

Smart Loader Package SLP-SE6 for Intelligent Earthquake Sensor SES60 User's Manual



Thank you for purchasing the SLP-SE6 for Intelligent Earthquake Sensor SES60.

This manual contains information for ensuring correct use of the SLP-SE6. It also provides necessary information for installation, maintenance, and troubleshooting.

This manual should be read by those who design and maintain devices that use the SES60.

Be sure to keep this manual nearby for handy reference.

RESTRICTIONS ON USE

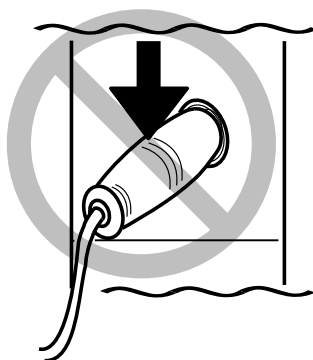
This product has been designed, developed and manufactured for general-purpose application in machinery and equipment. Accordingly, when used in applications outlined below, special care should be taken to implement a fail-safe and/or redundant design concept as well as a periodic maintenance program.

- Safety devices for plant worker protection
- Start/stop control devices for transportation and material handling machines
- Aeronautical/aerospace machines
- Control devices for nuclear reactors

Never use this product in applications where human safety may be put at risk.

IMPORTANT

Do not apply a strong force while connecting a loader plug. Failure to do so might damage the instrument.



! Handling Precautions

Application of excessive force to the loader plug might cause communication failure. If such failure happens, reconnect the loader plug correctly.

REQUEST

Ensure that this User's Manual is handed over to the user before the product is used.

Copying or duplicating this User's Manual in part or in whole is forbidden. The information and specifications in this User's Manual are subject to change without notice.

Considerable effort has been made to ensure that this User's Manual is free from inaccuracies and omissions.

If you should find any inaccuracies or omissions, please contact Yamatake Corporation.

In no event is Yamatake Corporation liable to anyone for any indirect, special or consequential damages as a result of using this product.

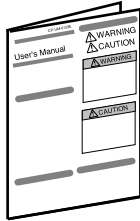
©2004 Yamatake Corporation ALL RIGHTS RESERVED

The SES®, Smart terminal® are registered trademark of Yamatake Corporation. Microsoft®, and Windows® are registered trademarks of Microsoft Corporation USA and other countries.

Other company names and product names listed in this manual are registered trademarks or trademarks of respective companies.

The Role of This Manual

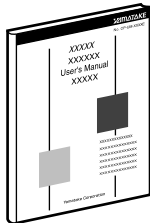
In all, three manuals have been prepared for the SES60. Read the manual according to your specific requirements. The following lists all the manuals that accompany the SES60 and gives a brief outline of the manual: If you do not have the required manual, contact Yamatake Corporation or your dealer.



Intelligent Earthquake Sensor SES60 User's Manual **Manual No. CP-UM-5322E**

This manual is supplied with the SES60 main unit. Personnel in charge of design and/or maintenance of hardware using this unit must thoroughly read this manual.

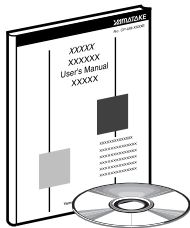
This manual describes the overview of this unit, installation, wiring, preparations for startup, and troubleshooting.



Intelligent Earthquake Sensor SES60 User's Manual "Design" **Manual No. CP-SP-1156E**

Personnel who use SES60 for the first time and those in charge of design and/or maintenance of hardware using this unit must thoroughly read this manual.

This manual describes the overview of this unit, installation, wiring, preparations for startup, description of internal action, troubleshooting, and detailed hardware specifications.



Smart Loader Package SLP-SE6 for Intelligent Earthquake Sensor SES60 User's Manual **Manual No. CP-UM-5336E**

This manual.

This manual is supplied with the system disk for SLP-SE6. Personnel in charge of setup after installation and/or operation monitoring after the system has been brought to operational status.

This program is a tool for monitoring and setting up the main unit on a personal computer.

The manual describes installation of the software into a personal computer, the functions and operating procedures of the loader.

Organization of This User's Manual

This manual is organized as follows:

Chapter 1. INTRODUCTION

Thoroughly read this chapter before starting the operation of this loader.

This chapter describes environments necessary to operate this loader, such as personal computer requirements, and the outline of functions.

Chapter 2. SETUP

This chapter describes how to install and start up this loader.

Chapter 3. BASIC OPERATIONS AND FUNCTIONS OF LOADER

This chapter describes menu configurations, basic operations, and outline of functions provided on this loader.

Chapter 4. OPERATION OF EACH FUNCTION

This chapter describes functions and operations of this loader.

Chapter 5. TROUBLESHOOTING

This chapter describes how to take corrective actions if an error message or error status is monitored.

APPENDIX Glossary

Contents

The Role of This Manual	
Organization of This User's Manual	
Conventions Used in This Manual	

Chapter 1. INTRODUCTION

1-1 Overview.....	1-1
■ Overview.....	1-1
■ Major features.....	1-1
1-2 System Operating Environment	1-2
■ Hardware.....	1-2
■ Hardware configuration	1-3
■ Personal computer used for confirmation of operating environment ..	1-3

Chapter 2. SETUP

2-1 Installation.....	2-1
■ Installing loader.....	2-1
2-2 Starting up and Exiting the Software	2-4
■ Setting up the environment	2-4
■ Connecting the earthquake sensor main unit to the personal computer ..	2-4
■ Starting up the software	2-4
■ Exiting the software.....	2-4

Chapter 3. BASIC OPERATIONS AND FUNCTIONS OF LOADER

3-1 Basic Operation.....	3-2
■ Screen display and transition operation	3-2
■ Menu configuration	3-2
■ Menu selection.....	3-4
■ Function	3-6
3-2 Real Time Monitor	3-7
■ Real time monitor display.....	3-7
■ Trend monitor display	3-8
■ Detailed error screen.....	3-9
3-3 Setting Change	3-10
■ Setting change screen.....	3-10
3-4 Waveform Memory	3-11
■ Waveform memory list screen	3-11
■ Waveform graph display screen	3-12
■ Waveform numeric value display screen	3-12
3-5 File Operation	3-13
3-6 Manual Output.....	3-14
■ Manual output display	3-14

3-7	Diagnosis Adjustment.....	3-15
■	Diagnosis adjustment screen.....	3-15
3-8	Mode Change.....	3-16
■	Mode change display.....	3-16

Chapter 4. OPERATION OF EACH FUNCTION

4-1	Real Time Monitor ([F1] Monitor).....	4-1
■	Checking the error status.....	4-1
■	Displaying the trend.....	4-2
4-2	Setting Change ([F2] Setup).....	4-5
■	Setting items.....	4-5
■	Method of setup.....	4-8
4-3	Waveform Memory ([F3] Diagnosis).....	4-11
■	Displaying the waveform data using graphs.....	4-11
■	Displaying the waveform data using acceleration numeric value data... ..	4-12
■	Changing the recording conditions.....	4-12
■	Saving waveform data into a disk.....	4-14
■	Recording waveform data manually.....	4-14
■	Deleting waveform data.....	4-15
■	File format of waveform data.....	4-15
4-4	Manual Output ([F5] Manual Out).....	4-16
4-5	Diagnosis Adjustment ([F6] Diagnosis).....	4-17
■	Pickup diagnosis.....	4-17
■	Zero adjustment (High function configuration).....	4-18
4-6	Mode Change ([F7] Mode Change).....	4-19

Chapter 5. TROUBLESHOOTING

■	Error message list.....	5-1
■	Taking corrective actions after checking the error status.....	5-2

Appendix

Glossary.....	App.-1
---------------	--------

Conventions Used in This Manual

The following conventions are used in this manual:

Handling Precautions :

Handling Precautions indicate items to which the user should pay attention when handling the SLP-SE6.

Note :

Notes indicate useful information that the user might benefit by knowing.



This indicates the item or page that the user is requested to refer to.

(1), (2), (3) :

The numbers with the parenthesis indicate steps in a sequence or indicate corresponding parts in an explanation.

>> :

Indicates the result of an operation, details displayed on the personal computer or devices, or the state of a device after an operation.

[Control Panel] :

Indicates messages and menus displayed on the personal computer.

[Noise] :

[Control Panel] → [Regional Options] :

Indicates the order to select the [Control Panel] first and then select the [Regional Options] displayed on the personal computer.

[F2] (Setup) :

Indicates function keys on the keyboard.

[OK] button :

Indicates a selection button or tab in screens displayed on the personal

[Graph] tab :

computer.

[Enter] key :

Indicates keys on the keyboard.

[Esc] key :

Chapter 1. INTRODUCTION

1 - 1 Overview

■ Overview

This Smart Loader Package (hereafter referred to as "loader") for the Intelligent Earthquake Sensor is a tool, which is so designed that it runs on Windows personal computer to perform the monitoring and settings with it connected to Yamatake's earthquake sensor.

This loader can be connected to SES60A, SES55A, SES51E/F, or SES50E. A menu selection method that functions are assigned to relevant function keys is used to easily operate the loader even for the engineer who uses it for the first time.

■ Major features

This loader provides the following features:

- Monitoring of current values, such as SI value and acceleration value
- Setting of vibration detection outputs
- Collection and monitoring of acceleration waveforms
- Saving of set values or waveforms into files
- Manual output of DO and AO signals
- Diagnosis adjustment
- Displaying of file contents in offline mode

1 - 2 System Operating Environment

The following system environment is required for using the SLP-SE6:

■ Hardware

Item	Description	
Personal computer	Target model	PC/AT compatibles with a Pentium chip or higher
	Memory	64M byte or more
	Operating system	Windows98 / Me / 2000 / XP (hereafter referred to as "Windows")
Peripheral devices	Display	Windows compatible display connectable to or built-into computer body
	Serial port	9-pin, serial port, 1ch or more *
	Hard disk drive	Hard disk with at least 40M byte of free space
	CD-ROM drive	1 drive or more
	Pointing device	Windows98 / Me / 2000 / XP-compatible mouse or equivalent device

* : Serial port

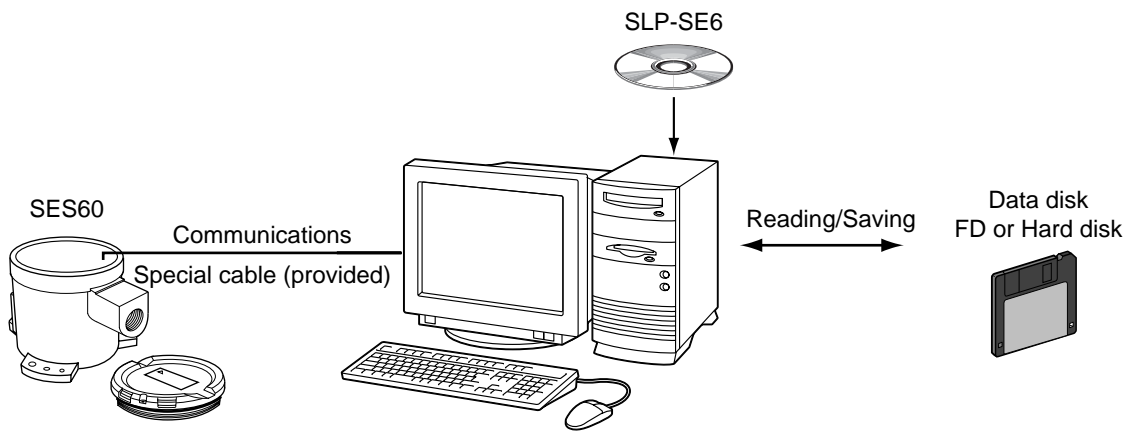
It is recommended to use a personal computer with 9-pin serial port built-in. If your personal computer does not have any serial port, you may use any of the extension adaptors listed below to connect the loader cable.

However, note that the operation may become unstable depending on the personal computer environment.

- Special interface (port replicater)
Adaptor specially designed for each personal computer (special adaptor for each personal computer model)
- CF card adaptor
CF232 manufactured by Elan Digital systems
URL: <http://www.elandigitalsystems.com/interface/cf232.php>
Operation confirmed personal computer, IBM's Thinkpad A31
REX-CF60 manufacture by RATOOC.
URL: <http://www.ratocsystems.com/products/subpage/cf60.html>(Japanese)
- USB adaptor
USB-RSAQ2 manufactured by I/O Data
URL: <http://www.iodata.co.jp/prod/mobile/serial/2003/usb-rsq2/>(Japanese)
Operation confirmed personal computer, IBM's Thinkpad A31
When connecting the USB cable, check the port No.
The port No. may vary depending on the USB cable connection position.

! Handling Precautions

- Before starting up SLP-SE6, quit all other applications.
If you start up SLP-SE6 while another application is running, SLP-SE6 may malfunction.
- This loader is so designed that it runs on almost all the PC/AT compatibles.
- The communication time-out may occur if the loader is connected through the RS-232C communication for an extended period of time while Windows' power management is running.
In this case, turn OFF the power management (power management setting of Control Panel).

■ Hardware configuration**■ Personal computer used for confirmation of operating environment**

Manufacturer	Model No.
Dell	Optiplex Gx270
IBM	Thinkpad A31

Chapter 2. SETUP

2 - 1 Installation

This section describes how to install the SLP-SE6 on a personal computer.

