FOREWORD

This workshop manual has been prepared to provide information regarding repair procedures on Hino Trucks.

Applicable for HINO 238, 258LP, 268, 338 series, equipped with J08E-VB and J08E-VC engine

When making any repairs on your vehicle, be careful not to be injured through improper procedures.
As for maintenance items, refer to the Driver's / Owner's Manual.
All information and specifications in this manual are based upon the latest product information available at the time of printing.
Hino Motors Sales U.S.A., Inc. reserves the right to make changes at any time without prior notice.

Please note that the publications below have also been prepared as relevant service manuals for the components and systems in these vehicles.

Manual Name	Pub. No.
Chassis Workshop Manual	S1-UNAE09A 1/2 S1-UNAE09A 2/2
J08E-VB, VC Engine Workshop Manual	S5-UJ08E09A
Trouble Shooting Workshop Manual	S7-UNAE09A 1/3 S7-UNAE09A 2/3

Hino Motors Sales U.S.A. , Inc.

CHAPTER REFERENCES REGARDING THIS WORKSHOP MANUAL

Use this chart to the appropriate chapter numbers for servicing your particular vehicle.

CHAPTER							
	MANUAL NO.	S7-UNAE09A 3/3 (U.S.A.), S7-CNAE09A 3/3 (CANADA)					
	MODELS	HINO 238, 258LP, 268, 338, 358					
	Production Model Code	NE8J, NF8J, NJ8J, NV8J					
GENERAL INTRODUCTION		GN01-001					
TROUBLE SHOOTING		TS01-001					
VEHICLE CONTROL		DN01-001					
FUEL CONTROL (J08E)		DN02-001					
FUEL CONTROL (DEF SCR)		DN02-002					
FUEL CONTROL (BURNER)		DN02-003					
OTHERS (CAN COMMUNICATION)		DN06-001					
DX MANUAL		DX01-001	DX02-001	DX03-001	DX04-001	DX06-001	DX07-001

This manual does not contain items on half-tone dot meshing.

HINO

WORKSHOP MANUAL

INDEX: TROUBLE SHOOTING GROUP 3/3

System Configuration, Connection and Setup

DX01-001

Special Tool and Outline of Function

Special Tool and Outline of Function

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A PC, Software (HINO-DX & RM) and Communication Interface will be used for Diagnosis with the PC. The following special tools will be needed in order to make good use of this function.

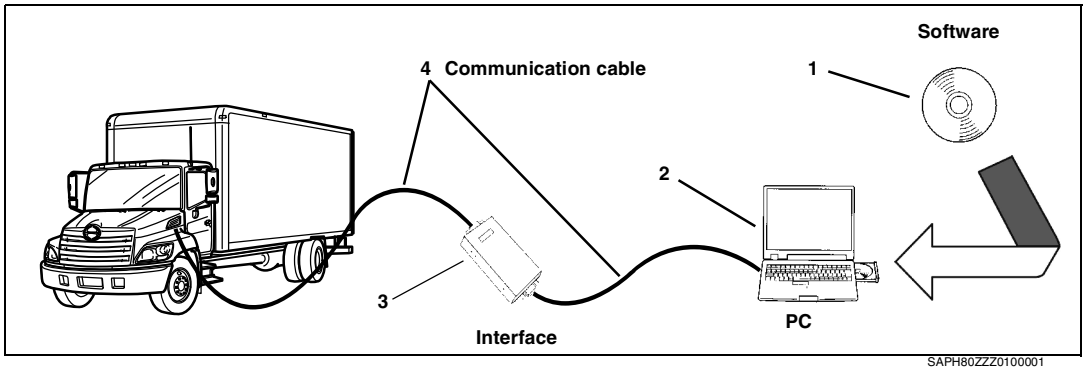

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Fig. 1-1

No.	Tool Name	Outline of Function/Operating Environment	
1	Software	• HINO Diagnostic eXplorer Diagnosis of electronic control system and Change to specific data of vehicle • HINO Reprog. Manager Reprogramming of ECU program	
2	PC	**Operating environment**	**Minimum required configuration**
		Display size	800 x 600 pixels
		CPU	Pentium 150MHz
		Memory (RAM)	32MB
		Hard disc	Free space of 200MB
		Drive	CD-ROM drive (External connection acceptable)
		Communication port	USB
		OS	Windows 2000 or XP
		Required software	Internet Explorer 5.0
		Operating environment	**Recommended configuration**
		Display size	1024 x 768 pixels minimum
		CPU	Pentium III 800MHz
		Memory (RAM)	128MBminimum
		Hard disc	Free space of 1GB minimum
		Drive	CD-ROM drive (External connection acceptable)

<table>
<tr><th>No.</th><th>Tool Name</th><th colspan="3">Outline of Function/Operating Environment</th></tr>
<tr><td></td><td></td><td colspan="2">Comm. port</td><td>RS232C</td></tr>
<tr><td rowspan="2"></td><td rowspan="2"></td><td colspan="2">OS</td><td>Windows 2000 or XP</td></tr>
<tr><td colspan="2">Required software</td><td>Internet explorer 5.0 or newer</td></tr>
<tr><td>3</td><td>Communication Interface</td><td colspan="3">Interface (I/F) in conformity to SAE J2534 (bus through) shall be used.
HINO BOWIE (recommended)
• Special Interface developed exclusively for HINODX & RM which is compliant to all the functions of HINODX & RM software.
• Other Interface which is in conformity to SAE J2534.
Pay attention to the allowable input voltage.</td></tr>
<tr><td rowspan="4">4</td><td rowspan="4">Communication cable</td><td colspan="3">Select each communication cable in accordance with I/F used.</td></tr>
<tr><td></td><td>Cable between PC and I/F</td><td>Cable between I/F and vehicle</td></tr>
<tr><td>When you use HINO BOWIE I/F.</td><td>Communication cable attached to I/F (USB use or RS232-C use)</td><td>Special HINO BOWIE communication cable</td></tr>
<tr><td>When you use other I/F in conformity to SAE J2534.</td><td>Communication cable specified by each I/F.</td><td>Communication cable specified by each I/F.</td></tr>
</table>

Recommended system

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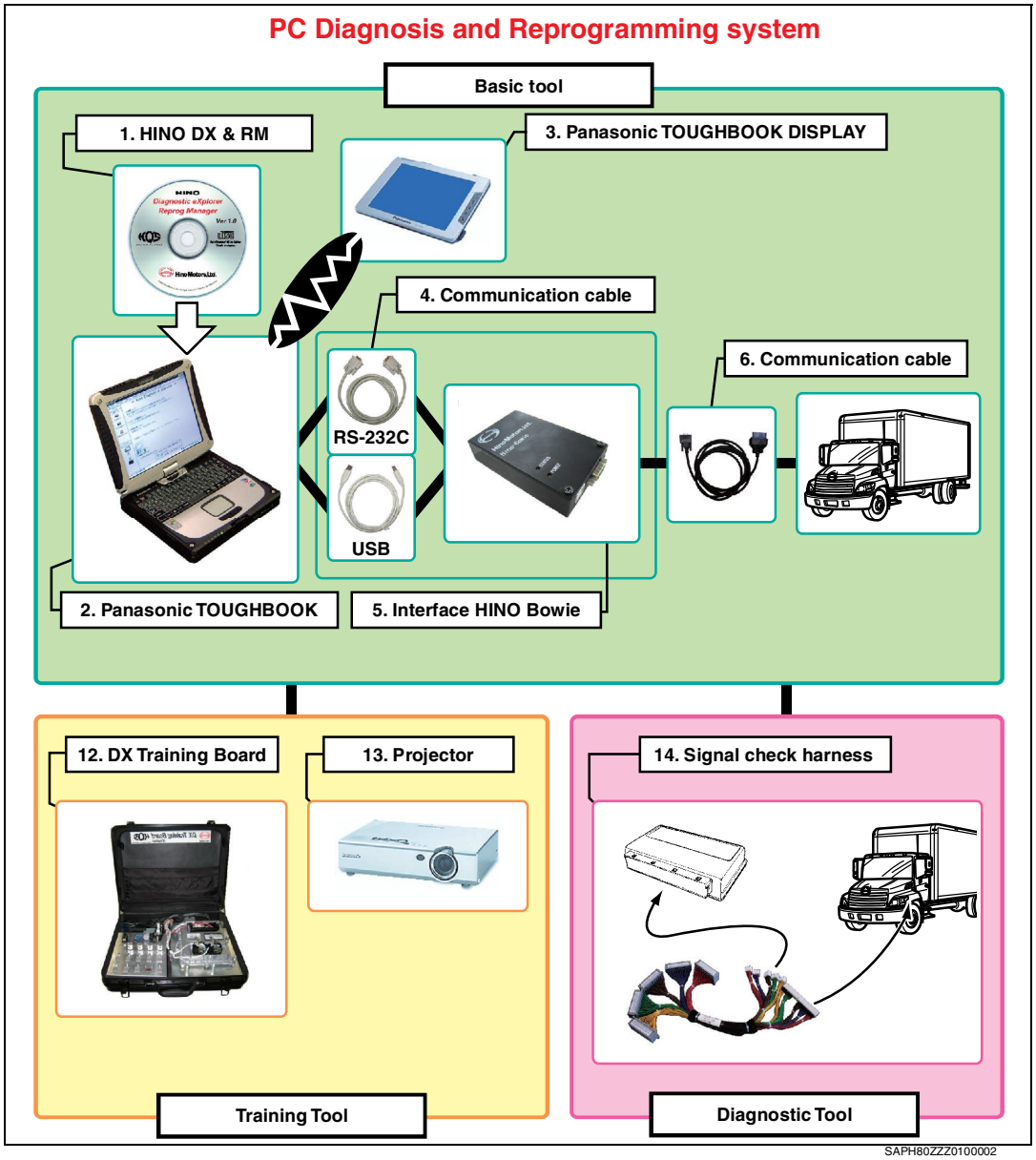
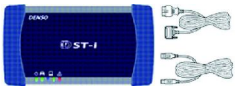
We have earlier mentioned about the required tools for utilizing this system and should like to introduce the examples here into which this system has been developed further. Accordingly, it is strongly recommended that you do introduce this system by all means.

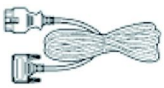


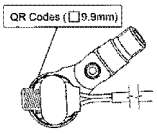
SAPH80ZZZ0100002

Fig. 1-2

<Table for recommended system>

No.	ITEM	DESCRIPTION & PARTS No.	PRICE PURCHASE
1	HINO DX & Rpr. 	Hino Diagnostic eXplorer & Hino Reprog Manager It is a the software which carries out the failure diagnosis and reprogramming of the vehicles carrying the Hino common-rail system **SD-DX-300E1**	 A
2	PC 	Panasonic TOUGHBOOK It has touch panel function and you can operate even where mouse cannot be used. It is strong against vibration and shock and has excellent water proofness.It is best suited for use at the service shop where the condition is normally severe for PC.(CD ROM drive is needed separately)	Manufacturer's price B
3	DISPLAY 	Panasonic TOUGHBOOK DISPLAY (CF-VDW07JS) You can work wile walking around by wireless LAN with PC and it is best suited for actual failure diagnosis. Same as TOUGHTBOOK you can operate with touch panel and it is strong against vibration, shock and has excellent waterproofness.	Manufacturer's price B
4	Communication cable 	Communication cable It is a communication cable which connects PC and HINO Bowie Interface. It is attached to HINO Bowie Interface.	-
5	Interface 	HINO Bowie Interface It is used to communicate between PC and the vehicle. **09993-E9070**	 D
6	Communication cable 	Communication cable This is the cable to connect HINO Bowie Interface and the vehicle. **09042-1220**	 D
7	Interface 	DENSO DST-i Set (without LCD) It is used to communicate between PC and the vehicle. **Without Bluetooth® 95171-01020** **With Bluetooth® 95171-01040**	 C

No.	ITEM	DESCRIPTION & PARTS No.	PRICE PURCHASE
8	Interface 	DENSO DST-i Set (with LCD) It is used to communicate between PC and the vehicle. **Without Bluetooth® 95171-01030** **With Bluetooth® 95171-01050**	 C
9	Communication cable 	USB cable (3 meter) It is a communication cable which connects PC and DENSO DST-i interface. **95171-10110**	 C
10	Communication cable 	DATA link cable (3 meter) This is the cable to connect DENSO DST-i interface and the vehicle. **95171-12430**	 C
11	License 	License License is necessity for downloading of files from DENSO web site which enables functions of DENSO DST-i interface. **95171-12500**	 C
12	Simulation Board 	DX Training Board The content is the same as above. The virtual state linked to the vehicle loading Bosh and DENSO engine ECUs can be carried out on the desk. **SD-DT-003E1**	 A
13	Projector 	Panasonic It can be used by high intensity 1600 l1600Lm1600lmm(ANSI) also at a bright place. It is convenient to carry by light weight and compact A4 size.	Manufacturer's price B
14	Cable 	Cable for update of Hino Bowie Interface It is used when updating firmware of Hino Bowie Interface. **09993-E9020**	 D

No.	ITEM	DESCRIPTION & PARTS No.	PRICE PURCHASE
15	QR Code Reader 	QR Code Reader QR code can be read QS20H-I-U (USB) QS20H-HD (RS-232C)  **http://www.denso-wave.com/en/adcd/product/qrcode/index.html**	Manufacturer's price B
16	Adapter 	Adapter RS232-C to USB It is an adapter to change from RS232-C to USB.	Manufacturer's price B

PRICE PURCHASE:

- A Place an order from Overseas Parts Division of HML.
- B Purchase from the manufacturer or its sales outlet.
- C Purchase from the manufacturer.
- D Purchase through normal spare parts channel.

Installing Interface Driver

Installing Interface Driver

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You need to install the driver to let the PC recognize the Interface. In case of Hino-Bowie Interface (recommended), use the CD packed originally with I/F to install in accordance with "Operation Manual." In case of other Interface other than Hino-Bowie, install in accordance with the "Manual" supplied with each I/F.

⚠ CAUTION
Never connect the PC with the Hino-Bowie until you completely finish installing and un-installing.
Inadequate communication may occur due to improper installing and un-installing.
Inadequate communication may occur due to improper installing and un-installing. In case you purchased Hino-Bowie earlier, do not use the driver in the CD attached then, but install the Hino-Bowie driver attached to the latest DX-CD.

Upgrading Hino-Bowie.

Upgrading Hino-Bowie.

EN80ZZZ01X100004

You need to upgrade I/F (Hino-Bowie), when you connect a PC with the Hino-DX with the vehicles equipped with new devices.

Instruction for Updating the Hino Bowie Interface

EN80ZZZ01X100005

In order to establish connections between a PC with the Hino-DX (DIAGNOSTIC EXPLORER / REPROG MANAGER) installed and a vehicle equipped with the devices listed in the following diagram (1.Object Devices), you are required to update your Hino Bowie interface and hardware driver for the terminal as described in these instructions.

Object Devices

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Vehicles equipped with the following devices are entitled

System / Vehicle	Device Name	Effective from
Headlight	High Intensity Discharge Auto Leveler	October, 2005
600 Series Vehicle	DCU Communication	March, 2010
300 Series Vehicle	CAN Communication	October, 2006
300 Series Vehicle	Stabilization of the CAN communication	September, 2008

Materials Required for Updates

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1. PC with Hino-DX installed

2. Hino-Bowie Interface

3. Connecting Cables

(1) DSUB9 pin data cable that came originally with the interface to connect the interface with the terminal

(2) Power source cable

a. AC power plug cable 09993-E9020

Hino-Bowie Interface Update Instruction

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1. Connect cables as illustrated below.

(1) Connecting with AC power plug cable 09993-E9020

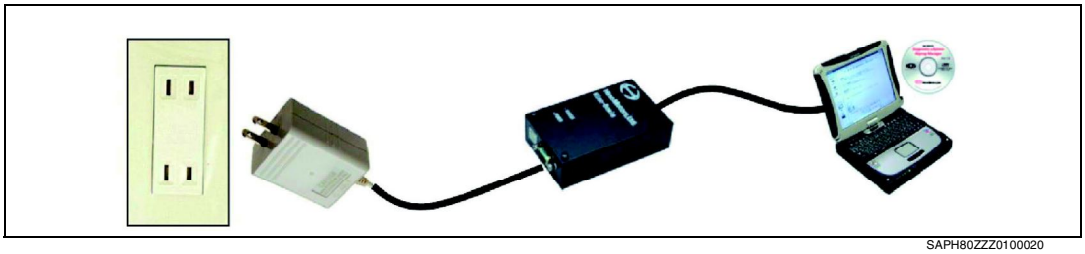

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Fig. 1-3

2. Launch updating software by opening the program file "BootPG"

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Fig. 1-4

3. Click "Start" to setup the communication information, then press "OK" to confirm.

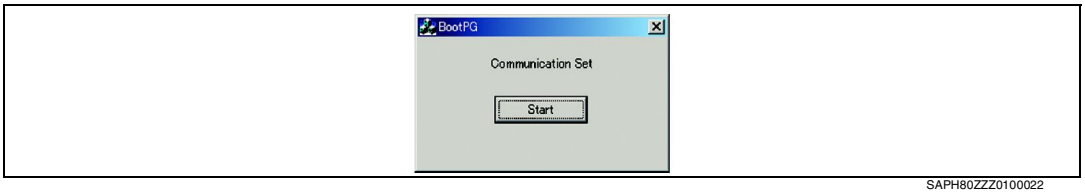

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Fig. 1-5

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Fig. 1-6

4. Specify the updating file by clicking "Select File".

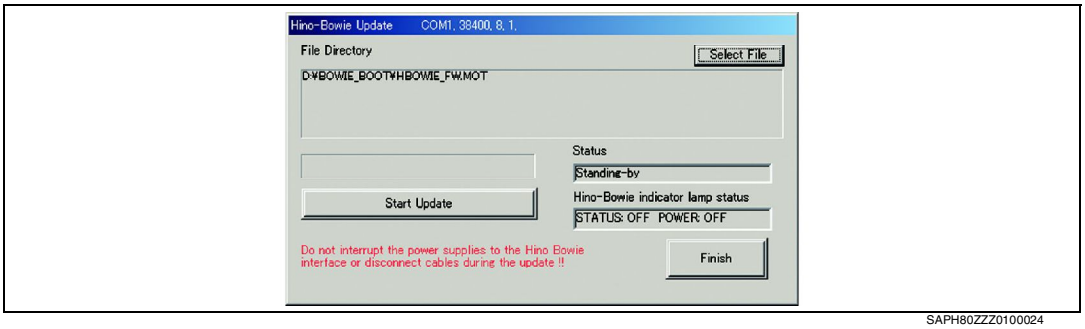

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Fig. 1-7

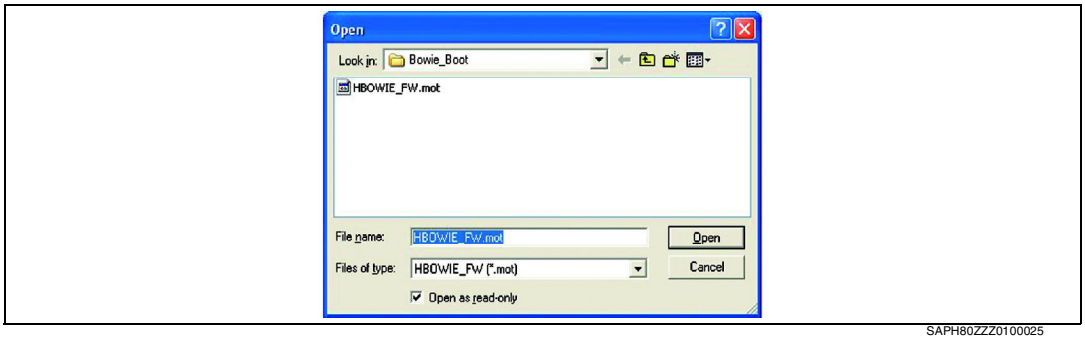

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Fig. 1-8

A browsing window will pop up. Select "HBOWIE_FW.mot" file then click "Open" to specify the file to update.

5. Update with specified file by clicking "Update"

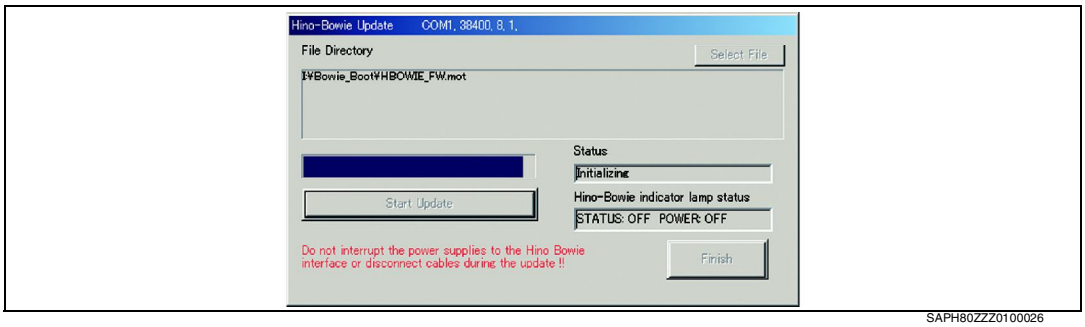

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Fig. 1-9

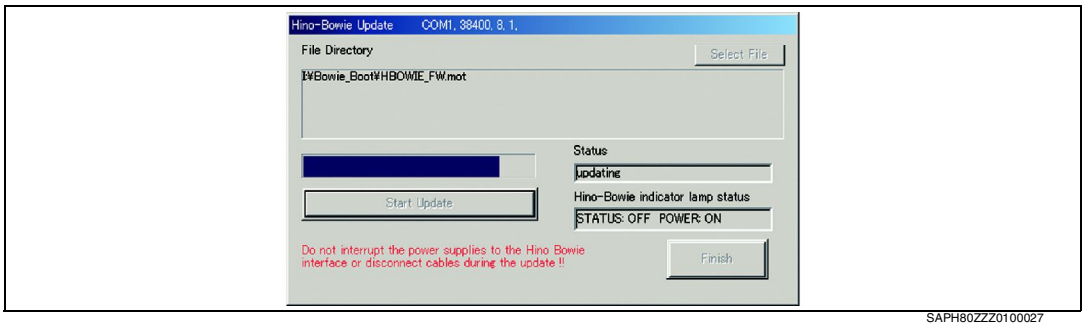

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Fig. 1-10

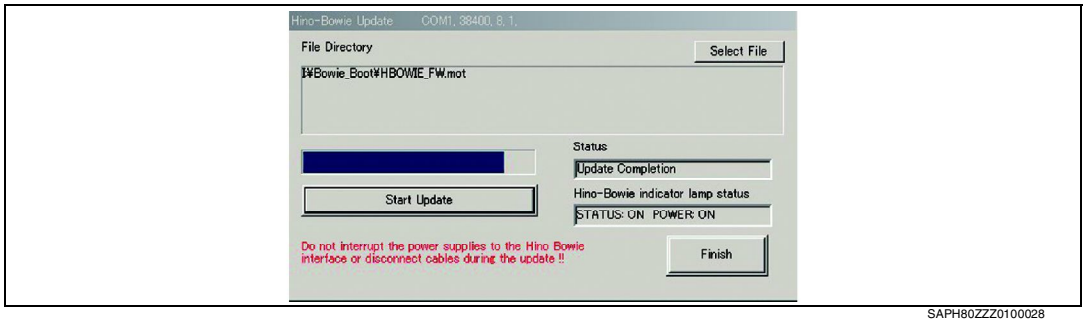

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Fig. 1-11

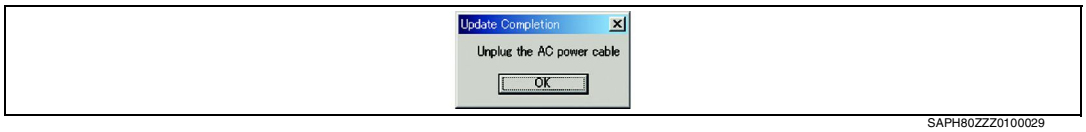

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Fig. 1-12

6. When update is complete, the window will open to inform that the update is complete. Click "OK", then "Finish" to confirm. Click "Finish" on the Hino-Bowie update window to end.

Hino-Bowie Hardware Driver Update Instructions

EN80ZZZ01X100009

To communicate with the updated Hino-Bowie, the communicating PC must have the corresponding hardware driver installed. Do not connect the I/F (Hino Bowie) to the PC, when installing the driver.

1. Launch setup program by opening the program file "HBSetup"

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Fig. 1-13

2. Select "Install" to proceed with the installation.

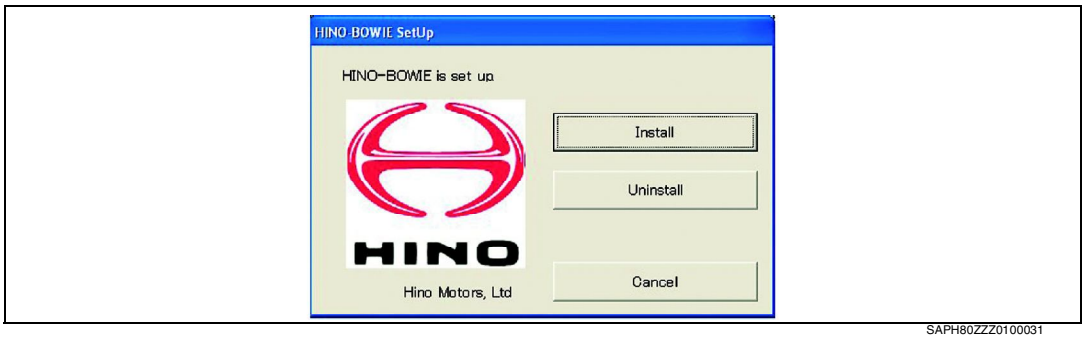

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Fig. 1-14

3. Specify a directory to install the driver then click "Next".

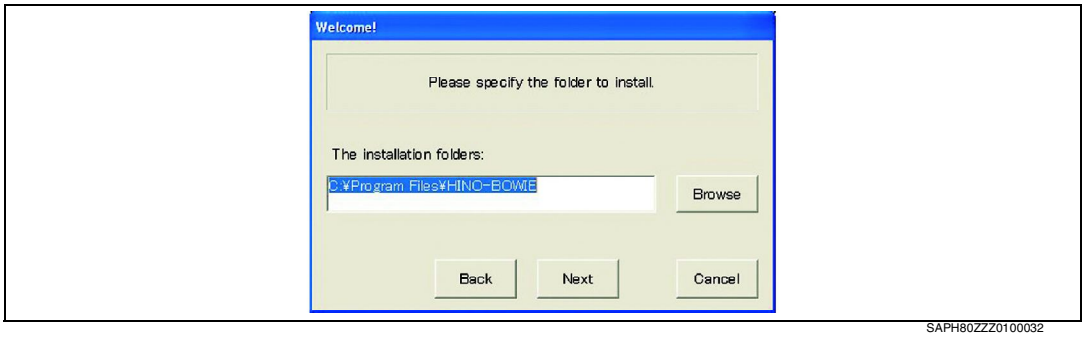

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Fig. 1-15

4. Start installation by clicking "Start".

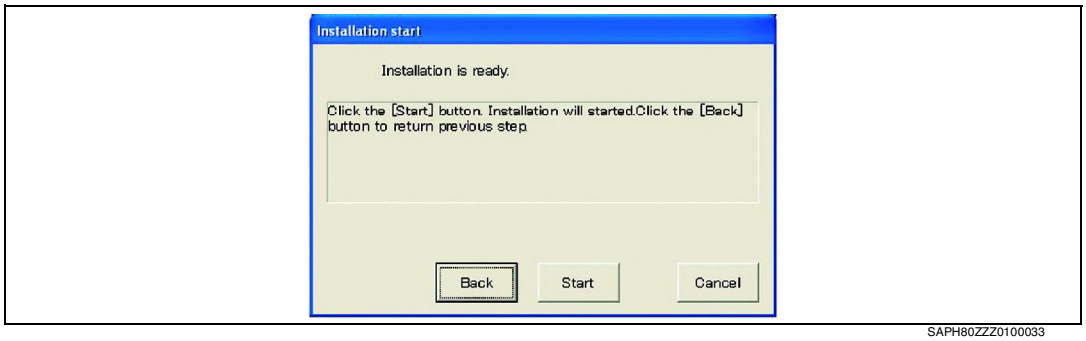

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Fig. 1-16

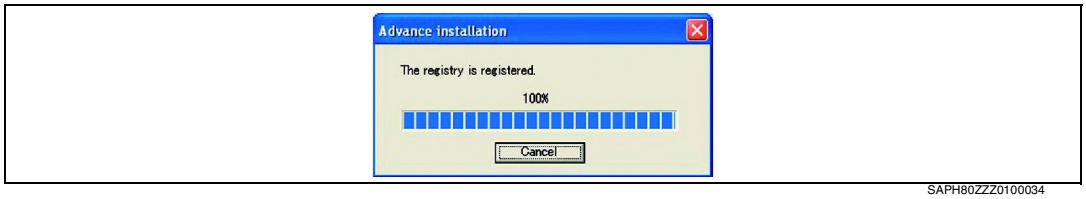

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Fig. 1-17

5. Complete installation by clicking "OK" then "Finish"

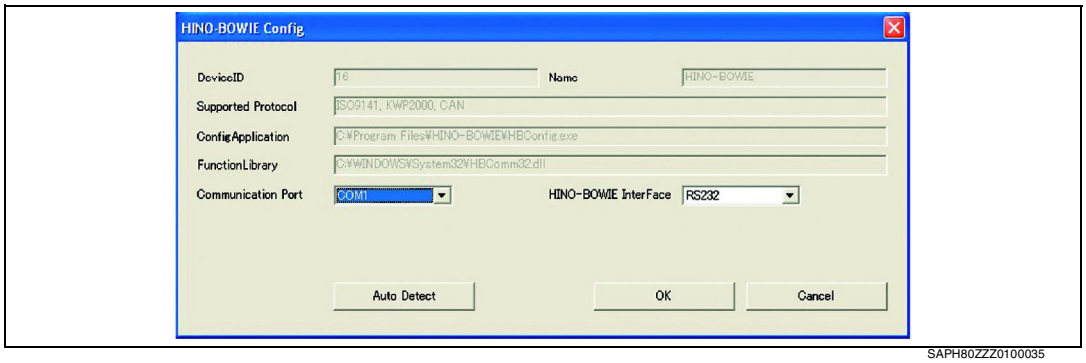

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Fig. 1-18

SAPH80ZZZ0100036

Fig. 1-19

Activation of Software

Activation of Software

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Insert Software to CD drive and installation will start automatically. For more details, refer to "HINO DX ACTIVATION USER'S MANUAL" to be supplied to you in the form of a CD, etc. whenever software (Hino-DX) is updated due to addition of new devices to the vehicle, etc.

HINT

If the software version already installed is newer than that you are going to install, an error message will be shown and you cannot install it.

Finish all the programs before you install the Software.

Connection to the vehicle

Connection to the vehicle

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In case of connection using HINO BOWIE Interface. Cable between Diag connector & I/F box Cable between PC and I/F box

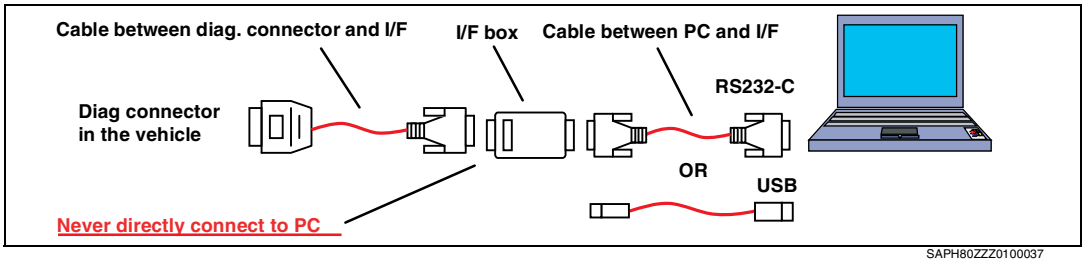

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Fig. 1-20

⚠ CAUTION

If you connect the PC to the vehicle directly, it may cause malfunction, damage and fire just by connection. Therefore, never do that.

Pay enough attention to the communication I/F corresponding voltage, when you use communication I/F. Never use communication 12V I/F to vehicles with 24V, since Hino vehicles in most of countries have 24 V.

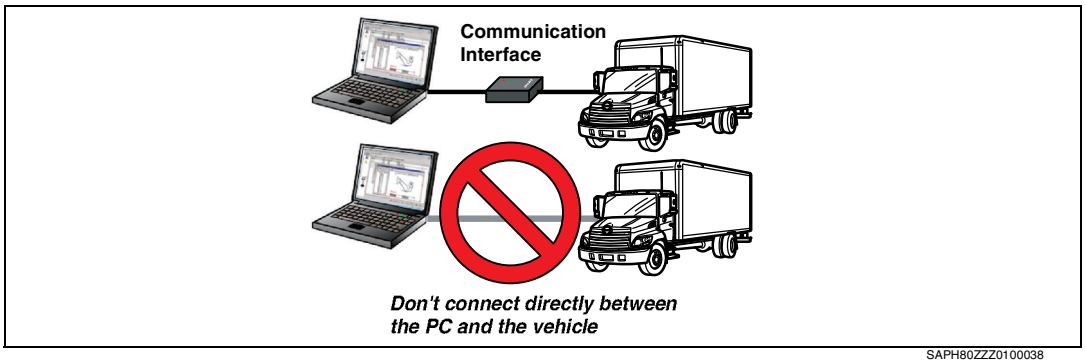

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Fig. 1-21

HINT

Why Interface is necessary?

Because there is a difference between the data obtained from the vehicle and the data which the PC can read in voltage and data format. And you cannot read the data of the vehicle from the PC by connecting the PC directly with the vehicle. Therefore, connecting the PC with the vehicle through the intermediary of the communication I/F, voltage and data are converted.

System Design

Registration of user (Administrator)

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Hino DX needs an Administrator. The Administrator has higher authority than general users and there are some items which only the Administrator can setup or which are shown only to him. Among those items is the right to register general users which is only given to the Administrator. Therefore, give due consideration to appoint the Hino DX Administrator.

1. Click Icon of [Hino Diagnostic eXplorer] (fig. 1-22 Hino-DX Desktop Icon) on the desktop to start up Hino-DX.

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Fig. 1-22 Hino-DX Desktop Icon

2. If the Administrator has not been set up, without launching Login window, Hino-DX will pop up a Caution window (fig. 1-23 Caution window) and click OK to proceed setup window of Administrator password

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Fig. 1-23 Caution window

3. User ID of the Administrator is fixed by Administration Division. (fig. 1-24 Administrator registration)
User Name and Password can be fixed at your option within the specified number of characters. Do not exceed the limit.
If the PIN {Personal Identification Number} is assigned by Hino in advance, input such number in the column of PIN. This information can be amended later.

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Fig. 1-24 Administrator registration

⚠ CAUTION
You cannot setup using space, symbols and 2 byte letters. Note that capital letters and small letters will be distinguished.

4. After completing the necessary information, click [OK]. Administrator registration window ends and Hino DX Login window (fig. 1-25 HinoDX Login) will pop up.
Use User ID and Password established at Step 3 to login to Hino-DX.

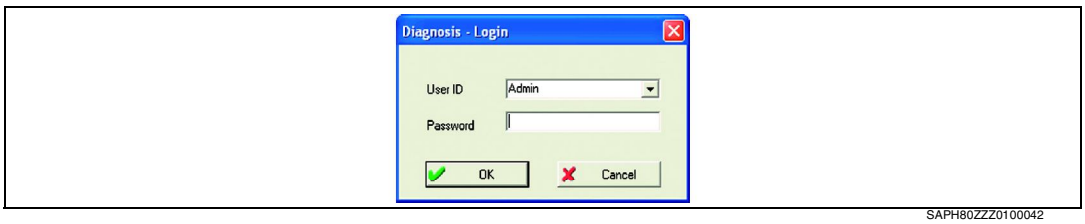

Fig. 1-25 HinoDX Login

⚠ CAUTION
If you forget your Password, you cannot login Hino-DX. It will then be necessary to re-install the Hino-DX. (Clean install)

Setting-up Option

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Before conducting diagnosis using Hino-DX, it is necessary to setup the following 3 items.

1. Communication I/F
2. Unit
3. Hino-DX User Registration

Make sure to correctly perform the setup in order to use the Hino-DX safely and properly.

1. Startup Hino-DX.

2. Select necessary items from [Options(S)] menu.

- **[Communications(D)]:**Selection of Communication I/F and setup communication
- **[Units(C)]:**Selection of the unit to be used
- **[User Administration(A)]:**Hino-DX User registration and administration
  Authority administration by registered user

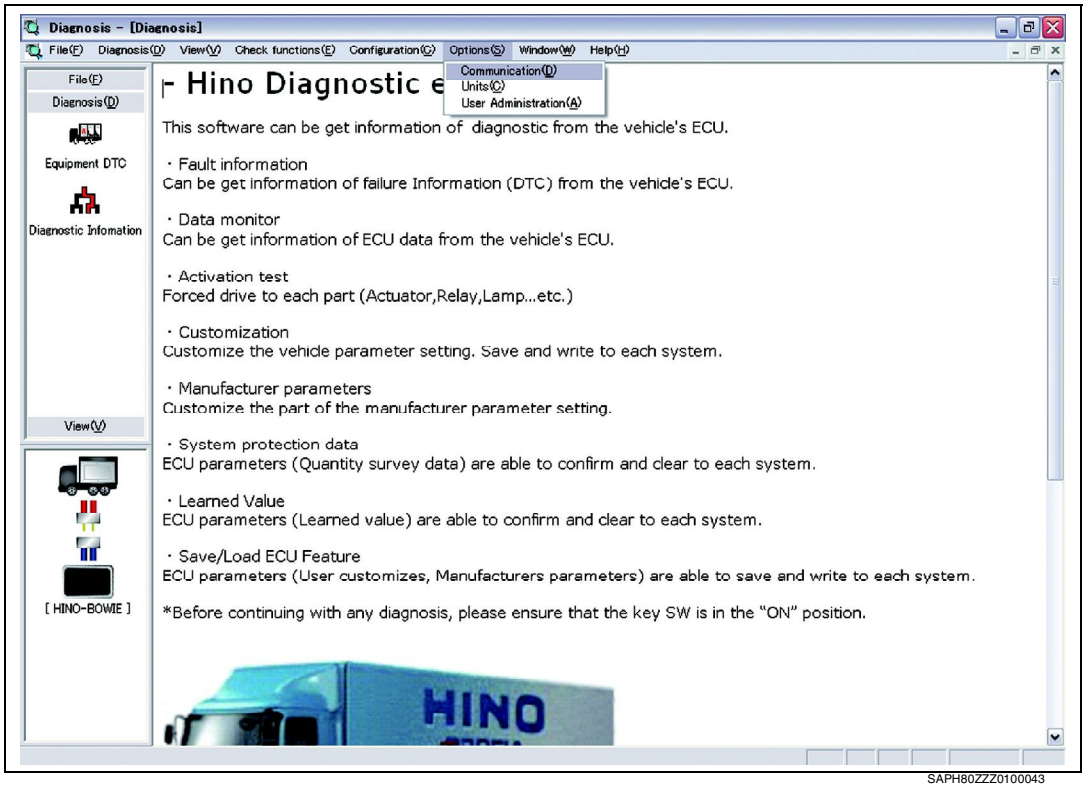

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Fig. 1-26 [Options] menu

Setting up Data Communication

1. Start up Hino-DX

2. Select [Communications(D)](fig. 1-27 [Options]-[Communications]

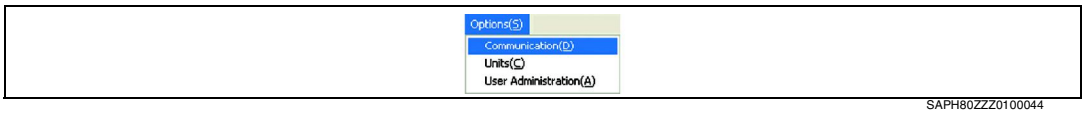

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Fig. 1-27 [Options]-[Communications]

3. Setup window of Communication I/F will pop up. The Communication I/F's already installed in the PC will be displayed listed in the Communication Interface column and select the exact Communication I/F which you use.

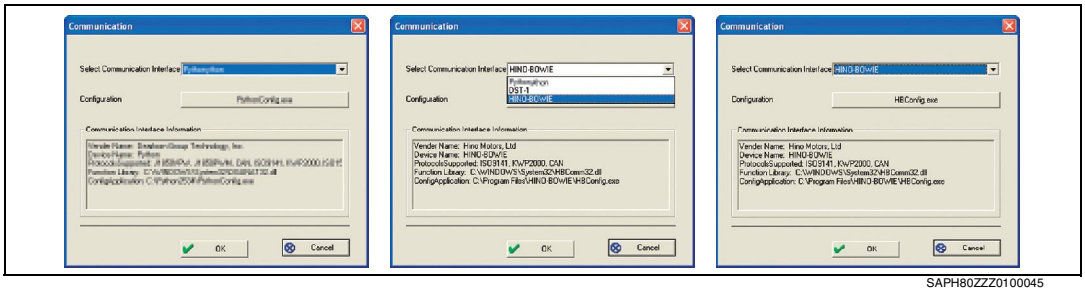

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Fig. 1-28 Communication Interface choice

4. Depending upon the selected Communication I/F, you may need to setup in its own way.
In such a case, click the Configuration Button and setup accordingly.

- **When you use Hino-Bowie Communication I/F.**
  Hino-Bowie is equipped with RS232C and USB for Communication port of the PC side. You can use either port but you need to setup one of those you are going to use.

1. Open the setup window by clicking the Configuration button. (In case of Hino-Bowie, click "HBConfig.exe button)
2. Select USB or RS232 from the HINO-BOWIE Interface column.

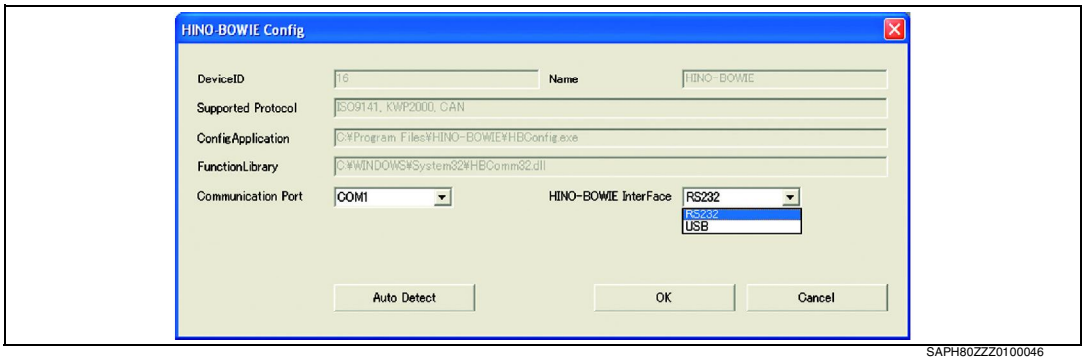

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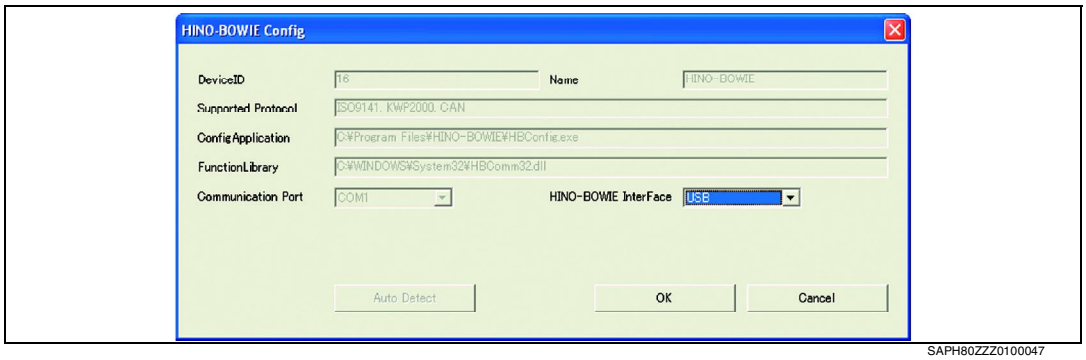
Fig. 1-29 Communication port of Hino-Bowie

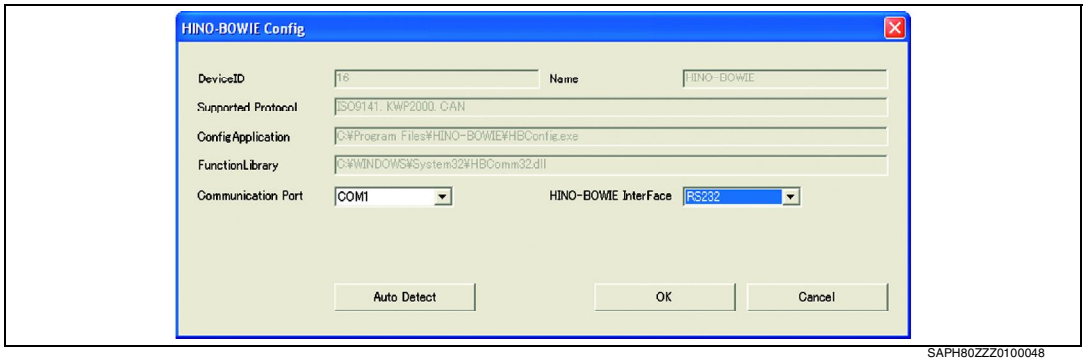
3. If you select USB, setup is complete with this and click [OK].



SAPH80ZZZ0100047

Fig. 1-30 Selecting USB Connection

4. If you select RS232, select the Communication port by one of the following methods.



SAPH80ZZZ0100048

Fig. 1-31 Selecting RS232C Connection

1. When you setup a Communication port manually, select the port you want to use from the Communication column and click [OK]

⚠ CAUTION
You can select the port you want to use from COM1 to COM8 only.

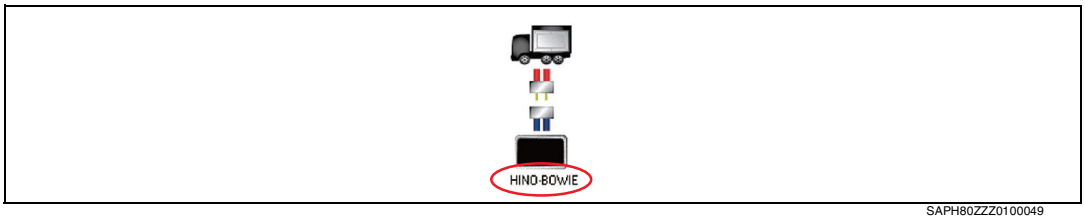
2. When you setup the Communication port automatically, click [Auto Detect].
Then the Communication port which Hino-Bowie uses will automatically be searched and click [OK] after searching.

⚠ CAUTION
It is necessary that Hino-Bowie is actually connected for automatic setup. Connect cable, etc. to the Hino-Bowie, connect each cable of Diag connector and PC, then setup automatically.

5. Click [OK] after completing all the setups and they will become effective.

HINT

Once the Communication port is setup, this will be saved in the Hino-DX and you don't need to setup again next time. Selected Interface name will be shown below the Communication Information Window.



SAPH80ZZZ0100049

Fig. 1-32 Interface name

With regards to confirmation of poor connection of the DX when using the USB port.

Check the followings when poor connection of DX occurs when using USB port.

1. Check whether the PC USB port recognizes the Hino Bowie or not.

NOTICE

In case the DX connected with the USB was used without problems, connect the same port as in the past and check it again. There might be a case that the Hino Bowie may not be recognized if you connect it with a different port.

(1) Open" Properties" of "My Computer". (In case of Windows XP)

SAPH80ZZZ0100050

Fig. 1-33

(In case of Windows 2000)

Right-click icon of "My Computer" on the desktop and click "Properties" the same for manner.

SAPH80ZZZ0100051

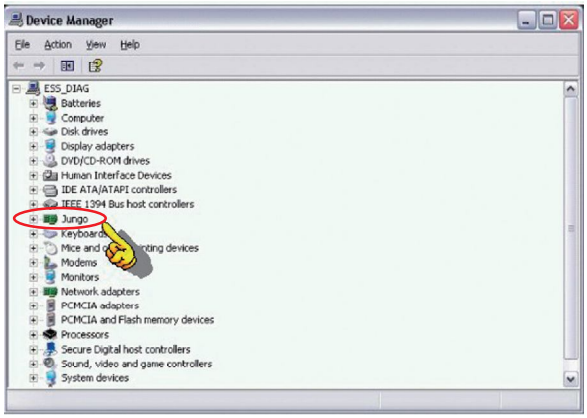
Fig. 1-34

(2) Click tab of "Hardware" and open "Device Manager"

SAPH80ZZZ0100052

Fig. 1-35

(3) Check for icon "Jungo".



SAPH80ZZZ0100053

Fig. 1-36

If you find an icon "Jungo" in "Device Manager", the connected USB port recognizes the Hino Bowie.
If there is no icon "Jungo", the USB port does not recognize the Hino Bowie. You are asked to carry out the following procedures.

a. Check and see connections with other USB ports.
b. Make sure to install the latest driver of the Hino Bowie.

2. Check the version of the driver.
Check whether the driver of the Hino Bowie corresponds to the version of the DX in use.
If the version differs from each other, there might be a problem when installing. Therefore, it is necessary to re-install the latest driver of the Hino Bowie.

(Files to confirm)
(A) HBConfig.exe
(B) HBComm32.dll

(1) Check the version of the Hino Bowie driver installed in the PC.
a. The folder for Hino Bowie is saved in the "Program Files" of (C:)drive.
To confirm, refer to the right chart for saving destination.

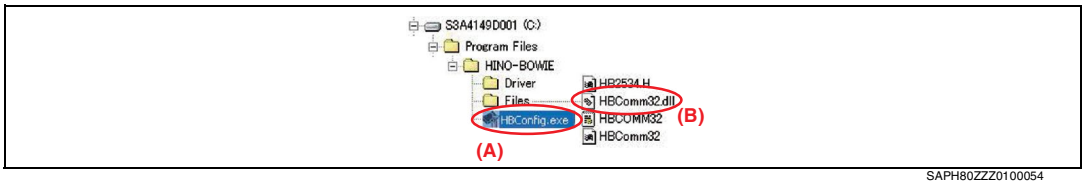


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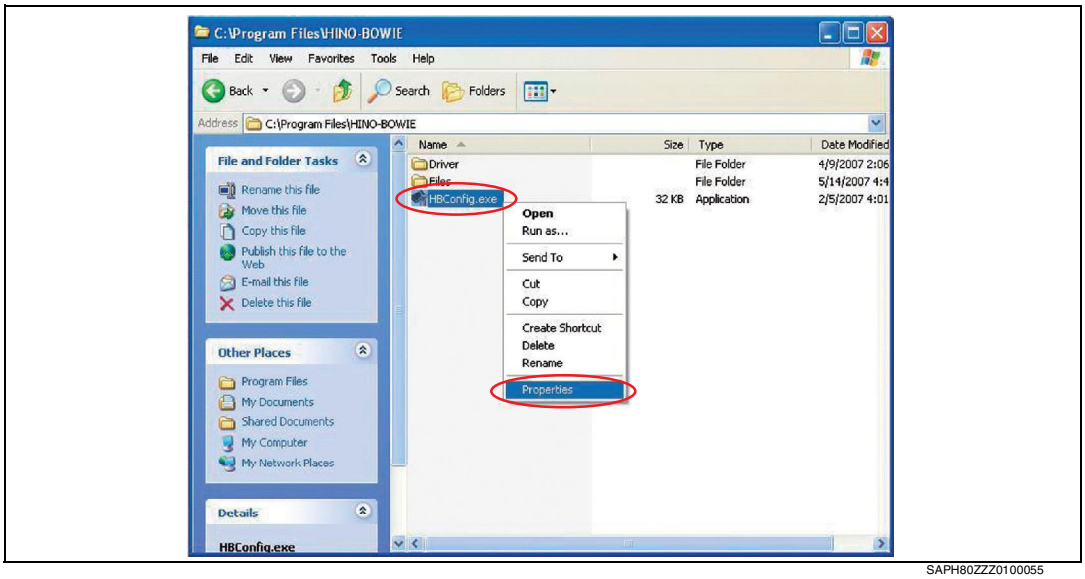
Fig. 1-37

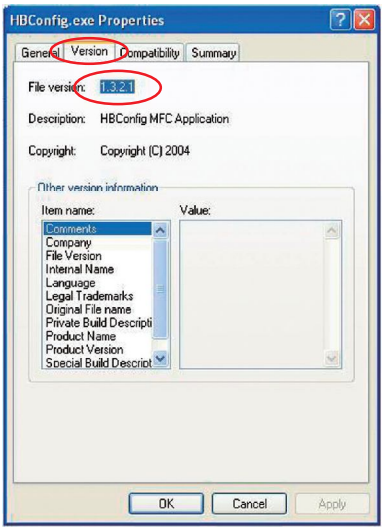
b. Right-click each file and click "Properties". (The following chart shows the case of "HBConfig.exe".)



SAPH80ZZZ0100055

Fig. 1-38

c. Click the tag of "Version" of the "Properties" to check version of the file. (The following chart shows the case of "HBConfig.exe".)
Examples version of each file
HBConfig.exe: 1.3.2.1
HBComm32.dll: 1.4.2.0

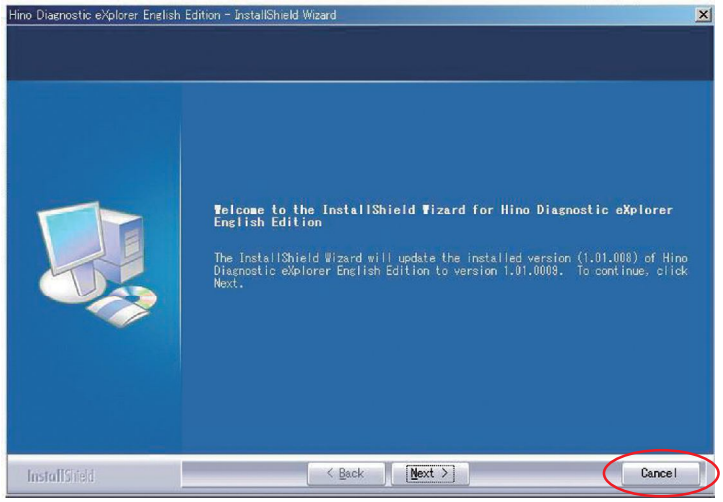


SAPH80ZZZ0100056

Fig. 1-39

(2) Check the version of the Hino Bowie driver corresponding to the DX currently in use.
a. Insert the CD of the DX currently installed.
b. Automatic run will start when the CD is inserted in the drive. Cancel in accordance with the following steps.

1. Click "Cancel" button.



SAPH80ZZZ0100057

Fig. 1-40

2. Click "YES (Y)" button.

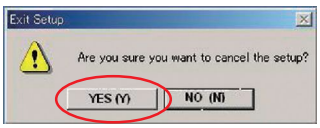


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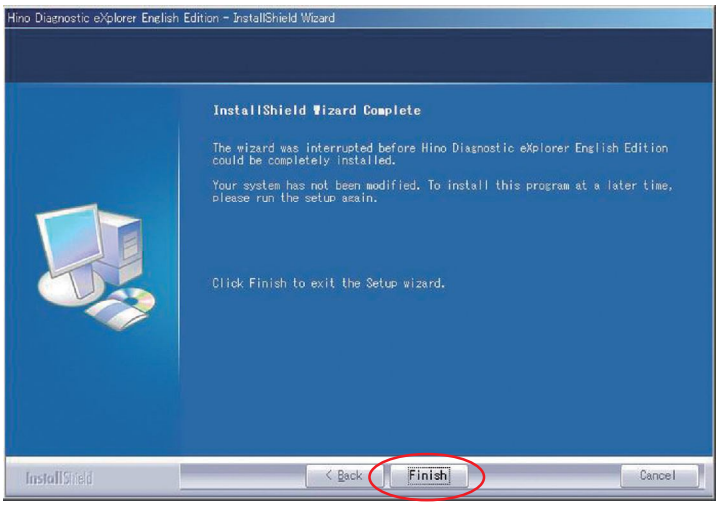
Fig. 1-41

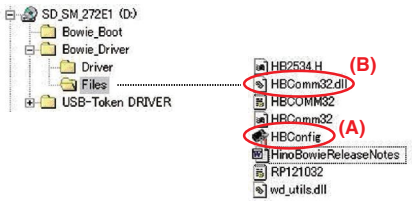
3. Click "Finish" button.



SAPH80ZZZ0100059

Fig. 1-42

c. Open the CD from "Explorer" and check the version of the file you want to confirm.



SAPH80ZZZ0100060

Fig. 1-43

(3) Check the version of HINO Bowie Interface firmware.
a. Connect PC through HINO Bowie with the vehicle.
b. Fig. 1-43 Click and start up [BootPG.exe] in the Bowie Boot file.

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Fig. 1-44

c. Click Version

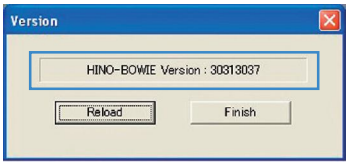
SAPH80ZZZ0100062

Fig. 1-45

d. Check the version by clicking OK

SAPH80ZZZ0100063

Fig. 1-46



SAPH80ZZZ0100064

Fig. 1-47

(4) Check the version of the file in the PC and CD.

	(1) File installed in the PC	(2) File in the CD
HBConfig.exe	(Example) 1.3.2.1	(Example) 1.3.2.1
HBComm32.dll	(Example) 1.4.2.0	(Example) 1.4.2.0
Hino-Bowie Firmware	(Example) 30313037	(Example) 30313037 (1.0.7)

If you compare the version checked by (1), (2), and (3) and there is no difference, the newest version is installed.
When there is a difference, please install a driver again from CD after uninstalling the driver in PC.
When HINO Bowie Firmware is different, please update it.
(About installation of the driver and Firmware, Please refer to the chapter of interface driver installation DX01-8.)

If DX does not work in good order, there is a possibility of other problems.
Contact Service department of Hino distributor in your country in such a case.

Setup of Unit

Various kinds of units are used worldwide. Typically the SI unit system, Metric system, Ft/Lb system are being used. Hino recommends the SI unit.
However, each country has its own customs and Hino-DX has a unit conversion function so that inconvenience may not happen due to inexperienced usage of the Unit.
You can finely setup the Unit which you wish to use.

1. **Startup Hino-DX**

2. **Select [Options(S)]-[Units(C)] menu (fig. 1-48 [Options]-[Units])**

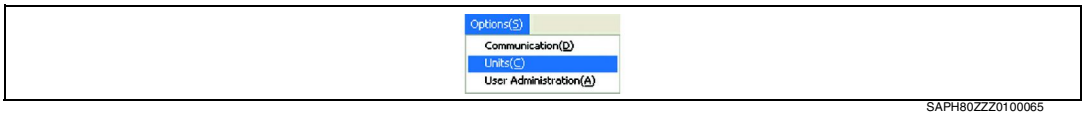


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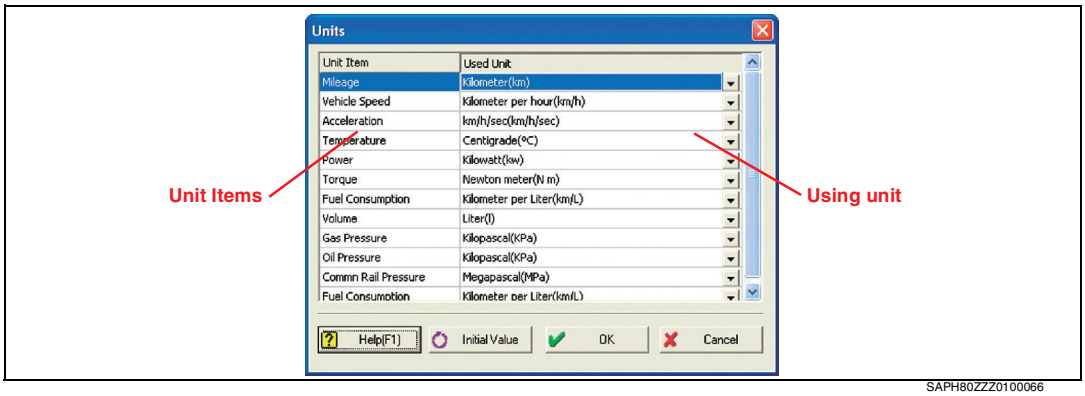
Fig. 1-48 [Options]-[Units]

3. **Setup Units Window will pop up. Select the item you wish to change and make choose of the unit you wish from the drop down box.**

HINT
The Unit items which are not used currently (Acceleration and Power, etc.) are set up in view of the future possibility of usage and they can be set up even now.
Once the Unit is setup, this will be saved in the Hino-DX and you don't need to set it up again next time.



SAPH80ZZZ0100066

Fig. 1-49 Unit setting window

Details of Units

	Name	Unit	Default	Conversion rate
Mileage	Kilometer	km	X	1
	Mile	Mile		0.6214

	Name	Unit	Default	Conversion rate
Vehicle Speed	Kilometer per hour	km/h	X	1
	Mile per hour	Mph		0.6214

	Name	Unit	Default	Conversion rate
Acceleration	Kilometer per hour per second	km/h/sec	X	1
	Mile per hour per second	Mph/sec		0.6214

	Name	Unit	Default	Conversion rate
Temperature	Centigrade	°C	X	1
	Fahrenheit	°F		1.8*[°C]+32

	Name	Unit	Default	Conversion rate
Power	Kilowatt	kw	X	1
	Horsepower	hp		1.341
	Metric horsepower	ps		1.360

	Name	Unit	Default	Conversion rate
Torque	Newton meter	N•m	X	1
	Kilogram force meter	kgf•m		0.1020
	Pound force foot	lbf•ft		0.7376

	Name	Unit	Default	Conversion rate
Fuel Consumption	Kilometer per liter	km/L	X	1
	Mile per US gallon	mpg		2.35
	Mile per imperial gallon	mile/igal		2.84
	Liter per 100km	L/100km		-

	Name	Unit	Default	Conversion rate
Volume	Liter	l	X	1
	US gallon	gal		0.2642
	Imperial gallon	igal		0.2200

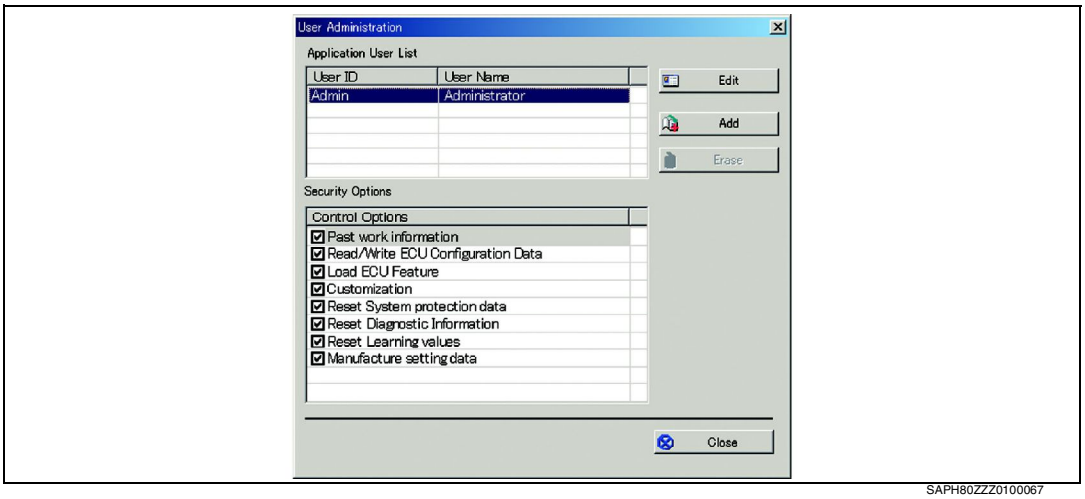
	Name	Unit	Default	Conversion rate
Gas pressure	Kilo Pascal	KPa	X	1
	Mega Pascal	MPa		0.0010
	Bar	Bar		0.0100
	Kilogram force per squire centimeter	kgf/cm2		0.0102
	Pound per squire inch	PSI		0.1450
	Millimeter of mercury	mmHg		7.5010
	Inch of mercury	inHg		0.2953

	Name	Unit	Default	Conversion rate
Oil pressure	Kilo Pascal	KPa	X	1
	Mega Pascal	MPa		0.0010
	Bar	Bar		0.0100
	Kilogram force per squire centimeter	kgf/cm2		0.0102
	Pound per squire inch	PSI		0.1450
	Millimeter of mercury	mmHg		7.5010
	Inch of mercury	inHg		0.2953

	Name	Unit	Default	Conversion rate
Common rail pressure	Kilo Pascal	KPa		1
	Mega Pascal	MPa	X	0.0010
	Bar	Bar		0.0100
	Kilogram force per squire centimeter	kgf/cm2		0.0102
	Pound per squire inch	PSI		0.1450
	Millimeter of mercury	mmHg		7.5010
	Inch of mercury	inHg		0.2953

User Registration

You can register multiple users in Hino-DX and switch the user when you log-in. Thanks to this function, you can set the items of operation by each user.
It is necessary to administrate the user in accordance with the level and content of skill of each operator.
The Administrator will decide how to administrate and give instructions to each operator.
For example, you can give an experienced operator high degree of authorization and limit authorization to an un-experienced operator until he/she gets more experienced.



SAPH80ZZZ0100067

Fig. 1-50 User administration window

1. Startup Hino-DX

2. Select [Options(S)]-[Units(C)] menu (fig. 1-51 [Options]-[User Administration]).

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Fig. 1-51 [Options]-[User Administration]

3. Register a new user.

(1) Click [Add]button and display Add new user window(fig. 1-52 Add new user).
(2) Input UserID, User Name and Password.

