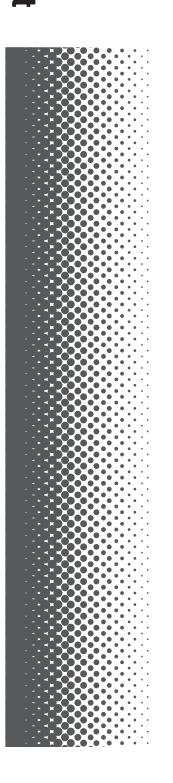


SMARTASSIST-Direct



YANMAR

YANMAR CO., LTD.

http://www.yanmar.co.jp

0AYSA-G00100

YANMAR

OPERATION MANUAL

SMARTASSIST-Direct

ANMAR

OPERATION MANUAL

SMARTASSIST Direct

SMARTASSIST-Direct

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• The pictures in this manual refer to Windows 7 (some to Windows XP).

• The contents of this manual may change without prior notice.

OPERATION MANUAL	Model	SMARTASSIST-Direct	
OF ERATION MANUAL	Code No.	0AYSA-G00100	

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Issued by : YANMAR CO., LTD. Business System Dept. ICT Dept. Edited by : YANMAR TECHNICAL SERVICE CO., LTD.

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OPERATION MANUAL

SMARTASSIST-Direct

1st edition: March 2012

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link)

1. Overview

The SMARTASSIST-Direct software supports the error diagnosis, and mounting and maintenance services of electrical control devices. It runs on Windows personal computers.

2. Operation Environment of SMARTASSIST-Direct

The service tool operates in the below environment.

• PC

• CPU:	Intel Pentium 4	2 GHz or more recommended
• HDD:	200 MB or more recon	nmended ^{*1}
 OS/Memory: 	Windows XP SP3	1 GB recommended
	Windows Vista SP2	2 GB recommended
	Windows 7 SP1	2 GB recommended
 Display resolution: 	1024 x 768 or higher	
• USB 1.1:	1 port	
 Microsoft Excel 2000 or higher (for the display of operation data) 		
• Internet Explorer 6.0 or higher, or Mozilla Firefox 5.0 or higher (for the manual		
¹ Does not included memory for data storage.		

• Interface Box (YANMAR Diagnosis Interface Box)

1R1999-25000

Display Language of SMARTASSIST-Direct

- Japanese
- English

3. Contents of SMARTASSIST-Direct

3.1 Contents of the Program

Software

The engine ECU (hereafter ECU), the 3G controller (hereafter ECU) and the drivers connect to the PC via the interface box (a signal converter) ([Figure 3-1 Connection to the product]). The software performs error diagnosis, writing of software, and initial settings.

Training Mode

In this mode, you can practice how to use SMARTASSIST-Direct on your PC without connecting to the ECU. The operation of the software and the ECU are simulated using data that is stored on the PC in advance.

• Displaying measurement data and operation data

• All data collected during maintenance can be displayed with the provided software.

- The data can be compared to other data of the same kind.
- All collected data can be displayed on other SMARTASSIST-Direct workstations.

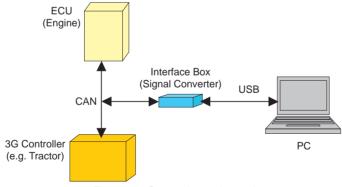
• Communication with the Center

The software uses the Internet to download required data and updates, and to upload collected data.

Detail Settings

The settings allow to change the communication speed to the ECU and other conditions. It is also possible to select the training mode and confirm software updates.

As a basic rule, do not change the communication settings unless instructed to do so by YANMAR.





3.2 Function Mode

Two settings for the usable functions are available, depending on the service level.

Standard Mode

Just as on the display panel, a basic error diagnosis function is available.

• Expert Mode (Expert Function)

In addition to the functions in standard mode, the expert mode allows to write data to the ECU and driver as well as to change settings. To use it, users with an expert mode license must log in with their user ID and password. When clearing data or changing settings, the password must be entered again at the time of data writing. It is not necessary to enter the password again if working with an active connection and the password was entered less than 10 minutes ago.

Separate licenses issued for different product categories and the limited YDT expert mode may further limit the machine models for which maintenance is possible.

			O: Usable	\times : Not usable \triangle : Option
Туре		Standard	Expert	YDT Equivalent to Expert
Utilization limitation	Per product category All models available	0	0	Limited models
License Management	License Update	0	0	0
	Basic Error Diagnosis	0	0	0
Error Diagnosis	Rewrite Setting Values	×	0	0
	ECU Writing	×	0	0
ECU Maintenance Data Up	oload	0	0	0
Operation data	Operation data	0	0	0
Service data	Manual link	×	0	×
	Service bulletin link	\bigtriangleup	\triangle	×
Software update		0	0	×

3.3 Updating SMARTASSIST-Direct

The SMARTASSIST-Direct service tool updates automatically.

Connect the PC to the Internet, launch the service tool and log in. It communicates automatically with the center, receives the setup files, and performs the update.

Note If you activate the Internet connection AFTER starting the service tool, it will not update.

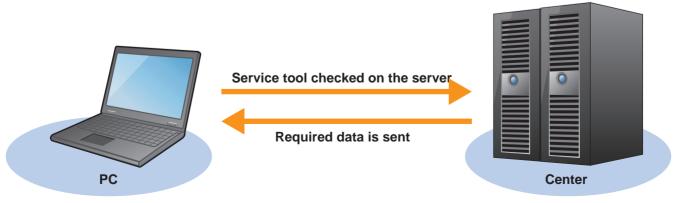


Figure 3-2 Update schema

After an automatic update, the login screen is displayed again after the process screen is shown. This is not a malfunction. Simply enter your user ID and password again to log in.

1 Enter your user ID and password to log in.



2 After an automatic update, the below screen is displayed for a couple of seconds.

🚥 C:¥Documents and Settings¥	All Users¥Application D	ata¥YSASSDIRECT¥SERVICE¥Upda.	- 🗆 🗙
C:¥Documents and Settings¥A C:¥Documents and Settings¥A T.zip		n Data¥YSASSDIRECT n Data¥YSASSDIRECT¥Temp¥YSASS	

3 After the update is completed, the login screen is displayed and it is necessary to log in again.

SMARTASSIST Login	83
SERIAL NO.	00000791
USER ID	
PASSWORD	
	**
STAF	CANCEL

3.4 License Security Check

To ensure that you always use the latest version of the software, a security check of the license is conducted at the center. Software management is necessary because some functions may influence engine performance.

Security Check Period

The security check period is three months after the last communication with the center.

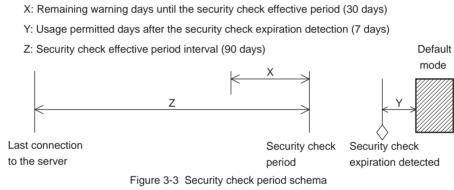
Security Check Period Warning

One month before the security check period expires, a warning is displayed each time the service tool is started to remind of the end of the security check period.

Exceeding the Security Check Period

If the security check period has exceeded and the service tool has not been used for an extended period of time, the usage period is extended for a grace period of 7 days.

After the grace period, the system switches to default mode and its functions become unavailable. Connecting to the center will make it serviceable again. (The security check period is extended by 3 months when connecting to the center.)



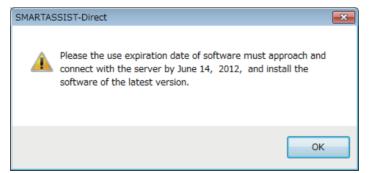


Figure 3-4 Before Incident Warning Screen

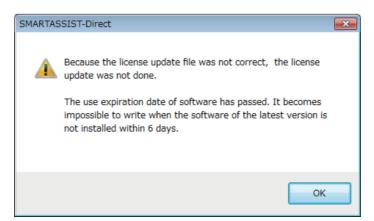
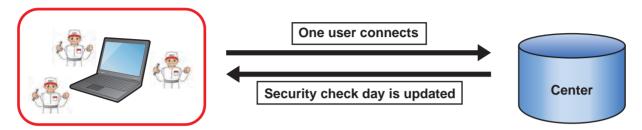


Figure 3-5 Screen After Exceeding Limit

- **Remark** The security check is performed for each PC.
 - If one PC is used by multiple users and one user connects the PC to the center, the last connection date is updated.

Not all users need to connect to the center



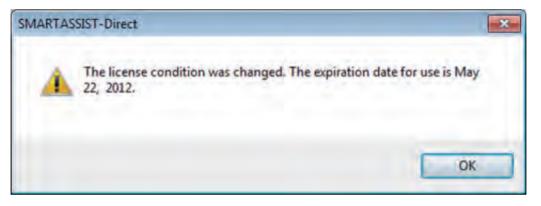
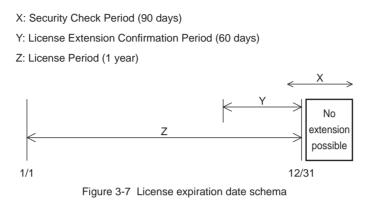


Figure 3-6 Example screen for security check update

3.5 License Expiration Date

The license is generally valid for one year, from January 1 to December 31.

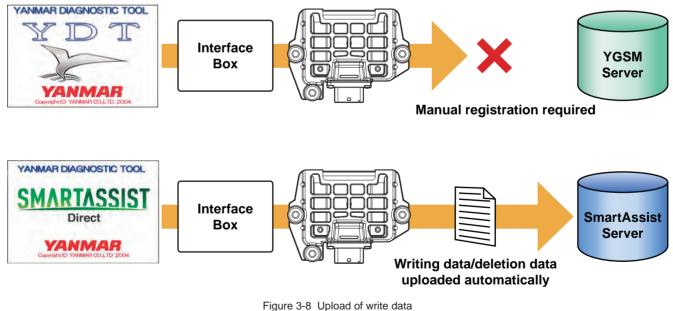
If a security check was conducted, but the license period is exceeded, it is not possible to connect to the center. Please confirm with YANMAR whether to extend the license period before it expires.



3.6 Maintenance Information for the ECU, Driver, Pump and Other Parts

In the earlier YDT system, it was necessary to formally register information that was written to the ECU or similar parts to YGSM.

SMARTASSIST-Direct automatically uploads to the center all data that was written or deleted, making it unnecessary to register the data separately.



Important

rigate e e opicad el write data

- To make sure that the data is sent and registered, start SMARTASSIST-Direct with an active Internet connection soon after maintenance is finished.
 The uniting process can be concelled from the softwards many (it is process).
 - The writing process can be canceled from the software's menu. (It is necessary to send cancellation/deletion data to the center.)

3.7 Software Serial Number and the License

YANMAR produces a wide range of products. To be able to conduct proper maintenance after appropriate training for the product, licenses are issued separately for each product category. (Same as YDT)

The product category-specific license information is affiliated with the software serial number. (License serial number)

Multiple product category-specific licenses can be affiliated to the same serial number

The standard mode license (with basic error diagnosis functions) and the expert mode license (with rewrite functions of the ECU and similar parts) are operated by separate software serial numbers.

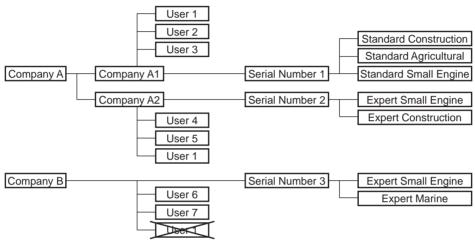


Figure 3-9 Serial number and user schema

The SMARTASSIST-Direct installed on the PC has an individual software serial number and can only be used by users registered for that serial number.

Example 1: User #4 cannot log into the PC with serial number 3 using his ID and password.

Example 2: User #1 is registered as user for the PCs with serial number 1 and 2 that have the same company code, and can log into both PCs with his ID and password.

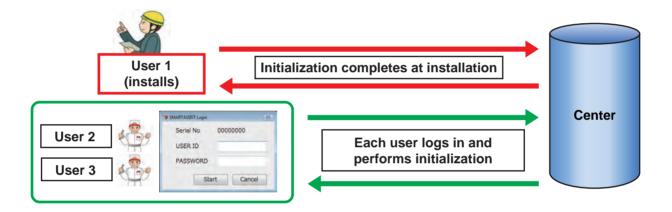
Example 3: User #1 cannot be registered for the PC with serial number 3 that has a different company code.

3.8 Software Serial Number and the User ID

Under SMARTASSIST-Direct, the users per PC are limited for reasons of safety and security.

- After the software installation is complete, the software connects to the center and activates. SMARTASSIST-Direct then confirms the serial number based on the information registered at the center in advance during the application.
- This serial number and user ID is affiliated with the registration information. Other SMARTASSIST-Direct users who are not affiliated cannot use the system.

Point The initialization (user verification) is performed for each user ID. After the installation is completed, each user should log into SMARTASSIST-Direct with an active Internet connection. (The initialization is performed automatically.)



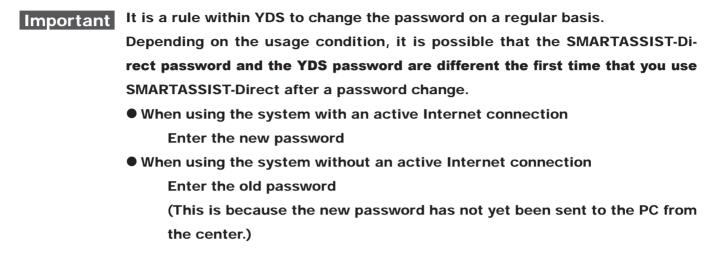
3.9 User ID and Password

The SMARTASSIST-Direct user ID and password are the same as for YANMAR D SITE (YDS).

• If You Forget Your User ID or Password

It is necessary to reassign a user ID and password within the YDS system through the YDS operation tool.

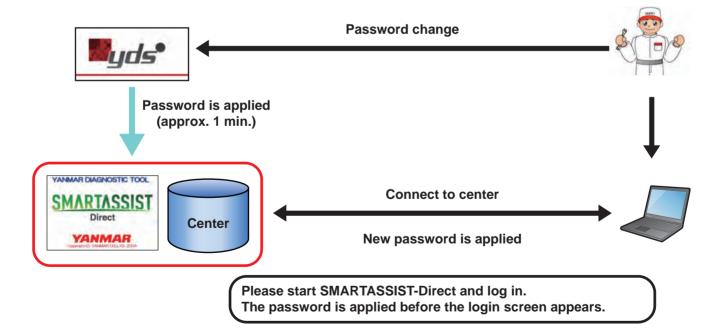
For details, consult with a representative of the business unit or your sales agent.



Point The YDS password change is reflected on the SMARTASSIST-Direct server in approx. 1 minute.

Start SMARTASSIST-Direct right after the change and login to the system and the PC password is also changed.

(This method requires some extra effort, but it is the most reliable method.)



Note Because YANMAR employees use the same ID and password as for the "My Portal" system, they need to exercise the same care after a password change as when using YDS.

4. Start, Stop and Finish Procedures

4.1 Operation Procedures

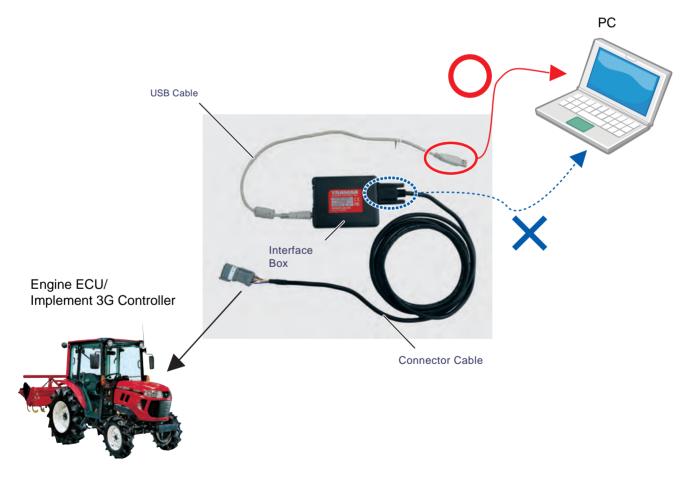
4.1.1 SMARTASSIST-Direct Connection

- 1 Plug the USB cable into the USB port of the PC and the USB port of the interface box.
- 2 Plug the diagnostic cable into CN1 (D-SUB 9P male end) of the interface box.
- **3** Plug the diagnostic cable into the service connector.

The interface box is powered by the device. Be careful: using a defective cable or short-circuiting the cable connector terminal is very dangerous.

The correct way to connect the cables is: Plug the connector cable into the interface box. Connect the interface box with the USB cable to the PC.

It is not possible to do the connection without the interface box (e.g. by plugging the connector cable directly into the PC or using a serial USB conversion cable). Always use the supplied interface box when using SMARTASSIST-Direct.



4.1.2 Power Supply

Except when using in training mode, it is necessary to turn on the power of the connection destination or the ECU (ignition key or power switch) before starting SMARTASSIST-Direct.

4.1.3 USB-Driver Installation

When you plug the powered interface box^{Note)} into the USB port of your PC, the driver set-up wizard starts automatically.

Follow the instructions on the screen to install the driver. (The example screen is for Windows XP.)

Found New Hardware Wizard		
Image: Check with the software in the with t		
< <u>B</u> ack <u>N</u> ext > Cancel		

Note The interface box is supplied with power (for example, connected to the product with the key switch turned on).

Depending on the version of Windows, the setup wizard may not start and the driver may be installed automatically. (The example screen is for Windows 7.)

Installing device driver software * * Click here for status.		
- · · · ·	No 19 19 40	2:45 PM 12/19/2011
USB Driver for PC Diagnosis System * * Device driver software installed successfully.		2:40 PM 12/19/2011

Depending on the specification and setting of your PC, the USB driver may not be installed automatically. In such a case, manually install the driver from the PC start menu.

Calculator Sticky Notes Snipping Tool XPS Viewer Windows Fax and Scan	Accessories Games Maintenance SMARTASSIST	 Windows opdate XPS Viewer Accessories Games Maintenance SMARTASSIST Driver Install SMARTASSIST-Direct Uninstall SMARTASSIST-Direct Startup
All Programs	Back Search programs and files	Back Search programs and files

4.1.4 Login Screen

How to Log In

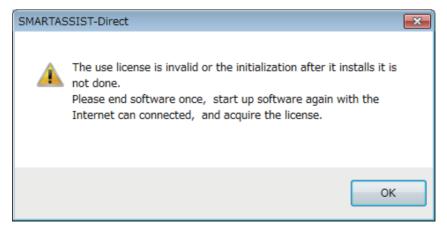
Double-click the icon (

) that was created during installation.

The SMARTASSIST-Direct logo appears, then the login screen is displayed.

🚏 SMARTASSIST Login	23	Log In	
SERIAL NO. 00000 USER ID PASSWORD	791	SMARTASSIST-Direct User ID Password	
START Internet connectio	CANCEL In active	Login Internet conne	Exit ction inactive
	SMART	NOSTIC TOOL	
		MAR CO.LTD. 2004	

Note • If the usage license is invalid or the initialization is not complete (because the software could not connect to the center directly after installation), the below warning is displayed.



• The user ID and password are the same as those for the YANMAR D SITE (YDS). If the YDS password has changed, refer to [3.9 User ID and Password] on page 10 for details.

Entering the User ID and Password

The Login Screen is displayed.

- **1** User ID : Enter the user ID.
- **2 Password** : Enter the password for this user ID.

3 Check the above, and click the **Start** or **Login** button.

	SMARTASSIST Login	23	Log In	
	SERIAL NO. 0000	00791	SMARTASSIST-Direct	
0—	USER ID		1 → User ID	
2—	PASSWORD		2 Password	
3—	START	CANCEL	3 Login Exit	
	Internet connec	tion active	Internet connection inactive	

Note If you enter your user ID or password incorrectly, the following warning appears.

SMARTA	ASSIST-Direct
8	PASSWORD or USER ID is different. CAUTION: There is a possibility of having changed the password, by YDS of the same password.

4.1.5 Start Menu

After login, the Start Menu is displayed.

- 1 : It is possible to change the display language. (Japanese/English as of January 2012)
- **2** : Select the product category that you wish to use.
- 3 : Exit the software.





4 : The selected category turns red. Select the model.

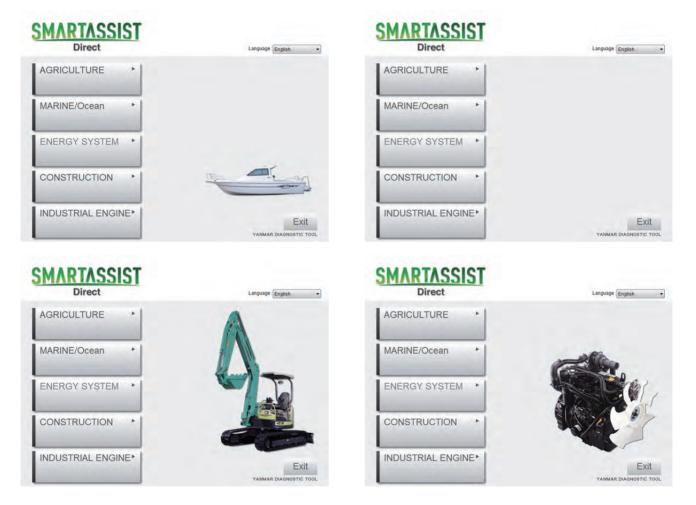


The available models are listed below. (J	January 2012)
---	---------------

Agriculture	Tractor
	Combine
	Rice-Transplanter
Marine/Ocean	Marine Gear
	Marine Engine
	Large Engine
Energy System	Generator
Construction	Construction
Industrial Engine	Small Land Engine

Note The categories and models increase with time.

After selecting the category, the picture of a representative model is displayed.



4.1.6 Main Menu

All functions of SMARTASSIST-Direct are displayed sorted in categories depending on the work situation.

Operations with ECU Connected

Operations that are performed with the ECU (controller) connected

2 Operations with ECU Disconnected

Operations that can be performed without the ECU (controller) connected

Collecting Related Data

Related data is collected voluntarily (via a connection to the center)

4 Detail Settings/Additional Functions

Settings and additional functions related to system operations (including training mode)

5 Job Assistant

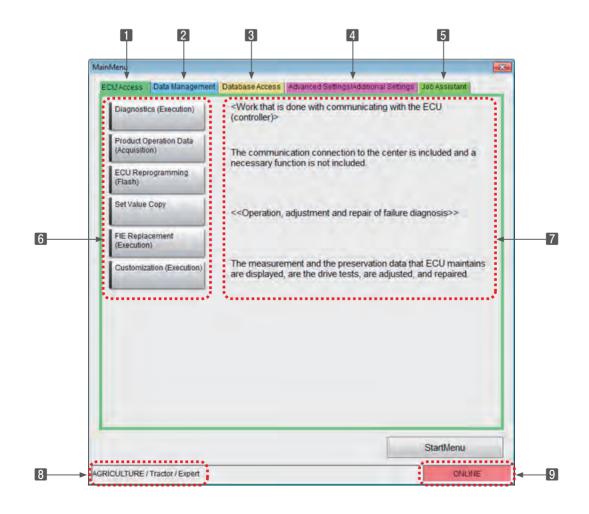
Guide function to perform a series of operations

- **6** Selection button for all functions. Functions that are not shown in red are unavailable.
- An explanation for all functions is displayed.
- **18** The product category or model selected in the start menu and the available function mode is displayed.
- 9 It is displayed whether a connection to the center or Internet is active.

Online: Connected

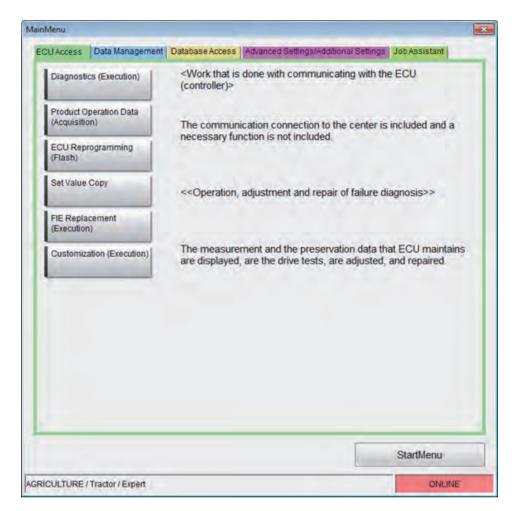
Offline: Not connected

Note To change from offline to online status, it is necessary to exit the software, restart it, and log in. Being connected with a LAN cable alone is not sufficient to change to the online status.



Operations with ECU Connected

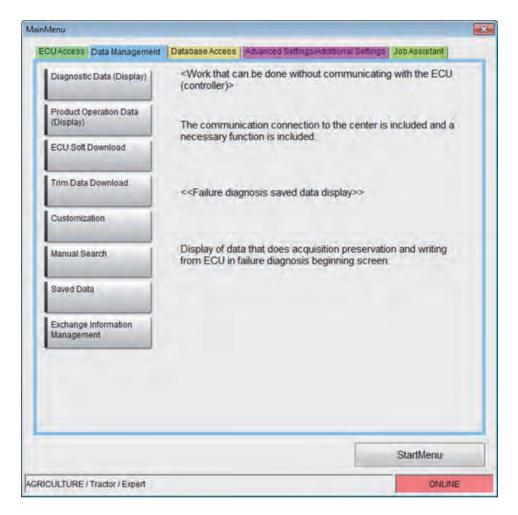
Operations that are performed with the ECU (controller) connected



Diagnostics (Execution)	Operations, adjustments and repairs during error diagnosis	View the measurement data and save data of the ECU, and perform an operational test, adjust- ments and repairs.	Refer to page 38.
Product Operation Data	Collecting and saving operation	View all saved operation data of the ECU, and	Refer to
(Acquisition)	data	do a comparative analysis with past data.	page 187.
ECU Reprogramming	ECU software writing	Performed in case of ECU replacement or soft-	
(Flash)		ware updates. First, it is necessary to download	
		the software with the ECU disconnected.	
Set Value Copy	Copying the settings during ECU	Reading and writing setting values and correc-	
	replacement	tion values for ECU replacement. It is necessary	
		to write the software to the new ECU in advance.	
FIE Replacement	Rewriting correction values	Rewrite correction values for the pump, injector	
(Execution)		and other parts.	
Customization	Customizing and deleting the set-	Change the settings according to your needs.	
(Execution)	tings	First, it may be necessary to download the cus-	
		tom data with the ECU disconnected.	

2 Operations with ECU Disconnected

Operations that can be performed without the ECU (controller) connected



Diagnostic Data (Display)	Viewing the saved error diag-	View and compare the saved data of the ECU in the er-	
	nosis data	ror diagnosis start screen. Data that has been collected at	Refer to
		other workstations must be imported from the Data Man-	page 139.
		agement menu.	
Product Operation Data	View saved operation data	View and compare the saved data of the ECU in the opera-	Refer to
(Display)		tion data screen.	page 193.
ECU Soft Download	ECU Software Download	Performed in case of ECU replacement or software up-	
		dates. When writing to the ECU, it is necessary to do so	
		with the ECU connected.	
Trim Data Download	Downloading the correction	Download the pump correction values. The correction value	
	values for electrical parts	of the injector for repair is not available for download.	
Customization	Customizing and deleting the	Download the maps and parameters for customization or	
	settings	cancellation.	
Manual Search	Searching and Viewing Techni-	Search for downloaded manuals or manuals on external	Refer to
	cal Manuals	media.	page 170.
Saved Data	Managing data on the worksta-	Import, export and delete data, and edit memos about data	
	tion	saved on the workstation (e.g. ECU write data, error diag-	
		nosis data, and operation data)	
Exchange Information	Manually upload data on re-	Manually upload to the management server data regarding	
Management	placed electrical parts	completion and cancellation of electrical parts replacement	
		and software updates	

3 Collecting Related Data

Related data is collected voluntarily (via a connection to the center)

UAccess Data Management	Database Access	Advanced Settings/Additional Settings Job Assistant
Technical Manual		quisition of associated data (communication o the center)>
Product Operation Data	Indispensable automatically	e data to the program operation is received
-system intorntation.	< <find and="" d<="" td=""><td>townload technical manuals>></td></find>	townload technical manuals>>
	ltdata retrie	val downloads it to the manual link using it.
		StartMenu
		StartMenu
CULTURE / Tractor / Expert		ONLINE

Technical Manual	Search and download technical informa-	Search and download data used in the manual	Refer to
	tion	link.	page 176.
Product Operation	Search and download operation data by	Search and download operation data saved in	
data	model and machine number	the database.	
System Information		This is a menu for special operations. It is not	
		normally available.	

4 Detail Settings/Additional Functions

Settings and additional functions related to system operations (including training mode)

lenu	
U Access Data Management	Database Access Advanced Settings/Additional Settings Job Assistant
Training	<settings action="" and="" functions="" optional="" regarding="" system=""></settings>
Communication Settings	In usual service
Terminal Information	
Manual Deletion	< <operation diagnosis="" failure="" of="" screen="" training="">></operation>
	The operation can be simulated without connecting each screen of the failure diagnosis with ECU.
	StartMenu
CULTURE / Tractor / Expert	ONLINE

Training	Operation training for the error diag-	It is possible to simulate operating the error diagnosis	
	nosis screen	screen of a representative model without connecting	
		to the ECU.	
Communication set-	Edit the settings for communicating	Normally, it is not necessary to change the settings.	Refer to
tings	with the ECU		page 203.
Terminal information	View all settings of the workstation	It is possible to confirm the usage license, software version, and updated information on supported models.	Refer to page 208.
Manual Deletion	Deleting data for the manual link	Delete obsolete data for the manual link.	Refer to page 183.

5 Job Assistant

Guide function to perform a series of operations

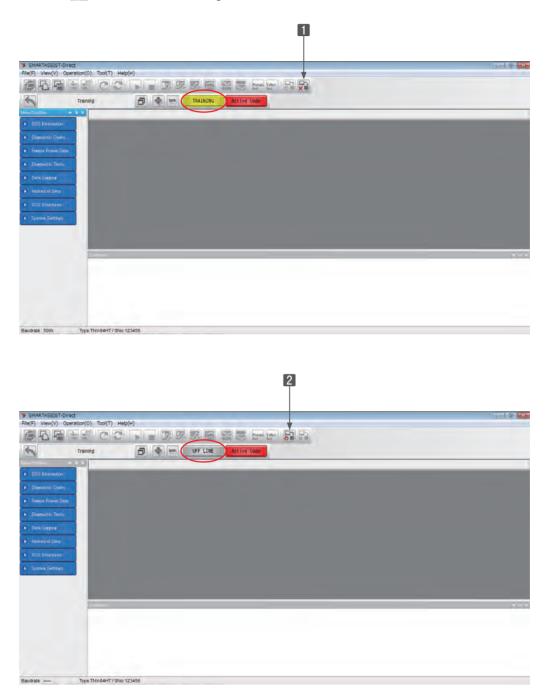
Note This function is unavailable as it is still under development. (January 2012)

lenu			
U Access Data Management	Database Access	Advanced Settings/Additional Setting	S Job Assistant
ECU Replacement:	<operation g<="" td=""><td>uide for sequential operations></td><td></td></operation>	uide for sequential operations>	
FIE Replacement		t each tag menu when you do an	individual
Service Campaign	operation.		
JobList	< <sequential< td=""><td>operation for ECU exchange>></td><td></td></sequential<>	operation for ECU exchange>>	
	It exchanges, writing.(unimp	and it tries the download of the l	ECU software and
			StartMenu
CULTURE / Tractor / Expert			ONLINE

ECU Replacement		
FIE Replacement		
Service Campaign		
Job List		

4.2 Stop Procedure

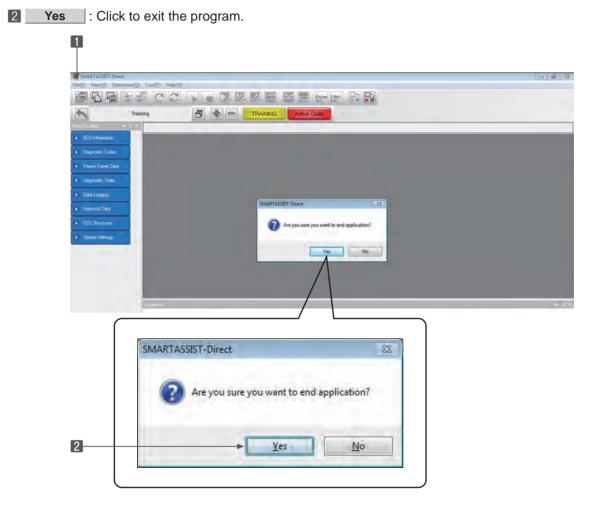
Click icon **1** without exiting the program. After the adjustments of the product are complete, click icon **2** to continue monitoring.



4.3 Finish Procedure

SMARTASSIST-Direct can be exited in the same way as other Windows applications. When disconnecting the interface box, do so after exiting the SMARTASSIST-Direct software.

1 × or "File (F)" - "Exit (X)": A confirmation message is displayed to exit the program.



Exit : Click this to exit from the Start Menu.



4.4 Troubleshooting

If communication with the ECU is faulty and normal monitoring is not possible, check the below points and restart SMARTASSIST-Direct.

If the communication cable disconnects or the power supply to the ECU/product is interrupted during data transmission, the system may not operate normally even after a restart. In that case, turn off the power (with the key switch) or, if that is not possible, disconnect the interface box from the product's service connector and reconnect it. The interface box will reset and operations will return to normal.

- Are all cables connected? Are all cables in good condition?
- Does the product have power?
- Is the system not in training mode?
- · Is the system connected?

For details on the warning messages, refer to [14. Error Screen and Warning Screen] on page 211.

5. Screen Functions

5.1 Basic Screen

• Toolbar		
1 Standard Toolbar	:	On the standard toolbars that allow basic operations 2 to 4, you can press
		ALT and the bracketed letter as a shortcut.
2 Operation Toolbar	:	On all screens, the available operations are shown on a toolbar, and only
		the necessary function icons are displayed.
3 Function Selection Toolbar	:	The view is equivalent to the standard toolbar where standard functions
		are selected.
4 Screen Display Toolbar	:	Expand and minimize the function selection toolbar and display messag-
		es and warnings.
5 Subfunction Selection Toolbar	:	A subfunction button is displayed within each function. Also, if the prod-
		uct has a multi-ECU, the communication destination controller can be
		switched.
Display Box		
6 Main Box	:	Displayed depending on the selected function.
7 Additional Information Box	:	Used as a special display on graph screens and time series data screens.
8 Comment Box	:	Usually, the current error status is displayed. The error criteria and error
		diagnosis results are displayed in the screen that shows the error code.
9 Status Box	:	Displays the current communication status.

Function Buttons

10 The function buttons that are not on the standard toolbar (e.g. the clear button) are in the main box or the additional information box.

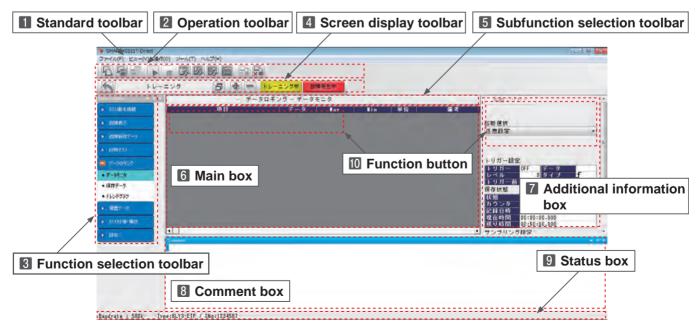


Figure 5-1 Basic Screen

5.1.1 Standard Toolbar

Toolbar to select the functions, screens, operations and tools. Select by clicking. When a menu is displayed, you can press ALT and the bracketed letter behind a menu entry as a shortcut.



le (F)	Operation (O)
Saving Files (S)	Update (R)
Screen Print (P	Automatic Update (C
Saving Screen Bitmap (B)	Start (S)
Main Menu (M)	Stop (P)
Exit (X)	Option Settings (O)
ew (V)	Trigger Settings (T)
ECU Basic Information (I)	Sampling Settings (L)
Main Data (I)	Data Settings (D)
Defect Display (F)	Top Graph Settings (
Current Defect (A)	Bottom Graph Setting
Defect History (L)	Parameter Settings (
List of Error Codes (I)	Filter Settings (F)
Display Data Before/After Error (R)	Clear (A)
Save Data (S)	Manual Trigger (M)
Trend Graph (T)	Connect (Z)
Diagnosis Test (D)	Disconnect (X)
Pulse/Analog Input/Output (A)	Tool (T)
Digital Entry/Bit Status (I)	Toolbar (T)
Digital Output (O)	Menu Toolbar
Forced Operation (D)	Comment
Forced Operation Graph (G)	Status Bar (F)
Forced Operation Hysteresis Graph (H)	Communication Setti
Data Logging (L)	Option (O)
Data Monitor (M)	
Save Data (S)	Help (H)
Trend Graph (T)	Version Information (
History Data (H)	-
Integrated Value (L)	-
Distribution Chart (M)	-
Incident Record (G)	-
ECU Specification/Structure (E)	-
Analog Signal (A)	_
Digital Dignal (D)	-
ECU ID Data (E)	
ECU Data Saving (S)	-
Settings (S)	
Configuration (C)	-
Sensor Correction (A)	-
	-
Parameter Adjustment (T)	-
Initial Settings (I)	-1
Manual Search (M)	

	Automatic Update (C)						
	Start (S)						
	Stop (P)						
	Option Settings (O)						
	Trigger Settings (T)						
	Sampling Settings (L)						
	Data Settings (D)						
	Top Graph Settings (G)						
	Bottom Graph Settings (H)						
	Parameter Settings (E)						
	Filter Settings (F)						
	Clear (A)						
	Manual Trigger (M)						
	Connect (Z)						
	Disconnect (X)						
0	ol (T)						
	Toolbar (T)						
	Menu Toolbar						
	Menu Toolbar Comment						
	Status Bar (F)						
	Communication Settings (C)						

(V)

5.1.2 Operation Toolbar

On all screens, the available operations are shown on a toolbar, and you can operate them by clicking them. Unavailable operations are displayed in a darker color.



J	Saving/Reading ECU Stor- age Data	囚	Screen Print		Saving Screen Bitmap
	Saving Files		Saving Measuring Data	C	Update
27	Continued Update		Start		Stop
E,	Option Settings	Se	Trigger Settings	14	Sampling Settings
1	Data Settings	21	Top Graph Settings	\mathbb{P}	Bottom Graph Settings
Param Set	Parameter Settings	Filter Set	Filter Settings		Connecting
× ₩	Disconnecting	5	Return to Menu		

5.1.3 Function Selection Toolbar

• Toolbar to select the functions of the service tool. Select a menu by clicking it. The view is equivalent to the stan-

dard toolbar.

	Name	Description							
News	News	Displayed when relevant news data for the connected product is available.							
ECU Information	ECU Basic Information	Displays main system information of the ECU or controller.							
Diagnostic Codes	Defect Display	Displays current or past defects detected by the ECU or controller.							
Freeze Frame Data	Data Before/After Error	Displays relevant data before/after a recent error was detected (expert function).							
Diagnostic Tests	Diagnosis Test	Separately checks the input/output tools. The input/output test has a forced operation							
		function.							
Data Logging	Data Logging	Diagnoses faults and analyses the operating conditions while the engine operates.							
Historical Data	History Data	Displays the operating condition stored in the ECU.							
ECU Structures	ECU Specification/Structure	Displays ECU and controller data and input/output layout information (expert function).							
System Settings	Settings	Necessary when performing initial settings and repair, and adjustments such as ECU							
	-	or controller replacement.							

• Operation tool available in all menus

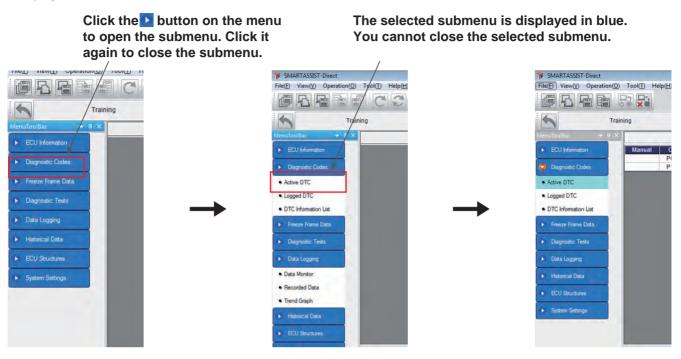
Menu	Submenu	Saving and reading the ECU storage data $^{^{\star 1}}$	Screen Print	Saving Screen Bitmap	Saving Files	Update	Continued Update	Start	Stop	Option Settings	Trigger Settings	Sampling Settings	Data Settings	Top Graph Settings	Bottom Graph Settings	Connecting	Disconnecting
News	News Display															<u> </u>	
ECU Basic Information			0	0	0	0	-	-	-	-	-	-	-	-	-	0	0
Defect Display	Current Defect		0	0	0	-	-	-	-	-	-	-	-	-	-	0	0
	Defect History List of Error Codes		0	0	0	0	-	-	-	-	-	-	-	-	-	0	0
Display Data Before/			0	0	0	-	-	-	-	-	-	-	-	-	-	0	0
Display Data Belore/			0	0	0	0	-	-	-			-	0		-	0	0
After Error	Trend Graph		0	0	-	-	-	-	-	-	-	-	-	0	0	0	0
Diagnosis Test	Pulse/Analog Input/Output		0	0	0	0	0	-	0	-	-	-	0	-	-	0	0
	Digital Entry/Bit Status		0	0	0	0	0	-	0	-	-	-	-	-	-	0	0
	Digital Output		0	0	0	0	0	-	0	-	-	-	-	-	-	0	0
	Forced Operation		0	0	0	-	-	-	-	-	-	-	-	-	-	0	* 2
	Forced Operation Graph		0	0	0	-	-	-	-	-	-	-	-	0	-	0	0
	Forced Operation Hysteresis Graph		0	0	0	-	-	-	-	-	-	-	-	0	-	0	0
Data Logging	Data Monitor		0	0	-	-	-	0	0	0	0	0	0	-	-	0	0
	Save Data		0	0	0	-	-	-	-	-	-	-	0	-	-	0	0
	Trend Graph		0	0	-	-	-	0	0	-	-	-	-	0	0	0	* 2
History Data	Integrated Value		0	0	0	0	-	-	-	-	-	-	-	-	-	0	0
	Distribution Chart		0	0	0	0	-	-	-	-	-	-	-	0	-	0	0
	Incident Record		0	0	0	0	-	-	-	-	-	-	-	-	-	0	0
ECU Specification/			0	0	0	-	-	-	-	-	-	-	-	-	-	0	0
Structure	Digital Signal		0	0	0	-	-	-	-	-	-	-	-	-	-	0	0
	ECU ID Data		0	0	0	0	-	-	-	-	-	-	-	-	-	0	0
	ECU Data Saving		0	0	0	0	-	-	-	-	-	-	-	-	-	0	0
Settings	Configuration		0	0	0	-	-	-	-	-	-	-	-	-	-	0	0
	Sensor Correction		0	0	0	-	-	-	-	-	-	-	-	-	-	0	0
	Parameter Adjustment		0	0	0	-	-	-	-	-	-	-	-	-	-	0	0
	Initial Settings		0	0	0	-	-	-	-	-	-	-	-	-	-	0	0
Manual Search	-		0	0	-	-	-	-	-	-	-	-	-	-	-	-	-

*1: Operation with ECU connected: saving ECU storage data

Operation with ECU disconnected: reading ECU storage data

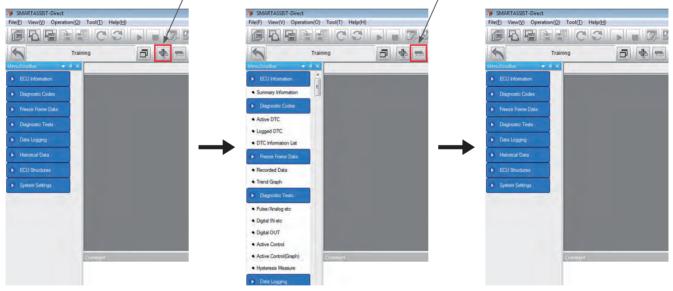
*2: Cannot disconnect during forced operation and when receiving logged data

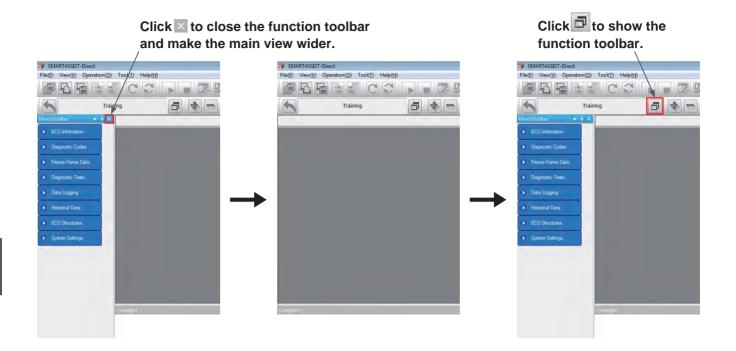
• Display of the Function Selection Toolbar



Click to 🔮 open all submenus.

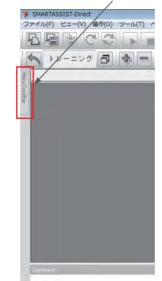
Click to close all submenus. You cannot close selected submenus.



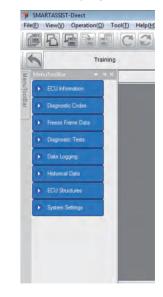


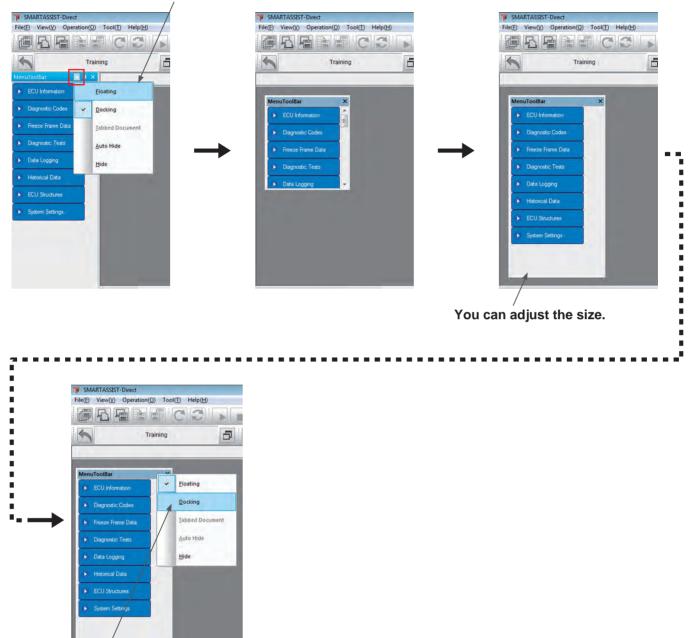
Click to hide the function toolbar and make the main view wider.





If you move the cursor close to the function toolbar tab, the hidden toolbar is displayed.





Click and select Floating to detach the function toolbar and move it to the desired location.

Right-click the function toolbar and select Docking to return it to its original position.

5.1.4 Comment Box

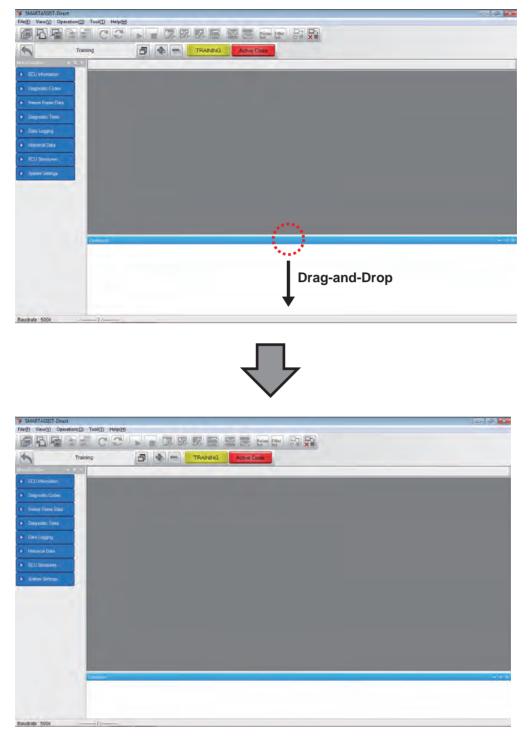
The display of the comment box can be changed in the same way as the function selection toolbar.

1 : Push to Hide button to hide the comment box.



To display the comment box again, go to the standard toolbar and click Tool (T), Toolbar (T), and Comment.

File(F) View(V) Operation(O	B	ol(T) Help(H) Tool Bar(T)	1	MenuToolBar	Param Fitter
	1	Status Bar(S)	(Comment	Set Set
Tra	in	Communication Setting(C)	2	TRAINING	Active Code
lenuToolBar 🚽 🖲 🗙		Option(O)			-
ECU Information					
Diagnostic Codes					



The size of the comment box is adjustable. (Operate by drag-and-drop.)

5.1.5 Changing the Display Border Width

The display border width of the display box and all selection screens is adjustable.

nufonifiar 🔷 🕅	*	- ECU Information - Summary In	nformation	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	
ECU Information	System Group	Detail	Value		Unit
	Engine	Туре	4TNV98-ZXXX		
Summary Information	75.0	Rated RPM		2000.00 r/mi	in
Diagnostic Codes		SNo	54321		
Lindgriddiid Codes		Manufacturing Test Date	080520		
		4	<u>ل</u>		
muijool5er 🗕 🕅	×	ECU Information - Summary	Information		
				Unit	
muilool5er 🔹 🕷	System Group	Detail	Information Value 4TNV98-ZXXX	Unit	
ECU Information			Value		
ECU Information	System Group	Detail Type	Value 4TNV98-ZXXX		
ECU Information	System Group	Detail Type Rated RPM	Value 4TNV98-ZXXX 2000.00		

Drag & drop the mark

DataSelect			
Model	Serial No	Date, Time	^
4TNV98T-ZNSA	X0001	20 March, 2012 17:10:53	
4TNV98T-ZNSA	X0001	20 March, 2012 17:07:28	
4TNV98T-ZNSA	X0001	20 March, 2012 16:38:52	E
4TNV98T-ZNSA	X0001	20 March, 2012 16:27:43	
4TNV98T-ZNSA	X0001	20 March, 2012 16:02:13	
4TNV98T-ZNSA	X0001	20 March, 2012 15:52:38	
4TNV98T-ZNSA	X0001	20 March, 2012 15:50:17	
4TNV98T-ZNSA	X0001	20 March, 2012 15:49:19	
4TNV98T-ZNSA	X0001	20 March, 2012 15:46:35	*



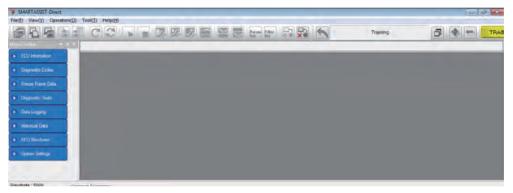
Model	Serial No	Date, Time	
4TNV	X0001	20 March, 2012 17:10:53	
4TNV	X0001	20 March, 2012 17:07:28	
4TNV	X0001	20 March, 2012 16:38:52	
4TNV	X0001	20 March, 2012 16:27:43	
4TNV	X0001	20 March, 2012 16:02:13	
4TNV	X0001	20 March, 2012 15:52:38	
4TNV	X0001	20 March, 2012 15:50:17	L
4TNV	X0001	20 March, 2012 15:49:19	
4TNV	X0001	20 March, 2012 15:46:35	

5.1.6 Screen Display Toolbar

- : Return to the Main Menu
- 2 : Display box for the selected function
- 3 🖻 : Show the Function Selection Toolbar again
- : Expand submenus of the Function Selection Toolbar
- 5 = : Minimize submenus of the Function Selection Toolbar
- 6 Display of ECU/controller communication status: 通信接続中 トレーニング中 etc.