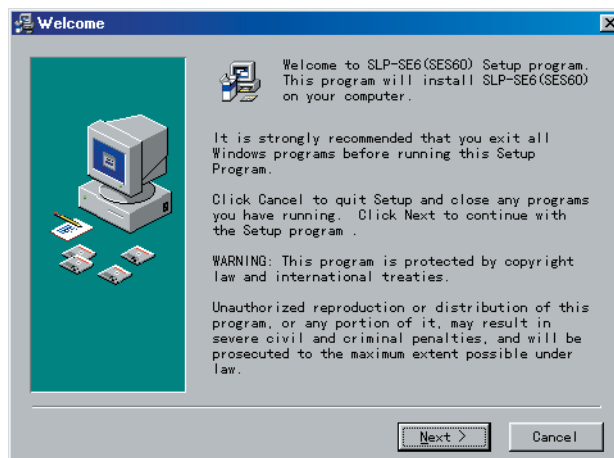
! Handling Precautions

- If you start up the Installer while another application is running, the Installer may malfunction.
Remove other resident applications from their directories before starting up the Installer.
The SLP-SE6 sometimes cannot be started up depending on the combination of other applications and drivers.
For details on Windows and personal computer settings, refer to the User's Manuals provided with Windows and the personal computer.

■ Installing loader

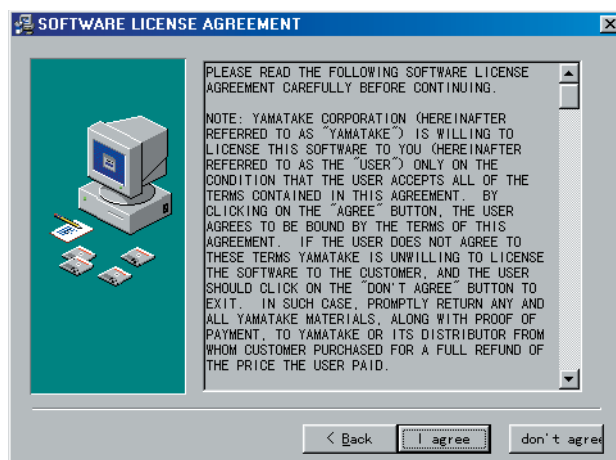
(1) Set the loader system disc in the disc drive.

>>The install program will be started up automatically and the following screen appears:



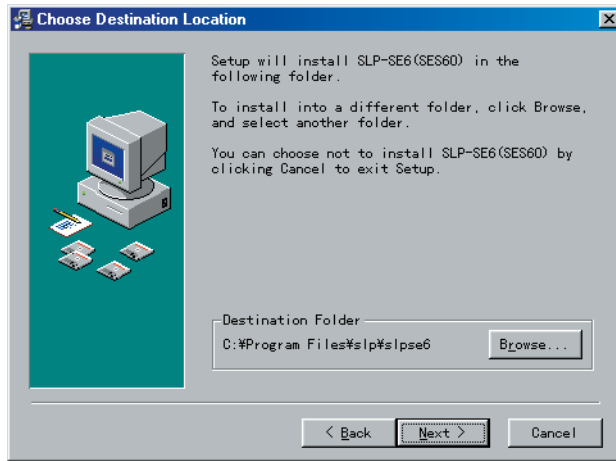
(2) Click [Next >]button.

>>Additionally, groups, which have already been installed, are shown in the existing group.



(3) Click [I agree] button.

>>The following “Choose Destination Location” screen appears:

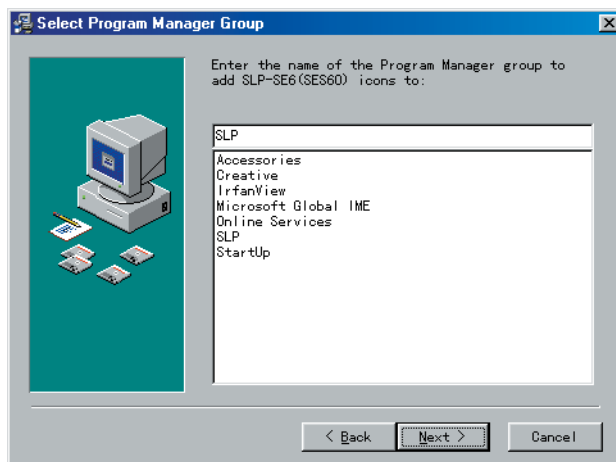


Note

To change the installation destination directory, click [Browse...] button.

(4) Click [Next >] button.

>>The following screen appears: Additionally, groups, which have already been installed, are shown in the existing group.

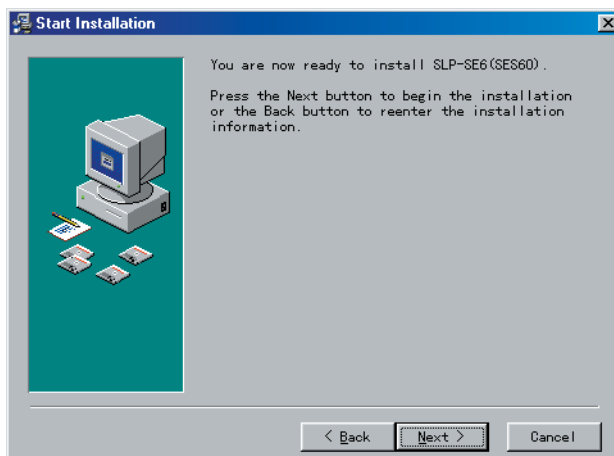


Note

To change the program folder, enter the new folder name.

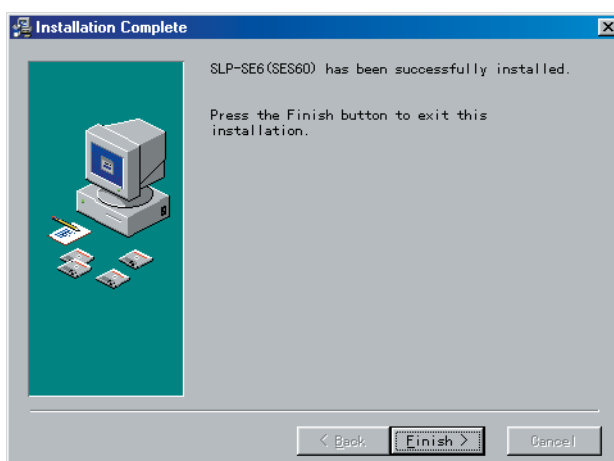
(5) Click [Next >] button.

>>The following screen appears:



(6) Click [Next >] button.

>>The following screen appears:



(7) Click [Finish >] button.

>>The normal installation is then completed.

(8) If the OS is Windows XP, the following steps are necessary besides the steps above:

- Click [Start] button at the lower portion of the screen. Then select [Programs] → [Accessories] → [Program Compatibility Wizard].
- Click [Next] button twice.
- Select [SLP-SE6 (SES60)], and then click [Next >] button.
- Select [Microsoft Windows 98 / Windows Me], and then proceed following the instructions on the screen:

>>The installation is then completed.

Note

- Installation of Adobe Acrobat Reader
If the Adobe Acrobat Reader is not installed in your personal computer, install it using any of the following procedures:
 - Download the Adobe Acrobat Reader from Adobe Systems' home page.
 - Install [adberdr60_enu_full.exe] from the CD-ROM.

2 - 2 Starting up and Exiting the Software

■ Setting up the environment

Before starting up the software, carefully check the handling precautions stated in the section, System Operating Environment.

- Select [Control Panel] → [Regional Options] and set a country other than Japan in the Location area.
- Select [Control Panel] → [Regional Options] → [Numbers] to make sure that [Decimal Symbol:] is set at "." (period).

For details, refer to;

☞ 1-2 System Operating Environment (page 1-2).

■ Connecting the earthquake sensor main unit to the personal computer

Connect the earthquake sensor main unit to the personal computer with the special RS-232C cross-cable.

It is not necessary to connect the earthquake sensor main unit to the personal computer only when checking files.

Additionally, when starting the operation in the offline mode, disconnect the cable. If the cable is disconnected during operation in the online mode or if the communication fails, the message, [Communication error], will appear and the screen is returned to the Windows screen.

If this occurs, recheck the connections and start up the loader again.

The earthquake sensor is automatically recognized when connected, providing loader operations corresponding to relevant model (SES60A, SES55A, SES51E/F, or SES50E).

■ Starting up the software

Double-click the SLP-SE6 (SES60) icon on the desktop.

Or, click the [Start] button at the bottom of the screen and select [Programs] → [SLP] → [SLP-SE6(SES60)]. This can also start up the software.

>>The loader is then started up and the main menu will appear.

■ Exiting the software

Return to the main menu, press [F8](Exit), and then press [Enter]key.

The software is exited and the screen is returned to the Windows screen.

Chapter 3. BASIC OPERATIONS AND FUNCTIONS OF LOADER

This chapter describes menu configurations, basic operations, and outline of functions provided on this loader.

For details about each function, refer to;

☞ Chapter 4, OPERATION OF EACH FUNCTION.

3 - 1 Basic Operation

■ Screen display and transition operation

The screen is classified into the display areas shown below. The contents of the display area A may vary depending on the operation mode.

The display areas other than the display area A are commonly used in all operation modes.

Display area A: Main screen

Display area B: File name display

Display area C: Distinction of online/offline, function name

Display area D: Information showing operation mode in the offline mode

Display area E: Waveform memory display

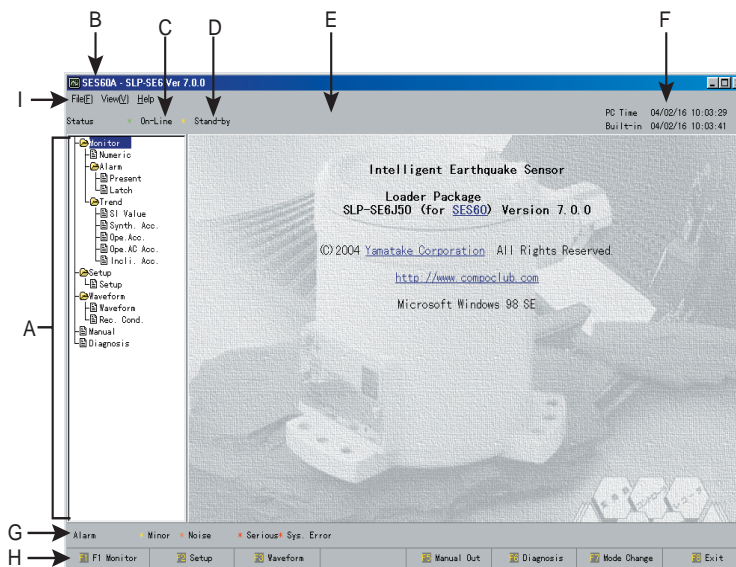
Display area F: Upper portion: Time of personal computer internal clock

Lower portion: Time of earthquake sensor internal clock (online mode only)

Display area G: Error display

Display area H: Main menu display (menus assigned to function keys)

Display area I: Sub-menu display



To transit the display screen, use relevant function key, [F1], [F2], [F3], [F5], [F6], [F7], or [F8].

The [F4] key is not used.

The [F8] key is used to return to the previous screen.

■ Menu configuration

The menu of this loader is composed of two menus, one is the main menu shown in the display area H of the screen and the other is the sub-menu shown in the display area I (standard menu area of Windows).

● Main menu configuration

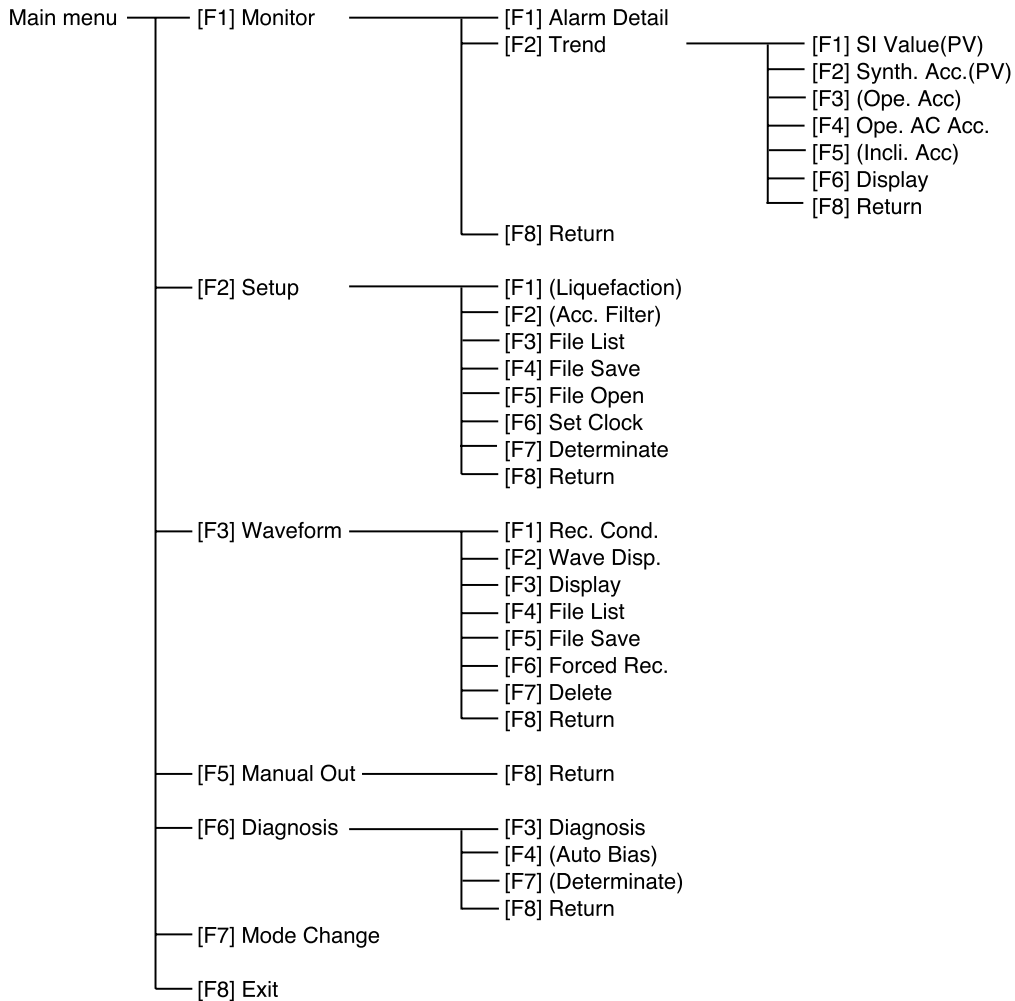
The configuration of the main menu is as shown below.

