3.2. Recorded Data

Recorded Data Function

Saved screen captures, flight record data and the oscilloscope waveforms can be reloaded for review by selecting this function.

Select “Recorded Data” from the main menu.

Data Type

Selecting the Recorded Data function from the main menu is followed by the list of the files contained in the G-scan2 SD card.
The types of the recorded data files are indicated in the right of the screen.

- Image: Screen capture image file saved using all functions.
- Sensor: Flight record data file saved using Diagnostic Function.
- Scope: Oscilloscope waveform replay file saved using Measurement Function

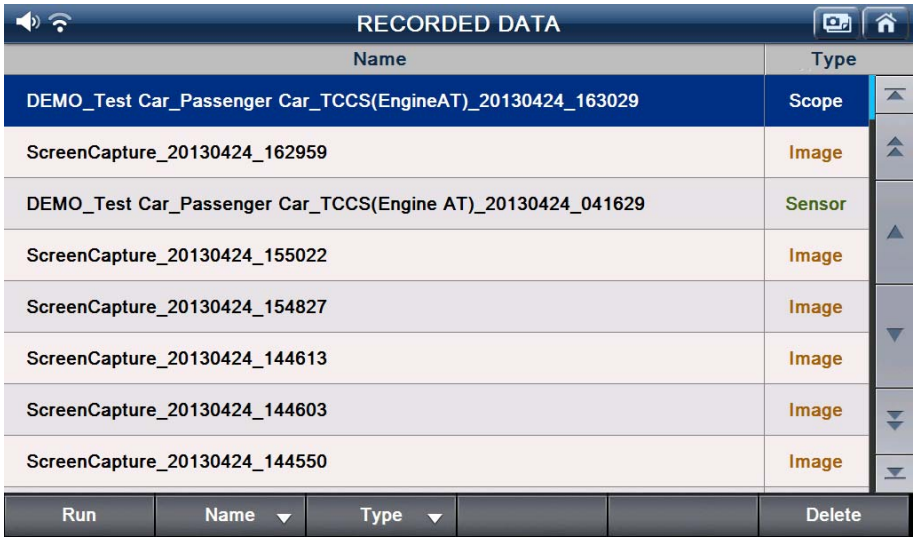
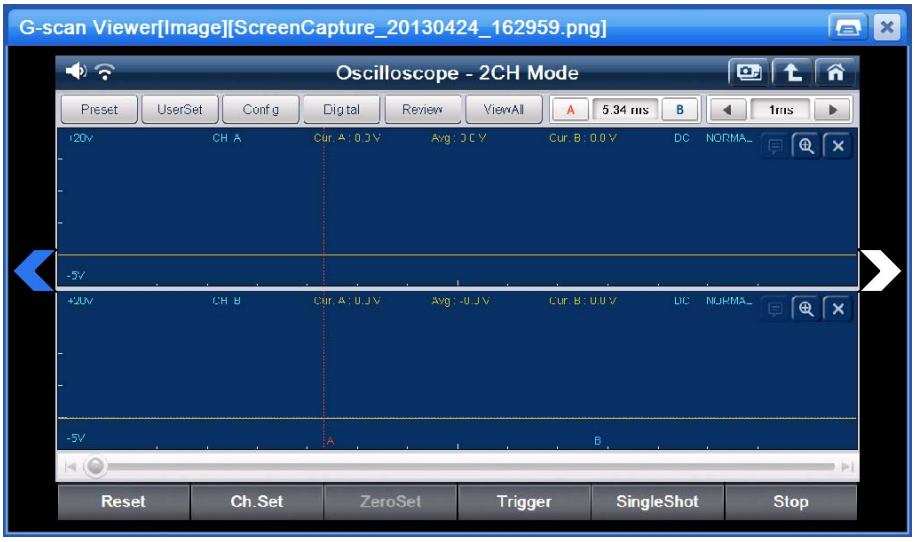


Image Viewer

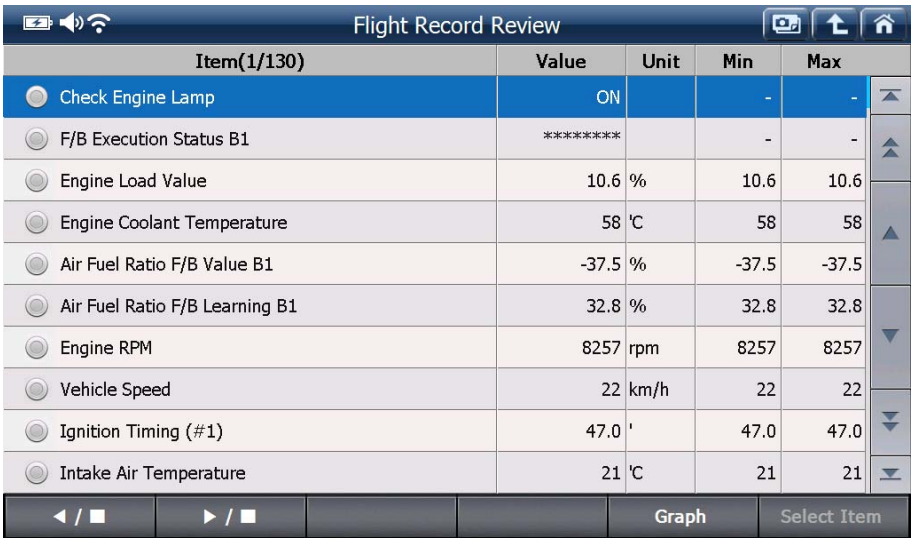
Select the Image type file and select “Run” button in the bottom. Then the image viewer is activated, and you can view the next or previous image contained in the SD card by selecting the right and left arrow head marks.



Flight Record Review

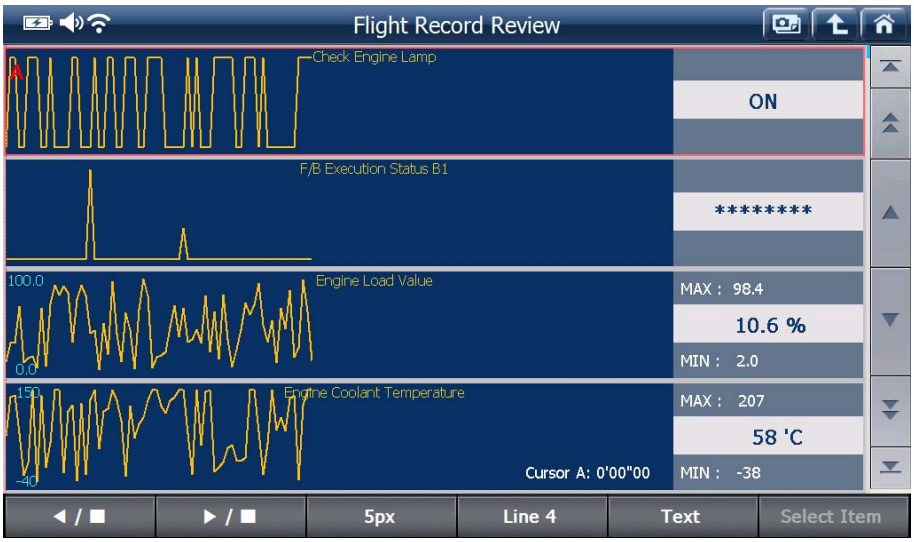
1. Text mode

Select the Sensor type file and press the “Run” button. Then the Flight Record function is activated and you can replay the recorded live data parameters in numeric or graphical form as shown below.



Control button	Description
◄ / ■ ► / ■	Replay the recorded data forward and backward
Graph	Switch to the graphical mode.

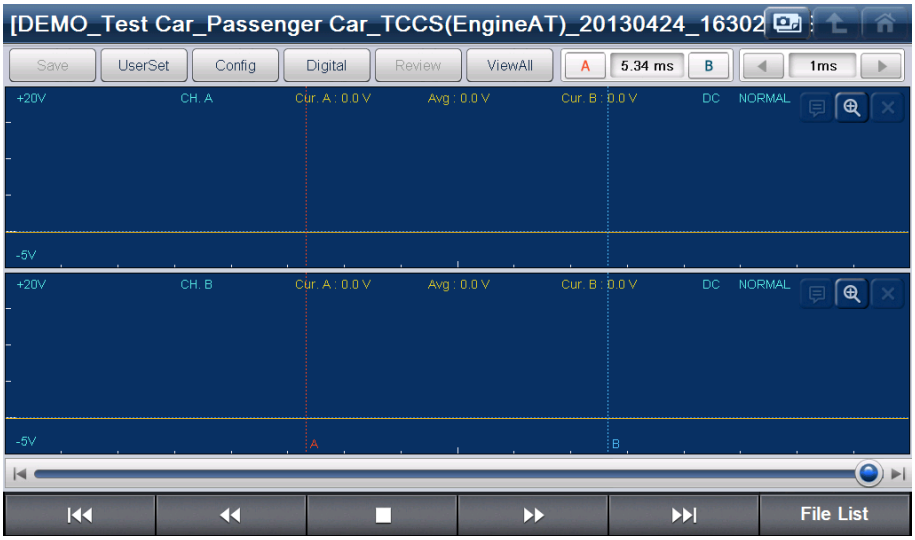
2. Graphic Mode



Control button	Description
◄ / ■ ► / ■	Forward and reverse replay control using these buttons is also possible in the graphical mode
15px	Graph size can be controlled by selecting the pixel per frame (1px -> 5px -> 15px). The more pixels per frame make the graphs bigger and vice versa.
Line 4	Number of graphs that appear on the screen also can be selected among 1, 2, 3 or 4 line(s).
Text	Switch to the numeric data mode by selecting “Text”,

Oscilloscope Waveform Replay

Select the Scope type file and press the “Run” button to replay the recorded oscilloscope waveform data.



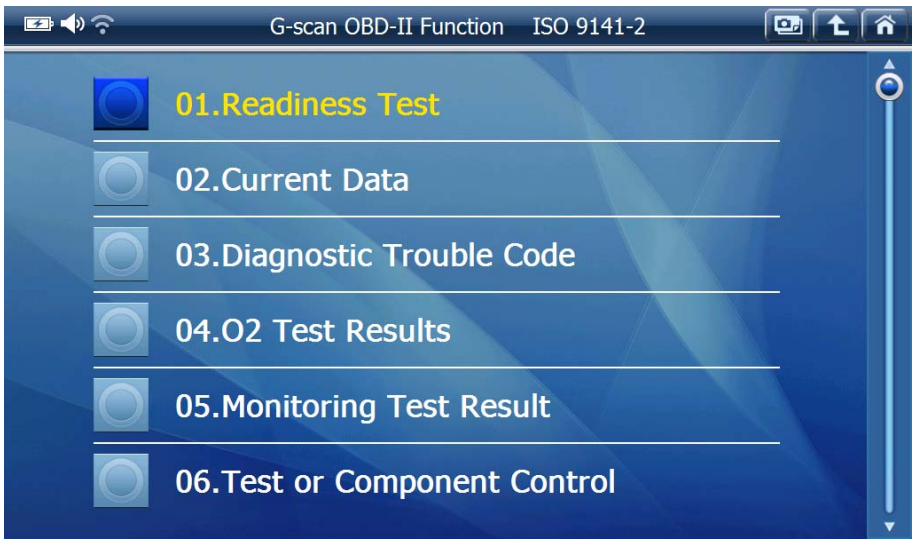
Control button	Description
⏮	Brings to the first frame of the recorded waveform data
◀◀	Replays the data reversely
■	Stops replaying the data
▶▶	Replays the data forward
⏭	Brings to the last frame of the recorded waveform data
File List	Returns to the data file selection menu

3.3. OBD-II

OBD-II Function

OBD-II function is used for diagnostics of OBD-II or EOBD complaint vehicle's emission-related powertrain control system supporting the industrial standard protocols including ISO9141-2, ISO14230-4 <KWP2000>, SAE J1850 VPW, SAE J1850 PWM and ISO15765-4（CAN）

Make the connection with the car using the main DLC cable, and select the "OBD-II" icon.



OBD-II

On Board Diagnostics was designed and mandated in order to monitor malfunction or failure of the car's emission control system. By illuminating the warning lamp on the dashboard, the OBD system alerts the driver in case the emission control system is failing or inefficient, allows the ordinary mechanic may immediately comprehend what is the problem by use of a proper diagnostic device, consequently contributes to minimizing the chance of emitting excessive exhaust gas.

OBD-II was introduced as an update of OBD in a way of increasing the efficiency of OBD system by standardization. Thanks to the efforts made for standardization, a mechanic can get the fault code information and data from all the cars that support ISO and SAE industrial standards regardless of brand or car make.

