Multi Use Tester III MUT-III Instruction Manual





Preface

This instruction manual provides information about MUT-III functions, operating procedures and other details.

An understanding of the functions and operating procedures for both the MUT-III system and the Vehicle Communication Interface (referred to as V.C.I. hereafter) will allow users to perform precise and efficient fault diagnosis for vehicle-mounted Electronic Control Units (referred to as ECU hereafter) that can be serviced with the MUT-III.

Please ensure that this instruction manual is read completely prior to using the MUT-III system, as the operating procedures may vary, depending upon the particular type of vehicle electronic control unit.

Please note that the information described within this manual may not be fully consistent with certain products, due to specification changes or version upgrades.

Table of Contents

Chapter 1 Product Overview	1
1-1. Precautions	2
1-2. V.C.I. Exterior Diagram and Part Names	3
1-3. Description and Usage of MUT-III Components	4
1-4. Harness Connection Procedures and Connection Order	6
1-5. Connection Harness and Vehicle Combinations	7
Chapter 2 MUT-III Functions	
2-1. Basic Functions	8
2-2. V.C.I. Function	8
Chapter 3 MUT-III Operating Procedures	10
3-1. Start-Up Procedures for PC and MUT-III System	11
3-2. Description of Operating Screens	12
3-3. Description of Buttons on the Operating Screens	13
3-4. Operating Procedures for the MUT-III System	15
3-5. Shutdown Procedures for the PC and MUT-III System	17
3-6. Removing a memory card from PC	18
Chapter 4 Operating Procedures for Diagnostic Functions	19
4-1. Operating Procedures for Diagnostic Trouble Codes (DTCs)	20
4-2. Operating Procedures for the Data List	21
4-3. Operating Procedures for the Actuator Test	31
Chapter 5 Operating Procedures for the Drive Recorder	
5-1. Recording with the Drive Recorder	
5-2. Handling the Recorded Data	51
5-3. Analyzing Recorded Data	

Chapter 6 Operating Procedures for Measurement Functions	. 62
6-1. Operating Procedures for Measurement Functions	63
Chapter 7 Other functions	. 64
7-1 Operating Procedures for V.C.I. Stand-alone Diagnosis	66
7-2 Operating Procedures for the Engine VIN Writing	70
7-3 Operating Procedures for Immobilizer Registration	71
7-4 Operating Procedures for Pulse Converter	74
7-5 Operating Procedures for the OBD-II Test Mode menu	76
7-6. Operating Procedures for Air Suspension Calibration	79
7-7 Operating Procedures for Language Switching	82
Chapter 8 Troubleshooting Measures	. 83
8-1. Troubleshooting Measures Classified by Symptom	83
Chapter 9 Reference	. 84
9-1. V.C.I. Electrical Properties	84
Appendix	. 85
<glossary></glossary>	85

For Your Safety

To ensure proper use of this product and prevent personal injury and property damage, various graphic displays are used in the user's manual. The graphic displays and respective meanings are described below.

🋕 Warning	Warning messages alert you to a procedure or practice which, if not followed correctly, could lead to death or serious injury.
£ Caution	Caution messages alert you to a procedure or practice which, if not followed correctly, could lead to serious injury and/or property damage.

lcon	The	S	symbol alerts you to a prohibited action.
Examples	The	0	symbol alerts you to an action that must be enforced.

<u> </u>	Varning
 Drivers should not operate the unit while driving. Operating the unit while driving may result in a traffic accident. 	Do not plug in or unplug the power AC adapter with wet hands. • Doing so results in the risk of electric shock.
 When using the cigarette lighter plug to supply power to the V.C.I. unit, be sure the power voltage supplied is DC32V or less. Applying a voltage greater than DC32V results in the risk of fire. MUT-III as provided to dealers includes 12V accessory / cigarette lighter plug adapter to power MUT-III during extended test drives. 	 Maximum voltage the V.C.I. can withstand is 40V. Do not use the V.C.I. on systems greater than the 32-volt system mentioned previously. Violating this requirement results in the risk of a ground fault, damage and/or electric shock.
	\otimes

🔔 Wa	arning
The V.C.I. screen is liquid crystal display or LCD. In the unlikely event that the display breaks due to impact, do not let your skin come in contact with the LCD fluid. If your skin comes in contact with the LCD fluid, wash your skin thoroughly with water. If skin rash or abnormality occurs seek medical attention from a doctor.	Do not use the unit if the power AC adapter plug or cord is damaged or plugging into the outlet is loose. Use under such conditions may result in electric shock, an electric short and/or fire.
Be sure to hold the harness connector when disconnecting from the vehicle. Do not disconnect the harness by pulling on the cord. Pulling the cord rather than the connector may result in damage to the lead wire inside the cord, thereby causing a short and possibly starting a fire.	Unplug the power AC adapter from the outlet when the unit is not in use. Failure to do so may result in injury, burns, electric shock caused by insulation deterioration, or fire due to a short circuit.



When the harness is connected to the V.C.I., be sure to check the top and bottom of the connector and connect the harness perpendicularly to the connector of the V.C.I.

Connecting at an angle may result in bending of the pins of the connector.

Check for the secure connection of the harness before tightening of the screw locks.

The bent pin may contact the connector case, thereby causing an electric short which leads to damage to the V.C.I.



Please Note

Do not expose the PC or V.C.I. to direct sunlight or high temperatures, or leave the unit in sun-heated cars. Such action may result in system failure.

Store the PC and V.C.I. in a dry environment at room temperatures.

Moving the PC and V.C.I. to a location with a very different temperature and humidity than that of the previous location may result in external or internal condensation. Caution is required.

Protect the PC and V.C.I. from exposure to elements such as rain, dirt, dust, food and liquids.

Be careful when handling the PC and V.C.I. Dropping the units may result in damage.

Do not expose either unit to engine oil, gasoline, antifreeze or battery acid. Also, do not clean the PC or V.C.I. case using solutions such as thinner or benzene. Doing so may result in deterioration of the case surface.

Prior to connecting the MUT-III main harness between the V.C.I. and vehicle, turn the IG switch to OFF.

Connecting the V.C.I. harness with the IG switch ON may damage the V.C.I. programming.

Use only the power AC adapter included with the PC (or approved replacement), power cigarette plug, other probes, main harness and other cables.

Use of unspecified parts may result in damage or malfunction due to excess voltage or insufficient contact.

The LCD display of this unit turns off when the supplied voltage is less the DC 8V. This is not an error. The power supplied should be from 8VDC to 32VDC.

Keep all V.C.I. connectors and openings away from dirt and static electricity. Exposure to dirt and static electricity may result in malfunction and damage.

Chapter 1 Product Overview

1-1.	Precautions	.P.2
1-2.	V.C.I. Exterior Diagram and Part Names	.P.3
1-3.	Description and Usage of MUT-III Components	.P.4
1-4.	Harness Connection Procedures and Connection Order	.P.6
1-5.	Connection Harness and Vehicle Combinations	.P.7

1-1. Precautions



- Be sure to follow all basic service work precautions when using MUT-III during vehicle inspection and service work.
- For detailed information regarding service work precautions, refer to the service instruction manual of each vehicle.



- When performing vehicle inspection work at the work site with the engine running, either use an exhaust gas discharger or ventilate the area sufficiently.
- When working on a vehicle, be sure to apply the parking brake and set wheel chocks in place to
 prevent the car from moving.



Driving Precautions

- If you wish to use MUT-III while driving the target vehicle, first verify that all parts are properly assembled.
- While driving, always have an assistant operate MUT-III.
- Be sure that the MUT-III maintenance harness and other cables will not interfere with driving.
- Install and remove the PC and V.C.I. with the vehicle parked, IG switch OFF.

PC Usage Limitations



Do Not Install Software on the PC

- The MUT-III PC is a special service tool. Do not install any software other than MUT-III software provided by MMNA onto the unit. Installation of other software results in the risk of MUT-III system failure.
- Any unauthorized software will not be supported. Technical support for units with unauthorized software will be charged additional technical support fees to return the unit to its authorized state of operation.
- All unauthorized software will be erased with each new upgrade.

1-2. V.C.I. Exterior Diagram and Part Names

Part names for the main unit are shown in the figure below.



(1) V.C.I. (MH062927)

1-3. Description and Usage of MUT-III Components







- 1. When Connected to PC
 - Provides ECU fault diagnosis (interactive fault diagnosis)
- 2. V.C.I. Stand-Alone Usage (usage while disconnected from PC)
 - Drive recorder

The V.C.I. can be utilized, without modification, for both 12V / 24V vehicles.



- (2) Harness, MUT-III TYPE-B (MH062962) This harness is used to connect the V.C.I. to a vehicle. Power can be supplied to the V.C.I. via the cigarette lighter plug, depending upon the particular model of vehicle. Refer to section 1-5 for connection of harness and vehicle combinations.
- (3) Harness, MUT-III TYPE-C (MH062930) This harness is used for checking or data recording of the Air Suspension ECU, manufactured by WABCO. This harness is used with Air Suspension I/F Cartridge.



(4) Harness, MUT-III TYPE-D (MH062951) This harness is used as an extension for TYPE-B/TYPE-E harnesses.



(5) Harness, MUT-III TYPE-E (MH063661) (MH063662) Only for Europe. This harness is used to connect the V.C.I. to a vehicle. Refer to section 1-5 for connection of harness and vehicle combinations.

Please refer to the service guide for each vehicle.





(11) I/F Cartridge

The I/F Cartridge is used to perform special functions that cannot be performed by the V.C.I. alone.

The following I/F Cartridges, which are from the MUT-II, can be utilized:

- Electronic Governor I/F Cartridge
- Air Suspension I/F Cartridge

1-4. Harness Connection Procedures and Connection Order

To perform diagnostics, first connect the cabling by following the procedures described below.

- [1] Restart the PC.
- [2] Connect one end of the USB cable to the V.C.I.
- [3] Connect the other end of the USB cable to the PC.
- [4] Connect the MUT-IIIharness to the V.C.I.
- [5] Connect the MUT-IIIharness to the vehicle's diagnostic connector.
 * To disconnect the cabling, reverse the above procedures:
- [6] Turn the V.C.I. power switch ON and check to ensure that the indicator lamp, located in the upper right corner of the LCD screen, illuminates in green.
- [7] Start up the MUT-III system software on the PC and turn the vehicle ignition switch ON to begin performing diagnostics.
 - * If the version of the V.C.I. software installed in the PC is different from the version of the firmware within the V.C.I. itself, then a V.C.I. software version upgrade will be initiated. If a version upgrade error occurs, restart the V.C.I. while simultaneously depressing the button on the V.C.I., in order to resume diagnostic testing.



<Connecting the USB Cable to the PC>



Open the lid covering the USB port, which is located on the Right side of the PC and indicated by the \leftarrow symbol. Plug the USB connector into the port.



<Connecting the Trigger Harness>

Connect the trigger harness to the trigger port of the V.C.I.

<Connecting the Measuring Adapter and Probes>



Connect the Measuring Adapter to the V.C.I. trigger port then connect the measuring probes to the adapter, matching the color of each probe plug to the appropriate color on the adapter jack.

1-5. Connection Harness and Vehicle Combinations

- Connect either a "TYPE-B" or "TYPE-C" or "TYPE-E " harness to the vehicle's 16-pole / 12-pole connector and perform fault diagnosis.
- A "TYPE-D" harness can be utilized as an extension for "TYPE-B / TYPE-E" harnesses.
- Use a combination of harnesses, either a "TYPE-B" or "TYPE-C" or "TYPE-E " (O), and either a "TYPE-D" or "Drive recorder" (•), depending upon the performing operation.

Harness Name	01	02	03	04	05
Vehicle	TYPE-B	TYPE-C	TYPE-E	TYPE-D	Drive recorder
~EURO3, ~EPA04, ~Taiwan 3rd terms	0			•	
EURO4~, EPA07~, Taiwan 4th terms~, EURO3(Limited country* ¹)~			0	•	•
Equipped with Air Suspension manufactured by WABCO		0			

*1 : Thailand, Chile

	Harness Name	Appearance
01	TYPE-B MH062962	
02	TYPE-C MH062930	
03	TYPE-E MH063661 MH063662(Only for Europe.)	
04	TYPE-D MH062951	
05	Drive recorder MH063663	

Chapter 2 MUT-III Functions

2-1. Basic Functions

- The MUT-III can be utilized for all types of vehicle electronic control units (incorporating the diagnostics function).
- The MUT-III reads each diagnostic code and displays it as a name.
- Using serial communications, the MUT-III reads the RAM data (data list) within the ECU that is required for servicing, thus enabling the display of both graphs and numeric values converted to physical quantities. (Only for ECUs that support serial communications.)
- The MUT-III can forcibly drive or forcibly stop the actuators required for servicing. (Only for ECUs that support serial communications.)
- Using its voltage measuring function, the MUT-III can measure DC voltage ranging from +/-40V.
- Using its resistance measuring function, the MUT-III can measure resistance ranging from 0 ~ 100kOhm.

2-2. V.C.I. Function

<Using the V.C.I. with a PC>



2-2-1. Fault Diagnosis

The V.C.I. can perform fault diagnosis by receiving commands from a PC and communicating with a vehicle ECU.

*The buttons on the V.C.I. will not function while it is connected to a PC.

[Start-up Screen]

• The screen to the left will be displayed when the USB cable is connected to the main unit.

The direction of signal flow between the PC and the V.C.I. will be indicated by an arrow, such as [P->V] or [P<-V].

<Using the Stand-Alone V.C.I.>





2-2-2. Measurement Functions: Voltmeter / Ohmmeter

The V.C.I. can read voltage / resistance values that are applied to its trigger port, displaying these numeric values on its LCD screen.

- (1) Connect the Measuring Adapter to the V.C.I. trigger port then connect the measuring probes (MB991499, etc.) to the adapter, matching the color of each probe plug to the appropriate color on the adapter jack.
- (2) Connect the vehicle to the V.C.I. using the appropriate harness, then turn the V.C.I. power switches ON.
- (3) Press the voltage button to select either the Voltmeter or the Ohmmeter from the main menu (refer to the photo at left) then press the voltage button to perform the measurement.

<For Your Reference>

- DC voltages ranging from +/-40V can be measured.
- Resistance values ranging from 0 ~ 100kOhm can be measured.

Chapter 3 MUT-III Operating Procedures

3-1.	Start-L	Ip Procedures for PC and MUT-III SystemP.11
3-2.	Descri	ption of Operating ScreensP.12
3-3.	Descri	ption of Buttons on the Operating ScreensP.13
3-4.	Opera	ting Procedures for the MUT-III System
	3-4-1.	Selecting Desired FunctionsP.15
	3-4-2.	Help Screen FunctionsP.16
	3-4-3.	Displaying the Instruction ManualP.16
3-5.	Shutdo	own Procedures for the PC and MUT-III System
	3-5-1.	Shutdown Procedures for the MUT-III SystemP.17
	3-5-2.	Shutdown Procedures for the PCP.17
3-6.	Remov	ving a memory card from PC
	3-6-1.	Removal Procedures for a memory card from PCP.18

3-1. Start-Up Procedures for PC and MUT-III System

[PC Start-Up]

[Entering User Name / Password]



[MUT-III Start-Up]

E FUSO MUT-Ⅲ [Enlarged View of Icon] Power up the PC. Wait for the Windows operating system to start up.

For more detailed PC operating instructions, please refer to the instruction manual included with the PC.

Once Windows is running, the logon dialogue will be displayed.

Enter both the user name and the password to logon as an administrator, then select the "OK" button.

Once the desktop screen is displayed, touch the "FUSO MUT-III" icon, which is located on the desktop, twice quickly. This action will start MUT-III.

Information about Trademarks

- Microsoft[®], WindowsXP[®] and Internet Explorer[®] are trademarks and registered trademarks of Microsoft Corporation in the USA and other countries.
- Acrobat Reader Copyright 1987-2001 Adobe Systems Incorporated. All rights reserved. Adobe, Adobe logo, Adobe Acrobat and Adobe Acrobat logo are trademarks of Adobe Systems Incorporated.