1 2	i 1	3 4	4 5		6	7
SMARTASSIST-Direct						
File(F) View(V) Operation(O						
	CC		E.	Sp 54		Param Filter O# X#
5	ť	5 4		OFF I	LINE No	Codes

You can change the position of the Screen Display Toolbar. (Operate by drag-and-drop.)

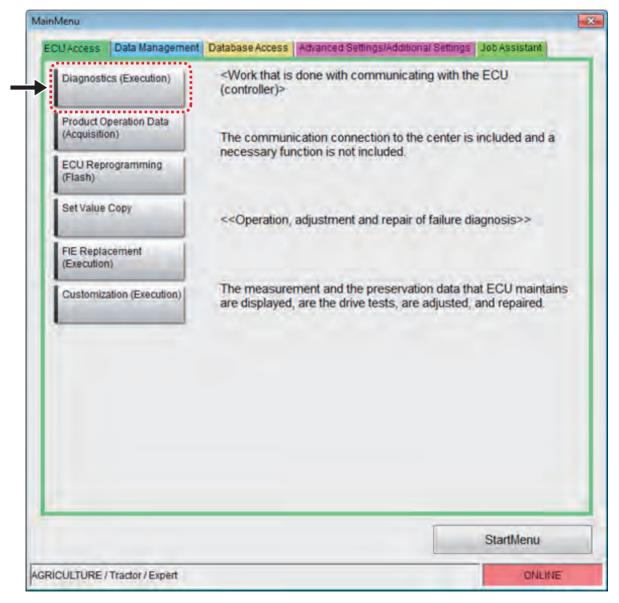


Example of a change

6. Error Diagnosis Function (ECU Connection)

6.1 Starting the Error Diagnosis

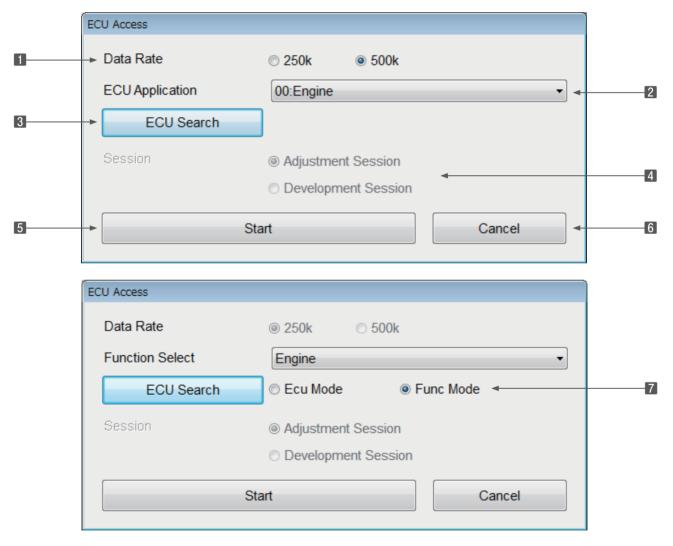
- 1 Connect the product and the PC with the interface box.
- 2 Turn on the product. (Turn the key switch to "On".)
- **3** Select the tab "ECU Connection".
- **4** Select the button "Diagnostics (Execution)".



5 Search the ECU/controller.

ECU Find	
ECU is being retrieved. Please wait for a while	

- 6 When the search of the product's internal ECU is finished, the selection screen for the connection destination is displayed. Select connection destination 2, and click "Start".
 - **1** Normally this is automatically set by a part that adjusts the communication speed and cannot be changed.
 - Select the connection destination. Normally, the parts in the product's internal ECU that can be connected to are displayed.
 - **3** Search the ECU again.
 - Used by the development and production departments. Not used for servicing.
 - **5** Activate the connection.
 - 6 Cancel the connection.
 - The display method can be changed to "Sort By ECU" and "Sort By Function". (Refer to [7 Display Sorted by Function] on page 39.)



7 Display Sorted by Function

To improve the product's functionality, a multi-ECU type has been developed that allows the control of one function on multiple ECU. In that case, select the display method "Sorted by Function" to view the necessary data filtered from multiple ECU.

Example: Running control, horizontal control

- If the search cannot be conducted because the power is turned off, the power supply is unstable, a cable is not connected or other reasons, an ECU list is displayed on the selection screen of 2 that suggests connection destinations from the product category selected on the start menu. If the search is not successful, changing the communication speed becomes available. For marine use, the standard is 250 kB; for land use, agricultural and construction equipment, the standard is 500 kB. The Baud rate can vary depending on the machine model. Select the communication speed and the ECU address, and click "Start".
 - The ECU address of the model selected at the Start Menu is displayed as selection destination.

ECU Access	
Data Rate	© 250k
ECU Application	03:Transmission Control
ECU Search	00:Engine 03:Transmission Control
Session	28:Merter EF:UFO Control
	O Development Session
Sta	art Cancel

- If connected to a service ECU (new ECU), refer to [10 Connecting to the service ECU] on page 43.
- **8** The communication with the ECU or controller starts.



Note If communication fails and an error screen is displayed, refer to 0000.

- 9 Data Selection Screen for the Manual Link Function
 - (1) When the connection to the product is established, the product model is confirmed and the manual link data for error diagnosis is automatically set. If multiple data sets are available, the data selection screen is displayed. Select the desired data, and click "OK".

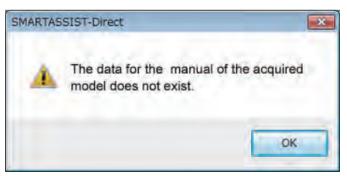
4TNV98	
Dmy_Eng07	
1.	

Example screen

If you click "OK" without selecting the data, the below warning screen is displayed.



2 If no applicable technical manual is available, the below screen is displayed.



Note If only one manual link data set is available, the screens described in ① and ② are not displayed and the data is set automatically.

- ③ If the manual link data is of a different language than the language set for the operating system, the below notice screen is displayed, asking for confirmation.
- 1 Selection window for different languages
- 2 If confirmed
- 3 If not confirmed

The s		he acquired model d	loesn't
	sts in the following I	languages.	
in Gais		anguages.	
	Japanese		•
	-	Cancel	_

Note When the manual display language setting and the language set for the PC's operating system are different, the manual display language setting is prioritized. 10 Connecting to the service ECU

When an error diagnosis (execution) is performed at the service ECU (new ECU), displays and functions are different between the engine ECU and the implement 3G controller.

• Engine ECU

- The search results for "Communication Speed" and "ECU Address" of the connected service ECU are displayed.
- 2 When starting the connection, a warning is displayed stating that the connected ECU is not a marketed prod-

uct.

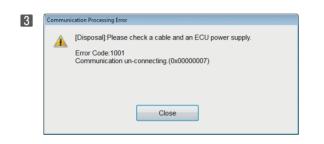
3 The error diagnosis screen for the service ECU is displayed.

	MainMenu			×		
	ECU Access Data Managem	ent Database Access Advanced Settin	gs/Additional Settings	ob Assistant		
	Diagnostics (Execution) Product Operation Data (Acquisition) ECU Reprogramming (Flash)	Work that is done with complex of the communication connect necessary function is not incomplex.	imunicating with the E	cu		
61	ECU Access			ECU Access		_
	Data Rate © 25	0k 💿 500k		Data Rate	⊚ 250k	
		Engine	or	Function Select	Engine	-
	ECU Search			ECU Search	© Ecu Mode	
				Session		
	0.14	ljustment Session evelopment Session		06331011	 Adjustment Session Development Session 	
	Start					ר
	Start	Cancel			Start Cancel	
2	SMARTASSIST-Direct	an a mass-production article are	e connected.			
3	Diagnos	on(O) Tool(T) Help(H)		OFFLINE	Param Fitter Par Par Set Set	
	MenuToolBar -					

• Implement 3G Controller (ECU)

- **1** The implement 3G controller (ECU) cannot be connected with the error diagnosis (execution) function.
- 2 If you click "Error Diagnosis (Execution)", the communication speed will not automatically be set. (selectable)
- If you set the communication speed or the ECU address manually, a warning screen is displayed, and the er
 - ror diagnosis (execution) function ends automatically.

ssion Control
nt Session
ent Session



6.2 ECU Basic Information

6.2.1 Display

Displays main data of the ECU.

Operation Toolbar

- 1 🗐 : Save the ECU's screen display data. (Refer to [7. Error Diagnosis Data Save and Display Functions].)
- 2 🔁 : Print the screen.
- 3 🔚 : Save a screenshot in BMP format.
- 4 📄 : Save the screen data in CSV format.
- 5 C : Update data.

• Main Box

System Group : Show the display categories.

- 8 Item : Show the names of the categories.
- **Data** : Show data.
- 10 Unit : Display the unit.
- **ECU** : Show the name of the ECU or controller whose data is saved.

• Comment Box

2 Comment box: Show annotations.

11 2 5	3 4 5	6 7	8	9	10	J I J2
T SMARTASSIST-Direct			/ /			
File(F) View(V) Operati			/ /		/ /	
间乌哈属			/			
6	Training	TRAINING	Active Code	/	· /	/
a (/		
0	Engine	ECU Information - Summa			+	
ECU Information	System Grou		Value	Unit	ECU	
Summary Information	Engine	Туре	4TNV98-ZXXX		Engine	
 Summary information 		Rated RPM		0.00 r/min	Engine	
Diagnostic Codes		SNo	54321		Engine	
And the second second second		Manufacturing Test Date	080520		Engine	
Freeze Frame Data		Run Hr		0.00 h	Engine	
	Fuel Sy	Type Part No.	2GECO_MP_TNV		Engine	
Diagnostic Tests		Sno.	729938-51XXX 080528Z321		Engine /	/
	ECU	Part No.	1R1992-00XXX**		Engine	
Data Logging	LECO	Fait No.	0852754321		Engine	
	Conina		0602704321		Engine	
Historical Data	Engine	-				
	Engine					
ECU Structures	UFO Control					
System Settings	Transmission C	Control				
	Merter	1.1.1				
	Eterna and				/	* 5 ×
	Comment			,	/	* # X

Figure 6-1 ECU Basic Data Display Screen

6.2.2 Screen Print

Click the 🔝 button of 🛿 to open the printer settings screen. Select an available printer and print.

Print Setup	64	×
Printer		
Name:	Microsoft XPS Document Writer	Properties
Status:	Ready	
Type:	Microsoft XPS Document Writer	
Where:	XPSPort:	
Comment		
Paper		Orientation
Size:	Letter	O Portrait
Source:	Automatically Select 👻	A e Landscape
Network.		OK Cancel

Figure 6-2 Example screen for Windows 7

6.2.3 Saving Image Bitmap

Click the 🔚 button of 🕄 to open the selection screen for the save location of the bitmap data.

Documents lib	rany		# *	0
	rany			
Includes: 2 locations	Taly	Arrange by:	Folder •	
Name	*	Date modified	Туре	
	No items match you	r search.		
	Construction of the			
	111			
V				_
Filer (* hmn)				-
rites (.binip)				
	Name Files (*.bmp)	No items match your	No items match your search.	No items match your search.

Figure 6-3 Example screen for Windows 7

6.2.4 Saving Files

Click the 📄 button of 🖪 to open the selection screen for the save location.

You can write a memo and attach it to the save data.

	Documents Name	~	*	0 🕈 🛤 🛄 -	
2	Name				
Recent Places				Date modified	Туре
		No iten	ns match your	search.	
Desktop					
Libraries					
Computer					
Network	([10			
	ile <u>n</u> ame:	20120222_173256	SYSIF.csv	•	Save
S	ave as type:	Summary Information	n(*.csv)	•	Cancel
	Memo:				
					*

Remark The data is saved as Comma Separated Values (CSV).

When saving data such as the data below with i button of 4,

Engine	ECU Information - Summary I	ECU Information - Summary Information							
System Group	Detail	Value	Unit	ECU					
Engine	Туре	4TNV98-ZXXX		Engine					
	Rated RPM	2000.00	r/min	Engine					
	SNo	54321		Engine					
	Manufacturing Test Date	080520		Engine					
	Run Hr	1300.00	h	Engine					
Fuel System	Туре	2GECO_MP_TNV		Engine					
	Part No.	729938-51XXX		Engine					
	Sno.	080528Z321		Engine					
ECU	Part No.	1R1992-00XXX**		Engine					
	SNo.	0852754321		Engine					



it is saved in the below format.

4TNV98-ZXXX	54321	Data 1	
Information Type	Item	Data	Unit
Engine data	Туре	4TNV98-ZXXX	
Engine data	Rated Speed	2000	r/min
Engine data	SNo.	54321	
Engine data	Shipment Ad-	80520	
	justment Day		
Engine data	Operating	1300	h
	Hours		
Pump Data	Туре	2GECO_MP_TNV	
Pump Data	Part No.	729938-51XXX	
Pump Data	SNo.	080528Z321	
ECU Data	Part No.	1R1992-00XXX* *	
ECU Data	SNo.	852754321	

6.3 Defect Display

Displays current or past defects detected by the ECU. Click the Screen Selection toolbar to display current defects or the defect history. Has a manual link function that links to more detailed technical information.

6.3.1 Current Defect

This function lists the current or past defects detected by the ECU in real-time (automatic update every 2 seconds). It displays the error code and its contents, and provides a simple explanation and solution in the box on the bottom. If the cause of the defect is removed and the machine works normally again, the defect display on the top disappears.

Operation Toolbar

- 1 🗐 : Save the ECU's screen display data. (Refer to [7. Error Diagnosis Data Save and Display Functions].)
- 2 🔄 : Print the screen. (Refer to [6.2.2])
- 3 🔚 : Save a screenshot in BMP format. (Refer to [6.2.3])
- 4 E: Save the screen data in CSV format. (Refer to [6.2.4])

Main Box

- 5 Manual : In entries that have this button **Display**, pressing it displays more detailed technical information.
- **Code** : Display error codes (DTC) that conform to SAE J2012 or that have been specified for the product.
- **FMI** : Display the error code. (Refer to [15. Attached Documents] on page 244.)
- **B Description** : Display the contents of the error code.
- 9 Probable Cause : Display the reason for the error determination.
- **ECU** : Display the ECU of the faulty device. (Only if multiple ECU are connected.)

Comment Box

11 Comment box: Display the contents of the error diagnosis for the selected error (line colored in green).

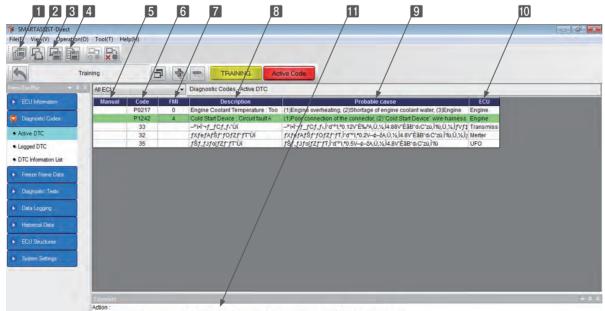


Figure 6-4 Current Defect Screen

6.3.2 Defect History (Expert Function)

Displays the stored past defect history, error code, error content, number of occurrences, and time of first and latest occurrence. Also, delete the complete defect history or single entries.

Operation Toolbar

- 1 🗐 : Save the ECU's screen display data. (Refer to [7. Error Diagnosis Data Save and Display Functions].)
- 2 🔄 : Print the screen. (Refer to [6.2.2])
- 3 🔚 : Save a screenshot in BMP format. (Refer to [6.2.3])
- 4 📷 : Save the complete history data in CSV format. (Refer to [6.2.4])
- **5** C: Update the complete history data.

Function Buttons

6 Clear Selected DTC : Select data in the Clear box and delete it.

Clear All : Delete the complete defect history. Past data are deleted, but current defects will still be displayed.

Main Box

8	Clear] : Display the data selected for deletion. (Click to tick the checkbox.)
9	Active] : Current defects are marked with a lamp symbol.
10	Code] : Display error codes (DTC) that conform to SAE J2012 or that have been specified for the
		product.
11	FMI] : Display the error mode. (Refer to [15. Attached Documents] on page 244.)
12	Description] : Display the contents of the error code.
13	00] : Display the total number of occurrences for the same defect.
14	First] : Display the time (machine operation) of the first occurrence.
15	Latest] : Display the time (machine operation) of the last occurrence.
16	ECU] : Display the ECU of the faulty device. (Only if multiple ECU are connected.)

Comment Box

17 Comment box: Display the reason for the error determination for the selected error (line colored in green).

1 2 3	(0) Tool(T)	Help(H)	86	9	TRAININ	7 NG Activi	e Code/	12	/	1 3	14	15	16	17
MenuToolBar 🔷 Ø	AILECU	\vdash	T	11	agnostic Codes - L	ogged DTC	7			_/		_/		-
ECU Information		ear Logge	ODTC /	A	Clear		1			1		1	/	
Diagnostic Codes	Clear	Active	Code P0217	FMI	Engine Coolant T		cription		OC 3	First 57.70	Latest 1300.00 Er	ECU	/	
Active DTC		ŏ	P1242	4	Cold Start Device		i ligit		4	34.00	1300.00 Er			
Logged DTC		0	P1202	4	Engine Fuel Rack				5	40.00	630.00 Er			
· Logged DTC		0	P0118	3	Engine Coolant T		sor : Shorted to	high source	1	122.75	122.75 Er			
DTC Information List		0	33	-	*'i•l'¬f_fCf,f∢`U '-sŒn*Ùi	JI			3	400.00	1300.00 Tr			
A CONTRACTOR OF		0	79 32	-	ŽáfŒfo[fZf*fT*	in:			1	604.00 30.00	604.00 Tr 359.00 Tr			
Freeze Frame Data	8	00	62		f\$fo[fTSW'Ùi	01			2	70.00	80.00 Tr			
A DOMESTIC TO A	<u> </u>		32	_	fXfefAfSf f0f2	74-47-11			2	70.00	1300.00 M			
Diagnostic Tests		1.1	52	-	% fZf*fT*Ùí	2)) 1 01					217.00 1			
Data Logging		-	62		"R-ufzf"fT'Ùi						200.00 M			
P Data Logging		0	35		f\$f.fJfo[fZf"fT	107			2	500.00	1300.00 UI			
Historical Data		ŏ	34		f\$ftfq\$pfZf`fT				1	217.00	217/00 U			
P TISTONSOF DISTO	8	ŏ	27		fAfNfZf (JZf fT				2	34.00	140.00 UI			
ECU Structures											/			
 System Settings 														
	Comment										/			- 3 - 2
	Action :									_				
	Check the	connector	r, wire-harne	ss. Cold	Start Device. Powe	er-off for a few tim	es. Then check	if DTC code is ge	nerated again.					

Figure 6-5 Defect History Screen

6.3.3 List of Error Codes

Displays the list of error codes that can be detected by the ECU.

Also, do a keyword search.

Operation Toolbar

Image: Save the ECU's screen display data. (Refer to [7. Error Diagnosis Data Save and Display Functions].)

2 🔄 : Print the screen. (Refer to [6.2.2])

- 3 🔚 : Save a screenshot in BMP format. (Refer to [6.2.3])
- 4 📷 : Save the complete history data in CSV format. (Refer to [6.2.4])

Function Buttons

- **5 Detail Search** : Enter the keyword for the search.
- 6 Search : Perform the search.

• Main Box

Code : Display error codes (DTC) that conform to SAE J2012 or that have been specified for the
product.
8 FMI : Display the error mode.
Description : Display the contents of the error code.
SPN : Display parameter ID numbers that comply to SAE J1939, and numbers for the sensors
and actuators
ECU : Display the ECU that controls the devices. (Only if multiple ECU are connected.)

Note The displayed contents can vary by product.

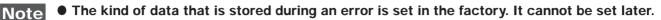
• Comment Box

2 Comment box: Display details of the error code for the selected line (colored in green).

6	raining	TEAINING Active Sode				
		- DTC Information List	/			
ECU Information	Description Sea				/	
	Code FMI	Description	SPN	ECU	/	
Diagnostic Codes	P0117 4	Engine Coolant Temperature Sensor : Shorted to low source	110	Engine		Í
Active DTG	P0118 3	Engine Coolant Temperature Sensor : Shorted to high source	110	Engine		
Logged DTC	P0119 2	Engine Coolant Temperature Sensor : Intermittent fault	110	Engine		
144 - W. 1.	P0122 4	Accelerator Pedal Position Sensor "A" : Shorted to low source	91	Engine	/	
DTC Information List	P0123 3	Accelerator Pedal Position Sensor "A" : Shorted to high source	91	Engine	/	
Carrier Barriera	P0124 2	Accelerator Pedal Position Sensor "A" : Intermittent fault	91	Engine	/	
Freeze Frame Data	P0217 0	Engine Coolant Temperature : Too High	110	Engine	/	
Diagnostic Tests	P0219 0	Engine speed : Over speed Condition	190	Engine		
Diagnostic rests	P0222 4	Accelerator Pedal Position Sensor "B" : Shorted to low source	29	Engine	/	
Data Logging	P0223 3	Accelerator Pedal Position Sensor "B" : Shorted to high source	29	Engine		
100 - 100 - 10 - 10 - 10 - 10 - 10 - 10	P0224 2	Accelerator Pedal Position Sensor "B" : Intermittent fault	29	Engine	/	
Historical Data	P0340 4	Engine Fuel Injection Pump Speed Sensor : Shorted to low source	1078	Engine	/	
	P0562 1	System Voltage : Too Low	158	Engine		
ECU Structures	P0563 0	System Voltage : Too High	158	Engine		
	P0601 12	E-ECU internal fault : EEPROM ReadWrite fault	630	Engine		
System Settings	Comment		_			
	Action :				*	
	Check the connect	or, wire-harness, Engine Coolant Temperature Sensor. Power-off for a few time	s. Then check if	DTC code is gener	rated again.	
	Probable cause :					

6.4 Data Before/After Error (Expert Function)

Displays relevant data before/after a recent error was detected, and click the screen selection toolbar to view a list of the data and a transition graph.



• Depending on the product specification, data before/after error or only before error is saved.

6.4.1 Save Data

Additional Information Box

The saved data is displayed in a list. Click a box to display the data in the main box.

- **1** No. : Display the line number of the data.
- **DTC** : Error code (The content can be confirmed at "Defect Display" "Defect History".)
- **Time** : Display the time of error occurrence (total operating time).

Operation Toolbar

- 🖪 🖅 : Save the ECU's screen display data. (Refer to [7. Error Diagnosis Data Save and Display Functions].)
- 5 🔁 : Print the screen. (Refer to [6.2.2])
- 6 🔚 : Save a screenshot in BMP format. (Refer to [6.2.3])
- Image: Save the data displayed in the main box in CSV format. (Refer to [6.2.4])
- 8 C : Update the data.
- Image: Display the data selection subwindow to add, delete and sort the displayed data.
- Function Buttons
 - **Clear FFD** : Delete the selected data. (The Password Entry Screen is displayed.)
 - * FFD: Freeze Frame Data

Main Box

- 12 No. : Display the time line number of the data.
- Item Box : The first letter of the selected data name is displayed, and the name is displayed at 12. (Content such as the unit can be confirmed on the ECU Specification/Structure [Analog Signal] Menu screen.) Right-click the item box to switch the data format from binary to decimal to hexadecimal.



Figure 6-7 Display Data Before/After Error Screen

Data Selection Window

Select the data displayed in the main box.

- 1 Data : List all available data.
- 2 ◀ / ► : Select/deselect data for display.
- **3** Set data : The data displayed in the main box.
- Image: Image: A state of the order in which the selected data is displayed.
- **Default** : Previously selected main items are set automatically.
- 6 Set : Confirm an entry.
- 7 Cancel : Discard an entry.

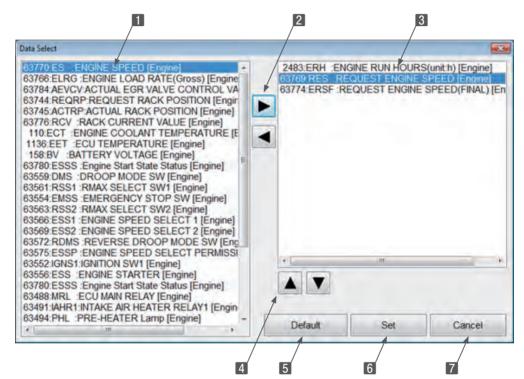


Figure 6-8 Data Selection Window Screen

6.4.2 Trend Graph

Additional Information Box

With the graph setting operation, display the name of the selected data item and the position of the cursor.

Graph 1 shows top values, graph 2 shows bottom values.

Position : Numeric value for the cursor position

Display item and data: Display the item name and data. The background color and the line color are of the same color.

Operation Toolbar

[3] Image: Save the ECU's screen display data. (Refer to [7. Error Diagnosis Data Save and Display Functions].)

4 🔄 : Print the screen. (Refer to [6.2.2])

5 🔚 : Save a screenshot in BMP format. (Refer to [6.2.3])

6 E : Do the settings for the display item and the scaling of the top graph.

1 Solution The display item and the scaling of the bottom graph.

• Main Box

8 Cursor position : Click the screen to change the position.

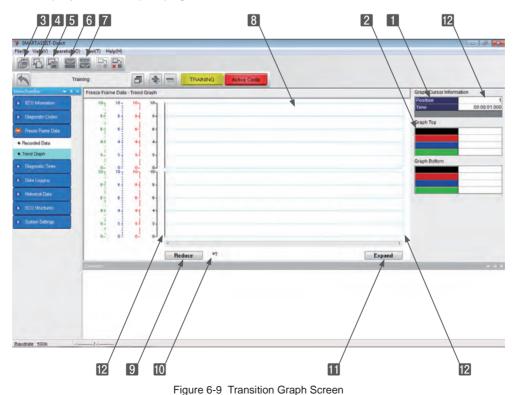
9 Minimize : Contract the graph.

10 *1 : Set the expansion value.

Expand : Expand the graph.

2 Counter value : Display the counter value of the y-axis.

Graph 1 and graph 2 are displayed. For details regarding operation of the graph, refer to [7.1 Error Diagnosis Data Save and Display Functions] on page 139.



6.5 Diagnosis Test

Allows to separately test the input/output device. Select the input/output test and the forced operation function by clicking them on the screen selection toolbar. Operation within this function that involve output may be usable only with the clutch in neutral and the engine in low idle or stopped.

- The test involves many operations where the product actually operates.
 Only personnel who have taken the SMARTASSIST-Direct training may perform the test, and must pay due attention to their surroundings.
 If not, the product may move unexpectedly and cause serious accidents.
- Important
- In an emergency, turn off the power of the ECU/controller (turn the key switch to "Off") to stop the product.
- "Maintain the previous status" or "Automatically controlled test Return to previous status" are operations in case that the diagnosis test is canceled under the below conditions, but which one is set varies by product.
 - The buttons "Abort, "Stop" or "Cancel" were clicked.
 - The connection harness between the product and the PC is disconnected.
 - The SMARTASSIST-Direct software was exited.

Important Reset

• Turn off the power of the ECU/controller after the diagnosis test is finished. (Turn the key switch to "Off".)

Put the product in forced operation with the SMARTASSIST-Direct, and the ECU/controller will change to force operation mode. If you continue using the device in this state, the automatic control will become unoperational.

6.5.1 Analog/Pulse Input/Output

The analog measuring values and pulse input values can be confirmed with this function when checking operations of the input device after error diagnosis or repair. When switching screens, the screen display automatically updates every 2 seconds.

Operation Toolbar

- 1 🗐 : Save the ECU's screen display data. (Refer to [7. Error Diagnosis Data Save and Display Functions].)
- 2 🔄 : Print the screen. (Refer to [6.2.2])
- 3 🔚 : Save a screenshot in BMP format. (Refer to [6.2.3])
- 4 📄 : Save the complete history data in CSV format.
- 5 C: Update the current data.
- 6 😂 : Continuously update the current data. (2 second interval)
- **7 •** : Stop continuous update.
- Image: After stopping, change the order of the data. With this operation, important data can be sorted in way that is easier to see. For operation details, refer to [Data Selection Window] on page 52.

• Main Box

9		: If multiple ECU are installed, you can switch between screens.
10	Description	: Display the input device name.
11	Value	: Display the measurement values.
12	Unit	: Unit
13	Raw Data	: Voltage of analog input (mV)
14	Notes	: Annotation box
15	ECU	: Display the ECU/controller that controls the devices. (Only if multiple ECU are connected.)

Comment Box

1 2 3 SMARTASS(ST-Direct left View(V) Operation		10	11	12 13	14		15	
5	Fraining	TRAINING	Active Co			/		
muTool5ar 🔫 🖲	Engine Diagnost	ic Tests - Pulse/Analo	og etc IN/OUT		+	+		
ECU Information	Description	Value	Unit	Raw Data	Notes	ECU	1	(
	ENGINE SPEED	1450	r/min	1450 Parameter		Engine		
Diagnostic Codes	CAMSHAFT ROTATION SPEED	725	r/min	725 Pulse Input		Engine		
	AUXILIARY ROTATION SPEED SENSOR	1450	r/min	1450		Engine		
Freeze Frame Data	LOADER REQUEST ROTATION SPEED	1448	r/min	1448		Engine		
	REQUEST ENGINE SPEED	1448	r/min	1448 Parameter		Engine		
Diagnostic Tests	RACK ACTUATOR OUTPUT DUTY	.96		96 PWM Output		Engine		
	ENGINE LOAD MONITOR	62	%	62		Engine		
Pulse/Analog etc	ACTUAL EGR VALVE CONTROL VALUE	32		32 Parameter		Engine		
Digital IN etc	RACK POSITION SENSOR VOLTAGE	307		307 A/I		Engine		
	ACCELERATOR PEDAL Position	40.4	%	101		Engine		
Digital OUT	RACK ACTUATOR CURRENT	3.20	A	64		Engine		
Active Control	ECU TEMPERATURE	47.00	degC	10240 A/I		Engine		
Active Control	BATTERY VOLTAGE	12.25	V	245		Engine /		
Active Control(Graph)	SENSOR SOURCE VOLTAGE	5.00	V	100 A/I		Engine		
	REQUEST RACK POSITION	297		297 Parameter		Engine		
Hysteresis Measure	Engine Stop Warning Status	0		0 Parameter		Engine		
Data Logging	ENGINE MODE	0		0 0:Isochronous		Engine		
Data Logging	ENGINE COOLANT TEMPERATURE	86	degC	126 A/I		Engine		
Historical Data	Starter Restraint Status	0		0 Parameter		Engine		
Tissofical Data	Starter Restraint Factor	0		0 Parameter		Engine		
ECU Structures						/		
System Settings	Comment				/			
	Notes :							
	Pulse Input							

Figure 6-10 Input/Output Screen (e.g. Analog/Pulse)

6.5.2 Digital Input

The On/Off status can be confirmed with this function when checking operations of the input device after error diagnosis or repair. When switching screens, the screen display automatically updates every 2 seconds.

Operation Toolbar

- 1 🗐 : Save the ECU's screen display data. (Refer to [7. Error Diagnosis Data Save and Display Functions].)
- 2 🔄 : Print the screen. (Refer to [6.2.2])
- 3 🔚 : Save a screenshot in BMP format. (Refer to [6.2.3])
- **4 E**: Save the complete history data in CSV format.
- 5 C: Update the current data.
- 6 🖾 : Continuously update the current data. (2 second interval)
- **7 •** : Stop continuous update.

• Main Box

8	: If multiple ECU are installed, you can switch between screens.
9 Description	: Display the input device name.
10 On/Off	: Display the on/off status.
11 Notes	: Annotation box
12 ECU	: Display the ECU/controller that controls the devices. (Only if multiple ECU are connected.)

• Comment Box

1 2 3 SMARTASSIST-Direct File(T Viet(V) Operation		9	10	11	
	Training		Code		
denufoolfiar 🗢 0			UT Bit Status, Control Plag		
ECU Information	Description	On/Off	Notes	ECU	
Diagnostic Codes	DROOP MODE SW RMAX SELECT SW1	OFF		Engine	
 Diagnostic Lodes 	EMERGENCY STOP SW	OFF	Discrete Input	Engine	/
Freeze Frame Data	RMAX SELECT SW2	OFF	Discrete input	Engine	
P THOSE THINK DUT	ENGINE SPEED SELECT 1	OFF		Engine	
Diagnostic Tests	ENGINE SPEED SELECT 2	OFF		Engine	
	REVERSE DROOP MODE SW	OFF		Engine	
 Pulse/Analog etc 	ENGINE SPEED SELECT PERMISSION	OFF		Engine	
Digital IN etc	IGNITION SW1	OFF	Discrete Input	Engine	
	ENGINE STARTER	OFF	Discrete Input	Engine	
Digital OUT	Engine Start State Status	OFF	Parameter	Engine	
Active Control	The second se				
 Active Control(Graph) 					
Hysteresis Measure					
- Tiyatoroaa modadiro					
Data Logging					
Historical Data					
ECU Structures					
System Settings	Comment			/	
	Notes :			1	



6.5.3 Digital Output (Expert Function)

This function checks operations of the output device after error diagnosis or repair. The forced On/Off status of the contact cannot be executed if the engine is not stopped. When switching screens, the screen display automatically updates every 2 seconds.

Operation Toolbar

- 1 🗐 : Save the ECU's screen display data. (Refer to [7. Error Diagnosis Data Save and Display Functions].)
- 2 🔄 : Print the screen. (Refer to [6.2.2])
- 3 🔚 : Save a screenshot in BMP format. (Refer to [6.2.3])
- 4 📄 : Save the complete history data in CSV format.
- 5 C: Update the current data.
- 6 😂 : Continuously update the current data. (2 second interval)
- **7 •** : Stop continuous update.

Main Box

8

11

: If multiple ECU are installed, you can switch between screens.

9 Forced Operation Mode : Display manual operations and update operations.

- When an update operation is performed, manual control is indicated by a check mark.
- Remove the check mark by clicking it and return to automatic control.

Important When returning to automatic control, whether the status "Maintain the previous status" or "Automatically controlled test - Return to previous status" is set in the ECU/ controller varies by product. Use it with due care.

10	Description	: Displays the output device name.
----	-------------	------------------------------------

- **On/Off** : Displays the status of the current value.
 - For changeable items, "On/Off" is displayed in blue.
 - Toggle between On and Off by double-clicking.
 - When changing the status, it is necessary to enter the password.
 - The password confirmation will be valid as long as you use this screen.
 - If toggling between On and Off is not permitted by other devices, the words are displayed in red.
 - Output that cannot be turned on and off (e.g. the main relay) is set by the ECU/controller.

12 Notes : Annotation box

: Display the ECU/controller that controls the devices. (Only if multiple ECU are connected.)

Comment Box

ECU

13

Taining Taining Taining Taining Diagnos/c Tests - DiglatiONOFF) g/UT • Edu Information Diagnos/c Tests - DiglatiONOFF) g/UT • Bagnosic Tests Diagnos/c Tests - DiglatiONOFF) g/UT • Rever Frank Date Diagnos/c Tests - DiglatiONOFF) g/UT • Network Tests Diagnos/c Tests - DiglatiONOFF) g/UT • Rever Frank Date Diagnos/c Tests - DiglatiONOFF) g/UT • Network Tests Diagnos/c Tests - Diglation g/U • Diglation Reve Defendicator • Diglation Reve Diff • Discrete Dulput Engine • Discrete Notion Right Diff • Discrete Dulput Engine • Discrete Dulput Engine • Discrete Dulput Engine <th>1 2 3 SMARTASSIST-Dir/ct e(T. Vieu(V) operating</th> <th></th> <th>10</th> <th></th> <th>12</th> <th>13</th> <th>14</th>	1 2 3 SMARTASSIST-Dir/ct e(T. Vieu(V) operating		10		12	13	14
Implication Implies Diagnose: Tests - Digital(ONIOFF) of T ECU Information Implies Pleade change the instruction bydouble-clicking. Diagnost: Codes Discrete Cutput Engine Fineste Finane: Data Discrete Cutput Engine Discrete Cutput Engine Engine Preste Finane: Data Discrete Cutput Engine Discrete Cutput Engine Engine PRCHEATER: Lamp OFF Discrete Output Engine Preste Finane: Data PRCHEATER: Lamp OFF Discrete Output Engine Pade/Andog etc EGR Step MOTOR(A) OFF Engine Engine Pada (VUT EGR Step MOTOR(A) OFF Engine Engine Active Control EGR Step MOTOR(C) OFF Engine Active Control (Cigoph) OFF Engine Engine Value Social EGN Step MOTOR(C) OFF Engine Active Control (Cigoph) OFF Engine Engine Value Soggrig Hotocol Data EGN Step MOTOR(C) OFF Engine EDUBalcloggrig Hotocol Data					/		/
ECU Information Disprodic Codes Pieade change the instruction bidouble-clicking. Disprodic Codes Description On/Off Notes ECU Frieze Frame Data Description OFF Discrete Output Engine Diagnostic Tests ENGINE STARTER RELAYI OFF Discrete Output Engine Diagnostic Tests ENGINE STARTER RELAYI OFF Discrete Output Engine Rulee /Analog etc EGR Step MOTOR(A) OFF Discrete Output Engine Digital IN etc EGR Step MOTOR(B) OFF Engine Engine Digital OUT EGR STEP MOTOR(B) OFF Engine Engine Active Control GSD SOLENORD VALVE OFF Engine Discrete Output Engine Engine Engine Active Control (Staph) OFF Engine Engine Active Control (Staph) Header Analog OFF Engine Active Control (Staph) Header Analog OFF Engine Active Control (Staph) Header Analog OFF Engine Data Logging Heatonsid Measure OFF							/
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Public Analog de: EGR Step MOTOR(A) OFF Engine Digital Nutric EGR Step MOTOR(B) OFF Engine Digital OUT EGR STEP MOTOR(C) OFF Engine Active Control OFF Engine Engine Active Control (Graph) OFF Engine Hystemset Mesaure Discrete Output Engine Data Logging Historical Data ECU Structures System Settings Econimient Kets	Liagnostic. Lests	ENGINE STARTER Interlock RELAY	OFF	Discrete Output	Engine		
Dotal IN etc ECR Step MOTOR(A) OFF Engine Dotal OUT ECR STEP MOTOR(B) OFF Engine ECR STEP MOTOR(C) OFF Engine Active Control (Graph) OFF Engine Hyderesis Measure Discrete Output Engine Data Logging Hyderesis Measure Ecul Structures System Settings Econicient Kontes :	Pulse/Analog etc	ECO MODE Lamp					
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Active Control(Graph) Hydraresis Measure Data Legging Hydronol Data ECU Shuchures System Settings ECU Shuchures System Settings	Digital OUT	EGR STEP MOTOR(D)	OFF		Engine		
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Hyderesis Messure Data Logging Historical Data ECU Shuckures System Settings EDMinient Notes :		FUEL RACK ACTUATOR RELAY	OFF	Discrete Output	Engine		
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System Settings	Historical Data				/		
System Settings							
Notes :	ECU Structures						
Notes :							
	System Settings	Comment					
Discrete Output					1		
		Discrete Output					

Figure 6-12 Digital Input Screen

• Subwindow (Screen Shift)

II If you click "On/Off", the password entry screen is displayed.

15Set: Toggle (On/Off).

Cancel : Cancel the toggling and return to the previous screen.

Please input pas	ssword.			
User ID	PG417334			
Password			1	
	Set	Cancel		

6.5.4 Forced Operation (Expert Function)

Sets the status for all devices (e.g. engine, clutch, switch, sensor) when operating each product separately by confirming the feedback control (e.g. control the rack position or speed governing of the engine) and product operation.

Important When you start it, the product may start as well.

- Be careful when you work with other personnel.
- Operate with due care to the surroundings.

Operation Toolbar

1 🗐 : Save the ECU's screen display data. (Refer to [7. Error Diagnosis Data Save and Display Functions].)

2 🔚 : Print the screen. (Refer to [6.2.2])

- 3 🔚 : Save a screenshot in BMP format. (Refer to [6.2.3])
- Image: Save the complete history data in CSV format. (Refer to [6.2.4])

• Main Box

5 . If multiple ECU are installed, you can switch between screens.
Manual : Display the status of the forced operation; a red circle indicates that the forced operation
is in progress, a gray circle indicates that it is stopped.
Stop Button : Click to stop the forced operation.
8 Run Button : Click to start the forced operation.
Description : Control item names
ENG Run : Indicates that the forced operation is available.
Req: Forced operation only during engine operation.
Not: Forced operation only during engine stop.
Measured : Display the measurement value (feedback value).
Desired : Display the target value (current set value). Click the target value to open the subwindow
and change the value.
13 Unit : Display the unit.
Graph : A red circle indicates that the graph can be displayed; a gray circle indicates that a mea-
surement is necessary to display the graph. Clicking the red circle after forced operation
switches to the graph display screen.
ECU : Display the ECU/controller that controls the devices. (Only if multiple ECU are connected.)

Comment Box

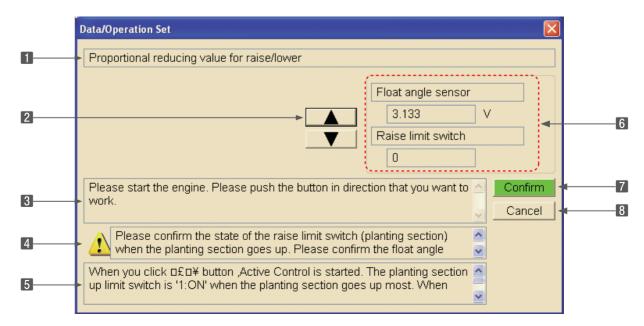
6. Error Diagnosis Function (ECU Connection)

123	4	56	7	8 9		10	11	12		13 14	15 f
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Tr	aining /			TRAINING Active Code	/	/ /	/	/	/	/ /	/
uToolBat 🚽 🖬 🕯	Engine			ests - Active Control				-/	-/		/
ECU Information		C Introl									-
	Manual	Stop button	Run button	— Description	ENG Run	Measured	Desired	Unit	Graph	ECU	
Diagnostic Codes	0	[STOP]	[RUN]	DIRECT ENGINE RPM CONTROL DIRECT RACK POSITION CONTROL	req	702	700 50	r/min	00	Engine	
Freeze Frame Data	0	[STOP]	[RUN]	AUTO HYSTERESIS MEASUREMENT	not	50	50		0	Engine Engine	
	ŏ	[STOP]	[RUN]	LOW IDLE RACK POSITION AUTO TUNING	req				-	Engine	
Diagnostic Tests	0	[STOP]	[RUN]	HIGH IDLE RACK POSITION AUTO TUNING	req					Engine	
ulse/Analog etc	0	[STOP]	[RUN]	DIRECT EGR VALVE CONTROL	not		0	%		Engine	
1.00	0	[STOP]	[RUN]	ENGINE LOAD MONITOR OUTPUT	not		16	%	_	Erigine	
igital IN etc	and the second second										
ligital OUT									/		
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ctive Control(Graph)											
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Figure 6-13 Forced Operation Screen

Change Subwindow 1

- Item Name : Display the name of the forced operation items.
 Operation Button : Display operation buttons such as Up (▲) and Down (▼).
 Operation Message : Display conditions set before forced operation.
 Precaution Message : Display precautions regarding forced operation.
 Assistance Message : Display additional information for forced operation.
 Assistance Message : Display target values/measurement values.
 Confirm : The confirmation button has two functions. - A green light indicates that the product can be operated in forced operation.
 - The light goes out if the upper limit or lower limit is exceeded during forced operation.
- 8 **Cancel** : Close the subwindow.



Change Subwindow 2	
1 Data Name	: Display the name of the forced operation items.
2 Measured	: Display the current measurement value of the feedback item.
3 Max	: Display the maximum setting for the target value.
4 Desired	: Display the current setting (target value).
5 Min	: Display the minimum setting for the target value.
6 Note	: Annotation
7 ▲/ ▼	: Change the setting in increments of 1, 10, and 100.
8 Measurement Mode	: Select to measure the feedback data.
9 🔺 / 🔻	: Adjust the measurement time.
10 Set	: Send the set directive value to the ECU and perform forced operation.
11 Cancel	: Cancel the forced operation and close the sub-window.
 Adjust the direct value with the direct value. 	th the ▲ / ▼ buttons. Set the direct value of the selected item with the Set but-

• Select **8** "Execute Measurement" with **Measurement Mode**, save the feedback data of the set time, and view the data on the graph screen.

ton.

	Data Set						×	
1—	Data Name DI	RECT ENGINE R	PM CONTRO	L				
2	Measured							
3	Max	65535	100 10	1				
4		700		▲				7
5	→ Min	0			_	_	_	
6	Note O	utput Test	1					
8	Measurement Mod	e						
	Not measuring			1	Veasurement	time(sec)	-	
	Measuring(grap)	oh display)				10	-	9
10			Set	Cancel				11

A part of the forced operation items are tested according to the previously set program for forced operations. In that case, the directive value cannot be entered.

Data Set	
Data Name	AUTO HYSTERESIS MEASUREMENT
Measured	
Max	
Desired	
Min	
Note	
Measurement M	Node
Not measure Not measure	ring Measurement time(sec)

6.5.5 Forced Operation Graph

The graph is only displayed if Execute Measurement is selected for forced operation.

• Additional Information Box (Cursor Value)

Displays the name and value for the data selected by the graph setting operation.

Graph 1: Top, data value

1 Position: Displays the data number for the cursor position.

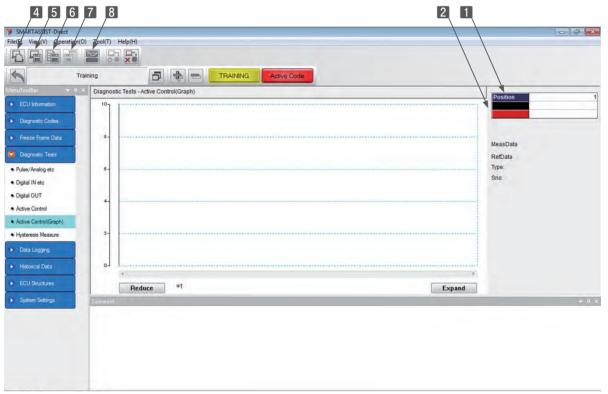
Display item data: Displays the item name and data. The background color and the color of the graph are the same.

Operation Toolbar

- [3] Image: Save the ECU's screen display data. (Refer to [7. Error Diagnosis Data Save and Display Functions].)
- 4 🔄 : Print the screen. (Refer to [6.2.2])
- 5 🔚 : Save a screenshot in BMP format. (Refer to [6.2.3])
- 6 📄 : Save the complete history data in CSV format. (Refer to [6.2.4])
- Image: Save the measured data. Save the data of the forced operation after measurement. For the display of the saved data, refer to [7. Error Diagnosis Data Save and Display Functions].
- 8 🔚 : Do the settings for the display item and the scaling of the top graph.

Main Box

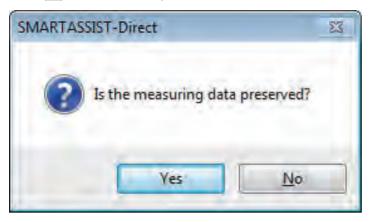
Graph 1 is displayed. For details regarding operation of the graph, refer to [7.1 Error Diagnosis Data Save and Display Functions] on page 139.



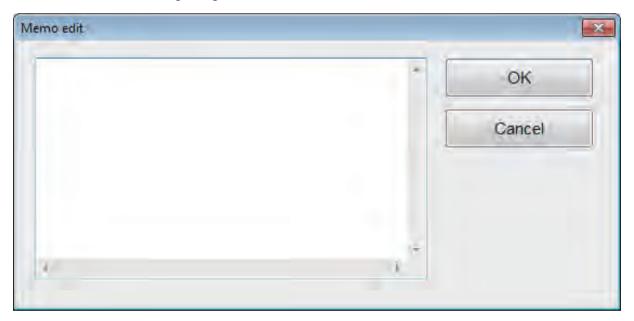


6.5.6 Saving the Measured Data

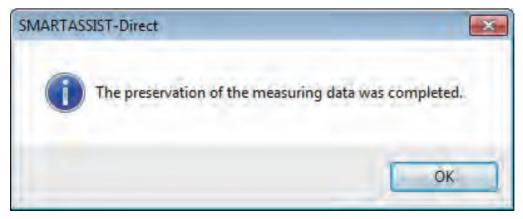
• Click the 🗾 button of 🚺 to open the confirmation screen.



• Click "Yes" to enter a memo regarding the measured data.



• After entering the memo, saving is complete.



- **Note** You cannot select the save location.
 - You can change the contents of the memo. For details, refer to $\infty\infty$.

6.5.7 Forced Operation Hysteresis Graph

Execute the forced operation (active control) of all automatic hysteresis measurements to start the set program, collect data from the ECU, active the below functions and display the graph in this screen.

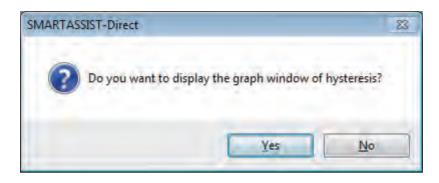


Figure 6-15 Selection Screen for Graph Display

- The response to the results gathered by the automatic hysteresis measurement differs depending on the product.
 - For details, refer to the product's technical manual or consult with the YANMAR Service Department.