The shortcoming of standardization is the narrowed scope of information: what you can get is the emission related minimum scope of information based on "commonly found in every car" concept.

OBD-II Fault Codes

SAE and ISO industrial standard documents define the OBD-II and EOBD codes are consisted of a three-digit numeric code preceded by an alpha-numeric designator.

The alpha-numeric designators are "P0~P3", "B0~B3", "C0~ C3" and "U0~ U3" corresponding to Power train, Body, Chassis, Network Communication systems.

Codes	system	Included sub-systems (examples)
P0*** ~ P3***	Power train	Engine, Transmission
C0*** ~ C3***	Chassis	ABS, Suspension, Traction
B0*** ~ B3***	Body	Airbag, Air conditioning, lighting
U0*** ~ U3***	Network	CAN, Inter-system communication

Manufacturer Specific Fault Codes

Not all the fault codes were standardized. The fault codes that can be commonly applied to any "internal combustion" vehicles were defined as standard codes. This is also called as "Generic codes" or 'Core codes

The larger portion of the entire codes was not standardized due to fundamental differences of each car Make's system design or diagnostic strategy. The codes that are reserved for each car manufacturer's own definition are called "Enhanced Codes" or "Non-standard codes"

C0*** and B0*** codes are also defined as the Generic Codes. However the actual list of the standard codes for these Body and Chassis control systems has not been released to public yet. Therefore, it is assumed that there are no known Generic Codes for these systems.

The codes that [Generic OBD2 / EOBD] function can access are just the Generic Codes.
If any enhanced (or non-standard code) is detected, the scan tool shows it as an “Undefined” or “Unknown code” because these non-standard codes are defined differently by the car manufacturers.

Enhanced Codes can be properly read in accordance with the manufacturer’s own definitions, please
select the [Diagnosis] from the initial menu and follow the model selection procedure.

EOBD and OBD-II Revision

Version 1996

The generic (standard) codes were originally defined by the SAE (Society of Automotive Engineers) document J2012 published by in 1992.

At the time of publication of the document, P2*** and P3*** codes were reserved for future use and not included in the standard codes.

Revision in 2002, after EOBD implementation

When the EOBD was mandated in 2001, the EOBD generic codes were suggested in accordance with the ISO/DIS15031-6 document and the original American SAE J2012 document was also revised for uniformity to form the global standard.

The P2*** and the P3*** codes were included in the list of standard codes in the revised documents.

OBD-II / EOBD code break-down

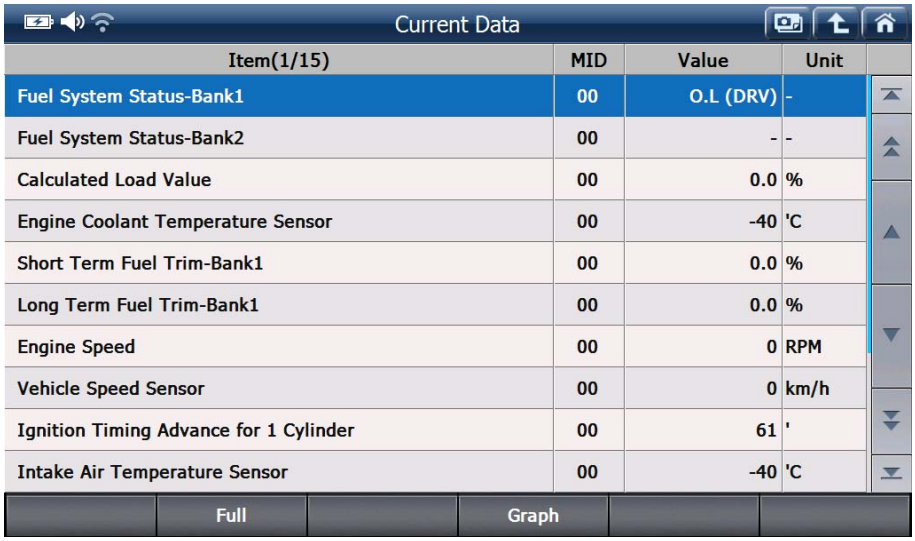
After the revision, the range of generic (standard) codes and enhanced (non-standard) codes now can be categorized as below:

Code No.	Defined Systems
P00XX	Fuel and Air metering and Auxiliary Emission Controls
P01XX ~ P02XX	Fuel and Air metering
P03XX	Ignition System or Misfire
P04XX	Auxiliary Emission Controls
P05XX	Vehicle Speed, Idle Control and Auxiliary Inputs
P06XX	Computer and Auxiliary Outputs
P07XX ~ P09XX	Transmission
P0AXX	Hybrid Propulsion

P0BXX ~ P0FXX	Reserved (for Standard Codes)
P1XXX	Manufacturer (Enhanced) Code
P20XX	Fuel and Air metering and Auxiliary Emission Controls
P21XX ~ P22XX	Fuel and Air metering
P23XX	Ignition System or Misfire
P24XX	Auxiliary Emission Controls
P25XX	Vehicle Speed, Idle Control and Auxiliary Inputs
P26XX	Computer and Auxiliary Outputs
P27XX ~ P29XX	Transmission
P30XX ~ P33XX	Manufacturer (Enhanced) Code
P34XX	Cylinder Deactivation
P35XX ~ P39XX	Reserved (for Standard Codes)
U00XX	Network Electrical
U01XX ~ U02XX	Network Communication
U03XX	Network Software
U04XX	Network Data

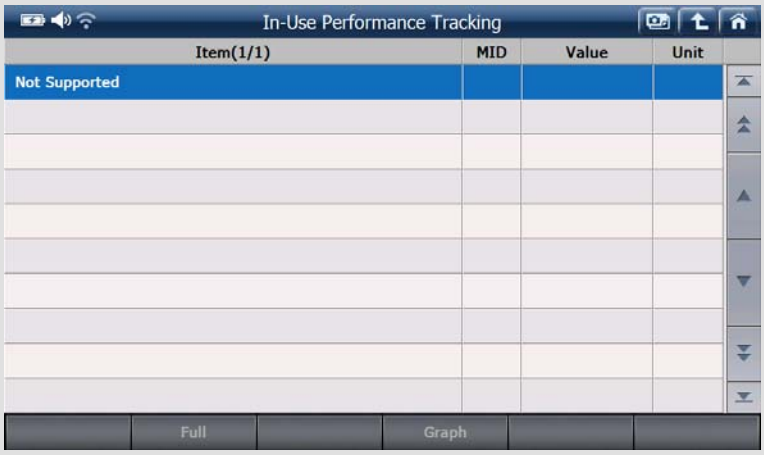
OBD-II / EOBD Current Data

When [2. Current Data] is selected from the OBD-II/EOBD menu, the live data of the sensors and parameters are listed as shown below:

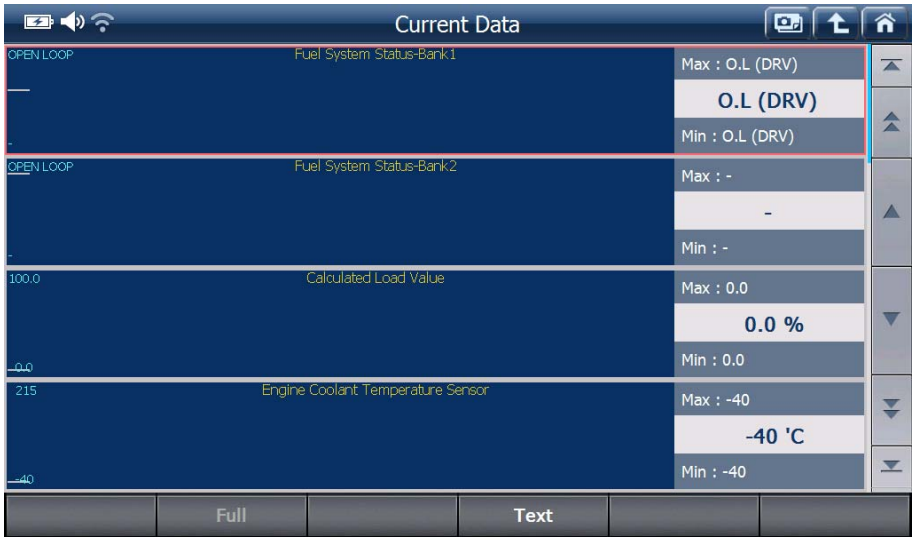


CAUTION

- When a function was selected from the OBD-II menu, the result may come up with “NOT SUPPORTED” reading as illustrated below, which means the selected function is not supported by the vehicle that is being tested.



In order to view the Current Data in graphical form, select the “Graph” button in the bottom. And the “Text” button will switch to the numeric mode again.



3.4. Vehicle Diagnosis

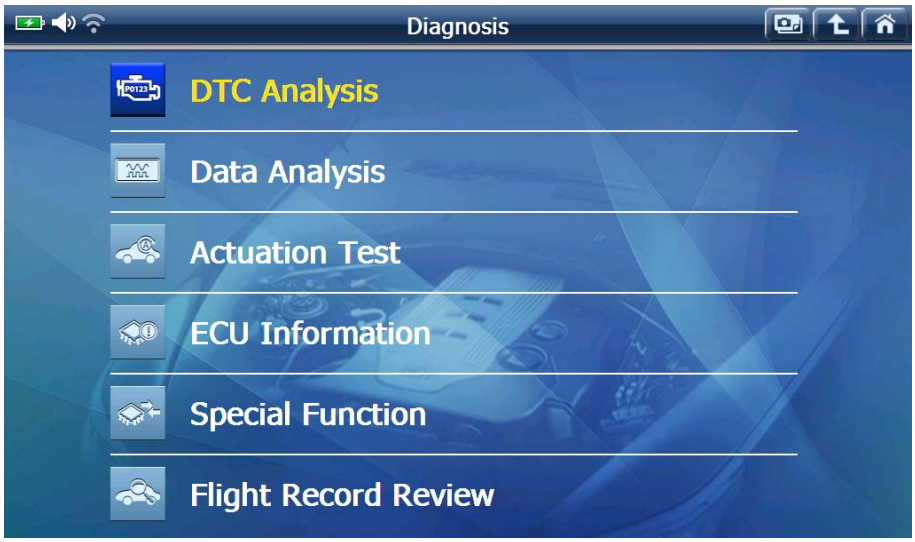
Manufacturer Specific Diagnossis

Non-standard manufacturer specific diagnostic functions such as DTC Analysis, Data Analysis, Actuation Test, Special Functions including Reset or Coding are provided when "Vehicle Diagnosis" is selected from the main menu.

Select "Diagnosis" icon from the G-scan2 main menu

Diagnostic Functions

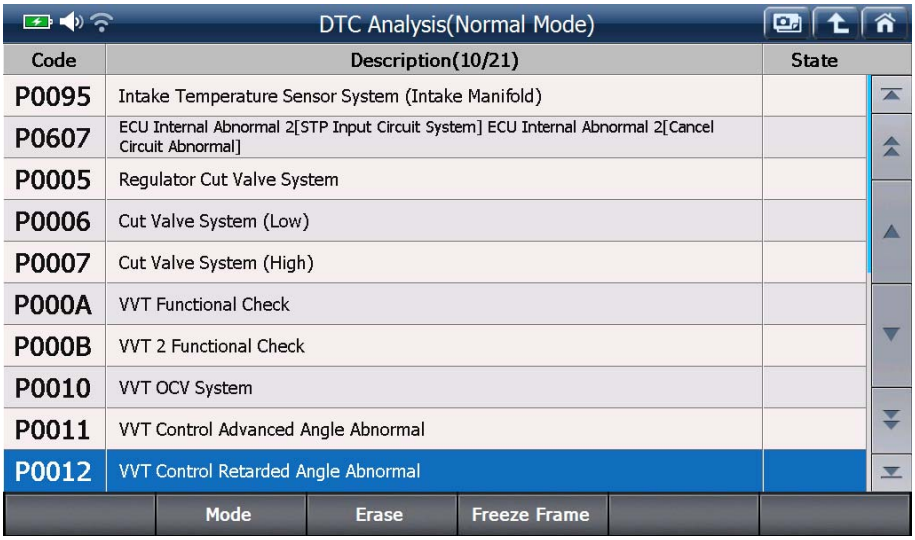
With the exceptions, following diagnostic functions are provided for the majority of the brands that G-scan2 supports. For more details, please refer to the coverage list which is published when the new update is released regularly.