3-2. Description of Operating Screens

<Start-Up Screen>



<Diagnostic Screen>

Self-d	diagnostic - Microsoft Internet Explorer		
	Sel	f-diagnostic E401010200	
	POWERTRAIN ENGINE Self-diagn stic		This screen displays titles for 3
	Diagnostic trouble code		hierarchies, in order to allow the user to
	DTC Name	DTC Procedures	-
		From Service Manual	understand which operation is currently
		PAST DTC display	rupping in each aveter
			running in each system.
			Selecting a different tab from the upper
⊩		Diagnostic Trouble Code Erasing	S 11
		▼	part of the screen will not change the
E		Freeze Frame Data	title displayed.
		_	
L	No DTC's found.		
Part	t Number.""""""""""""""""""""""""""""""""""""	SCC. E904	
	A 12 S 7		

3-3. Description of Buttons on the Operating Screens

The names and functions for the button icons are as follows:

Button Image		Deffer News	Button Function		
English	Except English	Button Name	Button Function		
FUSO	FUSO Main menu F		Returns the screen to the main menu.		
		Return Home	Returns the screen to the start screen.		
ì	ì	Return one level	Returns the screen to the upper layer screen.		
S		Print screen	Print the screen image.		
?	?	Help	Displays online help.		
\checkmark	\checkmark	OK or YES	Determines an outcome.		
\gg	\times	Cancel	Cancels the operation or closes the screen.		
		Select drive	Select drive		
		Select folder	Select folder		
	A	View vehicle information	Displays vehicle information.		
ltem #		Select item	Select an item.		
		Item group registration	Item group is registered.		
) I	Item group clearance	Registered item group is cleared.		
∎î	Ļ	Item sort	Sorts a chosen item.		
		View text	Displays text.		
	łł	View graph1	Displays four items on four graphs.		
***	***	View graph2	Displays (overwrites) four items on one graph.		
₩ I I I I I I I I I I I I I I I I I I I	₹	Change time scale	Changes the graph display time scale.		
() <u> </u> ()	() 	Change data scale	Changes the graph display time scale.		
Save			Sets extraction conditions and saves the extracted data in a file.		
	Ř	Save to HDD	Save to Hard drive.		
ŕð		Delete file	Deletes files.		
A		Alphanumeric input screen	Opens the alphanumeric input screen.		
Print	Ĩ	Print of the data	Print of the data.		
		Displays troubleshooting	Displays a troubleshooting		

Button	Image		
English	Except English	Button Name	Button Function
1/3 🕖	1/3 🕖	1/3	Change of function button (1/3 display)
Display Data	₽ ₽	View V.C.I. Regeneration data	Displays a list of V.C.I. Regeneration data.
		Data transfer	Transmits the data of the selected block to the PC.
Setting		Open setting screen (PC)	Opens the setting screen used to record information on the PC.
Setting	□ 77	Open setting screen (V.C.I.)	Opens the setting screen used to record information on the V.C.I
Manual Trigger	and the	Manual trigger	Generates a manual trigger.
Trigger Point		Trigger point data	Jumps to the trigger point.
Retrieval Setting	Q ^ℓ	Data Retrieval	Opens the search condition settings screen.
Data Extract	ļ	Data extraction settings	Opens the extraction condition (data) screen.
	Θ	Time setting	Opens the extraction condition (time) screen.
	l Š	Add	Adds items.
Correlation Chart		Correlation chart	Opens the correlation chart settings screen.
Histogram	Î	Distribution map	Opens the distribution chart settings screen.
Π	II	Pause	Pause
Record End	×	Record finish	Record finish
Trigger Setting		Trigger setting	Trigger setting
H H	H.	Systems select	Systems select.
⋑⋑≎	⋑⋻≎⇔	Exhaust	Exhaust
⊒∹⇔	∎‱	Air intake	Air intake
*	+ +	4 button	Shows an enlarged view of the 4 buttons.
		Front/Rear change	Front/Rear change
Eso	Esc	Esc	ESC Key function of V.C.I.
Enter	Enter	Enter	Enter Key function of V.C.I.
◙	谢	Down arrow	Down arrow Key function of V.C.I.
		Zero point calibration	Corrects the measurement function.

3-4. Operating Procedures for the MUT-III System





		Self-diagno	estic E40
WERTRAIN / EN	Self-diagnostic		
Diagnos	bc trouble code		
DTC	Name		DTC Procedures From Service Manual
			Diagnostic Trouble Code Erasing
		-	
No	DTC's found.		
nber *******/RCM/D ****	"Communication Type /SO Stan	dad MUTSOC ENGA	
1 1	10	2	

(4) If "ENGINE" is selected, the screen shown in the figure to the left will appear. The functions available for diagnosis are then displayed as

buttons.

Certain diagnostic functions may not be available, even though the buttons are displayed, depending upon the particular ECU utilized in the vehicle to be diagnosed.

(5) If "Self-Diagnostic" is selected, the screen shown in the figure to the left will appear.The Diagnostic Trouble Codes (DTCs) are acquired

through automatic communication with the vehicle ECU.

For information about the Diagnostic Trouble Code function, refer to "4-1. Operating Procedures for Diagnostic Trouble Codes."



3-4-2. Help Screen Functions

(1) The **?** button is used to display the help screen that corresponds to the screen currently displayed.

(2) This screen contains brief explanations for both the screen displays and the button functions, for use as a reference. Select the scroll buttons, located on the right hand side of the screen, to scroll the screen up or down.





3-4-3. Displaying the Instruction Manual

Select the **Instruction Manual (PDF)** button located at the bottom left of the screen shown in section 3-5-1.(1). If a "bookmarked tab" is selected, located on the left hand side of the screen, the screen shown in the figure to the left will appear. Selecting one of the bookmarked items will cause the screen to jump to the corresponding page. If the + symbol on the bookmark is selected, lower hierarchies will be displayed and made available for selection.

Select the x button, located in the upper right corner of the screen, to close the instruction manual.

If the "Page" tab, located on the left hand side of the screen, is selected, a screen will appear that displays smaller thumbnail images of pages, as shown in the figure to the left. Among the page thumbnail images shown, the specific section currently being displayed appears bordered by a red frame.

Select the x button, located in the upper right corner of the screen, to close the instruction manual.



(3) While the instruction manual is open, the display can be switched between the MUT-III system and the instruction manual by selecting the task bar icon, located at the bottom of the screen.

This function facilitates MUT-III operation, as it allows the user to make simultaneous reference to the instruction manual.

3-5. Shutdown Procedures for the PC and MUT-III System



3-5-1. Shutdown Procedures for the MUT-III System

Return to the MUT-III start-up screen by selecting either the icon or the icon, then touch the **Exit** button, located in the bottom right corner of the screen.



3-5-2. Shutdown Procedures for the PC

(1) After confirming that MUT-III has been shut down, touch the [Start] button, located in the bottom left corner of the screen and select [Shut Down].



(2) Select [Shut down] by touching the **■** button then select the **OK** button.

(3) After the PC has been shut down, the power indicator on PC will no longer be illuminated.

3-6. Removing a memory card from PC



Before you remove the memory card, make sure to perform the following procedures to stop the memory card, if the

3-6-1. Removal Procedures for a memory card from PC

(1) Before you remove the memory card, double-click the icon for removal of adaptor displayed on the bottom-right corner.

data has been transferred between PC and memory card.

Double click here

💑 Unplug or Eject Hardware	<u>? ×</u>
Select the device you want to unplug or eject, and then olic Windows notifies you that it is safe to do so unplug the dev computer.	
Hardware devices:	
PCMCIA IDE/ATAPI Controller HL-DT-ST DVD-ROM GDR8081N - (D:)	
PCMCIA IDE/ATAPI Controller at CardBus Slot 0	
Properties	Stop
Display device components	
Show Unplug/Eject icon on the taskbar	Close

Stop a Hardware device	<u>? ×</u>
Confirm devices to be stopped, Choose DK to continu	ië.
Windows will attempt to stop the following devices. Al stopped they may be removed safely.	ter the devices are
PCMCIA IDE /ATAPI Controller	
Generic volume · (E:)	
SunDisk SDCFB-64	
	Cancel
UK	Cancel
o Remove Hardware	

Safe To R	emove Hardware
•	The 'PCMCIA IDE/ATAPI Controller' device can now be safely removed from the system.
	ОК

(2) Select [*PCMCIA IDE/ATAPI Controller*] or the other appropriate device, then press **Stop** button.

(3) Verify the contents of the selection, then press **OK** button.

(4) After displayed the message "The device can now be safely removed from the system", push the lever on the side of PC m-card slot and remove the memory card.

Caution:

Do not remove the memory card away unless complete above method or turn off the PC.

Chapter 4 Operating Procedures for Diagnostic Functions

4-1.	Operat	ting Procedures for Diagnostic Trouble Codes (DTCs)	
	4-1-1.	Reading Diagnostic Trouble Codes (DTCs)P.2	0
	4-1-2.	Displaying Prior DiagnosticsP.2	0
	4-1-3.	Deleting DTCsP.2	0
	4-1-4.	Displaying Freeze Frame DataP.2	0
4-2.	Operat	ting Procedures for the Data List	
	4-2-1.	Displaying the Data ListP.2	1
	4-2-2.	Saving and Regenerating the Data ListP.2	4
	4-2-3.	Displaying the Data List Saved PreviouslyP.2	4
	4-2-4.	Group registrationP.2	7
	4-2-5.	Other Functions	9
4-3.	Operat	ting Procedures for the Actuator Test	
	4-3-1.	Operating Procedures for the Actuator TestP.3	1
	4-3-2.	Simultaneously Displaying the Actuator Test and Data ListP.3	1
	4-3-3.	Displaying the Data List Saved PreviouslyP.3	4
	4-3-4.	Other Functions	4

4-1. Operating Procedures for Diagnostic Trouble Codes (DTCs)

4-1-1. Reading Diagnostic Trouble Codes (DTCs)

	ostic trouble code		
DTC	Name	_	DTC Procedures From Service Manual
22 D-AI	B SQIB 2		
			PAST DTG display
			Diagnostic Trouble Code Erasing
			Freeze Frame Data
1 diagnost	tic trouble codes four	d.	
	"Communication Type ISO Sta	orbot MUT/SCC-DBD2	

After the DTCs are read, the results are displayed. Select the **PAST DTC display** button to display the status

(i.e., current or prior malfunctions) for the selected diagnostic items. -> Go to section 4-1-2.

Select the **Diagnostic Trouble Code Erasing** button to delete the DTCs.

-> go to section 4-1-3.

Select the **Freeze Frame Data** button to display the freeze frame data. -> Go to section 4-1-4.

4-1-2. Displaying PAST DTC display

Both current and prior DTCs can be acquired and displayed simultaneously.

- **1** --- Select this button to return to section 4-1-1.
- Select this button to display the service guide.
 - Select this button to delete DTCs (both current and prior).



2

4-1-3. Diagnostic Trouble Code Erasing

A dialogue requesting confirmation of DTC deletion will be displayed.

- --- Select this button to delete the DTC that is currently displayed.
- --- Select this button to cancel the delete operation and return to section 4-1-1.

			Self-dia	gnostic			
POW	RTRAIN		tie				
		Vagnostic trouble code(s)			FFD of The Selected D1	-	
sto.	DTC	Name		No.	Name	Value	L.,
	P0120	TPS		21	ECT SENSOR	-40 °C	
				87	ENGINE LOAD	0.0 %	
				22	ENGINE SPEED	0 stmin	
			•	13	AT SENSOR	-40 °C	
				44	G.TMNG ADV	61.0 deg	
	1 diar	mostic trouble codes for		The DTC has	s freeze frame data.		
				P0120	TPS		
Sunde	< MN100021	ROM/D 863900/Communication Type	190 Standard 060-87	\$00 166/1ML ON			

4-1-4. Displaying Freeze Frame Data

Both DTCs and Freeze Frame Data can be acquired and displayed simultaneously.

The DTCs that caused freeze frame data to be stored will be displayed.

1-1. Select this button to return to section 4-1-1.

		cc	CAN DATA ERR		00
-	,			•	 Se
					ar
nd.		3 diag	nostic trouble codes found.		

4-2. Operating Procedures for the Data List

WERTRAIN ENGINE	Data List	Data List		N40101
		tem Group List		
	No.	Item Group Name		
	1	All Data		
	2	Valiable data	•	
	3	Switch data		
	4	Blank 1	-	
	5	Blarik 2		
	_			
the group.				
1	8		5-6 E.4	

4-2-1. Displaying the Data List

(1) Select item group

Select the desired item group to be displayed.

- --- Text View: refer to section (2).
- --- Screen will return to the calling screen.
- Registered select group is cleared.
- Group Registration: refer to section 4-2-4.(1).
- Select display item: refer to section (5).

WERTRA				
No	Data List Reference Tabl	e Value		
12	VEH SPEED1	0.0 km/h	\$	
13	A/T OL, TEMP	35 °C		
15	ENGINE SPEED	640 rpm	A	
19	P POS SW	ON	•	
20	R POS SW	OFF		
21	N POS SW	OFF	¥	
inal Gear I	Rato 4.875 Tim	205/70R	6 0%0	

(2) Text View

When the number of items displayed must be reduced or when the order in which items are displayed must be changed, use the button to forward to the item selection screen: refer to section (4).

- Graph View 1: refer to section (2).
- Graph View 2: refer to section (3)
- --- Text View
- Select this button to move forward to the display screen showing the final gear ratio setting and tire information refer to section 4-2-4.(4).

<Note>

The order in which items are displayed can be changed: refer to section 4-2-4.(1).

Operating Procedures for the Data List

		Detail	Jist Reference Table
No	Name	Value	Graph
15	ENGINE SPEED	800 rpm	B288
19	P POS.SW	ON	ON CFF
20	RPOSSW	CFF	OFF
21	NPOS.SW	OFF	OFF
Final Gear			8

- (3) Graph View 1
 - Graph View 1 (The graph height area will change in accordance with the number of items displayed. For example, if 3 items are displayed, the graph height area will be divided into 3.)
 - Graph View 2 (overlay graph view): refer to section (3).
 - Text View: refer to section (1).
 - Save and regenerate Data List: refer to section 4-2-2.(1).
 - Change time scale
 - 1 --- Change data scale
 - Graph View pause / resume: refer to section 4-2-4.(3).
 - Select display item: refer to section (4).
 - Switch displays of individual function button (1/3 view)
 - Switch displays of individual function button (2/3 view)
 - Switch displays of individual function button (3/3 view)
 - Select this button to move forward to the display screen showing the final gear ratio setting and tire information refer to section 4-2-4.(4).

<Note>

- The order in which items are displayed can be changed: refer to section 4-2-4.(1).
- The data range can be changed to user-specified values: refer to section 4-2-4.(2).
- (4) Graph View 2

The buttons available for use with Graph View 2 are the same as those used for Graph View 1.

No Name Value Graph 12 NCHSPEED1 0.0 kml						
12 VEH SPEED1 0.0 km/k 13 AlT OL TEX-P 35 °C 15 ENGRE SPEED 640 gm			Graph	Value	Name	No.
15 ENORE SPEED 640 gm	4	8200		0.0 km/h	VEH SPEED1	12
	-			35 °C	A/T OL TEMP	13
	-			640 rpm	ENGINE SPEED	15
19 PPOSSW ON 120-40-40-20 0			120 -100 -80 -60 -40	ON	P POS SW	19
Find Grant Hass 4 815 Tim 205/15/15 2000 onder of the closes 30/2014b Close Al Dar Left Indee Tim Close Close Al Dar Left Indee Tim Close Close Al Dar Left Indee 1 1 Close	1/2 01		10 ************************************	I Data Part Number *******	loces 3071 tem, Group All	d Awer c

_			
	No.	Item Group List Item Group Name	
	1	All Data	
	2	Valiable data	~
	3	Switch data	_
			-
NO			

(5) Select Display Item Group

Select the group of items to be displayed and touch the button.

(6) Select Item

Items can be moved back and forth by using either the button or the dutton as necessary.

The item order can be changed by the following procedure: Temporarily return items that were once moved from the Selected Items to the Selectable Items list, back to the Selected Items list; change the position of the desired items; then move the items back to the Selectable Items list.

- Touch this button to insert all the items from the Selectable Item list into the desired positions on the Selected Item list. Please note that voltage values cannot be moved.
- --- Touch this button to insert the item currently chosen from the Selectable Item list into the desired position on the Selected Item list.
- --- Touch this button to move the item currently chosen from the Selected Item list to the very bottom position on the Selectable Item list.
- --- Touch this button to move all the items from the Selected Item list to the very bottom of the Selectable Item list.

