Doosan Excavator/WheelLoader Monitoring Program User's Guide

Index

1   Start and Settings

◈ Introduction to the DMS program

■ Features

● The Doosan Excavator/Wheel Loader Monitoring Program (also called "DMS-3") offers the following functions by connecting Controller (EPOS or VCU) with the user's IBM PC compatible PC.

1. **Monitoring:** You can monitor the current status of equipment installed with Controller (EPOS or VCU).
2. **Graph Output:** The major excavator/Wheel Loader sensor data will be displayed in a graph format. The data can be saved in the hard disk. You can check the excavator/Wheel Loader's performance through data comparison and analysis.
3. **Force Operation:** You can use vehicle diagnosis by forcing Controller (EPOS or VCU) outputs.
4. **Diagnosis:** You can check the real-time and past malfunction history maintained by Controller (EPOS or VCU).
5. **History Data:** You can analyze the work patterns when using an excavator/Wheel Loader, by checking the operation hours, filter/oil information, and daily operation information.

■ Hardware connection

● A separate communication cable is required to establish communication between Controller (EPOS or VCU). and external PC. The communication cable should be connected to the excavator/Wheel Loader's maintenance connector and user PC's Serial port.

Note) Please turn the excavator/Wheel Loader power off, when connecting/disconnecting the cable.

■ Program Menu

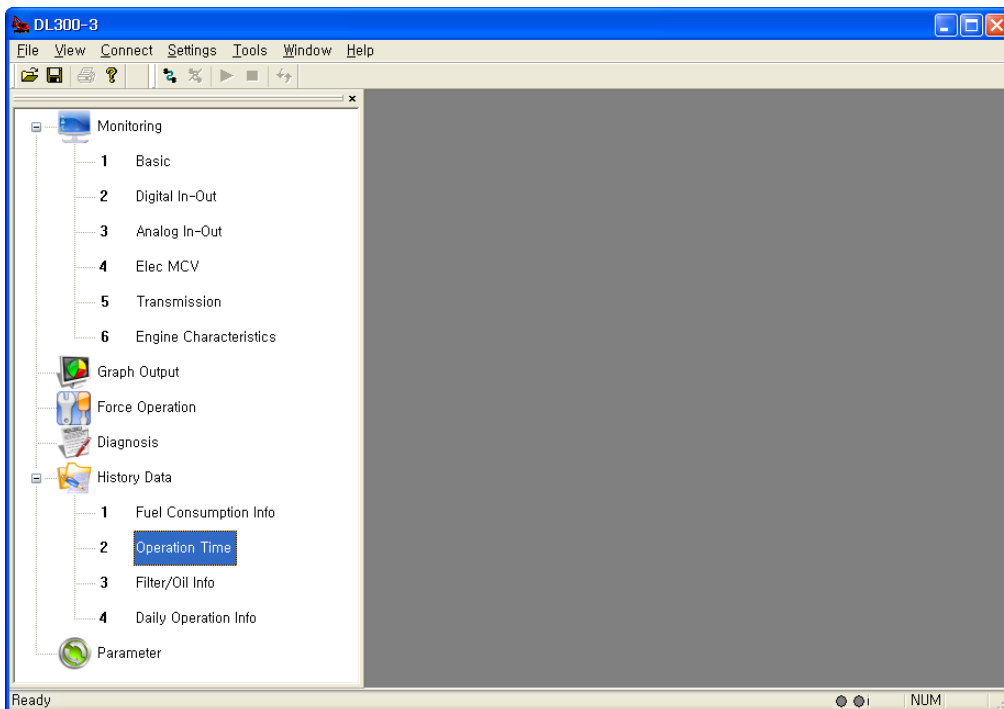● DMS is mainly composed of the following menus.

<Excavator>

<Wheel Loader>
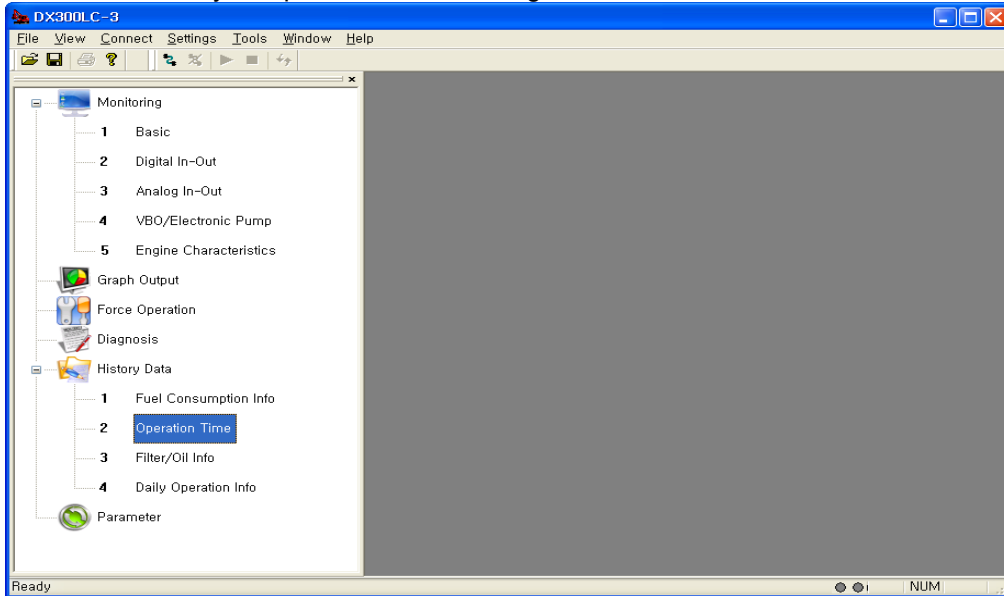
1. **File:** Open, Close, Save, Save As, Change Model, Page setup, Print, Recent File, and Exit.
2. **View:** Monitoring, Graph Output, Force Operation, Diagnosis, History Management, Parameter, Work Window, Toolbar, Status bar.
3. **Connect:** Connect, Disconnect, Start Monitoring, Stop Monitoring, Vehicle Information.

4. **Settings:** Units and Language.
5. **Tools:** Download Program and Download Wheel Loader Parameter Map, Expert mode, VBO Diagnostic tools, Password Initialization.
6. **Window:** Cascade, Tile, Arrange Icon, and Close All
7. **Help:** Help, About..

◈ The DMS-3 program support the following excavator and wheel loader models.

- Excavator

No	Model name
1	DX140LC-3
2	DX140LCR-3
3	DX140W-3
4	DX170W-3
5	DX180LC-3
6	DX190W-3
7	DX210W-3
8	DX210LCR-3
9	DX225LC-3
10	DX255LC-3
11	DX300LC-3
12	DX340LC-3
13	DX350LC-3
14	DX380LC-3
15	DX420LC-3
16	DX490LC-3
17	DX700LC-3

- Wheel loader

No	Model name
1	DL200-3
2	DL250-3
3	DL300-3
4	DL350-3
5	DL400-3
6	DL450-3
7	DL550-3

2 Installation

◈ Program installation (PC installation)

■ Recommended System

- OS: IBM compatible PC (Windows XP Over)

- Processor: Pentium III 800MHZ Over

- Memory: 256MB Over

■ **Installing the program**

● You can install the DMS monitoring program automatically by executing "**DMSSetup.msi**".
If the monitoring screen or graph display screen is not displayed normally after installation,
please refer to the following manual installation method.

1. Double click the "**DMSSetup.msi**" file.

2. Click [Next] when the "DMS Installation Wizard" popup window appears.

3. Select the DMS installation folder and click [Next].
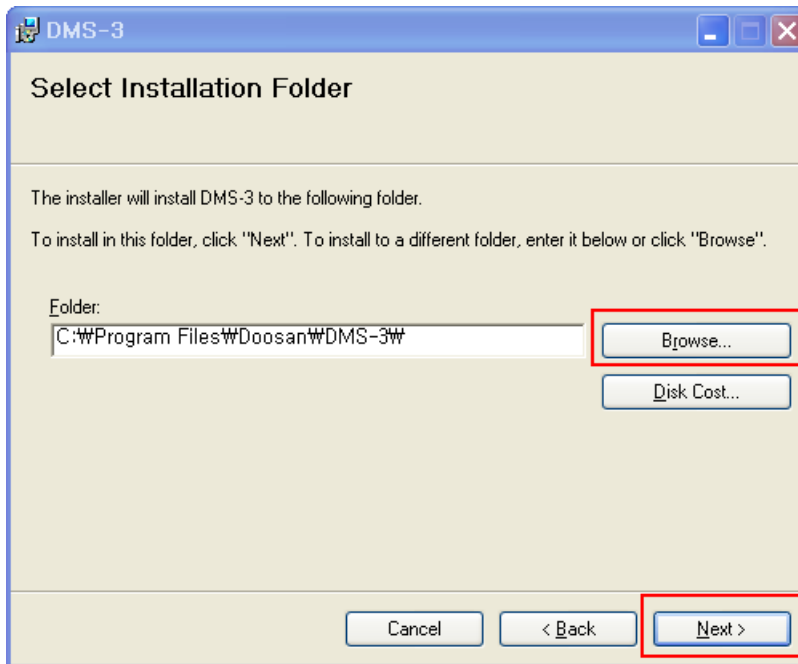
4. Click [Next], if you're ready to install DMS.

Note) If you want to stop installation in the middle, you have to click [Close] and start installation again.

5. Click [Close] when DMS is installed successfully.

6. Open the DMS installation folder and click the "**DMS-3.exe**" file.

3 Menu

3.1 File

◆ This section describes the "File" menu of the DMS program.

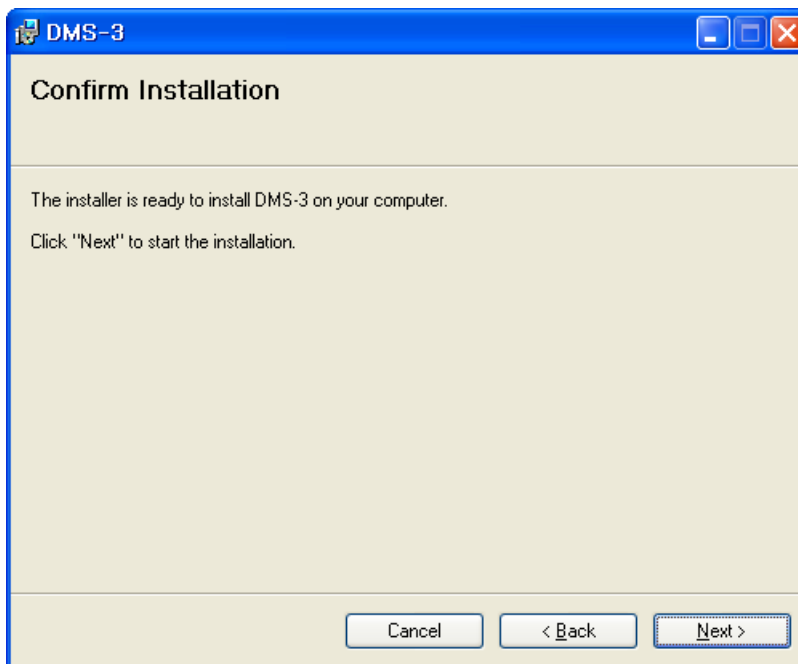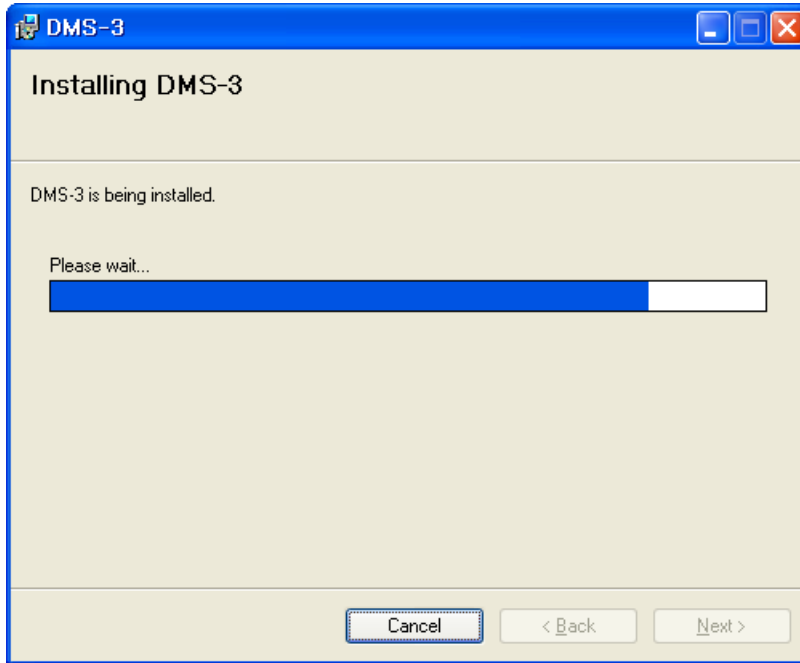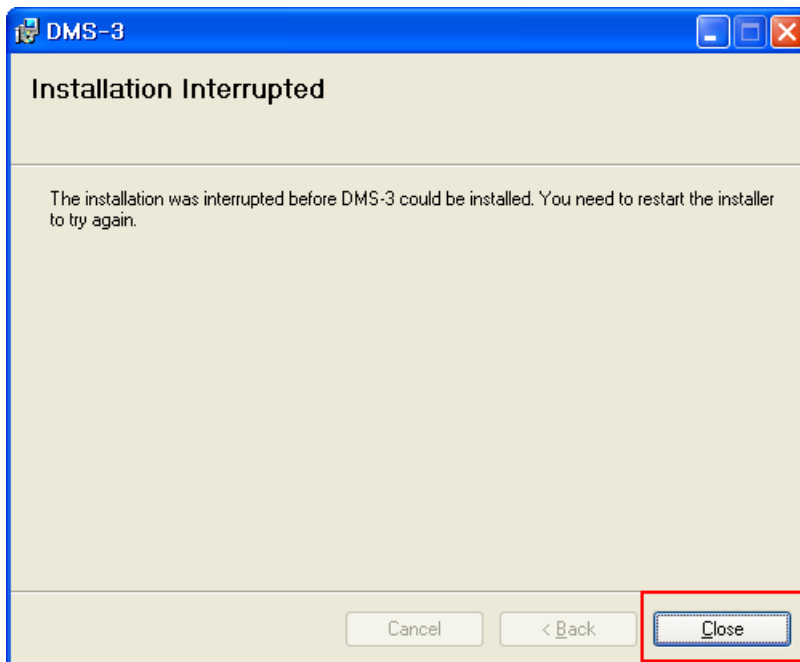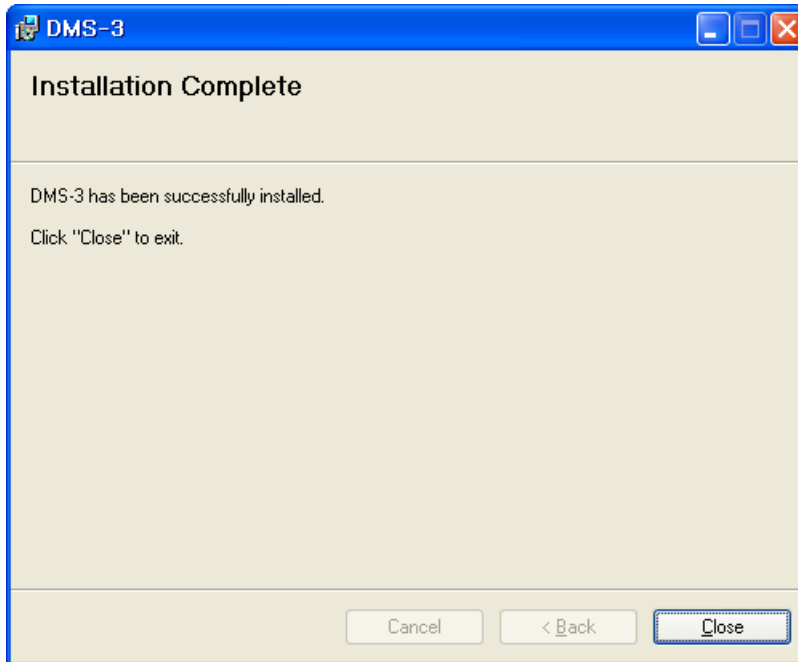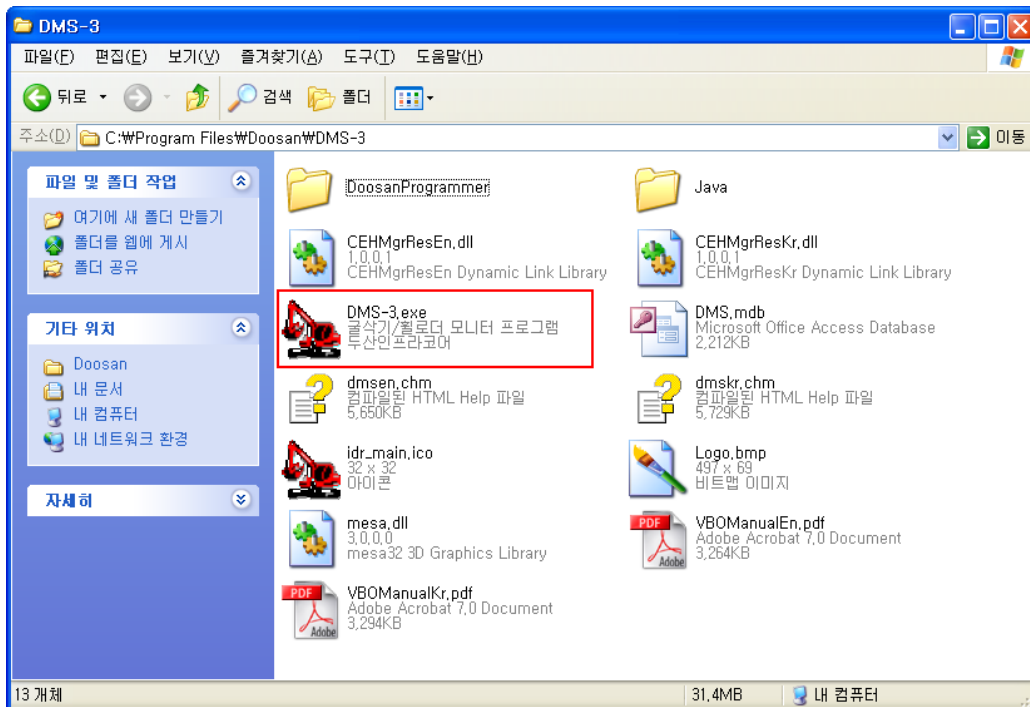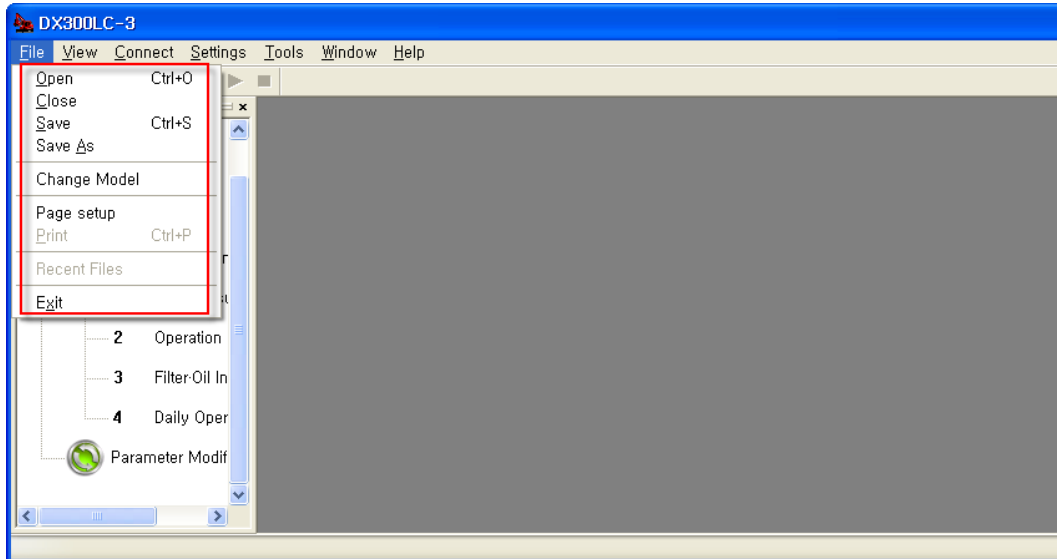### ■ Open...<Ctrl+O(O)>

1. Use this menu to open the saved file.
2. Select **[File] – [Open]**.
3. When the [**Open**] dialog box appears, select a drive or folder that contains the target file in "Find in".
4. Select a file from the "Open File" dialog box.
5. Click the [**Open**] button to open the selected file.
6. ⬚ is the shortcut icon and the file extension is **(*.ddms)**.

■ Close (C)

1. Use this menu to close the monitoring window on the DMS program screen.
2. Select **[File] – [Close]**.
3. All windows on the DMS screen will be closed at a time.

■ Save <Ctrl+S(S)>

1. Use this menu to save the monitoring window on the DMS program window.
2. Select **[File] – [Save]**.
3. Select a folder to save a file.
4. Input the name of the file to save in the **[File name]** field and click the **[Save]** button.
5. ⬚ is the shortcut icon and the file extension is **(*.ddms)**.

■ Save As (A)...

1. Use this menu to save the monitoring window on the DMS program window, using the different file name
2. When the **[Save As]** dialog box appears, specify a drive or folder to save a file in **[Save in]**.
3. Input the name of the file to save in the **[File name]** field and click the **[Save]** button.

■ Change Model

1. Use this function to change the model that is being monitored on the DMS program window.
2. Select **[File] – [Change Model]**.
3. Select the model from the "Select Model" dialog box.
4. You can see that the changed model name is displayed on the DMS program caption bar.
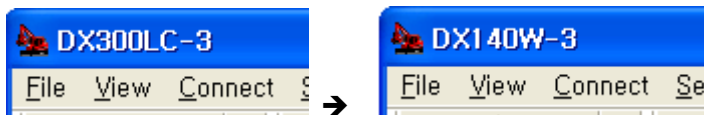
ex,) DX300LC −3   →   DX140W−3

Note)
1. You need to close and open the monitoring window again to see the changed model name.
2. If connected to the vehicle, the vehicle model name will be set automatically.

■ Print Settings
1. When you set the printer and paper size to print and use.
2. Select **[File - Print Setup]**
3. Used to set the printer and paper size.

■ Print
1. DMS has been monitoring the window screen number is used to print
2. Select **[File – Print]**
3. DMS has been monitoring the window screen is output.

■ the most recently used files
1. Displays recently used files

■ Exit (X)

1. Use this menu to close the DMS program.
2. Select **[File] – [Exit]**.
3. All opened windows on the DMS program screen will be closed, and the DMS program will be terminated.

3.2 View

◈ This section describes the [View] menu of the DMS program.
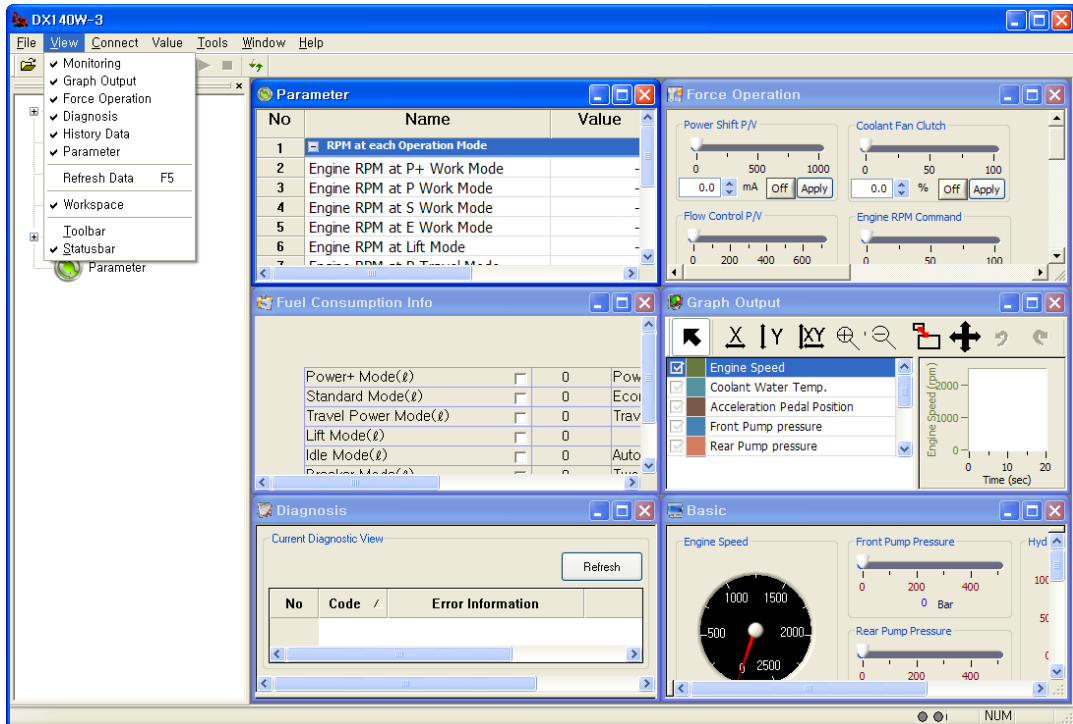
■ Monitoring

1. Select **[View] - [Monitoring]**.
2. The [**Basic**] window will appear on the DMS screen.

■ Logging Data

1. Select **[View] - [Monitoring]**.
2. The **[Graph Output]** window will appear on the DMS screen.

■ Force Operation

1. Select **[View] - [Force Operation]**.
2. The **[Force Operation]** window will appear on the DMS screen.

■ Diagnosis

1. Select **[View] - [Diagnosis]**.
2. The **[Diagnosis]** window will appear on the DMS screen.

■ History

1. Select **[View] - [History]**.
2. The **[Fuel Consumption Info.]** window will appear on the DMS screen.
3. When the history window appears on the DMS screen, select **[View]** – **[Refresh]** or use

   the shortcut icon [icon] to update the history data.

■ Parameter

1. Select [View] - [Parameter].
2. The [Parameter Modification] window will appear on the DMS screen.

■ Status Bar

1. The red LED will flash when monitoring begins.

2. The red LED will be turned off when monitoring stops.

3.3 Connect

◈ The correct data should be entered for communication, in order to synchronize with DMS-3 program, which enables the user to check the characteristics of the vehicle, with the vehicle controller (EPOS/VCU).
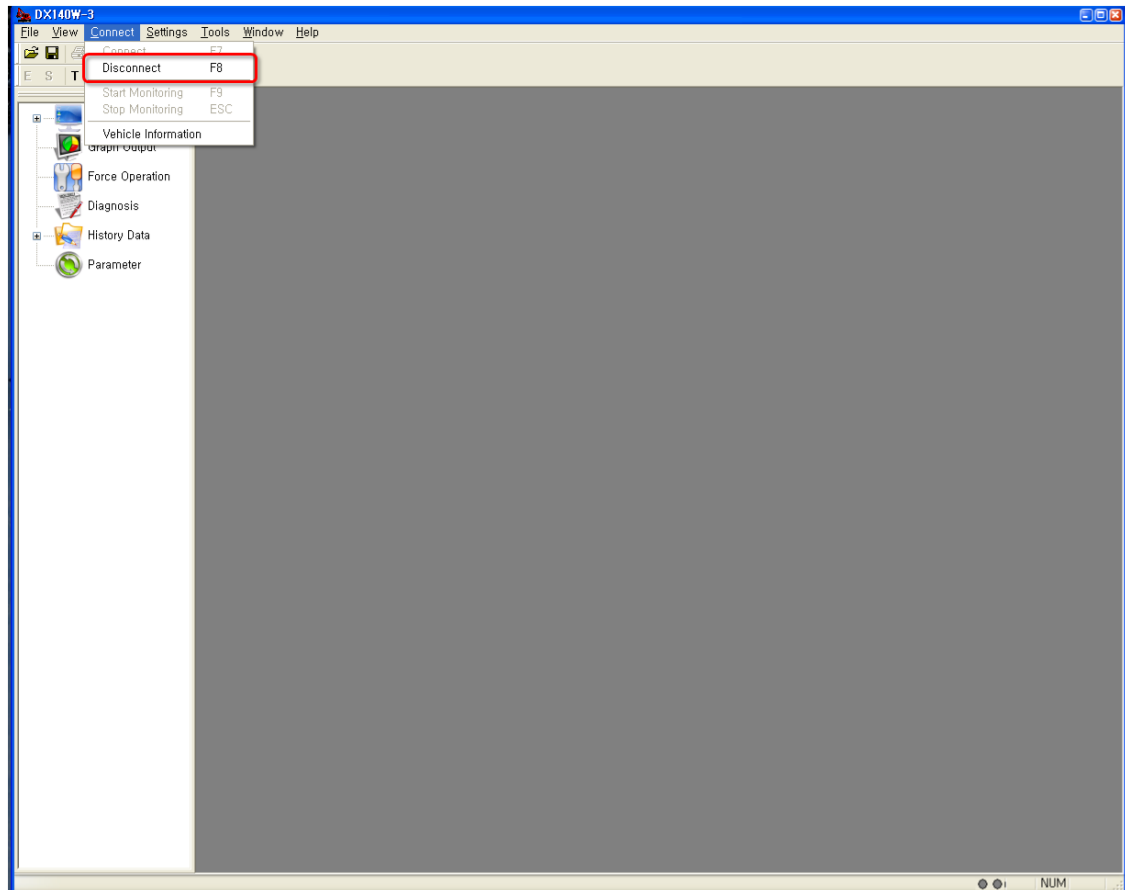
■ Connect

1. Select **[Connect - Connect]**.
Note) Please check the port number of the PC in question, when setting the connection port (P).
◆ Check port

- Check Port to be used on port entry of PC's Device Manager.
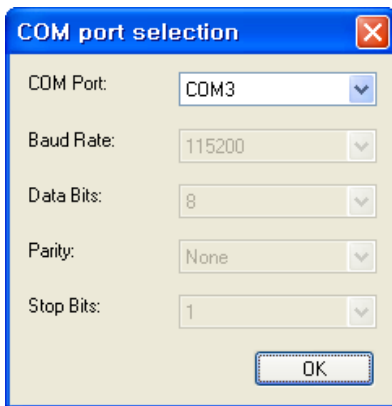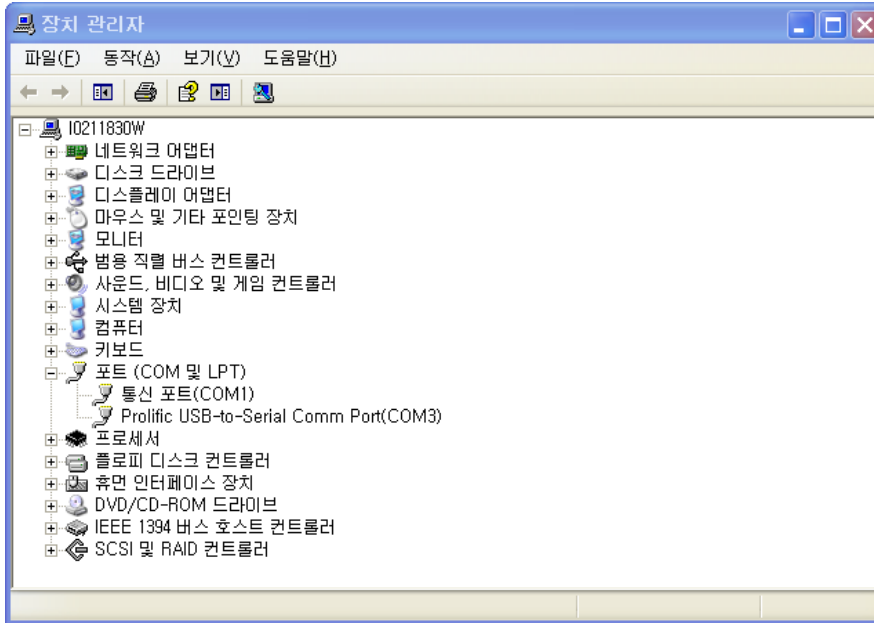
2. Set the COM port as shown above and click [OK] to establish communication with equipment.