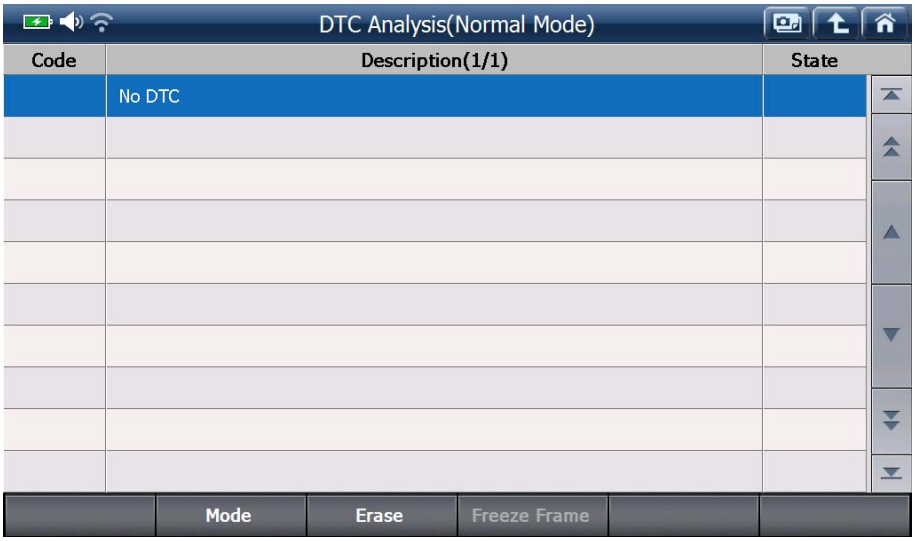
1. DTC Analysis

1.1. DTC Reading and Erasing

The basic diagnostic function used for reading and erasing the DTC (diagnostic trouble code) from the electronic control system.

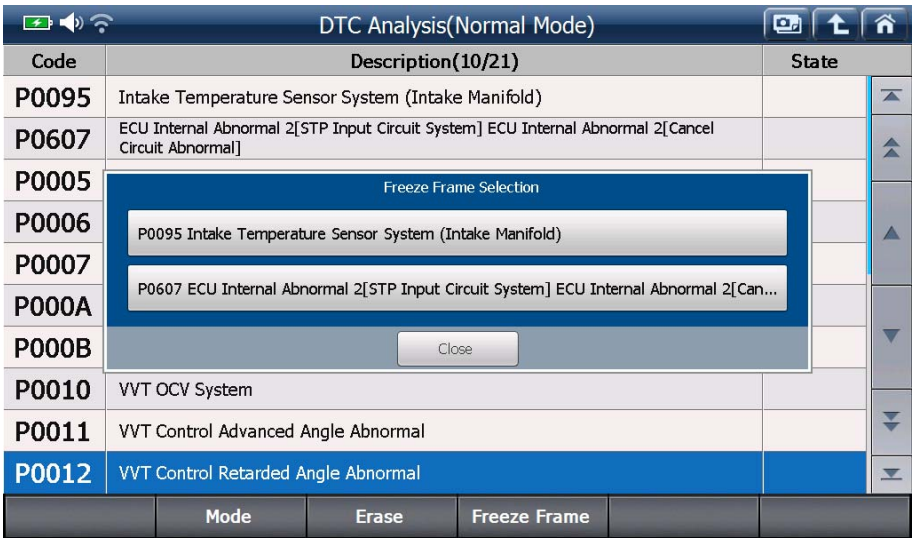


Select the “Erase” button to remove the DTC from the control unit’s memory.

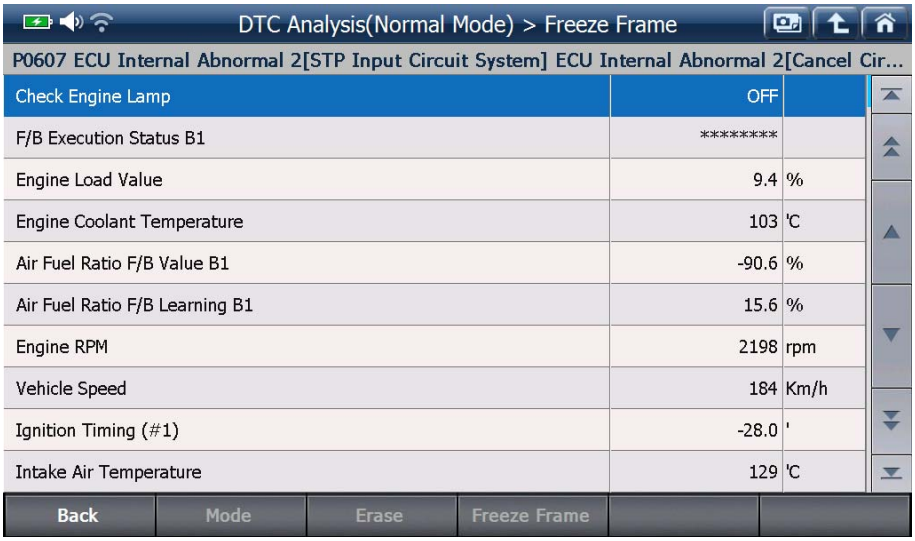


1.2. Freeze Frame Data

To aid the mechanic’s better understanding on what had happened to the vehicle’s control system before and after the DTC was logged, live Data parameters are recorded when the critical diagnostic trouble code was detected and logged to the control unit’s memory. Select the “Freeze Frame” button to list the freeze frame data recorded in the control unit’s memory.



Select the freeze frame data among the list, then the selected freeze frame data is retrieved from the control unit’s memory.



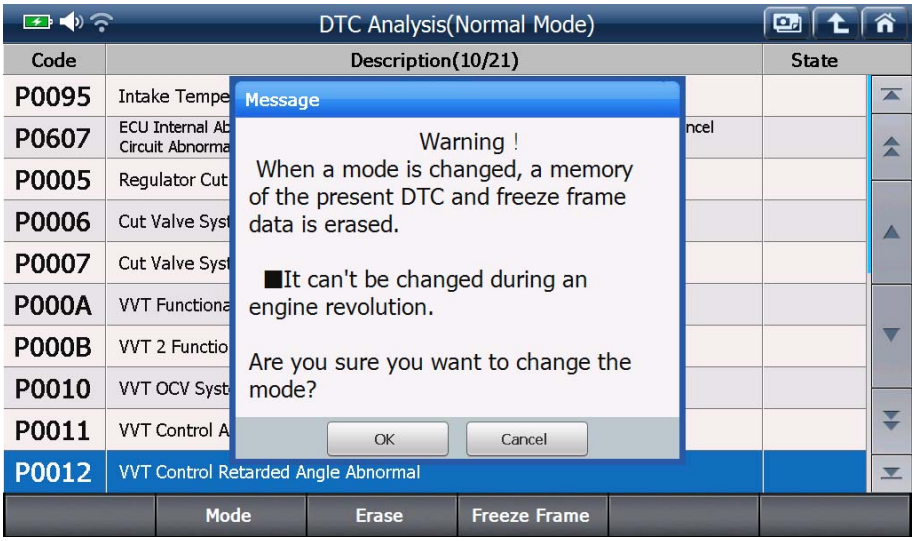
1.3. Manual reading and erasing for old vehicles

Reading and erasing the codes from the old vehicles of 1980's and early 1990's using G-scan2 or the other diagnostic tools may not be possible as the old control systems do not support bi-directional communication. Only manual reading and erasing are possible for those vehicles.

1.4. Advanced DTC functions for new vehicles

The late model vehicles provide diversified information through the DTC Analysis function.

For example the Toyota vehicles support switching to Check Mode where the control unit applies narrower allowance for fault code recognition in order to check the potential trouble codes with the defects of the marginal level.

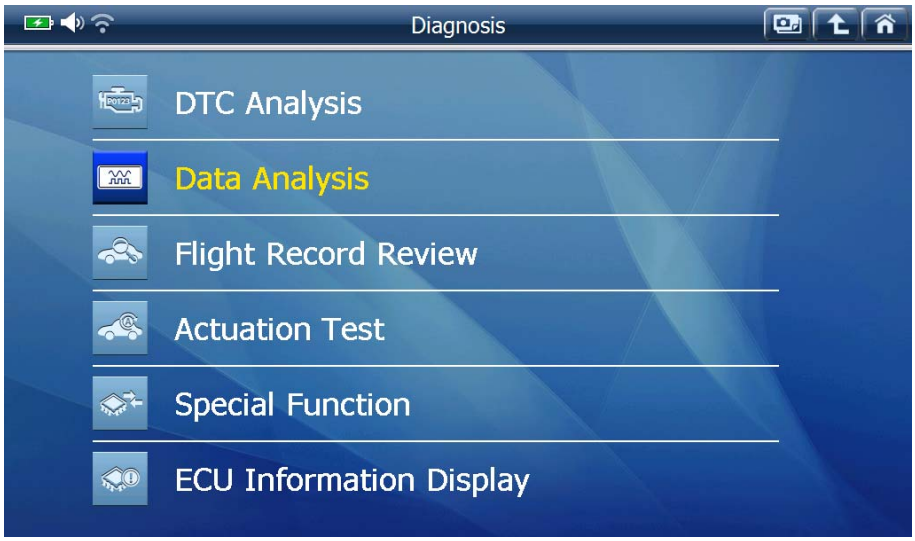


Some ABS systems support Test Mode that lists all the DTC's reserved for the system and conducts the calibration function at the same time. Each and every manufacturer supports different extra DTC Analysis functions in their own ways, therefore make sure to be acquainted with the different procedures and conditions before executing the manufacturer specific DTC Analysis functions.

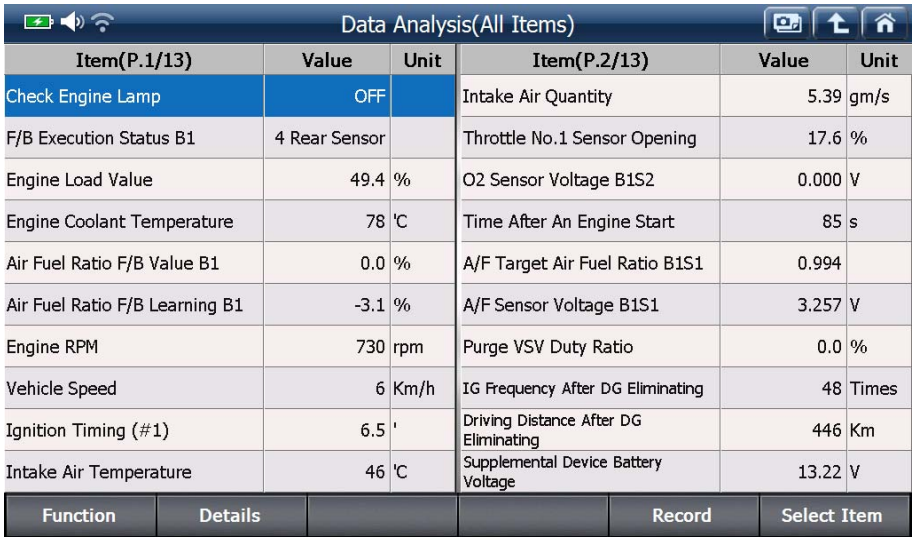
2. Data Analysis

2.1. Live Data / Current Data

Data Analysis is also called as Live Data, Data List, Data Stream or Current Data by the car manufacturers, and it is one of the basic diagnostic functions that shows the data values of input and output side of a control system



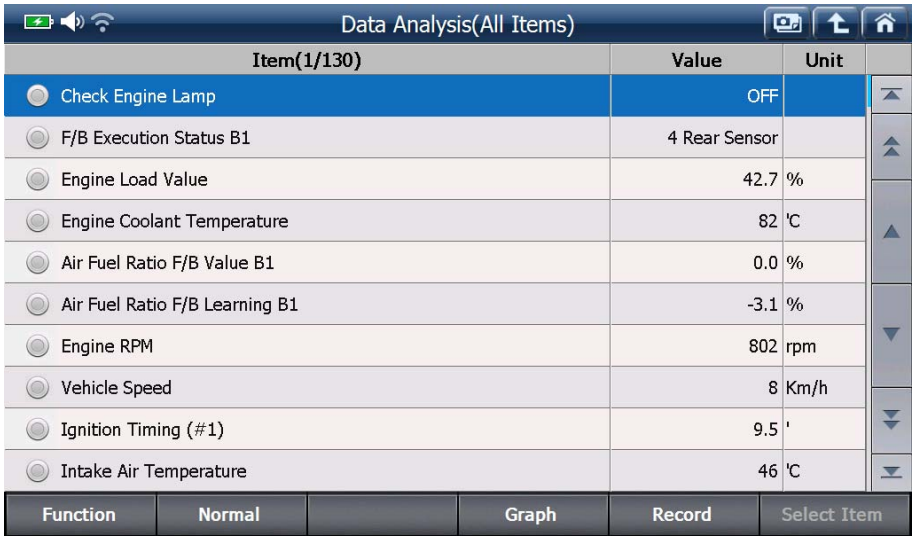
Select "Data Analysis" from the menu then the data parameters are listed as shown below.



