GDS - Vehicle S/W Management

Ver. 04. 06. 2010

ECU Upgrade

Auto / Manual Mode and CAUTIONS before ECU Upgrade

ECU upgrade can be divided into two: Auto(automatic) mode and Manual mode.
To check ECU Events that are currently supported, click "Event List" Tab.

Auto Mode

"Auto mode" reads ROM ID from the current control module. It automatically compares ROMID with the events and shows only the events that should be updated. Select each events, and upgrade automatically only for the selected events.

Manual Mode

"Manual mode" is used when there is a failure during the Auto upgrade or used in special purpose. It shows all the events for the selected control module. It even forces an upgrade from the current ROM ID to a previous version of ROM ID. The User can select each event for the control module to force update. Password input stage, that is not in Auto mode, is included.

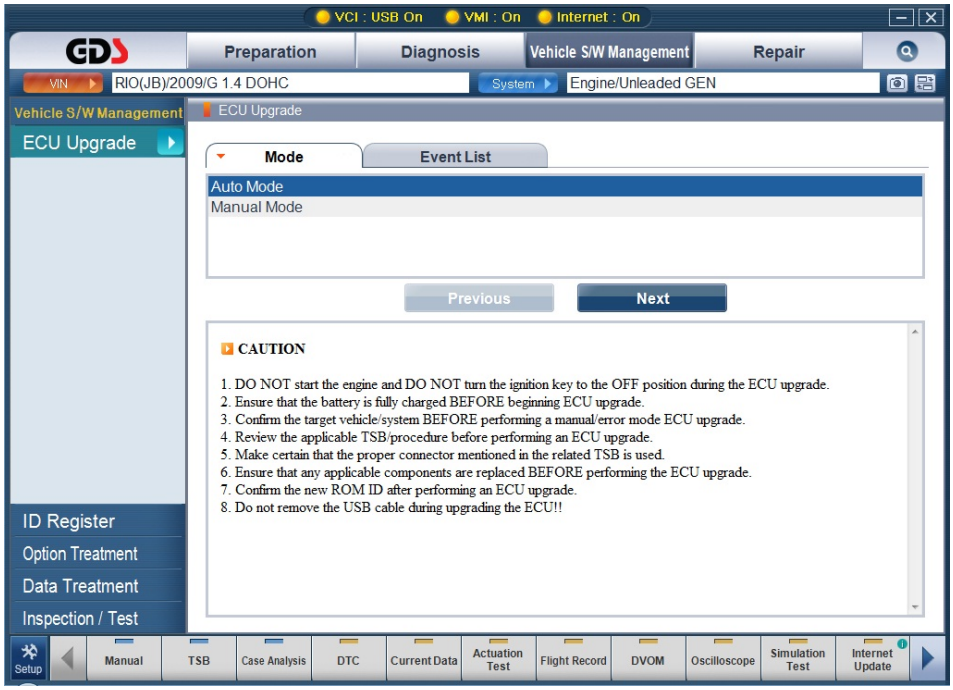


Figure 1. ECU Upgrade-Auto/Manual Mode

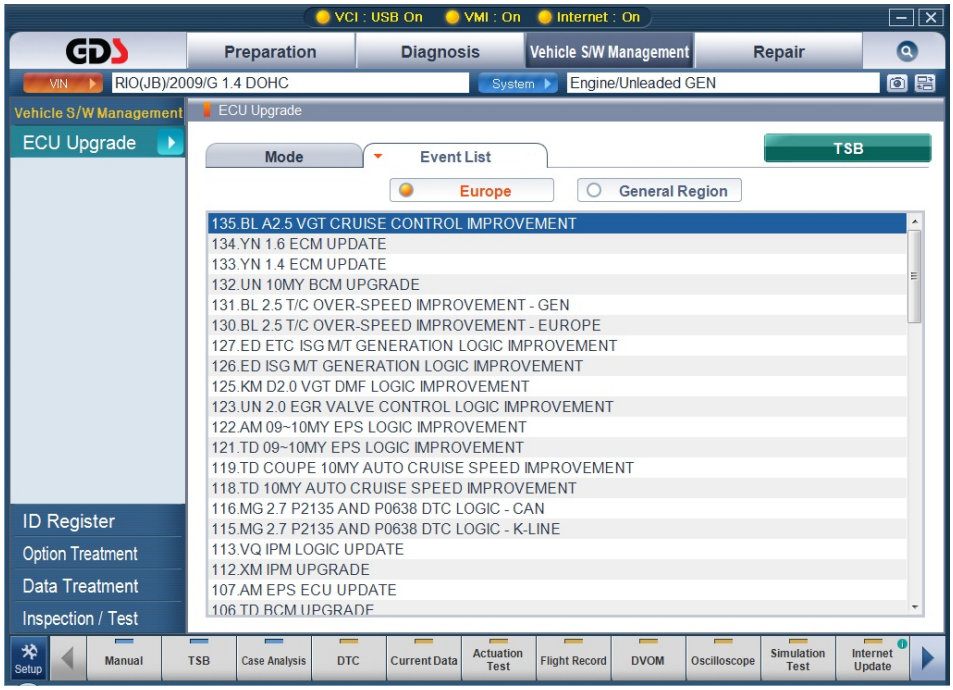


Figure 2. ECU Upgrade-Event List

After selecting an ECU upgrade event, click "TSB" button to check event details.

CAUTIONS

The following information should be reviewed prior to performing an ECU upgrade:

- Do not start the engine or turn the ignition key OFF during an ECU upgrade. These actions may damage the ECU.
- The battery should be in a good state of charge prior to beginning an ECU upgrade.
- Confirm the correct selection before performing a manual ECU upgrade.
- Do not perform an ECU upgrade without first reviewing the applicable TSB or Campaign.
- Use the correct vehicle DLC and DLC cable when performing an ECU upgrade.
- If the ECU upgrade is needed for a part change, user should upgrade the ECU after changing that part.
- After finishing the ECU upgrade, user should confirm the new ROM ID.
- ECU upgrades cannot be performed using wireless; connect the USB cable between the PC and VCI prior to selecting the "ECU Upgrade" function.

Auto Mode Upgrade

Following method can run an ECU upgrade by Auto Mode.

ECU Upgrade Mode (Auto Mode) Select

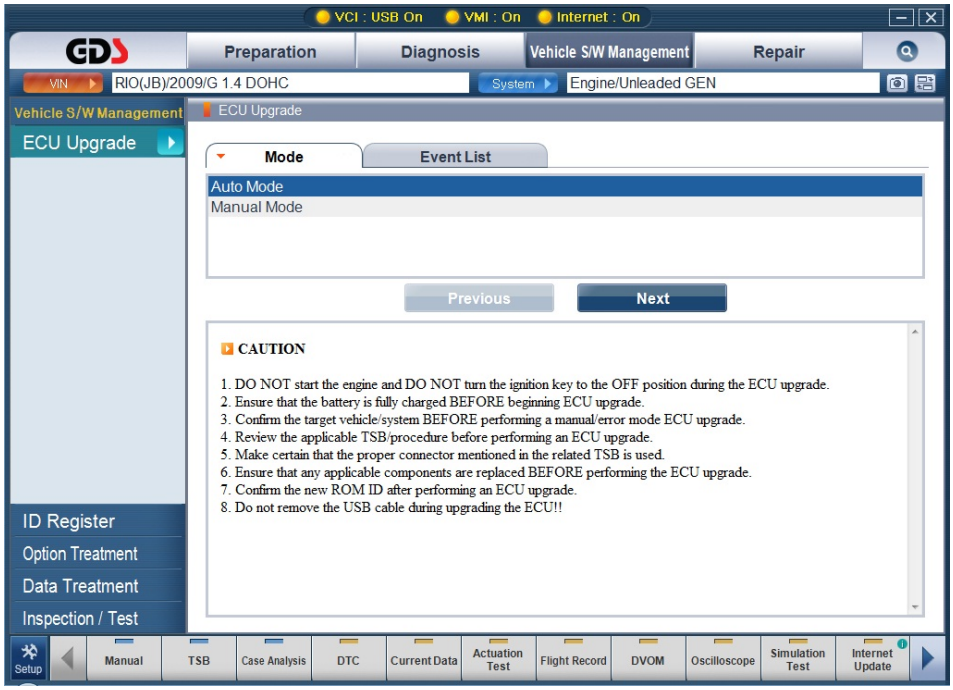


Figure 3. ECU Upgrade-Auto Mode-Mode

Click "Next" button after selecting "Auto Mode" from the Mode section in ECU Upgrade initial page.

ECU upgrade System Select

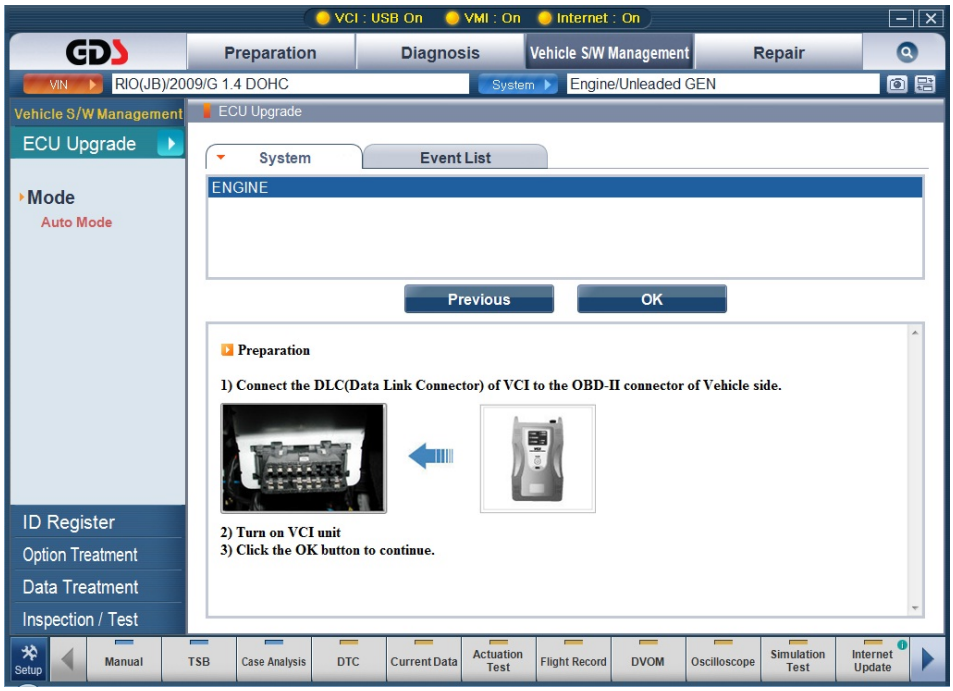


Figure 4. ECU Upgrade-Auto Mode-Mode

Click "OK" button after selecting the ECU upgrade system.

Start Auto Mode ECU upgrade

GDS automatically communicates with the ECU on the selected vehicle and checks for available event, and prompts a window for checking the battery voltage.

ROM ID will be automatically recognized and if there is no related event for the ECU, following message will be shown as in [Figure x].

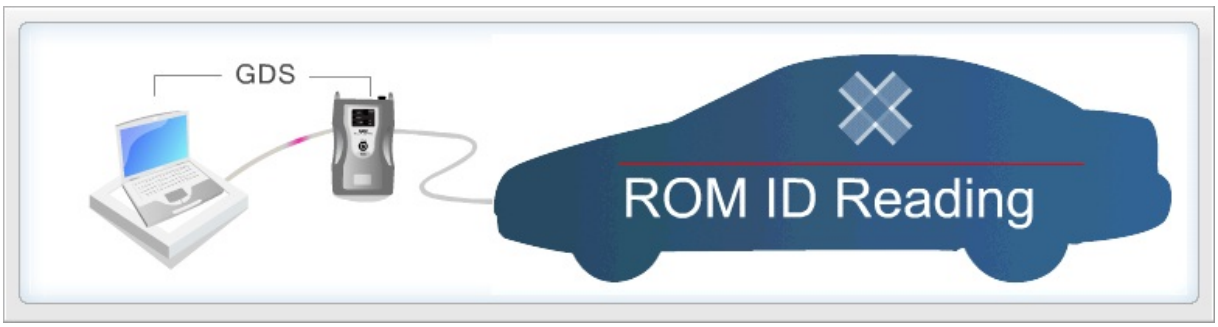


Figure 5. ECU Upgrade-Auto Mode-ROM ID Reading

If the battery voltage is sufficient, click "OK" button.

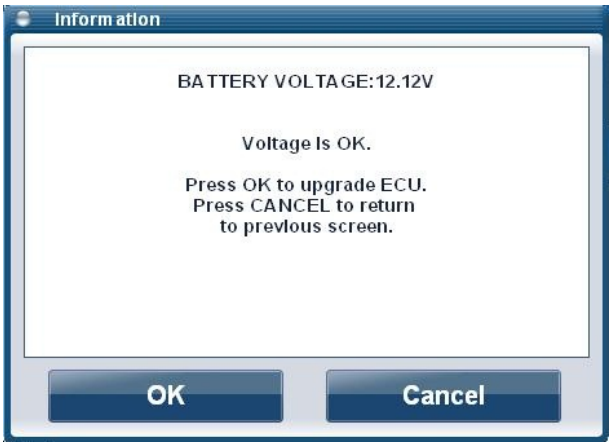


Figure 6. ECU Upgrade-Battery voltage check Battery Voltage OK

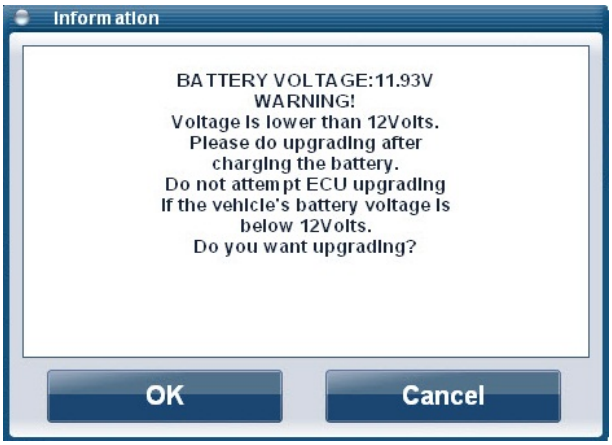


Figure 7. ECU Upgrade-Battery Voltage Check Insufficient!

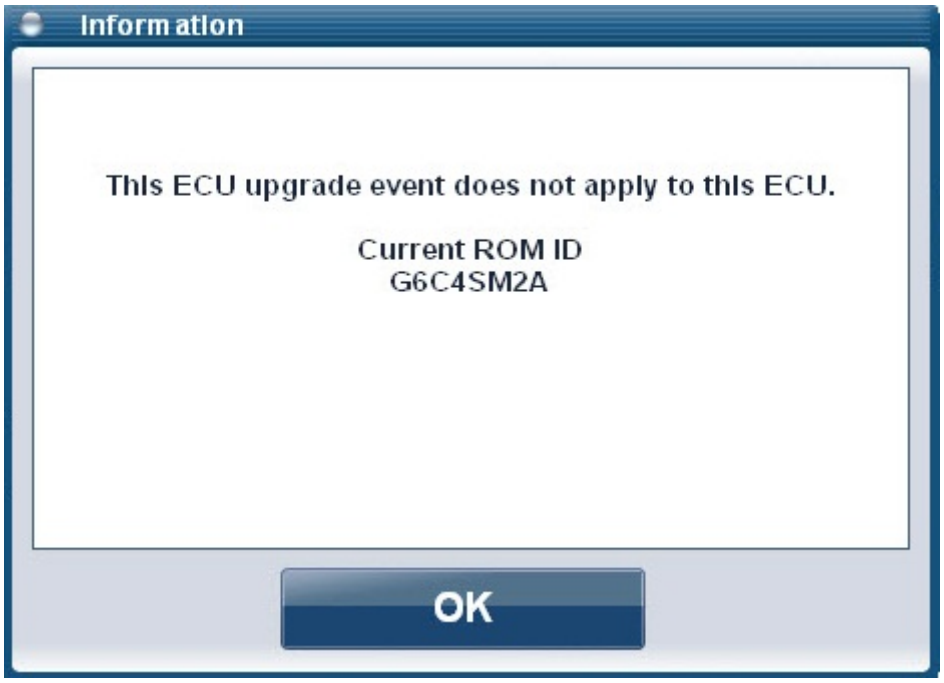


Figure 8. ECU Upgrade-Auto Mode- No available ECU Event

Automatically triggers the ECU Upgrade process and displays progress.

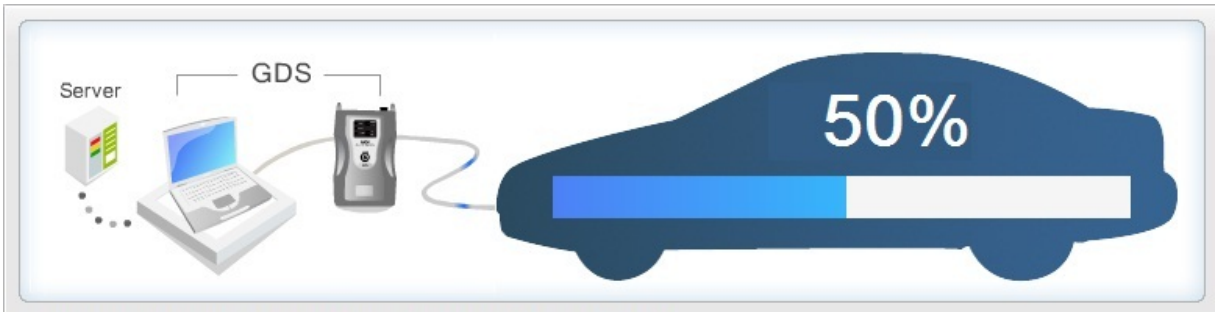


Figure 9. ECU Upgrade-Manual Mode-Upgrade in progress

When ECU Upgrade is completed, following message will be shown as in [Figure x].

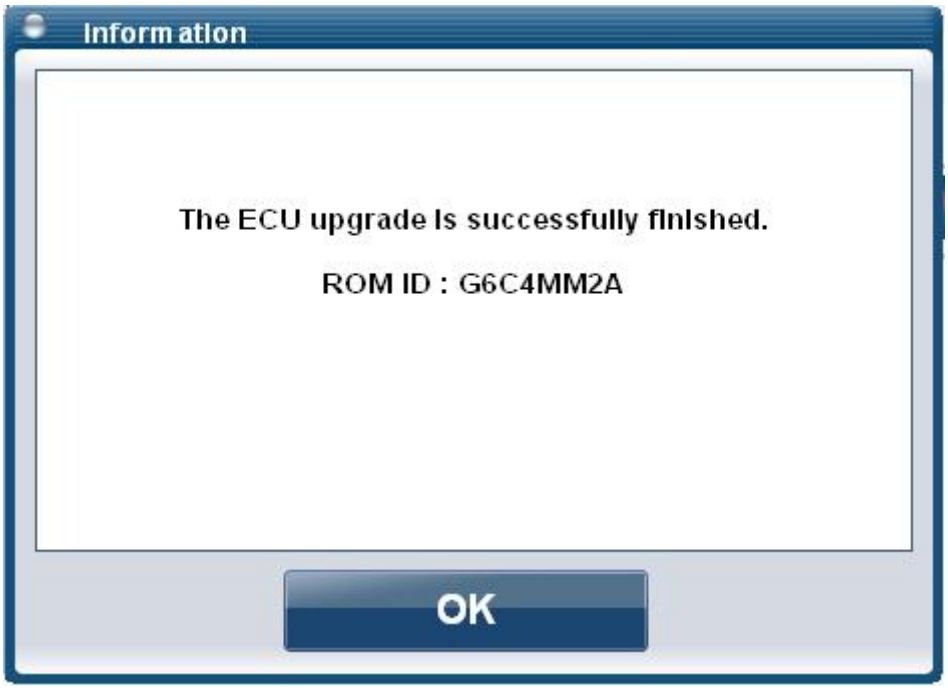


Figure 10. ECU Upgrade-Manual Mode-Upgrade completed

Manual mode upgrade

Following method can run an ECU upgrade by Manual Mode.

Select ECU Upgrade Mode (Manual Mode)

Click "Next" button after selecting the "Manual Mode" in ECU Upgrade Mode window.

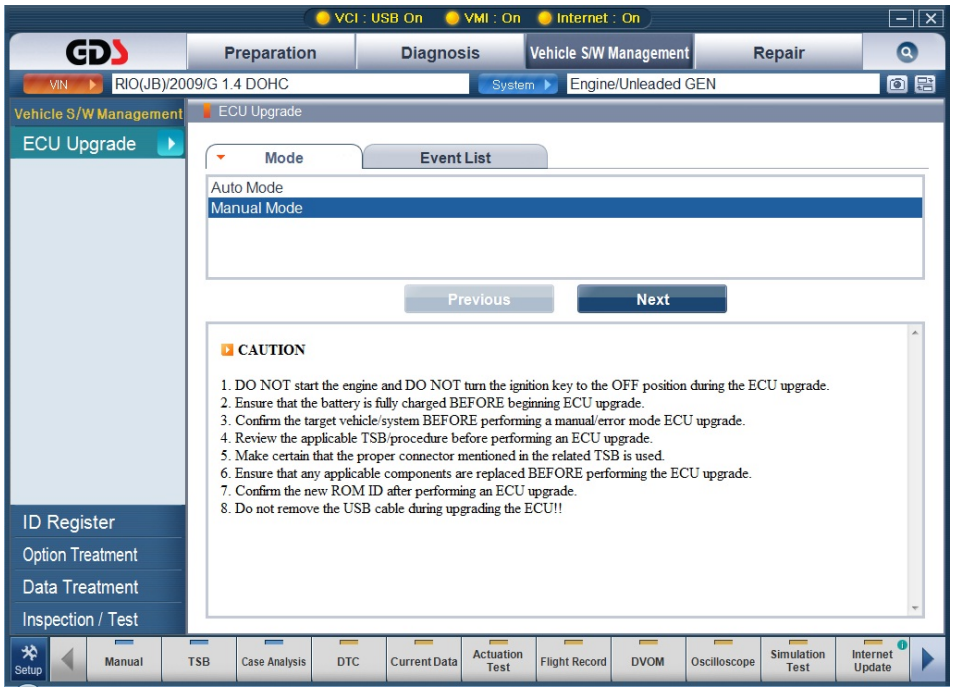


Figure 11. ECU Upgrade- Manual Mode-Mode

Select ECU upgrade System

Click "OK" button after selecting the ECU upgrade System.

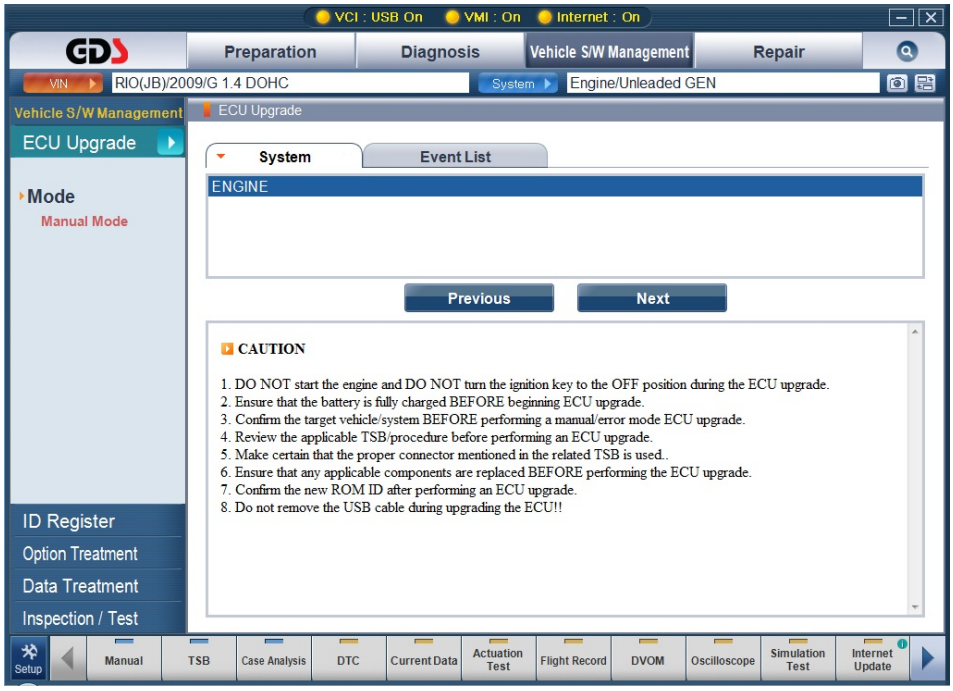


Figure 12. ECU Upgrade- Manual Mode-Select System

Select ECU uprade event

Select an Event from the list to upgrade an ECU under Event Group. Sub-list will be displayed after selecting an event as shown in [Figure 3].

After setting the ECU event, Click "Next" button.