• Additional Information Box (Data Display)

1 Cursor Data : Display data for the cursor position. (Only on the trend graph screen)

X-Y, **Trend**: Click the corresponding button to switch to an X-Y graph (x-axis: current) and trend graph (x-axis: time).

Operation Toolbar

- 3 </u> : Print the screen.
- 4 🔚 : Save a screenshot in BMP format.
- 5 📄 : Save the measurement results in CSV format.
 - date_time_DTHY.CSV: raw data of X-Y graph only
 - date_time_DTHYC.CSV: point data and calculated results
- Image: Save the measured data. Save the data of the forced operation after measurement. For the display of the saved data, refer to [7. Error Diagnosis Data Save and Display Functions].
- \blacksquare : Do the scaling settings for the X-Y plot graph.

• Main Box

Displays a graph of the raw data on the top.

For details regarding operation of the graph, refer to [7.1 Error Diagnosis Data Save and Display Functions] on page 139. X-Y graph

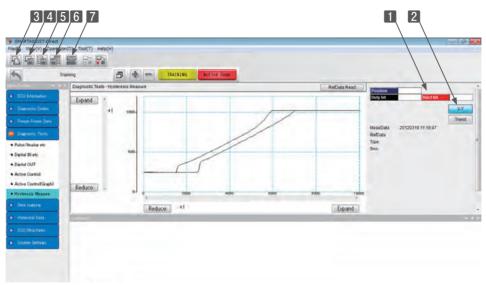


Figure 6-16 Forced Operation Hysteresis Graph Screen

Trend graph

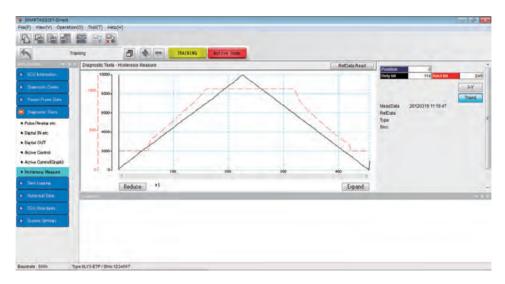


Figure 6-17 Trend Graph Screen

Remark In case of rack hysteresis

- The substitute value (pulse duty value) of the rack actuator current is on the x-axis. The substitute value (digital encode value of the voltage) of the rack position is on the y-axis. Because the rack position value is displayed together with the increased or decreased x-axis value, the hysteresis is easily identified. Generally, if the x-axis value is increased, the y-axis value changes along the bottom line; if the x-axis value is decreased, the y-axis value changes along the top line.
- The x-axis shows time (0.1 sec/point), the y-axis shows the substitute value for rack position (digital encode value of voltage) and the substitute value for the rack actuator current (pulse duty value). Any divergence between the rack position (rack) and the electric current value (duty) is easily identified.

6.5.8 Reference material: Digital output/forced operation (Engine/2G Eco TNV series)

Digital Output Screen

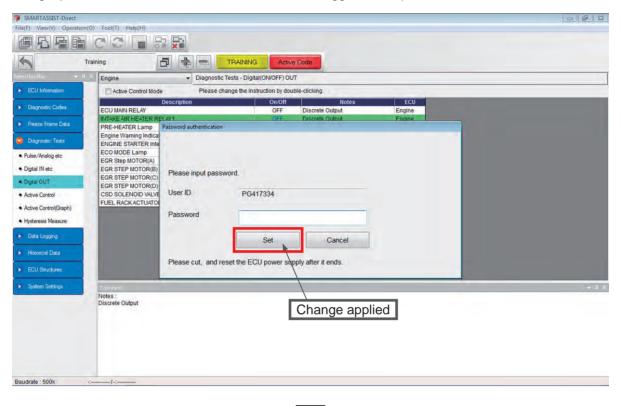
In the red box in the below menu Diagnosis Test, select Digital Output to switch to the digital output screen.

- **Description** : Display the setting items.
- **2 On/Off** : Display the current settings.
- **3 Notes** : Display reference information.

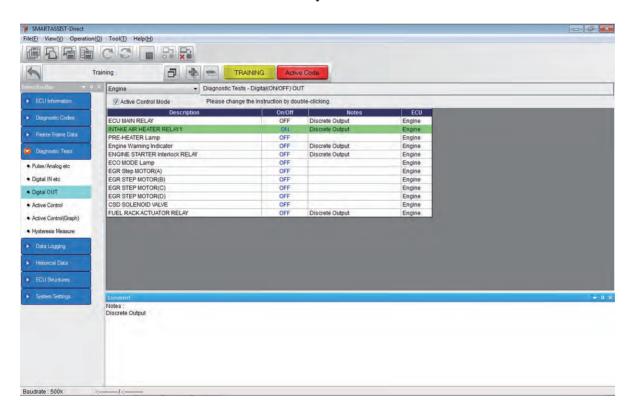
		RAINING	e Code		
uToolBar 🔫 4		sts - Digital(ON/OFF)			
ECU Information		ge the instruction by dou			
Diagnostic Codes	Description ECU MAIN RELAY	On/Off OFF	Notes	ECU	
	INTAKE AIR HEATER RELAY1	OFF	Discrete Output Discrete Output	Engine Engine	
Freeze Frame Data	PRE-HEATER Lamp	OFF	originate output	Engine	
	Engine Warning Indicator	OFF	Discrete Output	Engine	
Diagnostic Tests	ENGINE STARTER Interlock RELAY	OFF	Discrete Output	Engine	
Pulse/Analog etc	ECO MODE Lamp	OFF		Engine	
	EGR Step MOTOR(A)	OFF		Engine	
Diotal IN etc	EGR STEP MOTOR(B)	OFF		Engine	
Digital OUT	EGR STEP MOTOR(C)	OFF		Engine	
	EGR STEP MOTOR(D) CSD SOLENOID VALVE	OFF		Engine	
Active Control	FUEL RACK ACTUATOR RELAY	OFF	Discrete Output	Engine	
Active Control(Graph)	POEL RACKACTOATOR RELAT	OFF	Discrete Output	Engine	
Hysteresis Measure					
Data Logging					
Historical Data					
ECU Structures					

How to Perform Digital Output

Click the On/Off box to the right of the desired item. The password confirmation screen is displayed. First time only: Enter the login password and double-click the set button to toggle the output on/off.







If an item is light blue, digital output has been performed before.

muToolBar 🔫 🖗	Training 🔂 🖶 🗖 T	ests - Digital(ON/OFF) OU	π		
ECU Information	Active Control Mode Please chan	ige the instruction by dou	ble-clicking.		
2.2.2.2.2.2	Description	On/Off	Notes	ECU	
Diagnostic Codes	COLUMN DELAY	OFF	Discrete Output	Coging	
Freeze Frame Data	INTAKE AIR HEATER RELAY1	ON	Discrete Output	Engine	
neeze name Data	PRE-HEALER Lamp	UFF		Engine	
Diagnostic Tests	Engine Warning Indicator	OFF	Discrete Output	Engine	
enagricoste, reastr	ENGINE STARTER Interlock RELAY	OFF	Discrete Output	Engine	
Pulse/Analog etc	ECO MODE Lamp	OFF		Engine	
Digital IN etc	EGR Step MOTOR(A)	OFF		Engine	
179 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	EGR STEP MOTOR(B) EGR STEP MOTOR(C)	OFF		Engine	
Digital OUT	EGR STEP MOTOR(C)	OFF	-	Engine	
Active Control	CSD SOLENOID VALVE	OFF		Engine	
	FUEL RACK ACTUATOR RELAY	OFF	Discrete Output	Engine	
 Active Control(Graph) 		UT.			
Hysteresis Measure					
 Hysteresis Measure 					
Data Logging					
Contraction of the					
Historical Data					

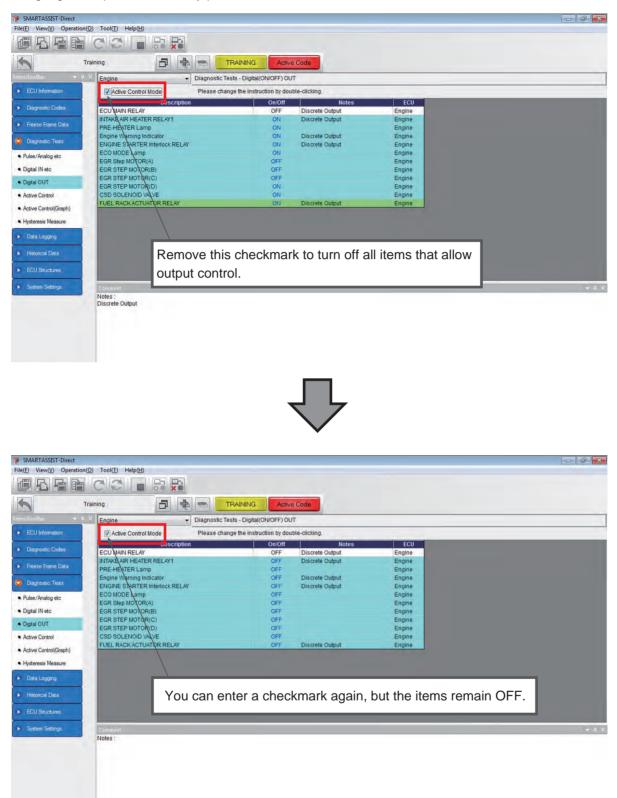
If an On/Off box is black, digital output cannot be performed on that item.

SMARTASSIST-Direct						
File(E) View(V) Operat	ion(@) Tool(T) Help(H)					
GRAG						
5	Training	TRAINI	NG Active	e Code		
hlenuToolfiar 🔫	Engine	 Diagnostic Tests - D 	igital(ON/OFF) OU	т		
ECU Information	Active Control Mode	Please change the	instruction by dou	ble-clicking.		
the second second	Descripti	on	On/Off	Notes	ECU	
Diagnostic Codes	ECU MAIN RELAY		OFF	Discrete Output	Engine	
Freeze Frame Data	INTAKE AIR HEATER RELAY1		ON	Discrete Output	Engine	
Freeze Frame Data	PRE-HEATER Lamp		OFF		Engine	
A Designation of the second	Engine Warning Indicator		OFF	Discrete Output	Engine	
Diagnostic Tests	ENGINE STARTER Interlock RELA	Y	OFF	Discrete Output	Engine	
Pulse/Analog etc	ECO MODE Lamp		OFF		Engine	
a complete the second	EGR Step MOTOR(A)		CIPP		Engine	
 Digital IN etc 	EGR STEP MOTOR(B)		SMARTASSIST	-Direct	Engine	
Digital OUT	EGR STEP MOTOR(C)				Engine	
	EGR STEP MOTOR(D)				Engine	
 Active Control 	CSD SOLENOID VALVE			nange is not possible.	Engine	
Active Control(Graph)	FUEL RACK ACTUATOR RELAY		1.00		Engine	
Hysteresis Measure				ОК		
Data Logging			L			
 Historical Data 						
ECU Structures						
 System Settings 	Comment.					+ 0 ×

Step motors (phase A to D) can only have one item turned on.

-					
SMARTASSIST-Direct					
Contraction of the second s	on(Q) Tool(I) Help(H)				
5	Training 🗗 🔹 TRAIN	Activ	e Code		
MenuToolBar 🔫	Engine	Digital(ON/OFF) OL	л		
ECU Information	Z Active Control Mode Please change th	e instruction by dou	ible-clicking.		
	Description	On/Off	Notes	ECU	
Diagnostic Codes	ECU MAIN RELAY	OFF	Discrete Output	Engine	
Freeze Frame Data	INTAKE AIR HEATER RELAY1	ON	Discrete Output	Engine	
Freeze Frame Data	PRE-HEATER Lamp	OFF		Engine	
Diagnostic Tests	Engine Warning Indicator	OFF	Discrete Output	Engine	
Undgrissau, Teata	ENGINE STARTER Interlock RELAY	OFF	Discrete Output	Engine	
Pulse/Analog etc	ECO MODE Lamp	OFF		Engine	
Distant a	EGR Step MOTOR(A)	OFF		Engine	
Digital IN etc	EGR STEP MOTOR(B)	OFF		Engine	
Digital OUT	EGR STEP MOTOR(C) EGR STEP MOTOR(D)	OFF		Engine	
Active Control	EGR STEP MOTOR(D)	his and a source of sources		Engine	
Active Control	FUEL RACK ACTUATOR RELAY	OFF	Discrete Output	Engine	
 Active Control(Graph) 	FOEL RACKACTOATOR RELAT	OFF	Discrete Output	Engine	
Hysteresis Measure					
Data Logging					
e ouid cogging					
Historical Data					
ECU Structures					
System Settings	Comment.				+ 0 ×

Performing digital output automatically puts a check mark into the checkbox.



When moving to another tab, a confirmation dialog for the end of the forced operation is displayed.

- **1** Yes : Turn all applicable output statuses to off and move to another tab.
- **2 No** : Keep all current output statuses and move to another tab.

	1 2	
SMARTASSIST-Direct		
File(E) View(V) Operation		
個凸唱脑		
1000		
	Training 🗗 🏶 📼 TRAINING Active Code	
MenuToolBar 🚽 🗸	Engine Diagnostic Tests - Digital(ON/OFF) OUT	
ECU Information	Active Control Mode Please change the instruction by double-clicking.	
Diagnostic Codes	Description On/Off Notes ECU ECU MAIN RELAY OFF Discrete Output Engine	
 Freeze Frame Data 	INTAKE AIR HEATER RELAY1 OFF Discrete Output Eduine PRE-HEATER Lamp OFF Brigine Engine Warning Indicator OFF Discrete Output Engine	
Diagnostic Tests	ENGINE STARTER Interlock RELAY OFF Discrete Output / Engine	
Pulse/Analog etc	ECO MODE Lamp OFF Engine EGR Step MOTOR(A) Engine	
Digital IN etc	EGR STEP MOTOR(B) SMARTASSIST-Direct / Brgine	
Digital OUT	EGR STEP MOTOR(C) EGR STEP MOTOR(D) Engine Egriptic	
Active Control	CSD SOLENOID VALVE Ob you want to stoped Active Control? Engine	
Active Control(Graph)	FUEL RACKACTUATOR RELAY Engine	
Hysteresis Measure	Ves No	
Data Logging		
Historical Data		
ECU Structures		
 System Settings 	Comment	- 0 ×
Baudrate : 500k		

	oba operation	
1	Manual	: Marked with a red light during forced operation.
2	Stop Button/Run Button]: Select Stop/Run.
3	ENG Run	: Indicates that the forced operation is available.
		Req: Only active during engine operation
		Not: Only active during engine stop
4	Measured]: Display the current measurement values.
5	Desired	: Display the control target values.
6	Graph	: Graph display button
		1 2 3 4 5 6
	WARTASSIST-Direct	
	File(F) View(V) Operation(O) Tool(T) He	elp(H)
	Training	TRAINING Active Code
	MenuToolBar • 8 × Engine	Diagnostic Tests - Active Control
	ECU Information	Control
	Manual	Stop button Run button Description ENG Run Measured Desired Unit Graph ECU
	Diagnostic Codes	ISTOP IRUN DIRECT ENGINE RPM CONTROL reg 702 700 r/min O Engine
	Freeze Frame Data	[STOP] [RUN] DIRECT RACK POSITION CONTROL not 50 O Engine [STOP] [RUN] AUTO HYSTERESIS MEASUREMENT not 0:0 Engine
	j j	[STOP] [RUN] LOW IDLE RACK POSITION AUTO TUNING req Engine
	Freeze Frame Data O Dagnostic Tests O	[STOP] [RUN] HIGH IDLE RACK POSITION AUTO TUNING req Engine [STOP] [RUN] DIRECT EGR VALVE CONTROL not 0 Engine
	Pulse/Analog etc	STOP (RUN) ENGINE LOAD MONITOR OUTPUT not 16 % Engine
	Digital IN etc	
	Digital OUT	
	Active Control	
	Active Control(Graph)	
	Hysteresis Measure	
	Data Logging	
	Historical Data ECU Structures	Click the execution button or the target
		value box to set forced operation.
	System Settings Comment Notes :	
	Output Test	
	Baudrate : 500k	···

Forced Operation Initial Screen

* A safety is locked on the ECU side.

If the forced operation cannot be performed, the in-progress lamp does not turn on.

Directive Engine Speed Control

1 Clicking the execution button or the target value box displays the password confirmation screen. Enter the password. (First time only):

Training	5/		TRAINING Active Co	de					
iña: 🚽 8 × Engine		✓ Diagnostic	Tests - Active Control						
I Information Manu	Control al top butto	un hutto	Description	ENG Run	Measured	Desired	Unit	Graph	ECU
nostic Codes 🛛 🔘	[STOP]	[RUN] DIRECT ENGI		per	702		100 r/min	0	Engine
Frame Data	Contract of the	Password authentication	POSITION CONTROL	not	50		50	00	Engine
- ŏ	[STOP]	Password authentication							Engine
nostic Tests	(STOP)							_	Engine Engine
Analog etc O	[STOI						1 %		Engine
IN etc		-							
толт		Please input pass	vora.						
Control		User ID	PG417334						
and the second se			1 official						
: Control(Graph)		Password			-				
resis Measure									
a Logging			Set	Cancel					
orical Data				ouncer					
I Structures						_			
em Settings Comment	-						-		

- **2** Select the directive value on the data setting screen.
 - **1 Desired** : Enter the desired value.
 - **2** \land / \checkmark : Adjustable in increments of 1, 10, and 100.
 - 3 : Adjustable by a slider.
 - 4 Set : Confirm an entry.
 - **5 Cancel** : The manual lamp is lit, but it indicates the forced operation mode.

Data Harris	CT ENGINE RPM CONTROL		
Measured		_	
Мах	65535 100 10	1	
Desired	700		
Min	0		
Note Output	ut Test		
Measurement Mode			
Not measuring		Measurem	ient time(sec)
Measuring(graph)	display)	E	10
	Set	Cancel	
	1		

3 During forced operation, the manual lamp is red.

File(E) View(V) Operation		lp(<u>H</u>)				
					_	
5	Fraining	1		TRAINING Active Code		
lenuToolBar 🔫 🖬	Engine			Diagnostic Tests - Active Control		
ECU Information		Control		Description	ENG Run	Measure
	Manual	top butto	un butto	Description	ENG KUII	measured
Diagnostic Codes	0	[STOP]	[RUN]	DIRECT ENGINE RPM CONTROL	req	
	0	[STOP]	[RUN]	DIRECT RACK POSITION CONTROL	not	
Freeze Frame Data	0	[STOP]	[RUN]	AUTO HYSTERESIS MEASUREMENT	not	
	0	[STOP]	[RUN]	LOW IDLE RACK POSITION AUTO TUNING	req	
Diagnostic Tests	0	[STOP]	[RUN]	HIGH IDLE RACK POSITION AUTO TUNING	req	
	0	[STOP]	[RUN]	DIRECT EGR VALVE CONTROL	not	
 Pulse/Analog etc 	0	[STOP]	[RUN]	ENGINE LOAD MONITOR OUTPUT	not	

Directive Engine Speed Control (Measurement)

1 Select the directive value at the data selection screen. Change the measurement mode to "Change to execute measurement".

1	Desired Value	: Enter the desired value.
2	 Measuring 	: Insert a checkmark.
3	Measurement Time	: Enter the measurement time. (seconds)
4	Set	: Start the measurement.

Data Set				×
Data Name	DIRECT ENGINE R	PM CONTROL		
Мах	65535	100 10 1		
Desired	700			
Min	0			-
Note	Output Test	1		-
Measuremen	t Mode			
O Not meas	suring		Measurement time(sec)	
🔸 🧕 Measurin	g(graph display)		10	-
				£
		Set	Cancel	

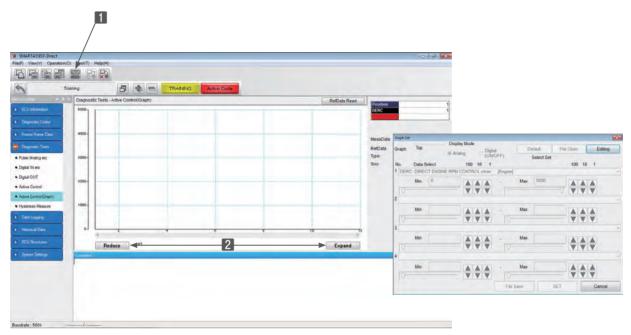
2 Wait until the measurement is finished.

	Training	Ð		RAINING Active Code						
Bar 🐨	• × Engine		 Diagnostic Te 	sts - Active Control				_	_	
J Information		Control	Run button	- Description	ENG Run	Measured	Desired	Unit	Graph	ECU
nostic Codes	Manual O	Stop button [STOP] [STOP]	(RUN) (RUN)	DIRECT ENGINE RPM CONTROL DIRECT RACK POSITION CONTROL	req not	700 50	700 50	r/min	00	Engine Engine
e Frame Data ostic Tests	000	[STOP] [STOP] [STOP]	[RUN] Information	AUTO HYSTERESIS MEASUREMENT	not	0:0			0	Engine Engine Engine
Analog etc	00	(STOP) [STOP]		Please wait processing.			0			Engine Engine
IN etc	- Contraction									
TUC			Data Name	DIRECT ENGINE RPM CONTR	ROL					
Control										
Control(Graph)			Measured	39						
esis Measure			Desired	700						
Logging			Desired							
orical Data				Cancel						
J Structures			-		_	_				
em Settings	Comment.				_			-	-	_
	Notes : Output Test									

When the measurement is finished, a graph is displayed. (The forced operation continues.) **Graph**: Display the graph.

T	raining	5	\$ -	TRAINING Active Code						/
uToolBer - 0				ests - Active Control					_	/
	Engine		Diagnostic	Lesis - Active Control	-			_		
ECU Information	Manual	Control Stop button	Run button	Description	ENG Run	Measured	Desired	Unit	Granh	ECU
Diagnostic Codes	Manual	ISTOPI	RUN DUITON	DIRECT ENGINE RPM CONTROL	reg	12	700	r/min	0	Engine
ang tosta cours	ŏ	[STOP]	[RUN]	DIRECT RACK POSITION CONTROL	not	50	50	Ranni	0	Engine
Freeze Frame Data	ŏ	[STOP]	[RUN]	AUTO HYSTERESIS MEASUREMENT	not	0:0			ŏ	Engine
	ŏ	[STOP]	[RUN]	LOW IDLE RACK POSITION AUTO TUNING	req				-	Engine
Diagnostic Tests	ŏ	[STOP]	[RUN]	HIGH IDLE RACK POSITION AUTO TUNING	req					Engine
	0	[STOP]	[RUN]	DIRECT EGR VALVE CONTROL	not		0			Engine
Pulse/Analog etc	Ö	[STOP]	[RUN]	ENGINE LOAD MONITOR OUTPUT	not		16	%		Engine
	1000									
Digital IN etc Digital OUT Active Control Active Control (Grsph) Hysteresis Measure Data Logging Historical Data										
Digital OUT Active Control Active Control(Graph) Hysteresis Measure Data Logging										
lgtal OUT ctive Control ctive Control (Graph) lgtaresis Measure Data Logging Historical Data	Eonment									

- **4** The measurement results are displayed in a graph.
 - 1 E : The y-axis scale is adjustable.
 - **2** Minimize / Expand : The x-axis scale is adjustable in 6 steps.



Specified Rack Position Control

- **1** Clicking the execution button or the target value box opens the data setting screen.
 - **Run Button** : Display the setting screen.

SMARTASSIST-Direct							
File(F) View(V) Operation	O) Tool(T) Hel	p(H)					
P A b							
1	raining	5	t =				
VenuTopičar 🔫 🛡	Engine		- Diagnostic	ests - Active Control			
ECU Information		Control		Description	ENG Run	Measured	Desi
	Manual	Stop button	Run button	Description	ENO KUI	measureu	Desi
Diagnostic Codes	0	[STOP]	[RUN]	DIRECT ENGINE RPM CONTROL	req	702	
	0	[STOF]	[RUN]	DIRECT RACK POSITION CONTROL	not	50	
Freeze Frame Data	0	[STOP]	[RUN]	AUTO HYSTERESIS MEASUREMENT	not	0:0	
1 al colores color	0	[STOP]	[RUN]	LOW IDLE RACK POSITION AUTO TUNING	req		
🕤 Diagnostic Tests	0	[STOP]	[RUN]	HIGH IDLE RACK POSITION AUTO TUNING	req		
	0	[STOP]	[RUN]	DIRECT EGR VALVE CONTROL	not		
 Pulse/Analog etc 	0	[STOP]	[RUN]	ENGINE LOAD MONITOR OUTPUT	not		
Digital IN etc	Contraction of Contraction						
Digital OUT							

6. Error Diagnosis Function (ECU Connection)

- **2** Select the directive value on the data setting screen.
 - **1 Desired** : Enter the desired value.
 - **2** ▲ / ▼ : Adjustable in increments of 1, 10, and 100.
 - 3 : Adjustable by a slider.
 - 4 Set : Confirm an entry.
 - **5 Cancel** : The manual lamp is lit, but it indicates the forced operation mode.

Data Name Measured						
Max	65535	100 10	1			
Desired	50		∑			_
Min	0		<u> </u>			_
Note	Output Test					
Measuremen	Mode					
Not meas	uring			Measurement	time(sec)	
Measuring	g(graph display)				10	
	F	Set	Cancel			2
		out	Guilder			

3 During forced operation, the manual lamp is red.

SMARTASSIST-Direct						
File(F) View(V) Operation	O) Tool(T) He	elp(H)				
GRA						
5	raining	5	TRAINING Active Code			
ienuToolBer 🔷 🗸	Engine		Diagnostic Tests - Active Control			
ECU Information	Manual	Control top butte un butte	Description	ENG Run	Measured	Desired
Diagnostic Codes	O	[STOP] [RUN]	DIRECT ENGINE RPM CONTROL	req	12	700
	Ø	(STOP) [RUN]	DIRECT RACK POSITION CONTROL	not	50	50
Freeze Frame Data	0	[STOP] [RUN]	AUTO HYSTERESIS MEASUREMENT	not	0:0	
	0	[STOP] [RUN]	LOW IDLE RACK POSITION AUTO TUNING	req		
Diagnostic Tests	0	[STOP] [RUN]	HIGH IDLE RACK POSITION AUTO TUNING	req		
	0	[STOP] [RUN]	DIRECT EGR VALVE CONTROL	not		0
 Pulse/Analog etc 	0	[STOP] [RUN]	ENGINE LOAD MONITOR OUTPUT	not		16
Digital IN etc						
Digital OUT						
Active Control						
Active Control(Graph)						

Specified Rack Position Control (Measurement)

1 Select the directive value on the data setting screen. Change the measurement mode to "Change to execute measurement".

).
t time. (seconds)
t.
1

Data Name Méasured		POSITION CONTR			
Max	6553	35 100 10	1		
Desired	5	50			
Min		0			_
Note	Output Test	-			
Measuremen	t Mode				
Not measured in the second	suring		Meas	urement time(sec)	
→ Measurin	g(graph display)			10	

2 Wait until the measurement is finished.

Trainin	ngine	Diagnostic Tests	Active Control					
ECU Information	Control		Description	ENG Run	Measured	Desired	Unit	Graph ECU
Diagnostic Codes	Manual top buttc un b	Utto		req	12	700	r/min	
Chag Torento Colous				not	50	50	- minine	O Engine O Engine
Freeze Frame Data	O [STOP] [RU	AUTO HYSTERESIS	MEASUREMENT	not	0:0			O Engine
	O [STOP] [RL							Engine
Diagnostic Tests	O ISTOPI IRL					-		Engine
lise/Analog etc	O [STOP] [RU O [STOP] [RU		Please wa	it processing.		16	96	Engine Engine
-		111				10	70	Engine
gtal IN etc								
gtal OUT		Data Name	DIRECT RACK P	OSITION CONTR	201			
ctive Control		Data Name	DATESTICIST					
				9				
ctive Control(Graph)		Measured						
vsteresis Measure		in the second	5	0				
Data Logging		Desired	0	0				
Data Logging								
Historical Data			Ci	ancel				
						-		
ECU Structures		-						
System Settings	amment							
and the second	otes :							
	itput Test							

6. Error Diagnosis Function (ECU Connection)

3 When the measurement is finished, a graph is displayed. (The forced operation continues.)

Graph : Display the graph.

Tr	aining	10								/
		1	7 4	TRAINING Active Code						/
nuToolBer 🔫 🕫 🗄	Engine	12		Diagnostic Tests - Active Control						/
ECU Information	Manual	Control top butte	un butto	Description	ENG Run	Measured	Desired	Unit	Graph	ECU
Diagnostic Codes	0			DIRECT ENGINE RPM CONTROL	req	12	700	r/min	0	Engine
	0	(STOP)		DIRECT RACK POSITION CONTROL	not	12	50		Ŭ	Engine
Freeze Frame Data	0	[STOP]		AUTO HYSTERESIS MEASUREMENT	not	0:0			0	Engine
	0	[STOP]		LOW IDLE RACK POSITION AUTO TUNING	reg					Engine
Diagnostic Tests	0	[STOP]		HIGH IDLE RACK POSITION AUTO TUNING	req				1	Engine
Pulse/Analog etc	0	[STOP]		DIRECT EGR VALVE CONTROL	not		0		-	Engine
	0	[STOP]	[RUN]	ENGINE LOAD MONITOR OUTPUT	not		16	%	_	Engine
Digital IN etc										
Digital OUT										
Active Control										
Active Control										
Active Control(Graph)										
Active Control(Graph)										
Active Control(Graph) Hysteresis Measure										
Active Control (Graph) Hysteresis Measure Data Logging										
Active Control(Graph) Hysteresis Measure										
Active Control(Graph) Hysteresis Measure Data Logging Historical Data										
Active Control(Graph) Hysteresis Measure Data Logging										

- **4** The measurement results are displayed in a graph.
 - **1 E** : The y-axis scale is adjustable.
 - **2** Minimize / Expand : The x-axis scale is adjustable in 6 steps.

MARTASSIST-Direct F) View(V) Operation	(0) (0)	Help(H)					_		0.0	×							
SPER		-															
	Training	3 4 -	TRAINING	Active Code													
1	Disgnost	c Tests - Active Control(Graph)				RelData Read	Position			1							
ECU Monution	5000				T		DERC			4							
Disgnestic Codes							_										
Freder Frame Data	4000-		-				MeasData	Graph Se		-							
Diagnostic Tests							RefData	Graph	Тор	Display		Distal		Default	File Op		Ede
lse/Analog etc	3000-						Type: Sno			# Analog		Digital (CN/OF	Ð.	Select S			
gital IN etc							Sho	No. 1 DER	Data Select		100 1		[Engine]			00 10	1
igtal OUT	2900-								Min 0					Max 5000			
tive Control (Snaph)								. 0-			* *	V			0.0		Ψ.
rateresis Measure	1000-							2	Mn					Max			-
Deta Légging								DO-	44n		44	4		Max			\$
Halonial Data	0				F 10			3				ALC: L					
				2		Expand			Min		44	-		Max			
CU Studians		Reduce															

■Automatic Hysteresis Measurement

- **1** Measure the hysteresis of the rack actuator.
 - **Set** : Start the measurement.

Data Name	AUTO HYSTERESIS MEASUREMENT
Measured	
Max	100 10 1
Desired	
Min	
Note	
Measuremer	nt Mode
Not measured.	suring Measurement time(s
C Measurin	ng(graph display)

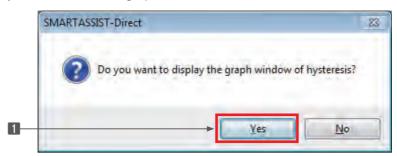
2 Wait until the measurement is finished.

Training	and the second se	TRAINING Active Code			
	gine Control	Diagnostic Tests - Active Control			1
ECU Information	Manual top butte un butto	Description	ENG Run Measured	Desired Unit	Graph ECU
Diagnostic Codes		DIRECT ENGINE RPM CONTROL DIRECT RACK POSITION CONTROL	reg 12 not 12	700 r/min 50	O Engine
Freeze Frame Data		AUTO HYSTERESIS MEASUREMENT	not 12 not 0.0	.50	O Engine
	O ISTOPI (RUN)	Information			Engine
Diagnostic Tests	O [STOP] [RUN]	Please wait	processing	n	Engine Engine
Pulse/Analog etc	O (STOP) [RUN] O [STOP] [RUN]	Ficase wait	processing.	16 %	Engine
Ngital IN etc					
Digital OUT		Data Name AUTO HYSTERES	S MEASUREMENT	-	
Active Control		Data Harris			
Active Control(Graph)		Measured 2914:414			
Hysteresis Measure					
Data Logging		Desired			
Historical Data		Car	icel		
ECU Structures					
System Settings	mment				
No	es:				

6. Error Diagnosis Function (ECU Connection)

3 Switch to the hysteresis graph.

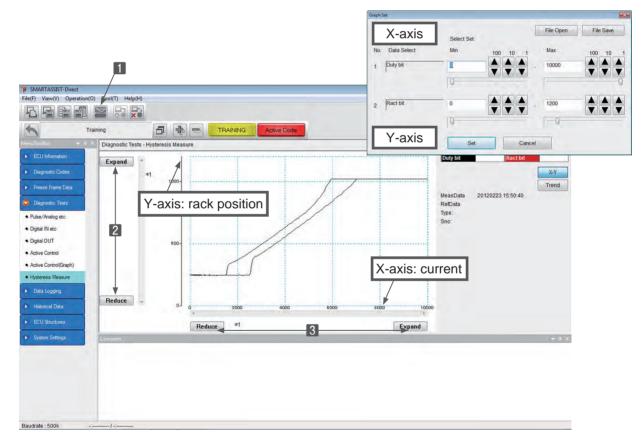
1 Yes : Display the measurement graph.



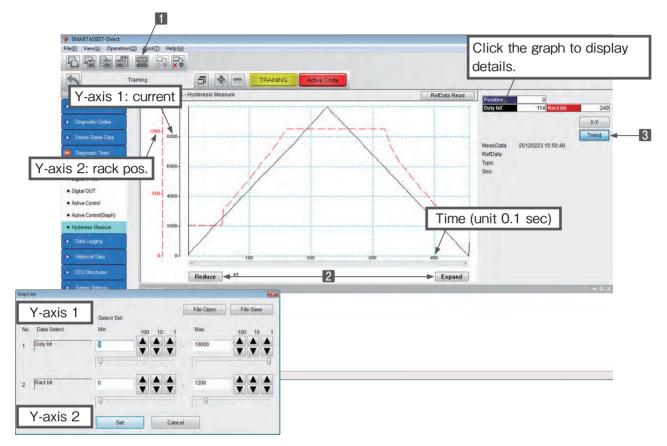
4 The X-Y display mode compares measurement discrepancies between the forward and reverse measurement, and its wrap-around is at the right end of the graph.

1 🔛 : The x- and y-axis scale are adjustable.

- **2** Minimize / Expand : The y-axis scale is adjustable in 6 steps.
- **3** Minimize / Expand : The x-axis scale is adjustable in 6 steps.
- **X-Y** : Display the X-Y display mode.



- **5** The trend display mode compares the directive value (black) and the measurement value (red), and displays a time line.
 - 1 E : The y-axis scale is adjustable.
 - **2** Minimize / Expand : The x-axis scale is adjustable in 6 steps.
 - **3 Trend** : Display the trend display mode.



■Automatic Correction of the Idle Rack Position (L-idle, H-idle)

This function is limited to developers.

5	Training	5 4	TRAINING Active Code		
ienuToolBer 🔫	Engine		Diagnostic Tests - Active Control		
ECU Information		Control	Description	ENG Run	Measured
a second second	Manual	top butte un butto			mousarca
 Diagnostic Codes 	0	[STOP] [RUN]	DIRECT ENGINE RPM CONTROL	req	
a Burnham San	0	[STOP] [RUN]	DIRECT RACK POSITION CONTROL	not	
Freeze Frame Data	0		AUTO HYSTERESIS MEASUREMENT	not	96
	0	(STOP) [RUN]	OW IDLE RACK POSITION AUTO TUNING	req	
Diagnostic Tests	0	[STOP] [RUN]	HIGH IDLE RACK POSITION AUTO TUNING	req	
Pulse/Analog etc	0	[STOP] [RUN]	DIRECT EGR VALVE CONTROL ENGINE LOAD MONITOR OUTPUT	not	
A CLUDICA OF COM	0	[STOP] [RUN]	ENGINE LOAD MONITOR OUTPOT	not	
 Digital IN etc 					
Digital OUT					
Active Control					

When trying to execute it, the below error message is displayed.

Data Set	
Data Name	LOW IDLE RACK POSITION AUTO TUNING
Measured	
Max	100 10 1
Desired	
Min	
Note	Output Test
Measurement N	Node
Not measure	ring Measurement time(sec)
Measuring(graph display)
	Set Cancel

EGR Valve Opening Control

- 1 Select the directive value on the data setting screen.
 - **Desired** : Enter the desired value.
 - 2 ▲/▼ : Adjustable in increments of 1, 10, and 100.
 - 3 : Adjustable by a slider.
 - * The directive value must be between 0 and 255. (Entry range is 0 54)
 - * If a value higher than the specified entry value (max. 54) is set, the value on the screen may be greater than

54, but the actual effective value is limited to 54.

Set : Confirm the entry.

Data Name	DIRECT EGF	R VALVE CONTROL			
Measured					
Мах		255 100 10	1		
Desired			↓		
Min		0	<i>[</i>]		_
Note	Output Test				
Measureme	nt Mode				
Not mea	suring		Meas	urement time(sec)	
Measun	ng(graph display)			10	

2 The forced operation starts, and the manual lamp lights in red.

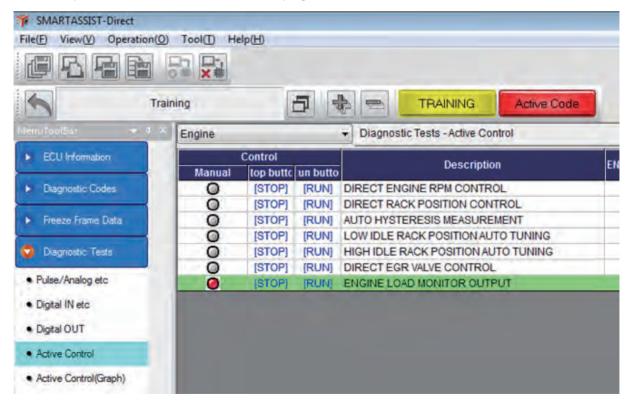
SMARTASSIST-Direct							
File(E) View(V) Operation(Q)	Tool(I) He	elp(H)					
GRAB							
Tra	ining	1	5 4		TRAINING	Active Code	
HenufoolBar 🚽 🗸 🗙	Engine			- Diagnos	stic Tests - Active Con	ntrol	
ECU Information		Control			Descriptio	'n	EN
	Manual	top butto	un butto		Descriptio		
Diagnostic Codes	0	[STOP]	[RUN]	DIRECTEN	IGINE RPM CONTRO	OL	
	0	[STOP]	[RUN]	DIRECT RA	CK POSITION CON	TROL	
Freeze Frame Data	0	[STOP]	[RUN]	AUTO HYST	TERESIS MEASURE	MENT	
	0	[STOP]	[RUN]	LOW IDLE	RACK POSITION AU	TO TUNING	
Diagnostic Tests	0	[STOP]	[RUN]	HIGH IDLE	RACK POSITION AU	TO TUNING	
	0	[STOP]	[RUN]	DIRECTED	R VALVE CONTROL		
 Pulse/Analog etc 	0	[STOP]	[RUN]	ENGINE LC	AD MONITOR OUTF	PUT	-
Digital IN etc	and the second second						
Digital OUT							
Active Control							
Active Control(Graph)							

■Load Ratio Monitor Output

- **1** Select the directive value on the data setting screen.
 - **Desired** : Enter the desired value.
 - **2** \blacktriangle : Adjustable in increments of 1, 10, and 100.
 - 3 : Adjustable by a slider.
 - 4 Set : Confirm the entry.

Data Name	ENGINE LOAD M	IONITOR OUTPUT		
Measured				
Max	25	5 100 10 1		
Desired		6		
Min		0		
Note	Output Test			
Measuren	nent Mode			
Not m	easuring		Measure	ment time(sec)
: Measu	iring(graph display)			10

2 The forced operation starts, and the manual lamp lights in red.



Additional Descriptions

When clicking another tab, a confirmation dialog for the end of the forced operation is displayed.

1 Yes : Stop all items and move to another tab.

2 No : Keep all current executed statuses and move to another tab.

* After switching the tab, the digital output will remain displayed in light blue.

								1	2				
SMARTASSIST-Direct								/	_/				0 8 3
e(E) View(V) Operation(O)) Tool(I) He	elp(<u>H</u>)						/	/				
(She							/	/	/				
Trai	ining	£	7		RAINING Active Code		/	/	/				
enuToolBa: 🗢 0 🗙	Engine			Diagnostic Te	ests - Active Control		/	/					
ECU Information	Manual	Control	un butte		Description	ENG Run	Measured	1	Desired	Unit	Graph	ECU	
Diagnostic Codes	0	[STOP]	[RUN]	DIRECT ENGINE		req	/	17		r/min	0	Engine	
Freeze Frame Data	0		[RUN]		OSITION CONTROL SIS MEASUREMENT	not	9	60:248	5)	0	Engine	
	ŏ		[RUN]		POSITION AUTO TUNING	req /	/	1		1		Engine	
Diagnostic Tests	0		[RUN]		POSITION AUTO TUNING	req	/	/				Engine	
Pulse/Analog etc	0		[RUN]			not	/	_		0		Engine	
No. of the second second	0	[STOP]	[RUN]	ENGINE LOAD M		0.00		_	1	6 %	_	Engine	
Digital IN etc					SMARTASSIST-Direct	/	23						
Digital OUT						/							
Active Control					Do you want to s	toped Active Con	trol?						
Active Control(Graph)						/							
Contraction of the						+							
Hysteresis Measure						'es	No						
Data Logging													
Historical Data													
ECU Structures													
System Settings	Comment												+ 0

When necessary, save as CSV, save a screenshot or make a printout of the screen.

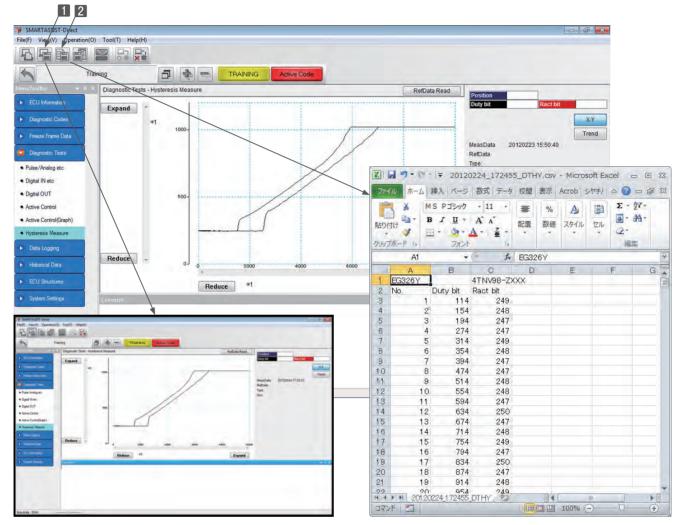
- 🔟 🗐 : Save the ECU's screen display data. (Refer to [7. Error Diagnosis Data Save and Display Functions])
- 2 🔄 : Print the screen. (Refer to [6.2.2])
- I I ave a screenshot in BMP format. (Refer to [6.2.3])
- Image: Save the screen data in CSV format. (Refer to [6.2.4])

SMARTASSIST-Diject				0	B X	
e(b View) operation(0) Tool(1) Help(H)						
Training 🗗 🍓 📼 TRAINING Active Code						
mufool5a: 🗸 8 🛠 Engine 🗸 Diagnostic Tests - Active Control						
ECU Information Control Description ENG Run	Measu	red Desire	d Unit (Graph ECU		
Diagnostic Codes O [STOP] [RUN] DIRECT ENGINE RPM CONTROL req		12	700 r/min	O Engine		
Freeze Frame Data STOP) [RUN] DIRECT RACK POSITION CONTROL not ISTOP) [RUN] AUTO HYSTERESIS MEASUREMENT not	/	12	50	O Engine		
ISTOP) IRUNI LOW IDLE RACK POSITION AUTO-TUNING req		🛃 🍤 र (भ र 🖙				
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An Analysian O WILLING SUCH SUCH CONTRACT, NAM IN N. S. Singles	2	System Group	Detail	Value	Unit	ECU
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pe Coff	4	Engine	Rated RPM		r/min	Engine
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VerOf GeGene Sees Seas Ver Jame Ver Jame Cit Jame	4 5 6 7 8 9 10	Engine Engine Engine Fuel System Fuel System Fuel System	Rated RPM SNo Manufacturing Run Hr Type Part No. Sno.	2000 54321 80520 1300 2GEC 0_MP_TNV 729938-51 XXX 080528Z321		Engine Engine Engine Engine Engine Engine Engine

The graph measured during forced operation is overwritten when other items are measured, so save the graph screen as bitmap or save the data in CSV format.

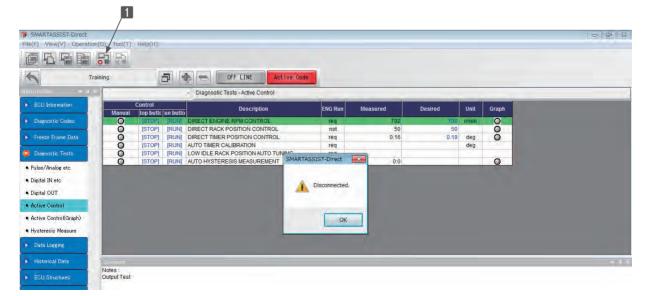
Be careful: The graph is deleted when other items are executed in forced operation.

- 1 🔚 : Save a screenshot in BMP format. (Refer to [6.2.3])
- 2 =: Save the screen data in CSV format. (Refer to [6.2.4])



If the communication with the ECU is interrupted and forced operation is performed, the below dialog box is displayed.

1 5 : The communication with the ECU starts.



6.6 Data Logging (Expert Function)

From the submenu of the graph display, you can select the data monitor that displays logged data in real-time or save data. The logged data is gathered by a tool that can determine defects and analyze the operating status during operation of the product. The logged data contains data before/after error (Refer to [6.4]) and arbitrarily set optional data. There is also a trigger setting that makes saving data easier.

6.6.1 Data Monitor

The measurement data of the ECU sensor and the control data are received at a sample interval set in advance (minimum 0.1 sec). A trigger that starts the recording of the data can be set.

Operation Toolbar

- 1 🔚 : Print the screen. (Refer to [6.2.2])
- [2] Fai: Save a screenshot in BMP format. (Refer to [6.2.3])
- Save the measured data. For the display of the saved data, refer to [7. Error Diagnosis Data Save and Display Functions].
- Image: The receiving of data starts. (Data that has not been saved according to [6.5.6 Saving the Measured Data] is overwritten and lost.)
- **5 •** : Manually stop the receiving of data.
- **6 [5]** : Settings of the option data that run the data monitor. When clicking, the option data settings subwindow is displayed and the settings can be changed.
- Set the trigger conditions (trigger on/off, data selection, level (trigger value) selection, trigger type), number of delays and number of saved data sets. When clicking, a trigger settings subwindow is displayed and the settings can be changed.
- Image: Set the sampling rate. When clicking, a sampling settings subwindow is displayed and the settings can be changed.
- Set the data that is displayed in the main box. When clicking, a data settings sub-window is displayed and the settings can be changed.

Main Box

14

15

16

10	Description	: Display the name of the logged data.
----	-------------	--

- **Data** : Display the measurement values.
- 12 Max : Maximum value
- 13 Min : Minimum value
 - Unit : Unit
 - Notes : Annotation box
 - **ECU** : Display the ECU/controller that controls the devices. (Only if multiple ECU are connected.)

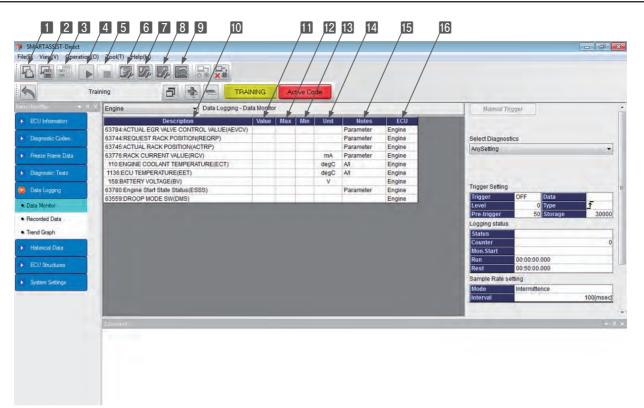


Figure 6-18 Data Monitor Screen

Additional Information Box

Trigger Settings

Displays the trigger setting information.

- **Manual Trigger** : Click to manually apply the trigger.
- 2 Select Diagnosis : Package data sets with the most appropriate settings sorted per event
- **3 Trigger** : Display the status of the trigger settings.
- **Level** : Display the values of the trigger settings.
- 5 Pre-trigger : Display the number of data sets from start of memorization to the trigger event.
- **Data** : Display the data abbreviations of the trigger settings.
- **Type**: Display the set trigger type (leading/trailing).
- 8 Storage : Display the number of data sets memorized. (Counting as one set the data collected at a given time.)

Saving status

Displays the data logging status.

Status : Display the measurement status. "Data saving (awaiting trigger)", "Data saving in progress", "Data saving complete"

Counter : Display the number of collected data sets.

- **Mon. Start** : Display the time when the monitor was started.
- **Run** : Display the time passed since start of measurement.
- 13 Rest : Display the time left until end of measurement.

Sampling Settings

Displays the current settings.

- Mode : Displays "discharge" if the sampling rate is set to 100 msec; displays "polling" for all other sampling rates.
- **Interval** : Displays the sampling interval.