2.2. Details

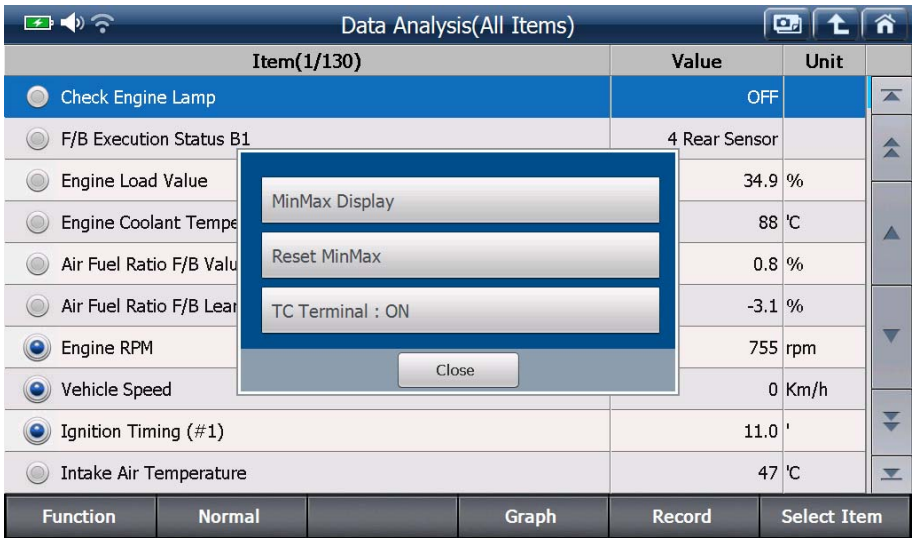
Select "Details" button in the bottom to switch the data display to a full page "Detail" mode, where up to 10 parameters are listed with more space to accommodate the longer parameter names.

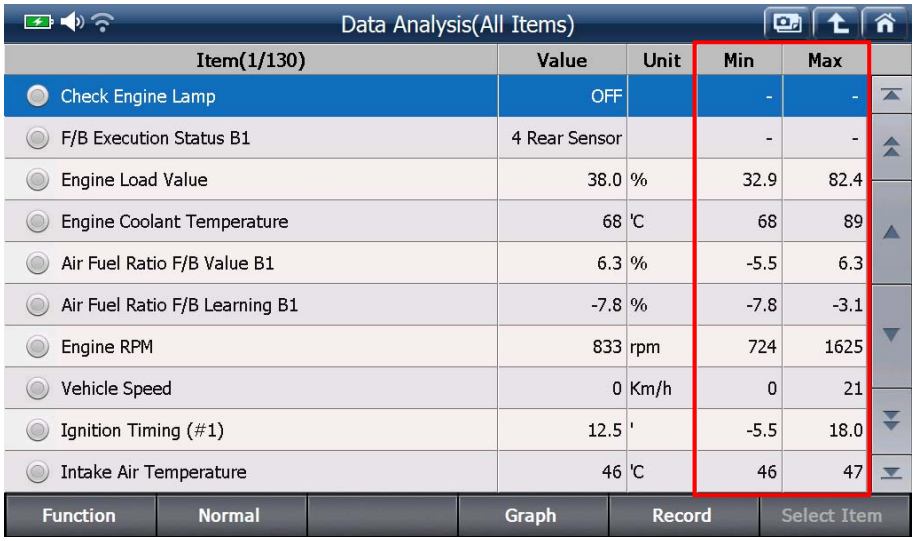
Select "Normal" button to return to the normal mode that shows up to 20 parameters in the split screen.



2.3. Function

A. Select "Function" button to add, remove or reset min/max information.



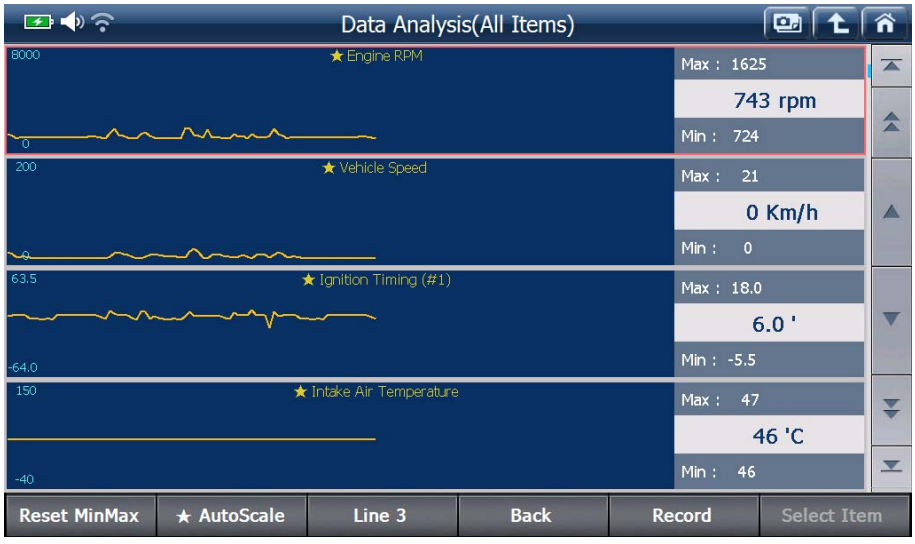


2.4. Old vehicles

Data Analysis for the old vehicles of 1980's and early 1990's using G-scan2 or the other diagnostic tools may not be possible as the old control systems do not support bi-directional communication.

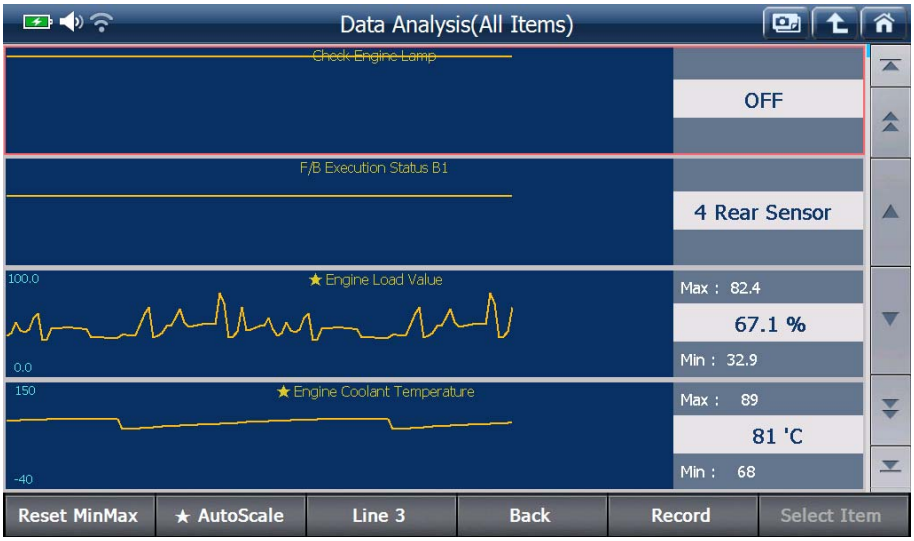
2.5. Graph Mode

Text based data parameters are switched to the graphical display mode when the "Graph" button in the bottom is selected.



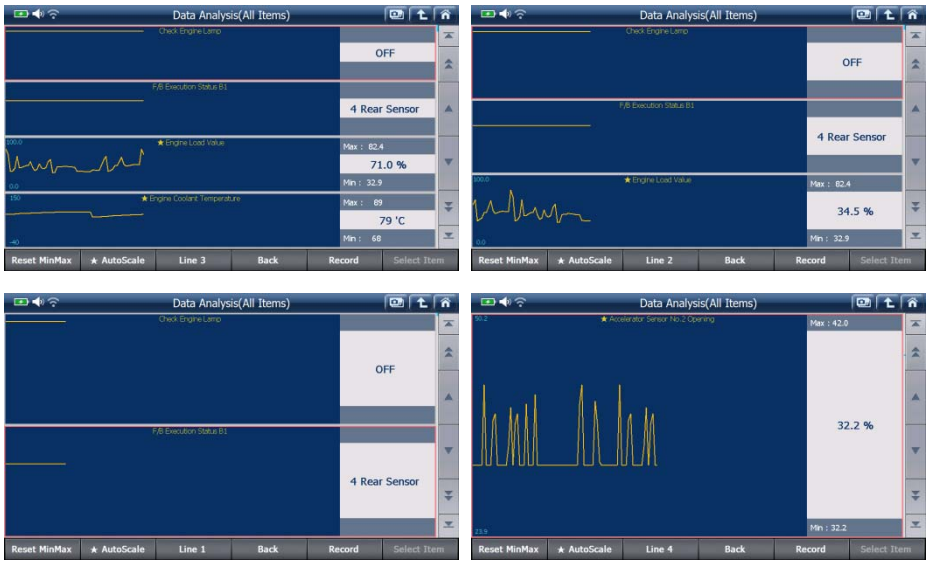
A. * AutoScale

Automatically adjusts the vertical resolution of the graphs to fit into the given space based on the min/max input values.



B. Line 3

Controls the total number of parameters that are graphed on the screen - changes 4 > 3 > 2 > 1 as the button is selected.



C. Back

Returns to the text based numeric data display mode.

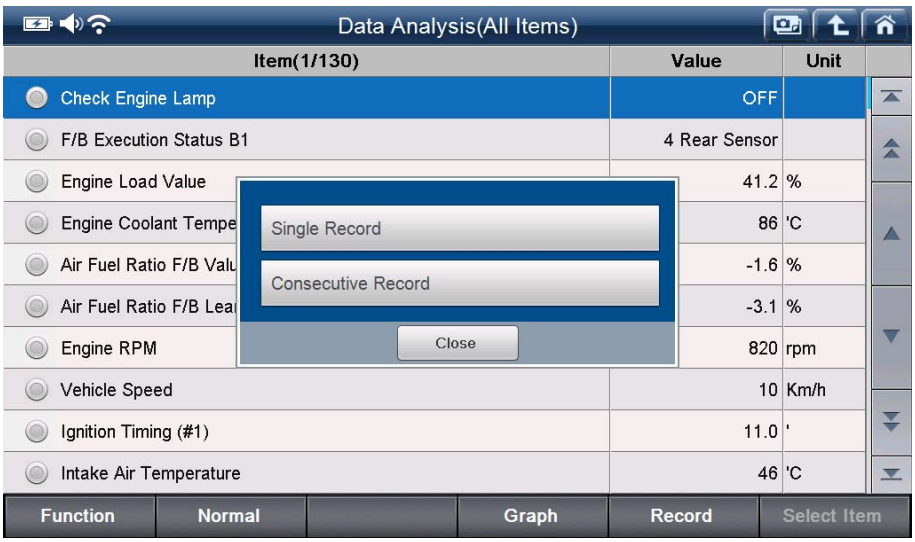
D. Record

Initiates the Flight Record function – please refer to the next paragraph.

2.6. Flight Record

A. Data Recording

Select "Record" button to start recording the data parameters, and then select among the single frame record or multiple "consecutive" record as shown below.

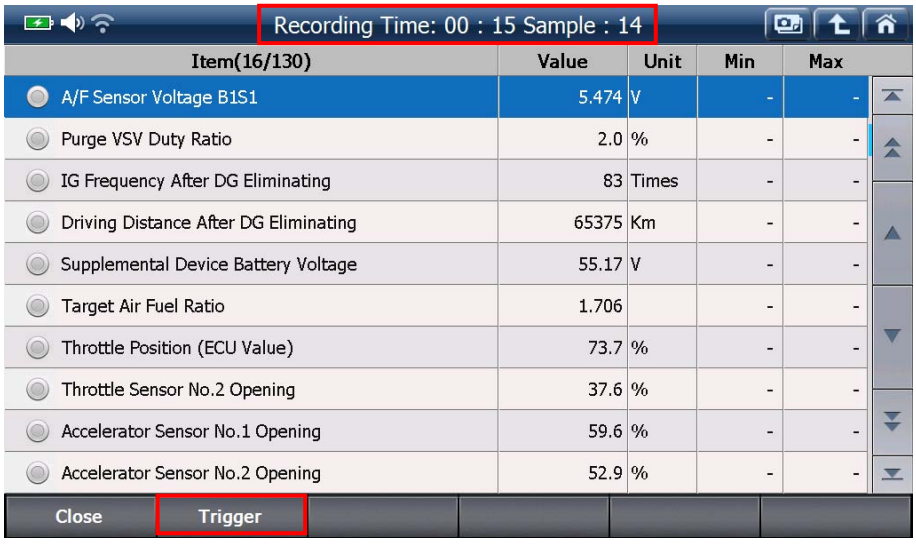


a. Single Record

Just one frame is sampled and recorded.