In the main menu, a transition method is used that selecting a hierarchical menu with relevant function key will transit to a desired mode (function).

For example, pressing [F1] key will transit to Real time monitor.

Additionally, it is also possible to transit the menu by clicking the menu display portion of a function key at the lower portion of the screen.

Items in () shows those used for the High function configuration screen.



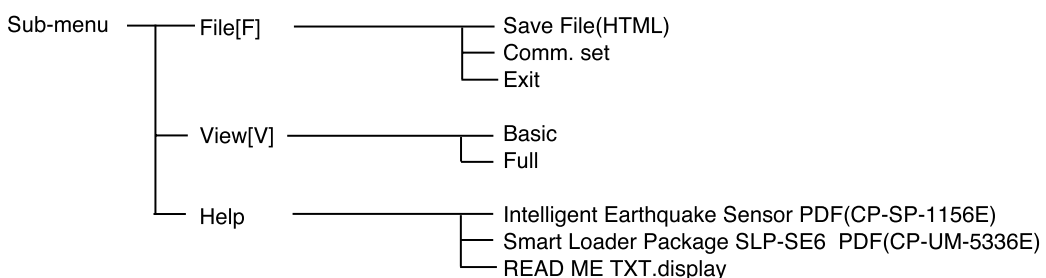
● Sub-menu configuration

The configuration of the sub-menu is as shown below.

The sub-menu is operated using the mouse.

The level setting can be changed through the pull-down menu of the [View] menu.

"Basic" and "Full" are provided. The number of items may vary depending on the level setting.



■ **Menu selection**

In this loader, the startup screen that appears when the loader is connected to the earthquake sensor main unit through the special cable (called "online mode") is different from that appears when the loader is not connected to the earthquake sensor (called "offline mode").

The reason why two kinds of startup screens are provided is that the loader provides the functions to be operated only in the online mode.

In the online mode, the earthquake sensor main unit is in any of four operation modes, "Initialize mode", "Maintenance mode", "Measurement mode", and "Standby mode". The current operation mode of the earthquake sensor is shown in the display area D.

! **Handling Precautions**

- The operation mode is shown only in the online mode.

● **Standby mode**

To change the setting or delete the waveform memory, it is absolutely necessary that the earthquake sensor main unit is in the Standby mode.

However, the setting data can be monitored in a mode other than the Standby mode.

When operating the loader, the conformation message, "Whether or not the operation is transited to the Standby mode", will appear.

Follow the messages that appear on the screen to proceed the operation.

The following shows the functions to be operated in the Standby mode:

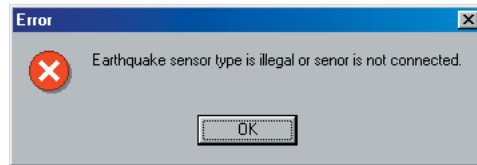
Menu	Operation
Setting change	<ul style="list-style-type: none"> • Setting change (manual setup and reading of data from setup file) • Setup file save
Waveform memory	<ul style="list-style-type: none"> • Saving and deleting of record data
Manual save	<ul style="list-style-type: none"> • File save
Manual output	<ul style="list-style-type: none"> • Manual output
Diagnosis adjustment	<ul style="list-style-type: none"> • Accelerometer diagnosis • Acceleration zero adjustment

! **Handling Precautions**

- The automatic waveform recording function cannot be operated in the Initialize mode, Maintenance mode, and Standby mode.

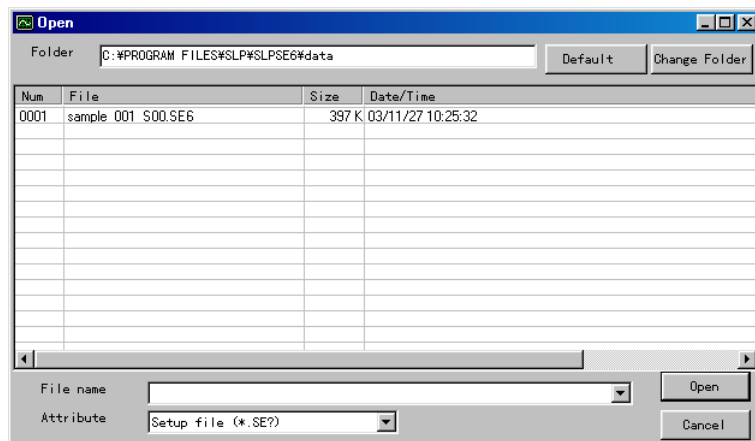
● Operation in the offline mode (Open the file)

If the loader is started without connection of the loader cable, the following error message appears:



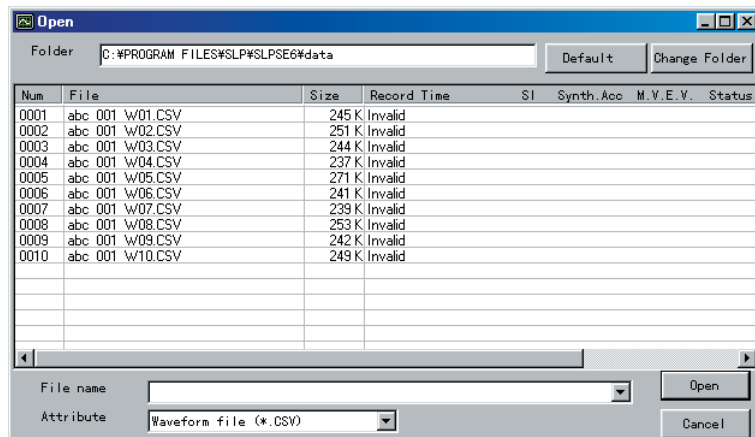
(1) Click [OK]button.

>>The file selection screen appears.



Note

- The initial value of the file type is "setup file" (*.SE6).
To open a waveform file, change the file type to the waveform file (*.CSV).



(2) Select a desired file and click [Open]button.

>>The loader is started up in the offline mode.

■ Function

This loader provides six kinds of functions as described below.

- (1)Real Time Monitor
- (2)Settting Change
- (3)Waveform Memory
- (4)Manual Output
- (5)Adjustment Diagnosis
- (6)Mode Change

The outline of each function is described on and after the next page.

3 - 2 Real Time Monitor

This real time monitor shows the current operation status of the earthquake sensor.

Press [F1](Monitor) on the main menu.

The error information is always monitored. If any error is found, it is shown in the display area G* on any screen.

*: For details about display areas, refer to;

☞ 3-1 Basic Operation (page 3-2).

For details about error message list, refer to;

☞ Chapter 5.TROUBLESHOOTING.

■ Real time monitor display

The inclination acceleration for operation is a value that the output of the gravity acceleration due to the inclination is added to the zero-point drift of the earthquake sensor in the installation status.

Monitor Item	Value/Status
Built-in Clock	04/02/16 12:03:15
Operating Mode	Initialize Measure Stand-by Maintenance
Alarm	Serious Noise Minor
SI Value (PV)	0.0 kine
Synth. Acc. (PV)	0.3 Gal (Operation 2Axis)
M.V.E.V (PV)	0.0 (Expres1)
Ope. AC Acc.	Z : -0.2 Y : -0.1 X : -0.1
Don. AC Acc.	Z : -0.1 Y : -0.1 X : 0.0
D01 Output	OFF ON Blink
Minor F.out select	2 mix N.mix P.minor P.minor
D02 Output	OFF ON
Control Output	OFF ON
D03 Lique. Output	OFF ON
A01 Output	Synth. Acc: Operation 2axis Output: 0.3 Gal %Output: 0.0%
A02 Output	SI : Output: 0.0 kine %Output: 0.0%
Version	Major 4 Minor 2

■ Trend monitor display

The SI value (PV value), synthesized acceleration (PV value), acceleration for operation, AC acceleration for operation, and inclination acceleration for operation can be displayed using trend graphs.

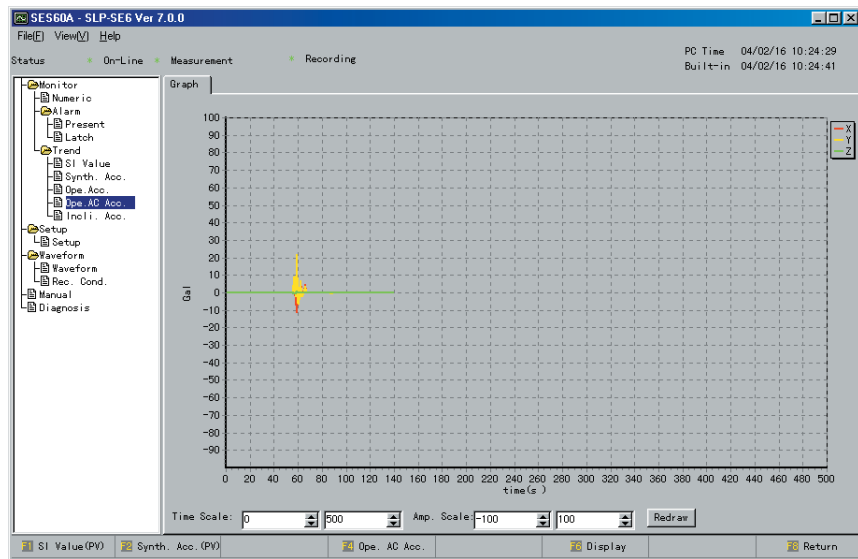
Press [F2](Trend).

A buffer is provided that stores data for approximately 20min, which is sampled at intervals of approximately 1s.

Therefore, the past trend can also be seen.

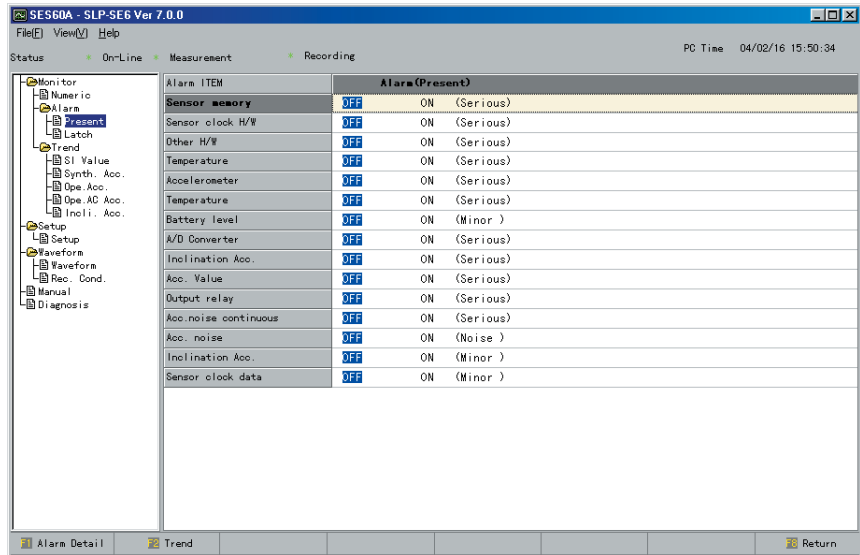
If this buffer becomes full, the sampling will be stopped.

When pressing [F2](Trend) of [F1](Monitor) after returned to the main menu, the buffer is cleared and the sampling is then restarted.