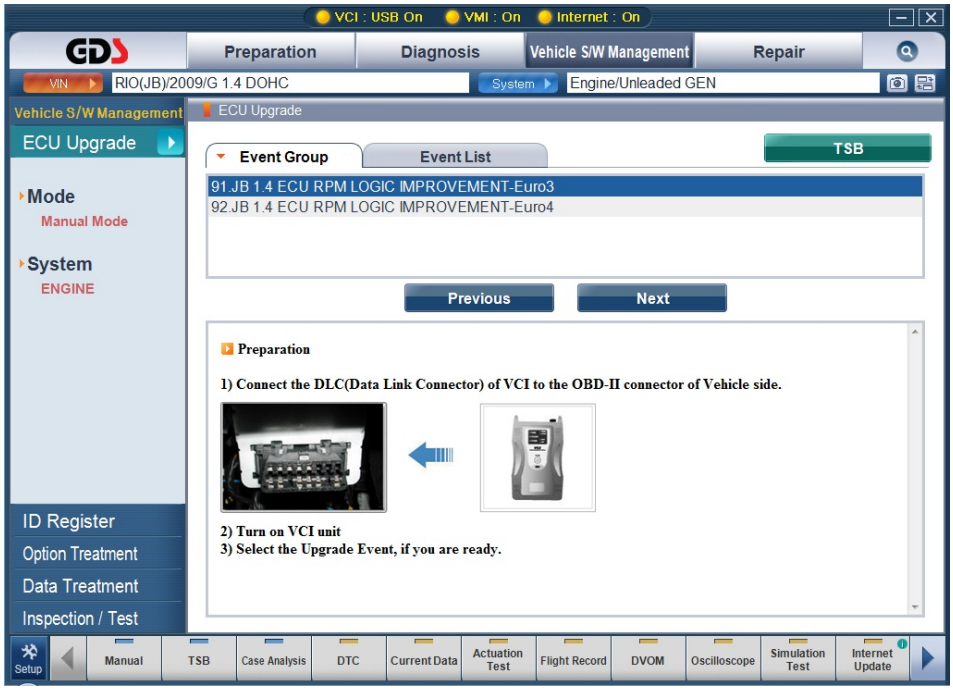


Figure 13. ECU Upgrade- Manual Mode-Event

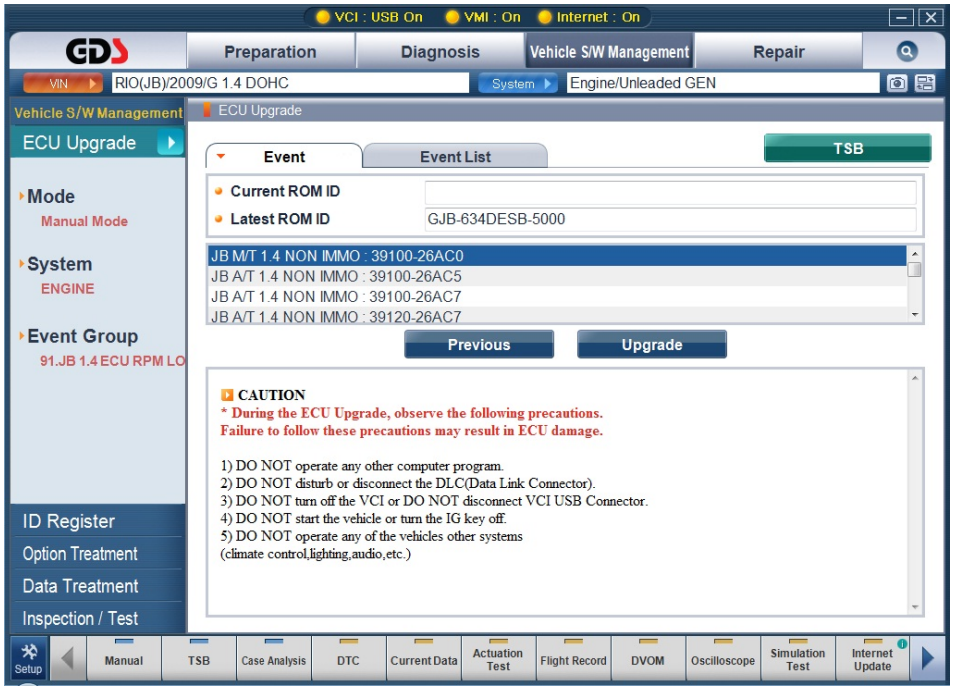


Figure 14. ECU Upgrade-Manual Mode- Select Sub-Event

CAUTIONS

Following instructions should be kept during the upgrade process, or else ECU could be damaged.

- In case running an ECU Upgrade in Manual Mode, select sub-event carefully according to the TSB.
- An ECU may only to be upgraded with correct event subjected to the TSB. Or else the ECU could be damaged.

Entering the correct ECU uprade event Password

Click "OK" button after entering a Password for ECU event.

Password for ECU upgrade event can be found in TSB.

Figure 15. ECU Upgrade-Manual Mode- Entering Password

Battery Voltage needs to be checked for stable ECU Upgrade process.

Restrain ECU Upgrade process if there are insufficient voltage recognized as shown in [Figure x].

Click "OK" button if there are sufficient voltage left for the process.

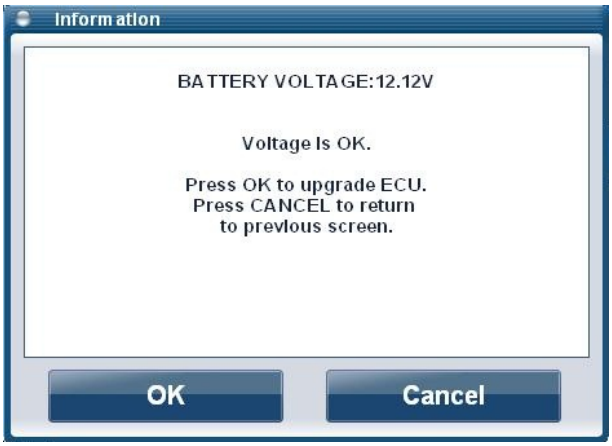


Figure 16. ECU Upgrade-Battery Voltage Check Battery Voltage OK

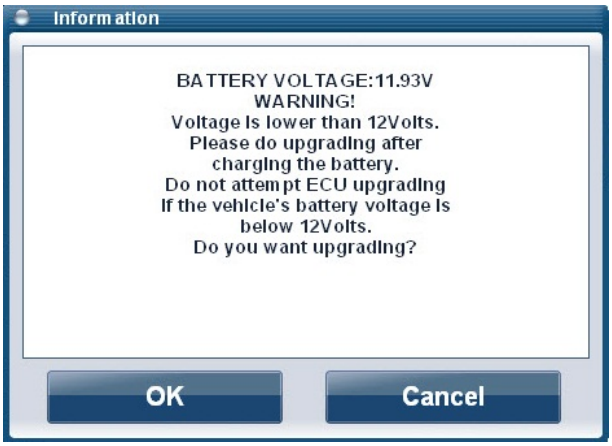


Figure 17. ECU Upgrade-Battery Voltage Check Insufficient

Automatically triggers the ECU Upgrade process and displays progress.

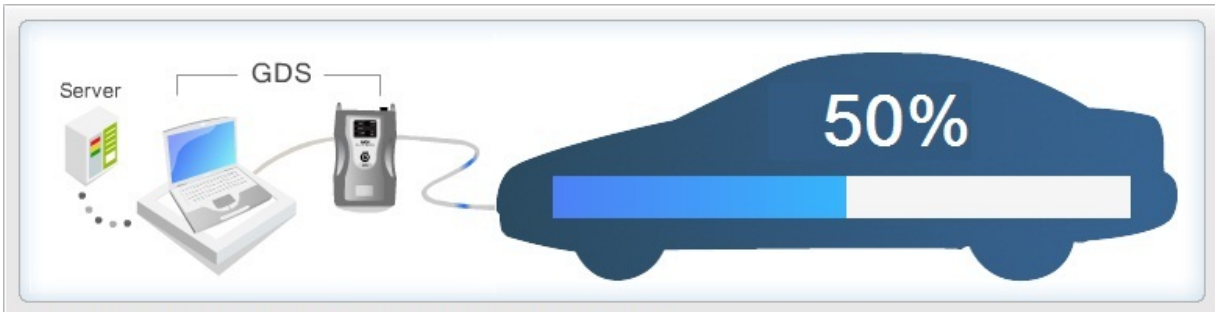


Figure 18. ECU Upgrade-Manual Mode- Upgrade in progress

When ECU Upgrade is completed, following message will be shown as in [Figure x].

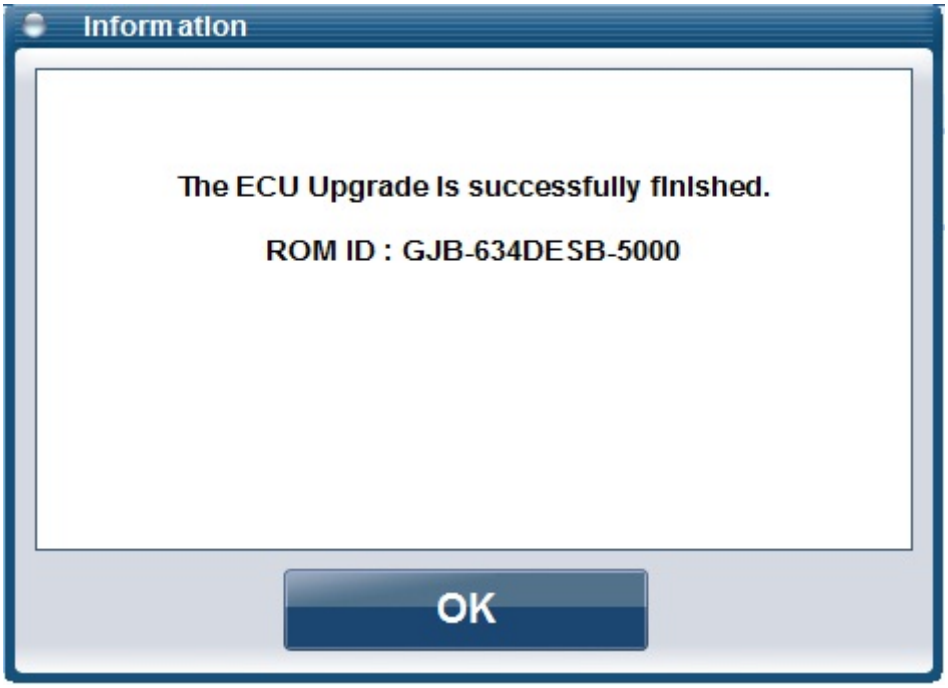


Figure 19. ECU Upgrade-Manual Mode-Upgrade completed

ID Register

(Supported additional function belongs to ECU specification)

Vehicle S/W Management **Module: A–05-002 (p.01)**

Additional functions (ECU specific) are supported under "Vehicle S/W" managemen"t.

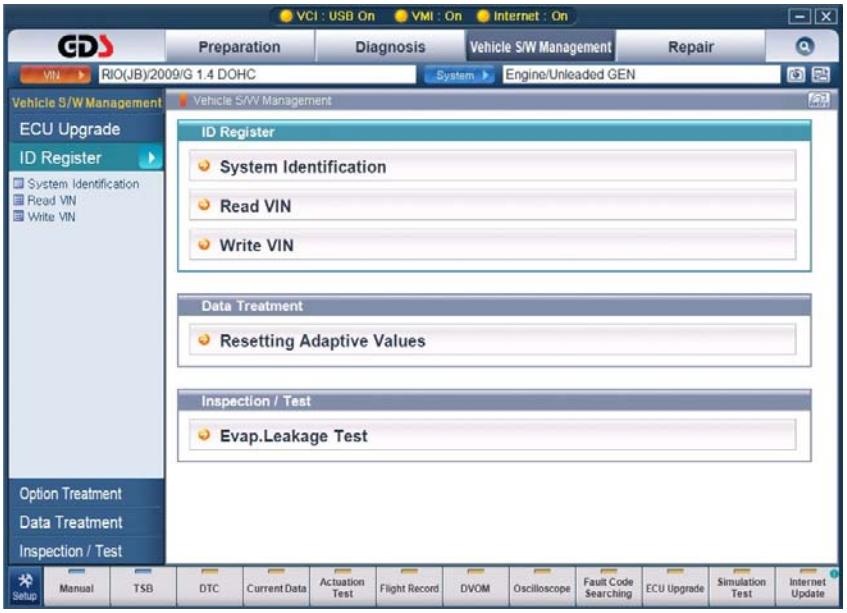


Figure 1. Initial page of Vehicle S/W Management (Engine)

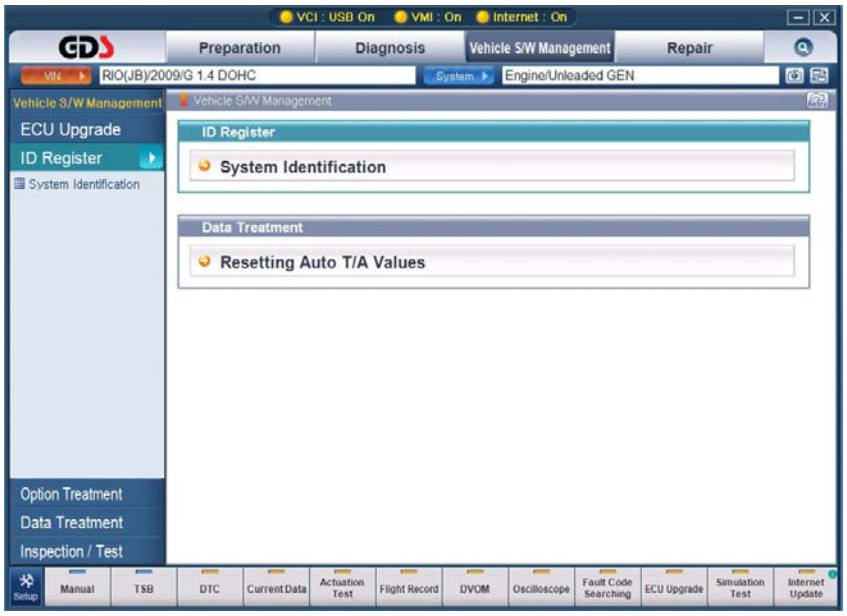


Figure 2. Initial page of Vehicle S/W Management (Auto T/M)

System Identification

System Identification shows the ROM ID of the current ECU.

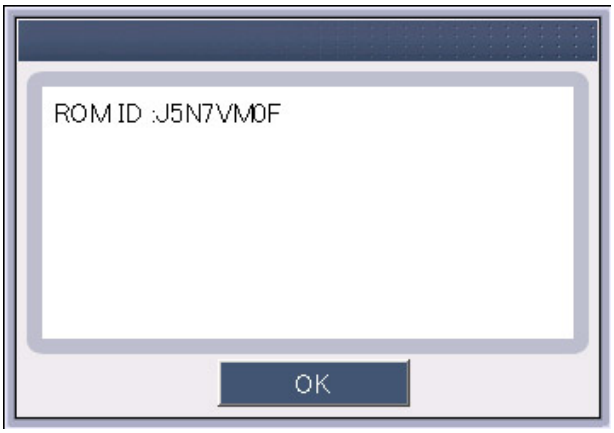


Figure 3. System Identification

Read VIN

The "Read VIN" function will display the VIN for the current ECU. Note that this function is currently supported for Engine ECUs on 2005 and later models.

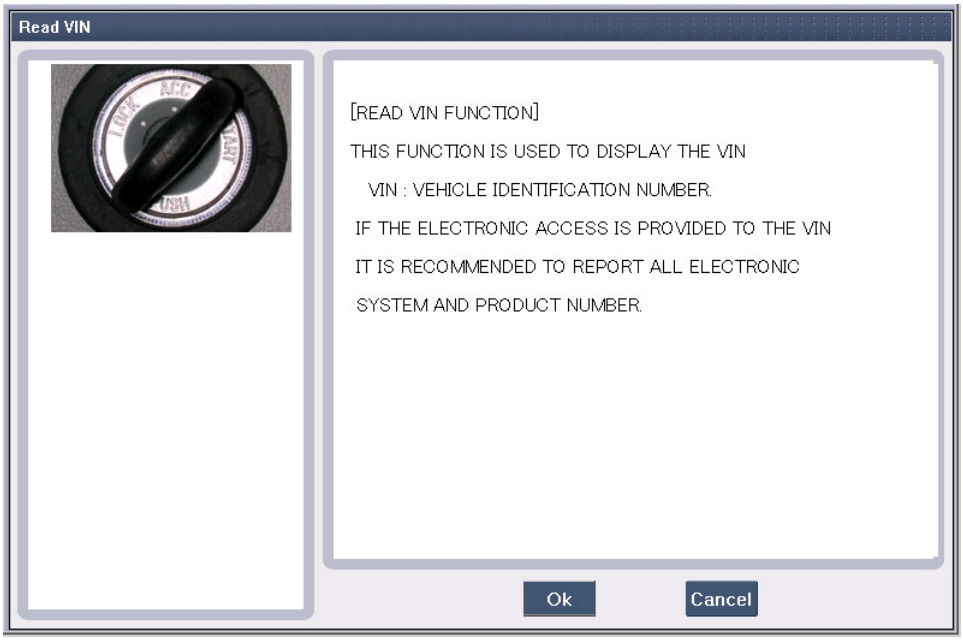


Figure 4. Read VIN - Initial Page

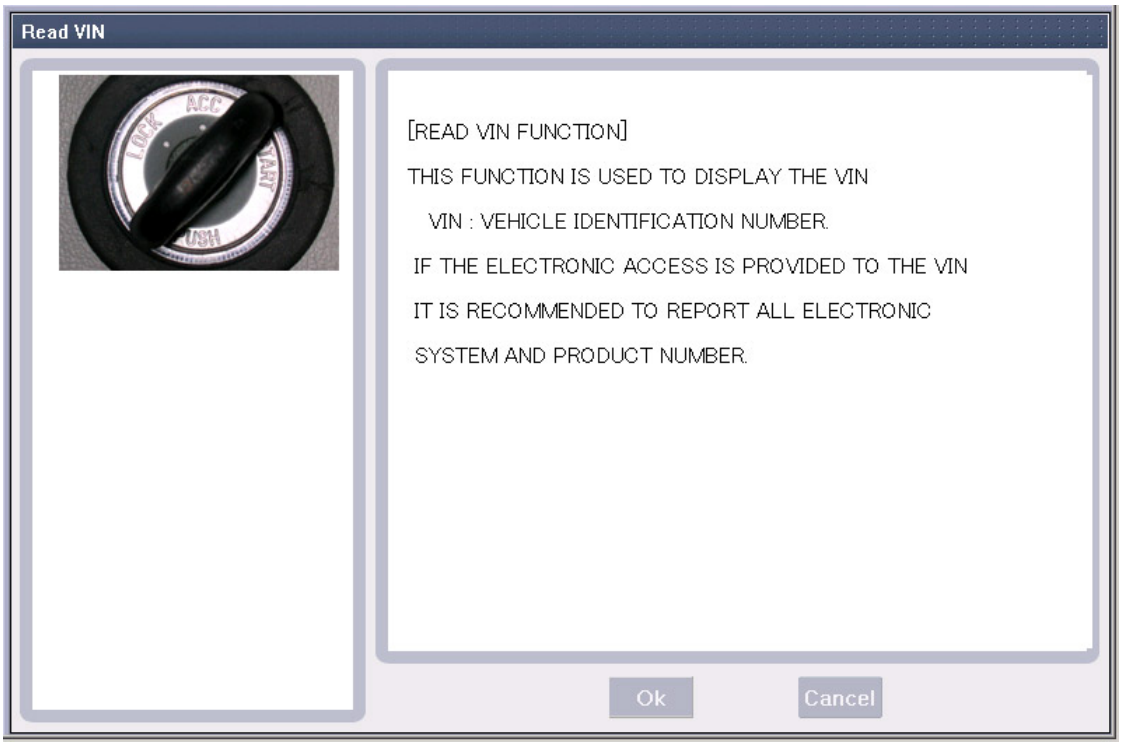


Figure 5. Read VIN - Processing

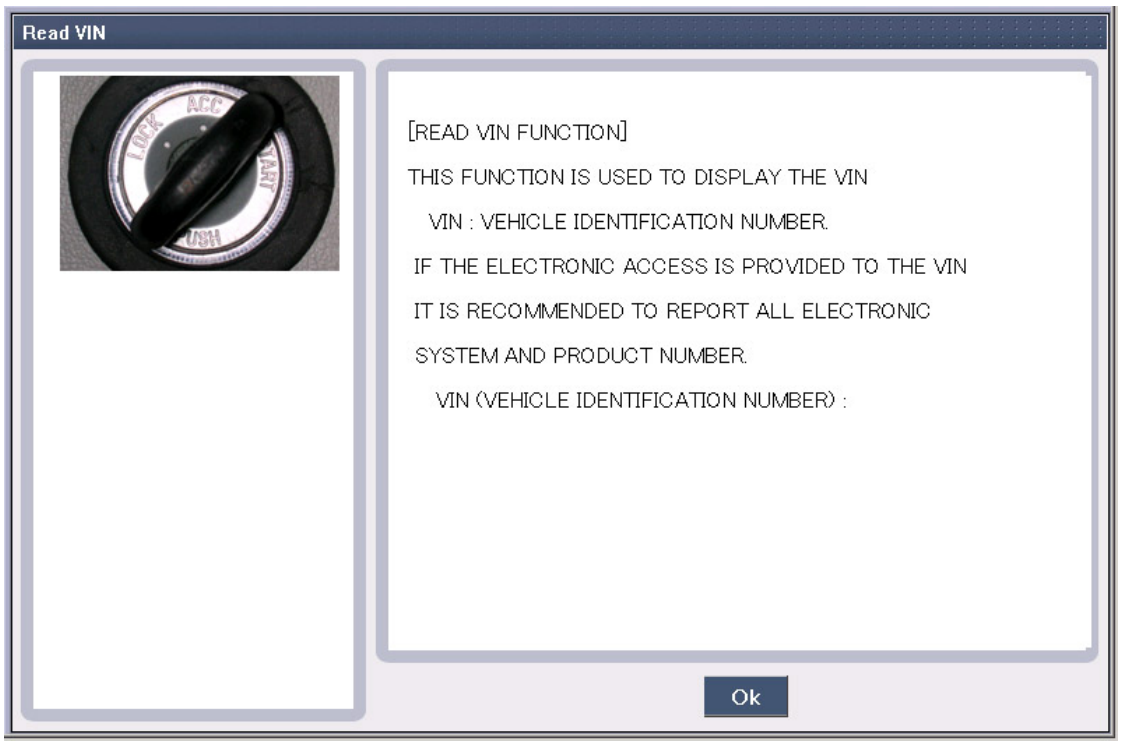


Figure 6. Read VIN - Complete

Write VIN

The "Write VIN" function is used to enter the VIN into a new Engine ECU. This function can only be performed ONCE on an ECU. Incorrect VIN entry and partial VIN entry conditions cannot be changed. This function is not supported on 2004MY or earlier vehicles.