- **UserID:**Less than ASCII 8 characters
- **User Name:**Less than ASCII 20 characters
- **Password:**Less than ASCII 8 characters

(3) Input PIN. Input PIN (formally issued only) by Hino or its Distributor.

(4) Click [OK] after change.

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Fig. 1-52 Add new user

HINT
PIN (Personal Identification Number) will be written into the ECU when the ECU is re-programmed as an operator information. PIN is not needed for the operator who does not re-program.
Addition and editing of user can only be made by the Administrator.

4. Change the information of registered users.
(1) Click to select the user whose information you wish to change.
(2) Click [Edit] button and display "User Registration Change" window. (fig. 1-53 Edit user information)
(3) Click to select the item you wish to change.
(4) Click [OK] after change.

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Fig. 1-53 Edit user information

HINT
You cannot change UserID of Administrator on "Admin"(fig. 1-54 Edit - Administrator's information)

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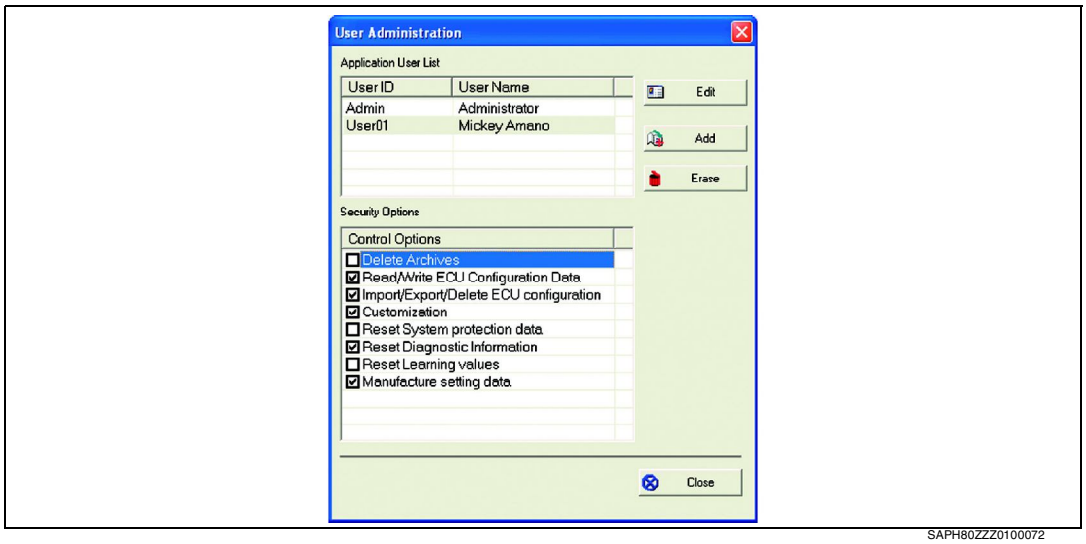
Fig. 1-54 Edit - Administrator's information

5. Change Security Option of registered user.
(1) Click to select the user whose Security Option you wish to change.
(2) Setup authority on "Security Option"
Method of setup: V Mark in the box with setup Blank without setup



SAPH80ZZZ0100072

Fig. 1-55 Security Option

Security Option Contents

Option Items	Detail
Past work information	Work history data saved in HinoDX can be deleted.
Read/Write ECU configuration data	You can read and/or write Engine ECU configuration data from/to ECU.
Load ECU Feature	You can export configuration data to other PC from Engine ECU so that you can use it or import the configuration data saved in other PC in order to use it.
Customization	Customized item which is setup by ECU can be changed.
Reset system protection data	You can reset system protection data saved in ECU in order to protect the device.
Reset Diagnostic Information	Diagnostic code can be deleted.
Reset learning values	Learning values saved in ECU can be reset in order for the device to function properly.
Manufacturer setting data	Manufacturer setting data which are set by ECU can be changed.

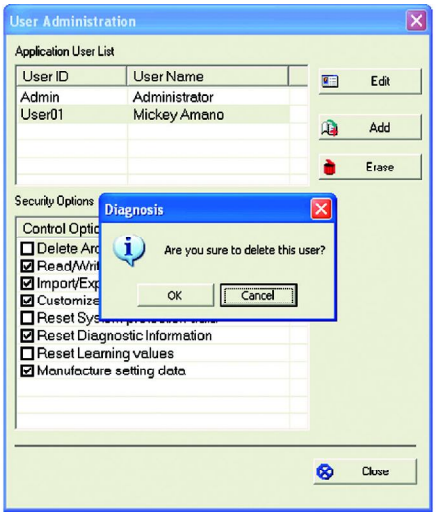
6. How to erase registered user.

(1) Click to select the user you wish to erase.

(2) Erase the user by clicking [Erase] button.

⚠ CAUTION

You cannot restore the user once erased. If by error you erase the user, you need to register him/her again by New user registration.



SAPH80ZZZ0100073

Fig. 1-56 Erase user

HINO Diagnostic eXplorer

DX02-001

Outline of HINO-DX Function

Outline of HINO-DX Function

EN80ZZZ02X100001

- Hino Diagnostic eXplorer (Hino-DX) is a tool that has the necessary functions in order to carry out " Diagnosis of the electronic control system", "Confirmation of its function" and "Setting up".

* Intended for HINO Common rail engines manufactured in and after November 2003.

SAPH80ZZZ0200001

Fig. 2-1

<Main function>

1. Able to obtain and delete Diag. code by communicating with ECU installed to the vehicle.
2. Diag. code read from ECU is linked to corresponding Diagnosis flow and can directly indicate necessary information. (*Function to indicate Diagnosis flow)
3. To obtain the state of the sensor from the vehicle when a malfunction occurs. (Freeze Frame function).
4. Able to monitor (Data Monitor function) and test (Active Test function) the state of the equipment installed to the vehicle while the vehicle is in motion.
5. In response to "with or without" optional equipment, you can amend the ECU data and make the state of the engine achieve optimum condition.
6. You can simulate the Diagnosis operation (Simulation function) without actually connecting to the vehicle.
7. ECU information read from the Hino-DX is automatically saved and you can proceed to analyze based on the saved information, even when you cannot grasp the cause of the malfunction.

Method of Diagnosis

EN80ZZZ02X100002

When abnormality occurs in the electronic control system of Hino products, you can trace the cause of abnormality by the following 2 methods or by one of the 2.

1. Identify the cause of abnormality from the DTC recognized by the ECU.
2. Identify the cause by assuming factors according to the situation of the abnormality which is happening.

HinoDX takes method 1 to proceed to Diagnosis. The cause of abnormality largely differs according to external circumstances such as the vehicle operating condition and the environment by country by the method 2, so you are asked to develop Diagnosis in accordance with the Hino Workshop Manual and your experience.

DTC Code

ECU which controls each electronic system has its own self-diagnosis function.
In case abnormality is determined thanks to Diagnosis based on its logic, it will be saved to the internal memory in line with its abnormality. This is called DTC which memorizes separately the currently continuing malfunction {Active DTC} and malfunction occurred in the past but repaired now {Inactive DTC} depending upon the ECU.

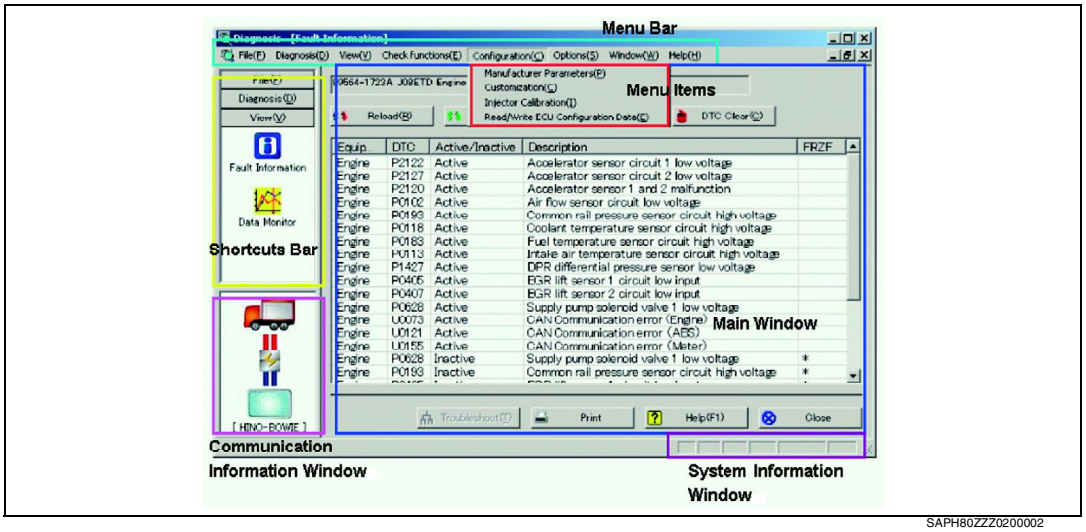
HINT

Normally the DTC is detected when the signals of each sensor or actuator evidently exceed the threshold.
Even in the case where various kinds of signals are within the threshold with no DTC detection, a similar phenomenon such as abnormality may occur.

HINO-DX Name of the Screen

HINO-DX Name of the Screen

EN80ZZZ02X100003



SAPH80ZZZ0200002

Fig. 2-2

Menu Bar
All the functions which the Hino-DX applies are summarized by a category of functions.
There are menus which are shown and not shown depending upon the equipment.

Menu Item
These are details of the menu summarized by the category of functions. Items may increase/decrease depending upon the equipment and the authority of the user of the PC.

Shortcut Bar
Frequently used functions are summarized by the items.

Main Window
Window which you actually use. Information obtained from the ECU and operation to the ECU, etc. are conducted here.

Communication Information Window
It shows a kind of I/F and current status of communication.

System Information Window
It shows the current status of the system.

EXAMPLE

[HINO-BOWIE]

Communication with ECU not established or communication is under pause

[HINO-BOWIE]

Under communication with ECU.

SAPH80ZZZ0200003

Fig. 2-3

Starting up HINO DX

Starting up HINO DX

EN80ZZZ02X100004

- Before starting up the HINO-DX, check the connection of the cable between the vehicle ↔ I/F ↔ PC and turn "ON" the starter key S/W of the vehicle.
  After turning the key S/W "ON", check if the power of the I/F is turned "ON"

SAPH80ZZZ0200004

Fig. 2-4

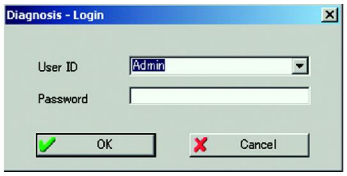
⚠ CAUTION
Even if the starter key S/W of the vehicle is positioned at "LOCK", the battery current reaches connector of the vehicle.
Accordingly, pay due attention to connect the cable.

1. Startup Hino-DX by clicking the Icon (Fig. 2-5 HinoDX Desktop Icon) on the desktop.

SAPH80ZZZ0200005

Fig. 2-5 HinoDX Desktop Icon

2. Input User ID and Password assigned to each user and click [OK].



SAPH80ZZZ0200006

Fig. 2-6

3. Initial screen of the Hino-DX will be shown.

SAPH80ZZZ0200007

Fig. 2-7

Reading DTC code

Reading DTC code

EN80ZZZ02X100005

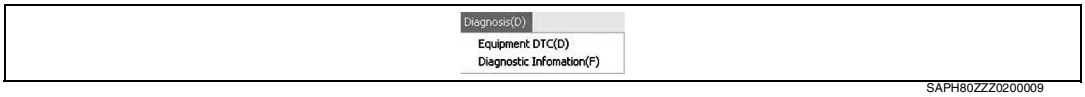
This HINO-DX adopts "Equipment DTC" by which user narrows down the targeted system to read DTC

1. **Selection of Equipment DTC**

SAPH80ZZZ0200008

Fig. 2-8 Shortcut Bar-All DTCs

Menu:[Diagnosis]-[Equipment DTC]
Shortcut Bar:[Diagnosis]-[Equipment DTC]



SAPH80ZZZ0200009

Fig. 2-9 Menu - Diagnosis

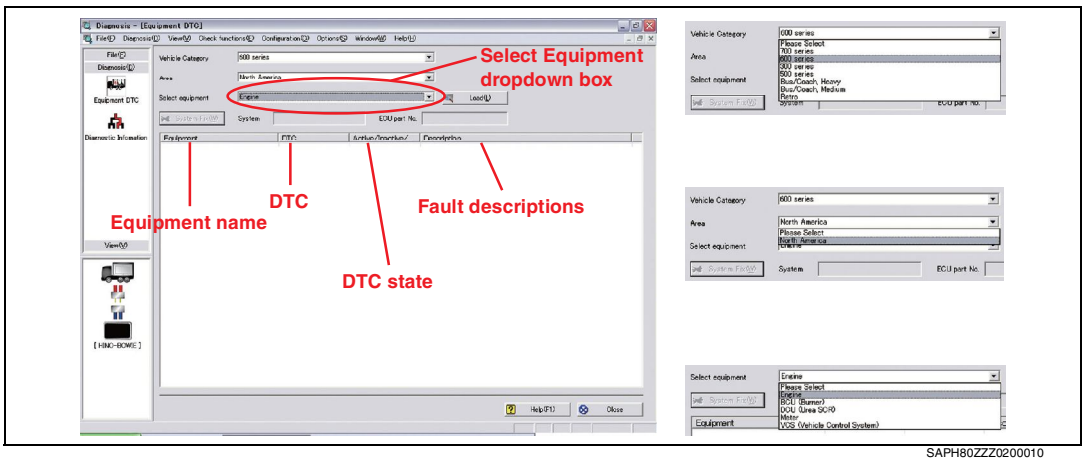
How to read DTC

EN80ZZZ02X100006

<Before System Fix >

1. **Start up the Hino-DX and after you check that the Communication Interface and cable are connected well, connect each cable to the vehicle and PC. After confirming that the PC and the vehicle are connected through the intermediary of the I/F, turn the key S/W of the vehicle from "LOCK" to "ON".**

2. **Select [Equipment DTC] and read DTC from ECU installed to the vehicle.**



SAPH80ZZZ0200010

Fig. 2-10 Equipment DTC

3. **Select target equipment from the "Select Equipment" drop-down list, and click the [Load] button to read malfunction information from the given ECU.**

4. **Click the [System Fix] button to fix the target equipment and start diagnosis.**

HINT
When communication between the Hino-DX and ECU cannot be established and the DTC cannot be read for some reason as no DTC is recorded to the ECU, the reason will be displayed.
If you do not carry out System Fix, the target equipment cannot be fixed and you cannot conduct Diagnosis further. And even if the DTC cannot be read from the ECU, if you don't carry out System Fix, data monitoring and injector calibration cannot be executed.

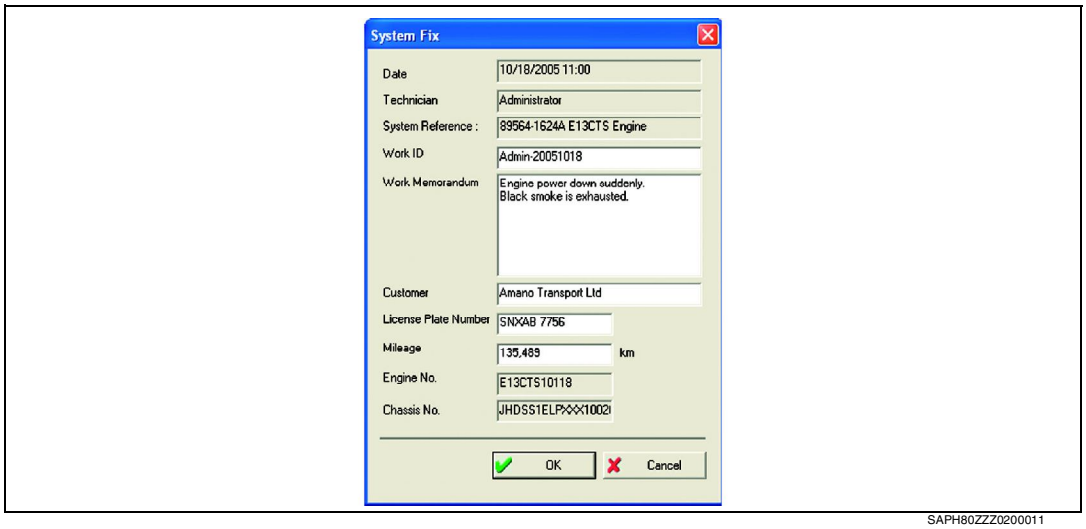
<System Fix>

By conducting System Fix, you can fix the target equipment of diagnosis. In accordance with this, menu items suitable for the targeted system can be shown. Accordingly, you can conduct the diagnosis efficiently.

1. **Record operation as operation record index will be shown on the screen.**

(1) Date (not alterable) Date of operation (Automatically input by PC)
(2) Technician (not alterable) Technician who logs in HinoDX
(3) System Reference (not alterable) Determined by ECU of targeted diagnosis
(4) Work ID Default Value is UserID + Date
(5) Work Memorandum Input vehicle condition and work memo, etc.
(6) Customer Input user name of the vehicle
(7) License Plate Number Input License Plate Number
(8) Mileage Input mileage when the vehicle is brought in
(9) Engine Number (not alterable) Engine Number read from ECU
(10) Chassis Number (not alterable) Chassis Number or VIN number read from Engine ECU

HINT
You can amend the content of the data which can be input during the Diagnosis or after the work.
Hino-DX saves ECU information when starting and finishing work and can be searched later on the basis of work index.



SAPH80ZZZ0200011

Fig. 2-11 Work index record

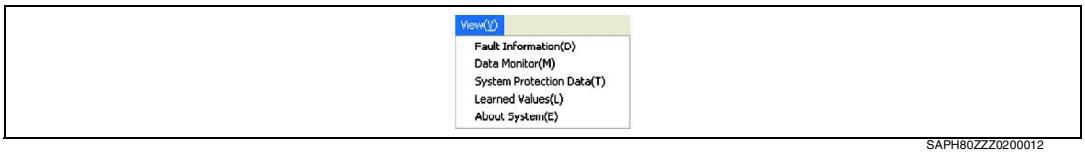
2. **When you click the [OK] button, you can read information necessary for diagnosis of malfunction obtained by usage of the Hino-DX from the ECU and usable menu will be shown.**

HINT
Information which is input here will be retained until you finish the Hino-DX or select New diagnosis.
For example, in case you conduct diagnosis of engine first and transmission next, the data input at engine diagnosis shall be retained and it is unnecessary to input again.

After System Fix

EN80ZZZ02X100007

You cannot change the targeted diagnosis equipment until you close operation or finish Hino-DX, once you conduct System Fix.
This is because we need to narrow down to one target operation in order to save the diagnosis operation information.
Fault Information Screen after System Fix can be called up from the Fault Information Menu.
Menu:[View]-[Fault Information]



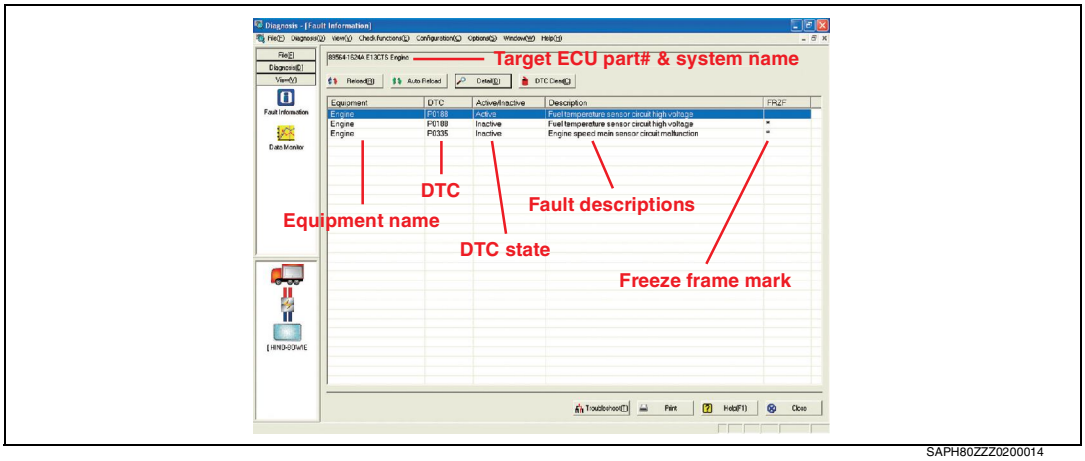
SAPH80ZZZ0200012

Fig. 2-12 Menu - Fault Information

Shortcut Bar:[View]-[Fault Information]

SAPH80ZZZ0200013

Fig. 2-13 Shortcut Bar - Fault Information



SAPH80ZZZ0200014

Fig. 2-14 Fault Information

Reload of DTC

When you click the [Reload] button (Fig. 2-15 Reload of DTC), Fault Information will be read again from the ECU and displayed on the screen

SAPH80ZZZ0200015

Fig. 2-15 Reload of DTC

This is used when you want to check the real-time Fault Information and confirm the DTC status after rectifying the malfunction.

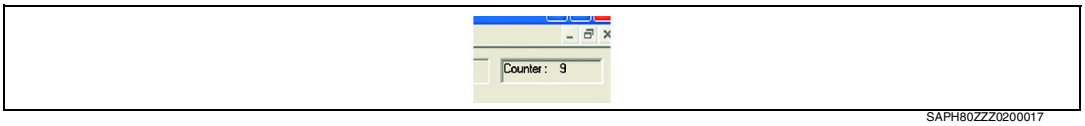
Automated Reload of DTC

When you click the [Auto Reload] button (Fig. 2-16 Automated Reload), Fault Information can be read again continuously and displayed on the screen.

SAPH80ZZZ0200016

Fig. 2-16 Automated Reload

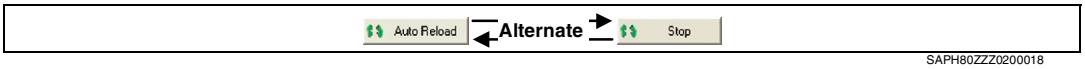
When malfunction occurs intermittently, this is used for identifying the portion of malfunction (verification by swinging harness wire, etc.) or identifying a malfunction which occurs under a specific condition.
When you conduct the Automated Reload, Reload counter (Fig. 2-17 Auto Reload Counter) will be displayed on the upper right of the Main Window and you can confirm how often we are reloading.



SAPH80ZZZ0200017

Fig. 2-17 Auto Reload Counter

And when you want to stop Automated Reload, click the [Stop] button.
[Auto Reload] and [Stop] will be shown by turns.
While Automated Reload is running once [Auto Reload] is clicked, button notation will be "Stop" and perform as the [Stop] button to stop the Automated Reload.
And notation when Automated Reload is not running will be the "Auto Reload" button to execute Automated Reload.



SAPH80ZZZ0200018

Fig. 2-18 [Auto Reload] and [Stop]

Detail Information of the DTC

Select one out of the DTCs read and click the [Detail] button (Fig. 2-19 Detail Information), and you can view probable cause of which DTC is being detected.

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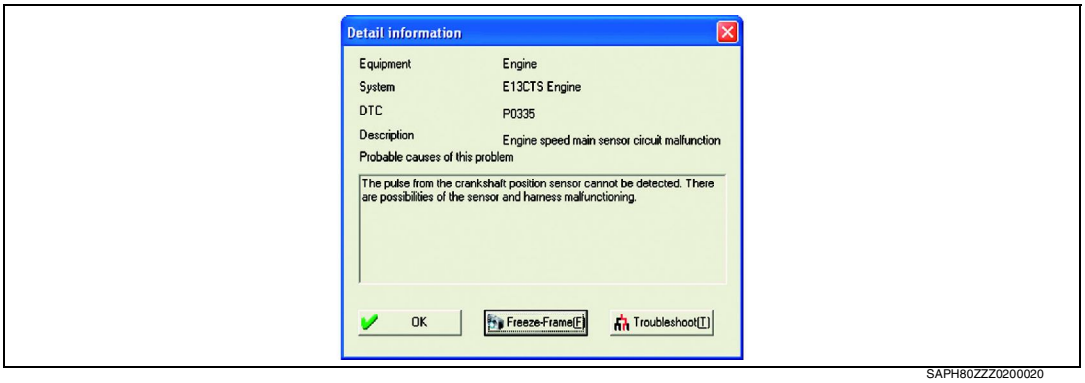
And in case the ECU obtains Freeze Frame Data, you can confirm the Freeze Frame Data on this screen.



SAPH80ZZZ0200020

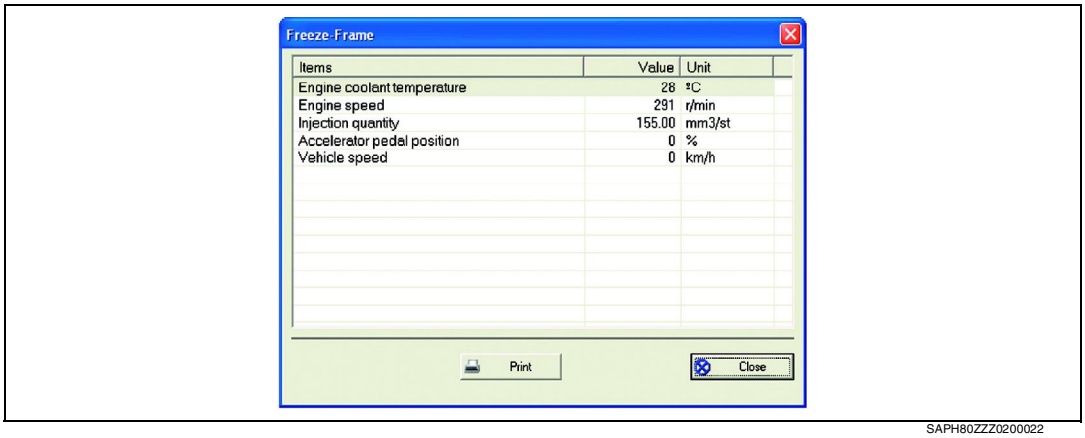
Fig. 2-20 Detail Information Window(Engine)

1. Freeze Frame Data

Freeze Frame Data are data which record the status of the system at the moment when the DTC is detected.
According to the data, you can grasp how the malfunction occurred and they are very useful to analyze the cause of the malfunction.
Freeze Frame Data are associated with the DTC of Freeze frame mark with the"*" mark.
Freeze Frame Data can be shown by clicking the [Freeze-Frame] button (Fig. 2-21 Freeze Frame) on the Detail Information Window.

SAPH80ZZZ0200021

Fig. 2-21 Freeze Frame

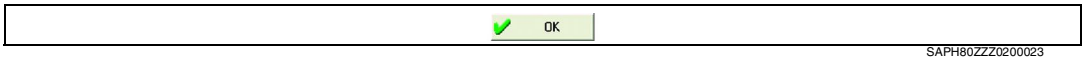


SAPH80ZZZ0200022

Fig. 2-22 Freeze Frame Data (Engine)

2. OK button

You can close the screen by clicking the [OK] button after checking the screen of the Detail Information. And you can also close the screen by clicking the X on the upper right of the screen.



SAPH80ZZZ0200023

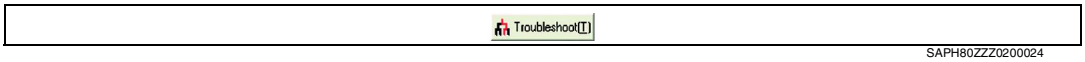
Fig. 2-23 OK

3. Trouble shooting Flow

Ballpark portion of the malfunction can be known from the DTC read from the ECU, but it is almost impossible to trace back the exact portion where the true cause exists by the DTC only.
It is very rare that the cause of malfunction can visibly be seen in case of the malfunction of the electric system. Therefore, it is necessary to conduct a diagnosis of the malfunction using measuring instruments.
In many cases the following contributing factors can be considered from one DTC.

(1) Malfunction of sensor or actuator.
(2) Malfunction of harness wire (Power source, GND, sensor/actuator, etc.)
(3) Malfunction of the ECU

In order to grasp the true cause of the malfunction, we measure using such measuring instruments as voltmeter, ohmmeter, oscilloscope, megohmmeter, etc. in accordance with the flow chart described on malfunction diagnosis flow and determine normal/abnormalities by comparing the measured value and standard value.
In each diagnosis flow method to check how to return to normal is described and you are asked to check if you have returned to normal based on the method after repair.

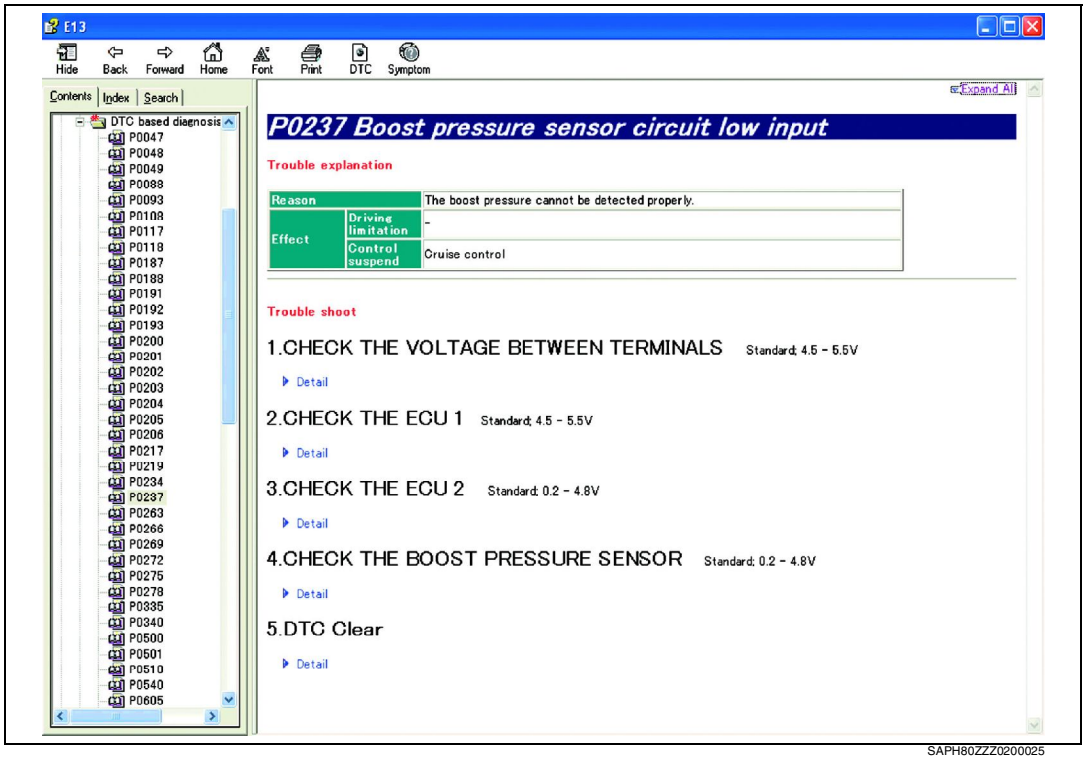


SAPH80ZZZ0200024

Fig. 2-24 Freeze Frame

⚠ CAUTION
Do not forget to erase the DTC when you want to check return to normal from the malfunction.
If you forget to do this, you cannot determine whether the Diag. code read from the ECU corresponds to the malfunction which occurs now or which occurred in the past when you conduct Diagnosis next time using the Hino-DX.

HINT
The contents of the malfunction diagnosis flow are identical to that described in the Workshop Manual.

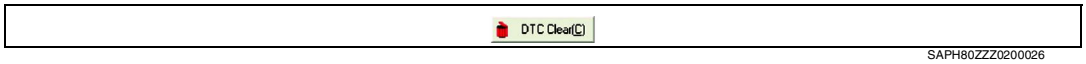


SAPH80ZZZ0200025

Fig. 2-25 Troubleshooting Flow

DTC Clear

You can clear the DTC and Freeze Frame Data which are read from the ECU.
DTC which can be cleared is for past malfunction {Inactive DTC} only and current malfunction {Active DTC} cannot be cleared. When you want to clear current malfunction, trace back its cause, repair it and make the DTC show the past malfunction only, then clear it.



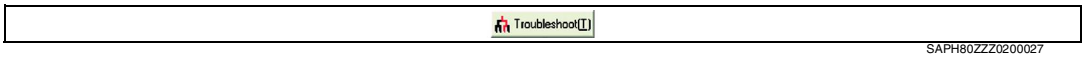
SAPH80ZZZ0200026

Fig. 2-26 DTC Clear

⚠ CAUTION
Do not forget to erase the DTC after you rectify the malfunction. If you forget to do this, you cannot determine whether the Diag. code read from the ECU corresponds to the malfunction which occurs now or which occurred in the past when you conduct Diagnosis next time using the Hino-DX.

Troubleshoot

Select one of the DTC read, click the [Troubleshoot] button and Diagnosis flow suitable for that DTC will be shown.

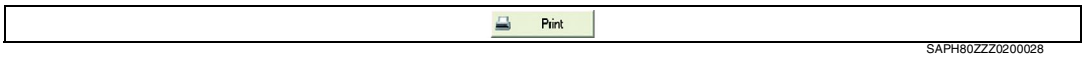


SAPH80ZZZ0200027

Fig. 2-27 Troubleshoot

Print

You can print out the Diagnosis Information displayed on the Hino-DX Main Window.

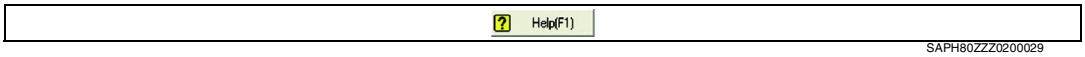


SAPH80ZZZ0200028

Fig. 2-28 Print

Help

Help for DTC basis diagnosis information is shown.



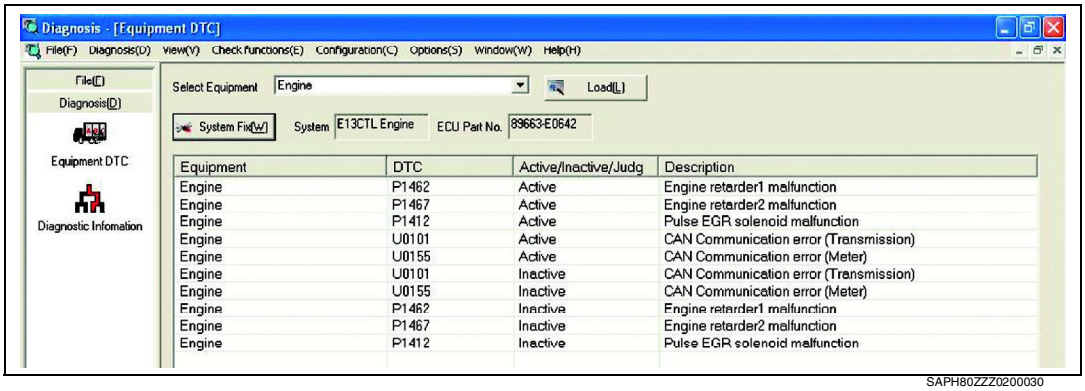
SAPH80ZZZ0200029

Fig. 2-29 Help

Close

Fault Information screen will be closed. In case you want show it, call up the screen in the following way.
Menu:[View]-[Fault Information]
Shortcut Bar:[View]-[Fault Information]

HINT
DTC display has [Active],[Inactive] and [Judge].

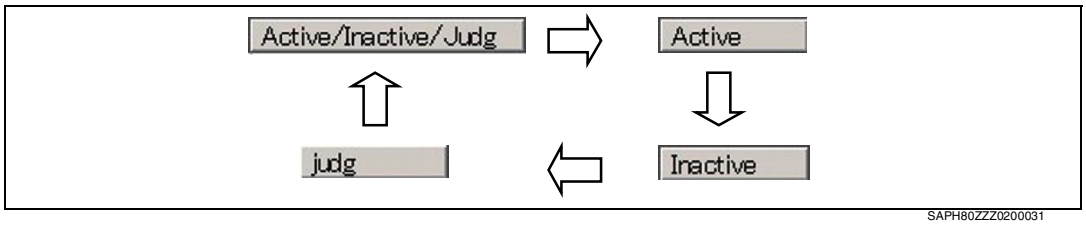


SAPH80ZZZ0200030

Fig. 2-30 DTC STATE

Active : means the status of failure currently.
Inactive : there is a history of the past failure but now it is repaired.
Judge : As of now (Sep. 2010), there is no DTC display as Judge.

Fig. 2-30 By clicking the portion of red circle on the screen, you can change the display method.



SAPH80ZZZ0200031

Fig. 2-31

Diagnostic Information

Diagnostic Information

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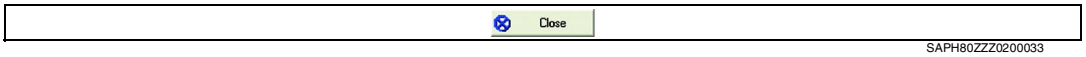
After you read the DTC from each ECU, Diagnosis flow can be displayed in line with the detected DTC. Diagnosis flow is displayed and by operating in line with it, you can find out whether it is malfunction of the sensor, breaking of the harness or malfunction of the ECU.

SAPH80ZZZ0200032

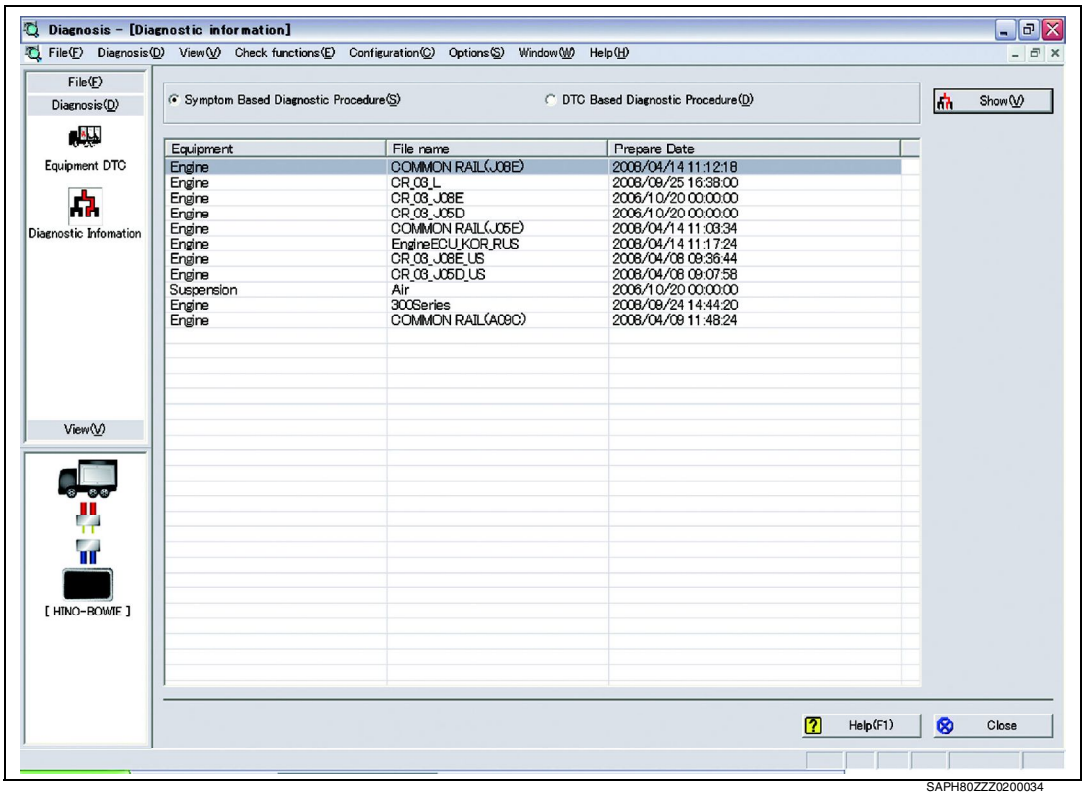
Fig. 2-32 Shortcut Bar-Diagnostic Information

Diagnosis flow (which is normally displayed after reading the DTC) can be referred to without reading the DTC Diagnostic Information.
And you can obtain a lot of information on the target system like system diagram, installed position of each sensor, ECU pin assignment and each menu, etc. aside from the Diagnosis flow.



SAPH80ZZZ0200033

Fig. 2-33 Close



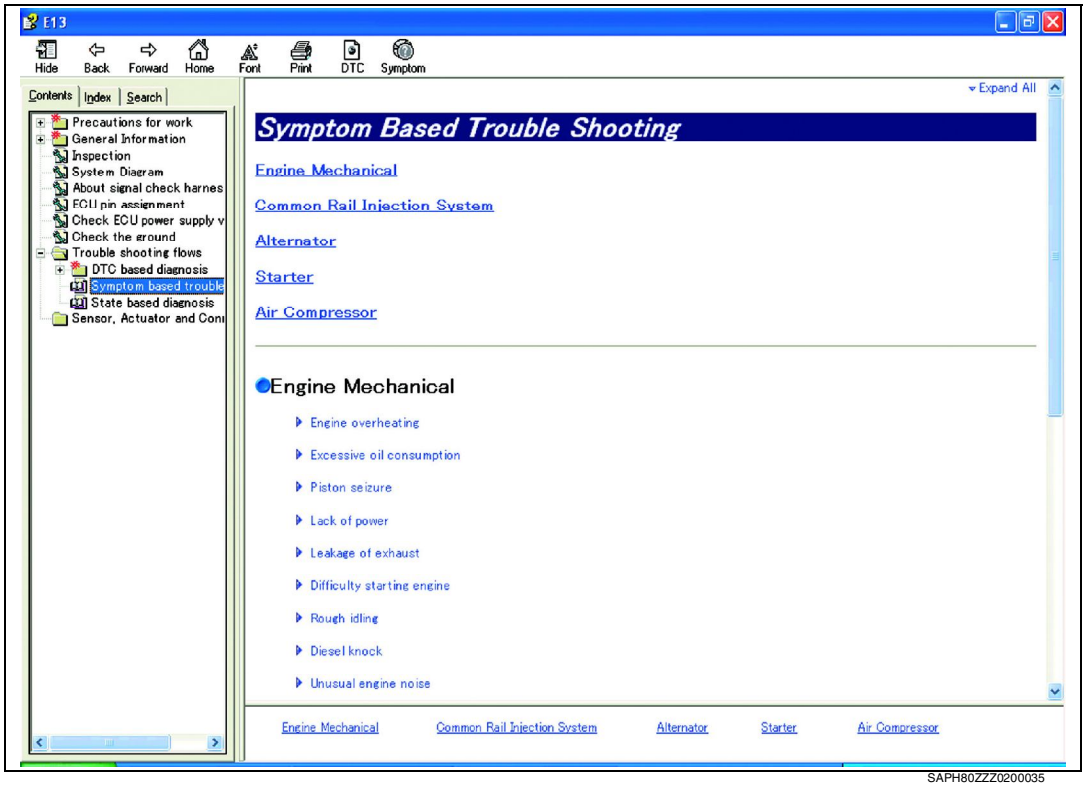
SAPH80ZZZ0200034

Fig. 2-34 Diagnostic Information

Symptom Based Diagnostic Information

EN80ZZZ02X100009

You can conduct diagnosis according to the specific phenomenon of malfunction which is occurring by this procedure. The contents of diagnosis are identical to that described in the Workshop Manual.



SAPH80ZZZ0200035

Fig. 2-35 Symptom Based Diagnosis

1. **Select Diagnostic Information from Menu or Shortcut Bar.**
   Menu:[Diagnosis]-[Diagnostic Information]
   Shortcut Bar:[Diagnosis]-[Diagnostic Information]

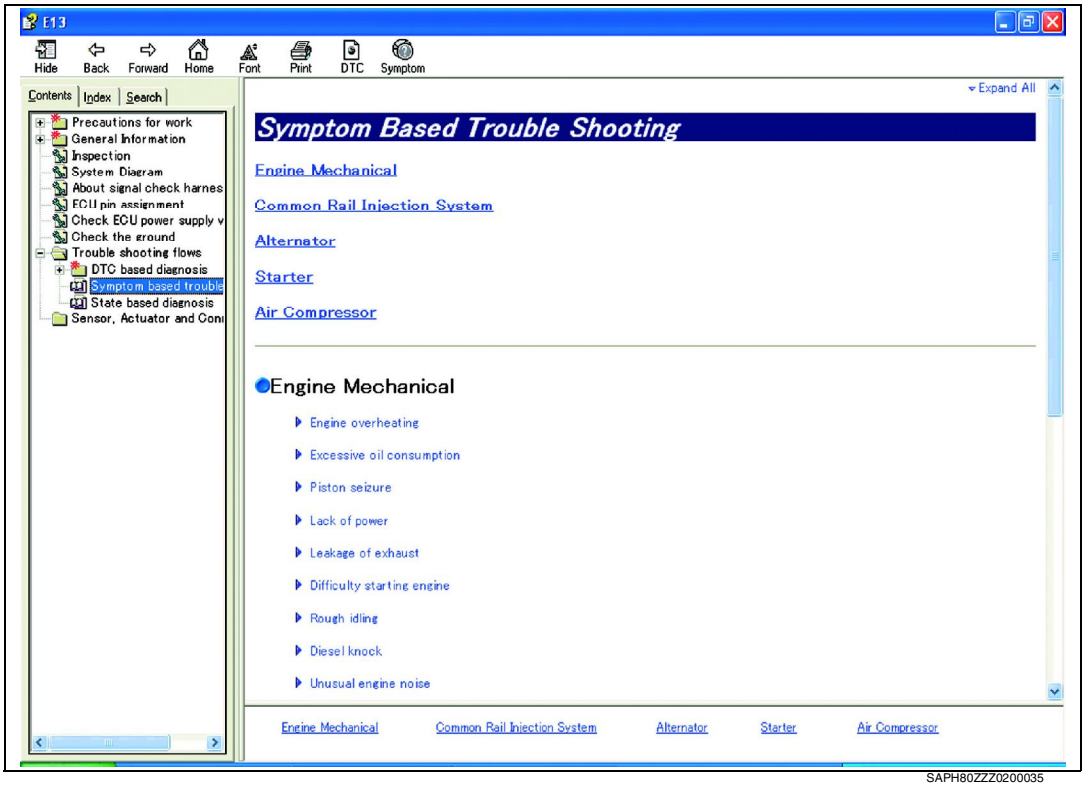
2. **Select Symptom Based Diagnostic Procedure with radio button and click the [Show] button.**

3. **Information is summarized by portion of malfunction and phenomenon of malfunction.**
   Select the most suitable item to conduct diagnosis.

DTC Based Diagnostic Information

EN80ZZZ02X100010

Diagnosis will be carried out in accordance with the DTC which the ECU recognizes. The contents of diagnosis are identical to that described in the Workshop Manual.



SAPH80ZZZ0200035

Fig. 2-36 Symptom Based Diagnosis

1. **Select Diagnostic Information from the Menu or Shortcut Bar.**
   Menu:[Diagnosis]-[Diagnostic Information]
   Shortcut Bar:[Diagnosis]-[Diagnostic Information]

2. **Select DTC Based Diagnostic Procedure with radio button and click the [Show] button.**

3. **Malfunction and its phenomenon of DTC will be shown as a list and click your target DTC.**

System individual function

System individual function

EN80ZZZ02X100011

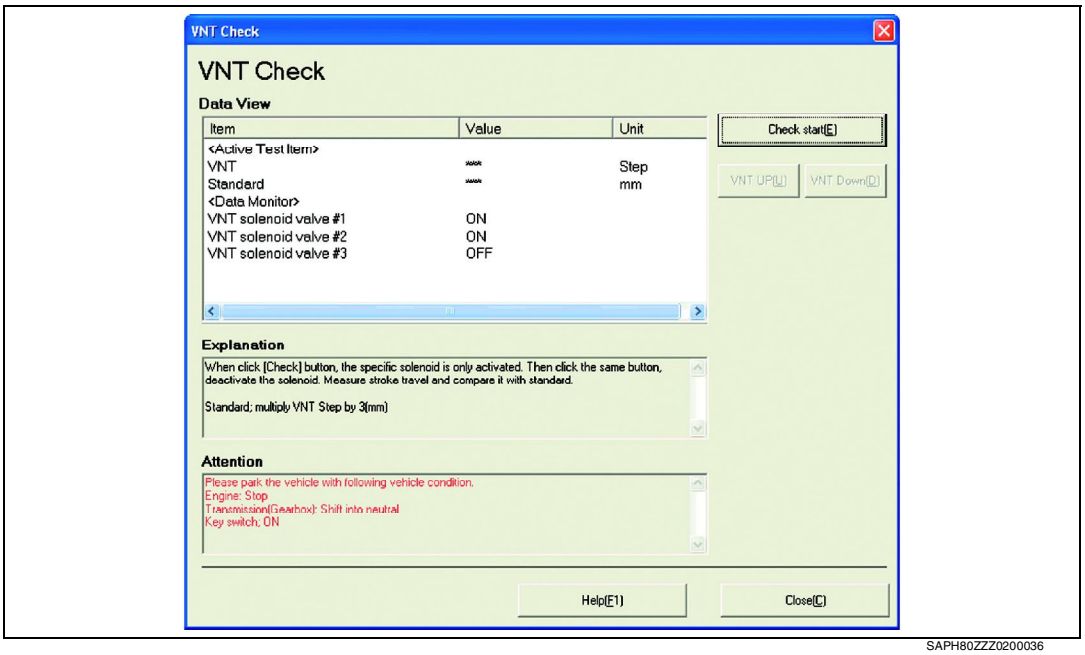
System individual function is the function of check and adjustment established by each system and ECU and it will be shown only when you conduct diagnosis of the specific system.
For example, individual function for the DPR (Diesel Particulate active Reduction) built-in engines will be shown on the Menu when you diagnose the engines with it. However for engine without it, this will not be shown on the Menu. And for general engines, there is an input function of the injector calibration but this will not be shown when you diagnose equipments other than the engine.
Usually what the Hino-DX can perform, offers a single a function such as data monitor which checks the status of each sensor and actuator, and active a test to activate actuator and lamps. When you carry out a complicated operation, you need to make a complicated setup.
System individual function offers the following functions in order to eliminate such inconvenience as much as possible to be able to conduct diagnosis simply.

1. **In order to check a specific function, the data monitor and active test to a specific sensor and a specific actuator are done on one screen.**

2. **Check and setup are performed according to the sequence defined beforehand.**

3. **Work on an exclusive input screen so that data input may be carried out easily.**

Basic procedure of System individual function is displayed on the screen and you are asked to follow it.



SAPH80ZZZ0200036

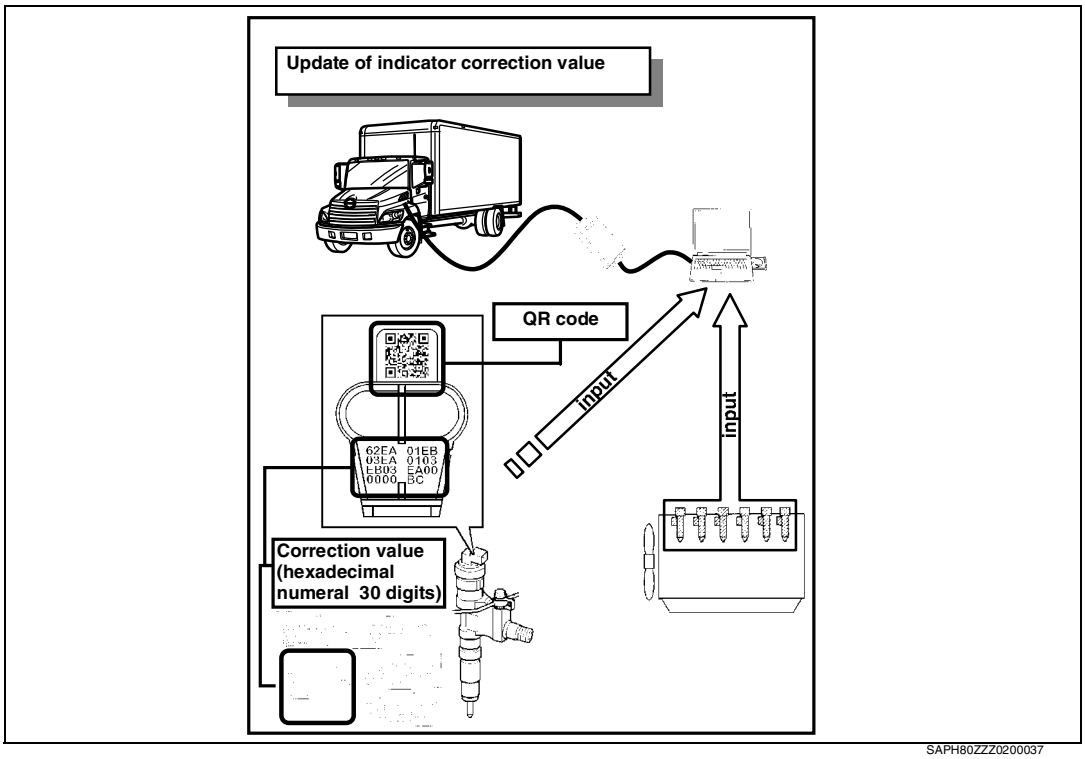
Fig. 2-37 System Individual function - VNT check

HINT
System individual function has different configurations and contents of the screen and what can be done also differs. Generally procedures are shown on the screen and what can be done is understandable. You are asked to refer to the screen.

Injector correction

EN80ZZZ02X100012

Engine controlled ECU improves engine performance by controlling the injection volume correction value by each injector (individual difference).
Correction value of injectors installed to the engine is directly input to the ECU.
Injectors are corrected at the multiple points (multipoint correction) in order to correct injection volume and timing. If those values are not input/or wrong values (another injector correction value) are input, the following influence will be given. You are asked to pay attention to this.
Engine malfunction code is detected. Deterioration of exhaust gas performance Vibration of the vehicle Abnormal noise, Knocking Defective DPR regeneration



SAPH80ZZZ0200037

Fig. 2-38

HINT
Impact on the vehicle when correct injector correction value is not written

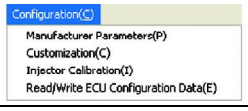
- **In case correction value is not written to the new ECU**
  ECU recognizes abnormality and check engine lamp will turn on.
  Engine blow up becomes poor due to control to reduce injection volume. Symptoms like that engine power decreases, etc. occur.
- **In case you did not write when the injector was replaced or made a mistake of the cylinder which should have been written to the new ECU.a**
  Since control is made according to the mistaken correction volume, fuel injection volume will have a big variation and it may cause a large variation of revolution and torque.
- **In case you write mistaken correction value.**
  If you mistakenly input a 30 digit correction value to one injector, the checksum function of the ECU will not accept it recognizing it as an error.
- **In case you input the correction value of the different engine.**
  Injector correction value is different depending upon the kind of engine. In case you intend to write injector value of the wrong engine, ECU takes it as abnormal and error message will be shown on the screen.

SAPH80ZZZ0200038

Fig. 2-39

How to input injector calibration

1. **After you make System Fix in the manner of DX02-9, select menu of Injector Calibration.**
   Menu:[Configuration]-[Injector Calibration]



SAPH80ZZZ0200039

Fig. 2-40 Configuration menu

2. **As input screen of Injector Calibration is shown, click the button in line with operation.**

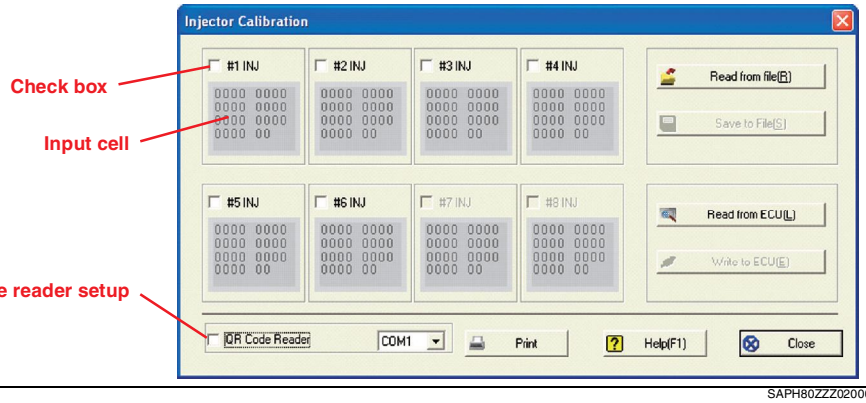


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Fig. 2-41 Injector Calibration Window

Read injector calibration data from the engine ECU

1. Input checkmark to the check box located on the side of the injector number from which you want to read the injector calibration and make the input cell active. You can appoint plural numbers of the injector not limiting to one.

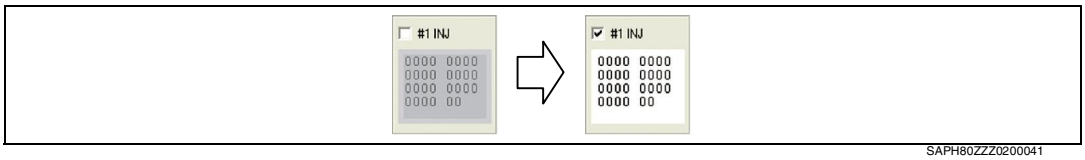


Fig. 2-42 Activate input cell

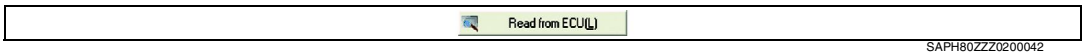


Fig. 2-43 Read from ECU button

HINT
When the checkbox cannot be used, it means that the respective engine does not use this injector.

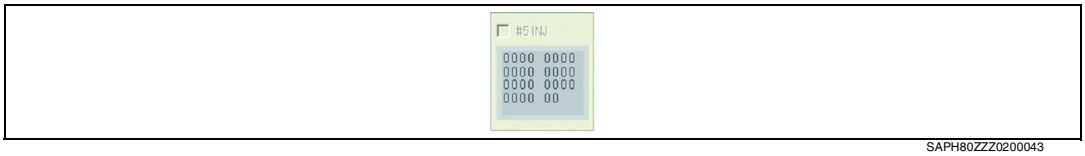


Fig. 2-44 Unusable state of input cell

2. Read injector correction value from ECU, clicking the [Read from ECU] button.
When you select plural cylinders, you can read the correction values for all the cylinders selected.

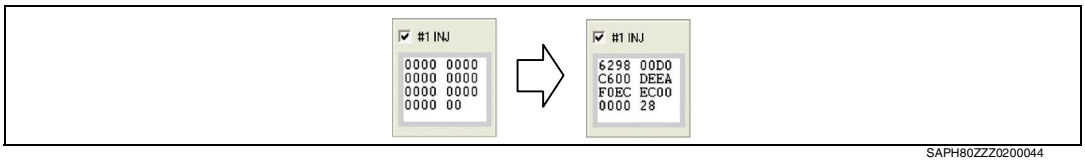
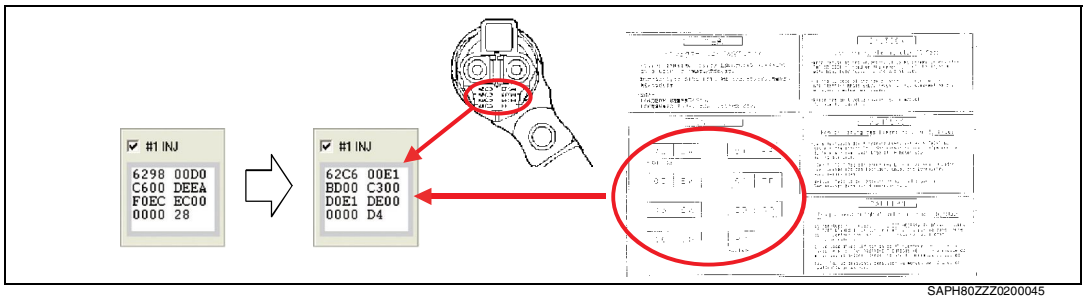


Fig. 2-45 Read injector calibration data

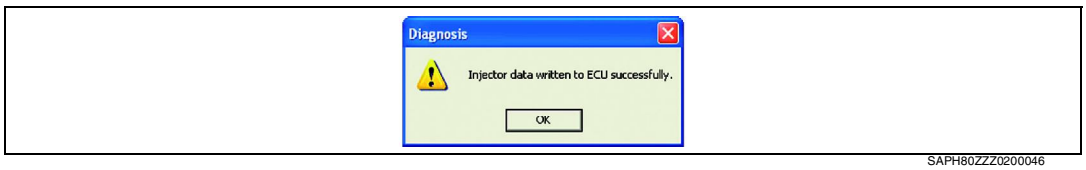
Write injector calibration data to the engine ECU

1. **Write the injector calibration data manually.**
   After writing a 30 digit-number which is stamped on the upper face of the injector or written on the paper packed with the injector to the input cell correctly, write it to the ECU by clicking the [Write to ECU] button.
   When it is written correctly to the ECU, a message " Injector data written to ECU successfully" as (Fig. 2-47 Success to write) will be shown.



SAPH80ZZZ0200045

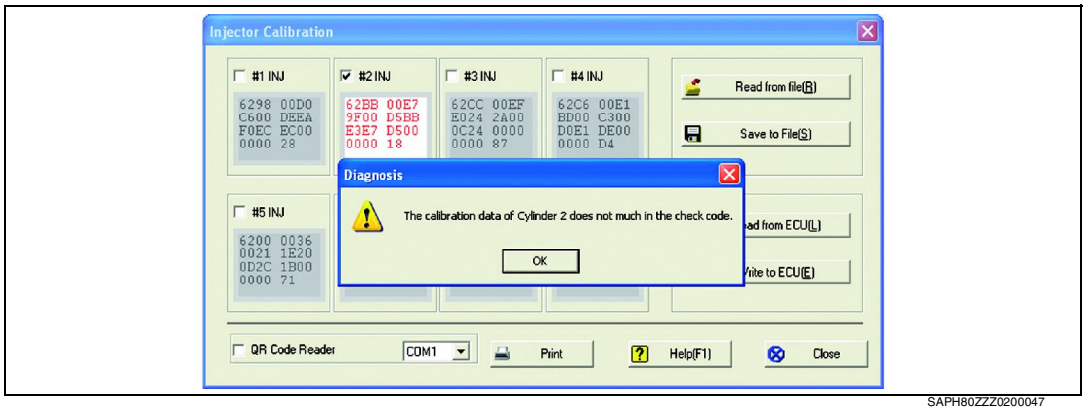
Fig. 2-46 Change and write injector calibration data



SAPH80ZZZ0200046

Fig. 2-47 Success to write

⚠ **CAUTION**
If the 30 digit- number which is input is mistaken, the Check Code Error window will be shown. In case this window shows, the input number is mistaken and it is not written to the ECU.



SAPH80ZZZ0200047

Fig. 2-48 Check code error

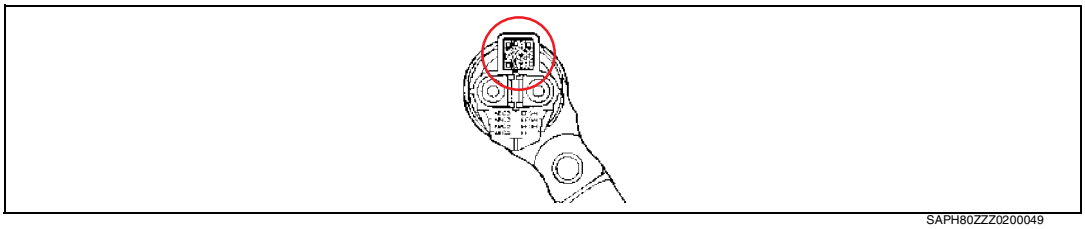
2. **Write injector calibration data by QR Code Reader Among other methods of writing the 30digit-number other than manually, there is the method of writing using the QR code reader.**
   In case you want to use it, you are asked to prepare appointed QR code reader (Denso Wave- QS20H-HD or equivalent). the QR code stamped on the injector is assured to be read by the QR code reader with high resolving power only.

(1) Connect QR Code Reader to PC and turn on power.

SAPH80ZZZ0200048

Fig. 2-49 QR Code Reader Setup

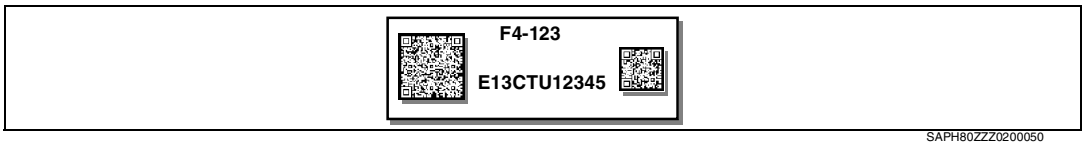
(2) Click the checkbox of the QR Code Reader to show the checkmark on the Injector Calibration window and set the communication port (COM1 - COM8) which connects the QR Code Reader.
(3) Put a checkmark on the checkbox located on the side of the cylinder number which you want to write the injector correction value to make the input cell active and put the cursor on the input cell.
(4) Read the injector QR Code stamped on the injector with the QR Code Reader. The QR Code which is read is converted to a 30-digit number and written to the input cell where the cursor is placed.



SAPH80ZZZ0200049

Fig. 2-50 Injector QR code

(5) Writing with the QR Code Reader is also effective to the Engine QR Code attached in the vicinity of the Flywheel Housing. The Engine QR Code has an injector correction data when the engine was manufactured and can be written to the ECU.



SAPH80ZZZ0200050

Fig. 2-51 Engine QR Code

⚠ CAUTION
This is the data at the time of vehicle delivery from the plant. This cannot be used for the engine whose injector has been replaced.

Save the injector calibration data.

You can save Injector calibration data which are read from the Engine ECU to a file. The file can be read and used using the Hino-DX.