Touch this button to change the order of items on both the Selectable Item list and the Selected Item list, in accordance with the specified default setting. <Note>

In the event that no items are chosen as Selected Items, then all items will be displayed, except for voltage values.

	borns Available			Selected terms.	
No.	Name		No.	Name	
16	BOOST PRESS		14	ACCEL VOLT	
17	PS ANG DIFF.		15	WATER TEMP	
18	SUPPLY VOLT		11	ENGINE SPEED	
19	ACCEL STROKE	•	12	TARGET RACK	
20	BOOST TEMP	•	13	REALRACK	
21	START SIG	₩ 144			



Idae	Time-	15	11	13	14	
oge	T anse -	WATER TEMP	ENGINE SPEED	REAL RACK	ACCEL.VOLT	
	m:s	°C	rpm	mm	v	
	0:00:000	45.3	704	6.39	0.941	
	0.00.500	44.7	704	6.58	0.961	A
	0.01.000	45.3	718	6.33	0.941	1000
	0:01:500	45.3	704	6.45	0.980	-
	0.02.000	44.7	704	6.45	0.922	
	0:02:400	45.3	704	6.33	0.922	
	0.02.900	45.3	718	6.45	0.784	
	0.03.500	45.3	718	6.39	0.784	
	0.04.000	45.3	718	6.51	0.784	
	0.04.500	45.3	704	6.33	0.804	V
	0.05.000	45.3	718	6.26	0.784	
		44	•	•	••	
N	lax.	47.3	Min.	44.7	Ave.	46.0

4-2-2. Saving and Regenerating the Data List

 If the button is selected during the Data List graph operation, only the data for the items currently displayed in the graph will be saved.

A prompt will be displayed to confirm the regeneration of saved data.

- --- OK: go to section (2).
- --- Cancel: the data will not be regenerated and the screen will return to the Data List display.

(2) Regenerating Saved Data

The data saved immediately after the recording will be displayed.

The display format can be changed by using the following buttons:

- 📰 --- Graph View 1
- --- Graph View 2 (overlay graph view)
- --- Text View

<Note>

- The order in which items are displayed can be changed: refer to section 4-2-4.(1).
- The data range can be changed to user-specified values while the graph is displayed: refer to section 4-2-4.(2).

4-2-3. Displaying the Data List Saved Previously

In order to display the previous Data List, select:
 Special Function from the function selection menu screen, then select Drive Recorder -> Display Data.
 For this operation, the V.C.I. does not need to be connected to the vehicle.



		Records	ed Data List		
Save Del	File Name	Record System	Conditions of Trigger	Record Information	
~	DR031111-110630.csv	ENGINE	Manual Trigger	FH605	1
	DR031111-110320.csv	ENGNE	Manual Trigger	FH605	
	SD031111-105618.csv	ENGINE	-		1
					,
_					-
904/ROI	ND *****YNumber of Aems SiRec	ord time 0 min 23 sec/Sample	ng interval Osec: (available Taste		1/2

(2) Regenerated File List

Select the desired data to display from the regenerated file list, then touch the file button to view the text data. Also, press the file and file buttons to view the graph data.

- Text View: go to section (3).
- Graph View 1: go to section (4).
- --- Graph View 2: go to section (5).
- Edit Recording Information
- Display V.C.I. Data
- File --- Delete Regenerated File
- Regenerated File

<Note>

The name of the file currently displayed is composed of SD (DR) + date + time. The time at which data was downloaded into the PC is used as a reference. The most recent data is displayed first.

DR : files saved via the Drive Recorder.

SD : files saved via the Data List.

(Including the Data List saved via the actuator test.)

(3) Text View

The data recorded via the Data List recording operation will be displayed as text.

- Graph View 1: go to section (4).
- --- Graph View 2: go to section (5).
- 🔚 💵 --- Select Item
- Set Data Extraction Condition
- Set Data Searching Condition
- Stringering Point
- --- Save Regenerated File
- Correlation Chart
- --- Set Distribution Chart
- 1/3 2 --- Switch displays of individual function button (1/3 view)
- 2/3 2 --- Switch displays of individual function button (2/3 view)
- Switch displays of individual function button (3/3 view)

<Note>

The order in which items are displayed can be changed: refer to section 4-2-4.(1).

Judge	Time-	11	12	15	14	
Juoge	1004-	ENGINE SPEED	TARGET RACK	WATER TEMP	ACCEL.VOLT	
	m:s	rpm	mm	°C	v	
	-0:03 104	962	6.14	56.7	1.314	
	-0.02.403	1034	6.07	58.7	1.314	
	-0:01.812	1048	6.07	56.7	1.314	
	-0.01.221	1048	6.07	56.7	1.314	
	-0.00.630	1048	6.01	56.7	1.314	
	0.00.000	1048	6.07	56.7	1.314	
	0.00.611	1048	6.07	56.7	1.314	T
	0.01.202	1063	6.07	56.7	1.333	
	0.01.793	1063	6.07	56.7	1.333	1000
	0.02.384	1077	6.01	56.7	1.353	÷
	0.02.975	1063	6.14	56.7	1 392	
		44	-	•	••	
,	Max.	1321	Min.	574	Ave.	867
of time 1	min 23 sec/Condi	tions of Trigger Manual Trigge	d'The number of Aem choices	BrittenvSystem Check Code	E90A/File Name DR03111	1-110020.cm
ø	Ê	\$	2	**		1/2 6
			_			

	Drive Recorder D			(Const.)			
No	item Name	Value		Graph			
11	ENGINE SPEED	1048 rpm.	3660			n	
12	TARGET RACK	6.07 mm	29				
15	WATER TEMP	56.7 °C	-40	-			
14	ACCEL VOLT	1.314 V	-01:19				00.41
		Time 0	• 00.000		-i	-][•
	3 sec/Conditions of Trigger I					-	
i	Ê	S (2		Ē		1/3
					LQ://k		2/3
				N LINE BX	- A & C		

(4) Graph View 1

The data recorded via the Data List recording operation will be displayed in the form of a graph.

The points currently displayed are indicated by pink dotted lines. During recording, the section where Graph View is paused will be indicated by a solid black line.

- Graph View 1 (The graph height area will change in accordance with the number of items displayed.
 For example, if 3 items are displayed, the graph height area will be divided into 3.)
- Graph View 2: go to section (5).
- **IEE** --- Text View: go to section (3).
- E --- Select Item
- Data Extraction Condition
- Stringering Point
- --- Save Regenerated File
- Correlation Chart
- --- Set Distribution Chart
- 👑 --- Change Time Scale
- 1000 Change Data Scale
- Iva 2 --- Switch displays of individual function button (1/3 view)
- 2/32 --- Switch displays of individual function button (2/3 view)
- Switch displays of individual function button (3/3 view)
- <Note>
- The order in which items are displayed can be changed: refer to section 4-2-4.(1).
- The data range can be changed to user-specified values: refer to section 4-2-4.(2).
- (5) Graph View 2

The buttons available for use with Graph View 2 are the same as those used for Graph View 1.

<Note>

For more information about handling the recorded data, please refer to section "5-3. Analyzing Recorded Data."



		Data List	944	
POWERTRAIN ENGINE	Data List			
		tem Group List		
	No.	Item Group Name		
	1	All Data		
	2	Valiable data	A	
	3	Switch data		
	4	Blank 1	-	
	5	Blank 2		
elect the group.				
	0	2 4 >		:6
l 🏟	6	2 -/ >		10

- (1) Group registration
 - Up to 5 new groups, which is the combination of user-specified items, can be registered.

Click \blacksquare button after selecting the line (No.4 – No.8) to be registered as group.

- E --- Registered group is cleared.
- \square --- Group registration: go to section (2) \land

Select display item: refer to section 4-2-1.(6)

- Registered contents can be corrected if you press the selecting the registered item group.
- Registered item group can be used for [Displaying the Data List Function], [the Actuator Test Function (simultaneously displaying the Data List)] and [Drive recorder Function (selecting the recorded item)].
- (2) Input Item Group Name

Enter up to 16 characters of group name to be registered.

--- OK: go to section (3).

--- Cancel: go to section (1).

<Note>

As the PC keyboard is connected, the information may be entered either directly from the PC keyboard or from the keyboard shown on the screen.

			hp	at Item Group	> Name (16	characters			_	_
0	1	2	3	4	5	6	7	8	9	
A	в	с	D	E	F	G	н	Т	J	
к	L	м	N	0	Р	٩	R	s	т	
U	v	w	x	Y	z				•	١
								Space	Back Space	Clea

	berns Available				Selected terms	
No.	Namo			No.	Name	
16	BOOST PRESS	A)	►►I	14	ACCEL VOLT	
17	PS ANG DIFF.		•	15	WATER TEMP	
18	SUPPLY VOLT			11	ENGINE SPEED	
19	ACCEL STROKE	•		12	TARGET RACK	
20	BOOST TEMP		•	13	REAL RACK	
21	START SIG	¥ ŀ	44			

(3) Selecting registered item

Pressing the button moves desired items to be registered as a group, to the Selected item list. After you press the button, Item group is registered, then the screen returns to section (1). <Note>

Items can be moved back and forth by using either the button or the dutton as necessary.

- >> --- Touch this button to insert all the items from the Selectable Item list into the desired positions on the Selected Item list.
- Touch this button to insert the item currently chosen from the Selectable Item list into the desired position on the Selected Item list.
- --- Touch this button to move the item currently chosen from the Selected Item list to the very bottom position on the Selectable Item list.
- --- Touch this button to move all the items from the Selected Item list to the very bottom of the Selectable Item list.
- Touch this button to change the order of items on both the Selectable Item list and the Selected Item list, in accordance with the specified default setting.

		Data L	ist Reference Table	
No.	Name	Value	Graph	
16	BOOST PRESS	-28 mmHg		
17	PS ANG DIFF.	0.20 deg	58	
18	SUPPLY VOLT	14.00 V	2125	
19	ACCEL STROKE	0.0%		

4-2-5. Other Functions

(1) Changing the Ordering of Items

The order in which items are displayed on the Data List screen can be changed. This function is available for Text View, Graph View 1 and Graph View 2.

The displayed item order can be changed while the Data List is continuously displayed. (Graph View will be reset.) Keep one item fixed by touching the area indicated by the item names, then change the order of the other items by scrolling non-selected items that are not fixed, using the up and down scroll buttons. Touch the item again to cancel the selection.

This function cannot be utilized in Graph View during the selection of the data range display area, using the data range change function. (Functions such as: Select Item / Cancel / Scroll, cannot be utilized.)

(2) Changing the Data Range

Select the item for which the data range must be changed by touching the screen.

Once the selected item becomes highlighted in yellow, numeric values can be entered.

Methods for entering values --- PC input or scroll button input

If a PC is used to enter values, enter user-specified values using the keyboard and either press the [Enter] key or touch the graph. This action will cancel the input state and will finalize the changed data range.

The A and V scroll buttons can also be used to change the data range. The A button will make a full-scale +5% change toward the default data range and the V button will make a change of -5%. Each time the values are changed, the data range change is finalized.

			Jist Reference Table	
No	Name	Value	Graph	
11	ENGINE SPEED	732 rpm	368 	
12	TARGET RACK	6.33 mm		
13	REAL RACK	6.51 mm	28 	v
14	ACCEL VOLT	0.765 V		¥

(3) Pausing for Graph View

If the u button is touched while the Data List is displayed as a graph, then Graph View will pause temporarily. If the button is touched again, Graph View will resume.

The section where the Graph View was temporarily paused will be indicated on the graph by a solid black line.

While Graph View is paused, the data recording function will not operate.

11 BOOSTPRESS _28 mm/sg 17 PS ANG CMF 0.00 deg 18 RUPKLY VQLT 40.0 V 19 RUPKLY VQLT 40.0 V
17 PS AND DFF. 0.00 deg 3 10 SUPPLY VQLT 1400 V 11 SUPPLY VQLT 1400 V
18 SUPPLY VOLT 14.00 V 0
19 ACCELSTROKE 0.0%
19 ACCEL STROKE 00%

Data Lis

	Final Gear Ratio		Final Gear Ratio Inp		
No.	Value		Pina	I ORAF MADO IN	put
1	4.875			- 1	
2	5.285	•	7	8	9
3	5.714		4	5	6
4	6.106	-	1	2	3
			0		
			Back Space	Clear	
	er Ratio Tine				

(4) Setting the Final Gear Ratio and Displaying Tire Information.

Enter the final gear ratio.

This screen is displayed only for certain vehicle models, when the system "transmission" has been selected.

Enter the final gear ratio using either the numeric buttons located on the right side of the screen, or using the keyboard.

After entering the final gear ratio, touch the <u>solution</u> button to finalize the entered values.
4-3. Operating Procedures for the Actuator Test

OWERTRAN	ENGINE Actuator Test	Ľ		E401010
	Actuator Test Items			
No.	Name		Data List(Text)	
91	SILENCER MV		Data Cat(Text)	
94	EXH BRAKE MV	A	Data List(Graph)	
97	DIAG LAMP(R)			
98	DIAG LAMP(U)	•		
99	A/C SIG			
	Activate actuator?			
Number MC 2002	1900440	O Shandard M (7/500 E919		
Number MIC3060	SROM-ID ************************************	o Standard MUT/SCC E919	×	

4-3-1. Operating Procedures for the Actuator Test

- (1) Driving the Actuator
 - --- Touch this button to drive the actuator selected from the Actuator Test Ref.

--- Touch this button to stop the actuator.

<Caution>

As this function forcibly drives or stops the actuator, always use additional care when performing these procedures and ensure that all safety measures are implemented.

In addition, check to ensure that all cabling and harnesses are connected properly, prior to performing this operation.

4-3-2. Simultaneously Displaying the Actuator Test and Data List

(1) Selecting item group

Touching the **Data List (Text)** button or the **Data List (Graph)** button on the screen shown in section 4-3-1.(1) will cause the item group selection screen to be displayed.

Selected the item group of the Data List to be displayed.

- --- OK : go to section (2)/(3)
- Cancel : go to section 4-3-1.(1)
- **⊟**⊷∰ --- Registered group is cleared.
- Group registration:
 - refer to section P.26 [4-2-4.(1) Group registration]
- go to section (5)

	Actuator Test Items		Data List Reference Table	0
No.	Name	No.	Name	Value
91	SILENCER MV	01	ENGINE SPEED	650 rpm
94	EXH BRAKE MV	03	NJ VOL	3.5%
97	DIAG LAMP(R)	09	TCV ANG DIFF	0.2 deg
98	DIAG LAMP(U)	08	ACCEL(%)	0.0%
99	A/C SIG	oc	ACCEL(V)	0.780 V
-	Activate actuator?	00	VEHICLE SPEED	0.0 km/h

(2) Simultaneous Display with Data List (Text View)

Touching the **Data List (Text View)** button on the screen shown in section 4-3-1.(1) will cause both the Actuator Test Ref screen and the Data List Text View screen to be displayed simultaneously.

- --- Touch this button to drive the actuator selected from the Actuator Test Ref.
- Touch this button to stop the actuator.
- Touch this button to select the item to be displayed from the Data List: go to section (4).

<Note>

The order in which Data List items are displayed can be changed: refer to section 4-3-4.(1).



	Actuator Test Items		Dat	a List Reference Table	
No.	Name		No.	Name	Value
91	SILENCER MV		08 ACC	EL(%)	16.9%
94	EXH BRAKE MV		100		
97	DIAG LAMP(R)		-120 -	100 -80 -60	-40 -20
98	DIAG LAMP(U)		No.	Name	Value
99	A/C SIG	-		NE SPEED	1575 rpm
	Activate actuator?		5400		
	hoces 6/20tern, Group All Data Part Num	L			-40 -20
			1 2	S 19 20 20 10 2	0102 1/2
	全 🔘	2	V 61		9-00 IV.

(3) Simultaneous Display with Data List (Graph View)

Touching the **Data List (Graph View)** button on the screen shown in section 4-3-1.(1) will cause both the Actuator Test Ref screen and the Data List Graph View screen to be displayed simultaneously.

- --- Touch this button to drive the actuator selected from the Actuator Test List.
- --- Touch this button to stop the actuator.
- 🖳 --- Change time scale
- 11--- Change data scale
- displayed from the Data List: go to section (4).
- Graph View Pause: refer to section 4-3-4.(3).
- Save Data List: touch this button once to save the data list currently displayed. No dialogue boxes or messages will be displayed to confirm the save operation.

<Note>

- The order in which items are displayed can be changed: refer to section 4-3-4.(1).
- The data range can be changed to user-specified values: refer to section 4-3-4.(2).
- The item names selected from the Actuator Test Ref are recorded as recording information for the file in which the Data List has been saved.
- (4) Select Display Item Group
 - Select the group of items to be displayed from the Data List and touch the _____ button. -> go to section (5).

