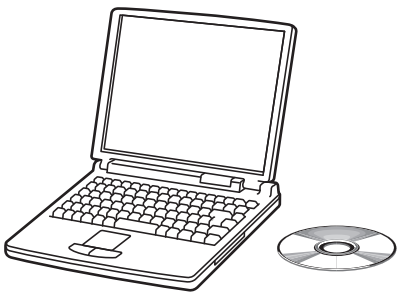
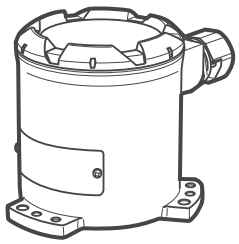
azbil

No. CP-UM-5756E

User's Manual for Smart Loader Package Model SLP-SE7 for Intelligent Earthquake Sensor Model SES70





Thank you for purchasing the Smart Loader Package.

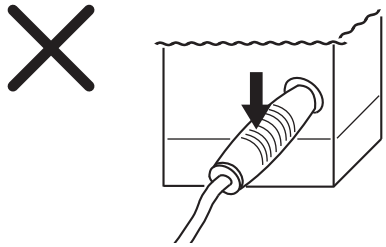
This manual contains information for ensuring correct use of the product. It also provides necessary information for installation, maintenance, and troubleshooting.

This manual should be read by those who design and maintain devices that use the product. Be sure to keep this manual nearby for handy reference.

Azbil Corporation

IMPORTANT

Do not apply a strong force while connecting a loader plug. Doing 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 plug correctly.

NOTICE

Be sure that the user receives this manual 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 manual are subject to change without notice.

Considerable effort has been made to ensure that this manual is free from inaccuracies and omissions. If you should find an error or omission, please contact the azbil Group.

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

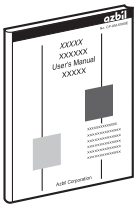
The SES™ is trademark of Azbil Corporation in Japan.

Unpacking

Check the following items when unpacking:

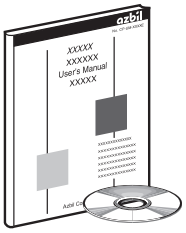
1. Check the model number to make sure you received the correct product.
2. Check for any obvious damage.
3. Check the contents of the package against the packing list to make sure that all items are included.

Items included in the package are shown below. Handle model SLP-SE7 and its accessories with care to prevent damage or loss of parts. If there is any problem with your order, please contact your dealer immediately.

Name	Model No.	Q'ty	Remarks
SLP-SE7 Installation disk 	SLP-SE7J90	1	CD-ROM
USB loader cable	81441177-001	1	
User's Manual 	CP-UM-5756E	1	This manual
Packing List	CP-UM-5802JE	1	Describes the configuration for the SLP-SE7J90
Software License Agreement	CP-UM-5603JE	1	Please read the software license agreement carefully before installation.

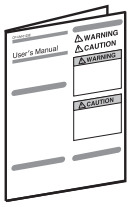
The Role of This Manual

A total of three different manuals are available for model SES70. Read them as necessary for your specific requirements. If a manual you require is not available, contact the azbil Group or its dealer.



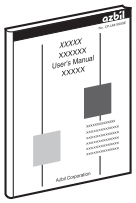
User's Manual for Smart Loader Package Model SLP-SE7 for Intelligent Earthquake Sensor Model SES70 **Document No. CP-UM-5756E**

This manual.
Included with the system disk for model SLP-SE7. Make sure this is read by the personnel in charge of post-setup configuration and operational monitoring. Model SLP-SE7 is a tool for monitoring and configuring the device from a PC. This manual provides detailed instructions on PC installation, loader functions, and operating methods.



Intelligent Earthquake Sensor Model SES70 User's Manual
Document No. CP-SP-1393E

Make sure this manual is read by the person who installs and connects this device as well as the personnel in charge of hardware design for using this device and maintenance personnel. This manual provides an overview of the device and explains the installation method, wiring, startup preparations, and troubleshooting.



Intelligent Earthquake Sensor Model SES70 User's Manual for System Design
Document No. CP-SP-1376E

Make sure this manual is read by personnel who will use this device as well as the personnel in charge of hardware design for using this device and maintenance personnel. This manual provides an overview of the device and explains the installation method, wiring, startup preparations, internal operations, troubleshooting, and hardware specifications.

Organization of This User's Manual

This manual is organized as follows:

Chapter 1. BEFORE USE

Be sure to read this chapter before you start using the loader.

An explanation of the required PC environment and an overview of functions are provided.

Chapter 2. LOADER STARTUP AND SHUTDOWN

Explains Loader environment setup, startup, and shutdown.

Chapter 3. BASIC LOADER OPERATIONS AND FUNCTIONS

Explains the Loader menu structure, basic operations, and an overview of the functions available through the Loader.

Chapter 4. FUNCTION OPERATIONS

Provides a detailed explanation of Loader functions and operations.

Chapter 5. TROUBLESHOOTING

Explains troubleshooting in the event of an error message or error during error status monitoring.

APPENDIX

Explanation of Terminology

Contents

Conventions Used in This Manual

■ In describing the product, this manual uses the icons and conventions listed below.

Handling Precautions:

Handling precautions indicate items that the user should pay attention to when handling this module.

Note: Notes indicate information that might benefit the user.

(1), (2), (3): Numbers within parentheses indicate steps in a sequence or parts of an explanation.

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

(Noise protect): Indicates screen message.

[Display]: Indicates PC screen menu.

[OK] button, [Graph] tab: Indicates PC screen button or tab. .

[F2] Setup: Indicates a keyboard function key.

[Enter] key, [Esc] key: Indicates a keyboard key.

[Settings]>[Control Panel]: Indicates to select [Settings] on the PC screen, and then select [Control Panel].

>>: Indicates operation results content displayed on the PC or device, or the device status after an operation.

Chapter 1. BEFORE USE

1 - 1 Overview

■ Overview

The SLP-SE7 Smart Loader Package for the Intelligent Earthquake Sensor (referred to as "Loader" below) is a monitoring and configuring tool that runs on a Windows PC and connects to our earthquake sensors.

This Loader can connect to the SES70A and the SES60A.

To ensure easy use for beginners, this system assigns each function to a function key that allows you to select from menu options.

■ Main functions

This Loader has the following functions.

- Current value monitoring function for SI value, acceleration speed, etc.
- Configure sensitivity output and other settings
- Acceleration waveform collection and monitoring function
- File save function for settings values and waveform
- DO, AO manual output function
- Diagnosis adjustment function
- Offline file content display function

1 - 2 Required Operating Environment

The following system environment is required to use this Loader.

■ Hardware

Item	Description	
PC	Computer	PC/AT compatible machine running a Core2Duo or higher CPU 1 GHz or higher 32 bit (x86) or 64 bit (x64) processor
	Memory	At least 1 GB memory or at least 2GB (for 64 bit systems) Recommended: 2 GB or higher
	Operating system	English language version of Windows 7 Pro (32 bit)/(64 bit), Windows 8 Pro/Ent (64 bit), Windows 8.1 Pro/Ent (64 bit) Windows 10 (referred to as "Windows" hereafter)
Peripheral Devices	Display	1024×600 resolution or higher, 16 bit color or higher recommended
	USB port	1 or more USB port
	Hard disk drive or SSD	Disk space: At least 100 MB for this software
	CD-ROM drive	At least one internal drive or an external drive
	Pointing device	Mouse or equivalent device compatible with Windows

[!] Handling Precautions

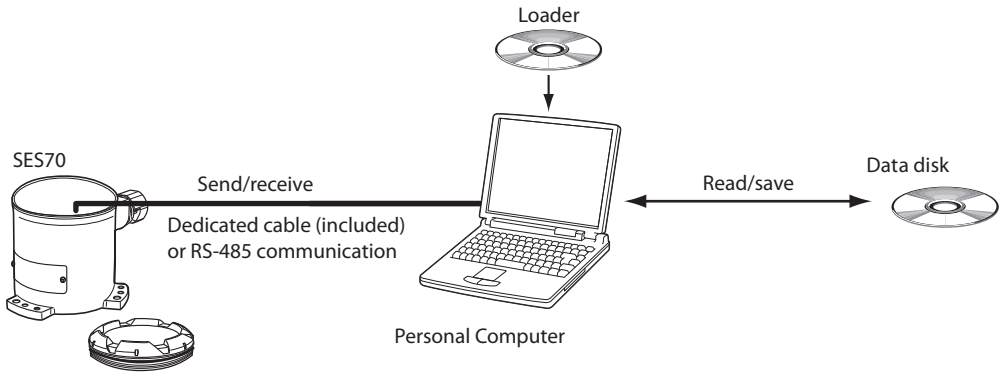
- FlexGlid70J is installed when you install this Loader. We cannot guarantee proper functionality if a different version of FlexGlid is already installed. In this case, we recommend using a different computer.
- If this loader was installed on Windows 10 by a user with an account type other than "administrator," the loader icon will not be displayed by clicking Start → [SLP].
  In this case, start the loader from the SLP-SE7 (SES70) icon on the desktop.
- Close all other applications prior to launching the Loader. The Loader may not function properly if other applications are running.
- If Windows Power Management is running, a communications timeout may occur if connected for a long time. In such cases, set Power Management to OFF (Control Panel > Power Management Settings).
- Check [Control Panel]>[Regional Options]>[Numbers]>[Decimal symbol] to ensure that this is set to " . " (a period). SLP-SE7 will not function properly if this is set to any other character.

  Example

  For Windows 7, select [Control Panel]>[Clock, Language, and Region]>[Regional and Language]>[Formats] tab>[Additional Settings]>[Decimal symbol].

  For Windows 8 and 8.1, select [Control Panel]>[Clock, Language, and Region]>[Region]>[Formats] tab>[Additional Settings]>[Decimal symbol].

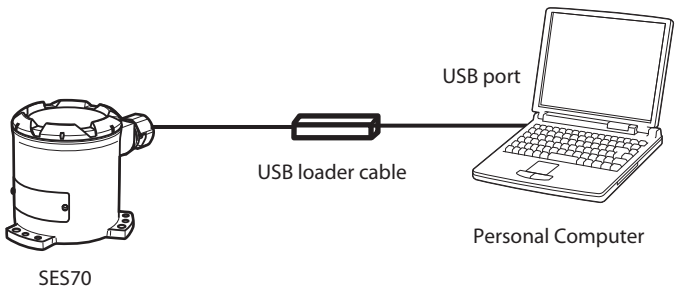
■ Hardware configuration



■ Connection with the earthquake sensor

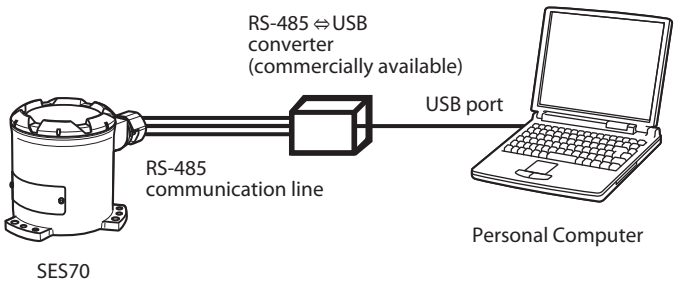
● Connection via loader communication (dedicated USB loader cable)

- This method is for connecting to the PC using the attached dedicated cable (Part No. 81441177-001). Under normal conditions, use this method for the connection.
- Connect the dedicated cable to the earthquake sensor loader jack and the PC USB port.



- **Connection via RS-485 communication**

  - This method is for connecting to the PC using a commercial RS-485↔USB converter.
  - Use this method for the connection when there is distance between the earthquake sensor and the PC.



  - RS-485↔USB converters for which compatibility has been confirmed are indicated below. (We have not confirmed operational compatibility for any other devices.)
    - Manufacturer: HuMANDATA LTD.
    - Model No: USB-003
    - URL: http://www.fa.hdl.co.jp/en/
    - Manufacturer: MOXA
    - Model No: UPort1130I
    - URL: http://www.moxa.com/

1 - 3 Installation

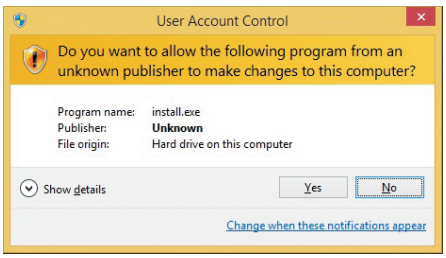
The following explains how to install the Loader onto your PC.