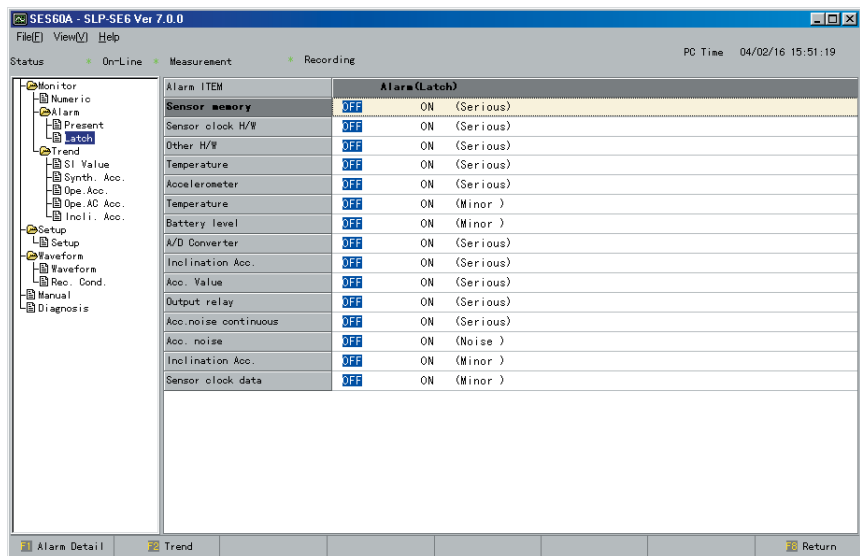


■ Detailed error screen

The details of errors are shown by pressing [F1] (Alarm Detail).



Every time [F1] (Alarm Detail) is pressed on the previous screen, the screen can be alternately switched between the error information display latched in the earthquake sensor main unit and the current error information display.



3 - 3 Setting Change

The vibration detection output of the earthquake sensor, time, AO scaling, and station address can be set.

Press [F2] (Setup) on the main menu.

To save the set contents onto a disk, press [F4] (File Save).

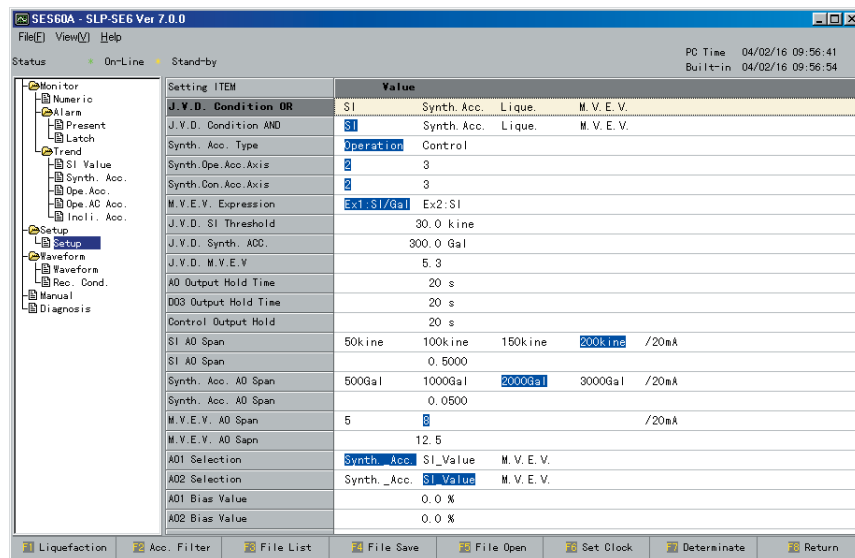
To display the settings saved in a disk on the personal computer loader, press [F5] (File Open).

! Handling Precautions

- If the Standby mode is selected while changing the setting change screen, the automatic waveform recording function is suspended during this period.
- In the offline mode, the set contents cannot be saved even by pressing [F4] (File Save).
- The built-in clock data cannot be downloaded even by pressing [F5] (File Open).

The following screen shows the setup contents:

■ Setting change screen



3 - 4 Waveform Memory

Ten waveforms stored inside the earthquake sensor and forced waveform can be displayed.

Additionally, currently displayed waveforms can be recorded onto a disk.

Press [F3] (Waveform) on the main menu.

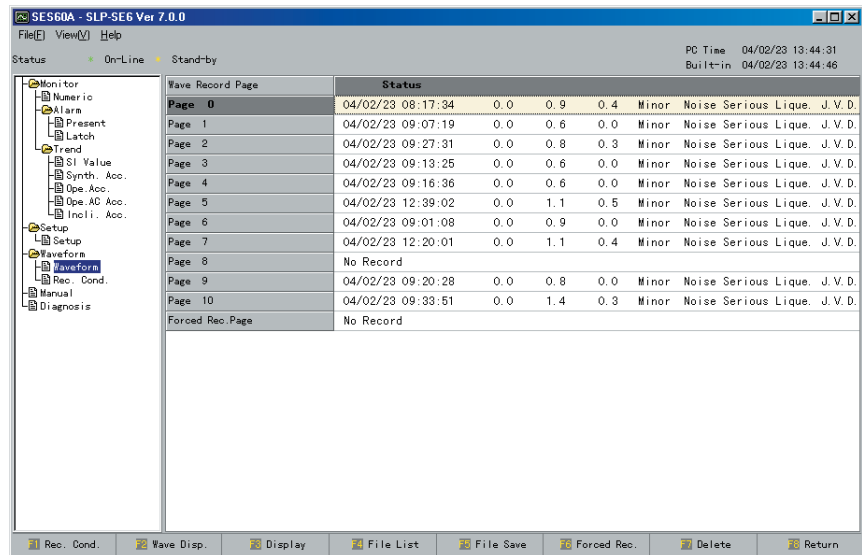
The waveform can be displayed in either the graph format or numeric value format.

! Handling Precautions

- If the Standby mode is selected while changing the setting change screen, the automatic waveform recording function is suspended during this period.

Changing of recording conditions, forced waveform recording, and deleting of waveforms can be made only in the Standby mode.

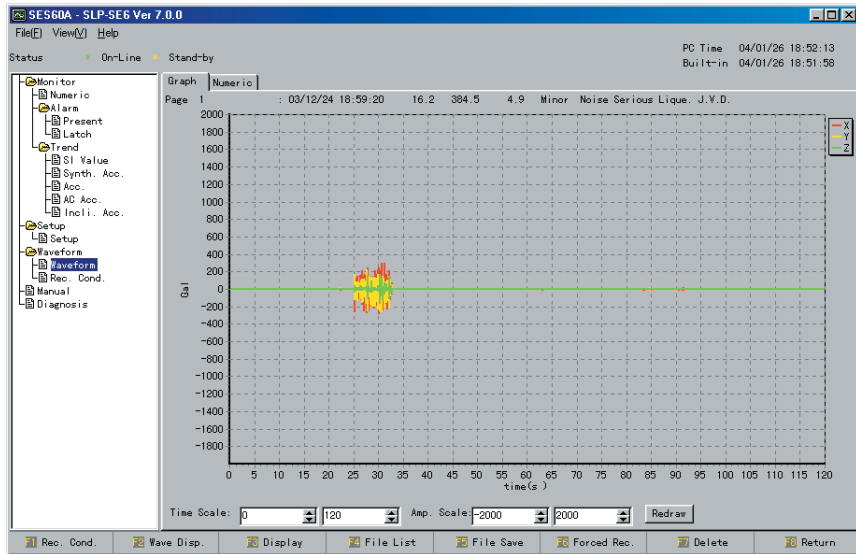
■ Waveform memory list screen



Wave Record Page	Status									
Page 0	04/02/23 08:17:34	0.0	0.9	0.4	Minor	Noise	Serious	Lique.	J. V. D.	
Page 1	04/02/23 09:07:19	0.0	0.6	0.0	Minor	Noise	Serious	Lique.	J. V. D.	
Page 2	04/02/23 09:27:31	0.0	0.8	0.3	Minor	Noise	Serious	Lique.	J. V. D.	
Page 3	04/02/23 09:13:25	0.0	0.6	0.0	Minor	Noise	Serious	Lique.	J. V. D.	
Page 4	04/02/23 09:16:36	0.0	0.6	0.0	Minor	Noise	Serious	Lique.	J. V. D.	
Page 5	04/02/23 12:39:02	0.0	1.1	0.5	Minor	Noise	Serious	Lique.	J. V. D.	
Page 6	04/02/23 09:01:08	0.0	0.9	0.0	Minor	Noise	Serious	Lique.	J. V. D.	
Page 7	04/02/23 12:20:01	0.0	1.1	0.4	Minor	Noise	Serious	Lique.	J. V. D.	
Page 8	No Record									
Page 9	04/02/23 09:20:28	0.0	0.8	0.0	Minor	Noise	Serious	Lique.	J. V. D.	
Page 10	04/02/23 09:33:51	0.0	1.4	0.3	Minor	Noise	Serious	Lique.	J. V. D.	
Forced Rec. Page	No Record									

Move the cursor to a desired waveform No. you wish to display graphically and press [Enter] key. The screen is then transited to the waveform graph display screen.

■ Waveform graph display screen



Clicking [Numeric]tab will transit to the waveform numeric value screen.

■ Waveform numeric value display screen

Clicking [Graph]tab will transit to the waveform graph display screen.

3 - 5 File Operation

To save only the settings, display the setting change screen from the main menu and save them into a file.

To save the settings and waveforms, display the waveform memory screen from the main menu and save them into a file.

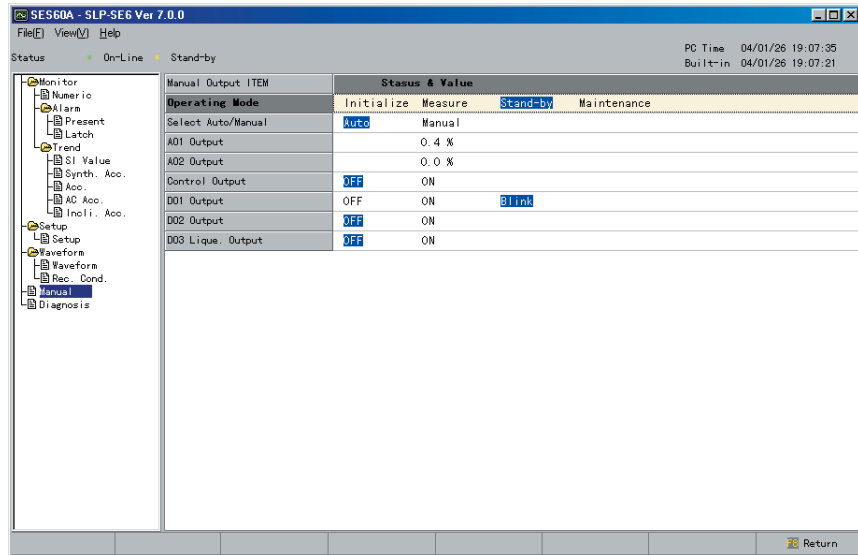
After the setup file has been read in the offline mode, the waveform file can be displayed by operating the waveform memory screen in the same manner as described for operation in the online mode.

3 - 6 Manual Output

To check the operation of the AO, vibration output, liquefaction output, or failure output of the earthquake sensor, these outputs can be sent forcibly with manual operation.

Press [F5] (Manual Out) on the main menu.

Manual output display

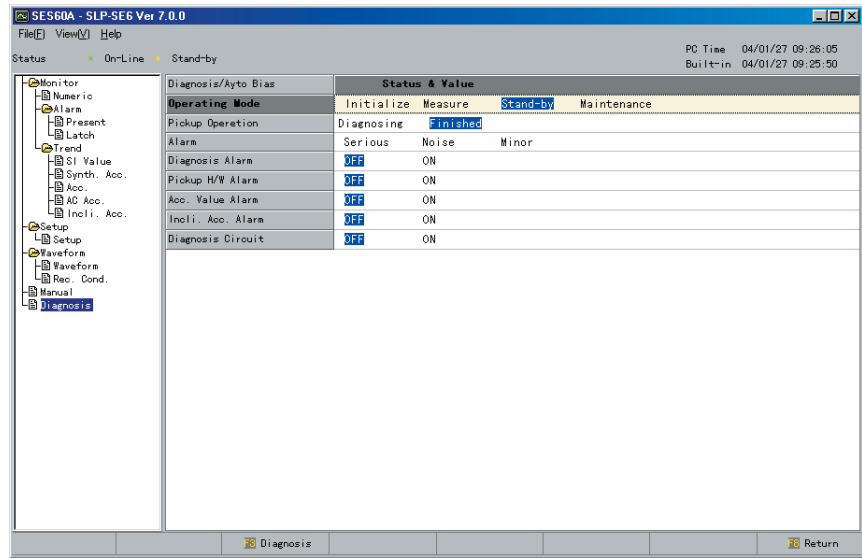


3 - 7 Diagnosis Adjustment

Even though the adjustment data has been set before shipment from the factory, the inclination adjustment (zero adjustment) after installation and the functional diagnosis of the acceleration sensor element (accelerometer) can be made.

Press [F6] (Diagnosis) on the main menu.

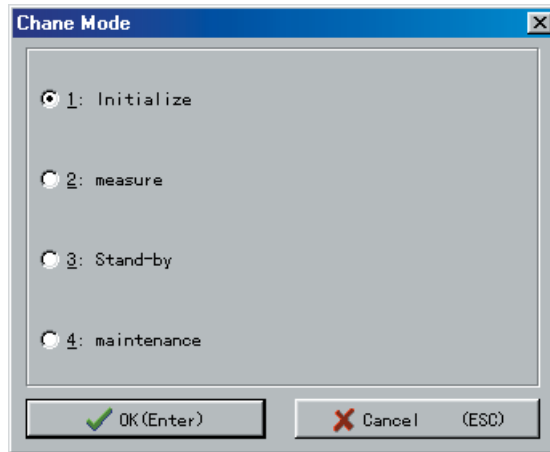
■ Diagnosis adjustment screen



3 - 8 Mode Change

The mode of the earthquake sensor is changed.
Press [F7] (Mode Change) on the main menu.
The dialog box shown below will appear.
Change the mode to a desired mode.