ERTRAIN ENGINE	Actuator Test	Actuator Test	
		Rem Group List	
	No.	Rem Group Name	
	1	All Data	
	2	Valable data	A
	3	Switch data	
Ļ			•
L			
pop			

	borns Available.			Selected terms.	
No	Namo		No.	Name	
OE	IDL VOL SNSR		03	INJ VOL	
10	WATER TEMP	-	09	TCV ANG DIFF	
11	FUEL TEMP		08	ACCEL(%)	
12	AIR TEMP	•	0C	ACCEL(V)	
13	Q RESISTOR		00	VEHICLE SPEED	
14	AIR PRESS	♥ 44	01	ENGINE SPEED	

(5) Select Item

Items can be moved back and forth by using either the button or the dutton as necessary.

The item order can be changed by the following procedure: Temporarily return items that were once moved from the Selected Items to the Selectable Items list, back to the Selected Items list; change the position of the desired items; then move the items back to the Selectable Items list.

- Touch this button to insert all the items from the Selectable Item list into the desired positions on the Selected Item list. Please note that voltage values cannot be moved.
- Touch this button to insert the item currently chosen from the Selectable Item list into the desired position on the Selected Item list.
- --- Touch this button to move the item currently chosen from the Selected Item list to the very bottom position on the Selectable Item list.
- --- Touch this button to move all the items from the Selected Item list to the very bottom of the Selectable Item list.
- Touch this button to change the order of items on both the Selectable Item list and the Selected Item list, in accordance with the specified default setting.

<Note>

In the event that no items are chosen as Selected Items, then all items will be displayed, except for voltage values.



4-3-3. Displaying the Data List Saved Previously

In order to display the previous Data List, select: **Special Function** from the function selection menu screen, then select Drive Recorder -> Display Data.

<Note>

For the procedure used to display the saved Data List, refer to "4-2-3. Displaying the Data List Saved Previously."

	Actuator Test terms		Data List Reference Table	,	
No.	Name	No.	Name	Value	
91	SILENCER MV	01	ENGINE SPEED	650 rpm	1
94	EXH BRAKE MV	03	NJ VOL	3.5%	
97	DIAG LAMP(R)	09	TCV ANG DIFF	0.2 deg	4
98	DIAG LAMP(U)	08	ACCEL(%)	0.0%	
99	A/C SIG	0C	ACCEL(V)	0.780 V	
	Activate actuator?	00	VEHICLE SPEED	0.0 km/h	44

VERTRAI	ENGINE Actuator Test	Actuator 1	est		E4)	010
	Actuator Test Items		Det	List Reference Table		
No.	Name		No.	Name	Value	
91	SILENCER MV		01 ENG	NE SPEED	625 rpm	
94	EXHERAKE MV		6400			1
97	DIAG LAMP(R)		-120	100 -80 -60	40 .20 0	
98	DIAG LAMP(U)		No.	Name	Value	
99	A/C SIG		03 NJ V	OL.	3.0%	
	Activate actuator?		100			

4-3-4. Other Functions

(1) Changing the Ordering of Items

The order in which items are displayed on the Data List screen can be changed. This function is available for Text View and Graph View.

The displayed item order can be changed while the Data List is continuously displayed. (Graph View will be reset.) Keep one item fixed by touching the area indicated by the item names, then change the order of the other items by scrolling non-selected items that are not fixed, using the up and down scroll buttons. Touch the item again to cancel the selection.

This function cannot be utilized in Graph View during the selection of the data range display area, using the data range change function. (Functions such as: Select Item / Cancel / Scroll, cannot be utilized.)

(2) Changing the Data Range

Select the item for which the data range must be changed by touching the screen.

Once the selected item becomes highlighted in yellow, numeric values can be entered.

Methods for entering values : PC input or scroll button input If a PC is used to enter values, enter user-specified values using the keyboard and either press the [Enter] key or touch the graph. This action will cancel the input state and will finalize the changed data range.

The A and scroll buttons can also be used to change the data range. The \blacktriangle button will make a full-scale +5% change toward the default data range and the velocity button will make a change of -5%. Each time the values are changed, the data range change is finalized.

	Actuator Test Berns	Dat	ta List Reference Tat	olo
No.	Name	No.	Name	Value
91	SILENCER MV	08 400	EL(%)	0.0 9
94	EXH BRAKE MV	100		
97	DIAG LAMP(R)	-120	100 -80 -60	40 -20
98	DIAG LAMP(U)	No.	Name	Value
99	A/C SIG		INE SPEED	625 rp
_	Activate actuator?	5400		
-		-120	100 -80 -60	-40 -20

(3) Pausing for Graph View

If the **II** button is touched while the Data List is displayed as a graph, then Graph View will pause temporarily. If the **II** button is touched again, Graph View will resume. The section where the Graph View was temporarily paused will be indicated on the graph by a solid black line. While Graph View is paused, the data recording function will not operate.

Chapter 5 Operating Procedures for the Drive Recorder

There are 2 methods used for recording data with the drive recorder:

- [1] Method in which data recording is performed using a stand-alone V.C.I..
- [2] Method in which data recording is performed using a PC, displaying data.

The sampling rates / times for each of the above methods are shown in the table below. The most appropriate recording method can be selected to suit the particular application.

	[1] Recording Using a Stand-Alone V.C.I.	[2] Recording onto a PC
Sampling Rate	Fast	Slow
Sampling Time	Short	Long

5-1. Recording with the Drive Recorder

5-1-1.	Recording with the Stand-Alone V.C.I.	? .37
5-1-2.	Recording with the PCP	. 42
5-1-3.	Recording by Using the Previous SettingsP	? .48
5-1-4.	Group registrationP	² .49

5-2. Handling the Recorded Data

5-2-1. Transferring Recorded Data from the V.C.I. to the PC	P.51
5-2-2. Regenerating the Recorded Data	P.52
5-2-3. Deleting / Saving the Recorded Data	P.53
5-2-4. Loading Recorded Data	P.54

5-3. Analyzing Recorded Data

5-3-1. Regenerating Recorded Data	P.55
5-3-2. Extracting / Searching the Recorded Data	P.58
5-3-3. Displaying the Correlation Chart / Distribution Chart	P.59
5-3-4. Item Order Change Function	P.61
5-3-5. Data Range Change Function	P.61

5-1. Recording with the Drive Recorder

		Sys	tem Check			E40100
POWERTR	AIN	UN	IDER CAR		BODY	
	ENGINE			TRANS	SMISSION	
Integ	gration control					
yatem						
		2				

5-1-1. Recording with the Stand-Alone V.C.I..

 Select the recording settings using the stand-alone V.C.I. Use the PC to select the drive recorder settings, such as the items to be recorded and the triggering method. Change the main category by selecting the tab located on the upper side of the screen and selects the system on which drive recording will be performed. The procedures used for setting up the Drive Recorder for the engine system are explained in this section. Select the **ENGINE** button.

	ENGINE	
ENTRAIN		
Self-diagnosis	Data List	Actuator Test
Drive Recorder	Voltmeter	Resistor
		- 12
NA		

(2) Select Function Select the **Drive Recorder** button.

(3) Select Drive Recorder Function
 Select the **Record** button from the Drive Recorder menu screen.



í £

		Drive Recorder		E4010
ENGINE Drive Recorder	Record			
	Die	agnosis Code Trigger Item		
	No.	Item Name		
	xx	ALL DTC	*	
	06	SUB RACK SNSR		
	03	PS OFFSET	A	
	16	ACCEL SNSR-2	•	
	15	NE SNSR		
	- 14	SUB NE SNSR	¥	
lect the item used as a trigger key.				
1 1	5	2		

- (4) Select Triggering Method Select the triggering method.
 Manual Trigger --- Touch this button for manual triggering.
 -> go to section (6).
 Diagnosis Code Trigger --- Touch this button for triggering upon the occurrence of user-specified DTCs. -> go to section (5).
- (5) Select Diag. Trigger
 Select the item to be used as a trigger key and touch the
 button.

Recording with the Drive Recorder

	Drive Recorde	Dur		- Shire	Record					N40101
ENGINE /	Drive Recorde	Meco	ra							
				item G	roup List					
			No.		item Gro	up Name				
			1	All Data						
			2	Valiable o	Sata					
			3	Switch da	ta			_		
			4	Blank 1						
			5	Blank 2						
				-						
eoe select a grou	6									
	-									
~			10				31	-		
1	٤		9	?		/	×	₽(
	£		9	?		1	×	- (
10 ⁻ 0			\$?		/	×	- (
10 ⁻ 0	result Internet In	plorer	9		Record	/	×	- (
e Recorder - Mic					Record	ler	×	- (
e Recorder - Mic	result Internet Fa	r Reco			Record	ler	×			
e Recorder - Mic	Drive Records	r Reco			Record	ler	No	Selected		
e Recorder - Mic	Drive Records	Reco Rie tem Name			Record	ler			erns. bern Nørne	E40101
Recorder - Mic ENGINE No.	creat Internet In Drive Records Derm Availa	Reco Role Rem Name T		Drive	Record		No.	Selected 1	erns kern Name EED	E40101
No.	Drive Records	M Reco Ible Item Name T		Drive			No. 11	ENGRE SF	terns tern Name EED ACK	E40101
Recerder Mic ENGRE No. 14	Drive Records	Reco lole term Name T P SS		Drive			No. 11 12	ENGINE SP TARGET R	terns tern Name EED ACK	E40101
Recorder We ENGINE No. 14 15 16	Drive Records	Reco total term Name T P SS		Drive			No. 11 12	ENGINE SP TARGET R	terns tern Name EED ACK	E-03101

S ? B7 B7

1 🗘 🖒

(6) Item Group Selection

Select the Group for Recording Items.

- --- OK : go to section (7)
- --- Screen will return to the calling screen.
- Registered group is cleared.
- Group registration : refer to 5-1-4.(1).

(7) Select Recording ItemsThe Display Item list for the Data List will be displayed.Select the items to be recorded.

- Touch this button to insert the item currently chosen from the Selectable Item list into the desired position on the Selected Item list.
- --- Touch this button to move the item currently chosen from the Selected Item list to the very bottom position on the Selectable Item list.
- Touch this button to move all the items from the Recording Selection Item list to the very bottom of the Selectable Item list. (The selected position and items are fixed.)
- --- V.C.I. Settings -> go to section (8).
- --- Sort: Touch this button to change the order of items on both the Selectable Item list and the Recording Selection Item list, in accordance with the specified default setting.

<Note>

A maximum of 16 items can be chosen as Recording Selection Items.

	Record Area(V.C.1)	Data M	
-00	Ram Setting	Conditions of Trigger	Manual Trigger
(2)	Blank	Measurement Item	8
-01	4	Recordable Time	
		Sampling interval	Osec (available faste
(4)	۵	Distribution before and after	trigge 50 : 50
(5)	Blank	Sampling interval	
(6)	Blank	1	
(7)	Blank	4	•
107	U1010	Distribution before and after trig	ger
(8)	Blank		
Recorde	d Rem Setting Select	44 4	b b

(8) V.C.I. Recording Settings

--- OK: go to section (10).

Pisplay --- Data display: go to section (9).

<Note>

<u>8 recording areas</u> can be selected. Also, contiguous areas can be selected.

Selected recording areas will be displayed in green.

If the V.C.I. does not have any space for recording areas, touch the button. Delete the recorded data from the V.C.I. display screen.

The sampling interval indicates the time interval between each recorded data sample of an item. Sampling interval settings can be selected from: 0 sec (fastest) / 1 sec / 10 sec / 1 min.

When any sampling interval setting is selected, other than the fastest interval, the available recording time will be displayed. Please note that this available time is only an estimate obtained by calculation, thus may differ from the actual amount of recording time available.

The triggering distribution ranges from 0:100 \sim 100:0 in increments of 1%.

(9) Display V.C.I. Data

The settings will be displayed for each item, for data recorded in the selected V.C.I. recording areas.

- Touch this button to delete V.C.I. recording data: the selected V.C.I. recording data will be deleted.
- --- Touch this button to return to the settings screen: go to section (8).
- Drive Recorder
 Drive Recorder
 Recorder

 Code
 Drive Recorder
 Recorder
 Recorder

 0
 1
 2
 3
 4
 5
 6
 7
 8
 9

 A
 B
 C
 D
 E
 F
 G
 H
 I
 J

 K
 L
 M
 N
 O
 P
 Q
 R
 S
 7

 U
 V
 W
 X
 Y
 Z
 .
 .
 1
- (10) Enter Recording Information

Enter up to 50 characters of recording information (memo), which can be used as a reference after recording.

🗸 --- OK

<Note>

- Reference information, such as vehicle model name and diagnostic system name, should be entered.
- As the PC keyboard is connected, the information may be entered either directly from the PC keyboard or from the keyboard shown on the screen.

	Setting Conditions(1/2)
bern	Settings
Conditions of Trigger	Manual Trigger
Trigger bern	-
Measurement tem	8
Record Place	PC
Sampling interval	Osec (available fastest s peed)
File Name	DR031111-110320.csv
Recordable Time	166min40sec
Record Information	FH605

(11) Recording Settings List

Recording settings can be confirmed with this function. Touch the Debutton to confirm the items to be measured on the Recording Item list screen. -> go to section (12). --- OK : go to section (13).

ne	Item Name	Setting Conditions(2/2)							
	Rommagning	No.		Item Name	No.				
	TARGET RACK	12	(2)	ENGINE SPEED	11	(1)			
	ACCEL VOLT	14	(4)	WATER TEMP	15	(3)			
	BOOST PRESS	16	(6)	REAL RACK	13	(5)			
	SUPPLY VOLT	18	(8)	PS ANG DIFF.	17	(7)			
						-			
					-				

(12) Recording Item List
 Touch the button to display the settings for data recording. -> go to section (11).
 --- OK : go to section (13).



Drive Recorder - Microsoft In		Delus Deservice		C1950000
		Drive Recorder		E40101071
ENGINE Drive	ecorder Record			
	Transfer r	ecord settings (PC -> \	/.C.I)	
			8	
	Wait a second.			
Transfer record settings to V	1 <i>1.</i>			

(13) Confirm Transfer

A message will be displayed requesting confirmation to transfer settings.

- --- OK : go to section (14).
- \times --- Cancel : go to sections (11) / (12).

(14) Transfer Settings

Settings are now being transferred to the V.C.I. Please wait for a moment until the transfer has completed. Upon transfer completion, a dialogue box will appear, that states "Transfer of Settings Completed." <Note>

If recording operations must be performed immediately after the transfer of setting has completed, unplug the USB cable while keeping the V.C.I. switch in the ON position.

If only the settings operations must be performed and if recording operations are to be performed later, then first turn the V.C.I. switch off, then unplug the USB cable.



(15) When Performing Manual Triggering

Connect the trigger harness to the V.C.I. trigger port, as necessary.

In the event that manual triggering must be generated during the recording operation, either press the button on the trigger harness or press the Enter button on the V.C.I.



(16) Start Recording

Upon the start of recording, the V.C.I screen will appear as shown to the left. If the ignition switch is not ON, perform one of the following operations to initialize communications: turn the ignition switch ON or turn the V.C.I. power switch ON after starting the vehicle engine. The recording operation will then start after communication initialization. <Note>

The [numeric value] shown on the V.C.I.'s LCD screen displays the number of the recording area for the Drive Recorder within the V.C.I.





(17) Triggering

Manual triggering can be initiated by pressing either the button located on the trigger harness, or the triggering button. Once triggering has occurred, the letter "T" will be displayed on the screen. Data produced subsequent to triggering will be recorded.

When using Diag. Trigger, triggering will be initiated automatically upon the occurrence of specified DTCs.

(18) End Recording

Regardless of the triggering method, whenever the recording operation must be stopped, data recording can be stopped by pressing the V.C.I.'s (Esc) button.

After recording, both the vehicle harness and the trigger harness can be detached after the V.C.I. has been turned OFF.

If triggering is not initiated, data will not be recorded.

(19) For confirmation of recorded data, please refer to "5-2-1. Transferring Recorded Data from the V.C.I. to the PC."



5-1-2. Recording with the PC

 The PC can be used to select the recording settings. Use the PC to select the drive recorder settings, such as the items to be recorded and the triggering method. Change the main category by selecting the tab located on the upper side of the screen and selects the system for which drive recording will be performed. The procedures used for setting up the Drive Recorder for the engine system are explained in this section.