SMARTASSIST-Direct F) View(V) Operation	i(O) Tool(T) Help(H)										/
							///	///			/
	Training 🗗 🏚 📼 TR	AINING	Active Code			4	/ / /	//			
uToolSet 🔷 I	Engine - Data Logging - I	Data Monitor				Mar	iual rigger			1	
ECU Information	Description	Value Ma	x Min Unit	Notes	ECU		///				
	63784:ACTUAL EGR VALVE CONTROL VALUE(AEVC)	0		Parameter	Engine	100 C	+ / /	/			
Diagnostic Codes	63744:REQUEST RACK POSITION(REQRP)			Parameter	Engine	Select Di	agnostics /	/	/ / /		
	63745:ACTUAL RACK POSITION(ACTRP)			Parameter	Engine	AnySetti	ng/ / gr		1-		
Freeze Frame Data	63776:RACK CURRENT VALUE(RCV)		mA	Parameter	Engine	(111		F		
	110:ENGINE COOLANT TEMPERATURE(ECT)		degC	All	Engine			/	/ /		
Diagnostic Tests	1136:ECU TEMPERATURE(EET)		degC	All	Engine		/ /	/			
	158:BATTERY VOLTAGE(BV)		V	-	Engine	Trigger S	etting	1			
Data Logging	63780:Engine Start State Status(ESSS)	-		Parameter	Engine	Trigger	OFF	Data			
Data Monitor	63559:DROOP MODE SW(DMS)	-	_	_	Engine	Level		0 Type	T		
						Pre-trig	aer 👘	0 Storage	30000		
Recorded Data						Logging					- 9
Trend Graph						Status	Status		T		T
						Counter			0	-	-10
Historical Data						Mon.Sta					-1
						Run	100:00:0	0.000			щ
ECU Structures						Rest	00:50:0	0.000		-	-12
¥						Sample	Rate setting				
System Settings						Mode	Untermit	tonco			
						Interval		tence	100[msec]	_	-14
						Interval			roo[msec]		
										+	-15
	Comment							-	÷α:		_

Figure 6-19 Data Monitor Screen

Data Settings Subwindow

The items that display data and the display order can be set arbitrarily. Click the solution on the operation toolbar to make the settings. You can select and register data from the arbitrarily displayed data that was registered before the event and is separated by category except data before/after error (Refer to [6.4]). For details, refer to [Data Selection Window].

• Option Data Settings Subwindow

You can select and register data from the arbitrarily displayed data that was registered before the event and is separated by category except freeze frame data.

Click the 🗊 button of the operation toolbar to open the selection screen.

1 Data: List all available data.

2
/ >: Select/deselect data for display.

3 Set data: The data displayed in the main box.

- 4 Set : Confirm the entry.
- **5 Cancel** : Close the entry screen.

Point

Data monitor items	Screen display
Data Before/After Error	Data items selected in the Data Settings
Optional data	window on the left.

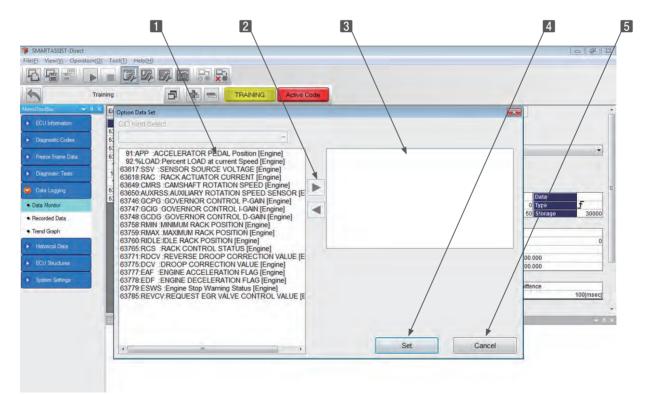


Figure 6-20 Option Data Settings Subwindow

• Trigger Settings Subwindow

Click the We button on the operation toolbar to change the trigger settings.

- **1** Trigger (On) : Activate the trigger.
- **2 Data Select** : Select the trigger data.
- **3** Level : Set the trigger value.
- **4 Type** : Set the set trigger type (leading/trailing).

Leading ____: Start saving if the value of the selected data exceeds the trigger value.

Trailing \mathbf{T} : Start saving if the value of the selected data falls under the trigger value.

- **Delay** : Display the number of data sets from start of memorization to the trigger event.
- **Storage** : Set the number of data sets memorized. (Counting as one set the complete data monitor items at a given time.)
- **Set** : Confirm the entry.
- 8 **Cancel** : Close the entry screen.

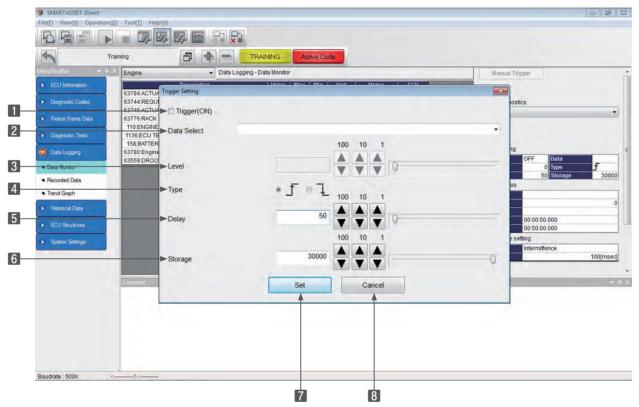


Figure 6-21 Trigger Settings Subwindow

• Sampling Settings Subwindow

Click the I button on the operation toolbar to change the sampling rate settings.

- **Select** : Add a checkmark to the button to select the sampling rate.
- 2 ▲ / ▼ : When inserting a checkmark to the desired setting, the sampling rate is adjustable in increments of 1, 10, and 100.
- **3 Unit** : Select the unit.
- 4 Set : Confirm the entry.
- **5 Cancel** : Close the entry screen.

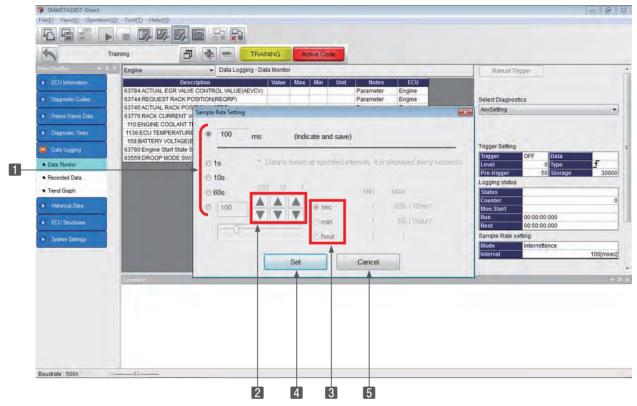
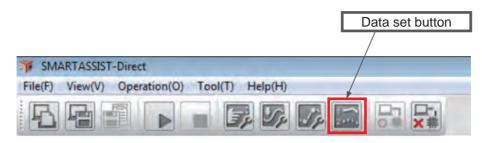


Figure 6-22 Sampling Settings Subwindow

6.6.2 Overview of the Data Sampling Operation

* This description applies to the TNV series engine.

1 Select the data you want to display.

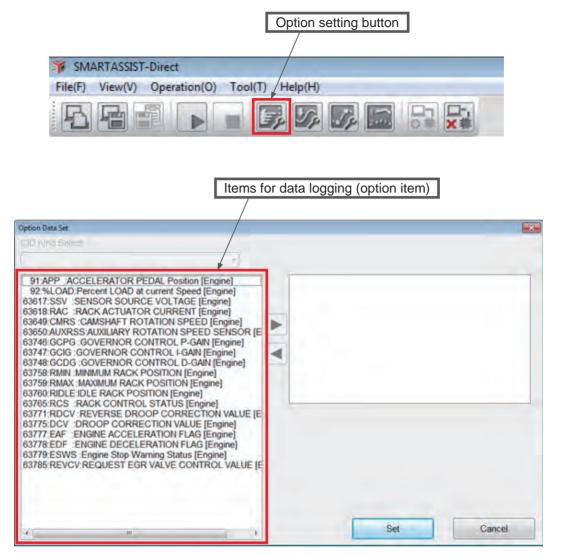


* If you wish to monitor items that are not displayed on this list, go to 2. Option Settings.



6. Error Diagnosis Function (ECU Connection)

Option Settings



3 Set the sampling rate as necessary.

* Normally, a change is not necessary.

				[Sampling	setting	g button	
					/			
🌾 SMA	ARTASSIST-I	Direct			/			
File(F)	View(V)	Operation(O)	Tool(T) Help	H)			
5				3, D	6 J.	2		

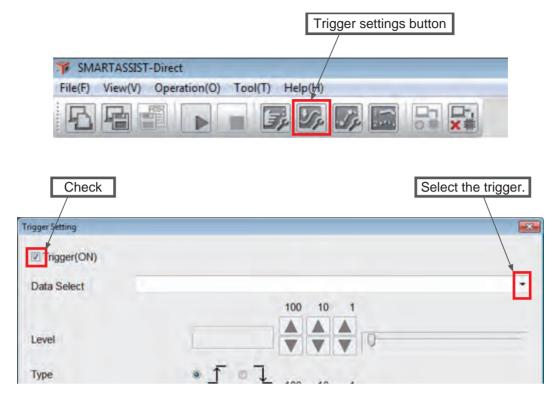
(Indicate and cause			
(Indicate and save)		
ata is saved at specified in	ntervals. It is	display	ed every second:
10 1	MIN	MAX	
Sec	1	600	(10min)
• min	Ţ	60	(1hour)
hour	10	4	
Set	Cancel		
	10 1 Sec min hour	10 T MIN	Sec 1 600 min 1 80 hour 1 1

Note • The standard is 100 msec.

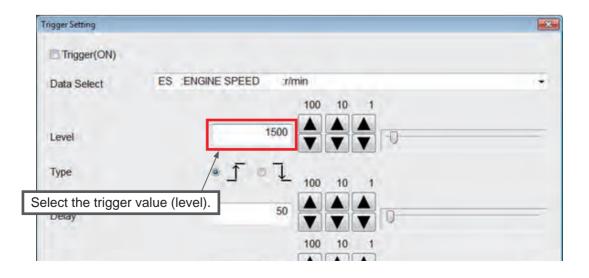
• On ECU that do not support a change, the other values are grayed-out.

4 Set the trigger.

A change is not necessary if the monitor was started by manual trigger.



rigger Setting		
Trigger(ON)		
Data Select		-
	ERH :ENGINE RUN HOURS(unit:h):h RES :REQUEST ENGINE SPEED:r/min	Î
Level	ES ENGINE SPEED r/min ELRO: ENGINE LOAD RATE(Gross):%	
Туре	AEVCV ACTUAL EGR VALVE CONTROL VALUE: REQRP:REQUEST RACK POSITION: ACTRP:ACTUAL RACK POSITION: RCV :RACK CURRENT VALUE :mA	
Delay	ECT ENGINE COOLANT TEMPERATURE:degC EET ECU TEMPERATURE :degC BV :BATTERY VOLTAGE :V ESSS Engine Start State Status:	÷.



5 Description of the trigger settings

Trigger Setting		×
Trigger(ON)		
Data Select ES E	NGINE SPEED :r/min	
Level		
The trigger actuates when the	50	
engine speed is 1500 or more.		
Storage		Q
	Set Cancel	

In trigger mode, the values before the trigger is applied can be saved.

* Normally, a change is not necessary.

Change if necessary.

rigger Setting		
Trigger(ON)		
Data Select		
	Select the number of points saved before the trigger actuates.	
Level	(default is 50)	-
Туре	• f • l 100 10 1	
Delay		-
Storage		
	Set Cancel	

Example: If the sampling time is 100 msec, $50 \times 100 = 5000$ msec (5 sec), thus the values are saved from 5 seconds before the trigger is applied.

rigger Setting		
Trigger(ON)		
Data Select		÷
Level		
Туре	● Select the save vo	lume.
Delay	50 (default is 500)	
Storage		
	Set Cancel	

Example: If the sampling time is 100 msec, $500 \times 100 = 50000$ msec (50 sec), thus the values are saved from 50 seconds before the trigger is applied.

6 Click the button to start the monitor.

ECU Information						Manual Trigg	19
	Description	Value Max	Min Unit	Notes	ECU		
	63784:ACTUAL EGR VALVE CONTROL VALUE(AEVCV)		1	Parameter	Engine	the second second	
Diagnostic Codes	63744:REQUEST RACK POSITION(REQRP)		a second second	Parameter	Engine	Select Diagnostics	1
	63745:ACTUAL RACK POSITION(ACTRP)			Parameter	Engine	AnySetting	
Freeze Frame Data	63776:RACK CURRENT VALUE(RCV)		mA	Parameter	Engine		
	110:ENGINE COOLANT TEMPERATURE(ECT)		degC	A/I	Engine		
Diagnostic Tests	1136:ECU TEMPERATURE(EET)		degC	A/I	Engine		
	158:BATTERY VOLTAGE(BV)		V	S	Engine	Trian Difference	
Data Logging	63780:Engine Start State Status(ESSS)			Parameter	Engine	Trigger Setting	
	63559:DROOP MODE SW(DMS)				Engine		OFF Data
ta Monitor						Level	0 Туре 🕂
corded Data						Pre-trigger	50 Storage 30
						Logging status	
and Graph						Status	
						Counter	
istorical Data						Mon.Start	
						Run	00:00:00:00
CU Structures						Rest	00:50:00.000
						Sample Rate settin	00
lystem Settings						1000 Contractor 1200 Contractor	ntermittence
						Interval	ntermittence 100[m
						interval	100[m
	Comment						

* Click the Manual Trigger button if necessary.

Min Unit N 0 Parar 0 Parar 94 Parar 0 mA 25 degC 72.22 degC 12.20 V	Al Engine Engine Parameter Engine Engine Level O Type	er to save.
0 Parar 0 Parar 94 Parar 0 mA Parar 25 degC A/I 72.22 degC A/I 12.20 V 0 Parar	Parameter Engine Please push a [Manual Trigger] in orde Parameter Engine AnySetting AnySetting Al Engine Parameter Engine Al Engine Parameter Engine Eng	
0 Parar 94 Parar 0 mA Parar 25 degC Al 72.22 degC Al 12.20 V 0 Parar	Parameter Engine Parameter Engine Select Diagnostics Parameter Engine AnySetting AnySetting Al Engine Al Engine Engine Engine Engine Engine Level 0 Trigger Setting Trigger ON Data	
94 Parar 0 mA Parar 25 degC All 72.22 degC All 12.20 V V 0 Parar	Parameter Engine Parameter Engine Al Engine Al Engine Parameter Engine Parameter Engine Engine Level 0 Type	
0 mA Parar 25 degC Al 72.22 degC Al 12.20 V 0 Parar	Parameter Engine Al Engine Al Engine Engine Parameter Engine Engine Engine University of the setting Trigger Setting Trigger ON Data Level O Type	
25 degC A/I 72.22 degC A/I 12.20 V 0 Parar	Al Engine Al Engine Engine Parameter Engine Engine Level 0 Trigger Setting	
72.22 degC Al 12.20 V 0 Parar	Al Engine Engine Parameter Engine Engine Level 0 Type	
12.20 V 0 Parar	Engine Trigger Setting Parameter Engine Trigger ON Data Engine Level O Type	
0 Parar	Parameter Engine Trigger Setting Engine ON Data Level 0 Type	
ON	Engine Trigger ON Data Level 0 Type	
		Ť
	Pre-trigger 50 Storage	5
	Logging status	
	Status Not recording(Waitin	g for a trigge
	Counter	
	Mon.Start 02/27 13:09:47	
	Interval	100[ms
		Run 00:00:02 100 Rest 00:00:00 000 Sample Rate setting Intermittence Interval Interval

7 If the trigger is applied, "Logging to memory" is displayed.

6	Training		TRAI	NING	Ac	tive Co	de			
muToolBat 🔷 👻	Engine		- Data Logging - Da	ta Monito	(Loggin	ng to me	mory]			Manual Trigger
ECU Information		Description		Value	Max	Min	Unit	Notes	ECU	
			ROL VALUE(AEVCV)	0		0		Parameter	Engine	And the second second
Diagnostic Codes		T RACK POSITIO		375		0		Parameter	Engine	Select Diagnostics
Freeze Frame Data		RACK POSITION(JRRENT VALUE(F		383 1557	743	93	mA	Parameter Parameter	Engine Engine	AnySetting
neeze name Data		OOLANT TEMPER		20			degC	Al	Engine	
Diagnostic Tests		PERATURE(EET)		-272.19			degC	A/I	Engine	
	158:BATTERY	VOLTAGE(BV)			14.15		٧	-	Engine	
Data Logging	63780:Engine S	tart State Status(E	SSS)	0	1	0		Parameter	Engine	Trigger Setting
Data Monitor	63559:DROOP	MODE SW(DMS)		ON	ON	ON			Engine	Trigger ON Data
Data Monitor										Level 0 Type 1 Pre-trigger 50 Storage 50
Recorded Data										Logging status
Frend Graph										Status Logging to memory
										Counter
Historical Data										Mon.Start 02/27 13:09:47
A REAL PROPERTY AND INCOME.										Run 00:00:33.000
ECU Structures										Rest 00:00:48.500
System Settings										Sample Rate setting
System Settings										Mode Intermittence
										Interval 100[mse
	Comment			_	_	_	_			

8 Click the button to end the monitor.

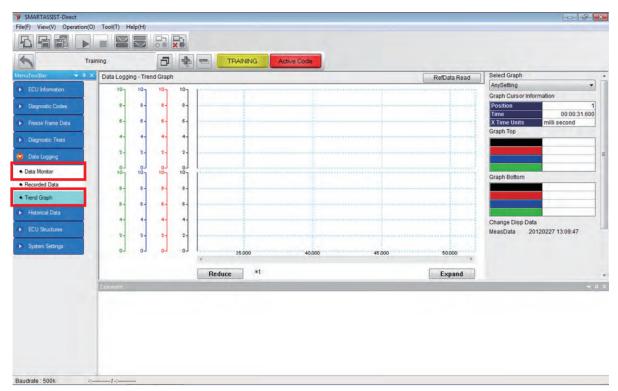
uToolBar 🔷 1	Training 🗗 🕀 📼	TRAINING	_	ctive Co				11		_
						1	1	Manual	Ingger	
ECU Information	Description 63784:ACTUAL EGR VALVE CONTROL VALUE	Val			Unit	Notes Parameter	ECU			
Diagnostic Codes	63744:REQUEST RACK POSITION(REQRP)		0 5		-	Parameter	Engine	Select Diagno	attice	
Dragnostic Codes	63744.REQUEST RACK POSITION(RECRP) 63745:ACTUAL RACK POSITION(ACTRP)		383 743		_	Parameter	Engine	and an and a second	ISUCS	
reeze Frame Data	63776:RACK CURRENT VALUE(RCV)		557 325		mA	Parameter	Engine	AnySetting		
Core manie Data	110:ENGINE COOLANT TEMPERATURE(EC		20 2		degC	All	Engine			
agnostic Tests	1136:ECU TEMPERATURE(EET)		19 272.1		degC	All	Engine			
	158:BATTERY VOLTAGE(BV)		15 14.1		V		Engine			
ata Logging	63780:Engine Start State Status(ESSS)		0			Parameter	Engine	Trigger Setting	9	-
	63559:DROOP MODE SW(DMS)	1	ON ON	I ON			Engine	Trigger	ON Data	
a Monitor								Level	0 Type	Ť
orded Data								Pre-trigger	50 Storage	
								Logging statu	S	
nd Graph								Status	Logging to memory	
storical Data								Counter		
stoncal Data								Mon.Start	02/27 13:09:47	
CU Structures								Run	00:00:33.000	
LU Structures								Rest	00:00:48.500	
stem Settings								Sample Rate	setting	
yatem aetinga								Mode	Intermittence	
								Interval		100[ms
										_
	Comment									

	Training	Ð		NING	Ac	tive Co	le				
urfoolfier 🔫	Engine		🔵 👻 Data Logging - Da	ita Monito	[Finish	ed(Mem	ory over)]		1.	Manual	Trigger
ECU Information		Descrip		Value	Max	Min	Unit	Notes	ECU		
			ONTROL VALUE(AEVCV)	0		0	-	Parameter	Engine	and the second second	
Diagnostic Codes	63744:REQUES			469	752		_	Parameter	Engine	Select Diagno	ostics
and the second second	63745:ACTUAL			469	743		-	Parameter	Engine	AnySetting	
Freeze Frame Data	63776:RACK CL			1908		0	mA	Parameter	Engine		
Discourse Trans			PERATURE(ECT)	22				A/I	Engine		
Diagnostic: Tests	1136:ECU TEM			-272.19			degC V	A/I	Engine		
Bard and	158:BATTERY				14.20		V	Destantes		Trigger Settin	q
Data Logging	63780:Engine S 63559:DROOP			0		0	_	Parameter	Engine	Trigger	ON Data
Data Monitor	63559.DROOP1	NODE SW(DM	15)	ON	ON	ON	_		Engine	Level	0 Type
and the second se										Pre-trigger	50 Storage
Recorded Data										Logging statu	
rend Graph										Status	Finished(Memory over)
										Counter	rinshed(memory over)
Historical Data										Mon. Start	02/27 13:09:47
										Run	00:00:51.800
ECU Structures										Rest	00:00:29.700
System Settings										Sample Rate	
										Mode	Intermittence
										Interval	100[ms
	Comment										

* If the memory is full, the data saving ends automatically.

6.6.3 Switching Screens

You can select Data Display and Graph Display during data monitoring and data saving



6.6.4 Continued Data Saving

If you switch to a different screen during data saving, the process stops temporarily.

But when returning to the Data Logging screen, the save process resumes automatically.

ToolBar 🗸	Training	5		TRAINING	Active Code			Select Graph
ECU Information		ng - Trend Grap				Re	fData Read	AnySetting
eco information	10	10 10	10					Graph Cursor Information
iagnostic Codes	8-	8- 8-	8-					Position Time 00:00:31.0
reeze Frame Data	6-	6- 6-	6-					X Time Units milli second
agnostic Tests	4-	4- 4-	4-					Graph Top
lagnostic Tests		2- 2-	2-					
ata Logging	2-	2- 2-	2-					
a Monitor	Vau	oon ob	ongo to	a different	aaraan durin.	r data aquina	dan series de la competencia d	Graph Bottom
corded Data	rou	can ch	ange to	a different	screen dunnç	g data saving.	1	Staph Bottom
nd Graph								
istorical Data		6- 6-	6-					
	4-	4- 4-	4-		·	*****************************		Change Disp Data
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ystem Settings	0-	0 0		35,000	40,000	45,000	50,000	
			6	39 000	40,000	40,000	+	
			Re	duce *1		(and	Expand	
	Comment	-						

6.6.5 Monitor Data Confirmation

The monitor results are saved primarily on the PC, and all data values can be confirmed. This submenu is not available during receiving of data. If stopped without the trigger applied, no data has been memorized, thus the item display is not available.

Operation Toolbar

- 1 Fint the screen. (Refer to [6.2.2])
- [2] Figure : Save a screenshot in BMP format. (Refer to [6.2.3])
- B i Save the complete history data in CSV format. (Refer to [6.2.4])
- Image: Save the measured data. Save the data of the forced operation after measurement. For the display of the saved data, refer to [7. Error Diagnosis Data Save and Display Functions].
- 5 🖾 : Open the subwindow, and set the display items and the order of the received data. For details, refer to [Data Selection Window].

Main Box

6

No. : Display the time line number of the data.

- **Time** : Display the time axis data. Also, the maximum and minimum values are displayed at the bottom of the list.
- Item Box : The first letter of the selected data name is displayed. (Contents, such as the name and unit, can be confirmed on the ECU Specification/Structure screen.) Right-click the item box to switch the display format from binary to decimal to hexadecimal.

6.6.6 Trend Graph (Expert Function)

Displays the currently received data or saved data in a graph. Select related items for and display them together in a graph. Digital data can be displayed as 1/0 by changing the display mode. The data-receiving graph is automatically shown as additional plot display.

Additional Information Box

I Graph display item selection: Package data sets with the most appropriate settings sorted per event

The data item names set for graph display and the cursor position where the graph is clicked are displayed.

Graph 1 shows top cursor values, graph 2 shows bottom cursor values.

- **Position**: Display data number for the cursor position.
- **Time** : Display time passed for the cursor position.
- **Unit** : Display the time unit.

5 Display item and data: Display the item name and data; The item color corresponds to the graph line color.

• Operation Toolbar

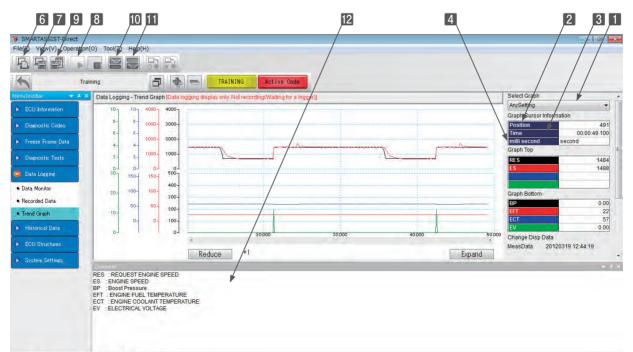
- 6 🔚 : Print the screen. (Refer to [6.2.2])
- Image: Save a screenshot in BMP format. (Refer to [6.2.3])
- Image: The receiving of data starts. (Data that has not been saved according to "7.5.2 Save Data" is overwritten and lost.)
- Image: Save the measured data. Save the data of the forced operation after measurement. For the display of the saved data, refer to [7. Error Diagnosis Data Save and Display Functions].
- 10 🔛 : Do the settings for the display item and the scaling of the top graph.
- \blacksquare : Do the settings for the display item and the scaling of the bottom graph.

Main Box

Graph 1 and graph 2 are displayed. For details regarding operation of the graph, refer to [7.1 Error Diagnosis Data Save and Display Functions].

Comment Box

2 Comment Box: The full name of the displayed data is displayed.



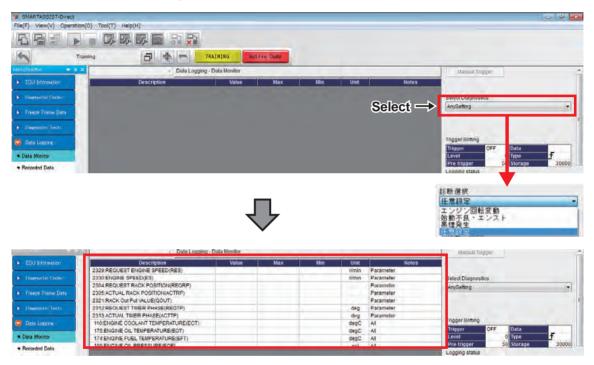
6.6.7 Package Data Set

It is difficult to determine without experience from the multiple data sets which item is active when monitored (data setting/option setting) or displayed as a graph. SMARTASSIST-Direct offers package data sets that allow you to set in advance the most appropriate item for each incident.

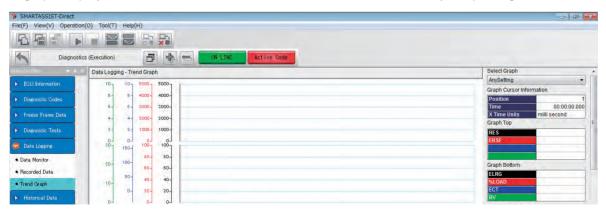


■Package Data Set Selection

The item is set from the selected analysis selection content.



The trend graph display selection is also set to the content set before the event by the package data.



Setting User for Package Data Sets

Package data can be created for each user.

(The user can be set at the time when data logging is executed as the data setting saving function.)

- MARTASSIST-Direct Tool(T) H View(V) Op 요료력 E. 17 1 <-- Click in. 1 Training 뢂 Manual Trigge 3770:ENGINE SPEED(E) 63491'INTAKE AIR HEATER REL AY1(IAHR1) Discrete Output Select Diagnostics AnySetting iostic Test Select the data and click "Set". + A V
- 1 It is set arbitrarily with the Data Setting button.

2 To check whether the setting is valid, conduct the measurement once under the usual conditions.

F SMARTASSIST-Direct							
File(E) View(V) Operation(O) Tool(I) Help(H)						
Tra	ining 🗗 🔂 🖻 📘	TRAINING	Act	ive Coo	le		
HenuTool5an 🗢 🕅 🗙	- Data Loggin	g - Data Monitor	[Data lo	gging d	splay or	ly. Not recording(Waitin	g for a trigger)]
ECU Information	Description	Value	Max	Min	Unit	Notes	
	63770:ENGINE SPEED(ES)	916	2096	0	r/min	Parameter	
Diagnostic Codes	63491:INTAKE AIR HEATER RELAY1(IAHR1)	OFF	OFF	OFF	_	Discrete Output	
Freeze Frame Data							
Diagnostic Tests							
😨 Data Logging							
Data Monitor							

- 1 Click the Start button.
- (2) Use the manual or automatic trigger and do a measurement.
- 3 When necessary, press the Stop button to end the measurement.

- 6. Error Diagnosis Function (ECU Connection)
- **3** After the measurement, arbitrarily set the graph settings.

	M		R.	- <mark>,</mark> Cli	ck				
Т	aining		5	1 4		TRAINING	Active Code	6	
lienuTool6ar 🔷 🕅	Data Loggi	ing - Tre	and Gra	ph					RefData R
ECU Information	3000-	250-	5000-	5000-	1		1		1
Diagnostic Codes.		200-	4000-	4000-					
Freeze Frame Data	2000-	150-	3000-	3000-					+
Diagnostic Tests	1000-	100-	2000-	2000-					
😳 Data Logging		50-	1000-	1000-					
Data Monitor	10-	10-	0- 5000-	60000-	1				
Recorded Data	8-	8-	4000-	000004					
Trend Graph			1000	40000-					

Note For package data sets created by the user, the graph can only be set to one kind.

4 Click the Edit button, arbitrarily set the graph settings, and click the Set button.

Graph Set								_			Graph Se												
Graph	Тор	 Display Mod Analog 	Digi	ital	С	lick	→	an	Editing		Graph	Тор		Display Mo		igital DN/OF		D	efault	File C	pen	Editir	g
		@ Analog	(ON	l/OFF)		Select Set								· Analog	((DN/OF	F)		Select Set				
No.	Data Select	100	10 1					100 10	1		No.	Data S	Select	10	0 10	1					100 1	0 1	
1 RES	REQUEST ENG	GINE SPEED:r/n	in							-	1 RES	REQUE	EST ENGI	NE SPEED:r/	min								
	Min 0			-	Max	5000	16					Min	0			D		Max	5000	[
							—0 [V V			10-									0 [v v		
2 ERSF	REQUEST EN	GINE SPEED(FI	NAL):r/min							-	2 ERS	F REQU	EST ENG	INE SPEED(FINAL):r/n	nin							
	Min 0				Max	5000	16					Min	0					Max	5000	1			
			$\mathbf{\nabla}$				-a r	• •			TO-			- 1		1				0			
3 AEVC	VACTUAL EGR	VALVE CONTRO	L VALUE							-	3 AEV	VACTU	AL EGR V	ALVE CONTR	ROL VALU	E:					-		
	Min 0				Max	255	16					Min	0					Max	255	I			
			\mathbf{V}				-0. C	• •			0									0	* *		
4 BV :	BATTERY VOLTA	AGE :V								-	4 BV	BATTER	Y VOLTA	GE IV									
	Min 0.00				Max	3212.75						Min	0.00					Max	3212.75				
					man				-		TO						1	aux	_	-0		T	
					ile Save		SET		0		14			-		-	-	-			1	-	0
					ue save		SEI		Cancel								File :	Save		SET		4	C

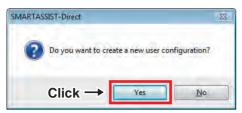
Point Click Save File to separately save only the graph settings. (This will not save the settings for the package data set.)

This is useful when saving multiple graph settings for the data settings of one set. For details, refer to [7.1 Error Diagnosis Data Save and Display Functions].

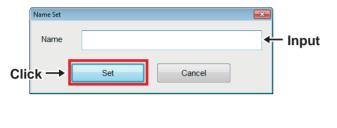
5 Click the "Measurement data saving" button that is activated on the data monitor screen and trend graph screen. (You may use either of the screens.)



6 The confirmation screen for the user setting file creation is displayed. Click Yes



7 Enter the desired name for the setting file and click the **Set** button.





9 Then, the confirmation screen for saving the measurement data is displayed. If you wish to save only the settings, click <u>No</u>.



Note For details on how to save the measured data, refer to [7. Error Diagnosis Data Save and Display Functions].

■Package Data Set with User Settings Selection

Select the saved package data in the following manner.

1 Click "Save User" in the Analysis Selection window.



2 Refer to its name and select the settings file for the package data set, and click the **Select** button.

	User File Select	
	test1 test2 test3	
Click→	Select	Cance I

3 The data will be set according to the user settings.

L(C) Viewall Annutier(A)	Table (LT) Liste (LD)							
ile(F) View(V) Operation(O)	Tool(T) Help(H)							
Trair	ing 🗗 🖬		TRAINING	Ac	tive Co	de		
ienufool6at - 8 x		+ Data Loggin	g - Data Monito	r[]				
interest of the second s								
ECU Information	Descriptio	n	Value	Max	Min	Unit	Notes	
	Descriptio	n	Value	Max	Min	Unit r/min	Notes Parameter	

■Package Data Set Editing

Edit the package data settings in the following manner.

• Package Data Set in Advance within SMARTASSIST-Direct.

Cannot be edited (overwritten)

After selecting the package data and changing the data item/graph display settings, create a new user setting to save the changes.

SMARTASSIST-D	1979 C			
🕐 Do y	ou want to	overwrite	the user s	ettings?
		Yes		No

Package Data Set with User Settings

Overwrite Saving

Can be edited (overwritten).

After selecting the package data and changing the data item/graph display settings, press the "Save Measurement Data" button to overwrite and a confirmation screen is displayed.

IICK Yes .	
SMARTASSISTEDIRECT	23
Do you want to cr	reate a new user configuration?
Click →	Yes <u>N</u> o

Save as New File

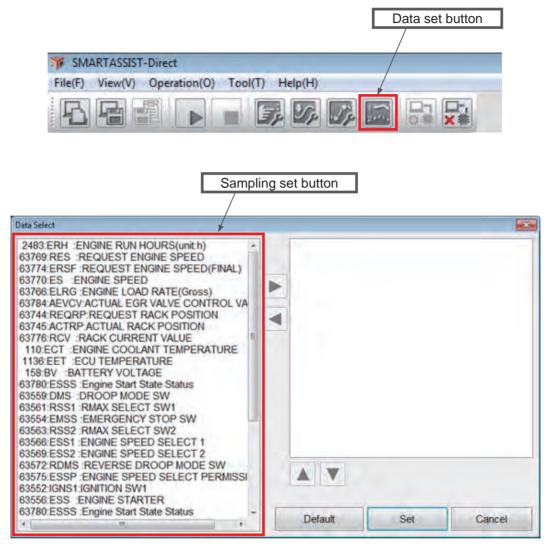
If you want to save the changed content separately, click "No" on the confirmation screen when asked to overwrite.

A confirmation to create a new file is displayed, so click **Yes**.

SMARTASSIST-Direct		23
Do you want to	overwrite the	user settings?
Click →	Yes	No

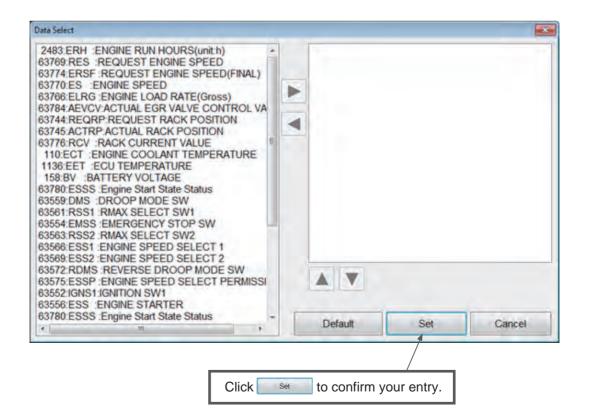
6.6.8 Reference material: Data logging (Engine/2G Eco TNV series)

■Data Set



* Item that are not displayed on this list can be set in the Data Logging Options (see below).

[Select items to monitor	Click	
Data Select	•		×
63770.ES :EN 63766:ELRG :I 63784:AEVCV: 63744:REQRP 63745:ACTRP 63776:RCV :R 110:ECT :EN 1136:EET :EO 158:BV :BAT 63780:ESSS :I 63559:DMS :E 63561:RSS1 :F 63563:RSS2 :F 63566:ESS1 :F 63569:ESS2 :E 63569:ESS2 :E 63572:RDMS :	NGINE RUN HOURS((Init:b) REQUEST ENGINE SPEED REQUEST ENGINE SPEED REQUEST ENGINE SPEED SNGINE LOAD RATE(Gross) ACTUAL EGR VALVE CONTROL VA REQUEST RACK POSITION ACTUAL RACK POSITION ACTUAL RACK POSITION ACTUAL RACK POSITION ACTUAL RACK POSITION ACTUAL RACK POSITION CURRENT VALUE IGINE COOLANT TEMPERATURE CU TEMPERATURE TERY VOLTAGE Engine State State States RICOP MODE SW RMAX SELECT SW1 EMERGENCY STOP SW RMAX SELECT SW2 ENGINE SPEED SELECT 1 ENGINE SPEED SELECT 2 REVERSE DROOP MODE SW ENGINE SPEED SELECT PERMISSI		
	ed items are listed.	1	_
	y slow down if you select ems. Pick 8 at a time.)	Default Set Cancel	
		J	
	Click Default to automa pick the top 8 items.	natically	

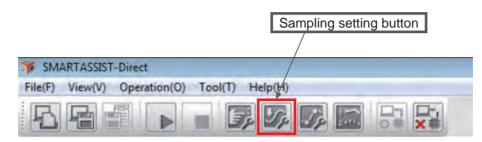


Option Settings Option setting button SMARTASSIST-Direct File(F) View(V) Operation(O) Tool(T) /Help(H) Je in 唱 Items for data logging (option item) Option Data Set × 91 APP ACCELERATOR PEDAL Position [Engine] 92:%LOAD:Percent LOAD at current Speed [Engine] 63617:SSV :SENSOR SOURCE VOLTAGE [Engine] 63618:RAC :RACK ACTUATOR CURRENT [Engine] 63648:CMRS :CAMSHAFT ROTATION SPEED [Engine] 63650:AUXRSS:AUXILIARY ROTATION SPEED SENSOR [E 63746:GCPG :GOVERNOR CONTROL P-GAIN [Engine] 63747:GCIG :GOVERNOR CONTROL I-GAIN [Engine] ◄ 63748 GCDG : GOVERNOR CONTROL D-GAIN [Engine] 63759:RMIN :MINIMUM RACK POSITION [Engine] 63759:RMAX :MAXIMUM RACK POSITION [Engine] 63760 RIDLE IDLE RACK POSITION [Engine] 63765 RCS RACK CONTROL STATUS [Engine] 63771 RDCV REVERSE DROOP CORRECTION VALUE [E 63775:DCV :DROOP CORRECTION VALUE [E 63775:DCV :DROOP CORRECTION VALUE [Engine] 63777:EAF :ENGINE ACCELERATION FLAG [Engine] 63778:EDF :ENGINE DECELERATION FLAG [Engine] 63779:ESWS :Engine Stop Warning Status [Engine] 63785:REVCV:REQUEST EGR VALVE CONTROL VALUE [E Set Cancel

Sampling Time Settings

* Normally, a change is not necessary.

Change if necessary.



100 ms	s (li	ndicate and save)		_
	Data is sav	ved at specified in	ntervals. It is	: display	ed every second
) 10s) 60s	100 10	T	MIN	MAX	
100		@ sec	1	600	(10min)
	ALAL	i o min	T.	60	(1hour)
1-4-		hour	ť.	F	

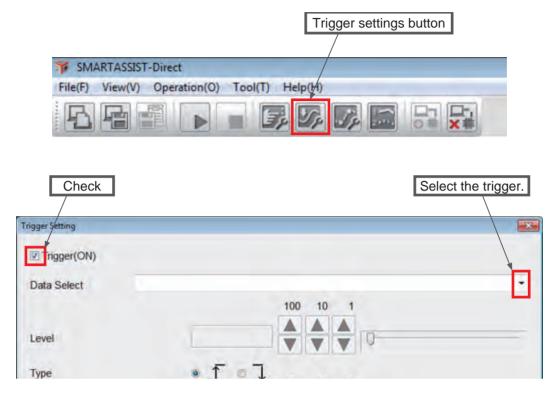
* The standard is 100 msec.

* On ECU that do not support a change, the other values are grayed-out.

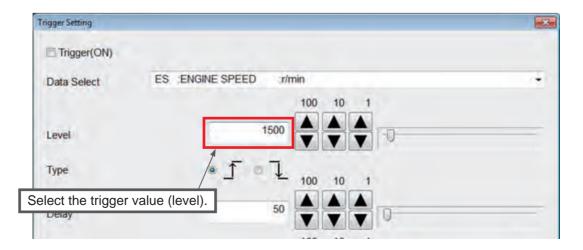
Trigger Settings

* Normally, a change is not necessary.

Change if necessary.



Trigger Setting		
Trigger(ON)		
Data Select		-
	ERH :ENGINE RUN HOURS(unit:h):h RES :REQUEST ENGINE SPEED:r/min	Ê
Level	ERSF:REQUEST ENGINE SPEED(FINAL):min ES_ENGINE SPEEDr/min ES_ENGINE SPEEDr/min	
Туре	AEVCV ACTUAL EGR VALVE CONTROL VALUE: REQRP:REQUEST RACK POSITION: ACTRP:ACTUAL RACK POSITION:	
Delay	RCV :RACK CURRENT VALUE :mA ECT :ENGINE COOLANT TEMPERATURE:degC EET :ECU TEMPERATURE :degC BV :BATTERY VOLTAGE : V	÷.



Trigger Setting		×
Trigger(ON)		
Data Select E	S :ENGINE SPEED :r/min	-
Level		
The trigger actuates when the engine speed is 1500 or more.		
Storage		<u>0</u>
	Set Cancel	

Description of the Trigger Settings

In trigger mode, the values before the trigger is applied can be saved.

* Normally, a change is not necessary.

Change if necessary.

rigger Setting		
Trigger(ON)		
Data Select		-
	before the	e number of points saved e trigger actuates.
Level	(default is	s 50)
Туре	• f • l/100 10	1
Delay	50 0 0	
Storage	500	× D
	Set Car	ncel

Example: If the sampling time is 100 msec, $50 \times 100 = 5000$ msec (5 sec), thus the values are saved from 5 seconds before the trigger is applied.

Trigger Setting		×
Trigger(ON)		
Data Select		
Level		
Туре	● 」 ● ↓ Select the save volum	e.
Delay	(default is 500)	
Storage		
	Set Cancel	

Example: If the sampling time is 100 msec, $500 \times 100 = 50000$ msec (50 sec), thus the values are saved from 50 seconds before the trigger is applied.

■Data Monitor Save Function

	Training 🗗 🛃 🖶 TRAI	VING	Active Co	de					
iToolBer 🔷 🖗	- Data Logging - Da	ta Monito	r				Manual Ti	loger	
ECU Information	Description	Value	Max Min	Unit	Notes	ECU			
	63784:ACTUAL EGR VALVE CONTROL VALUE(AEVCV)	-		-	Parameter	Engine			
Diagnostic Codes	63744:REQUEST RACK POSITION(REQRP)		1		Parameter	Engine	Select Diagnos	tics	
	63745:ACTUAL RACK POSITION(ACTRP)				Parameter	Engine	AnySetting		
Freeze Frame Data	63776:RACK CURRENT VALUE(RCV)			mA	Parameter	Engine	(a state of		
	110:ENGINE COOLANT TEMPERATURE(ECT)		1	degC	A/I	Engine			
Diagnostic Tests	1136:ECU TEMPERATURE(EET)			degC	A/I	Engine			
	158:BATTERY VOLTAGE(BV)			V	6	Engine	Trigger Setting		
Data Logging	63780:Engine Start State Status(ESSS)				Parameter	Engine		land land	-
1.11.12	63559:DROOP MODE SW(DMS)					Engine	Trigger Level	OFF Data	Ť
ata Monitor	and the second se						Pre-trigger	0 Type 50 Storage	3000
ecorded Data									3000
end Graph							Logging status		
eno Graph							Status	-	_
fistorical Data							Counter	-	
							Mon.Start	00.00.00	
ECU Structures							Run Rest	00:00:00.000	
System Settings							Sample Rate s		
							Mode	Intermittence	
							Interval	-	100[mse
	the second se	_	_	_	_				-
	Comment								

		NING	Act	ive Coo	le			
uToolSer 🔷 🖉	- Data Logging - Da	ta Monitor	(Data lo	gging d	lisplay or	nly. Not recordin	g(Waiting for a trigger)]	Manual Trigger
ECU Information	Description	Value	Max	Min	Unit	Notes	ECU	Please push a [Manual Trigger] in order to save.
	63784:ACTUAL EGR VALVE CONTROL VALUE(AEVCV)	0	0	0		Parameter	Engine	
Diagnostic Codes	63744:REQUEST RACK POSITION(REQRP)	0	0	0		Parameter	Engine	Select Diagnostics
	63745:ACTUAL RACK POSITION(ACTRP)	94	94	94		Parameter	Engine	AnySetting
Freeze Frame Data	63776:RACK CURRENT VALUE(RCV)	0	0	0	mA	Parameter	Engine	
Diagnostic Tests	110:ENGINE COOLANT TEMPERATURE(ECT) 1136:ECU TEMPERATURE(EET)	-272.22	25	25	degC degC	A/I	Engine	
Liagnostic: Testa	158:BATTERY VOLTAGE(BV)	12.25			V	AVI	Engine	A DECEMBER OF THE OWNER
Data Logging	63780:Engine Start State Status(ESSS)	12.25	12.30	12.20	v	Parameter	Engine	Trigger Setting
Data boyying	63559:DROOP MODE SW(DMS)	ON	ON	ON	_	rarameter	Engine	Trigger ON Data
ata Monitor	USSSS.DROOF MODE SW(DMS)	ON	UN	OIN	-		Engine	Level 0 Type
Recorded Data								Pre-trigger 50 Storage 5
Recorded Data								Logging status
Frend Graph								Status Not recording(Waiting for a trigge
								Counter
Historical Data								Mon. Start 02/27 13:09:47
Service and the service of the servi								Run 00:00:02.100
ECU Structures								Rest 00:00:50.000
System Settings								Sample Rate setting
System Settings								Mode
								Interval 100[mse
								Interval
	Comment							

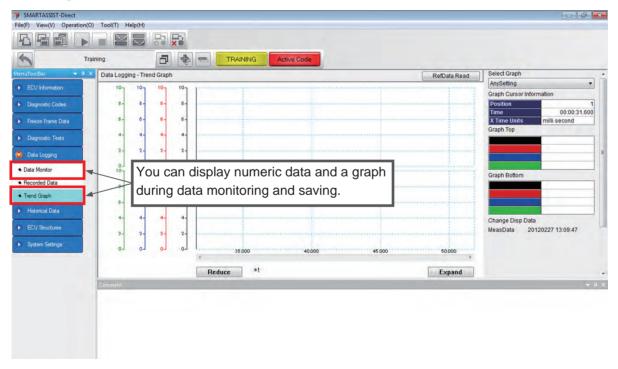
6. Error Diagnosis Function (ECU Connection)