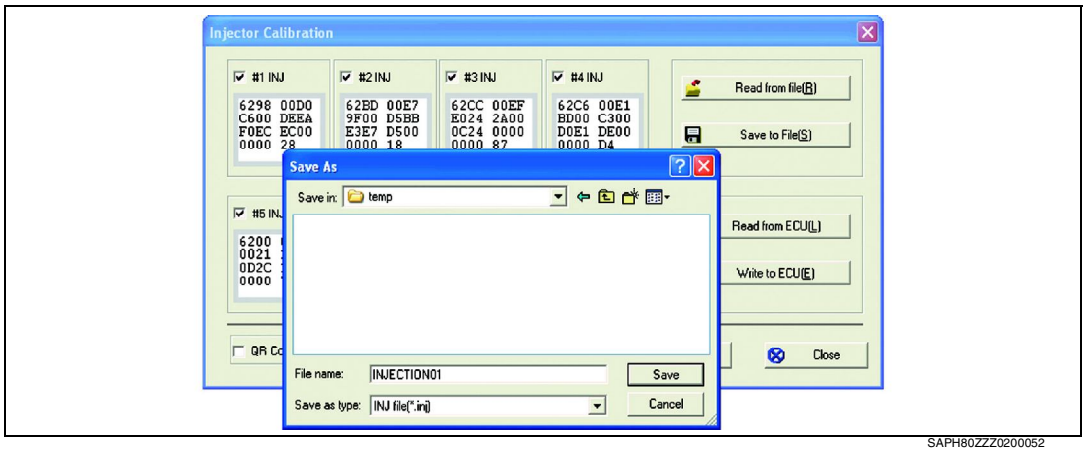
1. **Read the injector calibration data from the Engine ECU according to the Read injector calibration data from the engine ECU.**

2. **Save data by clicking the [Save to File] button (Fig. 2-52 Save to file button). The extension of the saved data will be ".inj".**

SAPH80ZZZ0200051

Fig. 2-52 Save to file button

HINT
You can save data from 1 cylinder to all cylinders. Cylinder number data are also saved in the Injector calibration data.



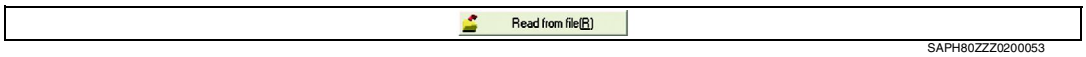
SAPH80ZZZ0200052

Fig. 2-53 Save injector calibration data

Read injector calibration data from saved file

You can read the Injector calibration data from a saved file and write them to the Engine ECU.

1. **You read data by clicking the [Read from file] button (Fig. 2-48 Read from file button) and read data will be laid out on an input cell.**
   The extension of the readable data will be ".inj".

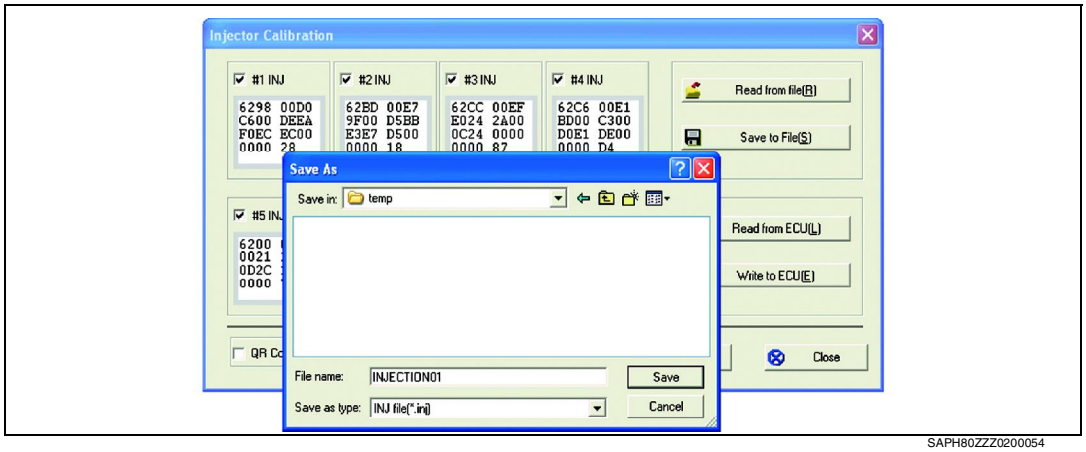


SAPH80ZZZ0200053

Fig. 2-54 Read from file button

2. **Write the actual ECU data by clicking the [Write to ECU] button.**

⚠ CAUTION
You do not write data to the ECU by reading them a from file only. When you write the ECU data, make sure that you click the [Write to ECU] button without fail.



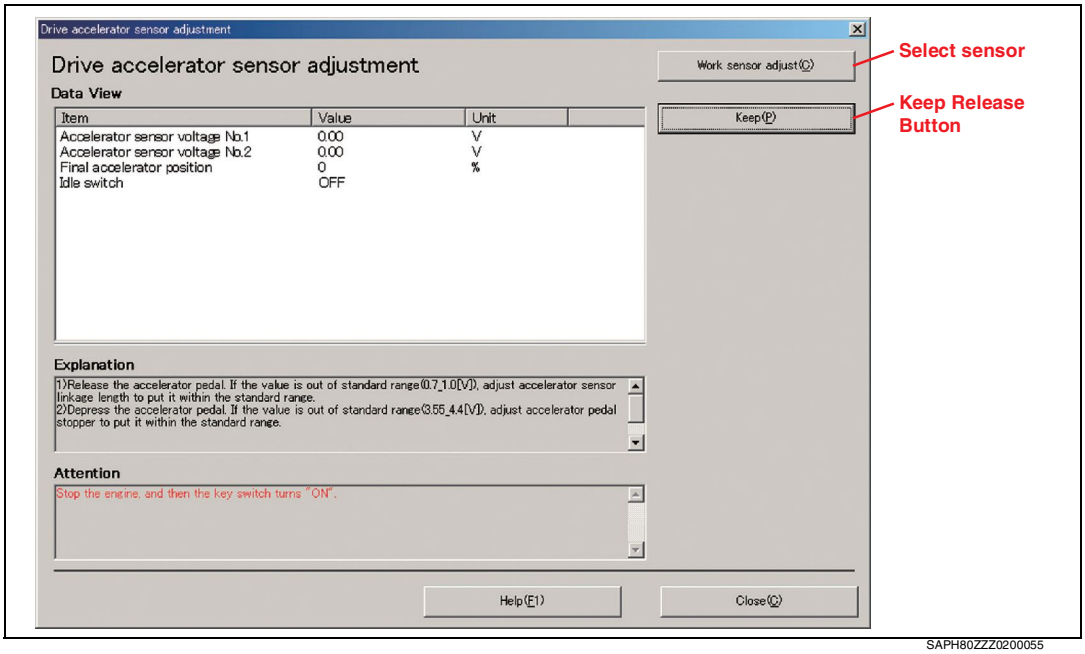
SAPH80ZZZ0200054

Fig. 2-55 Save injector calibration data

Drive accelerator sensor adjust

EN80ZZZ02X100013

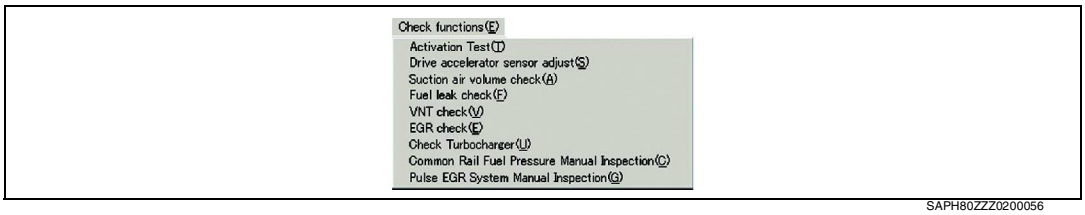
Check and adjustment of the Drive accelerator sensor and PTO accelerator sensor can be performed by this function.
When you replace both sensors, make an adjustment of them and when you replace one sensor, adjust it without fail.



SAPH80ZZZ0200055

Fig. 2-56 Drive accelerator sensor adjust Window

1. **Select the "Drive accelerator sensor adjustment" menu after system fix.**
   Menu:[Check function]-[Drive accelerator sensor adjust]

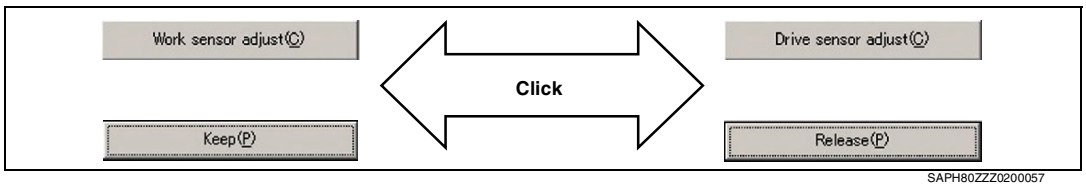


SAPH80ZZZ0200056

Fig. 2-57 Check function menu

2. **"Drive accelerator sensor adjust" screen displays out and perform check work following the instructions as displayed.**

HINT
You can change the screen of the "Drive accelerator sensor adjustment" and "PTO accelerator sensor adjustment" alternately by clicking Select sensor Button and Keep Release Button as well.



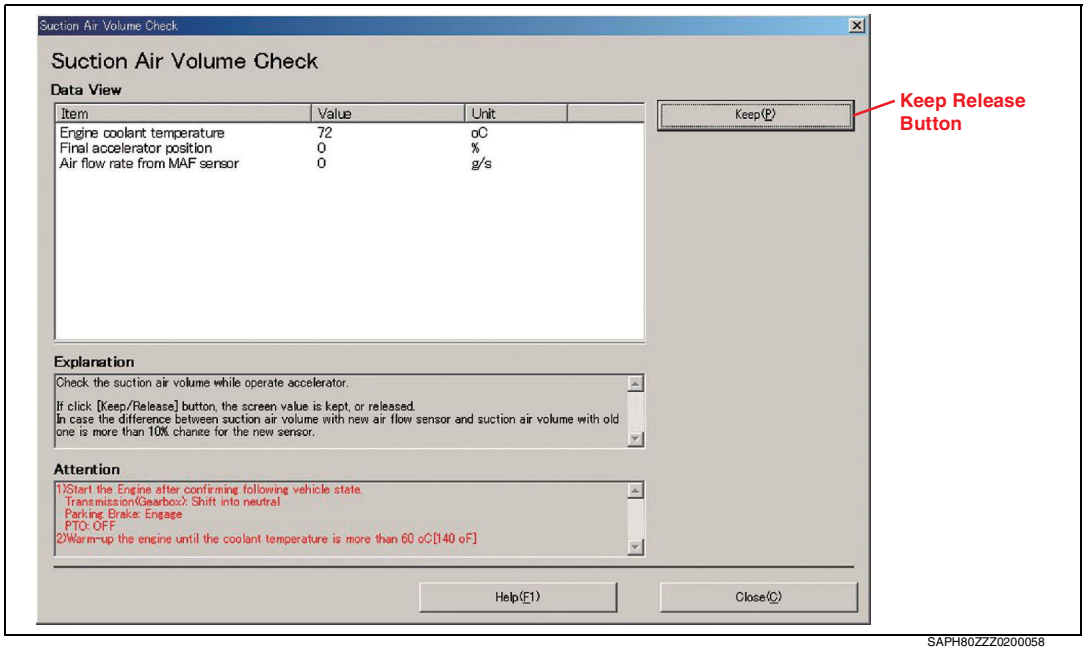
SAPH80ZZZ0200057

Fig. 2-58 Switch indicate item

Suction air volume check

EN80ZZZ02X100014

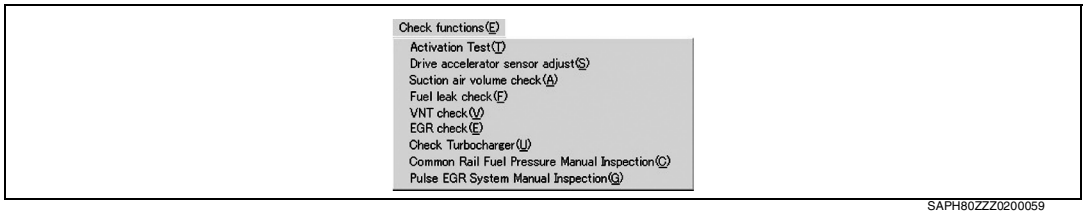
Suction air volume check can be performed.



SAPH80ZZZ0200058

Fig. 2-59 Suction air volume check Window

1. **Select the "Suction air volume check" menu after system fix.**
   Menu:[Check function]-[Suction air volume check]

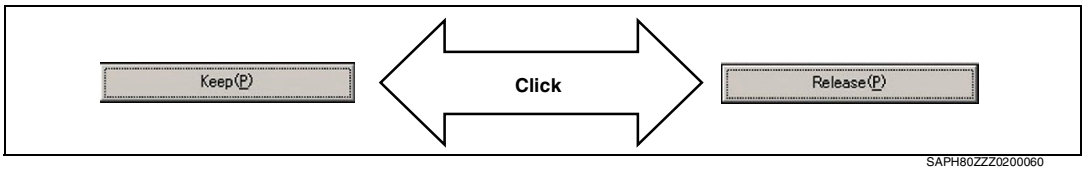


SAPH80ZZZ0200059

Fig. 2-60 Check function menu

2. **"Suction air volume check" screen displays out and perform check work following the instructions as displayed.**

HINT
Keeping/Releasing of data will be changed alternately every time you click the Keep Release Button.
If the final accelerator position value is other than 0 without operating the Drive acceleration, check and make an adjustment according to the "Drive accelerator sensor adjustment".



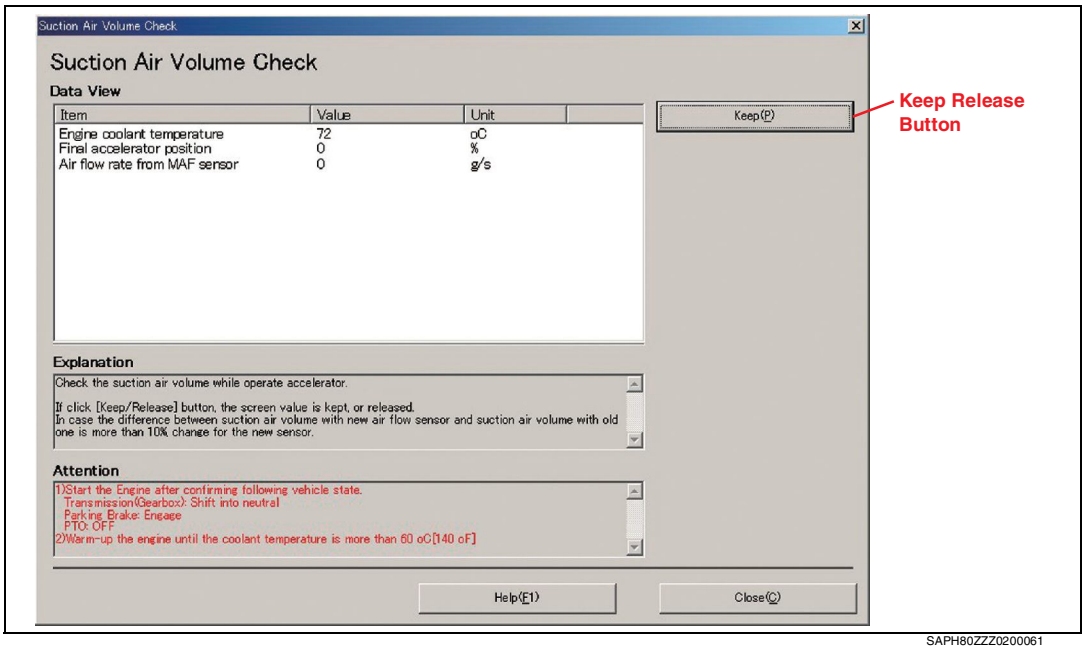
SAPH80ZZZ0200060

Fig. 2-61 Switch indicate item

Fuel leak check

EN80ZZZ02X100015

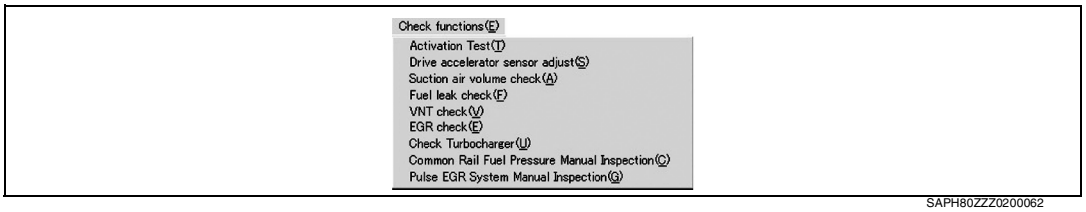
Fuel leak check can be performed.



SAPH80ZZZ0200061

Fig. 2-62 Fuel leak check Window

1. **Select the "Fuel leak check" menu after system fix is made according to the DX02-9 procedure.**
   Menu:[Check function]-[Fuel leak check]

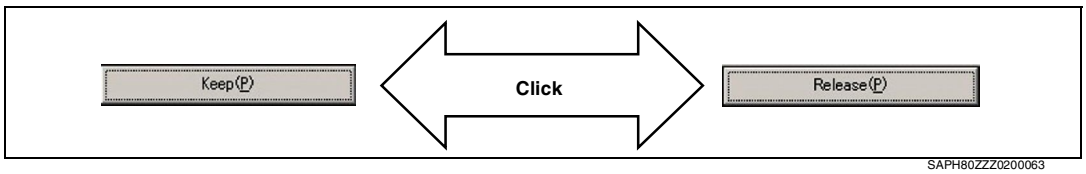


SAPH80ZZZ0200062

Fig. 2-63 Check function menu

2. **"Fuel leak check" screen displays out and perform check work following instructions as displayed.**

HINT
Every time you click the "Start" and "Stop" Button, the display will change "Start" and "Stop" alternately.
Rising engine rotation and common rail pressure vary according to the vehicle model and type.



SAPH80ZZZ0200063

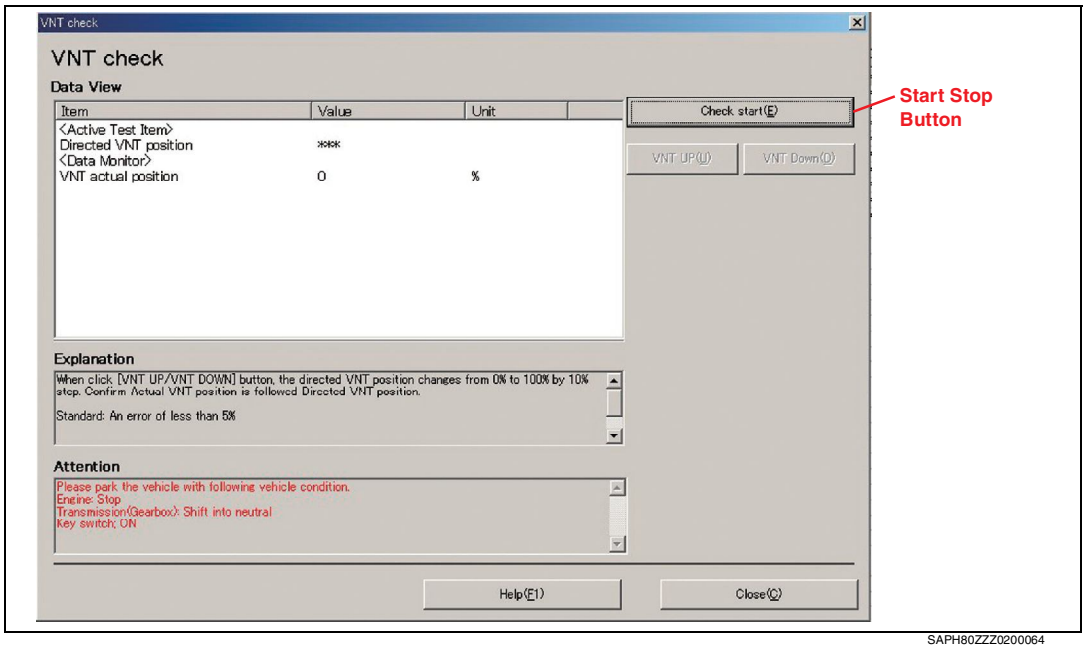
Fig. 2-64 Switch indicate item

⚠ CAUTION
If you click the Start Button, engine rotation will automatically go up to the specified value. Make sure to do work after checking that there is no person nor things in the surroundings of the vehicle.

VNT check

EN80ZZZ02X100016

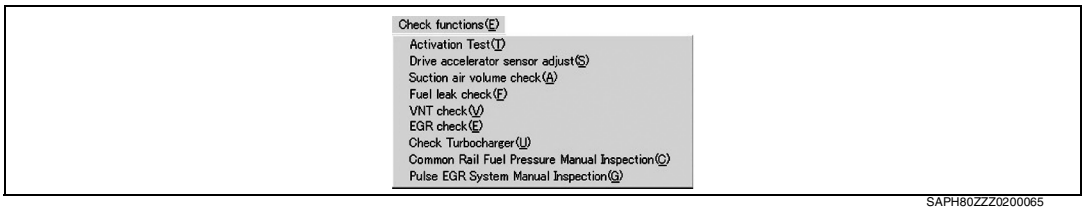
Operation check of Variable Nozzle of VNT (Variable Nozzle turbocharger) can be performed.



SAPH80ZZZ0200064

Fig. 2-65 VNT check Window

1. **Select the VNT check menu after system fix is made.**
   Menu:[Check function]-[VNT check]

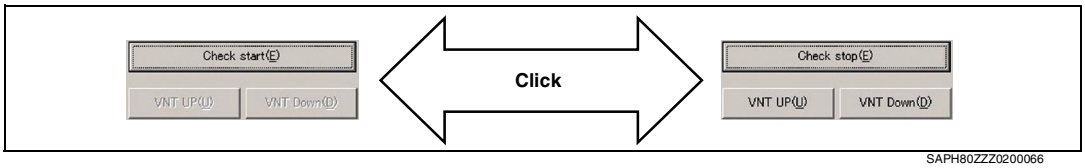


SAPH80ZZZ0200065

Fig. 2-66 Check function menu

2. **"VNT check" screen displays and perform check work following instructions as displayed.**

HINT
Every time you click the "Start" and "Stop" Button, the display will change "Start" and "Stop" alternately.
Check method and display screen vary according to the kind of turbo-charger.
Do the check work following explanation as displayed.
Operation sound of motor type is small and operation check may difficult by sound.



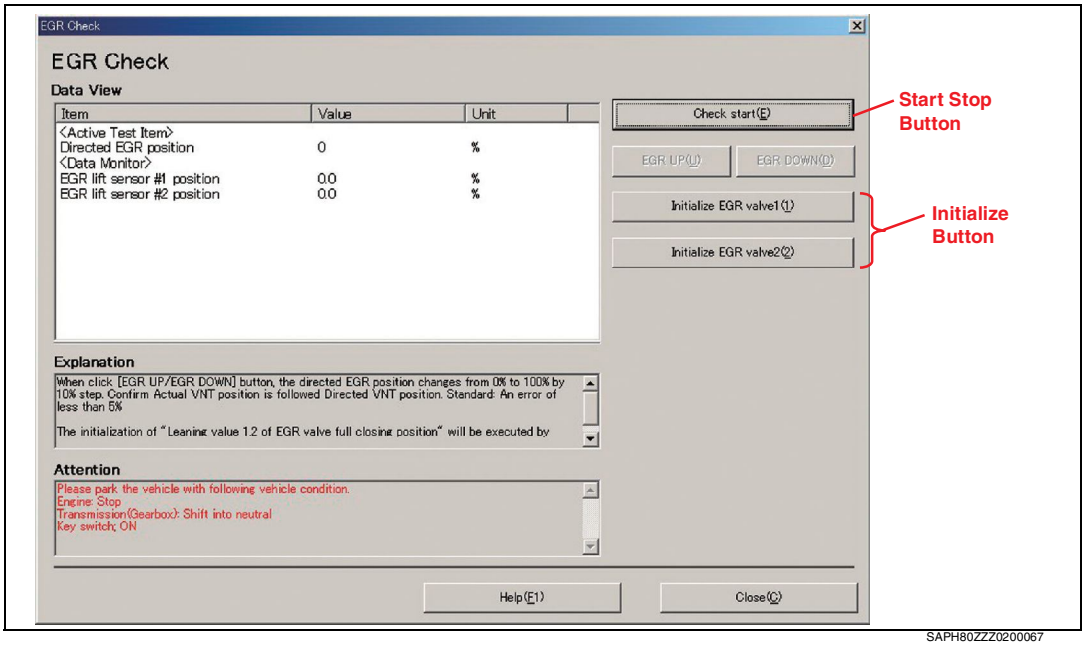
SAPH80ZZZ0200066

Fig. 2-67 VNT switch indicate item

EGR check

EN80ZZZ02X100017

Operation check of EGR can be performed.



SAPH80ZZZ0200067

Fig. 2-68 EGR check Window

1. Select the "EGR check" menu after system fix is made.
Menu:[Check function]-[EGR check]

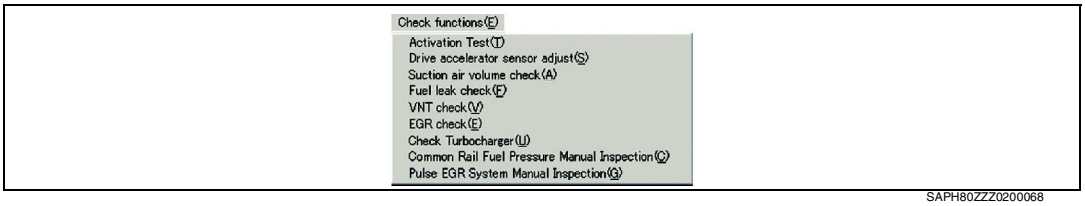


Fig. 2-69 Check function menu

2. "EGR check" screen displays and perform check work following instructions as displayed.

⚠ CAUTION
If the power source voltage of the vehicle is low, EGR valve may not operate normally.
Before inspection make sure to start engine and increase the battery voltage sufficiently.

HINT
Every time you click "Start" and "Stop" Button, the display will change "Start" and "Stop" alternately.
The Functioning Button will be displayed or non-display according to the status of the t work.
Displayed items vary according to the vehicle model and type.

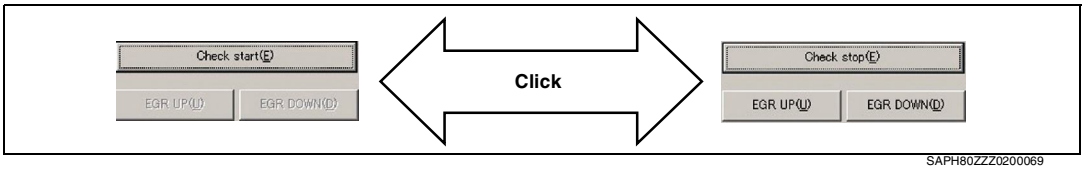


Fig. 2-70 EGR switch indicate item

In case of medium duty vehicles, Initialize EGR valve 1 Button or Initialize EGR valve 1 and 2 Buttons will be displayed.
When you replace parts, initialize by clicking those Buttons.

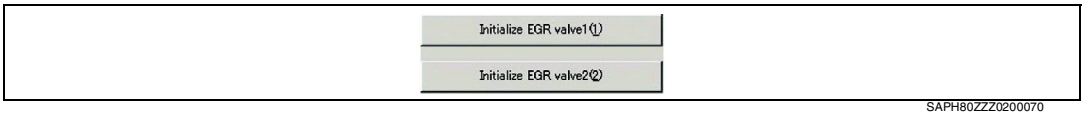
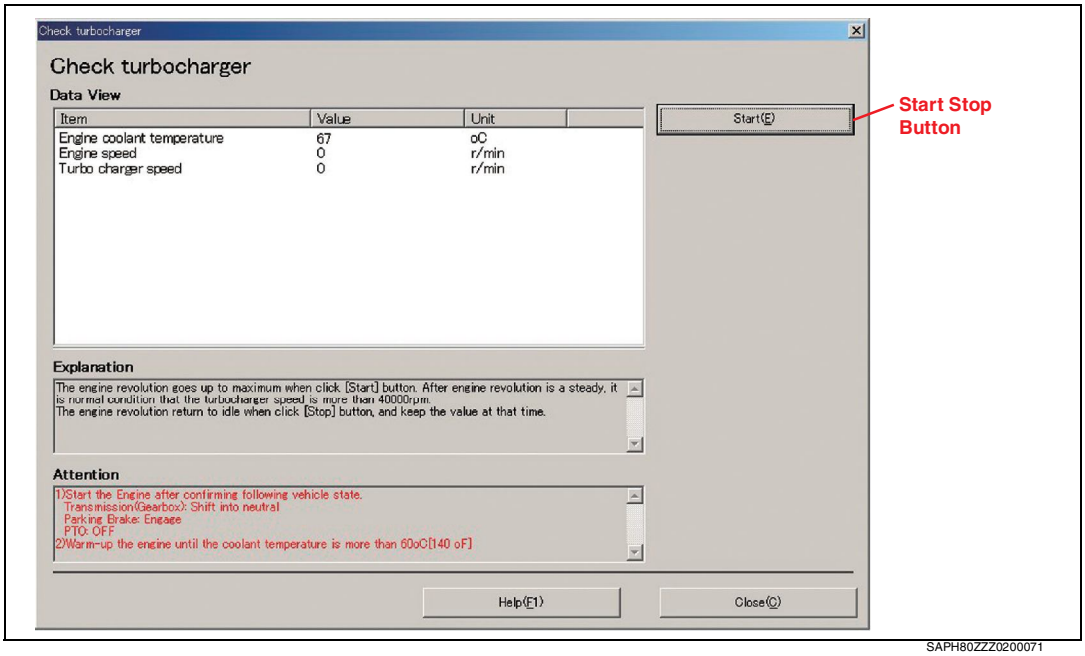


Fig. 2-71 Initialize button

Check Turbocharger

EN80ZZZ02X100018

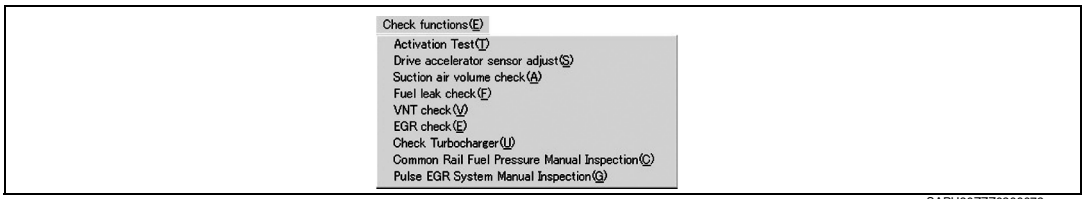
Check Turbocharger can be performed.



SAPH80ZZZ0200071

Fig. 2-72 Check Turbocharger Window

1. **Select the "Check Turbocharger" menu after system fix is made.**
   Menu:[Check function]-[Check Turbocharger]

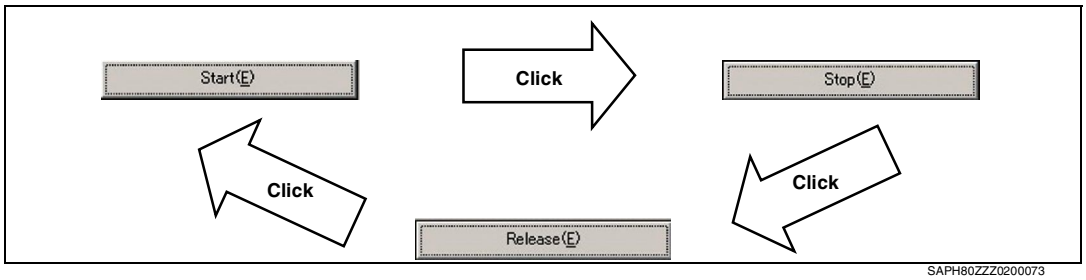


SAPH80ZZZ0200072

Fig. 2-73 Check function menu

2. **"Check Turbocharger" screen displays and perform check work following instructions as displayed.**

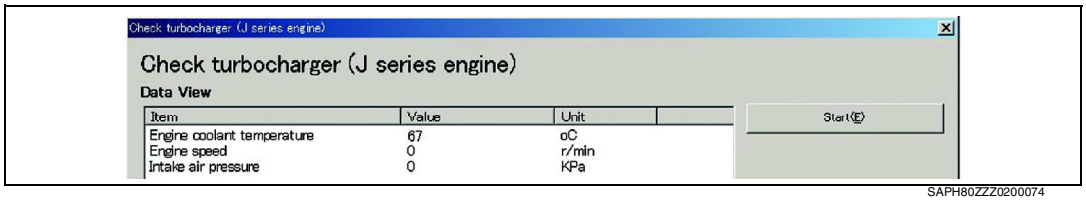
HINT
Every time you click the "Start" and "Stop" Button, the display will change as in Fig. 2-74 Check Turbocharger indicate switch item.



SAPH80ZZZ0200073

Fig. 2-74 Check Turbocharger indicate switch item

Display item will change according to the vehicle model and type.
In case of a J series engine, suction air pressure will be checked instead of engine rotation.



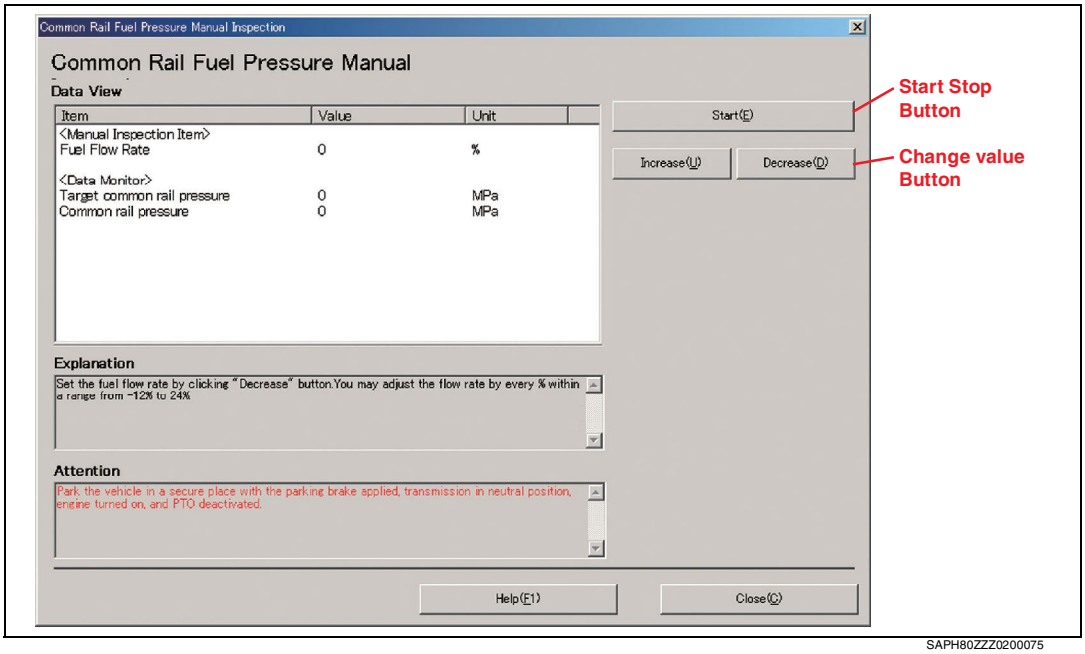
SAPH80ZZZ0200074

Fig. 2-75 Check Turbocharger (J series engine)

Common Rail Fuel Pressure Manual Inspection

EN80ZZZ02X100019

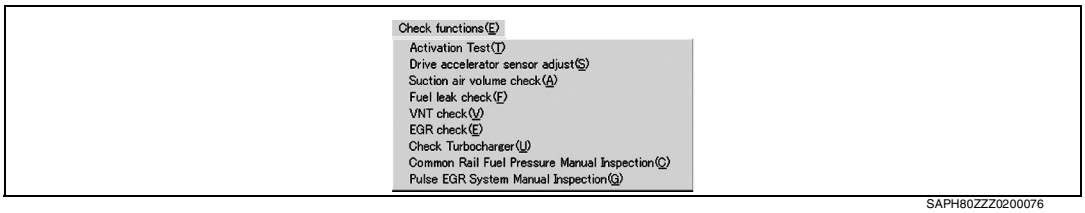
Pressure in the Common Rail is changed and function check can be performed.



SAPH80ZZZ0200075

Fig. 2-76 Common Rail Fuel Pressure Manual Window

1. **Select the "Common Rail Fuel Pressure Manual Inspection" menu after system fix is made.**
   Menu:[Check function]-[Common Rail Fuel Pressure Manual]



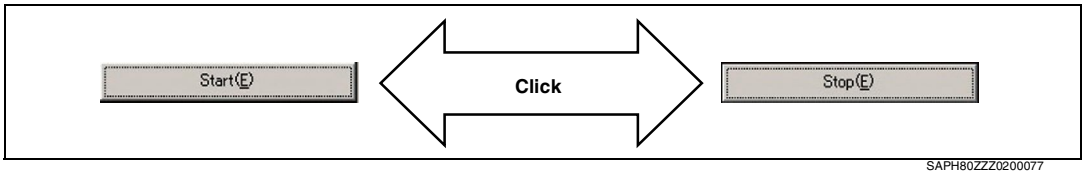
SAPH80ZZZ0200076

Fig. 2-77 Check function menu

2. **"Common Rail Fuel Pressure Manual Inspection" screen displays out and perform check work following the instructions as displayed.**

HINT

Every time you click the "Start" and "Stop" Button, the display will change "Start" and "Stop" alternately.



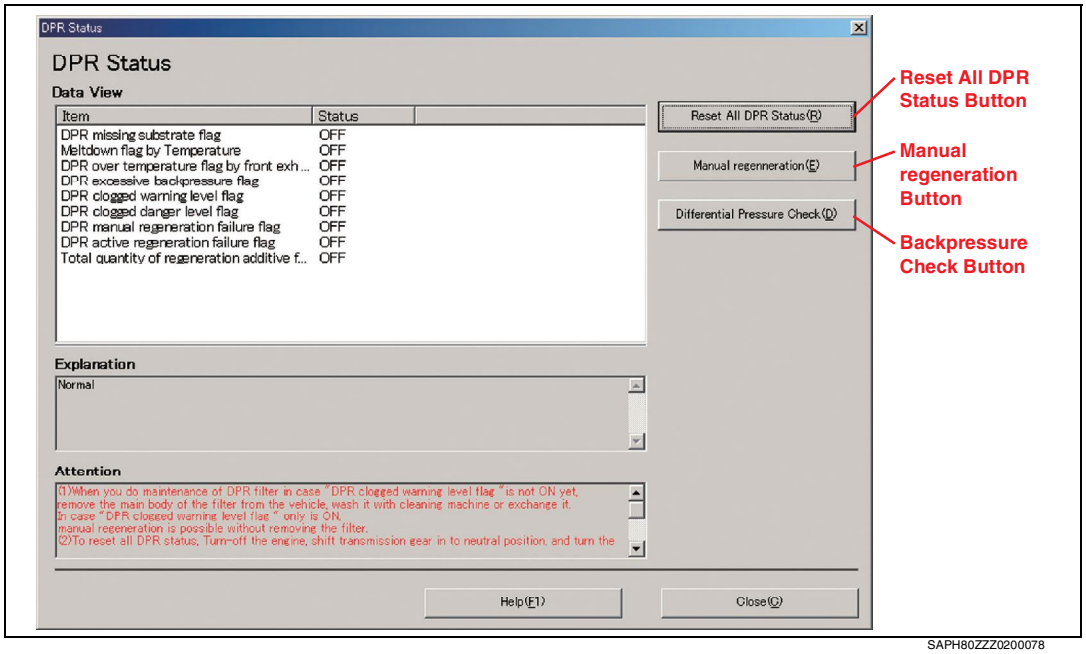
SAPH80ZZZ0200077

Fig. 2-78 Switch indicate item

DPR Reset Confirmation

EN80ZZZ02X100020

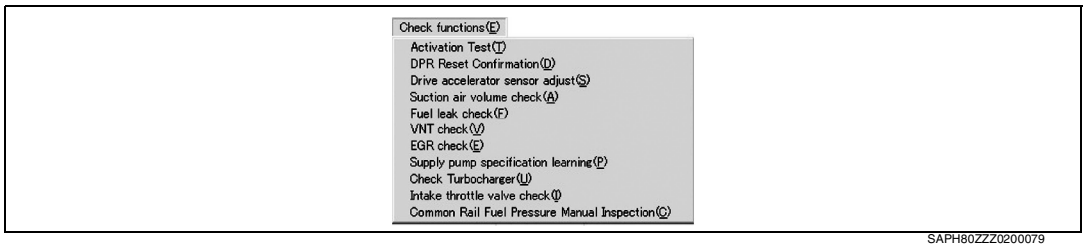
Monitoring/ Check/ Forced regeneration of DPR (Diesel Particulate Reduction system) status can be performed.



SAPH80ZZZ0200078

Fig. 2-79 DPR Reset Confirmation Window

1. **Select the "DPR Reset Confirmation" menu after system fix is made.**
   Menu:[Check function]-[DPR Reset Confirmation]



SAPH80ZZZ0200079

Fig. 2-80 Check function menu

2. **"DPR Status" screen displays and carry out Status reset, Manual Regeneration and DPR Back Pressure Check according to it's needs.**

HINT
If the status of the "Data View" screen is all "OFF", DPR functions normally.

ITEM	Content
DPR missing substrate flag	When breakage and a possibility of crack of DPR are detected.
DPR over temperature flag by rear exh gas temp	When unusual high temperature is detected in the rear temperature sensor

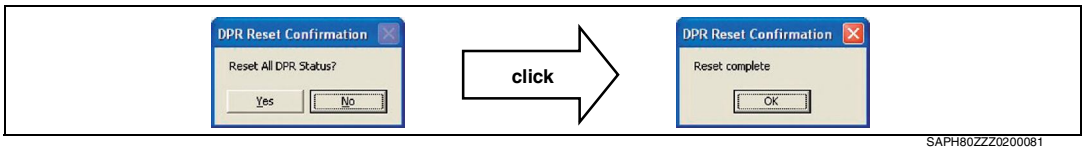
ITEM	Content
DPR over temperature flag by front exh gas temp	When unusual high temperature is detected in the front temperature sensor
DPR excessive backpressure flag	When unusual clog is detected
DPR clogged warning level flag	When computational clog according driving situation is detected (warning level)
DPR clogged danger level flag	When computational clog according driving situation is detected (danger level)
DPR manual regeneration failure flag	When defective regeneration by manual regeneration is detected.
DPR active regeneration failure flag	When defective regeneration by automatic regeneration is detected
Total quantity of regeneration additive fuel final limit flag	When limit value of fuel used for regeneration work is exceeded due to frequent discontinuation of regeneration work.

Reset All DPR Status

If you click the "Reset All DPR Status" Button, you can reset the DPR status.

SAPH80ZZZ0200080

Fig. 2-81 Reset All DPR Status button



SAPH80ZZZ0200081

Fig. 2-82 Reset confirmation - Complete message

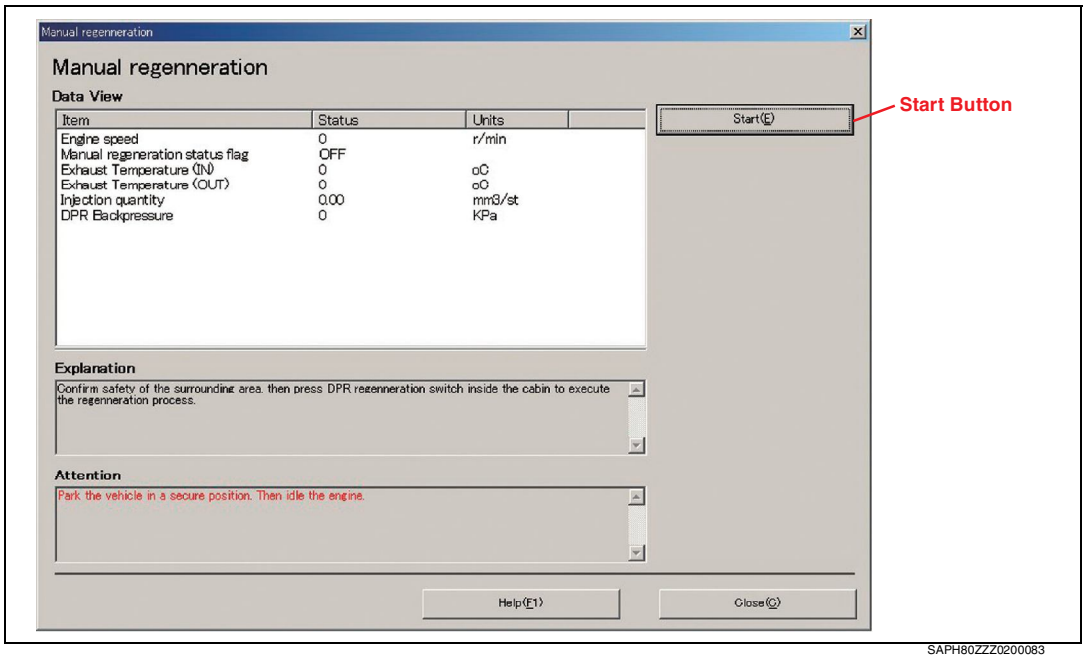
HINT
If you execute "Reset All DPR Status", the volume of deposition of particulate memorized in ECU is also reset.
If you execute "Reset All DPR Status", regenerate manually.

Manual regeneration

If you click the "Manual regeneration" Button, you can manually regenerate the DPR.

SAPH80ZZZ0200082

Fig. 2-83 Manual regeneration button



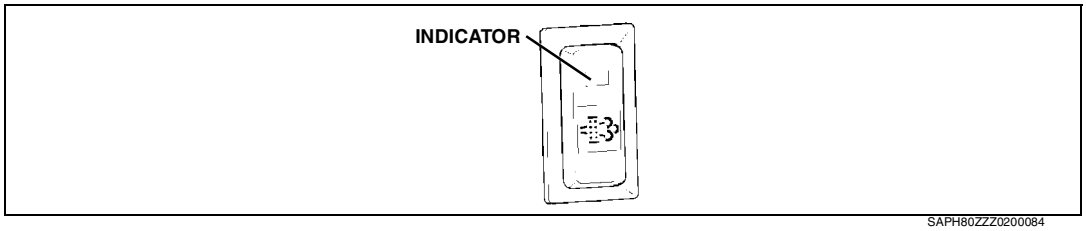
SAPH80ZZZ0200083

Fig. 2-84 Manual regeneration Window

1. **If you click the "Manual regeneration" Button, Fig. 2-83 DPR Manual regeneration switch will be shown.**

2. **Click the "Start" Button.**

3. **If you press the "DPR manual regeneration switch" in the cabin, manual regeneration will start.**



SAPH80ZZZ0200084

Fig. 2-85 DPR Manual regeneration switch

4. **When manual regeneration is completed, carry out Backpressure Check (according to the procedure in the next page. DPR Back Pressure Check)**

HINT

- **Manual regeneration is carried out when the DPR clogged warning level flag is ON in the "DPR Reset Confirmation Window" (Fig. 2-79 DPR Reset Confirmation Window).**
- **When the DPR clogged danger level flag is ON, remove the DPR from the vehicle and clean it with Hino's recommended cleaner or replace it.**
- **Manual regeneration time of the DPR is within 15 to 20 minutes approximately.**

⚠ CAUTION

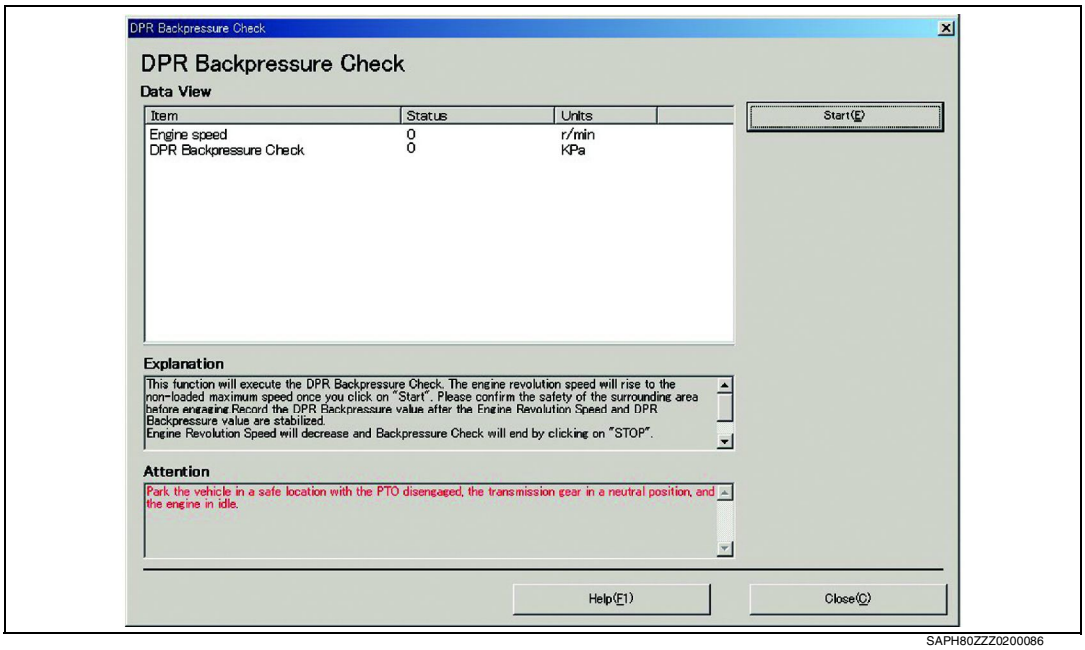
- **Never park the vehicle near any flammable material, including high grass or leaves, during manual regeneration. Extreme heat from the exhaust outlet could cause a fire resulting in personal injury and property damage.**
- **Always keep all flammable materials away from the DPR cleaner, exhaust pipe and tail pipes.**
- **Never touch the DPR cleaner, exhaust pipe or tail pipe during regeneration. Severe burns and/or other personal injuries could occur.**
- **Always turn the PTO switch off in a vehicle equipped with a PTO prior to beginning the manual regeneration procedure.**

DPR Back Pressure Check

If you click the "Backpressure Check" Button, you can measure the soot clogging status of the DPR as it's differential pressure and whether it is necessary to do maintenance or not can be checked.

SAPH80ZZZ0200085

Fig. 2-86 Back Pressure Check button



SAPH80ZZZ0200086

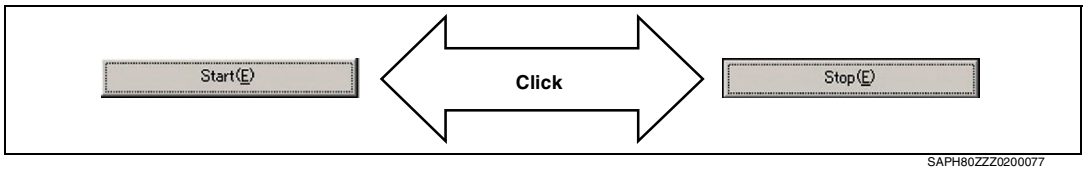
Fig. 2-87 DPR Back Pressure Check Window

1. **If you click "Backpressure Check the" Button, Fig. 2-87 DPR Back Pressure Check Window will be shown.**
2. **Click the "Start" Button.**
3. **Engine rotation will go up automatically to maximum and DPR differential pressure will be recorded.**

4. Click the "Stop" Button and you are finished measuring.

HINT

- **Everytime you click the "Start" and "Stop" Button, the display will change "Start" and "Stop" alternately.**



SAPH80ZZZ0200077

Fig. 2-88 Switch indicate item

- **If the DPR differential pressure exceeds the standard value, carry out either one of Manual regeneration, DPR cleaning or Replacement of the DPR.**
- **After Manual regeneration, check the DPR differential pressure and if it does not go down to the standard value, carry out Manual regeneration again.(Two times is the limit)**
- **If there is no change of differential pressure, check blockage in pipe, loosening of parts, leakage and cracks, etc.**

⚠ CAUTION

Never carry out DPR differential pressure check when exhaust air temperature is higher than 200°C.

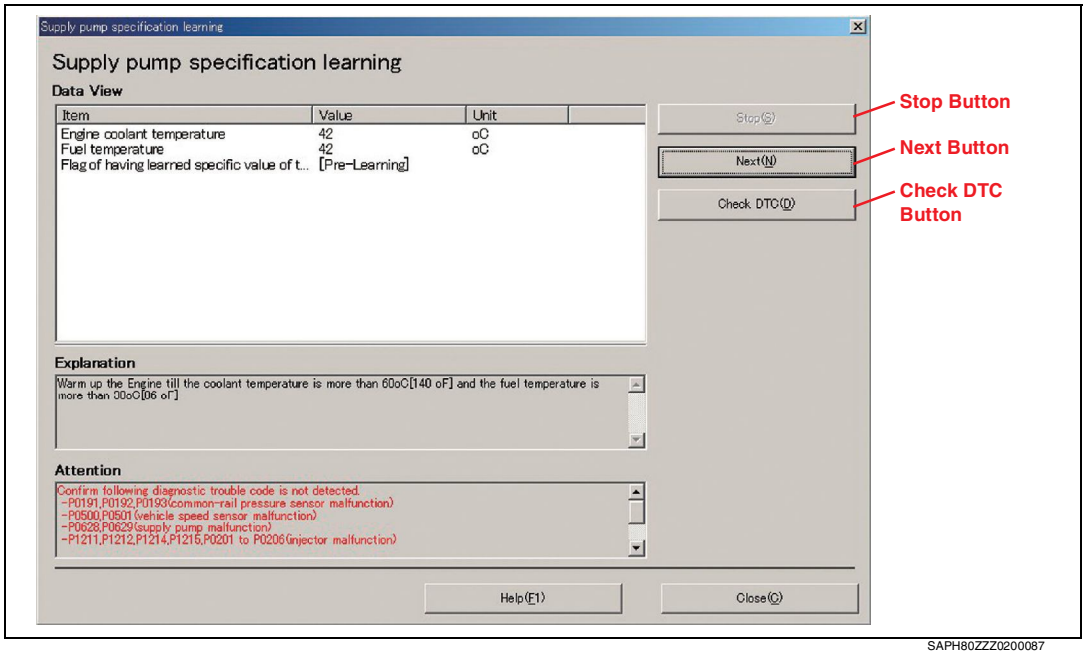
Supply pump specification learning

EN80ZZZ02X100021

Individual difference of the Supply pump is learned and optimum engine performance is exercised. When the Supply pump is replaced, update by re-learning of leaning value saved in the ECU by this function.

HINT

If there is no display of this item in the "Check function" menu, actually run the vehicle to learn automatically and there is no need to perform this function.

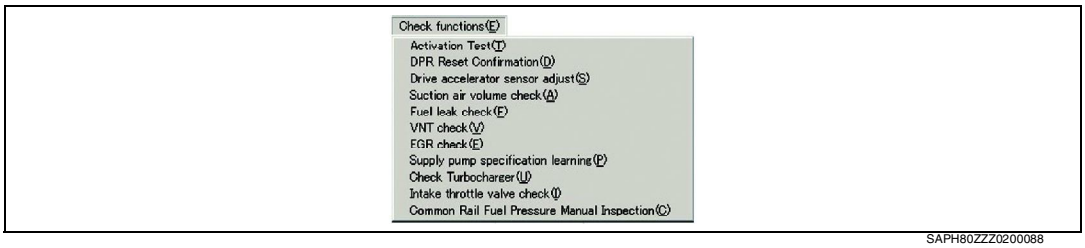


SAPH80ZZZ0200087

Fig. 2-89 Supply pump specification learning Window

1. Select the "Supply pump specification learning" menu after system fix is made.

Menu:[Check function]-[Supply pump specification learning]



SAPH80ZZZ0200088

Fig. 2-90 Check function menu

2. "Supply pump specification learning" screen displays and check the DTC and carry out Supply pump specification learning according to it's needs.

⚠ CAUTION
If you do not update the learning value, correct control of the common rail pressure cannot be carried out which causes the engine to stall and abnormally high common rail pressure. Therefore, never fail to update the learning value when the Supply pump is replaced.

Check DTC

Check if there is any DTC code of the vehicle by the "Check DTC button". If there is a DTC code, take necessary action to eliminate it.
If there is any specific DTC code, learning cannot be made.

SAPH80ZZZ0200089

Fig. 2-91 Check DTC button

Learning method of Supply pump

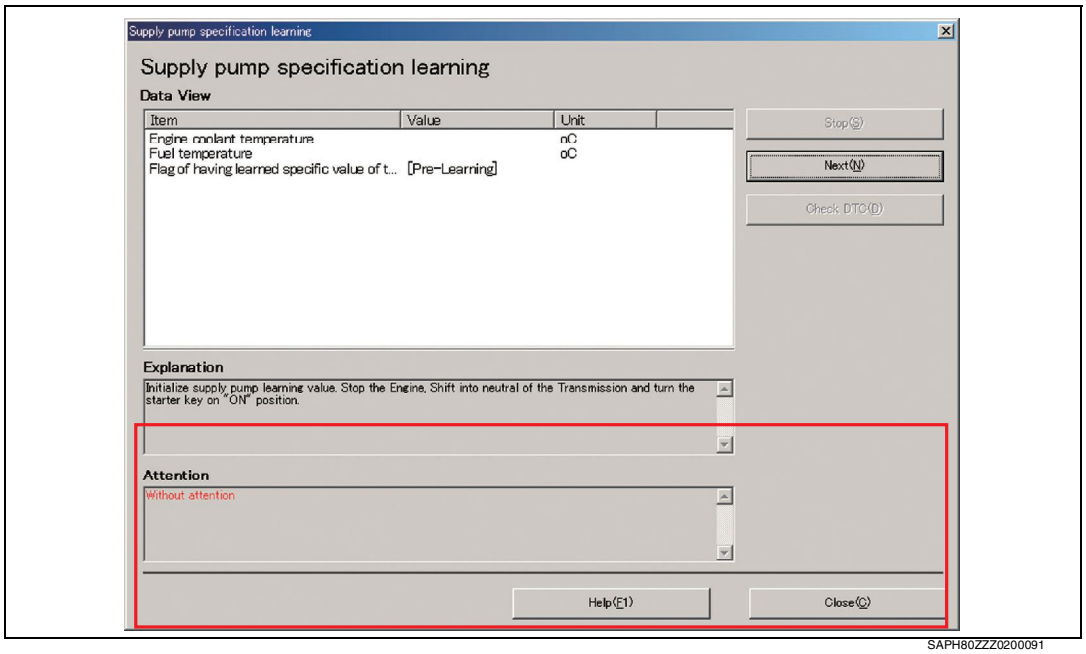
1. Check the instructions displayed

- Coolant temperature 60 °C or higher.
- Fuel temperature 30 °C or higher
- There is no DTC
- Air conditioner "OFF"
- Make sure that it is set to automatic idling.

2. Every time you click the "Next" Button, the explanation and attention will change. Carry out the work following the instructions.

SAPH80ZZZ0200090

Fig. 2-92 Next button



SAPH80ZZZ0200091

Fig. 2-93 Supply pump specification learning Window 2

HINT
Display of "Flag of having learned specific value of the pump" of Data View will change according to the status of learning as follows.
[Pre-Learning] - [On learning] - [Complete]

Actual learning time is within 1 minute. If the display does not become "Complete" even if you continue learning for more than1 minute, click the "Stop" Button and learn once again.

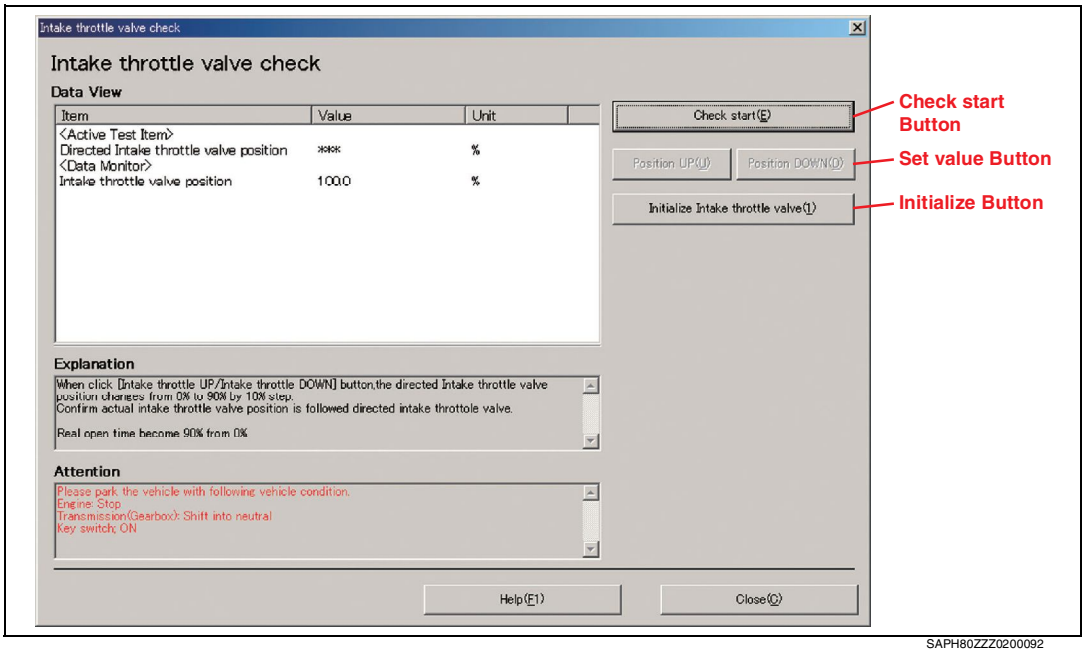
After you finish learning, make sure to turn the starter key to the Lock position, leave it there for more than 10 seconds to register the Supply pump specification learning data in the ECU.

Learning cannot be possible if the idle volume is not the auto-idle status (turning the idle set knob all the way to the left-clockwise) or the engine is warming-up.

Intake throttle valve check

EN80ZZZ02X100022

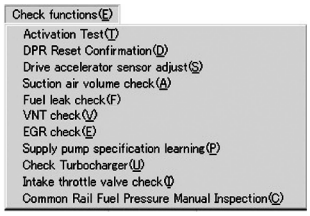
Function check of the Intake throttle valve (Diesel throttle valve) can be performed.



SAPH80ZZZ0200092

Fig. 2-94 Intake throttle valve check Window

1. **Select the "Intake throttle valve check" menu after system fix is made according to the DX02-9 procedure.**
   Menu:[Check function]-[Intake throttle valve check]

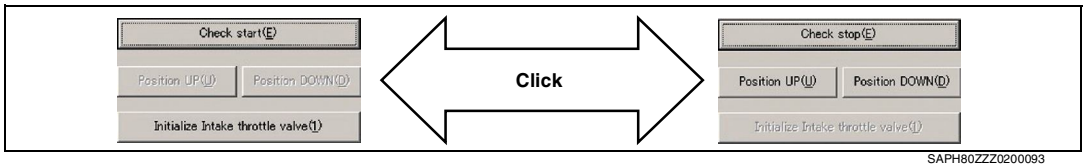


SAPH80ZZZ0200088

Fig. 2-95 Check function menu

2. **"Intake throttle valve check" screen displays and perform the check work following the instructions as displayed.**

HINT
Every time you click "Check start Button", display of each Button will change as in Fig. 2-96 Switch indicate item.



SAPH80ZZZ0200093

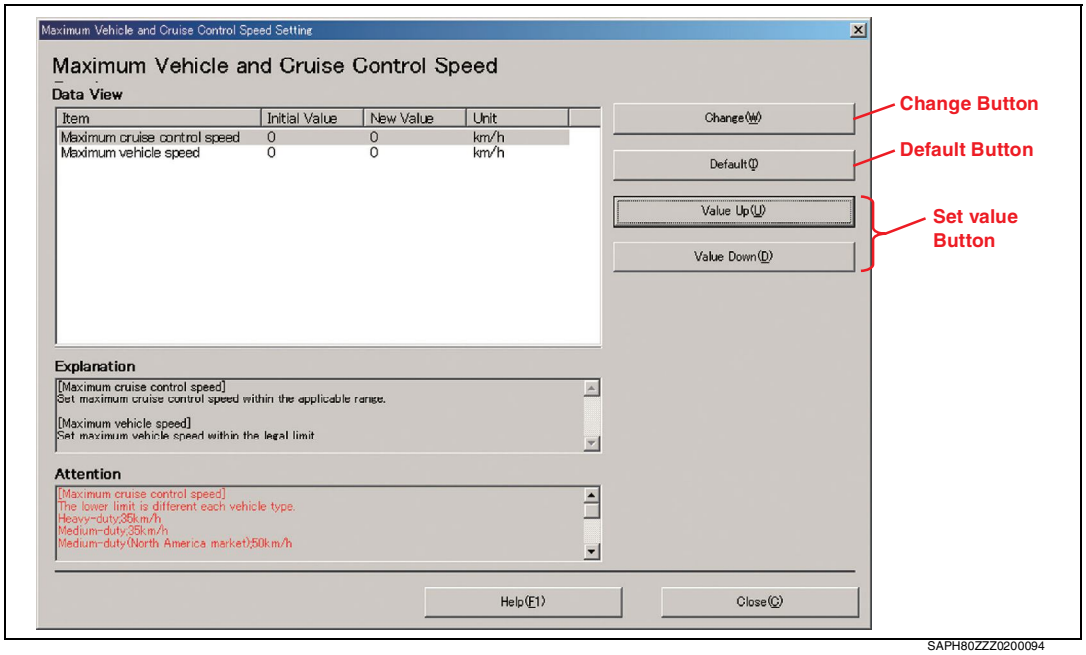
Fig. 2-96 Switch indicate item

When the Diesel throttle valve is replaced, initialize by clicking the "Initialize Button".

Maximum Vehicle and Cruise Control Speed Setting

EN80ZZZ02X100023

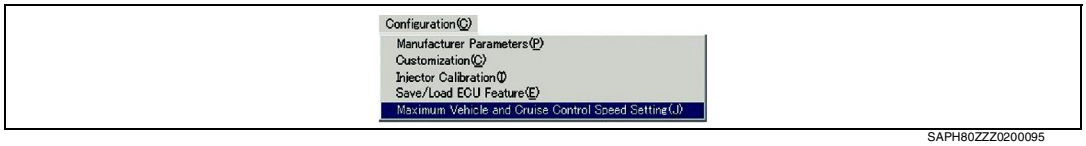
Maximum vehicle and cruise speed can be set up by this function.