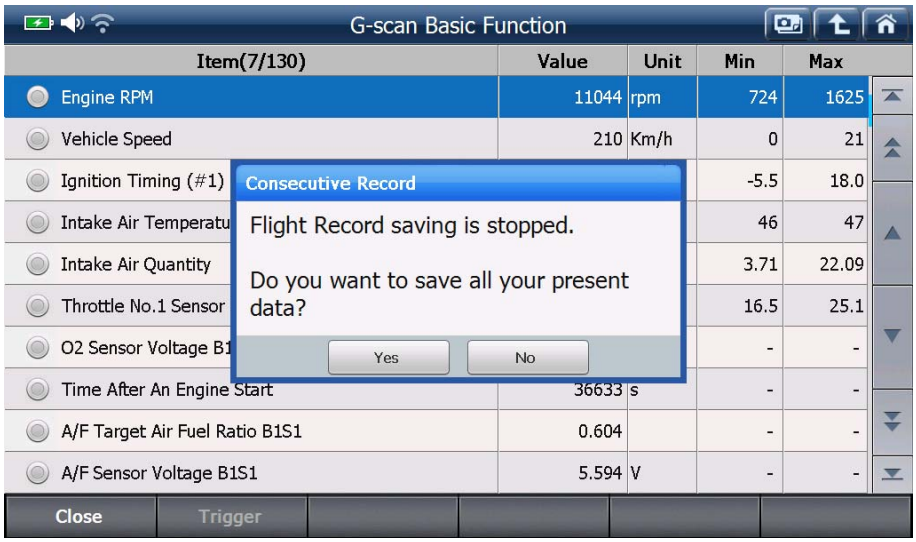
b. Consecutive Record

Consecutive multiple frames are recorded until stopped by the user.



Select "Trigger" to mark the important or critical moment, which is going to be indicated when reviewing the data.

Select “Close” to stop recoding the data and select “Yes” to end, then the data is saved as the Flight Record Data in the G-scan2 SD card.



B. Data Review

Recorded data can be reviewed and replayed by selecting “Recorded Data” function from the G-scan2 main menu, or “Flight Record Review” from the diagnostic functions menu.

2.7. Select Item

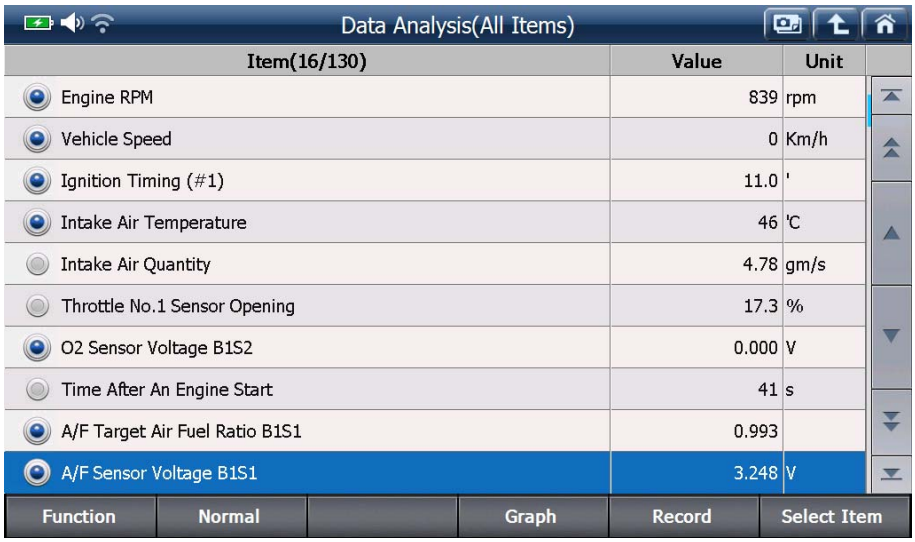
A. Lost among too many parameters

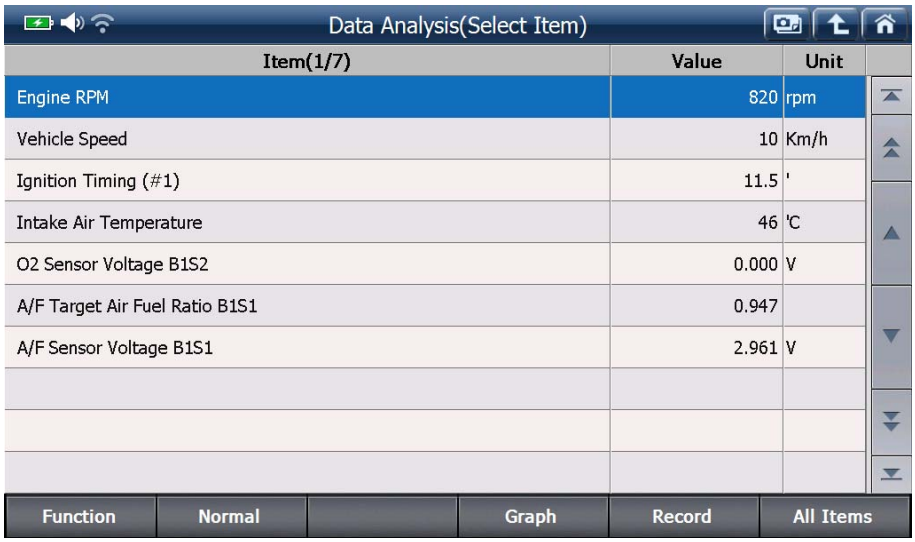
Later model vehicles provide the more parameters, sometimes hundreds of them need to be listed. The parameters are scattered here and there in the data list, and the increased parameters makes it more difficult to check and monitor the related parameters efficiently moving page to page for finding the desired parameters one after another.

B. Select Parameters

Switch to the Details Mode, and select the desired parameters from the data list by ticking on the check box in the head of the parameter names. Select “Selected Items” in the

bottom right corner, then just the selected parameters are listed in the screen as shown below.





As the G-scan2 needs to get the data for the smaller number parameters from the control unit, the data value refreshes at higher rate than showing the all parameters.

C. All Items

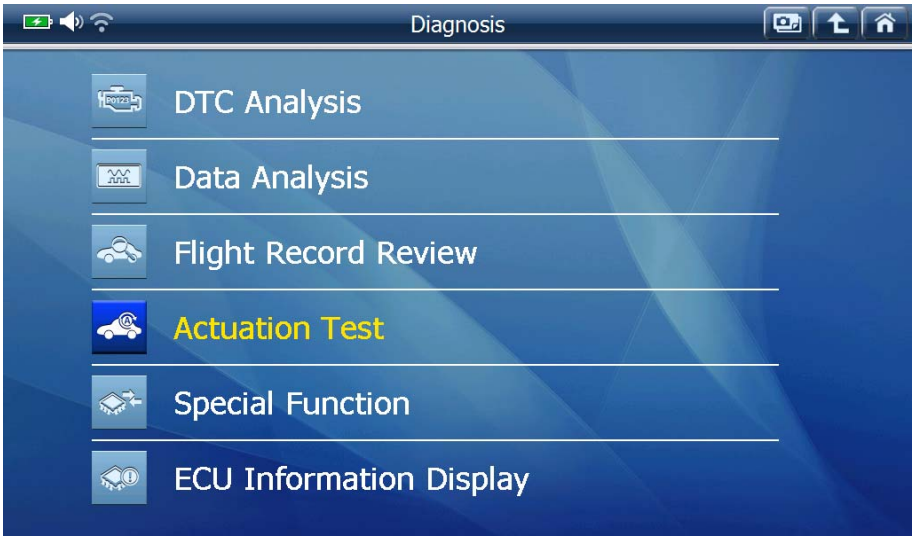
Select "All Items" to return to the full list mode.

3. Flight Record Review

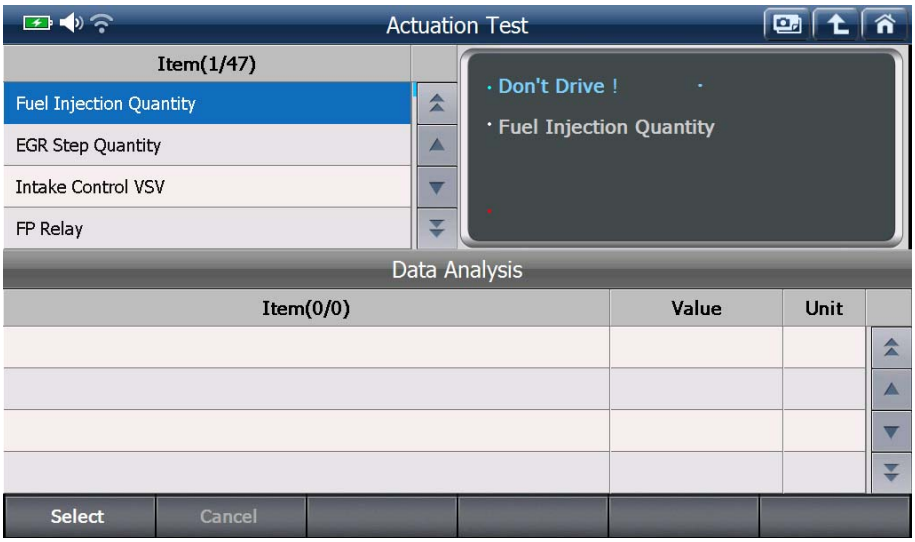
Reviews the recorded data and the function works the same as selecting the "Recorded Data" from the G-scan2 main menu. Please refer to [Chapter 3-2 Recorded Data] in this manual for further details.

4. Actuation Test

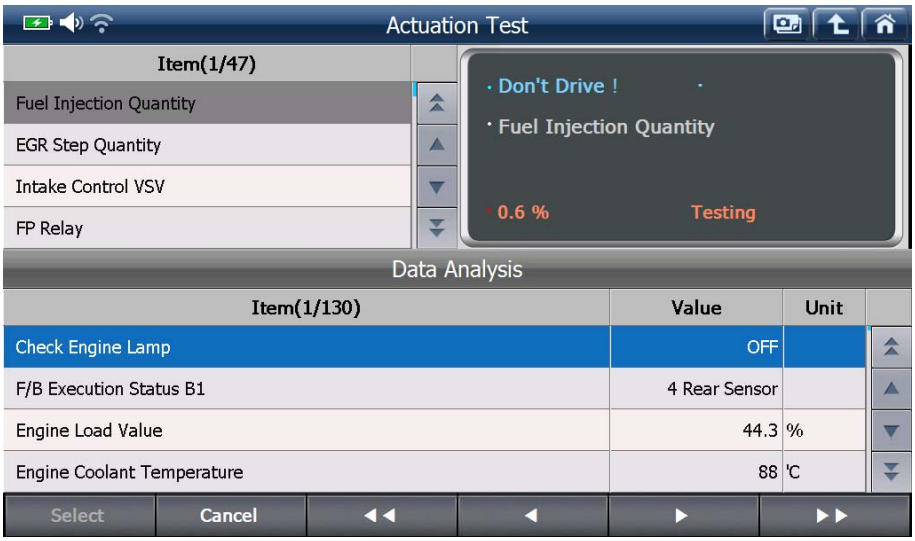
Actuation Test is a function that activates the active parts on the output side of the control unit such as injector, fans and valves, and examines the operation of the active parts and the related circuits.



Select the test item from the upper left window, observe the test conditions described on the upper right window and get the vehicle's condition in compliance then select "Select" button in the bottom or press [F1] key.



Control On/Off or adjust the values up and down using the buttons and keys and check the response of the selected active parts and the vehicle control system's reactions by monitoring the live data provided in the lower half of the screen.



Select the "Cancel" button or press [F2] key to stop the activation test on the selected item.