Handling Precautions

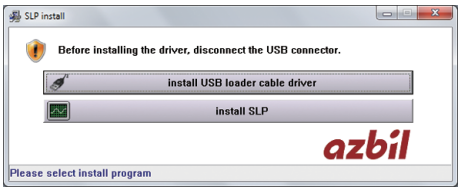
- The installation program may not function properly if other applications are running. Close all other applications before launching the installation program. Furthermore, the Loader may not function depending on the combination of other applications, drivers, etc., installed on your PC. See the user manual included with your Windows PC for details on Windows and PC settings.

■ Installing the Loader

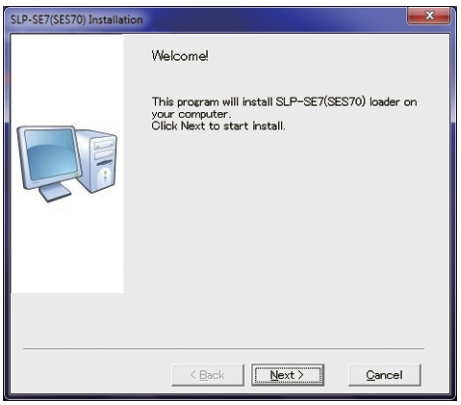
(1) Place the CD-ROM into the CD-ROM drive of your PC.
>> The installation program will launch automatically and display the following screen.



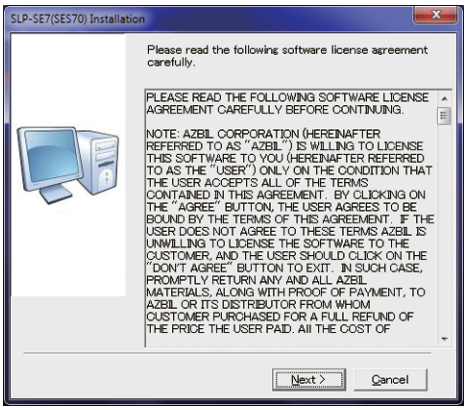
(2) Click [Yes] to display the following window.



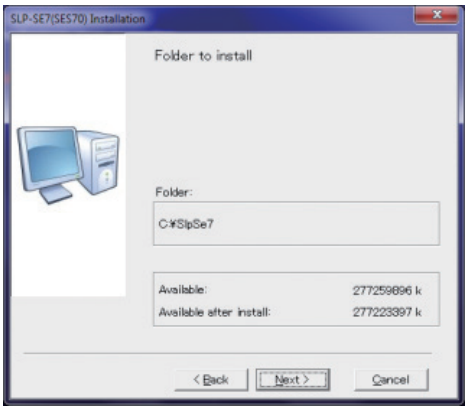
(3) Click [Install SLP].
>> The installation program will launch automatically and display the following screen.



(4) Click the [Next (N)>] button.
>> The following software license agreement screen is displayed.



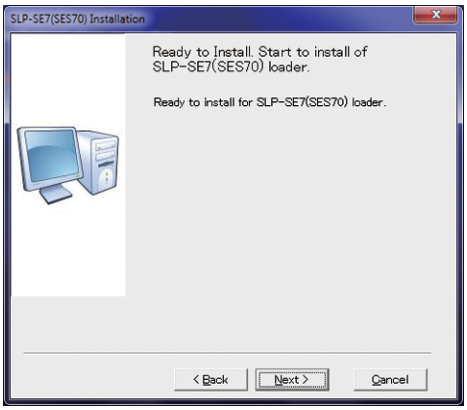
(5) Click the [Agree] button.
>> The following installation folder confirmation screen is displayed.



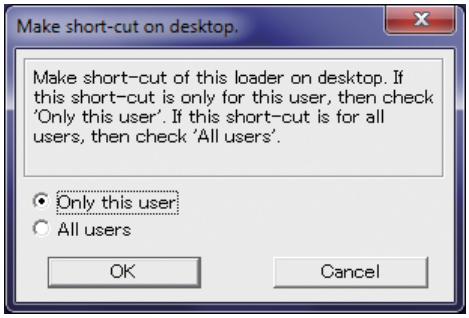
Note

- (You cannot change the installation destination folder.)

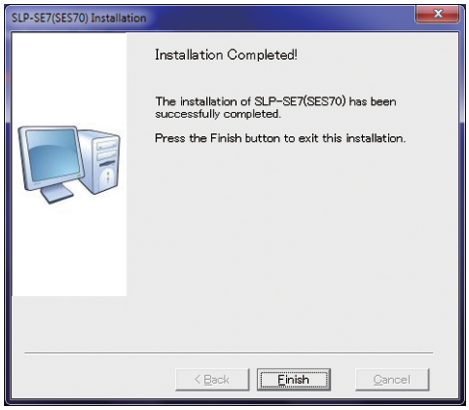
(6) Click the [Next (N)>] button.
>> The following screen is displayed.



(7) Click the [Next (N)>] button.
>> The following screen is displayed.



(8) Select either of the options and click the [OK] button.
For Windows 10, select [All users].
>> The following screen is displayed.



(9) Click the [Finish] button.
>> This completes the Installation.

Note

- If Adobe Reader is not installed on your PC, download the software from the Adobe Systems website.

■ Connecting using the USB loader cable

● How to install the device driver

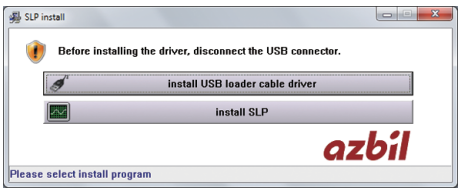
A device driver must be installed before using the USB loader cable. Follow the procedure below to install the device driver.

Handling Precautions

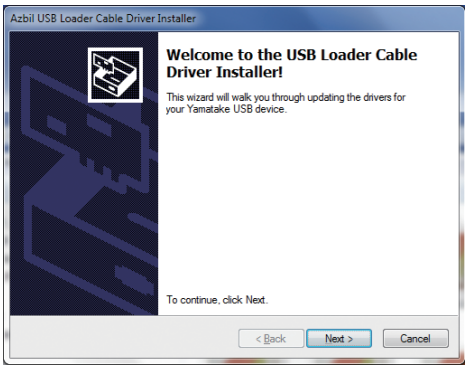
- Make sure you follow the procedure detailed below to install the device driver. The USB cable may not be recognized if the procedure is not followed. If the driver is not recognized, uninstall the device driver and then redo the installation procedure.
- Administrator privileges are required to install the device driver. This procedure should be conducted by an Administrator or by a user assigned to an Administrators Group.
- If the PC has multiple USB ports, make sure to insert the USB loader cable into the same port each time. Inserting the cable into a different port may require that you reinstall the device driver.

1. Place the SLP CD-ROM into the CD-ROM drive of your PC.

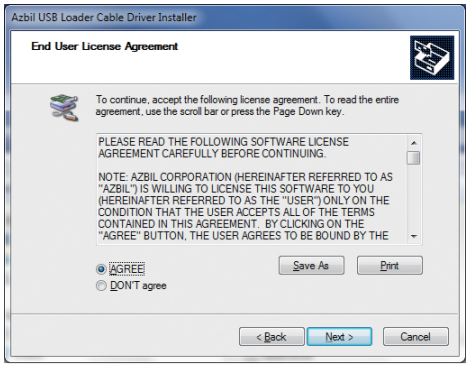
>> The installation program will launch automatically and display the following screen.



(1) Click [Install USB loader cable driver]. At this point, do not connect the USB loader cable to the PC.
>> The following screen is displayed.

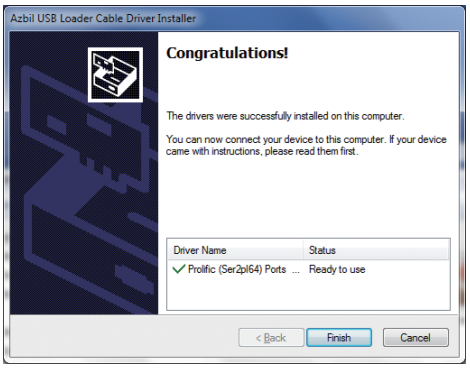


(2) Click [Next].
>> The following screen is displayed.



(3) Select [Agree] and click [Next].

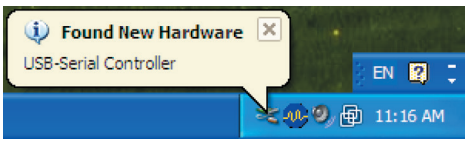
(4) Click [Install this driver software].
>> The device driver installation is launched. Once completed, the following screen is displayed.



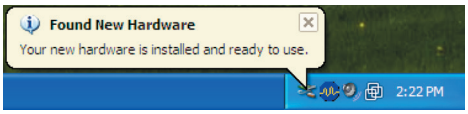
(5) Click [Finish] to complete the installation.

2. Connect the USB loader cable to the USB port.

(1) Once Windows recognizes the USB loader cable, the following type of indicator is displayed in the task tray and the driver installation wizard is displayed.

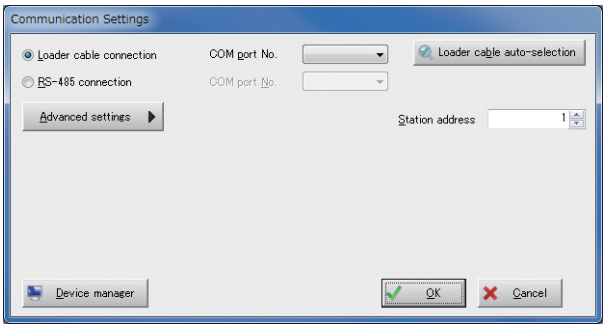


(2) The following type of indicator is displayed in the task tray once installation is complete.



(3) Launch the SLP-SE7. Since communications have not yet been established, the system first launches in offline mode. (For details on how to launch in offline mode, ☞ Loader startup (offline startup) (P. 2-2).)

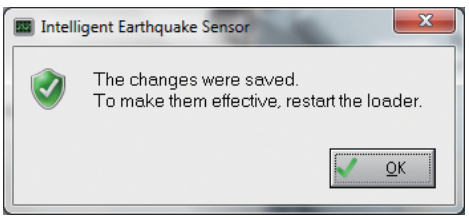
(4) Open the [File]>[Communications Settings] screen and select the [Connect via USB loader cable] radio button.



(5) Next, click the [Loader cable auto-selection] button. The number of the COM port to which the USB loader cable is connected is selected automatically.

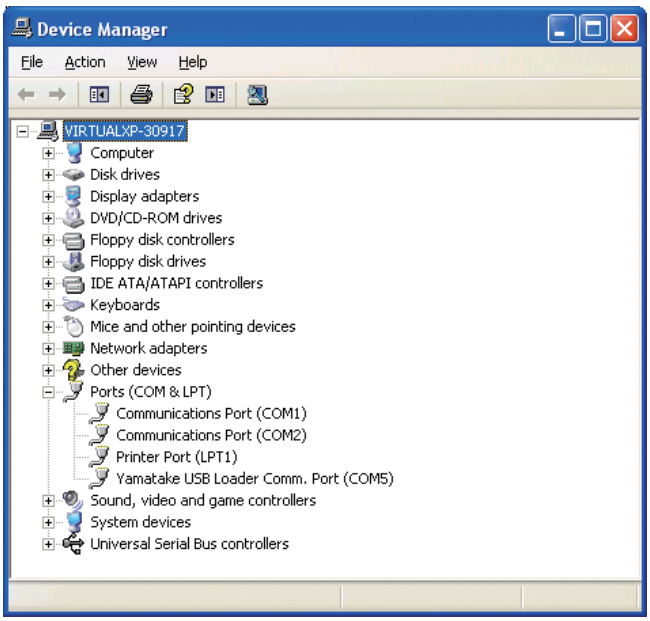
(6) Click the [OK] button to complete the change.

>> The following screen is displayed.



Note

- Clicking the [Auto-select USB loader cable] will cause the port to be selected automatically but, depending on conditions, in some cases the port is not selected automatically. In such cases, click the [Device Manager] button to confirm that the port number for Yamatake USB Loader Comm. is displayed under [Ports (COM and LPT)] then select that port.



(7) Click the [OK] button. The screen will close.

(8) Exit the SLP-SE7 and restart the loader.
This will enable the communication settings and establish communications.