SAPH80ZZZ0200094

Fig. 2-97 Maximum Vehicle and Cruise Control Speed Setting Window

1. **Select the Maximum Vehicle and Cruise Control Speed Setting" menu after system fix is made.**
   Menu:[Configuration]-[Maximum Vehicle and Cruise Control Speed Setting]



SAPH80ZZZ0200095

Fig. 2-98 Configuration menu

2. **"Maximum Vehicle and Cruise Control Speed Setting" screen displays and click the "Set value Button" to setup arbitrary value.**

3. Click the "Change Button" and change to the value set up in Step2.

HINT
Every time you click the "Set value Button", the value will change one by one.
Maximum upper limit speed which can be setup is the maximum speed specified by the regulations of each country.
You may exceed the set up speed on the down slope.

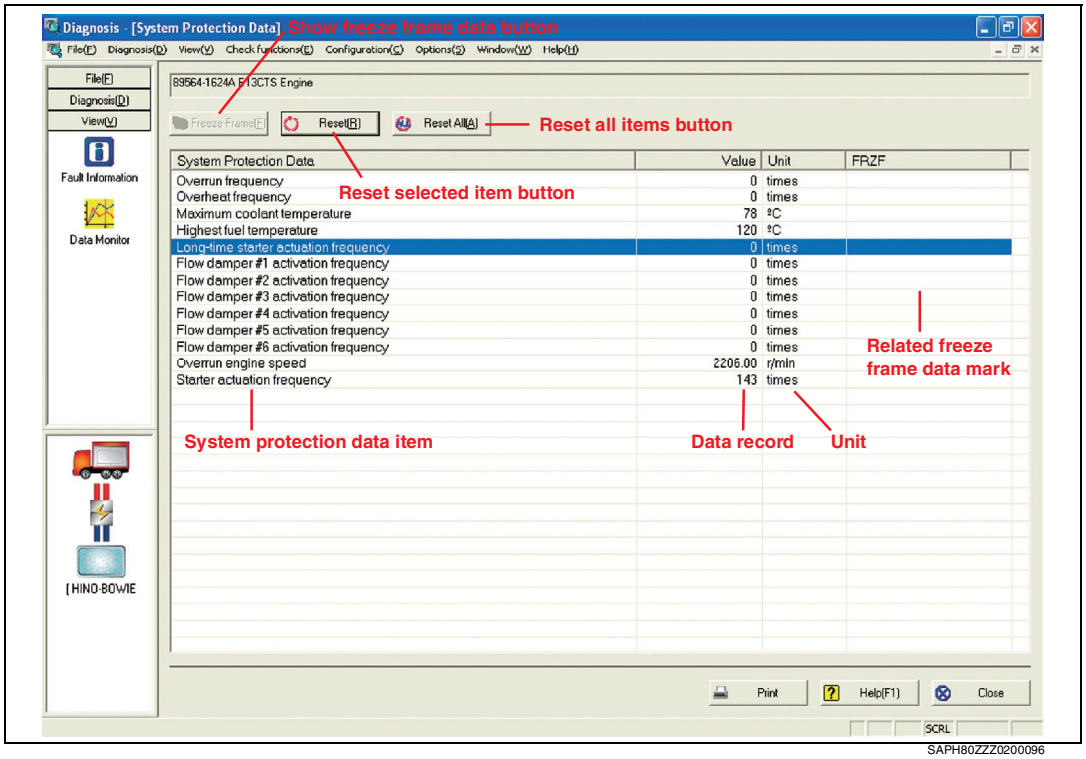
It is unable to set-up 50Km/h or slower depending upon the model.
In such a case, it is unable to set ECU without effect.

System Protection Data

System Protection Data

EN80ZZZ02X100024

System Protection Data shows the recorded system operation status data which the ECU wants to protect.
The displayed contents differ according to the target system.



SAPH80ZZZ0200096

Fig. 2-99 System Protection Data

What can be done in System Protection Data

EN80ZZZ02X100025

Investigation of the System Protection Data can help us find the cause of fault of which the DTC is not detected or to find what kind of vehicles are in use.
For example, when an engine is damaged, from Overrun frequency, Overrun engine speed, Maximum coolant temperature, etc. which are set as System Protection Data for the engine, we can find the cause of the engine damage by checking the driving manner of the relevant vehicle.

1. **Select the System Protection Data menu after System Fix.**
   Menu:[View]-[System Protection Data]

SAPH80ZZZ0200097

Fig. 2-100 Menu - view

2. Basically just confirm the data and that is all. But there are items which can be reset. How to reset is as follows: Click the item you want to reset actually. the selected items will be highlighted.

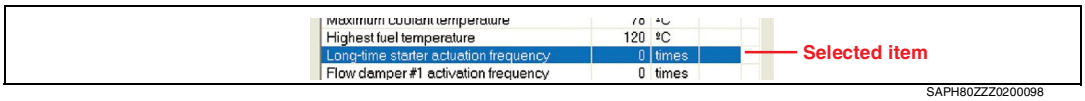


Fig. 2-101 System Protection Data - Selected item

3. Reset data can be done by clicking the [Reset] button and click [OK] when you really want to reset the selected data on the confirmation message.

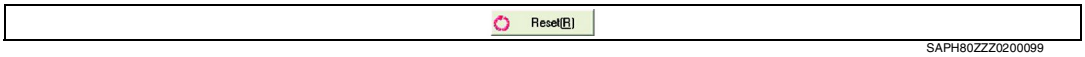


Fig. 2-102 Reset button

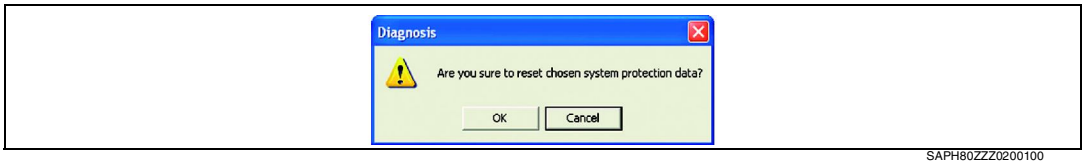


Fig. 2-103 Data reset confirmation message

4. If you want to reset all items of the System protection data, click the [Reset All] button.

Fig. 2-104 Reset All

HINT
When you change the Engine ECU value, you cannot do it while the engine is running.
If you reset, it will be shown in a blue-color letter.

Sample of system protection data items

EN80ZZZ02X100026

Type of ECU	Item	Detail	Unit
Engine ECU	Overrun frequency	The number of overruns is displayed. Judgment criterion of overrun: 4,000 r/min	times
	Overheat frequency	The number of overheat is displayed. Judgment criterion of overheat varies depending on engine type.	times
	# of writing, vehicle information	History of EOLP data reception from vehicle ECU "0" is displayed if EOLP data has never been received from the vehicle ECU. "1" is displayed if EOLP data has been received once or more. Whether the ECU has received EOLP data from the vehicle ECU can be checked.	times
	Maximum coolant temperature	The highest coolant temperature is displayed.	°C
	Highest fuel temperature	The highest fuel temperature is displayed.	°C
	Long-time starter actuation frequency	The number of long-time starter actuations is displayed.	times
	Trip Maximum Vehicle Speed → Maximum Vehicle Speed	The maximum vehicle speed is displayed. (Customized reset available)	km/h
	Flow damper #6 activation frequency → Flow damper activation frequency#6	The number of flow damper activations is displayed.(#6)	times
	Flow damper #5 activation frequency → Flow damper activation frequency#5	The number of flow damper activations is displayed.(#5)	times
	Flow damper #4 activation frequency → Flow damper activation frequency#4	The number of flow damper activations is displayed.(#4)	times
	Flow damper #3 activation frequency → Flow damper activation frequency#3	The number of flow damper activations is displayed.(#3)	times
	Flow damper #2 activation frequency → Flow damper activation frequency#2	The number of flow damper activations is displayed.(#2)	times
	Flow damper #1 activation frequency → Flow damper activation frequency#1	The number of flow damper activations is displayed.(#1)	times
	Air-flow meter learning frequency	Number of air flow meter learning	times
	Coolant Temp. sensor min. rate for monitoring	Frequency of diagnosis for coolant temperature sensor abnormality judgment %	%
	Air flow sensor min. rate for monitoring	Frequency of diagnosis for air flow sensor abnormality judgment %	%
	Boost Press. sensor min. rate for monitoring	Frequency of diagnosis for boost pressure sensor abnormality judgment %	%
	Ambient Press. sensor min. rate for monitoring	Frequency of diagnosis for atmospheric pressure sensor abnormality judgment %	%

Type of ECU	Item	Detail	Unit
Engine ECU	Intake air Temp. sensor min. rate for monitoring	Frequency of diagnosis for intake air temperature sensor abnormality judgment %	%
	Exh. Temp. sensor min. rate for monitoring	Frequency of diagnosis for exhaust gas temperature sensor abnormality judgment %	%
	Fuel injection min. rate for monitoring	Frequency of diagnosis for injector abnormality %	%
	Miss fire min. rate for monitoring	Frequency of diagnosis for misfire judgment %	%
	EGR system min. rate for monitoring	Frequency of diagnosis for EGR system abnormality judgment %	%
	Turbo system min. rate for monitoring	Frequency of diagnosis for turbo abnormality judgment %	%
	NMHC catalytic converter min. rate for monitoring	Frequency of diagnosis for NMHC catalyst abnormality judgment %	%
	NOX catalytic converter min. rate for monitoring	Frequency of diagnosis for NOX catalyst abnormality judgment %	%
	DPF system min. rate for monitoring	Frequency of diagnosis for DPF abnormality judgment %	%
	Thermostat min. rate for monitoring	Frequency of diagnosis for thermostat abnormality judgment %	%
	Overrun engine speed → Max. Engine speed record	The engine speed (maximum) at overrun is displayed.	r/min
	Engine operation hours	Total engine operation time	hr
	Starter actuation frequency	Number of starter operations	times
	Air-flow meter specification vary rate	Not to be displayed Learned value of air flow meter variation rate	%
	Air volume on normal idling	Learned value of air flow rate during normal engine idling	mg/cyl
	Total Idle Fuel Used	Total fuel consumed in idling is displayed. (Non-resettable)	
	Trip Idle Fuel Used	Total fuel consumed in idling is displayed. (Resettable)	
	Total Fuel Used	Total fuel consumption is displayed. (Non-resettable)	
	Trip Fuel	Total fuel consumption is displayed. (Resettable)	
	Total Engine PTO Fuel Used	Total fuel consumption in PTO mode operation is displayed. (Non-resettable)	
	Trip PTO Moving Fuel Used	Total fuel consumption during driving in PTO mode is displayed. (Customized reset unavailable)	
	Trip PTO Non-Moving Fuel Used	Total fuel consumption of a non-moving vehicle in PTO operation is displayed. (Customized reset available)	
Engine ECU & vehicle control ECU	PCS/SEM limited torque value	Output limit torque value when communication to Allison 2500 (with SEM function) is interrupted	
Meter ECU	Engine Oil Change(USE)	The interval of engine oil change is specified.	km
	T/M Oil Change(USE)	The interval of T/M oil change is specified.	km
	Diff oil Change(USE)	The interval of diff oil change is specified.	km

Type of ECU	Item	Detail	Unit
Meter ECU	Coolant Change(USE)	The interval of coolant change is specified.	km
	Fuel filter Change(USE)	The interval of fuel filter change is specified.	km
	Belt Check(USE)	The interval of fan belt check is specified.	km
	DPR Maintenance(USE)	The interval of DPR cleaning is specified.	km
	Turbo Check(USE)	The interval of turbocharger check is specified.	km
	Starter Overhaul(USE)	The interval of starter overhaul is specified.	km
	Alternator Overhaul(USE)	The interval of alternator overhaul is specified.	km
	Radiator Check(USE)	The interval of radiator check is specified.	km
	Battery Check(USE)	The interval of battery check is specified.	km
	Air dryer Change(USE)	The interval of air dryer change is specified.	km
	Engine Oil Change(USE)	The interval of engine oil change is specified.	Month
	T/M Oil Change(USE)	The interval of T/M oil change is specified.	Month
	Diff oil Change(USE)	The interval of diff oil change is specified.	Month
	Coolant Change(USE)	The interval of coolant change is specified.	Month
	Fuel filter Change(USE)	The interval of fuel filter change is specified.	Month
	Belt Check(USE)	The interval of fan belt check is specified.	Month
	DPR Maintenance(USE)	The interval of DPR cleaning is specified.	Month
	Turbo Check(USE)	The interval of turbocharger check is specified.	Month
	Starter Overhaul(USE)	The interval of starter overhaul is specified.	Month
	Alternator Overhaul(USE)	The interval of alternator overhaul is specified.	Month
	Radiator Check(USE)	The interval of radiator check is specified.	Month
	Battery Check(USE)	The interval of battery check is specified.	Month
	Air dryer Change(USE)	The interval of air dryer change is specified.	Month
DCU	Amount of ammonia adsorption	The calculated amount of NH_3 absorbed by the SCR catalyst.	g
	Amount of HC poisoning	The calculated amount of HC absorbed by the SCR catalyst.	g
	Amount of ammonia adsorption (wall)	The calculated amount of NH_3 absorbed by the inner wall of the exhaust pipe.	g
	Feedback amount, dosage of DEF	The feedback coefficient of urea solution dosage.	

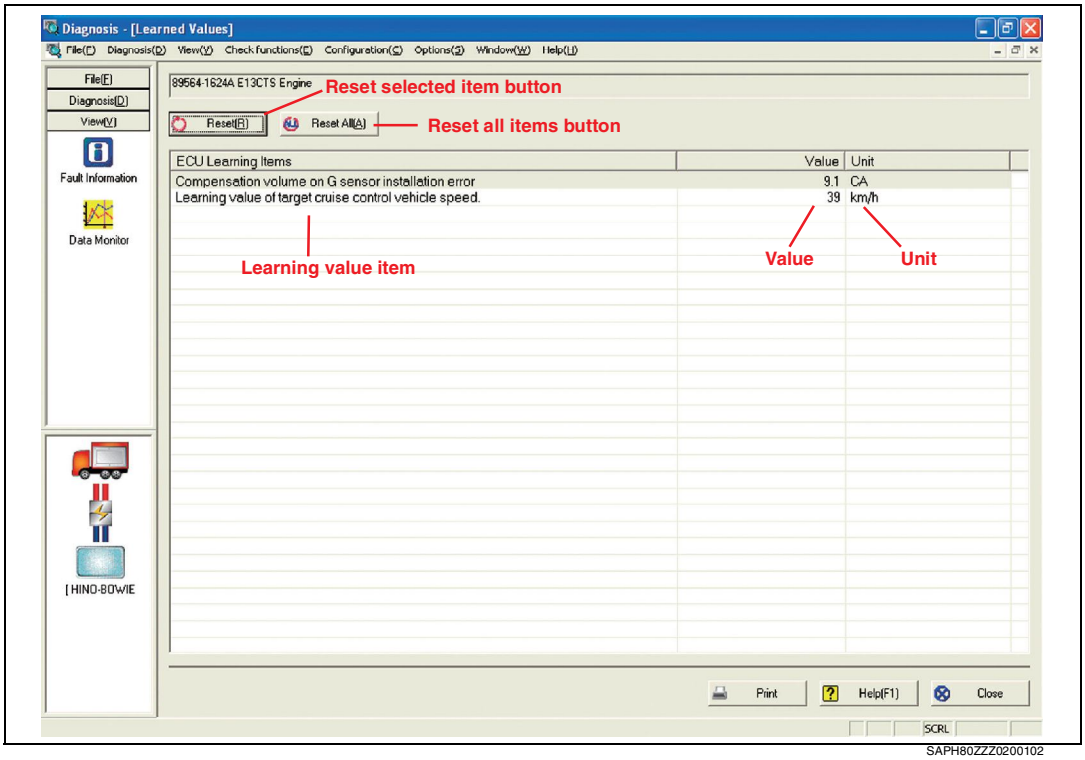
HINT
You can reset the items which you can reset customization by "History trip reset flag" of the customization.

Learning Value

Learning Value

EN80ZZZ02X100027

Learning Value has a function to read from the ECU and displays information necessary for the system to operate normally. The displayed contents differ according to the target system.



SAPH80ZZZ0200102

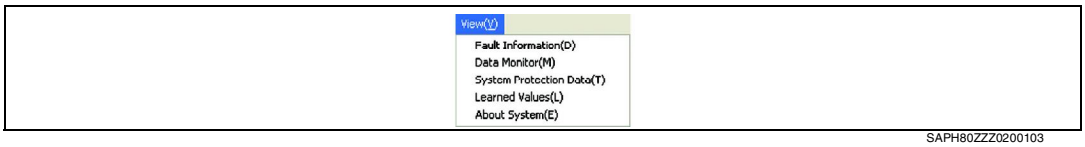
Fig. 2-105 Learning value

What can be done in Learning Value

EN80ZZZ02X100028

Investigation of the Learning Value makes it possible to confirm the vehicle operation condition and setting status of accessories.

1. **Select the System Protection Data menu after System Fix.**
   Menu:[View]-[Learning Value]



SAPH80ZZZ0200103

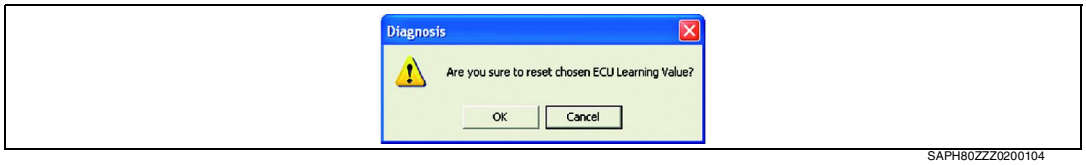
Fig. 2-106 Menu - view

2. **Basically just confirm the data and that is all. But there are items which can be reset. How to reset is as follows: Click the item you want to reset actually. the selected item will be highlighted.**

3. Reset data will be done by clicking [Reset] button and click [OK] when you really want to reset selected data on the confirmation message.

SAPH80ZZZ0200099

Fig. 2-107 Reset button



SAPH80ZZZ0200104

Fig. 2-108 Data reset confirmation message

4. If you want to reset all items of Learning Value displayed, click the [Reset All] button.

SAPH80ZZZ0200101

Fig. 2-109 Reset All

HINT
When you change the Engine ECU value, you cannot do it while the engine is running.
If you reset, it will be shown in blue-colored letters.

Sample of learned value items

EN80ZZZ02X100029

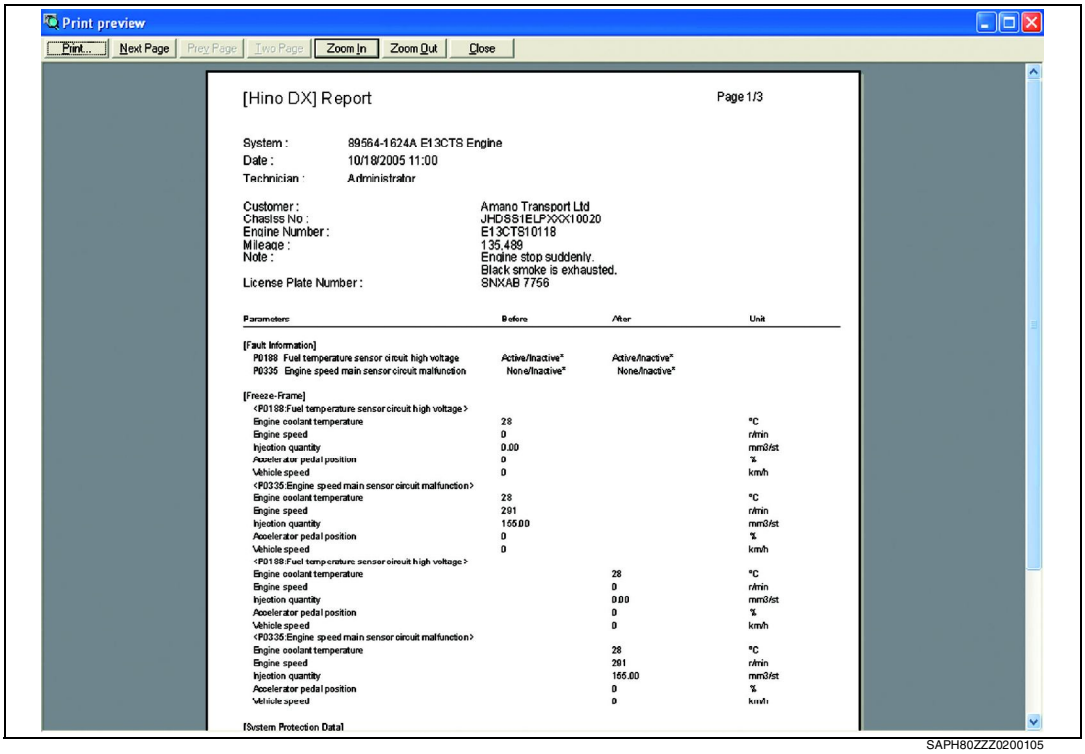
Type of ECU	Item	unit
Engine ECU	Learned value of Intake throttle close position Supply pump specification learning completion flag Supply pump specification learning value (note : Cannot reset)	°C mA
Engine ECU and vehicle control ECU	Learning value of FS speed limiter speed → Learning value of ES vehicle speed limiter Learning value of target cruise control vehicle speed.	km/h km/h
Meter ECU	Conversion rate	

Past Work Information

Past Work Information

EN80ZZZ02X100030

All the information which is obtained through Diagnosis using the Hino-DX is saved in the PC and can be confirmed later.
The saved information as to when, who and to which system manual operation is done and each data of fault information (including Freeze Frame Data), equipment specifications, customization, protected data, learning value, injector correction value (engine ECU only) are divided with the time of work started and finished and saved accordingly.
The saved data continues being saved until intentionally deleted.
Saved data are printable in the form of a Diagnostic report and printed literature can be filed and delivered to the user as work records.



SAPH80ZZZ0200105

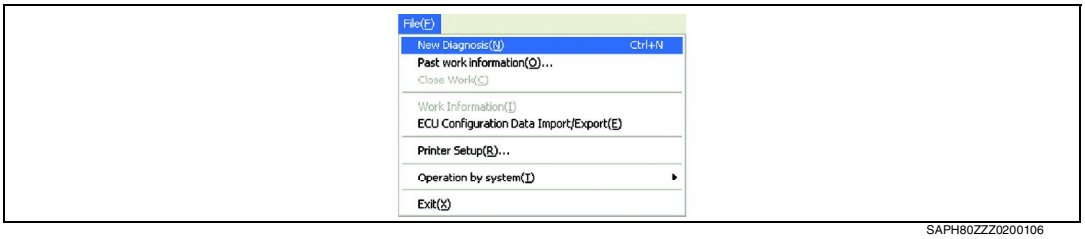
Fig. 2-110 Diagnostic report

What can be done in Past Work Information

EN80ZZZ02X100031

You can check and confirm from this Past Work Information on the following:
What kind of work was done and who did it when the fault occurred again last time?
What kind of change was made to equipment specifications and what kind of customization was made?
And also it is possible to save specific work information as individual file. By this you can forward the information of the default vehicle of which the cause of default is unclear to Hino and ask for analysis.

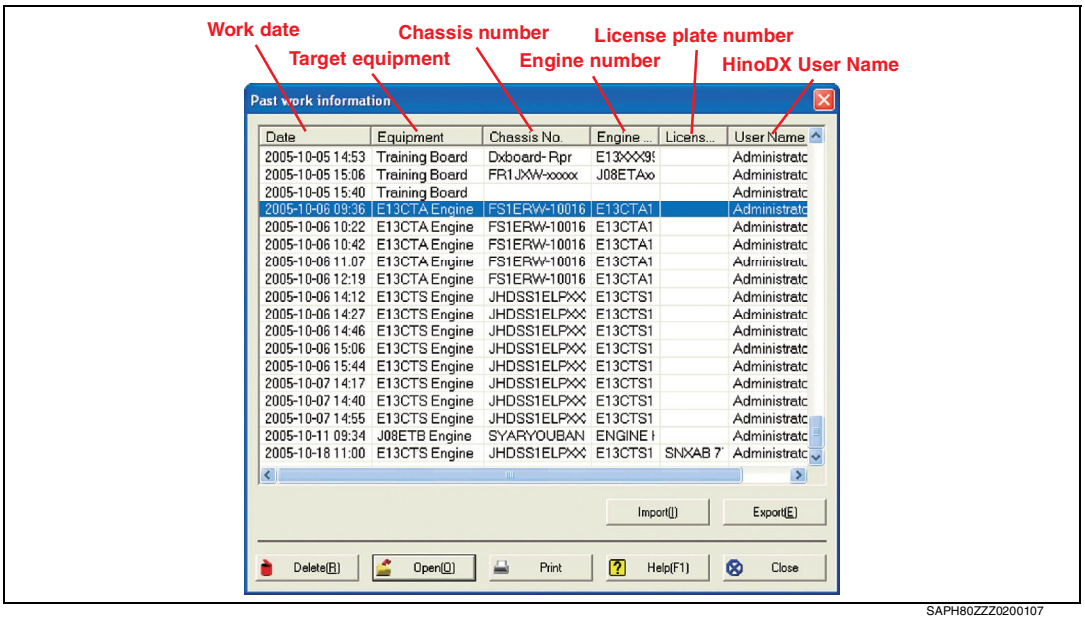
Step1 Start up the Hino-DX.
Step2 Select the [File(F)]-[Past work information(O)] menu.



SAPH80ZZZ0200106

Fig. 2-111 File Menu

Step3 The list of Past Work Information saved in the Hino-DX will be shown and select the data item you want to work with (Selected item will be highlighted) and click the button.



SAPH80ZZZ0200107

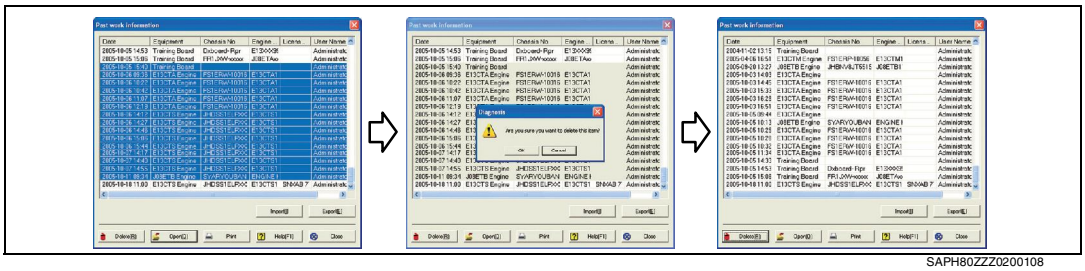
Fig. 2-112 List of Past Work Information

Delete Past Work Information from its list

Step4 Click the [Delete] button.
Step5 Warning message will be shown and you are asked whether you are sure to delete the selected file. If you are sure to delete, click [OK].

⚠ CAUTION
Pay due attention in case you delete, because once you delete the information, you cannot put it back.
Unless you delete information here, Past Work Information will not disappear.
You are asked to delete it regularly so that the capacity of the hard disc may not be pressed.
(20 - 30KB per one data).

HINT
In case of deletion only, you can select the plural data and delete them.



SAPH80ZZZ0200108

Fig. 2-113 Delete the selected past work information

Open Past Work Information (print the diagnostic report)

Step4 Click the [Open] button.

SAPH80ZZZ0200109

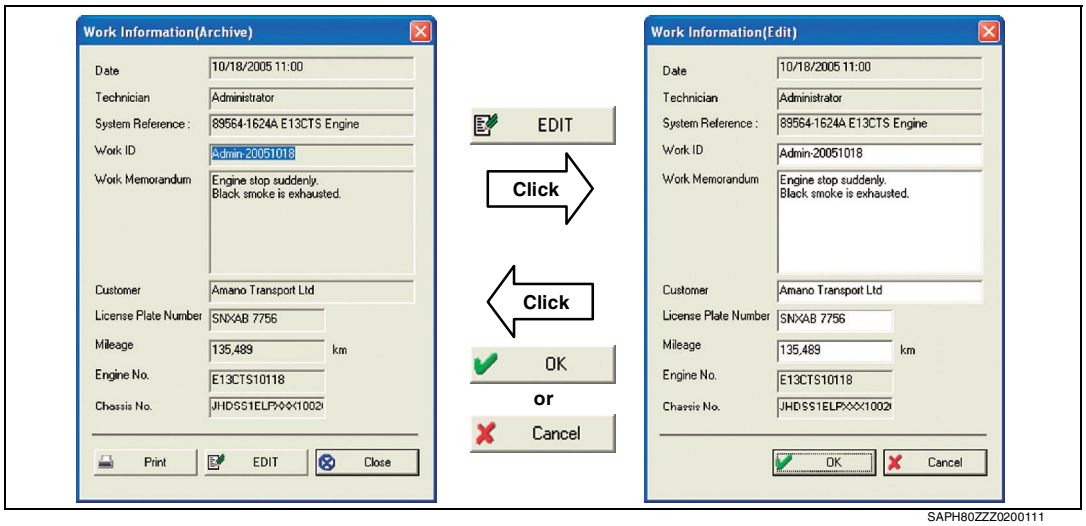
Fig. 2-114 Open button

Step5 Check the contents as Work Information is opened.
If the content is OK and you want to print out the Diagnostic report, click the [Print] button.

SAPH80ZZZ0200110

Fig. 2-115 Print button

When you want to amend the contents, you can amend "Work Memorandum", "Customer", "License Plate Number", "Mileage" by clicking the [EDIT] button.
After amendment and you want to validate amendment, click [OK]. When you don't want to amend, click the [Cancel] button.



SAPH80ZZZ0200111

Fig. 2-116 Change Work Information

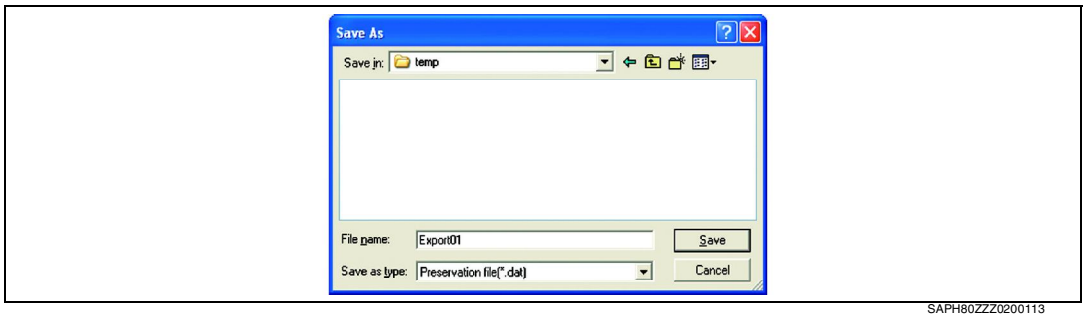
Export Past Work Information

Step4 Click the [Export] button.

SAPH80ZZZ0200112

Fig. 2-117 Export

Step5 Put arbitrary name to arbitrary holder as dialogue of saving file is shown and save it. And its extension will be ".dat".



SAPH80ZZZ0200113

Fig. 2-118 Save dialog

Import Past Work Information

Step4 Click the [Import] button.

SAPH80ZZZ0200114

Fig. 2-119 Export

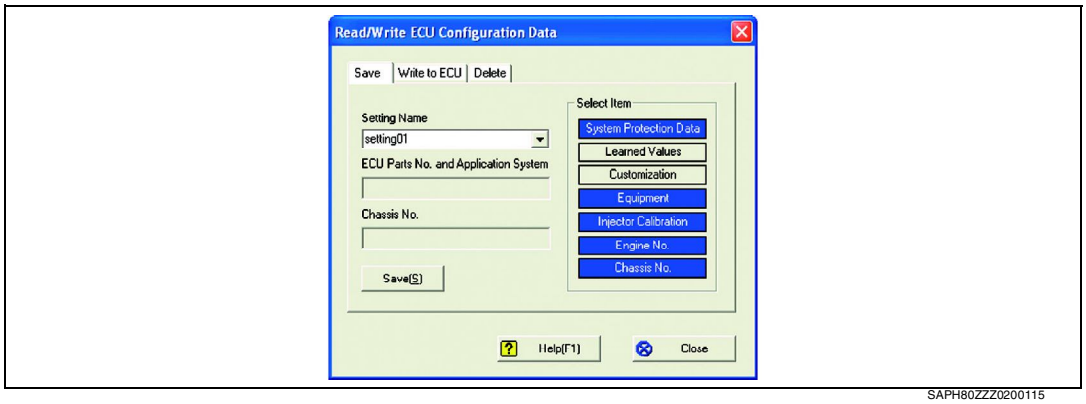
Step5 Appoint the file to import as dialogue to call up file.

Read/Write ECU configuration data

Read/Write ECU configuration data

EN80ZZZ02X100032

The various setting data recorded in the engine ECU are saved collectively and this has a function which bundles up only a required portion from the saved data and can write them to ECU. Furthermore, it is also possible to export the saved information and to move data to other PCs.



SAPH80ZZZ0200115

Fig. 2-120 Save dialog

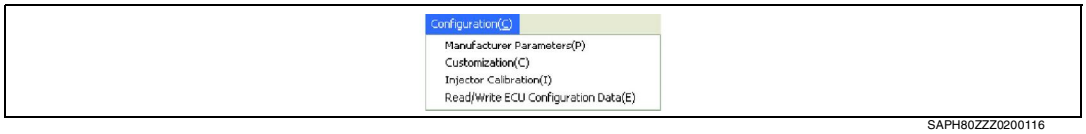
What can be done in Read/Write ECU configuration data

EN80ZZZ02X100033

When doing the following work, you can work easily.

1. To replace the engine ECU and to make the completely the same specifications as the original specifications.
2. To create two or more vehicles with the same specifications. (Maximum vehicle speed, maximum cruise control speed, PTO setup)
3. To save the backup data of the vehicles specifications.

Step1 Select the "Read/Write ECU configuration data" menu after system fix is made.
Menu:[Configurations]-[Read/Write ECU configuration data]



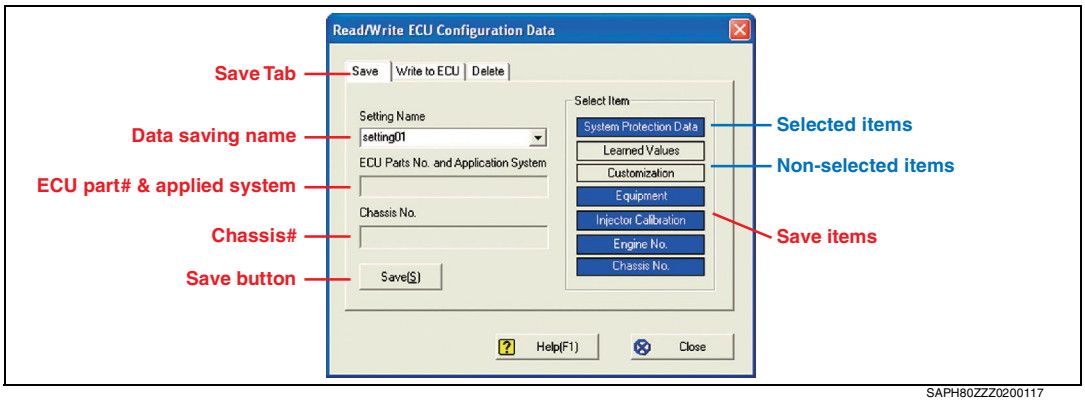
SAPH80ZZZ0200116

Fig. 2-121 Menu - Read/Write ECU Configuration data

Save ECU configuration data

EN80ZZZ02X100034

Read the setting value of the engine and vehicle specification, etc. currently recorded in the engine ECU and save them in the HINO-DX.



SAPH80ZZZ0200117

Fig. 2-122 Save ECU configuration data

Step2 Select the "Save Tab" and display data save screen.

SAPH80ZZZ0200118

Fig. 2-123 Select Save Tab

Step3 Select data items you want to save from the Save items. Save items are as follows.

General vehicle

Save items	Description	Authority
System Protection Data	Save the items of System Protection Data.	All
Learning Values	Save the items of Learning Value.	All
Customization	Save the items of Customization.	All
Equipment	Save the items of Manufacturer Parameter.	All
Injector Calibration	Save Injector Calibration data for the cylinders.	All
Engine No.	Save Engine Number.	Administrator
Chassis No.	Save Chassis Number.	Administrator

HINT
Display of Select item means the following.

Item Name	; Non-selected item
Item Name	; Selected item

⚠ CAUTION
Engine Number and Chassis Number are displayed only when logged in by an Administrator authority.
In case of the vehicle control ECU, the number of the items you can select is limited.
Data to be saved do not cover all of every each item.

Step4 Input Data saving name.

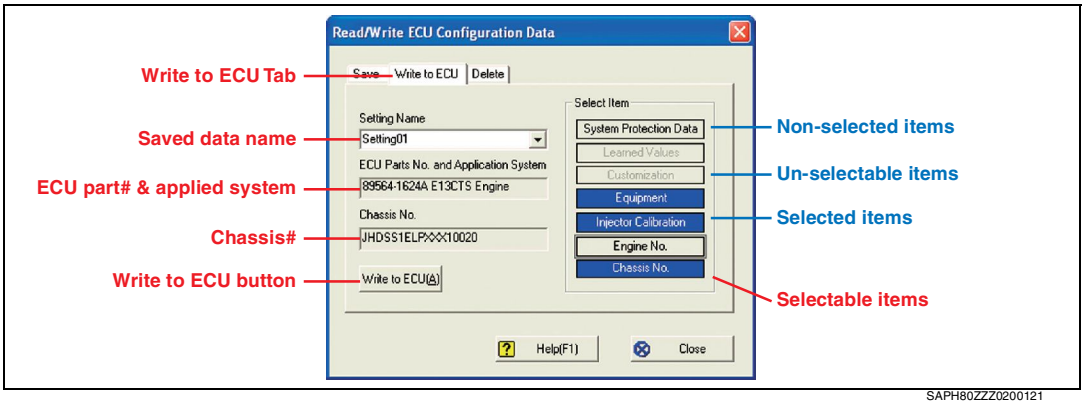
Step5 Click the [Save] Button and save data.

HINT
Since the ECU part number & applied system and Chassis number become reference information automatically input using the ECU data, you cannot change them.

Write ECU configuration data

EN80ZZZ02X100035

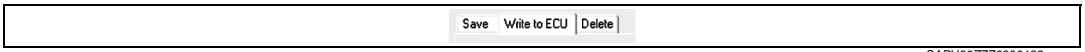
Step1 Write ECU Configuration data saved in the HINO-DX to the engine ECU.



SAPH80ZZZ0200121

Fig. 2-124 Write ECU configuration data

Step2 Select the "Write to ECU Tab" and display data reading screen.



SAPH80ZZZ0200122

Fig. 2-125 Select Write to ECU Tab

Step3 Select saved data which you want to write from the "Saved data name" and read them.

Step4 Select data item you want write to the ECU from Select items. Save items are as follows.

Save items	Description	Authority
System Protection Data	Write all items of System Protection Data to ECU.	All
Learning Values	Write all items of Learning Value to ECU.	All
Customization	Write all items of Customization to ECU.	All
Equipment	Write all items of Manufacturer Parameter to ECU.	All
Injector Calibration	Write Injector Calibration data for all cylinders to ECU.	All
Engine No.	Write Engine Number to ECU.	Administrator
Chassis No.	Write Chassis Number to ECU.	Administrator

HINT
The data which are not saved cannot be chosen as write-in items...

Item Name	; Selectable and non-selected item
Item Name	; Selectable and selected item
Item Name	; Un-selectable item (non-saved item)

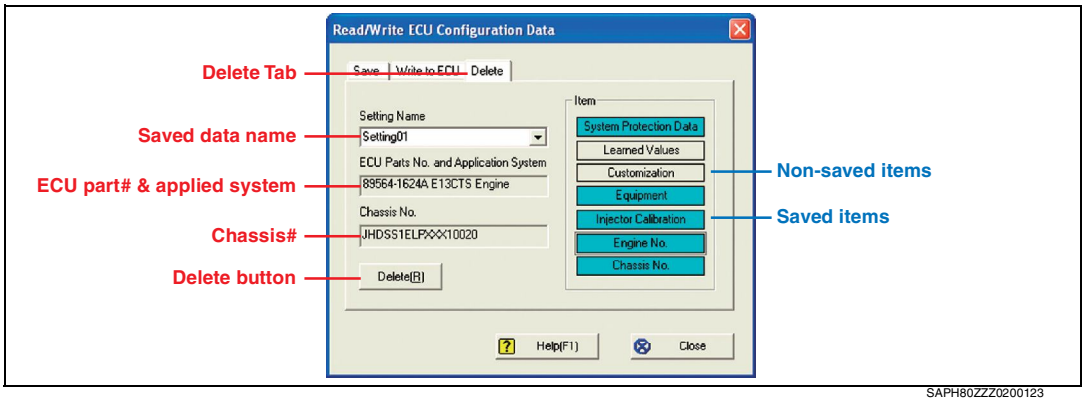
⚠ CAUTION
There are some Learning Values which cannot be written to the ECU, if they do not meet certain conditions and there may be a case that you cannot write-in all. In such a case, redo the learning again. (Example: J system engine pump machine difference compensation learning)

Step5 Click the [Write to ECU] Button and write selected data to the engine ECU.

Delete the ECU configuration data

EN80ZZZ02X100036

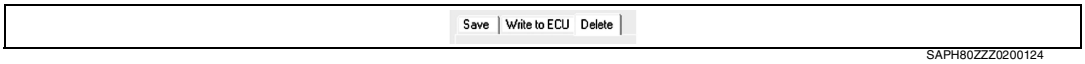
Delete ECU configuration data which are saved in the HINO-DX.



SAPH80ZZZ0200123

Fig. 2-126 Delete ECU configuration data

Step2 Select the "Delete Tab" and display the "Delete reading data" screen.



SAPH80ZZZ0200124

Fig. 2-127 Select Write to ECU Tab

Step3 Select saved data name which you want to delete from the "Saved data name" and read them.

Step4 Click the [Delete] Button and delete saved data.

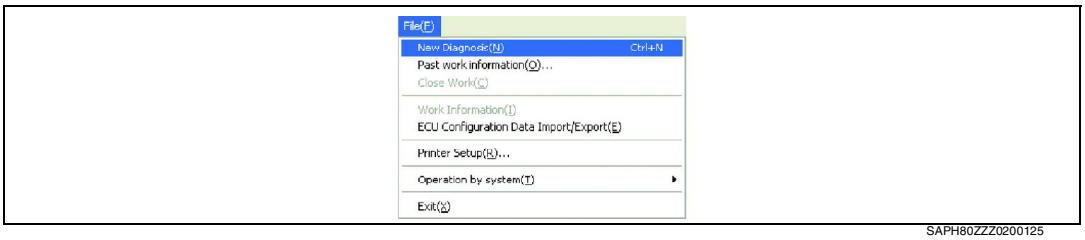
⚠ CAUTION
Deleted data cannot be recovered so pay much attention to the deleted data.

Procedure - Import / Export ECU configuration data

EN80ZZZ02X100037

Step1 Start HINO DX.

Step2 Select the [File (F)]-[ECU Configuration Data Import/Export (E)] menu.



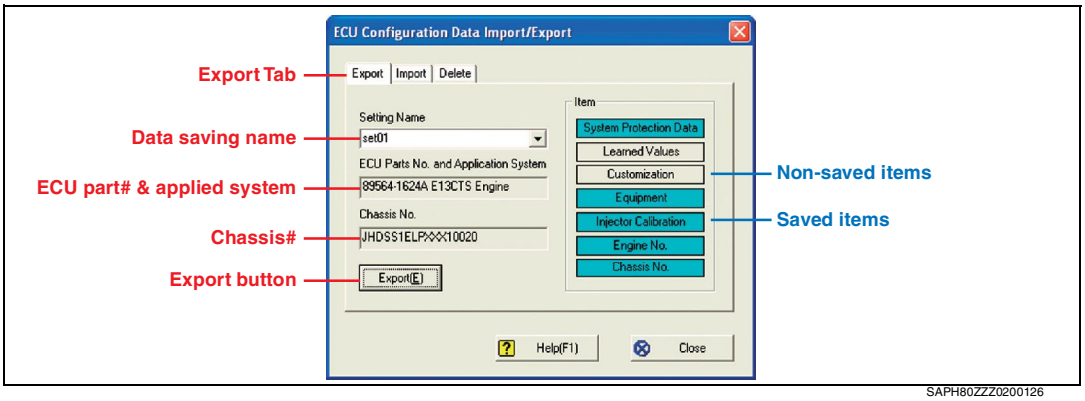
SAPH80ZZZ0200125

Fig. 2-128 File Menu

HINT
This menu cannot be displayed after system fix is made.

Export ECU configuration data

This has a function to export data as an external file so that ECU configuration data saved in the HINO-DX can be used in other PCs.



SAPH80ZZZ0200126

Fig. 2-129 Export ECU configuration data

Step3 Select the "Export Tab" and display the "Data export" screen.

SAPH80ZZZ0200127

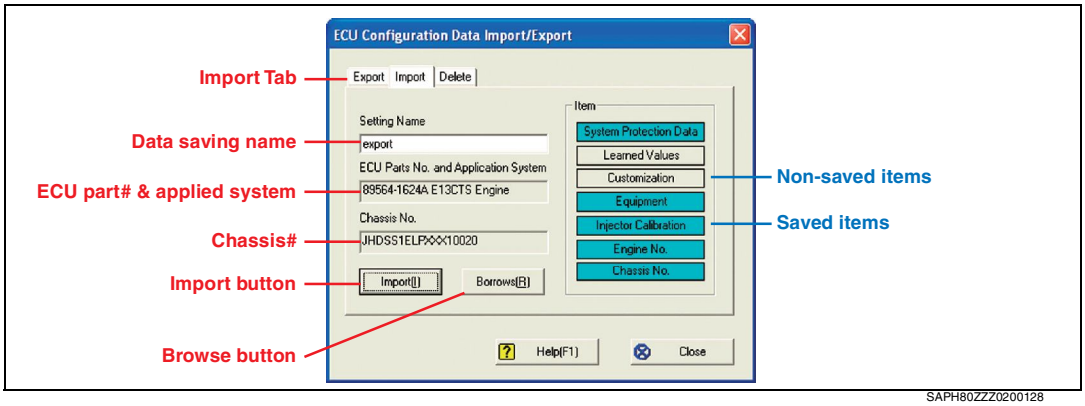
Fig. 2-130 Select Export Tab

Step4 Select the ECU configuration data which you want to export from the Data saving name.
HINT
Details of selected data can be checked with the ECU part# & applied system, Chassis#, Saved items and Non-saved items.

Step5 Click the [Export] Button and save data in the arbitrary folder with an arbitrary file name.
Its extension shall be ".cfg".

Import ECU configuration data

This has a function to import ECU configuration data which are exported to the HINO-DX and make them usable.



SAPH80ZZZ0200128

Fig. 2-131 Import ECU configuration data

Step3 Select the "Import Tab" and display the "Data Import" screen.

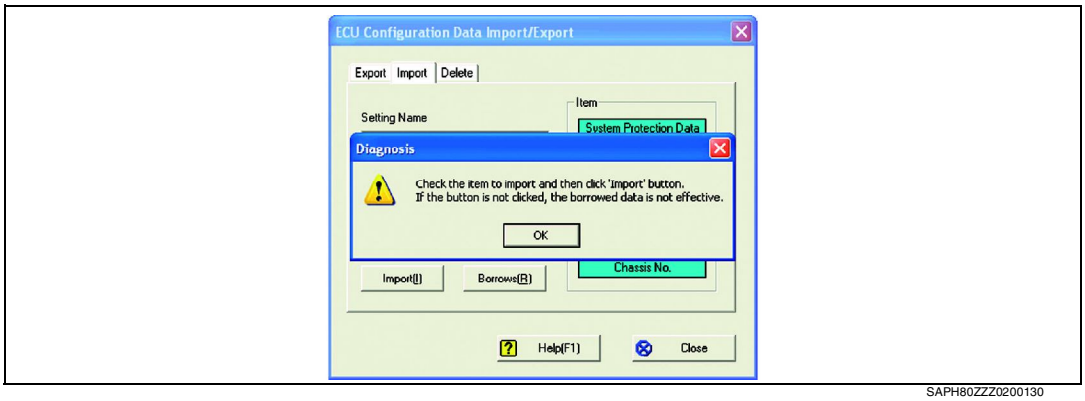
SAPH80ZZZ0200129

Fig. 2-132 Select Import tab

Step4 Click the [Browse] Button and select files to import.

⚠ CAUTION

By only choosing the file, data will only be displayed and cannot be imported in the HINO-DX. When you want to import them, click the [Import] Button as in Step 3. With respect to this, warning message of the HINO-DX is displayed in case of importing (Fig. 2-140 Data import warning message).



SAPH80ZZZ0200130

Fig. 2-133 Data import warning message

Step5 Click the [Import] Button and import data.

Delete ECU configuration data

ECU configuration data saved in the HINO-DX will be deleted.

Step3 Select the "Delete Tab" and display the "Delete read data" screen.

Fig. 2-134 Select Write to ECU Tab

Step4 Select the saved data which you want to delete from the "Saved data name" and read them.

Step5 Click the [Delete] Button to delete the saved data.

⚠ CAUTION
Deleted data cannot be recovered so pay much attention when deleting data.

HINT
ECU Configuration Data and Past Work Information from Data are different in the case where establishment of communication with the vehicle is made or before establishment of communication with the vehicle according to work contents.

After establishment of communication:

- **Save**
- **Write to ECU**

Before establishment of communication:

- **Export**
- **Import**

ECU Configuration Data and Past Work Information from Data

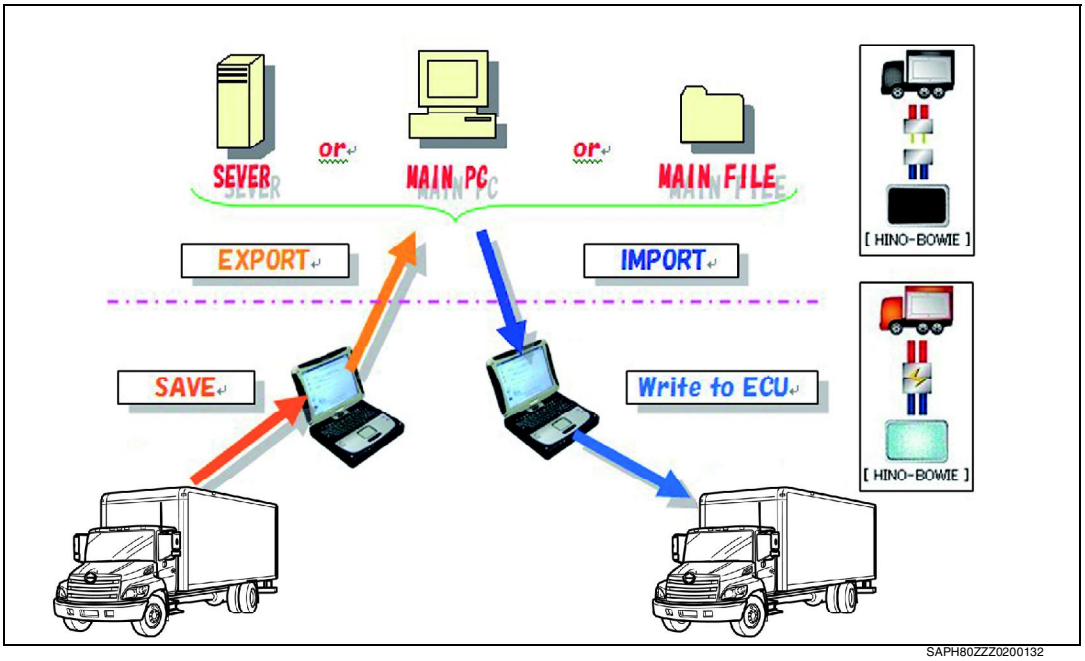


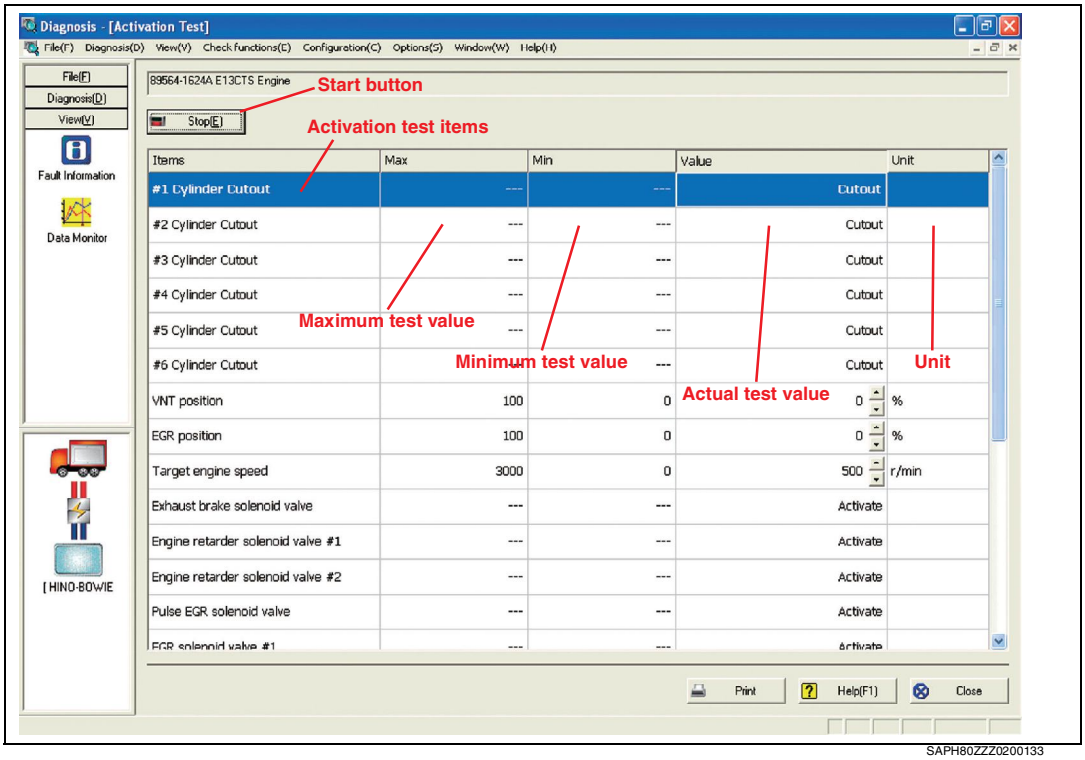
Fig. 2-135

Activation Test

Activation Test

EN80ZZZ02X100038

Active test is an activate function which lets the actuator and lamp linked to the ECU make mock movements by the signals from the ECU.



SAPH80ZZZ0200133

Fig. 2-136 Active Test

What can be done in Activation Test

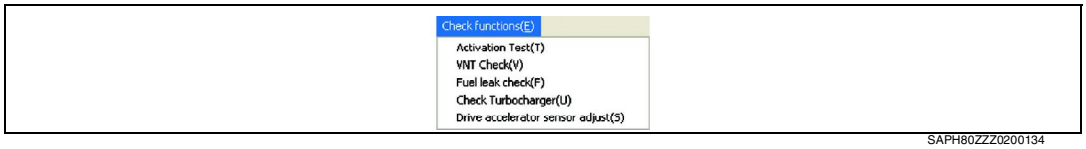
EN80ZZZ02X100039

By operating the actuator and lamp in false, you can check that the actuator is not broken and the lamp is not burnt out.
With respect to the actuator, operation check is performed by the operation sound of the actuator, system status change (Example: Change of engine rotation, Engine stall, etc.).
With respect to the lamp, lighting/putting out the light of the meter lamp or the lamp on the instrument panel are visually checked.

Procedure - Activation Test

EN80ZZZ02X100040

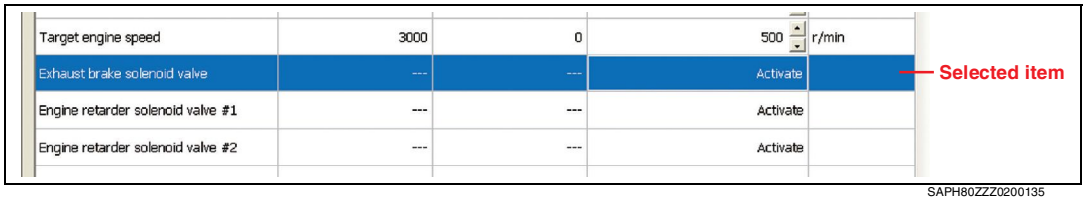
1. **Select the "Activation Test" menu after system fix is made.**
   Menu:[Check functions]-[Activation Test]



SAPH80ZZZ0200134

Fig. 2-137 Menu - Activation Test

2. **Click and select items you want to actually test. Selected items will be highlighted.**
   And the items which can be selected is limited to 1 item by 1 test.



SAPH80ZZZ0200135

Fig. 2-138 Activation test - selected item

3. **What kind of status do you want to make? After changing and setting up of the actual test value currently displayed on "Value", Click the [Start] Button and start the activation test.**

SAPH80ZZZ0200136

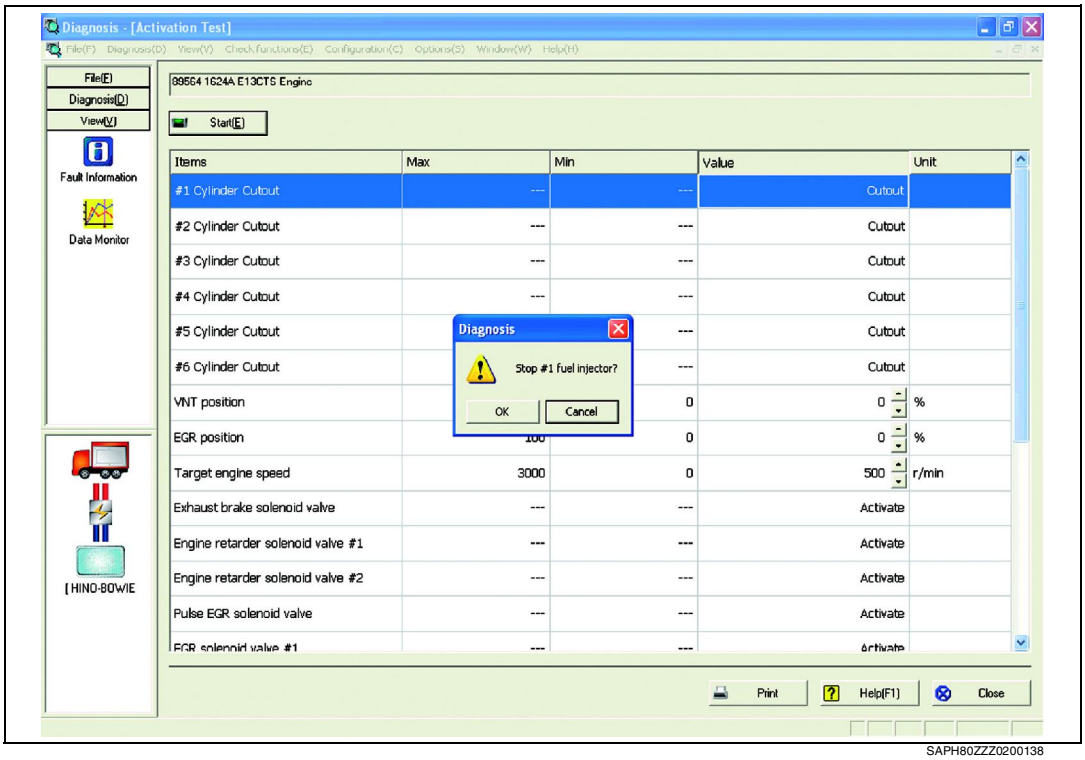
Fig. 2-139 Start button

After starting the active test, the notation of the [Start] Button will change to [Stop] and if you want to stop the active test, click this [Stop] Button.

SAPH80ZZZ0200137

Fig. 2-140 Stop button

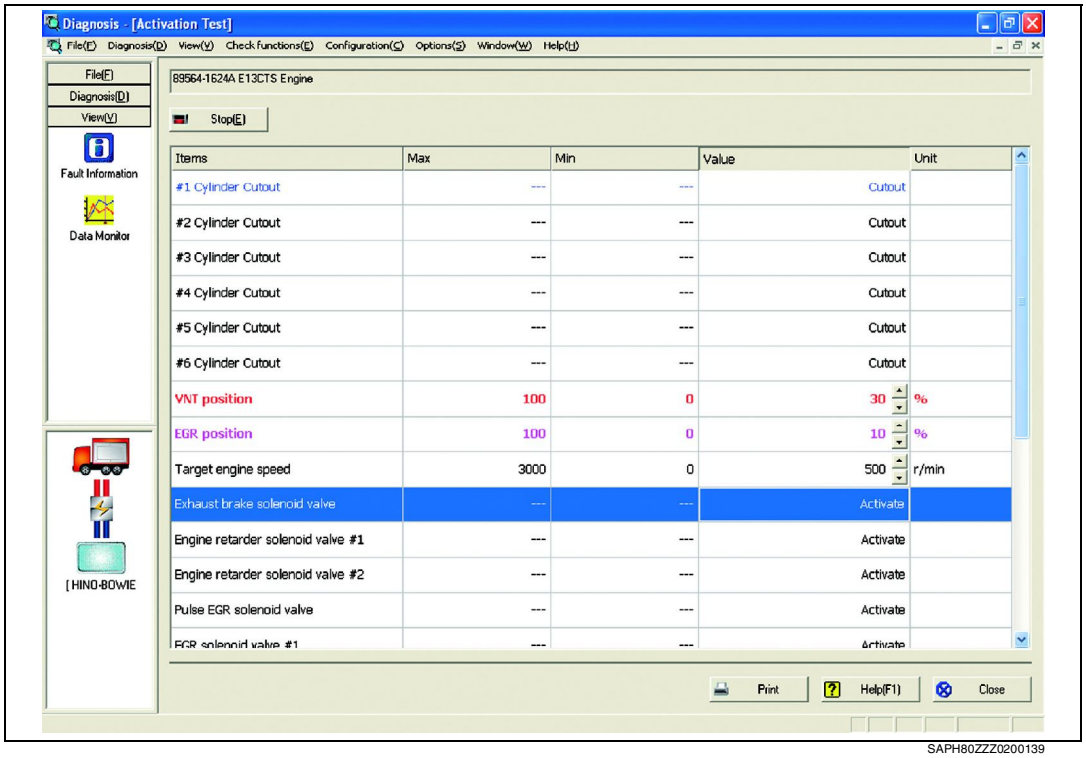
And if caution and warning displays after clicking the [Start] Button, carry out the active test according to the directions.



SAPH80ZZZ0200138

Fig. 2-141 Activation test - warning

HINT
A character color changes according to the active test implemented item and non-carried out item, etc.
Black color character:Non-carried out item of test
Blue color character:Carried out item of test
Red color character:Although values such as percentage and engine rotation were changed, test non-carried out item.
Peach color character:Under test implementation item



SAPH80ZZZ0200139

Fig. 2-142 Activation test - letter color

HINT
Even if you instruct number of the engine rotation which exceeds maximum engine speed previously set up in the control software for Target engine speed, engine rotation does not exceed set up maximum engine speed.
Number of items displayed will change according to the kind of vehicle.

Sample of activation test items (Engine ECU)

Item	Check the operation	Remarks
Cylinder #6 Cutout	Injection of the cylinder #6 is stopped.Injector operation status is judged by engine noise variation.	
Cylinder #5 Cutout	Injection of the cylinder #5 is stopped.Injector operation status is judged by engine noise variation.	
Cylinder #4 Cutout	Injection of the cylinder #4 is stopped.Injector operation status is judged by engine noise variation.	
Cylinder #3 Cutout	Injection of the cylinder #3 is stopped.Injector operation status is judged by engine noise variation.	
Cylinder #2 Cutout	Injection of the cylinder #2 is stopped.Injector operation status is judged by engine noise variation.	
Cylinder #1 Cutout	Injection of the cylinder #1 is stopped.Injector operation status is judged by engine noise variation.	
Engine retarder solenoid valve #2 forced drive	The engine retarder solenoid valve 2 is forced to drive.Operation status is judged by air exhaust noise.	
Engine retarder solenoid valve #1 forced drive	The engine retarder solenoid valve 1 is forced to drive.Operation status is judged by air exhaust noise.	
EGR solenoid valve #3 forced drive	The EGR solenoid valve 1 is forced to drive.Operation status is judged by air exhaust noise.	
EGR solenoid valve #2 forced drive	The EGR solenoid valve 2 is forced to drive.Operation status is judged by air exhaust noise.	
EGR solenoid valve #1 forced drive	The EGR solenoid valve 3 is forced to drive.Operation status is judged by air exhaust noise.	
VNT solenoid valve #1	The VNT solenoid valve 1 is forced to drive.Operation status is judged by air exhaust noise.	
VNT solenoid valve #2	The VNT solenoid valve 2 is forced to drive.Operation status is judged by air exhaust noise.	
VNT solenoid valve #3	The VNT solenoid valve 3 is forced to drive.Operation status is judged by air exhaust noise.	
Reset urea SCR related memory	Operate it only at the time of exchange of DEF.	
Reset DPR related memory	Operate it only at the time of exchange or washing of DPR.	
Release repeat offense	This item is used in the case that DTC related DEF SCR system cannot be cleared by “DTC clean” in DX due to repeat offence (tampering or DEF quality error).	

Sample of activation test items (Vehicle control ECU)

Activation Test Items	Checking operation	Remarks
Diagnosis lamp	Lighting of the diagnosis lamp is tested. It is judged normal if it lights up.	
Actuator relay	Operation of the actuator relay is checked. It is checked if the data monitor shows ON.	
ST ON relay 1	Operation of the starter ON relay is checked. It is checked by operation noise of the relay.	
Tachometer demonstration display	The tacho pulse output of the vehicle control ECU is checked once the engine speed is displayed as specified.	
Exh. Brake lamp	Lighting of the exhaust brake lamp is tested. It is judged normal if the lamp lights up.	
Eco-Run2 lamp	To be deleted.	