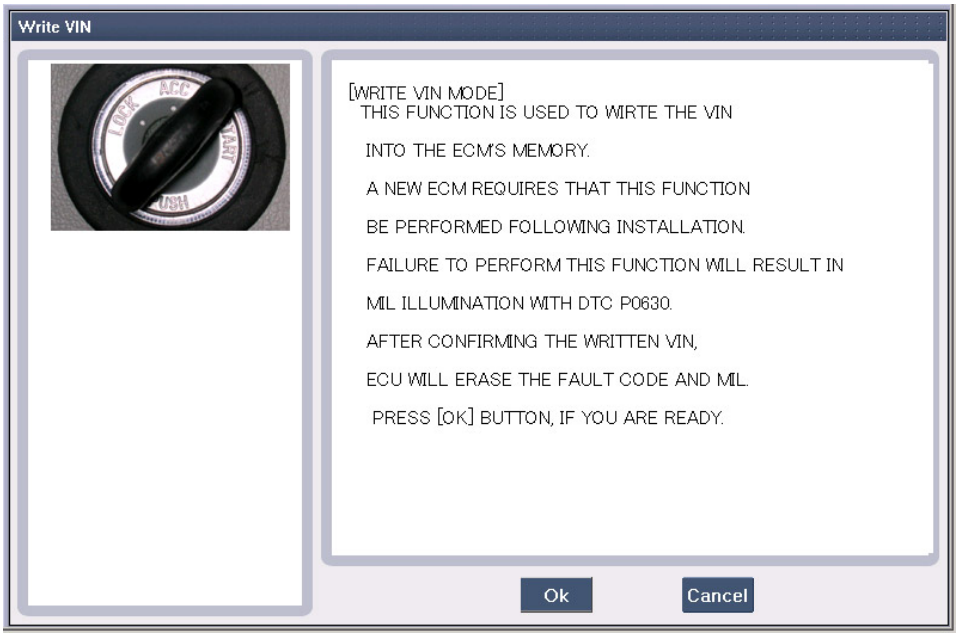


Figure 7. Write VIN - Initial Page

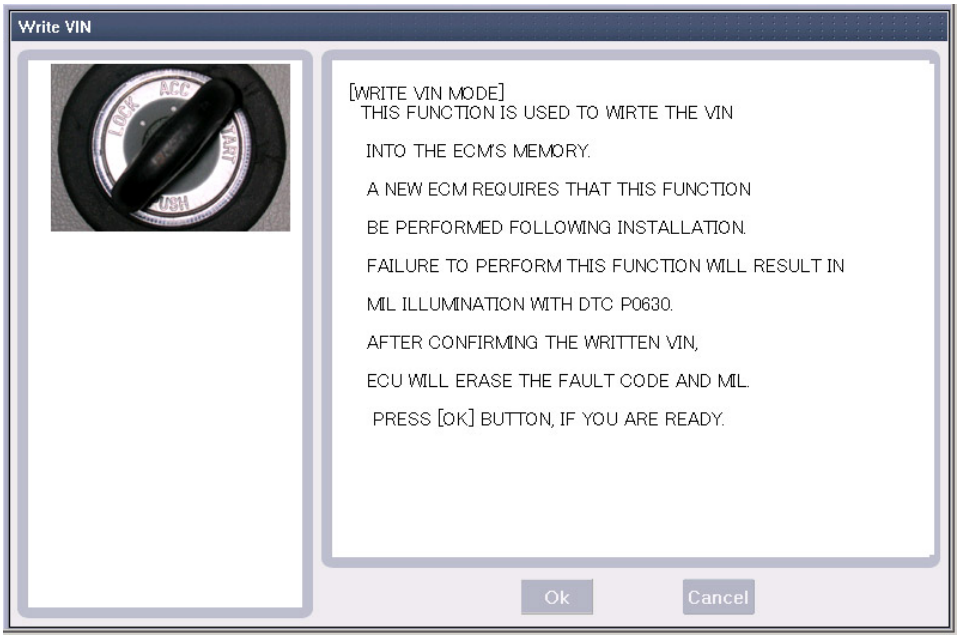


Figure 8. Write VIN - Processing

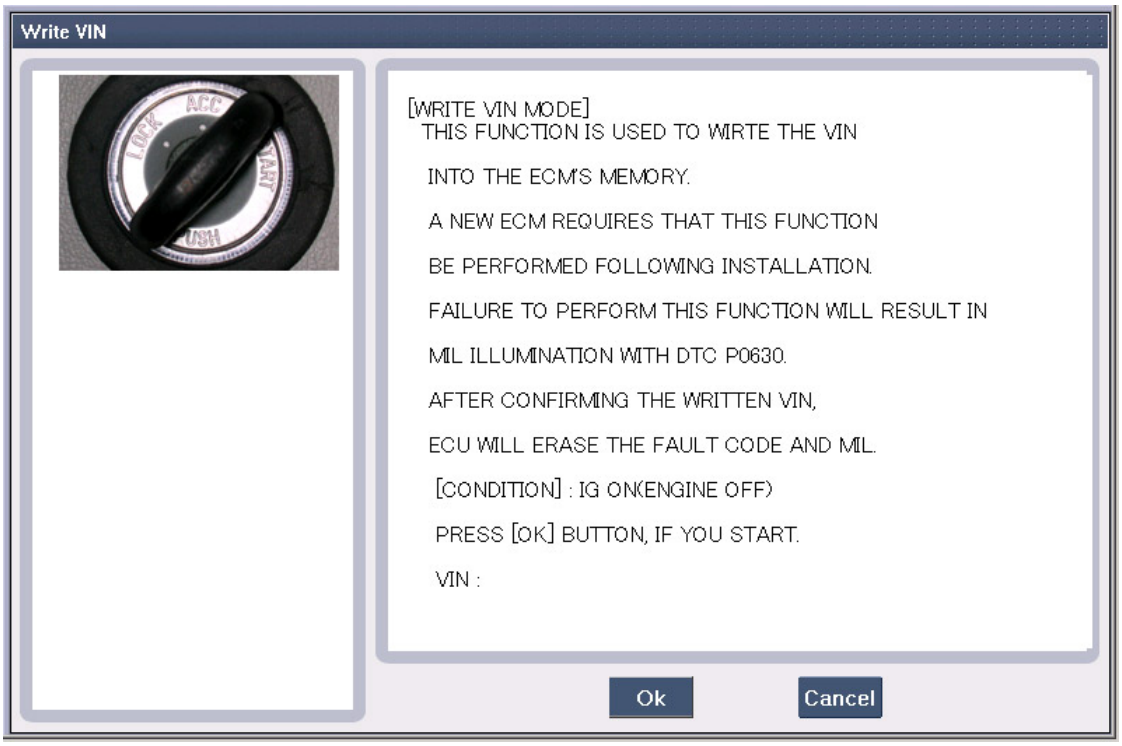


Figure 9. Write VIN - Input Condition

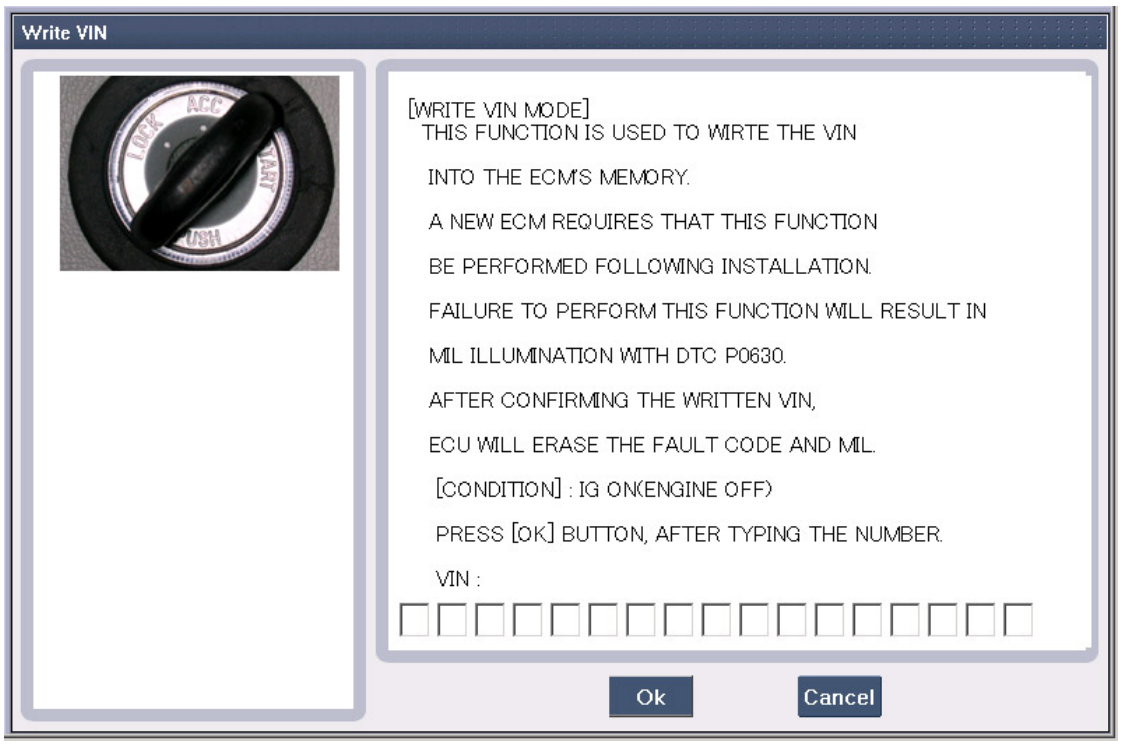


Figure 10. Write VIN - Input VIN

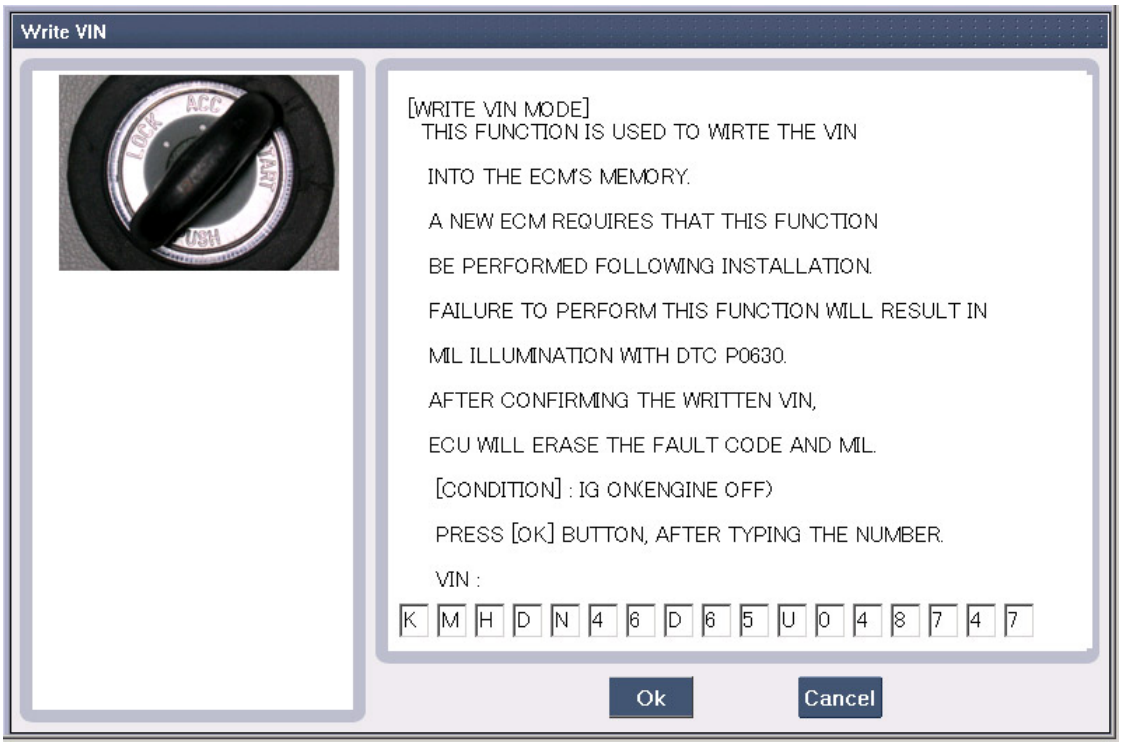


Figure 11. Write VIN - Input VIN Complete

Option Treatment

The "Option Treatment" function is used to adjust functionality on supported ECUs.

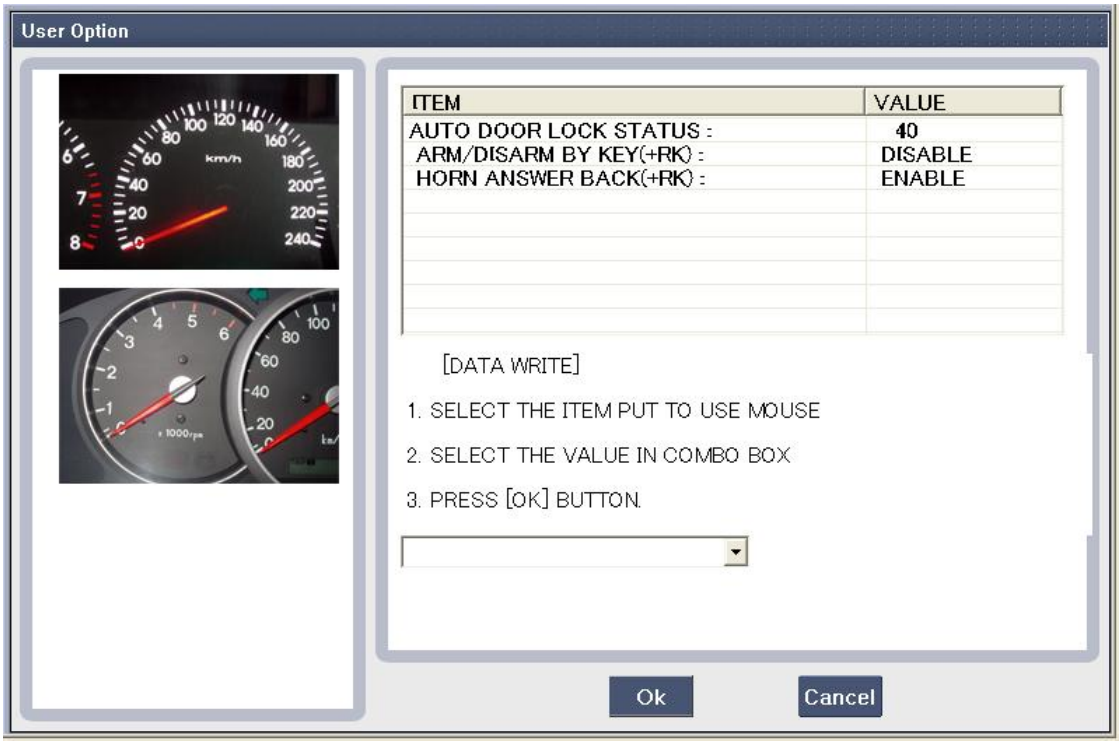


Figure 1. User Option Initial page

Resetting Adaptive Values

The "Resetting Adaptive Values" function is used to reset adaptive learn data on specific ECUs.

Figure 1. Resetting Adaptive Values - Before Reset

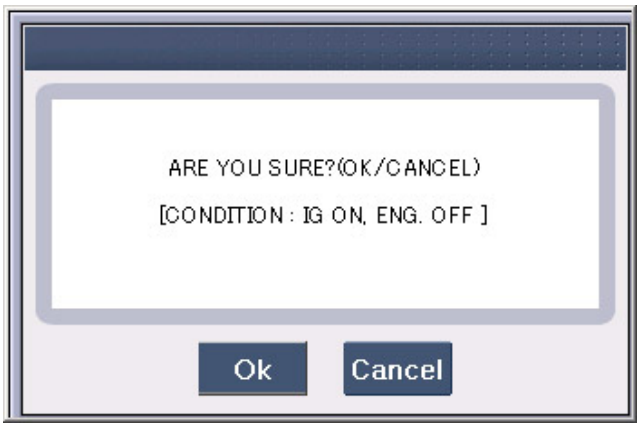


Figure 2. Resetting Adaptive Values – Message Box

Figure 3. Resetting Adaptive Values – Test Complete

Version Configuration

The "Version Configuration" function is used on supported engine ECUs to configure for transaxle and ABS ECU options.

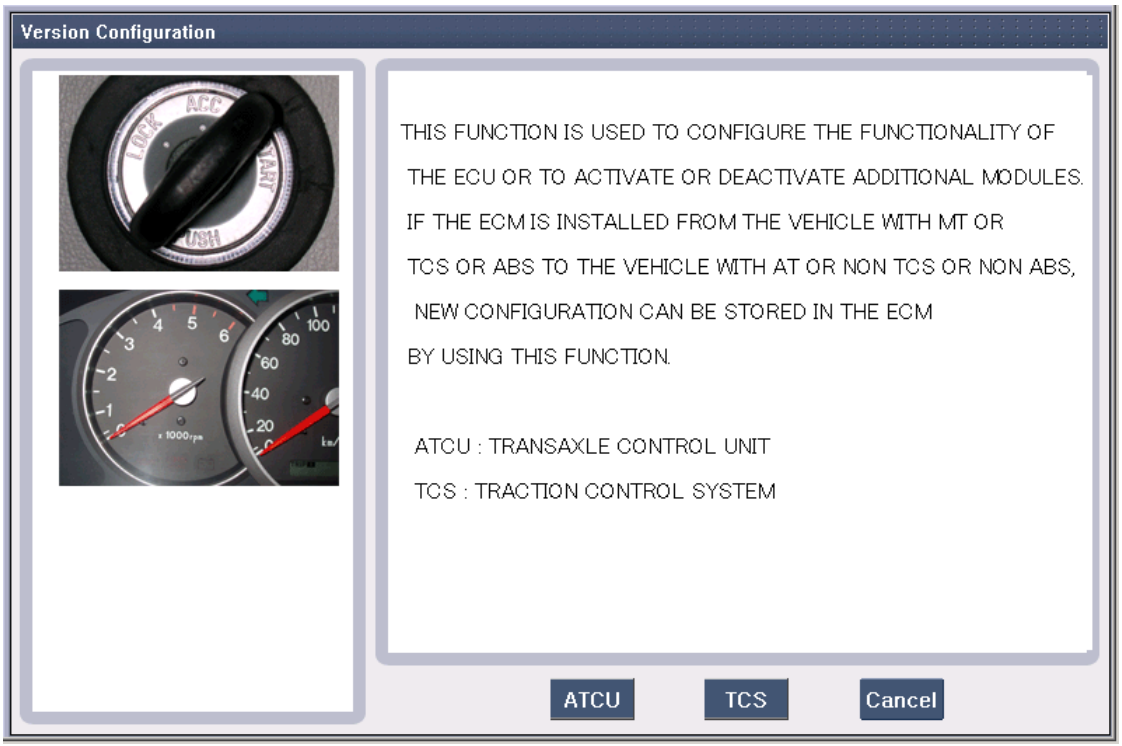


Figure 4. Version Configuration - Initial Page

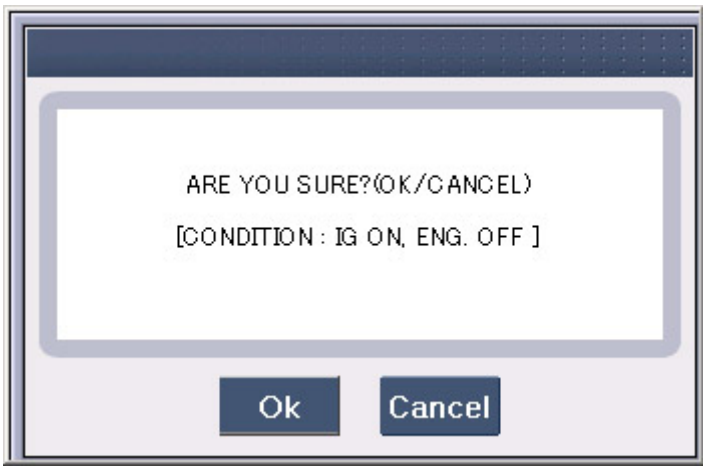


Figure 5. Version Configuration - Message Box

Figure 6. Version Configuration – Test Complete

Readiness Test

The "Readiness Test" function indicates whether or not a specific test is supported, and whether or not that test is completed.

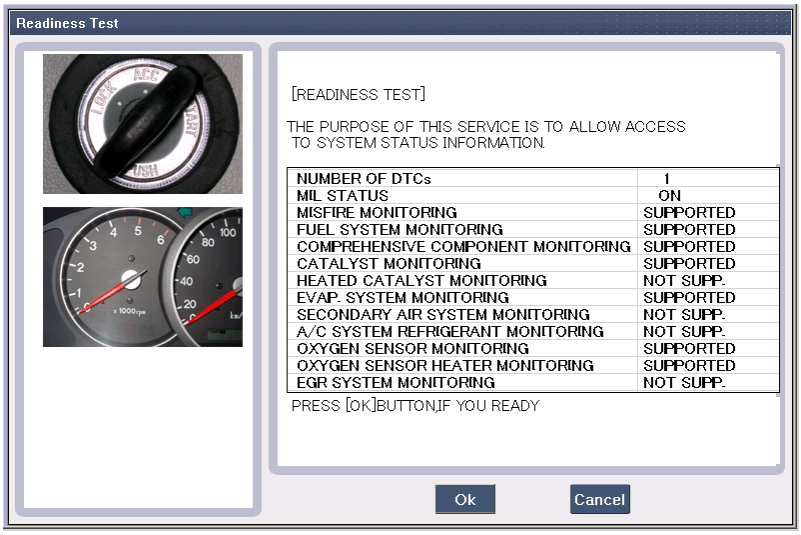


Figure 1. Readiness Test - Supporting List

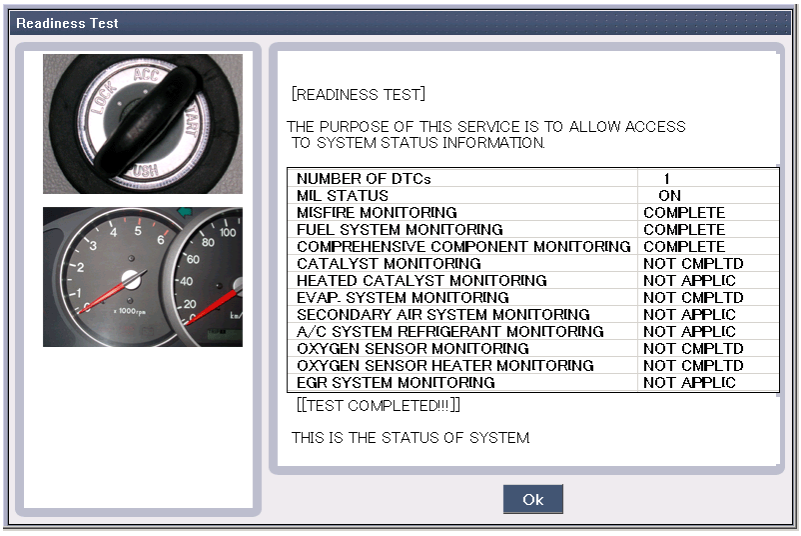


Figure 2. Readiness Test - Complete

Evap. (Evaporative emission) Leakage Test

The "EVAP Leakage Test" mode is used on supported engine ECUs to force an EVAP leak test to perform. The availability of current data during an EVAP test depends on the ECU. The vehicle conditions must be set as indicated; tests may not run or may provide false results if conditions are incorrect.