(F) View(V) Operation(O) Tool(T) Help(H)			/				
	- 5, 5,							
Tra	ining		TRAINING Active Coo					
ulfoolBat 🔫 🗸 🕯			g - Data Monito [Logging to me			Manual Trigge	p	
ECU Information		Description GR VALVE CONTROL VALUE(AE)		Unit Notes Parameter	ECU Engine			
Diagnostic Codes	63745:ACTUAL R	RACK POSITION(REQRP) ACK POSITION(ACTRP)	375 752 0 383 743 93	Parameter Parameter	Engine Engine	Select Diagnostics AnySetting		
Freeze Frame Data		RRENT VALUE(RCV) OOLANT TEMPERATURE(ECT)	1557 3253 0 20 25 20	mA Parameter degC A/I	Engine Engine			
Diagnostic Tests	1136:ECU TEMPI 158:BATTERY VC	OLTAGE(BV)	-272.19 272.19 172.22 14.15 14.15 8.40	degC A/I V	Engine Engine	Tringer Collins		
Data Logging	63780:Engine Sta 63559:DROOP M	art State Status(ESSS) ODE SW(DMS)	0 1 0 ON ON ON	Parameter	Engine Engine	Trigger Setting		-
Data Monitor Recorded Data						Level Pre-trigger	0 Type 50 Storage	1 50
Trend Graph						Logging status Status Lo	ogging to memory	
Historical Data						Counter Mon.Start 02	2/27 13:09:47	
ECU Structures						Run 00	0:00:33.000	
System Settings						Sample Rate setting	9	
						Mode In Interval	termittence 10	00[mse
						1		
	Comment-							
SMARTASSIST-Direct	Stop	e recording but	ton					
F) View(V) Operation(O) Tobi(T) Help(H)							
F) View(V) Operation(O) T d BI(T) Help(H)		TRAINING Active Coc					-
F) View(V) Operation(O) Tobi(T) Help(H)	Data Logging	TRAINING Active Coc - Data Monitor (Logging to me	nory	ECU	Manual Trigge		2
P) View(V) Operation(O P) P P P P P P P P P P P P P P P P P P) TG I(T) Help(H) ining 63784:ACTUAL E		TPAINING Active Coo g- Data Monitor (Logging to me Value Max Min (nory	ECU Engine Engine			
P View(V) Operation(O P View(V) Operation(O P View(V) Operation(O P View(V) Operation(Operati) T&(T) Help(H)	Data Logging Description GR VALVE CONTROL VALUE(AEV	TRAINING Active Coo g - Data Monitor (Logging to me /CV) 0 51 0	nony) Unit Notes Parameter	Engine	Manual Trigge Select Diagnostics AnySetting		
P) View(V) Operation(O) P View(V) Operation(O) P View(V) Operation(O ECU Information Disgnostic Codes Freeze Frame Data	0 170(1) Help(H) 0 170(1) Hel	Data Logging Description GR VALVE CONTROL VALUE(AEV RACK POSITION/RECRP) RACK POSITION/ACTRP) RRENT VALUE(RCV) DULANT TEMPERATURE(ECT)	Value Max Min 1375 752 0 383 743 93 1557 3253 0 20 25 20	Mory) Unit Notes Parameter Parameter Parameter MA Parameter degC A/I	Engine Engine Engine Engine Engine	Select Diagnostics		
View(V) Operation(O O	0 138(T) Help(H) 63784.ACTUAL E 63744.REQUEST 63745.ACTUAL E 63745.ACTUAL E 63765.ACTUAL E 1026015 10260 1026015 1026005 1026015 1026015	Data Loggin; Data Loggin; Data Loggin; Control: Value(Aet RACK POSITION(RECRP) RRENT VALUE(RCV) IOLANT TEMPERATURE(ECT) ERATURE(EET)	Active Coor - Data Monitor (Logging to merodation of the second of th	Mory) Unit Notes Parameter Parameter Parameter MA Parameter degC A/I	Engine Engine Engine Engine Engine Engine Engine	Select Diagnostics AnySetting Trigger Setting	F	
View(V) Operation(O O	0 138(T) Help(H) 63784.ACTUAL E 63744.REQUEST 63745.ACTUAL E 63745.ACTUAL E 63765.ACTUAL E 1026015 10260 1026015 1026005 1026015 1026015	Description GR VaVE CONTROL VALUE(AEV RACK POSITION(REGRP) IACK POSITION(REGRP) IACK POSITION(REGRP) IACK POSITION(REGRP) INCLANT TEMPERATURE(ECT) ERATURE(EET) DLTAGE(EV) at State Status(ESSS)	Active Coc - Data Monitor (Logging to me /CV) 0 375 752 383 743 1557 2253 20 25 20 25 20 25 21 272 22 27 14.15 14.15	Unit Notes Parameter Parameter Parameter MA Parameter degC A/I degC A/I V	Engine Engine Engine Engine Engine Engine	Select Diagnostics AnySetting Trigger Setting Trigger O	r Data N Data	
View(V) Operation(O V	0 178((T) Help(H) 0 178((T) Help(H) 0 10 10 10 0 10 10 0 10 10 0 10 10 0 10 10 10 20 10	Description GR VaVE CONTROL VALUE(AEV RACK POSITION(REGRP) IACK POSITION(REGRP) IACK POSITION(REGRP) IACK POSITION(REGRP) INCLANT TEMPERATURE(ECT) ERATURE(EET) DLTAGE(EV) at State Status(ESSS)	Value Active Cor 2 - Data Monitor (Logging to me Value Max Min /CV) 0 51 0 375 752 0 383 1557 2253 -272.19 272.29 -41.15 14.15 0 1	Unit Notes Parameter Parameter Parameter Parameter degC A/l degC A/l V	Engine Engine Engine Engine Engine Engine Engine Engine	Select Diagnostics AnySating Trigger Setting Trigger O	F Data	f
P) View(V) Operation(O P) Vie	0 178((T) Help(H) 0 178((T) Help(H) 0 10 10 10 0 10 10 0 10 10 0 10 10 0 10 10 10 20 10	Description GR VaVE CONTROL VALUE(AEV RACK POSITION(REGRP) IACK POSITION(REGRP) IACK POSITION(REGRP) IACK POSITION(REGRP) INCLANT TEMPERATURE(ECT) ERATURE(EET) DLTAGE(EV) at State Status(ESSS)	Value Active Cor 2 - Data Monitor (Logging to me Value Max Min /CV) 0 51 0 375 752 0 383 1557 2253 -272.19 272.29 -41.15 14.15 0 1	Unit Notes Parameter Parameter Parameter Parameter degC A/l degC A/l V	Engine Engine Engine Engine Engine Engine Engine Engine	Select Diagnostics AnySetting Trigger Setting Clevel Pro-trigger Logging status Status	r Data N Data	Ť 5
P) View(V) Operation(O P) Vie	0 178((T) Help(H) 0 178((T) Help(H) 0 10 10 10 0 10 10 0 10 10 0 10 10 0 10 10 10 20 10	Description GR VaVE CONTROL VALUE(AEV RACK POSITION(REGRP) IACK POSITION(REGRP) IACK POSITION(REGRP) IACK POSITION(REGRP) INCLANT TEMPERATURE(ECT) ERATURE(EET) DLTAGE(EV) at State Status(ESSS)	Value Active Cor 2 - Data Monitor (Logging to me Value Max Min /CV) 0 51 0 375 752 0 383 1557 2253 -272.19 272.29 -41.15 14.15 0 1	Unit Notes Parameter Parameter Parameter Parameter degC A/l degC A/l V	Engine Engine Engine Engine Engine Engine Engine Engine	Select Diagnostics AnySetting Trigger Setting Curvel Pre-trigger Level Pre-trigger Loging status Status Counter Mon.Start 02	r Data 0 Type 50 Storage	Ť 5
P) View(V) Operation(O P) Vie	0 178((T) Help(H) 0 178((T) Help(H) 0 10 10 10 0 10 10 0 10 10 0 10 10 0 10 10 10 20 10	Description GR VaVE CONTROL VALUE(AEV RACK POSITION(REGRP) IACK POSITION(REGRP) IACK POSITION(REGRP) IACK POSITION(REGRP) INCLANT TEMPERATURE(ECT) ERATURE(EET) DLTAGE(EV) at State Status(ESSS)	Value Active Cor 2 - Data Monitor (Logging to me Value Max Min /CV) 0 51 0 375 752 0 383 1557 2253 -272.19 272.29 -41.15 14.15 0 1	Unit Notes Parameter Parameter Parameter Parameter degC A/l degC A/l V	Engine Engine Engine Engine Engine Engine Engine Engine	Select Diagnostics AnySetting Trigger Setting Crigger O Level Pre-trigger Loging status Status Counter Mon.Start 00 Rest 00	N Data 0 Type 50 Storage 2227 13.09-47 700-33.000 200-48.500	2 @
P) View(V) Operation(O P) Vie	0 178((T) Help(H) 0 178((T) Help(H) 0 10 10 10 0 10 10 0 10 10 0 10 10 0 10 10 10 20 10	Description GR VaVE CONTROL VALUE(AEV RACK POSITION(REGRP) IACK POSITION(REGRP) IACK POSITION(REGRP) IACK POSITION(REGRP) INCLANT TEMPERATURE(ECT) ERATURE(EET) DLTAGE(EV) at State Status(ESSS)	Value Active Cor 2 - Data Monitor (Logging to me Value Max Min /CV) 0 51 0 375 752 0 383 1557 2253 -272.19 272.29 -41.15 14.15 0 1	Unit Notes Parameter Parameter Parameter Parameter degC A/l degC A/l V	Engine Engine Engine Engine Engine Engine Engine Engine	Select Diagnostics AnySetting Trigger Setting Trigger Setting OLevel Pro-trigger Logging status Status Logging status Status Counter Mon.Start OR Run Sample Rate setting Mode In	N Data 0 Type 50 Storage 227 13.09.47 000-33.000 0:00-48.500 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	f 51
P) View(V) Operation(O P) Vie	0 178((T) Help(H) 0 178((T) Help(H) 0 10 10 10 0 10 10 0 10 10 0 10 10 0 10 10 10 20 10	Description GR VaVE CONTROL VALUE(AEV RACK POSITION(REGRP) IACK POSITION(REGRP) IACK POSITION(REGRP) INCANT TEMPERATURE(ECT) ERATURE(EET) DLTAGE(EV) at State Status(ESSS)	Value Active Cor 2 - Data Monitor (Logging to me Value Max Min /CV) 0 51 0 375 752 0 383 1557 2253 -272.19 272.29 -41.15 14.15 0 1	Unit Notes Parameter Parameter Parameter Parameter degC A/l degC A/l V	Engine Engine Engine Engine Engine Engine Engine Engine	Select Diagnostics AnySetting Trigger Setting Level Pre-trigger Logging status Status Status Counter Mon.Start Sample Rate setting Sample Rate setting	N Data 0 Type 50 Storage 227 13.09.47 000-33.000 0:00-48.500 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Ť 51
P) View(V) Operation(O P) Vie	0 178((T) Help(H) 0 178((T) Help(H) 0 10 10 10 0 10 10 0 10 10 0 10 10 0 10 10 10 20 10	Description GR VaVE CONTROL VALUE(AEV RACK POSITION(REGRP) IACK POSITION(REGRP) IACK POSITION(REGRP) INCANT TEMPERATURE(ECT) ERATURE(EET) DLTAGE(EV) at State Status(ESSS)	Value Active Cor 2 - Data Monitor (Logging to me Value Max Min /CV) 0 51 0 375 752 0 383 1557 2253 -272.19 272.29 -41.15 14.15 0 1	Unit Notes Parameter Parameter Parameter Parameter degC A/l degC A/l V	Engine Engine Engine Engine Engine Engine Engine Engine	Select Diagnostics AnySetting Trigger Setting Trigger Setting OLevel Pro-trigger Logging status Status Logging status Status Counter Mon.Start OR Run Sample Rate setting Mode In	N Data 0 Type 50 Storage 227 13.09.47 000-33.000 0:00-48.500 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	f 5

6. Error Diagnosis Function (ECU Connection)

	n(O) Tool(T) Help(H)					/			
		NING	Act	ve Coo	de				
olSer 🔫 🛚	Data Logging - Data	a Monito	[Finishe	d(Mem	ory over)	1		Manual 1	rigger
CU Information	Description 63784:ACTUAL EGR VALVE CONTROL VALUE(AEVCV)	Value 0	51	Min 0	Unit	Notes Parameter	ECU Engine		
agnostic Codes	63744:REQUEST RACK POSITION(REQRP) 63745:ACTUAL RACK POSITION(ACTRP)	469 469	743	0 93		Parameter Parameter	Engine Engine	Select Diagno AnySetting	SUCS
eze Frame Data	63776:RACK CURRENT VALUE(RCV) 110:ENGINE COOLANT TEMPERATURE(ECT)	1908 22		0 20	mA degC	Parameter A/I	Engine Engine		
mostic Tests	1136:ECU TEMPERATURE(EET) 158:BATTERY VOLTAGE(BV)		272.19	72.22	degC V	A/I	Engine		
a Logging	63780:Engine Start State Status(ESSS)	0	1	0		Parameter	Engine	Trigger Setting	ON Data
Monitor	63559:DROOP MODE SW(DMS)	ON	ON	ON			Engine	Level	0 Type
rded Data								Pre-trigger Logging statu	50 Storage
Graph								Status Counter	Finished(Memory over)
orical Data								Mon.Start	02/27 13:09:47
I Structures								Run Rest	00:00:51.800 00:00:29.700
em Settings								Sample Rate	
								Mode	Intermittence 100[ms
	Comment								

Switching Screens



Additional Function (Continued Data Saving)

If you switch to a different screen during data saving, the process stops temporarily.

But when returning to the Data Logging screen, the save process resumes automatically.

	Training		TRAINING Active Code		
uToolBar 👻	Data Logging - Tre	end Graph		RefData Read	Select Graph
ECU Information	107 107	10 10 L			AnySetting
					Graph Cursor Information
Diagnostic Codes	8- 8-	8- 8-			Position Time 00:00:31.6
Freeze Frame Data	6- 6-	6- 6-			X Time Units milli second
	4- 4-	4- 4-			Graph Top
Diagnostic Tests					
Data Logging	2- 2-	2- 2-		*****	
sta Monitor					
	You car	h change to	a different screen d	uring data saving.	Graph Bottom
ecorded Data		1			
end Graph	6- 6-	6- 6-		t i i i i i i i i i i i i i i i i i i i	
Historical Data					
	4- 4-	4- 4-			Change Disp Data
ECU Structures	2- 2-	2- 2-			MeasData 20120227 13:09:47
System Settings	0 0				
		, Lo Lo	35,000 40,000	45,000 50,000	
		(duce *1		
		He	duce *1	Expand	
	Comment				

6.7 History Data

Display the product's operating data saved to the ECU/controller. There are submenus for the integrated value, distribution chart, and incident record.



- Note The saved content is different for each product.
 - The history data is saved in a precision range that does not affect the control of the product. Thus, use the history data as a guideline.

6.7.1 Integrated Value Display

Displays these values: total operating hours, total time and speed etc. during alarms (status when operation is limited due to fault detection), total values and total mean values such as distance.

Operation Toolbar

1 🗐 : Save the ECU's screen display data. (Refer to [7. Error Diagnosis Data Save and Display Functions].)

2 🚯 : Print the screen. (Refer to [6.2.2])

- 3 🔚 : Save a screenshot in BMP format. (Refer to [6.2.3])
- 4 E : Save the complete history data in CSV format. (Refer to [6.2.4])
- 5 C: Update the current data.

Function Buttons

- : Select the ECU/controller that is displayed. 6
- Clear Trip Time : Delete the data of the selected (checkmark) item. After pushing the button Selection Item Clear, the password is confirmed.

If the clear box does not have a checkbox, the data cannot be deleted. Note

Main Box

- 8 Clear : Box selected for deletion (click to insert checkmark)
- 9 **Description** : Save data
- 10 Value : Display total time
- 11 ECU : ECU/controller where data is saved

	123	4 5 8 6 7	9	<u>,10</u>	
7—	SMARTASSIST-Direct File(E) View(V) Operating	(0) pool(1) Help(h) C Provide the Tree of	AllNING Active Code	TO TI Value ECU 1433.60 Engine 1300.00 Engine 8.00 Engine 3.40 Engine 3.40 Engine	
	Lifetime Data Map Table Log Data EQU Shuctures System Settings				

Figure 6-24 Total Time Display Screen

6.7.2 Distribution Chart (Expert Function)

Visualizes the operation status and displays a distribution chart of the frequency information saved in the ECU/controller. The integrated data cannot be deleted. (E.g. the engine load pattern)

Operation Toolbar

- Image: Save the ECU's screen display data. (Refer to [7. Error Diagnosis Data Save and Display Functions].)
- 2 🔚 : Print the screen. (Refer to [6.2.2])
- Image: Save a screenshot in BMP format. (Refer to [6.2.3])
- Image: Save the complete history data in CSV format. (Refer to [6.2.4])
- 5 C : Update the current data.
- 6 🔄 : Open the adjustment subwindow; full scale of all axes is adjustable in 3 steps (25%, 50%, 100%).

• Function Buttons

- Image: Select the displayed ECU/controller.
- 8 _____: Select the data that is displayed.

Main Box

10

11

- **Data** : Total operating hours under all loads and speeds
 - Total : Total operating hours for all lines (rows)
 - (%) : Ratio for total operating hours for all lines (rows)
- Bar Graph : Bar graph for all axes full scale

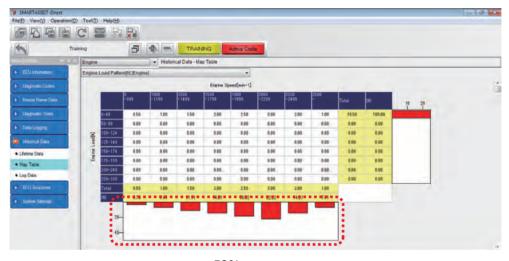
SMARTASSIST-Direct lefe Vice(V) operation	Training			7	B	NING	Active Cod	8	/	9			10	11	
enuToolBa: 🗢 🗸	Engine	() () () () () () () () () () () () () (- Histor	rical Data - M	ap Table			/			/	/		/
ECU Information	Engine	Load Patte	ern(h) [Engin	e]			-		/			/	/	/	·
Diagnostic Codes						Engine S	peed[min-1]		/						
Freeze Frame Data			0 -999	1000 -1199	1200 -1499	1500 -1799	1800 - 1999	2000 -2299	2300 -2499	2500	Total	00	10	20	
Diagnostic Tests		0-49	0.50	1.00	1.50	2.00	2.50	3.00	2.00	1.00	13.50	100.00			
Data Logging		50-99 100-124	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
Historical Data	Albeo	125-149	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
Lifetime Data	Engine Load[0]	150-174	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
August - A. Barrine	E	175-199	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
Map Table		200-249	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
Log Data		250-100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		-	
ECU Structures		Total	0.50	1.00	1.50	2.00	2.50	3.00	2.00	1.00					
System Settings		(%)	3.70	7.41	11,11	14.81	18.52	22.22	14.81	7.41	1				
		10-													
		20-	-			1	-								
		_	-												
	i unme	nt													* 2

Figure 6-25 Distribution Chart Screen

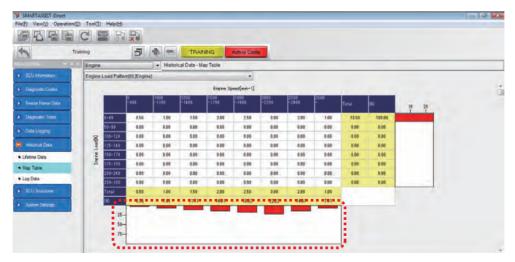
Scale Change

Click 5 to open the below screen.

Graph Scale Set		
Horizontal axis		
Title	Scale Select	
Engine Speed[min-1]	0-25%	← Change the scale of the horizontal axis
Vertical axis		
Title	Scale Select	
Engine Load[%]	0-25%	← Change the scale of the vertical axis
Set	Cancel	
Set	Cancel	



50% Figure 6-26 50% Example Display Screen



100% Figure 6-27 100% Example Display Screen

6.7.3 Incident Record

The incident record is displayed in two formats of save data.

- Total operating hours when the specified incident occurred
- Number of times and average value that the specified incident occurred during a certain range of operating hours

Operation Toolbar

- 🔟 🗐 : Save the ECU's screen display data. (Refer to [7. Error Diagnosis Data Save and Display Functions].)
- 2 🔁 : Print the screen. (Refer to [6.2.2])
- [3] Fair : Save a screenshot in BMP format. (Refer to [6.2.3])
- 4 📷 : Save the complete history data in CSV format. (Refer to [6.2.4])
- 5 C: Update the current data.

Main Box

6 No. : Display the number of the data.

Factor (B) : Display the factor of the specified item separated in bits.

(By right-clicking, the data can be changed to "binary number", "decimal number" and "hexadecimal number".)

8 Time of Occurrence (h) : Display the operating hours at the time of the incident

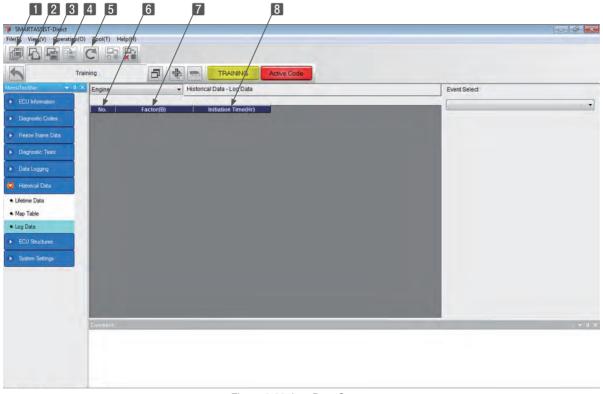


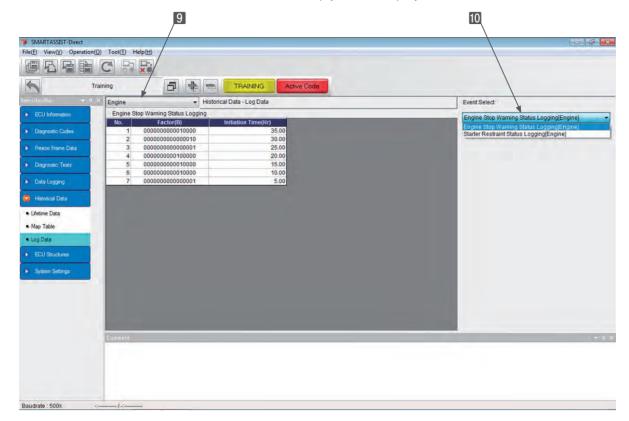
Figure 6-28 Log Data Screen

Incident Selection

10

- 9 : Select the displayed ECU/controller.
 - : Select the data saved to the ECU/controller selected at 9.

If no data has been saved, an empty box is displayed.



Example for binary display

No.	Factor(B)	Initiation Time(Hr)
1	000000000010000	35.00
2	000000000000010	30.00
3	000000000000001	25.00
4	000000000100000	20.00
5	000000000010000	15.00
6	000000000010000	10.00
7	0000000000000001	5.00

Example for decimal display

No.	Factor(D)	Initiation Time(Hr)
1	16	35.00
2	2	30.00
3	1	25.00
4	32	20.00
5	16	15.00
6	16	10.00
7	1	5.00

Example for hexadecimal display

No.	Factor(H)	Initiation Time(Hr)
1	0010	35.00
2	0002	30.00
3	0001	25.00
4	0020	20.00
5	0010	15.00
6	0010	10.00
7	0001	5.00

• Example incident data for TNV series engine

Engine Stop Cause Log (Engine)

Start Restraint Cause Log (Engine) : Click to display in the main box a recording of the incident cause that occurred when the engine stopped.

: Click to display in the main box a recording of the incident cause that occurred when the starter restraint actuated.

6.8 ECU Specification/Structure (Expert Function)

This function displays the ID information of the product's electronic control system/ECU/controller and the distribution of the ECU input/output channel.

6.8.1 Analog Signal

This screen is mainly used for communication between developers and the development department.

Information such as units, scaling, and channel information of the analog signal is displayed.

Operation Toolbar

- 1 🗐 : Save the ECU's screen display data. (Refer to [7. Error Diagnosis Data Save and Display Functions].)
- 2 🔄 : Print the screen. (Refer to [6.2.2])
- 3 🔚 : Save a screenshot in BMP format. (Refer to [6.2.3])
- 4 📷 : Save the complete history data in CSV format. (Refer to [6.2.4])

• Function Buttons

: Select the displayed ECU/controller.

Main Box

5

6

8

- CID : Used as common ID number for SAE J1939 compliant parameters
- **Description** : Contents of sensors, signals etc.
 - Acronym : Abbreviation number (SAE compliant)
- 9 Size : Data Length
- 10 Resolution : Resolution
- 11 Offset : Offset
- 12 Unit : Unit
- 13 Range : Range

Comment Box

14 Comment box: Display information for the selected line (colored in green).

123	4 6 5 7		8	9 10		11	1 12	13	14	
F SMARTASSIST-Direct		/				/		/		- 6 ×
File(E) View(V) Operation(O)	Tool(T) Help(H)			/		/	/	/	/	
		/	/	/	/			·	/	
但凡自由		/	/	/	/		/ /		/	
:	Ttalan	/	-		/		/ /			
Trai	ining / / 🗗 👘 📼	TPAINING.	Activ	/e Code	/		/ /			
MenuToolBar = 4 X		tures - Analog	-	1	_/	_	//		/	
mentaroolpai	00 Engine ECU Struct	tures - Analogy	nanneis	-	+			~	/	
ECU Information	CID Description	Acronym	Size	Resolution	Offset	Unit	Range			
	63619 RACK POSITION SENSOR VOLTAGE	RPSV	2	1	0		0 to 1023			
Diagnostic Codes	91 ACCELERATOR PEDAL Position	APP	1	0.4	0.0	%	0 to 100			
	63618 RACK ACTUATOR CURRENT	RAC	2	0.05	0.00	A	-1600 to 1612.75			
Freeze Frame Data	1136 ECU TEMPERATURE	EET	2	0.03125	-273.00	degC	-273 to 1,735			
	158 BATTERY VOLTAGE	BV	2	0.05	0.00	V	0 to 3212.75			
Diagnostic Testa	63617 SENSOR SOURCE VOLTAGE	SSV	2	0.05	0.00	V	0 to 3212.75			
	63744 REQUEST RACK POSITION	REQRP	2	1	0		0 to 1023			
Data Logging	63779 Engine Stop Warning Status	ESWS	2	1	0		0 to 65,535	/		
	63786 ENGINE MODE	EM	1	1	0		0 to 255	X		
Historical Data	110 ENGINE COOLANT TEMPERATURE	ECT	1	1	-40	degC	-40 to 210	/		
	63787 Starter Restraint Status	SRS	1	1	0		0 to 255			
ECU Structures	63788 Starter Restraint Factor	SRF	2	1	0	_	0 to 65,535			
Analog Channels										
Digital Channels										
ECU ID Information										
· ECUID momation										
 ECU Data Save 										
And										
 System Settings 										
	and the second se									



6.8.2 Digital Signal (Expert Function)

This screen is mainly used for communication between developers and the development department.

It displays information such as acceptance or rejection of the forced output for output, logic, and channel information of the contact input/output signal.

Operation Toolbar

- 1 🗐 : Save the ECU's screen display data. (Refer to [7. Error Diagnosis Data Save and Display Functions].)
- 2 🔄 : Print the screen. (Refer to [6.2.2])
- 3 🔚 : Save a screenshot in BMP format. (Refer to [6.2.3])
- 4 📷 : Save the complete history data in CSV format. (Refer to [6.2.4])
- 5 C: Update the current data.

• Function Buttons

6 : Select the displayed ECU/controller.

• Main Box

7 IN/OUT	: Input/output division
8 CID	: ID numbers for SAE J1939 compliant parameters
9 Description	: Contents of sensors, signals etc.
10 Acronym	: Abbreviation number (SAE compliant)
11 Byte	: Byte position of data
12 Bit	: Bit position of data
13 Logic	: Logic reversal
14 Mask	: Authorization mask for forced operation (0 means no change possible)

Comment Box

15 Comment box: Display information for the selected line (colored in green).

1 2 3	4	7869		10	11	12	13	14 15
	0) Tool(T) H		Active (ode				
MenuToolBa: • 0	- /	ECU/Structures - Digita			1	1	1	
ECU Information	1/0	CID Description	Acronym	Byte	Bit	Logic M	ask	
C C C C C C C C C C C C C C C C C C C		63559 DROOP MODE SW	DMS	0	0	0		
Diagnostic Codes	1	63561 RMAX SELECT SW1	RSS1	0	1	0		
a contraction	1	63554 EMERGENCY STOP SW	EMSS	0	2	0		
Freeze Frame Data	1	63563 RMAX SELECT SW2	RSS2	0	3	0		
and the second second	F	63566 ENGINE SPEED SELECT 1	ESS1	0	4	0		
Diagnostic Tests	1	63569 ENGINE SPEED SELECT 2	ESS2	0	5	0		
and the second second	1	63572 REVERSE DROOP MODE SW	RDMS	0	6	0		
Data Logging	1	63575 ENGINE SPEED SELECT PERMISSION	ESSP	0	7	0		
No. of the second s	P	63552 IGNITION SW1	IGNS1	1	0	0		
Historical Data	E F	63556 ENGINE STARTER	ESS	1	1	0		
	1	63780 Engine Start State Status	ESSS	1	2	0		
ECU Structures	0	63488 ECU MAIN RELAY	MRL	0	0	0	0	
	0	63491 INTAKE AIR HEATER RELAY1	IAHR1	0	1	0	1	
 Analog Channels 	0	63494 PRE-HEATER Lamp	PHL	0	2	0	1	
Digital Channels	0	63495 Engine Warning Indicator	EWI	0	3	0	1	
- Crighter Criterin fele	0	63497 ENGINE STARTER Interlock RELAY	ESR	0	4	0	1	
 ECU ID Information 	0	63498 ECO MODE Lamp	EML	0	5	0	1	
ECU Data Save	0	63499 EGR Step MOTOR(A)	ESM-A	1	0	0	1	
· CCO Data Save	0	63500 EGR STEP MOTOR(B)	ESM-B	1	1	0	-1	
 System Settings 	0	63501 EGR STEP MOTOR(C)	ESM-C	1	2	0	1 /	
He Street and	0	63502 EGR STEP MOTOR(D)	ESM-D	1	3	0	1 /	
	0	63490 CSD SOLENOID VALVE	CSD	1	4	0	1 /	
	0	63489 FUEL RACK ACTUATOR RELAY	FRAR	1	5	0		

Figure 6-30 Digital Signal Screen

6.8.3 ECU ID Data

Displays detailed ID information for each ECU/controller. (Related to "ECU Basic Information" and "Main Data")

- Operation Toolbar
 - 1 🗐 : Save the ECU's screen display data. (Refer to [7. Error Diagnosis Data Save and Display Functions].)
 - 2 🔚 : Print the screen. (Refer to [6.2.2])
 - 3 🔚 : Save a screenshot in BMP format. (Refer to [6.2.3])
 - 4 🔚 : Save the complete history data in CSV format. (Refer to [6.2.4])
 - 5 C : Update the current data.

Function Buttons

: Select the displayed ECU/controller.

• Main Box

6

7 ECUID	Management number for the data saved in the ECU
8 CID	Management number for the data called common ID
9 Description	Item name that is displayed
10 Data	Item content
11 Unit	Unit
12 Notes	Annotation box
1 2 3 4	6 7 8 9 10 11 1 2

		Active Code		
ufool6a: 🗸 🗸 🕽		formation		
ECU Information	ECUID CID Description	Value	Init Notes	
	86 61830 ECU Map Data P/N(OEM)	1 Sugar	ECU ID	
Diagnostic Codes	88 61832 ECU Software P/N(OEM)	11382200	ECU ID	
	8A 61834 System Supplier	YANMAR	ECU ID	
Freeze Frame Data	8C 61836 ECU S/N	0852754321	ECU ID	
	8D 61837 Fuel Injection Pump P/N	729938-51XXX	ECU ID	
Diagnostic Tests	8E 61838 ECU Map Data P/N	129938-74XXX00	ECU ID	
	91 61841 ECU Hardware P/N(OEM)	1R1994-00012	ECU ID	
Data Logging	92 61842 ECU Type P/N	129938-75XXX	ECUID	
	93 61843 ECU Hardware P/N	1R1994-00012	ECU ID	
Historical Data	94 61844 ECU Software P/N	1R1994-10021	ECU ID	
	96 61846 Qcode		ECU ID	
ECU Structures	97 61847 Engine Type(Vehicle Manufacture)	4TNV98-ZXXX	ECUID	
	98 61848 Manufacturing Tester ID	-	ECU ID	
Inalog Channels	99 61849 Flash Programming Date	080614	ECU ID	
lioital Channels	9A 61850 Calibration Equipment S/N(Repair Shop)		ECUID	
vgital Crialities	9B 61851 Calibration Date(Repair Shop)	080614	ECU ID	
CU ID Information	9D 61853 ECU Installation Date	080614	ECU ID	
	9E 61854 Engine Type	4TNV98-ZXXX	ECU ID	
CU Data Save	B0 61872 Service Tool Version	01111003	ECU ID	
System Settings	B1 61873 Fuel Injection Pump S/N	200806148999	ECUID	
ologin series (5)	B2 61874 Engine S/N	54321	ECU ID	
	B3 61875 FIP & Engine System ID	2GECO_MP_TNV	ECU ID	
	B4 61876 Manufacturing Test Date	080520	ECU ID	
	B5 61877 Engine S/N(Vehicle Manufacture)	54321	ECU ID	
	B6 61878 ECU Category	2	ECUID ("10" me	
	B6 61878 ECU Category	2	ECU ID ("10" me	

Figure 6-31 ECU ID Information Screen

6.8.4 ECU Data Saving

Saves the previously made settings in CSV format. The settings include correction values, adjustment values, initialization values and ECU ID information that are saved in the ECU.



Operation Toolbar

- 1 🗐 : Save the ECU's screen display data. (Refer to [7. Error Diagnosis Data Save and Display Functions].)
- 2 🔁 : Print the screen. (Refer to [6.2.2])
- I I ave a screenshot in BMP format. (Refer to [6.2.3])
- Image: Save the complete history data in CSV format. (Refer to [6.2.4])
- 5 C: Update the current data.

Function Buttons

6 : Select the displayed ECU/controller.

Main Box

Browse : Calls up a report format that contains the settings which data items are saved. This function is mainly used by developers. It is not necessary to change it during service work. You can select whether to save the data only or save the data and the title.

				100
	A	1	A B	C
	TNV98-ZNSA	1	エンジン型式(銘板名称)	4TNV98-ZNSA
and the second se	29939-51390		ポンプ部品コード	729939-51390
3 1:	29988-75000	3	ECU仕組部品コード	129988-75000
4	54686	4	エンジンシリアルNo(機番)	54686
5 2	00709148080	5	ボンブシリアルNo	20070914B080
6	680000065	6	ECUシリアルNo	680000065
7	1	7	Pump ホンプ最大ラック位置補正(回転軸1)管理Trq1	1
8	2	8	ホシプ最大ラック位置補正(回転軸2)管理Trq2	2
9	3	9	ホシフ。最大ラック位置補正(回転軸3)管理Trc3	3
10	4	10	ホンプ最大ラック位置補正(回転軸4)定格出力	4
Title	データのみ」の例 :Display the	e title.	「データとタイトル」の例	
Subtitle	: Display the			
Data		8	9 7 10	E
1 2 3		8	9 7 10	
1 2 3 SMARTASSIST-Direct Field Vieg(V) Operation(O)		8	9 7 10 RAINING Active Code	
1 2 3 SMARTASSIST-Direct Fletti Vice(V) Coreration(O) Control (Control (Contro) (4 5 6	8	9 7 10	
1 2 3 SMARTASSIST-Dijekt integr Vie (V) operator(O) C C C C C C C C C C C C C C C C C C C	4 5 6	B ECU Structure csv With title	9 7 10 RAINING Active Code	
1 2 3 SMARTASSST-Dir/et 1 Idel Vier(V) Operation(0) Idel Idel Idel Idel Idel <t< td=""><td>4 5 6 Col(T) Help(H) Col Type PAN Equipment Color C</td><td>B ECU Structure csv With title</td><td>9 7 10 RAINING Active Code s - ECU Data Save Browse Browse Browse 5 1806 12998-75000 54685</td><td></td></t<>	4 5 6 Col(T) Help(H) Col Type PAN Equipment Color C	B ECU Structure csv With title	9 7 10 RAINING Active Code s - ECU Data Save Browse Browse Browse 5 1806 12998-75000 54685	
1 2 3 SMARTASSIST-Dir/kt eg Vie (V) preration(O) F F F F F F F F F F F F F F F F F F F	4 5 6 Col(T) Height Colored Colored	8 ECU Structure csv With title	9 7 10 PRAINING Active Code IS - ECU Data Save Browse Browse ComPensation 1 1	
1 2 3 SMARTASSST-Dijkt Image: Constraints Image: Constraints Image: Constraints	4 5 6 Col(T) Help(H) Col Color Col	ECU Structure	9 7 10 RAINING Active Code s - ECU Data Save Browse Browse Browse ComPENSATION 1 1 ComPENSATION 1 1 ComPENSATION 1 1 ComPENSATION 2 2 ComPENSATION 3 3	
1 2 3 SMARTASSIST-Dir/ct Image: Control of the second seco	4 5 6 Col(T) Help(H) Col Color Col	B ECU Structure csv With title PUMP POWER PUMP POWER PUMP POWER PUMP POWER PUMP DOWER	9 7 10 RAINING Active Code In the Active Code In the 4Th/98-2NSA D Title 4Th/98-2NSA 129988-75000 54686 2007091-4E089 069000065 COMPENSATION 1 1 COMPENSATION 2 2 COMPENSATION 1 3 COMPENSATION 3 3 COMPENSATION 4 4	
1 2 3 SMARTASSIST-Direct Integration (0) Integration (0) Integration (0)	4 5 6 Col(T) Help(H) Col Color Col	ECU Structure CSV With title	9 7 10 RAINING Active Code Is - ECU Data Save Browse Browse Browse 0680000065 COMPENSATION 1 0 COMPENSATION 2 2 COMPENSATION 1 5 Metensation 4 4 Metensation 4 6	
1 2 3 SMARTASSIST-Direct Filett Visu(V) Operation(O) Control Visu(V) Operation(O) Train Annulau(Bac) ECU Informacor	4 5 6 Col(T) Help(H) Col Color Col	ECU Structure ECU Structure csv With title	9 7 10 PAINING Active Code Is - ECU Data Save	
1 2 3 SMARTASSIST-Direct Integration (0) Integration (0) Integration (0)	4 5 6 Col(T) Help(H) Col Color Col	B ECU Structure CSV With title PUMP POWER PUMP POWER PUMP POWER PUMP IDLE CO PUMP IDLE CO PUMP IDLE CO PUMP IDLE CO CS	9 7 10 RAINING Active Code Is - ECU Data Save Is - ECU Data Save Browse Browse COMPENSATION 1 Save COMPENSATION 2 Compensation 2 Compensation 2 Compensation 3 Compensation 1 Compensation 1 Compensation 1 Compensation 3 Compensation 1 Compensation 3	

Figure 6-32 ECU Data Saving Screen

6.9 Settings (Expert Function)

This function allows you to change the settings necessary for replacing, repairing and adjusting the ECU/controller, fuel injection pump, fuel injection valve (injector), and all sensors and switches after mounting and installation of the product. It has the submenus "Structure Settings", "Sensor Correction", "Parameter Adjustment", and "Initial Settings". You can create a report file after finishing the settings.

Follow the instructions in the technical manuals of the relevant product Important when changing values with any functions within the settings. If you change settings without due care, the product might stop working or the performance may decrease.

6.9.1 Configuration

You can backup and write the settings and setting values of the product's basic functions.

Operation Toolbar

- 1 🗐 : Save the ECU's screen display data. (Refer to [7. Error Diagnosis Data Save and Display Functions].)
- 2 🚯 : Print the screen. (Refer to [6.2.2])
- 3 Figure 3 Save a screenshot in BMP format. (Refer to [6.2.3])
- 4 🛅 : Save the screen data in CSV format. (Refer to [6.2.4])

Function Buttons

: Select the displayed ECU/controller.

5

- 6 Exchanges : This function saves the initial settings saved in the ECU and the correction values (ECU Data Backup (ECU to PC)) and writes these settings and values to the PC.
 - · This function writes the correction values of the fuel injection pump to the ECU after it was replaced.

The function by this button is the same as for the ECU Replacement (Execution), part replacement and adjustment, and it is in the location as in YDT, the predecessor to SMART-ASSIST-Direct.

Refer to the relevant page for instructions.

Main Box

The adjustable items are listed.

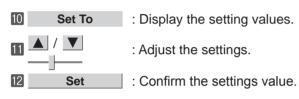
- **Description** : Display the setting items. 7
- 8 Value : Clicking the blue digits of the current setting value opens a window to change the setting value. To make the change, it is necessary to enter the password.
- : Reference information for the setting entry is displayed. 9 Notes

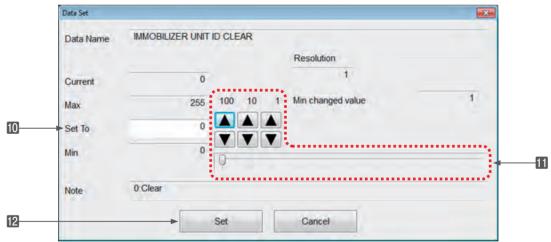
123	4 56	7	8	9	
F SMARTASSIST-Divect			/		- 6 ×
File(E) View(V) Operation	(Q) Tool(I) Help(H)		/	/	
ØSAB		/		/	
	Training 1		tive Code		
	Engine / System	Settings - Configuration			
ECU Information	Exchanges				
Diagnostic Codes.	Description	Value	Notes	ECU	
	IMMOBILIZER UNIT ID CLEAR		0:Clear	Engine	
Freeze Frame Data	DROOP LIMIT SPEED	1890		Engine	
	ISOCHRONOUS LIMIT SPEED	1890		Engine	
Diagnostic Tests	DROOP LIMIT SPEED2	1695		Engine	
	ISOCHRONOUS LIMIT SPEED2	1695		Engine	
Data Logging	HOLD SPEED1	1800		Engine	
	HOLD SPEED2	1500		Engine	
Historical Data	SLOW DOWN SPEED	1500		Engine	
	SLOW DOWN RATE1	85		Engine	
ECU Structures	SLOW DOWN RATE2	70		Engine	
	AUTO DECELERATION WAIT TIME	4		Engine	
System Settings	DROOP CONTROL SELECT		0:ISOCHRONOUS	Engine	
	ENGINE STOP DELAY TIME	30		Engine	
Configuration	The second se				
Calibration					
N.S.					
 Tuning 					
 Initial Settings 					

Figure 6-33 ECU Data Saving Screen

Subwindow







6.9.2 Sensor Correction (Calibration)

This function allows adjusting the standard position for sensors such as the accelerator position sensor.

Note When using this function, refer to the service manual and technical information of the relevant product.

Operation Toolbar

Image: Save the ECU's screen display data. (Refer to [7. Error Diagnosis Data Save and Display Functions].)

2 🔚 : Print the screen. (Refer to [6.2.2])

- 3 🔚 : Save a screenshot in BMP format. (Refer to [6.2.3])
- 4 E : Save the screen data in CSV format. (Refer to [6.2.4])

Function Buttons

5 _____: Select the displayed ECU/controller.

• Main Box

The adjustable items are listed.

- **6 Description** : Display the correction category.
- **Data** : Display the current offset quantity. Clicking opens a window to change the quantity. To apply the change, click "Set".
- 8 Notes : Display the relevant comment.

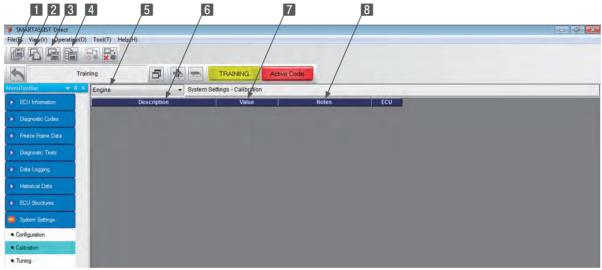


Figure 6-34 Sensor Correction Screen

Data Set	
Data Name	IMMOBILIZER UNIT ID CLEAR
Current	0 Resolution
Max	255 100 10 1 Min changed value 1
Set To	
Min	
Note	0.Clear
	Set Cancel

Figure 6-35 Example Change Screen

6.9.3 Parameter Adjustment (Tuning)

You can adjust and set all performance parameters in accordance with industry standards and Yanmar Industrial Standards.

- Example: Adjusting the engine low idle speed, torque patterns, and speed performance within exhaust gas standards
- Note When using this function, refer to the service manual and technical information of the relevant product.

• Operation Toolbar

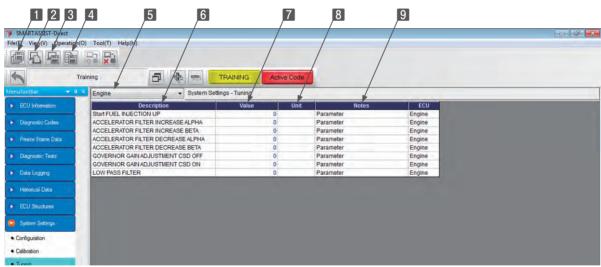
- 1 🗐 : Save the ECU's screen display data. (Refer to [7. Error Diagnosis Data Save and Display Functions])
- 2 🔁 : Print the screen. (Refer to [6.2.2])
- 3 🔚 : Save a screenshot in BMP format. (Refer to [6.2.3])
- Image: Save the screen data in CSV format. (Refer to [6.2.4])

• Function Buttons

: Select the displayed ECU/controller.

Main Box

- **6 Description** : Display the setting category.
- **Data** : Display the current parameter quantity. Clicking opens a window to change the parameters.
- 8 Unit : Display the unit.
- 9 Notes : Display the relevant comment.





Resolution	
0 1	
65535 100 10 1 Min changed v	alue 1
0	
Parameter	
F	0 1 65535 100 10 1 Min changed v 0 • • • • • • • • • • • • • • • • • • •

Figure 6-37 Example Change Screen

6.9.4 Initial Settings

This function allows to combine all feedback values of the sensor and set the ECU/controller accordingly when replacing or adjusting the ECU/controller or sensors. There are a number of types and subwindows with concrete instructions.

- Important
 Initial settings involve many items that actually operate the product. Only personnel who have taken the SMARTASSIST-Direct training may perform the test, and must pay due attention to their surroundings.
 If not, the product may move unexpectedly and cause serious accidents.
 Important
 In an emergency, turn off the power of the ECU/controller (turn the key switch to "Off") to stop the product.
 "Maintain the previous status" or "Return to the automatically controlled
 - "Maintain the previous status" or "Return to the automatically controlled status" are operations in case that the initial setting is canceled under the below conditions, but which one is set varies by product.
 - The buttons "Abort, "Stop" or "Cancel" were clicked.
 - The connection harness between the product and the PC is disconnected.
 - The SMARTASSIST-Direct software was exited.

Important Reset • Turn off the power of the ECU/controller after the initial settings are completed. (Turn the key switch to "Off".) Put the product to the initial settings with the SMARTASSIST-Direct, and the ECU/controller will change to initial settings mode. If you continue using the device in this state, the automatic control will become unoperational.

Operation Toolbar

1 🔚 : Print the screen. (Refer to [6.2.2])

[2] Fai: Save a screenshot in BMP format. (Refer to [6.2.3])

Function Buttons

: Select the displayed ECU/controller.

Main Box

3

- **Description** : Display the setting items.
- **5 Control** : Clicking the Execute button opens a window to change the parameters.
- 6 Notes : Annotation box
- **ECU** : Display the ECU.

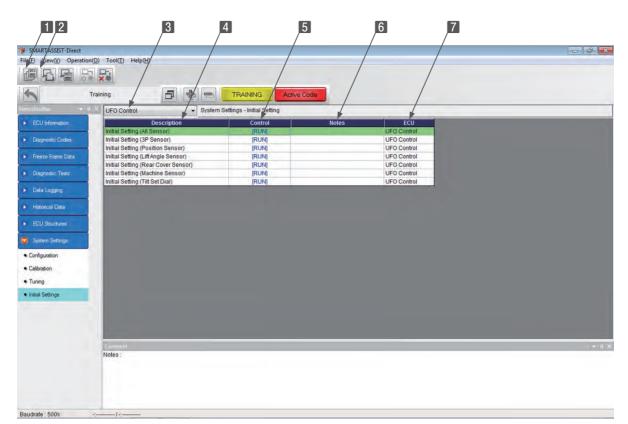
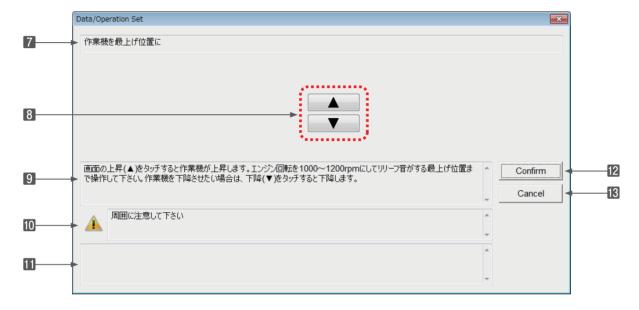


Figure 6-38 ECU Data Saving Screen

6. Error Diagnosis Function (ECU Connection)

Data Set Subwindow

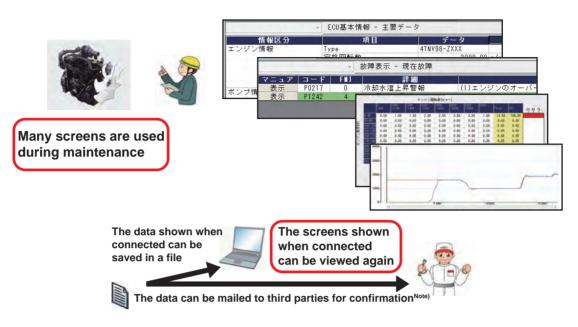
7 Data Name	: Display the name of the selected items.
8	: Display operation buttons such as Up (\blacktriangle) and Down (\triangledown).
9 Operation Message	: Display conditions set before operation.
10 Precaution Message	: If the operation is dangerous, a precaution reminder is displayed.
11 Assistance Message	: If the forced operation is unavailable, a notice is displayed.
12 Confirm	: This button is green when the operation conditions are met. Click to switch to the next screen.
13Cancel	: When aborting the initialization, the sub-window closes.



Data/Operation Set		Data/Operation Set	
fgf‰fNf*ð+\5É		ivÆr@a‰r/Œfol_AA3,*È Position Sensor Max 1.30 Current 1.30 v Min 0.70	
fgf‰fNf*ðvs.É&ŠÉu¢A‰**¢	Confirm Cancel	ŀvÆv@#₩r/Œ/o[AA8,*Ê'UʵA₩r ^a ;¢	Confirm
	+1	ЛſŴſѴӏӺӶӀ҄ZſſŢŦॐ҉∽_ÇĂ-₿ſſŴſѴӏ҉Ӻſ҄ZſſŢĬŀ₫Ÿŀ ^ĸ ҞѷӴҨ701.30V)ĖĖĂĂ¢Ũ!лВŒӿŶĨ ⁹ Ха̀₩А¬ЦТТаЕЕ&æ∞Е ⁺ ®µĂ‰?;¢В	*
Example Screen 1		Example Screen 2	

7. Error Diagnosis Data Save and Display Functions

7.1 Error Diagnosis Data Save and Display Functions



Note It is necessary to import/export the data management function.

The ECU storage data for error diagnosis screen display and the three types of measurement execution data can be saved.

• Displaying the Error Diagnosis Screen

ECU Storage Data

Measurement Execution Data

Forced Operation (Graph)

Forced Operation Hysteresis (Graph)

Data Logging

Note For display, only the save data in the product category selected in the start menu can be selected.

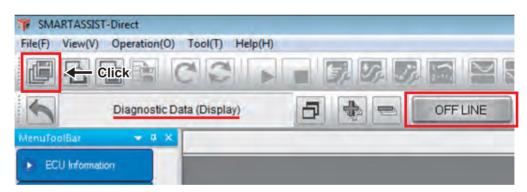
Example: Even a user with a license for both agricultural machinery and construction machinery cannot display the save data for "Construction Machinery" when "Agricultural Machinery" is selected in the start menu.

7.2 Saving the ECU Data for Screen Display

1 If the product allows selecting the screen display method of the error diagnosis, the content of the data to be saved is different depending on the selected screen display method.

CU Access		
Data Rate		
Function Select	Engine	Sort By Function
ECU Search		Sort By I direction
Session	Adjustment Session	Save the connected ECU's
	O Development Session	screen display data.
	Start Cancel	
CU Access		
CU Access Data Rate	@ 250k 0 500k	
CU Access Data Rate ECU Application	© 250k © 500k	Sort By ECU
Data Rate		Sort By ECU
Data Rate ECU Application	00:Engine 🔹	Save the selected ECU's
Data Rate ECU Application ECU Search	00:Engine • Ecu Mode • Func Mode • • •	

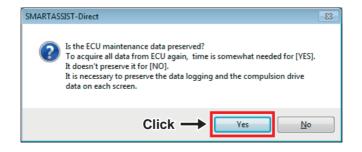
2 Click the "Save ECU Storage Data" button after executing the error diagnosis.





The save confirmation screen is displayed.

Click "Yes" to save the data.



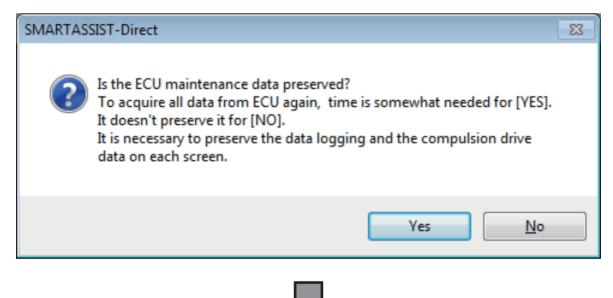
The memo entry screen is displayed.