Sample of activation test items (DCU)

Item	Checking operation	Remarks
Coolant open/close valve	The operation of the coolant open/close valve is verified. A clicking noise will be heard.	
Reverting valve	The operation of the DEF pump reverting valve is verified. A clicking will be heard.	
Urea injector position	The DEF injector is driven forcibly.	Do not drive the vehicle body because a blank run may cause abrasion.
Urea pump position	The DEF pump is driven forcibly.	Driving of the vehicle body will cause the piping to be damaged.

Sample of activation test items (BCU)

Item	Checking operation	Remarks
Combustion air valve	Operating sound is verified.	
Fuel Pump	Operating sound is verified.	Also available for fuel priming.
Atomizer master air valve	The air pressure sensor value is checked when turned ON/OFF.	
Atomizer atomization air valve	The nozzle pressure sensor value is checked when turned ON/OFF.	
Ignition coil	After removing the nozzle, the igniter end is checked for sparks.	
Atomizer Injector position	The nozzle pressure sensor value is checked when turned ON/OFF.	

Diagnostic simulation

Diagnostic simulation

EN80ZZZ02X100041

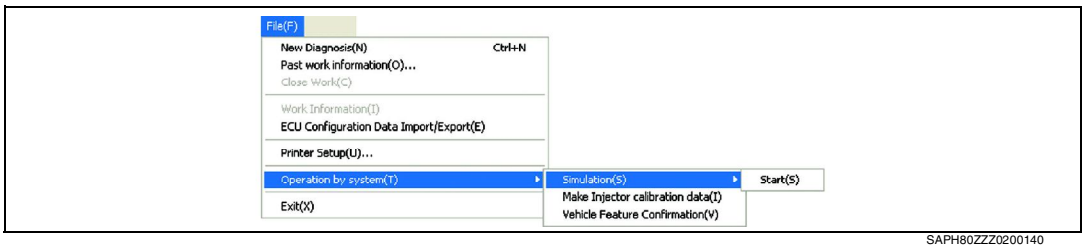
Although the HINO-DX is a tool which uses data communication with the ECU equipped to the actual vehicle, simulation function is also equipped so that you can learn the method of application without the actual vehicle.

Procedure - Simulation

EN80ZZZ02X100042

1. **Start the HINO-DX.**

2. **Select [File(F)]-[Operation by system(T)]-[Simulation(S)]-[Start(S)].**

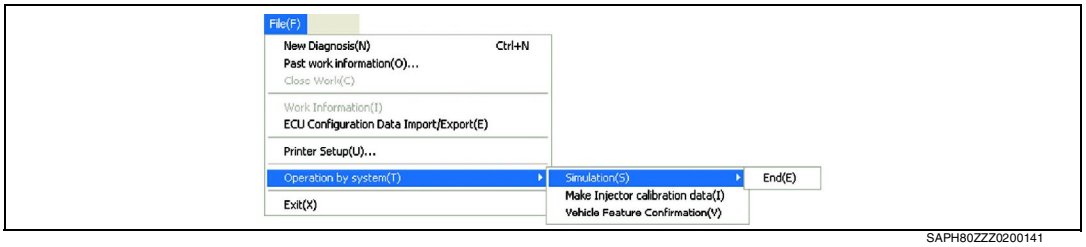


SAPH80ZZZ0200140

Fig. 2-143 Simulation Start

3. **Start malfunction diagnosis by reading the DTC code.**
   After that work simulation can be made according to the usual malfunction-diagnosis work.

4. **When you want to finish the simulation,**
   Select [File(F)]-[Operation by system(T)]-[Simulation(S)]-[End(E)].



SAPH80ZZZ0200141

Fig. 2-144 Simulation End

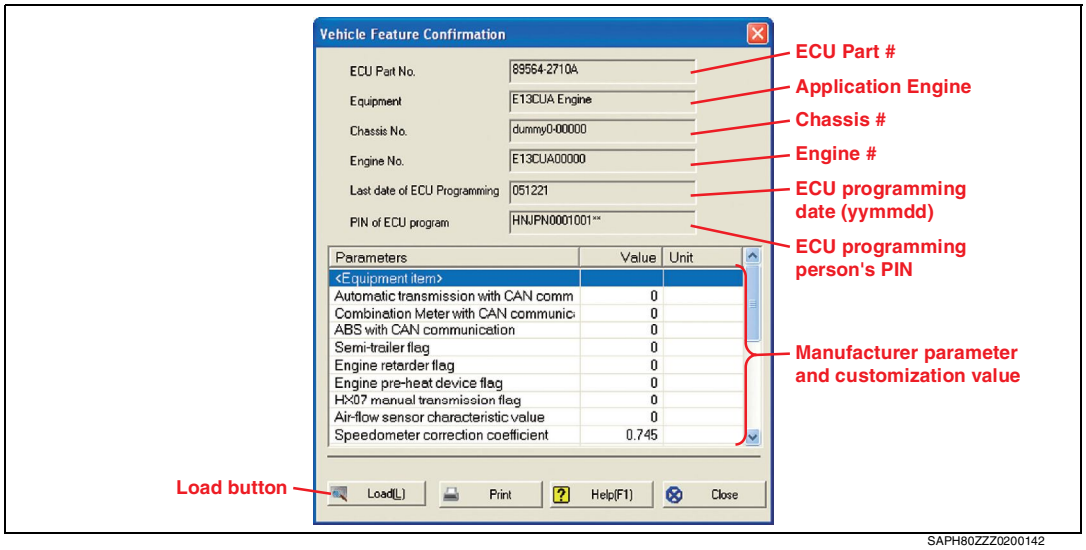
⚠ CAUTION
When doing malfunction-diagnosis work by simulation, the display of the injector calibration data input window may go wrong.
Displayed item and numerical value, etc. may differ from those when actually connected with the vehicle.

Vehicle Feature Confirmation

Vehicle Feature Confirmation

EN80ZZZ02X100043

You can check items of the "Manufacturer parameter" and "Customization" of the vehicle connected through communication I/F. Moreover, you can check when and who re-programmed the engine ECU.

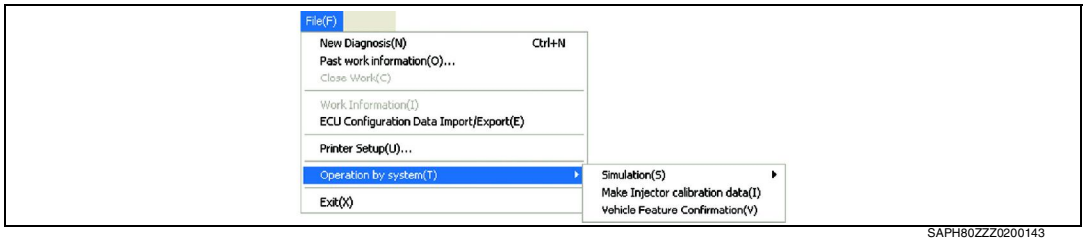


SAPH80ZZZ0200142

Fig. 2-145 Vehicle feature confirmation

1. **Start the HINO-DX.**

2. **Select [File(F)]-[Operation by system(T)]-[Vehicle Feature Confirmation(I)].**



SAPH80ZZZ0200143

Fig. 2-146 Vehicle Feature Confirmation

3. **Click the [Load] Button and read vehicle information from the engine ECU.**

⚠ **CAUTION**
A part of ECU programming person's PIN is hidden by an asterisk (*). This is an action for preventing improper use of the PIN.

HINO DX version information

HINO DX version information

EN80ZZZ02X100044

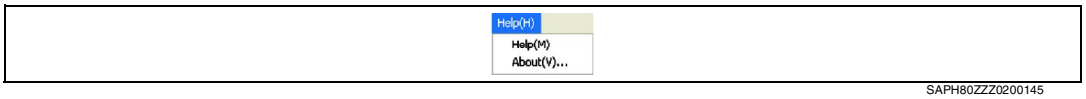
Check the version of the HINO-DX currently in use.
In the HINO-DX, upward compatibility is kept perfect and if the version is the latest the ECU used for diagnostic and the function which can be performed increases.
On the contrary, in a lower version of the HINO-DX of a version, since the ECU which cannot diagnose exists, you are recommended to always use the latest version of the HINO-DX.

SAPH80ZZZ0200144

Fig. 2-147 Version information

1. **Start the HINO-DX.**

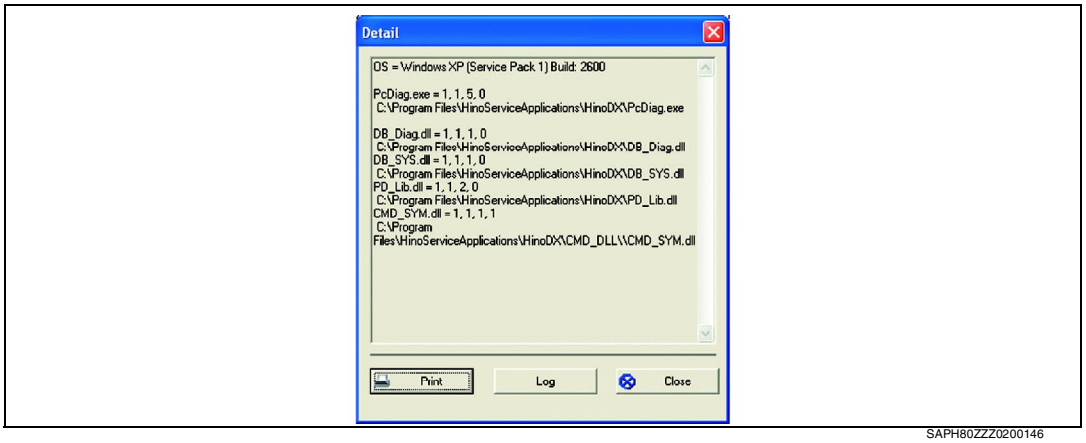
2. **Select [Help(H)]-[About(V)].**



SAPH80ZZZ0200145

Fig. 2-148 About HINO-DX

3. **HINO DX version information window displays and check Version information from there.**
   And by clicking the [Detail] Button, you can check the version information of important files which constitute the HINO-DX.



SAPH80ZZZ0200146

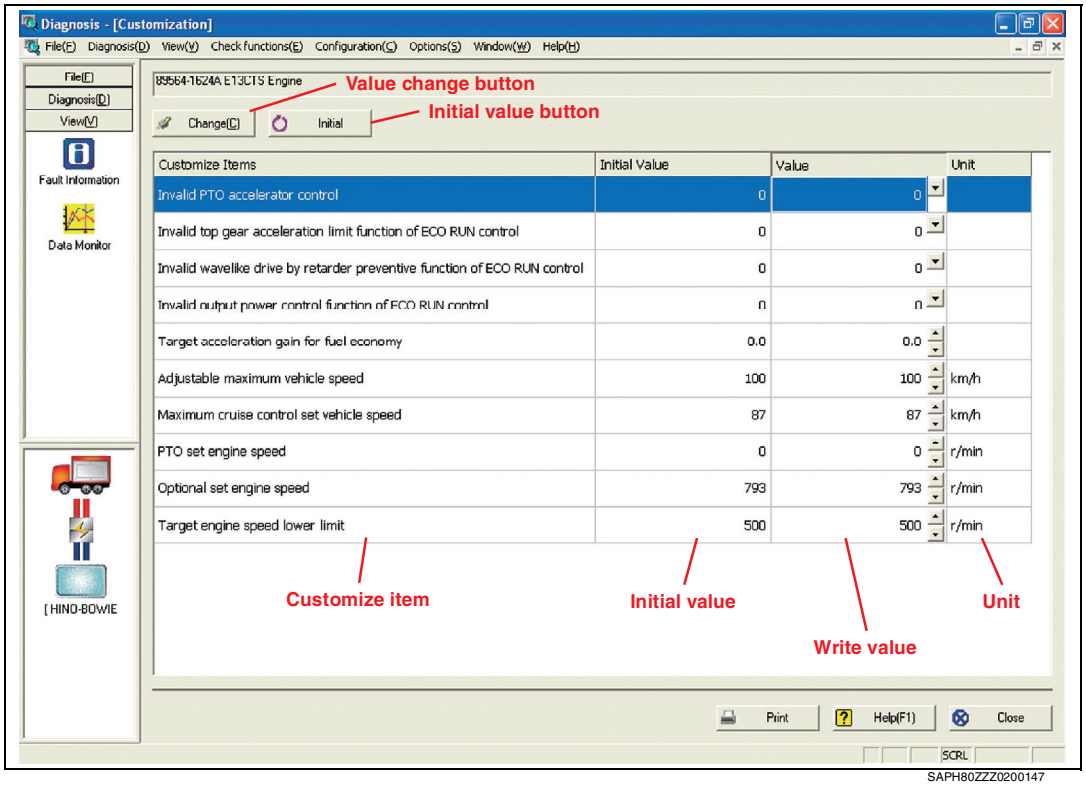
Fig. 2-149 Version information of important files

Customization

Customization

EN80ZZZ02X100045

Customization has the function to change a setup of a vehicles function according to the liking of the vehicles user.
It is possible to realize a predetermined function or to change a setup by changing a customized item value rather than changing the control software.



SAPH80ZZZ0200147

Fig. 2-150 Customization

What can be done in Customization

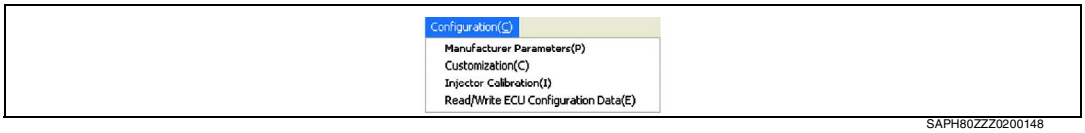
EN80ZZZ02X100046

In Customization by changing the data (=0) which is not set up at the time of the vehicles production, various kinds of setups can be performed like the number of rotations at the time of the PTO switch used in accordance with the specification of user's demand, setup of PTO accelerator, or idling, cruise control, and DPR.

Procedure - Customization

EN80ZZZ02X100047

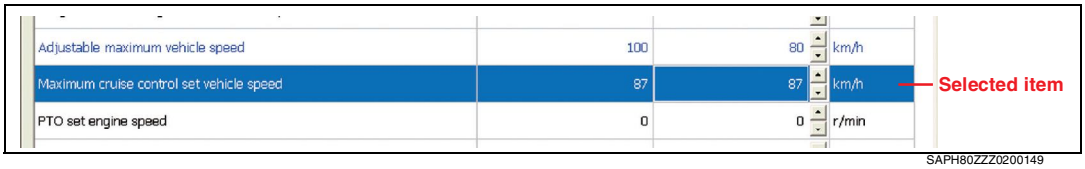
1. **Select "Customization" menu after system fix.**
   Menu:[Configurations]-[Customization]



SAPH80ZZZ0200148

Fig. 2-151 Menu - Customization

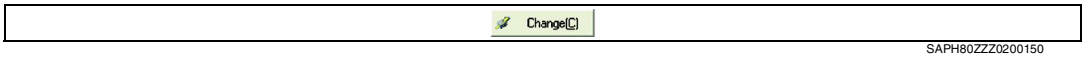
2. **Click and select the item which you actually want customized. Selected item will be highlighted. Selectable item will be limited to one.**



SAPH80ZZZ0200149

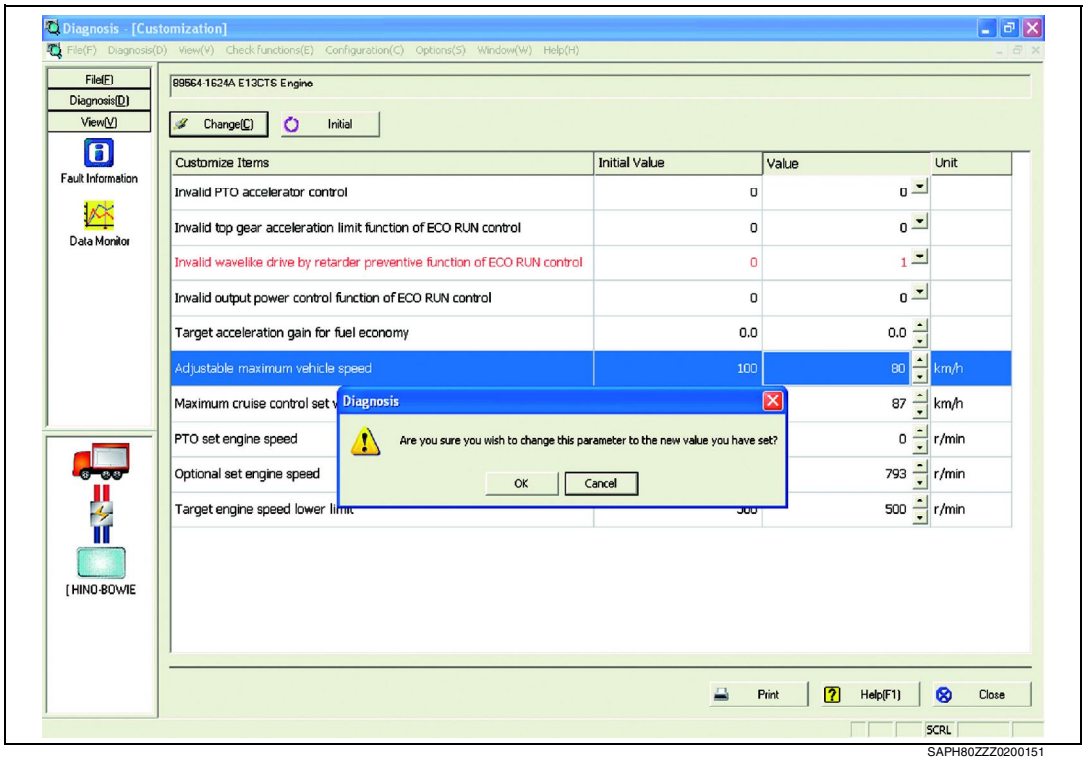
Fig. 2-152 Customization - Selected item

3. **Change "Value" and set it up according to "what kind of state do you want to make?" and click [Change] button. After clicking [Change] button, a message comes up asking you "Is it OK to change?" If it is really OK, click the [OK] button, if not click [Cancel] button.**



SAPH80ZZZ0200150

Fig. 2-153 Change button

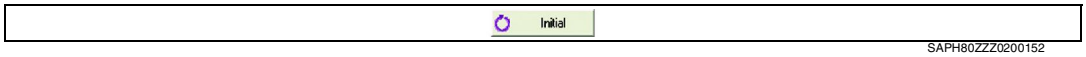


SAPH80ZZZ0200151

Fig. 2-154 Customization - Confirmation

⚠ CAUTION
When you perform set up, please carry out with out failure.
If a wrong setup is performed, dangers may arise in the vehicle's running and work ability.
When a setup is changed, it is necessary to send a work report {upload} to the service server.

4. After writing the changed value in the ECU, click the [Initial] button and you can return to the original value, if you want to do so.
The original value mentioned here is the value read from the ECU at the time of System Fix, and is not the information at the time of production.

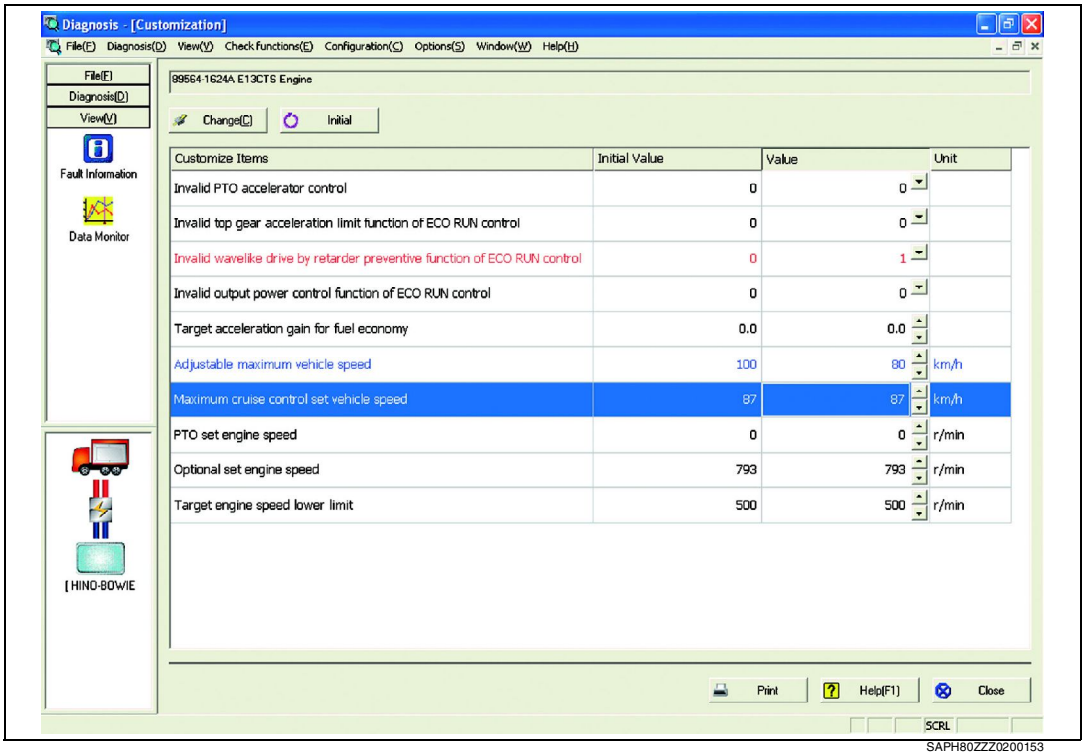


SAPH80ZZZ0200152

Fig. 2-155 Initialize button

HINT
In case of changing the Engine ECU value, you cannot change the value while the engine is running.
The number of displayable items and changeable items will be different according to the vehicle setup or equipment classification.
In Customization the character color changes according to the value write-in situation to ECU.

Black color character:items not yet written
Blue color character:items already written
Red color character:written value has been changed on display but not written to ECU



SAPH80ZZZ0200153

Fig. 2-156 Customization - letter color

Detail of customization items (Engine ECU)

EN80ZZZ02X100048

Item	Description	Setting
DPR manual regeneration failure flag → Catalytic Converter deterioration flag	The exhaust gas temperature sensor, located downstream of DPR, detects abnormally-high temperature.	
Invalid PTO accelerator control	Setup to validate PTO accelerator control only when the PTO switch is ON. Setting range: Valid/Invalid **Note:** – If the mounted equipment (mixer) is not equipped with the PTO switch, PTO accelerator control will be invalid. – If this customization item is set to valid, idle knob PTO control will not operate.	0: Invalid 1: Valid
Invalid manual idling at PTO flag	Setup which can invalidate operation of manual idle knob when PTO is in use. Setup range: Valid/Invalid	0: Invalid 1: Valid
Auto idling at PTO flag	Setup to validate auto idling which warms up water temperature even when PTO is in use. Setup range: Valid/Invalid	0: Invalid 1: Valid
Variable PTO idling flag	Setup which allows tip handling to make PTO speed variable by CRUISE S/W. Setup range: Valid/Invalid **Note:** • This function does not work when pre-set PTO customization is setup. • Applicable to the vehicle equipped with CRUISE S/W only. • This will not operate when PTO S/W is OFF.	0: Invalid 1: Valid
Idle shutdown flag	Permission of control for engine stop during idling has continued for the set time.	1: Idle shut-down is permitted. 0: Idle shut-down is disabled.

Item	Description	Setting
Preset PTO flag	Even without PTO accelerator PTO can be setup usable in high torque with turning ON of PTO S/W by validating this function. PTO rotation can be made variable temporarily in case of the vehicle with CRUISE S/W only. Setup range: Valid/Invalid **Note:** Use together with the following items • PTO accelerator parking brake switch flag • PTO accelerator brake pedal cancel flag • PTO accelerator clutch pedal cancel flag • Cancel PTO accelerator vehicle speed • PTO accelerator opening variation • With PTO do not customize idling rotation.	0: Invalid 1: Valid
PTO accelerator parking brake switch flag	Setup by which PTO accelerator can be used when PTO S/W is turned on while parking brake is working. Setup range: Valid/Invalid **Note:** • Variable PTO will not work unless parking brake S/W is ON regardless of this customization.	0: Invalid 1: Valid
PTO mode neutral flag	Exclusive use for Transfer PTO PTO accelerator (only available for vehicles with wheel parking brake) will be effective only when wheel parking brake S/W is ON even at other gear positions than neutral. Setup range: Valid/Invalid **Note:** • Never use this in case of variable PTO or Idle PTO • Applicable to the vehicles for North America (US07) only and do not use in case of the vehicles without Transfer PTO.	0: Invalid 1: Valid

Item	Description	Setting
PTO accelerator brake pedal flag	PTO accelerator will be effective only when turning ON PTO S/W while depressing the brake pedal. Setup range: Valid/Invalid **Note:** • Idle knob PTO will not operate. • If this customization is set up and its function becomes effective, PTO acceleration continues effective, unless the key switch is turned "OFF". (Even if the PTO switch is turned "OFF", PTO acceleration is still effective.)	0: Invalid 1: Valid
PTO accelerator brake pedal cancel flag	While driving the vehicle with a PTO accelerator, and if you press down the brake pedal, the PTO accelerator will be released. In order to restore after releasing the brake pedal, re-set it by turning PTO S/W OFF • ON. Setup range: Valid/Invalid **Note:** • This customization will not be reflected on the idle knob PTO.	0: Invalid 1: Valid
PTO accelerator clutch pedal flag	PTO accelerator becomes effective only when you turn PTO S/W ON while pressing the clutch pedal down. Setup range: Valid/Invalid **Note:** • Applicable to vehicles with manual T/M only • Idle knob PTO stops operating.	0: Invalid 1: Valid

Item	Description	Setting
PTO accelerator clutch pedal cancel flag	If you press down the clutch pedal while running with the PTO accelerator, it will be released. Restoration after releasing the clutch pedal , re-set turning PTO S/W from OFF • ON. Setup range: Valid/Invalid **Note:** • Applicable to vehicles with Manual T/M • This customization is not applicable to Idle Knob PTO.	0: Invalid 1: Valid
PTO accelerator opening variation → Preset PTO engine speed variation	Setup the speed of PTO accelerator opening Setup range: 0.5 or more **Note:** • Gradual change does not work if there is no PTO switch. • Gradual change does not work with Idle knob PTO. • Make sure to setup this customization, when you setup preset PTO and register PTO.	0: No setup
Preset PTO engine speed variation	Setup which enables engine idle speed variable with CRUISE S/W while pre-set PTO is working in case of the vehicle equipped with CRUISE S/W. Setup range: 50 r/min - 100 r/min	Every 50 r/min

Item	Description	Setting
Variable idling speed variation	Function which makes idling speed variable with CRUISE S/W and by one tip operation (by pressing quickly the S/W either upward or downward) engine speed can be changed. Setup range: 50 r/min - 1000 r/min **Note:** This customization is not applicable under the following conditions. • Cruise main S/W is OFF • T/M gear is positioned other than neutral • While manually idling • Vehicle is moving • Brake pedal is pressed down • Clutch pedal is pressed down (vehicles with MT) • Combination S/W of auxiliary brake is pulled. (only for vehicles for North America) • Initial value (engine speed) is raised by 50 r/min when CRUISE S/W is pushed down once.	Every 50 r/min
PTO idling speed variation	Setup which gradually increases engine speed without sudden blow up, when PTO S/W is ON. Setup range: (Fast) 0.5 - 100 (Slow)	Every 50 r/min
Variable PTO idling speed variation	Function which varies PTO rotation speed by CRUISE S/W and setup which can vary PTO rotation speed by one-time tip up and down of CRUISE CONTROL RESUME S/W (Heavy duty) and CRUISE CONTROL SET BUTTON (Medium duty) Setup range: 50 - 100 **Note:** Do not set up this for body building with high load.	Every 50 r/min

Item	Description	Setting
PTO accelerator vehicle speed	The function which does not allow usage of PTO unless the vehicle speed goes down under the specified speed. * Select 1 for operation setup when vehicle stops. Setup range: 1-100 (km/h) **Note:** Do not set up this when you use idle knob PTO or Variable PTO	Initial displayed "0" is "20"
Cancel PTO accelerator vehicle speed	The function which releases PTO when the vehicle speed exceeds the specified speed. Setup range: 1-100 (km/h) **Note:** • Do not set up this when you use idle knob PTO or Variable PTO. • Set higher speed than PTO accelerator effective vehicle speed.	Initial displayed "0" is "30"
Target engine speed lower limit	Setup of automatic idling speed Setup range: Automatic idling speed-manual idling speed upper limit Automatic idling speed North America 750 **Note:** If you setup exceeding upper/lower limit, it will be returned to automatic idling speed.	Automatic idling speed
Fuel consumption correction coefficient → Cancel PTO accelerator vehicle speed	Setup to enable adjustment of the calculated fuel consumption if the calculated fuel consumption stored as drive history data deviates from the actual fuel consumption. If the actual fuel consumption is 10% larger than the calculated value, the calculation can be corrected by entering 1.1.	Setting range: Increment of 0.1 0.7: Decrease by 13% 0.8: Decrease by 12% 0.9: Decrease by 10% 1.0: No correction (default value) 1.1: Increase by 10% 1.2: Increase by 12% 1.3: Increase by 13%
Variable idling speed set maximum engine speed → PTO idling speed set maximum engine speed	Setup which can set the maximum speed of idling by CRUISE S/W when PTO is in use. Setup range: Idling - Maximum vehicle speed with no load **Note:** Do not set up this for body building with high load.	No setup

Item	Description	Setting
Preset PTO set engine speed #1	Setup engine speed when PTO accelerator voltage is between 0V and 1V, in case of register PTO.	Automatic idle speed
PTO accelerator maximum engine speed	This is the setup by which maximum PTO operation rotation can be regulated. Setup range: Idling speed-Max. engine speed Max. engine speed **Note:** The setup rotation by this customization may differ from the actual rotation.	Maximum engine speed
PTO accelerator engine speed	Setup which operates PTO only when the engine speed is lower than pre-set speed. Setup range: Idling-Maximum engine speed **Note:** Do not set up this when you use idle knob PTO or Variable PTO.	No setup of engine speed
Cancel PTO accelerator engine speed	Setup which releases PTO when engine speed exceeds pre-set speed. Setup range: Idling-Maximum rotation speed **Note:** • Do not set up this when you use idle knob PTO or Variable PTO. • Set higher engine speed than pre-set speed.	No setup of engine speed
Rent a car flag	Setup which enables DPR manual regeneration at your own discretion regardless of the accumulated volume of soot. Setup range: Valid/Invalid	0: Invalid 1: Valid
DPR white smoke prevention mode (at PTO SW on idling) deactivate flag	Setup whether to prohibit DPR control during long idling when the PTO switch is ON. This is used to prevent fluctuations in idle speed during long idling with PTO control.	
DPR active regeneration (at PTO idling) activate flag	Setup to enable DPR active regeneration even if the PTO switch is ON while the engine idles with no accelerator input.	

Item	Description	Setting
DPR manual regeneration (at PTO idling) enable flag	Setup to enable DPR manual regeneration even if the PTO switch is ON.	
DPR active idling regeneration (at PTO idling) enable flag → PTO Auto switch regeneration admission flag	Setup to enable DPR active idling regeneration even if the PTO switch is ON.	
DPR active regeneration (at PTO operation) activate flag	Setup to enable DPR active regeneration during operation by the accelerator with the PTO switch ON.	
DPR active regeneration start at vehicle stop enable flag → Auto regeneration admission start flag	Setup to enable DPR active regeneration to start even while the vehicle is stopped.	
Active regeneration time limit deactivate flag	Setup to eliminate time limits for DPR automatic regeneration control while the vehicle is stopped.	
Auto switch regeneration admission flag	Setup to turn the DPR manual regeneration switch ON automatically to enable regeneration after the vehicle stops and the engine idles for a while when the DPR lamp blinks continuously.	
Invalid idle shutdown parking brake switch flag	Idle shutdown operates regardless of the parking condition. "1": Idle shutdown operates regardless of parking condition. "0": Idle shutdown operates when the parking brake lever is pulled. Setup range: Valid/Invalid **Note:** • Initial value is "0". • Idle shutdown operates when PTO switch is open circuit or PTO accelerator sensor is disconnected.	0: Invalid 1: Valid

Item	Description	Setting
Invalid idle shutdown PTO flag	Idle shutdown operates regardless of the parking condition. "1": Idle shutdown operates regardless of parking condition. "0": Idle shutdown operates when the parking brake lever is pulled. Setup range: Valid/Invalid **Note:** • Initial value is "0". • If the parking switch is out of order, "idle shutdown" will operate regardless of this customization. • You can choose to customize this only for the vehicle with parking brake circuit.	0: Invalid 1: Valid
Idle shutdown manual idling flag	Setup by which Idle shutdown is released while PTO is operating. "1"; Idle shutdown will is cancelled when PTO is in working. "0"; Idle shutdown operates regardless of PTO condition. Setup range: Valid/Invalid **Note:** • Initial value is "0". • Idle shutdown operates when PTO switch is open circuit or PTO accelerator sensor is disconnected.	0: Invalid 1: Valid

Item	Description	Setting
Invalid idle shutdown driver operation override flag	Setup to operate Idle shutdown even when driver operation is being made. (operation of clutch, brake and acceleration) "1"; Idle shutdown operates regardless of the brake pedal operation, the clutch pedal operation and the acceleration pedal operation. "0"; Idle shutdown is cancelled when the brake pedal, the clutch pedal or the accelera-tion pedal is operated. Setup range: Valid/Invalid **Note:** • Initial value is "0". • Idle shutdown operates regardless of this custom-ization, if the clutch switch or the brake switch is out of order • Idle shutdown operates if the clutch pedal or the brake pedal remain depressed	0: Invalid 1: Valid
Idle shutdown time setting	The idling continuation time to carry out "Idle shutdown" can be set up. Setup range: 0 - 255 (Minutes) **Note:** • Initial value is 5 minutes. • If you set up by "0", when the conditions of the idle shutdown operation are met, the engine stops immediately. • Idle shutdown does not stop working during DPR regeneration as time for regeneration will be excluded from idling time.	Initial displayed "0" is "5"
Idle shutdown water temperature setting	Setup the water temperature to carry out Idle shutdown. Setup range: Valid/Invalid **Note:** -40 - 215 (°C) • Initial value is 50 °C or below which cancel idle shutdown. • Idle shutdown does not operate when water tem-perature sensor is out of order.	0: Invalid 1: Valid

Item	Description	Setting
Idle shutdown Intake air temperature setting	Setup the intake air temperature to carry out Idle shutdown. Idle shutdown does not operate below the temperature hereby setup. Setup range: Valid/Invalid **Note:** -40 - 215 (°C) • Initial value is less than -30 °C, which cancels "Idle shutdown". • Idle shutdown does not operate, if the suction air temperature sensor is out of order.	0: Invalid 1: Valid
Optional set engine speed	Setup of engine speed of optional idle up when you use at neutral T/M gear position air-conditioner for buses and refrigeration compressor for trucks. Setup range: Automatic idling speed-Manual idling speed upper limit **Note:** • If you setup exceeding upper/lower limit, it will be returned to automatic idling speed. • In order to operate this customization, wiring is required to engine ECU.	Automatic idling speed
PTO idling speed set maximum engine speed	Setup which can set the maximum speed of idling by CRUISE S/W when PTO is in use. Setup range: Idling - Maximum vehicle speed with no load **Note:** Do not set up this for body building with high load.	

Detail of customization items (Vehicle control ECU)

EN80ZZZ02X100049

(According to this customization, vehicle will run at the fixed preset speed without pressing down the accelerator pedal once vehicle speed is setup under the cruise control.)

Item	Description	Setting
FS limiter synchronize with ECO-run switch flag	Enabled: The variable speed limiter is uncontrollable when the ECO-run switch is OFF. Disabled: The variable speed limiter is controllable regardless of the ECO-run switch ON/OFF.	Enabled/Disabled
FS speed limiter off flag	Enabled: The FS speed limiter is activated. Disabled: The FS speed limiter is not activated.	Enabled/Disabled
Limiter speed display on multi-information enable	When vehicle speed reached pre-set speed of speed limiter, vehicle speed will be display for 5 second on the multi-information display. Display: Setup speed limiter speed is displayed for 5 seconds on the multi-information display after taking the foll	0: No display 1: Display
Variable idling flag	Idling variable revolution can be cancelled by cruise switch. Setup range: Valid/Invalid **Note:** • Initial valve is "0". • If you set to "1".you cannot make idle rotation variable by cruise control SW or Resume SW.	0: Invalid 1: Valid
Cruise control off flag	Setup which can invalidate operation of cruise control. Setup range: Valid/Invalid **Note:** Pressing the cruise main turn the cruise main lamp, but can not set cruse control.	0: Invalid 1: Valid
Optional set engine speed	Idle up speed with the air conditioner is on is specified.	450 to 980 r/min
Vehicle CAN forced output switch	ON: The engine transmission ID is forcedly output to the vehicle. OFF: Transmission to the vehicle CAN is stopped. • No display is required due to a maker requirement.	ON/OFF
Data logger synchronize with Key OFF flag	• Data of each driving is obtained by synchronizing the daily log data of the data logger function and the key-OFF. • By ON, key-OFF becomes synchronized and by OFF, daily data is saved. • Saving format can be changed by changing the setup.	ON/OFF
Drive master vehicle speed alarm enable	Enabled: Drive master vehicle speed alarm is allowed. However, vehicle speed alarm judgment is not performed if the stay time for vehicle speed alarm is 0. Disabled: Vehicle speed alarm judgment is not performed.	Enabled/Disabled
Drive master accelerator alarm enable	Enabled: Drive master accelerator alarm is allowed. Disabled: Accelerator alarm judgment is not performed.	Enabled/Disabled
Drive master idle alarm enable	Enabled: Drive master idle alarm is allowed. Disabled: Idle alarm judgment is not performed but the alarm count is updated.	Enabled/Disabled

Item	Description	Setting
Exhaust brake with retarder enable	ON: The engine retarder and exhaust brake are activated concurrently. OFF: Not activated concurrently. * It is used when the auxiliary brake is activated close to the idle speed.	ON/OFF
Trouble forecast:CAN data memory with moment enable flag	Enabled: CAN data is memorized for 10 seconds before and after the cruise cancel switch is pressed and held (more than 2 seconds) (a buzzer sounds when the long pressing is recognized).Disabled: The function is disabled.	Enabled/Disabled
Prohibition setting for adjust idle knob during driving with manual transmission	Allowed: Idle knob operation during driving is enabled in a manual transmission vehicle. Prohibited: Idle knob operation during driving is disabled. ● It is dangerous because the vehicle can be driven even when the accelerator is OFF.	Allowed/Prohibited
Invalid output power control function of ECO RUN control	Enabled: Power limiting control is enabled. * Fuel injection quantity is limited to avoid unnecessary acceleration in low gears. Disabled: Power limiting control is disabled.	Enabled/Disabled
ECO-run control main switch all times ON flag	Enabled: ECO-run control is maintained even when the ECO-run switch is OFF. Disabled: ECO-run control is unavailable unless the ECO-run switch is ON.	Enabled/Disabled
Aux. brake synchronized with cruise control enable	ON: When the vehicle exceeds the cruise speed on a slope, it is automatically decelerated by the auxiliary brake. OFF: The cruise-synchronized auxiliary brake is disabled.	ON/OFF
Aux. brake synchronized with speed limiter enable	ON: When the vehicle exceeds the speed limiter speed on a slope, it is automatically decelerated by the auxiliary brake. OFF: The speed limiter-synchronized auxiliary brake is disabled.	ON/OFF
Aux. brake synchronized with cruise control enable by ECO-run switch	Enabled: The cruise-synchronized auxiliary brake is turned ON and OFF in the ECO-run status. ECO-run SW is ON => Synchronized operation prohibited ECO-run SW is OFF => Synchronized operation allowed Disabled: Requirement for the cruise-synchronized auxiliary braking	Enabled/Disabled
Aux. brake synchronized with speed limiter enable by ECO-run switch	Enabled: The limiter-synchronized auxiliary brake is turned ON and OFF in the ECO-run status. ECO-run SW is ON => Synchronized operation prohibited ECO-run SW is OFF => Synchronized operation allowed Disabled: The speed limiter-synchronized auxiliary brake is disabled.	Enabled/Disabled
Variable idling speed variation	Engine speed variation in an operation of the cruise switch idle knob is changed.	
Brake blending flag	0: Combination of default auxiliary brakes is specified. 1 to 3: Auxiliary brakes are specified by customized blend. 1: The transmission retarder is used first. 2: Only the engine retarder is used. 3: Only the transmission retarder is used. 4: The engine retarder Weak is forcedly activated by the BB. 5: The engine retarder Strong is forcedly activated by the BB.	
Trouble forecast: Boost pressure event threshold	When the boost pressure exceeds the specified threshold, data 10 seconds before and after that is memorized.	

Item	Description	Setting
Trouble forecast: Intake throttle position upper limit	When the intake throttle position upper limit is exceeded and then its lower limit is exceeded, the accumulated number of times is memorized.	
Trouble forecast: Intake throttle position lower limit	When the intake throttle position upper limit is exceeded and then its lower limit is exceeded, the accumulated number of times is memorized.	
Trouble forecast: Engine speed event threshold	When the engine speed exceeds the specified threshold, data 10 seconds before and after that is memorized.	
Trouble forecast: Turbo rev. event threshold (x1000) Trouble forecast: Turbo rev. event threshold(x1000)	When the turbo revolution exceeds the specified threshold, data 10 seconds before and after that is memorized.	
Trouble forecast: Turbo rev. accumulation time upper limit1(x1000)	Accumulation time during when the turbo revolution is between a specified upper and lower limits is memorized. (Range 1)	
Trouble forecast: Turbo rev. accumulation time lower limit1(x1000)	Accumulation time during when the turbo revolution is between a specified upper and lower limits is memorized. (Range 1)	
Trouble forecast: Turbo rev. accumulation time upper limit2(x1000)	Accumulation time during when the turbo revolution is between a specified upper and lower limits is memorized. (Range 2)	
Trouble forecast: Turbo rev. accumulation time lower limit2(x1000)	Accumulation time during when the turbo revolution is between a specified upper and lower limits is memorized. (Range 2)	
Trouble forecast: Turbo rev. accumulation time upper limit3(x1000)	Accumulation time during when the turbo revolution is between a specified upper and lower limits is memorized. (Range 3)	
Trouble forecast: Turbo rev. accumulation time lower limit3(x1000)	Accumulation time during when the turbo revolution is between a specified upper and lower limits is memorized. (Range 3)	
Trouble forecast: accumulation Turbo rev. upper limit(x1000)	When the specified lower revolution limit is exceeded and then its upper limit is exceeded, the accumulated number of times is memorized.	
Trouble forecast: accumulation Turbo rev. lower limit(x1000)	When the specified lower revolution limit is exceeded and then its upper limit is exceeded, the accumulated number of times is memorized.	
Trouble forecast: Coolant Temp. event threshold	When the coolant temperature exceeds the specified threshold, data 10 seconds before and after that is memorized.	
Trouble forecast: Fuel Temp. event threshold	When the fuel temperature exceeds the specified threshold, data 10 seconds before and after that is memorized.	
Trouble forecast: Common rail press. Event threshold	When the rail pressure exceeds the specified threshold, data 10 seconds before and after that is memorized.	
Trouble forecast: Fuel Temp. high threshold	When the fuel temperature exceeds the specified threshold, the accumulation time is memorized.	
Initialization CAN receiving device	When the vehicle is modified by removing any controller such as when the transmission is changed from Pro-shift or AT to manual, the communication setup is initialized.	

Item	Description	Setting
Watch sub battery	It is specified whether the sub battery is watched. Setup change is prohibited.	
Switch PKBcondition auto stop	It is specified whether the parking condition is available in the auto stop condition. Setup change is prohibited.	
Selection starting condition	It is specified whether the parking condition is available in and switched to/from the auto start condition. Setup change is prohibited.	

Detail of customization items (meter)

EN80ZZZ02X100050

(The following customization will operate under the speed limiter function electronically controlling the vehicle running condition and speed.)

Item	Description	Unit
Engine Oil Change(SET)	The interval of engine oil change is specified.	km
T/M Oil Change(SET)	The interval of T/M oil change is specified.	km
Diff oil Change(SET)	The interval of diff oil change is specified.	km
Coolant Change(SET)	The interval of coolant change is specified.	km
Fuel filter Change(SET)	The interval of fuel filter change is specified.	km
Belt Check(SET)	The interval of fan belt check is specified.	km
DPR Maintenance(SET)	The interval of DPR cleaning is specified.	km
Turbo Check(SET)	The interval of turbocharger check is specified.	km
Starter Overhaul(SET)	The interval of starter overhaul is specified.	km
Alternator Overhaul(SET)	The interval of alternator overhaul is specified.	km
Radiator Check(SET)	The interval of radiator check is specified.	km
Battery Check(SET)	The interval of battery check is specified.	km
Air dryer Change(SET)	The interval of air dryer change is specified.	km
Engine Oil Change(SET)	The interval of engine oil change is specified.	Month
T/M Oil Change(SET)	The interval of T/M oil change is specified.	Month
Diff oil Change(SET)	The interval of diff oil change is specified.	Month
Coolant Change(SET)	The interval of coolant change is specified.	Month
Fuel filter Change(SET)	The interval of fuel filter change is specified.	Month
Belt Check(SET)	The interval of fan belt check is specified.	Month
DPR Maintenance(SET)	The interval of DPR cleaning is specified.	Month
Turbo Check(SET)	The interval of turbocharger check is specified.	Month
Starter Overhaul(SET)	The interval of starter overhaul is specified.	Month
Alternator Overhaul(SET)	The interval of alternator overhaul is specified.	Month
Radiator Check(SET)	The interval of radiator check is specified.	Month
Battery Check(SET)	The interval of battery check is specified.	Month
Air dryer Change(SET)	The interval of air dryer change is specified.	Month

Data Monitor

Data Monitor

EN80ZZZ02X100051

Data Monitor has a function to show input-output signal value of the sensor/actuator/lamp to and from ECU in the form of a numerical value or graph. Signals are not acquired from these parts but are shown by reading the data which the ECU recognizes.

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Fig. 2-157 Data Monitor

What can be done in Data Monitor

EN80ZZZ02X100052

All input-output signals of ECU can be monitored by using Data Monitor. Thanks to this, you can check the signals of malfunction without DTC and investigate which portion has malfunction. Saving of data monitored is also possible. Therefore, you can save specific sensor signal of the running vehicle and make an analysis of it later. If you save data of Engine speed, Vehicle speed and Injection quantity for example, you can calculate approximate fuel consumption of the vehicle and driving instruction can be performed by saving Accelerator position, etc. together.

Calculation Sample

- Momentary fuel consumption (N cylinder Engine and per S millisecond)
  [Engine Speed(r/min)] x [Injection quantity (mm3/stroke)] x N x S/120000000000 (Litter)

HINT

The number of signals you can monitor at one time by the Hino DX monitor should be 1-32 items and keep in mind that you cannot choose 33 items or more of the data.

Procedure - Data Monitor

EN80ZZZ02X100053

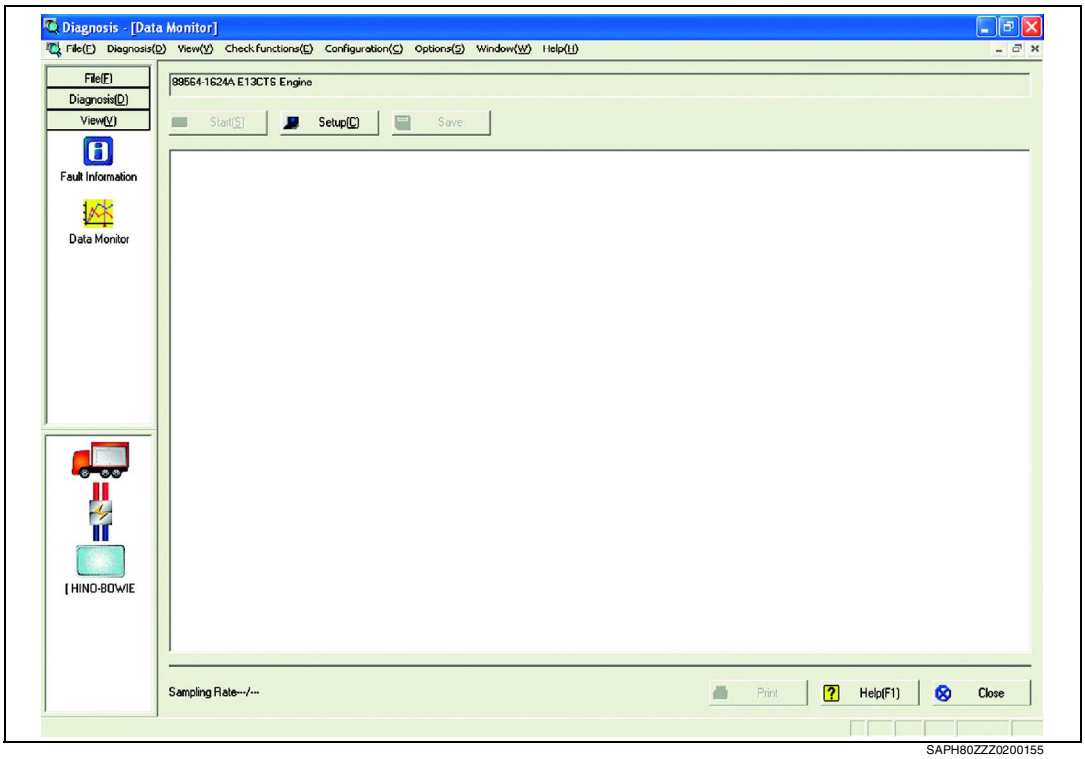

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Fig. 2-158 Initial window of Data Monitor

Monitor set up

EN80ZZZ02X100054

Before starting Data Monitor, it is necessary to 1) select monitor item 2) set up optional item and 3) setup trigger item.

Step1 Select "Data Monitor" menu after system fix is made.
Menu:[View]-[Data Monitor]

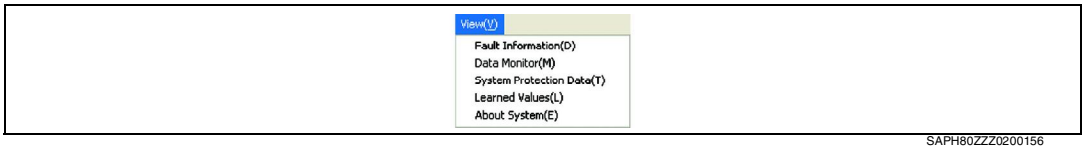

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Fig. 2-159 Menu- Data Monitor

Shortcut Bar:[View]-[Data Monitor]

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Fig. 2-160 shortcut Bar - Data Monitor

Step2 Click "[Setup]" Button and display Monitor setup screen.

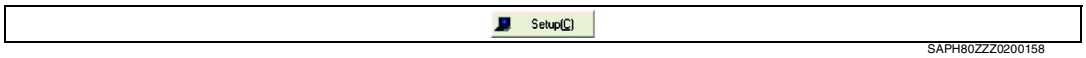

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Fig. 2-161 Setup

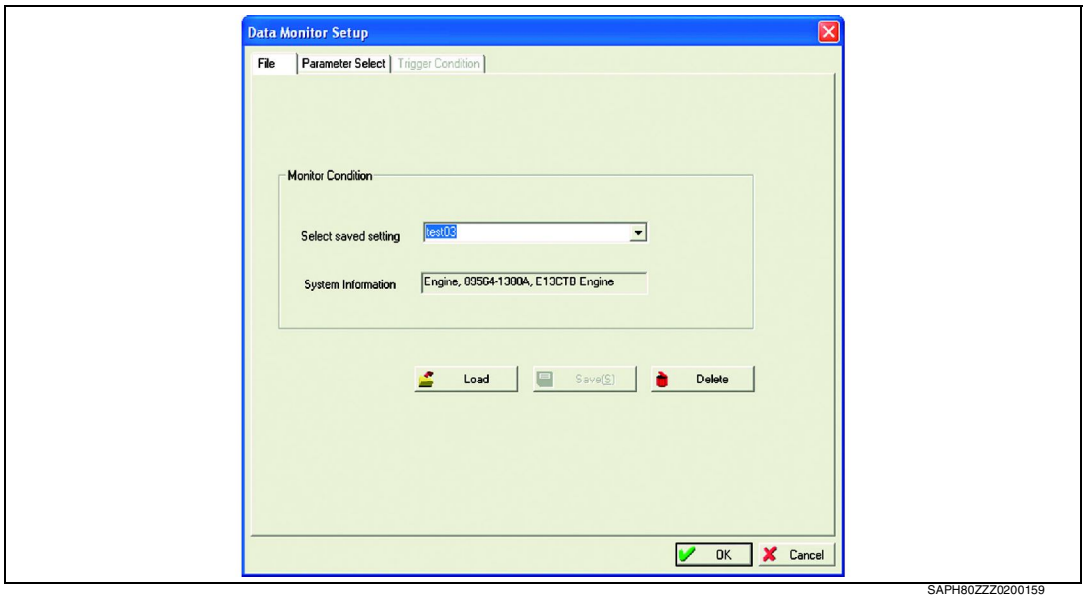

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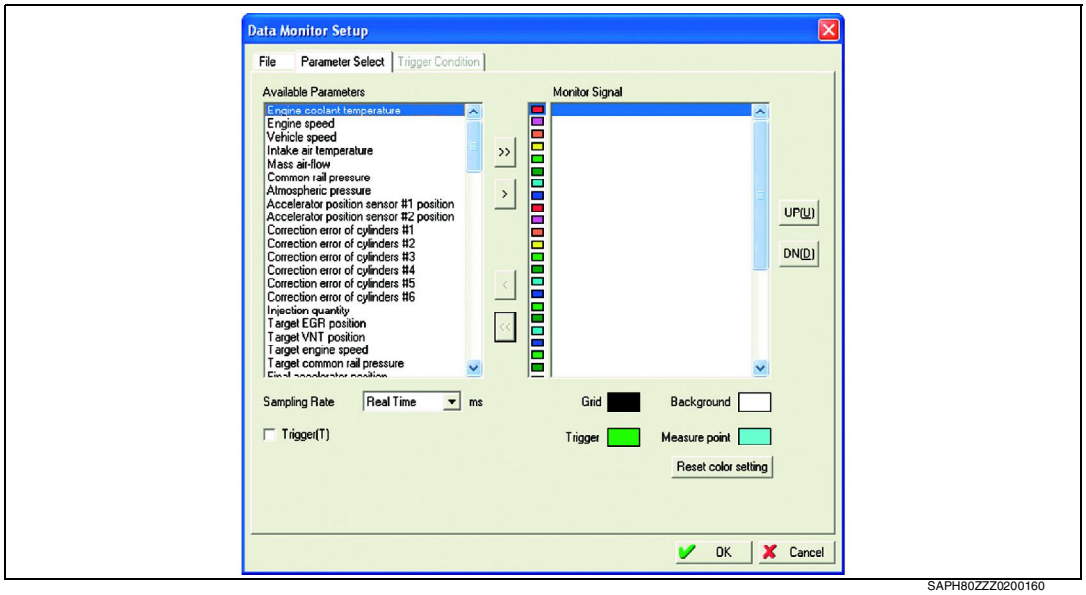
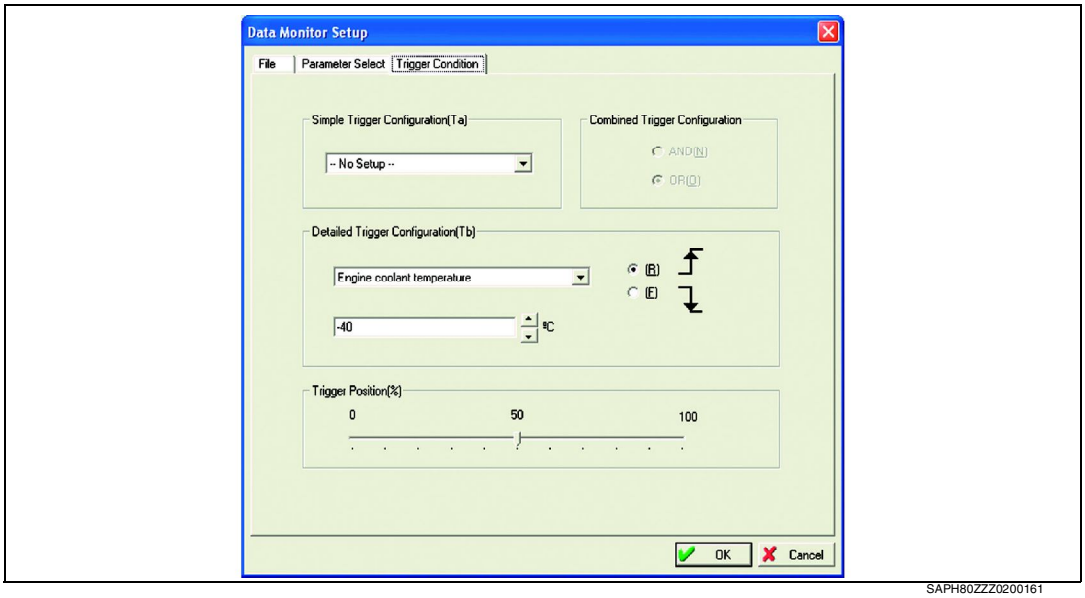
Fig. 2-162 Data Monitor Setup - File



SAPH80ZZZ0200160

Fig. 2-163 Data Monitor Setup - Parameter select



SAPH80ZZZ0200161

Fig. 2-164 Data Monitor Setup - Trigger Condition

- When the setup file is saved
  When Data Monitor is performed in Hino DX, selected items and setup can be saved there. By saving the setup often used, you do not have to make a complicated selection and setup again, when you want to carry out the same measurement.

Step3 Click "File" Tab (Fig. 2-165 Tab - File) and display the screen displays "Select saved file".

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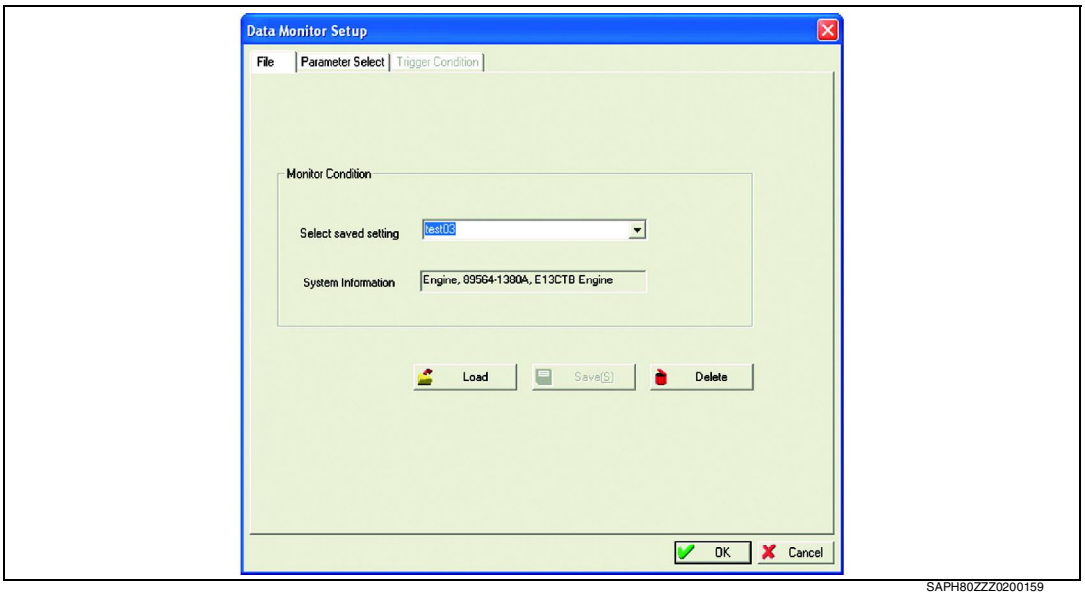
Fig. 2-165 Tab - File

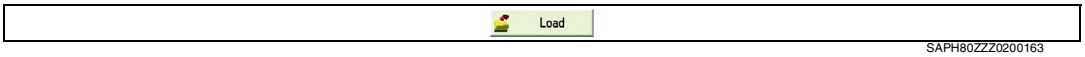
Step4 From the column of "Select Saved Setting", choose saved setup file. Content of information saved in the selected file will be shown at System Information column. (System, ECU part number, application).



SAPH80ZZZ0200159

Fig. 2-166 Select saved file

Step5 By clicking "[Load]" Button, you can read Monitor item and setup of optional item from the file.



SAPH80ZZZ0200163

Fig. 2-167 Load the setting

⚠ **CAUTION**
A warning will display when the part number of the target ECU after system fix differs from the ECU when the setup file is saved. Even in such a case, most setup files can be diverted. However, if the System is different, exact Data Monitor cannot be performed.
Choose data monitor item (parameter) again in that case.

Step6 You can finish data monitor setting by clicking "[OK]" Button.

- Delete the data monitor setting file
  Follow the procedure as below when you eliminate the setup file no longer in use or setup file accidentally saved.

1. Carry out until "Step 4" of previously discussed "When the setup file is saved".
2. Eliminate the file by clicking "[Delete]" Button.

SAPH80ZZZ0200164

Fig. 2-168 Delete the setting

- When you choose the item to perform Data Monitor by yourself
  When performing Data Monitor, it is necessary for you to select monitor item, to setup color of the diagram chart and the diagram chart axis and data sampling time (Sampling Rate), etc.
  Except for selection of monitor item, it becomes an optional item and it will not be problem if you use it in the initial status (default status)

Step3 Click "Parameter Setting" Tab (Fig. 2-169), and display "Tab-Parameter setting" screen.

Step4 Set up Data Monitor item and optional item.

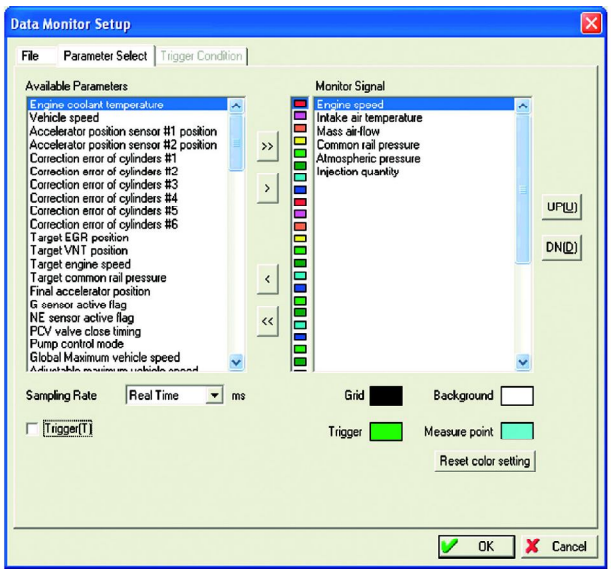
Step5 Finish Data Monitor setup by clicking "[OK]" Button.

SAPH80ZZZ0200165

Fig. 2-169 Tab - Parameter setting

Data Monitor Setup

EN80ZZZ02X100055



SAPH80ZZZ0200166

Fig. 2-170 Data Monitor setup screen

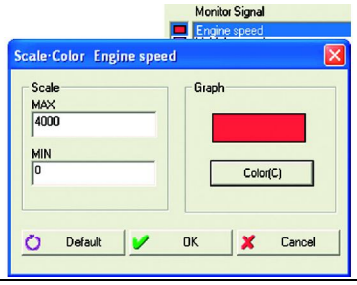
Available Parameters:	Selectable data monitor items are shown.
Monitor Signal:	They are selected data monitor items. You can select up to a maximum of 32 items. Items according to the order listed here will be shown on the Data monitor screen.
Sampling Rate:	The target cycle (millisecond) to acquire data is specified. Bear in mind, the more signals to monitor, the more the data acquiring cycle becomes longer generally speaking.

⚠ CAUTION
Even if you specify the short data acquiring cycle, you may not able to acquire the data with a specified cycle according to the performance of the ECU, I/F and PC. Remember 200 milliseconds per 1 item as a rough standard.

HINT
Selectable Sampling Rate (msec) is as follows:
Real Time,100, 200,300, 400,500,600,700,800,900, 1000, 2000, 2500, 3000,3500, 4000

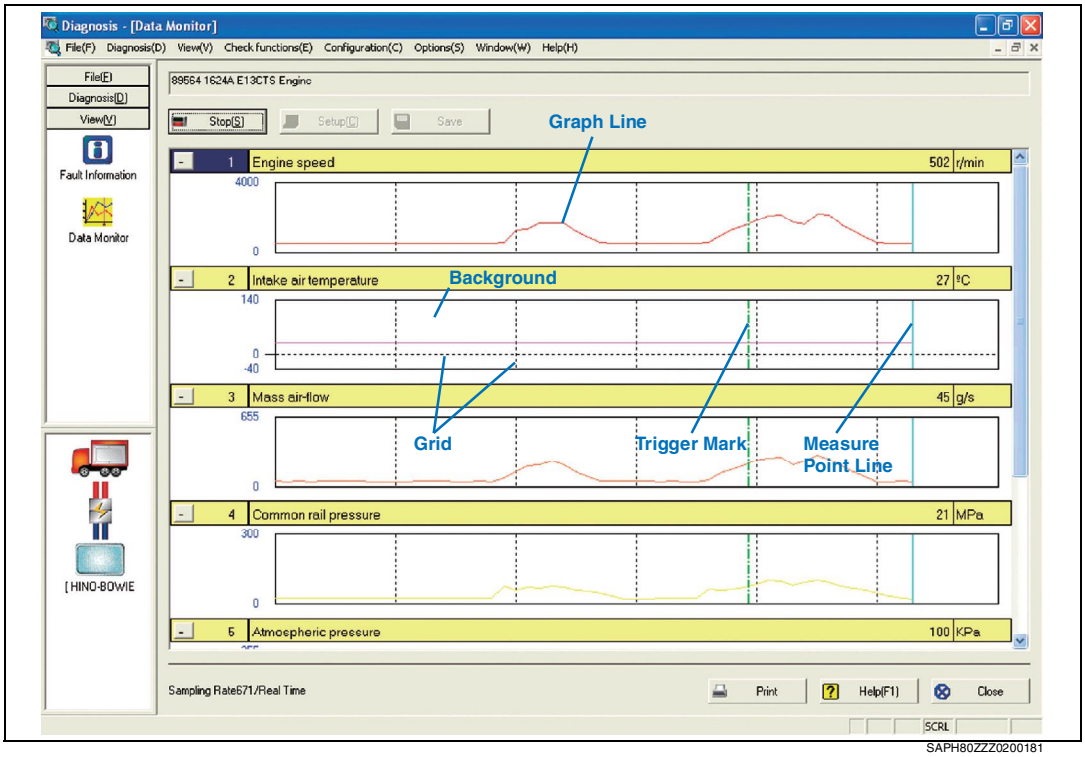
>>	All items of Available Parameters column are setup as monitor items. If Parameters exceeding 32 are displayed, 32 items from the bottom selected by Available Parameter column are setup.
>	Items selected by Available Parameters column shall be setup as monitor items.