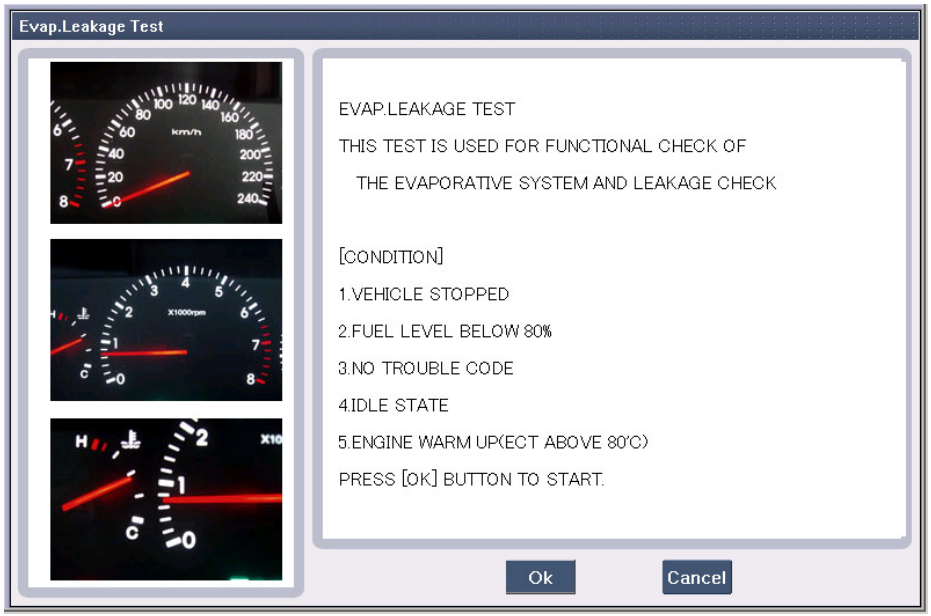


Figure 3. Evap Leakage Test - Ready

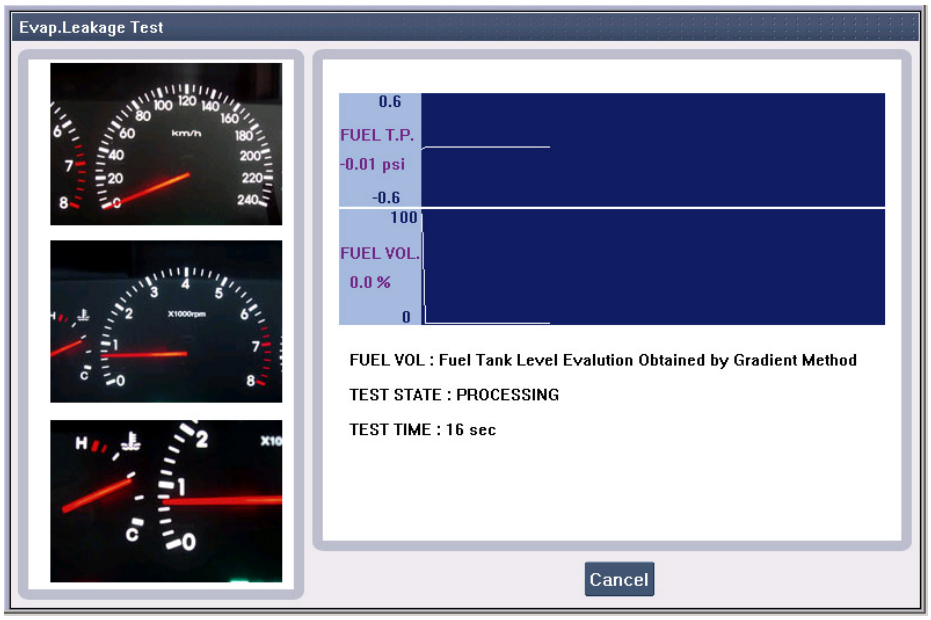


Figure 4. Evap. Leakage Test – Operation

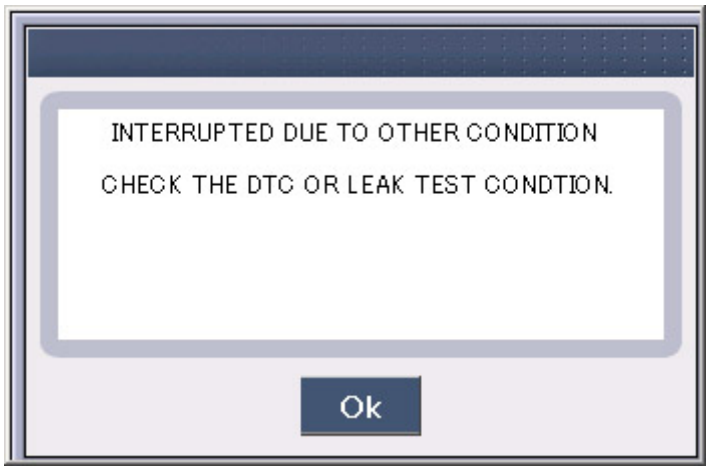


Figure 5. Evap. Leakage Test – Error

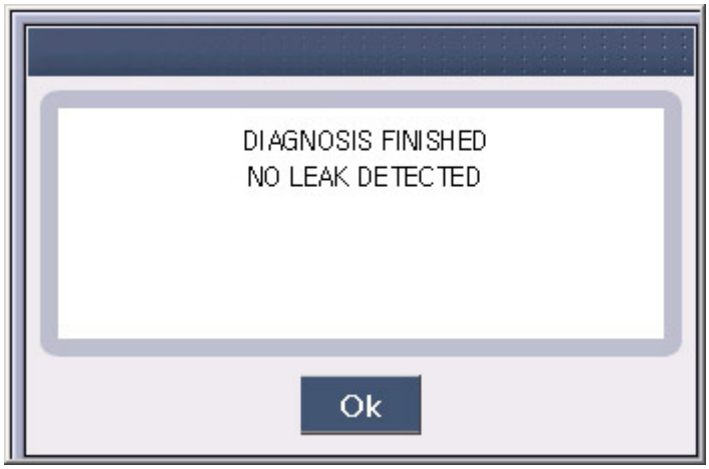


Figure 6. Evap. Leakage Test - Complete

Monitoring Test

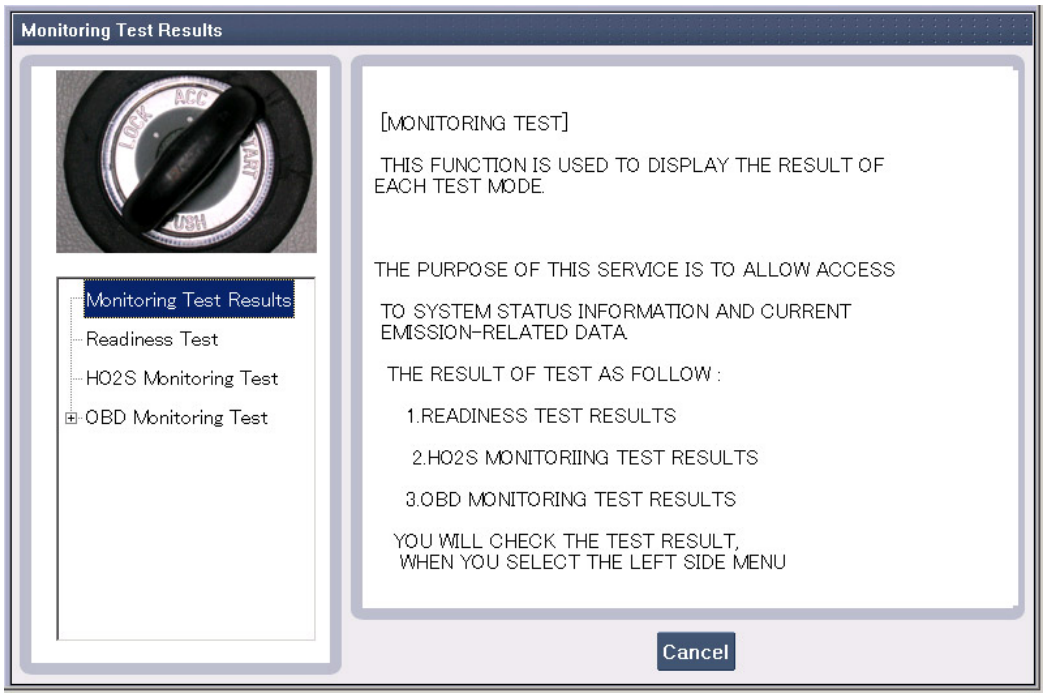


Figure 7. Monitoring Test Result

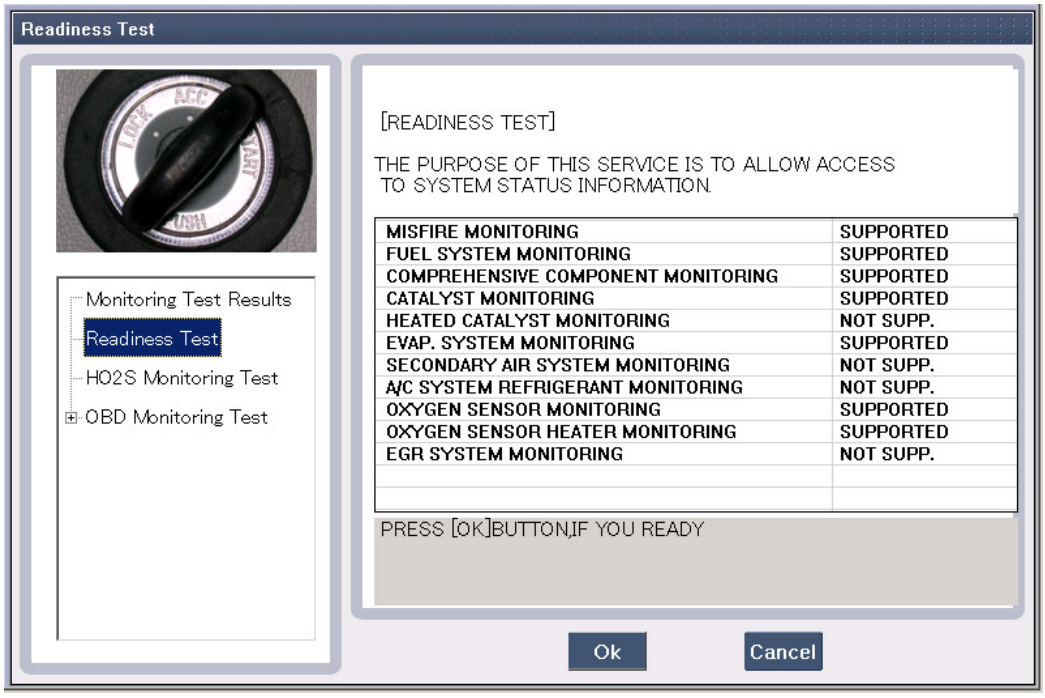


Figure 8. Readiness Test - 1

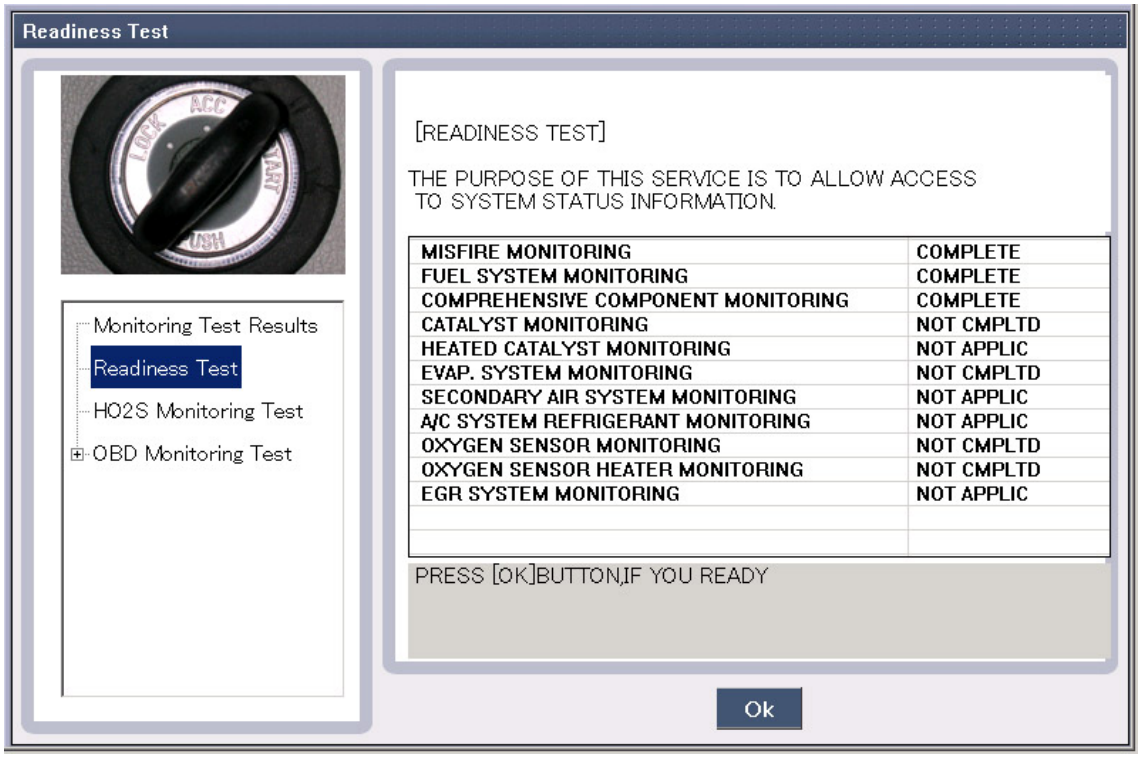


Figure 9. Readiness Test - 2

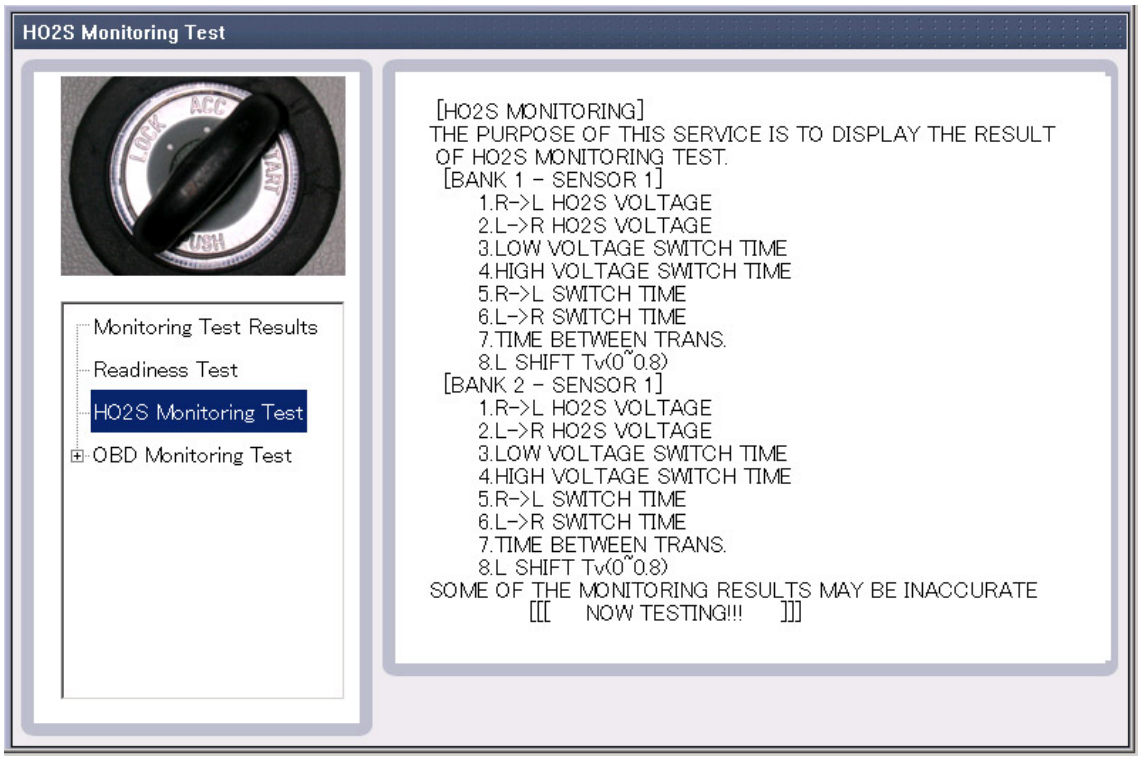


Figure 10. HO2S Monitoring Test

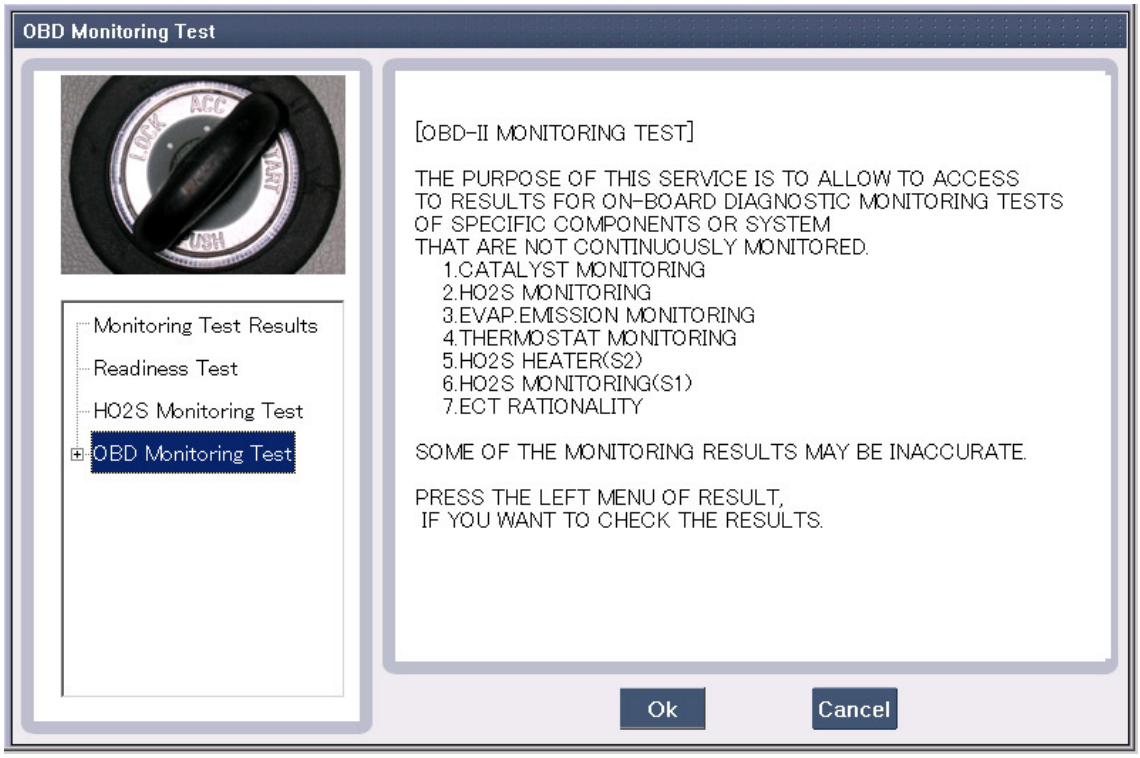


Figure 11. OBD Monitoring Test

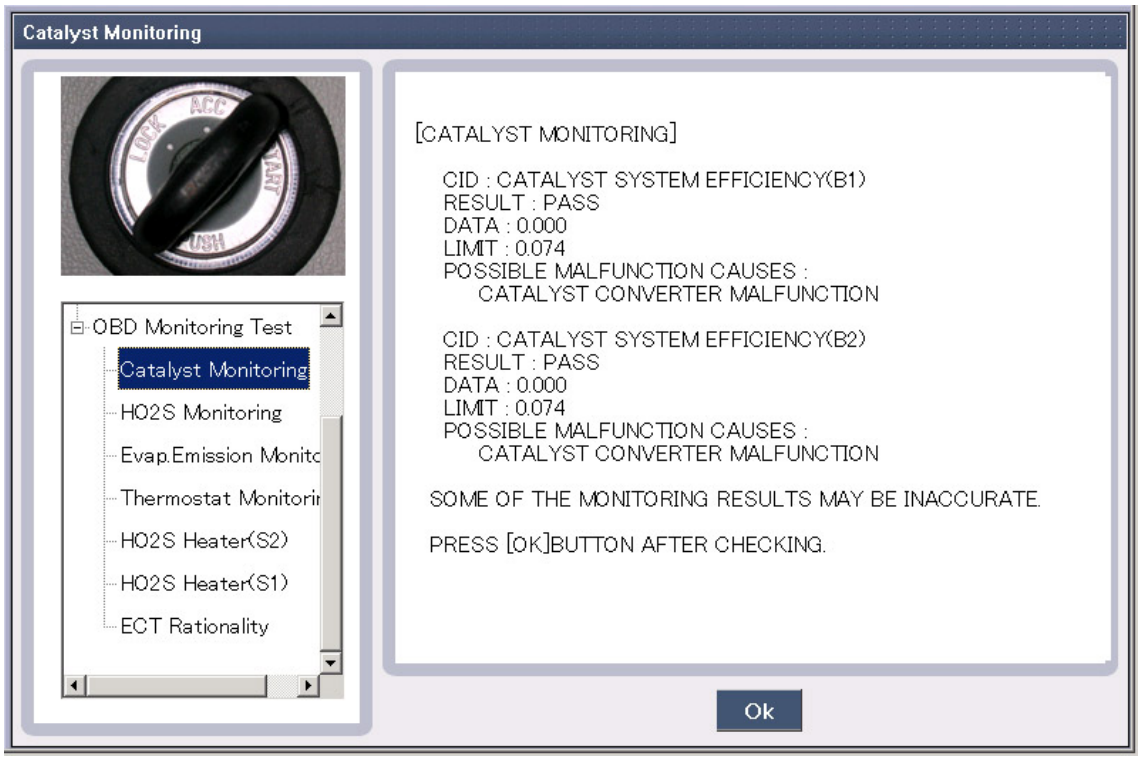


Figure 12. Catalyst Monitoring

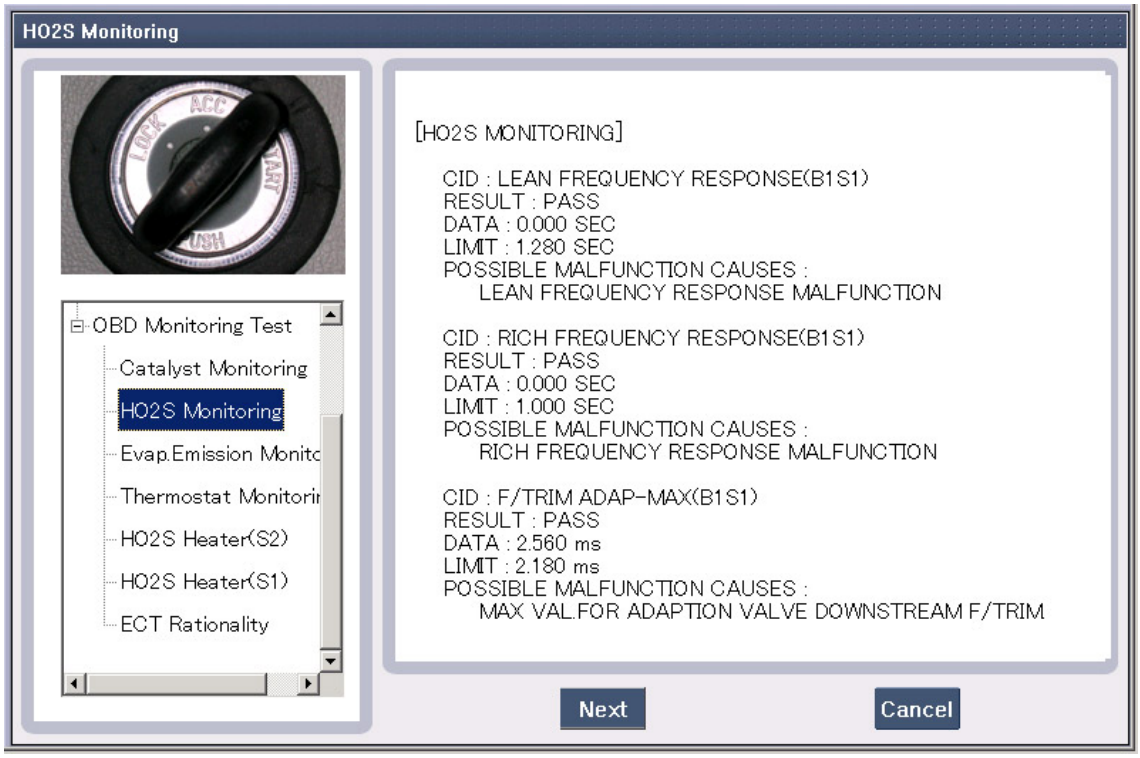


Figure 13. HO2S Monitoring - 1

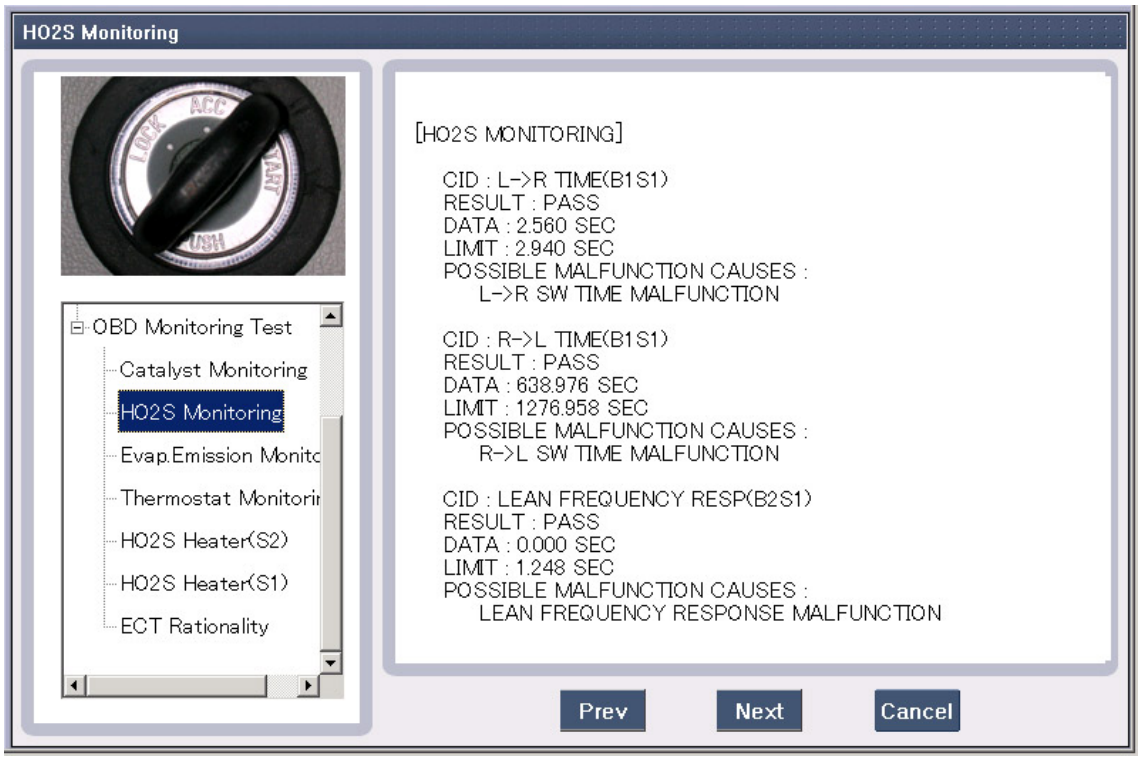


Figure 14. HO2S Monitoring - 2

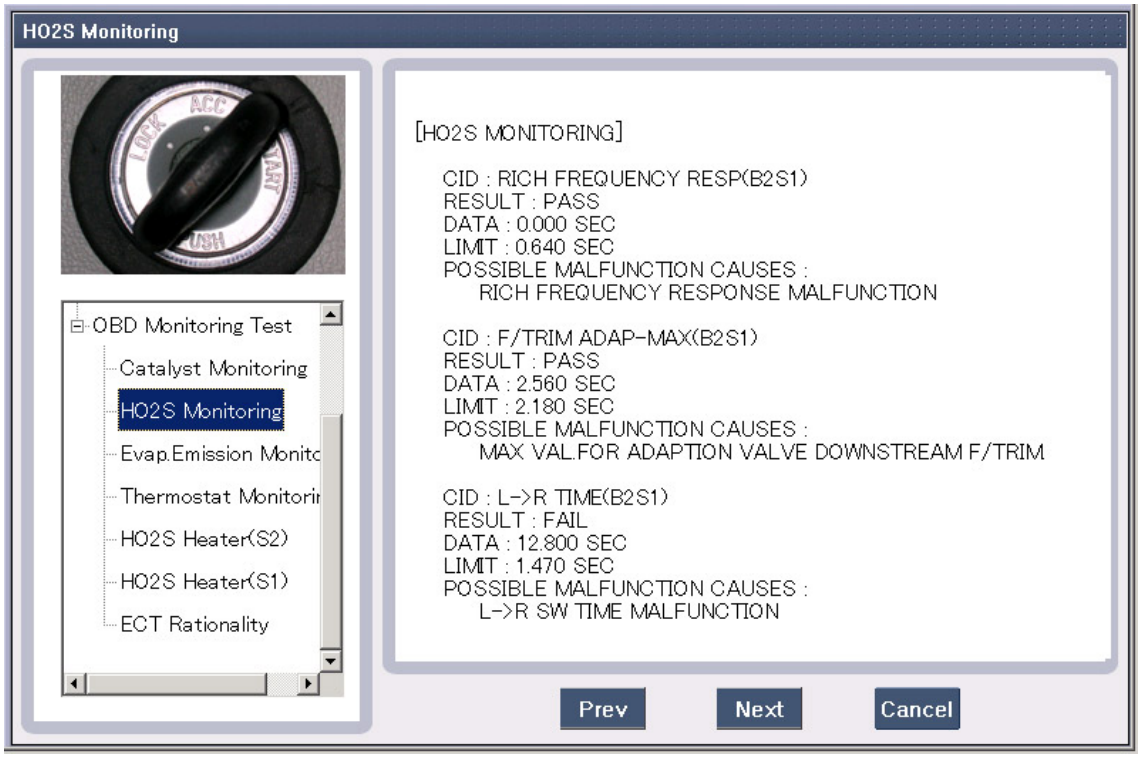


Figure 15. HO2S Monitoring - 3

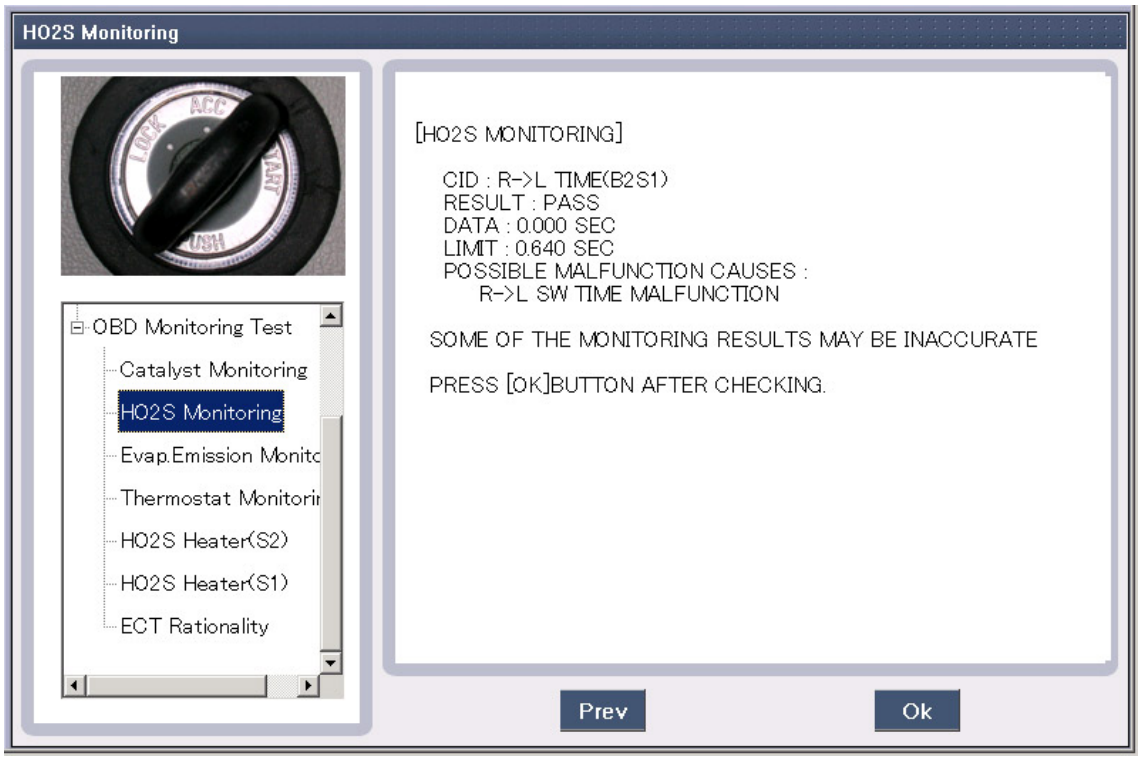


Figure 16. HO2S Monitoring - 4

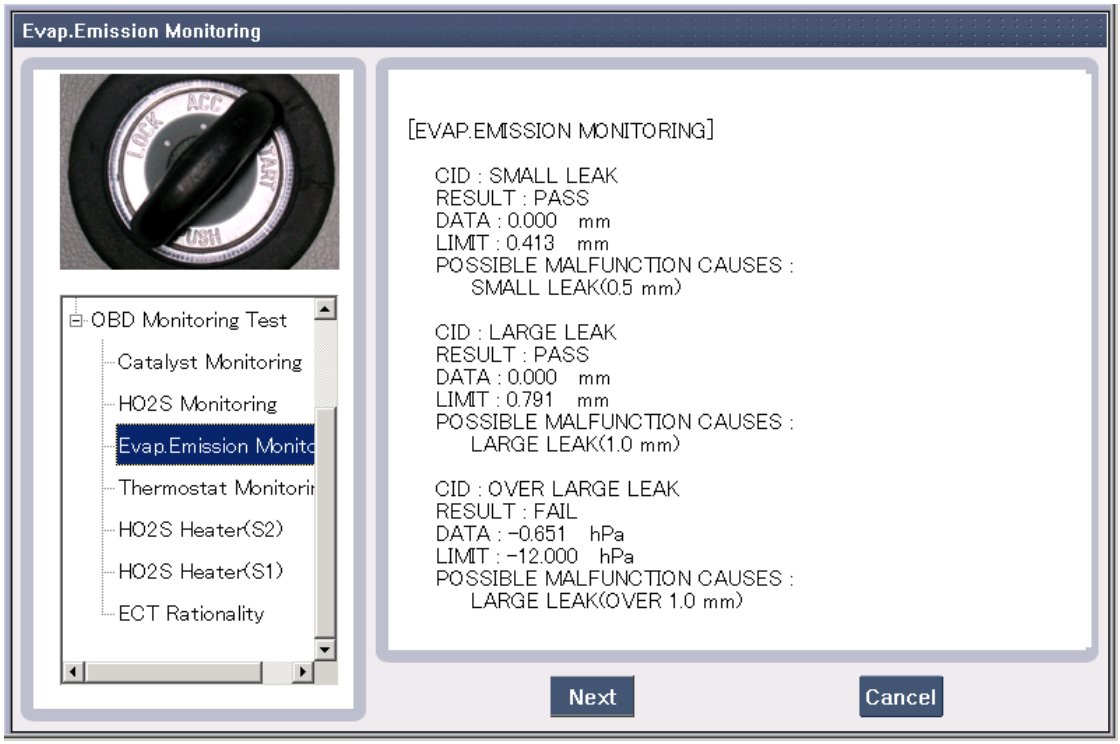


Figure 17. Evap. Emission Monitoring - 1

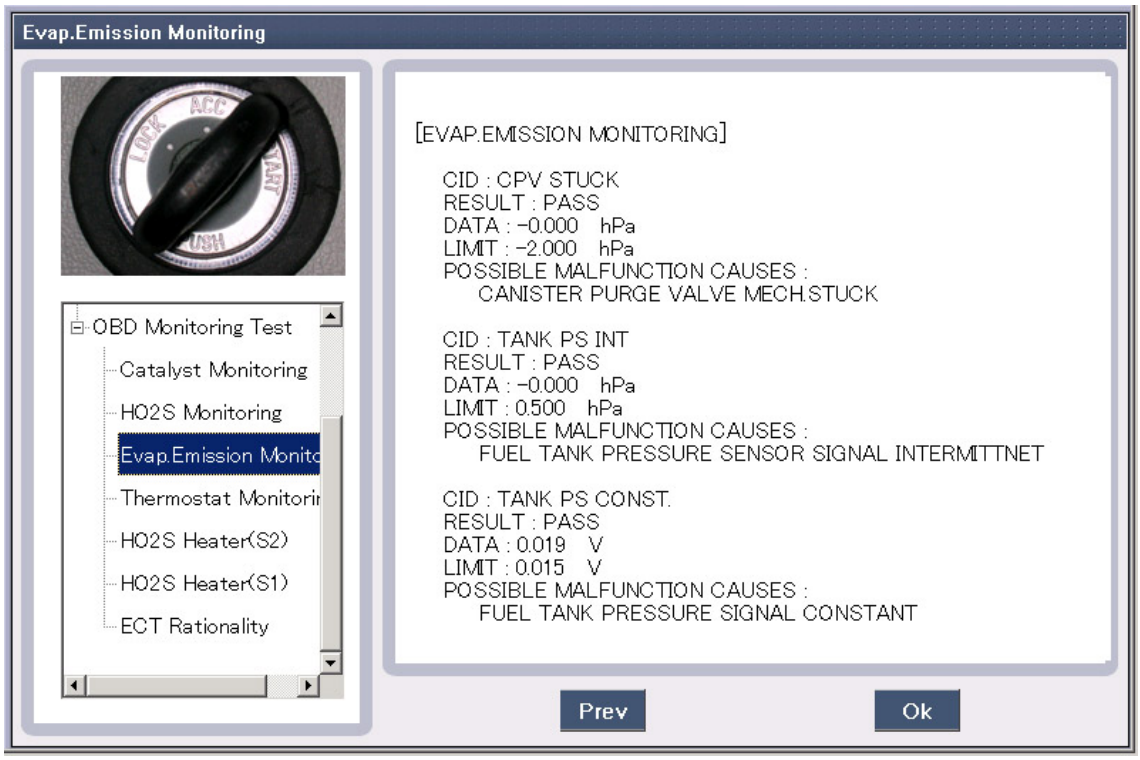


Figure 18. Evap. Emission Monitoring – 2

Power Balance Test

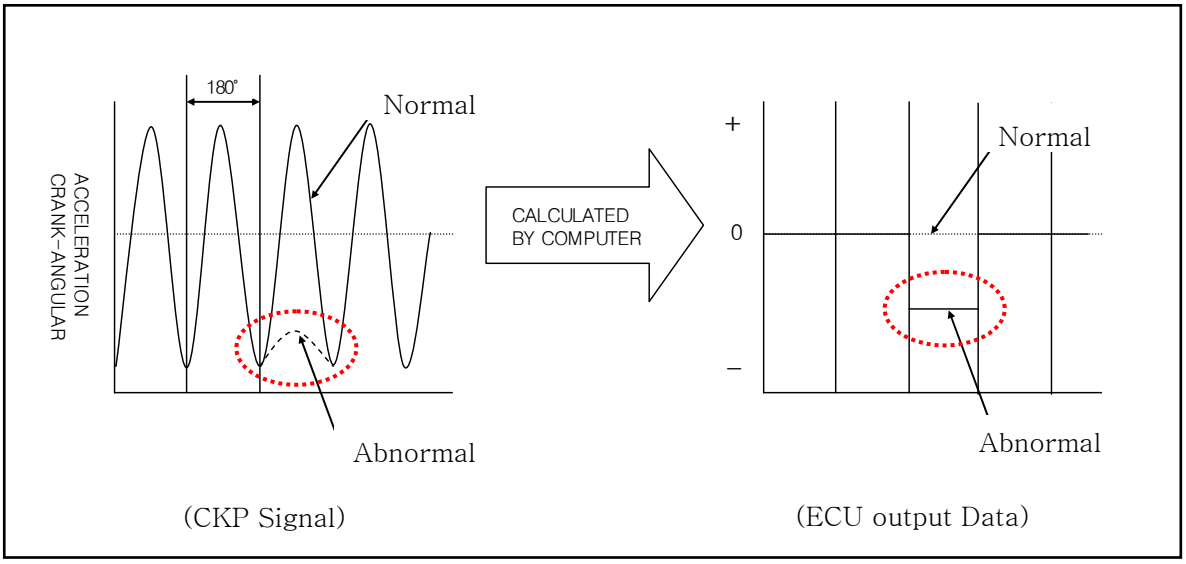
Appendix

1. Purpose

When engine shaking occurs, this mode can help to determine which cylinder (s) may be the cause. This test does not cut the injector to kill the cylinder. The ECM monitors the speed of the crankshaft while the engine is running to determine the contribution of each cylinder.

2. Logic

As the runs the crankshaft will speed up and slow down demending on the compression and power strokes of the cylinders Based on the CKP sensor data, ECU will calculate the speed of the crankshaft. The crankshaft will speed up as a cylinder fires which pushes the piston down. As another cylinder starts building compression, the crankshaft will slow until the next cylinder fires which will increase the crankshaft speed.

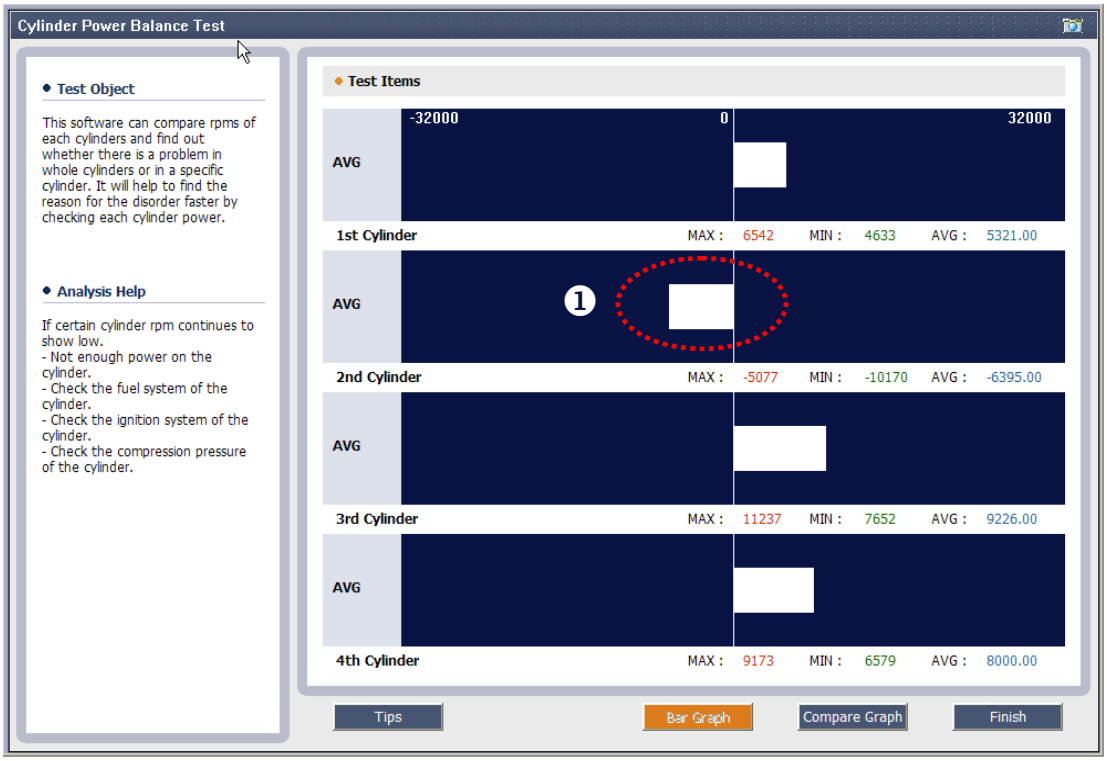


[Figure 1. Cylinder power balance measuring Logic]

3. Test Method

When Cylinder Power Balance Test Mode is pressed, it automatically collects the speed of the crankshaft for 30 seconds and calculates each cylinder's average speed and displays it in a bar. If a cylinder is reading low, it indicates that the cylinder is not contributing enough. This can be caused by compression, fuel, or spark concerns.

4. How to judge



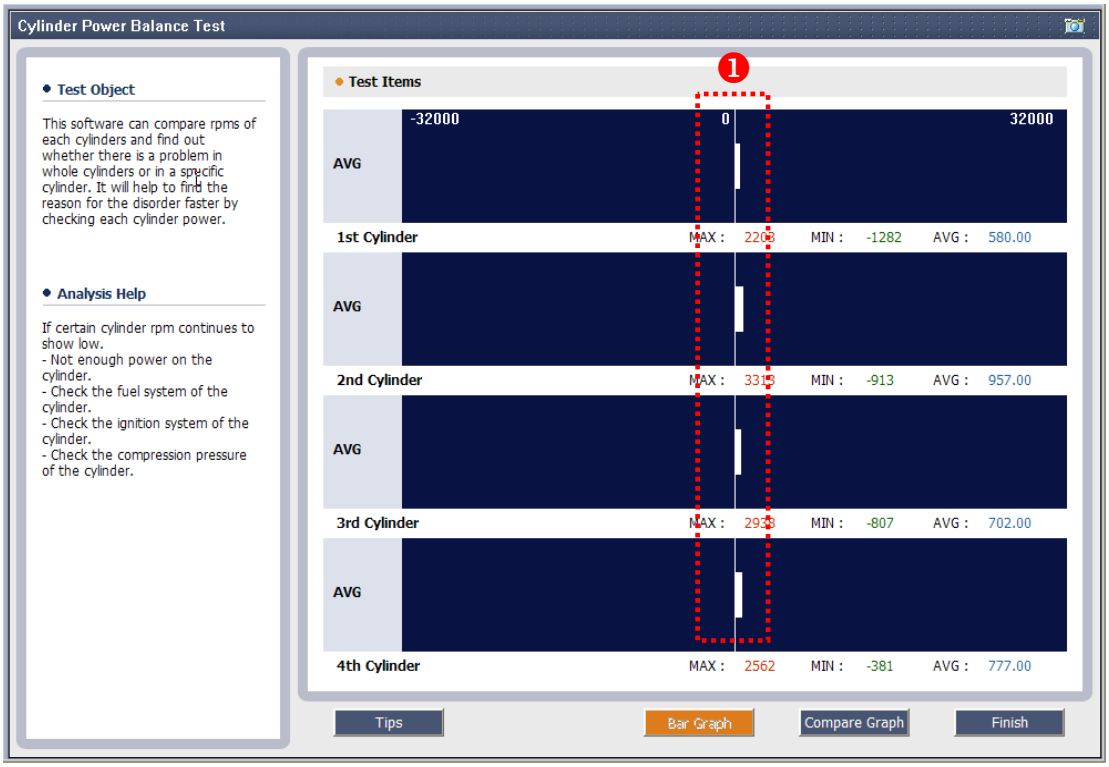
[Figure 2. Cylinder Power balance test screen]

1) ❶ Combustion pressure of cylinder is relatively LOW

