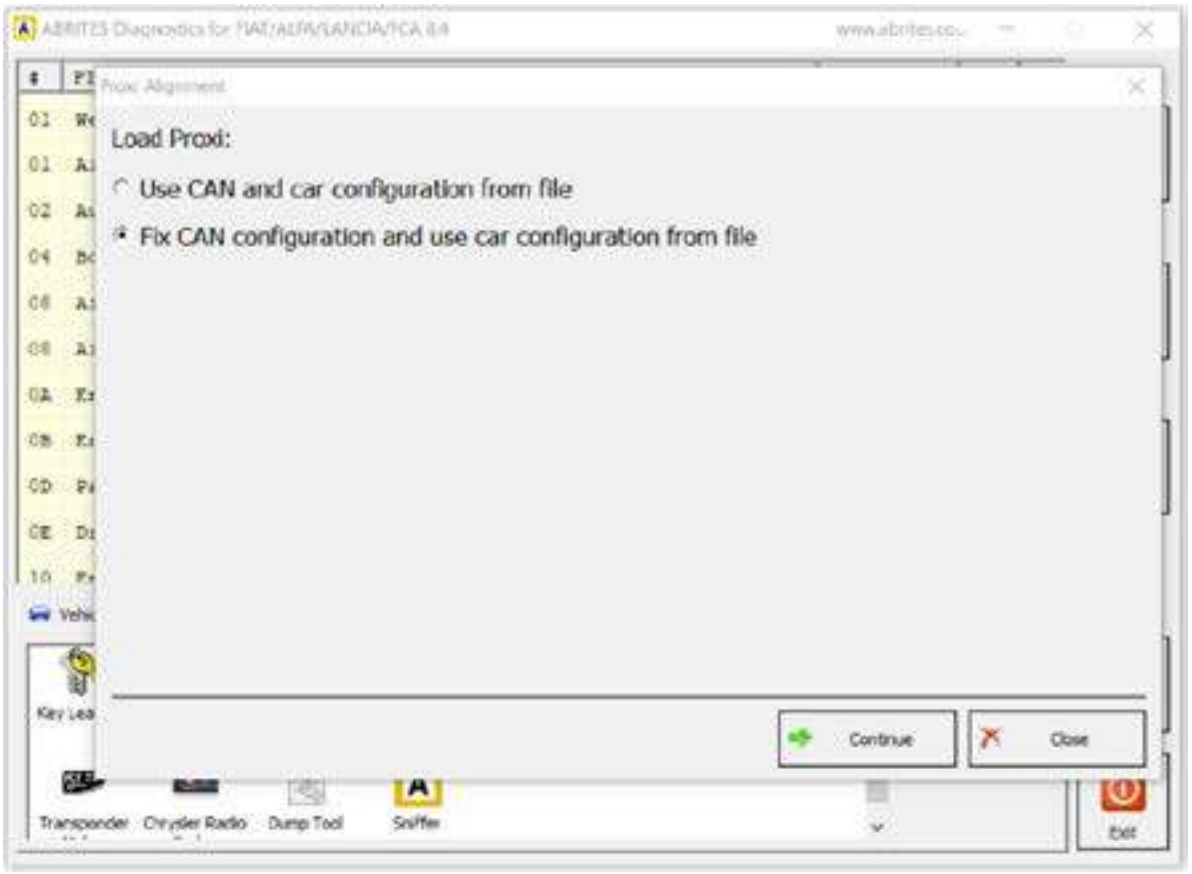




Loading the Proxi alignment configuration file has two options which are used in two different situations:

When the BCM is on bench and you power it up it will not "see" the other modules. Thus you can perform the configuration on a bench. This, however means that the BCM will be configured but it will not know that there are other modules related to proxi alignment in the car. For this case and other testing and development purposes you can select the "Use CAN and configuration from file.
When working on the vehicle this is not an issue and as you can see the default option is to "FIX" configuration from file. As it is the default option we suggest you use this as this will assist with the alignment.

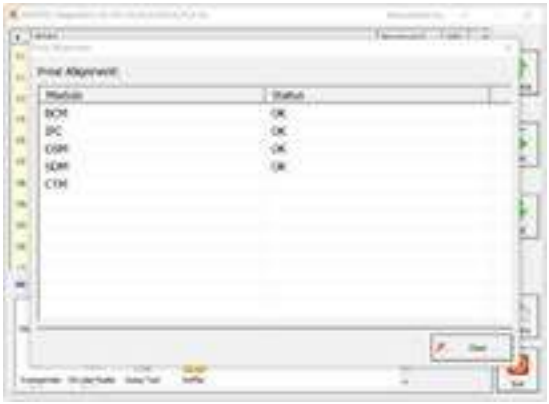




The next screen will prepare the car for programming of the Proxi alignment, make sure that the precautions on the screen are taken



The progress of the alignment is displayed on the screen, the modules currently being "aligned" are on the left side, while the status of the alignment is on the right



At the end of the procedure you can turn the ignition off and back on to test if everything went as expected