Enter a memo and click "OK".

	ОК	
Entry possible in single-byte and double-byte characters	Cancel	
4		

Point Even if you select "Cancel" in the memo screen, the error diagnosis data is saved. You can edit the memo with the data management function after saving the data.

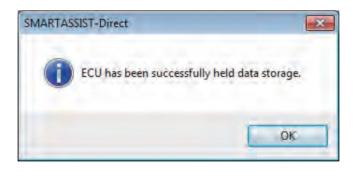
The communication with the product starts and the data is collected and saved.





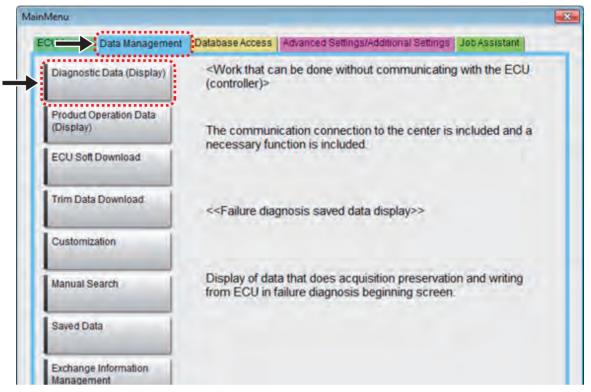






7.3 Displaying the Saved ECU Display Data

Select "Diagnostic Data (Display)" of the tab "Operations with ECU Disconnected".



The ECU storage data for screen display and the three types of the diagnosis execution result selection screen are displayed.

1 Select the data type "ECU Storage Data".

2 Machine model selected in the main menu at the time of saving

3 Model

4 Machine number

5 Date when data was saved

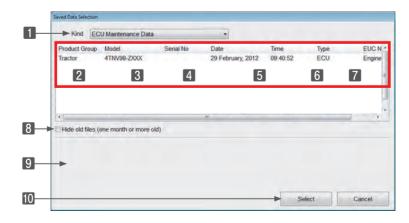
6 Display class ("By Function" or "By ECU") selected at the time of saving

ECU name of the original data

8 Display selection for the data saved more than 1 month ago

9 Memo display box at the time of saving

10 Selection button



Remark

Click **2** - **7** within the red frame and change the sorting order (ascending/descending) of the display. Select the data you want to display and click the "Select" button.

			•			
Product Group	Model	Serial No	Date	Time	Туре	EUC N
Tractor Tractor Tractor	4TNV98-ZXXX EG326Y EG326Y		29 February, 2012 28 February, 2012 28 February, 2012	09:40:52 17:29:27 17:29:56	ECU Function Function	Engine Engine Engine
_	one month or more of of the sele		" is displayed.			•
Memo	o of the sele	cted data i	is displayed.			

The error diagnosis data screen appears.

Open the item that you want to confirm. The saved information is displayed.

Diagnost	lic Data (Display)		RIPA	Param Filter D Ra		
	tic Data (Display)					
		Ð		OFF LINE No Codes		
	x	Carried S				
			_			
ECU Information						
				×		
2				•		
	Same and a la		n.			
Diagnost	tic Data (Display)	Ð	÷.	OFF LINE No Codes		
	and the second se	Ð	-	OFFLINE No Codes		
	and the second se	5	1.000	OFF LINE No Codes		
enuToolBat 🔷 🗸		5	1.000			
enuToolBat 🔷 🛡		5	1.000			
enuTool6at 🔹 🕫		Code	1.000		OC	First
enuToolBat 🔹 🗣	All ECU Clear Active		• Di	lagnostic Codes - Logged DTC	OC 3	First 57.70
ECU Information	All ECU Clear Active	Code	← Di	lagnostic Codes - Logged DTC. Description		
enviroolBat d ECU Information Diagnostic Codes Active DTC	All ECU Clear Active	Code P0217	Di FMI 0	Description Engine Coolant Temperature : Too High	3	57.70
enuToolSar • 0 ECU Information Diagnostic Codes Active DTC	All ECU Clear Active	Code P0217 P1242	▼ Di FMI 0 4	Description Engine Coolant Temperature : Too High Cold Start Device : Circuit fault A	3	57.70 34.00
eruiToolSar - 0 ECU Information Diagnostic Codes Active DTC Logged DTC	X All ECU	Code P0217 P1242 P1202	 Di FMI 0 4 4 	Description Description Engine Coolant Temperature : Too High Cold Start Device : Circuit RauthA Engine Fuel Rack Position Sensor : Shorted to low source	3 4 5	57.70 34.00 40.00
enuitoniliaer - 0 ECU Information Diagnostic Codes Active DTC Logged DTC	X All ECU	Code P0217 P1242 P1202 P0118	 Di FMI 0 4 4 	Description Engine Coolant Temperature : Too High Cold Start Device : Circuit fault A Engine Fuel Rack Position Sensor : Shorted to low source Engine Coolant Temperature Sensor : Shorted to high source	3 4 5 1	57.70 34.00 40.00 122.75
envitobiliar • 0 ECU Information Diagnostic Codes Active DTC Logged DTC DTC Information List	X AllECU	Code P0217 P1242 P1202 P0118 33 79	 Di FMI 0 4 4 	Description Engine Coolant Temperature : Too High Cold Start Device : Circuit fault A Engine Coolant Temperature Sensor : Shorted to high source Engine Coolant Temperature Sensor : Shorted to high source ="vit"-f_ff,f'Ui -scEr/Ui	3 4 5 1 3 1	57.70 34.00 40.00 122.75 400.00 604.00
enuToolBa: 🔹 🕫	Clear Active	Code P0217 P1242 P1202 P0118 33 79 32	 Di FMI 0 4 4 	Description Engine Coolant Temperature : Too High Cold Start Device : Circuit faultA Engine Fuel Rack Position Sensor : Shorted to low source Engine Coolant Temperature Sensor : Shorted to high source -**i*-rfCf_f_:'Ui -*sCBr'Ui Záf/C5/0[72/f_1*Ui	3 4 5 1 3 1 4	57.70 34.00 40.00 122.75 400.00 604.00 30.00
erruToplBat • 7 ECU Information Diagnostic Codes Active DTC Logged DTC DTC Information List Freezo Frame Data	X AHECU	Code P0217 P1242 P1202 P0118 33 79 32 62	 Di FMI 0 4 4 	iagnostic Codes - Logged DTC Description Engine Coolant Temperature : Too High Cold Start Device : Circuit fault A Engine Coolant Temperature Sensor : Shorted to high source Engine Coolant Temperature Sensor : Shorted to high source 	3 4 5 1 3 1	57.70 34.00 40.00 122.75 400.00 604.00
erwToolSat • 0 ECU Information Diagnostic Codes Active DTC Logged DTC DTC Information List	Clear Active	Code P0217 P1242 P1202 P0118 33 79 32	 Di FMI 0 4 4 	Description Engine Coolant Temperature : Too High Cold Start Device : Circuit faultA Engine Fuel Rack Position Sensor : Shorted to low source Engine Coolant Temperature Sensor : Shorted to high source -*Ni*-f_f(f,f;U)i -*sCEn'Ui Zár(f5(0;Zf;f;T)Ui	3 4 5 1 3 1 4	57.70 34.00 40.00 122.75 400.00 604.00 30.00

To change the save data that you want to display, click the "Read ECU Save Data" button. The data selection screen is displayed.

File(F) V	/iew(V) Operation(O)	Tool(T) He	lp(H)								
ø	Click	de		1 Gp	5. 5.	1	\mathbb{M}		Filter Set	52	
6	Diagnostic D	ata (Display)	5	7 4		OFF	LINE	No Cod	les		

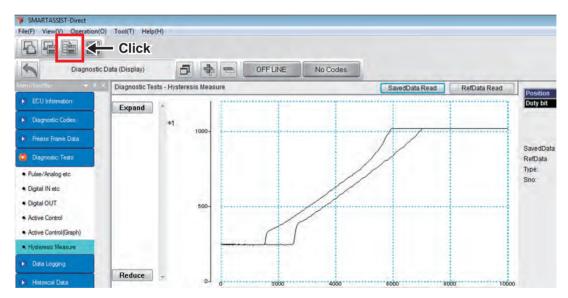
7.4 Saving the Forced Operation and Forced Operation Hysteresis Measurement Execution Data

The "Forced Operation" function allows to save the measurement data for items with "Graph" output.

Diagnostic	Data (Display)	Ð		OFF LINE No Codes						
tuToolBar 🚽 🗸 🗴	Engine		Diagnostic Te	ests - Active Control		-		-		
ECU Information	-	Control		Description	ENG Run	Measured	Desired	Unit	Graph	EC
Diagnostic Codes I	Manual	Stop button [STOP]	Run button [RUN]	DIRECT ENGINE RPM CONTROL	reg			r/min		ingine
Diagnosic Codes	Ö	[STOP]	[RUN]	DIRECT RACK POSITION CONTROL	not			1/mm		ingin
Freeze Frame Data	ŏ	[STOP]	[RUN]	AUTO HYSTERESIS MEASUREMENT	not					ingin
	ŏ	(STOP)	[RUN]	LOW IDLE RACK POSITION AUTO TUNING	reg					ingin
Diagnostic Tests	ŏ	[STOP]	IRUNI	HIGH IDLE RACK POSITION AUTO TUNING	reg					Engin
	Õ	[STOP]	[RUN]	DIRECT EGR VALVE CONTROL	not					Engine
Pulse/Analog etc	Ō	[STOP]	[RUN]	ENGINE LOAD MONITOR OUTPUT	not			%		Engin
Digital IN etc										
Digital OUT										
Didital UUT										
Active Control										

Click the "Save Measurement Data" button on the "Forced Operation Graph" or "Forced Operation Hysteresis Graph" screen after executing the forced operation.

When the graph is not displayed, you cannot click the button.



The save confirmation screen is displayed.

Click "Yes" to save the data.



The memo entry screen is displayed.

Enter a memo and click "OK".

mo edit		
-	ОК	Clic
Entry possible in single-byte and double-byte characters	Cancel	
-		

Point Even if you select "Cancel" in the memo screen, the measurement data is saved. You can edit the memo with the data management function after saving the data.

7.5 Displaying the Saved Forced Operation and Forced Operation Hysteresis Measurement Execution Data

7.5.1 Displaying the Data

Select "Diagnostic Data (Display)" of the tab "Operations with ECU Disconnected".

Data Management	Database Access Advanced Settings/Additional Settings Job Assistant
Diagnostic Data (Display)	<work (controller)="" be="" can="" communicating="" done="" ecu="" that="" the="" with="" without=""></work>
Product Operation Data (Display)	The communication connection to the center is included and a
ECU Soft Download	necessary function is included.
Trim Data Download	< <failure data="" diagnosis="" display="" saved="">></failure>
Customization	
Manual Search	Display of data that does acquisition preservation and writing from ECU in failure diagnosis beginning screen.

The ECU storage data for screen display and the three types of the diagnosis execution result selection screen are displayed.

Select the data types "Forced Operation Data" and "Forced Operation Hysteresis Data".

2 Machine model selected in the main menu at the time of saving

3 Model

4 Machine number

5 Date when data was saved

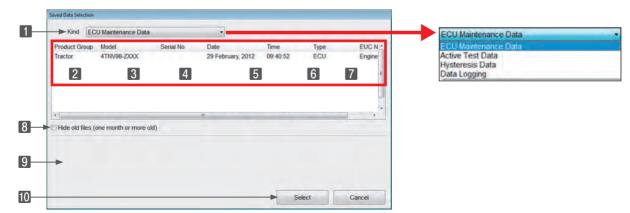
6 Display class ("By Function" or "By ECU") selected at the time of saving

7 ECU name of the original data

8 Display selection for the data saved more than 1 month ago

9 Memo display box at the time of saving

10 Selection button



Point Click 2 - 7 within the red frame and change the sorting order (ascending/descending) of the display. The error diagnosis data (view) screen appears after selecting the data. Open "Forced Operation Graph" and "Forced Operation Hysteresis Graph" of "Diagnosis Test" and check the content.

enuToolBat 🔷 🗸		FLINE No Codes	
ECU Information			
	_	-	
		7	
enufoolSer 🔫 🖗	Diagnostic Tests - Hysteresis Measure	Sa	vedData Read RefData Read
			Reit/dia Reau
ECU Information	Expand		ReiDala Reau
	Expand *		Reibala Reau
ECU Information Diagnostic Codes Freeze Frame Data			Reludid Redu
Diagnostic Codes Freeze Frame Data	*1		
Diagnostic Codes Fresze Frame Data Diagnostic Tests	*1		
Diagnostic Codes Freeze Frame Data Diagnostic Tests Pulse/Analog etc	*1		
Diagnostic Codes Freeze Frame Data	*1		

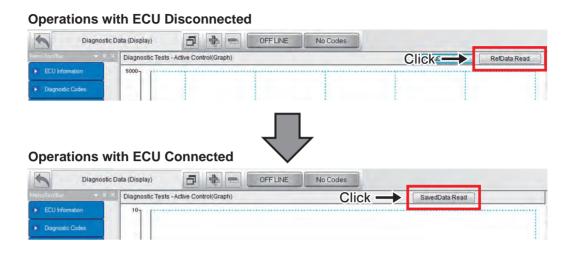
To change the save data that you want to display, click the "SavedData Read" button. The data selection screen is displayed.

SMARTASSIST-Direct							
File(F) View(V) Operation(O)	Tool(T) Help(H)						
Diagnostic D:	ata (Display)		OFFLINE	No Codes			
Menufool5ar 🚽 🕫 🛪	Diagnostic Tests	Active Control(Graph	1)	CI	ick →	SavedData Read]
ECU Information	107						
			$\overline{\mathbf{n}}$				
Forced Drive H	lysteres	is Graph	$\overline{\mathbf{v}}$				
Forced Drive H	lysteres	is Graph	$\overline{\mathbf{v}}$				
SMARTASSIST-Direct	Hysteres	is Graph	$\overline{\mathbf{v}}$				
SMARTASSIST-Direct		is Graph	$\overline{\nabla}$				
SMARTASSIST-Direct File(F) View(V) Operation(O)	Tool(T) Help(H)			No Codes	1		
SMARTASSIST-Direct File(F) View(V) Operation(O)	Tool(T) Help(H) ata (Display)			No Codes	SavedD	hata Read	

Forced Operation Graph

7.5.2 Calling Up the Reference Data

If the save data is on your PC, call up the "RefData" after "Execute Measurement" or "SavedData Read" to match the data.



Point • The reference data is displayed in a different line color.

 "RefData Read" can be selected in the tab screen "ECU Connection" in the main menu.

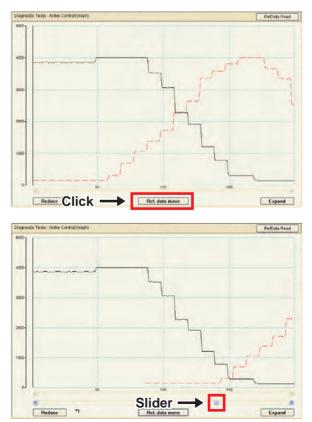
7.5.3 Moving the Display Location of the Reference Data

The "Reference Data" in the overlap display can be moved horizontally.

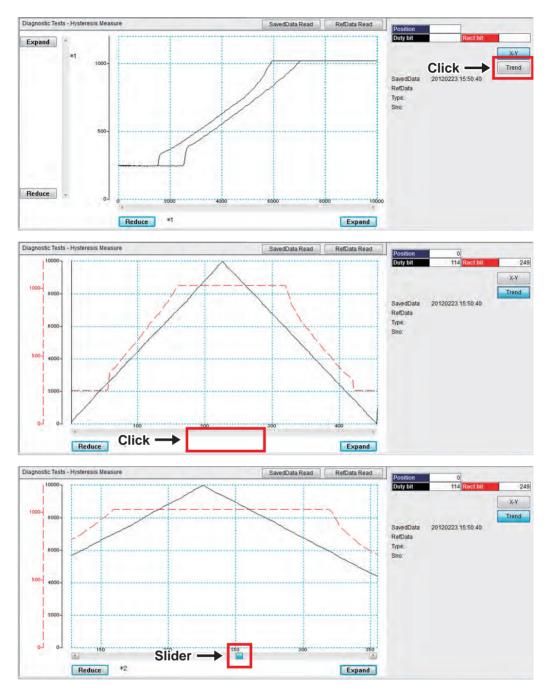
Use this to compare characteristic parts of the data.

Remark In the "Forced Operation Hysteresis Graph", the "Reference Data" can be moved with the "Trend Graph" display.

Forced operation graph: example of moving the reference data horizontally







7.6 Saving the Data Logging Measurement Data

The data logging function allows to save the measurement data in the "Data Monitor" or "Trend Graph" screen.

1 Click the "Save Measurement Data" button.

le(F) View(V) Operation(O)	Tool(T) Help(H)					
					_	
Diagnostic	ata (Display) 🗗 🤹 💿 Of	FLINE	No	Code	S	
	- Data Logging -	Data Monitor	(Finishe	[be	_	
ienuTool6er 🔷 🛡 🎗						
ECU Information	Description	Value	Max	Min	Unit	Notes
	Description 63770:ENGINE SPEED(ES)	Value 0	Max 0	Min 0	Unit r/min	Notes Parameter

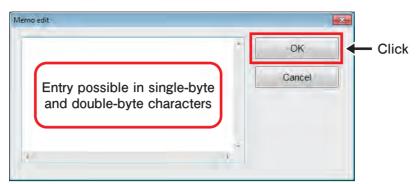
2 A screen is displayed to confirm that you want to create a user settings file for the measurement data. ^{Note)} Click "No" to only save the measurement data.



- When the package data set is performed on the "Diagnosis Selection Window", this screen is not displayed.
 - For details on creating the user settings file, refer to "User Settings for Package Data".
- **3** The confirmation screen for saving the measurement data is displayed. Click "Yes".

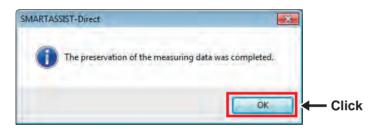


- 7. Error Diagnosis Data Save and Display Function
- 4 The memo entry screen is displayed. Enter a memo and click "OK".



Point Even if you select "Cancel" in the memo screen, the measurement data is saved. You can edit the memo with the data management function after saving the data.

5 The Save Complete screen is displayed. Click "OK".



7.7 Displaying the Saved Data Logging Measurement Data

7.7.1 Displaying the Save Data

Select "Error Diagnosis Data (View)" of the tab "Operations with ECU Disconnected".

Diagnostic Data (Display)	Database Access Advanced Settings/Additional Settings Job Assistant <work be="" can="" communicating="" done="" ecu<="" th="" that="" the="" with="" without=""></work>
	(controller)>
Product Operation Data (Display)	The communication connection to the center is included and a
ECU Soft Download	necessary function is included.
Trim Data Download	< <failure data="" diagnosis="" display="" saved="">></failure>
Customization	
Manual Search	Display of data that does acquisition preservation and writing from ECU in failure diagnosis beginning screen.
Saved Data	
Exchange Information Management	
	StartMenu

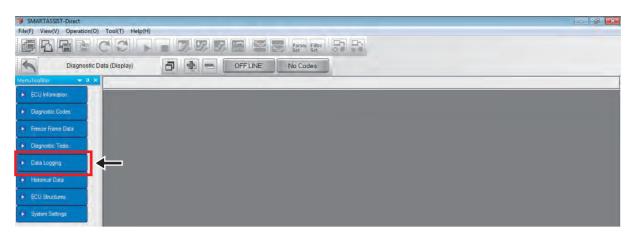
Click the "Display Reference Data" button. The selection screen appears. Select the save data that you want to display.

- **1** Select the "Data Logging" data type.
- 2 Product category selected in the main menu at the time of saving.
- 3 Model
- 4 Machine number
- 5 Date when data was saved
- 6 Not displayed
- **7** ECU name of the original data
- 8 Display selection for the data saved more than 1 month ago
- 9 Memo display box at the time of saving
- 10 Selection button

Product	Group M	lodel	Serial No	Date	Time	Туре	EUC N
Tractor 2		3 3		29 February, 2012	13:08:18 5	6	Engine 7
							-
Hide old	files (one	e month or more o	old)				-

The error diagnosis data (view) screen appears after selecting the data.

Open the data logging menu and confirm the content.



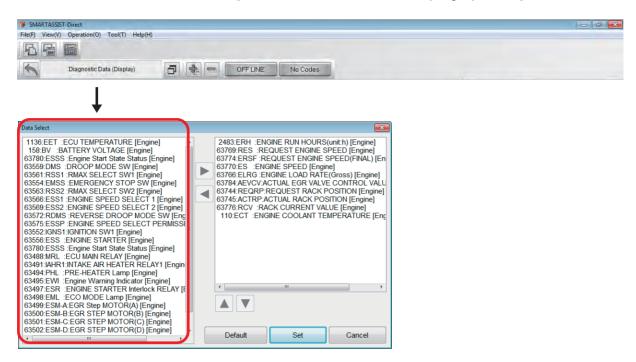
Diagnos	tic Data (Display) 🗗 🖶 🥌 OFF	LINE	Diagnostic	Data (Display)	3 4 -	OFF LINE
1 utor 📼 1)	Data Logging - Da	ata Monitor [Finish	MenuTopiSan 🔶 🗰 🗧	Data Logging - Recor	rded Data	*
ECU Information	Description	Value Max	ECU Information	Monitor Start Time	29-Feb-2012 1	4:29:17
Diagnostic Codes	2483:ENGINE RUN HOURS(unit.h)(ERH) 63769:REQUEST ENGINE SPEED(RES) 63774:REQUEST ENGINE SPEED(FINAL)(ERSF)	2 2 1036 2030 1031 2030	► Diagnostic Codes	No.[Time] 1 [00:00:01.	.800]	
Freeze Frame Data	63770:ENGINE SPEED(ES) 63766:ENGINE LOAD RATE(Gross)(ELRG)	1609 2096 0 95	Freeze Frame Data	2 [00:00:01. 3 [00:00:02.	.000]	
Diagnostic Tests	63784:ACTUAL EGR VALVE CONTROL VALUE(AEVCV) 63744:REQUEST RACK POSITION(REQRP)	246 752	Diagnostic Tests	5 [00:00:02.	.200]	
Data Logging	63745:ACTUAL RACK POSITION(ACTRP) 63776:RACK CURRENT VALUE(RCV)	241 743 1134 3253	Data Logging	7 [00:00:02	.400]	
Recorded Data	110:ENGINE COOLANT TEMPERATURE(ECT)	21 25	Recorded Data	9 [00:00:02.	.600]	
Trend Graph			Trend Graph	11 [00:00:02.	.800]	
Historical Data			Historical Data	13 [00:00:03.		
ECU Structures			ECU Structures		Min	
System Settings			System Settings			
				Comment		
	Model and serial nu	mber of the s	elected			
	dz B3784.ACTUAL EGR VALUE CONTROL VALUE(AEV(XV) 0 51 B3784.ACTUAL EGR VALUE CONTROL VALUE(AEV(XV) 0 51 B374.ACTUAL EGR VALUE CONTROL VALUE(AEV(XV) 111 743 B37578ACK CURRENT VALUE(RCV) 1134 3253 110 ENGINE COOLANT TEMPERATURE(ECT) 21 25 P 000:00.22:001 100:00:00.2000 100:00:00.2000 100:00:00:2000 100:00:00:2000 100:00:00:2000 110:ENGINE COOLANT TEMPERATURE(ECT) 21 25 P 00:00:00:2000 110:00:00:2000 100:00:00:2000 10:00:00:2000 110:00:00:2000 110:00:00:2000 10:00:00:2000 110:00:00:2000 110:00:00:2000 11:00:00:00:2000 110:00:00:2000 13:00:00:00:00 11:00:00:00:2000 13:00:00:00:00 Max 11:00:00:00:00 Max Max 11:00:00:00:00 Max Max <td></td> <td></td>					
	\downarrow					

Data monitor screen

Save data screen

In the saved measurement data, not only the display items at the time of storing but all logging data is included. The displayed data can be changed by clicking the "Data Settings" button.

For details on the selection screen, refer to [6.6.2 Overview of the Data Sampling Operation].



Point Items that are not displayed in the data selection box cannot be saved.

To change the save data that you want to display, click the "SavedData Read" button on the trend graph screen. The data selection screen is displayed.



Trend graph screen

7.7.2 Calling Up the Reference Data

If the save data is on your PC, read the "Reference Data" after "Execute Measurement" or "SavedData Read" to sort the data vertically.

Operations with ECU Disconnected

Diag	nostic Data (Display)	5 4 -	OFF LINE No Codes		
MenuToolBar	Data Logging - 1	rend Graph		Click	RefData Read

Operations with ECU Connected

💱 SMARTASSIST-Direct		
File(F) View(V) Operation(O) Tool(T) Help(H)		
Diagnostic Data (Display)		
MenuToolBar • a × Data Logging - Trend Graph	Click	RefData Read

Point "RefData Read" can be operated on the "Error Diagnosis (Execution)" screen in the tab "ECU Connection" in the main menu.

Click the "Display Reference Data" button. The selection screen appears. Select the save data that you want to display.

1 Select the "Data Logging" data type.

2 Machine model selected in the main menu at the time of saving

3 Model

4 Machine number

5 Date when data was saved

6 Not displayed

7 ECU name of the original data

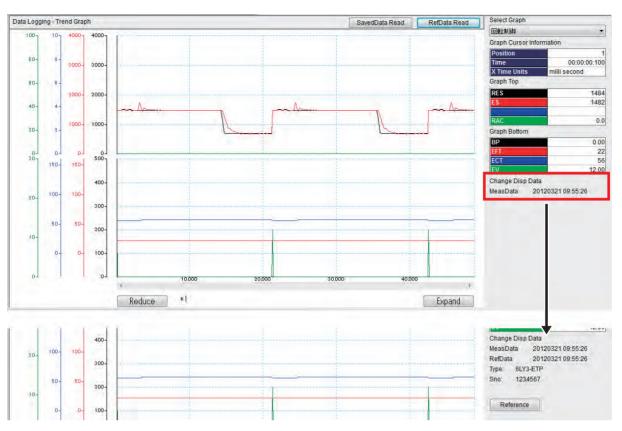
8 Display selection for the data saved more than 1 month ago

9 Memo display box at the time of saving

10 Selection button

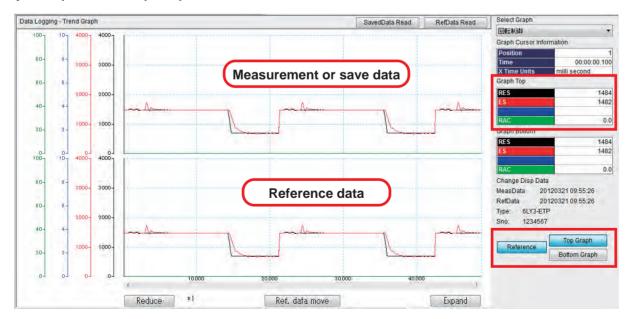
-	Froduct Group	ta Logging Model 4TNV98-ZXXX	Serial No	Date 29 February, 2012	Time 13:08:18	Туре	EUC Na Engine
	2	3		4	5	6	7
	*						
-	Hide old files (one month or more o	ld)				
-							

Point Click 2 - 7 within the red frame and change the sorting order (ascending/descending) of the display.



The reference data and the "Comparison Display" button appear.

Click the "Comparison Display" button. The "Top Graph" and "Bottom Graph" buttons appear. Select the graph (top or bottom) for the comparison display.



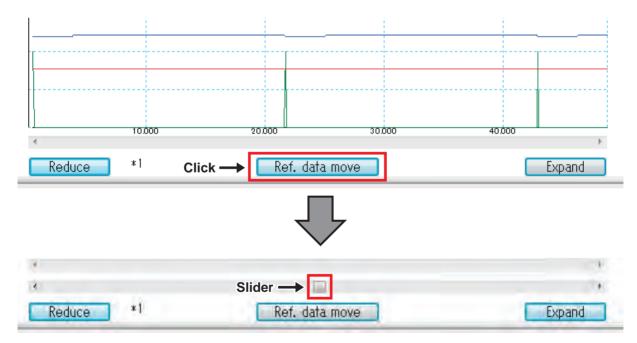
Display example when "Top Graph" is clicked

ta Logg	ing - Tre	nd Grap	n		SavedData Read	RefData Read	Select Graph	
30-			500-		(Contraction of the second		回転制御	
	150-	150-					Graph Cursor Infor	mation
							Position	
			400-				Time	00:00:00.1
20-	100-	100-		Measurement or s	ave data		X Time Units	milli second
			300-				Graph Top	_
	50-	50-					BP	0.
	50-	00-	200-				EFT	
10-							ECT EV	12.
	0-	0-	100-				Graph Bottom	12.
							BP	0.
	1.1						EFT	0.
30-	and I	- and	500				ECT	
	150-	150-					EV	12
			400-				Change Disp Data	
	100-	100-		Reference d	ata		MeasData 20	120321 09:55:26
20-			300-		ulu		RefData 20	120321 09:55:26
			000-				Type: 6LY3-ETF	,
	50-	50-					Sno: 1234567	
10-			200-				100 million (100 million)	(
							Reference	Top Graph
	0-	0-	100-					Bottom Graph
								£
01			0	10,000 20,000 300	40,000			
			×		(m			
			Reduc	ce *1 Ref. data move		Expand		
			Neuron	Ner, udia move		L'und		

Display example when "Bottom Graph" is clicked

7.7.3 Moving the Display Location of the Reference Data

The display location of the graph for the "Reference Data" (bottom graph) can be moved horizontally. Use this to compare characteristic parts of the graph.





Example of horizontal movement for the bottom graph

To change the data that is displayed in a graph, refer to "[8. SCIB Graph Function]".

8. SCIB Graph Function

The graph display and basic operation function have the common specification on the screen as shown below.

- "Data Before/After Error" "Trend Graph"
- "Diagnosis Test" "Forced Operation Graph" "Forced Operation Hysteresis Graph"
- "Data Logging" "Trend Graph"

8.1 Graph Settings

The graph settings have the following characteristics:

• With the and buttons on the control tool bar, the two graph screens on the top and the bottom can be set, respectively.

F SMARTASSIST-Direct	WARTASSIST-Direct	📅 SMARTASSIST-Direct
File(F) View(V) Operation(O) Tool(T) Help(H)	File(F) View(V) Operation(O) Tool(T) Help(H)	File(F) View(V) Operation(O) Tool(T) Help(H)
Figure 8-1 Data Before/After Error	Figure 8-2 Diagnosis Test	Figure 8-3 Data Logging

Note In "Diagnosis Test" of "Forced Operation Graph" "Forced Operation Hysteresis Graph", the graph is displayed on one screen.

- Four line graphs can be displayed in one graph.
- "Analog mode" or "Digital mode" can be selected in the graph display.

Point The separate mode can be set for the top and the bottom screens.

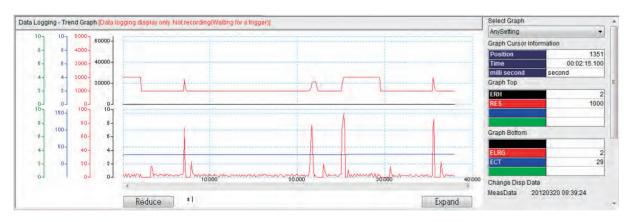


Figure 8-4 Graph display example (top: digital, bottom: analog)

• You cannot display the combination of analog/digital data within the same graph screen.

- The minimum and maximum graph values can be set in the analog mode.
- The content of the graph settings can be saved as the user settings file. The graph settings can be called up for problem analysis.
- Click the "Editing" button to perform the graph settings.

Graph Set			
Graph	Тор	 Display Mode ○ Digital (ON/OFF) 	Default File Open Editing Select Set
No.	Data Select	100 10 1	100 10 1
1 ERH	ENGINE RUN HC)URS(unit:h):h [Engine]	·
	Min 0		Max 64255
			Y
2 RES	REQUEST ENGI	NE SPEED:r/min [Engine]	
	Min 0		Max 5000
			· · · · · · · · · · · · · · · · · · ·
3 ERSF	REQUEST ENG	INE SPEED(FINAL):r/min [Engine	e] •
	Min 0		Max 5000
			· · · · · · · · · · · · · · · · · · ·
4 ES :	Min 0 A A - Max 5000 ENGINE SPEED :r/min [Engine] •		
	Min 0		Max 5000
			· · · · · · · · · · · · · · · · · · ·
		File	Save SET Cancel

Figure 8-5 Graph settings screen

8.1.1 Analog Mode Basic Operation

The basic operation in the analog mode is as follows:

		5
1 Graph to be set	:	"Top" and "Bottom" are displayed.
		In case of the screen with only one graph, the "Top" is displayed.
2 Analog mode selection	:	Click • Analog of the display mode to insert a checkmark.
3 Default	:	All items are automatically set to the default SMARTASSIST-Direct settings.
4 Read file	:	The saved settings are read.
		(Refer to [8.1.3 Saving and Calling Up the Settings Value] on page 165.)
5 Data selection	:	Select the data that you want to display. Set up to 4 data sets.
6 Minimum value	:	Set the minimum graph value with the lever button and \blacktriangle / \checkmark buttons.
7 Maximum value	:	Set the maximum graph value with the lever button and ▲ / ▼ buttons.
8 Saving files	:	Save the entered values to the settings file.
		(Refer to [8.1.3 Saving and Calling Up the Settings Value] on page 165.)
9 Set	:	Set the entered values and display the graph.

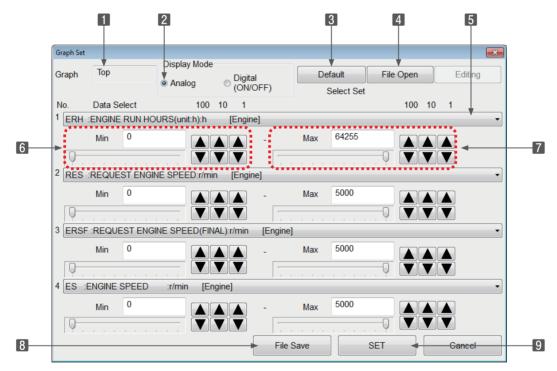


Figure 8-6 Analog mode basic operation screen

Click **5** to display the selectable data items.

1	ERH :ENGINE RUN HOURS(unit:h):h [Engine]
	ERH :ENGINE RUN HOURS(unit.h):h [Engine] RES :REQUEST ENGINE SPEED:r/min [Engine]
2	ERSF:REQUEST ENGINE SPEED(FINAL):r/min [Engine] ESS :ENGINE SPEED :://min [Engine]
2	ELRG: ENGINE LOAD RATE(Gross): [Engine] AEVCV:ACTUAL EGR VALVE CONTROL VALUE: [Engine]
	REQRP:REQUEST RACK POSITION: [Engine]
3	RCV :RACK CURRENT VALUE :mA [Engine] ECT :ENGINE COOLANT TEMPERATURE:degC [Engine]
Ĭ	EET :ECU TEMPERATURE :degC [Engine] BV :BATTERY VOLTAGE :V [Engine]
	ESSS :Engine Start Status: [Engine]

8.1.2 Digital mode

Use this mode to display the ON/OFF information of digital input/output and control flag. The available data can be confirmed at the ECU ID ([6.8.2 Digital Signal (Expert Function)] on page 129).

Point As the graph is displayed in "0" or "1" in the digital mode, it is not required to set the minimum/maximum values. (Unable to enter.)

- Digital mode : Click Digital of the display mode to insert a checkmark.
- 2 Data selection : Select the data that you want to display. Set up to 4 data sets.
- **3** Settings confirmation : **Set** Click the button to confirm the settings and display the graph.

Saving the file and opening operation can be performed in the same procedures as the analog mode. (Refer to [8.1.3 Saving and Calling Up the Settings Value] on page 165.)

		0		2
Graph Set				
Graph	Тор	Digital	CCV.	File Open Editing
No. 1	Braph Top Display Mode Analog Digital (ON/OFF) Select Set No. Data Select 100 Min Min			
	aph Top Display Mode Analog Digital ON/OFF Select Set Nin Min			
2				
3				Select Set 100 10 Max Image: Constraint of the second s
	Min		- Max	
4	Min			
			File Save	SET Cancel

Figure 8-7 Digital mode screen

8.1.3 Saving and Calling Up the Settings Value

The content of the graph settings can be saved and called up later.

Note This function is different from the user settings of [6.6.7 Package Data Set].

Saving the Settings Vvalue

- Opening the graph settings screen : Click the is or button of the operation toolbar to open the subwindow.
- Open the Save File screen : Click the "Save File " button in the bottom of the graph settings subwindow to open the save screen.

Point To save the graph settings after the error diagnosis, click the **B** "Edit" button on the top right, and then click the "Save File" button.

4 Saving files

: Save the file with a name that you can easily remember or search for. You can save the data to any location, but do not change the ".gset" file extension.

	Terr	Display Mode						1	_
Graph	Тор	Analog	Digita	al	Det	ault	File Open	Editing	-
		 Analog 	© (ON/	OFF)	S	Select Set			
No.	Data Select	100	10 1				100 1	0 1	
1 ERH	ENGINE RUN H	OURS(unit:h):h	[Engin	ie]					•
	Min 0			-	Max	64255			
0									
2 RES		INE SPEED:r/mir	n [Engii	nel					•
				-		5000			
	Min 0			-	Max	5000			
0									
3 ERSF	REQUEST EN	GINE SPEED(FIN	AL):r/min	[Er	igine]				•
	Min 0				Max	5000			_
				-	Wax	5000			
ļ 0 .									
4 ES :	ENGINE SPEED	:r/min [En	gine]						•
	Min 0			-	Max	5000			
0									
					File Save		SET	Cancel	
				T	The Save		JLI	Cancer	

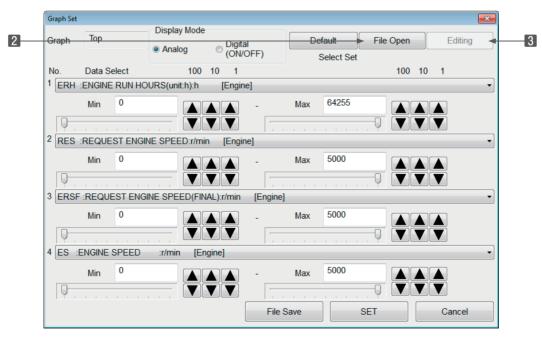


🌾 Save As		
🔾 🗢 🔳 Desktop 🔸	+ + ₂	Search Desktop
Organize 👻 New folder		
Favorites	Libraries System Folder	
Recent Places	YTSK System Folder	
Computer	Computer System Folder	
🏝 ローカルディス·	Network System Folder	
File name: igset		
Save as type: Graph set File(*.gset)	
Hide Folders		Save Cancel

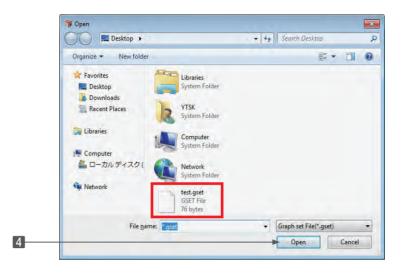
Calling Up the Settings Value

1 Opening the graph settings screen	Click the 🔛 or 🥃 button of the operation toolbar to open the subwin-
	dow.
2 Open File screen	After the operation of 1, click the File Open button in the upper
	right of the subwindow to open the file open screen.
Point To save the	ne graph settings after the error diagnosis, click the 🕄 "Ed-
iting" but	ton on the top right, and then click the "Save File" button.
4 File Selection	: Select the file name displayed in the subwindow and click the Open

Select the file name displayed in the subwindow and click the Ope button to automatically insert the saved graph setting value.

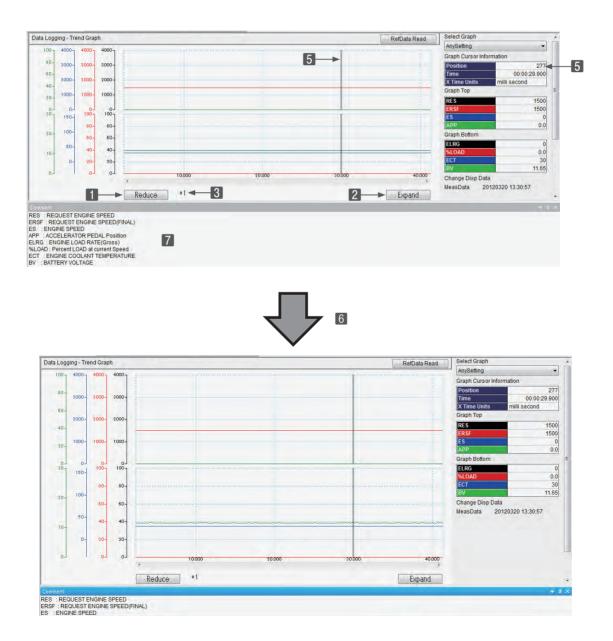






8.2 Graph Control

1 Minimize the time axis	Click the Minimize button to minimize the time axis and see the approximate
	tendency of the data transition. The display scale factor is shown in the right
	side of the button. "*1" is the smallest minimize value.
2 Expand the time axis	: To look at a part of the graph in detail, click the Expand button to expand.
	The maximum scale factor is 10.
3 Scale factor of the time axis	: It is possible to change the scale factor to 1, 2, 4, 6, 8, and 10.
4 Moving the window	: The display range of the enlarged graph can be moved with the scroll bar.
5 Moving the cursor and	: Click on the graph to move the cursor and the cursor value box is displayed
checking the values	for the data value of that point.
6 Expand/minimize the y-axis	: Drag the comment box to the top to widen it, and expand/minimize the y-axis.
7 Comment box	: The full name of the data displayed in the graph is displayed.



• Display color of the graph

The background color **1** for each cursor value box is displayed in the common color as the display color of the data value scale and the line color **2** of the line graph.

Data selection No.	Cursor value box	Line graph	Scale of data value	
Background color		Line color	Display color	
1	Black	Black	Black	
2	Red	Red	Red	
3	Blue	Blue	Blue	
4	Green	Green	Green	

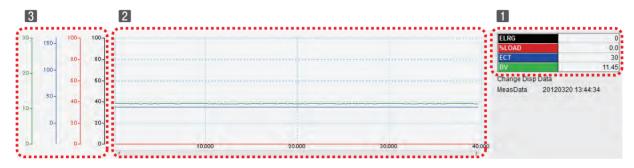


Figure 8-8 Graph Control Screen

9. Manual Link Function

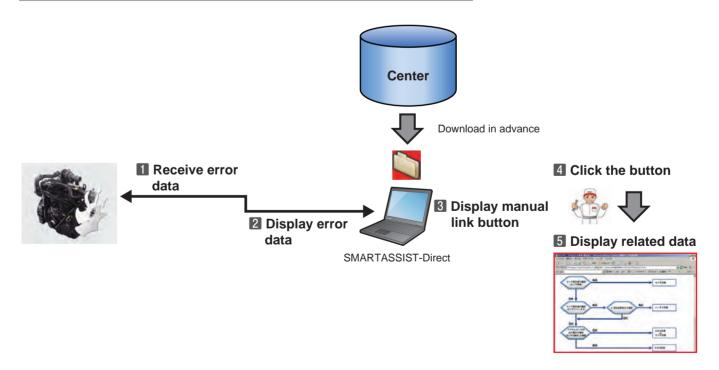
Manual link is the current error screen for the error diagnosis (execution) function. By clicking the defect display item, this function allows you to link to the data related to maintenance and service.

With this function, service personnel can promptly obtain the corresponding data for the defect (failure).

ile(F) View(V) Operatio		Help(H)			
Diagnost	ics (Execution)	E	7	S 🚍 ON L	INE Active Code
enuToolBar 🔷 🕈	×		+	Diagnostic Codes	-Active DTC
ECU Information	Manual	Code	FMI	Descri	 アンビムビング - Macrosoft Explores CERTE 中央科式の アメイムの 単正位 あ下公 おやは入り分 フールロ ヘルブタ アメーム 2000 - 100
	Display	P1222	4	Engine Fuel Rack.	7FL/2 Caherin Fa-fa-fa-fa-fa-fa-fa-fa-fa-fa-fa-fa-fa-fa
Diagnostic Codes	Display	P1232	4	Air Heater Relay : (Display related info
	Display	T 1.10	4	Cold Start Device :	オンサ酸カプト
Active DTC	Display	P1402		EGR Stepping Mot	
Logged DTC	Display	P1412	4	Stepping Mot	G_S A E28
+ LOBBOD DIO	Display	P1422	4	EGR Stepping	く (ハーネス朝カブラ ()
DTC Information List	Display	P1432	4	EGR Stepping Mot	*#アクセルセンサ (オフション) SNS5
	Display	P0118		Engine Coolant Te	

- Yanmar provides the data displayed with manual link function separately from the normal technical and service manuals.
 - The images used in this chapter are all example screens.
 - Depending on the product, the data may not be available.

9.1 Structure of the manual link function



Note The manual link button is only displayed if the manual link data that was from the center by model is the same as the model of the connected product and information relevant to the error signal is included.

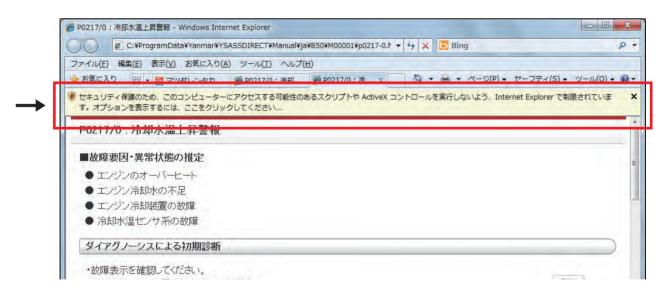
9.2 PC functions required for display

The related information data is displayed in the browser, e.g. Internet Explorer (IE).

- 0 X ❷ P02. 7/0:冷却水温上昇警報 - Windows Internet Explorer 🖉 C:¥ProgramData¥Yanmar¥YSASSDIRECT¥Manual¥ja¥B50¥M00001¥p0217-0.h 👻 🍫 🗙 🚺 Bing p + ファイル(E) 編集(E) 表示(V) お気に入り(A) ツール(I) ヘルプ(H) 🚖 お気に入り 🔡 🔹 🧮 マツダレンタカ.... 🏉 P0217/0:冷却... 🎉 P0217/0:冷... 🗴 👘 🔹 🦛 👻 ページ(P) 👻 セーフティ(S) 🔹 ツール(Q) 🔹 🚱 👻 🖲 セキュリティ保護のため、このコンピューターにアクセスする可能性のあるスクリプトや ActiveX コントロールを実行しないよう、Internet Explorer で制限されていま × す。オプションを表示するには、ここをクリックしてください P0217/0:冷却水温上昇警報 ■故障要因・異常状態の推定 ● エンジンのオーバーヒート ● エンジン冷却水の不足 ● エンジン冷却装置の故障 ● 冷却水温センサ系の故障

- The following browsers are supported: Internet Explorer 6.0 or higher Mozilla Firefox 5.0 or higher
 - The displayed (called up) data is an independent, stand-alone HTML document. After display, the functions are not related to the SMARTASSIST-Direct functions.

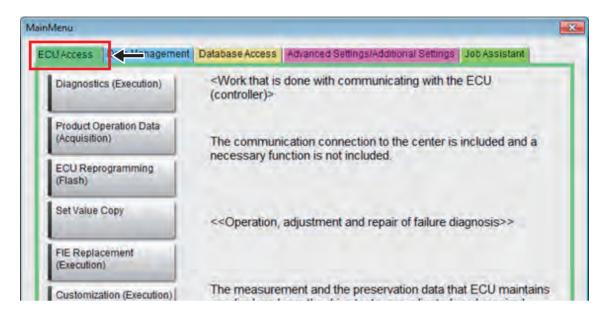
Browser warnings



Note Depending on the security settings on your PC, the above message may be displayed. This is not a problem.

9.3 Displaying Manual Link Data

Manual link function operates on the "Error Diagnosis (Execution)" menu of "ECU Connection".



Note The function is not operable in "Error Diagnosis (View)" of Operations with ECU Disconnected.

When there is an item for manual link data related to the current error item, the "Display" button is displayed.

MenuToolBar 🛛 🔻 🗭 🗙			+	Diagnostic Codes - Active DTC	
ECU Information	Manual	Code	FMI	Description	Ĩ
	Display	P1222	4	Engine Fuel Rack Actuator Relay :	(1)Poor
👩 Diagnostic Codes	Display	P1232	4	Air Heater Relay : Circuit fault A	(1)Poor
	Display	P1242	4	Cold Start Device : Circuit fault A	(1)Poor
Active DTC	Display	P1402	4	EGR Stepping Motor "A" : Circuit	(1)Poor
	ALCOND.	Here			

Items without display data are blank.

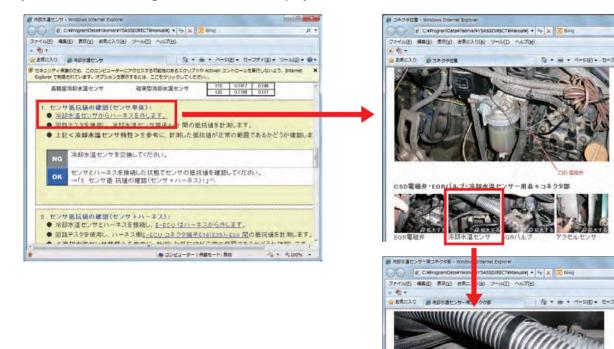
MenuToolBar 🔷 🛡	All ECU	All ECU 🔹		Diagnostic Codes - Active DTC	
ECU Information	Manual	Code	FMI	Description	1
		P1222	4	Engine Fuel Rack Actuator Relay :	(1)Poor
😡 Diagnostic Codes		P1232	4	Air Heater Relay : Circuit fault A	(1)Poor
	→	P1242	4	Cold Start Device : Circuit fault A	(1)Poor
Active DTC		P1402	4	EGR Stepping Motor "A" : Circuit	(1)Poor
		40130			11.000/001

CSD 電磁

Click the "Display" button to display related information. The displayed page may have a further link to other related information.