Select the **ENGINE** button.



(2) Select FunctionSelect the **Drive Recorder** button.

- (3) Select Drive Recorder Function Select the **Record** button from the Drive Recorder menu screen.

	Recorder E40101070
ENGINE Drive Recorder Record	
Manual Trigger	Diagnosis Code Trigger
Select higger type	
sawet trigger type.	

(4) Select Triggering Method Select the triggering method.
Manual Trigger --- Touch this button for manual triggering.
-> go to section (6).
Diagnosis Code Trigger --- Touch this button for triggering upon the occurrence of user-specified DTCs. -> go to section (5).

Exagence Code Registries No Exm Name Axx ALL DTC 06 ALB RACK SHORE 03 F2 OFFSET 16 ACCEL SHORE 2	NE Drive Recorder		Drive Recorder	
No. Num hann JXX ALL DTC 0 SUB RACK SHOR 0.0 SUB RACK SHOR 0.0 FC OPTSET 1.0 ACCEL SHOR 2	Re / Drive Recorder /	Record		
JXX ALLDTC 06 2.08 RACK SHOR 08 PS OFFSET 16 ACCEL SHOR2		Di	agnosis Code Trigger Item	
66 548 RACK SHOR 66 548 RACK SHOR 68 PS OFFSET 16 ACCEL SHOR2		No.	Item Name	
03 PS OFFICET 16 ACCEL 94/8/2		××	ALL DTC	4
16 ACCEL SNSR-2		06	SUB RACK SNSR	
		03	PS OFFSET	A
		16	ACCEL SNSR-2	
15 NE SNSR		15	NE SNSR	
14 SUBINE SINSR		14	SUB NE SNSR	*

(5) Select Diag. Trigger
 Select the item to be used as a trigger key and touch the
 button. -> go to section (6).

		Drive Recorder	
ENGINE Drive Recorder	Record		
		tem Group List	
	No.	Item Group Name	
	1	All Data	
	2	Valiable data	A
	3	Switch data	
	4	Blank 1	•
	5	Blank 2	
_			
Filease select a group.			
1 1	5	7 ×	

- (6) Item Group Selection
 Select the Group for Recording Items.
 --- OK : go to section (7)
 - --- Screen will return to the calling screen.
 - E --- Registered group is cleared
 - Group registration : refer to 5-1-4.(1).

	tems Available				Selected terms
No.	tem Name	_		No.	item Name
14	ACCEL VOLT			11	ENGINE SPEED
15	WATER TEMP		•	12	TARGET RACK
16	BOOST PRESS			13	REAL RACK
17	PS ANG DIFF.	•			
18	SUPPLY VOLT		<		
19	ACCEL STROKE	¥	144		

(7) Select Recording ItemsThe Display Item list for the Data List will be displayed.Select the items to be recorded.

- Touch this button to insert the item currently chosen from the Selectable Item list into the desired position on the Selected Item list.
- Touch this button to move the item currently chosen from the Selected Item list to the very bottom position on the Selectable Item list.
- Touch this button to move all the items from the Recording Selection Item list to the very bottom of the Selectable Item list. (The selected position and items are fixed.)

PC Settings -> go to section (8).

--- Sort: Touch this button to change the order of items on both the Selectable Item list and the Recording Selection Item list, in accordance with the specified default setting.

<Note>

A maximum of 16 items can be chosen as Recording Selection Items.

Graph dictor terms β No: term hame Display Form Graph	Degree States areas Measurement Name S No Secondable Time Diforiul Seco				
Deptide term Recordable Time Display Form Display Fo	Unit Description No Excitation No Excitation No Excitation No Excitation No Excitation No Excitation Display Form Carph Sampling Interval Display Form Excepting Interval Excepting Interval	R031111-110157.csv			Manual Trigger
No. Den hanne Recordables ume i roomvoluse M4 ACCEL VALT Displey Fem: Graph Sampling sterval 15 AATER TEXP Bangling sterval Sampling sterval 10 Displey SPEED Image: SPEED Image: SPEED	No. Benchmann Description Careford 14 ACCEL VAXT Esampling teternel Description Careford 15 AVETER TEMP Sampling teternel Description Careford				6
ACCEL.VOLT Display Form Scaph Sampling interval Sampling interval Sampling interval Sampling interval	Display Form Caraph 14 ACCEL VOLT Display Form Caraph 15 MUTER TEMP Sampling Interval Speed)			Recordable Time	166min40sec
15 WITER TIMP Sampling interval DIANE SPEED	Sampling interval ppeed) 15 WATER TEMP Sampling interval		WITT PREEDE	Display Form	Graph
Samping interval	Sampling interval	14 ACCEL VOLT		Sampling interval	
	· · · · · · · · · · · · · · · · · · ·	15 WATER TEMP		Sampling interval	
12 TARGET RACK	11 ENGNE SPEED	11 ENGINE SPEE	D	1	
	12 TARGET RACK	12 TARGET RACK	(4	•
Graph Text				O andra	J

(8) PC Recording Settings

"Normal Mode" is used as the setting for PC recording. The display format setting used during the recording operation is the data display format.

Set the sampling interval using the

- Graph
 --- Select the display format during the recording operation (either Graph View or Text View) by marking the appropriate selection (

).
- --- OK -> go to section (10).
- Select Graph View item -> go to section (9). (Only when Graph View has been selected as the display format.)

<Note>

- The sampling interval indicates the time interval between each recorded data sample of an item. Sampling interval settings can be selected from: 0 sec (fastest) / 1 sec / 10 sec / 1 min.
- When any sampling interval setting is selected, other than the fastest interval, the available recording time will be displayed. Please note that this available time is only an estimate obtained by calculation, thus may differ from the actual amount of recording time available.
- The Graph View item list will be displayed when "Graph View" is selected as the display format for the recording operation.
- The name of the file currently displayed is composed of DR + date + time. The time at which data was downloaded into the PC is used as a reference.
- DR: files saved via the Drive Recorder.

(9) Select Graph View Display Item

Select the desired item to display as a graph from among the selectable items.

Only the items selected will be displayed as graphs. Although other items will not be displayed, the data has been recorded.

- Touch this button to insert the item currently chosen from the Selectable Item list into the desired position on the Graph View Item list.
- Touch this button to move the item currently chosen from the Graph View Item list to the very bottom position on the Selectable Item list. (The selected position and items are fixed.)

 \sim --- OK -> go to section (8).

No Ben Name 10 SUPPLYVOLT A 11 SEAR RACK A 12 REAL RACK 11 14 DOOST FREESS A 17 PS AND DEF. I		tems Available.			Graph display items	_
A B I I III IIII IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	No.	Item Name		No.	item Name	
13 REAL RACK 12 TARGET RACK 16 BOOST PRESS 15 NATER TEMP	18	SUPPLY VOLT		11	ENGINE SPEED	
16 BOOST PRESS 15 WATER TEMP	13	REAL RACK		12	TARGET RACK	
17 PS.AND.DIFF. 14 ACCEL.VOLT	16	BOOST PRESS		15	WATER TEMP	
	17	PS ANG DIFF.	-	14	ACCEL VOLT	
			-			
			¥			

0	1	2	3	4	5	6	7	8	9	
-						-		-		
A	В	с	D	E	F	G	н	1	J	
к	L	м	N	0	P	۹	R	s	т	
U	v	w	x	Y	z				•	1
								Space	Back Space	Clea

(10) Enter Recording Information

Enter up to 50 characters of recording information (memo), which can be used as a reference after recording.

<Note>

- Reference information, such as vehicle model name and diagnostic system name, should be entered.
- As the PC keyboard is connected, the information may be entered either directly from the PC keyboard or from the keyboard shown on the screen.

	Setting Conditional 1/2
tem	Settings
Conditions of Trigger	Manual Trigger
Trigger bern	-
Measurement tem	8
Record Place	PC
Sampling interval	Osec (available fastest s peed)
File Name	DR031111-110320.csv
Recordable Time	168min40sec
Record Information	FH605

(11) Recording Settings List

Recording settings can be confirmed with this function. Touch the Derived button to confirm the items to be measured on the Recording Item list screen. -> go to section (12). \sim --- OK -> go to sections (13) / (14).

		Set	ing Conditions()			
	No.	Item Name		No.	item Name	
(1)	11	ENGINE SPEED	(2)	12	TARGET RACK	
(3)	15	WATER TEMP	(4)	14	ACCEL VOLT	
(5)	13	REAL RACK	(6)	16	BOOSTPRESS	
(7)	17	PS ANG DIFF.	(8)	18	SUPPLY VOLT	

(12) Recording Item List

The row items to be displayed in graph format during the recording operation will appear with the background highlighted in yellow, under the [Item Name] column. (Only when Graph View has been selected as the display format for the PC Recording Settings operation.)

Touch the button to display the settings for data recording. -> go to section (11).

--- OK -> go to sections (13) / (14).

		R	ecord Dat	a		
No.	Item Name	Value	No.	Rec	n Name	Value
11	ENGINE SPEED	675 rpm	12	TARGET RACK		6.39 mm
15	WATER TEMP	58.7 °C	14	ACCEL VOLT		0.784 V
13	REAL RACK	6.39 mm	16	BOOST PRES	5	-28 mmHg
17	PS ANG DIFF	0.00 deg	18	SUPPLY VOLT		14.00 V
Re	cord Time 0'10	Data		20point	Trigger	un-generatin

(13) Recording Screen (If Text View is Selected)

If Text View is selected, on the screen shown in section (8), data will be acquired / displayed as text and will be simultaneously saved in a file.

16 text items can be displayed simultaneously.

Freezeward --- Touch this button to end data recording: go to section (15).

If 0 points of data are recorded: go to section (16).

- Touch this button for manual triggering (Note that if Diag. Trigger has been selected as the triggering method, this operation will not function.)
- To resume display, touch this button again.
 The data recording operation will continue, even if Data List display is paused.

<Note>

- Even if triggering occurs, the recording operation will continue until the button is touched.
- Once the recording screen is displayed, the amount of available PC hard disc space will be checked. If 100 MB or less space is available, a message will be displayed and the recording operation will be canceled.
- Once 20,000 data points have been recorded, a message will be displayed and the recording operation will end. (If the sampling interval is 1 second, then 1 data point will be recorded each second. Therefore, when converted to time, approximately 5.5 hours are required to record 20,000 data points. If the sampling interval is 10 seconds, the time conversion will be approximately 55 hours. If the sampling interval is 1 minute, the time conversion will be approximately 333 hours.)
- In the event that an error occurs during the data recording operation, all data recorded up until the time of the error will be saved.

No.	Item Name	Value	Graph
11	ENGINE SPEED	962 rpm	3000
12	TARGET RACK	6.14 mm	0,00
15	WATER TEMP	56.7 °C	40.0
14	ACCEL VOLT	1.314 V	0000 -120 -100 -80 -60 -40 -20
Rec	ord Time 0'40	Data	69point Trigger un-generating

Data save Web Page Dialog					
🗘 Data save					
The data currently displayed was saved in file name					
DR031111-110320a.csv					
\checkmark					

Record Da	ıta Save Web	Page Dialog	
?	No record	l data	
	There was r Do you stop		
	$\langle \times$		

(14) Recording Screen (When Graph View is Selected)4 items are displayed simultaneously as graphs. Items that are not displayed on the screen are also recorded. The buttons available for use with this function are the same as those used for Text View.

<Note>

The occurrence of triggering is indicated by a solid red line. If the pause button is touched, a solid black line will be displayed on the graph.

(15) Save Recorded Data

If the button is touched, in the procedures described in either section (13) or (14), data will be saved and a dialogue will appear to confirm the completion of the data save operation.

Once data has been saved, the display will return to the Drive Recorder menu screen.

--- OK -> go to section (3).

(16) No Recorded Data

If no recorded data is present, a dialogue will appear to confirm whether the recording operation should be ended.

Go to the fault diagnosis menu (once the **final** button is selected).

Go to either section (13) or (14) (once the 1 button is selected).

Go to section (3) (once the *Reported* button is selected).

Touch this button to cancel: return to either section(13) or (14) and resume the recording operation.

(16) For the procedure used to confirm the data after the recording operation, refer to "5-2-2. Regenerating the Recorded Data."



5-1-3. Recording by Using the Previous Settings

(1) The previous recording settings can be restored to re-record data under the same conditions as those used for the previous data file.

Select the

Record (Read Setting Condition) button from the Drive Recorder menu screen.

	Data List	for read setting condition		
File Name	Record System	Conditions of Trigger	Record Information	
DR031111-110630.csv	ENGINE	Manual Trigger	FH605	1
DR031111-110320.csv	ENGINE	Manual Trigger	FH605	-
				1
	-			

(2) Select the data for which settings must be restored, from the Setting Conditions File list.

After displaying the Setting Conditions File list, the recording conditions can be reset.

🗸 --- OK

When displaying the data recorded with the stand-alone V.C.I.:

-> go to section 5-1-1.(7).

When displaying data recorded with the PC.

-> go to section 5-1-2.(7).

Touch this button to return 1 level: go to section (1).

		Drive Recorder	
ENGINE Drive Recorder	Record		
		tem Group List	
	No.	Item Group Name	
	1	All Deta	
	2	Valiable data	A
	3	Switch data	
	4	Blank 1	•
	5	Elanik 2	
lease select a group.			
📫 🖆	8	2 × ×	

5-1-4. Group registration

- (1) Group registration
 - Up to 5 new groups, which is the combination of user-specified items, can be registered.

Click button after select the line (No.4 – No.8) to be registered as group.

- **E** Segistered group is cleared.
- \blacksquare --- Group registration: go to section (2) \land

<Note>

- Registered contents can be corrected if you press the selecting the registered item group.
- Registered item group can be used for [Displaying the Data List Function], [the Actuator Test Function(simultaneously displaying the Data List)] and

[Drive recorder Function (selecting the recorded item)].

(2) Inp	ut Item G	roup Name
---------	-----------	-----------

Enter up to 16 characters of group name to be registered.

--- OK: go to section (3).

--- Cancel: go to section (1).

<Note>

As the PC keyboard is connected, the information may be entered either directly from the PC keyboard or from the keyboard shown on the screen.

				Prease In	put 16 chari	KONS.				
0	1	2	3	4	5	6	7	8	9	
A	в	с	D	E	F	G	н	Т	J	
к	L	м	N	0	Р	۹	R	s	т	
U	v	w	×	Y	z		•		•	١
								Space	Back Space	Clear

	berns Available				Selected terms	
No.	Name			No.	Name	
16	BOOST PRESS			14	ACCEL VOLT	
17	PS ANG DIFF.		•	15	WATER TEMP	
18	SUPPLY VOLT	•		11	ENGINE SPEED	
19	ACCEL STROKE			12	TARGET RACK	
20	BOOST TEMP		•	13	REALRACK	
21	START SIG	Ť	144			

(3) Selecting registered item

Pressing the button moves desired items to be registered as a group, to the Selected item list. After you press the button, Item group is registered, then the screen returns to section (1). <Note>

Items can be moved back and forth by using either the button or the dutton as necessary.

- >> --- Touch this button to insert all the items from the Selectable Item list into the desired positions on the Selected Item list.
- --- Touch this button to insert the item currently chosen from the Selectable Item list into the desired position on the Selected Item list.
- --- Touch this button to move the item currently chosen from the Selected Item list to the very bottom position on the Selectable Item list.
- --- Touch this button to move all the items from the Selected Item list to the very bottom of the Selectable Item list.
- Touch this button to change the order of items on both the Selectable Item list and the Selected Item list, in accordance with the specified default setting.

5-2. Handling the Recorded Data

Drive Reco	order E40
RTRAIN ENGINE Drive Recorder	(
Record	Data display
Record (Read setting condition)	Data storing

5-2-1. Transferring Recorded Data from the V.C.I. to the PC

 Data recorded in the V.C.I. can be transferred to the PC. Connect the V.C.I. to the PC using the USB cable. Select **Data Display** from the Drive Recorder menu. When transferring V.C.I. data by selecting the Drive Recorder from within the **Special Function** menu, it is not necessary to connect the V.C.I. to the vehicle.

		Records	rd Data List		
Save Del	File Name	Record System	Conditions of Trigger	Record Information	
~	DR031111-110630.csv	ENGINE	Manual Trigger	FH605	
	DR031111-110320.csv	ENGINE	Manual Trigger	FH605	
	SD031111-105618.csv	ENGINE			
	-				¥
	MID ******YNumber of Aeros Scher	1		-	

(2) Regenerated File List Select the Display V.C.I. Data button from the function buttons on the Regenerated File List.