■ Connecting via RS-485 Communication

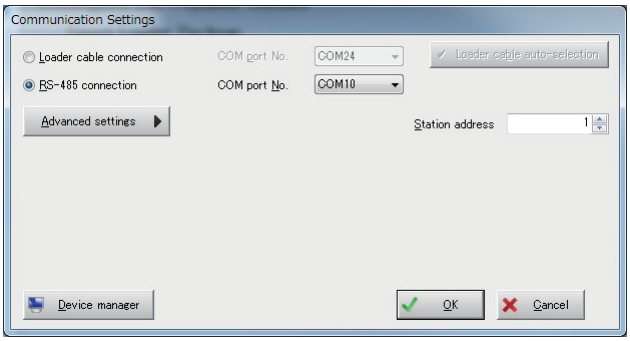
This method is for connecting to the PC using a commercial RS-485↔USB converter*.

* Refer to "1-2 Required Operating Environment" for details on RS-485↔USB converters for which compatibility has been confirmed.

(1) Install the driver for the RS-485↔USB converter. Refer to the user manual included with the converter for installation instructions.

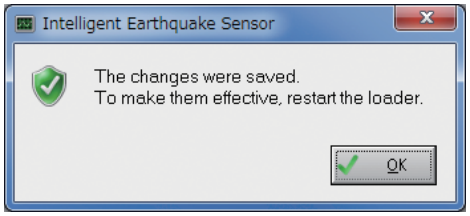
(2) Connect the RS-485↔USB converter to the earthquake sensor and the PC. Since communications have not yet been established, the SLP-SE7 first launches in offline mode.

(3) Select [File]→[Communications Settings] and select the [RS-485 connection] radio button.



(4) Click [Device manager] and check the COM port number of the RS-485↔USB converter. Select that port number and station address on the [Communication Settings] screen, and click the [OK] button.
The changes will be saved.

>> The following screen is displayed.



(5) Click the [OK] button. The screen will close.

(6) Exit the SLP-SE7 and restart the loader.
This will enable the communication settings and establish communications.

1 - 4 How to Uninstall

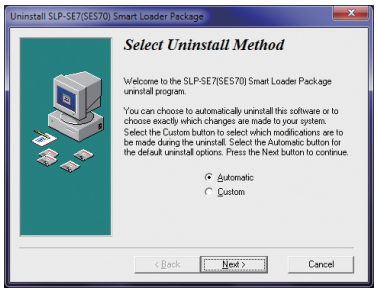
■ How to uninstall SLP-SE7

! Handling Precautions

- Make sure to reboot your PC after completing the uninstall. Make sure to close all other programs prior to conducting the uninstall procedure.
- Administrator privileges are required to uninstall the device driver. This procedure should be conducted by an Administrator or by a user assigned to an Administrators Group.

(1) Select [Control Panel]>[Programs and Functions]. Select SLP-SE7 (SES70) from the program list and select [Uninstall or Change]. The following window is displayed.

>> The following screen is displayed.



(2) Select [Automatic] and click [Next].

>> The following screen is displayed.

(3) Select [Uninstall]. The uninstallation will be completed after a few moments.

! Handling Precautions

- Uninstalling deletes the content of the SLPSE7 folder on the C: drive but the actual SLPSE7 folder is not deleted. Manually delete the folder if necessary.
- A [FlexGrid70J] folder is created on the C: drive during SLP-SE7 installation but this folder is not deleted during the uninstallation of SLP-SE7. Manually delete the folder if it is no longer necessary.
- Uninstalling SLP-SE7 does not delete any SLP-SE7 data saved in the user's My Documents folder. Manually delete this data if it is no longer necessary.

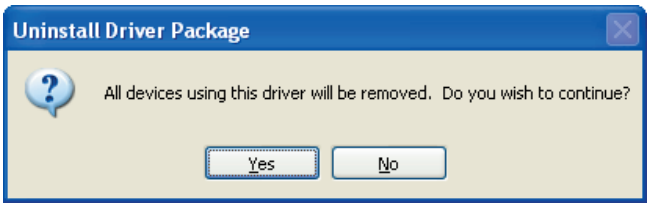
■ How to uninstall the USB loader cable driver

Handling Precautions

- Make sure to reboot your PC after completing the uninstall. Make sure to close all other programs prior to conducting the uninstall procedure.
- Administrator privileges are required to uninstall the device driver. This procedure should be conducted by an Administrator or by a user assigned to an Administrators Group.

(1) For Windows 7 (32 bit), select [Control Panel]>[Programs and Functions - Windows Driver Package Yamatake (YCspl) USB (04/10/2008 2.2.8)] and click the [Uninstall or Change] button.

For Windows 7 (64 bit), Windows 8 (64 bit), or Windows 8.1 (64 bit), select [Control Panel]>[Programs and Functions - Windows Driver Package Prolific (Ser2pl64) Ports (11/19/20092.0.13.130)] and click the [Uninstall or Delete] button.



(2) Click the [Yes] button.

(3) Reboot your PC.

■ How to uninstall the RS-485↔USB converter driver

- Refer to the user manual included with the converter for uninstallation instructions.

Chapter 2. LOADER STARTUP AND SHUTDOWN

2 - 1 Loader Startup

Close all other applications prior to launching the Loader. The Loader may not function properly if other applications are running.

■ Environment setup

Check [Control Panel]>[Regional Options]>[Numbers]>[Decimal symbol] to ensure that this is set to " . " (a period). (Normally, this is already set to period.)

For details, ☞ 1-2 Required Operating Environment (P. 1-2).

■ Connecting the earthquake sensor to the PC

Connect the earthquake sensor and PC via the dedicated USB loader cable. You also can use a commercially available RS-485↔USB converter and connect via RS-485 communication.

You do not need to connect the earthquake sensor with the PC if you only want to view files (offline). To startup the device in offline mode, remove the communications cable from the PC.

Removing the cable while online or any other communication failure will result in the following message: "A connection timeout error occurred with the earthquake sensor. Exiting program." The system will then return to Windows. Reestablish the connection and restart the loader.

The Loader will detect the device type (SES70, SES60) automatically when the device is connected to the PC. The Loader display and available operations will reflect the detected device.

■ Loader startup (online startup)

With the earthquake sensor connected to the PC, double-click the SLPSE7 (SES70) icon on the PC desktop.

Or, click the [Start] button at the bottom of the screen and then select [Programs]>[SLP]>[SLP-SE7 (SES70)]. Make sure to complete communications setup before you launch the Loader.
(To start the loader on Window 10, double-click the SLP-SE7 (SES70) icon on the desktop.)

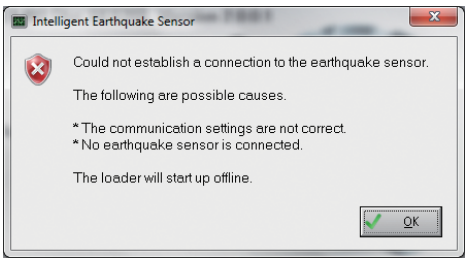
For details, ☞ 1-3 Installation "Connecting using the USB loader cable" or "Connecting via RS-485 Communication."

>> The Loader will startup and the following main menu is displayed. After normal system startup, "Online" should be indicated in the status view.

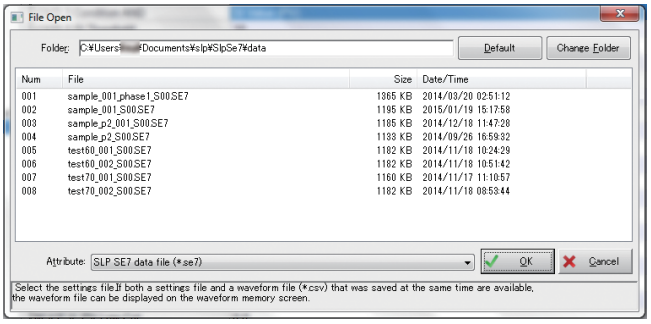
■ Loader startup (offline startup)

(1) With the earthquake sensor not connected to the PC, double-click the SLP-SE7 (SES70) icon on the PC desktop.
Or, click the [Start] button at the bottom of the screen and then select [Programs]>[SLP]>[SLP-SE7 (SES70)].
(To start the loader on Window 10, double-click the SLP-SE7 (SES70) icon on the desktop.)

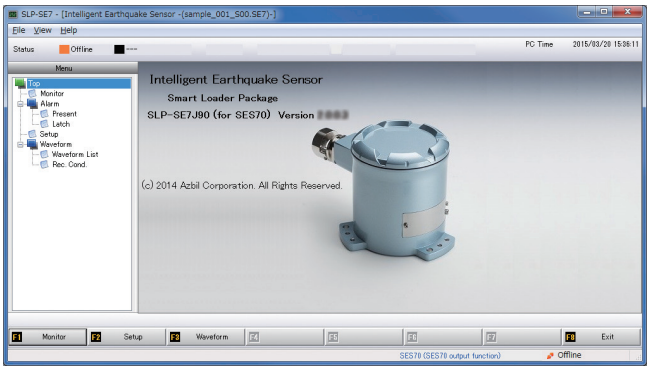
>> The following screen is displayed.



(2) Click the [OK] button to close the error screen.
>> The following [File Open] window is displayed.



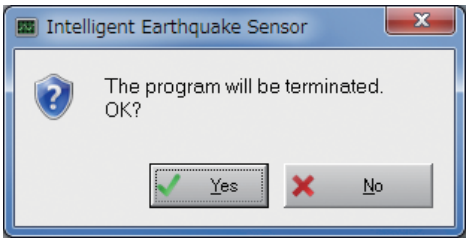
(3) Select the settings file “sample_001_S00.SE7” and click the [OK] button.
>> After offline startup, “Offline” should be indicated in the status view.



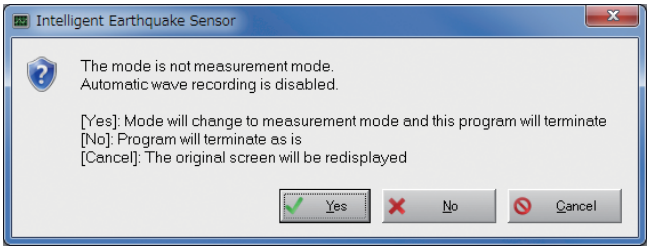
2 - 2 Loader shutdown

To exit the Loader, return to the main menu and select [File]>[Exit]. Or, press [F8] Exit.

Click [Yes] when the following screen is displayed. The system will then return to Windows.



In an mode other than Measurement mode, the following warning screen is displayed when you attempt to exit the Loader. If the earthquake sensor is not in Measurement mode, then the basic earthquake sensor functions (SI value calculation, analog output, control output, waveform recording, etc.) are not available. Make sure to confirm the earthquake sensor mode before exiting the Loader.



Chapter 3. BASIC LOADER OPERATIONS AND FUNCTIONS

This chapter explains the Loader menu structure, basic operations, and an overview of the functions available through the Loader.

For a detailed explanation of each function, ☞ Chapter 4. FUNCTION OPERATIONS.

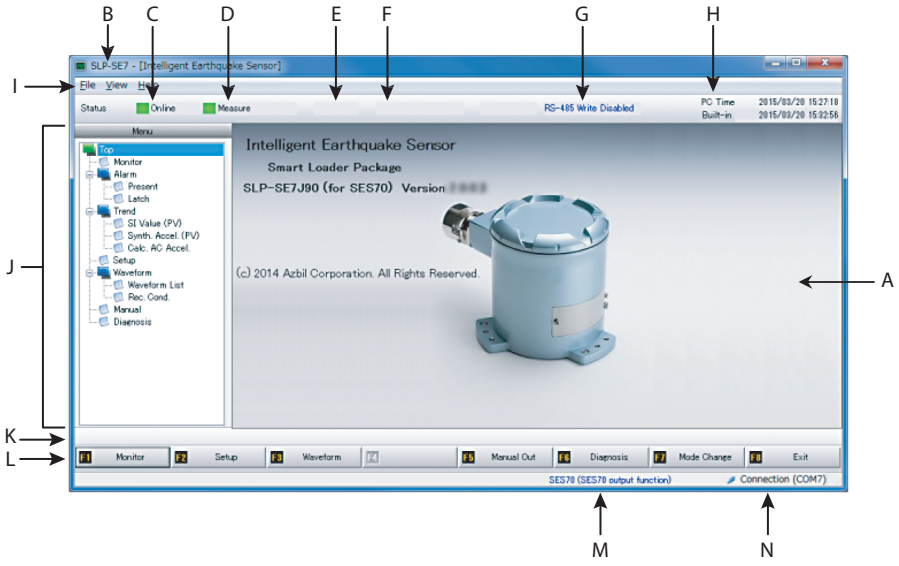
3 - 1 Basic Operations

■ Displaying and transitioning between screens

The screen is divided into the following areas. The content of display area A will vary depending on the operating mode.