<	Items selected as Monitor Signal column are released from monitor items and returned to Available Parameters column.
<<	All items of Monitor Signal column are released from monitor items and returned to ,Available Parameters column.
UP(U)	The items selected by Monitor Signal column are moved upwards.
DN(D)	The items selected by Monitor Signal column are moved downwards.
Grid	The grid color of graphical representation screen (Fig. 2-172 Data Monitor - Coloring) is changed. Standard color is black.
Background	The background color of graphical representation screen (Fig. 2-172 Data Monitor - Coloring) is changed. Standard color is white.
Trigger	The Trigger Mark color of graphical representation screen (Fig. 2-172 Data Monitor - Coloring) is changed. Standard color is olive green.
Measure point	Color of Major point line on the graphical representation screen (Fig. 2-172 Data Monitor - Coloring) is changed. Standard color is aqua.
Reset color setting	Graph Line Color is collectively returned to default.
Monitor Signal Engine speed Vehicle speed Common rail pre:	Graph Option is shown. Graph Line Color and the maximum and minimum of Graph axis Scale can be changed and setup (Fig. 2-178 Graph Option).
Trigger(T)	By putting checkmark, "[Trigger Condition] "Tab can be made selectable.



SAPH80ZZZ0200180

Fig. 2-171 Graph Option



SAPH80ZZZ0200181

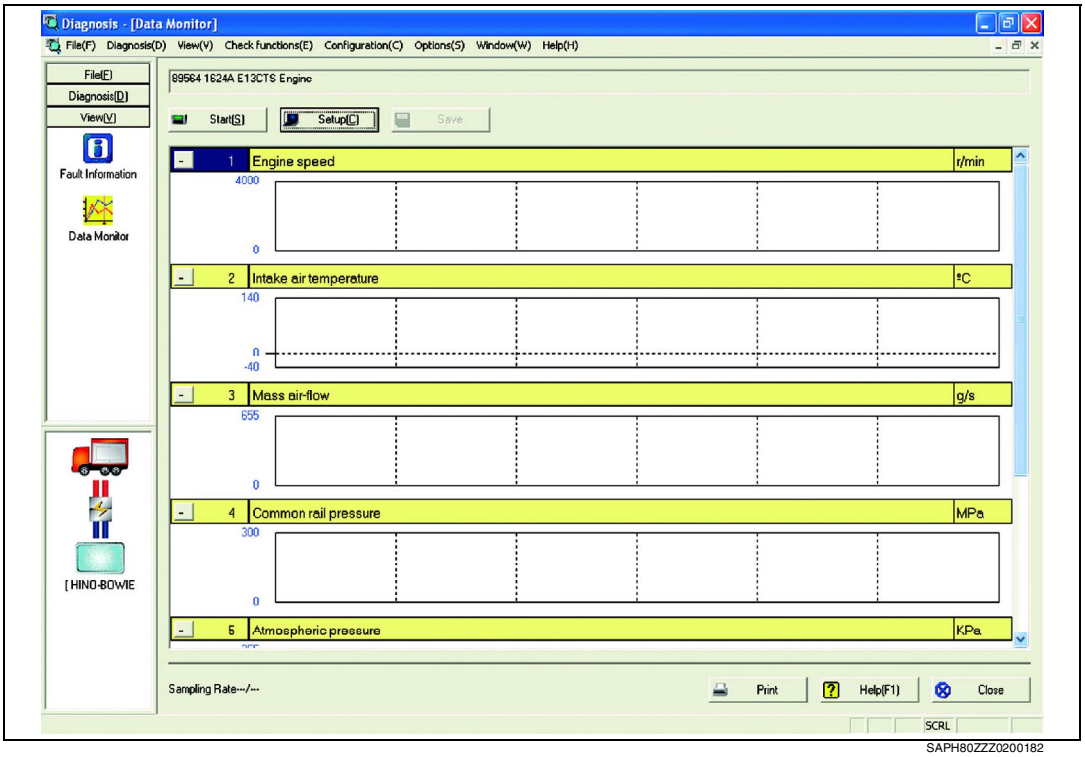
Fig. 2-172 Data Monitor - Coloring

Data Monitor Operation

EN80ZZZ02X100056

Data monitor can be performed when you finish setting up of signals to the monitor.

1. Check that all the signals selected are located in line on the monitoring screen.



SAPH80ZZZ0200182

Fig. 2-173 Data Monitor

2. Click "[Start]" Button to start Data Monitor.

SAPH80ZZZ0200183

Fig. 2-174 Start Button

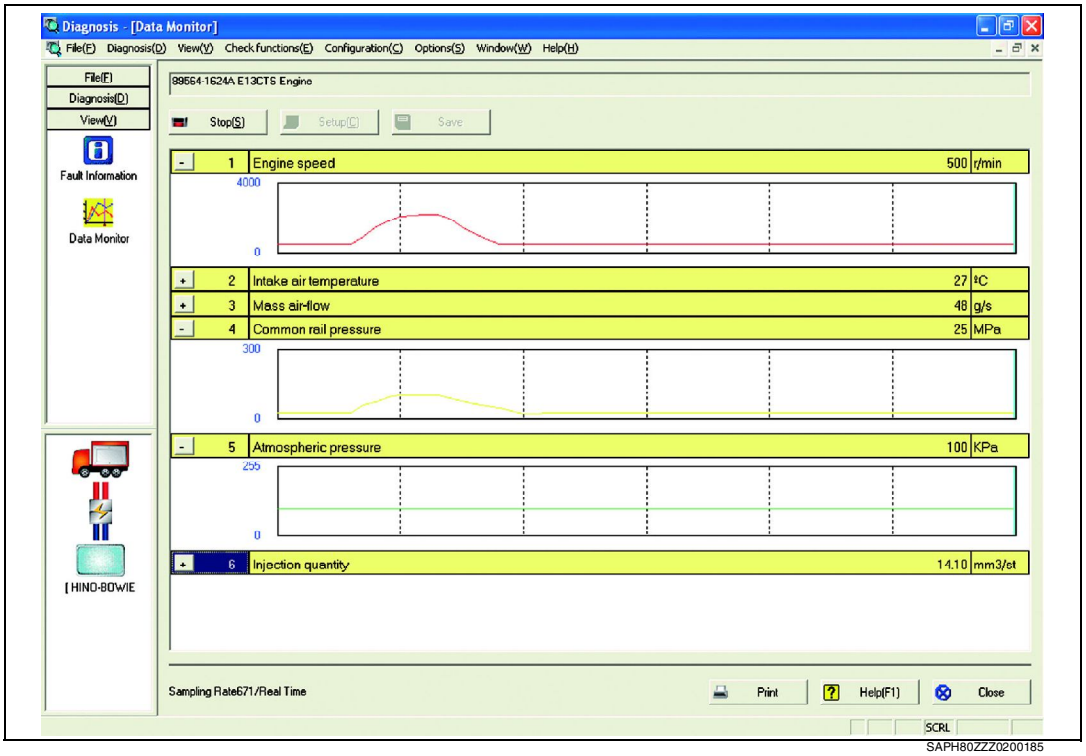
After you start Data Monitor, the notation of "[Start] Button will be changed to "[Stop]", and if you want to stop Data Monitor, click this "[Stop]" Button.

SAPH80ZZZ0200184

Fig. 2-175 Stop Button

⚠ CAUTION
Be careful of the communication cable so that it does not come off while performing Data Monitor. If it comes off, it is necessary to redo diagnosis from the beginning.

3. Graph area expansion and collapse
Graph area can be made a deployment {expansion} state or a contracted state {collapse} for item by item. In the state of deployment, a line graph and a numerical value can be displayed and only a numerical value is displayed for a contracted state.

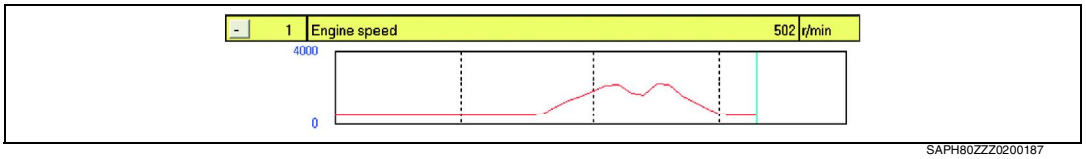


SAPH80ZZZ0200185

Fig. 2-176 Graph area Expansion - Collapse

SAPH80ZZZ0200186

Fig. 2-177 Graph area - collapse state

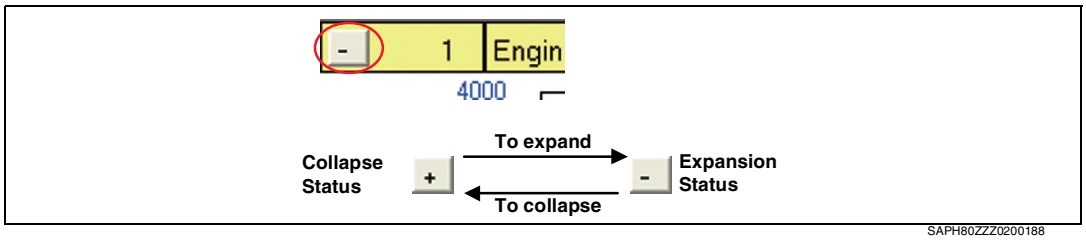


SAPH80ZZZ0200187

Fig. 2-178 Graph area - expand state

HINT

Area expands by clicking +box displayed on the upper left of the Graph area and collapses by clicking -box (Fig. 2-179 Area Expansion/Collapse icon). And all the items expand or collapse at once by [Ctrl]+[Space] of the keyboard.



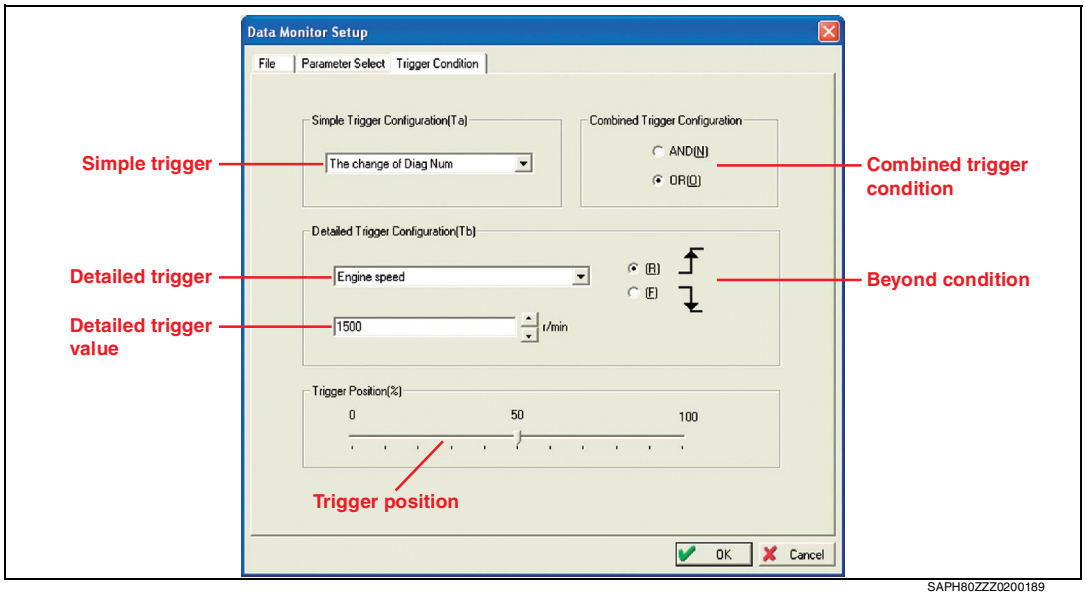
SAPH80ZZZ0200188

Fig. 2-179 Area Expansion/Collapse icon

Trigger function

EN80ZZZ02X100057

When a setup condition is reached, a function to attach a mark on the graph is called Trigger function. For example, when the number of engine rotations reaches 1500 r/min and the number of DTC changes (fault may be occurred), accelerator valve travel is more than 10 % and engine stalls, various conditions can be set up by the trigger function equipped to Hino DX Data Monitor.



SAPH80ZZZ0200189

Fig. 2-180 Trigger setup

1. Select Simple trigger. Items which can be set up by Simple Trigger are as follows.

Simple trigger name	Description
No setup	Simple trigger is not used.
Trigger SW (enter key)	When clicking Enter key, trigger status is detected.
Engine stall	When engine stalls, trigger status is detected.
Change of Diag Num	When Diag. number changes, trigger status is detected.

2. Select Detailed trigger. When you don't use Detailed trigger, select "No Setup". Items which can be selected by Detailed trigger are equal to Data Monitor items.

3. Set up Detailed trigger value. Trigger status will be detected when items setup in Detailed trigger reach this value.

4. Select Beyond condition. You can choose (Up ward arrow mark (R)) when trigger is reached from the bottom and (Downward arrow mark (F)) from the top.

5. When you specify both Simple trigger and Detailed trigger, choose Combined trigger condition. If you specify only one of them, this Combined trigger cannot be chosen.

- AND:
  When both Simple trigger conditions and Detailed trigger conditions are satisfied, trigger status will be detected.
- OR:
  When either one of Simple trigger conditions or Detailed trigger conditions is satisfied, trigger status will be detected.

6. Set up Trigger position.
This will determine whether you consider the data before trigger status is detected as important and save them (0 - 49 %) or after trigger status is detected (51 to 100 %) centering the trigger. However, since the number of samples which can be saved may change with the setting status of Trigger Position, it is necessary to take care.

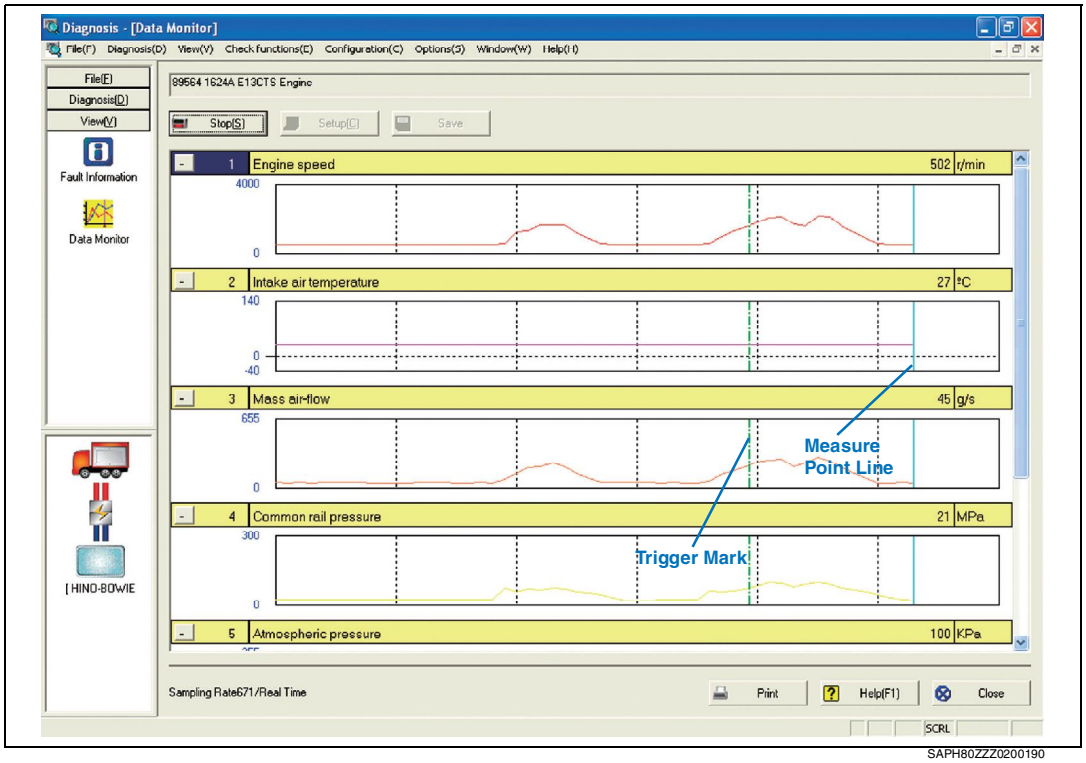
7. After finishing all above 6 steps, click [OK] Button.

⚠ CAUTION
As mentioned earlier, the number of samples which can be saved may change according to the setting status of the Trigger Position, we would recommend you to use Trigger Position with [50] for saving large quantity of data especially.
When you continue data monitor exceeding the permitted quantity of samples, the data extracted previously will be eliminated automatically. When you want to perform data monitor for long hours, save the data once within less than one hour as the standard time.

Graph Line Drawing

EN80ZZZ02X100058

Graph is drawn along with the Measure Point Line moving to the right from the left of the screen.
If the Measure Point Line reaches the right end of the screen, the Line will be fixed there and only the Graph Line will flow to the left from the right.
Trigger Mark is displayed only once at the beginning, when the trigger setup condition is satisfied.
In addition, keep in mind that Trigger Mark will also disappear from the screen with progress of a certain amount of time since Trigger Mark also flows to the left from the right in accordance with the Graph Line flowing to the left from the right of the screen.



SAPH80ZZZ0200190

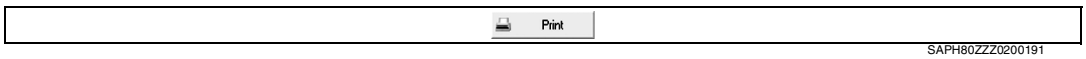
Fig. 2-181 How to watch the graph

HINT
The horizontal axis of the graph screen does not show the regular time in particular, and serves as a relative standard.
About progress of time, since it is greatly influenced by the actual sampling rate, you are asked to save data after data monitor and investigate from the saved file, when you require the detailed lapsed time.

Graph Print

EN80ZZZ02X100059

You can print out the graph shown on the screen by clicking [Print] Button (Fig. 2-182 How to print out the graph)
If you click [Print] Button, print preview screen comes up and make the necessary setup to print out the graph.



SAPH80ZZZ0200191

Fig. 2-182 How to print out the graph

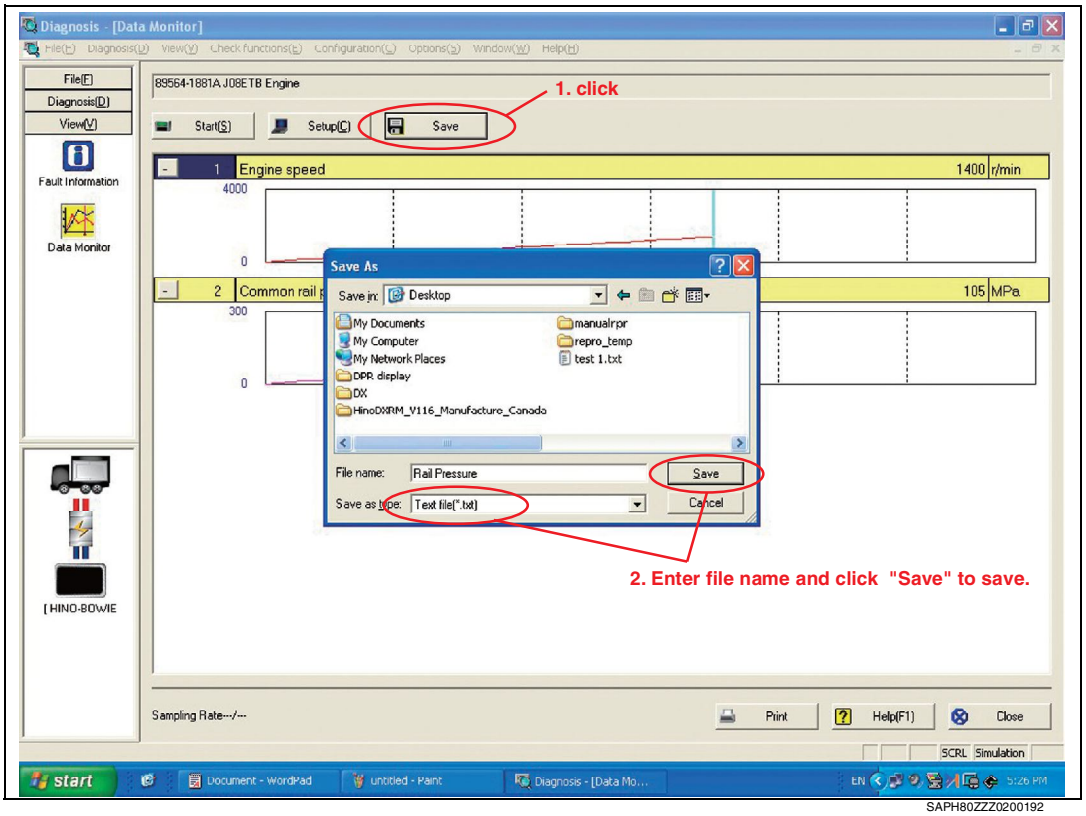
⚠ CAUTION
What you can print out by this operation is the range of the graph shown on the screen only when you click [Print] Button. Therefore, if you want to print out a larger range of the data graph, it is necessary to save once the extracted data and make a graph.
(Refer to data monitor reproduction method in the following clause)

Reproducing method of data monitor (making a graph of data)

EN80ZZZ02X100060

Here we will explain how to make a graph of the data recorded by data monitor. You can better grasp the change of status of each device by making a graph and you can present it to your customer for explanation.

1. Save data in the text
Save data by clicking [Save] while you temporarily discontinue by clicking ([Stop(S)].



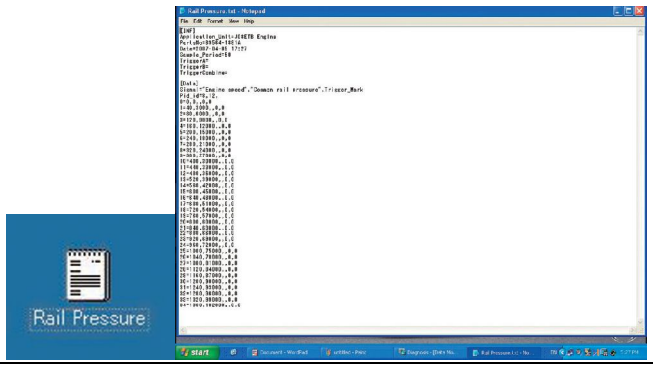
SAPH80ZZZ0200192

Fig. 2-183

⚠ CAUTION
In case the recorded data in Hino DX are not saved, they will be deleted if you carry out one of the following items.

(1) You start Data Monitor again. --- [Start(S)] is clicked again.
(2) [Setup(C)] button is clicked.
(3) Data Monitor screen is closed.

2. Opening saved text data. (How to read text data)
The saved data in Data Monitor are saved in the form of a text file (Extension "txt") and you can confirm data which are the inside of the file.
You can graph out such data in a text file by reading it on a spreadsheet like Excel, etc.

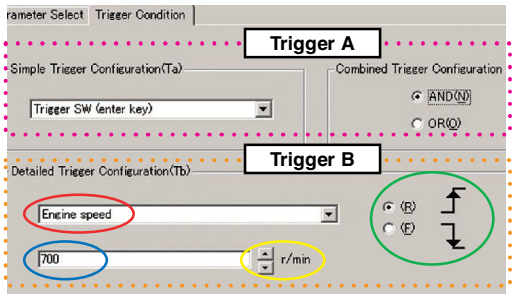


SAPH80ZZZ0200193

Fig. 2-184

The contents of the text file of the saved data are as follows:

[INF] Application_Unit=E13CTM Engine Parts No=89663-E0621 Date=2007-01-11 14:28 Sample_Period=50 Trigger A=Trigger SW (enter key) Trigger B=Engine speed, 700, r/min, <U>, 8 Trigger Combine=<AND>	Engine type Part Number of ECU program Time & date when Data Monitor is carried out Sampling rate (millisecond), In case of real time, it displays "50" Selected item of Simple Trigger Configuration(Ta) is displayed. Selected item of Detailed Trigger Configuration(Tb) is displayed. "AND(A)" or "OR(O)" condition of Combined Trigger Configuration is displayed
[Data] Signal="Engine speed", "Common rail pressure", "Vehicle speed", Trigger_Mark The order of item and Trigger mark Pid_id=8,12,9,18,32 □ Signal ID (unused specially)	
0=650,35000,0,,0,140,290 1= 710,35000,0,Tand,511,651,791	Each sample data (refer to under mentioned)



SAPH80ZZZ0200194

Fig. 2-185 Trigger Condition setting screen

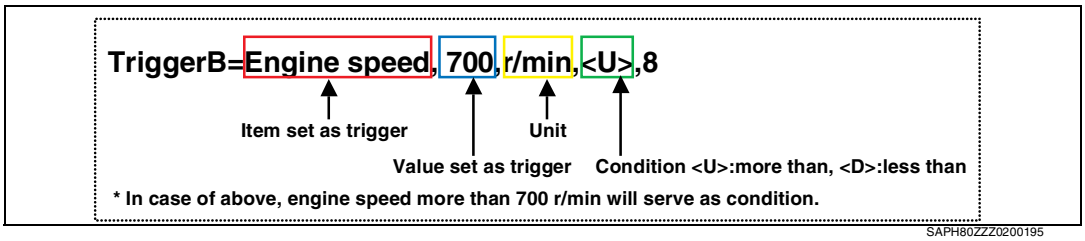


Fig. 2-186 Explanation of Trigger B

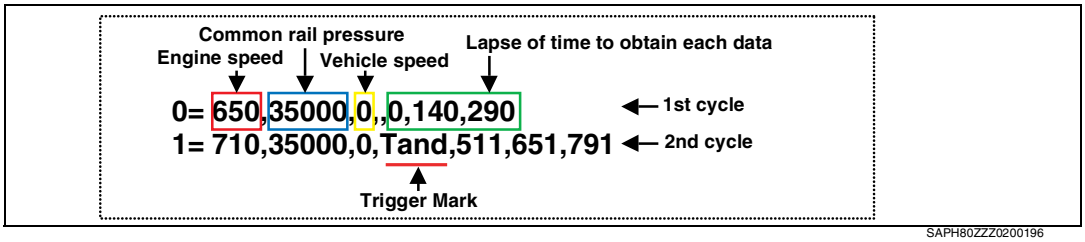
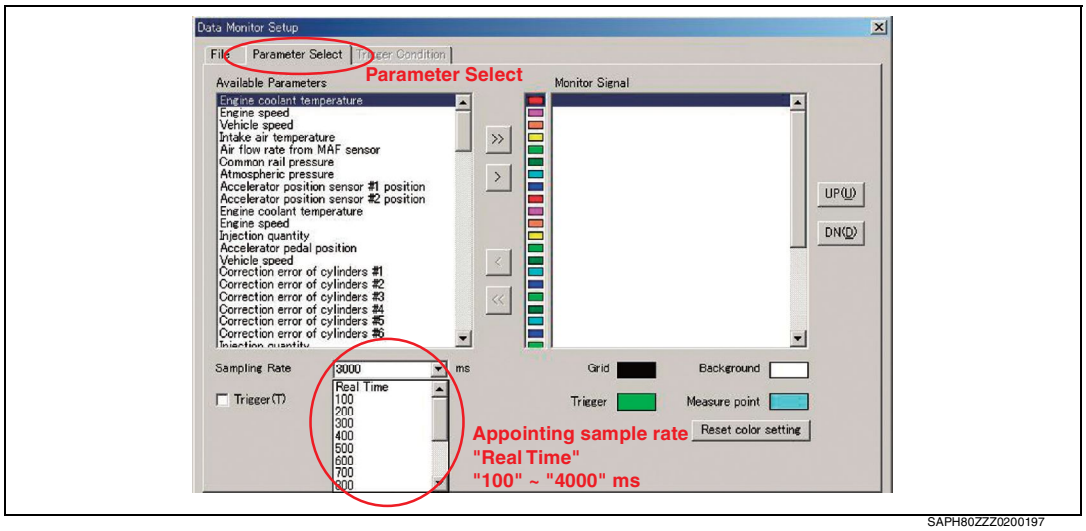


Fig. 2-187 Explanation of sample data

Above explanation is an example of Data Monitor with regards to 3 items which are "Engine speed", "Common rail pressure", "Vehicle speed".

- The first data when you start Data Monitor on the 1st row (row of 0).
- First numerical value is set to "0" and lapsed time will be recorded afterward (how many ms after) each data is obtained on the basis of it.
- On the 2nd row (row of 1) the second sample data will be recorded and on the 3rd row (row of 2) the third sample data will be recorded.
- Sampling rate expressed time to obtain each data. In case of above example, time to obtain first data is "0" and that for the second data is "511" meaning it took 511 ms.
- Time necessary to obtain sampling data is not constant since it depends upon number and content of such data you want to obtain. Accordingly, in case you want to obtain data like water temperature, etc. which are not changeable in a short period of time, you are recommended to appoint sampling rate in the following manner.



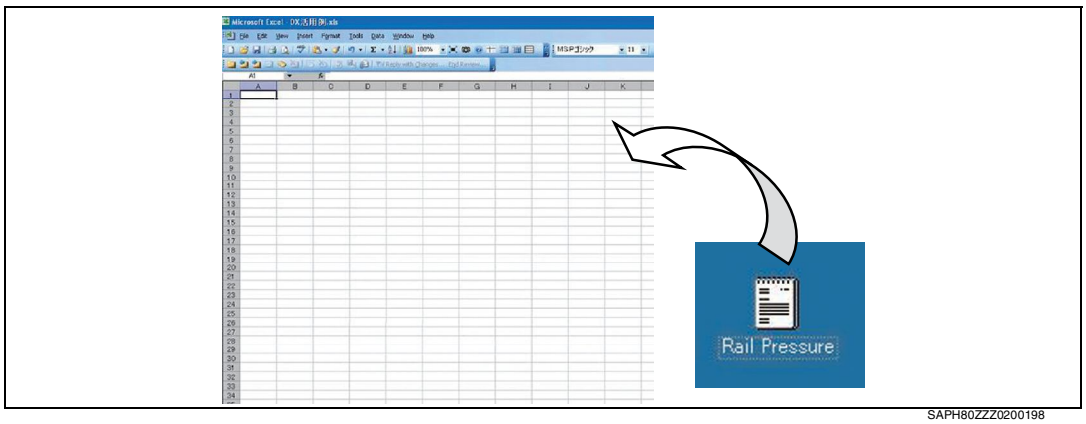
SAPH80ZZZ0200197

Fig. 2-188

- When trigger comes into effect, trigger mark will be shown as below.
  When simple trigger only is set:Ta
  Detailed trigger only:Tb
  Combined trigger is set as "and":Tand
  Combined trigger is set as "or":Tor

HINT
The maximum monitoring time depends on the sampling rate and number of parameters which you choose. (Approximately 1 hour of sampling can be recorded.)

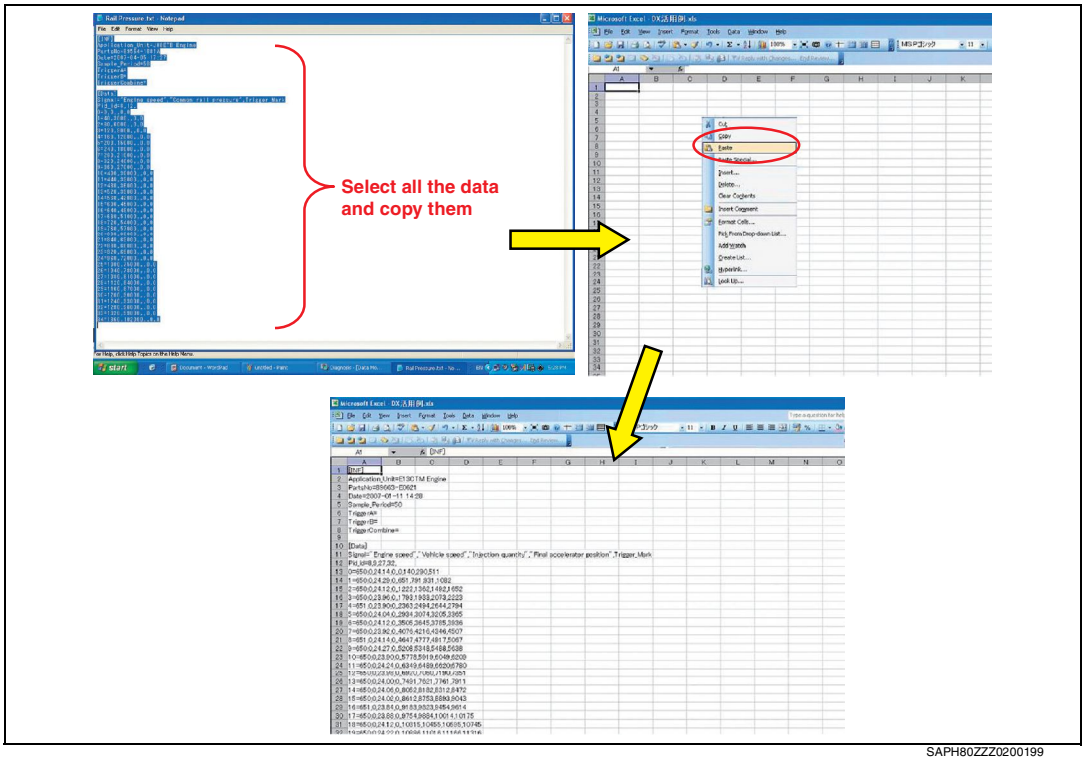
3. Copying data of saved text file to spreadsheet (Excel)
You can deploy text data to Excel according to the following methods.
Method 1) Drag & Drop the saved text file to Excel.



SAPH80ZZZ0200198

Fig. 2-189

Method 2) Open the saved text file and copy its data.



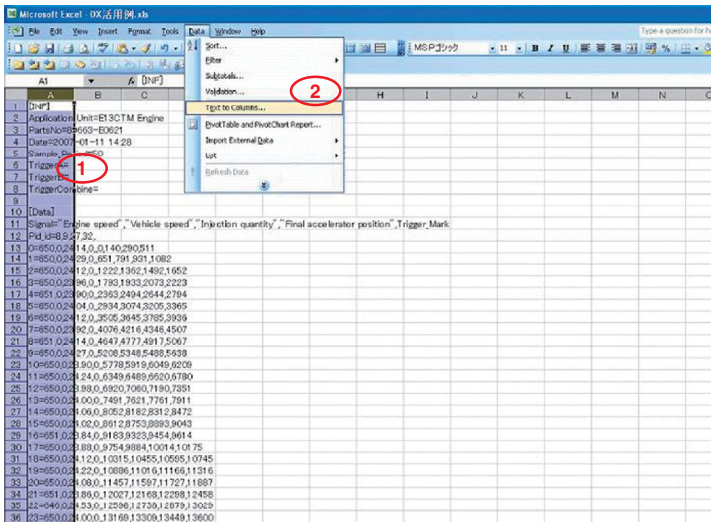
SAPH80ZZZ0200199

Fig. 2-190

Method 3) Right-click the icon of text data to choose program as Excel.
Method 4) Open Excel and click File(F) on the menu bar. And click Open(O) and choose the text data.

4. Delimitation
Delimit according to the following step in order to accommodate all the data copied to Excel in each cell.

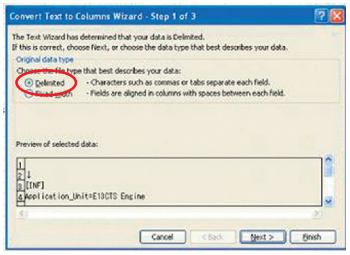
(1) Select A column, and select "Text to Columns" from "Data" menu.



SAPH80ZZZ0200200

Fig. 2-191

(2) Check "Delimited" at "Original data type" of "Convert Text to Columns Wizard - Step 1 of 3"



SAPH80ZZZ0200201

Fig. 2-192

(3) Put checkmarks in all the checkboxes (Tab, Semicolon, Comma, Space, Other:) of "Delimiters" on the screen of "Convert Text to Columns Wizard - Step 2 of 3" and put "=" mark to "Other:".

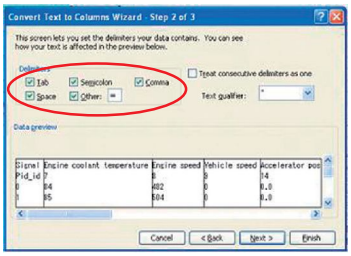


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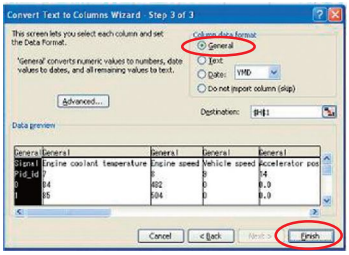
Fig. 2-193

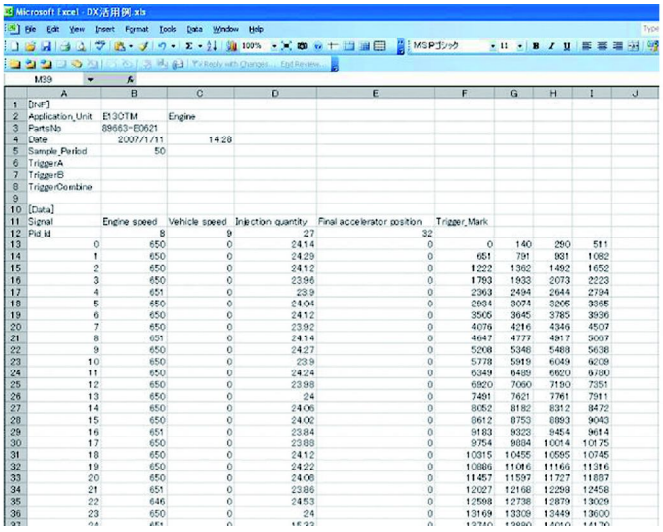
(4) Check "General" on the screen of "Convert Text to Columns Wizard - Step 3 of 3" and click "Finish" button.



SAPH80ZZZ0200203

Fig. 2-194

(5) Delimitation is complete with the above steps.

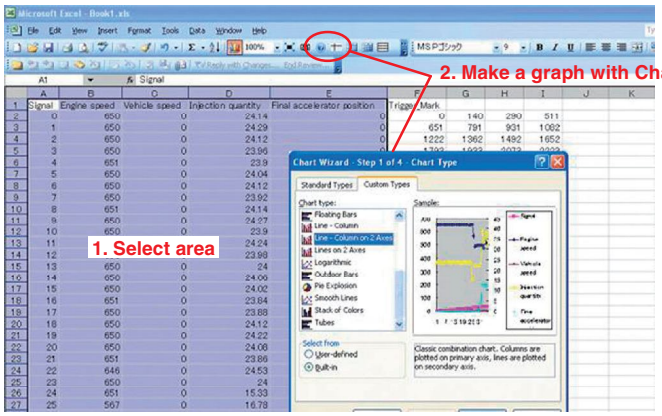


SAPH80ZZZ0200204

Fig. 2-195

5. Making a graph

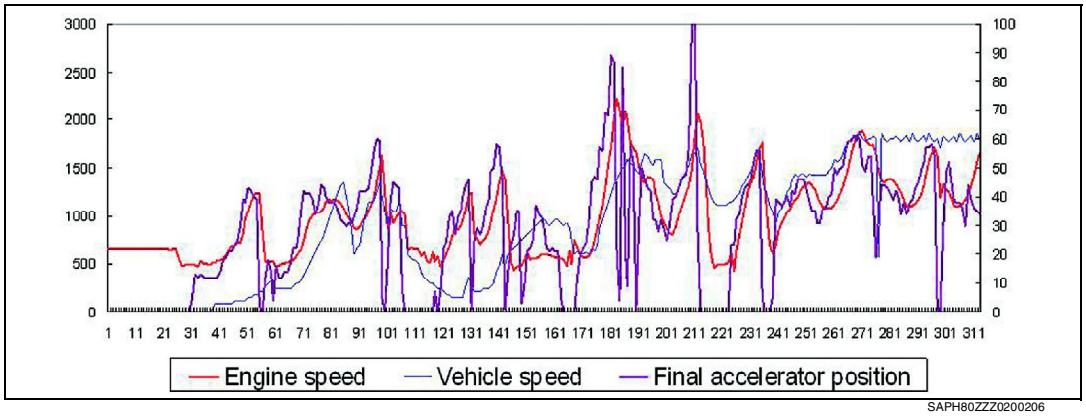
(1) Select the necessary data and make a graph using Chart Wizard.



SAPH80ZZZ0200205

Fig. 2-196

(2) Make an adjustment to the scale and you get a chart.



SAPH80ZZZ0200206

Fig. 2-197

To grasp the status of each equipment with Data Monitor and making a graph according to that help you not only analyze fault regularly but also explain the status of fault and operation condition of the vehicle as a communication tool with customers.

Data monitor items (Engine ECU)

EN80ZZZ02X100061

Item	Description	Unit	Supplemental
Vehicle speed	Current vehicle speed	Km/h	
Air flow rate from MAF sensor	Current air-intake volume	g/s	
PTO status	Status of PTO. PTO SW ON or PTO is working.	ON or OFF	
Fuel level	Ratio of remaining fuel to full tank capacity	%	
Atmospheric pressure	Current atmospheric pressure. Sensor can detect up to approximately 5,000 m above sea level.	KPa	Approximately 100 kPa at the sea level.
voltage	Engine ECU supply voltage	V	
Air flow Temp.	Intake air temperature	°C	
Accelerator sensor position#1	Current accelerator pedal opening sensor #1	%	
Accelerator sensor position#2	Current accelerator pedal opening sensor #2	%	
Time run by the engine while MIL is activated	Engine operation time after MIL turns ON	min	
Accelerator position	Final accelerator position determined according to PTO accelerator control, eco-run control and fuel-safe control	%	OFF = 0%, FULL = 100%
Parking brake switch	Status of Parking brake SW.	ON or OFF	
Main injection timing (To actual TDC)	Main injection timing	°CA	
Injection quantity	Current injection quantity	mm^3/st	
Target EGR position	Current target EGR position	%	
Target VNT position	Current target VNT position	%	
Target engine speed	Current target engine speed	r/min	
Target common rail pressure	Current target common rail pressure When "the actual pressure - instructed value by ECU" > "15MPa", DTC P0088 will be detected.	Kpa	
Accelerator pedal position	Accelerator position detected by engine ECU (Brake override control and eco-run control are considered)	%	
NE sensor active flag	Display whether engine speed sub sensor works normally or not.	ON or OFF	Normally ON

Item	Description	Unit	Supplemental
NE sensor active flag	Display whether engine speed main sensor is working normally or not.	ON or OFF	Normally ON
Cruise control escape flag	Flag for temporarily cancelling cruise control		
Cruise control enable flag	Flag for enabling cruise control		
Cruise control mode	Current cruise control status		(0: OFF, 1: Normal, 2: SET/ACCEL, 3: SET/COAST, 4: Resume, 5: Accelerator override)
PCV valve close timing	Close timing of PCV (Pressure control valve) of supply pump.	°	
Pump control mode	Supply pump control mode (display the status of supply pump)		
Maximum cruise speed	Maximum cruise vehicle speed which is set by customization.	Km/h	
Having learned specific value of the pump	Status of pump learning		255: Not learned, 0: Learning, 1: Temporary learning completed, 2: Full learning completed
Adjustable maximum vehicle speed (basic)	Upper limit of vehicle speed customized by user (calculated from difference)	Km/h	
Adjustable maximum vehicle speed	Upper limit of vehicle speed customized by user (calculated from difference)	Km/h	
VNT actual position	VNT actual position controlled by actuator (DC motor)	%	
Pump driving ration final value	Duty ratio for current-driving pump SCV	%	Approx. 20% to 50% while the engine speed and load are stable.
SCV driving current value	Actual current value for driving pump SCV	mA	No pumping: 2.2 A or higher, Full pumping: 0.5 A or lower at 24 V system No pumping: 1.2 A or higher, Full pumping: 0.8 A or lower at 12 V system
SCV driving current F/B value	Feedback control value for matching the pump SCV actual current value with the command value	mA	

Item	Description	Unit	Supplemental
FCCB correction final value (#1)	Final injection volume for FCCB between-cylinder correction (Up to +50 is displayed)	mm^3/st	If the value remains at 30 under stable conditions (idling after fully warmed-up and no accessory loads), the cylinder may have a malfunction. Perform an active test to forcibly stop injector operation and check whether the data monitor value changes. If the value does not change, the injector may be malfunctioning. If the value changes, a malfunction in the valve system or piston system is suspected.
FCCB correction final value (#2)			
FCCB correction final value (#3)			
FCCB correction final value (#4)			
FCCB correction final value (#5)			
FCCB correction final value (#6)			
Between-cylinder angular speed variation time (#1)	Speed variation time by cylinder. If that value exceeds ± 150, there might exist abnormality of the relevant cylinder.	μs	
Between-cylinder angular speed variation time (#2)			
Between-cylinder angular speed variation time (#3)			
Between-cylinder angular speed variation time (#4)			
Between-cylinder angular speed variation time (#5)			
Between-cylinder angular speed variation time (#6)			
Idle shutdown counter	Time before idle shutdown operation (Counter stops during DPR regeneration)	s	
VNT diag information 1	VNT error information (major fault) Display only when P0045 is currently detected as a fault. Refer to DTC P0045 troubleshoot for countermeasure.		
VNT diag information 2	VNT error information (minor fault) Display only when P0045 is detected as a fault. Refer to DTC P0045 troubleshoot for countermeasure		
EGR diag information 1	EGR fault information (Major fault) It is displayed only when P1458 is detected as current fault. As to countermeasure, refer to DTC P1458 troubleshoot.		

Item	Description	Unit	Supplemental
EGR diag information 2	EGR fault information (Minor fault) It is displayed only when P1458 is detected as current fault. As to countermeasure, refer to DTC P1458 troubleshoot.		
Lock up signal	Lock up status		1: Lock up, 0: No lock up (Allison torque converter AT)
Lock up signal error	Lock up signal error		0: Normal, 1: Malfunction (Allison torque converter AT)
Drive engagement	Drive engagement status		1: Connected, 0: Not connected (Eaton AMT)
Drive engagement error	Drive engagement signal error		0: Normal, 1: Malfunction
Neutral signal (CAN)	Neutral status (torque converter AT or Eaton AMT)		1: Neutral, 0: Other than neutral
Eco-run request	Eco-run data		1: Eco-run request signal being received, 0: Eco-run not operated
Vehicle ECU requesting accelerator position	Accelerator position requested for eco-run control	%	
Vehicle ECU requesting PTO accelerator position	Requested PTO accelerator position (for idle knob PTO control)	%	
Vehicle ECU receiving vehicle speed	Current vehicle speed received by vehicle ECU via CAN	Km/h	The data is used as a backup when the vehicle speed circuit is open.
SCR inlet Temp.(DCU received)	Exhaust gas temperature (upstream of urea SCR system received by DCU)	°C	
DPR inlet Temp. (BCU received)	Exhaust gas temperature (at DPR inlet received by burner ECU)	°C	
CCO inlet Temp.	Exhaust gas temperature (downstream of oxidation catalyst)	°C	
Deviation time Average speed up revolution	Engine speed deviation level during expansion stroke	μs	Reference standard while idling with no loads: – 150 to 220 for Allison 2000 series – 100 to 150 for other than above As the engine load increases, the value increases.

Item	Description	Unit	Supplemental
Deviation time speed down revolution	Engine speed deviation level during compression stroke	μs	Reference standard while idling with no loads: – 130 to 180 for Allison 2000 series – 80 to 150 for other than above As the engine load increases, the value increases.
Intake throttle valve actual position	Actual position of intake throttle valve	%	
Exhaust brake lamp	Current status of lighting of Exhaust brake lamp.		
Pre-heating lamp	Current status of lighting of Pre-heater lamp		
Cruise control lamp	Current status of cruise control lamp (green lamp illuminated while driving with cruise control)		Current status of cruise control lamp (green lamp illuminated while driving with cruise control)
Constant speed lamp	Current status of constant speed cruise control main lamp (orange lamp illuminated during cruise control standby mode)		Current status of constant speed cruise control main lamp (orange lamp illuminated during cruise control standby mode)
Check engine lamp	Status of lighting of check engine lamp.	ON or OFF	
Vehicle speed limiter lamp	Current status of lighting of Vehicle speed limiter lamp (When the speed limiter is working)	ON or OFF	
SVS lamp	SVS lamp illumination flag (check engine lamp in the meter)		1: ON, 0: OFF
STOP engine lamp	STOP engine lamp illumination flag		
DPR Indicator lamp	DPF regeneration lamp illumination flag		
Engine retarder lamp	Current status of lighting of Engine retarder lamp. (When Engine retarder is working)	ON or OFF	
Boost alarm lamp	Current status of lighting of Boost alarm lamp. It will light up when boost pressure goes up extraordinarily high (Sensor output 4.8 V or more being equivalent to 250 kPa. It differs according to engine revolution and atmospheric pressure.) Applicable to	ON or OFF	
Exhaust brake solenoid valve	Current status of operation of Exhaust brake solenoid valve #1.	ON or OFF	

Item	Description	Unit	Supplemental
Engine retarder solenoid valve #1	Current status of operation of Engine retarder solenoid valve #1 or #2.	ON or OFF	
Engine retarder solenoid valve #2			
PTO cut relay	Flag for PTO cut relay operation		1: Operating (PTO cut), 0: Not operating (PTO permitted)
Starter block relay	Flag for starter block relay operation		1: Operating , 0: Not operating
Idle shutdown flag	Flag for enabling idle shutdown function		1: Operating , 0: Not operating
PTO accelerator sensor position	Current PTO accelerator position	%	When PTO is not working, it is "0%"
PTO accelerator sensor voltage	Current PTO accelerator sensor voltage	V	Current PTO accelerator sensor signal voltage
Water in fuel warning switch	Flag for water intrusion to fuel		1: Water intrusion, 0: No water intrusion
PTO switch 2	PTO preset switch 2 operation		1: ON, 0: OFF
Number of Freeze-Frame	Number of Freeze Frame Data record able in ECU.	# of	
Cruise main switch raw value(Control side CPU)	Current status of constant speed cruise control main switch (instrument panel)		
Cruise main switch recognition value(Control side CPU)	Constant speed cruise control main switch active (detected by ECU)		
Cruise control switch, SET/COAST	Cruise control switch SET/ COAST (instrument panel or steering column)		1: ON, 0: OFF
Brake switch 1	Current status of Brake S/W which is installed on Brake valve. When brake pedal is fully pressed down, it will show "ON".	ON or OFF	Always ON except for vehicles with Automatic Cruise Control and with AT.
Fuel temperature	Current Fuel temperature	°C	
R/S Throttle position	Intake throttle sensor position	%	
Final value of pump current target	Indicated current value from ECU to SCV (Suction control valve) of supply pump	mA	
Common rail pressure2	Value recognized by sub common-rail pressure sensor	Kpa	
Turbo charger speed	Current Turbo charger speed	r/min	
Accelerator sensor voltage No.1	Voltage of current accelerator pedal opening sensor #1 signal. Whether its adjustment is needed or not, refer to "Drive accelerator sensor adjust(S)" of Check function(E).	V	

Item	Description	Unit	Supplemental
Accelerator sensor voltage No.2	Voltage of current accelerator pedal opening sensor #2 signal. Whether its adjustment is needed or not, refer to "Drive accelerator sensor adjust(S)" of Check function(E).	V	
All DTCs	Number of storable DTCs	# of	
Neutral switch	Status of Neutral switch. When shift lever is positioned at neutral, it shows "ON".	ON or OFF	
STP switch	Current status of stop lamp switch		1: ON (brake pedal depressed), 0: OFF
DPF forced regeneration switch	Actual value recognized by DPF forced regeneration switch		1: ON, 0: OFF
Engine oil pressure switch	Status of the S/W which stops engine when oil pressure goes down extraordinarily.	ON or OFF	"OFF" normally.
Exh. Brake switch	Current status of Exhaust brake switch, and that of Engine retarder switch	ON or OFF	
ENGINE STOP SW	Status of Engine stop S/W, such as Engine stop S/W for body.	ON or OFF	
Start control switch	Status of start idle up switch (Start assisting device) Applicable to the vehicle with start assisting device only.	ON or OFF	
Clutch switch	Status of Clutch S/W. "OFF" when clutch pedal is stepped on.	ON or OFF	
Key switch	Status of Key switch. State at starting position	ON or OFF	
Glow-relay	Glow-relay operation status		1: Operating, 0: Not operating
EGR gas temperature	EGR gas temperature at cooler outlet The sensor is mounted at EGR cooler outlet to monitor drops in the cooler efficiency.	°C	
Exhaust emission purifier indicator	Status of DPR regeneration indicator Applicable to the vehicles equipped with DPR.	ON or OFF	
Intake air pressure	Current intake air pressure	KPa	
Differential Pressure	Current DPR differential pressure (max. value: 25.5 kPa)	KPa	
Exhaust Temperature(IN)	Current exhaust temperature at DPR inlet.	°C	

Item	Description	Unit	Supplemental
Exhaust Temperature(OUT)	Current exhaust temperature at DPR outlet.	°C	
Intake air Temp.(Air flow meter)	The sensor is built into the air flow sensor. The detected value is used for correction of intake air flow rate and EGR rate calculation.	°C	
Inter cooler outlet Temp.	The sensor is mounted at the inter cooler outlet to monitor drops in the inter cooler efficiency.	°C	
Intake manifold Temp.	The sensor is mounted on the intake manifold. The detected value is used for EGR rate calculation.	°C	
Sensor supply voltage1	Sensor supply voltage 1	V	Normally 5 V
Sensor supply voltage2	Sensor supply voltage 2	V	Normally 5 V
Air flow sensor supply voltage	Air flow sensor supply voltage	V	Normally 12 V
Intake throttle current value	Intake throttle actuator current value	A	Reference standard: 0.2 to 1.0 A (when no loads applied to throttle valve)
EGR rate	Calculated EGR rate	%	
Nox density(Sensor1)	NOx concentration (upstream of SCR)	ppm	
Nox density(Sensor2)	NOx concentration (downstream of SCR)	ppm	
DTC that caused required freeze frame data storage	DTCs for problems in the past		
EGR solenoid valve #1	Current status of operation of EGR solenoid valve #1-3.	ON or OFF	
EGR solenoid valve #2			
EGR solenoid valve #3			
Intake throttle position2	Not available yet (To be used for recognition value of sub intake throttle sensor position)	%	
DPR inlet O2 density	O2 concentration at DPR inlet	%	
DPR outlet O2 density	O2 concentration at DPR outlet	%	
Fuel cut valve	Fuel cut valve operation flag		Not applicable for 2011MY

Data monitor items (VCS)

EN80ZZZ02X100062

Item	Description	Unit	Remarks
Engine coolant temperature	A coolant temperature is displayed.	°C	
voltage	A voltage is displayed.	V	
Accelerator opening angle for driving	An accelerator opening angle is displayed. (A value received from the engine via the CAN)	%	
Engine speed	An engine speed is displayed. * When 0 r/min, the engine is stalled.	r/min	
Vehicle speed	A vehicle speed is displayed. * It is the vehicle speed pulse that was input into a pulse modulator and filtered for a control purpose.	km/h	
Injection quantity	An injection quantity is displayed. * It is the total fuel consumption including the fuel for a DPR regeneration.	mm^3/st	
Engine torque	An engine torque is displayed.	N/m	
Adjustable maximum vehicle speed (basic)	It is a vehicle speed as a standard of the customized speed limiter. * Based on this vehicle speed, a target vehicle speed of the DX customized speed limiter is determined. * If it is legally mandated, the legal limiter speed must be followed. If not, the default value is 90 km/h.	km/h	
Adjustable maximum vehicle speed	It is a difference from the standard vehicle speed to determine a target vehicle speed of the customized speed limiter. * It shows how much the speed should be reduced from the standard speed limiter speed in km/h.	km/h	
Adjustable Maximum cruise speed (basis)	It is a vehicle speed as a standard of the customized cruise. * Based on this vehicle speed, the target maximum vehicle speed of the DX customized cruise is determined.	km/h	
Adjustable Maximum cruise speed	It is a difference from the standard vehicle speed to determine a target vehicle speed of the customized cruise. * It shows how much the speed should be reduced from the standard target maximum cruise speed in km/h.	km/h	
Exhaust brake lamp	It is an indicator status during an exhaust brake operation. ON: Light up The exhaust brake valve is in operation. OFF: Light out The exhaust brake valve is not in operation. * It is indicated by the lamp after an operation status is received from the engine via the CAN.		
Actuator relay	ON: In operation It displays a status that the relay is in operation, which supplies the power necessary for the load input/output by the ECU. OFF: Not in operation It displays a status that the relay is not in operation, which supplies the power necessary for the load input/output by the ECU. * Actuator relay ●●● Main power relays such as the accelerator switch, clutch switch, and stop lamp switch.		

Item	Description	Unit	Remarks
Diagnosis lamp	ON: Light up 1. It lights out 5 seconds after the key switch is turned ON. 2. A VCS diagnosis is generated. OFF: Light out A VCS diagnosis is not generated.		
Engine retarder lamp	ON: Light up The engine retarder is in operation. OFF: Light out The engine retarder is not in operation. * It is indicated by the lamp after an operation status is received from the engine via the CAN.		
Brake switch	ON: The brake pedal is pressed. OFF: The brake pedal is not pressed.		
ABS active signal	ON: The ABS is in operation. OFF: The ABS is not in operation.		
Air low pressure switch	ON: Abnormal air pressure (low) OFF: Normal air pressure		
Trailer-connection switch	ON: A trailer is connected. OFF: A trailer is not connected.		
Diag switch	ON: Output of a diagnosis code is requested. OFF: Output of a diagnosis code is not requested. * Output request of a diagnosis code to the VCS When the diagnosis switch is turned ON, the diagnosis lamp blinks.		
ST switch	ON: The key switch is in the start position or the starter is in operation. OFF: The key switch is out of the start position.		
Stop lamp switch	ON: The brake pedal is pressed. OFF: The brake pedal is not pressed.		
Neutral switch	ON: Neutral OFF: The gear is engaged.		
Key switch	ON: The key is ON. OFF: The key is OFF.		
Parking brake switch	ON: The parking brake is in operation. OFF: The parking brake is not in operation.		
Cruise control switch 1	When the set switch is on. (Cruise switch 1 = ON, Cruise switch 2 = ON) When the resume switch is on. (Cruise switch 1 = ON, Cruise switch 2 = OFF) When the cancel switch is on. (Cruise switch 1 = OFF, Cruise switch 2 = ON). * 2 switches are combined to indicate 3 statuses.		
Cruise control switch 2			
Clutch stroke switch	ON: When the clutch pedal is pressed to the end. OFF: When the clutch pedal is not pressed to the end.		
Watching to weld sticking of contact point for starter ON relay	● It is a status when the starter is activated. ON: The starter is in operation. OFF: The starter is not in operation. * If OFF is indicated while the engine is started, the relay or starter may be faulty.		
ECO-run switch	ON: The ECO-run switch is in operation. OFF: The ECO-run switch is not in operation.		

Item	Description	Unit	Remarks
Back lamp switch	ON: The gear is in reverse. OFF: The gear is not in reverse.		
Air conditioner idle up signal	ON: Idle up is requested from the air conditioner. OFF: Idle up is not requested from the air conditioner.		
Clutch pedal switch	ON: The clutch pedal is not pressed. OFF: The clutch pedal is pressed.		
Accelerator switch	ON: The accelerator pedal is pressed. OFF: The accelerator pedal is not pressed.		
Combination switch 1st step	• It is a status of the 1st step of the combination switch.		
Combination switch 2nd step	• It is a status of the 2nd step of the combination switch.		
Idle stop switch	• It is a status of the idle stop switch. It checks the switch's ON/OFF.		
IMC volume voltage	An idle manual control voltage is displayed.	V	0
Before Vehicle speed	A vehicle speed is displayed. * It is the vehicle speed pulse which was input into a pulse modulator and converted to km/h.	km/h	0
Calculated gear position	It is a gear position estimated in the VCS. * It is calculated during running while the clutch is engaged. It is indicated by "0 (neutral)" when the clutch is disengaged or in neutral.	Speed	0
Final estimate vehicle weight	It is a gross vehicle weight estimated in the VCS. * It is calculated from the variation of acceleration. It is not calculated when the clutch is disengaged or in neutral, or the service brake is applied.	Kg	5000

Data monitor items (DCU)

EN80ZZZ02X100063

Item	Description	Unit	Remarks
SCR inlet Exh. Temp sensor voltage	SCR inlet Exh. Temp. Voltage value of the Sensor	mV	
DEF pump pressure sensor voltage	Voltage value of the pump internal pressure sensor	mV	
DEF tank level sensor voltage	Voltage value of the DEF tank level sensor	mV	
DEF tank Temp. sensor voltage	Voltage value of the DEF tank (Adblue tank) internal temperature sensor	mV	
SCR inlet Exh. Temp. sensor	The exhaust temperature of the front of the SCR catalyst	°C	
DEF pump pressure	Internal pressure of the DEF pump	hpa	
DEF tank temperature	DEF temperature in the DEF tank (Adblue tank)	°C	
DEF pump Temp.#2	Internal temperature of the DEF pump	°C	
DEF pump Temp.#1	Internal temperature of the DEF pump	°C	

Item	Description	Unit	Remarks
Battery voltage	The operating voltage of the DCU ranges from 9 to 16 volts.	V	
DEF additive system control mode	Ongoing control state by the DCU		
Engine torque	Information from the engine ECU	Nm	
Engine coolant temperature	Information from the engine ECU	°C	
Nox sensor activation demand	Operating (Active) state of the Nox sensor		
SCR inlet O2 concentration	Oxygen (O2) concentration upstream of the SCR catalysts	%	
SCR inlet Nox concentration	Nitrogen oxide (Nox) concentration upstream of the SCR catalysts	ppm	
SCR inlet Nox sensor O2 signal	Self-diagnosis of SCR inlet Nox sensor oxygen (O2) detection		
SCR inlet Nox sensor Nox signal	Self-diagnosis of SCR inlet Nox sensor nitrogen oxide (Nox) detection		
SCR inlet Nox sensor Temp.	Self-diagnosis of SCR inlet Nox sensor temperature detection		
SCR inlet Nox sensor supply voltage	Self-diagnosis of supply voltage to the SCR inlet Nox sensor		
SCR inlet Nox sensor heater status	Operating state of the Nox sensor heater on the upstream side		
SCR inlet Nox sensor heater error status	Self-diagnosis result of the Nox sensor heater on the upstream side		
SCR inlet Nox sensor error status	Self-diagnosis result of the Nox sensor on the upstream side		
SCR outlet O2 concentration	Oxygen (O2) concentration downstream of the SCR catalysts	%	
SCR outlet Nox concentration	Nitrogen oxide (Nox) concentration downstream of the SCR catalysts	ppm	
SCR outlet Nox sensor O2 signal	Self-diagnosis of SCR outlet Nox sensor oxygen (O2) detection		
SCR outlet Nox sensor Nox signal	Self-diagnosis of SCR outlet Nox sensor nitrogen oxide (Nox) detection		
SCR outlet Nox sensor Temp.	Self-diagnosis of SCR outlet Nox sensor temperature detection		
SCR outlet Nox sensor supply voltage	Self-diagnosis of supply voltage to the SCR outlet Nox sensor		
SCR outlet Nox sensor heater status	Operating state of the Nox Sensor heater on the downstream side		
SCR outlet Nox sensor heater error status	Self-diagnosis result of the Nox sensor heater on the downstream side		
SCR outlet Nox sensor error status	Self-diagnosis result of the Nox sensor on the downstream side		

Item	Description	Unit	Remarks
Actual DEF injector opening rate	DEF injector operation rate	%	
Actual DEF pump rotor rate	DEF pump operation rate	%	
Calculated Nox concentration	Nox concentration upstream of SCR catalyst calculated by the DCU		
DEF filling rate	DEF filling rate in the DEF (Adblue) supply line	%	
DEF additive system control mode (Before)	State of DCU control (before) Previous control state by the DCU		
DEF additive system control mode Detail	Details of the state of DCU control		
DEF additive system control mode Detail (Before)	State of DCU control (before)		

Data monitor items (BCU)

EN80ZZZ02X100064

Item	Description	Unit	Remarks
Engine speed	Information from the engine ECU	r/min	
Calculated Engine Torque	Calculated engine torque	Nm	
Exhaust Gas Temperature (Burner Inlet)	Exhaust gas temperature at the burner inlet	°C	
Flame Temperature	Flame temperature of the burner	°C	
Exhaust Gas Temperature (Burner Outlet)	Exhaust gas temperature at the burner outlet	°C	
Target Exhaust Gas Temperature (Burner Outlet)	Target exhaust gas temperature (at the burner outlet)	°C	
Burner Operation Status	Operating state of the burner		
Intake air pressure	Air pressure at intake manifold	kpa	
Accelerator opening angle for driving	Accelerator pedal position	%	
Ambient Temperature from ECU	Ambient Temperature	°C	
Exhaust Gas Temperature (DPF Outlet)	Exhaust Gas Temperature after DPF	°C	
Burner Preparation Status	Ready / Not ready		
Engine coolant temperature	Engine coolant temperature	°C	
BCU internal temp.	Temerature sensed at BCU internal temperature sensor.	°C	
Atomizer air pressure	Air pressure supplied from the air tank to the air atomization module (pressure equal to air tank pressure)	kpa	
Atomizer fuel pressure	Fuel pressure supplied to the air atomization module	kpa	
Atomizer nozzle pressure	Injection pressure of the mixture air/Fuel Atomized pressure or Air pressure at nozzle.	kpa	

Item	Description	Unit	Remarks
Burner operation command status	Burner operation commnad from the engine ECU		
Event#	For making event log data 1 of 5		
TR hours Precision	For making event log data 2 of 5		
TR hours	For making event log data 3 of 5		
Event	For making event log data 4 of 5		
Flame temp for event log	For making event log data 5 of 5		

BCU Event Log collection

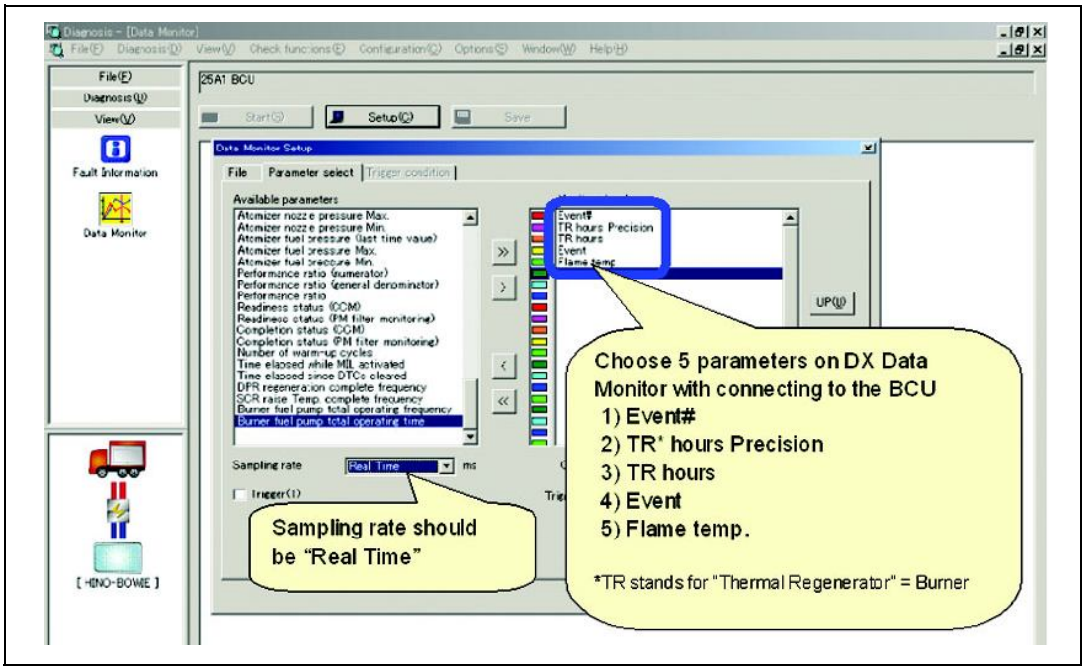
EN80ZZZ03X100008

What is the BCU event log?