■ Mode change display



! Handling Precautions

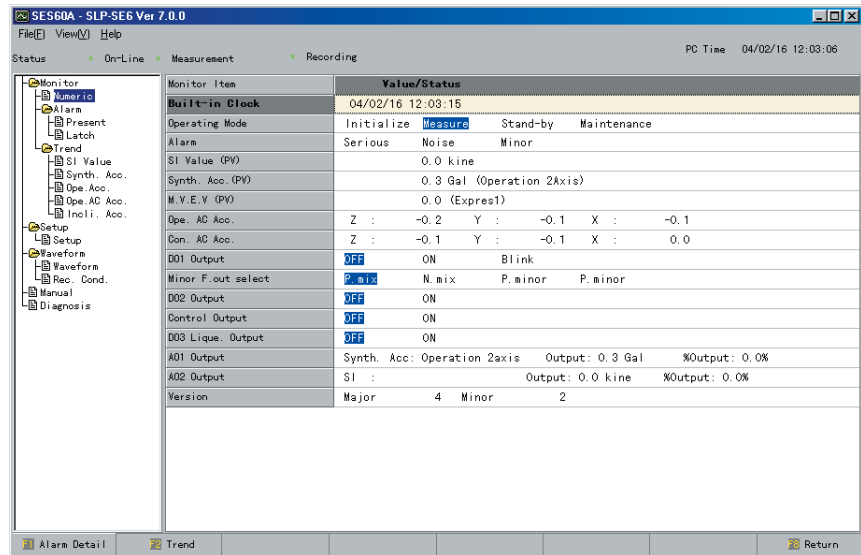
- When selecting a function, the loader will automatically display the mode change confirmation message even though the mode change function is not used.
Follow the messages that appear on the screen to proceed the operation.
The mode is then changed.

Chapter 4. OPERATION OF EACH FUNCTION

4 - 1 Real Time Monitor ([F1] Monitor)

Pressing [F1] (Monitor) on the main menu will transit to the real time monitor screen.

On this screen, the current status of the earthquake sensor is monitored.



! Handling Precautions

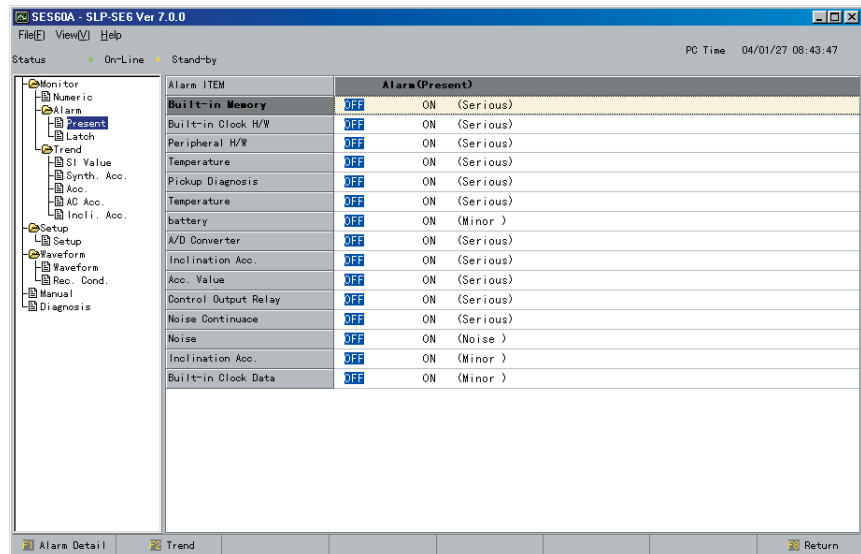
- The display contents (items) may vary depending on the level setting, "Basic" or "Full".

■ Checking the error status

To display the contents of the error, press [F1] (Alarm Detail) on the real time monitor screen.

Take corrective actions against various errors while checking the contents shown on the screen.

Pressing [F8] (Return) or [Esc]key will return to the real time monitor screen.

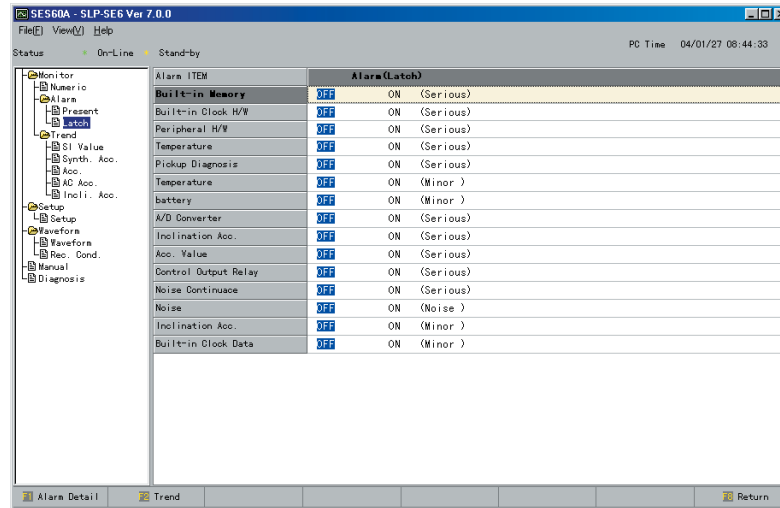


📖 Note

- For details about corrective actions against various errors, refer to;
 - ➡ ■ Taking corrective actions after checking the error status (page 5-2).

When pressing [F1] (Alarm Detail) again, the error information latched in the earthquake sensor main unit can be seen.

Every time [F1] (Alarm Detail) is pressed, the display contents are alternately switched between the status display and latch display.



■ Displaying the trend

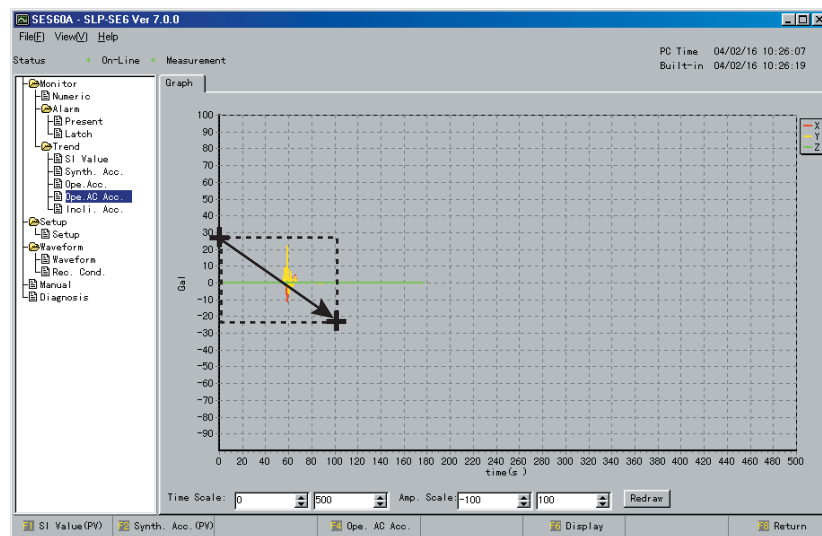
To display the trend of each value, press [F2] (Trend) on the real time monitor screen.

The trend, which is sampled at intervals of approximately 1sec., is displayed.

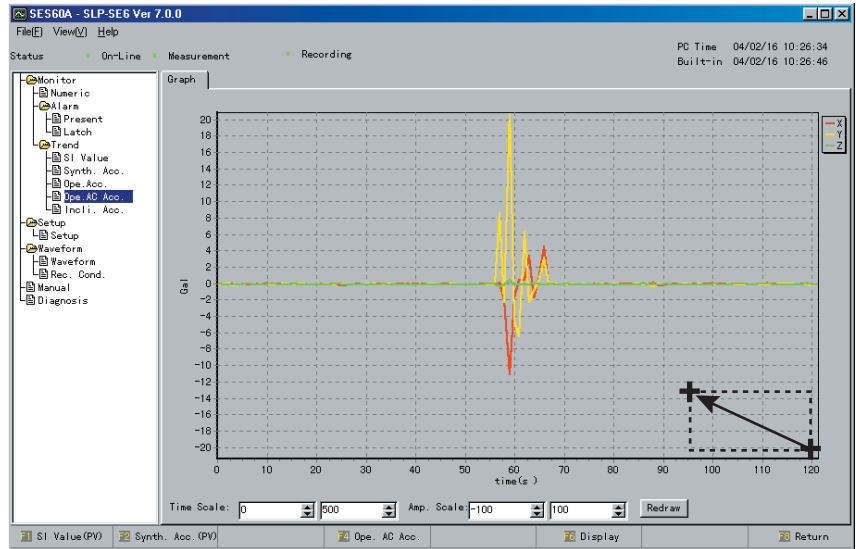
● Changing the time scale and amplitude scale

The time and amplitude scales can be changed using any of the following procedures:

- (1) Specify a trend display area using the mouse.



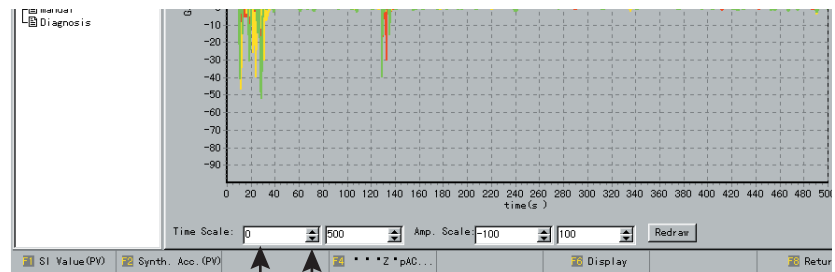
When dragging the mouse from the upper left position to the lower right position, the screen area can then be enlarged.



When dragging the mouse from the lower right position to the upper left position, the values are then returned to the initial values.

The drag position can be recognized anywhere regardless of the trend width.

- (2) Click ▲ button or ▼ button on the screen.
- (3) Input a numeric value directly into the input field on the screen.
- (4) After clicking a screen input field you wish to change, press [↑] key or [↓] key.



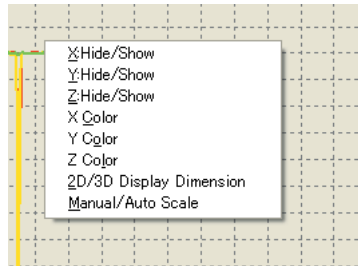
▲: Increases the value.
▼: Decreases the value.

After the numeric value has been changed, click [Redraw] button.
To change the display contents to other items, press [F1] to [F5] key.

● **Making the trend easy to see (Display change)**

If it is difficult to see the display since three graph displays of the X, Y, and Z axes are overlapped, such as displaying of the AC acceleration for calculation, the number of axes to be displayed can be changed.

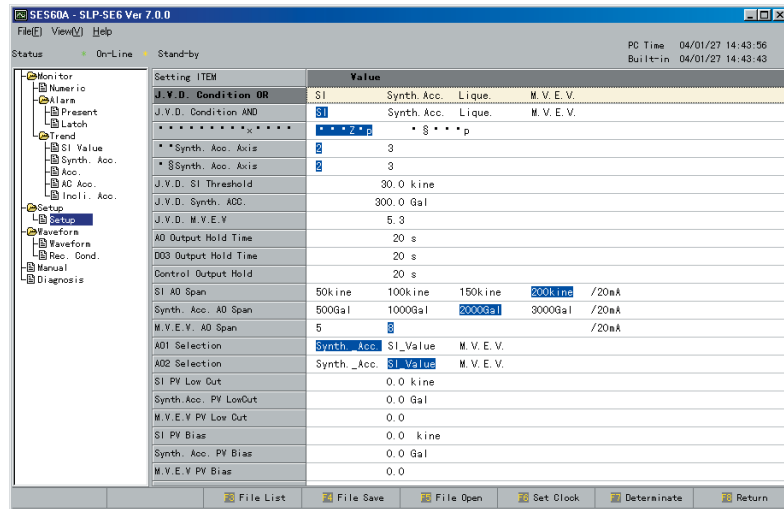
When pressing [F6] (Display) or right mouse button while the graph is being displayed, the list of display changes will be shown.



- | | |
|-------------------------------|---|
| [X:Hide / Show] : | Shows or hides the X-axis. |
| [Y:Hide / Show] : | Shows or hides the Y-axis. |
| [Z:Hide / Show] : | Shows or hides the Z-axis. |
| [X Color] : | Changes the X-axis color. |
| [Y Color] : | Changes the Y-axis color. |
| [Z Color] : | Changes the Z-axis color. |
| [2D / 3D Display Dimension] : | Changes the graph display to the 2D or 3D display. |
| [Manual / Auto Scale] : | Changes the graph amplitude scale to the Manual or Auto scale. When returned to the Auto scale after changed to the Manual scale, the settings are returned to those before changing to the Manual scale. |

4 - 2 Setting Change ([F2] Setup)

Pressing [F2] (Setup) on the main menu will transit to the setting change screen.



! Handling Precautions

- The display contents (items) may vary depending on the level setting, "Basic" or "Full".