Other than display area A, these regions are common to all modes.

Display region A: Main screen
Display region B: File name display
Display region C: Online/Offline status, function name
Display region D: Information indicating operating mode (when online)
Display region E: Maintenance mode phase indicator
Display region F: Waveform recording indicator
Display region G: RS-485 communications write status
Display region H: Upper line: PC time
Lower line: Earthquake sensor internal time (only when online)
Display region I: Supplemental menu display
Display region J: Display menu tree
Display region K: Error indicator
Display region L: Main menu display (menu allocated to function key)
Display region M: Connected earthquake sensor information display
Display region N: Connected communications port information display



Use function keys [F1], [F2], [F3], [F5], [F6], [F7], [F8] to transition between screens.

The [F4] key is not used.

Use the [F8] key to return to the previous screen.

In addition to function keys, you can use the menu tree displayed in display area J to transition between screens.

■ Menu structure

There are two types of Loader menus: the main menu displayed in display area L of the window and the supplemental menu displayed in display area I (Windows standard menu area).

● Main menu structure

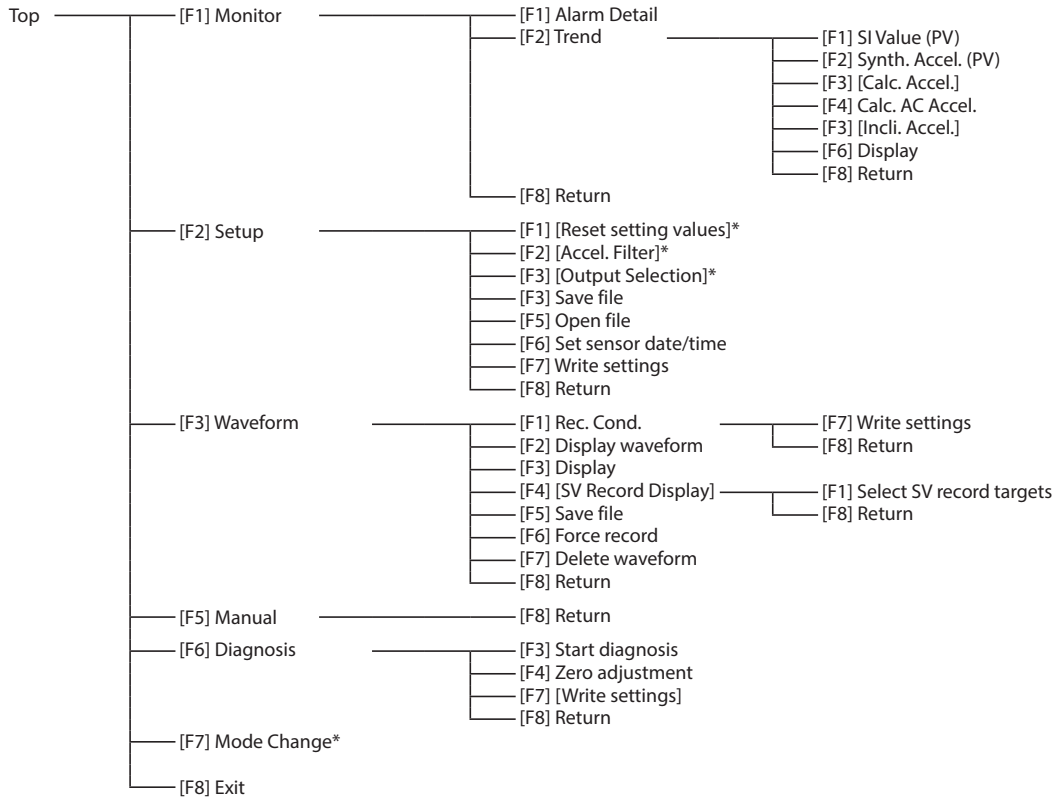
The main menu structure is as follows.

The main menu is designed so that the user transitions between each mode (functions) by using the function key or by selecting from the hierarchal menu in the displayed menu tree.

For example, when Top is displayed for Monitor, pressing the [F1] key will cause the screen to transition to that item.

You also may use the mouse to click on the menu display area for the function keys at the bottom of the screen.

This is also displayed if you click on the area displayed as Monitor in the menu tree displayed at the left of the screen.



Functions indicated in [ ] are functions that can be selected during multiple function settings display.

! Handling Precautions

- Conducting operations marked with " * " in any mode other than Measurement mode will result in the transition to Initialize mode. Please note that the SES60 may produce unstable analog output in Initialize mode.

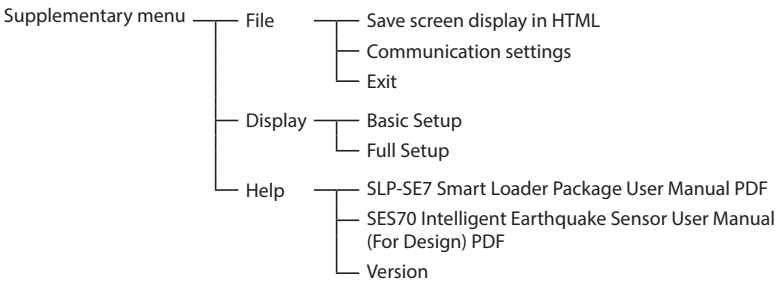
● **Supplementary menu structure**

The supplementary menu structure is as follows.

The supplementary menu is operated using the mouse.

Use the displayed pull-down menu to switch between settings levels.

There is a Basic Setup display and a Full Setup display. The displayed menu items will vary depending on the display.



■ Online and Offline

The operations displayed in each window of this Loader will vary depending whether the PC is connected to the earthquake sensor via a dedicated cable (online) or not connected to the earthquake sensor (offline). Some operations are only available when the system is online.

When online, the current mode of the earthquake sensor is displayed in display area D. The earthquake sensor has four modes: Initialize, Maintenance, Measurement, and Standby.

When offline, you can confirm previously saved files containing settings values and waveform data.

[!] Handling Precautions

- The operation mode is displayed only when the system is online.

● About online standby mode

Changing settings, deleting waveform records, etc., requires that the system be in Standby mode.

However, settings data monitoring can be conducted in any mode.

When you operate the Loader and a screen transition is required, a confirmation message is shown asking if you want to transition to Standby mode. Follow the instructions indicated in the message.

The following functions are available in Standby mode.

Menu	Operation
Monitor	• Confirm current values
Setup	• Setup • Save settings file
Waveform	• Save and delete record data • Change waveform recording conditions
Save file	• Save file
Manual	• Manual output
Diagnosis	• Pickup diagnosis • Acceleration zero adjustment

[!] Handling Precautions

- The automatic waveform recording function is not available in Initialize mode, Maintenance mode, or Standby mode.

■ Function

This Loader provides the following 6 types of functions.

- Monitor
- Setup
- Waveform
- Manual
- Diagnosis
- Mode change

An overview for each function is explained in the following pages.

3 - 2 Monitor

The Monitor displays the status of the current earthquake sensor operation.

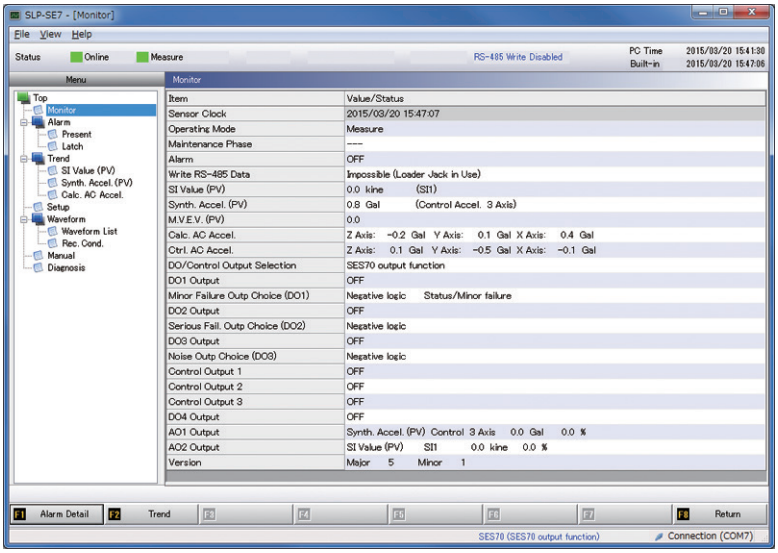
In the main menu, press [F1] Monitor. Or, select [Top]>[Monitor] from the displayed menu tree.

Error information is continuously monitored. In the event of an error, the information is displayed in display area K* regardless of which screen is being displayed.

* ☞ 3-1 Basic Operations (P. 3-2) for information on the display area.
☞ Chapter 5 Troubleshooting for a list of error messages.

■ Monitoring Screen

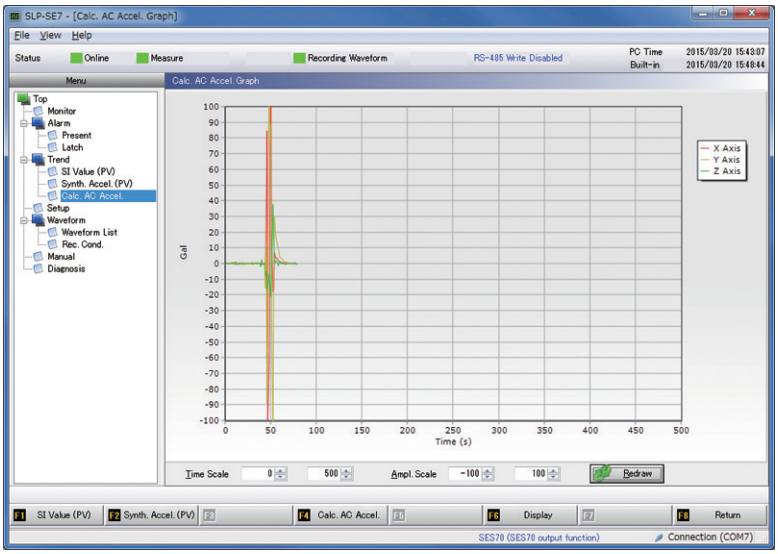
This screen displays the earthquake sensor operating mode and measurement results, calculation results, and output status.



■ Trend display

SI value (PV value), synthetic acceleration (PV value), calculation acceleration*, calculation AC acceleration, and calculation inclination acceleration* can be displayed as a trend graph. (* is only for Full Setup Display)

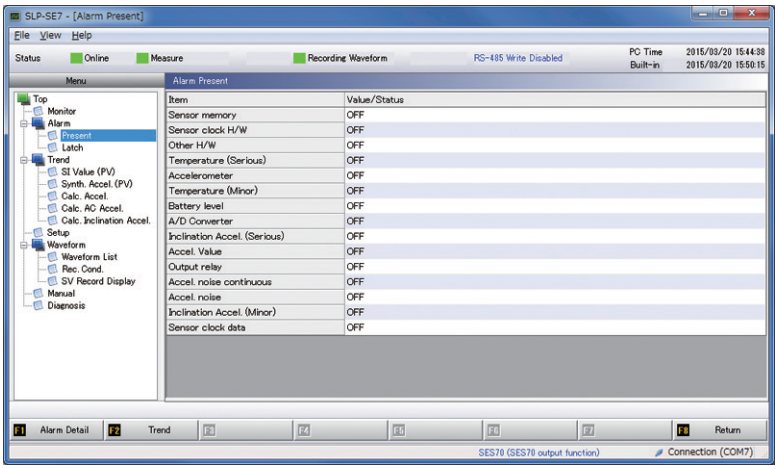
Click [F2] Trend. Each trend is displayed after clicking the button. Here, sampling takes approximately 1 second. This creates a buffer containing approximately 500 seconds of data, allowing you to view past trends. Sampling stops once the buffer becomes full. Return to the main menu and click [F2] Trend under [F2] Monitor to clear the buffer and start sampling.