P0217/0:冷初水温上昇智晓 - Windows Internet Explorer	
C:WProgramDataWyanmarWySASSDIRECT#ManualWjaVB50WM00001WpD217-0.t + + + × 5 Bing	p - 1
ファイル(E) 編集(E) 表示(Y) お気に入り(A) ツール(I) ヘルプ(H)	
👌 お気に入り 🕴 • 🧮 マツダレンタカ 🌮 P0217/0: 冷却 🏈 P0217/0: 冷 🗴 👘 • ページ(P) • セーフティ(S) •	$\gamma - \mu(\underline{\alpha}) + \Theta +$
『セキュリティ保護のため、このコンピューターにアクセスする可能性のあるスクリプトや ActiveX コントロールを発行しないよう、Internet Explorer で制 す。オプションを表示するには、ここをクリックしてください…	間泊されていま メ
P0217/0.冷却水温上昇警報	
■故障変因・異常状態の推定	
● エンジンのオーバーヒート	et Explorer
● エンジン冷却水の不足	WManubikjavBS0vM00001vtnv_troub + + x Bing
 ● エンジン治却装置の故障 ● 冷却水温センサ系の故障 	0 ~12(日)
ダイアグノーシスによる初期診断	る可能性のあるスクリプトや ActiveX コントロールを発行しないよう、Inter
・故障表示を確認してください。	Vha
・冷却水温、センサ電圧値を確認してください。	File . P0118/3, P0119/2, P0217/0)
A.現在放開表示の確認 現在放開有 り	故障履歴表示にDTC有り 貫振発生状況の確認 【確認項目】:エンジン冷却水温「Signal Data(SD)」
B. 検出価の開設に よる故障権定	

Not only buttons but also images and characters displayed in another color have links to other information.



9.4 Notice Screen When Starting the Error Diagnosis (Execution) Screen

The notice screen about available manual link data on your PC from the ECU data of the connected product is displayed.

Display when there is multiple data

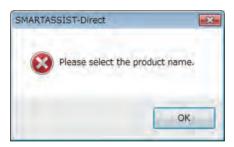
The selection screen for available data is displayed.

Select the data and click "OK". Then, the main screen is displayed.

Product setting	×
4TNV98 3TNV98	
ОК	Cancel



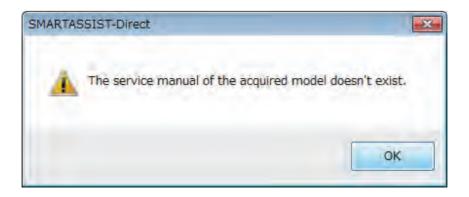
When clicking "OK" without selecting any data, a warning screen is displayed and you return to the selection screen.



Note If there is only one available data set, it is set automatically. No notice is displayed.

Display When No Data Is Available

The warning screen is displayed. Click "OK" to go to the main screen.



Note In this case, the manual link function does not operate.

If manual link data in a language different from your OS is saved on your PC, the following notice screen is displayed. You can select the data in a different language.

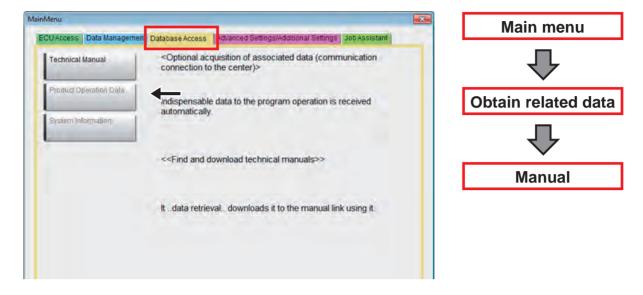
- **1** Selection window for different languages
- 2 If used.
- 3 If not used.

The service r exist.	manual of the	acquired model of	doesn't
It exists in the	e following lan	guages.	
Japane	ese		•
-		-	

Note When the manual display language setting and the OS language are different, the manual display language setting is prioritized.

9.5 Downloading Manual Link Data

You can download manual link data by manual selection from the center.



Note: You can only download manual link data from the available product category.

The selection screen for manual link data is displayed.

Firstly, connect to the center and obtain the download candidate list.

- 1 The product category license for the login user appears. (Unable to apply the change)
- 2 Select the language for data for the manual. You can select both "Japanese" and "English".

3 Click "OK" and request a list of available downloads from the center.

ind result clear
Find
Sort
Size

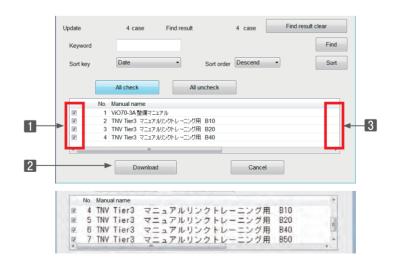
- After communicating to the center, the available data list appears.
- (The already downloaded data is not displayed)
 - Number of available downloads
 - 2 Manual name (applicable model name)
 - 3 Data version
 - 4 Date of data release (correction)
 - 5 "N (New)" or "C (Correction)"
 - 6 Data volume
 - 7 Display language

	Manual Download	
	Lisence	Agriculture ^ Marine Construction Machine Industrial Engine -
	Language	🖉 Japanese 📃 English
		OK
1	Update	→ 4 case Find result 4 case Find result clear
	Keyword	Find
	Sort key	Date Sort order Descend Sort
		All check All uncheck
		No. Manual name
		1 ViO70-3A 整備マニュアル
		2 2 Tier3 マニュアルリンクトレ 3 /用 B10 4 5 6 7
		4 TNV Tier3 マニュアルリンクトレーニング用 B40
	•	III
		Download Cancel

Note The list is not displayed for models without the issued manual link data.

Select the item you want to download and click the "Download" button. Download begins.

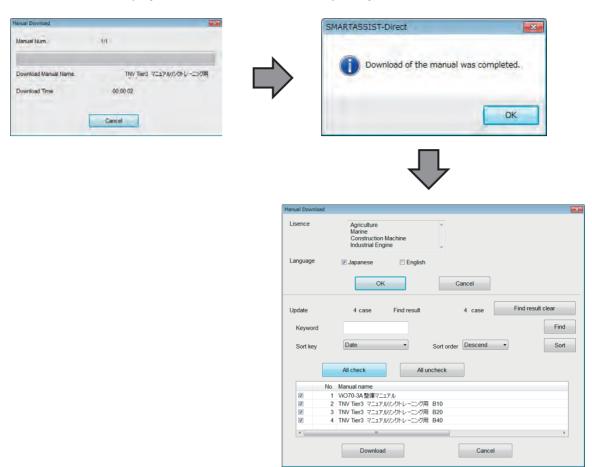
- **1** Tick the checkbox. You can download multiple items at the same time.
- 2 Download Execution button
- 3 Scroll Bar



- It takes time to download multiple items at the same time. Control the scroll bar ③ and check all checkbox.
 - All checkboxes are selected when displayed.

9. Manual Link Function

The download condition is displayed. After the download is complete, you are back to the selection screen.



Remark The downloaded data is automatically stored at a specified folder in your PC.

Search refinement is possible for the download data. Select the item you want to download and click the "Download" button **1** to start downloading.

- 1 Download Execution button
- 2 Number of search results
- 3 Clear the search results and display all results.
- 4 Keyword input field
- 5 Start Keyword Search button
- 6 Selection of sorting key
- **7** Select the sort order (ascending / descending).
- 8 Start Sorting button
- 9 Select all checkboxes for the data that you want to download.
- 10 Clear all ticked checkbox for the data you want to download.

Lisence Agriculture Marine Construction Machine Industrial Engine Construction Machine Industrial Enginee Construction Enginee Constr	
OK Cancel Update 4 case Find result 4 case Find result clear Keyword Find Sort order Descend Sort All check All uncheck Sort Sort 1 ViO70-3A 整備でニュアル B10 2 TKV Tier3 マニュアルルンドレーニング用 B20	
Update 4 case Find result 4 case Find result clear Keyword Find Sort key Date Sort order Descend Sort All check All uncheck No. Manual name ビー 1 Vo70-3A 壁像でニュアル ビー 2 TNV Tre3 マニュアルジクトレーニング用 B10 ビー 3 TNV Tre3 マニュアルジクトレーニング用 B20	
Keyword Keyword Keyword Katalow	
Sort key Date Sort order Descend Sort All check All uncheck No. Manual name I ViO70-3A 整確でユアル Z TNV Tre3 マニュアルレング用 B10 Z TNV Tre3 マニュアルルングトレーニング用 B20	
All check All uncheck No. Manual name 1 ジロイル3 2 TNV Tier3 マニュアルジンウトレーニング用 B10 3 INV Tier3 マニュアルジンウトレーニング用 B20 B20	
No. Manual name ☑ 1 ViO70-3A整備マニュアル ☑ 2 TNV Tier3 マニュアルシングトレーニング用 B10 ☑ 3 TNV Tier3 マニュアルシンクトレーニング用 B20	l I
 ViO70-3A 整備マニュアル マニュアルレレーニング用 B10 3 TNV Tier3 マニュアルリングトレーニング用 B20 	
図 2 TNV Tier3 マニュアルシックトレーニング用 B10 図 3 TNV Tier3 マニュアルシックトレーニング用 B20	٦.
3 TNV Tier3 マニュアルリンクトレーニング用 B20	-
IV 4 TNV Tier3 マニュアルリンクトレーニング用 B40	
	-
Download Cancel	

The keyword search is performed in "perfect match" and "prefix match". If you want to search in backward match, enter "*xxxx".

pdate		4 case	Find result		4 case	F	ind result clear
Keyword							Find
Sort key		Date	•	Sort order	Descend	•	Sort
		All check	All u	incheck			
	No.	Manual name					
V	1	ViO70-3A 整備マニュ	アル				
V	2	TNV Tier3 マニュアル	リリンクトレーニング用	B10			
V	3	TNV Tier3 マニュアル	リンクトレーニング用	B20			
V	4	TNV Tier3 マニュアリ	リリンクトレーニング用	B40			
•		III					4

Point If you want to search in middle match, enter "*xxxx*".

9.6 Language Change Setting of Manual Link Data

Language settings are available for the manual link data. (As of 2012, Japanese and English are available) Regardless of the OS language setting on your PC, you can change the language of the manual link data.

- When you want to confirm English (correspondence for inquiries, etc.)
- When you want to confirm Japanese

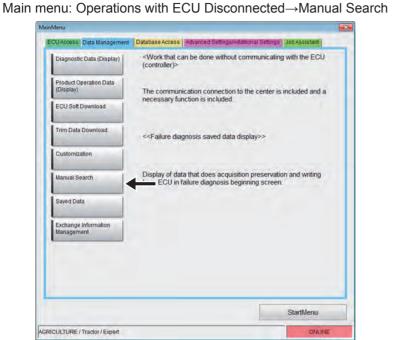
Click "Option" in "Tool" on the main screen for setting method.

SMARTASSIST-Direct					
File(F) View(V) Operation(O)	ool(T) Help(H)	1			
	Tool Bar(T) Status Bar(S) Communicat	ion Setting(C)	* 55	TRAINING	Active C
MenuToolBar 🛛 🔫 🗶 📕	Option(O)		-		
Option Unit Setting Temperature	lsius(degC)	© Fahrent	neit(degF)		X
Pressure o psi		⊚ kPa			
Failure Display form © Receive Code	Conversion	Code			
Manual Language					
English	· ·				
Language Setup					
English	*	-	Set	Cancel	
		<u></u>			

Note In the manual link function, the manual display language setting has priority over the OS language on your PC.

9.7 Searching and Displaying Manual Link Data

If necessary, the downloaded manual link data can be displayed from other locations than the Defect Display screen. It can be used like a normal technical manual.

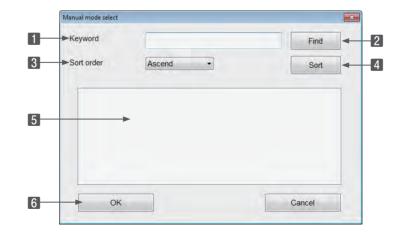


Main	Screen: View→Ma	anua	l Find
🌾 SMAR	TASSIST-Direct		
File(F)	/iew(V) Operation(O) Too	bl(T)	Help(H)
	ECU Information(I)		2
	Diagnostic Codes(F)		P.
6	Freeze Frame Data(R)		
	Diagnostic Tests(D)	*	-
MenuTo	Data Logging(L)		
► EC	Historical Data(H)		
	ECU Structures(E)		
Dir	System Settings(S)		
► Fre	Manual Find(M)		
Diag	nostic Tests		
🕨 Data	Logging		
🕨 Histo	rical Data		
● ECU	Structures		
Syste	em Settings		

Display selection screen of manual link data

1 Keyword search character input field (enter either "Representative Model Name" or "Series Name")

- Search Execution button
- 3 Change Sorting "Ascending/Descending"
- 4 Start Sorting button
- 5 Display/selection field of manual link data
- 6 Display button

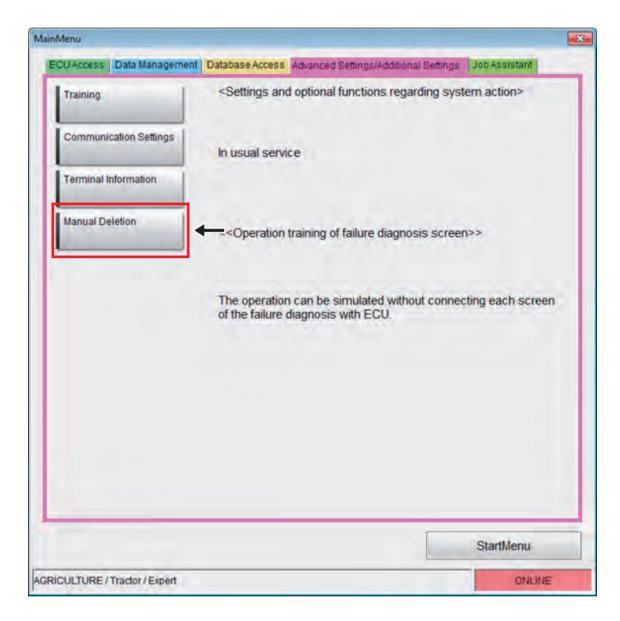


When the manual link data is displayed from the "Manual Search/Review" menu, the "Content Page" opens. This "Content Page" has links to each related page within the data.

電制トラブルシューティング - Windows	s Internet Explorer		
🖉 🗢 🙋 C:¥ProgramData¥Yann	nar¥YSASSDIRECT¥Manual¥ja¥B50¥M00	001¥index.htm 👻 😽 🗙 📴 Bing	<u>م</u>
Pァイル(E) 編集(E) 表示(⊻) お気に	こ入り(A) ツール(I) ヘルプ(H)		
お気に入り 🏉 電制トラブルシュー	ティング	☆ ▼ 帚 ▼ ページ(P) ▼ セーフティ(S) ▼ ツール(C)	<u>)</u> - 🕐 -
電制トラブルシューティング	1		
电中国 ファルフェ ティンプ	2		-
■アナログ入力関連	■アナログ入力関連		Ē
■ パルスセンサ		P1202/4 異常(電圧低)	
■接点出力関連 ■接点入力関連 ■アクチュエータ他 ■ECU内部および通信関連	ラック位置センサ	P1203/3 異常(電圧高)	
		F1205/5 共市(电压同)	
	アクセルセンサ	P0122/4 異常 (電圧低)	
		P0123/3 異常 (電圧高)	
		P0124/2 間欠故障	
		P1125/1 異常(フートペタル閉位置)	
		P1126/0 異常(フートペタル開位置)	
	予備アクセルセンサ	P0222/4 異常(電圧低)	
		P0223/3 異常(電圧高)	i I
		P0224/2 間欠故障	i I
		P1225/1 異常(フートペタル閉位置)	i I
		P1226/0 異常(フートペタル開位置)	1
		P1227/8 異常(パルス通信)	i
		P2228/4 異常(電圧低)	T
	大気圧センサ	P2229/3 異常(電圧高)	i
		P2230/2 間欠故障	1
		▲ コンピューター 保護モード: 無効 👘 💌 🔍 10	

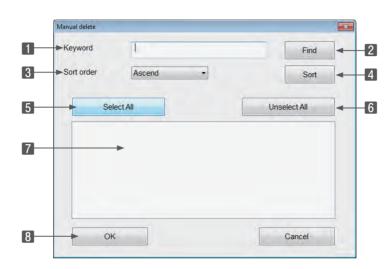
9.8 Deleting Manual Link Data

Deletion of the manual link data can be performed from the main menu.



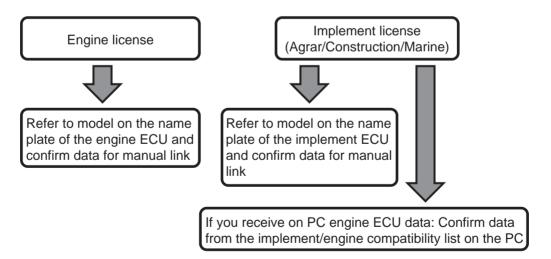
Delete selection screen of manual link data

- 1 Keyword search character input field
- 2 Search Execution button
- 3 Toggle sorting from "Ascending" to "Descending"
- 4 Start Sorting button
- 5 Select All button
- 6 Deselect All button
- 7 Display/selection field of manual link data
- 8 Start Deletion button



Remark

Depending on the user's license, the confirmation method of manual link data for reference is different.



Based on the nameplate model information stored in the ECU, confirm the reference data.

10. Functions Related to the Operation Data

About Functions Related to the Operation Data

• These are functions to call up, display and save information about the operation status of the machine (i.e. operation data) stored in each ECU/controller equipped in the product.

Also, it is possible to display the comparison of the past save data for the same product and the save data of the other product.

Understand and use the operation data for maintenance and usage guidance for the users.

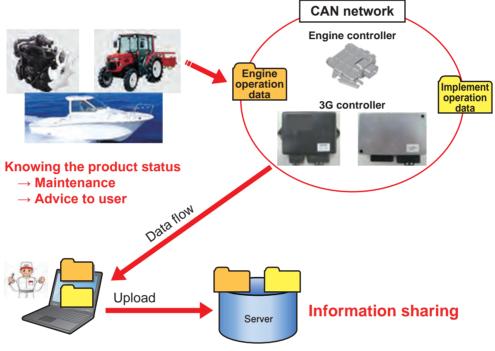


Figure 10-1 Outline of operation data

• The operation data is categorized into 3 types of information.

Save Data Disp	Ref Data Disp	Ave Disp	Maintena
	A:GET DATA DI	SP	
Descr	iption	Value	Unit
DateTime		2/03/20 15:29:54	
VehicleSignatureType		4TNV98T-ZNSA	
VehicleIdentificationNum	iber	X0001	
Total ECU Run Time		0.25	h
TotalEngineHours(h)			h
ENGINE RUN HOURS		0.00	h
ENGINE WARNING TOT	AL RUN HOURS	0.00	h
ENGINE WARNING TRIP	RUN HOURS	0.00	h
ENGINE RUN TIMES		0	

Figure 10-2 Example screen of the integrated value data (integrated data for whole period)

ingine			+ Histor	ical Data - M	ap Table							
ngine	Load Patter	rn(h) (Engin	e]			*						
					Engine S	peed[min-1]						
		0 -999	1000 -1199	1200 -1499	1500 - 1799	1800 -1999	2000 -2299	2300 -2499	2500	Total	(%)	10 3
	0-49	0.50	1.00	1.50	2.00	2.50	3.00	2.00	1.00	13.50	100.00	-
	50-99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Engine Load[%]	100-124	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	125-149	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	150-174	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Ē	175-199	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	200-249	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	250-100	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
	Total	0.50	1.00	1.50	2.00	2.50	3.00	2.00	1.00			
	(%)	3.70	7.41	11.11	14.81	18.52	22.22	14.81	7.41	-		
	10— 20—		-									

Figure 10-3 Example screen of the distribution diagram data (integrated data for whole period)

No.	Data(B)	Save Time(Hr)
1	50.05	10.0
2	52.22	20.0

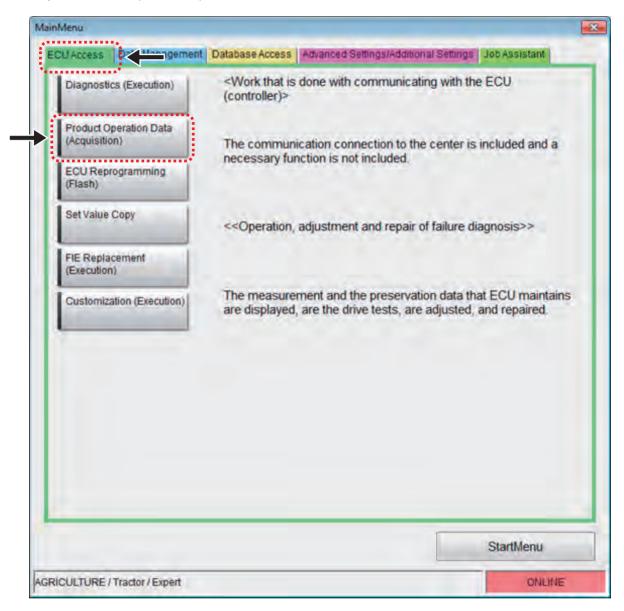
Figure 10-4 Example screen of the log data (integrated data for a given period)



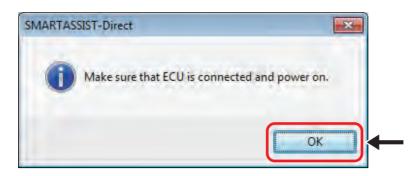
- The operation data stored in your PC is automatically uploaded when connected to the center, and accumulated as the operation data database.
- When there is no stored information in the ECU, an empty box is displayed. Depending on the product, the content of the operation data is different.
- As no information related to location, specific information on individuals, voice, or image is included in the operation data, operation data is not considered personal information.
 * In Japan

10.1 Collection of Operation Data

1 Select "Operation Data" (Collection) of the tab "ECU Connection" in the main menu.



2 The display that urges to connect your PC with the ECU (product) and the power supply appears.



After connecting your PC and the check coupler of the product with an interface box and turning ON the power (key switch), click the "OK" button. The communication with the ECU starts.

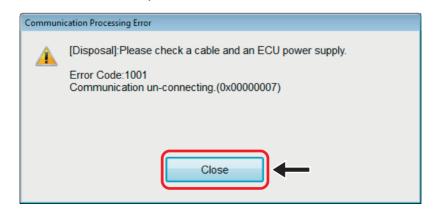
3 A connectable ECU is searched for and the connection execution screen is displayed. Click "Start".

ECU Find	
	being retrieved. wait for a while



If there are problems such as the power is not turned on, the power is unstable, or the communication cable is disconnected, an error is displayed.

Click "Close" and determine the cause of problem.



4 If there is no connectable ECU in the preset communication speed, the communication speed change screen is displayed. Change the speed and click the "ECU Search" button.

ECU Access Data Rate	© 250k	● 500k	Change
ECU Search			
	Start		Cancel

- Remark Right after turning on the power of the product (with the key switch), ECU searches from external devices may be disabled. This is for internal processes such as system checks. In such a case, click "Cancel" once and restart the procedures from 1. later.
- **5** The communication with the ECU starts and the collection of operation data starts.



Example screen

- **6** When the communication with the ECU is complete, the below message appears.
 - Click "Yes (Y)" to display the operation data after saving it on your PC.
 - Click "No (N)" to display the operation data without saving it.

SMARTAS	SSIST-Direct	8
?	Is acknowledgment of the preser information received from the pro	
		(はい(Y) いいえ(N)

Point As no information related to location, specific information on individuals, voice, or image is included in the operation data, operation data is not considered personal information.

- * In Japan
- **7** Click "OK". The memo entry screen is displayed.

Memo Input Guest informa	ation is registrable.	
	Enter up to 200 characters (single- or double-spaced characters usable)	~
٠		4
	Save	ancel

Point Even you select "Cancel" in the memo screen, the operation data is saved.

You can edit the memo with the data management function after saving the data.

8 Then, enter the connection purpose.

Select the most suitable item from the choices.

		1	
Operation Machine Information			
Please select connected purpose.			
Connected purpose		Select	• Use this as a filter when you use or search the obtained operation data.
Operation Machine Information			 To obtain data for training and practise, select
Please select connected purpose.	Visit		"Training/test" to keep it separate from the actual data.
Connected purpose	Visit Visit Maintenance / Inspection Delivery Campaign / Measure Training / Test Ok		

9 Then, the usage time check screen is displayed.

Click "OK". The collection information is displayed. Click "Change". The usage time entry screen is displayed.

Operation Machine Information
The duration of this machine from ECU information for
0.00 hr Is it good at this duration?
is it good at this datation:
Ok Change
There is a possibility that the driving adjusting time is reset when exchanging it when ECU has been exchanged.

Usage time check screen

Reason for Confirmation

- The usage time of the machine is the most important item of the operation data.
- When maintenance using the service ECU is performed, the information in the ECU is reset.

10 When there is no usage time information in the ECU information, the warning screen is displayed.

Click "Input". The usage time entry screen is displayed. Click "Cancel" to display the operation data without saving it.

Operation Machine Information
The duration of this machine cannot be confirmed from ECU information.
Please input the duration in the hand.

Screen when the usage time cannot be confirmed

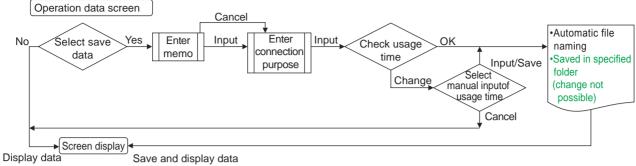
Reason for Entry

- The usage time of machine is the most important item of the operation data.
- There are many cases in which the usage time of the 3G controller is not recorded.
- **11** After manually entering the usage time by controlling the button, click the "Save" button. The collection information display screen is displayed.

Operation Machine Information	
Please input the duration.	
0.00 hr 100 10 1 ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓ ↓	
Please input time, and push the preservation button.	Click
When the cancel button is pushed, operation machine information is not preserved.	

Important If you select "Cancel" in the usage time manual entry screen, the operation data is not saved.

Summary of flow up to saving the operation data



without saving

10.2 Display Screen of Operation Data

- Access to all ECU on the same CAN network, and display the saved operation data. (Even if the saved operation data is in multiple ECU, it is displayed in one screen.)
- The model is displayed in the stored information in the ECU.
- The model of the machine equipped with multiple ECU is displayed under the model of the "Implement ECU".
- The history data saved in the engine ECU is also collected and displayed as operation data.

• "Integrated Value" Display Screen of Operation Data

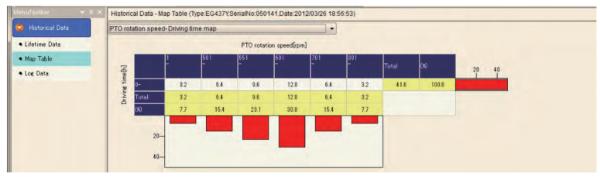
Historical Data	Save Data Disp Ref Data Disp	Ave Disp	Maintena	nce Info Excel (Dut	
Lifetime Data	A:GET DATA DI	SP		REF DATA DISP	B:YEAR AVERAGE	COMPARE
Set and a diamon	Description	Value	Unit	Value	Avarage	Compare
Map Table	DateTime	2/03/20 15:52:38				
Log Data	VehicleSignatureType	4TNV98T-ZNSA				
	VehicleIdentificationNumber	X0001				
	Total ECU Run Time	0.10	h			
	TotalEngineHours(h)		h			
	ENGINE RUN HOURS	0.00	h			
	ENGINE WARNING TOTAL RUN HOURS	0.00	h			
	ENGINE WARNING TRIP RUN HOURS	0.00	h			
	ENGINE RUN TIMES	0	-			

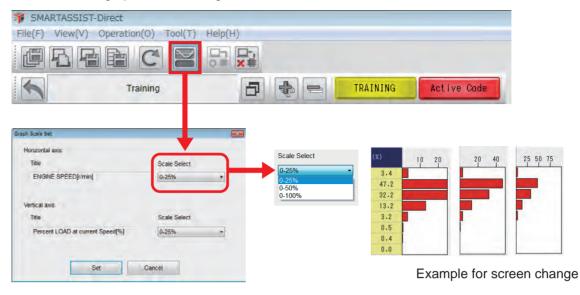
"Distribution Chart" Display Screen of Operation Data

- This is the display screen for the operation data stored as the distribution chart. (The maximum display for maps is 16 rows x 16 columns.)
- The history data for the existing engine is also collected and displayed as the operation data.
- The display can be selected and changed when the multiple distribution chart information is saved.

	PTO	otation s	speed-Drivi	ng time m	ар	_								_
uToolBar 🚽 🏾	× Historio	al Data - M	lap Table (Typ	e:EG437Y,S	erialNo:05014	11. to:2012	2/03/26 18:56	6:53)						
Historical Data	Engine	speed and	Load map du	uring PTO dr	iven		•							
ifetime Data						Engine Sp	eed[min-1]							
Map Table .og Data	←		0	600	1200	1500	1800	2000	2300	2500	Total	90	20	41
		0-	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.0		
		10-	0.4	0.6	0.8	1.0	1.2	1.0	0.8	0.0	5.8	0.1		
		20-	51.4	51.6	51.8	52.0	52.2	52.4	52.2	52.0	415.6	8.1		
	Z	30-	102.6	102.8	103.0	103.2	103.4	103.6	103.4	103.2	825.2	16.1		
	Load	40-	105.8	106.0	106.2	106.4	106.6	106.8	106.6	106.4	850.8	16.6		
	Engine Load()	50-	109.0	109.2	109.4	109.6	109.8	110.0	109.8	109.6	876.4	17.1		
	5	60-	112.2	112.4	112.6	112.8	113.0	113.2	113.0	112.8	902.0	17.6		
		70-	102.6	102.8	103.0	103.2	103.4	103.6	103.4	103.2	825.2	16.1		
		80-	51.4	51.6	51.8	52.0	52.2	52.4	52.2	52.0	415.6	8.1		
		90-	0.2	0,4	0.6	0.8	1.0	12	1.0	0.8	6.0	0.1		_
		Total	635.6	637.4	639.2	641.0	642.8	644.2	642.4	640.2				
		(90)	12.4	12.4	12.5	12.5	12.5	12.6	12.5	12.5				
		20-	-											



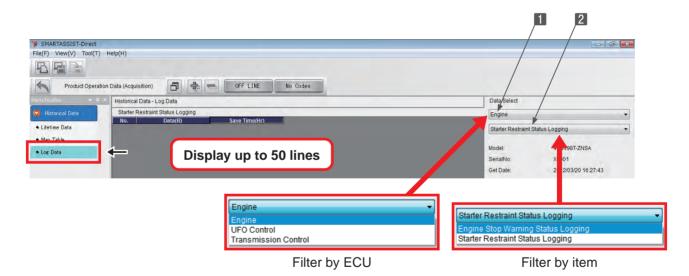




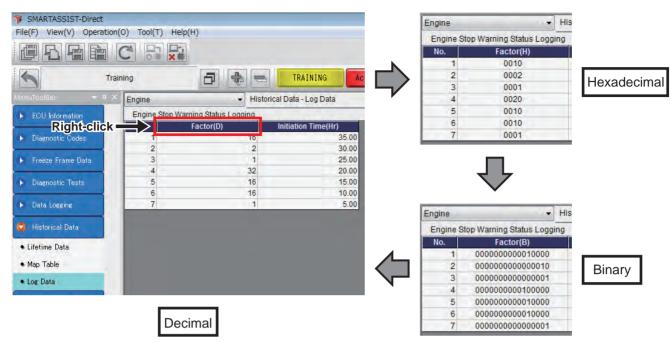
The scale value of the bar graph can be changed to 25%, 50% and 100%.

- Log Data" Display Screen of Operation Data
 - Two display systems are supported: save the time of the event occurrence and save the values per unit time.
 - The displayed data can be divided by ECU and type of data.
 - The history data saved in the engine ECU is also collected and displayed as operation data.

Example for ECU Selection	n Display	
2 Operation Data Selection	Display	



By right-clicking the "Factor (D)" box, the data display can be changed to binary, decimal and hexadecimal numbers.



• Function buttons on the accumulated information screen

- 1 🔚 : Print the screen. (Refer to [6.2.2])
- 2 Fair : Save a screenshot in BMP format. (Refer to [6.2.3])
- 3 E : Save the complete history data in CSV format. (Refer to [6.2.4])
- 4 Save Data Disp : Select and display the save data.
- 5 **Ref Data Disp** : Select and display the reference data.
- 6 Ave Disp : Comparison with the average values per model and year of shipment.
- 7 Maintenance Info : Maintenance information display
- 8 Excel Out : Output in Excel-format.
- 9 Explanation display for individual operation data item

1 2 3	4	5	6	7	8	9	
SMARTASSIST-Direct	/	/	/			/	
IE(F) VIEW(V) TOOI(T)) Help(H)	/ /		/	/	/	
		/			/		
		/		/	/	/	
Product Opera	tion Data (Acquisition)	OFF LINE	No Cod	es	/		
-uto	Historical Data - Lifetime Data	1					
Historical Data	Save Data Disp Ref Data Disp	Ave Disp	Maintena	nce Info Excel C	Dut		
Lifetime Data	A:GET DATA DIS	P		REF DATA DISP	B:YEAR AVERAGE	COMPARE	
and the second second	Description	Value	Unit	Value	Avarage	Compare	
Map Table	DateTime	2/03/20 16:38:52					
Log Data	VehicleSignatureType	4TNV98T-ZNSA					
	VehicleIdentificationNumber	X0001					
	Total ECU Run Time	0.85	h				
	TotalEngineHours(h)		h				
	ENGINE RUN HOURS	0.00	ĥ				
	ENGINE WARNING TOTAL RUN HOURS	0.00	ħ				
	ENGINE WARNING TRIP RUN HOURS	0.00	h				
	ENGINE RUN TIMES	0					
					_		
	Eliminent					-	
						,	
	Description of	the sele	cted	operatio	n data (in (green) is displayed.	

10.3 Operation for the operation data (integrated value)

Function buttons and display screen

Operation Toolbar

- 1 Fint the screen. (Refer to [6.2.2])
- [2] Fair : Save a screenshot in BMP format. (Refer to [6.2.3])
- 3 E : Save the complete history data in CSV format. (Refer to [6.2.4])

• Function Buttons

- **Save Data Disp** : A: Call up and display the saved data in the collected (saved) data display box.
- 5 RefData Disp : Display the saved data as reference.
- 6 Ave Disp : Display and compare the "Average values per model and year of shipment".
- **Maintenance Info** : Display the maintenance information.
- 8 Excel Out : Export the screen information in the specified EXCEL format.
- **9** Selection Item Clear : Clear the maintenance information.

1 2 3	4	5	6	7	8		
SMARTASSIST-Direct			/				
File(F) View(V) Tool(1	Г) Неір(Н) /	/		/	_ /		
Product Oper	ation Data (Acquisition)	OFF LINE	No Cod	les			
Fullet 🔶	Historical Data - Lifetime Data		_				
😏 Historical Data	Save Data Disp Ref Data Disp	Ave Disp	Maintena	nce Info Excel 0	Dut		
Lifetime Data	A:GET DATA DISI	P		REF DATA DISP	B:YEAR AVERAGE	COMPARE	
	Description	Value	Unit	Value	Avarage	Compare	
Map Table	DateTime	2/03/20 16:38:52					
Log Data	VehicleSignatureType	4TNV98T-ZNSA					
	VehicleIdentificationNumber	X0001					
	Total ECU Run Time	0.85	h				
	TotalEngineHours(h)		h				
	ENGINE RUN HOURS	0.00	h				
	ENGINE WARNING TOTAL RUN HOURS	0.00	h				
	ENGINE WARNING TRIP RUN HOURS	0.00	h				
	ENGINE RUN TIMES	0	*				
	Eimment						

• Main Box

10 A:GET DATA DISP	: Display the collected or saved data.
11 Description	: Display the operation data name.
12 Value	: Display the saved value.
13 Unit	: Display the unit.
14 REF DATA DISP	: Display the reference data.
15 B:YEAR AVERAGE	: Display the "average values per model and year of shipment".
16 Average Value Comparison] : Display the comparison of the values $[0]$ and $[5]$.
17 Clear	: Display the maintenance information clear box.
18 Maintenance Information] : Display the maintenance information "Details" button.

• Comment Box

[9] "Comment" box: Display the comment for the clicked operation data.

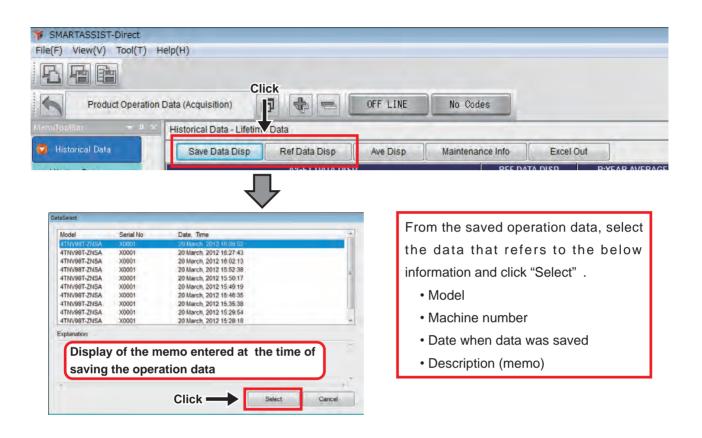
	Dر	1 10	ſ	2 13	14	15	19
WARTASSIST-Direct					/		
File(F) View(V) Tool(1		/	/		/	/	/ -
			/	/ /	/	/	
Product Oper	ration Data (Acquisition)	OFF LINE	No Coo	ep	/		/
in utor 🐨	Historical Data - Lifetime Data		/				/
🧔 Historical Data	Save Data Disp Ref Data Disp	Ave Disp	Maintena	nce Info Excel C	Dut		
Lifetime Data	A:GET DATA D			REF DATA DISP	B:YEAR AVERAGE	COMPARE	
	Description	Value	Unit	Value	Avarage	Compare	
 Map Table 	DateTime	2/03/20 16:38:52					
• Log Data	VehicleSignatureType	4TNV98T-ZNSA					
	VehicleIdentificationNumber	X0001					
	Total ECU Run Time	0.85	h				
	TotalEngineHours(h)		h				
	ENGINE RUN HOURS	0.00	h				
	ENGINE WARNING TOTAL RUN HOURS	0.00	h				
	ENGINE WARNING TRIP RUN HOURS	0.00	h				
	ENGINE RUN TIMES	0	-				
	Eumment						
							▶

Display the Save Data and Reference Data

The operation data stored in your PC can be displayed in comparison.

Utilization example

- Check the temporal change for the same machine.
- Check the difference in the usage condition with the other machine.



The collected (called up) data is displayed in the left row, the reference data is displayed in the right row.

A:GET DATA D	REF DATA DISP		
Description	Value	Unit	Value
DateTime	2/03/20 16:38:52		2012/03/20 16:38:52
VehicleSignatureType	4TNV98T-ZNSA		4TNV98T-ZNSA
VehicleIdentificationNumber	X0001		X0001
Total ECU Run Time	0.85	h	0.85
TotalEngineHours(h)		h	
ENGINE RUN HOURS	0.00	h	0.00
ENGINE WARNING TOTAL RUN HOURS	0.00	h	0.00
ENGINE WARNING TRIP RUN HOURS	0.00	h	0.00
ENGINE RUN TIMES	0	÷	0

Unlike serial numbers, the operation data for different models can be displayed as the reference data.

A:GET DA	A:GET DATA DISP			
Description	Value	Unit	Value	Avarage
DateTime	2/03/20 17:10:53		2012/03/20 15:28:18	
VehicleSignatureType	4TNV98T-ZNSA		4TNV98T-ZNSA	
VehicleIdentificationNumber	X0001		X0001	
A:GET D/	ATA DISP		REF DATA DISP	B:YEAR AVERAGE
A:GET DA	ATA DISP Value	Unit	REF DATA DISP Value	B:YEAR AVERAGE Avarage
		Unit		
Description	Value	Unit	Value	
Description DateTime	Value 2/03/20 17:10:53	Unit	Value 2012/03/20 15:28:18	B:YEAR AVERAGE Avarage

Remark Only the matched operation data items with the collected (called) data are displayed for the reference data.

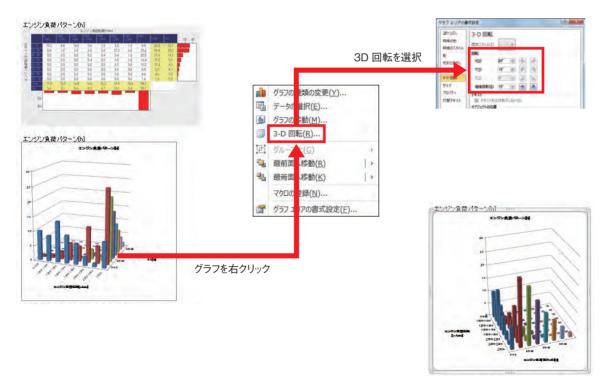
> Example: If the construction machinery and the agricultural machinery data are displayed, the common engine-related operation data is displayed. (In case of having the engine-related operation data in both data.)

This is a function to export the operation data in the specified EXCEL format.

Assuming that the data is submitted to the end user and attached to the work report, it has the below characteristics.

- Output the required information in easy-to-see format.
- Unlike the output in CSV file format, reprocessing is not necessary.

User ID					
En	gine			Veh	icle
Engine Signature Type			Vehicle Signatur	ге Туре	
Engine Identification Number			Vehicle Identific	ation Number	
Operating time			Operating time (Manual input)	
Date time				(Reference)	Compare
A:Description	Value	Unit	REF Data	B: Average	A/B (%)
Total ECU Run Time				1	The second
ENGINE RUN HOURS					



Note Output the integrated value information and the distribution chart information (2D and 3D) in EXCEL. (You cannot export the log data.)

SMARTASSIST-Direct File(F) View(V) Tool(T) Help(H) È Click OFF LINE No Codes Product Operation Data (Acquisition) P * = Historical Data - Lifetime Data Historical Data Save Data Disp Ref Data Disp Ave Disp Maintenance Info Excel Out 市名前を付けて保存 x The default file name contains ●●● ■デスクトップ・ ▼ 4 デスクトップの検索 Q information of the obtained (saved) data 整理 ▼ 新しいフォルダー 0 -★ お気に入り ライブラリ in the below order. システムフォルダー 🚺 ダウンロード ■ デスクトップ Model vnetuse 9月 最近表示した場所 システムフォルダー Serial number コンピューター 🛢 ライブラリ ステムフォルダー Date obtained 1 コンピューター ネットワーク システムフォルダ The file name can be changed. 🚢 ローカル ディスク (C:) 💼 ローカル ディスク (D:) 24日750 ファイル名(N): Opinf ファイルの種類(工): 稼働機情報エクセルファイル(*.xls) Click = 保存(S) キャンセル ▲ フォルダーの非表示

Click the "EXCEL Write" button, select the save location, and then click the "Save" button.

Point The file created by "EXCEL Write" can be handled between PCs without processing "Export" and "Import" in the "Data Management Function".

• Display the Average Values

- **1** The average values calculated from the operation data uploaded to the center are displayed.
- **2** The ratio of the collected data (right) for the average values is calculated.
- **3** The average values are calculated per model and year of shipment in the beginning of every month and automatically downloaded when logging in to the SMARTASSIST-Direct with an active Internet connection.

Save Data Disp	Ref Data Disp	Ave Disp	Maintenar	nce Info	Excel C	ut	100
	A:GET DATA DI	SP		REF DATA D	ISP	B:YEAR AVERAGE	COMPARE
Desci	ription	Value	Unit	Value		Avarage	Compare
DateTime		2/03/20 16:38:52	-				
VehicleSignatureType		4TNV98T-ZNSA					
VehicleIdentificationNun	nber	X0001					
Total ECU Run Time		0.85	h				
TotalEngineHours(h)			h				1
ENGINE RUN HOURS		0.00	h				
ENGINE WARNING TOT	TAL RUN HOURS	0.00	h				
ENGINE WARNING TRI	P RUN HOURS	0.00	h				
ENGINE RUN TIMES		0	4		-		1

11. Tool Function

11.1 Communication Settings

This is the screen to perform the communication settings between the SMARTASSIST-Direct and the product. When connected to the product, it is automatically set, so there is no need to operate during normal service. Change the settings only when instructed to do so by YANMAR.

Important The parameters for CAN communication can be changed. To change the parameters, you need to have sufficient knowledge of CAN. As the communication can be cut off, change only when instructed to do so by YANMAR.

Settings Screen

You can open the communication settings screen by clicking the "Communication Settings" button in the tab "Detail Settings/Additional Functions" in the main menu. (You can also open the screen from the control screen.)

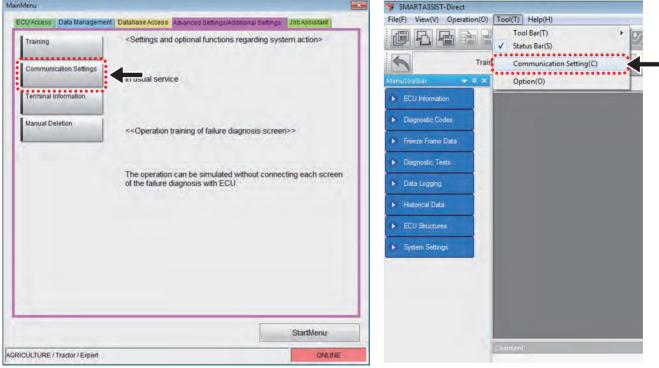


Figure 11-1 Main Menu

Figure 11-2 Control Screen

 fication, the version can be selected. Baud Rate Check CAN-ID : Prepared for adding new specification in the future specification change. CAN ID : There is no need to change the parameters for the CAN signal. Priority : The standard value is 6. Physical Address : The standard value is DA00h. In systems with multiple ECU, it is required change it to 00h. Function Address : Fixed at DB33h. SA : Address for the service tool, fixed at F0h. Data Rate : Communication baud rate. For marine use, 250 kbps is standard. For land u 500 kbps is standard. ISO 15765 : The parameters for flow control. There is no need to change. 			
 Port : Fixed at USB. Version Select : As some initial ECU for small-sized engine have a different communication spification, the version can be selected. Baud Rate Check CAN-ID : Prepared for adding new specification in the future specification change. CAN ID : There is no need to change the parameters for the CAN signal. Priority : The standard value is 0. Physical Address : Fixed at DB33h. SA : Address for the service tool, fixed at F0h. Data Rate : Communication baud rate. For marine use, 250 kbps is standard. For land u 500 kbps is standard. ISO 15765 : The parameters for CAN message. There is no need to change. Message Timing : The timing parameters for CAN message. There is no need to change. Message Timing is the standard set of the standard. ISO 15765 : The parameters for CAN message. There is no need to change. Message Timing is the standard set of the standard set of the standard. USB USB Set of the set of the standard set of the standard. Iso 15765 : The timing parameters for CAN message. There is no need to change. Message Timing is the standard set of the standard set of the standard. USB USB Diver Parameters for CAN message. There is no need to change. Message Timing is the standard set of the se			. Foundation of a survey on the maximum data data d
 Version Select: As some initial ECU for small-sized engine have a different communication spin fication, the version can be selected. Baud Rate Check CANID : Prepared for adding new specification in the future specification change. CAN ID : There is no need to change the parameters for the CAN signal. Priority : The standard value is 6. Physical Address : The standard value is DA00h. In systems with multiple ECU, it is required change it to 00h. Function Address : Fixed at DB33h. SA : Address for the service tool, fixed at F0h. Data Rate : Communication baud rate. For marine use, 250 kbps is standard. For land u 500 kbps is standard. ISO 15765 : The parameters for GNW control. There is no need to change. Message Timing : The timing parameters for CAN message. There is no need to change. Message Select #1 02 03 04 Message Timing : The timing parameters for CAN message. There is no need to change. Message Timing : The timing parameters for CAN message. There is no need to change. Message Timing : The timing parameters for CAN message. There is no need to change. Message Timing : The timing parameters for CAN message. There is no need to change. Message Timing : The timing parameters for B h DA 0 h H D			
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ISO15765 Flow Control BS 0 STmin 0 Frame timing N_AS 25 N_AR 25 N_BS 75 N_BR 25 N_CS 75 N_CR 150			© 250K
N_CS 75 N_CR 150		F	SO15765 Flow Control BS 0 STmin 0 Frame timing N_AS 25 N_AR 25

Figure 11-3 Graph Control Screen

50

5000

5000

OK

0 Max

0 Max

0 Max

P2CAN

P2CAN*

P3CAN

Min

Min

Min

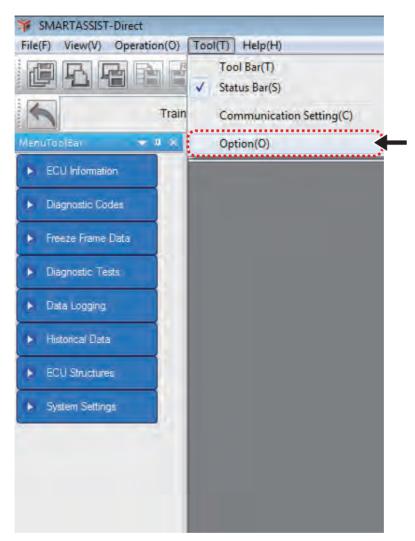
11.2 Option Settings

This is a screen to perform the screen settings. Mainly, the following settings can be performed.

- Change the display unit.
- Change the language.

Settings Screen

You can open the settings screen by clicking "Option" in "Tool" in the control screen.



Control Method

1 Set the units for temperature and pressure.

2 Change the display format of the error codes.

Point Normally set in the determined display format for the product, but if you want to see it in another error code format, you can change it.