■ Setting items

The following items can be set for the SES60A:

● Synthesized acceleration type

The synthesized AC acceleration PV value can be selected from the synthesized AC acceleration for operation or synthesized AC acceleration for control.

● Synthesized acceleration axes selection

The synthesized axes of the synthesized AC acceleration for operation and synthesized AC acceleration for control are selected from the horizontal plane 2 axes (X/Y) or 3 axes.

Initial value for operation: 2 axes Initial value for control: 2 axes

● Vibration detection judgment setting

The logical operation of the SI value, synthesized AC acceleration, measuring vibration equivalent value, and liquefaction judgment value to turn ON or OFF the vibration detection output can be selected for the vibration detection judgment conditions.

Threshold values can be set for the SI value, synthesized AC acceleration, and

measuring vibration equivalent value to turn ON or OFF the vibration detection output.

Item name	Setting value	Initial value
Vibration detection judgment conditions	Logical AND of AND conditions and OR conditions is used for the vibration detection judgment conditions. However, the same item cannot be set for both AND and OR conditions. AND conditions: Logical AND of set items is used for the judgment conditions. OR conditions: Logical OR of set items is used for the judgment conditions.	AND conditions SI (SI only)
SI set value for vibration detection judgment	1 to 200kine	30kine
Synthesized AC acceleration for vibration detection judgment (Set value)	5 to 3000Gal	300Gal
Measuring vibration equivalent value for vibration detection judgment (Set value)	2.5 to 7.0	5.3

● **Output hold time settings**

The hold time values of the vibration detection output (relay), liquefaction output (DO3), AO1, and AO2, which are control outputs, can be set.

Item name	Setting value	Initial value
Vibration detection judgment hold time	20 to 604800s	20s
Liquefaction judgment hold time	20 to 604800s	20s
AO output peak hold time	20 to 604800s	20s

● **AO scaling selections**

The scaling assignment to 0 to 100% (4 to 20mA) of AO1 and AO2 can be changed.

Item name	Setting value	Initial value
SI AO span value	Selected from 50, 100, 150, or 200kine /20mA.	200kine
Synthesized AC acceleration AO span value	Selected from 500, 1000, 2000, or 3000Gal /20mA.	2000Gal
Measuring vibration equivalent value AO span value	Selected from 5 or 8/20mA.	8

● **AO object selections**

The AO1 and AO2 output object data can be selected.

Item name	Setting value	Initial value
AO1 object selection	Selected from the synthesized acceleration, SI value, or measuring vibration.	Synthesized acceleration
AO2 object selection	Selected from the synthesized acceleration, SI value, or measuring vibration.	SI value

● **AO bias setting**

The AO1 and AO2 output bias values can be set.

Item name	Setting value	Initial value
AO1 bias value	-5.0 to +5.0%	0.0%
AO2 bias value	-5.0 to +5.0%	0.0%

● **PV low cut setting**

The low cut setting is available for the SI PV value, synthesized AC acceleration PV value, and measuring vibration equivalent PV value.

Item name	Setting value	Initial value
SI PV low cut	0.0 to 30.0kine	0.0kine
Synthesized AC acceleration PV low cut	0.0 to 400.0Gal	0.0Gal
Measuring vibration equivalent PV low cut	0.0 to 3.0	0.0

● **NP continuous serious failure (time setting)**

The serious failure occurrence time due to noise protect continuation can be set.

Setting value: 5 to 10080min

Factory setting: 5min

● NP low limit value

The noise protect function is operated by multiple logical operations. One of these logical operations is that a symptom that the AC acceleration unevenly deflects in the positive or negative direction is used for the noise judgment. The low limit value of the AC acceleration is determined, at which this logical operation functions.

NP low limit value of single-axis ratio: 1 to 200Gal

Initial value: 50Gal

Another logical operation is that a symptom that the AC acceleration of one axis (any of the X, Y, and Z axes) deflects in the positive and negative directions and the deflection of other axes is small is used for the noise judgment. The low limit value of the AC acceleration is set, at which this logical operation functions.

Z-axis NP low limit value of other axis ratio: 1 to 200Gal

Initial value: 100Gal

X/Y-axis NP low limit value of other axis ratio: 1 to 200Gal

Initial value: 50Gal

● Communication settings

The station address, data format (parity check), and transmission speed can be set. The data format is fixed so that the data length is 8 bits and the stop bit is 1 bit. Only the parity check can be selected from "none" or "even".

Item name	Setting value	Initial value
Station address	0 to 126	Specified according to model No. *
Data format	Selected from "none" or "even".	Even
Transmission speed	Selected from 9600bps or 19200bps.	19200bps

* SES60AV320-□□0□ Station address =0
SES60AV320-□□1□ Station address =1

● PV bias

The bias operation results may affect the SI PV value, synthesized AC acceleration PV value, and measuring vibration equivalent PV value.

Item name	Setting value	Initial value
SI PV bias	-30.0 to +30.0kine	0.0kine
Synthesized AC acceleration bias	-400.0 to +400.0Gal	0.0Gal
Measuring vibration equivalent bias	-3.0 to +3.0	0.0

● Liquefaction detection enable/disable setting

The liquefaction output enable or disable can be selected using [F1] (Liquefaction).
Initial value: Enable

● Acceleration filter (High function configuration only)

The filter value of each of the acceleration for operation and the acceleration for control can be selected from 3, 5, 7, 10, 20, 30, 50, or 100 Hz using [F2] (Acceleration filter).

Initial value for operation: 30Hz

Initial value for control: 10Hz

● Minor failure output function selection

The liquefaction minor failure output (DO1) can be set to "common to status and minor failure (minor failure, mode, or noise detection)" or "minor failure only".

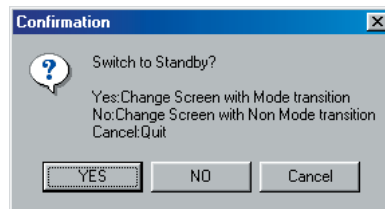
■ Method of setup

To make the setup, move the cursor (character highlighted in yellow) to a desired item you wish to change and press [Enter]key. The setup window will appear. For selection setting item, select a desired item and press [Enter]key. For numeric value entry item, input a numeric value and press [Enter]key. The value you have changed is then written into the memory of the earthquake sensor, and then it is read and monitored. Therefore, it can be checked that the correct value has been written.

● Putting the loader in the setup status

(1) To change the setting, change the mode to the Standby mode.

>>After the setup window has been displayed, the confirmation window will appear.



(2)Click [YES]button.

>>[YES]button : The operation mode is changed to the Standby mode, allowing you to change the setting.

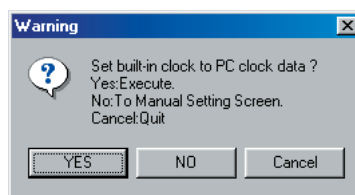
[NO]button : The current setting can be seen without changing of the mode.

[Cancel]button : Returns to the menu screen.

● Putting the loader in the setup status

(1) To set the built-in clock of the earthquake sensor, press [F6] (Set Clock).

>>The confirmation window will appear.



(2) Click any of the following buttons:

>>[YES]button : Makes the built-in clock of the earthquake sensor matched with that of the personal computer.

[NO]button : Displays the date and time setup window, allowing you to set the clock manually.

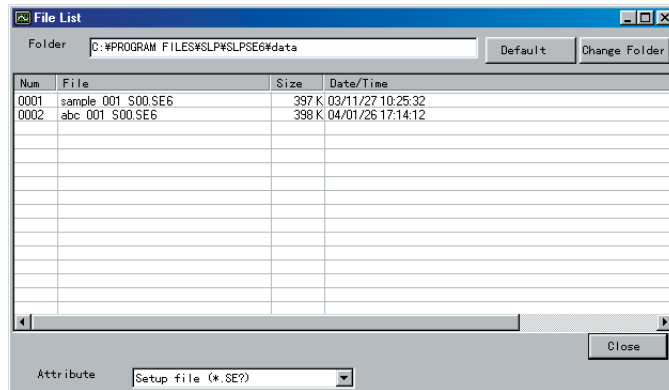
[Cancel]button : Returns to the menu screen.



● Displaying the file list

(1) Press [F3] (File List).

>>The list of setup files appears.

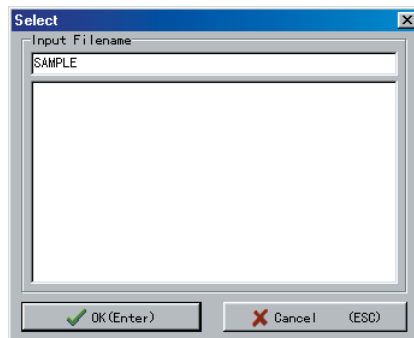


(2) Click [Close] button to exit the file list.

● Saving setup data

(1) Press [F4] (File Save).

>>The "Input File Name" dialog box will appear.



(2) Input a file name, and then click [OK] button or press [Enter] key.

>>The data saving is then started.

Note

For the file name of the setup file, characters other than the character string specified by the user are determined automatically.

XXXXXX_VVV_SNN.SE6

XXXXXX: File name specified by the user

VVV: Version No. (in units of "XXXXXX")

S: Meaning of setup file

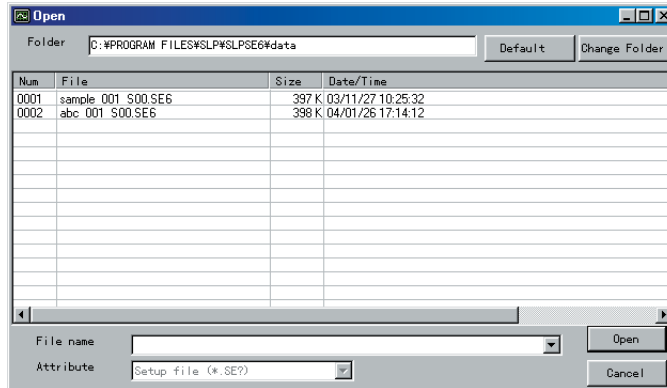
NN: 00 (Fixed.)

When saving data with the same file name, such data is not overwritten, but it is saved into a new file with the version No. incremented.

● **Opening saved data**

(1) Press [F5] (File Open).

>>The file selection screen appears.



(2) Select a file and click [Open]button.

>>Another screen (online mode) is started up.

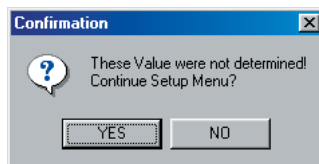
Note

- Two kinds of setup files are provided (*.SE5 and *.SE6) as described below.
 - *.SE5 : Setup file saved using the loader having the old version
 - *.SE6 : Setup file saved using this loader
 This loader can open either file.

● **Writing setup data**

(1) After the settings have been completed, press [F7] (Determinate).

>>The confirmation window will appear.



(2) Click [YES]button.

>>The settings are written and the setup is completed.

! Handling Precautions

- If [F7] (Determinate) is not pressed, all of the setup data except for the clock data are returned to the values before changing the set values after the operation has been transited to the earthquake sensor power reset or the initialization by the communication command. Therefore, always press [F7] (Determinate) to write the data you have input.

● **Putting the earthquake sensor in the measurement status**

Pressing [F8] (Return) will automatically return to the Measurement mode.

4 - 3 Waveform Memory ([F3] Waveform)

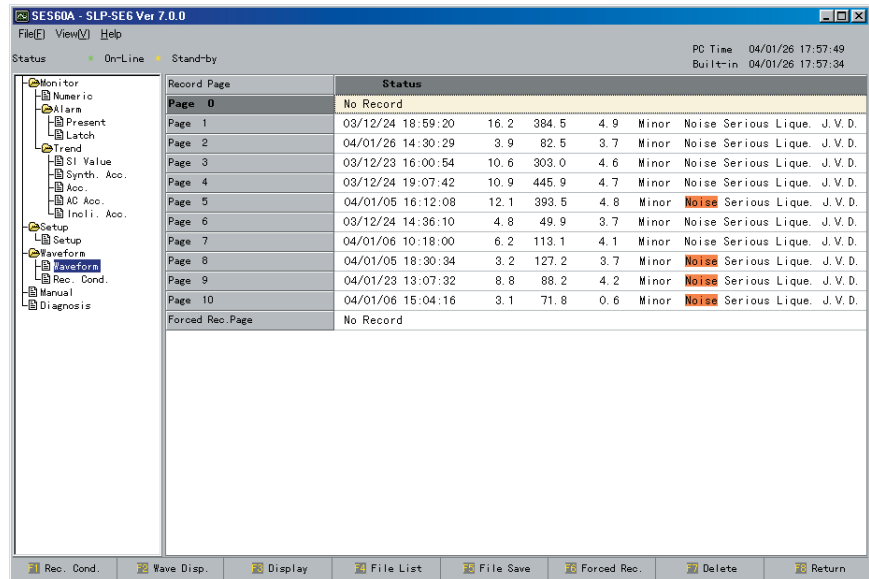
When pressing [F3] (Waveform) on the main menu, the screen is then transited to the waveform memory screen and the list of the waveform records is displayed.

When the earthquake sensor is in the measurement mode, the acceleration data for operation of three axes is always stored into 12 buffers (auto waveforms 0 to 10, and forced waveform).