This is the case that a cylinder's contribution is low as compared to the other cylinders. It is assumed that the cylinder with the combustion pressure being LOW is the one causing engine shaking. (Refer to the guide provided on the left section of the screen, when needed.)

5. Use example

• Normal

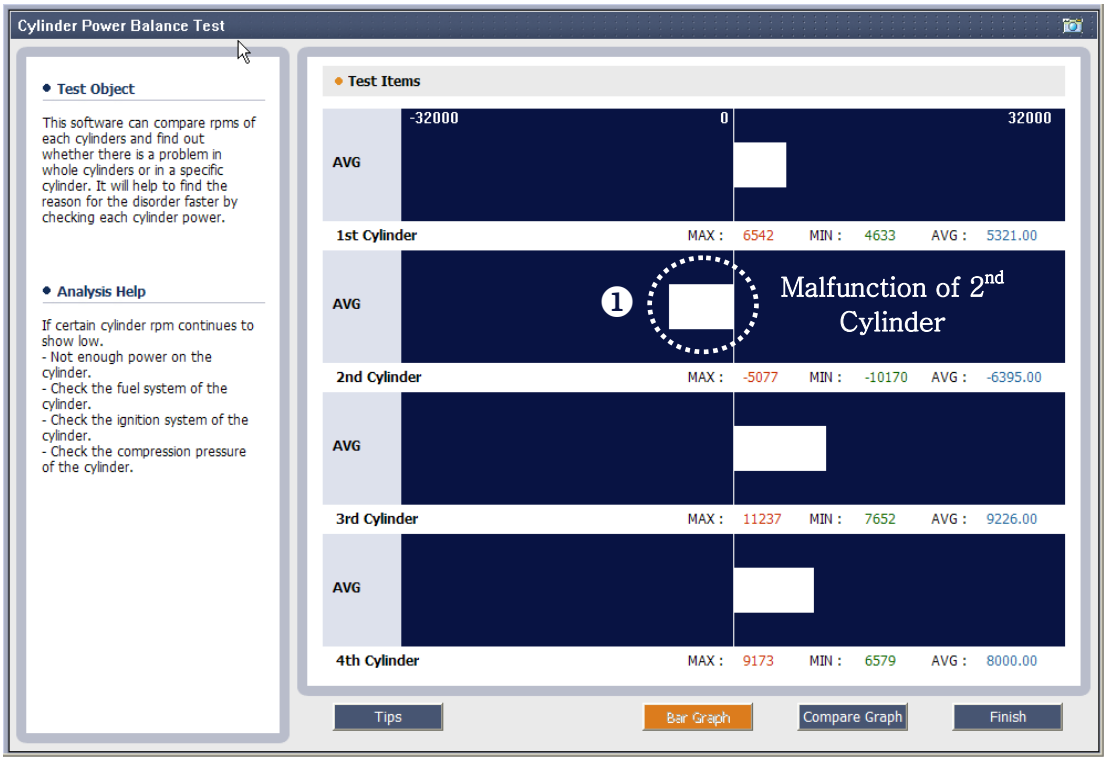


[Figure 3. Cylinder power balance test screen – Normal]

1) ❶ There is very little differences in speed data between cylinders

(The most preferred condition is that when all cylinders data are near to the "0" value.)

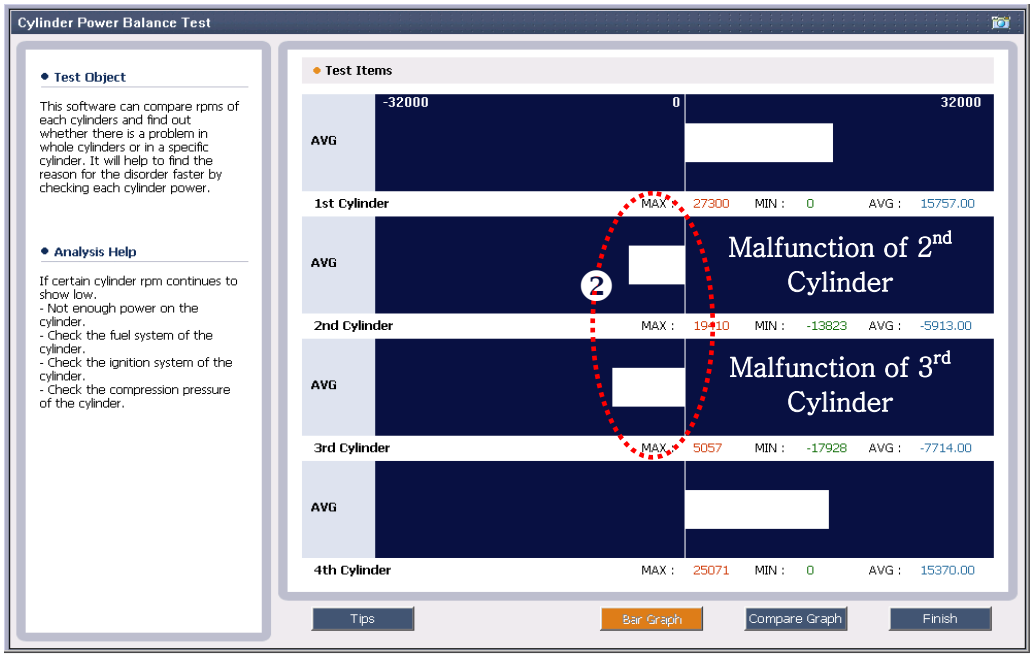
• Abnormal



[Figure 4. Cylinder power balance test screen –1 cylinder being abnormal]

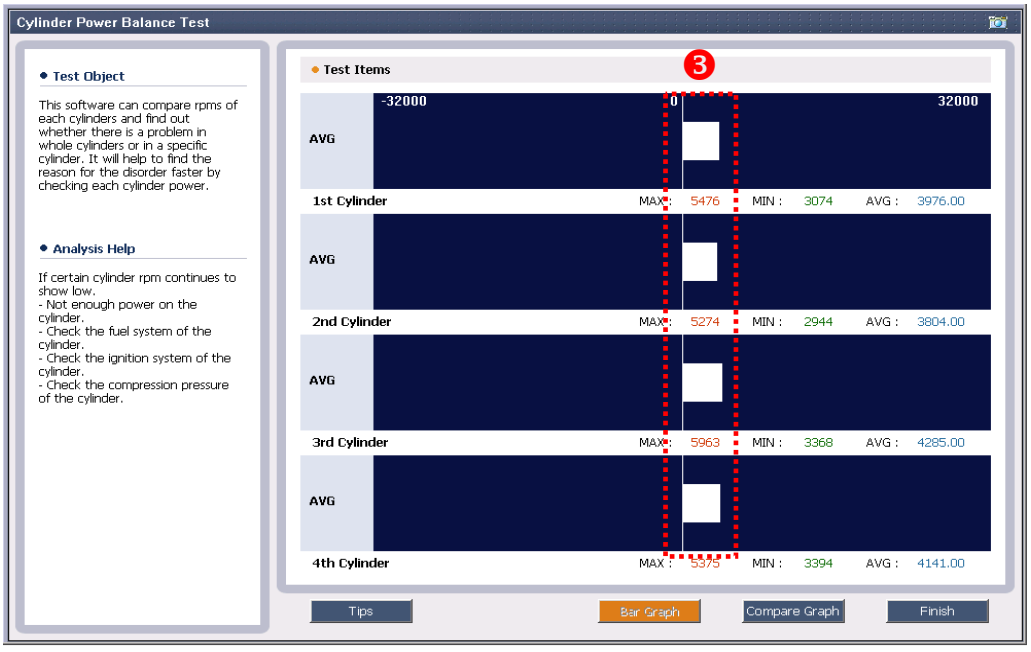
1) ❶ The Notice that cylinder 2 has a negative contribution verses a positive contribution for the other cylinders.

(Speed data value is (– direction) toward to the left)



[Figure 5. Cylinder power balance test screen – two cylinder abnormal]

2) ❷ No 2,3 cylinder speed data are toward to the minus direction



[Figure 6. Cylinder power balance test screen – every cylinders being normal]

3) ❸ If every cylinders speed data are toward to the positive direction and fairly even, yet the engine is shaking, check for areas that would influence all the cylinders. Check air/fuel and ignition timing.

CVVT Test

Appendix

1. Purpose

This test mode is to diagnose the possibility of poor acceleration occurrence due to the defects of CVVT system that has possible mechanical faults at the Oil Control Valve (OCV) or Camshaft valve.

2. Logic

While driving and observing the Cam position targeted data value through the logic in ECU on-board system, the CVVT control system can determine if the system is faulty or not. By comparing the targeted value and the current data value, this will give the idea as to whether there is a defect or not. If the OCV does not reach the targeted data value within a certain period, it is assumed that it is defective and then will display a CVVT related DTC code.

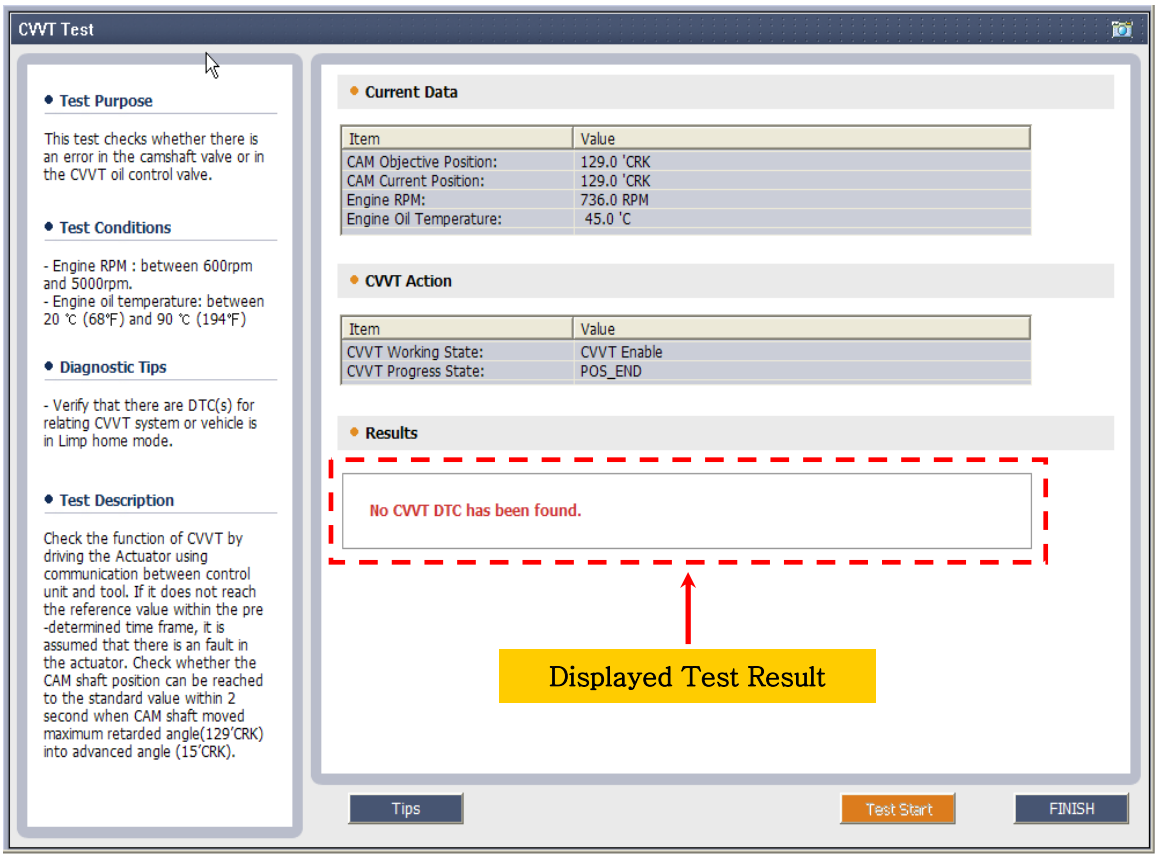
3. Method

When CVVT test mode button is pressed, it will automatically drive the OCV in two seconds to test if it does reach the targeted value. If it does not reach the targeted values within the two seconds, it will display a CVVT related DTC code.

The test mode conditions on engine is limited to engine RPM of 600rpm~5000rpm below and temperature 20℃~90℃. (68 to 94 degrees F.)

※ In the past, CVVT mechanical fault diagnosis mode was only available when driving the vehicle, but this CVVT test mode diagnosis is now possible to perform without driving the vehicle.

4. How to judge

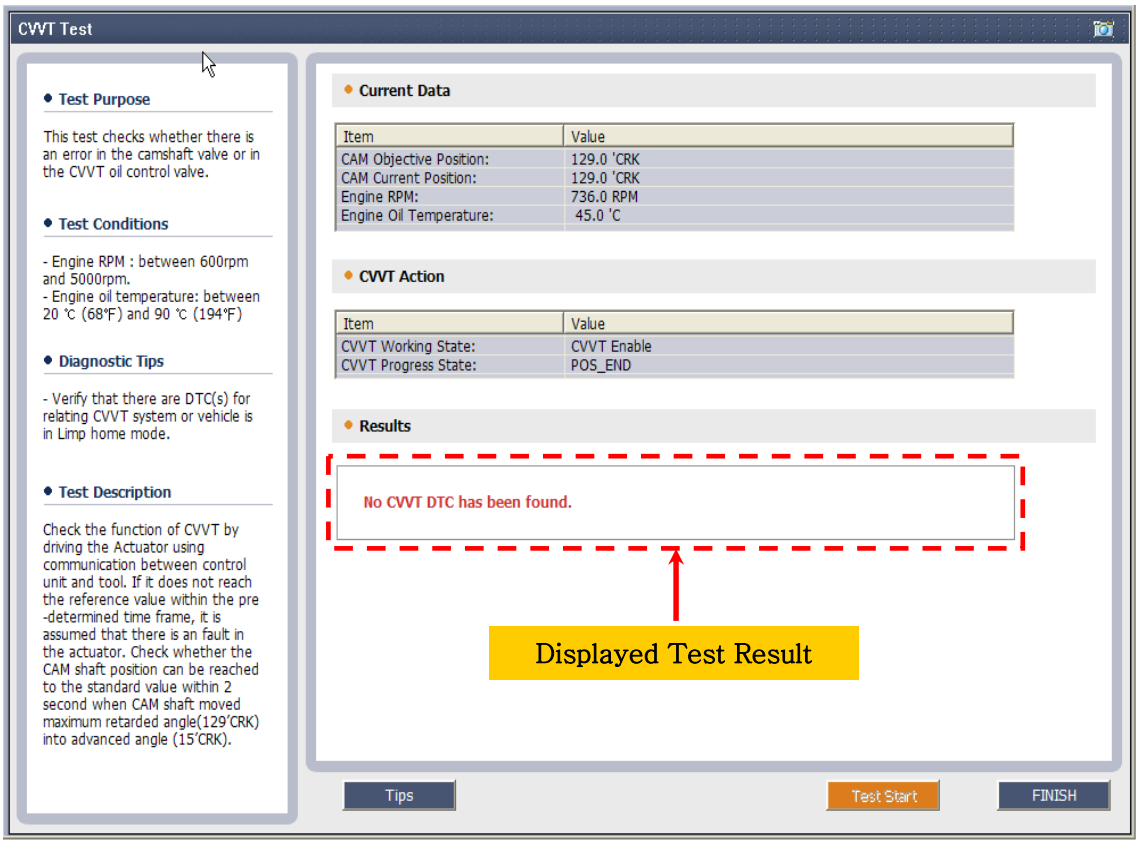


[Figure1. CVVT Test screen]

- Determine if there is a fault by checking for a CVVT related DTC code or by verifying that the CVVT operating value is not in Limp Home mode.