Shortcut icon	

■ Disconnect

1. Select **[Connect - Disconnect]**.

Shortcut icon	
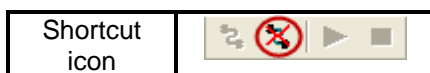
■ Start monitoring

1. Select **[Connect – Start monitoring]**.

Shortcut icon	

■ Stop monitoring

1. Select **[Connect – Stop monitoring]**.

Shortcut icon	

3.4 Settings

◈ This section describes "Setting" menu of the DMS program.
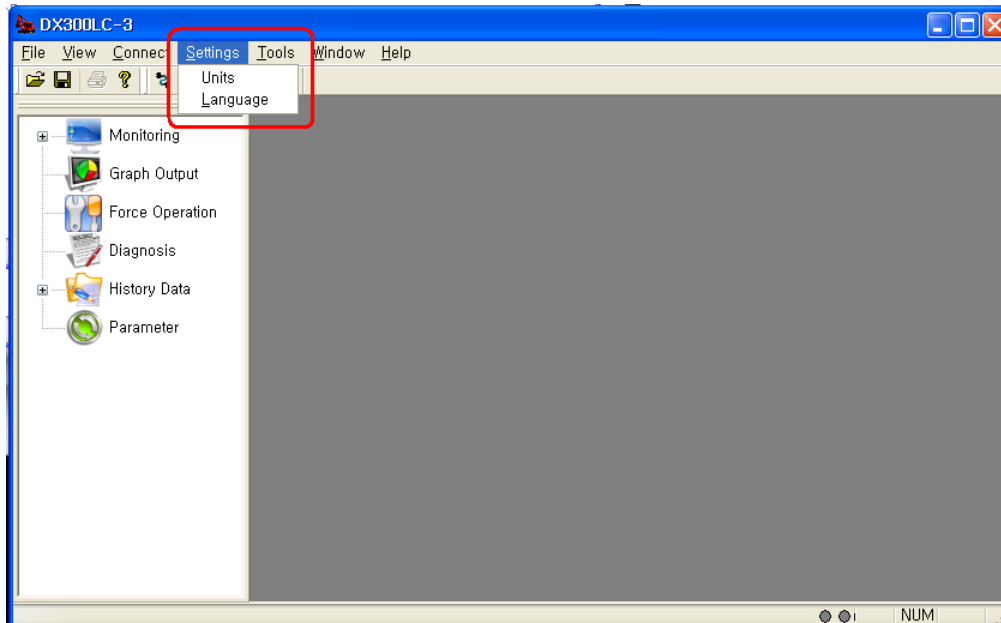
■ Units (U)

● A different unit can be used for the temperature and pressure excavator/wheel loader sensor data, depending on the location. You can set the unit you want on this screen.

1. Select **[Setting] - [Units]**.
2. Set the proper unit for pressure and temperature.
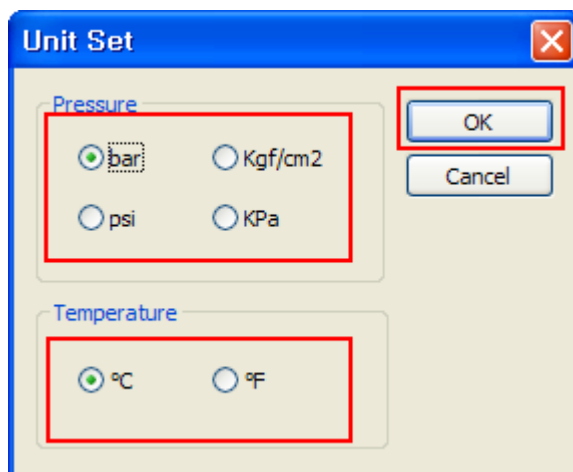
3. Click [OK] to apply settings.
4. Sensor values will be displayed after conversion, using the unit selected here.

■ Language (L)

● This program supports English and Korean. You can select your preferred language on this screen.

1. Select **[Setting] - [Language]**.
2. Select Korean or English.
3. Click the [OK] button to apply setting.

NOTE) The selected language will be applied when the program is re-started.
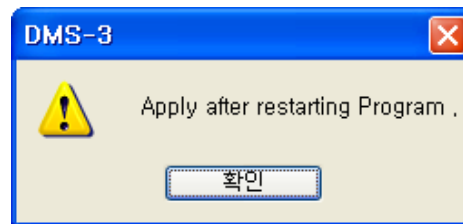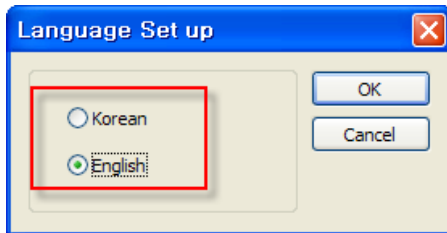
3.5 Tools

◈ This section describes the [Tools] menu of the DMS program.
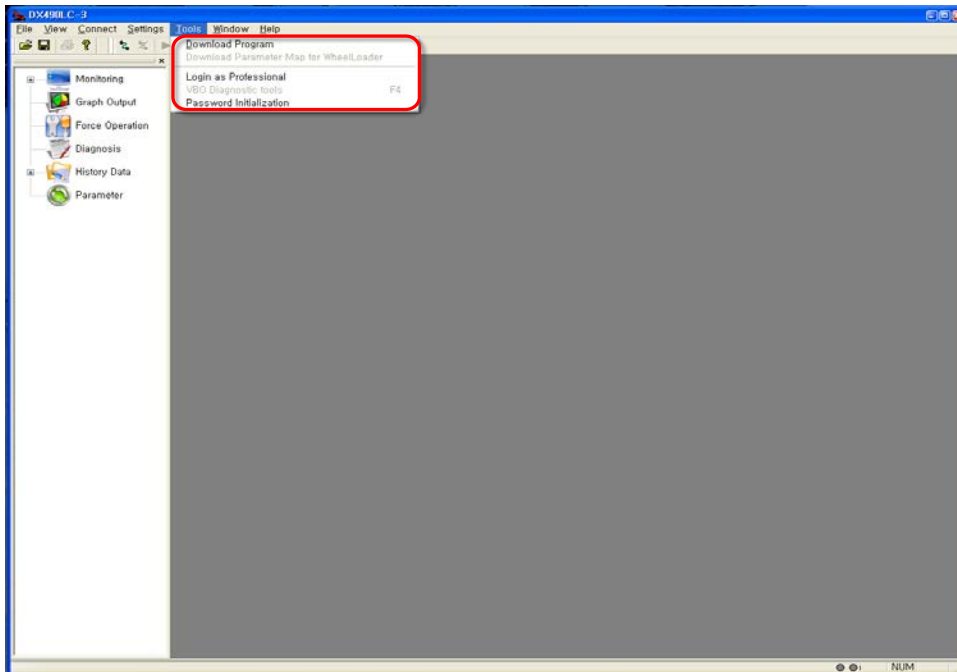
■ **Download Program (D)**

● Use this function to modify the controller (EPOS/VCU) program when performance is improved. You can add the controller function simply by modifying the program, instead of modifying controller hardware.

▶ **How to change the controller (EPOS / VCU) program**

1. Vehicles from the computer while the power is turned OFF (laptop) to connect to a PC CHECK CABLE to connect to the vehicle CHECK CONNECTOR.

2. Select **[Tools]-[Download Program]** menu.
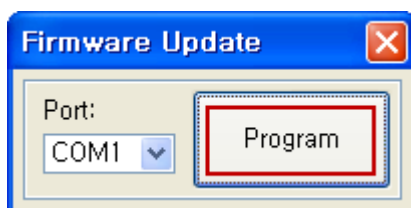
3. Select the communication port on the "Firmware Update" window, as shown above, and click the [Program] button. Then, you can select the data file (*.hex) from the folder where the VCU program is installed.
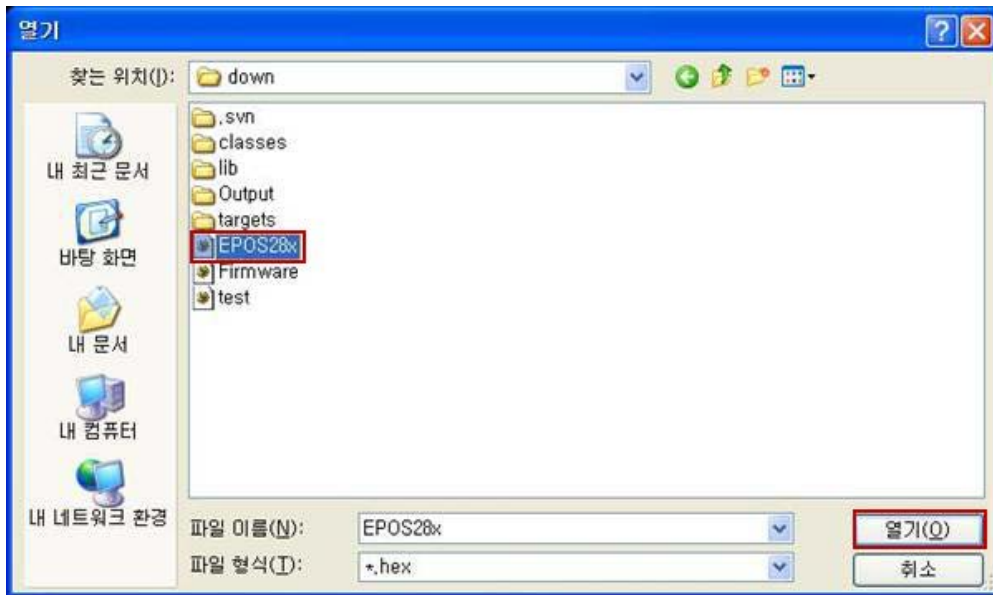
4. Select the file and turn the toggle switch of the PC check cable on to start the download mode in the controller. Then, turn the vehicle power on to display the following program update progress.
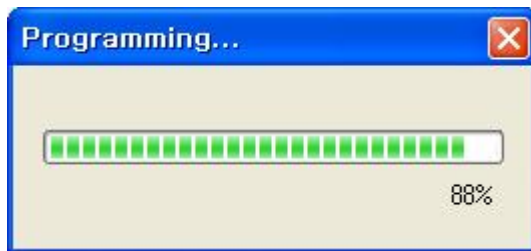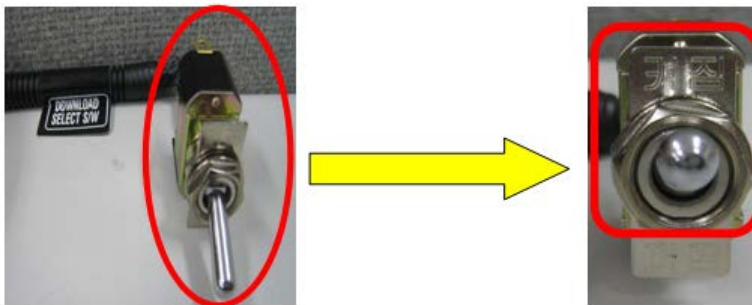
5. When EPOS/VCU program update is completed, click [OK] and make sure to restart the excavator/wheel loader. At this time, PC CHECK CABLE create a toggle switch to the OFF state to the controller to switch to the normal operation mode
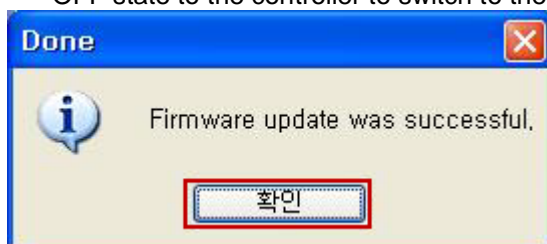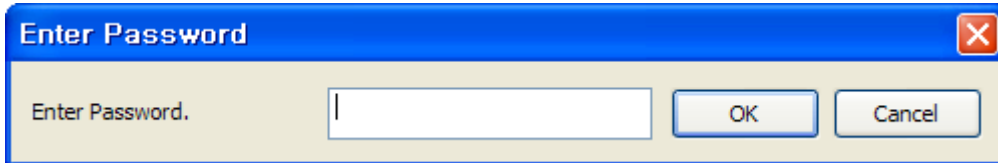
■ Expert mode

● You need to have the expert mode right to use the DMS function that can change the equipment setting information. Use this menu to check the expert mode right.
The following jobs require the expert mode right.

※ Force Operation, Delete Failure History, Delete Fuel Usage Information, Delete Operating Time Information, Delete Filter/Oil Information, Download Program, Edit Parameter

1. Select **[Tools]-[Expert mode]** menu. Input the password for the professional mode on the "Enter Password" window.

■ VBO Diagnostic Tools (F4)

● Use this menu to diagnose and tune equipment that uses the VBO electronic pump function. (DX340LC-3 / DX350LC-3 / DX380LC-3) The menu will be enabled only when connected to the electronic pump.
For more details on the use, refer to the "VBOManual.pdf" file.
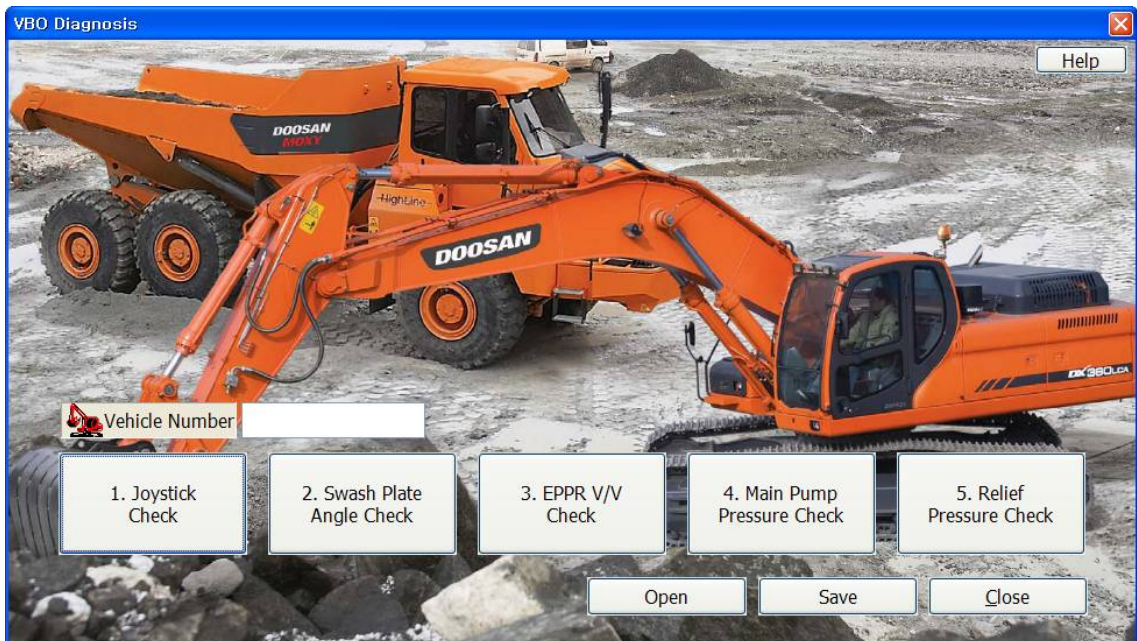
■ Password reset

● Use this menu to initialize the password of equipment that is locked with the startup limitation password. Both user and administrator passwords will be initialized.

3.6 Window

◈ This section describes the "Window menu of the DMS program.
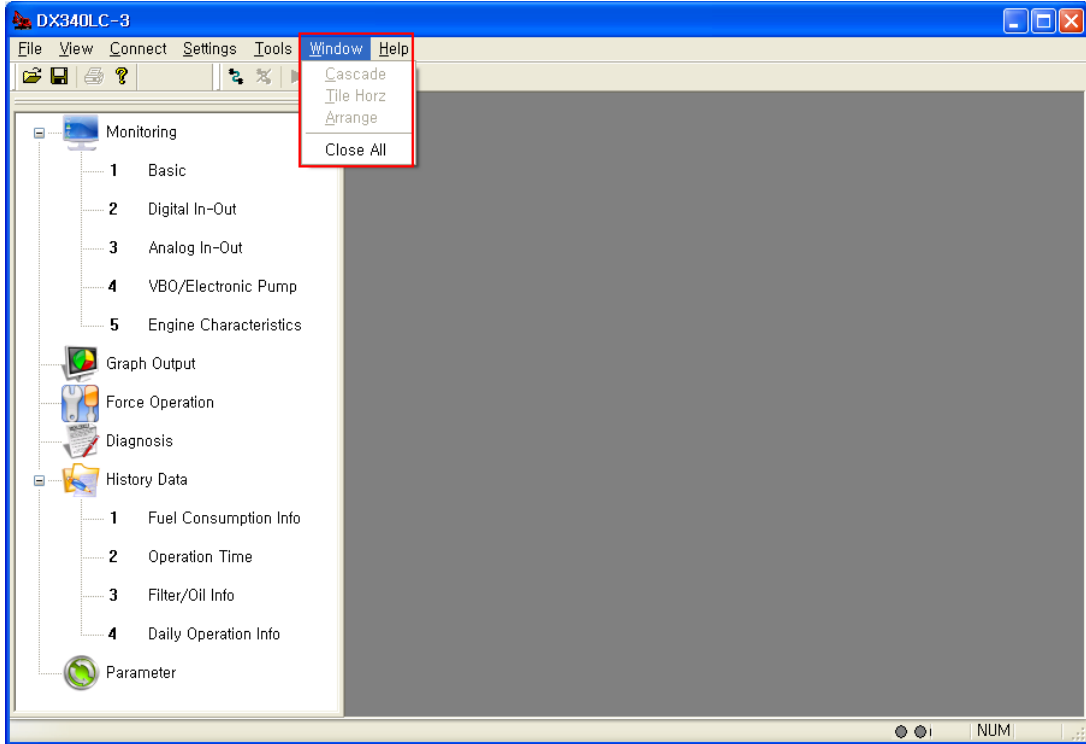
■ Cascade (C)

1. Select **[Window]** – **[Cascade]** menu.
2. Displays the monitoring windows in the cascade mode.
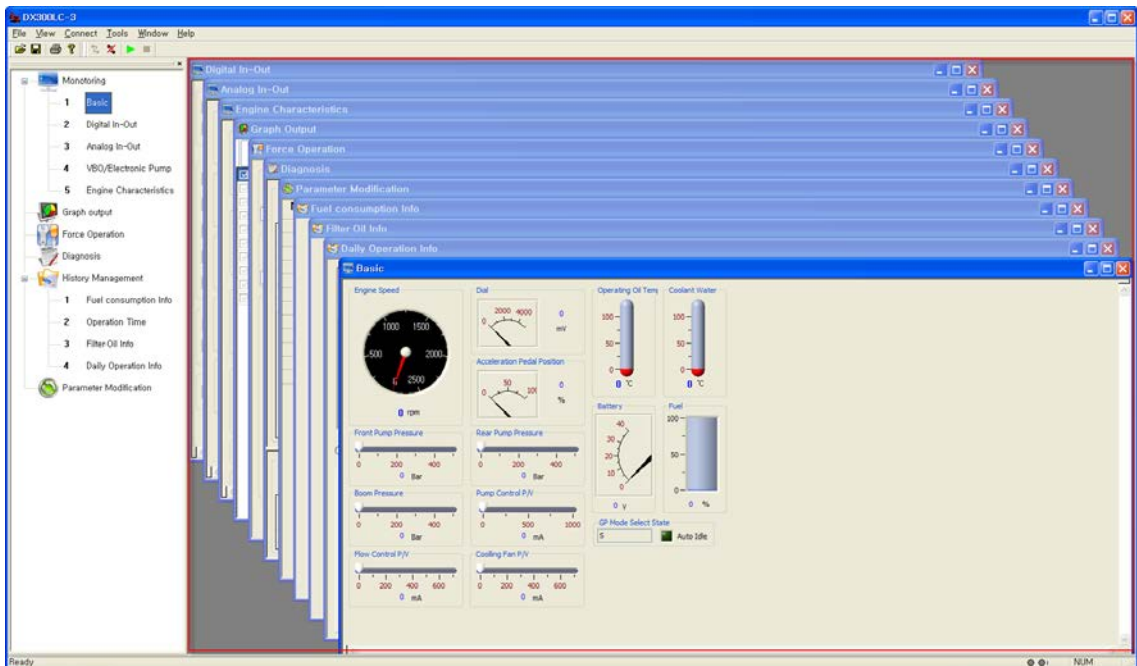
■ Tile (T)

1. Select **[Window]** – **[Tile]** menu.
2. Displays the monitoring windows in the tile mode.

■ Arrange (A)

1. Select **[Window]** – **[Arrange]** menu.
2. You can arrange window icons.
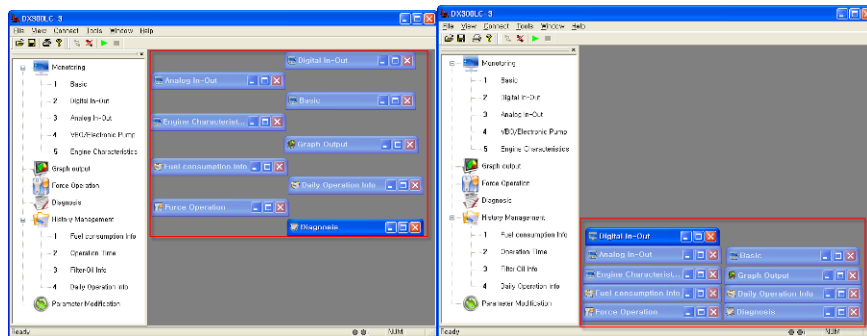
■ Close All

1. You can close all monitoring windows of the DMS program at a time, using this menu.
2. Select **[Window]** – **[Close All]** menu.
3. All monitoring windows will be closed. **(See the first image.)**

3.7 Help

◆ This section describes the **[Help]** menu of the DMS program.
   ■ Help
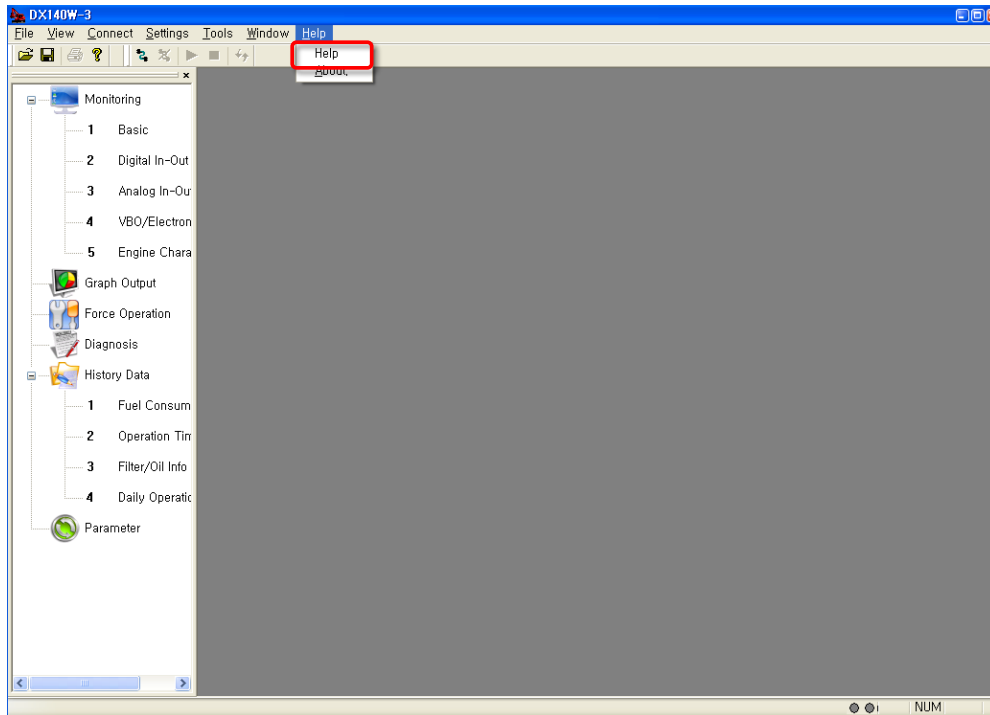
   ■ Help
   1.   Select **[Help]-[Help]**.
   2.   You can display the DMS help file.

■ About ..
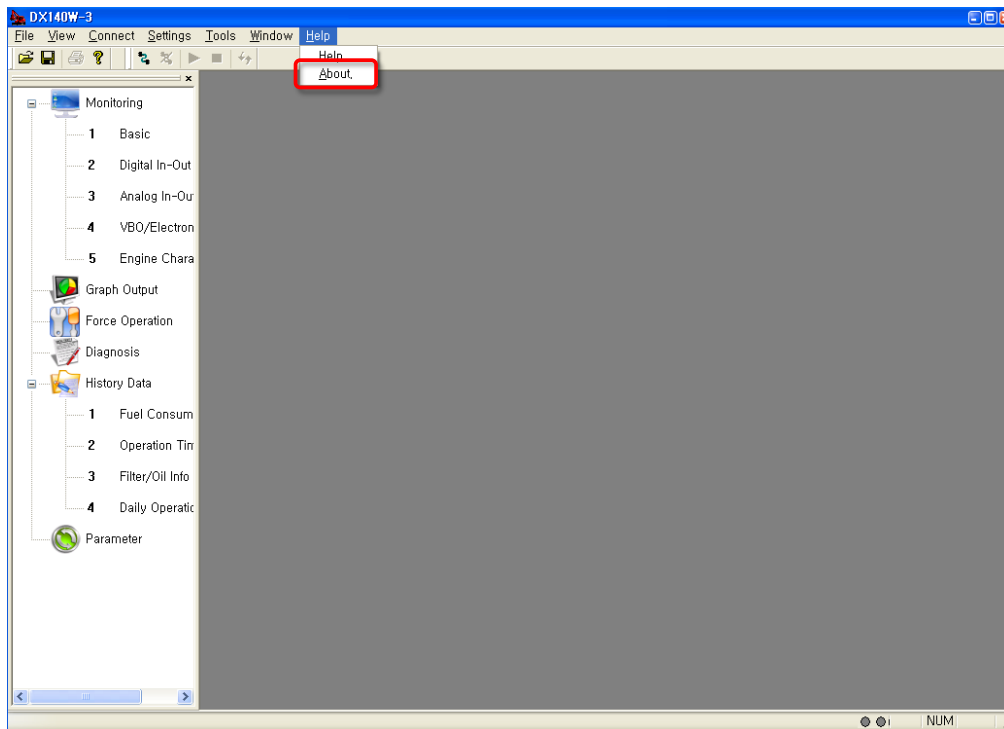
1. Select **[Help]-[About]**.
2. You can display the DMS version information.
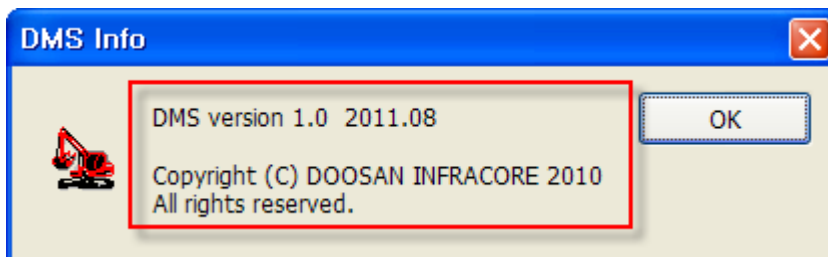
3. ![icon] is the shortcut icon.
4. Click the **[OK]** button to close the "DMS Info" window.

3.8 Workspace

◈ This section descries the "workspace window" of the DMS program.
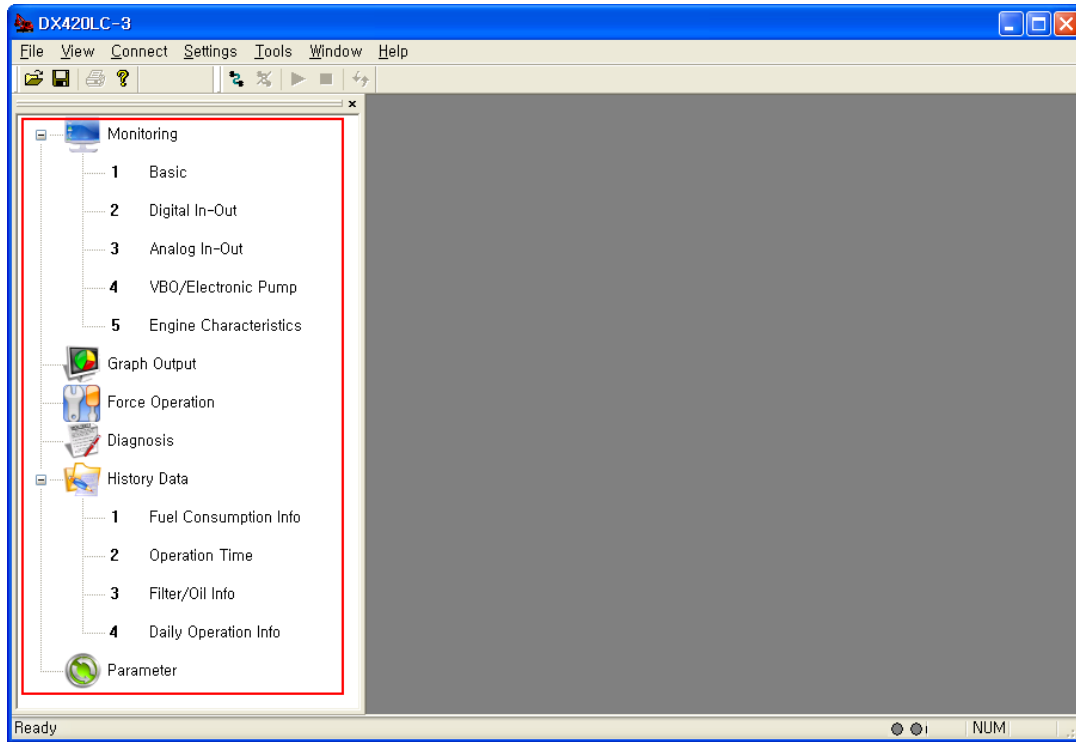
■ **You can execute six items in the "View" menu quickly and conveniently, using the icons located at the left side of the program window.**

1. Monitoring
   Excavator - Basic, Digital In-Out, Analog In-Out, VBO/Electronic Pump, Engine Characteristics.
   Wheel Loader - Basic, Digital In-Out, Analog In-Out, Elec MCV, Transmission, Engine Characteristics.
2. Graph Output: The monitoring data will be displayed as a graph.
3. Force Operation: You can test equipment by entering the value you specify into the particular equipment data.
4. Diagnosis: You can diagnose equipment malfunction. The current malfunction information and history will be displayed.
5. History Data: Fuel Consumption Info., Operation Time, Filter Oil Info, Daily Operation Info.
6. Parameter: You can read/write some parameters for equipment. The menu runs in the professional mode.

4 Easy guide

◆ Take the following steps to run Doosan Excavator/Wheel Loader Monitoring Program (DMS).