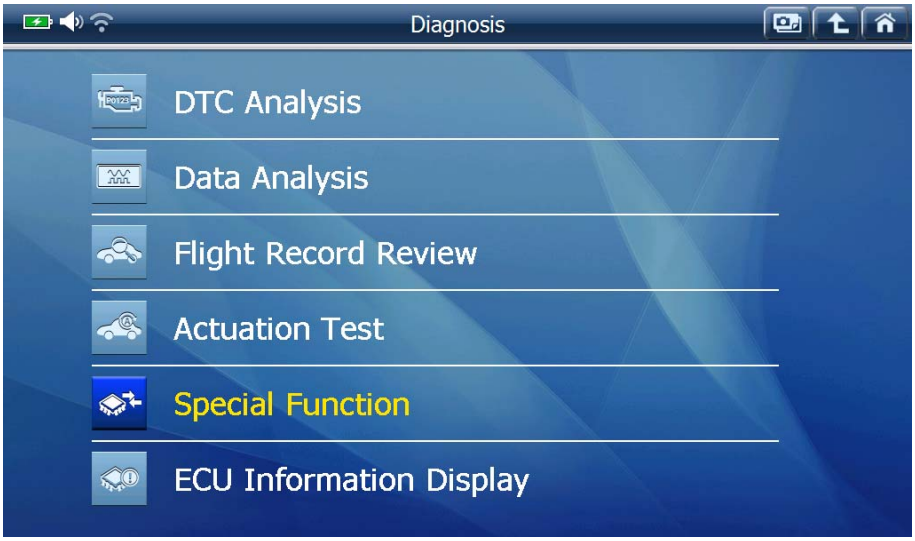
4-1. Different Items supported

Not all active parts of a control system are supported for this function. The list of the active parts available for the actuation test is predefined by the car manufacturers, therefore different items are supported according to the brands and models.

4-2. Test Conditions

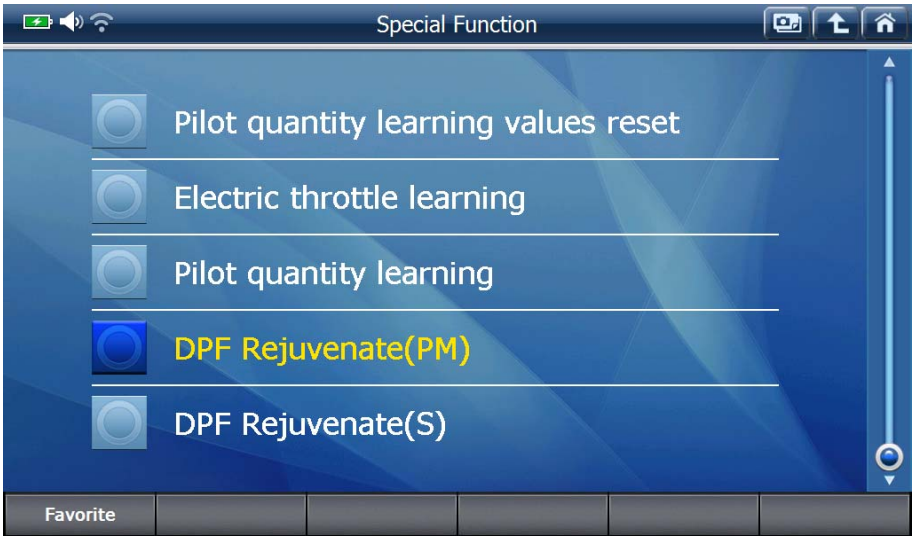
Please make sure to observe the test conditions and get the vehicle ready as instructed on the top right window before starting the test, otherwise the function will fail.

5. Special Function

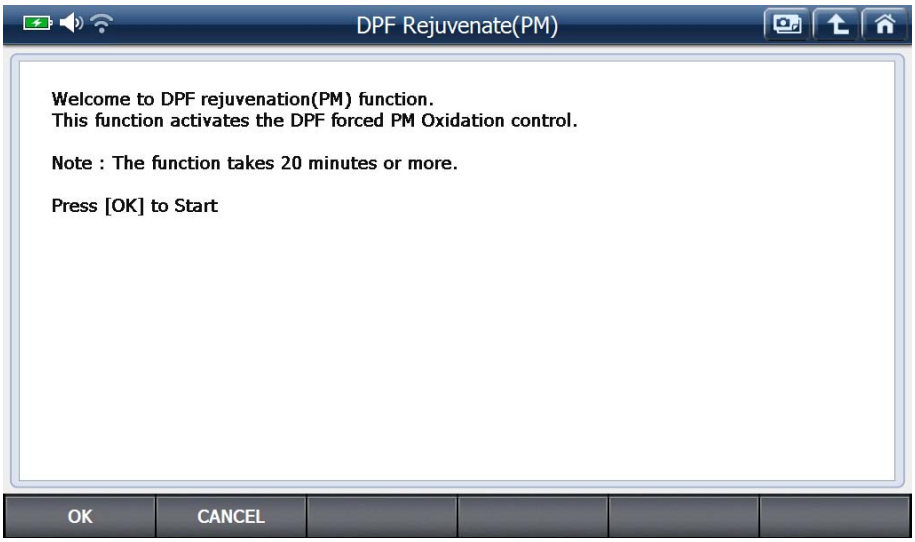


While DTC Analysis, Data Analysis, Actuation Test and ECU Information functions are considered as basic diagnostic functions that are commonly supported for most of the systems of the major car manufacturers, there are more advanced functions that are required for service and maintenance purposes such as coding, reset, calibration, initialization, adaptation or programming, and these functions are called as Special Functions collectively.

Select "Special Function" from the diagnostic functions menu, then the list of the special functions available for the vehicle follows as shown below:



Find and select the desired special function from the list, read the instruction provided on the screen carefully and select "Start" or press the [F1] key to start.



Abort the function by selecting "CANCEL" or pressing the [F2] key.

5-1. Favorite

Please refer to [Chapter 3.6 Favorite] in this manual for more information.

5-2. Different functions supported

The list of the Special Functions available for the selected vehicle is predefined by the car manufacturer, therefore please mind that different special functions are supported according to the brands and models.

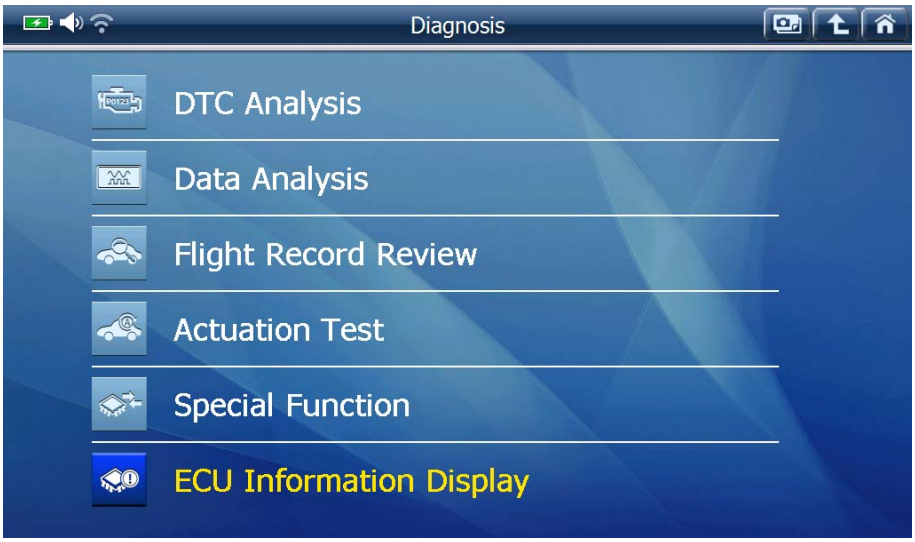
5-3. Test Conditions

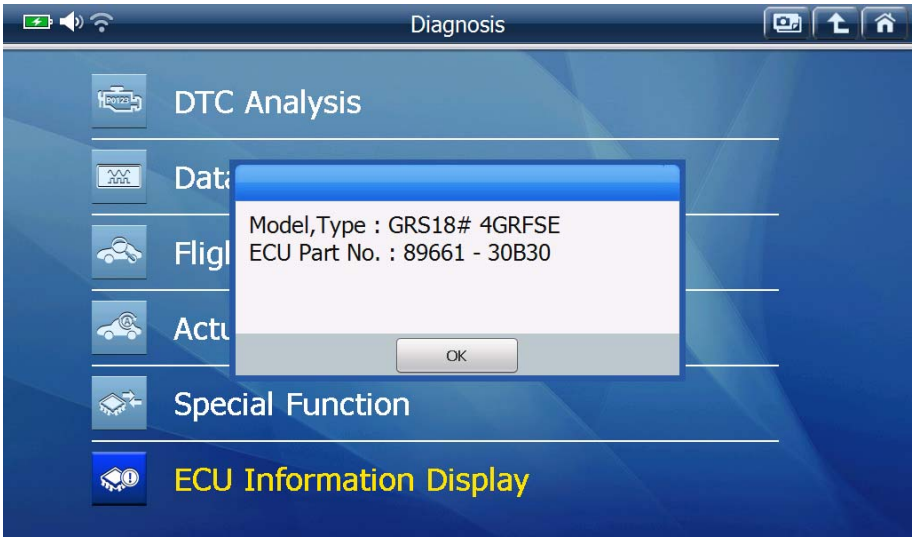
A small unfulfilled condition such as slightly misaligned steering wheel, engine not fully warmed up or released parking brake may lead to the failure of the function, so please make sure to observe the test conditions and get the vehicle ready as instructed on screen before commencing, otherwise the function will fail.

6. ECU Information Display

ECU Part Number and other information needed for identifying the control unit is provided as one of the basic diagnostic functions.

Please mind that the different information is provided according to the car manufacturers and vehicle models.




Diagnosis
DTC Analysis
Data
Fligl
Actu
Special Function
ECU Information Display
Model,Type : GRS18# 4GRFSE
ECU Part No. : 89661 - 30B30
OK

Maker Selection

Select the car manufacturer from the menu to begin the manufacturer specific diagnosis.

1. All Regions

When "Diagnosis" is selected from the main menu, all the vehicle brands that G-scan2 supports are listed as the first step for car manufacturer selection as shown below.

The brand of the vehicle that the G-scan2 has recently communicated with is placed in the top of the list. By applying this so called "Recent-First" rule, the more frequently serviced vehicle brands are placed in the first 1 or 2 pages of the list, and the rarely used brands are listed in the bottom of the list.

2. Regional Categories

Understanding that it is difficult to find the desired brand name among many dozens of the brand name made of the plain text based buttons, G-scan2 offers the vehicle brands categorized under 4 regional groups to aid the quicker and easier selection.

Select the regional category of the vehicle brand, then list of the car manufacturers of the selected region follows.

1-1. Europe

European cars include Mercedes Benz, BMW ,VAG (Volkswagen, Audi, Seat, Skoda), Renault, Peugeot, Mini, Ford Europe, Opel/Vauxhall, Dacia, Volvo as of June 2013, and the more brands will be added as the development for more European cars gets materialized.

1-2. Asia

Asian brands include Acura, Chery, Chevrolet (Korean), Daihatsu, Fuso, GM Daewoo, Great Wall, Hino, Honda, Hyundai General, Hyundai USA, Infiniti, Isuzu, Kia General, Kia USA, Lexus, Lifan, Mahindra, Maruti, Mazda, Mitsubishi, Nissan, Proton, Speranza, Ssangyong, Subaru, Suzuki, Tata, Toyota and UD (Nissan Truck) as of June 2013.

The more local brands are expected to be added, and the additional category can be added to separate the brands by the countries or by the passenger / commercial vehicle segments.

1-3. United States

US domestic brands such as Chrysler, Dodge, Jeep and Ford USA are included under this regional category as of June 2013.

1-4. Others

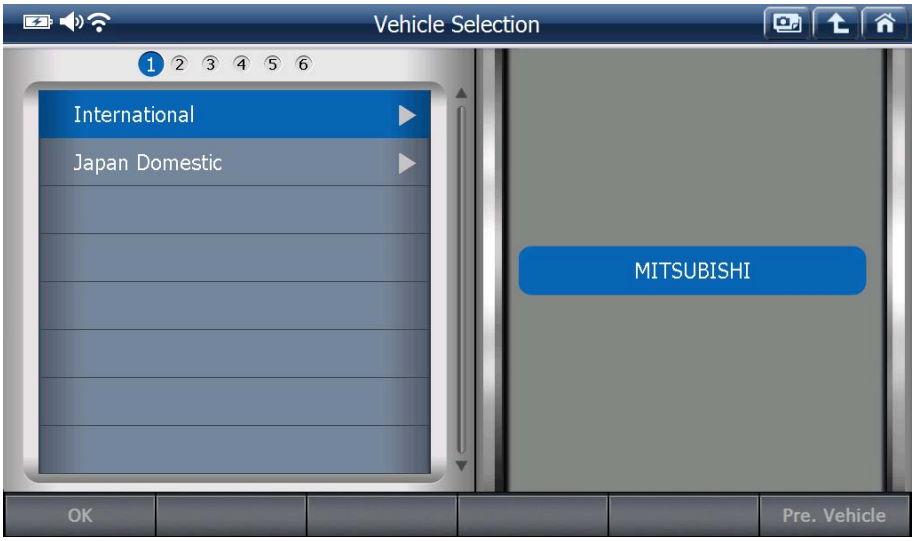
Demo program, or the trial versions that have not been officially released therefore could not be categorized to a specific region are found under this category.