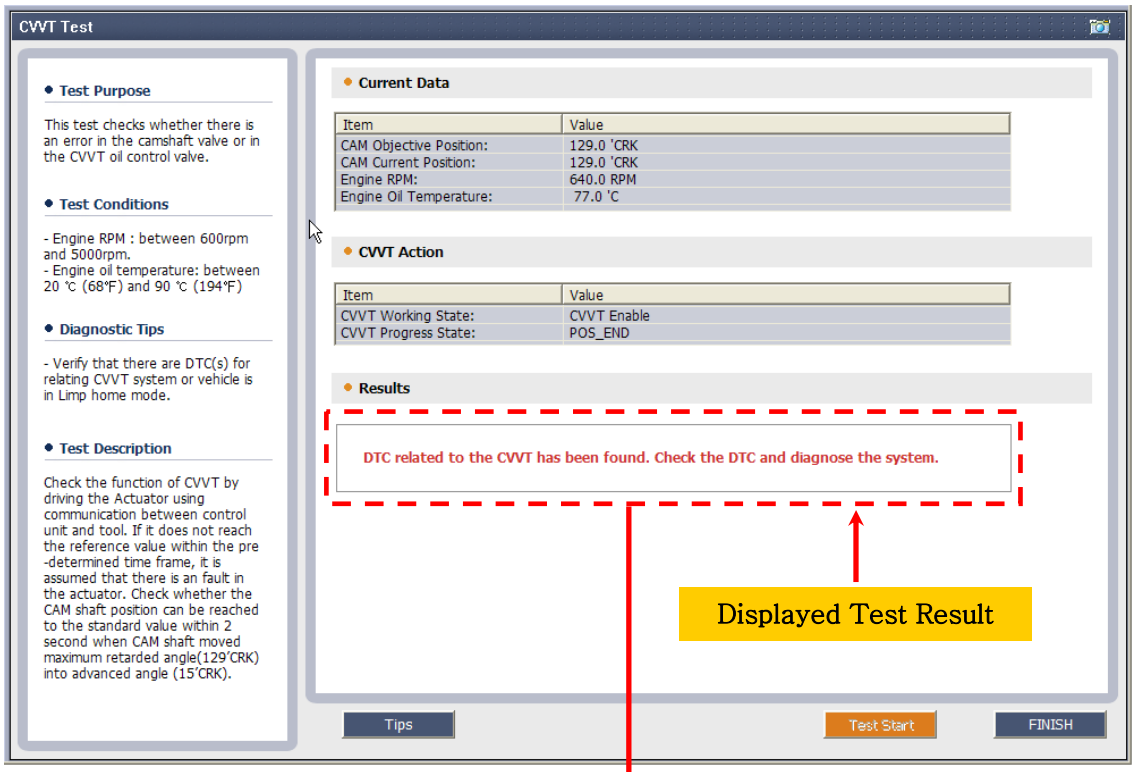
5. Use example

- Normal

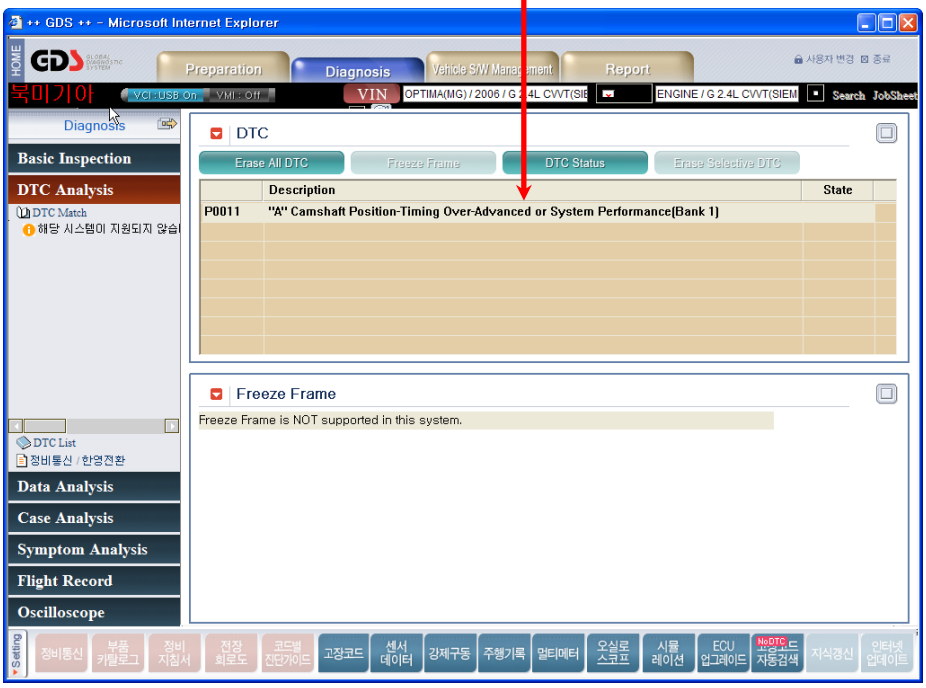


[Figure2. CVVT Test result - Normal]

• Abnormal



[Figure3. CVVT Test result- abnormal]



[Figure4. DTC code shown]

MAF/TPS/ECT Circuit Test

Appendix

1. Purpose

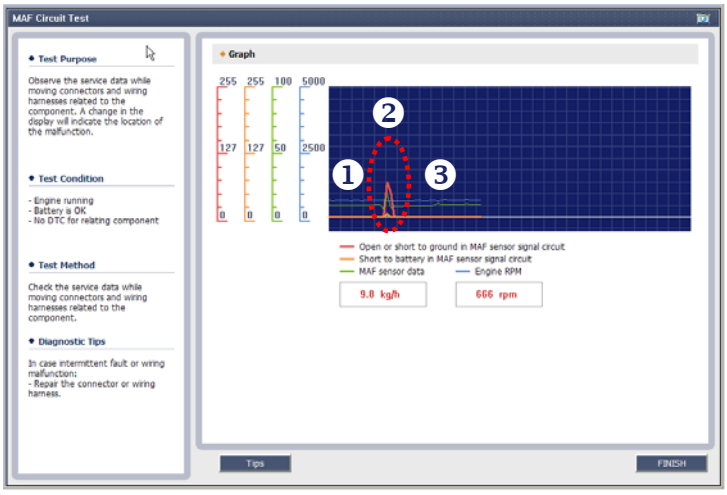
This test mode is used to diagnose the symptoms like engine stalling or intermittent engine shaking possibly caused by the MAF (Mass Air Flow) sensor, which could have an intermittent wiring problem.

2. Logic

It retrieves the error bit from Shadow failure memory and displays the output data in graph form.

3. Method

Press the MAF/TPS/ECT Circuit Test button to enter the Circuit Test mode and then monitor the data continuously. Analyze the graph data to find out possible wrong conditions. A possible problem can be found by monitoring the output signal while shaking the sensor wire or vehicle driving.

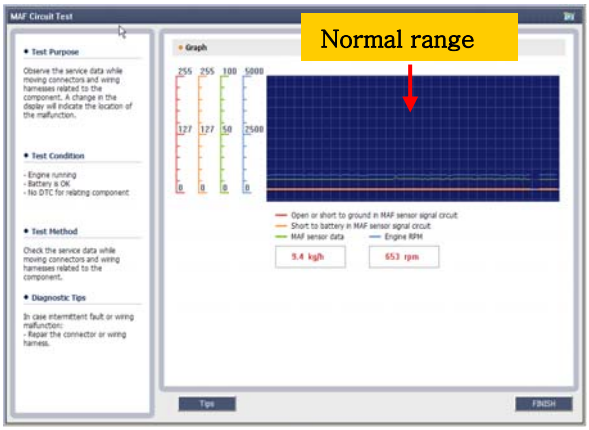


[Figure 1. MAF sensor wiring poor connection test]

1) ❶ : Normal range
2) ❷ : Intermittent disconnection occurrence
3) ❸ : Error bit test reading range

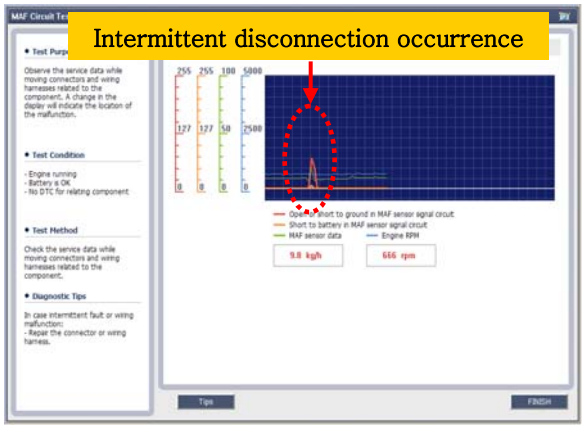
4. Use example

• Normal



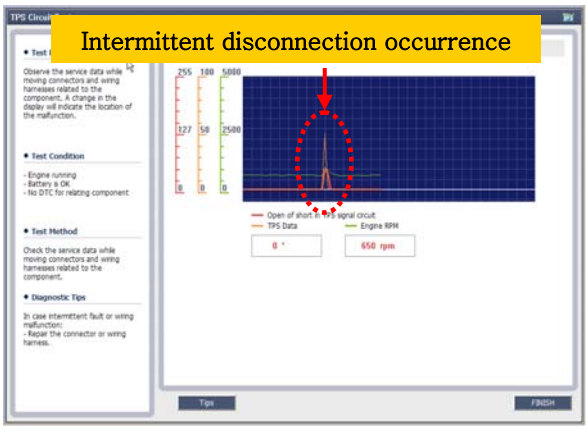
[Figure 2. MAF sensor wiring disconnection test -Normal]

• **Abnormal**

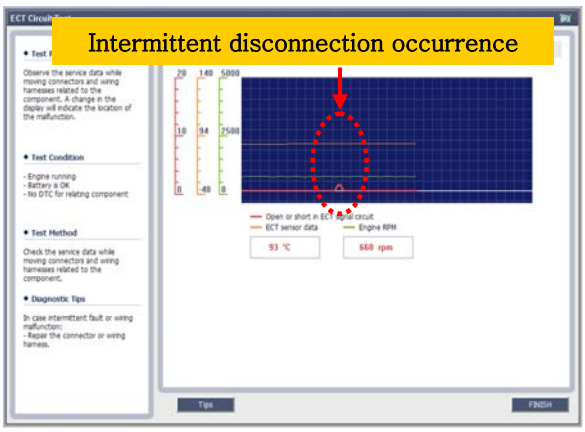


[Figure 3. MAF sensor wiring disconnection test -Abnormal]

※ TPS(Throttle Position Sensor) / ECT(Engine Coolant Temperature) sensor can be tested by Circuit Test Mode as well.



[Figure 4. TPS sensor wiring disconnection test -abnormal]



[Figure 5. ECT sensor wiring disconnection test -abnormal]

EVAP Test

Appendix

1. Purpose

This test mode is used to check the function of evaporative system on vehicles with OBD-Ⅱ, and to make diagnose easier by displaying the test result in a graph form. This Mode is helpful when checking the operation and checking for leakage of EVAP system.

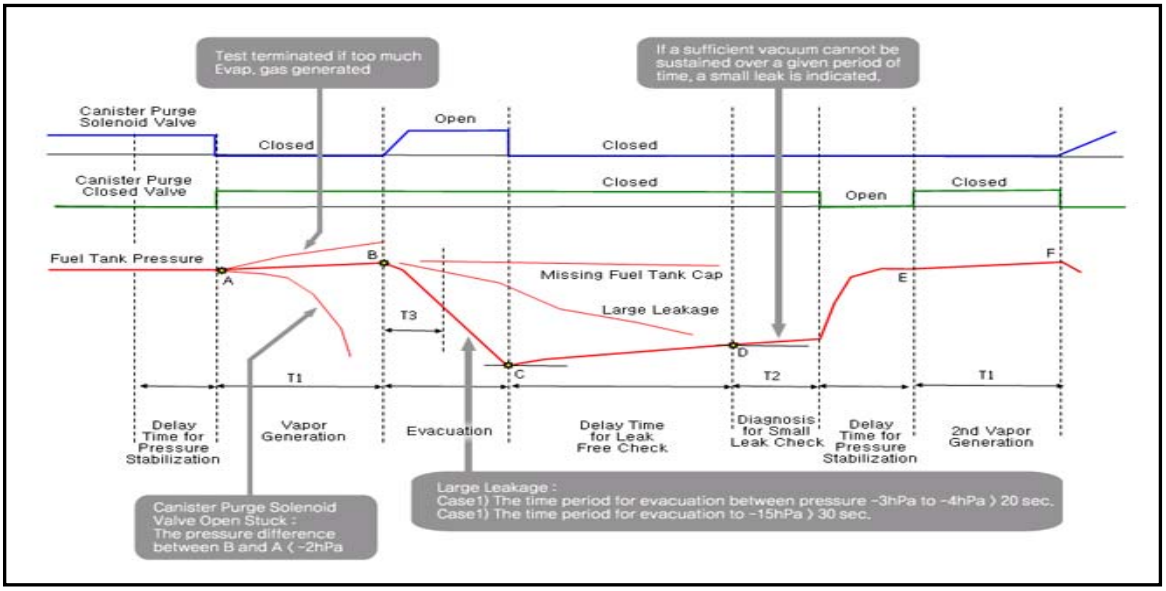
2. Test Logic

The EVAP Test mode is built into the ECU and can be activated by using the GDS. The system monitors the tank pressure sensor while activating the PCSV valve, and Canister close valve.

3. Test Method

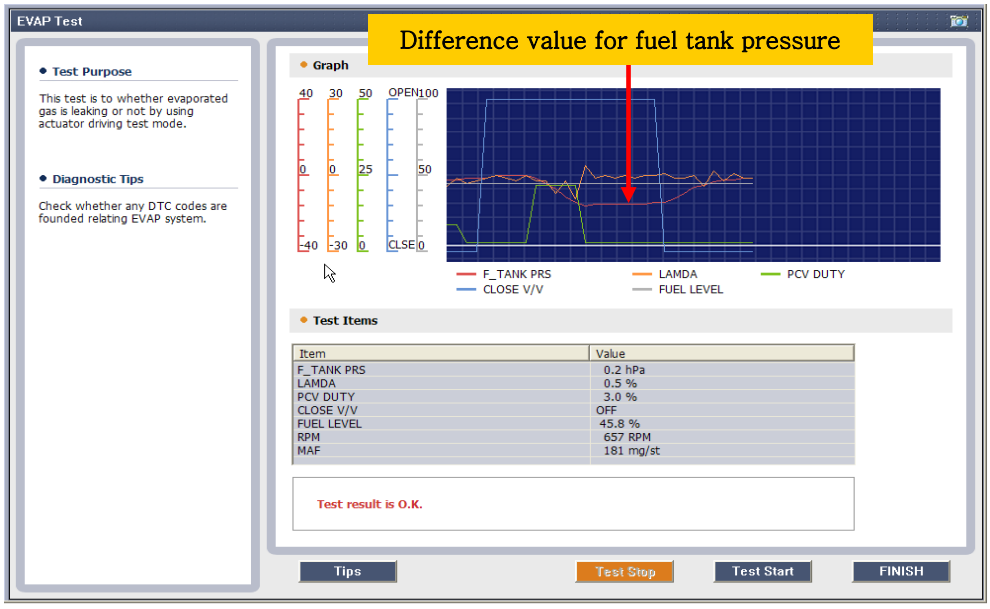
When the "Start" button is pressed, the engine ECU automatically checks the readiness of evaporative system leakage test. If the leakage test is ready, the ECU activates the Canister purge solenoid valve and close valve to make suitable vacuum condition in the fuel tank system at an appropriate time. The ECM monitors the changes in vacuum/ pressure in the fuel tank system within a given time.

The test results will be displayed on the screen and the ECM will generate a DTC if the measured value excess the limit value.



[Figure1. EVAP Monitoring logic]

4. How to judge

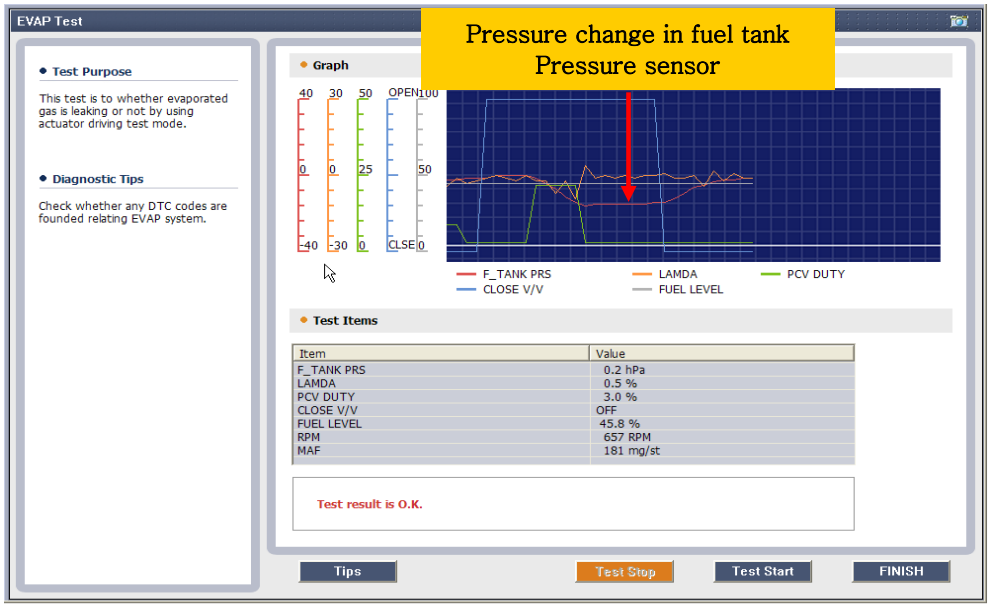


[Figure 2. Screen of testing the EVAP leakage]

- After running the test mode, if there is a leakage, ECU will show the relevant DTC. For more detailed diagnosing, refer to the graph shown in Figure 1.

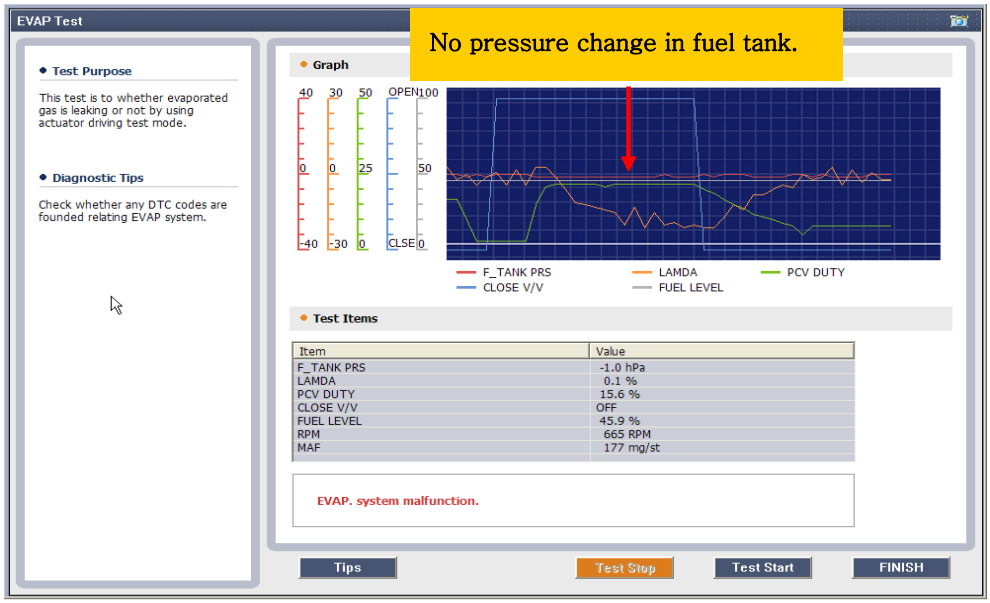
6. Use example

- Normal



[Figure3. Screen of testing EVAP leakage - Normal]

- Abnormal



[Figure4. Screen of testing EVAP leakage - Abnormal]

Belt Timing Test

Appendix

1. Purpose

This test mode is to inspect the position and condition of the timing belt. If the engine has hard starting, engine stall, or engine shaking it can be due to a jumped timing belt, poorly positioned belt or an excessively loosen belt. This test mode can analyze the belt position and condition by comparing signals between CKP sensor and CMP sensor.

2. Test Logic

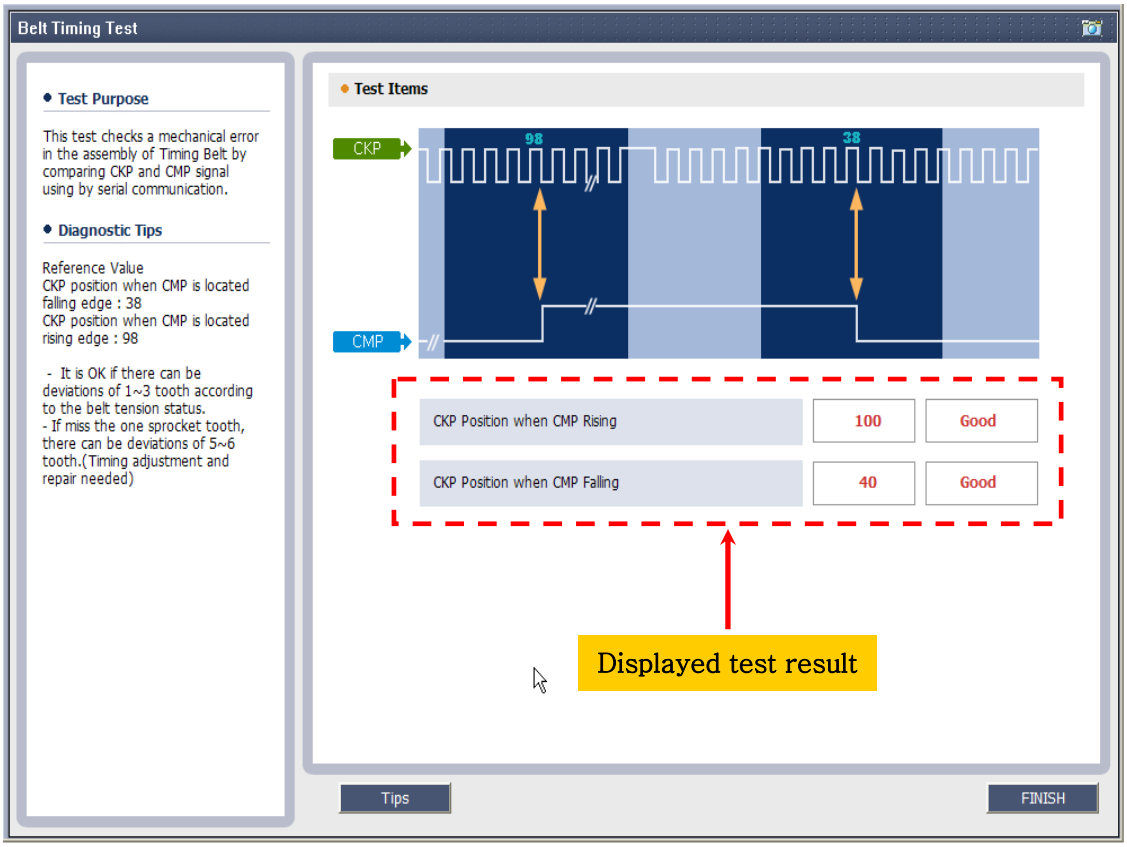
By inspecting the teeth position signal of CKP sensor where the CMP signal is ascending and descending, the assembled timing belt condition can be checked indirectly. (Timing mark for both the camshaft and crankshaft gear should be marked at same location all the time.)

3. Method

If a technician needs to check the belt timing after assembling the engine or replacement of the timing belt, it is possible to check the timing of the belt without disassembling the timing belt cover. It is also possible to find out the correct timing position of belt just by cranking the engine when the engine can not be started.

*** This test mode is only applicable when the signals of CKP/CMP sensor is normal.**

4. How To judge



[Figure1. Screen of testing the Timing Belt]

- By inspecting the teeth position signal of CKP sensor where the CMP signal is ascending and descending, the timing belt position and condition can be checked automatically. (Please refer to the described guide if needed.)

Ignition Test

Appendix

1. Purpose

This mode will test the secondary ignition system including ignition coils, spark plugs, and checks for high-voltage leakage causing engine shaking or poor acceleration.

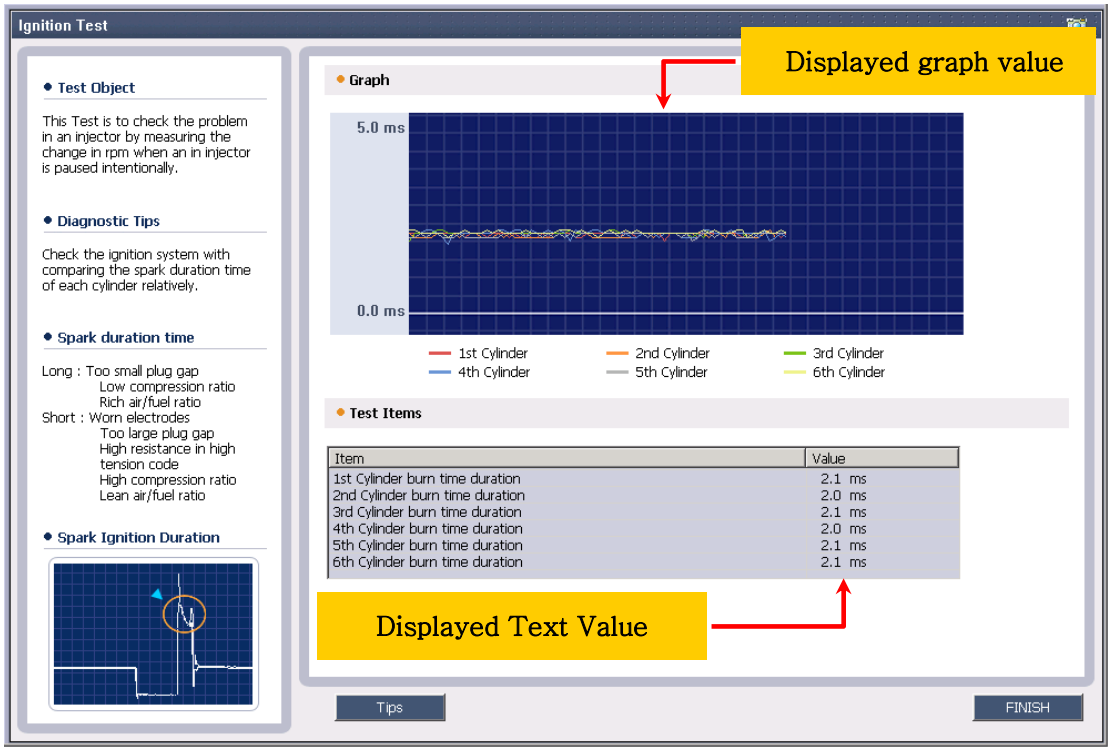
2. Logic

As you know, the energy produced by the ignition coil is dispensed as voltage over time. The higher the voltage demand, the lower the duration of the spark, and visa versa. By monitoring the spark duration we get an indication of the voltage demand of the ignition system. The ignition coils, ignition wires, spark plugs, compression and fuel ratio will all effect the voltage and time of the spark.