1. Select **[Start] - [All Programs] – [DMS-3]** menu, or click the "**DMS-3**" icon on the desktop screen.

2. When the DMS screen is opened, select [File] – [Change Model] to select the model you want.
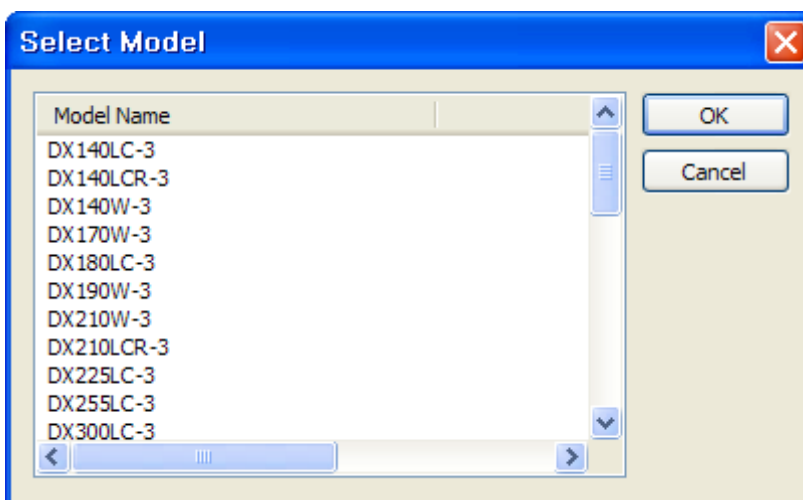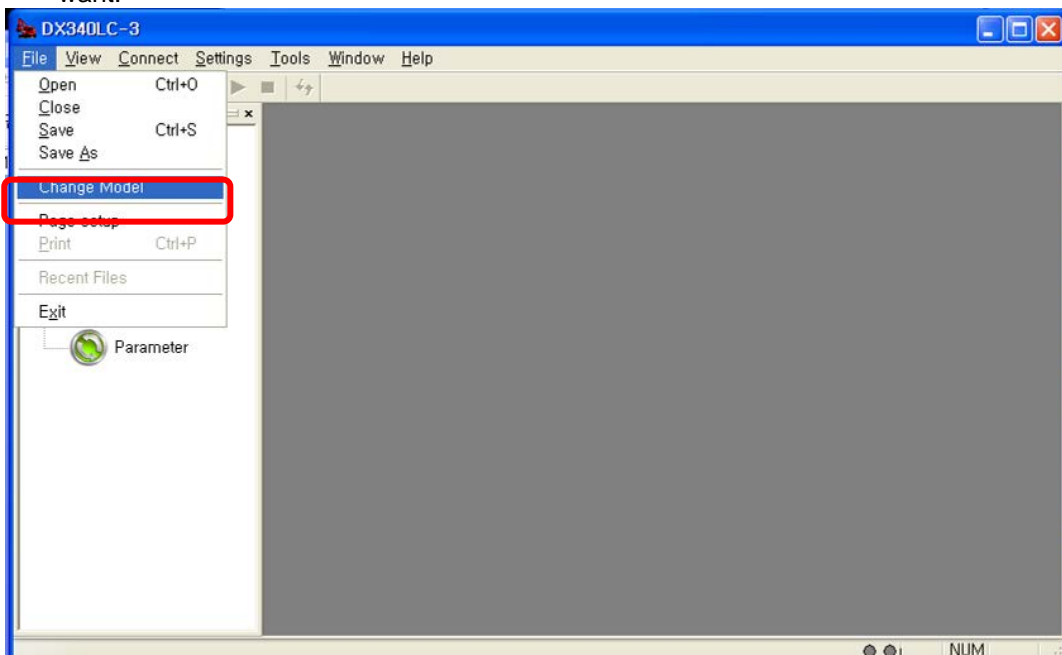
3. Select the model you want and select [Connect] – [Connect] menu, or click the "Connect" icon to establish communication with Controller (EPOS OR VCU).
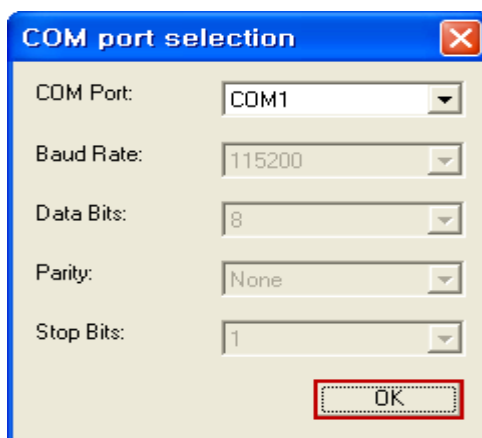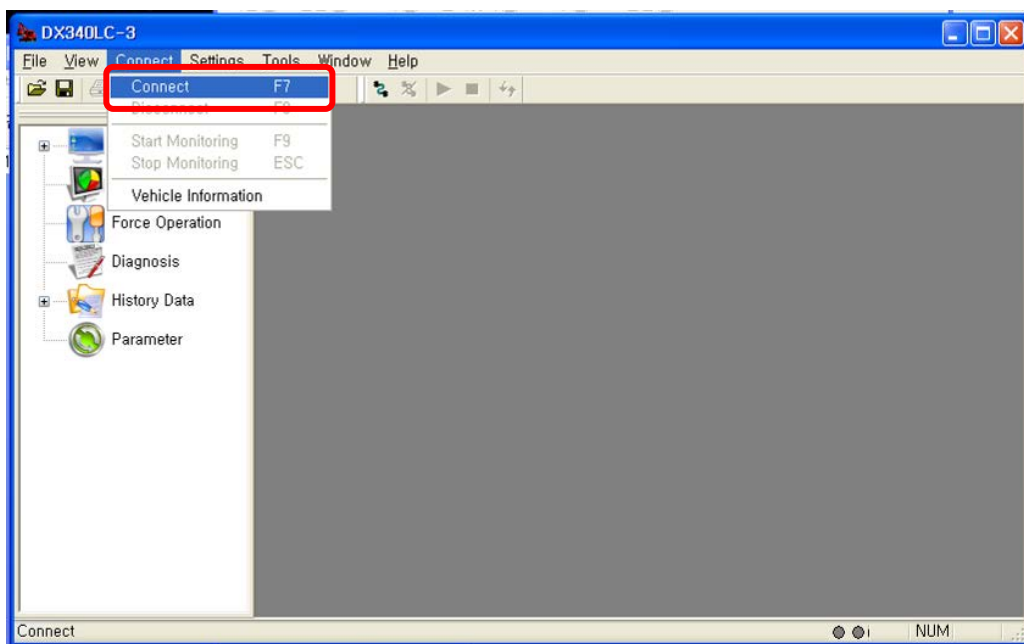
4. When connected to Controller (EPOS OR VCU) successfully, you can check the data in real-time on multiple windows.

⇄	✗	▶	■
Connect	**Disconnect**	**Start**	**Stop**

Note) When monitoring is started, other monitoring windows on the DMS screen will not be closed and any new window will be opened.

5 Monitoring

5.1 Default

◈ Use this function to check various data related to an excavator/wheel loader.

1. Select **[View]** – **[Monitoring]** menu on the DMS main screen, or double click **[Monitoring]** – **[Basic]** on the workspace window.
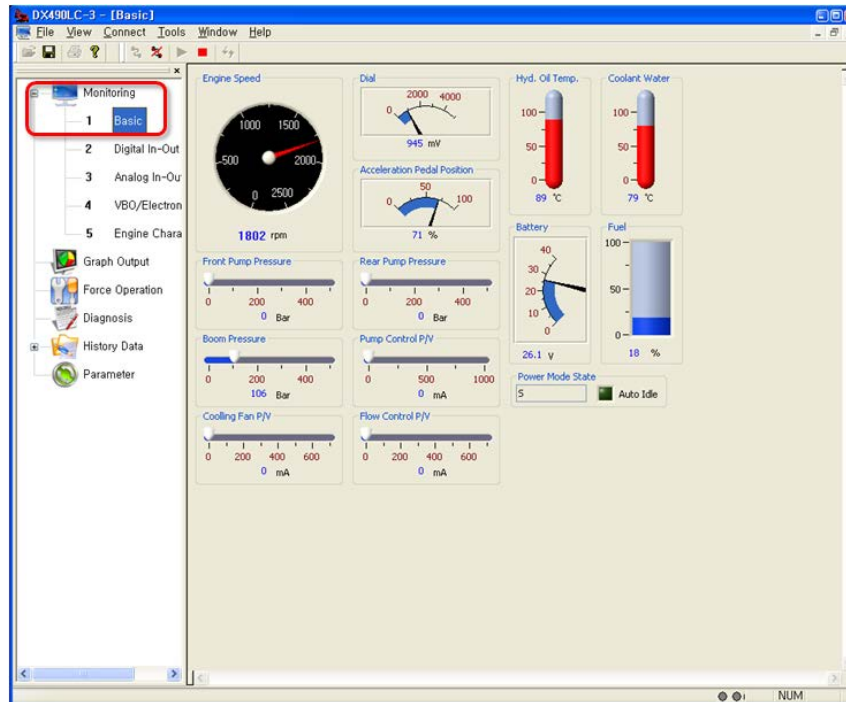
Note) The data displayed on the screen can be different, depending on the model.

2. You can see the following data on this screen.

♦ **Crawler Excavator(14~30 ton)**

1) Sensor data: various kinds of analog sensor data will be displayed.

- Engine Speed (rpm)
- Dial (mV)
- Acceleration Pedal Position (%)
- Front Pump Pressure (Bar)
- Rear Pump Pressure (Bar)
- Boom Pressure (Bar)

- Pump Control P/V (mA)
- Flow Control P/V (mA)
- Hyd. Oil Temp(℃)
- Coolant Water. (℃)
- Battery (V)
- Fuel (%)

2) Power Mode State

- P+: Power Plus Mode
- P : Power Mode
- S : Standard Mode

- E : Economy Mode
- AUTO IDLE : ON/OFF

♦ **Crawler Excavator(30 ton)**

1) Sensor data: various kinds of analog sensor data will be displayed.

- Engine Speed (rpm)
- Dial (mV)
- Acceleration Pedal Position (%)
- Front Pump Pressure (Bar)
- Rear Pump Pressure (Bar)
- Boom Pressure (Bar)
- Pump Control P/V (mA)

- Cooling Fan P/V(mA)
- Flow Control P/V (mA)
- Hyd. Oil Temp(℃)
- Coolant Water. (℃)
- Battery (V)
- Fuel (%)

2) Power Mode State

- P+: Power Plus Mode
- P : Power Mode
- S : Standard Mode

- E : Economy Mode
- AUTO IDLE : ON/OFF

♦ **Crawler Excavator(30 ton~)**

1) Sensor data: various kinds of analog sensor data will be displayed.

- Engine Speed (rpm)
- Dial (mV)
- Acceleration Pedal Position (%)
- Front Pump Pressure (Bar)
- Rear Pump Pressure (Bar)
- Boom Pressure (Bar)
- Pump Control P/V (mA)

- Cooling Fan P/V(mA)
- Flow Control P/V (mA)
- Hyd. Oil Temp(℃)
- Coolant Water. (℃)
- Battery (V)
- Fuel (%)

2) Power Mode State

- P+: Power Plus Mode
- P : Power Mode
- S : Standard Mode

- E : Economy Mode
- AUTO IDLE : ON/OFF

♦ **Crawler Excavator(VBO, 34/38 ton)**

1) Sensor data: various kinds of analog sensor data will be displayed.

- Engine Speed (rpm)
- Dial (mV)
- Acceleration Pedal Position (%)

- Front Pump Pressure (Bar)
- Rear Pump Pressure (Bar)
- Boom Pressure (Bar)

- Pump Control P/V1 (mA)
- Pump Control P/V2 (mA)
- Cooling Fan P/V(mA)
- Hyd. Oil Temp(℃)

- Coolant Water. (℃)
- Battery (V)
- Fuel (%)

2) Power Mode State

- P+: Power Plus Mode
- P : Power Mode
- S : Standard Mode

- E : Economy Mode
- AUTO IDLE : ON/OFF

♦ **Wheel Excavator**

1) Sensor data: various kinds of analog sensor data will be displayed.

- Engine Speed (rpm)
- Dial (mV)
- Acceleration Pedal Position (%)
- Accel Pedal (mV)
- Front Pump Pressure (Bar)
- Rear Pump Pressure (Bar)
- Boom Pressure (Bar)
- Pilot Gear-Pump Pressure (Bar)

- Pump Control P/V (mA),
- Flow Control P/V (mA)
- Hyd. Oil Temp.(℃)
- Coolant Water (℃)
- Battery (V)
- Fuel (%)
- Speed Meter (km/h)

2) Power Mode State

- P+: Power Plus Mode
- P : Power Mode
- S : Standard Mode

- E : Economy Mode
- AUTO IDLE : ON/OFF

♦ **Wheel Loader – Doosan Engine**

1) Sensor data: various kinds of analog sensor (Engine Speed, Pump Pressure) data will be displayed.

- Vehicle Speed (km/h)
- Engine Speed (rpm)
- Accel Pedal Position (%)
- Fan Control P/V(mA)
- Coolant Temp.(℃)

- Torque Converter Oil(℃)
- Sump Oil Temp (℃)
- Fuel Level (%)
- Battery (V)

2) State : You can check the status of Wheel Loader output

- Current Direction
- Current Actual Gear
- Select Gear
- Engine Power Mode

- Transmission Mode
- Auto Idle
- Warm Up
- Angle Set Mode

3) Warning : You can check the Warning status of Wheel Loader output

- Engine
- Water In Fuel
- Charge
- Engine Oil Pressure
- Transmission
- Engine Stop

- Preheat
- DPF
- HEST
- Prohibit Regen
- Quick Clamp

♦ **Wheel Loader – Scania Engine**

1) Sensor data: various kinds of analog sensor (Engine Speed, Pump Pressure) data will be displayed.

- Vehicle Speed (km/h)
- Engine Speed (rpm)
- Accel Pedal Position(%)
- Fan Control P/V(mA)
- Coolant Temp.(℃)

- Torque Converter Oil(℃)
- Sump Oil Temp (℃)
- Fuel Level (%)
- DEF(AdBlue)Level (%)
- Battery (V)

2) State : You can check the status of Wheel Loader output

- Current Direction
- Current Actual Gear
- Select Gear
- Engine Power Mode

- Transmission Mode
- Auto Idle
- Warm Up
- Angle Set Mode

3) Warning: **You can check the Warning status of Wheel Loader output**

- Engine,
- Water In Fuel
- Charge
- Engine Oil Pressure

- Transmission
- DEF(AdBLue) Low
- SCR Fault
- Quick Clamp

Note) The data displayed on the screen can be different, depending on the model. Please refer to the equipment specification.

5.2 Digital In/Out

◈ Use this function to check various data related to an excavator/wheel loader in real time.

1. Double click **[Monitoring]** – **[Digital In-Out]** on the workspace window of the DMS main screen.
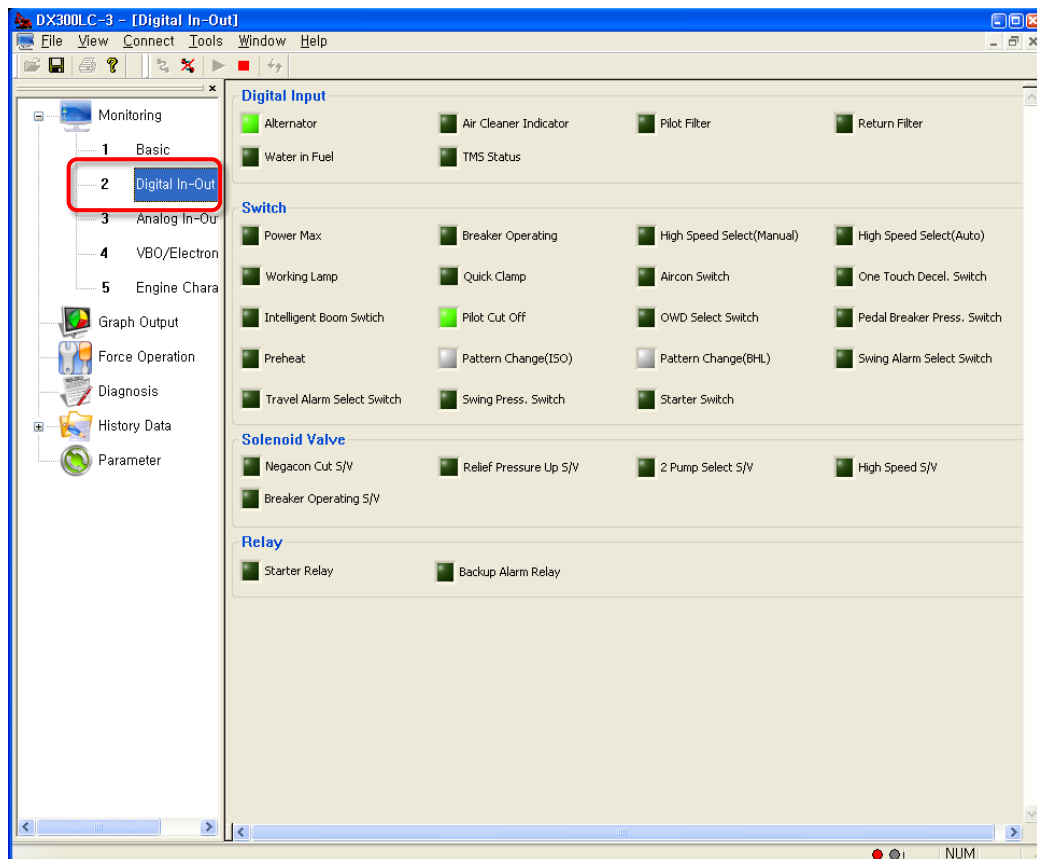
Note) The data displayed on the screen can be different, depending on the model.

2. You can check the following data on this window.

♦ **Crawler Excavator(14~30 ton)**
   1) Digital Input: You can check the status of the vehicle

- Alternator
- Air Cleaner Indicator
- Pilot Filter

- Return Filter
- Water in Fuel
- TMS Status

2) Switch: You can check the status of the user's operation

- Power Max
- Breaker Operating
- High Speed Select(Manual)
- High Speed Select(Auto)
- One Touch Decel. Switch
- Intelligent Boom Switch
- Pilot Cut Off
- OWD Select Switch
- Pedal Breaker Press. Switch
- Pattern Change(ISO)

- Working Lamp,
- Quick Clamp
- Preheat
- Aircon Switch
- Pattern Change(BHL)
- Swing Press Switch
- Starter Switch
- Swing Alarm Select Switch
- Travel Alarm Select Switch

3) Solenoid Valve: You can check the status of the solenoid valve

- Breaker Operating S/V
- Relief Pressure Up S/V
- 2 Pump Select S/V

- High Speed S/V
- Negacon Cut S/V

4) Relay: You can check the status of the vehicle relay

- Starter Relay,
- Backup Alarm Relay

♦ **Crawler Excavator(30 ton)**

1) Digital Input: You can check the status of the vehicle

- Alternator,
- Air Cleaner Indicator,
- Pilot Filter,

- Return Filter,
- Water in Fuel,
- TMS Status,

2) Switch: You can check the status of the user's operation

- Power Max
- Breaker Operating
- High Speed Select(Manual)
- High Speed Select(Auto)
- Working Lamp
- Quick Clamp
- Aircon Switch
- One Touch Decel. Switch
- Intelligent Boom Switch
- Pilot Cut Off

- OWD Select Switch
- Pedal Breaker Press. Switch,
- Pattern Change(ISO)
- Pattern Change(BHL)
- Swing Press. Switch
- Preheat
- Starter Switch
- Swing Alarm Select Switch
- Travel Alarm Select Switch

3) Solenoid Valve: You can check the status of the solenoid valve

- Breaker Operating S/V
- High Speed S/V
- Relief Pressure Up S/V
- Negacon Cut S/V
- 2 Pump Select S/V

4) Relay: You can check the status of the vehicle relay

- Starter Relay
- Backup Alarm Relay

♦ **Crawler Excavator(30 ton~)**

1) Digital Input: You can check the status of the vehicle

- Digital Input
- Return Filter
- Alternator
- Water in Fuel
- Air Cleaner Indicator
- TMS Status
- Pilot Filter

2) Switch: You can check the status of the user's operation

- Power Max
- OWD Select Switch
- Breaker Operating
- Pedal Breaker Press. Switch
- High Speed Select(Manual)
- Pattern Change(ISO)
- High Speed Select(Auto)
- Pattern Change(BHL)
- Working Lamp
- Swing Press. Switch
- Quick Clamp
- Preheat,
- Aircon Switch
- Starter Switch
- One Touch Decel. Switch
- Swing Alarm Select Switch
- Intelligent Boom Switch
- Travel Alarm Select Switch
- Pilot Cut Off

3) Solenoid Valve: You can check the status of the solenoid valve

- Breaker Operating S/V
- Reverse Fan S/V
- Relief Pressure Up S/V
- 2 Pump Select S/V
- High Speed S/V

4) Relay: You can check the status of the vehicle relay

- Starter Relay
- Backup Alarm Relay

♦ **Crawler Excavator(VBO, 34/38 ton)**

1) Digital Input: You can check the status of the vehicle

- Alternator
- Air Cleaner Indicator
- Pilot Filter
- Return Filter
- Water in Fuel
- TMS Status

2) Switch: You can check the status of the user's operation

- Power Max
- Breaker Operating
- High Speed Select(Manual)
- High Speed Select(Auto)
- Working Lamp
- Quick Clamp
- Aircon Switch
- One Touch Decel. Switch,
- Intelligent Boom Switch
- Pilot Cut Off
- OWD Select Switch
- Pedal Breaker Press. Switch
- Pattern Change(ISO)
- Pattern Change(BHL)
- Swing Press. Switch
- Preheat
- Starter Switch
- Swing Alarm Select Switch
- Travel Alarm Select Switch

3) Solenoid Valve: You can check the status of the solenoid valve

- Breaker Operating S/V
- High Speed S/V
- Bypass Cut Off S/V
- Swing Brake Release S/V

4) Relay: You can check the status of the vehicle relay

- Starter Relay
- Backup Alarm Relay

♦ **Wheel Excavator**

1) Digital Input: You can check the status of the vehicle

- Alternator
- Air Cleaner Indicator
- Pilot Filter
- Return Filter
- Water in Fuel
- TMS Status

2) Switch: You can check the status of the user's operation

- Power Max
- Breaker Operating
- Travel Select
- Working Lamp
- Quick Clamp
- Forward Switch
- Neutral Switch
- Reverse Switch
- Cruise Select Switch
- Stop Lamp Switch

- Inching Speed Select Switch,
- Low Speed Select Switch
- High Speed Select Switch
- High Beam Select Switch
- Emergency Steering Press. Sw
- Aircon Switch
- Parking Switch
- Ram Lock Switch
- One Touch Decel. Switch
- Intelligent Boom Switch

- Pilot Cut Off
- OWD Select Switch
- Brake Oil Press. Switch
- Pedal Breaker Press. Switch
- Accel Pedal Validation Switch
- Pattern Change(ISO)
- Pattern Change(BHL)
- Preheat, Starter Switch
- Travel Alarm Select Switch

3) Solenoid Valve: You can check the status of the solenoid valve

- Breaker Operating S/V
- Relief Pressure Up S/V
- 2 Pump Select S/V
- Cruise S/V

- Forward S/V
- Reverse S/V
- Negacon Cut S/V

4) Relay: You can check the status of the vehicle relay

- Starter Relay
- Backup Alarm Relay
- Backup Lamp Relay

- Inching Speed Relay
- Low Speed Relay
- High Speed Relay

♦ **Wheel Loader – Doosan Engine**

1) Digital Input: You can check the status of the vehicle

- Boom Magnet
- Pilot Buzzer

2) Switch: You can check the status of the user's operation

- Reverse Fan Switch(Manual)
- Reverse Fan Switch(Auto),
- Aircon Switch,
- Safety Start Switch,
- Detent Set Switch (BOOM),
- Detent Active Switch,
- VCCO Select Switch,
- Pilot Cut Off Switch,
- Engine Mode Switch(L),

- Parking Brake Pressure Switch,
- Engine Mode Switch(M),
- VCCO Set Switch,
- Accel Pedal Validation Switch,
- Power Mode Foot Switch
- Transmission Shift Switch(L),
- Transmission Shift Switch(M),
- Quick Clamp Switch

3) Solenoid Valve: You can check the status of the solenoid valve

- Reverse Fan Solenoid Valve
- Unloading Solenoid Valve

4) Relay: You can check the status of the vehicle relay

- Starter Relay

♦ **Wheel Loader – Scania Engine**

1) Digital Input: You can check the status of the vehicle

- Boom Magnet
- Pilot Buzzer
- Bucket Magnet

2) Switch: You can check the status of the user's operation

- Electric Steering Select Switch,
- Key Switch(Start)
- Electric Steering Speed High Switch,
- Parking Brake Pressure Switch
- Electric Steering Direction Switch,
- Engine Mode Switch(M)
- Reverse Fan Switch(Manual),
- Torque Converter Lock Up S/W
- Reverse Fan Switch(Auto),
- VCCO Set Switch
- Aircon Switch,
- Accel Pedal Validation Switch
- Safety Start Switch,
- 3rd FNR (F)
- Arm Rest Cut Off Switch,
- 3rd FNR (N)
- Detent Set Switch (BOOM),
- 3rd FNR (R)
- Detent Set Switch (Bucket),
- Power Mode Foot Switch
- Detent Active Switch,
- Transmission Shift Switch(L)
- VCCO Select Switch
- Transmission Shift Switch(M)
- Engine Mode Switch(L)
- Quick Clamp Switch

3) Solenoid Valve: You can check the status of the solenoid valve

- Reverse Fan Solenoid Valve
- Unloading Solenoid Valve

Note) The data displayed on the screen can be different, depending on the model. Please refer to the equipment specification.

5.3 Analog In/Out

◈ Use this function to check various data related to an excavator/wheel Loader in real time.

1. Double click **[Monitoring]** – **[Analog In-Out]** on the workspace window of the DMS main screen.
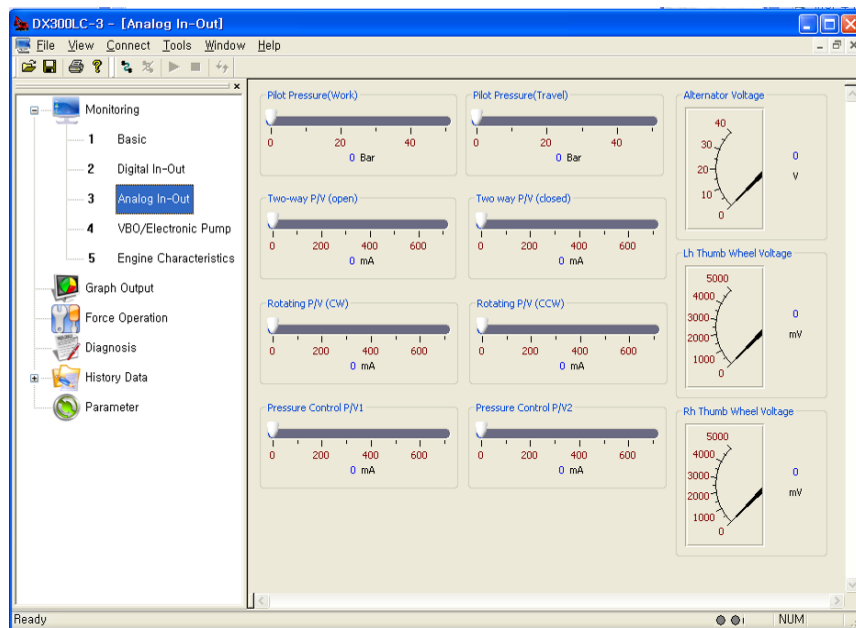
The data displayed on the screen can be different, depending on the excavator/wheel loader model.

2. You can check the following data on this window.

♦ **Crawler Excavator(14~30 ton)**

- Pilot Pressure(Work)
- Pilot Pressure(Travel)
- Two-way P/V (open)
- Two way P/V (closed)
- Rotating P/V (CW)
- Rotating P/V (CCW)

- Pressure Control P/V1
- Pressure Control P/V2
- Alternator Voltage
- Lh Thumb Wheel Voltage
- Rh Thumb Wheel Voltage

♦ **Crawler Excavator(30 ton)**

- Pilot Pressure(Work)
- Pilot Pressure(Travel)
- Two-way P/V (open)
- Two way P/V (closed)
- Rotating P/V (CW)
- Rotating P/V (CCW)

- Pressure Control P/V1
- Pressure Control P/V2
- Alternator Voltage
- Lh Thumb Wheel Voltage
- Rh Thumb Wheel Voltage

- **Crawler Excavator(30 ton~)**
  - Pilot Pressure(Work)
  - Pilot Pressure(Travel)
  - Two-way P/V (open)
  - Two way P/V (closed)
  - Rotating P/V (CW)
  - Rotating P/V (CCW)
  - Pressure Control P/V1
  - Pressure Control P/V2
  - Alternator Voltage
  - Lh Thumb Wheel Voltage
  - Rh Thumb Wheel Voltage

- **Crawler Excavator(VBO, 34/38 ton)**
  - Two-way P/V (open)
  - Two way P/V (closed)
  - Rotating P/V (CW)
  - Rotating P/V (CCW)
  - Pressure Control P/V1
  - Pressure Control P/V2
  - Front pump Angle volt
  - Rear pump Angle volt
  - Travel Straight P/V
  - Alternator Voltage
  - Lh Thumb Wheel Voltage
  - Rh Thumb Wheel Voltage

- **Wheel Excavator**
  - Pilot Pressure(Work)
  - Pilot Pressure(Travel)
  - Two-way P/V (open)
  - Two way P/V (closed)
  - Rotating P/V (CW)
  - Rotating P/V (CCW)
  - Pressure Control P/V1
  - Pressure Control P/V2
  - Alternator Voltage
  - Lh Thumb Wheel Voltage
  - Rh Thumb Wheel Voltage
  - Speed Meter

- **Wheel Loader – Doosan Engine**
  - Break Oil Pressure
  - Main Pressure
  - Water In Fuel
  - Angle Sensor Boom
  - Alternator
  - Accel Pedal
  - Battery
  - Fan Control Solenoid Valve
  - Fuel Level

- **Wheel Loader – Scania Engine**

  - Break Oil Pressure
  - Steer Pressure
  - Water In Fuel
  - Angle Sensor Boom
  - Angle Sensor Bucket
  - Alternator
  - Main Pressure
  - Accel Pedal
  - Battery
  - Fan Control P/V
  - Fuel Level

Note) The data displayed on the screen can be different, depending on the model. Please refer to the equipment specification.

5.4 VBO/Elec. Pump

◈ Use this function to check various data related to an excavator in real time.

1. Double click **[Monitoring]** – **[VBO/Electronic Pump]** on the workspace window of the DMS main screen.
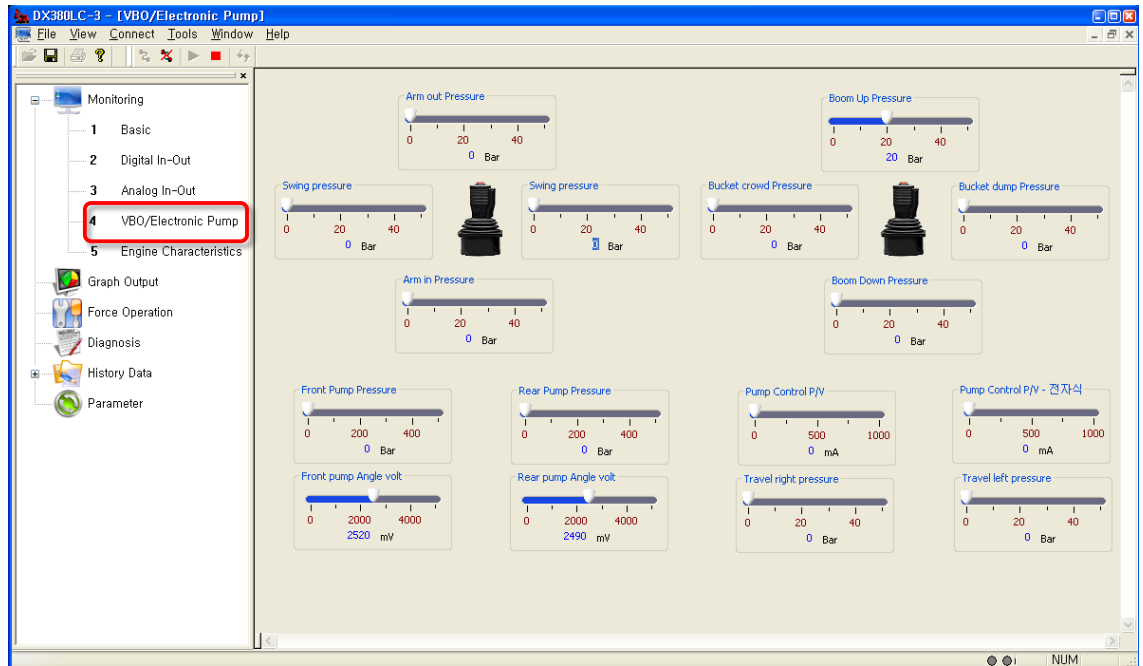
2. You can see the following data on this window.
   : You can check the analog output status of VBO equipment.