- Transfer record settings -- Web Page Dialog

 Transfer record settings

 Transmission

 Confirmation



Drive Recorder	
ENGRE / Drive Recorder / Record Transfer record settings (PC → V.C.I)	
Wait a second.	

(3) Display V.C.I. Data

The conditions of the V.C.I. recording areas can be displayed. Drive Recorder data recorded in the V.C.I. can be transferred to the PC. As well, the data within the V.C.I. can be deleted.

Touch the Example button after selecting the data to be transferred.

Touch the for button to delete the data.

- (4) Confirm V.C.I. Data Transfer
 - --- OK: go to section (5).
 - \ge --- Cancel: go to section (3).
- (5) V.C.I. Data Transfer Status

Data is now being transferred from the V.C.I. to the PC. Please wait for a moment.

Upon completion of data transfer, a message will be displayed requesting confirmation to delete the data in the V.C.I..

Follow the instructions.

After data has been transferred, the screen will return to section (3).



5-2-2. Regeneratin	g the Recorded Data
--------------------	---------------------

- (1) Select Drive Recorder Function
 - To display recorded data after recording using the Drive Recorder, select the **Data Display** button. When displaying recorded data by selecting the Drive Recorder from within the **Special Function** menu, it is not necessary to connect the V.C.I. to the vehicle.

Save File Name Record System Conditions of Trigger Record Informat	00
	100 C
DR031111.110630.csv ENGINE Manual Trigger FH605	A
DR031111-110320.csv ENGINE Manual Trigger FH605	
SD031111-105618.csv ENGNE	A.
	-
	•

(2) Regenerated File List

Select the desired data to display from the regenerated file list, then touch the 💼 button to view the text data.

Also, touch the and buttons to view the graph data.

The background color of the selected file row will change. <Note>

The name of the file currently displayed is composed of DR (SD) + date + time. The time at which data was downloaded into the PC is used as a reference. The most recent data is displayed first.

DR: files saved via the Drive Recorder.

SD: files saved via the Data List.

(Including the Data List saved via the actuator test.)

(3) For more information about the procedure used to check regenerated files, please refer to "5-3. Analyzing Recorded Data."



Same period File Name Record System Conditions of Trigger Record Information V DR031111-110630.cvv ENGNE Manual Trigger FH605
DR031111-110630.csv ENGINE Manual Trigger FH605
DR031111-110320.csv ENGINE Manual Trigger FH605
SD031111-105618.csv ENGINE -

		Records	rd Data List		
Save Del	File Name	Record System	Conditions of Trigger	Record information	
~	DR031111-110630.csv	ENGINE	Manual Trigger	FH605	1
	DR031111-110320.csv	ENGNE	Manual Trigger	FH605	H
	SD031111-105618.csv	ENGINE	-		1
_					
04/80)	410 ******Number of Jerns Sifier	ord time 0 min 23 sec/Sample			1/2

5-2-3. Deleting / Saving the Recorded Data

- (1) Select Drive Recorder Function Select the **Data Display** button.
 When displaying the recorded data by selecting the Drive Recorder from within the **Special Function** menu, it is not necessary to connect the V.C.I. to the vehicle.
 In order to save the data, insert removable media into the PC.
- (2) Deleting Regenerated FilesMark the check box, then touch the figure button to delete

the data. (Multiple files can be marked.)

Move the curser onto the check box and click. This action will cause the \checkmark mark to appear. (To select)

The ✓ mark will disappear if the check box is clicked again. (To cancel)

A confirmation dialogue will be displayed after the delete button is touched. Follow the instructions.

(3) Saving Regenerated Data

Mark the check box beside the file to be saved then touch the button. (Multiple files can be marked.)

Move the curser onto the check box and click. This action will cause the \checkmark mark to appear. (To select)

The ✓ mark will disappear if the check box is clicked again. (To cancel)

If removable media is not present in the PC, files will not be saved.

		Drive Recorder		E402
ENGINE / Drive R	ecorder / Data displ	ay		
		Drive List	100 C	
	D.\Removable	disk		
			_	
			7	
see select the drive that yo	u saved and press the OK bu	Non.		
1		2	X	



(4) Select the Save Drive for Regenerated Files The drive selection screen will be displayed. Select the save destination drive.

Touch the value button to save the file to the removable media.

<Note>

Prior to saving data, insert a PC memory card or other type of removable media, into the PC. If using a PC memory card, first open the card slot cover, which is located on the side of the PC, then insert the card.

Please note that PC memory cards are not provided with the product and must be obtained separately.

Caution

Never remove the PC memory card while data is being saved, as the data may become corrupted.

5-2-4. Loading Recorded Data

(1) Regenerated files that have been saved on removable media can be loaded into the PC. After selecting the Special Function button from the function selection menu screen, select the Drive Recorder button to display the screen shown to the left. Select the Data Storing button.

e Recorder - Microsoft Inte	rnet Explorer	Drive Recorder		E4020
ENGINE / Drive R	corder / Data display			
		Drive List		
	D'Removable dis	ĸ		
			_	

(2) Load Data

Data recorded on removable media can be loaded into the PC.

Select the removable media that holds the saved data and touch the 🗸 button.

<Note>

If the removable media has not been inserted into the PC, an error message will be displayed.



5-3. Analyzing Recorded Data

Drive Reco	rder	E4010
ERTRAIN ENGINE Drive Recorder		
Record	Data display	
Record (Read setting condition)	Data storing	
Record (Read setting condition)	uata storing	
da		

1 L

5-3-1. Regenerating Recorded Data

 Select the Data Display button from the Drive Recorder function menu. To display data without connecting the V.C.I. to the vehicle, select Special Function from the function selection menu screen, then select Drive Recorder.

(2) Regenerated File List

Select the desired data to display from the regenerated file list, then touch the button to view the text data. Also, touch the state and buttons to view the graph

data.

¥

1202

87 88 84

- --- Text View: go to section (3).
- --- Graph View 1: go to section (4).
- Graph View 2: go to section (5).

<Note>

The name of the file currently displayed is composed of DR (SD) + date + time. The time at which data was downloaded into the PC is used as a reference. The most recent data is displayed first.

DR: files saved via the Drive Recorder.

SD: files saved via the Data List.

(Including the Data List saved via the actuator test.)

(3) Text View

The data recorded via the Drive Recorder recording operation will be displayed as text.

Triggering points are displayed in red font.

- E Graph View 1: go to section (4).
- --- Graph View 2: go to section (5).
- --- Select Item: go to section (7).
- Data Extraction Condition: go to section 5-3-2.(1).
- Example --- Set Data Searching Condition: go to section 5-3-2.(3).
- Strong --- Jump to Triggering Point
- --- Save Regenerated File: go to section (6).
- --- Set Correlation Chart: go to section 5-3-3.(1).
- --- Set Distribution Chart: go to section 5-3-3.(2).
- 1/3 C2 --- Switch displays of individual function button (1/3 view)
- 2/3 72 --- Switch displays of individual function button (2/3 view)

Switch displays of individual function button (3/3 view)

The order in which items are displayed can be changed (refer to section 5-3-4).

		11	12	15	14	7
Judge	Time-	ENGINE SPEED	TARGET RACK	WATER TEMP	ACCEL.VOLT	-
	m:s	rpm	mm	°C	v	
-	-0:03.104	962	6.14	56.7	1.314	
-	-0:02:403	1034	6.07	58.7	1.314	
	-0:01.812	1048	6.07	56.7	1.314	
	-0:01.221	1048	6.07	56.7	1.314	
	-0.00.630	1048	6.01	56.7	1.314	
	0.00.000	1048	6.07	56.7	1.314	- · ·
	0.00.611	1048	6.07	58.7	1.314	V
	0.01.202	1063	6.07	56.7	1.333	
	0:01.793	1063	6.07	56.7	1.333	The second se
_	0.02.384	1077	6.01	56.7	1.353	T
	0.02.975	1063	6.14	56.7	1.392	
		44	-	•	••	
,	Max.	1321	Min.	574	Ave.	867
		tions of Tryger Manual Tryge		a Billians/System Check Co	te E90AFile Name DP00111	
	Ê	S	2	(1.1.1) (1.1.1)		8
					10/11	2/3 22

No.	Bern Name	Value			Graph		_
			3660	1			11
11	ENGINE SPEED	1048 rpm	•	-	m	-	
12	TARGET RACK	6.07 mm	20	_			
-			130				П
15	WATER TEMP	56.7 °C	-40				Ц
14	ACCEL VOLT	1.314 V					
			-01:11			1 1	00.41
		Time 0:	00.000	< -			•
w 1 min 2	3 sec/Conditions of Trigger &	farval TriggerThe runs	ber of Aéro choices B	BhervSystem CA	ick Code E904/File I	Name DA001111-	110020 ci
5	<u>د</u>	S (2		2 🕮		1/3
				The E		i ol	2

(4) Graph View 1

The data recorded via the Drive Recorder recording operation will be displayed in the form of a graph.

The points currently displayed are indicated by pink dotted lines. Trigger points are indicated by solid red lines.

During recording, the section where Graph View is paused will be indicated by a solid black line. The section where Graph View has resumed will be indicated by a solid gray line.

- Graph View 1 (The graph height area will change in accordance with the number of items displayed.
 For example, if 3 items are displayed, the graph height area will be divided into 3.)
- --- Graph View 2: go to section (5).
- **I** --- Text View: go to section (3).
- Em Select Item: go to section (7).
- Data Extraction Condition: go to section 5-3-2. (1).
- Strong --- Jump to Triggering Point
- --- Save Regenerated File: go to section (6).
- --- Set Correlation Chart: go to section 5-3-3.(1).
- missogram --- Set Distribution Chart: go to section 5-3-3.(2).
- Left --- Change Time Scale
- 1 --- Change Data Scale
- 1/3 72 --- Switch displays of individual function button (1/3 view)
- 2/3 🔁 --- Switch displays of individual function button (2/3 view)

3/3 72 --- Switch displays of individual function button (3/3 view)

- <Note>
- The order in which items are displayed can be changed (refer to section 5-3-4).
- The data range can be changed to user-specified values (refer to section 5-3-5).
- (5) Graph The b



(5) Graph View 2

The buttons available for use with Graph View 2 are the same as those used for Graph View 1.



_	tims Available.				selected item
No.	tem Name	_		No.	Item Name
13	REAL RACK			-11	ENGINE SPEED
16	BOOST PRESS		•	12	TARGET RACK
17	PS ANG DIFF.			15	WATER TEMP
18	SUPPLY VOLT	•		14	ACCEL VOLT
			•		
		¥	144		

(6) Save Regenerated File

Recorded data that is currently displayed will be saved in the PC.

Data that has been reduced via extraction can also be saved.

File names will consist of the original data file name + a letter (a, b, \sim z).

(7) Select Display Item

Items to be displayed can be selected using this function. Items can be selected by moving them back and forth using either the button or the dutton.

The item order can be changed by the following procedure: Temporarily return items that were once moved from the Selected Items to the Selectable Items list, back to the Selected Items list; change the position of the desired items; then move the items back to the Selectable Items list;

- Touch this button to insert all the items from the Selectable Item list into the desired positions on the Selected Item list.
- --- Touch this button to insert the item currently chosen from the Selectable Item list into the desired position on the Selected Item list.
- Touch this button to move the item currently chosen from the Selected Item list to the very bottom position on the Selectable Item list.
- --- Touch this button to move all the items from the Selected Item list to the very bottom of the Selectable Item list.
- --- Touch this button to change the order of items on both the Selectable Item list and the Selected Item list, in accordance with the specified default setting.

	Extraction Settin	gs (Data S	letting)				7		8	9
No./tem Name	Threshold value	Unit	UP/DOW	LevelEdge	AND/OR				Ŭ	
11 ENGINE SPEED	1830	rpm	UP	Level	1		4	£.	5	6
							1		2	3
			_				c	1		
			+	-		•	Ba Spa		Clear	
			Condition e				_	_		
No./I	tem Name		shold value		Jnit	UP/	DOWN	Lev	elEdge	ANDIO
11 ENGINE SP	EED 💌		1830		pm	UP	~	Leve	н 🛩	AND



5-3-2. Extracting / Searching the Recorded Data

Recorded data can be extracted and searched under user-specified conditions. Data can also be reduced and marked for reference. The time range or threshold value of items can be specified as data extraction / search conditions.

(1) Set Data Extraction Condition

Edit the item conditions, under the Edit Conditions column, then touch the Exlaw button to add the item to the extraction conditions. Up to 8 conditions can be specified for data extraction.

After specifying the extraction conditions, touch the button and only data that matches the specified extraction conditions will be displayed.

- (2).
- Touch this button to delete the selected extraction conditions.

<Note>

Numeric values can be entered using either the keyboard or the buttons located on the right side of the screen.

(2) Set Time Extraction Conditions

After setting the upper and lower time range limits for the desired data, touch the button and only data that matches the specified extraction conditions will be displayed.

<Note>

When both the data extraction conditions and the time extraction conditions have been specified, data will be extracted via AND processing.

(3) Set Data Searching Condition (Only for Text View Screen)

Edit the item conditions, under the Edit Conditions column, and then touch the dutter button to add the item to the search conditions. Up to 8 conditions can be specified for data searching.

After specifying the search conditions, touch the

button. The * symbol will then be displayed in the confirmation column, directly beside data that matches the search conditions, on the text display screen shown in section 5-3-1.(3).

Current --- Set Time Searching Condition -> go to section (4).

Touch this button to delete the selected search conditions.

0.27	 - 0 min 4					7	8	9
						4	5	6
Extraction		-	ve)			1	2	3
fime range (Lower limit value) fime range (Upper limit value)	0	min min	-	44	500	0		
						Back Space	Clear	

(4) Set Time Searching Condition

After setting the time range for the desired data to search, ouch the button. The * symbol will then be displayed in the confirmation column, directly beside data that matches the search conditions, on the text display screen shown in section 5-3-1.(3).

<Note>

When both the Data Searching Conditions and the Time Searching Conditions have been specified, data will be searched via AND processing.

<Information About Setting the Conditions>

- Item Name: use to select the items for which conditions are to be specified.
- Threshold Value: a value that can be used as a standard.
- UP: specification of a condition that has a value greater than the threshold value.
- DOWN: specification of a condition that has a value less than the threshold value.
- Level: all data that matches the specified conditions.
- Edge: data that is at the point where its status changes, from not matching the specified conditions, to matching the specified conditions.

5-3-3. Displaying the Correlation Chart / Distribution Chart

(1) Set Correlation Chart

Touch the subject to display the correlation chart, after first specifying the time range for the subject data, as well as the item names and display ranges for each data group. Analog data and voltage data can be plotted on the correlation chart.

Subject item 1 will be plotted on the vertical axis of the correlation chart and subject item 2 will be plotted on the horizontal axis of the correlation chart.

- Time Range: time range for the data to be plotted.
- Subject Item 1: item plotted on the vertical chart axis.
- Data Range 1: range of data for the item plotted on the vertical axis.
- Subject Item 2: item plotted on the horizontal chart axis.
- Data Range 2: range of data for the item plotted on the horizontal axis.

<Note>

Numeric values can be entered using either the keyboard or the buttons located on the right side of the screen.

ENGINE / Drive Recorder		ve Reco	luei			E4020009
	Range			7	8	9
Time	-0 min 44 sec - 0 min -	41 sec			°	
Data (tem 1)	0 - 3660 rpm			4	5	6
Data (tem 2)	0.00 - 20.00 mm	5		4	5	0
Ce	rrelation Setting.			1	2	3
Time range (Lower limit value)	-0 min	44	50C			
Time range (Upper limit value)	0 min	41	sec	0		-
bern 1	11 ENGINE SPEED		2	Back	Clear	
Data Range 1	0 •	3660		opace		
item 2	12 TARGET RACK		9			
Data Range 2	0.00 +	20.00	-			
toe a time range minimum value smal	ler than the upper limit value.					



	Range				7	8	5
Time	-0 min 44 t	sec - 0 min 4	1 sec		'	v	-
Data	0	- 3660 rpm			4	5	e
His	togram Settin	9			1	2	3
Time range (Lower limit value)	-0	min	44	sec			
Time range (Upper limit value)	0	min	41	sec	0	•	
Applicable item	11 ENGINE SP	EED			Back Space	Clear	
Data Range	0		3660		space		
X-axis interval	366						
Y-axis range (0.Optimum Value is 0)	0						

(2) Correlation Chart

Recorded data is displayed in the form of a correlation chart under the specified conditions.