3. Method

When the "Ignition Test" mode button is pressed, the spark duration is monitored for each cylinder then displayed both in graph form and text form.

4. How to judge



[Figure 1. Ignition channels Test mode screen]

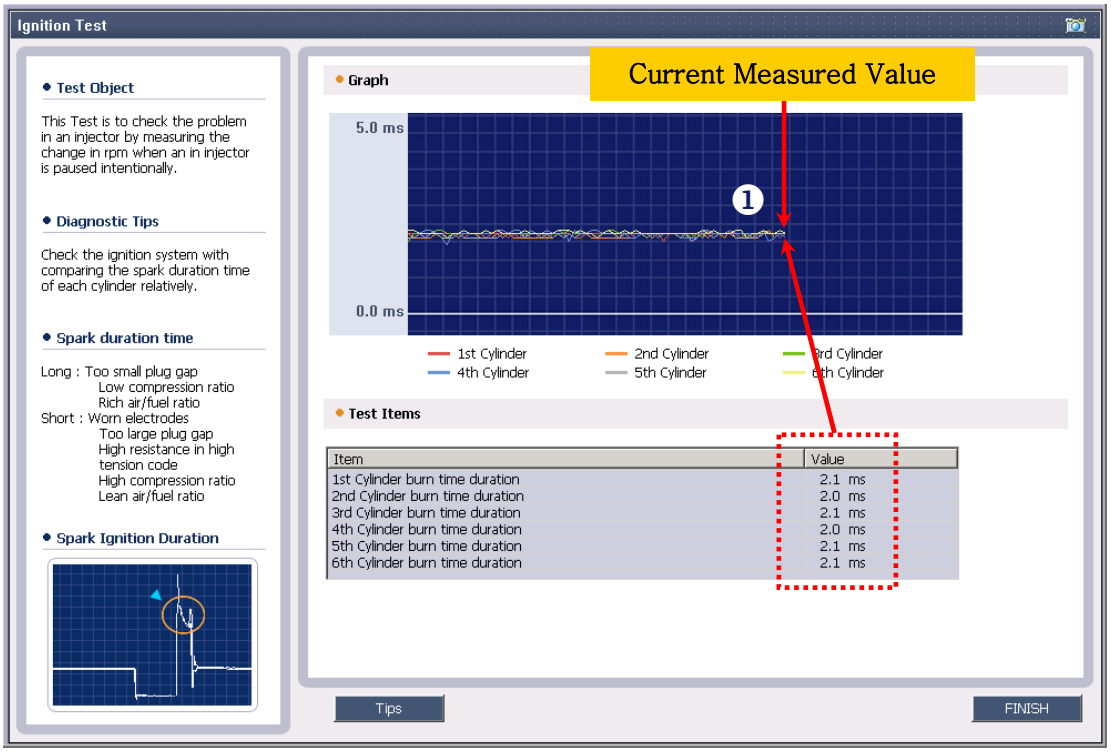
- Duration of all the cylinder's spark can be compared to determine if one or more cylinders are out of the normal. (Refer to the guide on the left side of the main screen for guidance.)

※ Conditions that can be checked with the spark duration (ms)

- ignition coil condition
- High-voltage cable leakage
- Spark plug condition
- Combustion pressure status
- air/fuel mixture status

5. Use example

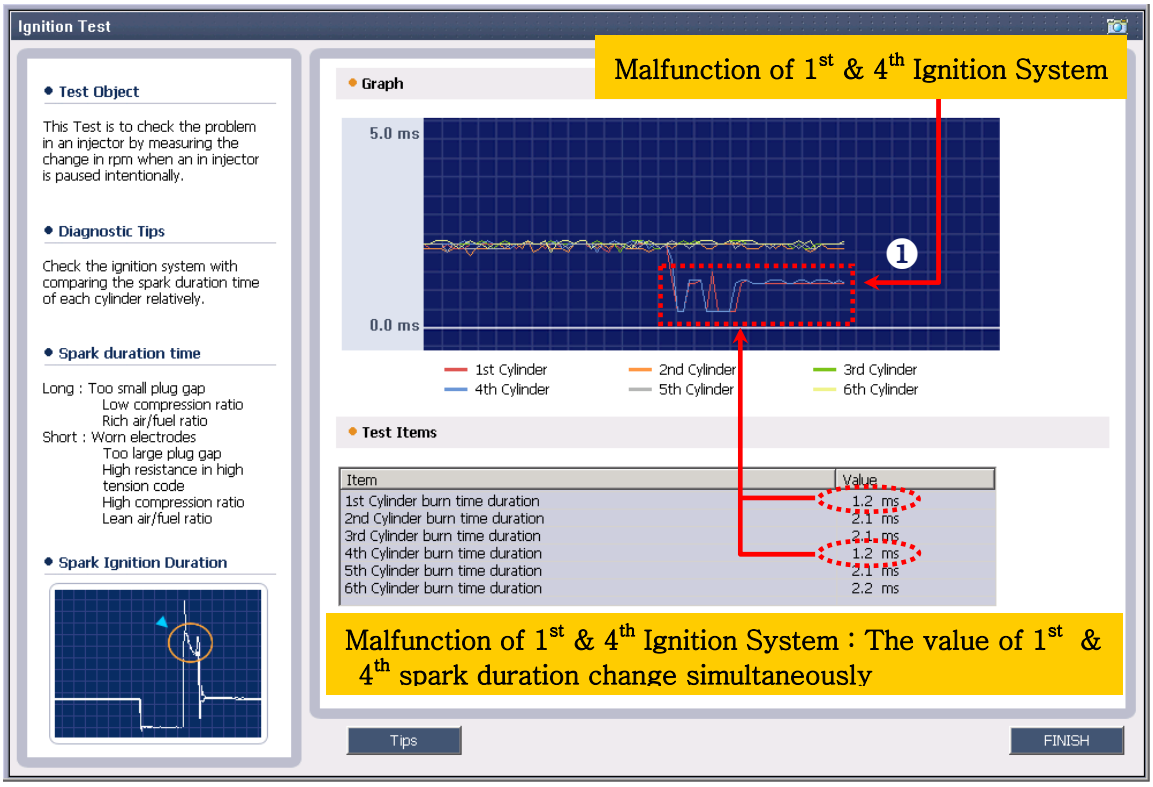
• Normal



[Figure 2. Ignition channels(6cylinders) test mode-normal]

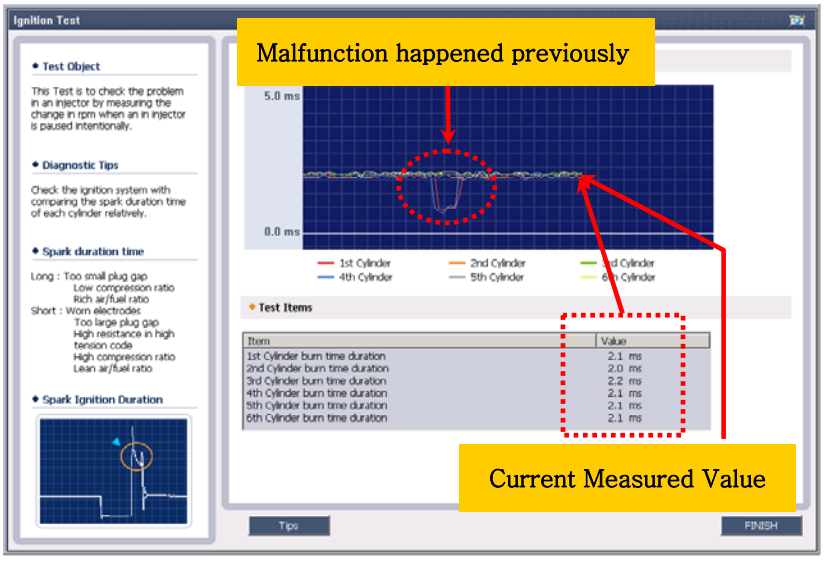
1) ❶ duration for each cylinder shows equal data values. Assumed as normal.

• Abnormal



[Figure 3. Ignition channels(6cylinders) test mode -abnormal]

1) ❶ No. 1 and 4 Cylinders have different data values. Assumed as abnormal.



[Figure 4. Ignition channels(4 cylinders) test mode]

Oxygen Short-trip Test

Appendix

1. Purpose

This mode will test the performance of the O2 sensor(s) by monitoring the reactions of O2 sensor while varying the air/fuel ratio

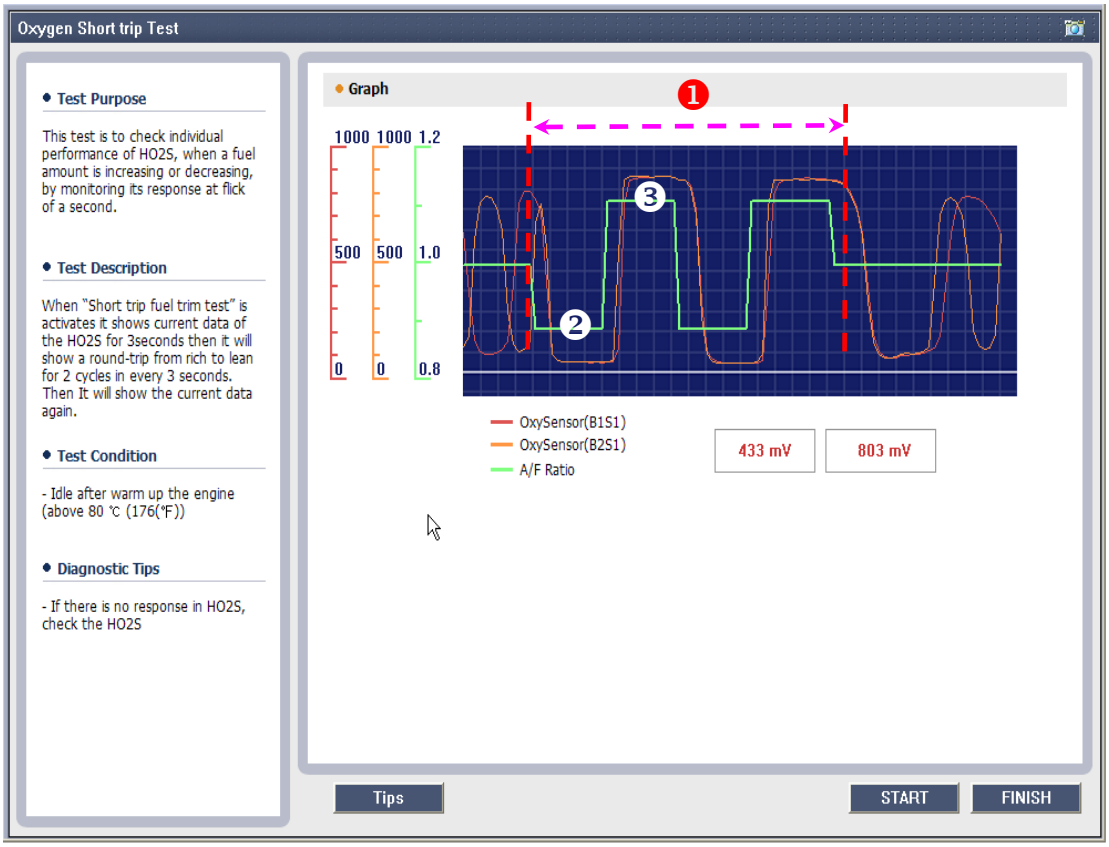
2. Logic

By using the Short Term Fuel Trim function, the ECM will move the fuel mixture rich to lean for 3 seconds while monitoring the O2 sensor signal. The system will display the O2 sensor signal as it reacts to the changes in fuel mixture.

3. Method

When O2 sensor Short-trip test mode is pressed, the reaction of O2 sensor is displayed while the air/fuel amount is varied. The display will show the command to the fuel system to move the mixture rich and lean. Also displayed is the response from the O2 sensor(s) to the changes in the fuel mixture.

4. How to judge



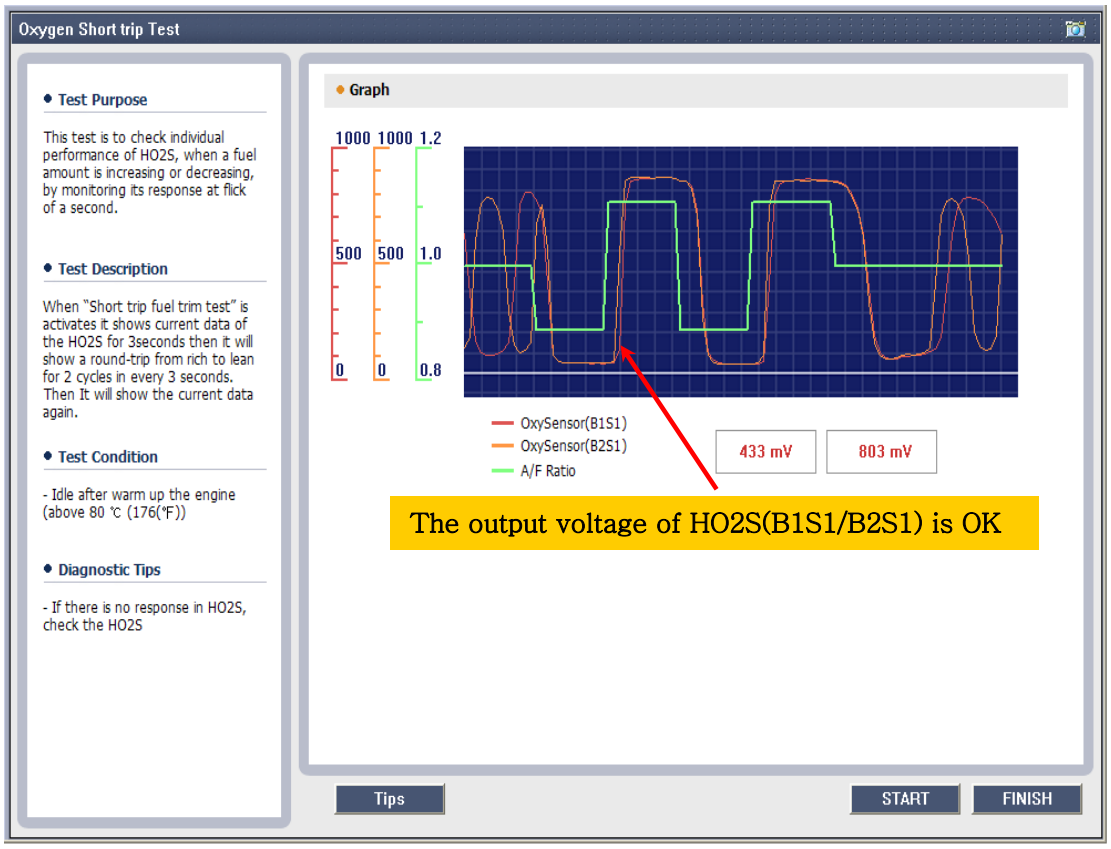
[Figure 1. O2 sensor Short trip]

1) ❶ Section where the fuel was deliberately reduced or increased.
2) ❷ fuel amount deliberately decreased (Air/fuel ratio lean)
3) ❸ fuel amount deliberately increased (Air/fuel ratio rich)

- Check the voltage of the O2 sensor(s) to see that it follows the command of the ECM as the Air/Fuel mixture is changed.
- Reaction in O2 sensor.
  - Air/Fuel ratio (rich): O2 sensor higher voltage signal
  - Air/Fuel ratio (lean): O2 sensor lower voltage signal

5. Use example

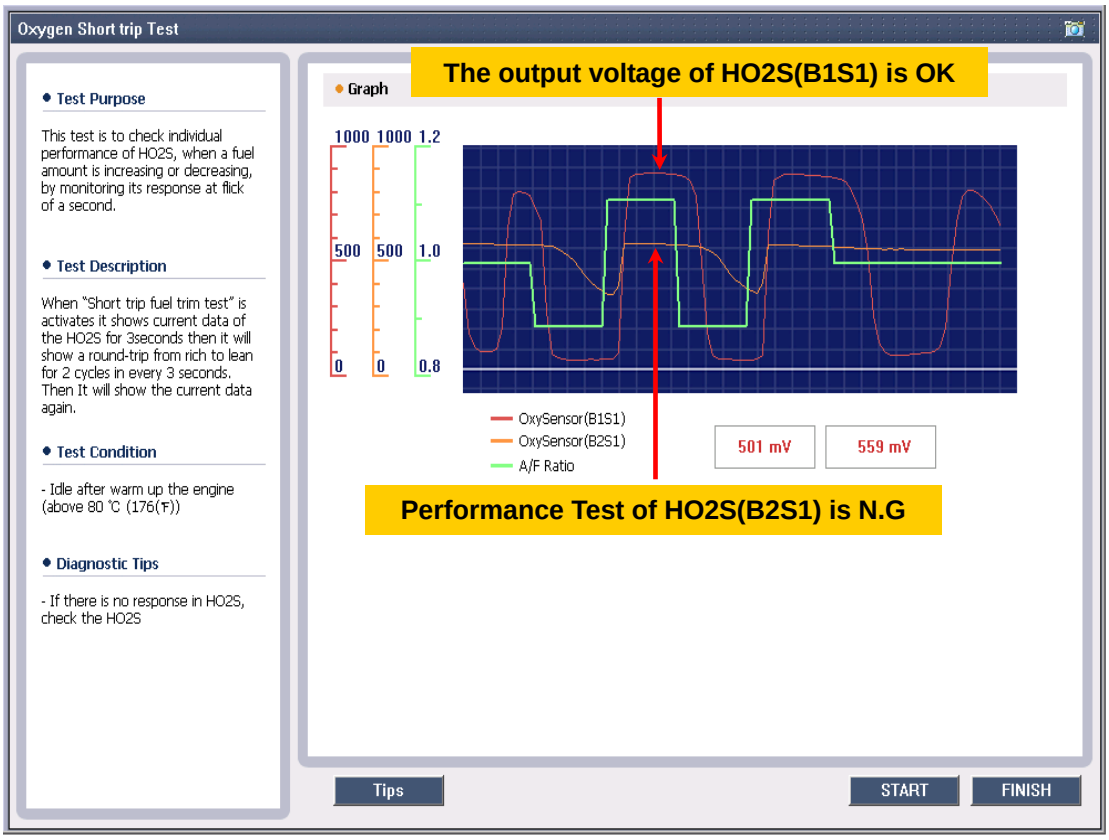
• Normal



[Figure 2. O2 sensor Short trip Test screen - normal]

- The O2 sensor signals follow the lean/rich command of the ECM as the fuel mixture changes.

• Abnormal



[Figure 3. O2 sensor Short trip Test screen - abnormal]

- The one O2 sensor signal does not follow the lean/rich command of the ECM as the fuel mixture changes.

ISA Short-trip Test

Appendix

1. Purpose

This test mode will check the mechanical condition of Idle Speed Actuator (ISA) valve. A malfunctioning Idle Speed Actuator Valve may cause engine shaking, poor idle, or engine stalling.

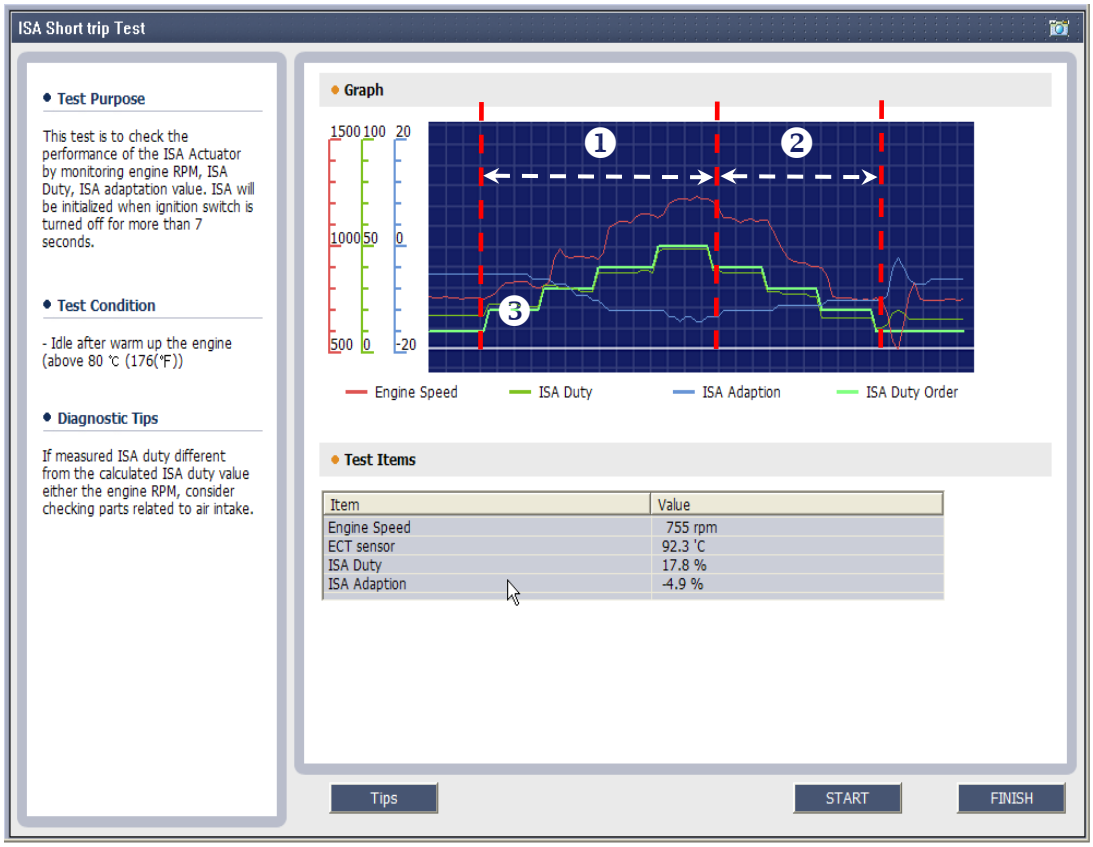
2. Logic

With the engine idling, the GDS performs the ISA Duty control (Short Term Adjustment) function test while monitoring the value changes of engine RPM, ISA duty change, and ISA adaptation at short trip time to check the function of the ISA valve.

3. Method

When ISA Short-trip test mode "Start" button is pressed, GDS automatically varies the duty cycle of the ISA valve and then, displays the changes in data (ISA valve duty change, Engine RPM, ISA adaptation values) in graph form. Users can use the graph data to analyze the functionality of the ISA valve.

4. How to judge



[Figure 1. ISA Short-trip Test]

1) ❶ Range of ISA valve Duty cycle increased
2) ❷ Range of ISA valve Duty cycle decreased
3) ❸ ISA valve commands the Duty to increase or to decrease (Approximately by 10%)

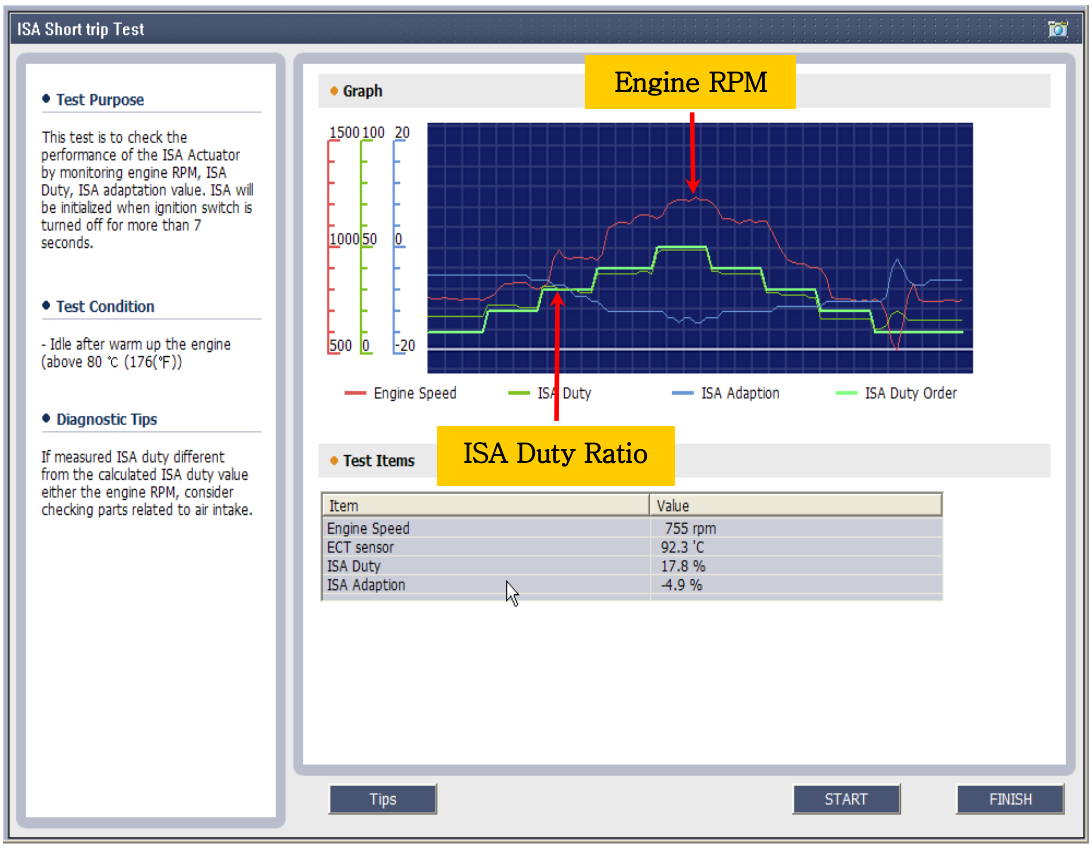
- Check the waveform for engine RPM, which follows the ISA valve duty variation.
  - When ISA valve duty increases: engine RPM increases / ISA adaptation value decreases
  - When ISA valve duty decreases: engine RPM decreases / ISA adaptation value Increases

If the air intake increases, ISA adaptation value is decreased and if the air intake increases, ISA adaptation value is decreased.

The ECU uses the ISA adaptation value to control the basic ISA valve duty values to maintain the engine idling RPM.