   - Boom up pressure
   - Boom down pressure
   - Bucket crowd pressure
   - Bucket dump pressure
   - Arm in pressure
   - Arm out pressure
   - Front pump angle volt
   - Rear pump angle volt

   - Swing pressure
   - Swing pressure
   - Front pump pressure
   - Rear pump pressure
   - Pump control P/V
   - Pump control P/V – electronic
   - Travel right pressure
   - Travel left pressure

Note) The VBO/Electronic Pump menu is activated for the DX350LC-3 and DX380LC-3 model only.

5.5 Transmission

◈ Use this function to check various data related to a wheel loader.

1. Select **[View]** – **[Monitoring]** menu on the DMS main screen, or double click **[Monitoring]** – **[Transmission]** on the workspace window.
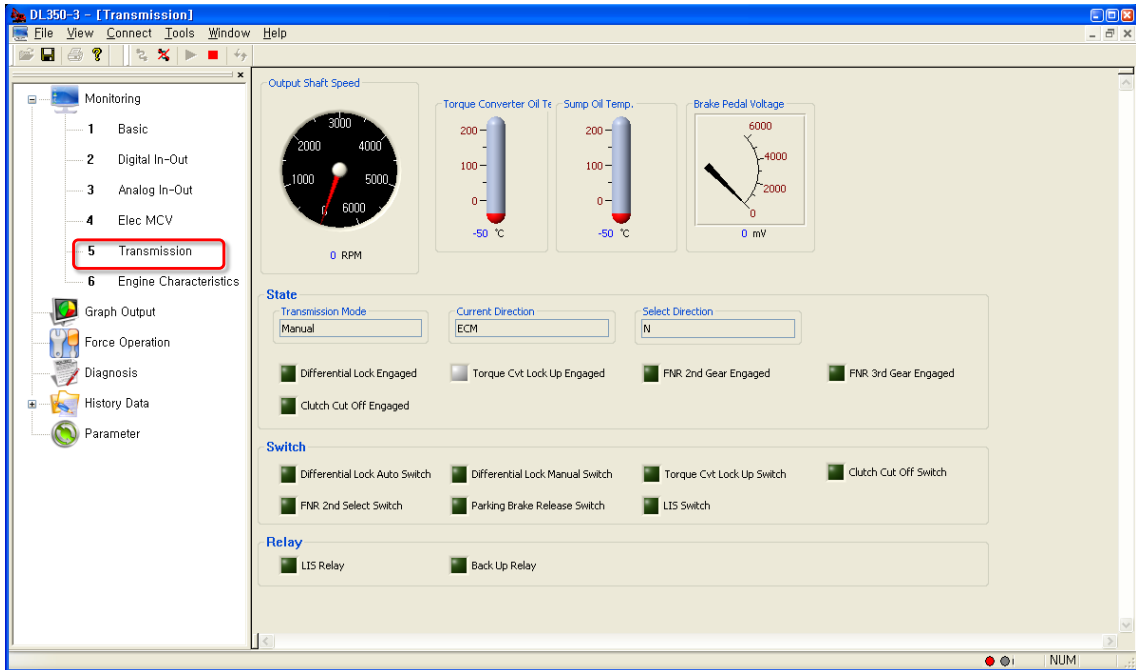
2. You can see the following data on this screen.

◆ **Wheel Loader(Doosan E/G)**

1) Sensor Data
- Torque Converter Oil Temp.
- Sump Oil Temp.

- Output Shaft Speed
- Brake Pedal Voltage

2) State
- Transmission Mode
- Current Direction
- Select Direction

- Differential Lock Engaged
- FNR 2nd Gear Engaged
- Vehicle Clutch Cut Off

3) Switch
- LIS Switch
- Parking Brake Release Switch
- FNR 2nd Select Switch

- Differential Lock Auto Switch
- Differential Lock Manual Switch
- Select Gear

4) Relay
- Back Up Relay

- LIS Relay

◆ **Wheel Loader(Scania E/G)**

1) Sensor Data

- Torque Converter Oil Temp.
- Sump Oil Temp.
- Output Shaft Speed
- Brake Pedal Voltage

2) State

- Auto Transmission Mode
- Current Gear
- Select Gear
- Differential Lock Engaged
- Torque Cvt Lock Up Engaged
- FNR 2nd Gear Engaged
- FNR 3nd Gear Engaged
- Vehicle Clutch Cut Off

3) Switch

- LIS Switch
- Parking Brake Release Switch
- FNR 2nd Select Switch
- Differential Lock Auto Switch
- Differential Lock Manual Switch
- Select Gear
- Clutch Cut Off

4) Relay

- Back Up Relay
- LIS Relay

Note) The data displayed on the screen can be different, depending on the model. Please refer to the equipment specification.

5.6 Elec. MCV

◈ Use this function to check various data related to a wheel loader.

1. Select **[View]** – **[Monitoring]** menu on the DMS main screen, or double click **[Monitoring]** – **[Elec MCV]** on the workspace window.

2. You can see the following data on this screen.

5) EMCV

- EMCV Lever Boom,
- EMCV Lever Bucket,
- EMCV Lever Option,
- EMCV P/V Float,
- EMCV P/V Raise,

- EMCV P/V Dump,
- EMCV P/V Crowd,
- EMCV P/V Option1,
- EMCV P/V Option2

2) Electric Steering

- Electric Steering Valve (Left),
- Electric Steering Valve (Right)
- Value State
- Electric Steering Lever

- Electric Steering Select Switch
- Electric Steering Speed High Switch
- Electric Steering Direction Switch

Note) The data displayed on the screen can be different, depending on the model. Please refer to the equipment specification.

5.7 Engine Property

◈ Use this function to check various data related to an excavator/wheel loader in real time.

1. Double click **[Monitoring]** – **[Engine Characteristics]** on the workspace window of the DMS main screen.
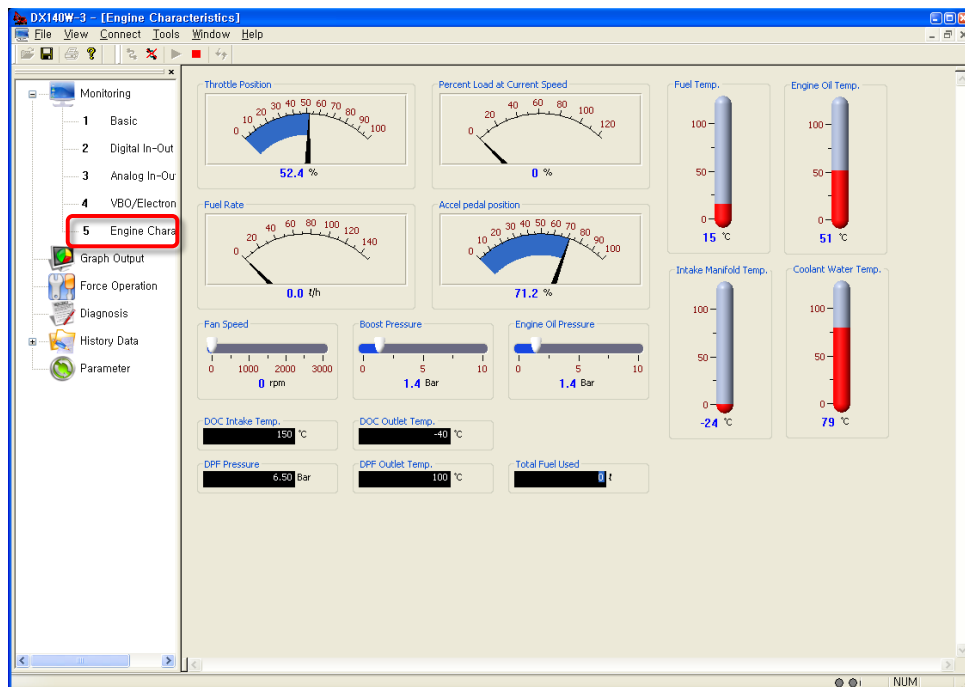
2. You can check the following data on this window.

♦ **Crawler Excavator(14~30 ton)**

- Accel pedal position
- Throttle Position
- Percent Load at Current Speed
- Fuel Rate
- Fan Speed
- Boost Pressure
- Engine Oil Pressure
- Fuel Temp.

- Engine Oil Temp.
- Coolant Water Temp,
- Intake Manifold Temp.
- DOC Intake Temp.
- DOC Outlet Temp.
- DPF Outlet Temp.
- DPF Pressure
- Total Fuel Used

♦ Crawler Excavator(30 ton)

- Accel pedal position
- Throttle Position
- Percent Load at Current Speed
- Fuel Rate
- Fan Speed
- Boost Pressure
- Engine Oil Pressure
- Fuel Temp.
- Engine Oil Temp.
- Coolant Water Temp.
- Intake Manifold Temp.
- DOC Intake Temp.
- DOC Outlet Temp
- DPF Outlet Temp.
- DPF Pressure
- Total Fuel Used

♦ Crawler Excavator(30 ton~)

- Fuel Rate
- Boost Pressure
- Engine Oil Pressure
- Fuel Temp.
- Engine Oil Temp.
- Coolant Water Temp.
- Intake Manifold Temp.
- DOC Intake Temp.
- DOC Outlet Temp.
- DPF Pressure
- Total Fuel Used

♦ Crawler Excavator(VBO, 34/38 ton)

- Accel pedal position
- Throttle Position
- Percent Load at Current Speed
- Fuel Rate
- Fan Speed
- Boost Pressure
- Engine Oil Pressure
- Fuel Temp.
- Engine Oil Temp.
- Coolant Water Temp.
- Intake Manifold Temp.
- DOC Intake Temp.
- DOC Outlet Temp.
- DPF Outlet Temp.
- DPF Pressure
- Total Fuel Used

- ♦ **Wheel Excavator**
  - Accel pedal position
  - Throttle Position
  - Percent Load at Current Speed
  - Fuel Rate
  - Fan Speed
  - Boost Pressure
  - Engine Oil Pressure
  - Fuel Temp.
  - Engine Oil Temp.
  - Coolant Water Temp.
  - Intake Manifold Temp.
  - DOC Intake Temp.
  - DOC Outlet Temp.
  - DPF Outlet Temp.
  - DPF Pressure
  - Total Fuel Used

- ♦ **Wheel Loader – Doosan Engine**
  - Engine Speed
  - Throttle Position
  - Percent Load at current Speed
  - Fuel Rate
  - Boost Pressure
  - Engine Oil Pressure
  - Fuel Temp.
  - Engine Oil Temp.
  - Coolant Temp.
  - Intake Manifold Temp.
  - Accel Pedal Position
  - Total Fuel Used
  - Total Fuel Used(M)
  - Percent Torque
  - Reference Torque
  - Forced Regen Status
  - Eco Level
  - Pilot Cut Off Switch
  - Parking Brake Pressure Switch

  \<EGR\>
  - DOC Intake Temperature
  - DOC Outlet Temperature
  - DPF Outlet Temperature
  - DPF Pressure

  \<Warning\>
  - Engine
  - Engine Oil Pressure
  - Engine Stop
  - Preheat
  - DPF
  - HEST
  - Prohibit Regen

♦ **Wheel Loader – Scania Engine**

- Engine Speed
- Percent Load at current Speed
- Fuel Rate
- Boost Pressure
- Engine Oil Pressure
- Coolant Temp.
- Intake Manifold Temp.
- Accel Pedal Position

- Total Fuel Used
- Total Fuel Used (M)
- Percent Torque
- Reference Torque
- DEF(AdBLue) Level
- Accel Pedal
- Low Idle Switch
- Eco Level

- Engine
- Engine Oil Pressure

- DEF(AdBLue) Low
- SCR Fault
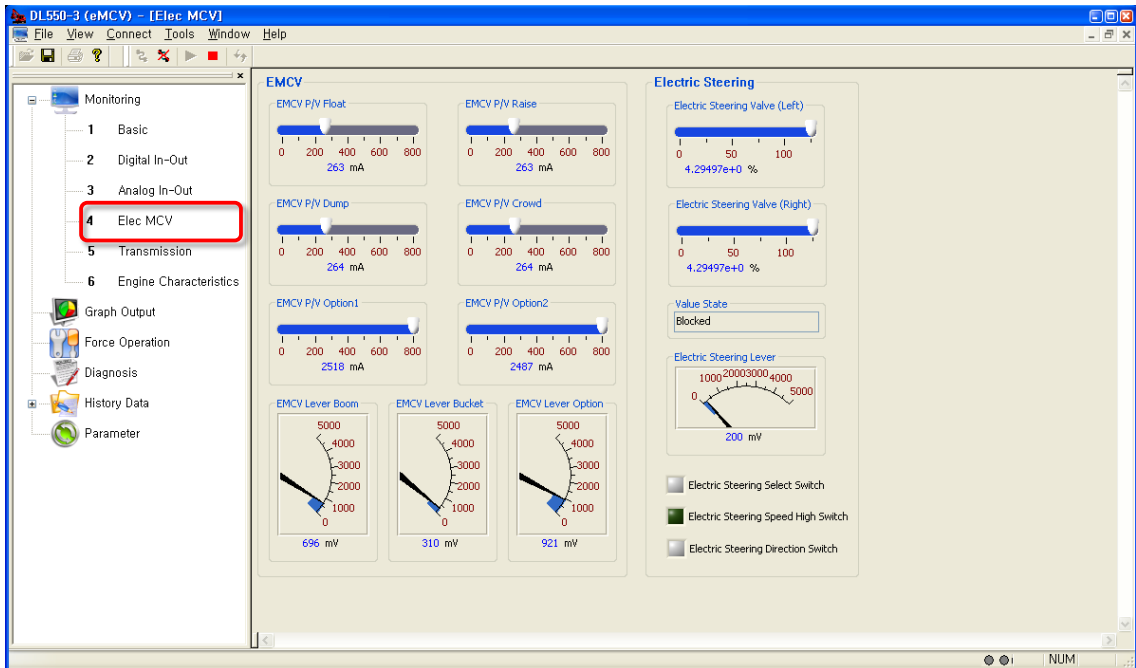
Note) The data displayed on the screen can be different, depending on the model. Please refer to the equipment specification.

6   Graph output

◈ The function provides plotted sensor data related with excavator/wheel loader performance in graphs and can save the measured data in a hard disc. It also enables to evaluate the performance of excavators by comparison and analysis of the measured data.

■ **The following data is used.**

◆ Excavator

- Engine Speed
- Throttle Position
- Percent Load at Current Speed
- Fuel Rate
- Boost Pressure
- Engine Oil Pressure
- Fuel Temp.
- Engine Oil Temp.
- Coolant Water Temp.
- DOC Intake Temperature
- DOC Outlet Temperature
- DPF Outlet Temperature
- DPF Pressure
- Fan Speed
- Intake Manifold Temp
- Total Fuel Consumption
- Acceleration Pedal Position
- Front Pump pressure
- Rear Pump pressure
- Boom Pressure
- Px Pressure
- Py Pressure
- Parking Break pressure (Pilot gear Pump Pressure)
- Alternator Voltage
- Battery Voltage
- Engine Control Dial

- TMS Voltage
- Water in Fuel Sensor
- Lh Thumb Wheel Voltage
- Rh Thumb Wheel Voltage
- Operating Oil Temperature
- Vehicle Speed (Real)
- Vehicle Speed
- Power Shift 1 P/V
- Power Shift 2 P/V
- Flow Control P/V
- Two-way P/V (open)
- Two way P/V (closed)
- Rotating P/V (CW)
- Rotating P/V (CCW)
- Pressure Control P/V1
- Pressure Control P/V2
- Boom Up Pressure
- Boom Down Pressure
- Arm Crowd Pressure
- Arm Dump Pressure
- Bucket Crowd Pressure
- Bucket Dump Pressure
- Swing Pressure
- Front Pump Pressure
- Rear Pump Pressure
- Travel Straight P/V

◆ Wheel Loader

- Engine Speed
- Throttle Position
- Percent Load at Current Speed
- Fuel Rate
- Boost Pressure
- Engine Oil Pressure
- Fuel Temp.
- Engine Oil Temp.
- Coolant Water Temp.
- DOC Intake Temperature
- DOC Outlet Temperature
- DPF Outlet Temperature
- DPF Pressure
- Acceleration Pedal Position
- Intake Manifold Temp
- Total Fuel Consumption
- Percent Torque
- Reference Torque
- Torque Converter Oil Temp
- Sump Oil Temp
- Brake Pedal Voltage
- Estimated Flow_Extend
- Estimated Flow_Retract
- Vehicle Speed
- ECO Level Percent

- Brake Oil Pressure
- Main Pressure
- Steer pressure
- Angle Sensor Boom
- Angle Sensor Bucket
- Electric Steer Joystick
- EMCV Joystick Boom
- EMCV Joystick Bucket
- EMCV Joystick Option(3rd)
- Alternator
- Battery Voltage
- EMCV P/V Float
- EMCV P/V Raise
- EMCV P/V Dump
- EMCV P/V Crowd
- EMCV P/V 3rd UP
- EMCV P/V 3rd Down
- Cooling Fan Control P/V
- Reverse Fan Solenoid Valve
- Unloading Solenoid Valve
- Starter Relay
- Boom Magnet
- Bucket Magnet

1. Select [View] – [Graph Output] from the DMS main screen, or double click [Graph Output] on the workspace window.
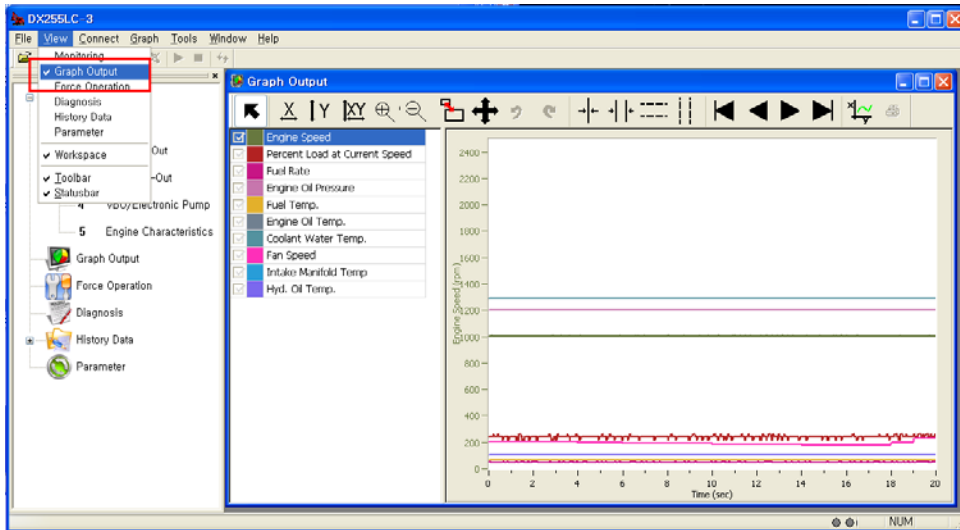
☞ When the graph mode is engaged, the following graph menu will appear.
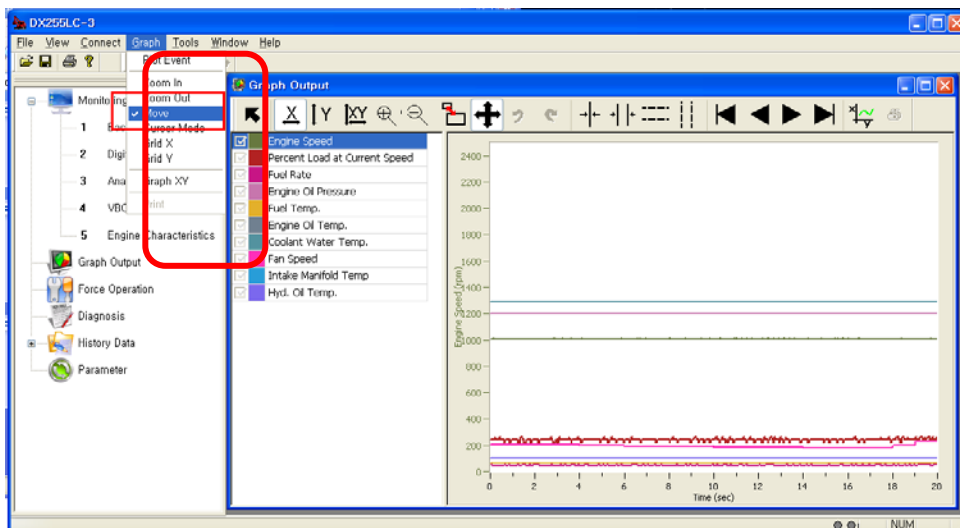
① **Zoom In:** The monitoring graph display will be expanded.
② **Zoom out:** The monitoring graph display will be shrunk.
③ **Move:** The monitoring graph display will be moved up/down/left/right.
④ **Grid X:** A grid line will be displayed to the X axis.
⑤ **Grid Y:** A grid line will be displayed to the Y axis.
⑥ **Graph XY**: Relation will be displayed using the monitored data.
⑦ **Print:** A graph screen will be printed out.

2. Select **[Connect]-[Connect]** menu or click the ⬆ (Connect icon) icon and ▶ (Start monitoring icon) to display a graph on the DMS screen.

3. The monitoring cycle is 20ms.
   (If monitoring-related windows are opened on the DMS screen, besides the graph, the monitoring cycle will be changed to 100ms.)

4. If you right click on the window that shows the data type, you can modify several data.
(When graph display is stopped (■))
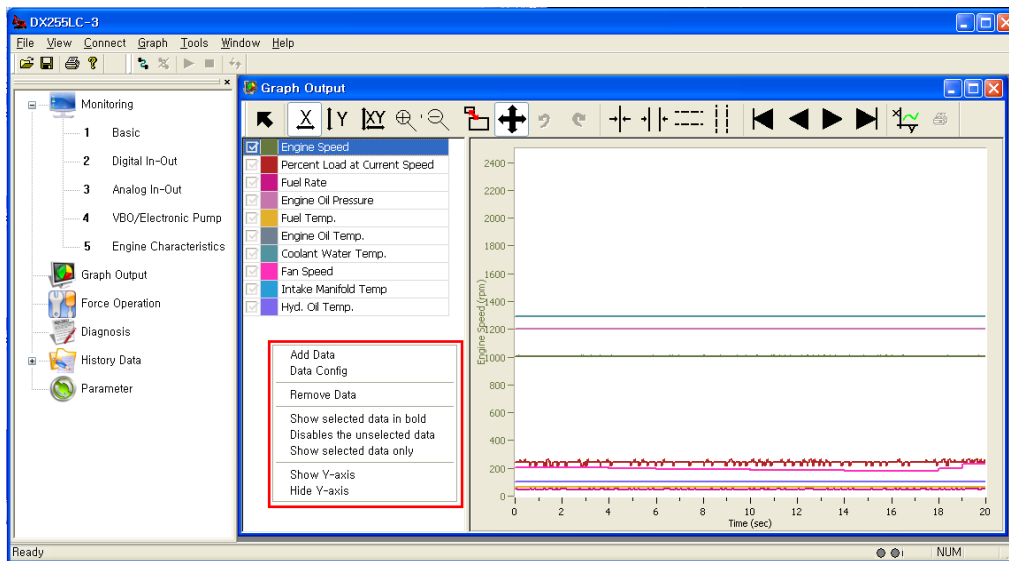
1) Add Data: You can select the data using the [Select All], [Select None], [Select Reverse] button on the "Select Data" window.
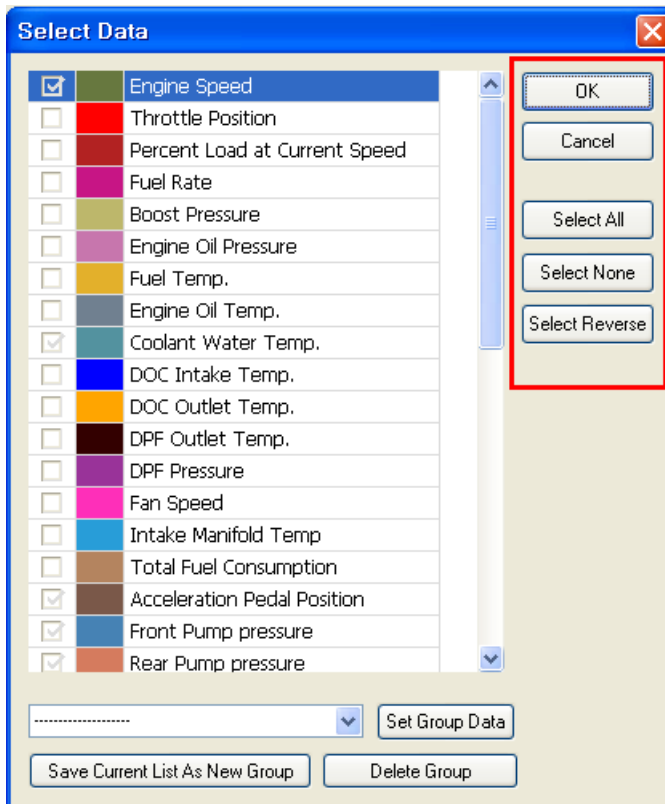
① **OK:** Click [OK] to select the data after modification.
② **Cancel:** Click this button to cancel data selection
③ **Select All:** Click this button to select all data.

④ **Select None:** Click this button to unselect all data.

⑤ **Select Reverse:** Click this button to reverse the data selection status. Selection will be cancelled, and the unselected data will be selected.

Note 1) Up to 10 data can be monitored on graph display.
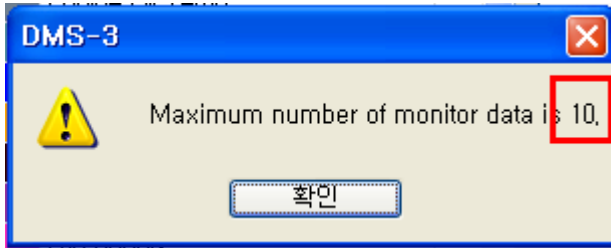
Note 2) Up to 20 data can be monitored on graph display in the [Expert Mode].
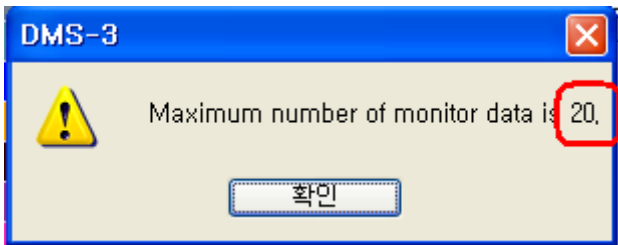
2) Graph Property Setting: You can modify Scale, Offset, and Color.

① Modifying Scale and Offset

☞ You can see that Engine Oil pressure is **6.1 Bar** on graph display.
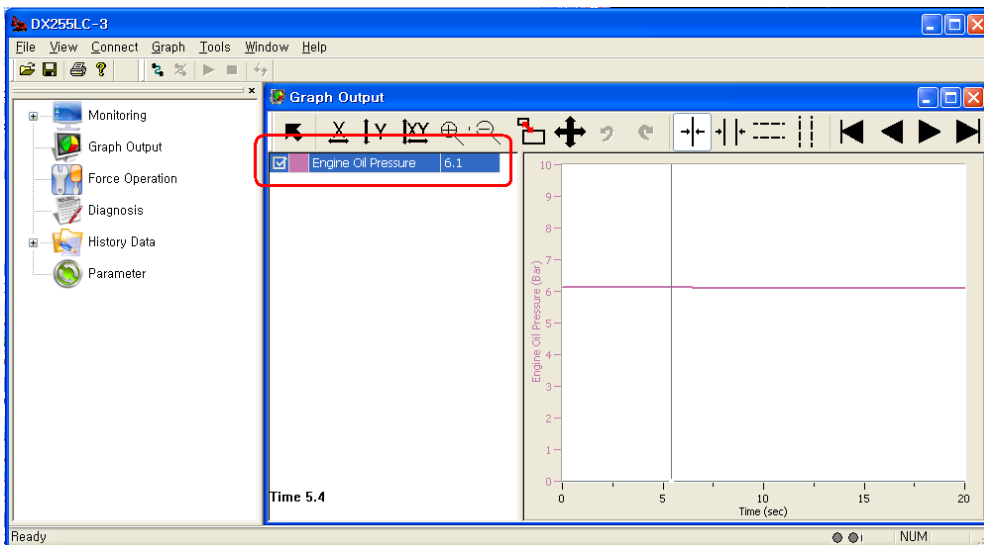
② When you open the "Graph Property Setting" window with right mouse click, change the Scale and Offset as shown below and click [OK].
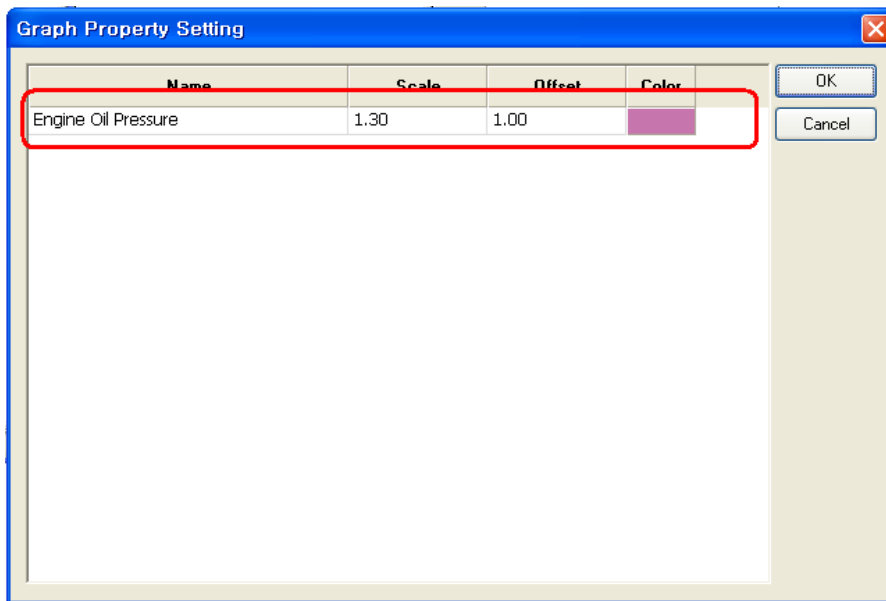
③ You can see that Engine Oile Pressure is **8.9 Bar,** as shown in the figure.
(Engine Oil Pressure * Scale + Offset = Modified Engine Oil pressure)
⇒ **6.1 * 1.3 + 1 = 8.9**
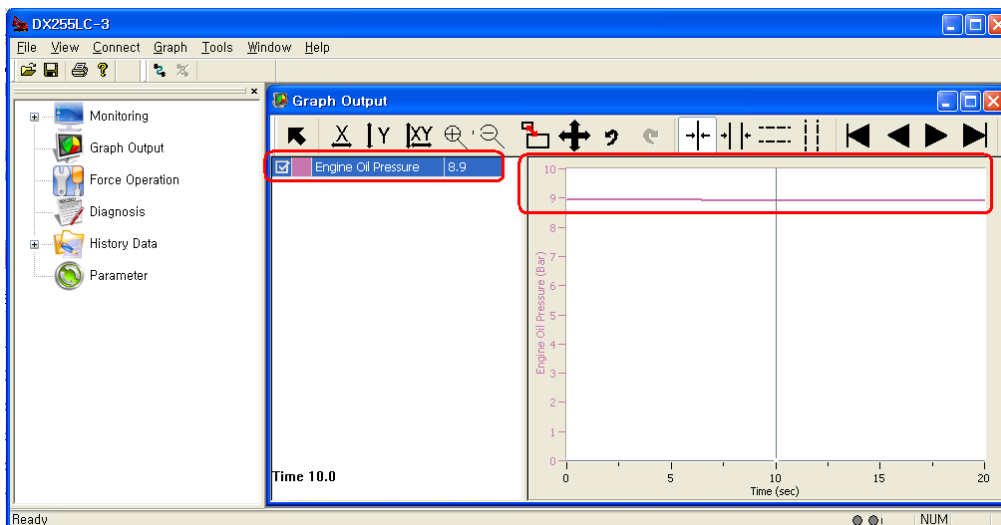
④ Changing Color