■ Error Details Window

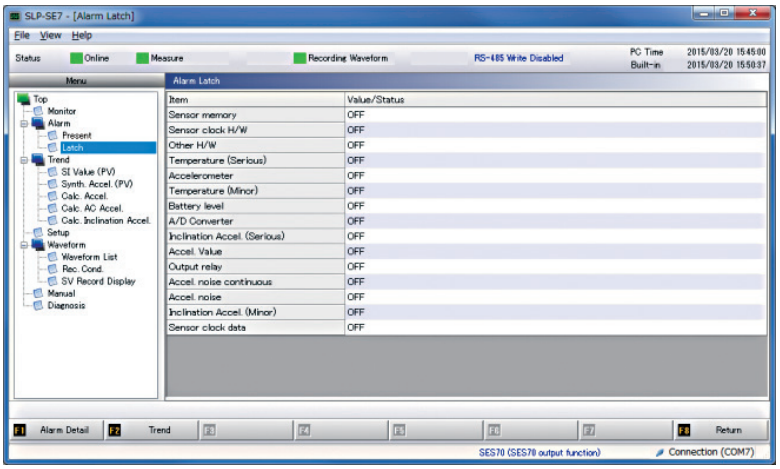
Display error details by clicking [F1] Alarm Detail.

You also can select [Top]>[Alarm]>[Present] in the displayed menu tree to display error details.



Click [F1] Alarm Detail in the previous screen to switch between the error information display and the current error information display for the error information latched on the earthquake sensor.

You also can select [Top]>[Alarm]>[Latch] in the displayed menu tree to display the error information latched on the earthquake sensor.



3 - 3 Setup

Allows you to configure earthquake sensor control output settings, time, AO scaling, device address, etc. Press [F2] Setup in the main menu. You also can select [Top Setup]>[Setup] in the displayed menu tree.

Press [F4] File Save to save the settings.

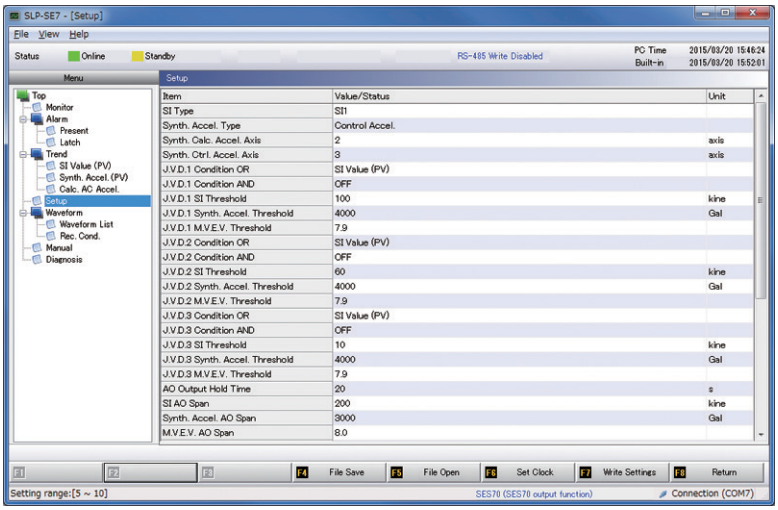
Press [F5] File Open to display saved settings on the PC Loader.

Handling Precautions

- The automatic waveform recording function is paused if Standby mode is selected when switching to the Setup window.
- [F4] File Save is not available when the system is offline.
- To prevent unintended operations, [F5] File Open cannot write the settings data saved in the file to the earthquake sensor. This only displays the contents of the saved file.

The settings content window is shown below.

■ Setup window



3 - 4 Record Waveform

Displays the 10 waveforms recorded in the earthquake sensor and one forced waveform.

You also can save displayed waveforms onto the PC.

Press [F3] Record Waveform in the main menu. You also can select [Top]>[Waveform]>[Waveform List] in the displayed menu tree.

The waveform can be displayed as a graph or as a numeric representation.

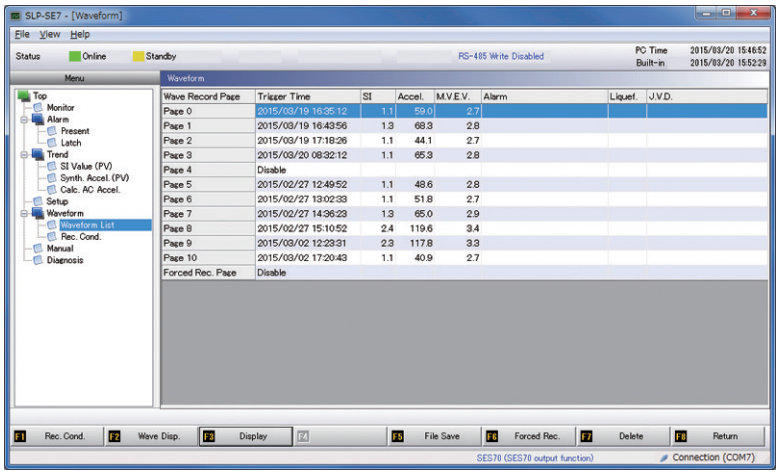
Handling Precautions

- The automatic waveform recording function is paused if Standby mode is selected when switching to the Setup window or the Record Waveform window.
- Change Recording Conditions, Force Record, Delete Waveform are available only in standby mode.

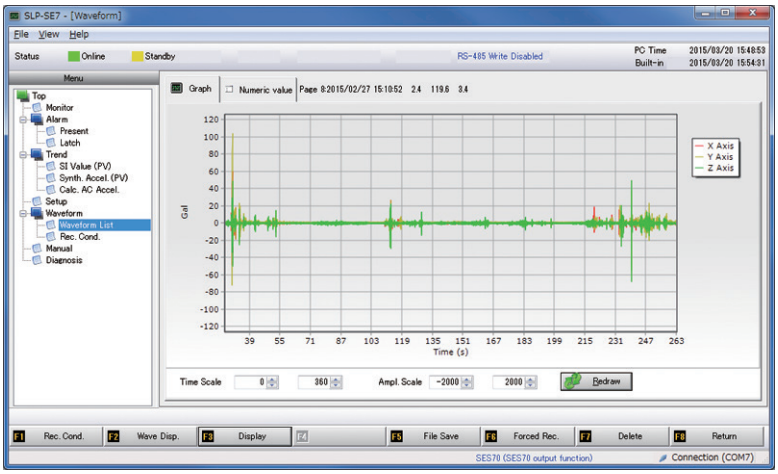
■ List of Recorded Waveforms window

Align the cursor with the number of the waveform graph you want to display and press [Enter] to go to the waveform graph display window.

You also can got to the waveform graph display window by using the left mouse button to double-click on the row of the waveform number for the waveform graph you want to display.

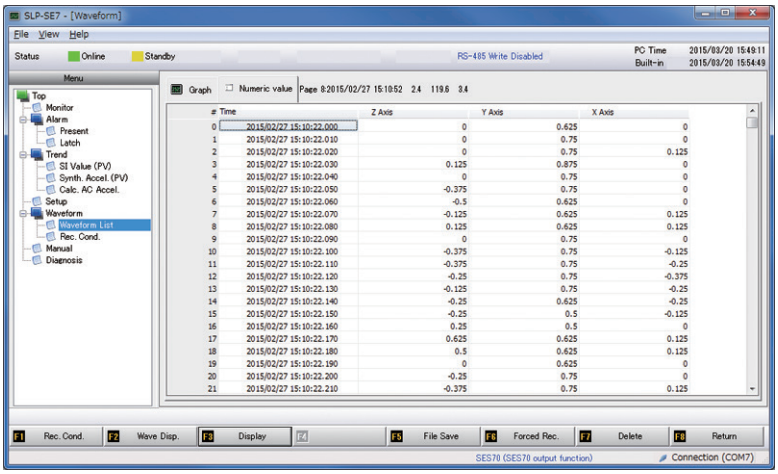


■ Waveform graph display window



Click the [Numeric Value] tab to go to the wave form numeric value window.

■ Waveform numeric value display window



Click the [Graph] tab to go to the wave form graph display window.

3 - 5 File Operations

Select Save File from the Setup window in the main menu to save only the settings.

To save the settings and the waveform, select Save File from the Record Waveform window in the main menu.

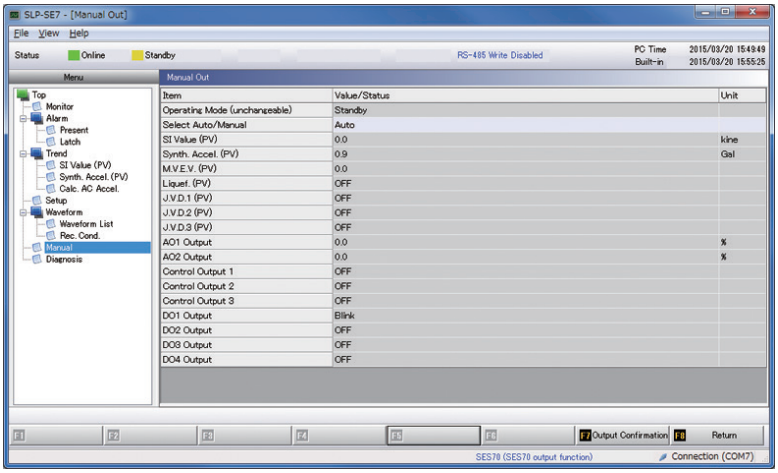
As when online, after writing to a settings file while offline, the waveform file is displayed via the Record Waveform window. (However, only when both the settings file and waveform file have been saved.)

3 - 6 Manual Output

You can manually force output when you want to check the earthquake sensor AO, control output, liquefaction output, or failure output.

Press [F5] Manual in the main menu.

■ Manual output screen



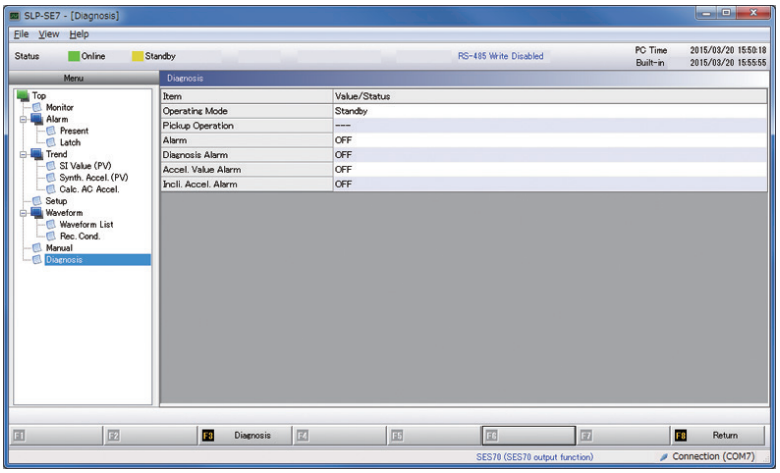
3 - 7 Adjust Diagnosis

You can run a diagnosis on the acceleration sensor (pickup).

Adjustment data is configured by default but the inclination adjustment (zero adjustment) can be done at the Full Setup window.

Press [F6] Diagnosis in the main menu.

■ Diagnosis window



3 - 8 Change Mode

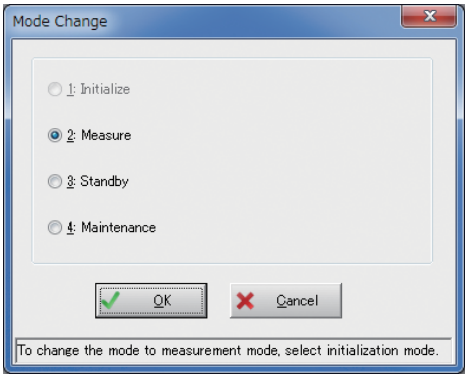
Change the earthquake sensor mode.

Press [F7] Mode Change in the main menu.

A dialog box is displayed.

Change to the desired mode.

■ Change mode window



Handling Precautions

- When you select a function, a mode change confirmation is displayed during the window transition even if you do not use the Change Mode function. Follow the instructions indicated in the message. The mode is changed automatically.
- Note that analog output may be unstable in initialize mode if the SES60 is connected.
- Analog output is always stable with the SES70.

Chapter 4. FUNCTION OPERATIONS

4 - 1 Monitor [F1]

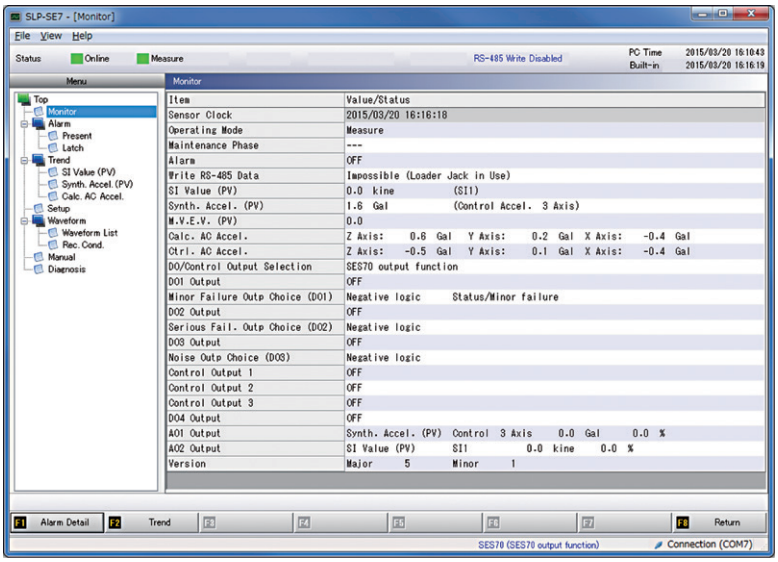
Clicking [F1] Monitor in the main menu will transition the system to the Monitor screen.