3 Set the language for the manual link data of the error diagnosis function.

4 Change the display language of SMARTASSIST-Direct.

5 Confirm the changed content.

	Option			_
1	➡Unit Setting			
	Temperature	Celsius(degC)	⊘ Fahrenheit(degF)	
	Pressure	ø psi	⊚ kPa	
2	► Failure Display form			
	Receive Code	Conversion	on Code	
	Manual Language			
3	English	-		
	Language Setup			
4	English]		
	Linghorn		Set	1
			8	

12. Glossary

Abbrevia-	Name	Content
tion		
BS	Block Size	Flow control related parameters used in ISO 15765
CAN	Controller Area Network	Communication standard used in the in-vehicle LAN
CSV	Comma Separated Values	File format used in PC
DA	Destination Address	ID information for the CAN communication data
D-SUB	Connector Standard	-
DTC	Error Diagnosis Code	Coded information according to the failure content
ECU	Engine (or Electronic) Control Unit	Also called ECM.
FFD	Freeze Frame Data	Data related to before and after the failure
FMI	Failure Mode Identifier	Detailed failure information added to the DTC
LID	Local Identifier	ID information specific to the controller
OC	Occurrence Counter	Number of DTC occurrences
PC	Personal Computer	-
PF	Protocol Data Unit Format	ID information for the CAN communication data
PDM	Product Data Management	-
SA	Source Address	ID information for the CAN communication data
SAE	Society of Automotive Engineers	-
Sno.	Serial Number	Manufacturing serial number for engine, pump and ECU
SPN	Source Parameters Number	Common ID used in SAE J1939
USB	Universal Serial Bus	Serial communication port used in PC

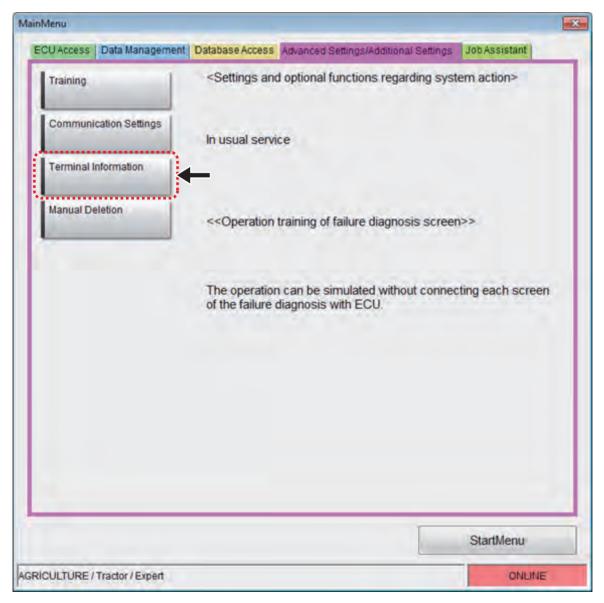
13. Workstation Information (Version Information)

You can check the SMARTASSIST-Direct software information.

- Software version information.
- Updated information of the corresponding models.
- License expiration date and authority information.

Check screen

You can open the check screen by clicking "Terminal Information" in the tab "Detail Settings/Additional Functions" in the main menu. (You can also open the screen from the control screen.)



🌾 SMARTASSIST-Direct		
File(F) View(V) Operation(O) Tool(T)	Help(H)	
ARABA	Version Information(V)	
	Operating manual(M)	-

• Version Information Screen

Terminal Information				×
SMARTASSIST	-Direct			OK
Version 1.2.1	Rele	ase T	01.1.03	
Copyright (C) 2	011 YANMAR CO.,L	TD.		
Version Information	Update Information	License	Information	
Module/Table		Ver	sion	
Main Module		1.2	.1.1	
Control Module		1.2	.0.1	
ECU Type LY3 Module	e	1.2	.0.1	
ECU Type 2GECO(TI	NV) Module	1.2	.0.1	
ECU Type J1939 Mod	lule	1.2	.0.1	
ECU Type ISO14229	Module	1.2	.0.1	
Ecu Commnunication	Module	1.2	.0.1	
Upload/Download Mod	dule	1.2	.1.1	
Common Module		1.2	.0.1	
Interface Box Firmwa	re	-		
Interface Box DLL		-		
Interface Box API		-		
•				+

• Updated Information Screen of the Supported Models

Terminal Information		×
SMARTASSIST-Di	rect Release	OK T01.1.03
Copyright (C) 2011	YANMAR CO., LTD.	
Version Information Up	late Information Licer	nse Information
1/Feb/2012 New models are added,so pi <new model=""> Tractor US401,EF300Vseries EG48~EG65,EG76/83 Combine AE445,AG6114,AG7114,GS4 GC585,GC585D,GC585DC, Construction Machine @ViO70-3A,B7-5B SV100-1,ViO80,B6-6A(Limit <catalog con<br="" connectable="" of="">Engine 2GECO 3TNV84T-Z 4TNV84T-Z 3TNV88-Z 3TNV88-E 4TNV88-Z 4TNV88-E 4TNV98-Z 4TNV98-E 4TNV98-Z 4TNV98-E</catalog></new>	00,GC441V GC380 ed access)	E
<		+
The corresponding mode automatic renewal is done		e model from which the

License Information Screen

- 1 Display the security check period.
- 2 Presence and absence of the utilization limitation by model
- 3 Available product category
- 4 License mode
- 5 Presence and absence of the utilization limitation by ECU/controller

Note To use the SMARTASSIST-Direct, a security check is required every 3 months.

Check this screen periodically and make sure that your license does not become invalid. Start the SMARTASSIST-Direct with your PC connected to the Internet. The software automatically communicates with the center and the security check is performed.

	Terminal Information	
	SMARTASSIST-Direct	ОК
	Version 1.2.1 Relea	se T01.1.03
	Copyright (C) 2011 YANMAR CO., LTD.	
	Version monnation opuate monnation	icense Information
	Item	Data
	License Serial No.	00000791
	Date of issue	21 September, 2011
1	Off-line use time limit	30 May, 2012
2	Model limitation	None
3	Commodity field	* Agriculture
	Inducing ahead	YANMAR Engine
4	→ Use authority	Expert
5	ECU Type limitation	TNV, Tier4B, Tier4D, UFC
_		
	Commodity field	* Agriculture
	Inducing ahead	YANMAR Machine
	Use authority	Expert
	ECU Type limitation	TNV.Tier4B.Tier4D.UFC *
	✓	•

Various "Error Screen" and "Warning Screen" appear while you are using the SMARTASSIST-Direct.

14.1 Error Screen

Screen when a failure occurred mainly in the stage of communication processing between the SMARTASSIST-Direct and the product.

Communi	Communication Processing Error					
4	[Disposal]:Please check a cable and an ECU power supply. Error Code:1001 Communication un-connecting.(0x00000007)					

Figure 14-1 Error screen example

Error Message List

No.	Error message		Cause
1	Error code: 1001		Undefined error occurred (0x00000007) (0x00000008)
	Error content: Not connected (code)		(0xFFFFFFD)
	Process message: "Check the commu-		When the I/F Box is not connected
	nication cable and		 When the ECU power is not turned on
	the ECU power sup-		 The USB driver is not correctly installed
	ply".		Incomplete setting of PDIB32.dll (production bench only)
	*The code is displayed in the return		Time-out occurred (0x0000009)
	value from the I/F Box in hexadecimal.		Message buffer is empty (0x00000010)
			This error occurs when the source address is different.

2 Error code: 1002	Error from the I/F box determined.
Error content: Abnormal communica-	(0xFFFFFFFE): When there is a problem in the ECU side set-
tion (code)	ting (EEPROM fault, etc.): 1002
Process message: "Upgrade the ver-	 Unsupported function is requested (0x00000001).
sion of the ECU, IF/	 Invalid channel ID is specified (0x0000002)
Box, and service	 Invalid protocol ID is specified (0x0000003)
tool."	 Null pointer is specified (0x00000004)
	 Invalid message buffer size is specified (0x0000005)
*The code is displayed in the return	 Invalid flags are specified (0x0000006)
value from the I/F Box in hexadecimal.	 Invalid message is specified (0x000000A)
	 Invalid time interval is specified (0x000000B)
	 Periodic Msg Filter setting that exceeds the limit is request
	ed (0x000000C)
	 Invalid Msg ID is specified (0x000000D)
	 Invalid Error ID is specified (0x000000E)
	 Invalid loctl ID is specified (0x000000F)
	 Message buffer is full (0x00000011)
	 Message buffer is overflown (0x00000012)
	 Invalid pin number is specified (0x00000013)
	 Specified Channel ID is in use (0x00000014)
	 Protocol ID in the message is invalid (0x00000015)
	 Tester message transmission failed (0x800D0001)
	 ECU reception error occurred (0x800E0001)
	 ECU message checksum error (0x800F0001)
	 ECU message structure error (0x80100001)
	 ECU message byte time error (0x80110001)
	 ECU message time error (0x80120001)
	Other errors
	(0xFFFFFFF): Incorrect argument error: 1002
	(0xFFFFFFC): Incorrect response data error: 1002
	(0xFFFFFFB): Security access denial error: 1002
	(0xFFFFFFA): Different protocol error: 1002
	(0xFFFFFF9): Abnormal memory error: 1002

3 Error code: 1003	When the following negative response is received from the ECU
Error content: Abnormal service re-	● General refusal (0x10)
sponse (code)	 Service not provided (0x11)
	 Subfunction not provided (0x12)
*The code is displayed from the ECU	 When the conditions of the ECU are not met (forced op-
in hexadecimal. When there is no re-	eration, etc.)
sponse, the display is blank.	 Out of request range (0x31)
	 Security access refused (0x33)
Process message: "Check the version	 Invalid security key (0x35)
of the ECU, IF/Box,	 Download not permitted (0x40)
and service tool."	 Incompatible download format (0x41)
	 Specified download address disapproved (0x42)
	 Number of download request bytes disapproved (0x43)
	 Service not provided in the current diagnostic mode (0x78)
	No response from the ECU

Note When an error other than the underlined error code occurred, it is possibly related to development of the product. Contact YANMAR.

14.2 Error (Warning) Message

■At Application Start-up

Function	Process	Message (example)	Cause	Operation after display	Remark
Direct start-up	License	There is a problem with the license. Please repeat the set-up.		Application closed.	
		Unable to start because the version is incorrect. Please repeat the set- up.	Installation failure. Updating the module failed. The module structure of the version is incorrect (not matched).	Application closed.	
		The usage license is invalid or the initialization after installation has not been performed. To obtain the license, exit the software, confirm that the computer is con-	user information are not	Start with the default mode.	
			The license key of the license file does not match the install key.	Start with the default mode.	
			License is expired.	Start with the default mode.	
			When the license is incon- sistent	Start with the default mode.	
		The license was not updated because the license update file is incorrect. The software utilization term has expired. If the latest software is not in- stalled within 7 days, writing is disabled.		Normal operation (Only for the displayed valid term)	
		License conditions were changed. The utilization term is until 2011/12/31.	License was updated.	Normal operation	
Login		Enter the user ID.	Your user ID is not entered at login.	Re-enter login	
		Enter your password.	Your password is not entered at login.	Re-enter login	
		The user ID or your password is different. Note: Using a common password with YDS might have changed the pass- word. To update the settings file: Exit the software, confirm that the computer is connected to the Inter- net, start the software again, and log in.	Wrong user ID or pass- word is entered.	Re-enter login	
		Click OK to exit.	When you exit the pro- gram	When "Yes", Direct closes. When "No", Exit is canceled.	

Function	Process	Message (example)	Cause	Operation after display	Remark
Operation mainte- nance informa- tion	Extract the compressed file	Extracting the maintenance data failed.	Processing the file reply for the operation data and maintenance information failed.	Continue the pro- cess (Cancel the extraction of the maintenance information)	
Start Menu	Exit operation	Click OK to exit.	When you exit the pro- gram	When "Yes", Direct closes. When "No", Exit is canceled.	
Main Menu		Change data not found.	When there is no parts replacement information in the parts replacement screen.	Process is can- celed	
		Reading the save data failed.	For some reason (internal cause or breakage of a file), reading the operation data failed.	Process is can- celed	
		Operation is not possible because the server is offline.	The menu is selected when the server is offline.	Not operable	Currently not supported
Common for each view	Function change	Switch to XXXX function?	The function selection combo box for each func- tion screen is changed.	When "Yes", execute change. When "No", do not change.	
	ECU change	Switch to XXXX?	The ECU selection combo box for each function screen is changed.	When "Yes", execute change. When "No", do not change.	

Defect Display

Function	Process	Message (example)	Cause	Operation after display	Remark
Current Defect	Manual dis- play		The selected manual file does not exist.	The manual is not displayed.	

Data Before/After Error

Function	Process	Message (example)	Cause	Operation after display	Remark
Trend Graph		(Select the settings so that the lower limit is smaller than the upper limit.)		Re-enter in the graph settings screen.	

Diagnosis Test

Function	Process	Message (image)	Cause	Operation after display	Remark
Digital Output	Data Settings	Unable to apply the change.	When the selected data cannot be changed	No action.	
	Screen change	Stop the forced driving?	When the screen change is executed while execut- ing the force operation (fixed control)	When "Yes", recover control. When "No", control remains fixed. Change the screen, respec- tively.	
Forced Operation	Data Settings	Unable to apply the change.	When the selected data cannot be changed	No action.	
		Stop the forced driving?	When the screen change is executed while execut- ing the force operation (fixed control)	When "Yes", recover control. When "No", control remains fixed. Change the screen, respec- tively.	
		Switch to the hysteresis graph?	When the hysteresis mea- surement is performed and exited	When "Yes", change to the graph screen. When "No", no action.	
Forced Operation Graph		Check the conditions of the range setting. (Select the settings so that the lower limit is smaller than the upper limit.)	In the minimum and maxi- mum settings for graph, a minimum value that is greater or equal to the maximum was set.	No action. Re-enter in the graph settings screen.	
		Save the measured data?	When saving the mea- sured data.	When "Yes", save. When "No", do not save.	
		Measure data saved.	The measured data is complete.		
		Saving the measured data failed.	For some reason, saving the measured data failed.	Saving is inter- rupted.	
Forced Operation Hysteresis Graph		Same as the forced operation graph			

■Data Logging

Function	Process	Message (image)	Cause	Operation after display	Remark
Data Moni- tor		Creating the user settings file failed.	For some reason (internal cause), saving the user settings information file failed.	The process is canceled.	
		Saving the measured data failed.	For some reason (internal cause), saving the mea- sured data failed.	The process is canceled.	
		The optional settings of the ECU and this software do not match. Set the option data again.	When you need to reset the option information in the beginning of logging, check before displaying the option settings screen.	The process is canceled after setting the option settings.	
		Polling mode is not supported.	When the polling mode is set for the sampling set- tings in the beginning of logging and the ECU does not support the polling mode.	The process is canceled.	
		Acquiring saved user settings data failed.	For some reason (internal cause), reading the user settings information file failed.	The process is canceled.	
		Settings are not saved.	When trying to read the user settings information file, but nothing was saved	The process is canceled.	
Save Data		Creating the user settings file failed.	For some reason (internal cause), saving the user settings information file failed.	The process is canceled.	
		Saving the measured data failed.	For some reason (internal cause), saving the mea- sured data failed.	The process is canceled.	
Trend Graph		Check the conditions of the range setting. (Select the settings so that the lower limit is smaller than the upper limit.)	In the minimum and maxi- mum settings for graph, a minimum value that is greater or equal to the maximum was set.	No action. Re-enter in the graph settings screen.	

■History Data

Function	Process	Message (example)	Cause	Operation after display	Remark
Integrated Value	Clear		The "Clear Selection Items" button is pressed without the ticking the clear box.	No action.	

■Settings

Function	Process	Message (image)	Cause	Operation after display	Remark
Configura- tion (Configu- ration)	Data Settings	Unable to apply the change.	The selected data cannot be changed.	No action.	
Sensor Correction (Calibra- tion)		Same as the configuration			
Parameter Adjust- ment (Tuning)		Same as the configuration			
Initial Set- tings	Data Settings	Unable to apply the change.	The selected data cannot be changed.	No action.	
	Data Settings	Sequence data not found.	Not processed, due to inconsistency in the se- quence settings.	The process is canceled.	
	Data Settings	Unable to extract local ID from the process ID.	Not processed, due to inconsistency in the se- quence settings.	The process is canceled.	

Development mode

Function	Process	Message (image)	Cause	Operation after display	Remark
Common ID access		This summary CID cannot be added because it is set as a string. Check the settings file.	The specified CID is set as a string.	The process is canceled.	
		The CID is not registered in the LID/CID response list.	SPN is not set in the set- tings file. (In case of TNV-CR)	The process is canceled.	
		The CID is not registered in the LID/CID response list.	SPN is not set in the set- tings file. (In case of ISO 14229)	The process is canceled.	

Function	Process	Message (image)	Cause	Operation after display	Remark
	Processing file	File is defective. (verification error)	The file model did not match while reading the settings file.	The process is canceled.	
		File not found.	Settings file not found.	The process is canceled.	
		Writing the file failed.	For some reason (internal cause), saving the settings file failed.		
		Unable to apply the change.	The selected data cannot be changed.	The process is canceled.	
Common ID access (text)		This summary CID cannot be added because it is set as 2D or 3D map. Check the settings file.	2D, 3D maps are set in the common ID access (text) function.	The process is canceled.	
		The CID is not registered in the LID/CID response list.	SPN is not set in the set- tings file. (In case of TNV-CR)	The process is canceled.	
		The CID is not registered in the LID/CID response list.	SPN is not set in the set- tings file. (In case of ISO 14229)	The process is canceled.	
		File is defective. (verification error)	The file model did not match while reading the settings file.	The process is canceled.	
		File not found.	Settings file not found.	The process is canceled.	
		Writing the file failed.	For some reason (internal cause), saving the settings file failed.	The process is canceled.	
	Data Settings	Unable to apply the change.	When the selected data cannot be changed	No action.	

Function	Process	Message (image)	Cause	Operation after display	Remark
Address specified access		Unable to apply the change.	Out of the address range	No action.	
			The "+F" row is pressed by WORD specification.	No action.	
Data ID specified access					

■ECU Software Writing

Function	Process	Message (image)	Cause	Operation after display	Remark
Prepara- tion for writing		Copying the file to the write process sheet failed.	For some reason (internal cause), copying the down- loader file and the writing settings file failed.	The process is canceled.	
		Reading the engine production history data failed.	For some reason (internal cause), reading the engine production history data failed.		
		Reading the individual data definition file failed.	For some reason (inter- nal cause), reading the individual data definition file failed.	The process is canceled.	
		Reading the initial individual data file failed.	For some reason (internal cause), reading the initial individual file failed.	The process is canceled.	
		Reading the implement production history data failed.	For some reason (internal cause), reading the implement production history data failed.	The process is canceled.	
		Reading the specified pump correction data file failed.	For some reason (internal cause), reading the pump correction data file failed.	The process is canceled.	
		Reading the specified ROM writer data file (ZIP) failed.	For some reason (internal cause), reading the ROM writer data file (ZIP) failed.	The process is canceled.	
		Reading the specified initial individual data file (LZH) failed.	For some reason (internal cause), reading the initial individual file (LZH) failed.	The process is canceled.	

Function	Process	Message (image)	Cause	Operation after display	Remark
Prepara- tion for writing		Reading the specified ROM writer data file (LZH) failed. Copy UNLHA32.DLL to the SYSTEM32 folder.	Because the compres- sion/decompression DLL is not set, reading the ROM writer data file (LZH) failed.	The process is canceled.	
		Reading the specified initial individual data file (LZH) failed. Copy UNLHA32.DLL to the SYSTEM32 folder.	Because the compression/ decompression DLL is not set, reading the initial individual file (LZH) failed.	The process is canceled.	
		Mask processing of the map file failed.	For some reason (internal cause), reading or writing the map file failed.	The process is canceled.	
		Writing the individual data file failed.	For some reason (inter- nal cause), reading the individual file failed.	The process is canceled.	
		Reading the specified ROM writer data file (ZIP) failed.	For some reason (internal cause), extracting the ROM writer data file (ZIP) failed.	The process is canceled.	
		Reading the specified initial individual data file (ZIP) failed.	For some reason (internal cause), extracting the initial individual file (ZIP) failed.	The process is canceled.	
		Creating the write process sheet failed.	For some reason (inter- nal cause), writing the process sheet failed.	The process is canceled.	
		Custom map file not found.	For some reason (ROM writer data, internal cause), the custom map file could not be found.	The process is canceled.	
		Individual data definition file not found.	For some reason (ROM writer data, internal cause), the individual data definition file could not be found.	The process is canceled.	
		Initial individual data file not found.	For some reason (ROM writer data, internal cause), the initial indi- vidual success definition file could not be found.	The process is canceled.	
		Initial individual data file (INDEX) not found.	For some reason (ROM writer data, internal cause), the initial individ- ual data (Index) file could not be found.	The process is canceled.	

Function	Process	Message (image)	Cause	Operation after display	Remark
Prepara- tion for writing		Control map file not found.	For some reason (ROM writer data, internal cause), the control map file could not be found.	The process is canceled.	
		Mask map file not found.	For some reason (ROM writer data, internal cause), the mask map file could not be found.	The process is canceled.	
		Control program file not found.	For some reason (ROM writer data, internal cause), the control program file could not be found.	The process is canceled.	
		Several custom map files found.	For some reason (ROM writer data, internal cause), multiple custom map files are found after extracting the ROM writer data.		
		Several engine production history files found.	For some reason (ROM writer data, internal cause), multiple engine production history files are found after extracting the ROM writer data.		
		Several pump production history files found.	For some reason (ROM writer data, internal cause), multiple pump production history files are found after extracting the ROM writer data.		
		Several individual data definition files found.	For some reason (ROM writer data, internal cause), multiple individual data definition files are found after extracting the ROM writer data.		

Function	Process	Message (image)	Cause	Operation after display	Remark
Prepara- tion for writing		Several initial individual data files found.	For some reason (ROM writer data, internal cause), multiple initial individual files are found after extracting the ROM writer data.		
		Several initial individual data files (INDEX) found.	For some reason (ROM writer data, internal cause), multiple initial individual files (INDEX) are found after extracting the ROM writer data.		
		Several control map files found.	For some reason (ROM writer data, internal cause), multiple control map files are found after extracting the ROM writer data.		
		Several mask map files found.	For some reason (ROM writer data, internal cause), multiple mask map files are found after extracting the ROM writer data.		
		Several implement production history files found.	For some reason (ROM writer data, internal cause), multiple implement production history files are found after extracting the ROM writer data.		
		Several control map files found.	Multiple files are found while reading the control map file.		

Function	Process	Message (image)	Cause	Operation after display	Remark
Prepara- tion for writing		Folder "Diag_Tool" not found in the extracted ROM writer data.	Folder "Diag_Tool" not found in the extracted ROM writer data.	The process is canceled.	
		Folder "Table" not found in the extracted ROM writer data.	Folder "Table" not found in the extracted ROM writer data.	The process is canceled.	
Flash writ- ing		There is no manufacturer code that matches the license.	The manufacturer code collected from the writing process sheet could not match the manufacturer code of the license.	The process is canceled.	
		The checksum of the manufacturer code does not match.	Checksum for the manu- facturer code of the writing process sheet did not match.	The process is canceled.	
		The checksum does not match.	Checksum of the writing process sheet did not match.	The process is canceled.	
		Delete the current control program and rewrite?	Check when the ECU, H/ W, and serial No. collected from the writing process sheet did not match.	When "Yes", con- tinue processing. When "No", inter- rupt processing.	
		ECU 3N does not match.	The ECU 3N code col- lected from the writing pro- cess sheet did not match.	The process is canceled.	
		ECU H/W part number does not match.	The ECU part No. col- lected from the writing pro- cess sheet did not match.	The process is canceled.	
		ECU H/W serial number does not match.	The ECU, H/W, and serial No. collected from the map file did not match.	The process is canceled.	
		Unable to count RMNC.	The RMNC count did not match when processing the service ECU.	The process is canceled.	
		CB reset failed.	For some reason (ECU and internal cause), reset- ting in the CB area failed.	The process is canceled.	

Function	Process	Message (image)	Cause	Operation after display	Remark
Flash writ- ng		Engine serial number does not match.	The engine serial No. collected from the map file did not match.	The process is canceled.	
		Engine type does not match.	The engine model col- lected from the writing pro- cess sheet did not match.	The process is canceled.	
		Unable to change this ECU to a service ECU (RMNC error).	The RMNC count did not match when processing the service ECU.	The process is canceled.	
		Unable to change this ECU to a service ECU (TRUN error).	The TRUN count did not match when processing the service ECU.	The process is canceled.	
		Model name does not match.	The model name did not match when processing the model check.	The process is canceled.	
		Deleting Flash failed.	For some reason (ECU and internal cause), delet- ing Flash failed.	The process is canceled.	
		Communication with ECU failed.	Communication with ECU failed while writing ECU.	The process is canceled.	
		Clearing DTC failed.	Deletion failed in the dele- tion process of the DTC area.	The process is canceled.	
		ECU reset failed.	For some reason (ECU and internal cause), reset- ting ECU failed.	The process is canceled.	
		Writing for EEPROM initialization failed.	For some reason (ECU and internal cause), writing for the EEPROM initialization failed.	The process is canceled.	
		Writing initial setting data failed.	For some reason (ECU and internal cause), writ- ing the initial data failed.	The process is canceled.	

Function	Process	Message (image)	Cause	Operation after display	Remark
Flash writ- ing		Verifying the key file failed.	Verifying the key collected from the writing process sheet failed.	The process is canceled.	
		Hard check of LY3 failed.	Hard check collection of LY3 (ECU S/N) failed.	The process is canceled.	
		Writing the manufacturer code failed.	For some reason (ECU and internal cause), writ- ing the manufacturer code failed.	The process is canceled.	
		The checksum of the object does not match.	For some reason (internal cause), checksum of the object writing (APL soft- ware, map file, individual data) did not match.	The process is canceled.	
		Download of object failed.	For some reason (ECU and internal cause), downloading the object (APL software, map file, individual data) failed.	The process is canceled.	
		Reading of common data failed.	For some reason (ECU and internal cause), reading the common data failed.	The process is canceled.	
		Reading of data ID failed.	For some reason (ECU and internal cause), read- ing the data ID failed.	The process is canceled.	
		Reading of map category failed.	For some reason (ECU and internal cause), reading the map category failed.	The process is canceled.	
		Reading of EEPROM failed.	For some reason (ECU and internal cause), read- ing the EEPROM data failed.	The process is canceled.	
		SBL download failed.	For some reason (ECU and internal cause), down- loading SBL failed.	The process is canceled.	
		Security access failed.	For some reason (ECU and internal cause), the security access (program- ming mode, adjustment mode) failed.	The process is canceled.	

Function	Process	Message (image)	Cause	Operation after display	Remark
Flash writ- ing		Writing of common data failed.	For some reason (ECU and internal cause), writing the common data failed.	The process is canceled.	
		Writing of data ID failed.	For some reason (ECU and internal cause), writ- ing the data ID failed.	The process is canceled.	
		Writing of EEPROM failed.	For some reason (ECU and internal cause), writ- ing the EEPROM data failed.	The process is canceled.	
		Rewriting the fingerprint of data rewrite failed.	For some reason (ECU and internal cause), rewrit- ing the data, rewriting the fingerprint failed.	The process is canceled.	
		Rewriting the fingerprint of software rewrite failed.	For some reason (ECU and internal cause), rewriting fingerprint of the software failed.	The process is canceled.	
		Unable to connect to the ECU because the license type is limited.	Because the limited mod- els of the license function is set, the limited models do not match.	The process is canceled.	
		License key does not match.	The license key collected from the writing process sheet did not match.	The process is canceled.	
		Report format file not found.	Format file corresponding to the ECU not found.	The process is canceled.	
		Unable to perform the abnormal writing process.	Displayed when connect- ed in the programming session before executing the abnormal writing.	The process is canceled.	
		Process aborted.	The "Cancel" button was pressed while writing the ECU.	The process is canceled.	
		Reading the write settings file failed.	Reading the write settings file collected from the writing process sheet failed.		

Function	Process	Message (image)	Cause	Operation after display	Remark
Flash writ- ing		Reading the write process sheet file failed.	For some reason (internal cause), reading the writing process sheet failed.		
		Saving the report failed.	For some reason (ECU and internal cause), stor- ing the report failed.	The process is canceled.	
		This service is currently unavailable. Please restart the ECU.	For some reason (ECU and internal cause), col- lecting the parameters failed.		
		The system is currently in forced driving mode. To release the forced driving mode, it is necessary to restart the ECU.	The report parameters collection are performed while in the forced opera- tion mode.		
Flash ROM writing tool menu		Reading the download file (ZIP) failed.	For some reason (internal cause, corrupted file), reading the downloaded file failed.	The process is canceled.	
		The operation is currently not supported.	The download file type specified the files of 213, 2C3, and xx6.	The process is canceled.	
		Reading the key file failed.	For some reason (internal cause, corrupted file), reading the downloaded file failed.	The process is canceled.	
		The checksum does not match.	Checksum of the process sheet file collected from the extracted download file did not match.	The process is canceled.	
		Reading the write process sheet file failed.	Reading the process sheet file collected from the extracted download file failed.	The process is canceled.	

■ECU Software Writing

Function	Process	Message (image)	Cause	Operation after display	Remark
ECU Re- placement		Copy-protection: unable to write.	Writing failed due to the ECU copy limit.	The process is canceled.	
		Unable to apply the change.	Writing to the ECU was not allowed.	The process is canceled.	
		Verification of data failed.	The check data did not match when manually entering the ECU data.	The process is canceled.	
		The BBC of XXXXXXXXX does not match.	BCC did not match when reading the PDM file.	The process is canceled.	
		File not found.	For some reason (internal cause), the PDM file could not be found.		
		File is defective.	For some reason (internal cause), reading the PDM file failed.	The process is canceled.	
		Unable to write because the model or machine number is different.	Model or machine number of the ECU data is differ- ent.	The process is canceled.	
		Writing data to the ECU failed.	For some reason (ECU and internal cause), writ- ing the ECU failed.	The process is canceled.	
		Reading the pump interchangeability file failed.	For some reason (internal cause), reading the pump compatibility file failed. (If pump data is available.)	canceled.	
		The replacement pump is not interchangeable. Unable to write.	The replacement pump is not interchangeable. (If pump data is available.)	The process is canceled.	
		The pump part code is different. Write the correct value?	A confirmation message is displayed to check whether or not to write the data when the mode is not the developer mode, the ECU is LY3, and the pump part code is different. (If pump data is available.)	rupt processing.	

Function	Process	Message (image)	Cause	Operation after display	Remark
ECU Replacement		The pump part code is different. Unable to write.	Do not perform writing except for the developer mode or the ECU is LY3. (If pump data is available.)	The process is canceled.	
		The number is different. Write the correct value? (ECU: XXXXXXXXX / Input: XXXXXXXXXX)		When "Yes", execute writing. When "No", inter- rupt processing.	
		The engine model or engine serial number is different. Unable to write.	The engine model or en- gine serial number of the ECU data is different. (LY3 only)	The process is canceled.	
		Enter the parameter.	There is an omission in the input parameters of the ECU data. (Manual entry)	The process is canceled.	
Saving the report		Report format file not found.	For some reason (internal cause, file not installed), the format file could not be found.	The process is canceled.	
		Saving the report failed.	For some reason (ECU and internal cause), sav- ing the report failed.	The process is canceled.	

■Part Replacement

Function	Process	Message (image)	Cause	Operation after display	Remark
Pump re- placement		File not found.	The file could not be found in reading the EXCDPF file, the EXCSF file, and the EXCDOC file.	The process is canceled.	
		The BBC of XXXXXXXXX does not match.		The process is canceled.	
		Unable to apply the change.	Writing to the ECU was not allowed in writing the part replacement.	The process is canceled.	
		Unable to write because the model or machine number is different.	Model or machine number of the ECU data is differ- ent.	The process is canceled.	

Function	Process	Message (image)	Cause	Operation after display	Remark
Pump re- placement		Writing data to the ECU failed.	For some reason (ECU and internal cause), writ- ing the ECU failed.	The process is canceled.	
		Reading the pump interchangeability file failed.	For some reason (internal cause), reading the pump compatibility file failed.	The process is canceled.	
		The replacement pump is not interchangeable. Unable to write.	When the replacement pump is not compatible.	The process is canceled.	
		The pump part code is different. Write the correct value?	A confirmation message is displayed to check whether or not to write the data when the mode is not the developer mode, the ECU is LY3, and the pump part code is different.	rupt processing.	
		The pump part code is different. Unable to write.	Do not perform writing except for the developer mode or the ECU is LY3.	The process is canceled.	
		The number is different. Write the correct value? (ECU: XXXXXXXXX / Input: XXXXXXXXXX)	A confirmation message is displayed to check whether or not to write data when the name of the pump model matches up to the 11th character.	When "Yes", execute writing. When "No", inter- rupt processing.	
		The engine model or engine serial number is different. Unable to write.	The engine model or en- gine serial number of the ECU data is different. (LY3 only)	The process is canceled.	
		Enter the parameter.	There is an omission in the input parameters of the ECU data.	The process is canceled.	
		Verification of data failed.	The check data did not match when reading the EXCDPF file, the EXCSF file, the EXCDOC file and the old ECU data.	The process is canceled.	
			The check data did not match when manually entering the ECU data.	The process is canceled.	
Injector replace- ment		File is defective.	For some reason (internal cause), reading the PDM file failed.	The process is canceled.	

Function	Process	Message (image)	Cause	Operation after display	Remark
Injector replace- ment		File not found.	For some reason (internal cause), the PDM file could not be found.	The process is canceled.	
		The BBC of XXXXXXXXX does not match.	BCC did not match when reading the PDM file.	The process is canceled.	
		Unable to apply the change.	Writing to the ECU was not allowed.	The process is canceled.	
		The data is defective. Enter it again.	The data is defective in the injector data entry.	The process is canceled.	
		Writing data to the ECU failed.	For some reason (ECU and internal cause), writ- ing the ECU failed.	The process is canceled.	
Common	Saving the report	Report format file not found.	For some reason (internal cause, file not installed), the format file could not be found.	The process is canceled.	
		Saving the report failed.	For some reason (ECU and internal cause), sav- ing the report failed.	The process is canceled.	

■Part Replacement

Function	Process	Message (image)	Cause	Operation after display	Remark
Operation data col- lection		Reading the unique ID table failed.	Occurs when the unique ID table file does not exist and the reading failed. (Opinf_UniqueID (K).tbl)	The process is canceled. Interrupt the operation data collection and re- turn to the main menu.	
		Reading the working machine initial setting table failed.	Occurs when the initial setting table file does not exist and the reading failed. (Opinf_InitSet (K).tbl)	The process is canceled. Interrupt the operation data collection and re- turn to the main menu.	
		Reading the data table for initial setting acquisition failed.	Occurs when the initial setting collection table file does not exist and the reading failed. (Opinf_InitItemInfo.tbl)	The process is canceled. Interrupt the operation data collection and re- turn to the main menu.	

Function	Process	Message (image)	Cause	Operation after display	Remark
Operation data col- lection		Reading the operation data auxiliary setting table failed.	Occurs when the opera- tion data auxiliary setting table file does not exist and the reading failed. (Opinf_Setting_Sub.tbl)	The process is canceled. Interrupt the operation data col- lection and return to the main menu.	
		Reading the display format file failed.	Occurs when the display format file does not exist and the reading failed. "xxxx" of the file name is the support information number received from the ECU. (Opinf_Setting_XXXX.tbl)	Although the screen (inte- grated value, map, log) is not displayed, the data can be saved. Process- ing continues.	
		Saving failed.	Occurs when saving the data failed, such as the specified folder does not exist at the time of storing the operation data file (for storing SA-D and upload- ing to the server), and the file with the same file name exists.	Processing con- tinues, because the screen can be displayed.	
Refer to the save data.		Select a file.	Occurs when the section button is clicked without selecting the save data on the list on the screen.	Display the warn- ing only.	
		Save data not found.	Occurs when there are no SA-D save data files in the specified folder. (MngData\OperationData)		
Operation time man- ual entry screen		No			
Connec- tion pur- pose entry screen		The connection purpose is not selected.	Occurs when the OK button is clicked without selecting the connection purpose.	It does not occur except for incorrect setting or damage data of the settings file. If this occurs, a forced exit is required.	
Integrated value in- formation screen		Mean value data not found.	Occurs when the relevant average values for the displayed data could not be found at the time of clicking the average value display button.		
		Reading the mean value file (by model and year) failed.	Occurs when the relevant average values for the displayed data is found but the mean value file (by model and year) could not be found at the time of clicking the average value display button and the reading failed.		
		Reading the unique ID table failed.	Occurs when the unique ID table file does not exist and the reading failed. (Opinf_UniqueID (K).tbl)		
		Reading the save data failed.	Occurs when the read- ing failed including the incorrect data file format selected on the data se- lection screen at the time of clicking the save data display or reference data display button.	Return to the integrated value screen display without reading the relevant data.	

Function	Process	Message (image)	Cause	Operation after display	Remark
Integrated value in- formation screen		Reading the display format file failed.	Occurs when the display format file does not exist and the reading failed. "xxxxx" of the file name is the support information number received from the ECU. (Opinf_Setting_XXXXX. tbl)		
		Maintenance data not found.	Occurs when the relevant maintenance information for the displayed data could not be found at the time of clicking the mainte- nance information button.		
		Reading the maintenance data failed.	Occurs when the relevant maintenance information for the displayed data is found but the maintenance information file does not exist and the reading failed.		
		Excel write settings file (XXXXXXXXX) not found.	Occurs when the display format file does not exist and the reading failed. "xxxxx" of the file name is the support information number received from the ECU. (Opinf_Setting_XXXXX. tbl)		
		Excel template file (XXXXXXXXX) not found.	Occurs when the template file for EXCEL output does not exist. "xxx" of the file name is described in the display format file. (Opinf_E_Template_XXX (K).xls)		
		The operation failed because writing to the save file failed. Check that the writing file is not open and perform the operation again.	Occurs when copying to the specified location of the template file for EXCEL output failed or the file with the same file name exists.		
		Unable to open Excel write settings file (XXXXXXXXX).	Occurs when opening the file failed including the display format file exists but the other program is opened for exclusive operation. (Opinf_Setting_XXXXX. tbl)		
		Unable to open Excel file (XXXXXXXXX).	Occurs when the EXCEL file could not be created.		
		Writing to Excel failed.	Occurs when a program error occurred during the EXCEL output.		
		Make a selection.	Occurs when the clear button is clicked without selecting the clear item.		

Function	Process	Message (image)	Cause	Operation after display	Remark
Integrated value in- formation screen		Saving the maintenance data clear table failed.	Occurs when the file could not be created or the specified folder for the maintenance clear table file could not be found at the time of clicking the clear button.		
Map screen		Reading the unique ID table failed.	Occurs when the unique ID table file does not exist and the reading failed. (Opinf_UniqueID (K).tbl)		
Log screen		Reading the unique ID table failed.	Occurs when the unique ID table file does not exist and the reading failed. (Opinf_UniqueID (K).tbl)		
Opera- tion data download		Operation is not possible because the server is offline.	Occurs when tried to display the operation data download screen in the offline condition (not con- nected to the server).	Without display- ing the operation data download screen, return to the main menu.	
		Enter the nameplate model with 2 letters or more.	Occurs when the entry is not made in "nameplate model", or less than 2 characters are entered and the search button is clicked.	Search is not conducted.	
		Enter the user ID.	Occurs when the search button is clicked without entering "User ID" while the "Specified User ID No." is selected for the "Data Search Object".	Search is not conducted.	
		Enter the month with a number from 1 to 12.	Occurs when the numeric value except for 1 to 12 for "Month" of "Upload Date" or "Collection Date" is entered and the search button is clicked.	Search is not conducted.	
		Enter the year.	Occurs when only the "Month" is entered and not the "Year" in "Upload Date" or "Collection Date" and the search button is clicked.	Search is not conducted.	
		Creating the operation data list request file failed.	Occurs when the XML file for server request could not be created, such as the specified folder does not exist or could not be written.	Search is not conducted.	
		Process aborted.	Displayed when searching or downloading is inter- rupted.		
		Download of operation data list request response failed.	Occurs when there is no response for the search result from the server.		

Function	Process	Message (image)	Cause	Operation after display	Remark
Opera- tion data download		Communication during download of operation data list request response failed. Error code: XXXXXXXXX Message: XXXXXXXXXX	Occurs when an error oc- curred on the server side.		
		Response error Error code: XXXXX	Occurs when the search result response from the server is an error.		
		More than 300 search results. Narrow down the search parameters.	Occurs when the search result exceeds the speci- fied number (300 items).	Search is not conducted.	
		Select the operation data that you want to download.	Occurs when the down- load button is clicked with- out selecting the operation data for download.	1 1	
		Download of operation data failed.	Occurs when the specified operation data could not be downloaded.		
		Incorrect file.	Occurs when the down- loaded operation data is structurally incorrect.		
		Moving the operation data download file failed.	Occurs when the down- loaded operation data could not be moved to the specified folder, such as the folder does not exist.		

Data Management

Function	Process	Message (image)	Cause	Operation after display	Remark
Import	Select	Select a category.	"Import" is executed with- out selecting the section.	No action. Return to the data manage- ment screen.	
		Select a type.	"Export" is executed with- out selecting the type.	No action. Return to the data manage- ment screen.	
	Execute		Importing a file with the file format that does not belong to the selected section or type was at- tempted.	No action. Return to the data manage- ment screen.	

Function	Process	Message (image)	Cause	Operation after display	Remark
Import	Execute	Registration of XXXXXXXX failed. Retry?	When saving the file failed for some reason.	Press "Yes" to retry on the same file. Press "No" to not register and pro- cess the next file. Press "Cancel" to abort the process.	
		XXXXXXXXX is already registered. Overwrite?	Overwriting check when the file is already regis- tered.	Press "Yes" to overwrite. Press "No" to not overwrite and pro- cess the next file. Press "Cancel" to abort the process.	
		Model XXXXXXXX or machine number XXXXX is already registered. Overwrite?	Confirming to overwrit- ing when the file with the same format and machine number is registered for the ECU software and pump correction values.	Press "Yes" to overwrite. Press "No" to not overwrite and pro- cess the next file. Press "Cancel" to abort the process.	
Export	Select	Select a category.	"Export" is executed with- out selecting the section.	No action. Return to the data manage- ment screen.	
		Select the data that you want to export.	"Export" is executed with- out selecting the export data.	No action. Return to the data manage- ment screen.	
	Execute	XXXXXXXXX is already registered. Overwrite?	The file for export already exists in the output destination (same file name).	Press "Yes" to export by over- writing the file. Press "No" to cancel the opera- tion.	
		Unable to export the specified data.	When trying to export a file that cannot be exported.	No action. Return to the data manage- ment screen.	
		Unable to export the specified data because the data was imported.	The file that was attempted to export cannot be exported because it is an imported file.	No action. Return to the data manage- ment screen.	
		Data export failed.	For some reason (internal cause), the export failed.	The process is canceled. Return to the data manage- ment screen.	
Delete	Select	Select a category.	"Delete" is executed with- out selecting the section.	Press "OK" to return to the data management screen.	
		Select the data that you want to delete.	"Delete" is executed without selecting the data to be deleted.	No action. Return to the data manage- ment screen.	

Function	Process	Message (image)	Cause	Operation after display	Remark
Delete	Select	Deleting XXXXXXXX failed.	For some reason (internal problem), it cannot be deleted.	The process is canceled. Return to the data manage- ment screen.	
Memo Edit	Select	Select a category.	"Memo Edit" is executed without selecting the sec- tion.	No action. Return to the data manage- ment screen.	
		Select the data (memo) that you want to edit.	"Memo Edit" is executed without selecting the data.	No action. Return to the data manage- ment screen.	
		Unable to edit because the memo was not found.	When there is no memo area in the data.	The process is canceled. Return to the data manage- ment screen.	
	Save	Saving the memo failed.	For some reason (internal cause), the memo regis- tration failed.	The process is canceled. Return to the data manage- ment screen.	

Manual

Function	Process	Message (image)	Cause	Operation after display	Remark
Download		Operation is not possible because the server is offline.	The "Manual" menu of the main menu is selected when the server is offline.	The process is canceled.	
		No manual selected for download.	The "Download" button is clicked without selecting the manual.	The process is canceled.	
		Download failed. Cancel process?	For some reason (internal cause or communication cause, etc.), downloading failed.	Press "Yes" to continue down- loading the next manual. Press "No" to interrupt downloading.	
		ZIP file not found.	The manual file (ZIP file) could not be downloaded.		
		Acquiring the manual list failed.	There was a problem while downloading the manual list.	The process is canceled.	

Function	Process	Message (image)	Cause	Operation after display	Remark
Initializa- tion and folder check		The data for the service manual of the acquired model does not exist.	Manual not found.		
Initializa- tion and folder check	Execute	Select the product name.	The "OK" button was clicked without selecting the product in the product selection screen.	The process is canceled.	
Search and review	Execute	Select the product name.	The "OK" button was clicked without selecting the product in the manual product selection screen.	The process is canceled.	
		The manual does not exist.	There is no manual for the selected product in the manual product selection screen.		
Delete	Execute	Select a manual.	The "OK" button was clicked without selecting the manual to be deleted in the manual deletion screen.	The process is canceled.	
		Unable to delete XXXXXXXXXXX.	There is no selected manual in the manual deletion screen.	The process is canceled.	

Service bulletin link

Function	Process	Message (image)	Cause	Operation after display	Remark
Download	Main Menu	Update of error diagnosis data in progress. The selected function can affect operation. Abort data update and execute the selected function?	Check when the ECU connection operation is selected while download- ing.	Press "Yes" to interrupt downloading and execute the se- lected process. Press "No" to continue downloading and do not execute the selected process.	
News Display	Detail display	Select the attachment file.	The "Selection" button was clicked on the news detail screen without selecting the attached file.	No action. Return to the bulletin detail screen.	
			Although the attached file was selected on the news detail screen, the specified file could not be found.	No action. (The attached file is not opened.) Return to the bulletin detail screen.	

■J1939 line monitor

Function	Process	Message (image)	Cause	Operation after display	Remark
Line moni- tor	Save		For some reason (real- time log is lost or could not be read), the log file could not be stored.	The process is canceled.	
			specified folder.	"Yes" to save and overwrite. "No" to cancel saving.	
	Start	J1939 log was not saved.		The process is canceled.	
Save Data	Reading		For some reason, the log file is broken or the log file in different format is read.	The process is canceled.	

Saving the ECU Storage Data

Function	Process	Message (image)	Cause	Operation after display	Remark
ECU Stor- age Data	Reading	File not found.	The selected data file does not exist.	canceled.	Does not happen under normal circumstances.
	Save	Saving the ECU data failed.	For some reason, saving failed.	canceled. (Not	Does not happen under normal circumstances.
Measure- ment data	Reading	Same as the ECU storage data			

Operation after Function Process Remark Message (image) Cause display Common Process aborted. When processing is The process is server aborted by the cancel butcanceled. communi ton while communicating cation to the server Communication failed. This occurs when the The process is Display the con-Error code: % content of the "Status" tag canceled. tent of the server Message: % is "False" response tags (* This is improbable in 'errorcode" and the current specification message". according to YISS.) Response error This occurs when an un-The process is Display the con-Error code: % defined response code is canceled. tent of the "respreceived from the server. code" tag. If the "resp-code' Common Specified model not found. This occurs when the The process is server response code 10 is canceled. tag has the value communi received from the server "10" cation Specified machine number not found. This occurs when the If the "resp-code' The process is . canceled. tag has the value response code 20 is received from the server. "20". The number of digits for the serial number is incorrect. This occurs when the The process is If the "resp-code' response code 30 is canceled. tag has the value received from the server. "30" License not found This occurs when the The process is If the "resp-code' response code 40 is canceled. tag has the value received from the server. "40". No applicable object found. This occurs when the The process is If the "resp-code' response code 50 is canceled. tag has the value received from the server. "50". If the "resp-code' Exchange in progress. This occurs when the The process is response code 60 is canceled. tag has the value received from the server. "60". ECU is use. This occurs when the The process is If the "resp-code' response code 70 is canceled. tag has the value received from the server. '70". Parts exchange data is corrupt. This occurs when the The process is If the "resp-code' response code 80 is canceled. tag has the value received from the server. "80".

Download/Upload (ECU software related)

Function	Process	Message (image)	Cause	Operation after display	Remark
Common server communi- cation		Data server process faulty. Please contact the administrator.	This occurs when the response code 99 is received from the server.	The process is canceled.	If the "resp-code" tag has the value "99".
ECU list download		Enter the model and machine number.	This occurs when the clear transmission button was pressed without entering the model or machine number.	The process is canceled.	
		Specified model is not an engine model. Enter the model again.	This occurs when the ma- chine model was entered despite the engine being selected on the machine selection screen.	The process is canceled.	
		Specified model is not the model of this machine. Enter the model again.	This occurs when the engine model was entered despite the engine being selected on the engine and machine selection screen.	The process is canceled.	
ECU write download		Select an item for download.	This occurs when the transmission button was clicked without selecting (ticking) the download item.	The process is canceled.	
		Enter the serial number.	This occurs when the transmission button is pressed without enter- ing the serial number for ECU replacement (actual machine/desktop) only.	The process is canceled.	
		Reading the download file (ZIP) failed.	This occurs when the ECU software ZIP file does not exist and could not be stored in the specified file.	The process is canceled.	
Part Re- placement	Pump re- placement	Enter the model and machine number.	This occurs when the clear transmission button was pressed without entering the model or machine number.	The process is canceled.	
		Select an item for download.	This occurs when the transmission button was clicked without selecting (ticking) the download item.	The process is canceled.	
Custom map		Enter the model and machine number.	This occurs when the clear transmission button was pressed without entering the model or machine number.	The process is canceled.	
		Select an item for download.	This occurs when the transmission button was clicked without selecting (ticking) the download item.	The process is canceled.	

Function	Process	Message (image)	Cause	Operation after display	Remark
Replace- ment Data Upload (Replace- ment complete)			This occurs when the transmission button was pressed without selecting (ticking) the upload item.	The process is canceled.	
	Replacement canceled		This occurs when the transmission button was pressed without selecting (ticking) the upload item.	The process is canceled.	

15. Attached Documents

FMI	Content
0	The data is valid, but exceeds the normal operation range. (Upper limit exceeded)
1	The data is valid, but does not reach the normal operation range. (Lower limit exceeded)
2	The data is unstable, intermittent, and inappropriate. (Intermittent fault)
	The voltage exceeds the normal operation range or short-circuited on the high-voltage side. (Signal fault
3	upper limit)
1	The voltage does not reach the normal operation range or short-circuited on the low-voltage side. (Signal
4	fault lower limit)
5	The current does not reach the normal operation or the circuit is open. (Electric current fault low)
6	The current does exceeds the normal operation or the circuit is grounded. (Electric current fault high)
7	The machine system is not reacting or misaligned. (Machine system fault)
8	The rotational speed or pulse width/cycle is faulty. (Rotational speed, pulse width fault)
9	The update ratio is faulty. (Smart sensor and actuator fault)
10	The rate of change is faulty. (Rate of change fault)
11	The error code is unknown. (Incorrect sub-system error code)
12	There is a problem in the intelligent device/component. (Intelligent device problem)
13	Unable to calibrate. (Calibration disabled)
14	This is a special command. (Special command)
15	Normal. (Normal)