☞ Click the Color column in the "Graph Property Setting" window and select the color to change and then, click [OK].
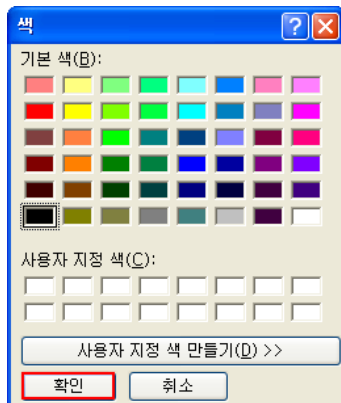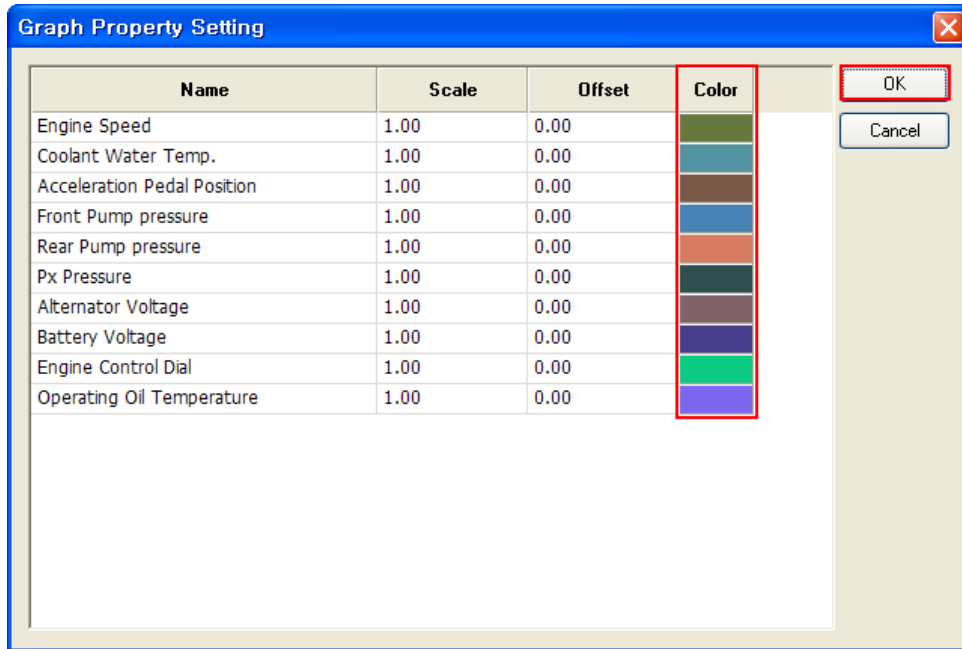
3) Remove Data**:** The data displayed on the DMS screen will be removed.
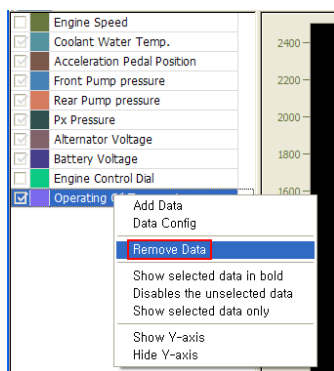
[Before data removal]   [After data removal]
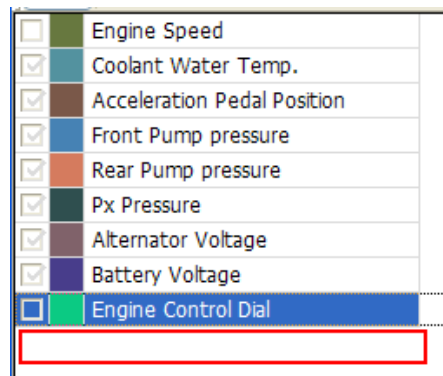
4) Show selected data in bold: Only the selected data will be displayed in bold fonts.
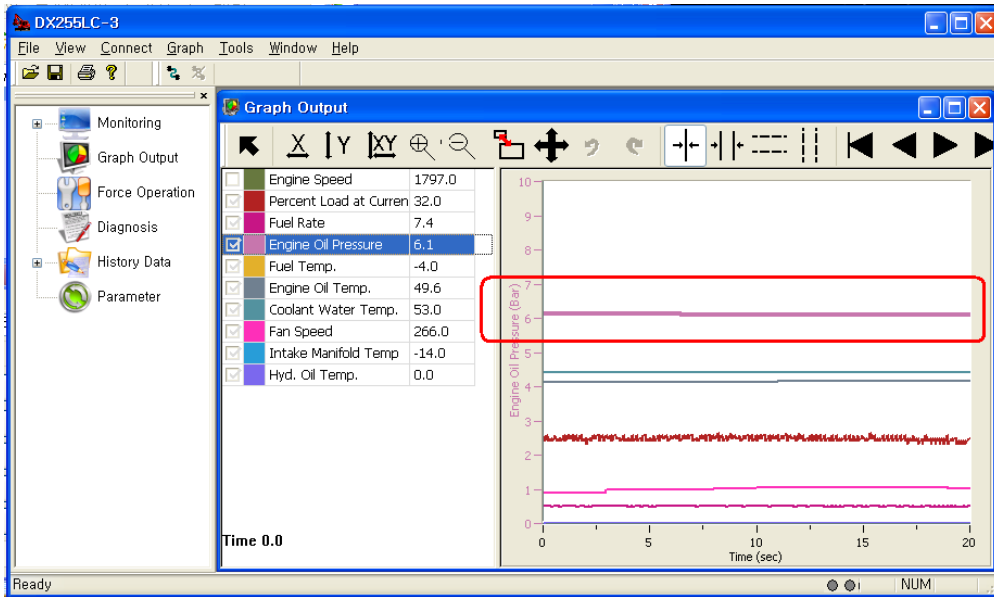
5) Disable unselected data: The color of the unselected data will disappear.
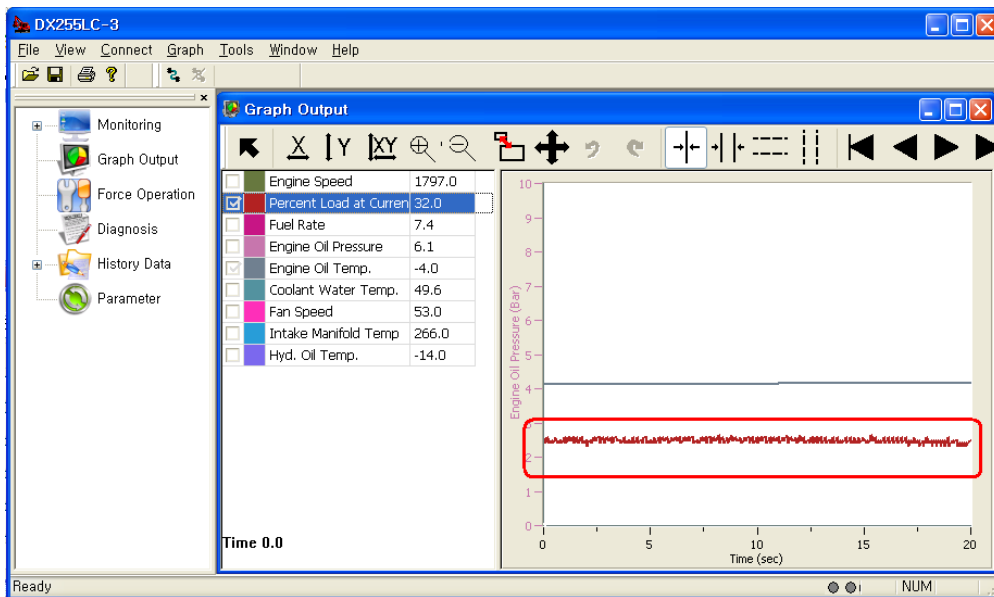
6) Show selected data only: Only the selected data will be displayed, and the remaining data will be hidden.

Note) When the graph display window is opened (▶), only (Show selected data in bold, Disable unselected data, Show selected data only) will be applied.
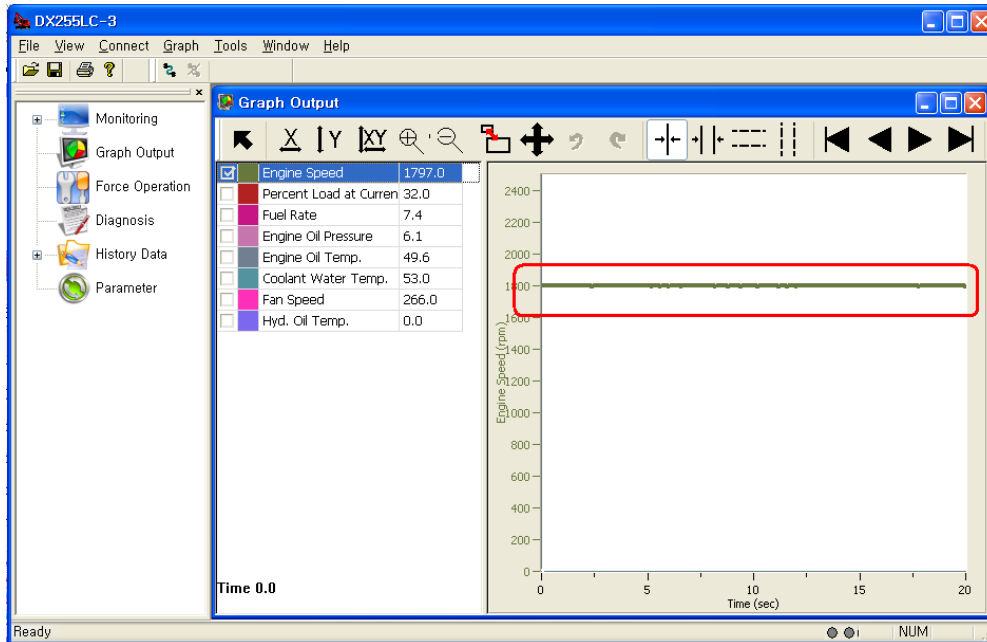
7) Show Y-axis

Example) If you select the "Engine Speed" checkbox and select the "Show Y-axis" menu, the Engine RPM will be displayed on the Y axis of the graph, as shown below.
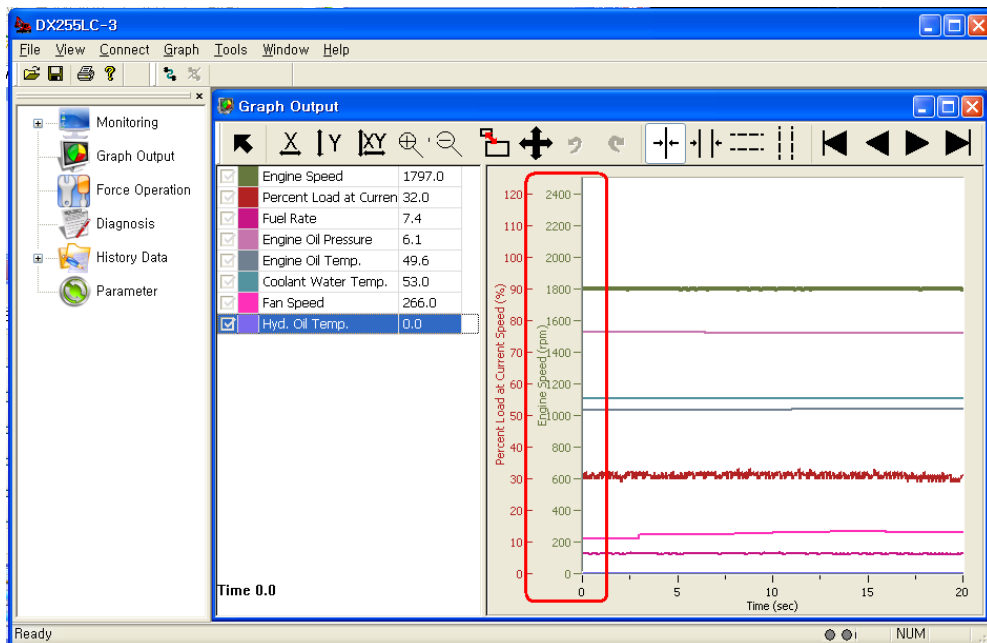
7) Hide Y-axis
Example) If you select the "Engine Speed" checkbox and select the "Hide Y-axis" menu, the Engine RPM will be hidden from the Y axis of the graph, as shown below.
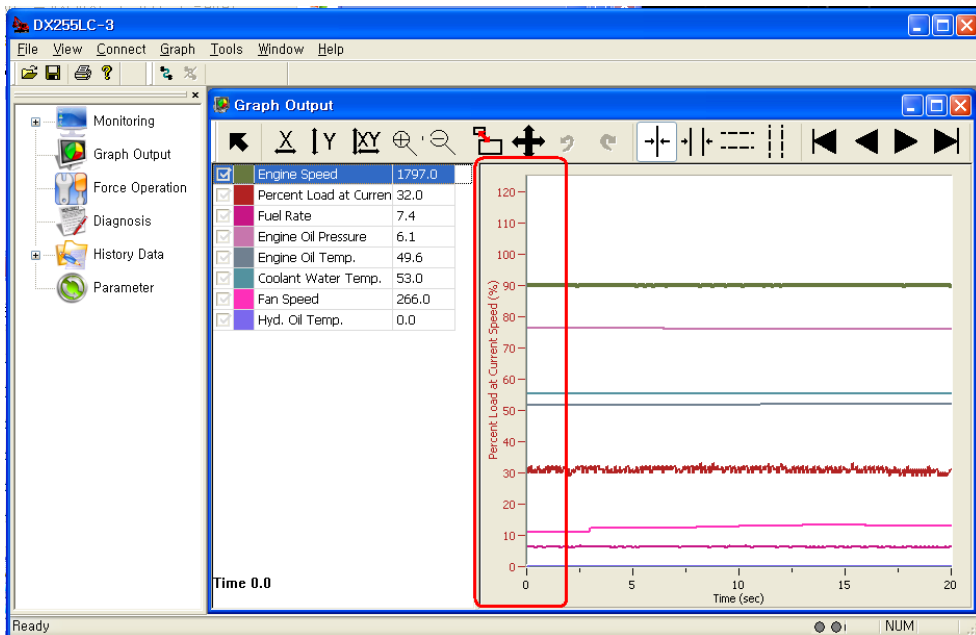
5. The following section describes icons on the graph.
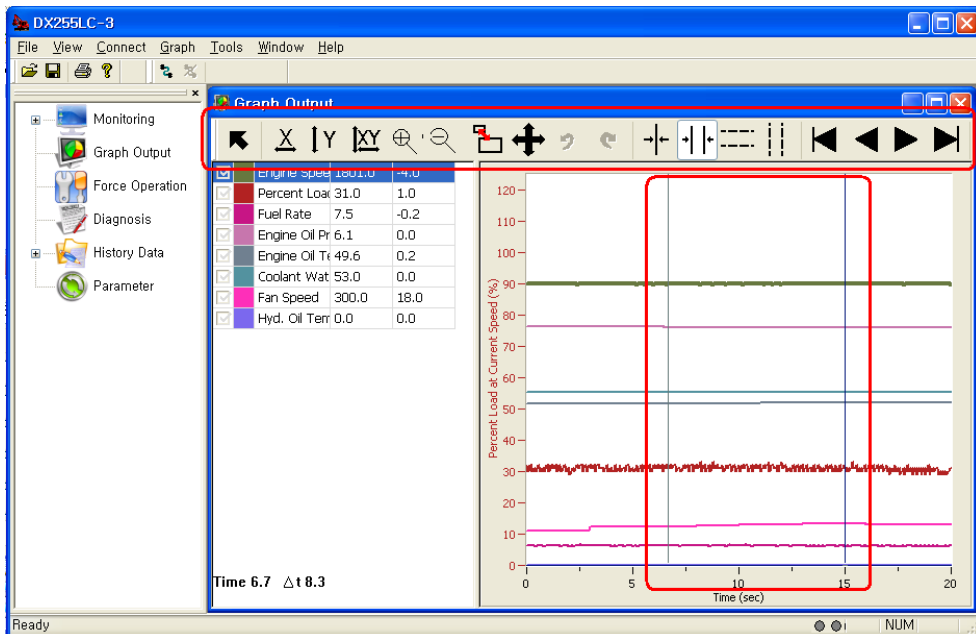
1) Time 6.7 Δt8.3" shows the time difference in the graph.

2) Each time you click **[Alt + data name]** with your left mouse button, the data name and scope will be created on the Y axis of the graph screen.
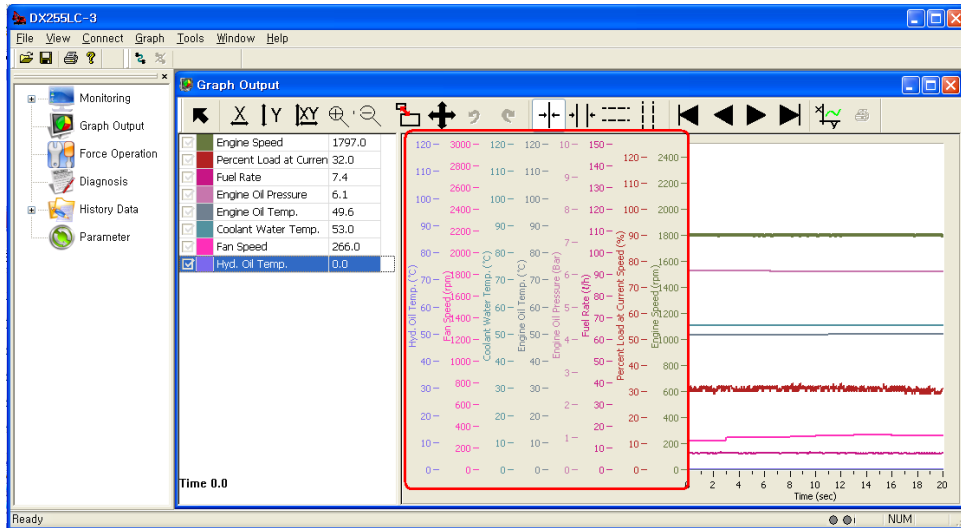
X	Move the output data to the left/right (Zooming in/out is applicable for the left and right only.)
Y	Move the output data up/down (Zooming in/out is applicable for up and down movement only.)
XY	Move the output data to the up/down/left/right direction (Zooming in/out is applicable for up/down/left/right movement.)
⊕	Increase the image size of the output data.
⊖	Decrease the image size of the output data.
⬚	Expand the selected area.
✛	Needed to move the output data to the up/down/left/right direction.
↺	Move to the previous step of graph display.
↻	Move to the next step of graph display.
→|←	Check the position value of the output data.
→||←	Check the time value in the output data selection area.

---- ----	Y-axis grid (A Y-axis will be created for each data.)
¦ ¦	X-axis grid
◄|	Move to the beginning of the output data.
◄	Move to the previous step of the output data.
►	Move to the next step of the output data.
|►	Move to the end of the output data.

3) : The name of the graph selected from the left side list will be selected, if the graph line is selected from the graph screen after logging.

When selected, the name of the selected graph, and X and Y value will be displayed on the bottom selection window.
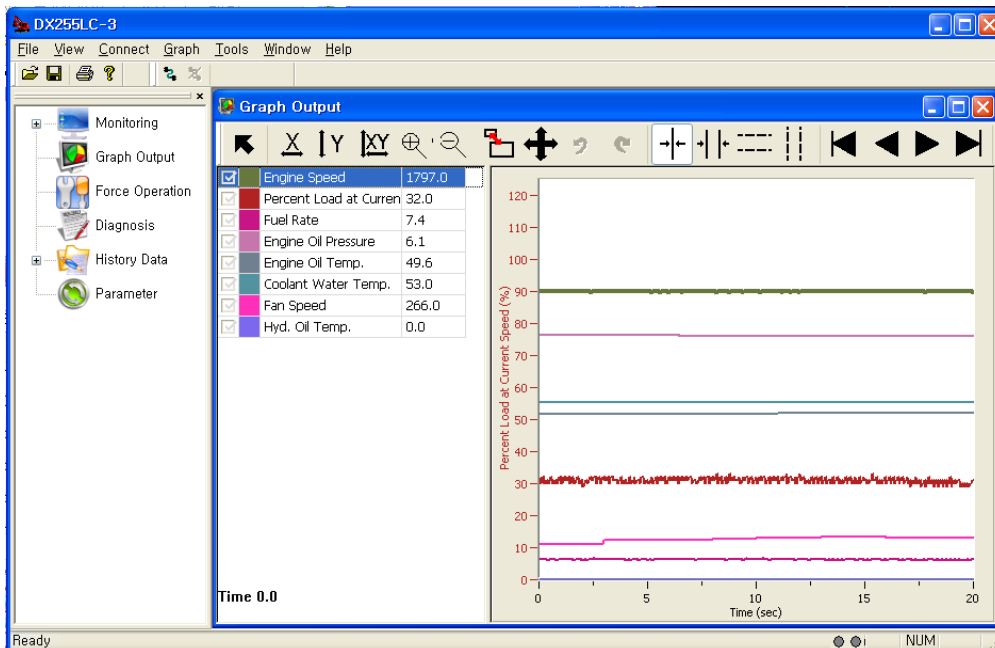
4) : Data relations can be checked, using the monitored data.

① Monitor the data and click the XY Chart icon.
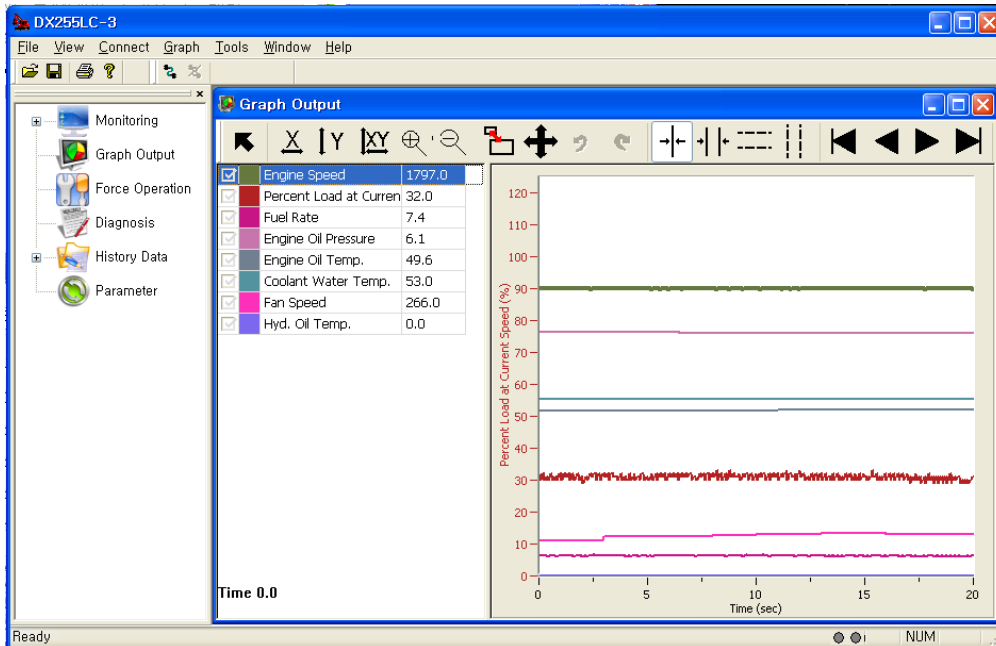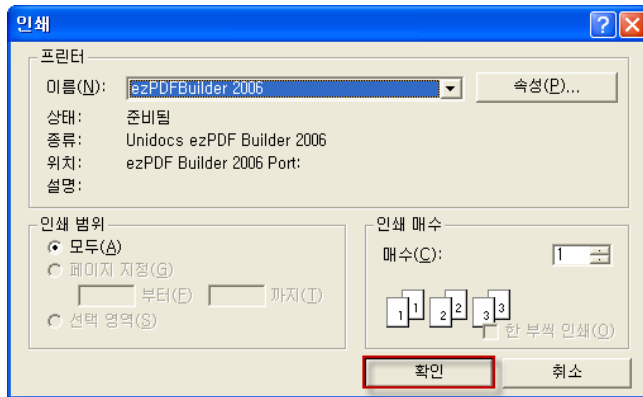
② Select the data to display on the screen from the monitored data items, and click the "Draw Graph" button. If monitoring is in progress, the graph will be updated continuously.

Note 1) If you monitor the XY graph for a long time, the program can be slowed down.
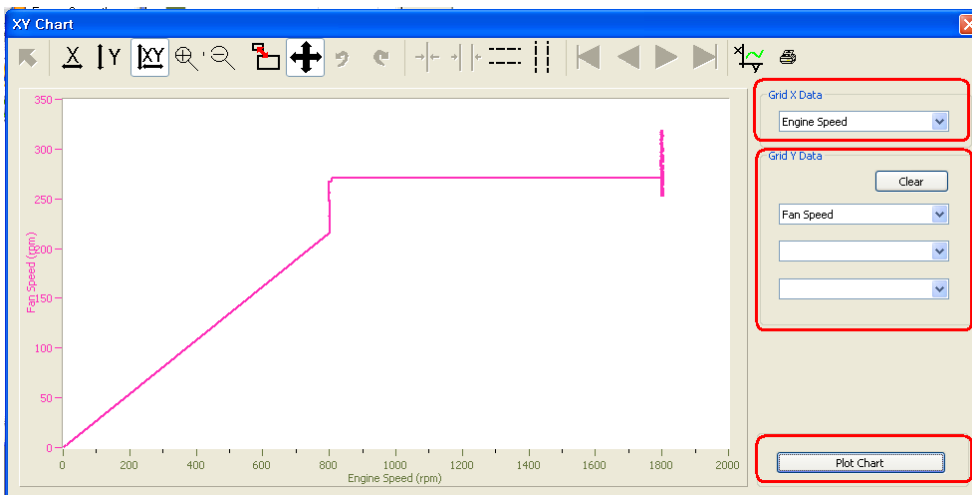
5) 🖶 : The displayed graph will be printed out.

Click the Print icon, set the printer, and click the [OK] button.
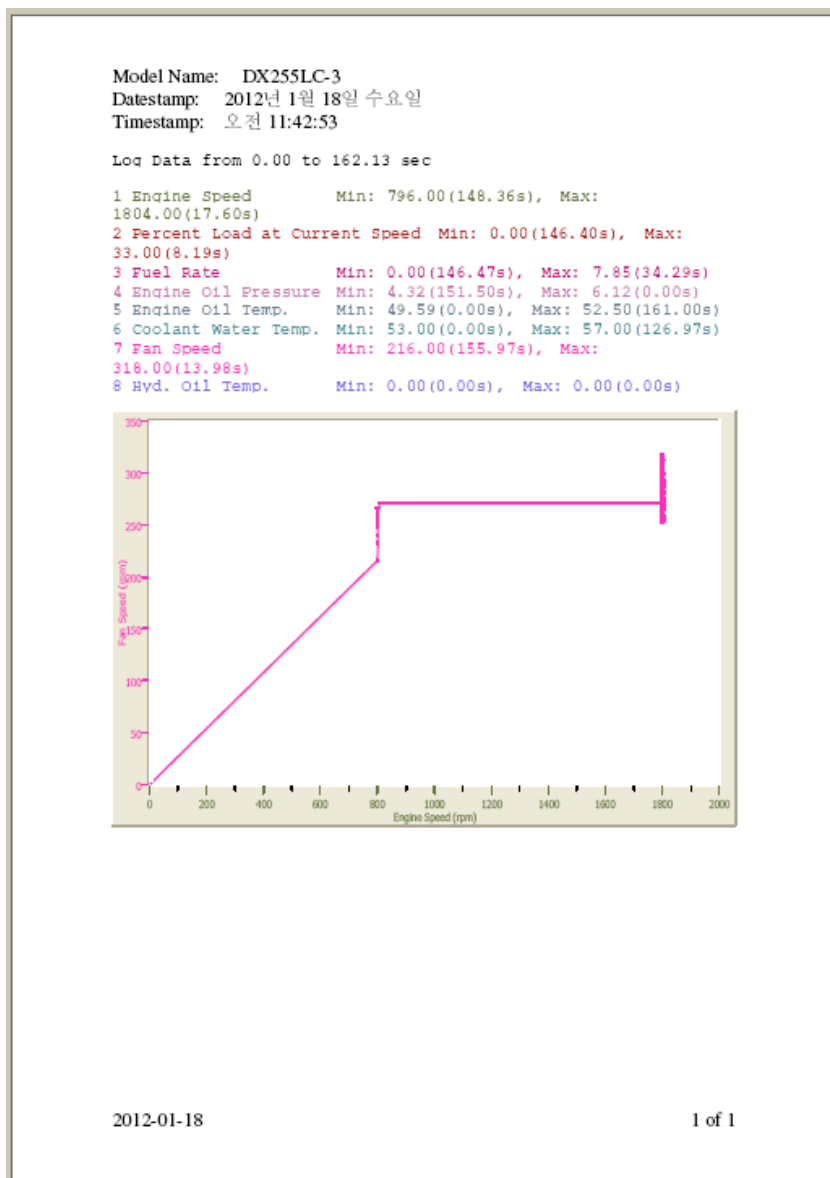
6. When printing out the graph, the [Export, Import] menu will be created under the File menu.
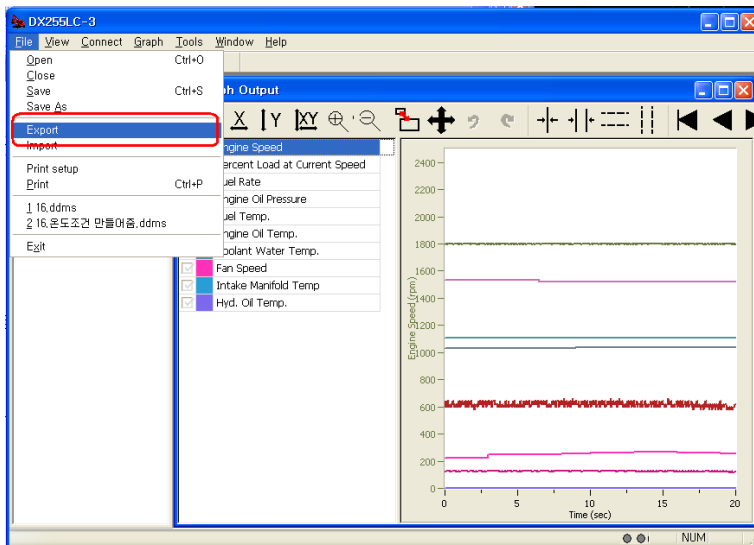
1) **Export:** The graph output data can be saved as a **(.csv)** file.

① Select **[File]-[Export]** menu. The data cannot be saved while the data is received.)
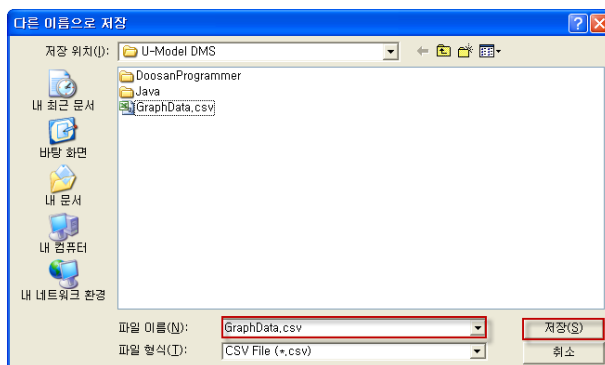
② When a **[Save As…]** dialog box appear, select the driver and folder to save the file, or type the saving location in "Save in".

③ Select a folder to save the file.

④ Input the name of the file to save in "File name" and click the [Save] button.

⑤ The file extension is (.csv).