One buffer can store data for 120s, which is sampled at intervals of 10ms (12000 data records).

Additionally, a buffer for forced waveform using manual operation is also provided. With these buffers, whether or not the waveforms are recorded correctly in the Standby mode can be checked.

Pressing [F6] (Forced Rec.) in the Standby mode will start the waveform recording forcibly.

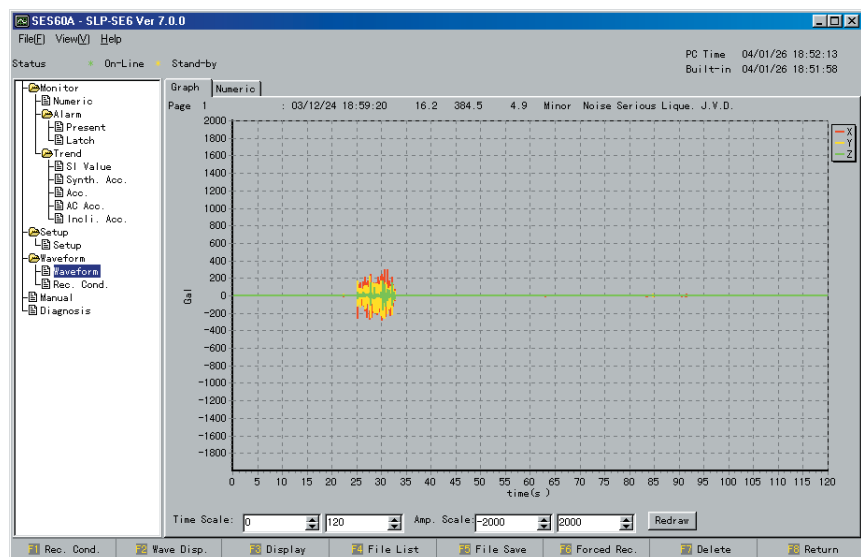


Record Page	Status									
Page 0	No Record									
Page 1	03/12/24 18:59:20	16.2	384.5	4.9	Minor	Noise	Serious	Lique.	J.V.D.	
Page 2	04/01/26 14:30:29	3.9	82.5	3.7	Minor	Noise	Serious	Lique.	J.V.D.	
Page 3	03/12/23 16:00:54	10.6	303.0	4.6	Minor	Noise	Serious	Lique.	J.V.D.	
Page 4	03/12/24 19:07:42	10.9	445.9	4.7	Minor	Noise	Serious	Lique.	J.V.D.	
Page 5	04/01/05 16:12:08	12.1	393.5	4.8	Minor	Noise	Serious	Lique.	J.V.D.	
Page 6	03/12/24 14:36:10	4.8	49.9	3.7	Minor	Noise	Serious	Lique.	J.V.D.	
Page 7	04/01/06 10:18:00	6.2	113.1	4.1	Minor	Noise	Serious	Lique.	J.V.D.	
Page 8	04/01/05 18:30:34	3.2	127.2	3.7	Minor	Noise	Serious	Lique.	J.V.D.	
Page 9	04/01/23 13:07:32	8.8	88.2	4.2	Minor	Noise	Serious	Lique.	J.V.D.	
Page 10	04/01/06 15:04:16	3.1	71.8	0.6	Minor	Noise	Serious	Lique.	J.V.D.	
Forced Rec. Page	No Record									


■ Displaying the waveform data using graphs

Select a desired waveform you wish to see on the waveform memory display screen and press [Enter] key to graphically display the waveform data.

First, the entire waveform is displayed.

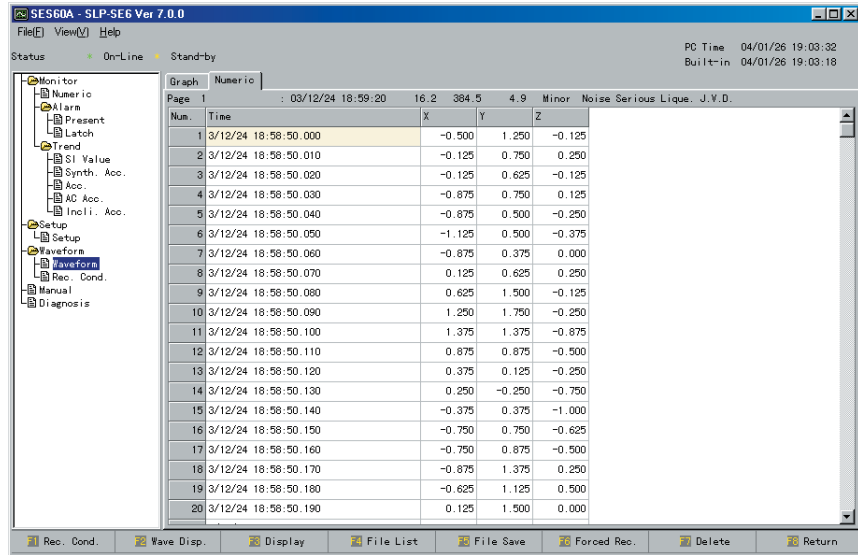


📖 Note

- For details about how to change the waveform display width, refer to;  ■ Displaying the trend (page 4-2).

■ **Displaying the waveform data using acceleration numeric value data**

When clicking [Numeric]tab while the waveform data is being displayed graphically, the waveform data is then displayed using numeric values. Clicking [Graph]tab will return to the graph display.

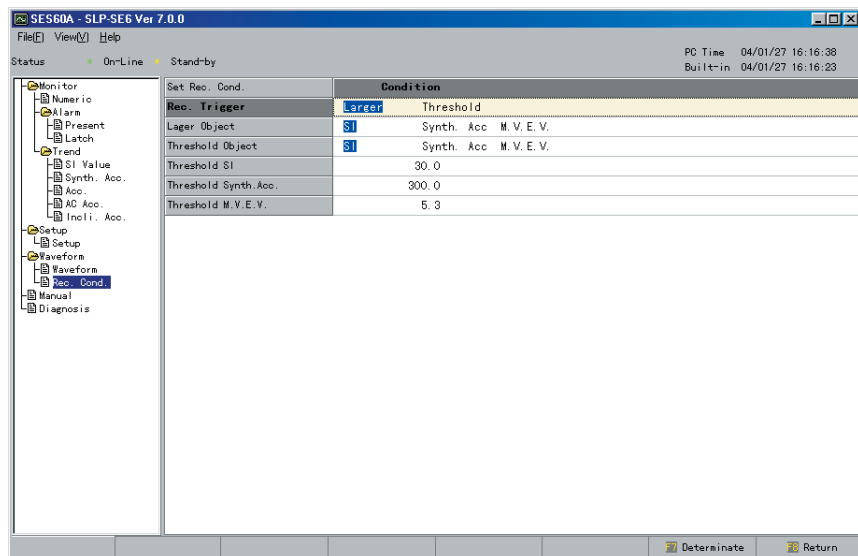


■ **Changing the recording conditions**

When pressing [F1] (Rec. Cond.), the screen is changed to the recording condition setup item display. A desired waveform recording method (maximum value or threshold value) can be selected.

For following items, either the maximum value or threshold value becomes valid depending on the recording conditions of the waveform recording method:

For method object items, the maximum value method object can be selected from the SI value, synthesized AC acceleration for operation, or measuring vibration equivalent value. The threshold value can be set individually.



! **Handling Precautions**

- If any recording conditions are changed, all recording conditions are deleted. Therefore, the necessary waveforms must be saved before changing the recording conditions.

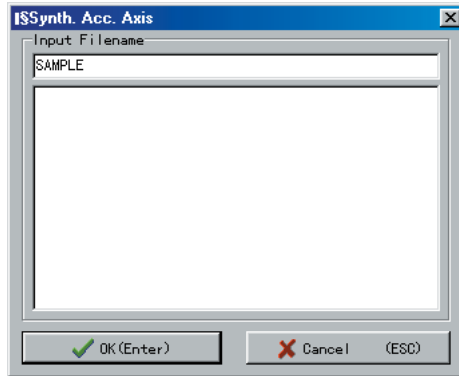
■ Saving waveform data into a disk

All waveforms, which are shown and made valid in the waveform list, can be saved into a disk.

At the same time, the files you have changed the settings are also saved.

(1) Press [F5] (File Save).

>>The "Input File Name" dialog box will appear.



(2) Input a file name and click [✓OK(Enter)]button or press [Enter]key.

>>The file saving is then started.

It takes approximately 1min to save the file for one waveform.

Note

- As the data of the waveform file is saved, the setup file data is also saved automatically.

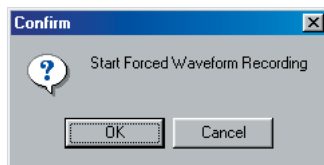
■ Recording waveform data manually

Press [F6] (Forced Rec.). The manual waveform (forced waveform) recording is started.

This waveform is recorded for 120s after the recording start instruction has been output to the forced recording buffer.

(1) Press [F6] (Forced Rec.).

>>The confirmation window will appear.




(2) Click [OK]button.

>>The forced waveform recording is then started.

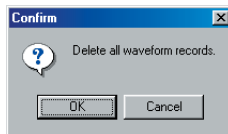
Note

- The waveform recording/completion status can be checked through the display area E *.

* : For details about display areas, refer to;
 3-1 Basic Operation (page 3-2).

■ Deleting waveform data

- (1) To delete all waveforms completely, press [F7] (Delete).
>>The confirmation window will appear.



- (2) Click [OK]button.
>>All of the waveform data are deleted completely.

■ File format of waveform data

The waveform data collected by this loader is saved into a file in the CSV format. The data saved in the CSV format can be directly read using waveform analysis software, such as Microsoft Excel.

Header information

waveform data

1	A	B	C	D	E	F	G	H
1	SLP-SE6 Waveform File							
2	(C) 2004 Yamatake Corporation All Rights Reserved							
3	Page 1	03/12/24 18:59:20	16.2 384.5	4.9	Minor Noise	Serious Lique.	J.V.D.	
4								
5	Date&Time	03/12/24 06:59 pm						
6	Trigger point	3000						
7	Alarm			0				
8	SI (kine)	16.25						
9	Synth Acc. (Gal)	384.5						
10	M.V.E.V.	4.9						
11	Lique.	0						
12	J.V.D.	0						
13	Incl. Z (Gal)	-4.63						
14	Incl. Y (Gal)	-1.88						
15	Incl. X (Gal)	-23.13						
16	Rec. Trigger	[Lager]	Threshold					
17	Lager Object	[SI]	Synth Acc.	M.V.E.V.				
18	Threshold Object	[SI]	Synth Acc.	M.V.E.V.				
19	Synth Acc. Axis	[2Axis]	3Axis					
20	M.V.E.V.Expression	[Expres1]	Expres2					
21	Reserve1	000A45A1	128					
22	Reserve2							
23	Reserve3							
24								
25								
26								
27								
28								
29								
30	Z (Gal)	Y (Gal)	X (Gal)					
31	-0.5	1.25	-0.13					
32	-0.13	0.75	0.25					
33	-0.13	0.63	-0.13					
34	-0.88	0.75	0.13					
35	-0.88	0.5	-0.25					
36	-1.13	0.5	-0.38					
37	-0.88	0.38	0					
38	0.13	0.63	0.25					
39	0.63	1.5	-0.13					
40	1.25	1.75	-0.25					
41	1.38	1.38	-0.88					
42	0.88	0.88	-0.5					
43	0.38	0.13	-0.25					
44	0.25	-0.25	-0.75					

Note

- As the waveform file is saved, the setup file is also saved at the same time. The waveform data is saved with other file name.
- For the file name of the waveform file, characters other than the character string specified by the user are automatically determined.

XXXXXX_VVV_WNN.CSV

XXXXXX : File name specified by the user

d : Version No. (in units of "XXXXXX")

W : Meaning of waveform file

NN : Waveform No.

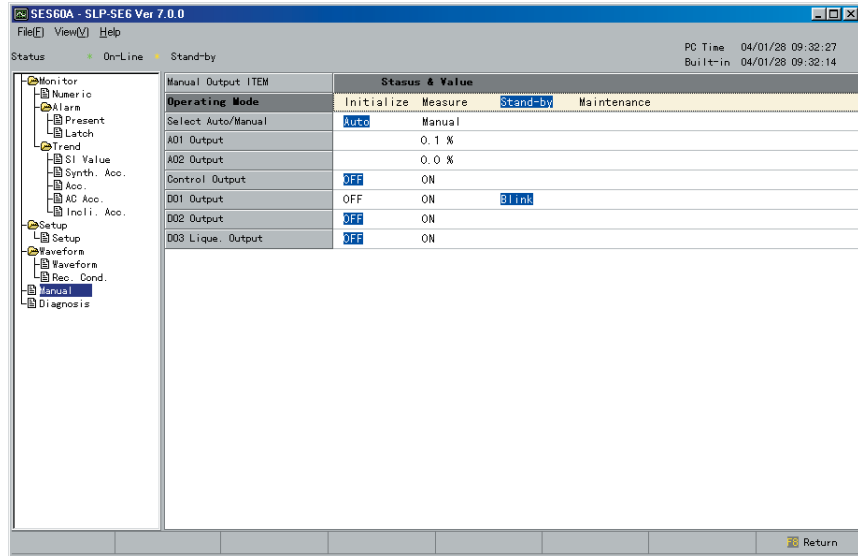
When saving data with the same file name, such data is not overwritten, but it is saved into a new file with the version No. incremented.