Select [Monitor]>[Monitor] from the displayed menu tree.

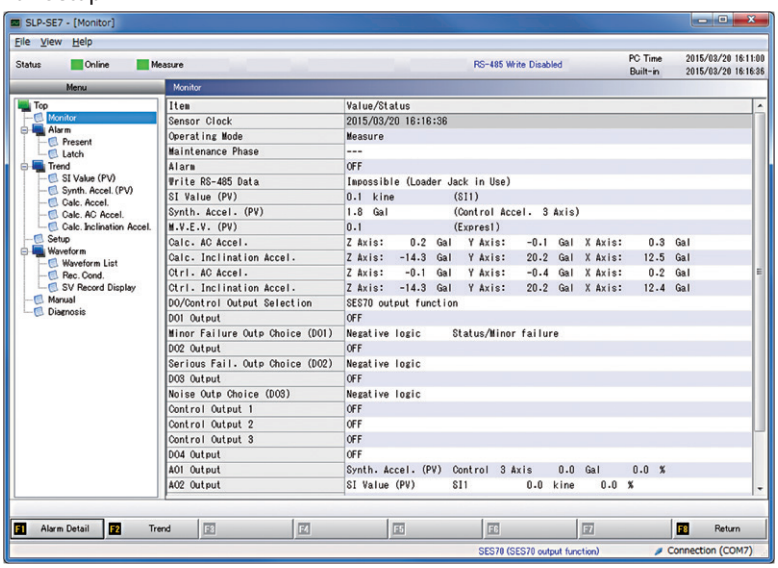
This monitors the current status of the earthquake sensor.

■ Displaying the Monitor

Basic Setup



Full Setup



Handling Precautions

- The displayed content (items) will vary between Basic Setup and Full Setup.
- For SI value and other displayed figures, earthquake gauge internal figures are rounded off to the nearest one-tenth.
- DO1 Output, DO2 Output, and DO3 Output indicate the internal analysis results. If negative logic is selected, the status may differ from the actual DO terminal. The following indicates the correlation between the display and the actual terminal status.

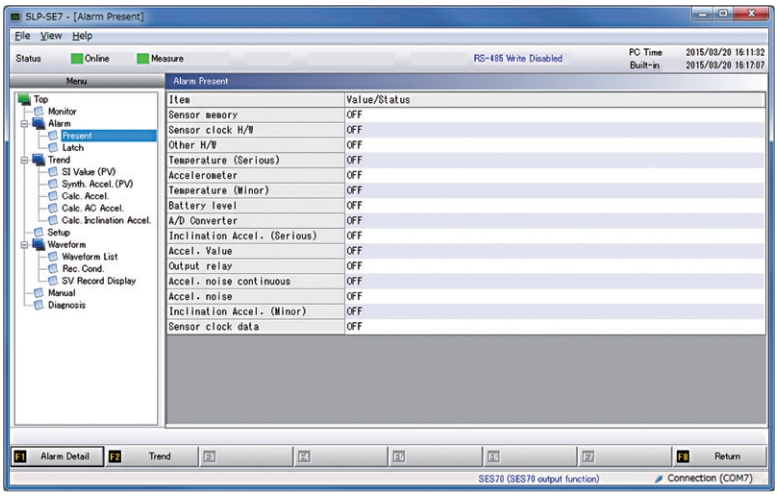
Item	Loader display	SES70 terminal status	
		Positive logic	Negative logic
Minor failure (DO1)	OFF	OFF	ON
	ON	ON	OFF
	Blinking	Slow OK/OFF Fast OK/OFF Flashing One of the above	Slow OK/OFF Fast OK/OFF Flashing One of the above
Serious failure (DO2)	OFF	OFF	ON
	ON	ON	OFF
Noise protect (DO3)	OFF	OFF	ON
	ON	ON	OFF

■ Confirming error status

To display the content of an error, press [F1] Alarm Detail. You also can select [Top]>[Alarm]>[Present] in the displayed menu tree to display error details.

View this information to respond to any errors that occur.

Press [F8] Return to return to the Monitoring screen.

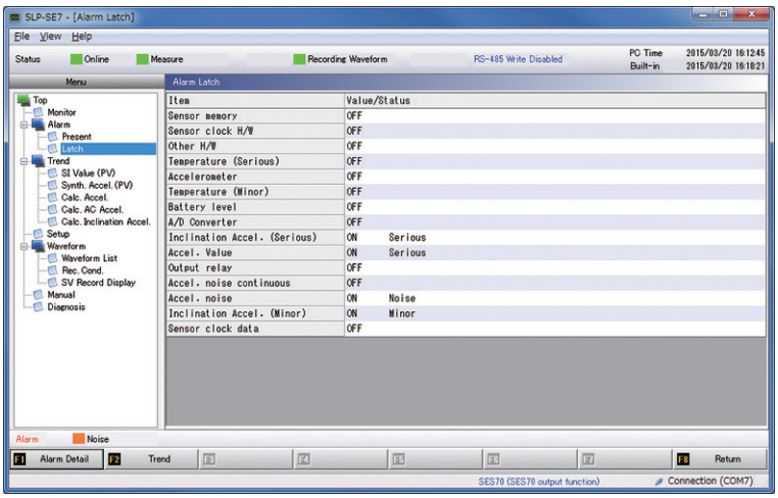


Note

-  Chapter 5. TROUBLESHOOTING (P. 5-1) for information on how to address.

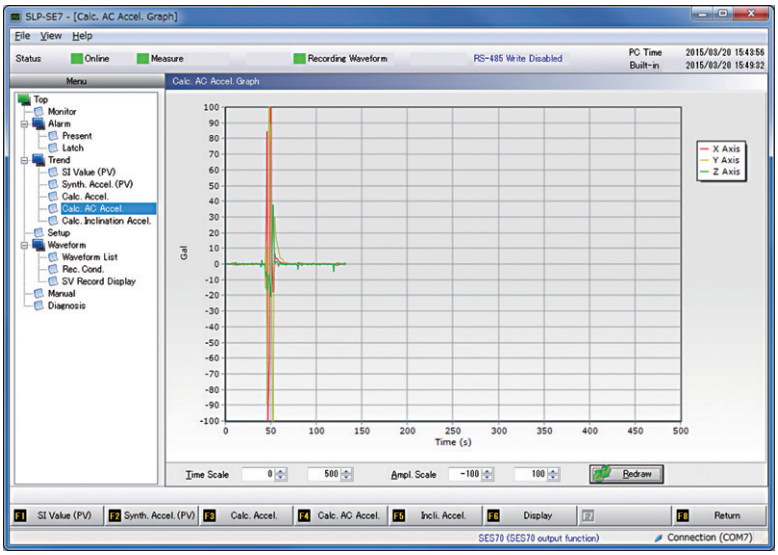
Press [F1] Alarm Detail again to view the error information latched on the earthquake sensor. Press [F1] Alarm Detail to switch between the status display and the latch display.

You also can select [Top]>[Alarm]>[Latch] in the displayed menu tree to display the error information latched on the earthquake sensor.



■ Displaying simple trends

To display the simple trends for each value, click [F2] Simple Trend in the Monitoring screen. The Calc.AC Accel. Graph for calculation screen is displayed. This trend is displayed as a sampling in approximately 1 s intervals. (Note that this differs from the sampling cycle of the earthquake sensor.)



The display targets are assigned to function keys as indicated below. Press the applicable function key for the trend you want to display. You also can select a trend from Simple Trend Display under the display menu.

[F1] SI Value (PV)

[F2] Synth. Accel. (PV)

[F3] Calc. Accel.*

[F4] Calc. AC Accel.

[F5] Incli. Accel.*

* only when in Full Setup Display

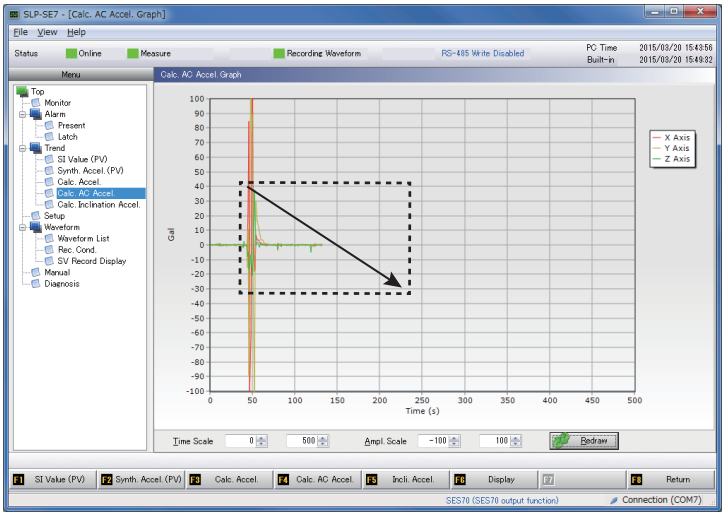
● Making trends easier to view

You can change the display screen (Trends) if the graph display scale is off or if the X, Y, Z axes overlap making the display difficult to view.

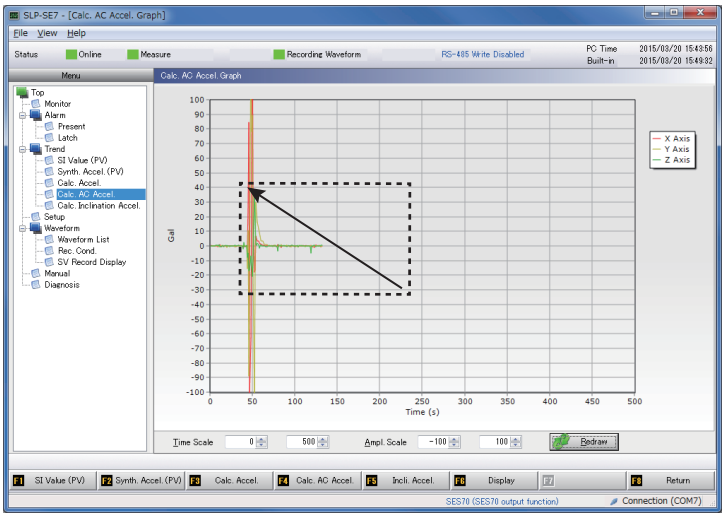
● Changing the time interval and amplitude

Use one of the following to change the time axis and amplitude.

- Use the mouse to specify the trend display range.



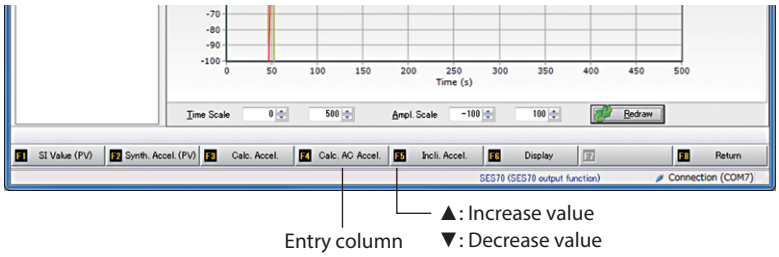
Expand the window by dragging the mouse from the upper left to the lower right.



Drag from the lower right to the upper left to return the window to the default size. The drag position is recognized anywhere, regardless of trend width.

- Click the [▲]/[▼] buttons in the window.
- Directly input a numeric value in the window input column.

- Click the column of the window you want to change and then press the [↑]/[↓] keys.

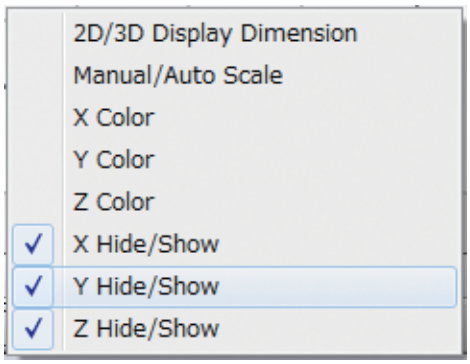


After making the change, click the [Redraw] button. To change display content to other items, press the [F1] through [F5] keys.