5. Use example

• Normal

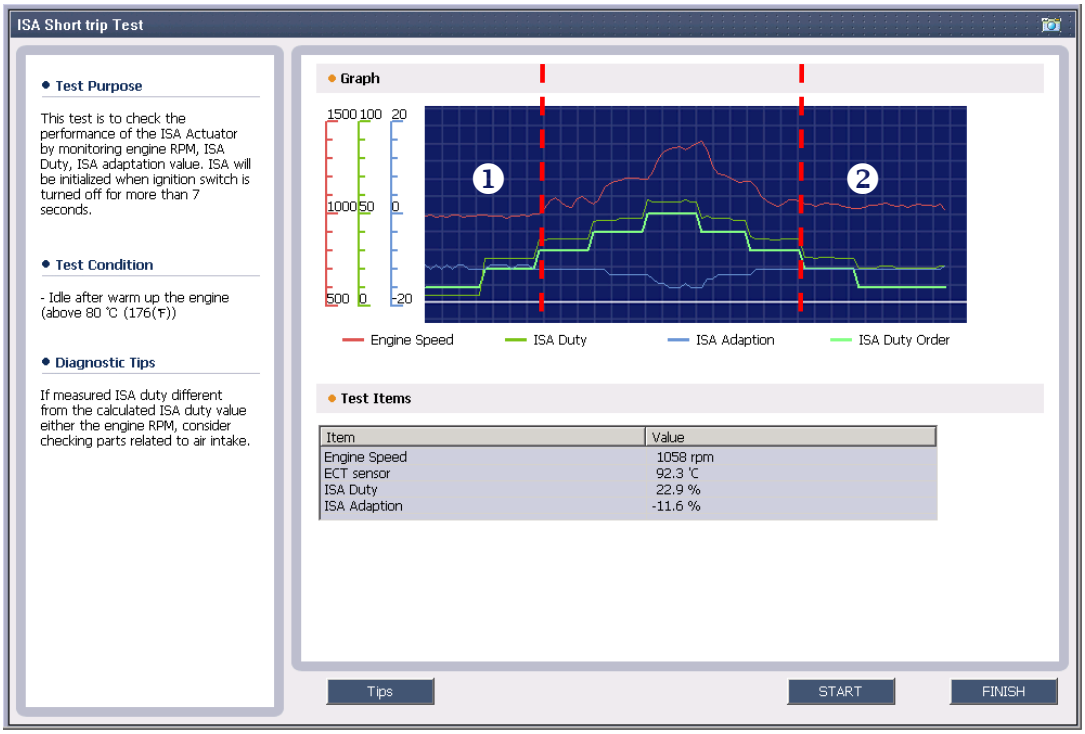


[Figure 2. ISA Short-trip Test screen - Normal]

- Engine RPM varies according to ISA valve variation

  (Check the ISA Actual Duty, RPM and ISA Adaption as compared to the ISA Command Duty.)

• Abnormal



[Figure 3. ISA Short-trip Test screen - abnormal]

- There is no change in engine RPM in ❶and❷ sections.
  (Check for air leakage or ISA valve malfunction at specific operating range)

MAF Short-trip Test

Appendix

1. Purpose

This test mode is to test the MAF (Mass Air Flow) sensor fault. A faulty MAF may cause engine shaking, poor idle, or engine stalling.

2. Logic

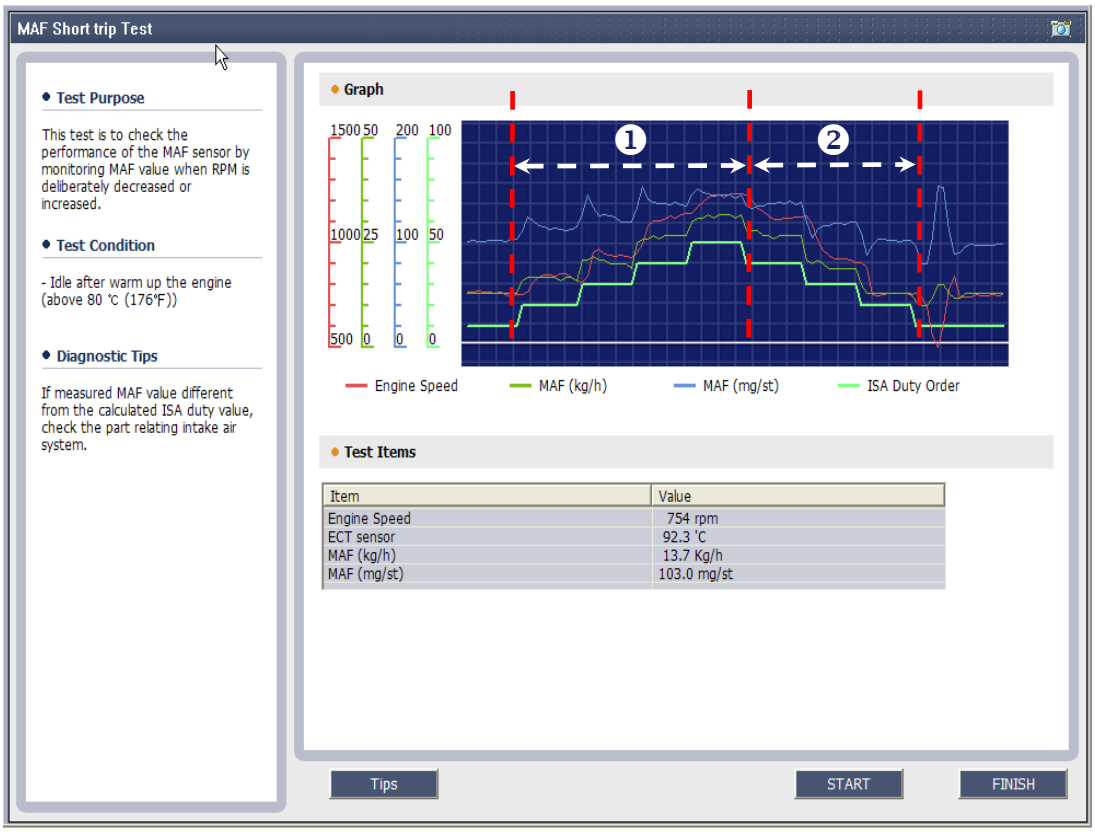
At Engine idling condition, the user monitors the MAF sensor data while varying ISA Duty values by GDS. Users can analyze the MAF sensor data values to determine whether the MAF sensor is malfunctioning.

3. Method

When test button is pressed, GDS automatically varies the ISA duty valve amount and displays the relative data such as ISA duty order, Engine RPM, Air flow (Kg/h), Air flow (mg/st) in graph form. User can analyze the displayed data to check MAF sensor functionality.

- Air flow (Kg/h): MAF (Air intake) intake air measured from the sensor.
- Air flow (mg/st): Maximum intake air for one cylinder per one stroke.

4. How to judge



[Figure 1. MAF Short-trip test]

1) ❶ Range of ISA Duty valve increase

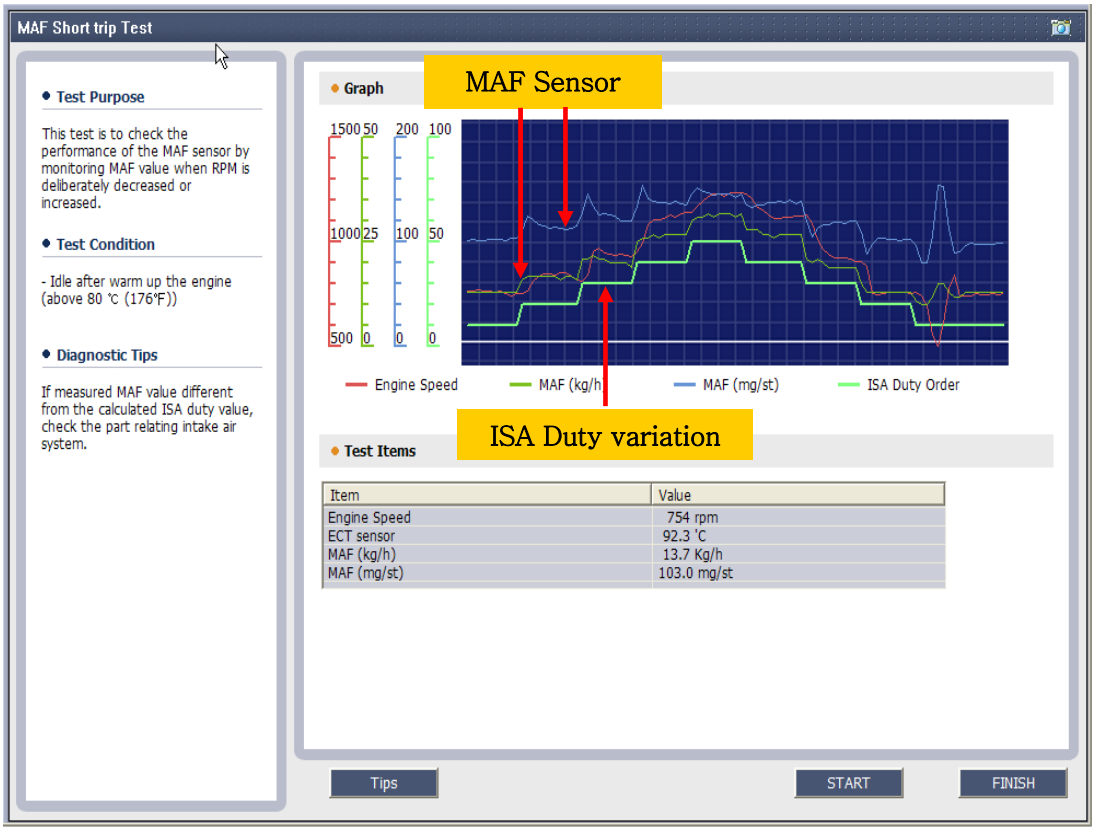
2) ❷ Range of ISA Duty valve decrease

- Check whether there is change in engine RPM when ISA valve duty changes.
  - ISA duty valve increases: engine RPM increases / Air flow increases
  - ISA duty valve decreases: engine RPM decreases / Air flow decreases

※ This test can only be performed when ISA valve functionality is normal.

5. Use example

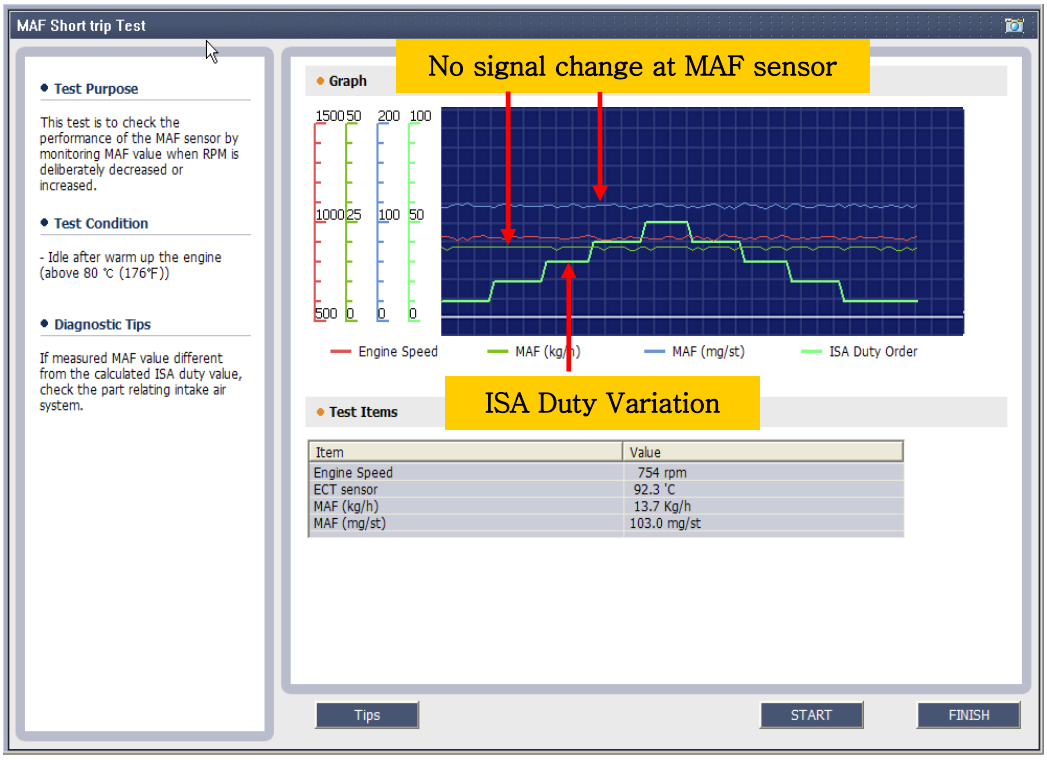
- Normal



[Figure 2. MAF Short-trip test screen -normal]

- MAF sensor data values are changing when ISA valve data values vary.

• Abnormal



[Figure 3. MAF Short-trip test screen - abnormal]

- MAF sensor data values are fixed when ISA valve data values vary.

PCSV Test

Appendix

1. Purpose

This test mode is to check the function of the Purge Control Solenoid Valve (PCSV). A faulty PCSV may cause engine vibration or idle concerns.

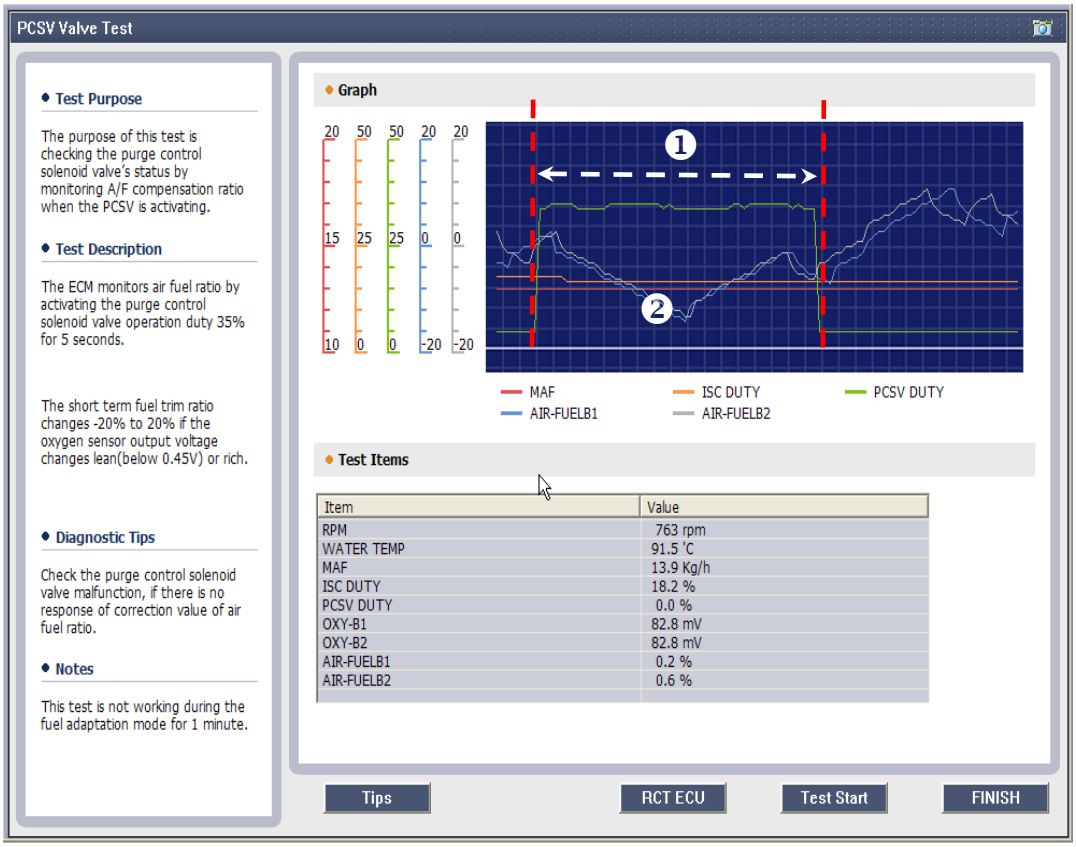
2. Logic

The PCSV duty control (Short Term Adjustment) function operates the PCSV valve to 35% for 5 seconds and then reads the variation in air/fuel ratio correction to diagnose the PCSV valve indirectly in a short period of time.

3. Method

When the PCSV test mode "Start" button is pressed, it automatically operates the PCSV valve then displays the data such as MAF sensor, ISA valve duty, PCSV valve duty, air/fuel ratio correction in graph form. Users can check the functionality of the PCSV valve by analyzing the air/fuel ratio correction (B1/B2).

4. How to judge



[Figure 1. PCSV Test screen]

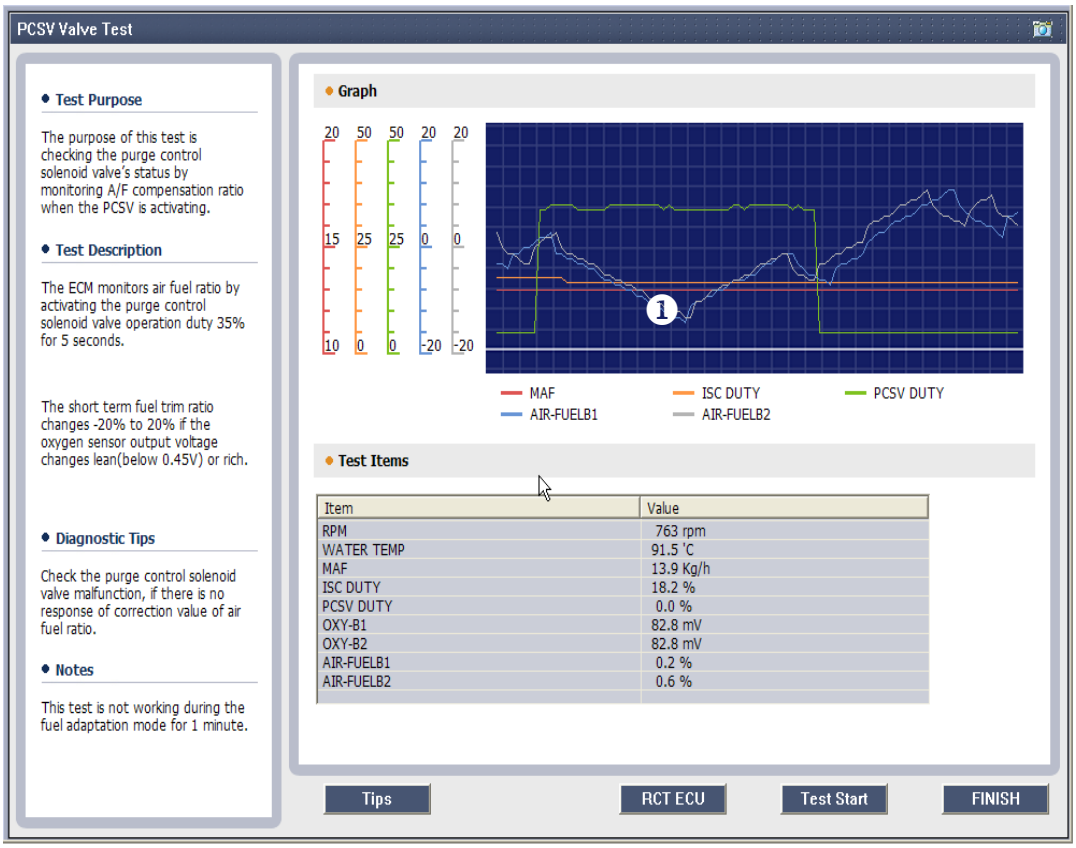
1) ❶ PCSV valve operating range (approximately 35% duty)

2) ❷ Air/fuel ratio correction (B1/B2) change

- In the middle of operating PCSV valve, ±20% of air/fuel ratio correction could be shown depending on the evaporation gas stored in the canister. In other words, there will always be a difference in air/fuel ratio correction when using the Charcoal Canister with evaporative gas. If there is no difference in the air/fuel ratio correction value, the PCSV valve mechanism could be faulty.

5. Use example

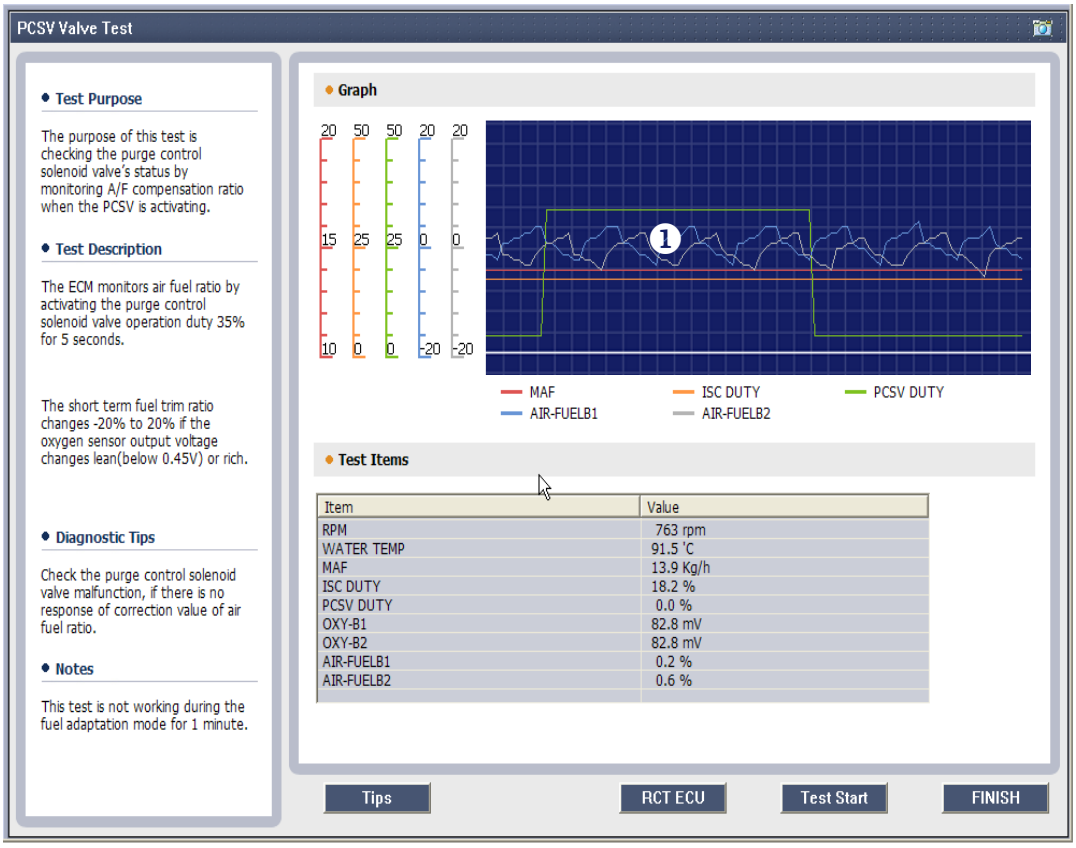
• Normal



[Figure 2. PCSV Test screen -Normal]

1) ❶ Air/fuel ratio correction (B1/B2) is not in a fixed pattern in PCSV valve operating region.

• Abnormal



[Figure 3. PCSV Test screen -Abnormal]

1) ❶ Air/fuel ratio correction (B1/B2) is fixed in PCSV valve operating region. (PCSV faulty)

Idle RPM Control Test

Appendix

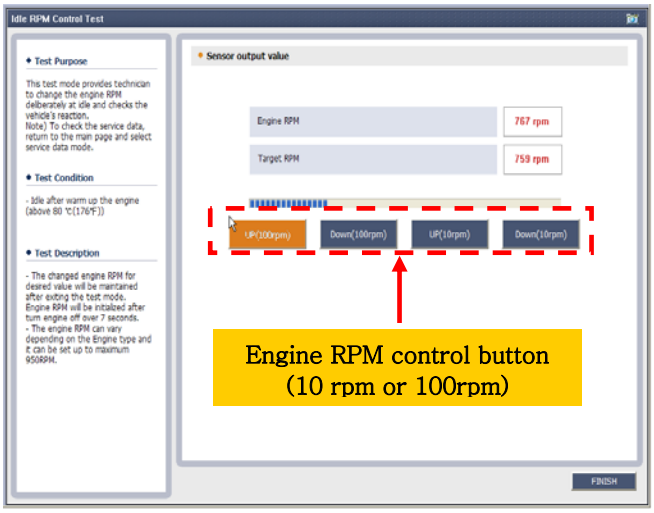
1. Purpose

During the diagnosis process, the user can set the vehicle engine RPM to a certain RPM for testing. This mode enables the user to set the engine RPM at a certain rate. [However, a maximum of 950 RPM (±50) is allowed.]

2 Logic

For certain specific diagnosis, users are able to set the engine RPM at a certain rate.

3. Method



[Figure1. Idle RPM Control Test]

- Depending on the user's purpose, set the engine RPM to a certain rate and then press the "Finish" button.

Use this test mode to perform diagnosis on Actuation test, Sensor data and DTC code with Scan tool or to retrieve some specific vehicle symptoms (such as engine vibration, load compensation). If the user turns the ignition off for 7 seconds after finishing the diagnosis, the engine RPM is automatically reset to its initial RPM.

DTC Back-up Mode

Appendix

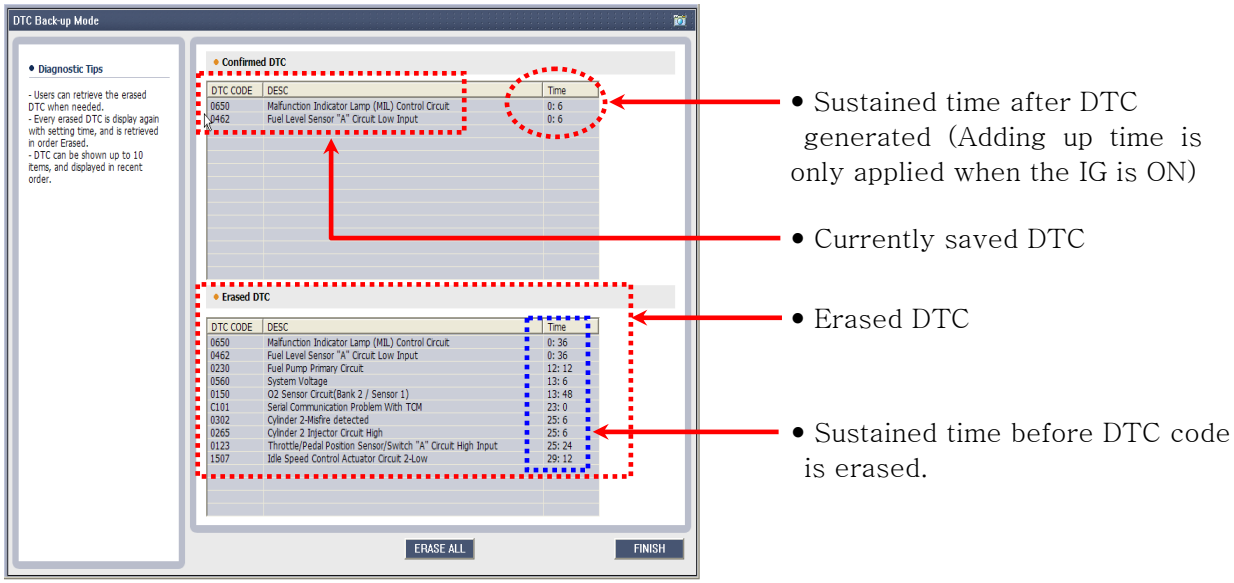
1. Purpose

This test mode retrieves the DTC originally erased by the GDS when it is necessary to know the history of the erased DTC.

2. Test Logic

History DTCs can be retrieved from the ECU Back up Memory for up to a maximum of 10 DTCs. Only the last 10 DTCs are memorized by ECU and the others are permanently erased by ECU.

3. Descriptions



[Figure 1. DTC Back-Up Mode]

- Adding up time is applied only when the" IG ON" is on for more than 5 minutes.

If the "IG ON" is less than 5 minutes, time is not counted.