⑥ When the "Export" dialog box appear, select the data to export and click [OK].
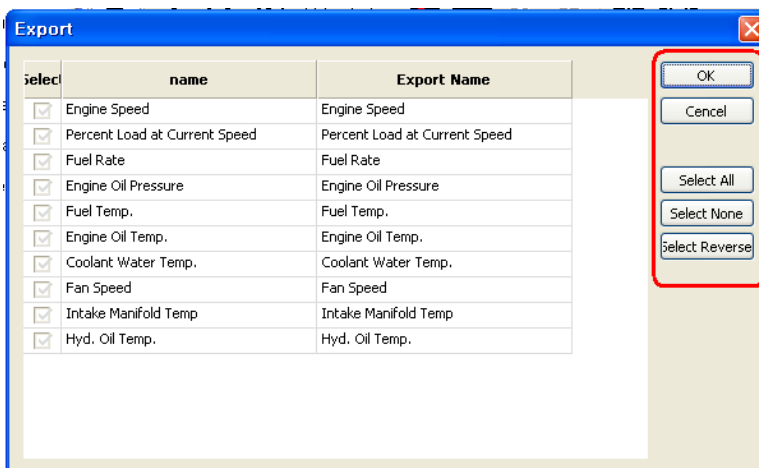
2) **Import:** The graph data save din the **(.csv)** file can be fetched.

① Select **[File]-[Import]**.

② When the **[Open]** dialog box appear, select the file **(.csv)** to import and click the [Open] button.
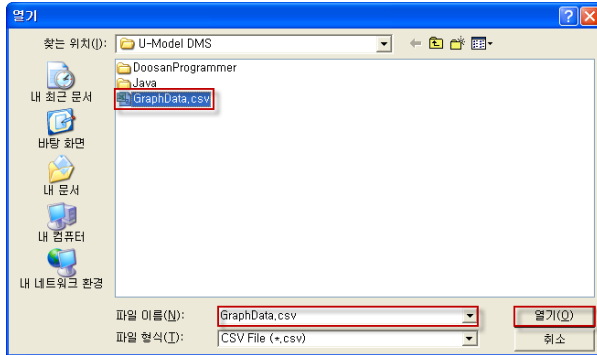
③ When the "Import" dialog box appear, select the data to import and click [OK].
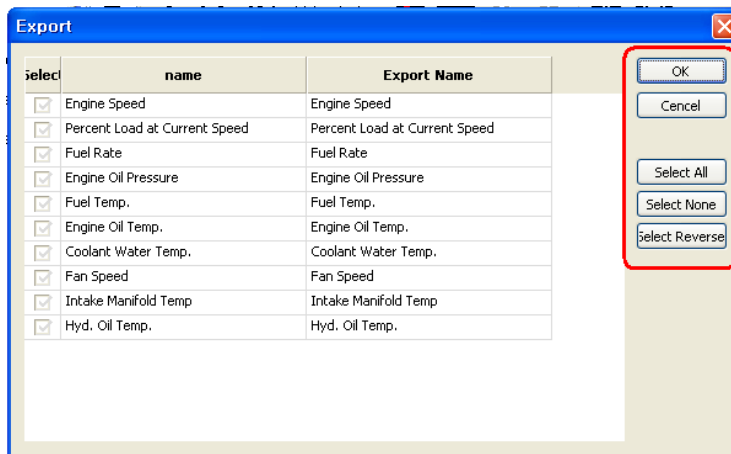
3) If you open the CSV file, the saved data will be displayed as shown below.
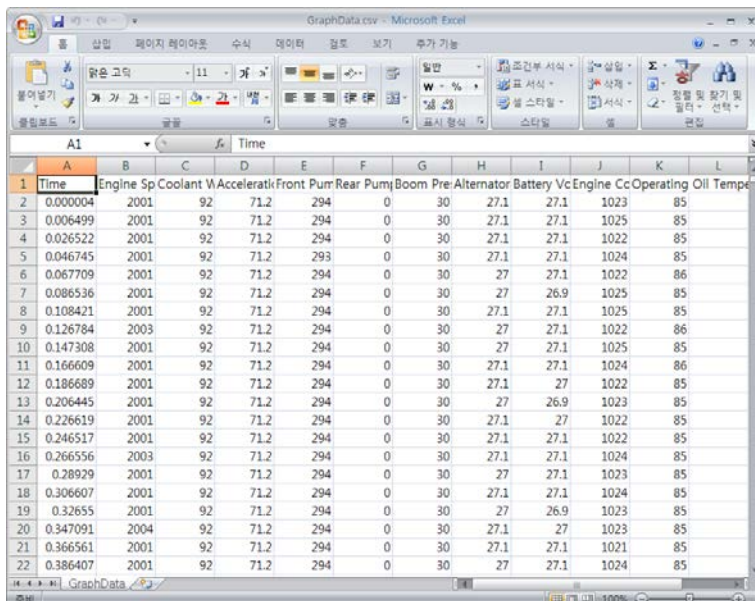
7 Force Operation

◆ Use this function to start the Controller (EPOS/VCU) by force. You can implement the situation artificially that cannot be realized in actual equipment, using this function.

■ Force Operation

1. Select **[View]** – **[Force Operation]** menu on the DMS main screen, or double click **[Force Operation]** on the workspace window.
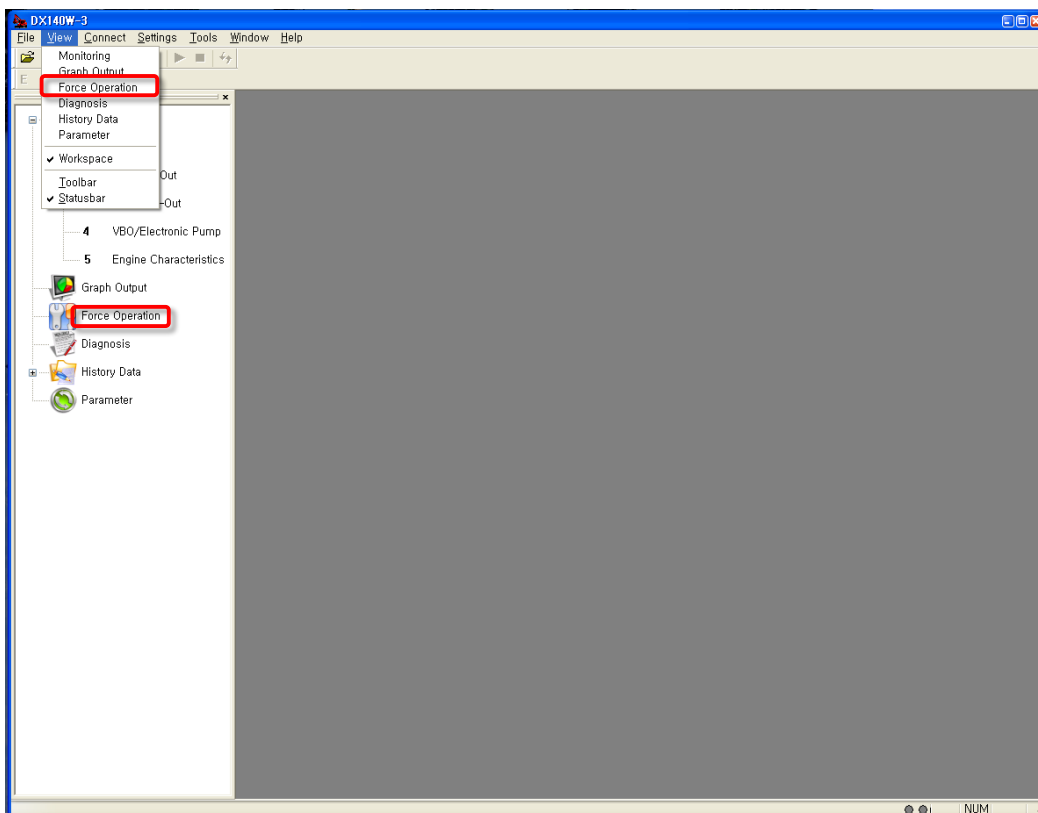
2. If you run the "Force Operation" menu, the following "Enter Password" window will appear as shown below.
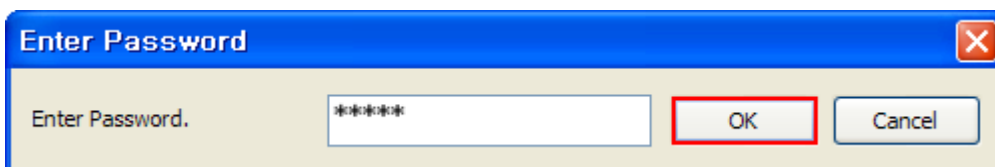
Note) You should input the password to start "force operation" because it requires your attention.

3. The following "Force Operation" window will appear, if you input the correct password and click the [OK] button.
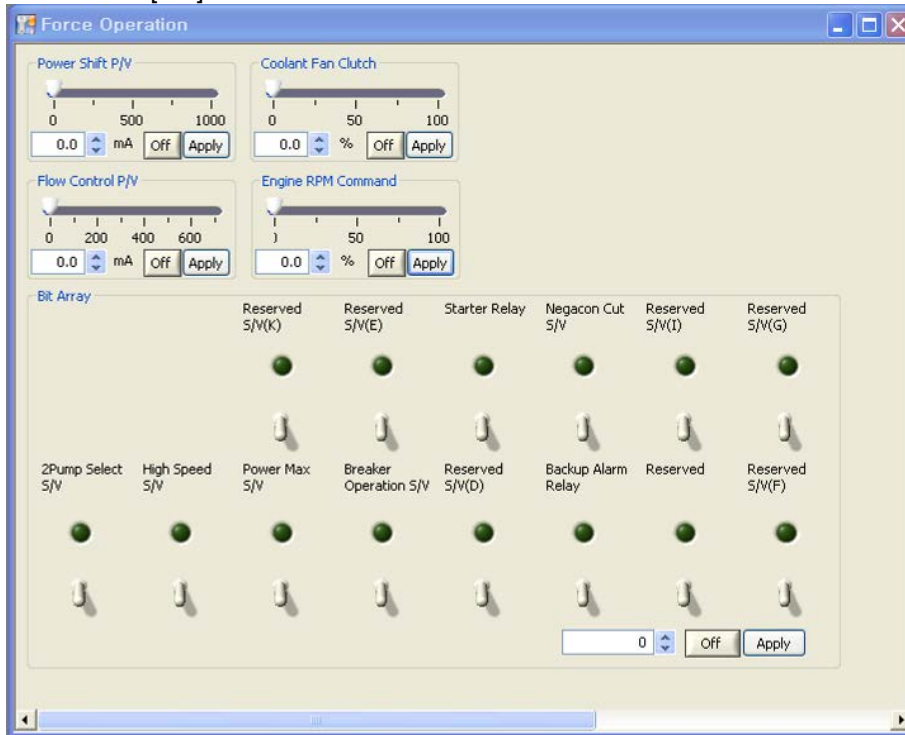
4. You can check the graph output data that is started by force, as shown below.
   Ex) Output data graph when applying the force operation by setting the "Engine RPM Command" to 50%

1) Click the [On] button of the item to start by force.
2) Set value and click the [Apply] button to operate by force selectively.
3) Click the [Off] button to stop force operation.
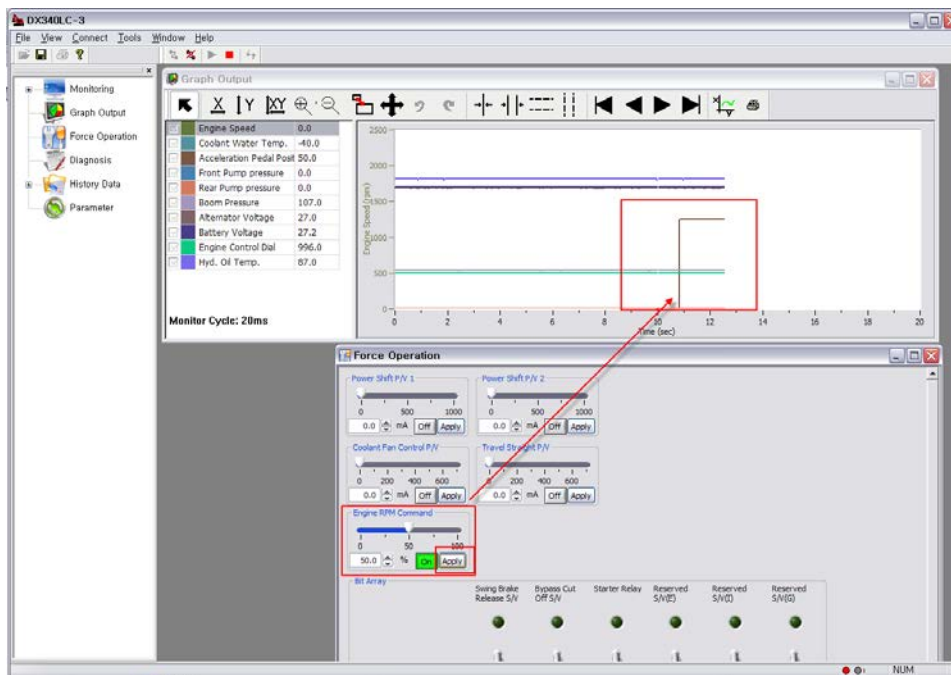
5. The following force operation items are provided.

◆ Crawler Excavator (14~30 ton)

- Power Shift P/V
- Coolant Fan Clutch
- Flow Control P/V
- Engine RPM Command
- Starter Relay
- Negacon Cut S/V

- 2Pump Select S/V
- High Speed S/V
- Power Max S/V
- Breaker Operation S/V
- Backup Alarm Relay

◆ Crawler Excavator (30 ton)

- Power Shift P/V
- Coolant Fan Clutch
- Flow Control P/V
- Engine RPM Command
- Starter Relay
- Negacon Cut S/V

- 2Pump Select S/V
- High Speed S/V
- Power Max S/V
- Breaker Operation S/V
- Backup Alarm Relay

◆ Crawler Excavator (VBO, 34/38ton)

- Power Shift 1 P/V
- Power Shift 2 P/V
- Coolant Fan Clutch
- Travel Straight P/V
- Engine RPM Command
- Swing Brake Release S/V

- Bypass Cut Off S/V
- Starter Relay
- 2Pump Select S/V
- High Speed S/V
- Breaker Operation S/V
- Backup Alarm Relay

◆ Crawler Excavator (30ton~)

- Power Shift 1 P/V
- Coolant Fan Clutch
- Flow Control P/V
- Engine RPM Command
- Starter Relay
- Reversed S/V

- 2Pump Select S/V
- High Speed S/V
- Power Max S/V
- Breaker Operation S/V
- Backup Alarm Relay

◆ Wheel Excavator

- Power Shift 1 P/V
- Coolant Fan Clutch
- Flow Control P/V
- Engine RPM Command
- Negacon Cut S/V
- Starter Relay
- High Speed Relay
- Reversed S/V
- Forward S/V

- 2Pump Select S/V
- Inching Relay
- Power Max S/V
- Breaker Operation S/V
- Low Speed Relay
- Backup Alarm Relay
- Backup Lamp Relay
- Cruise S/V

◆ Wheel Loader (Doosan E/G)

- Fan Control P/V
- Engine RPM Command
- Starter Relay
- Reverse Fan S/V

- Boom Magnet
- Bucket Magnet
- Unloading S/V

◆ Wheel Loader (Scania E/G)

- Fan Control P/V
- Engine RPM Command
- Reverse Fan S/V
- Boom Magnet
- Bucket Magnet
- Unloading S/V
- Engine Start

- EMCV P/V Float
- EMCV P/V Raise
- EMCV P/V Dump
- EMCV P/V Crowd
- EMCV P/V Option1
- EMCV P/V Option2

8 Diagnosis

◆ Use this function to check the current and past malfunction history of the controller (EPOS/VCU).

■ Current Diagnostic View

1. Double click **[Diagnosis]** on the workspace window of the DMS main screen.
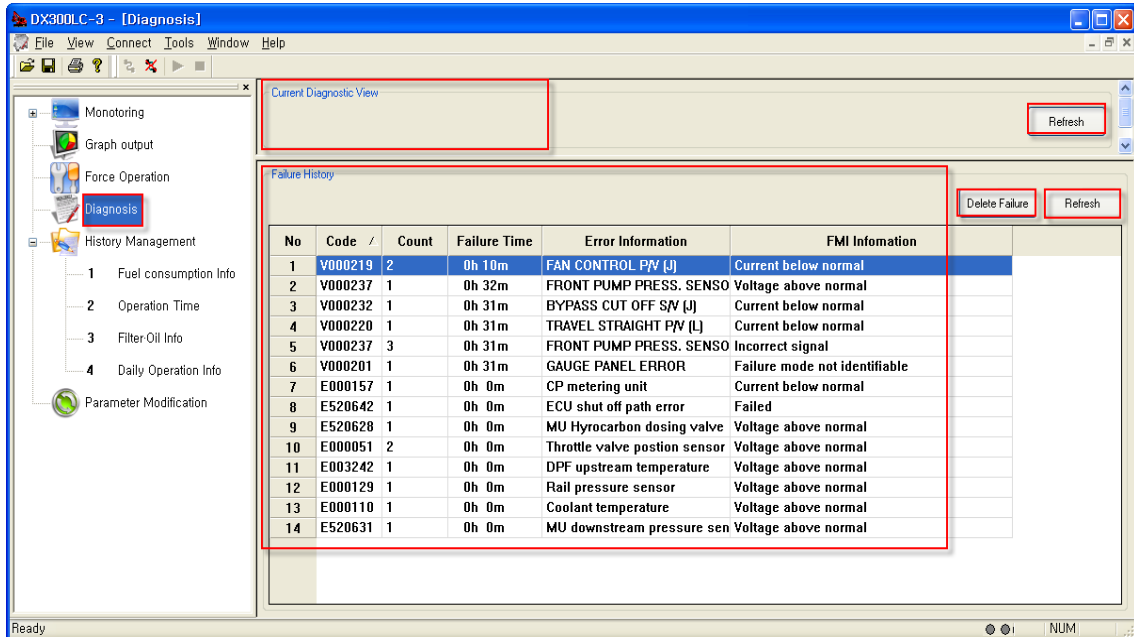
2. You can check the code, error information, and FMI information on the current error. (See appendix.)

3. Click [**View**] – [**Refresh**] menu, or press the [**F5**] key, or the [**Refresh**] button on the "Current Malfunction Information" window to retrieve the most up-to-dated malfunction information.

■ Past Malfunction History

1. Double click **[Diagnosis]** on the workspace window of the DMS main screen.
2. You can check the code, frequency, occurred time, error information, and FMI information of the past malfunction. (See appendix.)
3. Click the [Delete Failure] button, such as entering a password will be generated
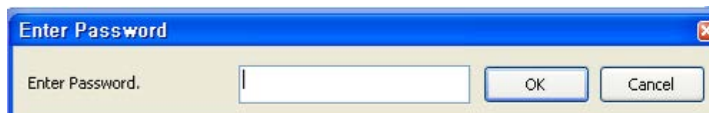
Note) Must enter a password to delete failure history as a major factor to check equipment Failure history

4. Enter the password and then click the OK button will delete the past history of failure
5. Click **[View]** – **[Refresh]** menu, or press the **[F5]** key, or the **[Refresh]** button on the "Past Malfunction Information" window to retrieve the most up-to-dated past malfunction information

9 History Data

9.1 Fuel Consumption

◈ Use this function to get various fuel information, such as the fuel use by work mode, accumulated operation time, filter and oil, and daily operation information.

■ Fuel Consumption Info.

▶ Fuel Consumption information by mode can be found
   1. Select **[View]** – **[History]** menu on the DMS main screen, or double click **[History Management]** – **[Fuel Consumption Info.]** on the workspace window.

   ◆ Excavator
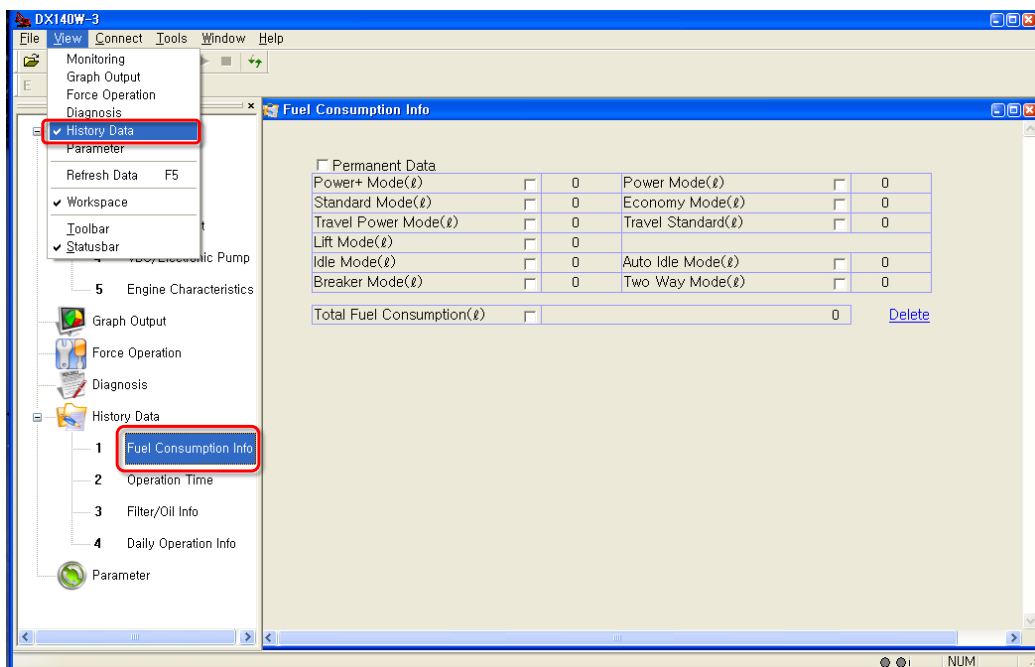
◆ Wheel loader
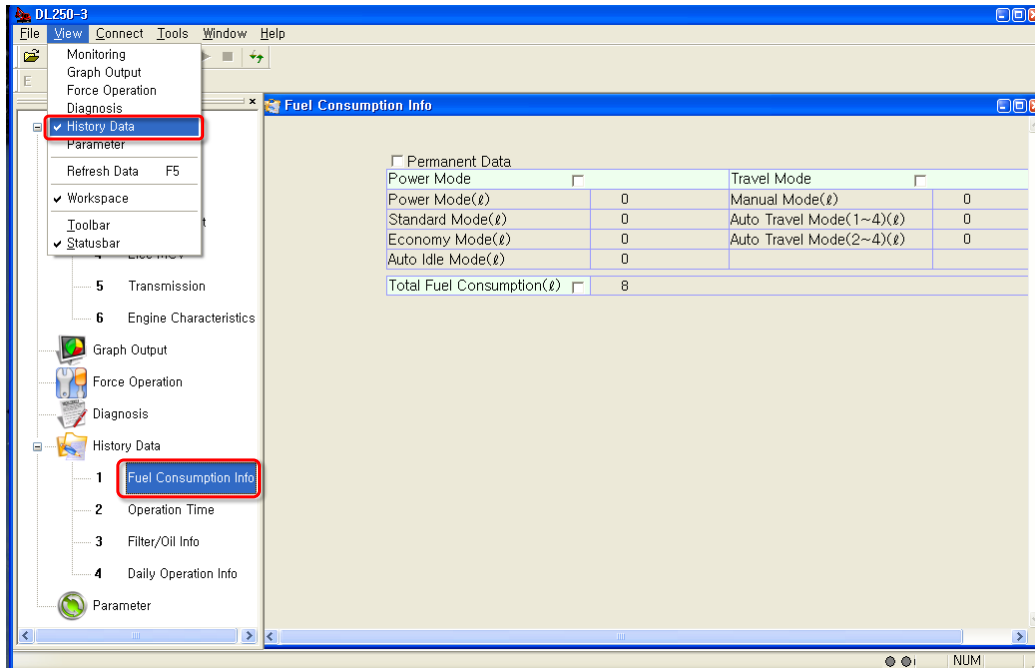
2. The fuel consumption information on each mode that is related to the operation of the excavator/wheel loader will be displayed.
3. The fuel consumption information history of each mode can be deleted selectively.
4. The following fuel consumption information will be provided by this screen.

◆ Excavator

- Power+ Mode
- Power Mode
- Standard Mode
- Economy Mode
- Travel Power Mode

- Travel Standard Mode
- Lift Mode
- Idle Mode
- Auto Idle Mode
- Total Fuel Consumption

◆ Wheel Loader

<Power Mode>

- Power Mode
- Standard Mode

<Travel Mode>

- Manual Mode
- Auto Travel Mode(1~4)

- Economy Mode
- Auto Idle Mode

- Auto Travel Mode(2~4)
- Total Fuel Consumption

9.2 Operation Hour

◈ Use this function to obtain the information on the fuel use by work mode, accumulated operation time, filter and oil, and daily operation time.

■ Operation Time
➤ Operation time information can be found by mode

1. Double click **[History Data]** – **[Operation Time]** on the workspace window of the DMS main screen.

◆ Excavator

◆ Wheel Loader

2. The operation time of each mode and the total operation time will be displayed when the excavator/wheel loader is running.
3. The history of the operation time by mode can be deleted selectively.
4. The following operation time information will be displayed on this screen.

◆ Excavator
1) Work Mode
① Operating Mode

- Power+ Mode,
- Power Mode,
- Standard Mode,
- Economy Mode,
- Auto Idle Mode,

- Idle Mode,
- Travel Power (W),
- Travel Standard (W),
- Lift Mode

② Attachment

- Max. Pressure Mode,
- Breaker Mode,

- Two-Way Mode

2) Travel Mode
① Work/Travel (W)

- Work Mode

- Travel Mode

② Travel Mode

- Travel 1 Speed Mode

- Travel 2 Speed Mode

3) Temperature

① Hydraulic Temp.

- Less than 30
- 31　　　～50
- 51　　　～75
- 76　　　～85
- 86　　　～95
- Over 96

② Coolant Temp.

- Less than 40
- 41　　　～60
- 61　　　～85
- 86　　　～95
- 96　　　　～104
- Over 105

4) Engine State

① Engine RPM

- Less than 1200rpm
- 1200　　　　～1300rpm
- 1300　　　　～1400rpm
- 1400　　　　～1500rpm
- 1500　　　　～1600rpm
- 1600　　　　～1700rpm
- 1700　　　　～1800rpm
- 1800　　　～1900rpm
- 1900　　　～2000rpm
- Over 2000rpm

② Engine Load

- Over 100%
- ～100%
- ～90%
- ～80%
- ～70%
- ～60%
- ～50%
- ～40%

5) Engine Torque by Speed Zone

Zone 1	90%~	1200rpm
Zone 2	90%~	1200~1400rpm
Zone 3	90%~	1400~1600rpm
Zone 4	90%~	1600~1800rpm
Zone 5	90%~	1800~rpm
Zone 6	70~90%	~1200rpm
Zone 7	70~90%	1200~1400rpm
Zone 8	70~90%	1400~1600rpm
Zone 9	70~90%	1600~1800rpm
Zone 10	70~90%	1800~rpm
Zone 11	50~70%	~1200rpm
Zone 12	50~70%	1200~1400rpm
Zone 13	50~70%	1400~1600rpm
Zone 14	50~70%	1600~1800rpm
Zone 15	50~70%	1800~rpm
Zone 16	30~50%	~1200rpm
Zone 17	30~50%	1200~1400rpm
Zone 18	30~50%	1400~1600rpm
Zone 19	30~50%	1600~1800rpm
Zone 20	30~50%	1800~rpm
Zone 21	~30%	~1200rpm
Zone 22	~30%	1200~1400rpm
Zone 23	~30%	1400~1600rpm
Zone 24	~30%	1600~1800rpm
Zone 25	~30%	1800~rpm

6) By Pump Load

① Front Pump Load

- Less than 50bar
- ~100bar
- ~150bar
- ~200bar

- ～250bar
- ～300bar
- Less than relief pressure
- Relief pressure

② Rear Pump Load

- Less than 50bar
- ~100bar
- ~150bar
- ～200bar

- ～250bar
- ～300bar
- ～ Less than relief pressure
- Relief pressure

◆ Wheel Loader

1) Work Mode

① Operating Mode

- Power Mode
- Standard Mode,

- Economy Mode,
- Auto Idle Mode

② Auto Travel Mode

- Manual Mode,
- Auto Travel Mode(1~4),

- Auto Travel Mode(2~4)

2) Engine State

① Engine RPM

- Less than 1200rpm
- 1200　　　　～1300rpm
- 1300　　　　～1400rpm
- 1400　　　　～1500rpm
- 1500　　　　～1600rpm

- 1600　　　　～1700rpm
- 1700　　　　～1800rpm
- 1800～1900rpm
- 1900　　　　～2000rpm
- 2000rpm Over

② Engine Torque

- Over 100%
- ～100%
- ～90%
- ～80%

- ～70%
- ～60%
- ～50%
- ～40%

3) Engine Torque - Speed Zone

Zone 1	90%~	1200rpm
Zone 2	90%~	1200~1400rpm
Zone 3	90%~	1400~1600rpm
Zone 4	90%~	1600~1800rpm
Zone 5	90%~	1800~rpm
Zone 6	70~90%	~1200rpm
Zone 7	70~90%	1200~1400rpm
Zone 8	70~90%	1400~1600rpm
Zone 9	70~90%	1600~1800rpm
Zone 10	70~90%	1800~rpm
Zone 11	50~70%	~1200rpm
Zone 12	50~70%	1200~1400rpm
Zone 13	50~70%	1400~1600rpm
Zone 14	50~70%	1600~1800rpm
Zone 15	50~70%	1800~rpm
Zone 16	30~50%	~1200rpm
Zone 17	30~50%	1200~1400rpm
Zone 18	30~50%	1400~1600rpm
Zone 19	30~50%	1600~1800rpm
Zone 20	30~50%	1800~rpm
Zone 21	~30%	~1200rpm
Zone 22	~30%	1200~1400rpm
Zone 23	~30%	1400~1600rpm
Zone 24	~30%	1600~1800rpm
Zone 25	~30%	1800~rpm

4) Pump Load

① Pump Load Strength

- Less than 50bar
- ～100bar
- ～150bar
- ～200bar
- ～250bar
- ～300bar
- Over 300bar

5) Temperature

① T/M Oil Temp

- Less than 49
- 50~69
- 70~84
- 85~99
- 100~119
- Over 120

② Coolant Temp

- Less than 40
- 41~70
- 71~80
- 81~90
- 91~102
- Over 103

6) Vehicle Speed

- 0~5 km/h
- 5~10 km/h
- 15~20km/h
- 20~25 km/h
- 25~30 km/h
- 30~35 km/h
- 35~40 km/h
- Over 40 km/h

9.3 Filter/Oil Information

◆ Use this function to obtain the fuel use information by work mode, equipment operation hours, filter/oil information, and operation information by date.

■ Filter/Oil Info.
▶ You can check the Usage Hour and Replacement Cycle of many filters and oil used by the Equipment.

1. Double click [**History Data**] – [**Filter/Oil Info.**] on the workspace window of the DMS main screen.

◆ Excavator

◆ Wheel Loader

2. You can check the use time and replacement interval of many filters and oil used by the excavator/wheel loader.
3. You can delete the history of the filter or use time selectively.
4. You can specify the replacement interval of the filter and oil arbitrarily.
5. The following filter and oil information will be displayed on this screen.

◆ Excavator

   1) **Filter**

- Fuel
- air cleaner
- engine oil
- Hyd Oil

- pilot
- DPF
- Breather Oil Separator Filter.

   2) **Oil**

- Engine oil
- Hydraulic oil

- coolant

◆ Wheel Loader(Doosan E/G)

1) **Filter**

- Fuel
- engine oil
- Hyd Oil
- pilot

- air cleaner
- Mission oil Filtter
- DPF

2) **Oil**

- Engine oil
- Hydraulic oil
- coolant

- Mission oil
- Axle oil

◆ Wheel Loader(Scania E/G)

3) **Filter**

- Fuel
- air cleaner
- engine oil

- Hyd Oil
- pilot
- Mission oil Filtter

4) **Oil**

- Engine oil
- Hydraulic oil
- coolant

- Mission oil
- Axle oil

9.4 Daily Operation Information

◈ Use this information to obtain the daily operation information, such as fuel use information by work mode, equipment operating hours, filter/oil information, and daily operation information.

■ Daily Operation Info.