● Changing the graph display

You can change the number of axis lines displayed if the graph displays of the X, Y, Z axes for the calculation AC acceleration, etc., overlap making the display difficult to view.

While displaying a graph, press [F6] Display or right-click on the graph to display a list of display change options.



[2D/3D Display Dimension]: Switch between a flat graph and 3D display.

[Manual/Auto Scale]: Switch between auto and manual adjustment of the graph width range. After switching to manual, when you switch back to auto the settings revert to the settings applied prior to switching to manual.

[X color]: Changes the color of the X-axis

[Y color]: Changes the color of the Y-axis

[Z color]: Changes the color of the Z-axis

[X Hide/Show]: Switch between displaying and hiding the X-axis.

[Y Hide/Show]: Switch between displaying and hiding the Y-axis.

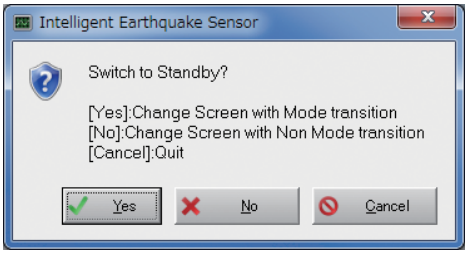
[Z Hide/Show]: Switch between displaying and hiding the Z-axis.

4 - 2 Setup [F2]

Pressing [F2] Setup in the main menu will switch to the Setup screen.

You also can select [Top]>[Setup] in the displayed menu tree.

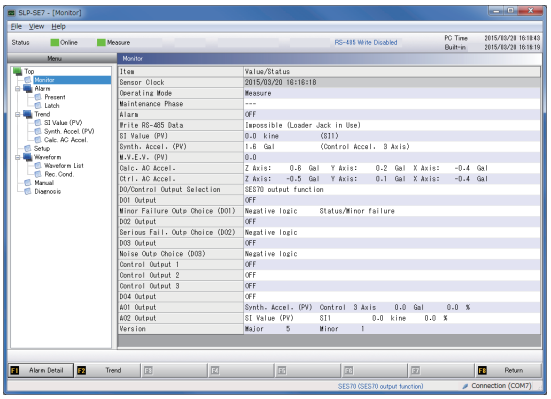
When switching to the Setup screen, a message will be displayed asking if you want to switch to Standby mode.



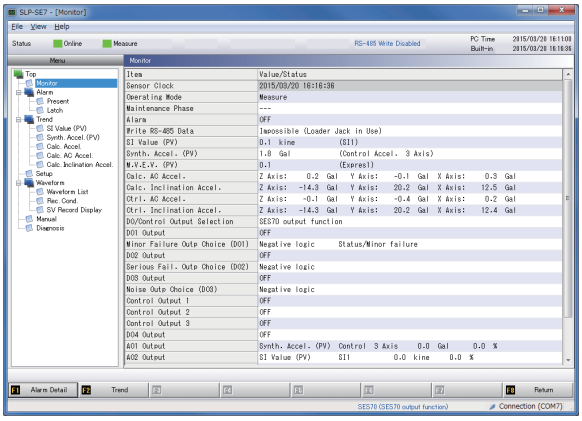
- To change settings, click [Yes] and switch to Standby mode.
- To confirm current settings, click [No] to change screens without switching to Standby mode.
- To cancel, click [Cancel]. The system will return to the Top screen.

After changing the settings, press [F7] Write Settings.

Basic Setup



Full Setup



Handling Precautions

- The displayed content (items) will vary between Basic Setup and Full Setup.

■ Setting item

The following settings can be changed on the SES70.

- **SI Values [SES70 only]**

  Select either SI Value 1 or SI Value 2.

  SI value 1: 7 fixed cycles, 8-direction projection

  SI value 2: 24 fixed cycles, 16-direction projection

  SI Values - Default value: SI Value 1

- **Synthetic acceleration types**

  For the synthetic AC acceleration PV Value, select between calculation synthetic AC acceleration and control synthetic AC acceleration.

  Synthetic acceleration types - Default value: Control synthetic AC acceleration

- **Select the number of synthetic acceleration axis lines**

  For the synthetic axis of both calculation synthetic AC acceleration and control synthetic AC acceleration, select flat 2-axis (X/Y) or 3-axis.

  Calculation - Default value: 2-axis; Control - Default value: 3-axis

- **Select M.V.E.V. formula (Full Setup only)**

  For the M.V.E.V. formula (formula for the Japan Meteorological Agency seismic intensity scale value), select either the formula that calculates using both SI Value and acceleration or the formula that calculates using only SI Value.

  Formula 1: uses both SI Value and acceleration

  Formula 2: uses SI Value only

  M.V.E.V. default formula: formula 1

● J.V.D. settings

You can set three J.V.D. conditions. (J.V.D.1 Condition, J.V.D.2 Condition, J.V.D.3 Condition) [For SES60, only J.V.D.1 Condition is available]

For each J.V.D. Condition, you can select the SI value for turning the Control Output ON/OFF, the synthetic AC acceleration, the M.V.E.V. value, and the logic calculation for liquefaction judgment value.

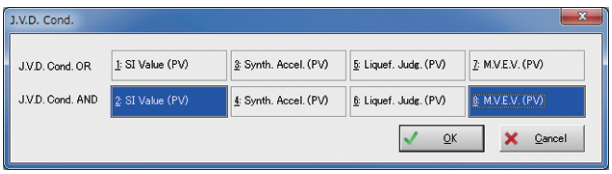
You can set the threshold values for the SI value used for control output, the synthetic AC acceleration, and the M.V.E.V.

Item name	Setting	Default value	Set increments
J.V.D.1 OR condition J.V.D.1 AND condition	The logical sum of the AND condition and OR condition are set as the J.V.D. condition. However, both AND/OR conditions cannot be set for the same field. AND condition: The AND condition of the setting field is set as the J.V.D. condition. OR condition: The OR condition of the setting field is set as the J.V.D. condition.	AND condition: None OR condition: None	—
J.V.D.1 SI Threshold	1 to 300 kine	300	1 kine
J.V.D.1 Synthetic acceleration threshold	5 to 4000 Gal	4000	1 Gal
J.V.D.1 M.V.E.V. threshold	1.0 to 7.9	7.9	0.1

*The same also applies for J.V.D.2 and J.V.D.3.

Click the line of the [J.V.D. Cond. OR] or [J.V.D. Cond. AND] to set the J.V.D. condition. The following window is displayed regardless of which one you click. Set the OR condition and the AND condition. The enabled settings are those with a highlighted button.

However, both AND/OR conditions cannot be set for the same field.



! Handling Precautions

- The default values for J.V.D. have changed compared to the SES60. Refer to the following table to see the points of difference. The default setting for the SES70 is to not conduct J.V.D. so make sure to configure this setting prior to use.

Default settings for J.V.D. condition (comparison with previous model)

Item	SES70	SES50/51/55/60 (Previous model)
J.V.D. OR condition J.V.D. AND condition	OR condition: None AND condition: None	OR condition: SI value AND condition: None
J.V.D. SI Threshold	300 kine	30 kine
J.V.D. Synthetic acceleration threshold	4000 Gal	300 Gal
J.V.D. M.V.E.V. threshold	7.9	5.3

- **Output hold time setting**

You can set the control output (relay), liquefaction output (DO4), AO1, and AO2 hold times. (Control output hold time and liquefaction hold time are available only in Full Setup mode)

Item name	Setting	Default value	Set increments
Control Output Hold Time	20 to 604800 s	20 s	1 s
DO4 Output Hold Time	20 to 604800 s	20 s	1 s
AO Output Hold Time	20 to 604800 s	20 s	1 s

- **Select AO span**

You can change the span allocation setting of 0 to 100 % (4 to 20 mA) for AO1 and AO2.

Item name	Setting	Default value	Set increments
SI AO span	Select from 50, 100, 150, and 200 kine/20 mA	200 kine	1 kine
Synth. accel. AO span	Select from 500, 1000, 2000, and 3000 Gal/20 mA	2000 Gal	10 Gal
M.V.E.V. AO span	Select either 5.0 or 8.0 (20 mA)	8.0	0.1

Instead of selecting, you can double-click the item and directly input a span value.

- **Select AO object**

You can select the output object data for AO1 and AO2.

Item name	Setting	Default value	Set increments
Select AO1 object	Select from Synth. Accel. (PV), SI (PV), or M.V.E.V. (PV)	Synth. Accel. (PV)	—
Select AO 2 object	Select from Synth. Accel. (PV), SI (PV), or M.V.E.V. (PV)	SI value (PV)	—

- **AO ratio setting (Full Setup only)**

You can select the output ratio for AO1 and AO2.

Item name	Setting	Default value	Set increments
AO1 ratio	0.900 to 1.100	1.000	0.001
AO2 ratio	0.900 to 1.100	1.000	0.001

- **AO bias setting (Full Setup only)**

You can select the bias setting for AO1 and AO2.

Item name	Setting	Default value	Set increments
AO1 bias setting	−5.0 to +5.0%	0.0%	0.1%
AO2 bias setting	−5.0 to +5.0%	0.0%	0.1%

- **PV low cut**

You can set a low cut setting for the SI PV, Synth. Accel. PV, and M.V.E.V. PV.

Item name	Setting	Default value	Set increments
SI PV low cut	0.0 to 30.0 kine	1.0 kine	0.1 kine
Synth. Accel. PV low cut	0.0 to 400.0 Gal	5.0 Gal	0.1 Gal
M.V.E.V. PV low cut	0.0 to 3.0	1.0	0.1

*On the SES60, the default value for all three fields is 0.

- **PV bias**

A calculated bias is reflected in the SI PV, Synth. Accel. PV, and M.V.E.V. PV.

Item name	Setting	Default value	Set increments
SI PV bias	−30.0 to +30.0 kine	0.0 kine	0.1 kine
Synth. Accel. PV bias	−400.0 to +400.0 Gal	0.0 Gal	0.1 Gal
M.V.E.V. PV bias	−3.0 to +3.0	0.0	0.1

- **N.P. Serious Fail Time**

You can set the serious fail time caused by continued noise protect.

Settings range: 5 to 10080 min

Default value: 30 min

Setting increment: 1 min

- **NP lower threshold (only when in Full Setup)**

The noise protect function operates based on multiple logics. One of these is a logic that treats the phenomenon of AC acceleration pulses in the positive or negative direction as noise. You can set the lower threshold for the AC acceleration at which this logic operates.

Single axis ratio NP lower threshold: 1 to 200 Gal

Default value: 50 Gal

Setting increment: 1 Gal

Another is a logic that treats AC acceleration occurring in both the positive and negative directions as noise when the acceleration is limited to a single axis (X, Y, or Z) and there is little movement on the other axes. You can select whether or not to run this logic. If run, then you also set the lower threshold for the AC acceleration.

Select other axis ratio NP detection: Use/prohibit

Default value: Use

Other axis ratio Z-axis NP lower threshold: 1 to 200 Gal

Default value: 100 Gal

Setting increment: 1 Gal

Other axis ratio X/Y-axis NP lower threshold: 1 to 200 Gal

Default value: 50 Gal

Setting increment: 1 Gal

- **Minor Failure Outp Choice (DO1)**

  You can set Liquef. Minor Failure Outp Choice (DO1) as Status/Minor Failure (Minor Failure Mode) or Minor Failure only. You also can set the output logic as positive or negative.

  Default value: Status/Minor Failure, Positive Logic

- **Serious Fail. Outp Choice (DO2) [SES70 only]**

  You also can set the output logic for Serious Fail. Outp Choice (DO2) as positive or negative.

  Default value: Positive Logic

- **Noise Outp Choice (DO3) [SES70 only]**

  You can set the output logic for Noise Outp Choice (DO3) as positive or negative.

  Default value: Positive Logic

- **Communication settings**

  You can set the device address, RS-485 communications data format (parity check), and RS-485 communications transfer speed. The data format is fixed at a data length of 8-bit and a stop bit of 1-bit. Only parity ("None" or "Even") can be selected.