Also, local brands that are supplied to the specific countries exclusively are included under this category, such as Australian Holden and Ford that are exclusively available only for Australia, or Iran Khodro and Saipa that are exclusive for Iran.

Japanese Cars

1. Japan Domestic vs. International

Select any Japanese brand “Toyota”, “Nissan”, “Honda”, “Mitsubishi”, “Mazda”, “Daihatsu” and “Suzuki” from the car maker selection menu, then it is followed by the G-scan2’s unique Japanese car menu structure as shown below.

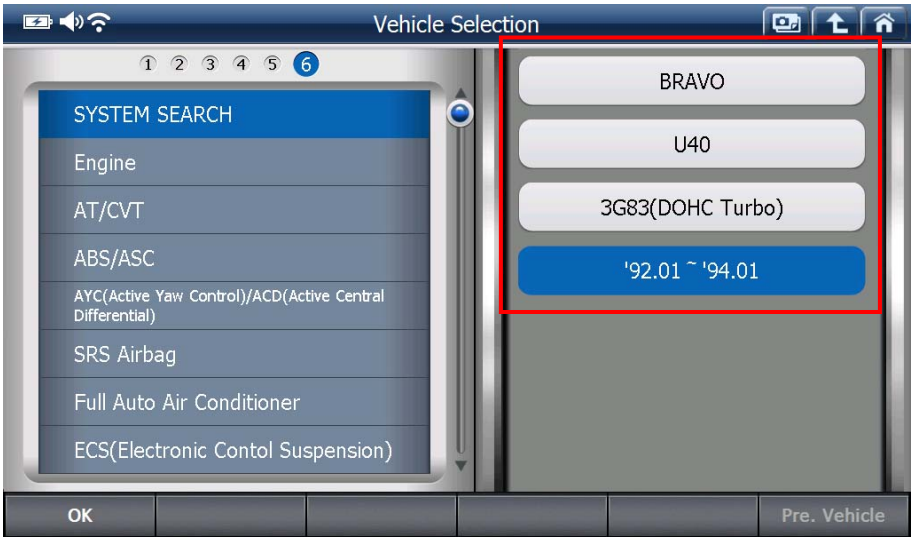


1-1. Japan Domestic

G-scan2's Japanese car software was developed and engineered in Japan by the Japanese engineers, and the database was built as demanded by the Japanese mechanics who prefer pin pointing the vehicle details to get the most specific diagnostic information from the vehicle.
G-scan2 is offering the model names and the detailed model selection procedure to the Japanese users in the conventional way for the cars sold in Japanese domestic market.

Therefore, Japan Domestic is not recommended to the international users.
Select Japan Domestic only when testing the Japanese cars originally sold in Japan and imported as secondhand cars from Japan.

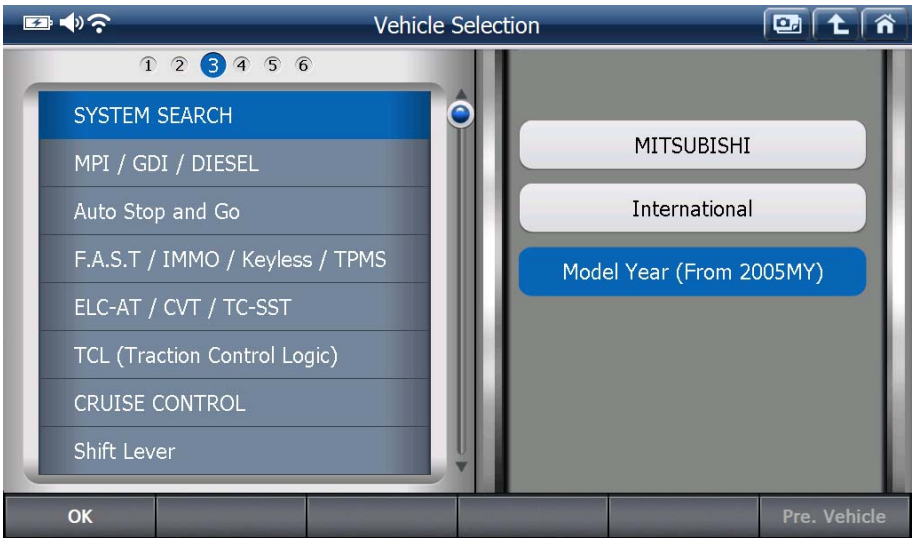
The model names and further details provided under Japan Domestic menu include only the Japanese domestic specs, therefore the export models or foreign local assembly models may not be supported if the compatible models are not sold in Japan.



1-2. International

Japan Domestic menu is conventional therefore maybe more familiar.
However, it is not applicable outside Japan.
In the overseas, the cars are named differently, and there is a huge variety of cars of different versions that are not found in Japan.
International menu was added to include ALL regional versions of each Japanese brand.

Therefore, make sure to select International unless the car is imported from Japan second-hand.



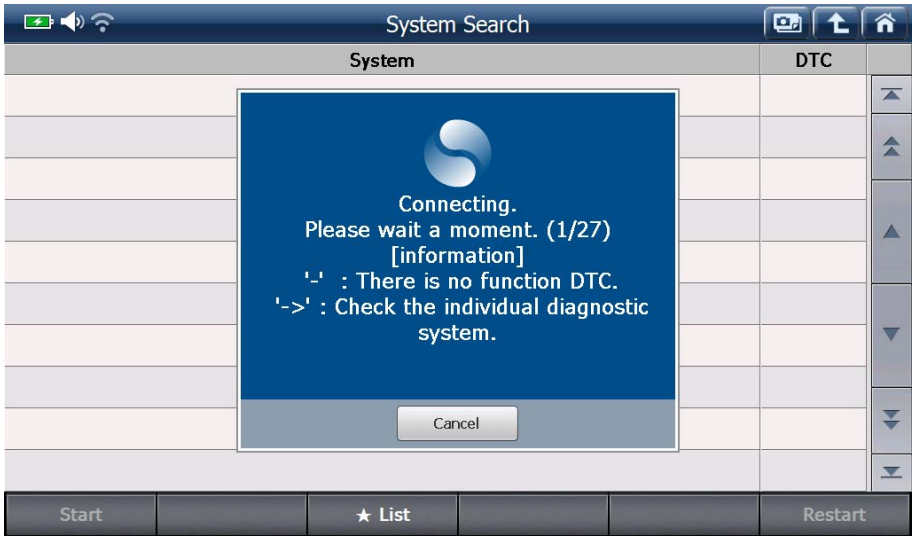
If International is selected, a simple Diagnostic Connector Type selection follows and then the system selection can be made without having to follow further model name, model code, type or model year selections.
The menu is simplified but it is not providing simplified functions. It provides complete function and diagnostic result of the same level as selecting all the details of the test car in Japan Domestic.

2. System Search

1.1. System Auto Search

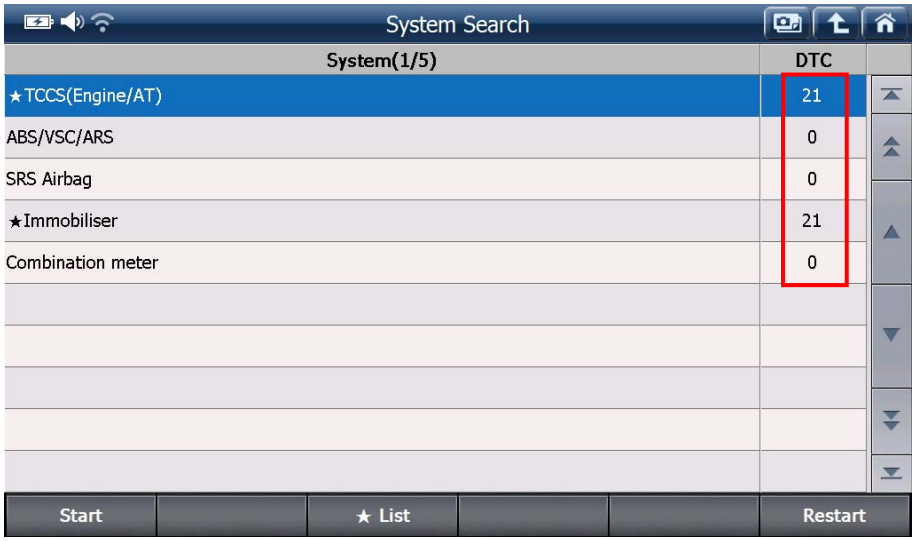
For the Japanese cars with the exception of Isuzu, selecting “System Search” from the system selection menu activates the automatic “All Systems Check” procedure.

G-scan2 tries to establish communication with all possible systems fitted in the car one after one, and then provides the summarized report of the diagnostic result on the screen.



1.2. Number of DTC’s

G-scan2 reads the DTCs from the vehicle’s control systems while conducting the system search function, and indicates the number of trouble codes found in each system.



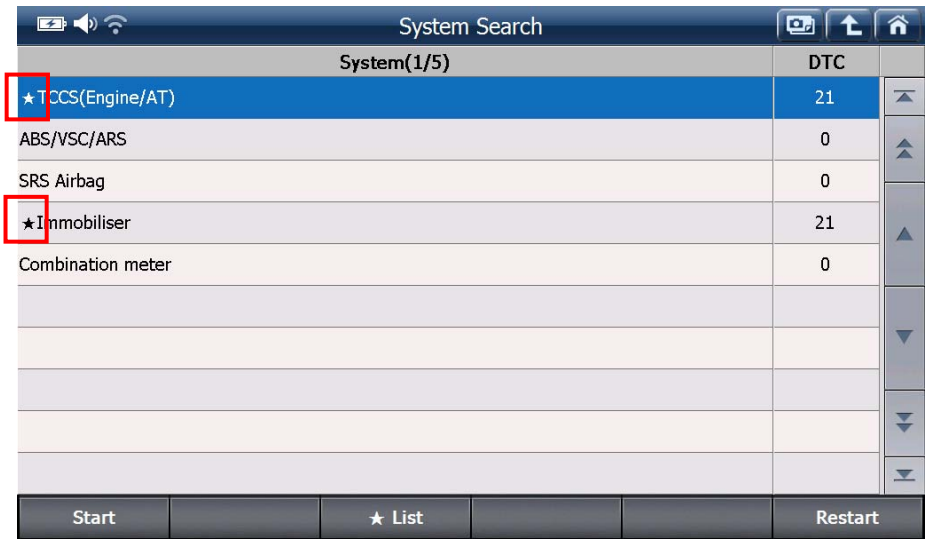
However, some of the control systems such as SRS, IMM or BCM may not support DTC Read and Erase functions. Some control modules may require G-scan2 to communicate with the system individually to read the DTC.

In both cases, G-scan2 is unable to show the number of DTCs in the System Search report, not because of its fault but because the system is designed in that way.
To avoid misunderstanding, G-scan2 indicates such exceptional cases with the " - " and " -> " symbols.

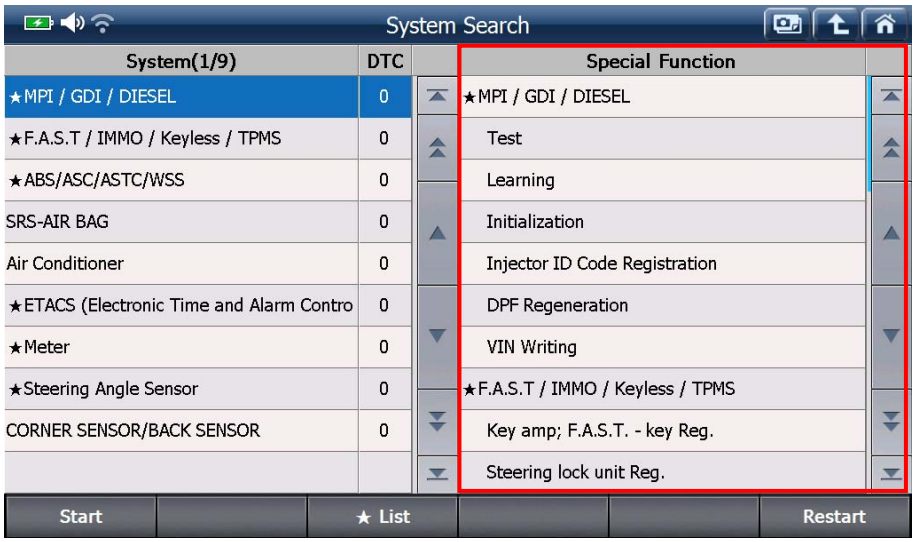
Symbol	Description
-	The system does not support DTC reading function.
->	The system needs to communicate individually. Please select the system from the menu and check the DTC individually.