--- Touch this button to return to the Set Correlation Chart screen: go to section (1).

(3) Set Distribution Chart

Touch the <u>solution</u> button to display the distribution chart, after first specifying the time range for the subject data, as well as the item names, data range, division width and frequency range.

Analog data and voltage data can be plotted on the distribution chart.

- Time Range: time range for the data to be plotted.
- Subject Items: items plotted.
- Data Range: range of data for the items plotted.
- Data Division Width: width of data divisions.
- Frequency Range: maximum frequency for the Y-axis (if "0" set to the optimum value to display the maximum frequency for each division width).

<Note>

Numeric values can be entered using either the keyboard or the buttons located on the right side of the screen.

(4) Distribution Chart

Recorded data is displayed in the form of a distribution chart under the specified conditions.

1 --- Touch this button to return to the Set Distribution Chart screen: go to section (3).





1

5-3-4. Item Order Change Function

The order in which items are displayed on the Text View screen and on Graph View 1 and 2 screens, can be changed.

 (1) Changing the Ordering of Items on the Text View Screen Select the names of items that are to remain fixed, by clicking on them (multiple items can be selected). Use the
 Image: buttons to scroll the non-selected items, changing their order, while the selected items remain fixed. Touch the items again to cancel their selection.

11 DVARE SPEED Mall yn 12 TAROETRACK 607 mm 15 MALTER TEMP 50.7 °C		40.	item Name	Value	Grach
11 DIARS SPEED 104 gm 12 TARGETRACK E01 mm 13 WATER TEMP 50.7 °C 14 G			a contraction	1000	
12 AADOETRACK 607 m 3 15 WATER TEAP 50.7 C 3 15 0 AATER TEAP 50.7 C 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1	11	ENGINE SPEED	1048 rpm	
15 WATER TEMP: 50.7 °C		12	TARGET RACK	6.07 mm	
	+	-			130
11 ACCE VAT 1144	1	15	WATER TEMP	56.7 °C	
		14	ACCEL VOLT	1314 V	
				Time 0	00.000
Time 0:00.000 4					

(2) Changing the Ordering of Items on the Graph View 1 and 2 Screens

Select the item names that are to remain fixed (multiple items can be selected). Use the **v** buttons to scroll the non-selected items, changing their order, while the selected items remain fixed. Touch the items again to cancel their selection.

		Data U	ist Reference Table	
No.	Name	Value	Graph	
16	BOOSTPRESS	-28 mmHg		1
17	PS ANS DIFF.	0.00 deg	59 0	
18	SUPPLY VOLT	14.00 V	21.25	
19	ACCEL STROKE	0.0%		*

5-3-5. Data Range Change Function

Select the item for which the data range must be changed by touching the screen.

Once the selected item becomes highlighted in yellow, numeric values can be entered.

Methods for entering values: PC input or scroll button input. If a PC is used to enter values, enter user-specified values using the keyboard and either press the [Enter] button or touch the graph. This action will cancel the input state and will finalize the changed data range.

The A and v scroll buttons can also be used to change the data range. The button will make a full-scale +5% change toward the default data range and the v button will make a change of -5%. Each time the values are changed, the data range change is finalized.

Chapter 6 Operating Procedures for Measurement Functions

6-1. Operating Procedures for Measurement Functions
6-1-1. Measurement Function MenuP.63
6-1-2. VoltmeterP.63
6-1-3. OhmmeterP.63

6-1. Operating Procedures for Measurement Functions



6-1-1. Measurement Function Menu

Select the **Special Function** button from the function selection menu to enter special function mode. Switch to the **Measurement Functions** menu, using the tab located at the top of the screen.

<Note>

For the method used to connect the measuring probes, refer to section "2-2-2. Measurement Functions".

	Voltage	measurement	 E4020018
Measurement function / Vo	itage measurement		
Volta	40		
ov			
1			
	······		
	0		
	-40 10	.5	
le measurement range is from -40V to 40			
	S 7		

6-1-2. Voltmeter

Select the **Voltmeter** button from the menu screen shown in section 6-1-1.

The voltage is read from the trigger port, by using the measuring probes. The numeric values are displayed on the PC screen.

Prior to measurement, perform zero point calibration by touching the **m** button while the probes are short-circuited.

<Note>

DC voltages ranging from +/-40V can be measured.



6-1-3. Ohmmeter

Select the **Ohmmeter** button from the menu screen shown in section 6-1-1.

The resistance is read from the trigger port, by using the measuring probes. The numeric values are displayed on the PC screen.

Prior to measurement, perform zero point calibration by touching the while the probes are short-circuited. <Note>

Resistance values ranging from 0 \sim 100kOhm can be measured.

Chapter 7 Other functions

7-1. Operating Procedures for V.C.I. Stand-alone Diagnosis	
7-1-1. Transfer function of the database for V.C.I. stand-alone diagnosisP	266
7-1-2. Reading DTCs by V.C.I. stand-aloneP	2.67
7-1-3. Error and Troubleshooting of V.C.I. Stand-alone Diagnosis	2.69
<note></note>	
 V.C.I. Stand-alone Diagnosis can read out DTCs by using the Program/Data stored in tinternal memory of VCI, without connecting PC. 7-2. Operating Procedures for Engine VIN Writing 	the
7-2-1. Coding MenuP	2.70
7-2-2. VIN WritingP	2.70
7-2-3. Displaying of VIN informationP	2.70
7-3. Operating Procedures for Immobilizer Registration	
7-3-1. Registration menuP	271
7-3-2. The 1st key RegistrationP	2.71
7-3-3. VIN RegistrationP	2.72
7-3-4. Additional key RegistrationP	2.72
7-3-5. Erasing Registered keyP	2.73
7-4. Operating Procedures for Pulse Converter	
7-4-1. Pulse Converter menuP	2.74
7-4-2. Parameter SettingP	274
7-4-3. Parameter DisplayP	274
7-4-4. System InformationP	2.75
7-5. Operating Procedures for OBD-II Test Mode	
7-5-1. OBD-II Test Mode menuP	2.76
7-5-2. Diagnostic Trouble Code(Mode\$03)P	2.76
7-5-3. On-Board Test Result(Mode\$06)P	2.77
7-5-4. Pending DTCs(Mode\$07)P	2.77
7-5-5. Vehicle Information(Mode\$09)P	2.78
7-5-6. Readiness TestsP	2.78
7-5-7. Monitor SystemP	2.78

7-6. Operat	ting Procedures for Air Suspension Calibration	
7-6-1.	Calibration Menu	P.79
7-6-2.	Height Sensor Calibration	P.79
7-6-3.	Pressure Sensor Calibration	P.81
7-6-4.	Calibration Data	P.81

7-1 Operating Procedures for V.C.I. Stand-alone Diagnosis

7-1-1. Transfer function of the database for V.C.I. Stand-alone diagnosis



(1) Insert the memory card into the card adaptor, and then insert them into m-card slot on PC.



(2) Select function
 Select the Special Function button from the function selection menu to enter special function mode.
 Select the V.C.I. Stand-alone Diagnosis button



- (3) Select removable media
 - --- The Database, which is only for V.C.I. Stand-alone diagnosis, is transferred to the selected removable media(removable disk drive).

Database Transfer procedure written above has completed, remove the memory card from PC after stopping memory card by the procedures refer to [3-6].

- (4) Insert the memory card, which is storing V.C.I. stand-alone diagnosis data, into the card adaptor, then insert them into V.C.I. main unit.
- <Main Menu>
- 1 Read DTCs
- 2 Voltmeter
- 3 Ohmmeter



ex:	
<dtcs> 、</dtcs>	ļ 1/10
P2199#	EGR Temp
P2413#	EGR System
P0016#	Ne SNSR O
P0607*	ECU System
#######	#########

7-1-2. Reading Diagnostic Trouble Codes (DTCs)

- (1) Connect the V.C.I and the diagnosing vehicle with an appropriate main harness (TYPE-B/TYPE-E) securely, turn the V.C.I. power ON, and the V.C.I. LCD screen displays the Main Menu as illustrated on the left.
 - Confirm that "**1. Read DTCs**" is displayed, then press [Enter] (Enter) button.

<Note>

- If the V.C.I. is set on Drive Recorder mode, the LCD displays Drive Recorder menu screen (refer to 5-1-1(16)) Please press (Esc) (Esc)button twice in quick succession to cancel the Drive recorder mode.
- Necessary program/data for V.C.I. stand-alone diagnosis has been transferred automatically into the memory card.
- (2) System Select

Press \bigcirc button to browse the list until the LCD displays the system you want to diagnose, then press \bigcirc (Enter) button.

The display scrolls in the direction of the arrow displayed on the first line. To switch the direction, press (Esc), button once.

<Note>

If you press (Esc) button twice in quick succession, the screen goes back to the Main Menu (1).

The scrollable last line is displayed as[[]#############].

(3) DTCs Display

The DTCs that have been read from ECU are displayed.

- The number shown on the right edge of first line is indicating [The number of reading order / Total number of detected DTCs].
- Press v button to display the next DTC.
- The display scrolls in the direction of the arrow displayed on the first line. To switch the direction, press (Esc) button once. (When having only one DTC, the arrow is not displayed on the first line.) To switch the direction, press (Esc) button once.

- V.C.I. is constantly reading DTCs in order from Active to Stored and updating the screen.
- If the system supports status recognition, current status of each DTC is expressed by the following symbols, which appears after code.



<Note>

If you press (Esc) button twice in quick succession, the screen goes back to the Main Menu (1).

7-1-3. Error and	d Troubleshooting	a of V.C.I.	Stand-alone	Diagnosis
		y or vrom		Blagnoolo

No.	Error Message / Symptom	Cause	Remedy
1	 < Init. Error > System not Supported or System not exist > Out of target for V.C.I. Stand-alone diagnosis.(unregistered) 	 > The systems you selected are out of target for the V.C.I. Stand-alone diagnosis. > The selecting systems do not exist. 	 Use the PC to make a diagnosis because the systems you selected are not supported for the V.C.I. Stand-alone diagnosis. Confirm that if the system you selected exists or not.
2	<comm. error=""> Retry ? > Error has happened during communication between V.C.I. and ECU</comm.>	 Communication line between V.C.I. and ECU got disconnected or loosed connection from any cause ECU power OFF 	 Verify that the IG switch is turned ON. Check if the communication wire between V.C.I. and ECU is disconnected or not. Pressing the V.C.I. "Enter" key proceeds on the diagnosis.

7-2 Operating Procedures for the Engine VIN Writing

7-2-1. Coding Menu



New VIN: JLBFE649F6FKA000

2 3 4 5

D

6

9

I J S T

> Back Space

1

1 L

Select the Codingbutton from the Engine system.The Coding menu is displayed.VIN WritingStart VIN Writing : go to section 7-2-2.VIN InformationDisplay VIN Information : go to section 7-2-3.

7-2-2. VIN Writing

 The VIN that has been read from ECU is displayed on [Current VIN].

Input the desired VIN to be written into [New VIN].

--- Performing VIN Writing : go to section (2).

- VIN Writing

 Excercit Coding Viti Veriang

 Results of VIN Veriang

 Results of VIN Veriang

 Results of VIN Veriang

 LIBFE046F6KA12345
 Before Writing JLBFE046F6KA00001
- (2) The result screen of VIN Writing is displayed.

7-2-3. Displaying VIN information

VIN information that has read from ECU is displayed.



7-3 Operating Procedures for Immobilizer Registration



7-3-1. Registration menu

Select **Registration** button from the IMMOBILIZER system. Registration menu is displayed.

The 1st key Registration

Register the key information for the IMMOBILIZER system with no registered keys is registered.

 \rightarrow go to section 7-3-2.

VIN Registration

Send the VIN from Engine system and store the information on the IMMOBILIZER system. \rightarrow go to section 7-3-3.

Additional key Registration

Add and register the information for new key to the IMMOBILIZER system.

 \rightarrow go to section 7-3-4.

Erasing Registered key

The key information registered on the IMMOBILIZER system is erased. Except the Master key information with key-on currently.

 \rightarrow go to section 7-3-5.

7-3-2. The 1st key Registration

(1) The confirming screen if the 1st registrable key is at the "ON" position is displayed.



The 1st key Registration
Please confirm the 1st registrable
key is at the "ON" position.

Informa	tion
The 1st Registrable Master key	1
The 1st Registrable Sub key	1
Registered Master key	0
Registered Sub key	0
Status	

(2) The screen of the 1st key registration is displayed.
 Register both Master key and Sub key.
 --- The 1st key registration



L



7-3-5. Erasing Registered key

- (1) The confirming screen if Master key is at the "ON" position is displayed.
 - --- OK : go to section (2).

			Registrati	on	140102
MMOBILIZER	Registration	Erasing Reg			
			Information		
	Status				
~			2		

- (2) The Erasing Registered key screen is displayed. The registered key is erased except the key being at the "ON" position currently.
 - --- Performing Erasing Registered key.

7-4 Operating Procedures for Pulse Converter



UD-E - Moreof Interest Explore Puls BODY Pulse Converter	e Converter
Parameter Setting	Parameter Display
elect function.	2

	· · ·
Decementer Display	displaye
Parameter Display	Paramo
	Chan
	\rightarrow go
	Paramo

9

3 2

SET

5 6

7-4-1. Puls	se Converter menu
-------------	-------------------

(1) Change the screen to **BODY** by selecting its tab located on the upper side of the screen. Select **Pulse Converter** button from the BODY-related

menu.

System Check

Change and display the parameter value of Pulse Converter.

 \rightarrow go to section (2)

System Information

Display the system information.

 \rightarrow go to section 7-4-4.

(2) The function selection screen of Pulse Converter is ed.

eter Setting

ge the parameter value of Pulse Converter. to section 7-4-2.

eter Display

Display the parameter registered on Pulse Converter. \rightarrow go to section 7-4-3.

7-4-2. Parameter Setting

The parameter value that Pulse Converter recognizes is displayed.

((*.***) is displayed as the numeric value being out of the setting ranges.)

Insert the value by the numeric keypad.

As pressing the **SET** button, the value is registered.

Press the solution to perform Parameter setting.

- --- Performing Parameter setting
- \sim --- Cancel: go to section 7-4-1(2).

7-4-3. Parameter Display

The parameter registered on Pulse Converter is displayed.

--- Return to the function selection screen \rightarrow go to section 7-4-1(2).



nation	
System Information	
FMS-E06-1X6 STEP1	
Type RKTB-0606-00	Ver 1.06.06.30.0
Type:X5W-101-01	Ver.0.6.7.12.0 E061X6
Type:X5W-101-01	Ver.0.6.7.12.0 E061X6
32-00003120	
	System Information PMS-E06-1x0 STEP1 Type RVTB-0006-00 Type XSN4 101-01 Type XSN4 101-01

7-4-4. System Information

Select the **System Information** button from Pulse Converter menu screen.

System information screen displays [Software Version], [Basic Software], [Software for Fault Diagnostics System], [Database for Fault Diagnostics System] and [VCI Serial Number] of current MUT-3 system installed on PC.

Return to Pulse Converter menu screen

 \rightarrow go to section 7-4-1(1).

7-5 Operating Procedures for the OBD-II Test Mode menu

7-5-1. OBD-II Test Mode men	u
-----------------------------	---

	Data List	Actuator Test
Drive Recorder	OBD-II Test Mode	Voltmeter
Resistor	Q Adjustment Resistor Clear	ECU Information
Resistor	Q Adjustment Resistor Clear	ECU Informati

(1) Change the screen to **POEWERTRAIN** by selecting its tab located on the upper side of system selection menu screen.

Select **ENGINE** from the POWERTRAIN-related menu.

Select the **OBD-II Test Mode** button from the function selection screen of **ENGINE**.

On-Board Test Result(Mode\$06)
Vehicle Information(Mode\$09)
Monitor System

(2) Function selection screen of ODB-II Test Mode is displayed.

Diagnostic Trouble Code(Mode\$03)

Diagnostic Trouble Code displaying screen is displayed. \rightarrow go to section 7-5-2.

On-Board Test Result(Mode\$06)

Monitor System selection screen is displayed. \rightarrow go to section 7-5-3.

Pending DTCs(Mode\$07)

Pending DTCs displaying screen is displayed.

\rightarrow go to section 7-5-4.

Vehicle Information(Mode\$09)

Vehicle Information selection screen is displayed.