1. You can check the equipment operation date, operating hours, fuel consumption, number of errors, error codes, error information, FMI information.
   - ◆ Excavator
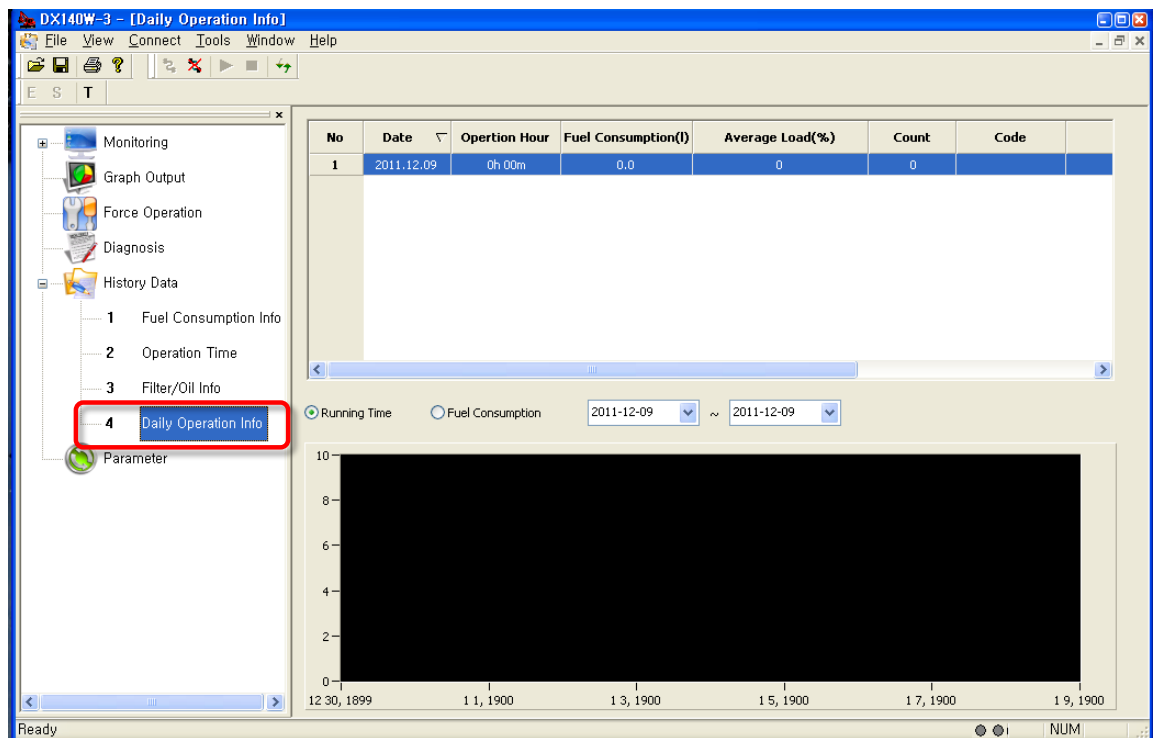
◆ Wheelloader
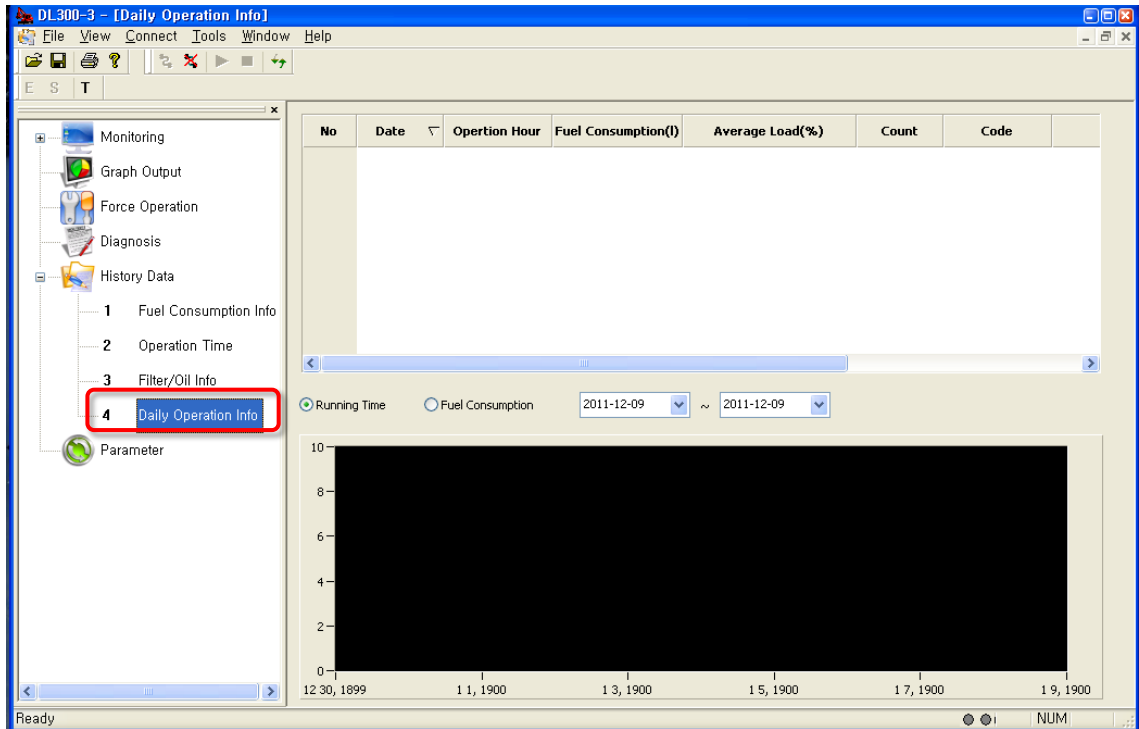
2. The daily excavator/wheel loader operation hours will be displayed.
3. The daily information will be saved up to 180 days, and will not be removed arbitrarily.
4. The following daily operation information is provided.

- Date
- Operation Hours (hr)
- Fuel Consumption (ℓ)
- Error Count

- Error Code
- Error Information
- FMI Information

5. Each column can be used to sort the displaying items.
6. You can select the date to display the operation hours and fuel consumption graph.

1) The following figure will display the operation hour graph for period of January 1, 2011 and September 5, 2011.
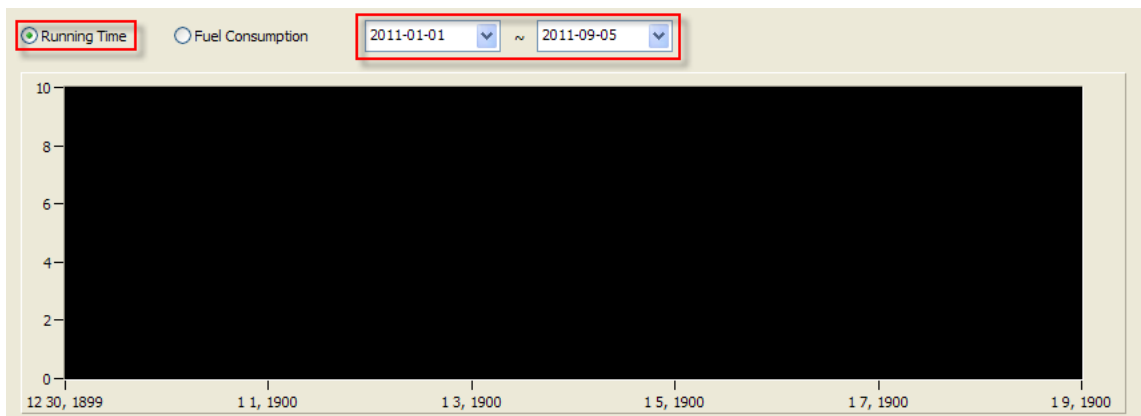
2) The following figure will display the fuel consumption graph for period of January 1, 2011 and September 5, 2011.
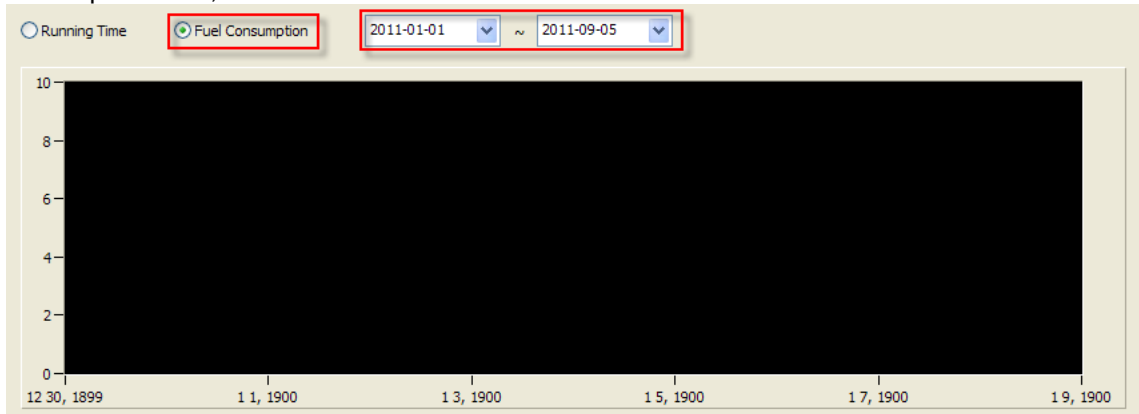
10 Parameter Viewer

◆ you can modify/change the characteristics values related to vehicle performance.

1. Double click **[Parameter]** on the workspace window of the DMS main screen.
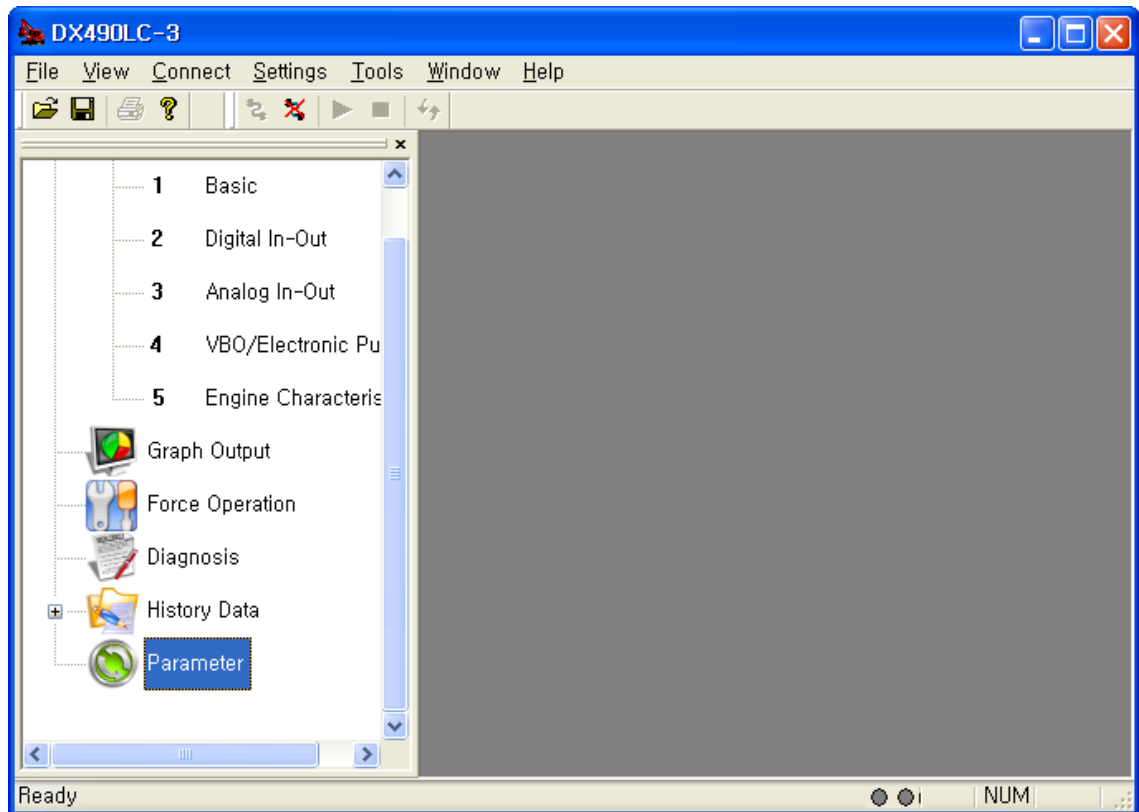
2. The "Enter Password" window will appear when you click "Parameter".
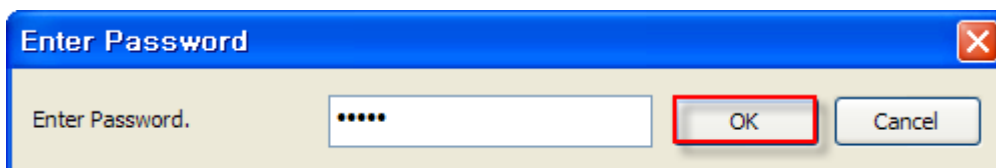
Note) You're required to input the password, because you need to be careful when changing the parameters.

3. If you input the password correctly and click [OK], the following parameters that can be modified will be displayed.

4. Change the parameter value and click the [Apply] button.

5. Click the [Initial value] button to apply the Initial parameter value to the item in question.
6. You have to restart the excavator/wheel loader to apply the modified value.

11 Tools

11.1 Download

▶ How to change the EPOS/VCU program

1. Vehicles from the computer while the power is turned OFF (laptop) to connect to a PC check cable to connect to the vehicle check connector.

2. Select **[Tools]-[Download Program]** menu.
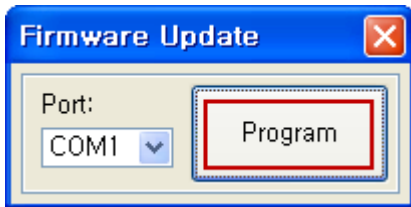
3. Select the communication port on the "Firmware Update" window, as shown above, and click the [Program] button. Then, you can select the data file (*.hex) from the folder where the update program is installed.
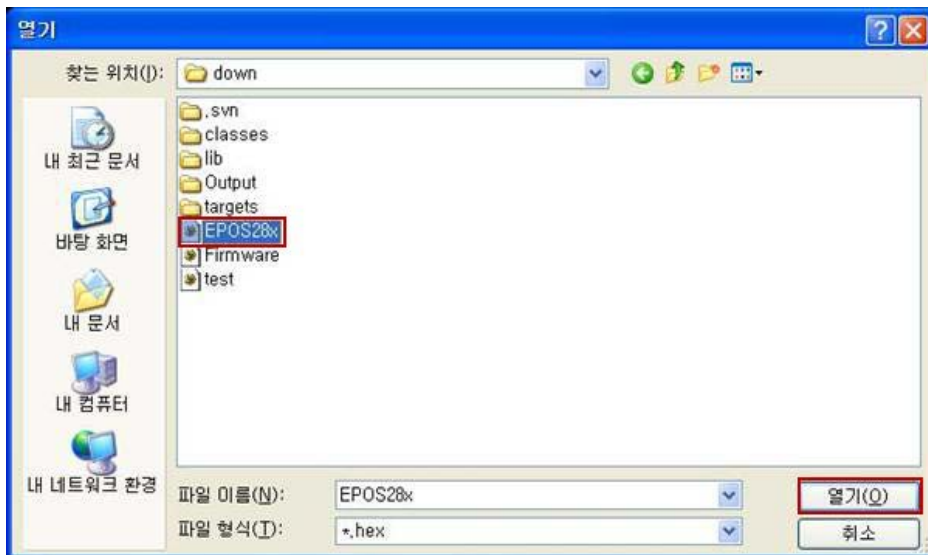
4. Vehicles in the state's power OFF, select the file and PC CHECK CABLE ON state of the toggle switch to download mode controller is created and is ready to recognize.
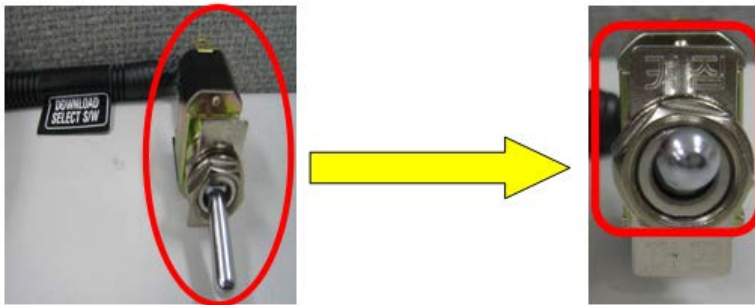
5. If you turn vehicle's power ON, you can see the progress of the update.
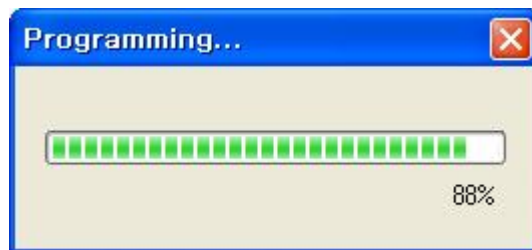
6. After the controller program is updated successfully, the excavator power must be restarted. At this time, turn the toggle switch of the PC check cable to Off, so that the controller can switch to the normal operation mode.
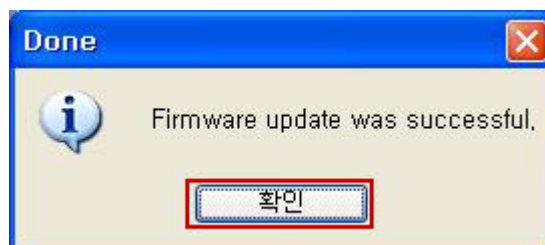
12 Appendix

12.1 Error Code (DL06 Engine)

◈ The table is a short description for a breakdown occurs in following model.

▪ DX140LC-3	▪ DX210W-3
▪ DX140W-3	▪ DX210LCR-3
▪ DX170W-3	▪ DX225LC-3
▪ DX180LC-3	▪ DX255LC-3
▪ DX190W-3	

Index	Code	Description
1	V000201	GAUGE PANEL ERROR
2	V000202	E-ECU ERROR
3	V000210	PUMP P/V (A)
4	V000211	PUMP P/V (B)
5	V000212	FLOW CONTROL P/V (C) 2-WAY LH-H
6	V000213	FLOW CONTROL P/V (D) 2-WAY RH-H
7	V000214	FLOW CONTROL P/V (E) ROTATING CW
8	V000215	FLOW CONTROL P/V (F) ROTATING CCW
9	V000216	FLOW CONTROL P/V (G)
10	V000217	PRESS. CONTROL1 P/V (H)
11	V000218	PRESS. CONTROL 2 P/V (I)
12	V000219	FAN CONTROL P/V (J)
13	V000220	TRAVEL STRAIGHT P/V (L)
14	V000221	BOOM CONFLUENCE P/V (M)
15	V000222	ARM CONFLUENCE P/V (N)
16	V000223	BREAKER OPERATING S/V
17	V000224	RELEF PRESS. UP S/V (B)
18	V000225	HIGH SPEED S/V (C)
19	V000226	BREAKER SELECT S/V (D)
20	V000227	REVERSE FAN S/V (E)
21	V000228	CRUISE S/V (F)
22	V000229	FORWARD S/V (G)
23	V000230	REVERSE S/V (H)
24	V000231	2 Pump SELECT S/V (I)
25	V000232	BYPASS CUT OFF S/V (J)
26	V000233	SWING BRAKE RELEASE S/V (K)
27	V000234	STARTER RELAY
28	V000235	BACK BUZZER RELAY

29	V000236	PILOT RELAY
30	V000237	FRONT PUMP PRESS. SENSOR
31	V000238	REAR PUMP PRESS. SENSOR
32	V000239	OWD PRESS. SENSOR
33	V000240	Px(FRONT) PRESS. SENSOR
34	V000241	Py(TRAVEL) PRESS. SENSOR
35	V000242	PARKING BRAKE PRESS. SENSOR
36	V000243	BOOM UP PRESS. SENSOR
37	V000244	BUCKET CR PRESS. SENSOR
38	V000245	BOOM DOWN PRESS. SENSOR
39	V000246	BUCKTET DUMP PRESS. SENSOR
40	V000247	ARM IN PRESS. SENSOR
41	V000248	ARM OUT PRESS. SENSOR
42	V000249	TRAVEL LEFT PRESS. SENSOR
43	V000250	TRAVEL RIGHT PRESS. SENSOR
44	V000251	SWING PRESS. SENSOR
45	V000252	ATT(OPTION) PRESS. SENSOR
46	V000253	OIL TEMP. SENSOR
47	V000254	ACCEL PEDAL SENSOR
48	V000255	VEHICLE SPEED SENSOR
49	V000256	FUEL SENSOR
50	V000257	ALTERNATOR POTENTIAL
51	V000258	DIAL
52	V000259	ANGLE SENSOR (A)
53	V000260	ANGLE SENSOR (B)
54	V000261	WIF SENSOR
55	V000262	ACCEL. PEDAL SWITCH
56	V000263	THUMB WHEEL (RH)
57	V000264	THUMB WHEEL (LH)
58	V000265	INCHING RELAY
59	V000266	LOW SPEED RELAY
60	V000267	HIGH SPEED RELAY
70	E000051	Throttle valve position sensor
71	E000091	Accelerator Pedal Position
72	E000100	Oil pressure sensor
73	E000102	Boost pressure sensor
74	E000108	Barometric pressure sensor in ECU
75	E000110	Coolant temperature
76	E000129	Rail pressure sensor
77	E000132	Air Mass Flow sensor

78	E000157	CP metering unit
79	E000158	Battery
80	E000105	Air Intake Manifold temperature
81	E000173	DPF downstream temperature
82	E000174	Fuel temperature sensor
83	E000175	Oil temperature sensor
84	E000606	Overspeed detection in component engine protection
85	E000734	Solenoid powerstage 1 (Cylinder 1)
86	E000735	Solenoid powerstage 2 (Cylinder 5)
87	E000736	Solenoid powerstage 3 (Cylinder 3)
88	E000737	Solenoid powerstage 4 (Cylinder 6)
89	E000738	Solenoid powerstage 5 (Cylinder 2)
90	E000739	Solenoid powerstage 6 (Cylinder 4)
91	E000977	Auto fan clutch PWM out
92	E001207	Engine ECU Temperature
93	E001322	Monitoring Misfire detection multiple cylinder
94	E001323	Injection Misfire detection cylinder 1
95	E001324	Injection Misfire detection cylinder 5
96	E001325	Injection Misfire detection cylinder 3
97	E001326	Injection Misfire detection cylinder 6
98	E001327	Injection Misfire detection cylinder 2
99	E001328	Injection Misfire detection cylinder 4
100	E001482	Timeout error of CAN receive frame TCU
101	E001639	Auto fan clutch speed
102	E003242	DPF upstream temperature
103	E003464	Throttle valve control
104	E003509	Monitoring of 12V sensor supply voltage in ECU
105	E003609	DPF pressure sensor physical range check
106	E003719	Maximum soot mass in particulate filter
107	E004765	DOC upstream temperature
108	E004767	Diesel oxidation catalyst differential pressure
109	E005456	MU Hydrocarbon doser intake fuel temperature
110	E005465	Pressure control regulator
111	E520196	Rail pressure monitoring
112	E520197	Timeout error of CAN Module C
113	E520199	Crankshaft sensor
114	E520200	Camshaft sensor
115	E520201	EEPROM error
116	E520203	Monitoring of PRV
117	E520206	Timeout error of CAN Module A

118	E520336	Engine temperature sensor plausibility
119	E520602	Hydraulic oil temperature CAN time out
120	E520603	Timeout error of CAN receive frame DEC1V
121	E520604	ECU hardware chip CY146 error
122	E520605	DPM system error
123	E520606	Timeout error of CAN receive frame EGR Valve
124	E520607	EGR valve actuator error
125	E520608	Error message from VGT actuator
126	E520609	Air control governor deviation error
127	E520610	Power stage for intake air heater
128	E520611	Timeout error of CAN receive frame Vehicle cut off switch
129	E520612	Accel pedal CAN Max error
130	E520613	Vehicle cutoff switch error
131	E520614	Timeout error of CAN receive frame VGT
132	E520615	Performance limit activation
133	E520616	ECU power stage test
134	E520617	Metering Unit supply voltage
135	E520618	Monitoring of ADC
136	E520619	Monitoring of communication module
137	E520620	Completely damaged particulate filter
138	E520621	Mon pressure differential characteristics
139	E520622	Disconnected DPF pressure sensor hose line
140	E520623	MU differential pressure MIN
141	E520624	Monitoring of injection
142	E520625	Detection of failed engine start
143	E520626	Injection bank
144	E520628	MU Hydrocarbon dosing valve
145	E520631	MU downstream pressure sensor
146	E520633	ECU power stage module
147	E520636	MU upstream pressure sensor
148	E000172	Air Mass Flow sensor temperature
149	E520637	Actuator relay0 error
150	E520638	Actuator relay1 error
151	E520639	Actuator relay2 error
152	E520640	Actuator relay3 error
153	E520601	ECU hardware chip CY320 error
154	E520641	Monitoring of complete ROM test
155	E520642	ECU shut off path error
156	E520643	Monitoring of overrun
157	E520644	Monitoring of voltage supply

158	E520645	ECU main relay
159	E520646	DPF Pressure sensor hose line check
160	E520647	DPF Pressure sensor offset diagnostic
161	E520651	Monitoring for maximum ash mass in DPF
162	E520648	Monitoring of the engine protection
163	E520649	Monitoring of incomplete regeneration
164	E520650	Regeneration locked
165	E520652	Forced regeneration switch
166	E520653	Forced regeneration inhibit switch
167	E520654	MSC Errors of R2S2
168	E520655	MU Shut off valve

12.2 Error Code (DL08 Engine)

◈ The table is a short description for a breakdown occurs in following model.

- DX300LC-3
- DX340LC-3
- DX350LC-3
- DX380LC-3
- DX700LC-3

Index	Code	Description
1	V000201	GAUGE PANEL ERROR
2	V000202	E-ECU ERROR
3	V000210	PUMP P/V (A)
4	V000211	PUMP P/V (B)
5	V000212	FLOW CONTROL P/V (C) 2-WAY LH-H
6	V000213	FLOW CONTROL P/V (D) 2-WAY RH-H
7	V000214	FLOW CONTROL P/V (E) ROTATING CW
8	V000215	FLOW CONTROL P/V (F) ROTATING CCW
9	V000216	FLOW CONTROL P/V (G)
10	V000217	PRESS. CONTROL1 P/V (H)
11	V000218	PRESS. CONTROL 2 P/V (I)
12	V000219	FAN CONTROL P/V (J)
13	V000220	TRAVEL STRAIGHT P/V (L)
14	V000221	BOOM CONFLUENCE P/V (M)
15	V000222	ARM CONFLUENCE P/V (N)
16	V000223	BREAKER OPERATING S/V
17	V000224	RELEF PRESS. UP S/V (B)
18	V000225	HIGH SPEED S/V (C)
19	V000226	BREAKER SELECT S/V (D)
20	V000227	REVERSE FAN S/V (E)
21	V000228	CRUISE S/V (F)
22	V000229	FORWARD S/V (G)
23	V000230	REVERSE S/V (H)
24	V000231	2 Pump SELECT S/V (I)
25	V000232	BYPASS CUT OFF S/V (J)
26	V000233	SWING BRAKE RELEASE S/V (K)
27	V000234	STARTER RELAY
28	V000235	BACK BUZZER RELAY
29	V000236	PILOT RELAY
30	V000237	FRONT PUMP PRESS. SENSOR
31	V000238	REAR PUMP PRESS. SENSOR

32	V000239	OWD PRESS. SENSOR
33	V000240	Px(FRONT) PRESS. SENSOR
34	V000241	Py(TRAVEL) PRESS. SENSOR
35	V000242	PARKING BRAKE PRESS. SENSOR
36	V000243	BOOM UP PRESS. SENSOR
37	V000244	BUCKET CR PRESS. SENSOR
38	V000245	BOOM DOWN PRESS. SENSOR
39	V000246	BUCKTET DUMP PRESS. SENSOR
40	V000247	ARM IN PRESS. SENSOR
41	V000248	ARM OUT PRESS. SENSOR
42	V000249	TRAVEL LEFT PRESS. SENSOR
43	V000250	TRAVEL RIGHT PRESS. SENSOR
44	V000251	SWING PRESS. SENSOR
45	V000252	ATT(OPTION) PRESS. SENSOR
46	V000253	OIL TEMP. SENSOR
47	V000254	ACCEL PEDAL SENSOR
48	V000255	VEHICLE SPEED SENSOR
49	V000256	FUEL SENSOR
50	V000257	ALTERNATOR POTENTIAL
51	V000258	DIAL
52	V000259	ANGLE SENSOR (A)
53	V000260	ANGLE SENSOR (B)
54	V000261	WIF SENSOR
55	V000262	ACCEL. PEDAL SWITCH
56	V000263	THUMB WHEEL (RH)
57	V000264	THUMB WHEEL (LH)
58	V000265	INCHING RELAY
59	V000266	LOW SPEED RELAY
60	V000267	HIGH SPEED RELAY
70	E000051	Throttle valve position sensor
71	E000091	Accelerator Pedal Position
72	E000100	Oil pressure sensor
73	E000102	Boost pressure sensor
74	E000108	Barometric pressure sensor in ECU
75	E000110	Coolant temperature
76	E000129	Rail pressure sensor
77	E000132	Air Mass Flow sensor
78	E000157	CP metering unit
79	E000158	Battery
80	E000105	Air Intake Manifold temperature

81	E000173	DPF downstream temperature
82	E000174	Fuel temperature sensor
83	E000175	Oil temperature sensor
84	E000606	Overspeed detection in component engine protection
85	E000734	Solenoid powerstage 1 (Cylinder 1)
86	E000735	Solenoid powerstage 2 (Cylinder 5)
87	E000736	Solenoid powerstage 3 (Cylinder 3)
88	E000737	Solenoid powerstage 4 (Cylinder 6)
89	E000738	Solenoid powerstage 5 (Cylinder 2)
90	E000739	Solenoid powerstage 6 (Cylinder 4)
91	E000977	Auto fan clutch PWM out
92	E001207	Engine ECU Temperature
93	E001322	Monitoring Misfire detection multiple cylinder
94	E001323	Injection Misfire detection cylinder 1
95	E001324	Injection Misfire detection cylinder 5
96	E001325	Injection Misfire detection cylinder 3
97	E001326	Injection Misfire detection cylinder 6
98	E001327	Injection Misfire detection cylinder 2
99	E001328	Injection Misfire detection cylinder 4
100	E001482	Timeout error of CAN receive frame TCU
101	E001639	Auto fan clutch speed
102	E003242	DPF upstream temperature
103	E003464	Throttle valve control
104	E003509	Monitoring of 12V sensor supply voltage in ECU
105	E003609	DPF pressure sensor physical range check
106	E003719	Maximum soot mass in particulate filter
107	E004765	DOC upstream temperature
108	E004767	Diesel oxidation catalyst differential pressure
109	E005456	MU Hydrocarbon doser intake fuel temperature
110	E005465	Pressure control regulator
111	E520196	Rail pressure monitoring
112	E520197	Timeout error of CAN Module C
113	E520199	Crankshaft sensor
114	E520200	Camshaft sensor
115	E520201	EEPROM error
116	E520203	Monitoring of PRV
117	E520206	Timeout error of CAN Module A
118	E520336	Engine temperature sensor plausibility
119	E520602	Hydraulic oil temperature CAN time out
120	E520603	Timeout error of CAN receive frame DEC1V

121	E520604	ECU hardware chip CY146 error
122	E520605	DPM system error
123	E520606	Timeout error of CAN receive frame EGR Valve
124	E520607	EGR valve actuator error
125	E520608	Error message from VGT actuator
126	E520609	Air control governor deviation error
127	E520610	Power stage for intake air heater
128	E520611	Timeout error of CAN receive frame Vehicle cut off switch
129	E520612	Accel pedal CAN Max error
130	E520613	Vehicle cutoff switch error
131	E520614	Timeout error of CAN receive frame VGT
132	E520615	Performance limit activation
133	E520616	ECU power stage test
134	E520617	Metering Unit supply voltage
135	E520618	Monitoring of ADC
136	E520619	Monitoring of communication module
137	E520620	Completely damaged particulate filter
138	E520621	Mon pressure differential characteristics
139	E520622	Disconnected DPF pressure sensor hose line
140	E520623	MU differential pressure MIN
141	E520624	Monitoring of injection
142	E520625	Detection of failed engine start
143	E520626	Injection bank
144	E520628	MU Hydrocarbon dosing valve
145	E520631	MU downstream pressure sensor
146	E520633	ECU power stage module
147	E520636	MU upstream pressure sensor
148	E000172	Air Mass Flow sensor temperature
149	E520637	Actuator relay0 error
150	E520638	Actuator relay1 error
151	E520639	Actuator relay2 error
152	E520640	Actuator relay3 error
153	E520601	ECU hardware chip CY320 error
154	E520641	Monitoring of complete ROM test
155	E520642	ECU shut off path error
156	E520643	Monitoring of overrun
157	E520644	Monitoring of voltage supply
158	E520645	ECU main relay
159	E520646	DPF Pressure sensor hose line check
160	E520647	DPF Pressure sensor offset diagnostic

161	E520651	Monitoring for maximum ash mass in DPF
162	E520648	Monitoring of the engine protection
163	E520649	Monitoring of incomplete regeneration
164	E520650	Regeneration locked
165	E520652	Forced regeneration switch
166	E520653	Forced regeneration inhibit switch
167	E520654	MSC Errors of R2S2
168	E520655	MU Shut off valve

12.3 Error Code (Cummins Engine)

◈ The following is a short description for a breakdown occurs in DX140LCR-3 model.