- BCU event log shows its operating history and failure detection history.
- The manufacturer will utilize it for trouble shooting of the system.
- If BCU relative failure (P141F stored in ECU, and any DTC stored in BCU) has occurred, the event log collection will be required.
- BCU event log can be collected by DX Data monitor.

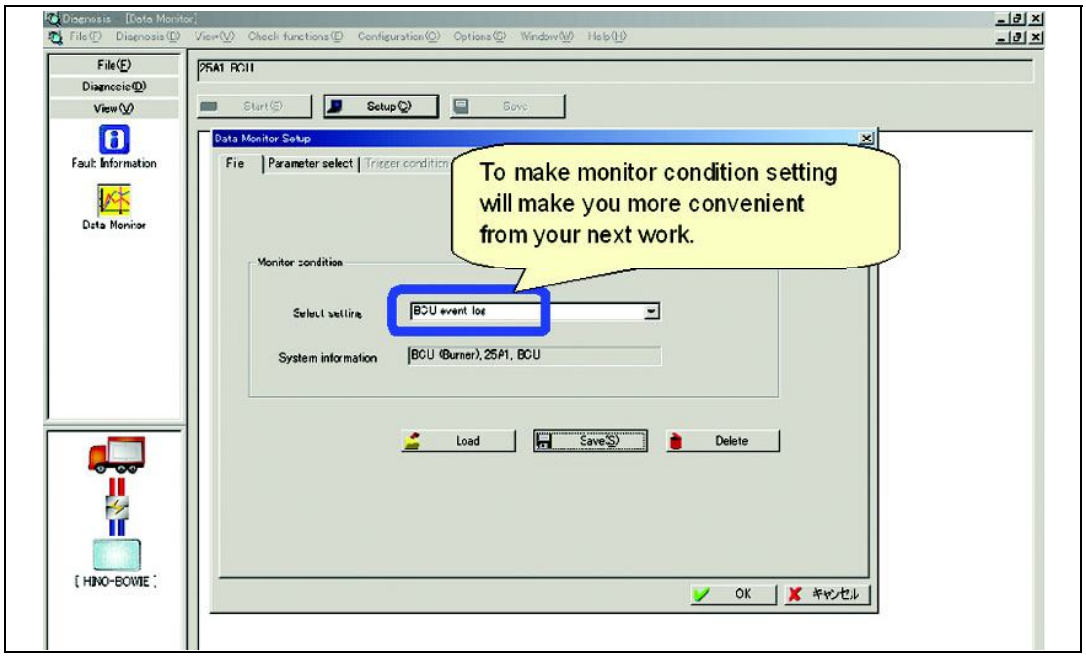
How to collect event log from BCU

1. Select the BCU (Burner) as System Fix.
2. Choose 5 parameters on DX Data monitor function.
3. Set the sampling rate with "Real Time".



SAPH80ZZZ0200207

4. Save the set up items.



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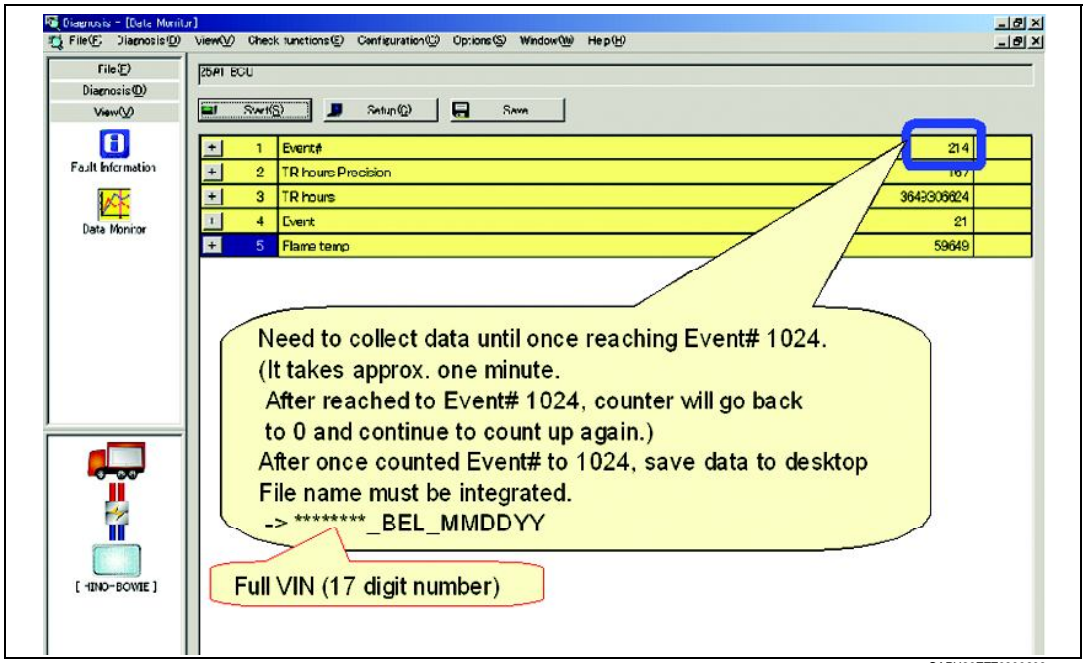
5. Start monitoring (collect data).
6. Save the data with instructed file name.



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Manufacturer Parameter

Manufacturer Parameter

EN80ZZZ02X100065

As a result of communalization of the system control software written into the hardware of the ECU, the predetermined function is realized by not changing the software itself but by changing the parameter in order to have different specifications according to the type of vehicles.

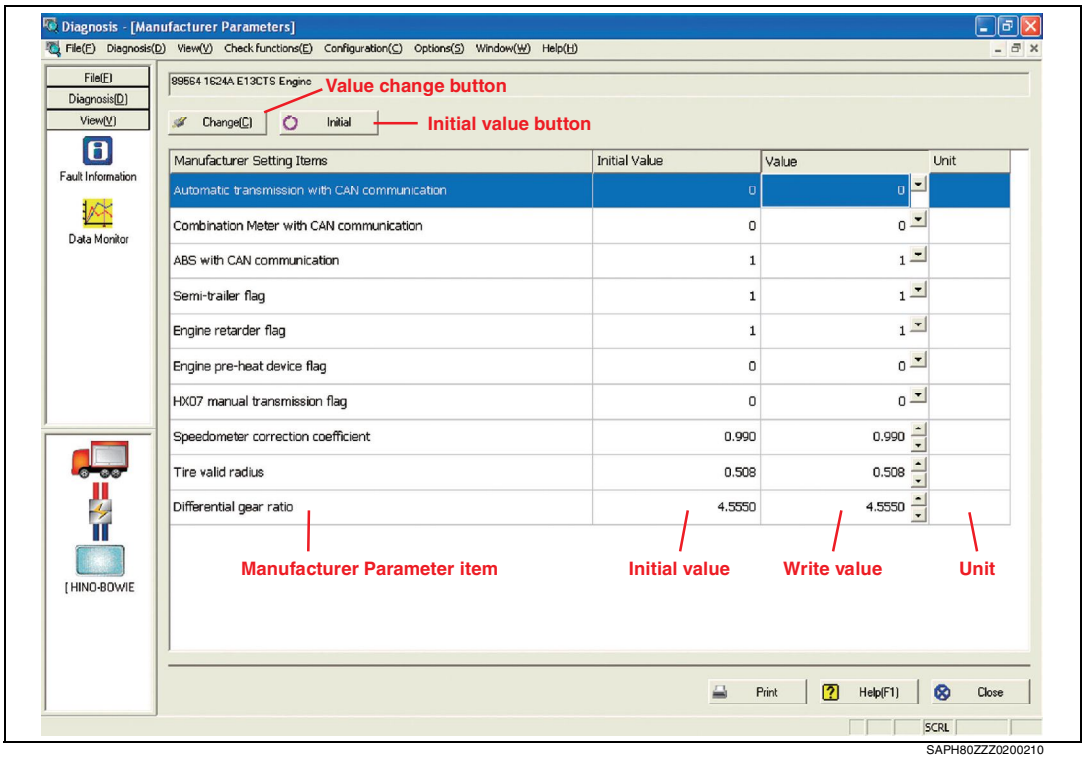

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Fig. 2-198 Manufacturer Parameters

What can be done in Manufacturer Parameter

EN80ZZZ02X100066

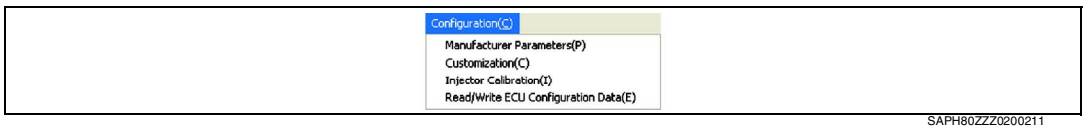
In Manufacturer Parameter, the parameter set up at the time of vehicles production can be changed, and we can meet the predetermined function.
For example, in Manufacturer Parameter for engines, if you install exhaust brakes afterwards to the vehicles produced without exhaust brakes, it is necessary to change the Exhaust brake flag as 0=>1.
If you change the differential and tires in order that a fuel-saving related setup could operate exactly, it is necessary to the change parameter.

⚠ **CAUTION**
If you make a mistake during this setup, it may cause failure of the vehicle and an accident. Therefore, perform set up without mistakes according to the vehicle specifications.
If you change the setup, it is necessary to send a work report (upload) to the service server.

Procedure - Manufacturer Parameter

EN80ZZZ02X100067

1. **Select "Manufacturer Parameter" menu.**
   Menu:[Configurations]-[Manufacturer Parameters]



SAPH80ZZZ0200211

Fig. 2-199 Menu - Manufacturer Parameter

2. **Select by clicking the item you actually want to change in the parameter.**
   Selected item will be highlighted.
   Selectable item will be limited to one.

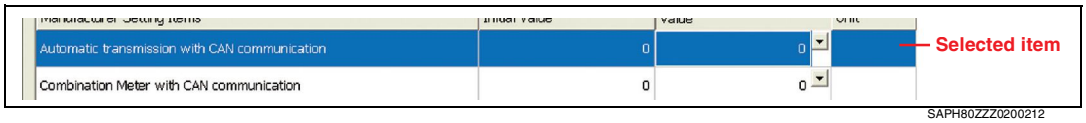


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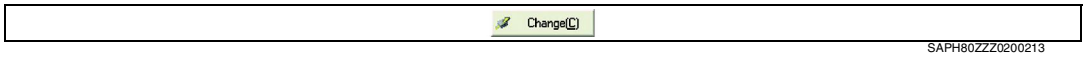
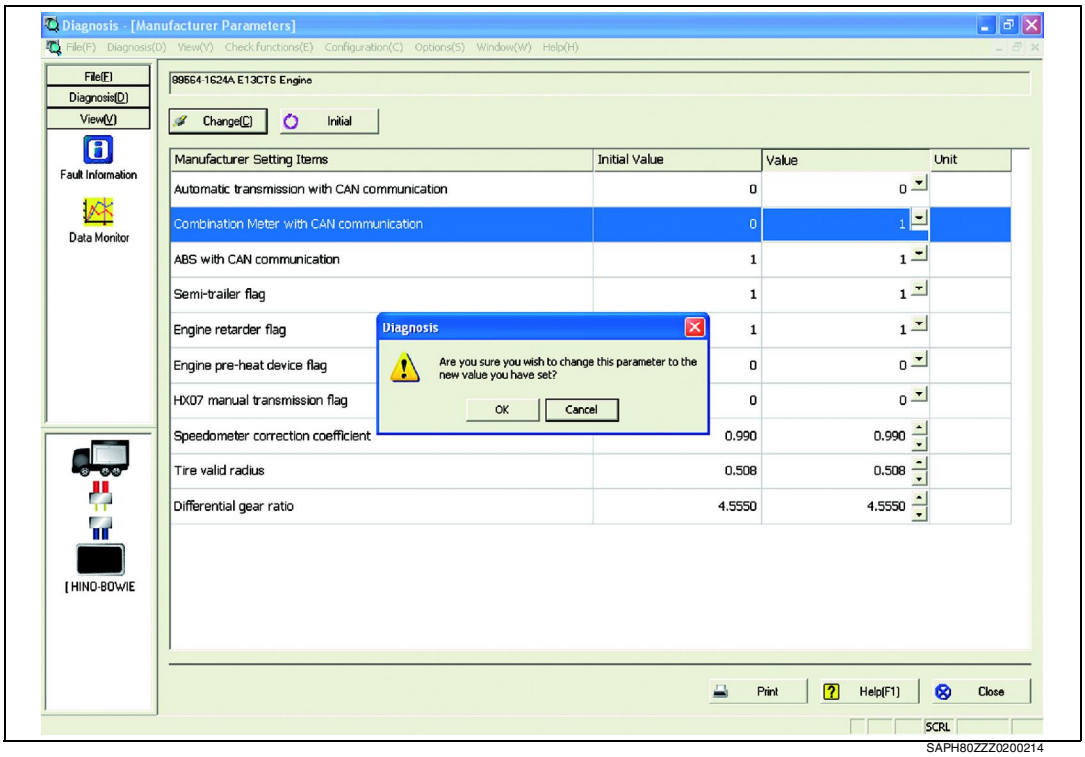
Fig. 2-200 Manufacturer Parameter - Selected item

3. **Change "Value" and set it up according to "what kind of state do you want to make?" and click [Change] button. After clicking [Change] button, a message comes up asking you "Is it OK to change?" If it is really OK, click [OK] button, if not click [Cancel] button.**



SAPH80ZZZ0200213

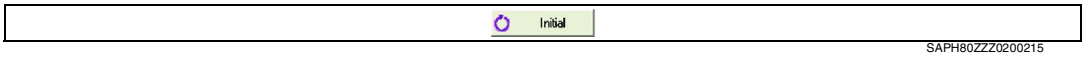
Fig. 2-201 Change button



SAPH80ZZZ0200214

Fig. 2-202 Manufacturer Parameter - Confirmation

4. **After writing the changed value in ECU, click the [Initial] button and you can return to the original value, if you want to do so.**
   The original value mentioned here is the value read from the ECU at the time of System Fix, and is not the information at the time of production.

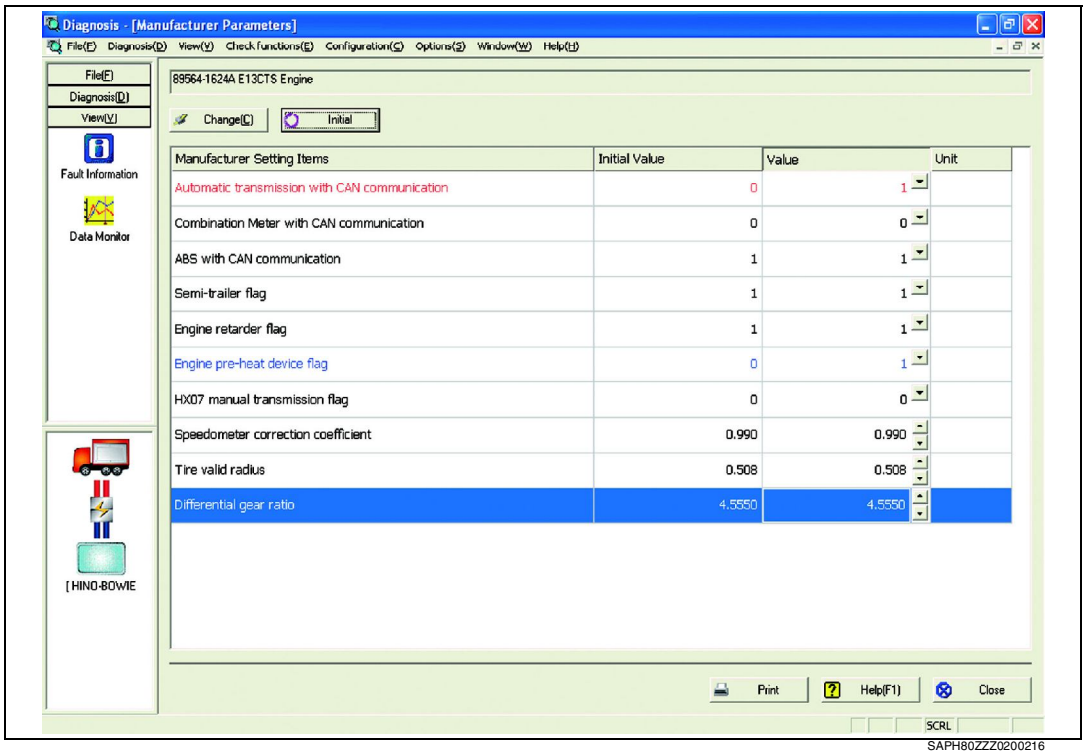


SAPH80ZZZ0200215

Fig. 2-203 Initialize button

HINT
In case of changing the Engine ECU value, you cannot change the value while the engine is running.

In Customization the character color changes according to the value write-in situation to the ECU.
Black color character:items not yet written
Blue color character:items already written
Red color character:written value has been changed on display but not written to ECU



SAPH80ZZZ0200216

Fig. 2-204 Manufacturer Parameter - letter color

Manufacturer Parameter Items

EN80ZZZ02X100068

Item	Function	Remarks
Invalid driver accelerator on PTO mode → Fire engine flag(Invalid driver accelerator on PTO mode	Purpose: Switching the fire engine coach build-specific control flag Function: Capable of making the driver accelerator invalid during PTO control (neutral SW: ON, PTO SW: ON). 0: The coach build is other than a fire engine. 1: The coach build is a fire engine. When 0 is mistaken for 1: The driver accelerator will become invalid in the middle of PTO control, and PTO engine control will be switched to control for fire engine. When 1 is mistaken for 0: The driver accelerator will become valid in the middle of PTO control.	
Automatic transmission with CAN communication	Purpose: Switching AT control as a result of failure troubleshooting when communication with the AT ECU is disrupted Function: Capable of making the driver accelerator invalid during PTO control (neutral SW: ON, PTO SW: ON). 0: When the vehicle is not equipped with an AT or when the AT is not connected to the CAN 1: When the vehicle is equipped with an AT and the AT is connected to the CAN When 0 is mistaken for 1: On an MT vehicle, the state will be considered to be a communication blackout, and the malfunction code output (U0101), the exhaust brakes, and the engine retarder will become inactive. When 1 is mistaken for 0: The AT will be no longer identified.Auxiliary brake cut will fail during lockup release. Note: Select "1" when the vehicle is equipped with the AT concerned.	
Scanning cruise control with CAN communication	0: When the vehicle is not equipped with a vehicle distance cruise system or when the vehicle distance cruise system is not connected to the CAN 1: When the vehicle is equipped with a vehicle distance cruise system and the vehicle distance cruise system is connected to the CAN	
Air suspension with CAN communication → Air suspension	0: When the vehicle is not equipped with air suspensions or when the air suspensions are not connected to the CAN 1: When the vehicle is equipped with air suspensions and the air suspensions are connected to the CAN	
Combination Meter with CAN communication	0: When the meter is not connected to the CAN 1: When the meter is connected to the CAN When 0 is mistaken for 1: When 1 is mistaken for 0:	
ABS with CAN communication	Purpose: Judging a communication blackout with the ABS ECUABS and ASR output adjustment, retarder control, etc. 0: When the vehicle is not equipped with an ABS or EBS or when the ABS or EBS is not connected to the CAN 1: When the vehicle is equipped with an ABS or EBS and the ABS or EBS is connected to the CAN When 0 is mistaken for 1: The state will be considered to be a communication blackout, the malfunction code output (U0121) will become inactive, and the operation of the second stage of the auxiliary brakes on a semi-tractor will be restricted. When 1 is mistaken for 0: The ABS malfunction code will not be output, and the auxiliary brakes will become inactive if communication is disrupted when the ABS is in operation (they will be recovered after the key is turned OFF). Note: Select "1" (ON) for a vehicle equipped with an ABS having a CAN.	

Item	Function	Remarks
PWM PTO FLAG → Type of engine retarder	0: When the vehicle is not equipped with an engine retarder or when the engine retarder has only three cylinders 1: When the vehicle is equipped with a six-cylinder engine retarder When 0 is mistaken for 1: When 1 is mistaken for 0:	
Drive master flag	Purpose: Setting the drive master Function: Setting whether a drive master is equipped or not 0: Not equipped 1: Equipped Setting the drive master with a built-in ECU valid/invalid 1: Invalid 0: Valid	
Semi-trailer flag	Purpose: Setting engine maximum speed controlSetting DPR control or EBS control specific to the semi-tractor, switching brake control 0: When the vehicle model is not SS or SH 1: When the vehicle model is SS or SH When 0 is mistaken for 1: The maximum speed control of the E13C engine will enter semi-tractor mode, and this state will seriously affect DPR regeneration control (the DPR may be clogged). When 0 is mistaken for 1: An engine retarder malfunction code (P1462, P1467) will be displayed on a vehicle equipped with an engine retarder, or the engine retarder indicator lamp will light on a vehicle without an engine retarder. When 1 is mistaken for 0: The maximum speed control of the E13C engine will enter single truck mode, and the T/M retarder will become active in a disconnected state from the trailer, which is very dangerous.The effect on DPR regeneration control will be serious (the DPR may be melted down). Note: Select "1" (ON) for a semi-tractor vehicle.Select "0" (OFF) for other vehicle types.	
Exhaust brake flag	Purpose: Control switching as a result of the optional setting of the exhaust pipe butterfly valve 0: When the vehicle is not equipped with exhaust brakes 1: When the vehicle is equipped with exhaust brakes When 0 is mistaken for 1: An exhaust pipe butterfly valve system diagnosis code (P1681) will be displayed, or the exhaust valve indicator lamp will light on a vehicle without an exhaust pipe butterfly valve. When 1 is mistaken for 0: The exhaust pipe butterfly valve will fail to operate. Note: Select "1" for a vehicle equipped with an exhaust pipe butterfly valve.	
Engine retarder flag	Purpose: Switching auxiliary brake control 0: When the vehicle is not equipped with an engine retarder 1: When the vehicle is equipped with an engine retarder When 0 is mistaken for 1: An engine retarder malfunction code (P1462, P1467) will be displayed on a vehicle equipped with an engine retarder, or the engine retarder indicator lamp will light on a vehicle without an engine retarder. When 1 is mistaken for 0: Engine retarder malfunctions will not be detected or the engine retarder will fail to operate on a vehicle equipped with an engine retarder. Note: Select "1" for a vehicle equipped with an engine retarder.	
T/M retarder flag	Purpose: Switching vehicle distance cruise interlock auxiliary brake control; applicable to vehicles equipped with a powerful T/M retarder for heavy- and medium-duty vehicles 0: When the vehicle is not equipped with a T/M retarder 1: When the vehicle is equipped with a T/M retarder When 0 is mistaken for 1: A T/M retarder diagnosis code (P1472) will be displayed, but the check engine indicator lamp will not light. When 1 is mistaken for 0: T/M retarder malfunctions will not be detected, or the vehicle distance cruise interlock T/M retarder will fail to operate. Note: Select "1" for a vehicle equipped with a T/M retarder.	

Item	Function	Remarks
Cruise control retarder flag	Purpose: Controlling vehicle distance cruise interlock auxiliary brake control on medium-duty vehicles 0: When the vehicle is not equipped with an FS cruise system or multi-step T/M retarder 1: When the vehicle is equipped with an FS cruise system and a multi-step T/M retarder When 0 is mistaken for 1: A cruise retarder diagnosis code will be displayed. When 1 is mistaken for 0: Malfunctions will not be detected.The vehicle distance cruise interlock cruise retarder will fail to operate. Note: Input "0" (ON) for a vehicle equipped with a medium-size engine and a vehicle distance scanning cruise system	
Transmission with Pro-Shift flag	Purpose: Switching Pro Shift control 0: When the T/M controller is not mechanically automatic 1: When the T/M controller is mechanically automatic When 0 is mistaken for 1: Malfunctions of the PCS/SW exclusively for MT vehicles will not be judged, or Pro Shift communication will be judged to be disrupted (U0101). When 1 is mistaken for 0: If communication is disrupted in the middle of Pro Shift gear shifting during which the speed limiter cannot be temporarily released during Pro Shift automatic gear shifting, gear shifting will be indentified and remain unchanged. Note: Select "1" (ON) for a vehicle equipped with Pro Shift.	
Engine pre-heat device flag	Purpose: Judging switching errors of control as a result of the optional use of an engine pre-heat device, switching operation indicator lamps and multi-information 0: When the vehicle is not equipped with an engine pre-heat device 1: When the vehicle is equipped with an engine pre-heat device When 0 is mistaken for 1: An engine pre-heat device malfunction (P0540) will be displayed, or the cooling indicator lamp will light or multi-information will be displayed even if an engine pre-heat device is not equipped. When 1 is mistaken for 0: A malfunction code will not be displayed although a malfunction exists.The engine pre-heat device will fail to operate. Note: Select "1" (ON) for a vehicle equipped with an engine pre-heat device.	
Speedometer correction coefficient	Purpose: The ECU corrects the speed inside for the purpose of calculating the absolute vehicle speed. When the input is wrong: The limit vehicle speed and the actual vehicle speed will not match when the speed limiter functions. When nothing is input: Backup will take place when the speedometer correction coefficient is "1" (no correction). The actual vehicle speed will decrease. Note: Do not change the speedometer correction coefficient unnecessarily because speed limiter control will vary.	
Tire valid radius	Purpose: For identifying the position of the vehicle fuel economy control gear When the input is wrong: The position of the vehicle fuel economy control gear will become unidentifiable and the vehicle will run in an unintended gear position. When nothing is input: The position of the vehicle fuel economy control gear will become unidentifiable and the vehicle will run in an unintended gear position although the vehicle is backed up by the set maximum valid radius of the vehicle's tires. Note: Whenever the tire size is changed, input the correct valid radius.	

Item	Function	Remarks
Differential gear ratio	Purpose: For identifying the position of the vehicle fuel economy control gear When the input is wrong: The position of the vehicle fuel economy control gear will become unidentifiable and the vehicle will run in an unintended gear position. When nothing is input: The position of the vehicle fuel economy control gear will become unidentifiable and the vehicle will run in an unintended gear position although the vehicle is backed up by the set maximum differential gear ratio of the vehicle. Note: Whenever the differential gear is changed, input the correct gear ration.	
Refrigeration compressor flag	Purpose: Switching refrigeration compressor identification control Function: Idle-up will automatically take place when the refrigeration compressor is in operation.Idle-up will take place when the battery voltage drops. 0: When the vehicle is not equipped with a refrigeration kit 1: When the vehicle is equipped with a refrigeration kit When 0 is mistaken for 1: Idle-up to the set engine speed will take place when an idle-up signal for the refrigeration compressor is issued. When 1 is mistaken for 0: Idle-up will not take place when the refrigeration compressor is in operation.The battery may go dead because idle-up does not take place even if the battery voltage drops. Note: The refrigeration compressor will not operate unless a refrigeration compressor actuation signal is not input into the engine ECU.	
Side turn signal identification	0: When the vehicle is not equipped with intermediate side turn signal lights 1: When the vehicle is equipped with an intermediate side turn signal lights	
Rear combination lamp specification	0: When the vehicle is not equipped with rear combination lights 1: DUAL TYPE (dual type = single stop light) 2: TRIPLE TYPE (triple type = two stop lights)	
Brake type	0: DRUM 1: DISC	
PCS (Power cut system)	0: When the vehicle is not equipped with a PCS (power cut system) 1: When the vehicle is equipped with a PCS (power cut system)	

HINT
The items may not be shown depending upon the model & type and specifications.

HINO Reprog Manager

DX03-001

General outline of HINO RM function

General outline of HINO RM function

EN80ZZZ03X100001

Hino Reprog Manager (Hino Rpr.) is a tool equipped with all the functions required to perform the writing and updating ECU program of the engine control ECU. In order to use this software, registration of the user with setup PIN (Personal Identification Number) is necessary. You can get the PIN through the HINO Re-programming Service Server.

SHTS80ZZZ0300001

Fig. 3-1

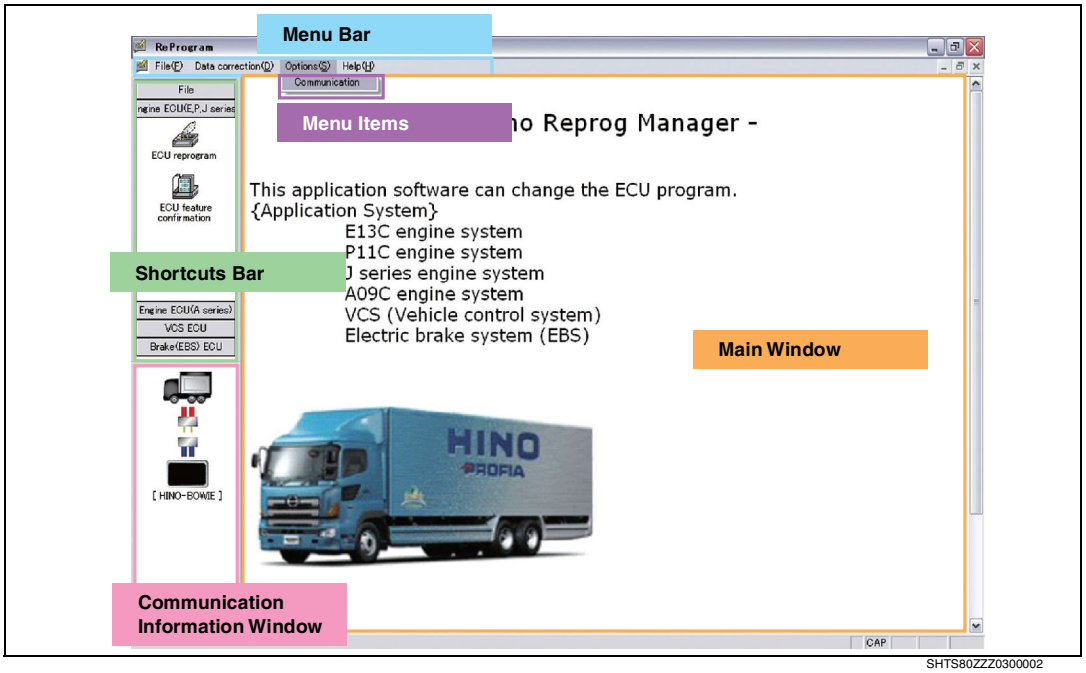
<Main function>

1. You can write and update the ECU program written in the Engine control ECU. (Reprogramming function)
2. You can change engine number limiting to that with the same specifications.
3. You can read and write vehicle data {EUC configuration data}. (ECU feature Related)
   Refer to Read/Write ECU configuration data for details.
4. You can check main vehicle information. (Vehicle Feature Confirmation)
   Refer to Vehicle Feature Confirmation for details.

Screen name of HINO-RM

Screen name of HINO-RM

EN80ZZZ03X100002



SHTS80ZZZ0300002

Fig. 3-2

Menu Bar
All the functions used in the Hino RM are summarized by functions.
There are menus which are displayed and not displayed according to the object equipment.

Menu Item
Detailed menus are shown summarized by functions. Items may increase/decrease according to the object equipment and work authority of the user.

Shortcut Bar
The function used well usually is summarized according to the item.

Main Window
All the Information and instructions for reprogramming are displayed.

Communication information window
The kind of I/F and current status of communication is displayed.

EXAMPLE

[HINO-BOWIE]

Communication with ECU not established or communication is under pause

[HINO-BOWIE]

Under communication with ECU.

SHTS80ZZZ0300003

Fig. 3-3

Reprogramming function

Reprogramming function

EN80ZZZ03X100003

Reprogramming work differs in the enforcement procedure according to work content.
Pin is recorded in the ECU after work and you can see when and who did the job.
Re-programming can be performed not only when it is installed to the vehicle but also when used as a separate item.

⚠ CAUTION
Notes when re-programming work

1. Before starting to work

(1) Supply the power sources of PC from the electric outlet!
* Re-programming work (writing to ECU) takes approximately 30 minutes. There is a possibility that an operation may not be stabilized when used with a built-in battery, or from the electric outlet in combined use with an electric welder ,etc.

(2) Keep the voltage of battery more than 12V!
* Connect with battery charger so that the ECU operation is stable!

(3) Check the setup of PC!
* Turn OFF "the power saving function (system standby) of a monitor", and a "screen saver" during work.
If the PC is in a rest condition, it may not complete work normally.

2. While working

(1) Keep the key switch "ON"!
* Re-programming work is interrupted if the key switch is turned "OFF" during communicating with ECU.
If you cancel in the middle of work, it may damage the ECU.
* However, when you finish working the message "Turn the key switch off then 10 seconds after, turn it on again" will be displayed. In such a case, turn the key switch "OFF".

(2) Do not operate the vehicle!
* If the other operation (starting engine ,etc.) is performed while communicating with ECU, you cannot complete the work normally.
* Consider putting up a board , etc, showing " Under re-programming", " Prohibited to operate vehicle" so that other engineers can see.

(3) Use Re-prog file that is suitable for the vehicle!
* When re-programming (re-writing) to ECU installed to the vehicle is performed, you cannot re-program the file with a different engine type (suffix).

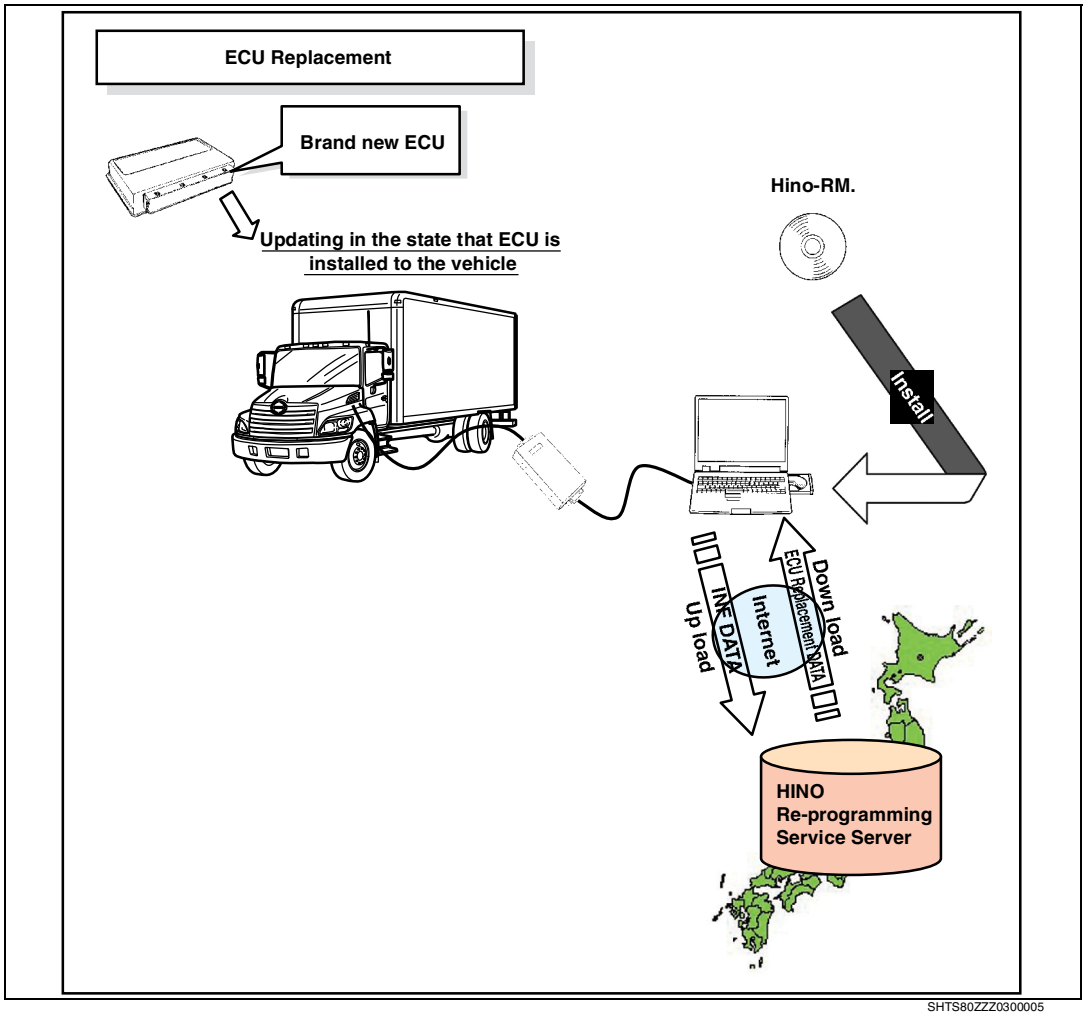
3. After work

(1) Delete Diag. code
* In Re-prog work, due to temporal communication discontinuation with Engine ECU, malfunction of communication abnormalities occur. After the completion of work, make sure that you eliminate diag. code of other equipments also.
* Additionally, since the DTC is memorized in Multi-information, make sure that you eliminate there, too.

ECU Replacement

EN80ZZZ03X100004

This is performed when Engine ECU has a failure or is damaged and you replace the ECU.
The same data (must be the newest data) as the original ECU data (ECU program and vehicle feature data) will be written to a brand new ECU corresponding to the target vehicle.



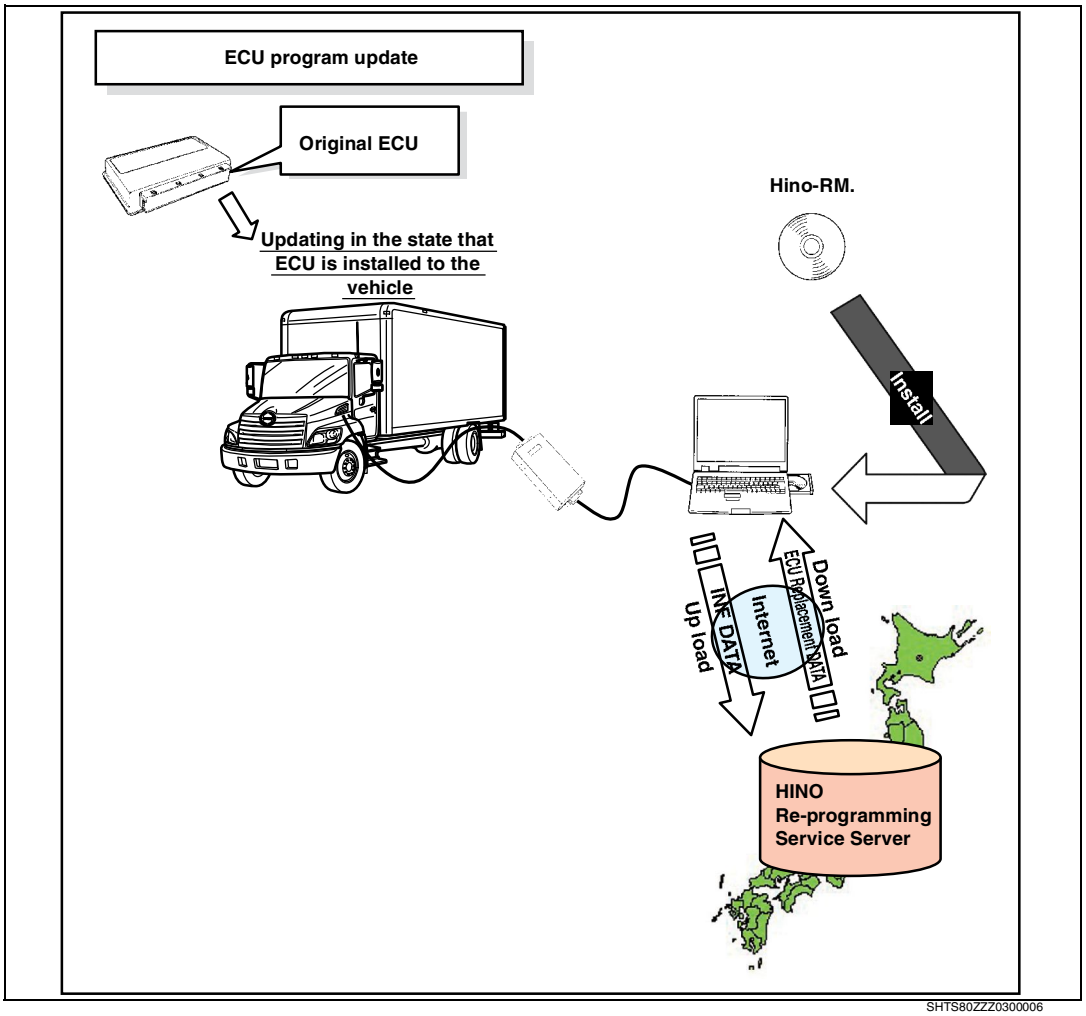
SHTS80ZZZ0300005

Fig. 3-4

ECU program update

EN80ZZZ03X100005

This is used when ECU is updated according to the instructions by the manufacturer, etc.
ECU program portion only updates original ECU (ECU with data already written). Vehicle features data are not updated.



SHTS80ZZZ0300006

Fig. 3-5

Engine exchange

EN80ZZZ03X100006

This is performed when an engine is exchanged.
New engine number and feature data will be updated to original ECU (ECU with data already written).

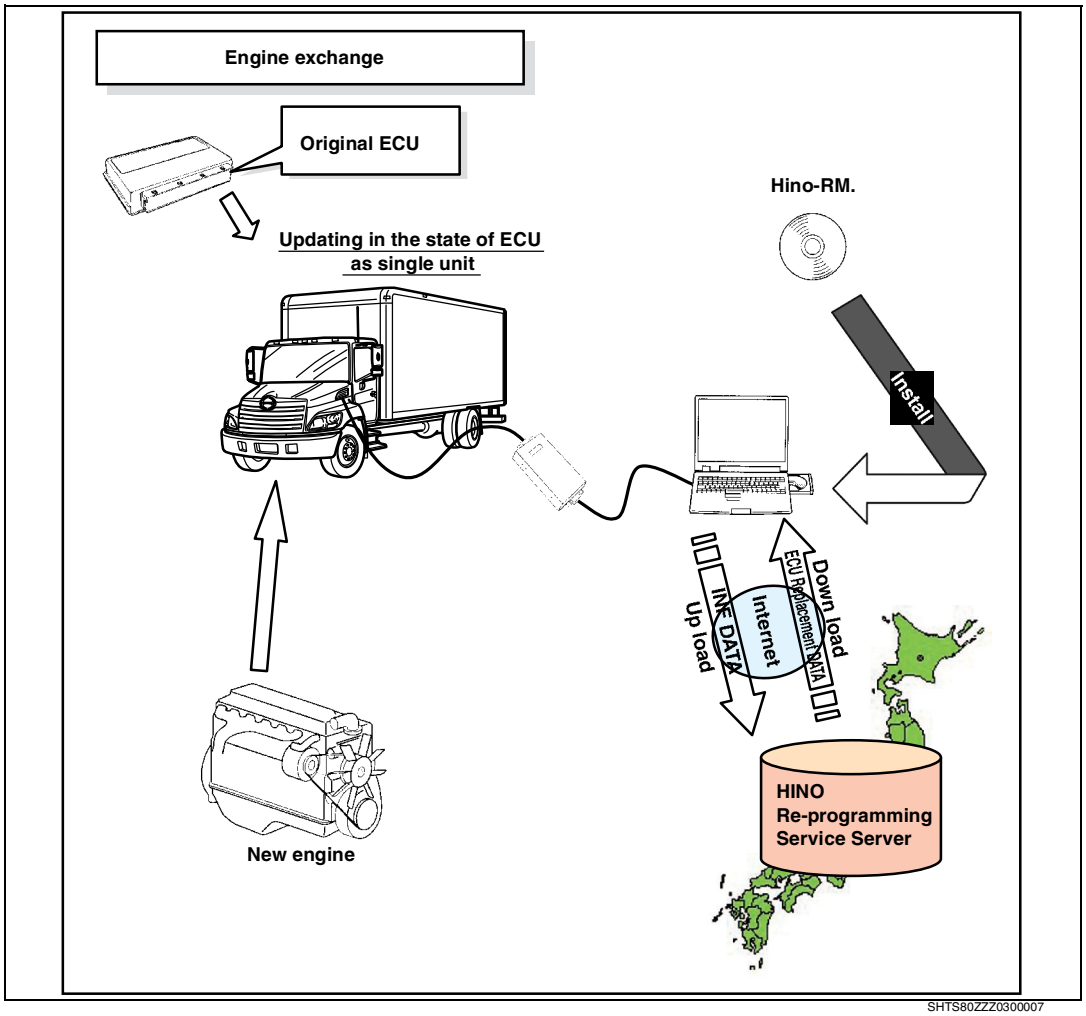


Fig. 3-6

Startup of HINO-RM

Startup of HINO-RM

EN80ZZZ03X100007

Before starting up of HINO-RM
Check the cable connection of vehicle ↔ I/F ↔ PC and turn the key switch of the vehicle "ON".
After the key switch is "ON", check if the I/F is "ON".

SHTS80ZZZ0300008

Fig. 3-7

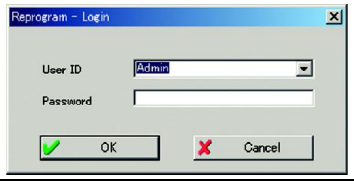
⚠ CAUTION
Since the battery voltage comes from the connector of the vehicle, pay attention when you connect the cable, even when the key switch of the vehicle is "LOCK".

1. Click the icon of Hino Reprog Manager on the desktop (HINO-RM Desktop Icon) to start up HINO-RM.

SHTS80ZZZ0300009

Fig. 3-8 HINO-RM Desktop Icon

2. Enter user ID and password specified by user and click [OK].



SHTS80ZZZ0300010

Fig. 3-9

3. Initial screen of HINO-DX is displayed.

SHTS80ZZZ0300011

Fig. 3-10

Re-programming work

Re-programming work

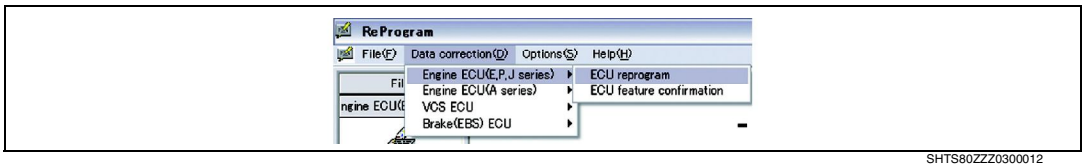
EN80ZZZ03X100008

HINO-RM can perform 3 kinds of re-programming work.

1. ECU Replacement
   When you replace ECU due to Engine control ECU has failure and damage.
2. ECU program update
   When you update ECU in accordance with manufacturer's instruction, etc.
3. Engine exchange
   When you replace engine

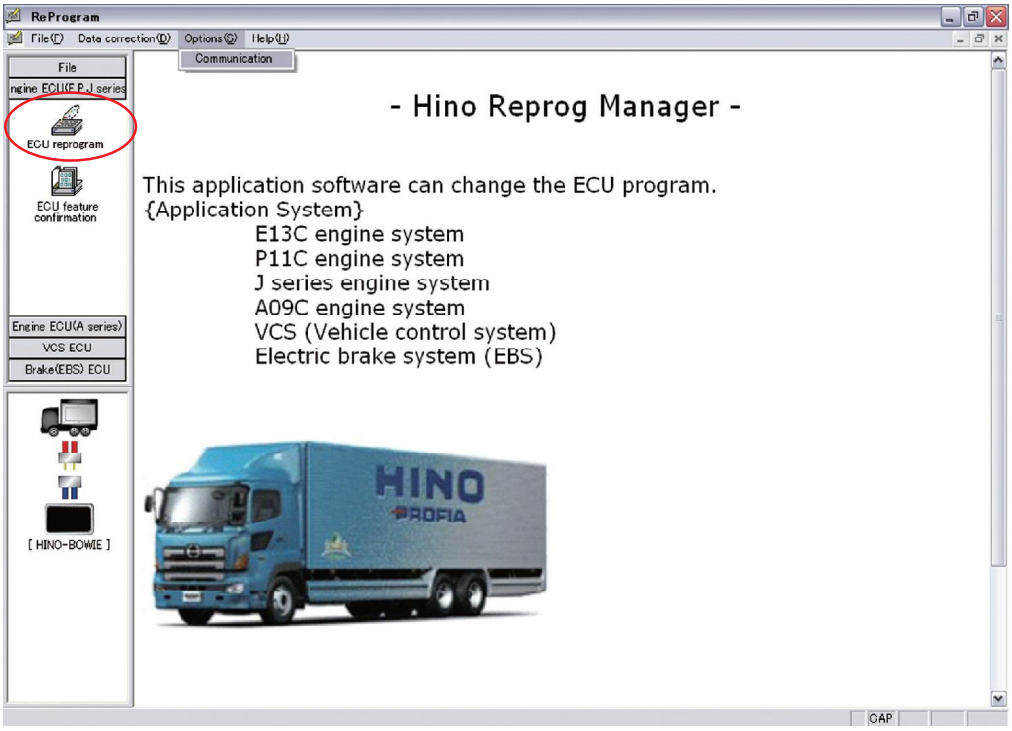
1. Start up HINO-RM and make sure that the Communication Interface and cable are connected without any problems, then connect respective cables to the vehicle and PC. After checking that the PC and the vehicle are connected with the cables through I/F, turn the key switch of the vehicle from "LOCK" to "ON".

2. Select [ECU Reprogram] from [Shortcut Bar] or [Menu Bar].
Menu:[Data correction]-[Engine ECU (E, P, T series)]-[ECU Reprogram]
Shortcut Bar:[Engine ECU (E, P, T series)]-[ECU Reprogram]



SHTS80ZZZ0300012

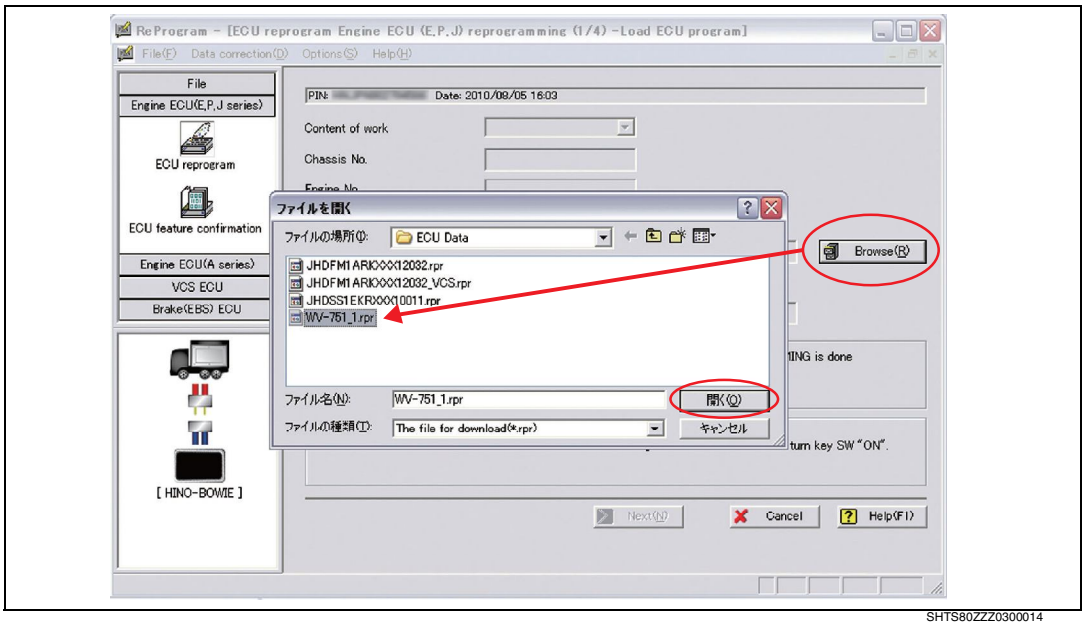
Fig. 3-11 Menu



SHTS80ZZZ0300013

Fig. 3-12 Shortcut Bar-ECU Reprogram

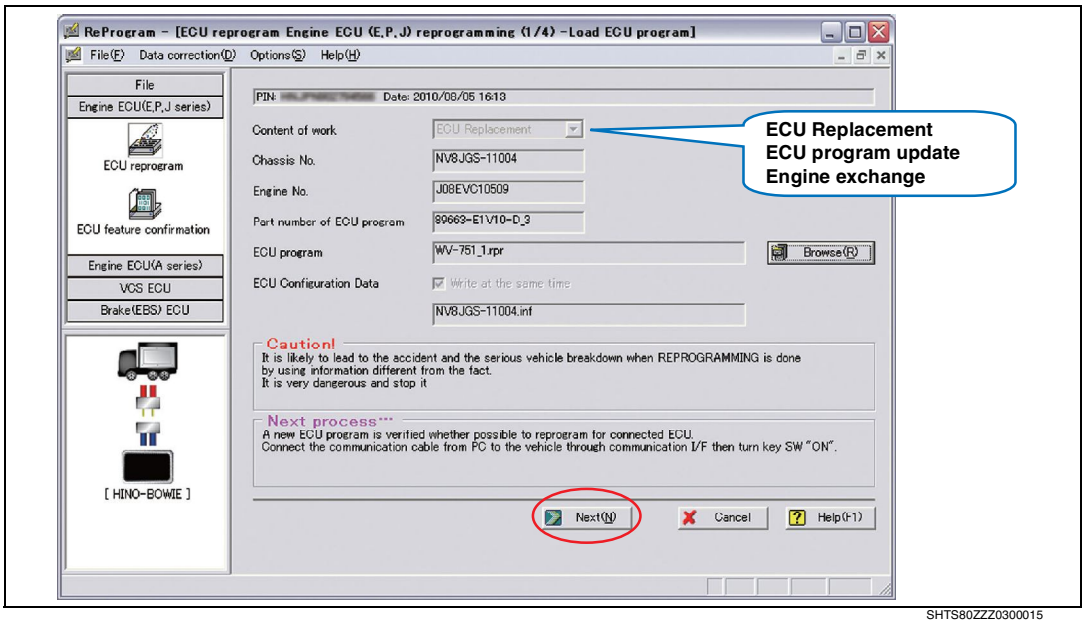
3. Click [Borrows] button and select the data previously downloaded from the HINO Re-programming Service Server.



SHTS80ZZZ0300014

Fig. 3-13 Select data

4. The content of the data selected at Step3 will be shown and check each item. Click [Next].

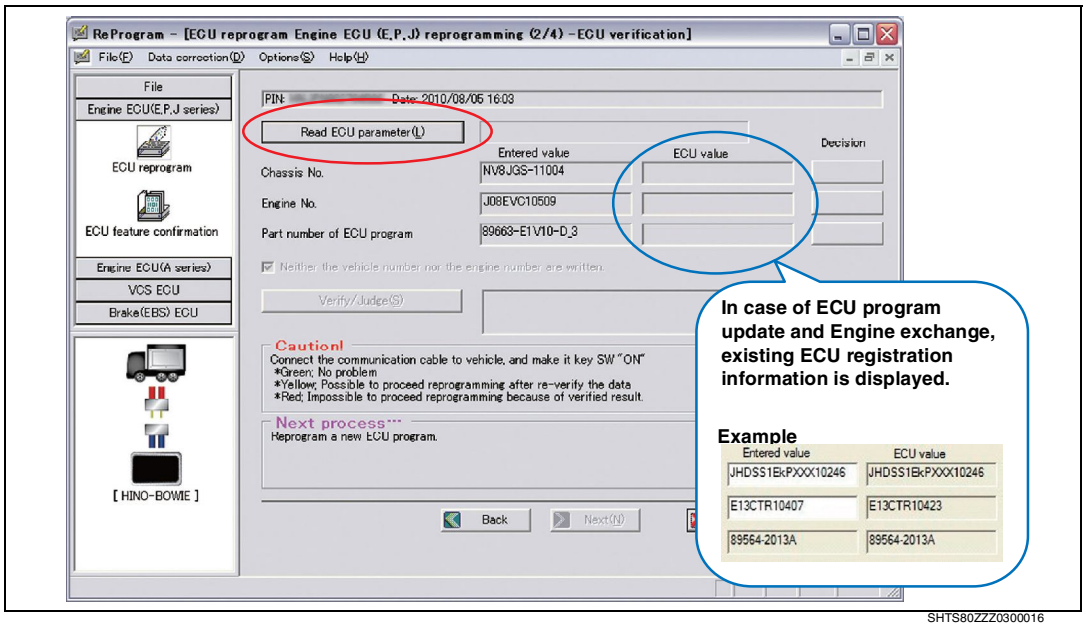


SHTS80ZZZ0300015

Fig. 3-14 Select data contents

HINT
Contents of work will show the work contents selected when you download from the HINO Re-programming Service Server.
Contents of work items will be shown dimly and its contents cannot be changed.

5. ECU information which you re-program is read,
Click [Read ECU parameter].



SHTS80ZZZ0300016

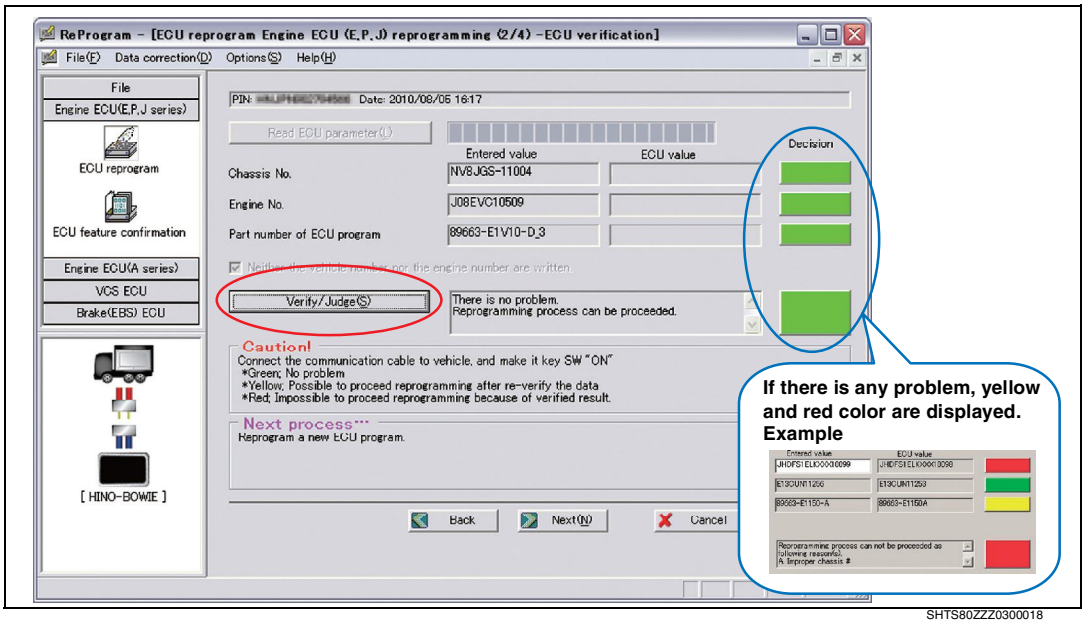
Fig. 3-15 Read ECU parameter

HINT
In case of ECU Replacement, use a brand new ECU. You cannot re-program the ECU with the data once written. If you re-program the ECU Replacement data to the ECU with the data already written, an error message is displayed as in Error message.

SHTS80ZZZ0300017

Fig. 3-16 Error message

6. Judgment whether writing is accepted or not is made.
Click [Verify/Judge].



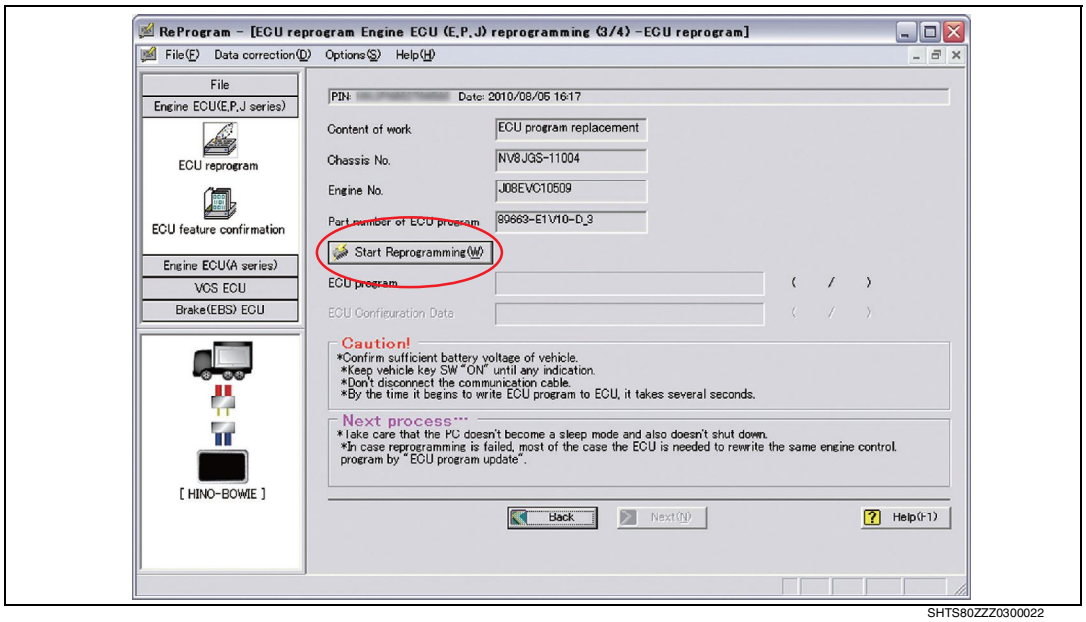
SHTS80ZZZ0300018

Fig. 3-17 Judge

HINT
If a green color appears in Decision, there is no problem. If you have one red color displayed, you cannot re-program.

	green color: No problem
	yellow color: Re-programming possible (Check entered value and ECU value displayed and proceed to re-program)
	red color: Re-programming impossible

7. Will start re-programming work.
Click [Start Reprogramming].

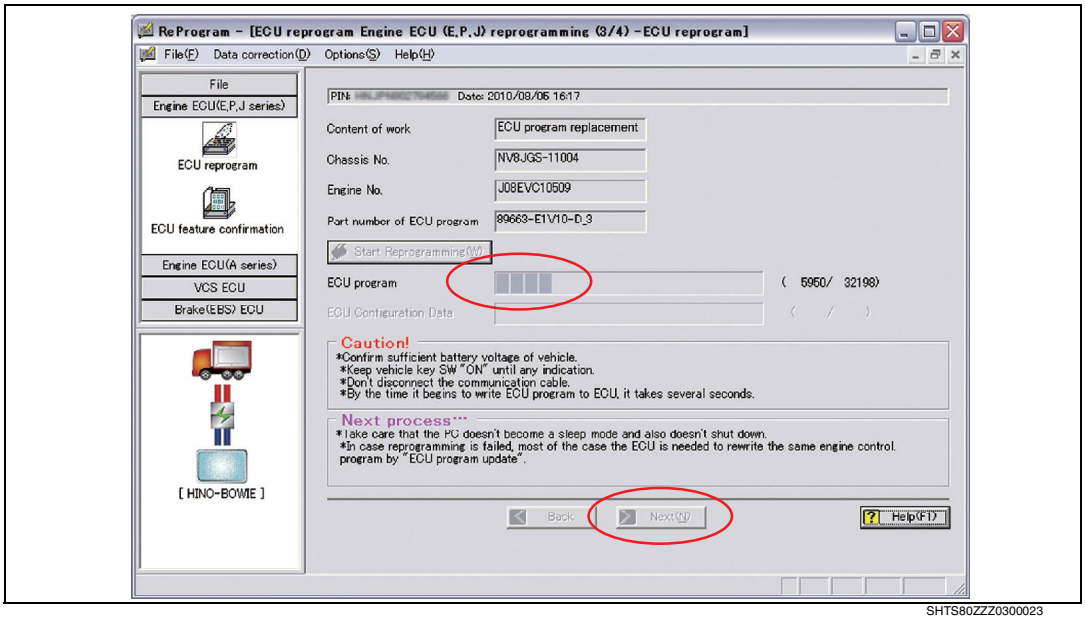


SHTS80ZZZ0300022

Fig. 3-18 Start Reprogramming

HINT
Re-programming takes approximately 30 minutes. While writing, never drop the power source of PC nor put to suspend mode. Otherwise, you cannot write normally. Observe strictly the note according to the procedure in the next page, of re-programming function.