4 - 4 Manual Output ([F5] Manual Out)

When selecting [F5] (Manual Out) on the main menu, a specified value can be output forcibly to the output port provided on the earthquake sensor.

- **Manual output display**

External devices can be tested using this function.



To manually output a desired value, move the cursor to a manual output selection field and press [Enter]key to change the auto mode to the manual mode.

Next, move the cursor to the actual output field, select ON or OFF, and then press [Enter]key to change the output.

When pressing [Enter]key with [AO] selected, the loader prompts you to input data.

Input a numeric value and press [Enter]key.

The value you have changed is then output immediately.

4 - 5 Diagnosis Adjustment ([F6] Diagnosis)

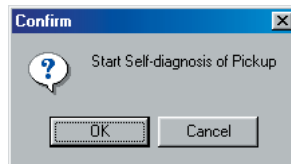
When pressing [F6] (Diagnosis) on the main menu, the diagnosis adjustment data is displayed on the screen. On this screen, the self-diagnosis of the accelerometer or the zero adjustment of the acceleration can be made.

Diagnosis/Arto Bias		Status & Value			
Operating Mode		Initialize	Measure	Stand-by	Maintenance
Pickup Operation		Diagnosing	Finished		
Alarm		Serious	Noise	Minor	
Ope.Acc. befor Bias	Z :	-2.2	Y :	11.4	X : 8.2
Ope.Acc. after Bias	Z :	-2.1	Y :	11.5	X : 8.2
Don.Acc. befor Bias	Z :	-2.4	Y :	11.3	X : 7.8
Don.Acc. after Bias	Z :	-2.3	Y :	11.3	X : 8.1
Auto Bias Value	Z :	0.0	Y :	0.0	X : 0.0
Diagnosis Alarm		OFF		ON	
Pickup H/W Alarm		OFF		ON	
Acc. Value Alarm		OFF		ON	
Incli. Acc. Alarm		OFF		ON	
Accelerometer Cir.		OFF		ON	

■ Pickup Diagnosis

(1) To diagnose the accelerometer of the earthquake sensor, press [F3] (Diagnosis).

>>The confirmation window will appear.



(2) Click [OK]button.

>>The accelerometer operation items enter the diagnosis status during diagnosis. When the diagnosis is completed, [Finished] is highlighted.

! Handling Precautions

- The error flag noise occurs after the diagnosis has been started and [Noise] is shown in the display area H* at the lower right portion of the screen.

This symptom occurs since the simulation of the accelerometer is operated forcibly during diagnosis. Therefore, this is not a problem. This symptom will disappear when approximately 100s have elapsed after starting of the diagnosis.

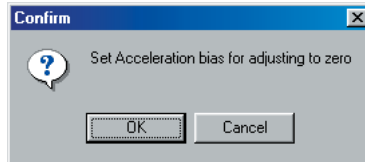
* : For details about display areas, refer to;

☞ 3-1 Basic Operation (3-2 page).

■ Zero adjustment (High function configuration)

(1) To perform the zero point adjustment of the acceleration, press [F4] (Auto Bias).

>>The confirmation window will appear.



(2) Click [OK]button.

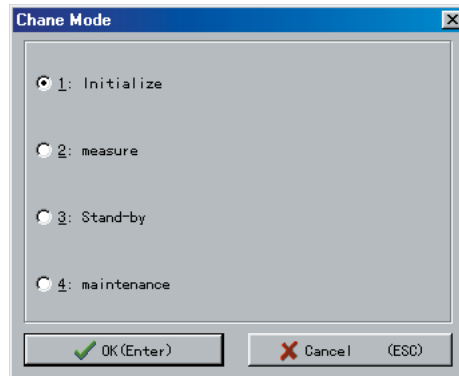
>>After the adjustment has been completed, the acceleration (after adjustment) item shows a value around "0". It is understood that the zero adjustment has been completed.

! Handling Precautions

- [Noise] may be shown in the display area H at the lower right portion of the screen during adjustment.
This symptom occurs since the acceleration value is forcibly adjusted to zero. Therefore, this is not a problem.
This symptom will disappear when approximately 100s have elapsed after completion of the adjustment.
However, since the AC acceleration is not changed by the zero adjustment, it does not affect the synthesized AC acceleration, SI value, measuring vibration equivalent value, and liquefaction judgment used for control. Therefore, the zero adjustment may not be used normally.

4 - 6 Mode Change ([F7] Mode Change)

When pressing [F7] (Mode Change) on the main menu, the "Change Mode" dialog box will appear. In this dialog box, change the mode.



Check on a desired mode (click [O]), and then click [✓OK(Enter)]button.
>>The mode is then changed and the dialog box will be closed.


Chapter 5. TROUBLESHOOTING

■ Error message list

If any key operation error occurs, relevant error message is shown in the display area G *.

This section describes how to take corrective actions if such message is shown.

* : For details about display areas, refer to;

 3-1 Basic Operation (page 3-2).

Message	Remedy
File name needs to be input.	Input a correct file name again.
Data error	The data you have input is beyond the specification. Input a correct value again.
Communication error	The communication fails. Check the cables and connectors.
Serious Noise Minor	These are typical errors given by the earthquake sensor main unit. Check the details of the error and take appropriate actions while referring to the User's Manual for earthquake sensor main unit.
Date and time error	Input correct date and time again.
DC acceleration is beyond ± 150 .	Since the earthquake sensor main unit is inclined excessively, the zero adjustment cannot be performed. Install the earthquake sensor properly.
File type is not matched. Cannot open File.	The specified data file is faulty. Specify a correct file.
Cannot operate under this mode.	Start the operation after the earthquake sensor has entered the Measurement mode. Or, start the operation after the mode has been changed to the Standby mode.
Switch to Measure on Standby mode.	Restart the operation after the mode has been changed to the Measurement or Standby mode.
Error occurs in the sensor data. Stop the operation of the unit and contact the manufacturer. This setting is not of the range.	The memory of the earthquake sensor is faulty. Contact the manufacturer to ask for the repair.
This setting is out of the range.	Input a correct value.

■ Taking corrective actions after checking the error status

Follow the steps stated in section 4-1, Real Time Monitor ([F1] Monitor) (page 4-1) to check the error status. If "ON" is shown in any alarm contents field, take relevant actions stated in the Table below.

General error information	Description	Remedy
Memory error (Serious failure)	Memory data error or read error	After checking the contents of the current error, reset the power. Waveform memory data may be deleted. If the same error occurs again, contact Yamatake Corporation or your dealer.
A/D converter error (Serious failure)	A/D converter is faulty.	After checking the contents of the current error, reset the power. If the same error occurs again, contact Yamatake Corporation or your dealer.
Sensor built-in clock error (Serious failure)	Built-in clock malfunctions.	
Vibration detection output error (Serious failure)	Vibration detection output circuit is faulty.	It is detected that the vibration detection output circuit of the earthquake sensor is faulty. Replace the earthquake sensor with a new one.
Other H/W error (Serious failure)	Other H/W error	After checking the contents of the current error, reset the power. If the same error occurs again, contact Yamatake Corporation or your dealer.
Accelerometer diagnosis error (Serious failure)	Accelerometer output is faulty.	After checking the contents of the current error, reset the power. Perform the diagnosis of the accelerometer. If the same error occurs again, contact Yamatake Corporation or your dealer.
Acceleration error (Serious error)	Detected acceleration value is faulty.	After checking the contents of the current error and sensor installation status, reset the power. If the same error occurs again, contact Yamatake Corporation or your dealer.
Inclination error (large) (Serious error)	Levelness of the earthquake sensor is faulty.	After checking the contents of the current error and sensor installation status, reset the power. If the same error occurs again, contact Yamatake Corporation or your dealer.
Acceleration noise continuous error (Serious error)	Non-earthquake waveform continues abnormally.	After checking the contents of the current error, reset the power. If the same error occurs again, contact Yamatake Corporation or your dealer.
Battery level error (Minor error)	Battery voltage drops.	Replace the battery with a new one. For details about how to replace the battery, see the User's Manual (Design, CP-SP-1156E). If the same error occurs again, contact Yamatake Corporation or your dealer.
Temperature error (Minor failure)	Internal temperature of the earthquake sensor is faulty.	Turn OFF the power. After checking that the ambient temperature is correct, turn ON the power again. If the same error occurs again, contact Yamatake Corporation or your dealer.
Sensor built-in clock data error (Minor failure)	Built-in clock data is faulty	Set the earthquake sensor built-in clock to the correct time. If the same error occurs again, contact Yamatake Corporation or your dealer.
Inclination error (small) (Minor failure)	Levelness of the earthquake sensor is faulty.	After checking the contents of the current error and earthquake sensor installation status, reset the power. If the same error occurs again, contact Yamatake Corporation or your dealer.
Acceleration noise error (Noise protection)	Non-earthquake waveform detection is faulty.	Wait for approximately 100s. If the error is not reset or if the same error occurs frequently, contact Yamatake Corporation or your dealer.

APPENDIX

■ Glossary

The glossary of terms used in the SES60 related User's Manuals is as follows:

Term	Description
Accelerometer	An acceleration detection element built into this unit. This accelerometer can detect the acceleration in the X-, Y-, and Z-axis (3-axes in total).
SI value	A numeric value correlated to the earthquake damage. The unit is kine (= cm/s). Actually read value or output value is the maximum value of those obtained for 10 to 20s.
Synthesized AC acceleration	Horizontal plane 2-axes or 3-axes vector synthesized AC acceleration. The unit is Gal (=cm/s ²). Actually read value or output value is the maximum value of those obtained for 10 to 20s.
Measuring vibration equivalent value	A damage estimate value calculated from the correlation expressions using only the SI value or SI value and synthesized AC acceleration.
Characterization compensation	The temperature characteristics of the accelerometer are compensated using the values of the temperature sensor in order to improve the accuracy of the measured acceleration.
Acceleration for operation	An acceleration value that has the frequency band necessary to operate the SI value and measuring vibration equivalent value. This acceleration is also used for the waveform recording or synthesized AC acceleration PV value.
Acceleration for control	An acceleration value that the high-frequency area is cut when compared to the acceleration for the operation in order to reduce the background noise by considering the AO and monitoring.
Acceleration adjustment value	An acceleration value after completion of bias adjustment
Inclination acceleration	This value shows a static acceleration by the temperature drift and inclination of the installation place.
AC acceleration	This value shows a dynamic acceleration. (= acceleration adjustment value - inclination acceleration)
Judgment for vibration detection	If the SI value and synthesized acceleration value exceed their set values and the output conditions are satisfied, the unit enters the vibration detection status.
Vibration detection output	When the vibration detection judgment conditions are satisfied and no errors are detected, the vibration detection output relay is turned ON.
Liquefaction	When the liquefaction judgment conditions, such as SI value, synthesized acceleration value, estimate displacement, and zero cross count are satisfied, the unit enters the liquefaction detection status.
Liquefaction output	When the liquefaction judgment conditions are satisfied and no errors are detected, the liquefaction control output DO3 is turned ON.
Waveform recording	Two kinds of waveform recording functions are provided, automatic waveform recording (10 waveforms) and forced waveform recording (1 waveform).
Error diagnosis	Four kinds of errors are detected, reset, serious failure, minor failure, and noise detection.
Reset	If a serious failure that affects all functions occurs, the unit is then reset.
Serious failure	This failure may affect the control functions, such as vibration detection output or liquefaction output. The serious failure output is turned ON and the control output is turned OFF.

Term	Description
Minor failure	<p>This failure does not affect the control outputs. However, in the minor failure status, a failure occurs in the waveform recording and time data memory, a failure occurs in the clock data, and/or installation conditions need to be changed.</p> <p>The minor failure output is turned ON.</p>
Noise detection Noise protection	<p>A signal other than the vibration waveform is detected. This failure may affect the operation results.</p> <p>Various PV values are set to "0" or turned OFF. The minor failure output is flashing.</p>
Maintenance sequence	<p>As the output is changed according to the constant sequence in the maintenance mode, the functional check including the instrumentation is performed on the external unit connection side.</p>
Accelerometer	<p>The diagnosis circuit physically moves the accelerometer to detect whether or not the accelerometer has a functional error.</p>
Auto bias	<p>The bias value is adjusted automatically using the loader.</p>
FSG	<p>1960Gal span value that is the accuracy guarantee acceleration range (gravity acceleration reference $\pm 980\text{Gal}$)</p>
%FSG	<p>A percentage of 1960Gal span ($\pm 2\% \text{FSG} = \pm 39.2\text{Gal}$)</p>
FSO	<p>4000Gal span value that is the measurable acceleration range ($\pm 2000\text{Gal}$)</p>
%FSO	<p>A percentage of 4000Gal span ($\pm 2\% \text{FSO} = \pm 80\text{Gal}$)</p>

YAMATAKE

Yamatake Corporation
Advanced Automation Company

Totate International Building
2-12-19 Shibuya Shibuya-ku
Tokyo 150-8316 Japan
URL: <http://www.yamatake.com>

This has been printed on recycled paper. (02)

Specifications are subject to change without notice.

Printed in J apan.
1st Edition: Issued in Apr., 2004(W)