 \rightarrow go to section 7-5-5.

Readiness Tests

Readiness Test result displaying screen is displayed. \rightarrow go to section 7-5-6.

Monitor System

Monitor System displaying screen is displayed. \rightarrow go to section 7-5-7.

7-5-2. Diagnostic Trouble Code(Mode\$03)

Self-diagnostic displaying screen is displayed. Usable buttons are the same as ones on section 4-1-1.



Oxygen Sensor	Catalyst	EGR
EVAP	Oxygen Sensor Heater	Heated Catalyst
Secondary Air	Fuel System	Mis-Fire

OBD-II TEST MODE

1 1

Test Result

78.4 °C 78.4 °C -40.0 °C

Passed

7-5-3. On-Board Test Result(Mode\$06)

(1) Select the desired Monitor System to be displayed. \rightarrow go to section (2).

(2) The result of On-Board Test is displayed.

ENG		T MODE Pending DTCs(M	iode\$07)		
		sing DTCs			
info.	DTC	Name		Freeze Frame Data	
_					
			-		
			-		
			-		
	No	DTCs found	_		

7-5-4. Pending DTCs(Mode\$07)

- (1) Pending DTCs are displayed.
 - Freeze Frame Data Freeze Frame Data screen is displayed. \rightarrow go to section (2).

		Self-diagn	ostic		
RTRAIN	ENGINE Self-diagnostic				
	Pending DTCs			Freeze Frame Data	
DTC	Name		No.	Name	Value
P0500 V	whicle Speed Sensor		01	LOAD Value	6.7 %
			02	Engine Coolant Temperature	11 °C
			03	Intako MAP	18 kPa
		*	04	No	73 rpm
			05	Vehicle Speed Sensor	2 km/h
1 diagno	stic trouble codes foun		DTC ca	used to store freeze frame o	lata
			500	Vehicle Speed Senso	(
	Communication Type OBDonG	CAN/ML OFF			

(2) Freeze Frame Data is displayed.

OBD-II TEST MODE Model Test MODE Model (Cold Test Model Values Values) VN Calibration ID		Vehicle Information(Mode\$09) Select the desired VIN to be displayed. \rightarrow go to section (2).
Paura anto administra		
NOT 101 FOR 2 Names Read Same OBD-II TEST MODE RedString ENDRE / ODD 2 TEST MODE / Vhick Hommation/deat(30) Endle (100 - 100	(2)	Selected VIN is displayed.
Velie Monate VIN 0123456780EF0TUWW		
The Test Month States OBD-II TEST MODE JAIDSING STORE / COLD TEST MODE JAIDSING	7-5-6.	Readiness Tests Readiness Test results are displayed.
Bearings Test Heards Item Status Catalyst Complete		Not Available : Monitor not supported.

Readiness Test Resul	ta .	
Item	Status	
Catalyst	Complete	
Heated Catalyst	Incomplete	
Evaporative System	Not Available	
Secondary Air System	Not Available	
A/C System Refrigerant	Incomplete	
O2 Sensor	Complete	
02 Sensor Heater	Not Available	
EGR System	Complete	

- Not Available : Monitor not supported.
- Complete : Monitor complete.
- Incomplete : Monitor not complete.

OE Monitor System		
Monitor Sys	tem	
Item	Status	
Mafro	Available	
Fuel System	Available	
Component	Not Available	
Catalyst	Available	
Heated Catalyst	Available	V
Evaporative System	Not Available	

7-5-7. Monitor System

The corresponding state of Monitor System is displayed.

- Available : Monitor supported.
- Not Available : Monitor not supported.

7-6. Operating Procedures for Air Suspension Calibration

キャリプレー クロンション	ーション	3401073
ハイトセンサ	圧力センサ	
キャリプレーションデータ表示		
キャリンレーションデーダ表示		
6. rema		

7-6-1. Calibration Menu

Select the **Calibration** button from Suspension System. Air Suspension calibration menu is displayed.

Height Sensor

Height sensor calibration is performed.

 \rightarrow go to section 7-6-2.

Pressure Sensor

Pressure sensor calibration is performed.

 \rightarrow go to section 7-6-3.

Calibration Data

Calibration data list is displayed.

 \rightarrow go to section 7-6-4.

7-6-2. Height Sensor Calibration

(1) Set the Normal Level

Car height on each of the front / rear can be adjusted.

For the adjustment method, please refer to the service guide for each vehicle.

- --- greatly down
- --- small down
- areatly up
- 🔺 --- small up
- --- Go to the Upper level set screen, after the adjustment state is set.
- --- Cancel : go to section 7-6-1.
- Enlarged view of the 4 buttons : go to section (5).
- F--- The operate mode display: go to section (4).

For ensuring safety, the declining operation is stopped automatically, by the consecutive operation in a given time. (It stops after 3 Seconds for Front, 10 Seconds for Rear.) Press the button again if you continue declining operation.

(2) Set the Upper Level

Car height on each of the front / rear can be adjusted. For the adjustment method, please refer to the service guide for each vehicle.

- areatly up
- --- small up

🛫 --- greatly down --- small down

--- Go to the Lower level set screen, after the adjustment state is set.



--- The operate mode display : go to section (4).

For ensuring safety, the declining operation is stopped automatically by the consecutive operation in a given time (It stops after 3 Seconds for Front, 10 Seconds for Rear.). Press the button again if you continue declining operation.

マジブレーション・Microsoft Internet Explorer			
2+2 \$2. 192 ++17L	キャリブレーショ	2	J401073

49 /		シ キャリプ				-		
	ाज	トセンサキャリフ	_				リヤ車高調整件業	NE-K
中立位置	Pttoh	上限位置せい	+	下原位置セット			ノーマル	
		Antext				-	POE	
	No.	名称		辅	N		名称	생
	12 F /V	(Ht:)7		20.77%	12	RFL SP077		27 11/7/
	17 RL.)	VH60#		122 70%	16	RFR SPG77		26.1172
	18 RR -	nitest		127 かたト	11	RRL SPG77		26 11/7/
+					14	RRR SP077		26 11/7/
		つロント東京誌	82				0.X1052	
*		*	*	±	*	*	*	1

		ハイトセンサキ	モリプレーショ	2		リヤ東高調整	計断モード
中立位置	Et:	上限位	置セット	下限位置セット		7-5	マル
	-	1MB	E/#			SPOE	
	No.	4	BAR	誦	No	名称	
	12	F MHE/7		20 177/4	15	RFL SP077	27 1172
	17	BL MHON		122.77%十	16	RFR SPG77	26.870
	10	RR MHE/7		127. かたト	13	RRL SP077	26 1177
					14	RRR SP077	26 117.
		702/4	NA 1912			0元素素調整	
#		+		#	*	* *	=
****	_			-			

(3) Set the Lower Level

Car height on each of the front / rear can be adjusted. For the adjustment method, please refer to the service guide for each vehicle.



--- small down

🔺 --- small up

Image: --- Height sensor calibration will be complete, after the adjustment state is set.

Enlarged view of the 4 buttons : go to section (5).

F--- The operate mode display : go to section (4).

For ensuring safety, the declining operation is stopped automatically by the consecutive operation in a given time. (It stops after 3 Seconds for Front, 10 Seconds for Rear.) Press the button again if you continue declining operation.

- (4) Select the operate mode
 - --- Setting
 - --- Return to the previous screen





- (5) The button display can be enlarged in order that the up-and-down setting of car height is performed easier without looking at a screen.
 - San --- Front / Rear change
 - 1 --- Return to the previous screen
 - --- The operate mode display: go to section (4).

This screen is for operating up-and-down setting of car height, so the adjustment state cannot be fixed here.

Return to the previous screen by the 1 button, and fix the adjustment state by the vertice button.

	たかかか キャリプレーショ 圧力センサキャリプレーショ			圧力調整体	lit-⊀
				1-2	ı.
	ハイトセノサ			SPOE	
No.	名称	舗	No	名称	18
12	F MHE/T	19.27元子	15	RFL SP077	22 1172
17	RL MHO#	26 177/+	16	RFR SP077	20 1172
18	RR MH2/7	30 7/7/-	13	RRL SP077	21 7/7
			14	RRR SP077	21 1177
				压力調整	
				300 B((01
	L. OVERSTHELET.				

7-6-3.	Pressure	Sensor	Calibration
			• • • • • • • • • • •

- (1) Go on to the Pressure Sensor Calibration, after height sensor calibration ends.
 - ີ⊒≓ວ⇔ --- Exhaust
 - ⊇<< e --- Air Intake
 - --- Ending Calibration
 - --- Cancel
 - --- Operate mode display : go to section (2).
- (2) Select the operate mode.

7-6-4. Calibration Data

Calibration data list is displayed.

		キャリプレーシ	コン	
42 9257M2 ++	リプレーション			
-	キャリプレーンシンデータ表示			1
	No.	名称	値	
	11	8 中立	あかかいト	*
	12	F中立	יעלת וז	
	13	8 上限	158 ガウント	•
	14	F 上限	156 ガウント	
	15	R下限	31 カウント	
	16	F下限	22 777-24	*
L				
14 ······//224-D ······/##)	ウズエアウス・ティン	9:3K 8081		
	10	2	/	

7-7 Operating Procedures for Language Switching



7-7-1. Language Switching

(1) Select the Maintenance button from the Start-UP Screen. Change the screen to the Environment by selecting its tab located on the upper side of Maintenance screen, and select the Select Language for Display button from Environment-related menu.

Select Language for display (System)	Select Language for display (Service Manual)

- (2) Display language setting menu
 Select Language for Display(System)
 Language switching for Display(System) is performed.
 → go to section (3).
 Select Language for Display(Service manual)
 - Language switching for Display(Service manual) is performed.
 - \rightarrow go to section (4).



- (3) Select Language for Display(System)
 Select the desired Language to be used for Display(System).
 - --- Setting the selected Language to be used for Display(System).



- (4) Select Language for Display(Service manual) Select the desired Language to be used for Display(Service manual).
 - --- Setting the selected Language to be used for Display(Service manual)

Chapter 8 Troubleshooting Measures

8-1. Troubleshooting Measures Classified by Symptom

This section describes the primary causes of error messages and provides measures to address each trouble symptom.

[Note]

- The error messages described within this section may be displayed at the same time as other screens.
- When inspecting circuits, please refer to the electrical wiring diagram that corresponds to the particular vehicle model.
- Communication lines vary, depending upon the particular systems and communication methods.
- For details about diagnostic connector port configuration, please refer to the electrical wiring diagram that corresponds to the particular vehicle model.

Remedy No.	Error Message / Symptom	Cause	Remedy
1	The following message is displayed: "No CD-ROM or wrong CD-ROM in drive."	There is no CD-ROM in the drive, or the wrong CD-ROM has been inserted.	Check the CD-ROM that has been inserted. If the error message stills appears, even though the proper CD-ROM has been inserted, request an inspection.
2	Although the V.C.I. is connected to the vehicle and the switch has been turned ON, the V.C.I. does not power up. (i.e., the V.C.I. indicator lamp does not illuminate in green.)	 V.C.I. switch is turned OFF. Low battery voltage. Vehicle harness is not connected 	 Check to see if the V.C.I. switch is turned ON. Check the battery voltage. Check the quality of the cable connections. Check whether any wires are broken in the harness. (Try connecting using another harness.) If the situation is not remedied after implementing the above solutions 1~4, then a hardware malfunction has probably occurred. Request an inspection of the hardware, as well as the harness.
3	The V.C.I. does not power up when connected to the PC under the following conditions: the V.C.I. is not connected to the vehicle; and the V.C.I. switch is turned OFF. (i.e., the V.C.I. indicator lamp does not illuminate in red.)	broken.	 Check to ensure that the PC is powered up. Check to ensure that the PC and V.C.I. are connected directly together. (A USB hub should not be utilized.) Check the quality of the cable connections. Check whether any wires are broken in the cable. (Try connecting using another cable.) If the situation is not remedied after implementing the above solutions 1~4, then a hardware malfunction has probably occurred. Request an inspection of the hardware, as well as the cable.
4	As soon as the V.C.I. powers up, the screen displays "Maintenance Mode."	The basic V.C.I. application has not yet loaded.	 Power down, then power up the V.C.I. again. Start up the MUT-III diagnostic application on the PC. Perform a diagnosis to see if the application will download via the V.C.I. auto upgrade function. After downloading has completed, power up the V.C.I. again. If either the V.C.I. <main menu=""> or "PC Communication" does not appear, then request an inspection.</main>
5	As soon as the V.C.I. powers up, the screen displays "ECU Reprogramming."	The basic V.C.I. application has not yet loaded.	 Connect the V.C.I. to the PC, while pressing the [Esc] button. (Powers up) Check to ensure that the V.C.I. displays "Maintenance Mode," then start up the MUT-III diagnostic application on the PC. Perform a diagnosis to see if the application will download via the V.C.I. auto upgrade function. After downloading has completed, power up the V.C.I. again. If either the V.C.I. <main menu=""> or "PC Communication" does not appear, then request an inspection.</main>

Chapter 9 Reference

9-1. V.C.I. Electrical Properties

<Power Requirements>

- <u>Rated Voltage</u>
 DC 12V, 24V
- Ground Polarity (-)
- Guaranteed Operating Voltage Range DC 8.0~32.0V
- Power Supply Reverse Voltage DC -40V (1 min.)
- Stand-alone Power Consumption (Max.) 1A (Only Within Guaranteed Operating Voltage Range)
 - * The above values do not apply under special operating conditions, such as if an upgraded control port or other component is short-circuited to GND, as well as under conditions outside of the guaranteed operating voltage range.

Current consumption is 420mA or less when the unit is used at the rated power supply.

Appendix

<Glossary>

(The terms below are defined in alphabetical order.)



CAN --- Abbreviation for the term Controller Area Network. A system that facilitates data sharing among controllers, through communication.

Each command (signal) can only be processed via a communication line.

D

- Data Transfer --- The transfer of data that has been saved in a certain memory area, to another area in memory. When using MUT-III, the term "data transfer" refers to the transfer of data saved in the memory area of the V.C.I., to the PC.
- Default --- The initial settings or configuration for a system; in other words, a pre-specified configuration for certain settings.
- Diagnosis --- A self-diagnostic function (Diagnosis). In the "Diagnosis" system, a computer (ECU) monitors the signals that are input from various sensors and switches. In the event of an error or malfunction in signal inputs, details of the error and the data at the time of malfunction are recorded by the computer.
- Directory --- A structure created to organize and manage data files. A directory can be referred to as a folder. Information about each file is compiled within the directory.
- Ε
- ECU --- Abbreviation for the term Electronic Control Unit. A control device for an electronic control system.

I/F Cartridge --- An I/F cartridge is used when a particular situation cannot be handled solely by MUT-III, such as for unusual ECU communication methods, or for the expansion of MUT-IIIfunctionality. The Electronic Governor I/F cartridge used with the MUT-II, as well as several varieties of Air Suspension I/F cartridges, can be utilized interchangeably, without modification.

Μ

Memory Card --- A form of removable media used for data storage.

MUT-III utilizes flash memory, which enables data content to be changed via electrical charge and allows content to be preserved even when powered down. This feature allows the unit to retain operational data

0

- Online Help --- Also referred to as Online Manual. The operating manual is converted to data (files) for the Online Help function, allowing users to view brief explanations on the screen, while the application is running. For the operation currently being performed, Online Help provides explanations of the operating procedures, processes and methods used for each function.
- R
- RAM --- Abbreviation for the term Random Access Memory. A memory device that permits both read and write data operations. Data stored in RAM is erased when the power is turned off.
- ROM --- Abbreviation for the term Read Only Memory. A read-only memory device. Data stored in ROM will remain, even when the power is turned off.

S

- Serial Communication ---- A method of communication in which bits of digital data are transmitted, one after the other, using a communication line. When using MUT, this type of communication method is called "Serial Communication" in order to provide contrast with the alternate method, called "Pattern Diagnosis," particularly when DTCs are read from the ECU via communications.
- Slide Bar --- A data entry method in which values are entered by moving a sliding bar.
- SWS --- Abbreviation for the term Smart Wiring System. A single-harness wiring system that performs centralized coordination of multiple electrical signals, in order to minimize the number of harnesses utilized. SWS is an upgraded version of a multiplex transmission system that enables the usage of lightweight harnesses and facilitates multi-functional operations for electrical devices.



V.C.I. --- Abbreviation for the term Vehicle Communication Interface. A communication interface device used to connect a vehicle ECU to a PC.