8. Re-programming work started.
Progress status can be checked by ECU program.

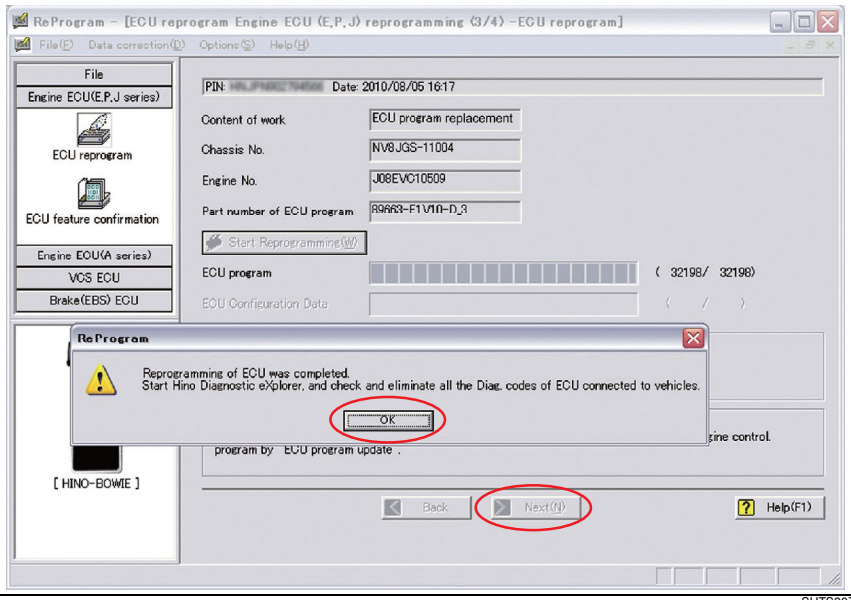


SHTS80ZZZ0300023

Fig. 3-19 Indicate progressed

HINT
In case of Engine exchange, engine program is not re-written, and will finish in several minutes.

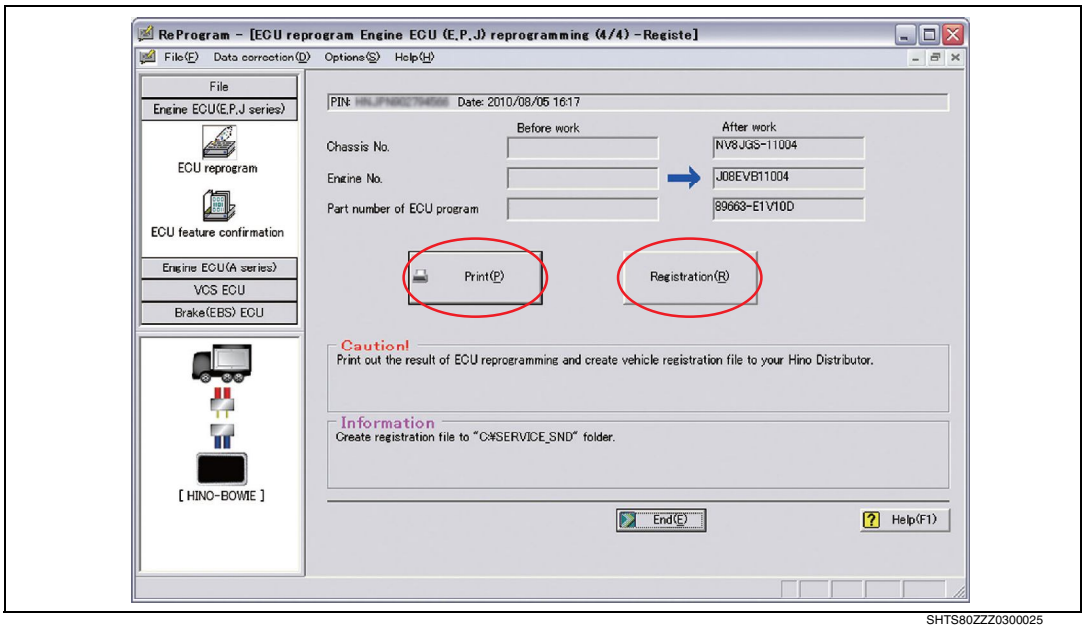
9. Reprogramming is now complete.
Click [OK] and click [Next].



SHTS80ZZZ0300024

Fig. 3-20 Complete message

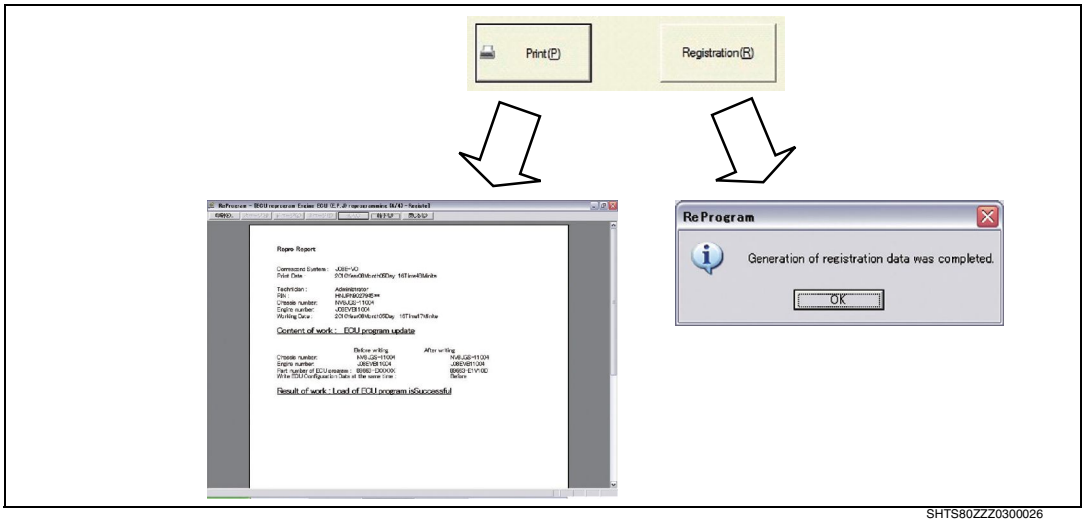
10. The contents before and after re-programming is displayed.
If you click [Print], you can print out the results of the re-programming.
If you click [Registration], you can make data to upload to the HINO Re-programming Service Server.



SHTS80ZZZ0300025

Fig. 3-21 Result display

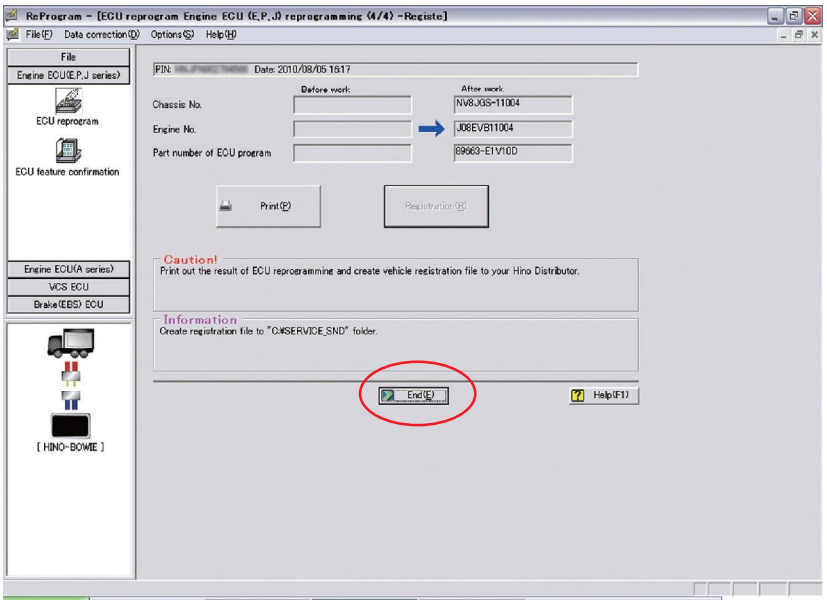
HINT
Set the printer in advance, when you print out.
Upload data to the HINO Re-programming Service Server which is made by clicking the [Registration] button, which will automatically be prepared in the folder "HINO Re-programming Service Server" of working PC.



SHTS80ZZZ0300026

Fig. 3-22 Print Registration

11. Click [End] and return to the initial screen.



SHTS80ZZZ0300027

Fig. 3-23 End display

⚠ CAUTION
After re-programming, always remember to check that there is no DTC appearing in the HINO-DX.
If DTC appears, eliminate it.
In case of the vehicle with Information display, equally eliminate DTC.

Reprogramming to the state of vehicle

ECU Replacement

EN80ZZZ03X100009

It is performed when new ECU is replaced according to failure or breakage of ECU.

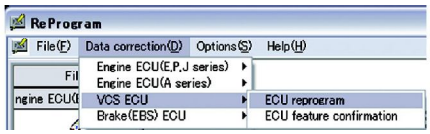
1. Download data from Reprogramming Server.

	Engine ECU	Vehicle Control ECU
ECU type	Engine ECU	Vehicle Control ECU
Work Contents division	ECU replacement	ECU replacement

2. Startup HINO-RM , connect with vehicle and write the downloaded file to ECU.

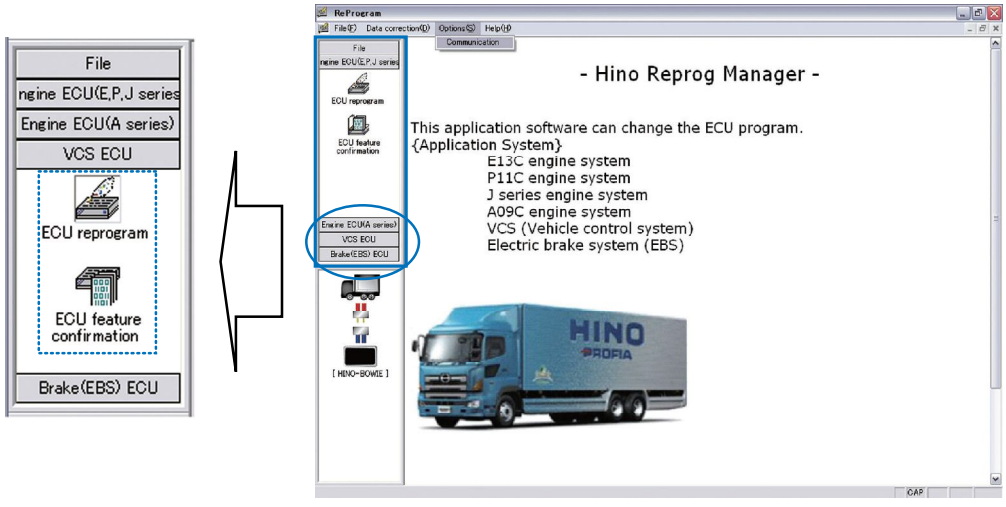
HINT

- **Refer to "6-4 Start-up of HINO-RM" and subsequent notes for detailed operation procedures.**
- **An initial screen will be displayed like Fig. 3-25 when HINO-RM is started. Select ECU which works from Menu Bar (Fig. 3-12) or Shortcut Bar.**
  Menu:[Data correction]-[VCS ECU]-[ECU reprogram]
  Shortcut Bar:[VCS ECU]-[ECU reprogram]



SHTS80ZZZ0300028

Fig. 3-24

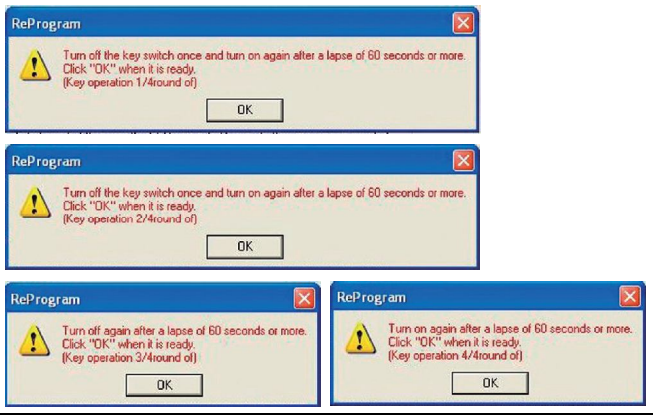


SHTS80ZZZ0300029

Fig. 3-25

- **Reprogramming time: Engine ECU (about 60 minutes) Vehicle Control ECU (about 15 minutes)**

- **Operate according to the instruction, as the message of Fig. 3-26appears in the course of reprogramming.**



SHTS80ZZZ0300030

Fig. 3-26

3. **Prepare work report file (upload) in the final process of reprogramming or prepare it by SS DATA Creator. Refer to Reprogramming Work or 7-SS DATA Creator for details.**

4. **Connect with Reprogramming Server and register the work report file (upload) prepared according to Step 3. Refer to 8-3-3-upload (repair report) for details.**

ECU program update

EN80ZZZ03X100010

It is carried out when updating ECU program according to the instruction by manufacturer, etc.

1. **Download data from Reprogramming Server.**

	Engine ECU	Vehicle Control ECU
ECU type	Engine ECU	Vehicle Control ECU
Work Contents division	Rewrite ECU program	Rewrite ECU program

2. **Start up HINO-RM, connect with vehicle and write downloaded file into ECU. Refer to "6-4 Start up of HINO-RM" and subsequent notes for details.**

3. **Prepare work report file (upload) in the final process of reprogramming., or by SS DATA Creator. Refer to Reprogramming Work or 7-SS DATA Creator for details.**

4. **Connect with Reprogramming Server and register the work report file (upload) prepared according to Step 3. Refer to 8-3-3-upload (repair report) for details.**

Engine replacement

EN80ZZZ03X100011

It is performed when you exchange spare parts engine or the same type used engine.

⚠ CAUTION
Do not change ECU of other vehicle. (engine) Engine and Engine ECU operate in pairs.

1. **Connect with Reprogramming Server and check the state of registration of the relevant vehicle.**

HINT
No customized information is expressed in case of the vehicle without the history of update in the past.

2. **In the status that engine is exchanged, connect with vehicle and setup customization identical to customization information checked by Step 1.**

3. Using SS DATA Creator, acquire upload data (INF file) for Service Server..

4. Connect with Reprogramming Server and register the work report file (upload) prepared according to Step 3.

HINT

At this point information of exchanged engine (engine number, injector correction value, customization information) is registerd to Reprogramming Server.

⚠ CAUTION

You are asked to carry out from Step 1 to Step 4 certainly.
If you carry out directly Step 5 and subsequent ones, engine information before exchange is overwritten to ECU of new engine. Once the engine number, in particular, is overwritten, it cannot be changed.

5. Download data from Reprogramming Server.

	Engine ECU	Vehicle Control ECU
ECU type	Engine ECU	Reprogramming unnecessary
Work Contents division	Rewrite ECU program	

HINT

- **It is not necessary to reprogram vehicle control ECU with the engine exchange.**
  (Because vehicle control ECU does not have engine information)
- **In case of spare parts A09C engine or the same type of engine, ECU is installed to which engine serial number and injector correction value are written. Therefore, when exchanging engine, it is not necessary to rewrite engine information.**
- **However, since the control software currently written in these ECUs is not necessarily the newest version. Download by [Rewrite ECU program], from Reprogramming Server, reprogram engine ECU and write in the latest control software.**

6. Start up HINO-RM, connect with vehicle and write in the downloaded file to ECU.

7. Prepare a work report (upload) in the final process of reprogramming or by SS DATA Creator.

8. Connect with Reprogramming Server and register the work report file (upload) prepared according to Step 7.

SS DATA Creator

DX04-001

SS DATA Creator - Outline of function

SS DATA Creator - Outline of function

EN80ZZZ04X100001

This tool can be used to create the data to report repair work {Repair report (Upload)} to HINO Re-programming Service Server.
Creation of the data file for upload to a service server is performed using [SS DATA Creator].
In [SS DATA Creator] creation of the data file for upload is possible also for the operator to whom the PIN is not given. *1

<Main function>

1. The function which acquires uploaded data from vehicles directly and creates it while connecting with vehicles. (Recommended method)
2. The function which creates uploaded data from the work data saved on the PC when failure diagnosis is made using the DX.

⚠ CAUTION
***1 The administrator with the PIN given in advance needs to set up the communication interface used in the Reprog Manager.**

Procedure - SS DATA Creator

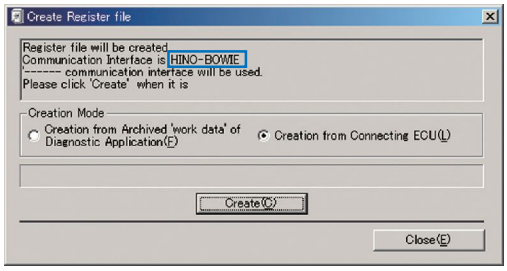
Procedure - SS DATA Creator

EN80ZZZ04X100002

1. Click shortcut [SS DATA Creator] on desktop to start.

SHTS80ZZZ0400001

Fig. 4-1 SS DATA Creator Desktop Icon



SHTS80ZZZ0400002

Fig. 4-2 SS DATA Creator display

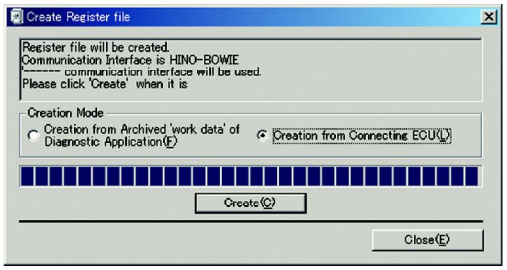
HINT
Please check that the communication interface which is a kind of blue enclosure (Fig. 4-2 SS DATA Creator display) is used.
When different, communicating becomes poor and file creation by the function which acquires data from vehicles cannot be performed.
As for setup of a communication interface, a "HINO-RM" set up is used.
When you change the setup, please start "HINO-RM" and change by [Option]->[Communication].

2. Creation Mode is chosen with a radio button {radio button}.

Creation Mode Item	Explanation
Creation from Archived "work data" of Diagnostic Application	In the state of connecting with vehicles, uploaded data is directly acquired from vehicles and is created.
Creation from Connection ECU	Uploaded data is created from the work data saved to PC when the failure diagnosis is performed using DX.

<When Creation from Connection ECU is selected>

3. Click [Create] button.



SHTS80ZZZ0400003

Fig. 4-3

4. When all indicators are displayed, creation is complete. Click [OK] button.

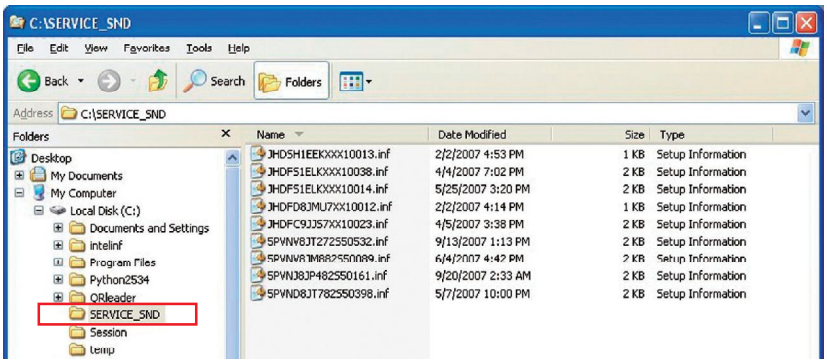
SHTS80ZZZ0400004

Fig. 4-4

5. Repair work report file has been prepared. Click [OK].

HINT

Same as the time of failure diagnosis, vehicles are connected with the PC through the interface, and the key switch needs to be "ON." An upload file is automatically saved at the same time of Reprog to [C:\SERVICE_SND] (change and updating).



SHTS80ZZZ0400005

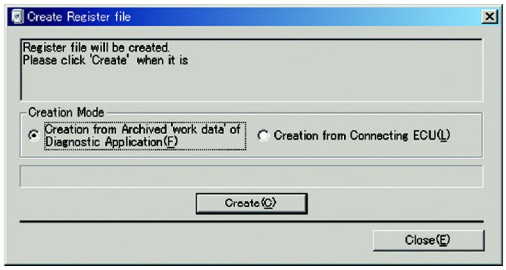
Fig. 4-5

⚠ CAUTION

Upload file name will be [VIN.inf] and if work report data is created several times for the same vehicle, they will over-write old data making them only new data.

<In case you select "Creation from Archived "work data" of Diagnostic Application">

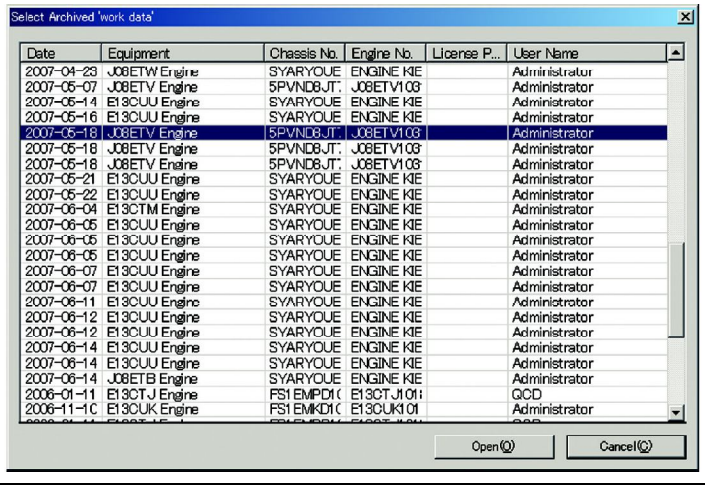
6. Click [Create] button.



SHTS80ZZZ0400006

Fig. 4-6

7. All the contents saved by deciding equipment at the time of failure diagnosis will be displayed.



SHTS80ZZZ0400007

Fig. 4-7

8. All the contents saved by equipment-deciding [System Fix], and carrying out at the time of failure diagnosis will be displayed.
Choose the required work for the work report and clicks [Open].

9. A work report file has been completed. Click [OK].

SHTS80ZZZ0400008

Fig. 4-8

HINT
Since work report data is created using the data saved by Past work information (reference 2-9), it can work also in the state where vehicles are not connected with PC.
An upload file is automatically saved at the same time of Reprog to [C:\SERVICE_SND] (change and updating).

⚠ CAUTION
Since Archived work data is saved on the PC whenever it works in the HINO-DX (communication established), please fully check the selection of data for the work report.

Analysis Example

DX06-001

Power RELEVANT ENGINE MODEL N04C: J05E: J08E

Phenomenon: Experience a lack of engine power

EN80ZZZ06X100001

There is a complaint from a user of a cargo truck that he experiences a lack of engine power in all range of engine speed. *No complaint in case of running on normal roads.

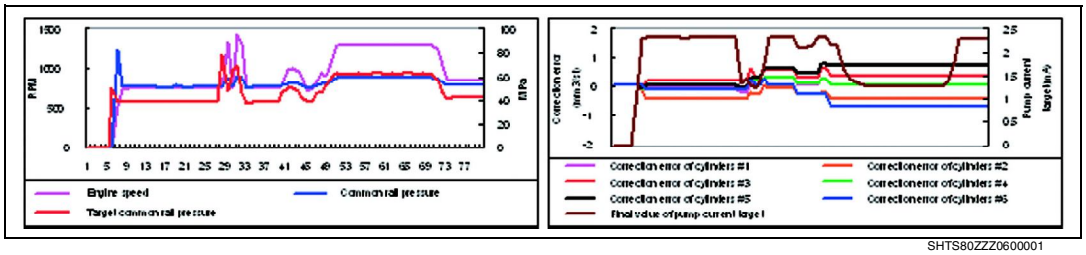
Enforcement item of maintenance

1. **Check Diag. code:**
   P0088 Excessive common rail pressure (past)is detected.

2. **Carry out troubleshooting in accordance with P0088:**
   Voltage is standard value.
   Replace common rail Assy based on the instructions of troubleshooting. → Problem unsolved

Analysis step of malfunction

1. **Check the following data by Data monitor**
   Engine speed, Target common rail pressure, Actual common rail pressure, Injection quantity, Correction error of cylinders #1~6(*Depending on the model, it is FCCB correction final value), SCV driving current F/B value, SCV driving current F/B value As a result of the data analysis, confirmed instruction values to each injector and ECU pump were normal, but it was found that they did not follow the ECU instruction value.



SHTS80ZZZ0600001

2. **As a result of 1, the following (1) -(4) items were implemented.**

(1) Check crushing of fuel hose and pipe → No crushing of hose/pipe found
(2) Replace fuel filter → Problem unsolved
(3) Clean fuel pipe between fuel tank and pump → Problem unsolved
(4) Clean pipe between supply pump and common rail → Problem unsolved

According to the results of 1-4, it was determined that there were no abnormalities of the fuel pipes between the fuel tank and common rail.

Final Action and Cause

Action
According to the enforcement items of maintenance, it was determined that there were no abnormalities of the fuel pipe system. It was determined that the supply pump itself had a problem and was replaced.

Cause of malfunction
Based on the check of the supply pump, it was determined that the SCV does not work properly due to rust.

Comment

P0088 Excessive common rail pressure was detected.
When SCV accretes on the full opening side, fuel flows excessively than target volume at engine starting and common rail pressure goes excessively high instantaneously. However, in medium and high engine speed ranges, due to inability to control fuel flow speed, the actual pressure becomes lower than the instructed value.

Malfunction of SCV
DX may not be able to determine the trouble if the parts have a mechanical malfunction.
*Items and standard value of the data monitor may vary according to the vehicle series. For details, refer to DX help.

Power RELEVANT ENGINE MODEL All engine series

Phenomenon: Experience a lack of engine power

EN80ZZZ06X100002

Users of cargo trucks complain about experiencing a lack of engine power in a whole range of engine revolutions.

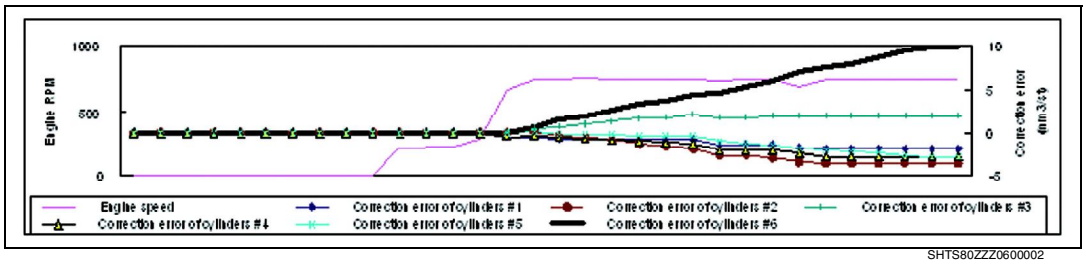
Enforcement items of maintenance

1. **No diagnosis code**
2. **Check with data monitor → No injection from #6**
3. **Cut-off of #6 injector → No change of engine sound and vibration**
4. **Replace #6 injector → Not dissolved**
5. **Clean interior of #6 injector pipe → Not dissolved**
6. **Replace #6 flow damper (Common rail) → Not dissolved**

Analysis step of malfunction

1. **Check injection condition of injectors**

- Check correction value among cylinders with Data Monitor
  STD (target):± 2-3mm^3/stcyl maximum @850 rpm Only #6 rapidly indicates -10mm^3/stcyl. Other cylinders gradually start to make a correction to the minus side.
  It was determined that #6 injector has no injection. No injection=It was determined that no signal was received since there was no problems of the fuel pipes



SHTS80ZZZ0600002

2. **Check electric circuit:**
   It is assumable that Diag. code (P201-6 etc.) related to defective injector control is seen due to no injection and was checked by taking the troubleshooting procedure. → Result: #6 chassis harness (Injector connector) only identified as abnormal resistance.

3. **Identify malfunction part (Conduction of chassis harness confirmed)**
   As a result of (2) check, remove each connector of the starting point of the chassis harness (Engine side) and its ending point (Cab harness side) to check conduction. (As to the place, refer to Workshop Manual) → Result: It is known that +●- of #6 has a short circuit within the harness wire

Final action and cause

Action
Dissolved malfunction by replacing chassis harness

Cause of the malfunction
It was found that the short circuit took place due to the fact that the film of the chassis harness was stripped by being crushed heavily by something

Comment

No Diag. code
Breaking of the harness was detected by Diag. Code but its short circuit was not detected by Diag. Code.

No injection of injector:
No injection of injector means no fuel or signal arrives at the injector.

Check of electric system:
Presume Diag. Code by currently known facts, if you want to check electric system without having any Diag. Code.
*Items and standard value of the data monitor may vary according to the vehicle series. For details, refer to DX help.

Power RELEVANT ENGINE MODEL Models adopting VN Turbo

Phenomenon: Lack of engine power (Engine does not blow up when running at high speed)

EN80ZZZ06X100003

There is a complaint that while running the vehicle at high speed, the engine check lamp turns on and engine revolution does not go up enough.

Enforcement items of maintenance

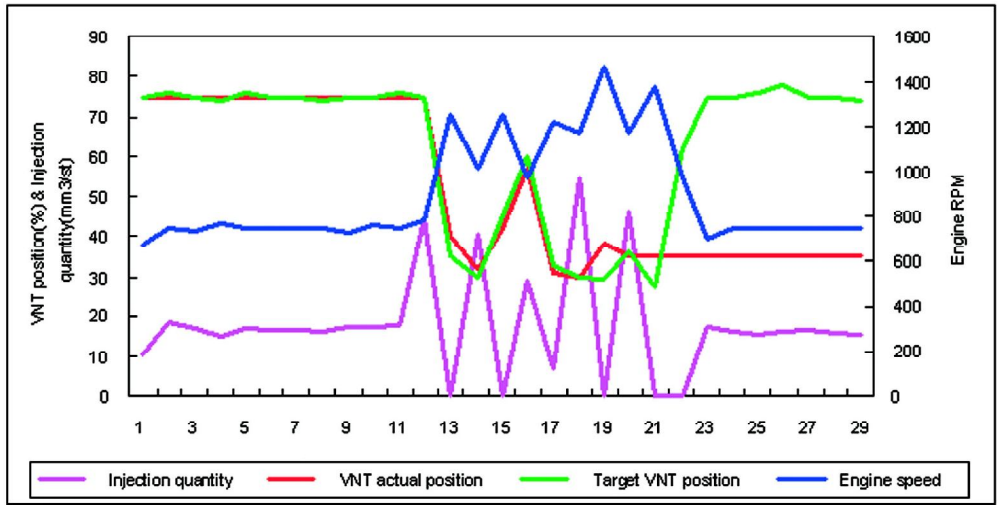
1. **Check Diag. code → Diag. code···P0045(in the past)**
   Engine revolution can only go up 1,800 rpm when engine check lamp turns on)

2. **Inspect based on troubleshooting → Unable to detect abnormalities**

3. **In order to conduct a reproductive check, check while running the vehicle and check lamp turns on.**
   Start the engine again, check lamp turns on and diag. code P0045 is remembered as past data. After running another 20km, stop the engine and re-start the engine, then check lamp turns on. (Reproduced)

Analysis step of malfunction

1. **Check Turbo (VNT) control**
   Inspect VNT of Data monitor and check the difference between specified VN opening and actual opening. Check specified VN opening, actual opening, engine revolution and volume of injection by Data monitor. → Result: After check lamp turns on, actual VN opening cannot follow specified VN opening and was finally frozen. Therefore, it was determined as malfunction due to Turbo control error.



SHTS80ZZZ0600003

Final action and cause

Action
Malfunction dissolved by replacing Turbo.

Comment

Malfunction of Turbo control
Check difference between specified VN opening and actual VN opening by Data Monitor in order to check Turbo (VNT) control.
If actual opening does not follow the specified opening, it is determined as Control error and Turbo is to be replaced.

Diag. Code P0045
If this code is detected, engine power output is restricted for the protection of the engine.
*Items and standard value of the data monitor may vary according to the vehicle series. For details, refer to DX help.

Power RELEVANT ENGINE MODEL All engine series

Phenomenon: Lack of engine power

EN80ZZZ06X100004

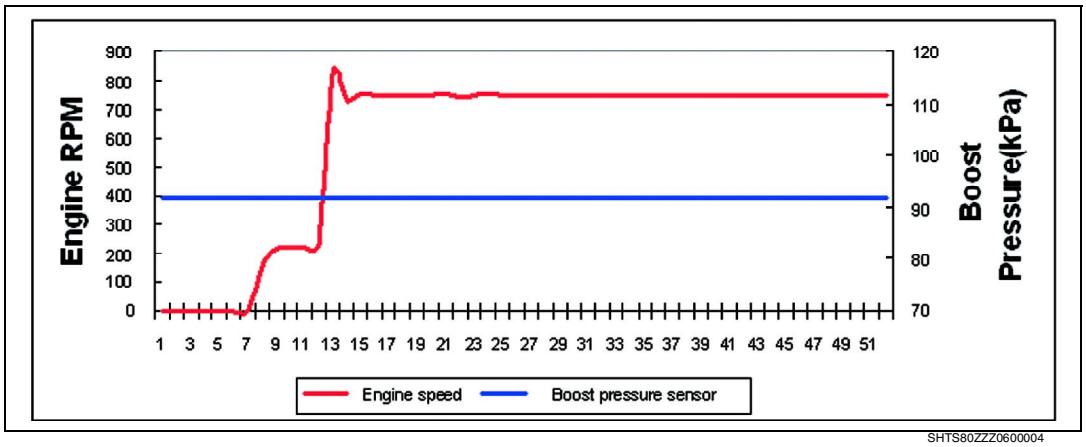
There is a complaint that a user who operates Hino trucks at higher than 2,000m above sea level feels a lack of engine power after engine overhaul and engine check lamp turns on.

Enforcement items of maintenance

1. **Check Diag. Code → P0237 Boost pressure sensor circuit low input (Active)**
2. **P0237 Troubleshooting → No abnormalities found**
3. **Check Air cleaner → No abnormalities found**
4. **Check intake pipe and hose, etc. → No crushing, nor bending, etc. found**
5. **Replacing BOOST PRESSURE SENSOR → Problem un-dissolved**
6. **Check revolution of Turbo → No abnormalities found**

Analysis step of malfunction

1. **Check turbocharge pressure. As a result of troubleshooting, it was determined that each equipment has no problem. Therefore, check supercharging pressure by data monitor.**
2. **As a result of 1., the supercharging pressure turned out to remain at 92Pa without change.**
   It was determined that no supercharging was taking place for some reason.



SHTS80ZZZ0600004

3. **Check function of VNT**
   → Check interior of hoses between Air cleaner and Turbo-charger
   → Result: Cleaning cloth got jammed in the Intercooler.

Final Action and Cause

Action:
Problem dissolved by removing foreign material. It was considered that a cleaning cloth to wipe out dirt was left without taking out at overhaul.

Comment

Supercharging pressure sensor
Detectable range of the supercharging sensor is 93kPa-370kPa. Standard atmospheric pressure at sea level is 101.3kPa and if you rise every 1,000m above sea-level, it will go down by 10kPa. At 2,000m above sea-level, it goes down by 20kPa making atmospheric pressure approx. 80kPa. Therefore, if there is no supercharging at 2,000m or higher above sea-level, supercharging pressure sensor cannot detect pressure and Diag. Code P0273 may come up. (Without clogging, it is approx. 100kPa at engine idling)
*Items and standard value of the data monitor may vary according to the vehicle series. For details, refer to DX help.

Power RELEVANT ENGINE MODEL E13C

Phenomenon: Lack of engine power (Poor response to accelerator)

EN80ZZZ06X100005

Although it became comparatively good after attaching countermeasure version ECU, the accelerator response changes sometimes and you feel deficiency in performance.

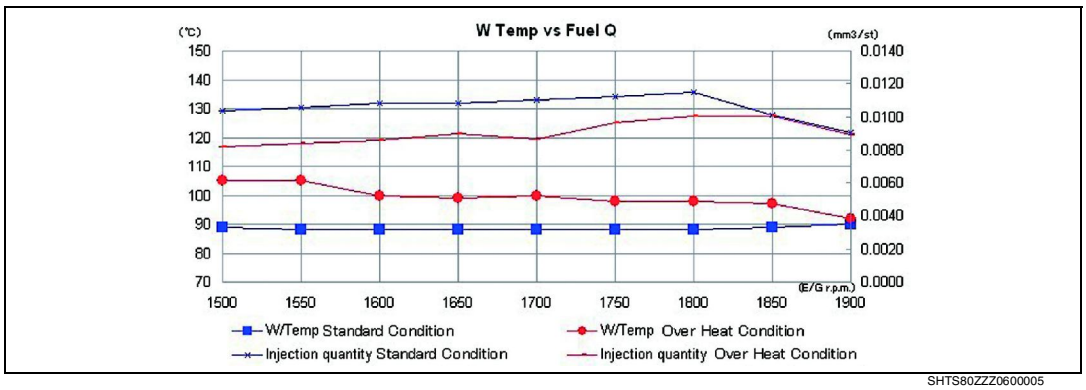
Enforcement items of maintenance

1. **DTC not found. Although each inspection items were checked, no problems were found. (There is a history of high water temperature 100°C)**

2. **Concurrently with measurement with chassis dynamometer , perform data monitor to compare with new vehicle data (contrast vehicle)**

Analysis step of malfunction

1. **The chart shows that high water temperature control is working. Poor response is presumed resulting from this.**



SHTS80ZZZ0600005

2. **Wash the circumference of radiator and perform chassis dynamo test again → No change and overheat occurs again**

3. **Cool forcibly the circumference of radiator and perform chassis dynamo test → although it is good but compared with base data, turbine rotation is fast.**

4. **Holes (countless pores) of Intercooler are considered to be the reason of overrun. Even if you wash more, you cannot wash completely.**

5. **Adhesion of dirt is determined as the cause of overheat and poor response.**

6. **Therefore, replace Intercooler and radiator, perform measurement and get the good result.**

Final Action and Cause

Action:
Arrange to change radiator and Intercooler to new ones.

Comment

In order to make good use of this function for data analysis, in case you save data on chassis dynamo or when the vehicle is climbing hill, save it so that the data becomes sharp and well appealing under the same condition of full load status. Data Monitor Item (Reference): "Engine coolant temperature", "Engine speed", "Vehicle speed", "Accelerator position sensor #1 position", "Accelerator position sensor #2 position", "Injection quantity", "Intake air pressure", "Turbo charger speed", "Common rail pressure", "Target common rail pressure"

*Items and standard value of the data monitor may vary according to the vehicle series. For details, refer to DX help.

Power RELEVANT ENGINE MODEL E13C

Phenomenon: Lack of power (Slow vehicle speed)

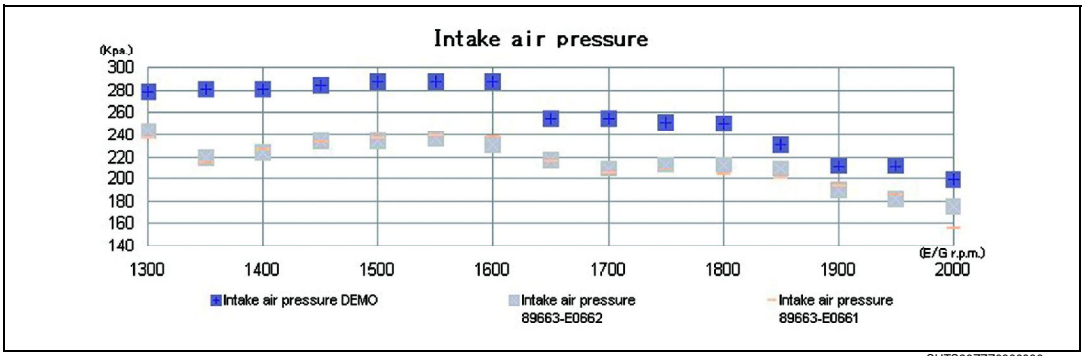
EN80ZZZ06X100006

Enforcement items of maintenance

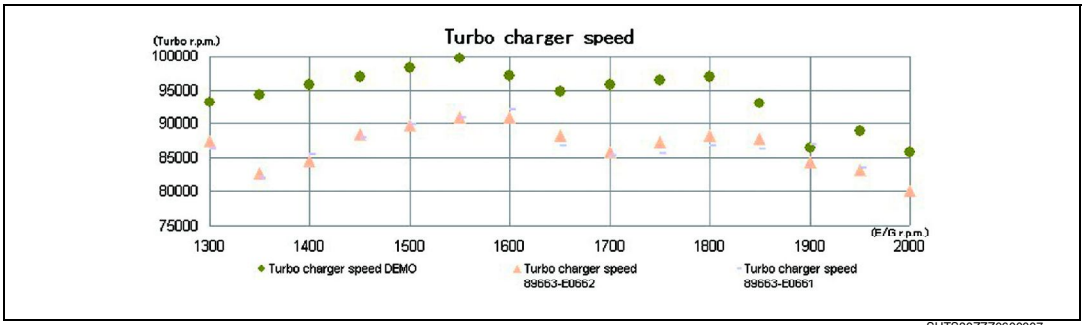
1. **DTC code··· Not found**
2. **Checked Turbocharger with DX and found no problem within the standard.(Standard: 40,000 rpm or more)**
3. **No leakage from Intercooler.**

Analysis step of malfunction

Compared the data monitor result with the data of the same type new vehicle and confirmed the difference as shown in the chart



SHTS80ZZZ0600006



SHTS80ZZZ0600007

Final Action and Cause

Action:
Dissolved failure by replacing Turbocharger.

Comment

In order to make good use of this function for data analysis, in case you save data on chassis dynamo or when the vehicle is climbing hill, save it so that the data becomes sharp and well appealing under the same condition of full load status. Data Monitor Item (Reference): "Engine coolant temperature", "Engine speed", "Vehicle speed", "Accelerator position sensor #1 position", "Accelerator position sensor #2 position", "Injection quantity", "Intake air pressure", "Turbo charger speed", "Common rail pressure", "Target common rail pressure"

*Items and standard value of the data monitor may vary according to the vehicle series. For details, refer to DX help.

Overheat RELEVANT ENGINE MODEL

Engines adopting Cool EGR

Phenomenon: Overheat (Large quantity of white smoke after replacing LLC)

EN80ZZZ06X100007

A vehicle is brought in to the dealer with a complaint that the water temperature gauge went high while running the vehicle

Enforcement items of maintenance

1. **Diag. Code confirmed: → P0217**

2. **Replaced fan clutch and delivered the truck to the customer due to a similar experience in the past when the trouble was dissolved by replacing the fan clutch, but the trouble happened again.**

3. **The same complaint that Overheat and large quantity of white smoke occurred again and the vehicle was brought in to the dealer again.**

Analysis step of malfunction

1. **Check Past work information:**
   Confirmed the engine control history by the Diag. monitor as follows.

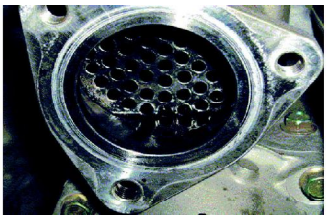
Parameters	Before	After	Unit
[Fault Information]			
[Freeze-Flame]			
[System Protection Data]			
Overrun frequency	0	0	times
Overheat frequency	0	1	times
Maximum coolant temperature	102	123	oC
Highest fuel temperature	70	70	oC
Overrun engine speed	2237.00	2237.00	r/min

SHTS80ZZZ0600008

*It was evident that the engine overheated for some of the reason according to the above history.

2. **Check if there is any abnormality in engine control.**
   Found no special abnormalities in active test, injector control and EGR valve control, etc. by data monitor. However, the water level warning lamp turned on.

3. Investigation of the cause why water level warning lamp turns on.
Lowering of the water level in the reservoir tank was not confirmed and checked the water level in the radiator by removing the radiator cap, and the coolant level turned out to be lower than water level sensor. When the coolant level is low, there is a possibility of no-water burning, Therefore, having removed the EGR pipes located at the front and rear of the EGR and checked interior of the EGR cooler, it was found that there was a leakage of LLC to the inside of the EGR cooler.



SHTS80ZZZ0600009

→ When replacing LLC, air bleeding was not done given sufficiently and due to no-water burning of the EGR cooler, the EGR tube cracked and the passages of gas and coolant in the EGR connected each other resulting in the "overheat"

Final action and cause

Action:
Replacing EGR cooler, LLC and flushing to dissolve malfunction.

Comment

No-water burning of EGR:
In case of lowering of the water level, LLC cannot spread enough in the EGR cooler and it may cause cracking of the EGR tube.

Air bleeding when replacing LLC:
Without sufficient air bleeding when replacing LLC of the vehicle adopting EGR cooler, there is a possibility of no-water burning of the EGR cooler. Therefore, sufficient air bleeding is absolutely necessary.

Overheat:
For both heavy-duty and medium duty vehicles continuation of higher temperatures than 115°C for more than 30 seconds will be recorded as "Overheat" Temperature less than 114°C will be recognized as normal.
*Items and standard value of the data monitor may vary according to the vehicle series. For details, refer to DX help.

Starting malfunction RELEVANT ENGINE MODEL

All engine series

Phenomenon: Poor engine start ability

EN80ZZZ06X100008

Engine stops while running and is unable to start again. The vehicle is brought in to the workshop.

Enforcement items of maintenance

1. **Check Diag. code → P0088 (in the past)**

2. **Replace supply pump → P0088 is dissolved but engine cannot start.**

3. **Injection cut by active test → No change of engine vibration nor sound of cylinders #1, 5, 6**
After running for several tens of minutes (10, 20~ min.), the engine stalls. Unable to re-start after then.

Analysis step of malfunction

Assume injector control problem according to enforced items of maintenance (Fuel nor signal do not reach injector)

1. **Check whether fuel flows to injector. Check clogging of fuel channel.**
Remove parts of fuel channel (fuel tank -injection pipe) and check fuel → No abnormalities found

2. **Check whether electric signal run to injector.**
Inspect based on P0088 troubleshooting → No abnormalities found
Assume Diag. Code (P201 -6) related to injector control malfunction conduct and troubleshooting → No abnormalities found

3. **Check ECU protection data**
Check overrun, overheat, flow-damper operation frequency, etc. → No abnormalities found

4. **Check whether ECU recognizes injector control, etc. when engine starts up.**
Check whether each control value varies before/after engine starts.

Data monitor value at cranking

+	1	Engine speed	222	r/min
+	2	Common rail pressure	50	MPa
+	3	Target common rail pressure	51	MPa
+	4	Injection quantity	0.00	mm3/st
+	5	Correction error of cylinders #1	0.04	mm3/st
+	6	Correction error of cylinders #2	0.04	mm3/st
+	7	Correction error of cylinders #3	0.04	mm3/st
+	8	Correction error of cylinders #4	0.04	mm3/st
+	9	Correction error of cylinders #5	0.04	mm3/st
+	10	Correction error of cylinders #6	0.04	mm3/st
+	11	G sensor active flag	ON	
+	12	NE sensor active flag	ON	

Engine speed: No problem
Specified value of common rail: No problem
Actual common rail pressure: No problem
Injection volume: No injection
#1Correction value: No Correction
#2Correction value: No Correction
#3Correction value: No Correction
#4Correction value: No Correction
#5Correction value: No Correction
#6Correction value: No Correction
G sensor: When key is ON Indicated as ON: No problem
NE sensor: When key is ON indicated as ON: No problem

Final action and cause

Action
It was determined that injector has no injection and problem dissolved after replacing 6 injectors.

Comment

Injector correction value while idling
J08E: 3.00-4.00 mm^3/st approx. (Rough standard) E13C: 5.00-5.00 mm^3/st approx. (Rough standard)

Injection volume while idling
J08E: 11.00 mm^3/st approx. (Rough standard) E13C: 15.00 mm^3/st approx. (Rough standard)
*Items and standard value of the data monitor may vary according to the vehicle series. For details, refer to DX help.

Starting malfunction RELEVANT ENGINE MODEL N04C, J05E, J08E

Phenomenon: Hunting

EN80ZZZ06X100009

Engine stops while running normally and unable to start again after then. The vehicle is brought in to the workshop and engine re-started. However, there is a complaint that the engine idling revolution has hunting and the vehicle is brought in to the dealer.

Enforced items of maintenance

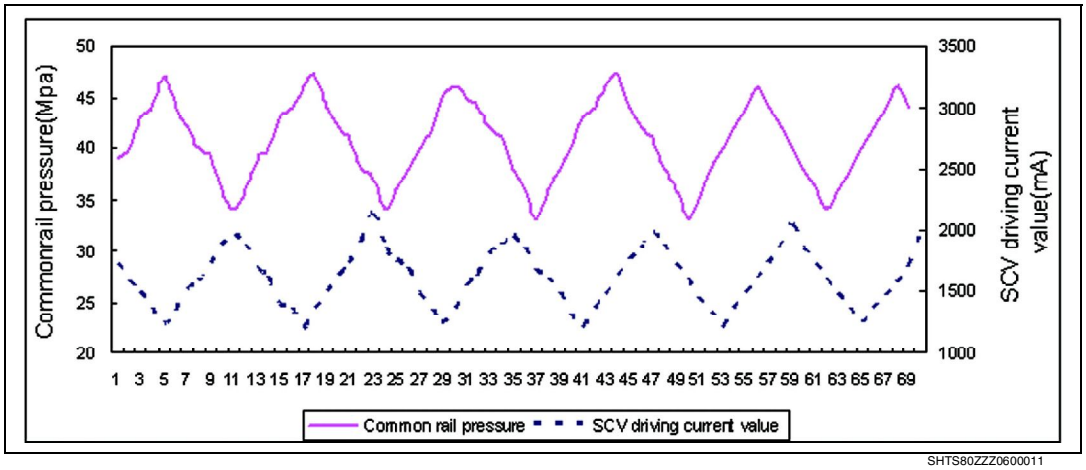
1. **Check Diag. code → None**

2. **Replace fuel filter → Problem un-dissolved**

Analysis step of malfunction

1. **Check the hunting condition 1) Check whether fuel flows to injector.**
   As a result of monitoring engine revolution, common rail pressure, etc. under engine idling condition by the data Monitor, it was determined that the actual common rail pressure is under a hunting condition. Check fuel after removing parts of the fuel channel (fuel tank -injector pipe) → No abnormalities found

2. **Check supply pump control**
   As a result of monitoring, the final pump current target value (mA) under the condition of engine idling, it is hunting in the same cycle with the actual common rail pressure. Final pump current target value indicates SCV operating condition and that this means SCV is hunting.



SHTS80ZZZ0600011

Final action and cause

Action
It is determined that hunting takes place due to bad sliding of the SCV. Problem dissolved by replacing the supply pump. Due to rust, bad sliding takes place. Unable to respond to real time to the instructions of the ECU and waveform becomes contrary to actual common rail pressure. (Normally almost even)

Comment

SCV Driving Current Value
SCV does not operate without current and fuel will be all pressure fed. (SCV is fully open when there is no current) Therefore, relationship between common rail pressure and pump current is value as follows: High rail pressure=Full pressure feed=Pump current low Low rail pressure=Low pressure feed=Pump current high HP4 pump SCV current value at idling 900-1700 mA approx.
*Items and standard value of the data monitor may vary according to the vehicle series. For details, refer to DX help.

Reference information

DX07-001

Trouble case example

Trouble case example

EN80ZZZ07X100001

In case of the malfunction with the following DTC code, output restriction or engine stop control starts with the engine when detecting abnormality. (This may differ depending on vehicle type and emission control)

No.	Diagnostic Trouble Code (DTC)	CONTENT
1	P0045	VNT turbocharger controller malfunction
2	P0047	VNT valve 1 open circuit, short to GND
3	P0048	VNT valve 1 short to BATT
4	P0049	Turbocharger overrun
5	P0088	Excessive common rail pressure
6	P0093	Fuel leakage
7	P0101	Air flow sensor characteristic abnormality
8	P0102	Air flow sensor circuit low input
9	P0103	Air flow sensor circuit high input
10	P0108	Boost pressure sensor circuit high input
11	P0117	Coolant temperature sensor circuit low input
12	P0118	Coolant temperature sensor circuit high input
13	P0122	Throttle sensor low input
14	P0123	Throttle sensor high input
15	P0191	Common rail pressure sensor malfunction
16	P0192	Common rail pressure sensor circuit low input
17	P0193	Common rail pressure sensor circuit high input
18	P0200	ECU charge circuit high input
19	P0201	Injector circuit malfunction -cylinder 1
20	P0202	Injector circuit malfunction -cylinder 2
21	P0203	Injector circuit malfunction -cylinder 3
22	P0204	Injector circuit malfunction -cylinder 4
23	P0205	Injector circuit malfunction -cylinder 5
24	P0206	Injector circuit malfunction -cylinder 6
25	P0217	Engine overheat
26	P0219	Engine overrun
27	P0234	Turbocharger over boost
28	P0237	Boost sensor circuit low input
29	P0335	Engine speed main sensor circuit malfunction
30	P0400	Abnormal flow amount of EGR

No.	Diagnostic Trouble Code (DTC)	CONTENT
31	P0401	EGR ratio insufficiency
32	P0402	EGR ratio excess
33	P0404	EGR valve stick 1
34	P0405	EGR lift sensor 1 circuit low input
35	P0406	EGR lift sensor 1 circuit high input
36	P0407	EGR lift sensor 2 circuit low input
37	P0408	EGR lift sensor 2 circuit high input
38	P0489	EGR solenoid 1 malfunction (Open circuit or ground line short)
39	P0490	EGR solenoid 1 malfunction (Power source line short)
40	P0500	Vehicle speed sensor circuit low input
41	P0501	Vehicle speed sensor circuit high input
42	P0524	Engine oil pressure low
43	P0605	Flash ROM error
44	P0606	CPU malfunction (Hard detection)
45	P0607	Monitoring IC malfunction in CPU
46	P0611	ECU charge circuit malfunction
47	P0628	SCV malfunction
48	P0629	SCV out put short to BATT
49	P1062	VNT valve 2 open circuit, short to GND
50	P1063	VNT valve 2 short to BATT
51	P1067	VNT valve 3 open circuit, short to GND
52	P1068	VNT valve 3 short to BATT
53	P1211	Injector common 1 short to GND
54	P1212	Injector common 1 short to BATT
55	P1214	Injector common 2 short to GND
56	P1215	Injector common 2 short to BATT
57	P1215	Injector common 2 short to BATT
58	P1229	Supply pump excess forced feed
59	P1266	Supply pump malfunction
60	P1401	EGR valve 2 sticking
61	P1402	EGR solenoid 2 malfunction (Open circuit or ground short)
62	P1403	EGR solenoid 2 malfunction (Power source line short)
63	P1407	EGR solenoid 3 malfunction (Open circuit or ground short)
64	P1408	EGR solenoid 3 malfunction (Power source line short)
65	P1412	Pulse EGR solenoid valve fault

No.	Diagnostic Trouble Code (DTC)	CONTENT
66	P1413	Pulse EGR solenoid valve fault
67	P1458	EGR actuator fault 1 (Major fault)
68	P1459	EGR actuator fault 2 (Minor fault)
69	P2002	DPR system malfunction
70	P2100	Intake throttle valve malfunction (GND short)
71	P2101	Intake throttle valve sticking
72	P2103	Intake throttle valve malfunction (Open circuit or VB short)
73	P2228	Atmospheric pressure sensor circuit low input
74	P2229	Atmospheric pressure sensor circuit high input
75	P2633	PCV 2 malfunction
76	P2634	PCV output short to GND
77	P2635	Supply pump malfunction (insufficient flow)
78	U0073	CAN malfunction (Engine)
79	U1122	CAN communication malfunction (EGR)
80	U1123	CAN communication malfunction (VNT)

List of DTC (Diagnostic Trouble Code)

Related to Common Rail

EN80ZZZ07X100002

No	Trouble phenomenon	DTC	DTC details	Warning signal	Vehicle type	Details	Inspection method and action
1	Engine check lamp lighting	P0088	Abnormal common rail high pressure	Engine check lamp lighting	General	Common-rail pressure sensor signal detected an abnormal value and it was determined that high-pressure exceeded the unusual threshold due to disturbance. Therefore, injection quantity was slightly restricted.	In accordance with the workshop manual, check the sensor system fitting, wire harness, cable of sensor body and resistance value. There is an example of a defective connector fitting of the joint box in the front lid. (Do not replace the sensor and ECU suddenly) In case there is no abnormality of the sensor system and harness wiring system, replace the ECU since there is a possibility of the ECU main body interior being defective.
					Medium duty	Unstable supply pump (SCV) discharge quantity control	First, check if there is no problem (clog. etc.) of fuel system (piping, filter, etc.), monitor common rail pressure and drive currency of SCV. If they deviate from the standard ±40mA, etc.), there is a strong possibility of defective sliding of the SCV. It is recommended that you replace the SCV as a single unit. (Be careful when replacing the pump assy and conducting set replacement of the common rail and injector)
					Light duty		

No	Trouble phenomenon	DTC	DTC details	Warning signal	Vehicle type	Details	Inspection method and action
		P1266 P0093	Defective pressure feed of pump and Fuel leak was determined	Engine check lamp lighting	Heavy duty	Common rail pressure sensor signal detects an abnormal value recognizing low pressure and injection volume increase → pressure limiter (high pressure safety valve) open → Target pressure not converged → it was determined that the pressure feed pump was defective and leaked fuel to the exterior.	First, check the fuel piping system and if you don't find any leakage in the connector, etc., check the inspection sensor connector fitting, cable of sensor main body, resistance value and wire harness of sensor system in accordance with the shop manual to confirm whether there is any abnormality in the sensor system. If there is no abnormality in the sensor system, it is possible that the circuit inside the ECU main body is defective. Therefore, replace the ECU.
		P0191 P0192 P0193	Abnormal output of common rail pressure sensor	Engine check lamp lighting	General	Common rail pressure sensor signal detects abnormal value-disconnection, short circuit and abnormal output characteristic (output value locked)	In accordance with the workshop manual, check the sensor system fitting, wire harness, cable of sensor body and resistance value. There is an example of a defective connector fitting of the joint box in the front lid. (Do not replace the sensor and ECU suddenly) In case there is no abnormality of the sensor system and harness wiring system, replace the ECU since there is a possibility of the ECU main body interior being defective.
		Plural codes occur				PTO accelerator 5V power source wiring bites when tightening bolts to chassis rail side and GND short circuit occurred. All the related sensors stopped working.	When DTC for plural sensors and actuator occur, failure related to GND (earth) can be considered. Check whether there is any abnormality of GND wiring or connecting portion with cab. Check power source, voltage, etc.

No	Trouble phenomenon	DTC	DTC details	Warning signal	Vehicle type	Details	Inspection method and action
2	Engine Stall, Hard to start again	None	None	None	Heavy duty	Common rail pressure sensor signal detects abnormal value due to disturbance, recognizing low pressure. Injection volume increase → flow damper works → flow to injector intercepted → engine stall or fuel not supplied when restarting engine	Check the sensor system and check if the flow damper works (fuel interception) or not. In accordance with the workshop manual, check the fitting of sensor system connector, wire harness, cable of sensor main body and resistance value. There is an example of a defective fitting of the connector of the joint box in the front lid. (Do not replace the sensor and ECU suddenly.) If there is no abnormality in the sensor system and wire harness, there is a possibility of the ECU main body interior being defective. Therefore, replace ECU.
		P0088	Abnormal common rail high pressure	Engine check lamp lighting	Medium duty	Due to defective sliding of supply pump (SCV) discharge quantity control valve, follow-up of pressure and injection volume control deteriorated	First, check if there is no problem (clog. etc.) of fuel system (piping, filter, etc.), monitor common rail pressure and drive currency of SCV. If they deviate from the standard ±40mA, etc.), there is a strong possibility of defective sliding of the SCV. It is recommended that you replace SCV as a single unit. (Do not replace pump assy and conduct set replacement of common rail and injector)
					Light duty		
3	Engine rotation Blow-up (Unstable)	none	none	none	General	Unstable engine rotation → Abnormal common rail pressure when ECU is monitored → Voltage of the power source (by right should have 5 V) of common rail pressure sensor was only 2.5 V approx.	Investigate the defects of the circuit system which makes the power source voltage of the sensor system abnormal and restore it. In case of the relative vehicle, when building a body, wiring of DPR differential pressure sensor are installed afterwards. (Extension of wiring) Signal and power source are installed reversibly. Therefore, voltage of common rail pressure sensor (usually 5 V) was decreased to 2.5 V.

No	Trouble phenomenon	DTC	DTC details	Warning signal	Vehicle type	Details	Inspection method and action
4	Lack of blow-up Lack of output (Lack of kinesthetic sense) Idle Hunting (poor rotation stability)	none P0088 (P2635)	Abnormal Common rail High-pressure Abnormal pump control	Engine check lamp lighting	Medium duty	Due to defective sliding of supply pump (SCV) discharge quantity control valve, follow-up of pressure and injection volume control deteriorated	First, check if there is no problem (clog. etc.) of fuel system (piping, filter, etc.), monitor common rail pressure and drive currency of SCV. If they deviate from the standard ±40 mA, etc.), there is a strong possibility of defective sliding of the SCV. It is recommended that you replace the SCV as a single unit. (Be careful when replacing the pump assy and conducting set replacement of the common rail and injector)
		none or P0088			Light duty		
		none			General	Due to reverse assembly of airflow sensor against air flow, air volume cannot be detected correctly and injection volume is restricted	Check if the air flow sensor is assembled in the correct direction against intake air flow.

No	Trouble phenomenon	DTC	DTC details	Warning signal	Vehicle type	Details	Inspection method and action
5	Automatic Cruise does not work	P0341	Abnormal number of G pulse	none	Medium duty Heavy duty	Due to detachment of the G pulse dowel pin from the cam gear, G sensor becomes non-active.	Replace cam gear or camshaft in assembly.
		P0336	Abnormal number of NE pulse			Due to defective machining of Flywheel pulse hole, scratches and dents, NE becomes non-active.	Replace flywheel.
		none				Due to defects of neutral SW and Clutch SW circuit, Auto Cruise operation condition does not come into effect.	Inspect relevant circuit and SW and adjust it.
		U0155	Communication cut (Meter)			Due to communication discontinuation with meter, auto cruise ceases to operate.	Repair relevant communication circuit.
		none				Due to communication discontinuation between ABS and ECU, auto cruise control ceases operation.	Repair relevant communication circuit or replace ABS-ECU.
	Unable to release Auto Cruise	none				Brake SW is locked on the "OFF" side.	Check and adjust relevant circuit and SW.

Pitfalls of Trouble Diagnosis

Pitfalls of Trouble Diagnosis

EN80ZZZ07X100003

Phenomenon	Recommendation
Verification of power source system	Supply power source in two lines or more. Check whether battery case, etc. have been moved for body mounting.. If so, make sure that cables are surely connected.
Verification of grounding wire	Check the connection condition and removal of paint film when connecting grounding cable again after painting. There are many cases of defective grounding cable due to lack of its tightening.
Verification of wire harness	Insertion status of coupler pin and disconnection of wire harness due to friction of colgate and inner wire
Verification of fuel property	Using any use of inadequate fuel? Judge from color and smell. Easy to check fuel filter.
Verification of fuel tank	Existence of rust and impurities which have precipitated in the inner side of the tank
Verification of clog in the fuel system	Clog in the piping, element, built-in inlet filter of union bolt located at feed pump suction side, etc. Protrusion of sealant in the connecting portion of rubber piping
Verification of Engine ECU	Has the software been re-programmed to the latest version?
Tightening of injector	Make sure that you tighten it by the specified torque. Due to excessive torque, deformation and due to lack of torque leakage, etc may happen.
Learning machine difference of supply pump	Make sure that you carry it out. Implement it even after improvement of clog in the fuel system.
When output is lacking	Check if there is any air leak of secondary side of the Turbo, (including Intercooler) and also check if output restriction mode is on.
Output restriction mode	Remove the sensor of the coupler in order currently used for fuel injection volume restriction.
Verification of Error code	Investigate both DTC code and Diag. monitor code. (There are error codes which cannot be detected only by both)
When common rail pressure is abnormal	Examine dividing into hardware and software.
(Hardware)	Leak due to defective pressure feed (Clog, dust and air, etc. jammed in piping system) and due to pressure limiter valve opening
(Software)	Fail safe of water temperature lower than 70°C, high temperature of fuel, abnormal pressure sensor and other causes
Defects of plural parts (Example) Defect of actuator power relay	Examine original cause
	Actuator and airflow sensor of VNT. EGR and auxiliary brake, etc.
Auto Cruise	Check the switches which act on the safety side at the time of failure such as brake, clutch, etc.

Hino Motors Sales U.S.A., Inc.
41180 Bridge Street, Novi, MI 48375
Telephone: (248) 699-9300
PRINTED IN JAPAN

Pub.No. S7-UNAE09A 3/3 '11.11