1.3. Special Functions Availability

Depending on the vehicle, if a detected system supports the "Special functions", then G-scan2 indicates it with the star marks.



Select the ★ List button in the bottom, and the G-scan2 shows the details of the special functions available with the detected systems.



Korean Cars (Hyundai and Kia)

Select “Diagnosis” from the main menu then the Car Maker Selection menu follows.

There are several Hyundai and Kia software versions available and they are:

- **Hyundai General**: Hyundai cars sold worldwide except North America.
- **Hyundai USA**: Hyundai cars sold in North America.
- **Hyundai Korea**: Hyundai cars sold in Korea.
- **Kia General**: Kia cars sold worldwide except North America.
- **Kia USA**: Kia cars sold in North America.
- **Kia Korea**: Kia cars sold in Korea.
- **Hyundai and Kia Truck / Bus**: Hyundai and Kia Commercial Vehicles (Trucks and Buses)

Some of these versions may or may not be included in your G-scan2 according to the regional demand

1. Accurate Vehicle Details Selection

Please note that GIT is the original scan tool supplier for Hyundai and Kia, and this aftermarket G-scan2 product is also made precisely based on the original database. It requires accurate model and details selection to be provided with the accurate and reliable diagnostic result.

1.1. Quick Move

The model names of Hyundai / Kia cars are listed in the Alphabetic order.

For a quicker selection, use the Quick Move keypad provided in the lower right corner – simply type in the model name's first alphabet, then the menu will jump to the model names that start with the selected alphabet.

1.2. Model Year

Model year selection is the most delicate part for Hyundai and Kia cars – wrong model year selection may result in communication or diagnostic function failure.

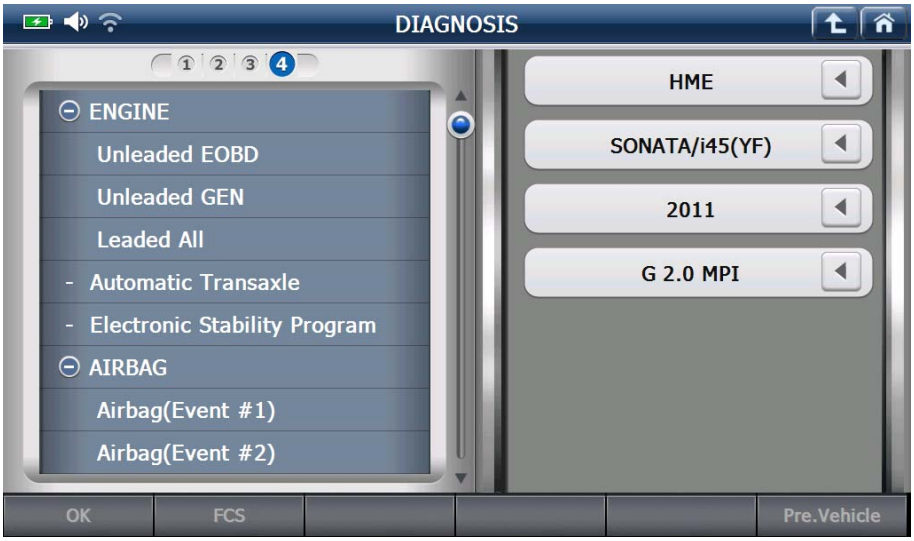
The vehicles that have been produced close to the model changing period may cause confusions. Therefore, if the communication fails with the selected model year, please retry by selecting the different model years of the same model.

Please mind that the model year is decided not by the registration or importation year, but by the production year as indicated on the metal tag or VIN.

The project names and model year information are also provided in the end of each model name, please make sure to make the correct selection.

1.3. Further Details

Select the system, then further vehicle details need to be precisely selected among the applied emission control systems, engine types and sizes, fuel types and other system specifications. Please make sure to make the correct selections for all steps to avoid failure. When all the selections are made, OK button in the bottom left is activated. Please select "OK" button or press the [F1] key to start the communication with the selected system.



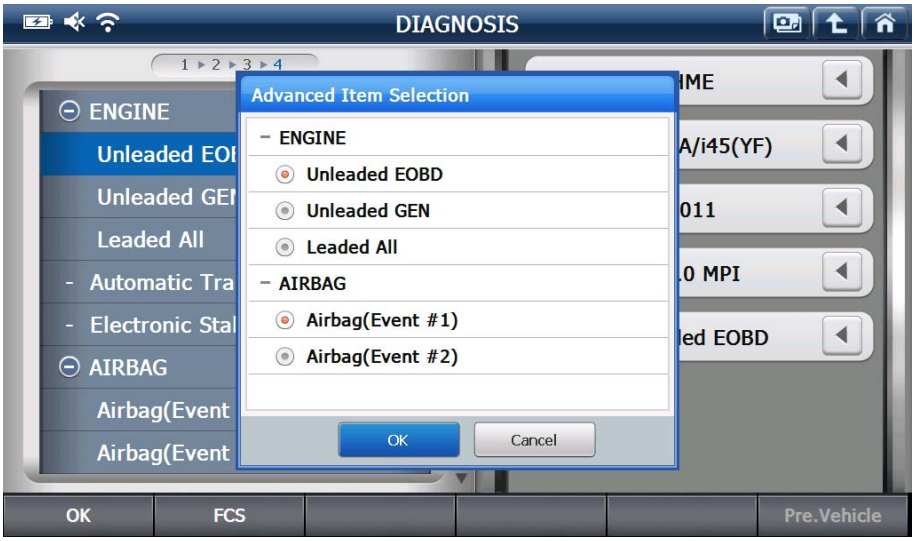
1.4. Pre. Vehicle

G-scan2 remembers the details of the specifications of the last vehicle that it communicated. If you are testing the same vehicle again, simply select the “Pre.Vehicle” then the vehicle details are automatically reloaded.

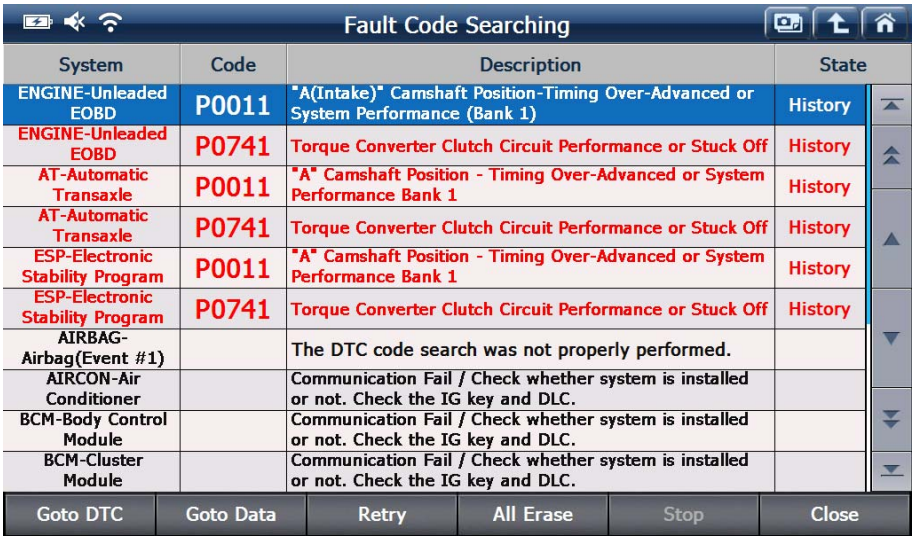
2. FCS (Fault Code Searching)

When the vehicle details are all selected, “FCS” button in the bottom is activated.
Select “FCS” button or press the [F2] key to start the Fault Code Searching function.

Make the selections for the final details of the vehicle’s systems so that G-scan2 start communicating with the systems in the vehicle.



G-scan2 tries to establish communication with all possible systems in the vehicle one after one, and then reports the basic diagnostic result as shown below

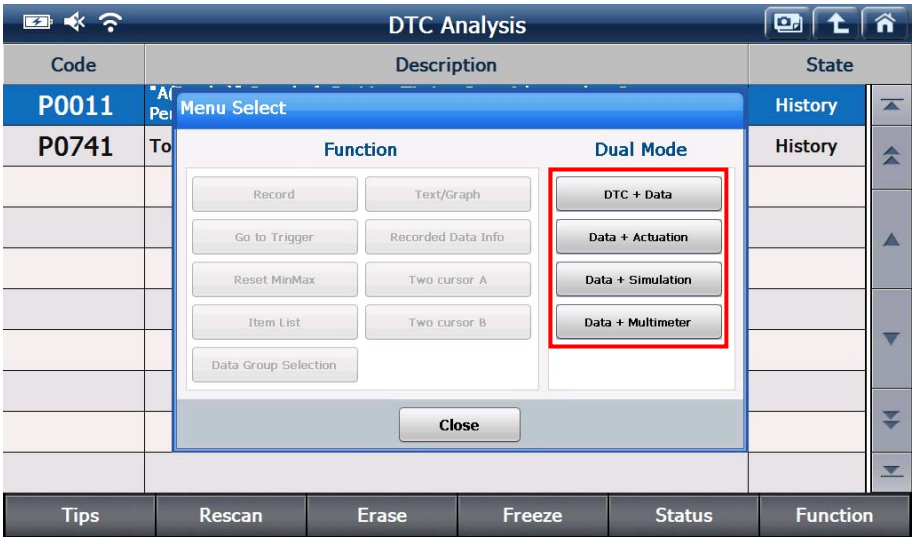


Button	Description
Goto DTC	Goes to the DTC Analysis function of the selected system
Goto Data	Goes to the Data Analysis function of the selected system
Retry	Restarts the Fault Code Search function
All Erase	Erases all the diagnostic trouble codes found
Stop	Aborts the Fault Code Searching while the function is running
Close	Quits the FCS function and returns to the system selection menu.

3. Dual Mode

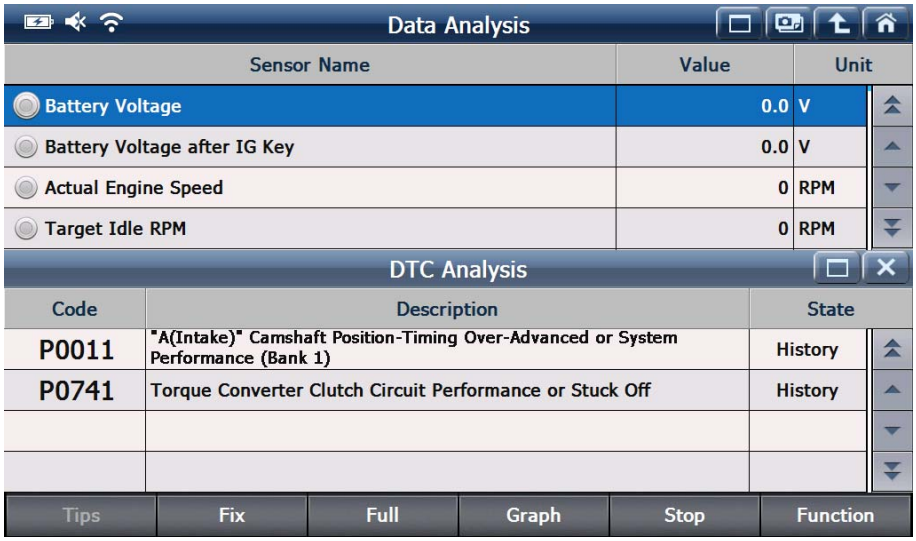
Hyundai and Kia software of G-scan2 supports dual mode where the 2 of the diagnostic functions are executed and displayed simultaneously.

Select “Function” or press the [F6] key from the DTC Analysis or Data Analysis function’s diagnostic result display as shown below.



3.1. DTC + Data

G-scan2 displays the DTC Analysis and Data Analysis functions simultaneously.



3.2. Data + Actuation

G-scan2 executes the Actuation Test function while showing the Data Analysis parameters at the same time.