Index	Code	Description
1	V000201	GAUGE PANEL ERROR
2	V000202	E-ECU ERROR
3	V000210	PUMP P/V (A)
4	V000212	FLOW CONTROL P/V (C) 2-WAY LH-H
5	V000213	FLOW CONTROL P/V (D) 2-WAY RH-H
6	V000214	FLOW CONTROL P/V (E) ROTATING CW
7	V000215	FLOW CONTROL P/V (F) ROTATING CCW
8	V000216	FLOW CONTROL P/V (G)
9	V000217	PRESS. CONTROL1 P/V (H)
10	V000218	PRESS. CONTROL 2 P/V (I)
11	V000219	FAN CONTROL P/V (J)
12	V000223	BREAKER OPERATING S/V
13	V000224	RELIEF PRESS. UP S/V (B)
14	V000225	HIGH SPEED S/V (C)
15	V000234	STARTER RELAY
16	V000235	BACK BUZZER RELAY
17	V000237	FRONT PUMP PRESS. SENSOR
18	V000238	REAR PUMP PRESS. SENSOR
19	V000239	OWD PRESS. SENSOR
20	V000240	Px(FRONT) PRESS. SENSOR
21	V000241	Py(TRAVEL) PRESS. SENSOR
22	V000253	OIL TEMP. SENSOR
23	V000256	FUEL SENSOR
24	V000257	ALTERNATOR POTENTIAL
25	V000258	DIAL
26	V000261	WIF SENSOR
27	V000263	THUMB WHEEL (RH)
28	V000264	THUMB WHEEL (LH)
29	E000100	E/G OIL PRESSURE SENSOR
30	E000102	Boost pressure sensor
31	E000103	Turbocharger #1 speed
32	E000105	Intake manifold temperature sensor

33	E000108	Barometric pressure sensor
34	E000110	Coolant temperature sensor
35	E000157	Injector metering rail 1 press. sensor circuit
36	E000168	Battery voltage
37	E000190	E/G SPEED SENSOR
38	E000412	Exhaust gas recirculation(EGR) temperature
39	E000611	intermediate speed switch validation
40	E000612	E/G magnetic pickup. speed/position lost both signals
41	E000627	POWER SUPPLY
42	E000629	ECU critical internal failure
43	E000633	fueling actuator #1 circuit error
44	E000639	CAN communication error
45	E000640	Engine external protection input
46	E000647	FAN clutch control circuit
47	E000651	Injector solenoid driver cylinder 1 circuit
48	E000652	Injector solenoid driver cylinder 2 circuit
49	E000653	Injector solenoid driver cylinder 3 circuit
50	E000654	Injector solenoid driver cylinder 4 circuit
51	E000655	Injector solenoid driver cylinder 5 circuit
52	E000656	Injector solenoid driver cylinder 6 circuit
53	E000723	Engine speed sensor error
54	E000729	Intake air heater 1 circuit
55	E001075	Electric lift pump control signal for E/G fuel
56	E001136	sensor circuit-voltage
57	E001172	Turbocharger #1 compressor inlet temperature
58	E001209	Exhaust gas pressure
59	E001347	Fuel pump pressurizing assembly 1
60	E002789	Turbocharger turbine inlet temperature
61	E003509	Sensor supply voltage 1 circuit
62	E003510	Sensor supply 2 circuit
63	E003511	Sensor supply 3 circuit

12.4 Error Code (ISUZU Engine)

◈ The table is a short description for a breakdown occurs in following model.
DX420LC-3, DX490LC-3

Index	Code	Description
1	V000201	GAUGE PANEL ERROR
2	V000202	E-ECU ERROR
3	V000210	PUMP P/V (A)
4	V000211	PUMP P/V (B)
5	V000212	FLOW CONTROL P/V (C) 2-WAY LH-H
6	V000213	FLOW CONTROL P/V (D) 2-WAY RH-H
7	V000214	FLOW CONTROL P/V (E) ROTATING CW
8	V000215	FLOW CONTROL P/V (F) ROTATING CCW
9	V000216	FLOW CONTROL P/V (G)
10	V000217	PRESS. CONTROL1 P/V (H)
11	V000218	PRESS. CONTROL 2 P/V (I)
12	V000219	FAN CONTROL P/V (J)
13	V000220	TRAVEL STRAIGHT P/V (L)
14	V000221	BOOM CONFLUENCE P/V (M)
15	V000222	ARM CONFLUENCE P/V (N)
16	V000223	BREAKER OPERATING S/V
17	V000224	RELEF PRESS. UP S/V (B)
18	V000225	HIGH SPEED S/V (C)
19	V000226	BREAKER SELECT S/V (D)
20	V000227	REVERSE FAN S/V (E)
21	V000228	CRUISE S/V (F)
22	V000229	FORWARD S/V (G)
23	V000230	REVERSE S/V (H)
24	V000231	2 Pump SELECT S/V (I)
25	V000232	BYPASS CUT OFF S/V (J)
26	V000233	SWING BRAKE RELEASE S/V (K)
27	V000234	STARTER RELAY
28	V000235	BACK BUZZER RELAY
29	V000236	PILOT RELAY
30	V000237	FRONT PUMP PRESS. SENSOR
31	V000238	REAR PUMP PRESS. SENSOR
32	V000239	OWD PRESS. SENSOR
33	V000240	Px(FRONT) PRESS. SENSOR

34	V000241	Py(TRAVEL) PRESS. SENSOR
35	V000242	PARKING BRAKE PRESS. SENSOR
36	V000243	BOOM UP PRESS. SENSOR
37	V000244	BOOM DOWN PRESS. SENSOR
38	V000245	BUCKET CR PRESS. SENSOR
39	V000246	BUCKTET DUMP PRESS. SENSOR
40	V000247	ARM IN PRESS. SENSOR
41	V000248	ARM OUT PRESS. SENSOR
42	V000249	TRAVEL LEFT PRESS. SENSOR
43	V000250	TRAVEL RIGHT PRESS. SENSOR
44	V000251	SWING PRESS. SENSOR
45	V000252	ATT(OPTION) PRESS. SENSOR
46	V000253	OIL TEMP. SENSOR
47	V000254	ACCEL PEDAL SENSOR
48	V000255	VEHICLE SPEED SENSOR
49	V000256	FUEL SENSOR
50	V000257	ALTERNATOR POTENTIAL
51	V000258	DIAL
52	V000259	ANGLE SENSOR (A)
53	V000260	ANGLE SENSOR (B)
54	V000261	WIF SENSOR
55	V000262	ACCEL. PEDAL SWITCH
56	V000263	THUMB WHEEL (RH)
57	V000264	THUMB WHEEL (LH)
58	V000265	INCHING RELAY
59	V000266	LOW SPEED RELAY
60	V000267	HIGH SPEED RELAY
71	E000091	Accelerator Pedal Position Fault
72	E000100	Engine Oil Pressure Sensor Fault
73	E000102	Boost Pressure Sensor Fault
74	E000108	Baro Sensor Fault
75	E000110	Coolant Temperature Sensor Fault
76	E000129	Not Defined
77	E000132	MAF Sensor Fault
78	E000157	Common Rail Pressure Sensor Fault
79	E000158	System Power Supply Voltage Fault
80	E000105	Boost Temperature Sensor Fault
81	E000173	Exhaust Temperature Sensor Fault
82	E000174	Fuel Temperature Sensor Fault
148	E000172	Inlet Air Temperature Sensor Fault

180	E000081	DPF Differential Pressure High
181	E000190	Overrun
182	E000628	ROM Fault
183	E000633	Pressure Limiter Open
184	E000636	G Sensor Fault
185	E000639	CAN Bus Fault
186	E000651	Injection Nozzle #1Drive System Open Circuit Fault
187	E000652	Injection Nozzle #2Drive System Open Circuit Fault
188	E000653	Injection Nozzle #3Drive System Open Circuit Fault
189	E000654	Injection Nozzle #4Drive System Open Circuit Fault
190	E000655	Injection Nozzle #5Drive System Open Circuit Fault
191	E000656	Injection Nozzle #6Drive System Open Circuit Fault
192	E000675	Glow Plug Fault
193	E000676	Glow Relay Fault
194	E000677	Starter Cut Relay Fault
195	E000723	Crank Sensor Fault
196	E000968	Idle Speed Up-Down Switch Fault
197	E000987	Check Engine Lamp Fault
198	E001077	CPU Fault
199	E001079	5V Power Supply-6 Voltage Fault
200	E001080	5V Power Supply-2 Voltage Fault
201	E001131	Manifold Temperature Sensor Fault
202	E001239	Common Rail Pressure Fault (Lack of Feed 1)
203	E001240	Common Rail Pressure Fault (Lack of Feed 2)
204	E001347	PCV 1 Drive System Fault
205	E001348	PCV 2 Drive System Fault
206	E001381	Fuel Filter Clogging Sensor Fault
207	E002791	EGR Gas flow Fault
208	E010001	EGR Position Sensor Fault
209	E010002	EGR Valve Control Fault
210	E010003	Injection Nozzle Common 1 Drive System Fault
211	E010004	Injection Nozzle Common 2 Drive System Fault
212	E010005	Charge Circuit Fault （Bank 1）
213	E010006	Charge Circuit Fault （Bank 2）
214	E010007	CPU Monitoring IC Fault
215	E010008	A/D Conversion Fault
216	E010009	5V Power Supply-3 Voltage Fault
217	E010010	5V Power Supply-4 Voltage Fault
218	E010011	5V Power Supply-5 Voltage Fault
219	E010012	12V Power Supply Voltage Fault

220	E010013	EEPROM Fault
221	E010014	EGR Gas Temperature Sensor Fault
222	E010020	EGR 2 Valve Control Fault
223	E010021	EGR 2 Position Sensor Fault
224	E010022	Intake Throttle Fault
225	E010023	EVRV Vacuum Sensor Fault
226	E010024	Exhaust Temperature Sensor 2 Fault
227	E010025	DPF Lamp Fault
228	E010026	DPF PM Over
229	E010027	DPF Regeneration Defective
230	E010028	DPF Exhaust Temperature 2
231	E010029	DPF Regeneration Timeout Excess Frequency
232	E010030	Starter Deterioration Warning
233	E010031	Starter Switch Fault
234	E010032	QR Code Error
235	E010033	RAM Fault
236	E010036	VGS 1 M/V Fault
237	E010037	VGS 2 M/V Fault
238	E010038	VGS 3 M/V Fault
239	E010039	VGS Relay Fault
240	E010040	ISO-CAN Bus Fault

12.5 Error Code (WheelLoader)

◈ The table is a short description for a breakdown occurs in following model.
H200, H250, H300, H350, H400, H450, H550

Index	Code	Description
1	V001	Gauge Panel Communication
2	V002	ECU Communication
3	V003	TCU Communication
4	V004	Electric Steering Communication
10	V010	Cooling Fan Proportional Valve
11	V011	Auxiliary Proportional Valve
12	V012	Electronic MCV Boom Raise Proportional Valve
13	V013	Electronic MCV Boom Float Proportional Valve
14	V014	Electronic MCV Bucket Crowd Proportional Valve
15	V015	Electronic MCV Bucket Dump Proportional Valve
16	V016	Electronic MCV Option Proportional Valve1
17	V017	Electronic MCV Option Proportional Valve2
18	V018	Reverse Fan Solenoid Valve
19	V019	Unloading Solenoid Valve
20	V020	Auxiliary Solenoid Valve 2
21	V022	Starter Relay
22	V023	Main Pump Pressure Sensor
23	V024	Steering Pump Pressure Sensor
24	V025	Boom Angle Sensor
25	V026	Bucket Angle Sensor
26	V027	Electronic MCV Boom Joystick
27	V028	Electronic MCV Bucket Joystick
28	V029	Electronic MCV Option Joystick
29	V030	Electric Steering Joystick
30	V031	Alternator Potential
31	V032	Boom Magnet
32	V033	Reserved Magnet
33	V034	Return to Dig Magnet
34	V035	Water In Fuel Sensor
35	V036	Brake Oil Pressure Sensor
36	V037	Accel Pedal
37	V038	Power Mode Foot Switch
70	E001	Engine Throttle Position

71	E002	Engine Fuel Delivery Pressure
72	E003	Engine Oil Level
73	E004	Engine Oil Pressure
74	E005	Engine Intake Manifold #1 Pressure
75	E006	Engine Intake Manifold 1 Temperature
76	E007	Engine Air Filter 1 Differential Pressure
77	E008	Barometric Pressure
78	E009	Engine Coolant Temperature
79	E010	Engine Coolant Level
80	E011	Engine Injector Timing Rail 1 Pressure
81	E012	Charging System Potential (Voltage)
82	E013	Battery Potential / Power Input 1
83	E014	Ambient Air Temperature
84	E015	Engine Speed
85	E016	Accelerator Pedal Kickdown Switch
86	E017	Engine Idle Shutdown Timer State
87	E018	Engine Position Sensor
88	E019	Engine Injector Cylinder #01
89	E020	Engine Injector Cylinder #02
90	E021	Engine Injector Cylinder #03
91	E022	Engine Injector Cylinder #04
92	E023	Engine Injector Cylinder #05
93	E024	Engine Injector Cylinder #06
94	E025	Engine Injector Cylinder #07
95	E026	Engine Injector Cylinder #08
96	E027	Engine Starter Motor Relay
97	E028	Requested Percent Fan Speed
98	E029	Engine Protection System has Shutdown Engine
99	E030	Engine Fuel Leakage 1
100	E031	Engine Misfire for Multiple Cylinders
101	E032	Engine Misfire Cylinder #1
102	E033	Engine Misfire Cylinder #2
103	E034	Engine Misfire Cylinder #3
104	E035	Engine Misfire Cylinder #4
105	E036	Engine Misfire Cylinder #5
106	E037	Engine Misfire Cylinder #6
107	E038	Engine Misfire Cylinder #7
108	E039	Engine Misfire Cylinder #8
109	E040	Engine Fuel Valve 1 Position
110	E041	Source Address of Controlling Device for Engine Control

111	E042	Engine Torque Limit Feature
112	E043	Fan Speed
113	E044	Aftertreatment 1 SCR Catalyst Tank Level
114	E045	Engine Injector Group 1
115	E046	Engine Injector Group 2
116	E047	Aftertreatment 1 SCR Catalyst Tank Temperature
117	E048	Aftertreatment 1 Outlet NOx
118	E049	Aftertreatment 1 Exhaust Gas Temperature 1
119	E050	Aftertreatment 1 SCR Catalyst Tank Controller
120	E051	Aftertreatment 1 SCR Catalyst Dosing Unit
121	E052	Aftertreatment 1 SCR Catalyst Tank Heater
122	E053	NOx limits exceeded, root cause unknown
123	E054	NOx limits exceeded due to Interrupted Reagent Dosing
124	E055	NOx limits exceeded due to Empty Reagent Tank
125	E056	Aftertreatment 1 SCR Dosing Reagent Absolute Pressure
126	E057	Aftertreatment 1 SCR Dosing Reagent Temperature
127	E058	Aftertreatment 1 SCR Catalyst Reagent Line Heater 1 Preliminary FMI
128	E059	Aftertreatment 1 SCR Catalyst Reagent Pump Motor Speed
150	E000051	Throttle valve position sensor
151	E000091	Accelerator Pedal Position
152	E000100	Oil pressure sensor
153	E000102	Boost pressure sensor
154	E000108	Barometric pressure sensor in ECU
155	E000110	Coolant temperature
156	E000129	Rail pressure sensor
157	E000132	Air Mass Flow sensor
158	E000157	CP metering unit
159	E000158	Battery
160	E000105	Air Intake Manifold temperature
161	E000173	DPF downstream temperature
162	E000174	Fuel temperature sensor
163	E000175	Oil temperature sensor
164	E000606	Overspeed detection in component engine protection
165	E000734	Solenoid powerstage 1 (Cylinder 1)
166	E000735	Solenoid powerstage 2 (Cylinder 5)
167	E000736	Solenoid powerstage 3 (Cylinder 3)
168	E000737	Solenoid powerstage 4 (Cylinder 6)
169	E000738	Solenoid powerstage 5 (Cylinder 2)
170	E000739	Solenoid powerstage 6 (Cylinder 4)
171	E000977	Auto fan clutch PWM out

172	E001207	Engine ECU Temperature
173	E001322	Monitoring Misfire detection multiple cylinder
174	E001323	Injection Misfire detection cylinder 1
175	E001324	Injection Misfire detection cylinder 5
176	E001325	Injection Misfire detection cylinder 3
177	E001326	Injection Misfire detection cylinder 6
178	E001327	Injection Misfire detection cylinder 2
179	E001328	Injection Misfire detection cylinder 4
180	E001482	Timeout error of CAN receive frame TCU
181	E001639	Auto fan clutch speed
182	E003242	DPF upstream temperature
183	E003464	Throttle valve control
184	E003509	Monitoring of 12V sensor supply voltage in ECU
185	E003609	DPF pressure sensor physical range check
186	E003719	Maximum soot mass in particulate filter
187	E004765	DOC upstream temperature
188	E004767	Diesel oxidation catalyst differential pressure
189	E005456	MU Hydrocarbon doser intake fuel temperature
190	E005465	Pressure control regulator
191	E520196	Rail pressure monitoring
192	E520197	Timeout error of CAN Module C
193	E520199	Crankshaft sensor
194	E520200	Camshaft sensor
195	E520201	EEPROM error
196	E520203	Monitoring of PRV
197	E520206	Timeout error of CAN Module A
198	E520336	Engine temperature sensor plausibility
199	E520602	Hydraulic oil temperature CAN time out
200	E520603	Timeout error of CAN receive frame DEC1V
201	E520604	ECU hardware chip CY146 error
202	E520605	DPM system error
203	E520606	Timeout error of CAN receive frame EGR Valve
204	E520607	EGR valve actuator error
205	E520608	Error message from VGT actuator
206	E520609	Air control governor deviation error
207	E520610	Power stage for intake air heater
208	E520611	Timeout error of CAN receive frame Vehicle cut off switch
209	E520612	Accel pedal CAN Max error
210	E520613	Vehicle cutoff switch error
211	E520614	Timeout error of CAN receive frame VGT

212	E520615	Performance limit activation
213	E520616	ECU power stage test
214	E520617	Metering Unit supply voltage
215	E520618	Monitoring of ADC
216	E520619	Monitoring of communication module
217	E520620	Completely damaged particulate filter
218	E520621	Mon pressure differential characteristics
219	E520622	Disconnected DPF pressure sensor hose line
220	E520623	MU differential pressure MIN
221	E520624	Monitoring of injection
222	E520625	Detection of failed engine start
223	E520626	Injection bank
224	E520628	MU Hydrocarbon dosing valve
225	E520631	MU downstream pressure sensor
226	E520633	ECU power stage module
227	E520636	MU upstream pressure sensor
228	E000172	Air Mass Flow sensor temperature
229	E520637	Actuator relay0 error
230	E520638	Actuator relay1 error
231	E520639	Actuator relay2 error
232	E520640	Actuator relay3 error
233	E520601	ECU hardware chip CY320 error
234	E520641	Monitoring of complete ROM test
235	E520642	ECU shut off path error
236	E520643	Monitoring of overrun
237	E520644	Monitoring of voltage supply
238	E520645	ECU main relay
239	E520646	DPF Pressure sensor hose line check
240	E520647	DPF Pressure sensor offset diagnostic
241	E520651	Monitoring for maximum ash mass in DPF
242	E520648	Monitoring of the engine protection
243	E520649	Monitoring of incomplete regeneration
244	E520650	Regeneration locked
245	E520652	Forced regeneration switch
246	E520653	Forced regeneration inhibit switch
247	E520654	MSC Errors of R2S2
248	E520655	MU Shut off valve
249	E000015	Engine shut off request from EPOS
250	E000093	Engine error lamp
251	E000094	ECU reset

300	T010	LOGICAL ERROR AT DIRECTION SELECT SIGNAL 3RD SHIFT LEVER
301	T011	LOGICAL ERROR AT GEAR RANGE SIGNAL
302	T012	LOGICAL ERROR AT DIRECTION SELECT SIGNAL
303	T013	LOGICAL ERROR AT ENGINE DERATING DEVICE
304	T014	LOGICAL ERROR AT PARKBRAKE STATUS
305	T015	LOGICAL ERROR AT DIRECTION SELECT SIGNAL 2. SHIFT LEVER
306	T016	LOGICAL ERROR AT AXLE CONNECTION
307	T021	S.C. TO BATTERY VOLTAGE AT CLUTCH CUTOFF / INCHPEDAL INPUT
308	T022	S.C. TO GROUND OR O.C. AT CLUTCH CUTOFF / INCHPEDAL INPUT
309	T025	S.C. TO BATTERY VOLTAGE OR O.C. AT T/M SUMP TEMP. SENSOR INPUT
310	T026	S.C. TO GROUND AT T/M SUMP TEMP. SENSOR INPUT
311	T027	S.C. TO BATTERY VOLTAGE OR O.C. AT TORQUECvt. TEMP. SENSOR INPUT
312	T028	S.C. TO GROUND AT TORQUECONVERTER TEMP.SENSOR INPUT
313	T031	S.C. TO BATTERY VOLTAGE OR O.C. AT ENGINE SPEED INPUT
314	T032	S.C. TO GROUND AT ENGINE SPEED INPUT
315	T033	LOGICAL ERROR AT ENGINE SPEED INPUT
316	T034	S.C. TO BATTERY VOLTAGE OR O.C. AT TURBINE SPEED INPUT
317	T035	S.C. TO GROUND AT TURBINE SPEED INPUT
318	T036	LOGICAL ERROR AT TURBINE SPEED INPUT
319	T037	S.C. TO BATTERY VOLTAGE OR O.C. AT INTERNAL SPEED INPUT
320	T038	S.C. TO GROUND AT INTERNAL SPEED INPUT
321	T039	LOGICAL ERROR AT INTERNAL SPEED INPUT
322	T03A	S.C. TO BATTERY VOLTAGE OR O.C. AT OUTPUT SPEED INPUT
323	T03B	S.C. TO GROUND AT OUTPUT SPEED INPUT
324	T03C	LOGICAL ERROR AT OUTPUT SPEED INPUT
325	T03E	OUTPUT SPEED ZERO DOESN'T FIT TO OTHER SPEED SIGNALS
326	T054	VEHICLE_1 TIMEOUT
327	T055	JSS TIMEOUT
328	T056	ENGINE CONF TIMEOUT
329	T057	EEC1 TIMEOUT
330	T058	EEC3 TIMEOUT
331	T061	AEB REQUEST SIGNAL
332	T065	ENGINE TORQUE SIGNAL
333	T069	REFERENCE ENGINE TORQUE SIGNAL
334	T06A	ACTUAL ENGINE TORQUE SIGNAL
335	T06B	NOM FRICTION TORQUE SIGNAL
336	T06E	EEC2 TIMEOUT
337	T071	S.C. TO BATTERY VOLTAGE AT CLUTCH K1

338	T072	S.C. TO GROUND AT CLUTCH K1
339	T073	O.C. AT CLUTCH K1
340	T074	S.C. TO BATTERY VOLTAGE AT CLUTCH K2
341	T075	S.C. TO GROUND AT CLUTCH K2
342	T076	O.C. AT CLUTCH K2
343	T077	S.C. TO BATTERY VOLTAGE AT CLUTCH K3
344	T078	S.C. TO GROUND AT CLUTCH K3
345	T079	O.C. AT CLUTCH K3
346	T07A	S.C. TO BATTERY VOLTAGE AT CONVERTER CLUTCH
347	T07B	S.C. TO GROUND AT CONVERTER CLUTCH
348	T07C	O.C. AT CONVERTER CLUTCH
349	T081	S.C. TO BATTERY VOLTAGE AT CLUTCH K4
350	T082	S.C. TO GROUND AT CLUTCH K4
351	T083	O.C. AT CLUTCH K4
352	T084	S.C. TO BATTERY VOLTAGE AT CLUTCH KV
353	T085	S.C. TO GROUND AT CLUTCH KV
354	T086	O.C. AT CLUTCH KV
355	T087	S.C. TO BATTERY VOLTAGE AT CLUTCH KR
356	T088	S.C. TO GROUND AT CLUTCH KR
357	T089	O.C. AT CLUTCH KR
358	T08A	S.C. TO GROUND AT DHL VALVE OUTPUT
359	T08B	S.C. TO BATTERY VOLTAGE AT DHL VALVE OUTPUT
360	T08C	O.C. AT DHL VALVE OUTPUT
361	T091	S.C. TO GROUND AT RELAY REVERSE WARNING ALARM
362	T092	S.C. TO BATTERY VOLTAGE AT RELAY REVERSE WARNING ALARM
363	T093	O.C. AT RELAY REVERSE WARNING ALARM
364	T09A	S.C. TO GROUND AT CONVERTER LOCK UP CLUTCH SOLENOID
365	T09B	O.C. AT CONVERTER LOCK UP CLUTCH SOLENOID
366	T09C	S.C. TO BATTERY VOLTAGE AT CONVERTER LOCK UP CLUTCH SOLENOID
367	T0A7	S.C. TO GROUND AT LIS OUTPUT
368	T0A8	S.C. TO BATTERY VOLTAGE AT LIS OUTPUT
369	T0A9	O.C. AT LIS OUTPUT
370	T0B1	SLIPPAGE AT CLUTCH K1
371	T0B2	SLIPPAGE AT CLUTCH K2
372	T0B3	SLIPPAGE AT CLUTCH K3
373	T0B4	SLIPPAGE AT CLUTCH K4
374	T0B5	SLIPPAGE AT CLUTCH KV
375	T0B6	SLIPPAGE AT CLUTCH KR
376	T0B7	OVERTEMP SUMP

377	T0BA	DIFFERENTIAL PRESSURE OIL FILTER
378	T0BB	SLIPPAGE AT CONVERTER LOCKUP CLUTCH
379	T0BC	OVERSPEED OUTPUT
380	T0C0	ENGINE TORQUE OR ENGINE POWER
381	T0C1	TRANSMISSION OUTPUT TORQUE OVERLOAD
382	T0C2	TRANSMISSION INPUT TORQUE OVERLOAD
383	T0C3	OVERTEMP CONVERTER OUTPUT
384	T0D1	S.C. TO BATTERY VOLTAGE AT POWER SUPPLY FOR SENSORS
385	T0D2	S.C. TO GROUND AT POWER SUPPLY FOR SENSORS
386	T0D3	LOW VOLTAGE AT BATTERY
387	T0D4	HIGH VOLTAGE AT BATTERY
388	T0D5	ERROR AT VALVE POWER SUPPLY VPS1
389	T0D6	ERROR VALVE POWER SUPPLY VPS2
390	T0D7	S.C. TO GROUND AT DHL LONGITUDINAL OUTPUT
391	T0D8	S.C. TO BATTERY VOLTAGE AT DHL LONGITUDINAL OUTPUT
392	T0D9	O.C. AT DHL LONGITUDINAL OUTPUT
393	T0E5	DISPID1_TIMEOUT
394	T0E6	ILLEGAL ID REQUEST VIA CAN
395	T0F1	GENERAL EEPROM FAULT
396	T0F2	CONFIGURATION LOST
397	T0F3	APPLICATION ERROR
398	T0F5	CLUTCH FAILURE
399	T0F6	CLUTCH ADJUSTMENT DATA LOST OR INCHPEDAL CALIBRATION DATA LOST
400	T0F7	SUBSTITUTE CLUTCH CONTROL
500	S000	1's complement redundancy test
501	S001	1st boot
502	S002	Division by zero
503	S003	CapCom values
504	S004	Variable truncation
505	S005	Verified write to cell error
506	S006	Estimate Calibration values error
507	S007	PWM Calibration values error
508	S008	Mechanical Spool Compensation values
509	S009	CRC16 check / Parameter Memory
510	S010	Fall back to old values.
511	S011	CRC16 check / Program Memory
512	S012	LVDT wiring error
513	S013	Power supply above specified range
514	S014	Power supply below specified range

515	S015	No answer on handshakes
516	S016	Power-on self test failed
517	S017	Main spool cannot reach neutral
518	S018	Main spool cannot reach float position
519	S019	Main spool not in neutral at boot up
520	S020	Main spool position is greater than the reference
521	S021	Main spool position and reference are in opposite directions
522	S022	Float threshold has not been passed
523	S023	Time guarding on Auxiliary Valve Command
524	S024	Illegal CAN address
525	S025	Command out of range
526	S026	Scaling error
527	S027	Ramps error
528	S028	Float threshold error
529	S029	Dead band compensation error
530	S030	Slope error
531	S031	Shape error
532	S032	Invert port error
533	S033	Illegal combination of Port Flow Command and Blocked state
534	S034	Illegal combination of Port Flow Command and Float state
535	S035	Port Flow Command above 100%
536	S036	Illegal Valve State
537	S037	Illegal valve state and illegal Port Flow Command
538	S038	Illegal combination of inverted ports and float properties

12.6 FMI Comments

Index	Description
0	Above normal range
1	Below normal range
2	Incorrect signal
3	Voltage above normal
4	Voltage below normal
5	Current below normal
6	Current above normal
7	IMPROPER MECHANICAL RESPONSE(MECHANICAL SYSTEM NOT RESPOSDING OR OUT OF ADJUSTMENT)
8	Abnormal signal
9	Abnormal update
10	ABNORMAL RATE OF CHANGE(ABNORMAL RATE OF CHANGE)
11	Failure mode not identifiable
12	Failed
13	OUT OF CALIBRATION
14	SPECIAL INSTRUCTIONS
15	DATA VALID BUT BELOW NORMAL OPERATIONAL RANGE - LEAST SEVERSE LEVEL
16	DATA VALID BUT BELOW NORMAL OPERATIONAL RANGE - MODERATELY SEVERE LEVEL
17	DATA VALID BUT BELOW NORMAL OPERATIONAL RANGE - LEAST SEVERSE LEVEL
18	DATA VALID BUT BELOW NORMAL OPERATIONAL RANGE - MODERATELY SEVERE LEVEL
19	RECEIVED NETWORK DATA IN ERROR
20	RESERVED FOR SAE ASSIGNMENT
21	RESERVED FOR SAE ASSIGNMENT
22	RESERVED FOR SAE ASSIGNMENT
23	RESERVED FOR SAE ASSIGNMENT
24	RESERVED FOR SAE ASSIGNMENT
25	RESERVED FOR SAE ASSIGNMENT
26	RESERVED FOR SAE ASSIGNMENT
27	RESERVED FOR SAE ASSIGNMENT
28	RESERVED FOR SAE ASSIGNMENT
29	RESERVED FOR SAE ASSIGNMENT
30	RESERVED FOR SAE ASSIGNMENT
31	Not available or Condition exist