Item name	Setting	Default value
Device address	0 to 126	1
RS-485 communication data format (parity)	Select parity as "None" or "Even"	Even
RS-485 communication transfer speed	Select from 9600 bps, 19200 bps, or 38400 bps	38400 bps

Note: With the SES60, both Loader Communication and RS-485 Communication are set. You also can select a transfer speed of 9600 or 19200 bps. (Default value: 19200 bps)

- **Liquefaction detection Enable/Disable (Full Setup only)**

  You can select to enable or disable liquefaction output.

  Default value: Enabled

- **Reset settings (Full Setup only) [SES70 only]**

  You can press [F1] Reset Settings to reset the device settings to the default settings.

  All settings other than communications settings are returned to their default values. All recorded waveforms and other data are deleted.

  Be careful as once executed, this operation cannot be undone.

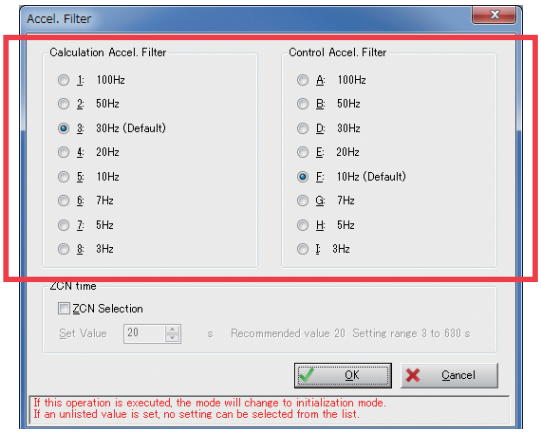
  Executing this function also sends the device into Initialize mode.

- **Acceleration filter (Full Setup only)**

You can press [F2] Accel. Filter to select the filter value for both Calc. Accel. and Control Accel. Select from 3, 5, 7, 10, 20, 30, 50, or 100 Hz.

Calc. default value: 30 Hz

Control default value: 10 Hz



Note: Changing this setting will affect earthquake sensor operations. Make sure you fully understand the impact of changing these settings before making any changes. Executing this function also sends the device into Initialize mode.

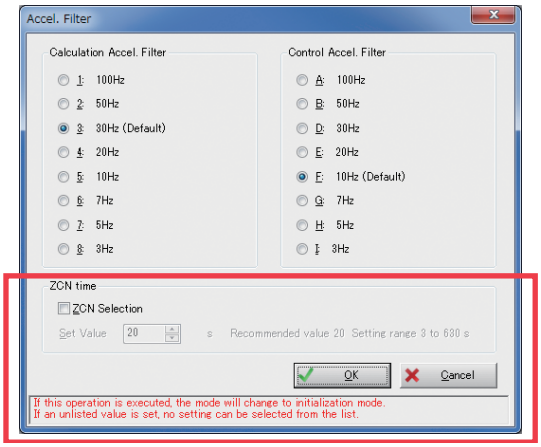
- **ZCN Selection (Full Setup only)**

You can press [F2] Accel. Filter to select Use/Prohibit for the ZCN detection. If you select "Use," you then can set the ZCN time.

Default value: 20 s

Setting increment: 1 s

Executing this function also sends the device into Initialize mode.



The recommended value for ZCN time changes in correlation to the Cal. Accel. Filter value.

Make sure to adjust the ZCN time to the recommended setting.

- **Output Selection (Full Setup only) [SES70 only]**

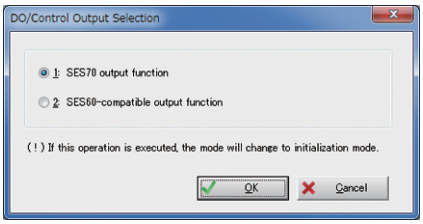
You can press [F3] Output Selection to select between SES70 Output and SES60 compatible output.

SES60 compatible output makes the following changes to the SES70 output to output a signal equivalent to the SES60.

Item	SES70 output	SES60 compatible output
J.V.D.	J.V.D. 1, 2, 3	J.V.D. 1 only
Control output	Control output 1, 2, 3	Control output 1 only
Minor Failure Outp.*	Status/Minor Failure	Status/Noise/Minor Failure
DO3 Output	ON	None
Maintenance sequence	Phase 1 to 3	Phase 1 only

* Status/Minor Failure for the Minor Failure Output function simply switches to the Status/Noise/Minor Failure function. The selected settings fields are not updated automatically. (For example, fields set to "Minor Failure Only" do not automatically switch to "Status/Minor Failure".) Make sure to change the settings fields as required.

Default value SES70 output



Executing this function also sends the device into Initialize mode.

Note: Simply changes the output function selection to "SES60 Compatible" but this does not provide the same exact operations as the SES60. Also change the following as necessary. (The following is a comparison with default values. Make the necessary changes if you have changed the default values.)

Item	SES70 output	SES60 compatible output
J.V.D. OR condition	OR condition: None	OR condition: SI value
J.V.D. AND condition	AND condition: None	AND condition: None
J.V.D. SI Threshold	300 kine	30 kine
J.V.D. Synth. Accel. Threshold	4000 Gal	300 Gal
J.V.D. M.V.E.V. threshold	7.9	5.3
Rec.Trigger	Threshold	Max. Wave (+Trigger Updating)
Max. Wave (+Trigger Updating) object	SI value	SI value
Max. Wave (– Trigger Updating) object	SI value	- (no function)
Threshold object	SI value	SI value
Threshold SI	1 kine	30 kine
Threshold - Synth. Accel.	5 Gal	300 Gal
Threshold - M.V.E.V	1.0	5.3
RS-485 communication speed	38400 bps	19200 bps
Minor Failure Outp Choice (DO1)	Positive logic value Status/ Minor Failure	Positive logic value Status/Minor Failure (Function operates as Status/Noise/Minor Failure)
Serious Fail. Outp Choice (DO2)	Positive logic	Positive logic
SI PV low cut	1.0 kine	0.0 kine
Synth. Accel. PV low cut	5.0 Gal	0.0 Gal
M.V.E.V. PV low cut	1.0	0.0

■ How to change settings

To change settings values, align the cursor (blue inverted character) with the content in the field you want to change in the Setup window and double-click.

There are three ways to input values as indicated below. the input method varies with each method.

(1) Select

(2) Numeric input

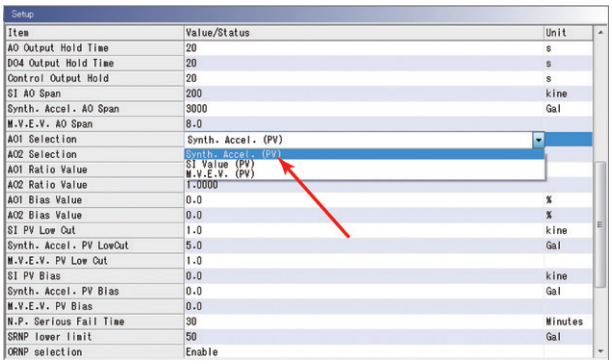
(3) Select + numeric input

After completing all input, press the [F7] Write Settings button. The changed values are written to the earthquake sensor memory. After writing settings to the memory, those values are read and monitored so you can confirm that the correct values have been written.

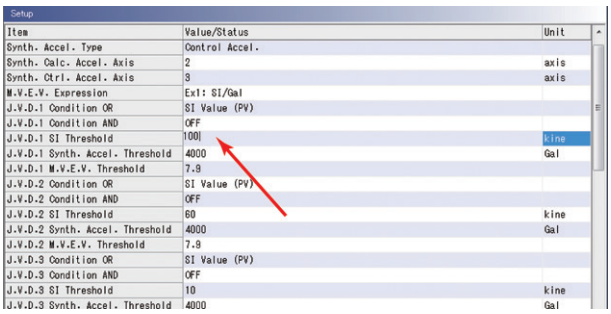
Make sure to write the settings to the memory. If you do not perform this memory write, the settings data will revert to the previous values once you reset the earthquake sensor or go to the Initialize screen.

● How to input settings

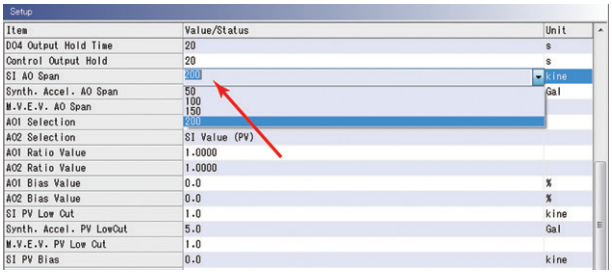
(1) Double-click on a selection method, select the field you want to set from the pull-down, and then press the [Enter] key.



(2) Numeric input method
Click on the desired field line, input the desired values in half-width characters, and then press the [Enter] key. For reference, you can align the cursor with the value field to display the applicable value range at the bottom left of the screen. The field column becomes red to indicate an error if a value exceeding the applicable range is input. Make sure to input an appropriate value.



(3) Select + numeric input
Select the field you want to set from the pull-down, and then press the [Enter] key or input the numeric value and then press the [Enter] key. The precautions related to numeric value input are the same as the precautions for (2) Numeric Input.

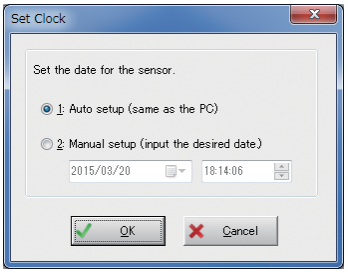


Handling Precautions

- When inputting a value for the earthquake sensor, after inputting the value confirm that the appropriate value has been input.
- Inputting the incorrect value can result in performance that varies from customer expectations.

- **Aligning the internal sensor clock**

(1) Press [F6] Set Clock to set the internal sensor clock.
>> The settings screen is displayed.

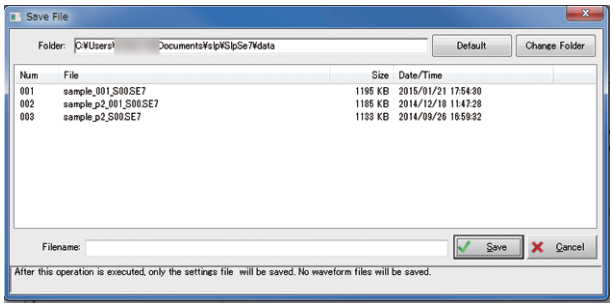


(2) Set one of the following.
>> 1: Auto: Aligned with PC internal clock
2: Manual: The following date and time settings area is displayed and allows you to manually input the settings.

(3) After inputting settings, click [OK]. To cancel, click [Cancel]. The system returns to the Setup window.

- **To save settings**

(1) Press [F4] Save File.
>> A file name input dialog box is displayed.



(2) Input the file name and click [Save] or press the [Enter] key.
>> The file is saved.

Note

- Other than the character string specified by the user, the settings file name is determined automatically.

  XXXXXX_VVV_SNN.SE7

  XXXXXX: Filename specified by the user

  VVV: Version No. (xxxxxx)

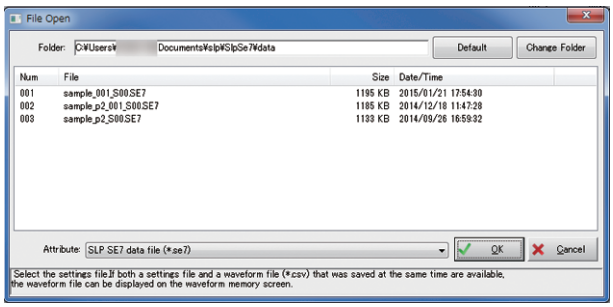
  S: Meaning of settings file

  NN: 00 (fixed)

- If a file with the same name exists, the file is not overwritten. Instead, it is saved as a new file with a sequential version number.
- The Save File function at the Setup screen only saves the settings file and does not save the waveform file.
- To save the waveform file, conduct the file save process at the Record Waveform screen.

- **To open saved data**

(1) Press [F5] File Open.
>> The Select File screen is displayed.



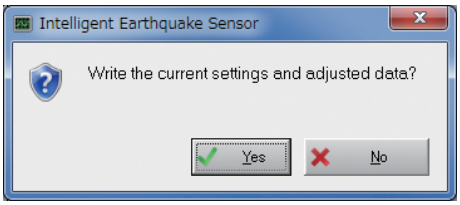
(2) Select a file and click [OK].
>> A new window (offline mode) is launched.

Note

- There are multiple settings for the file type (*.SE6 and *.SE7).
- *.SE6: Settings file saved using the previous version of the Loader (SLP-SE6).
- *.SE7: Settings file saved using this Loader.
- Either file type can be opened. However, only files saved as SES60 can be opened as *.SE6. (Not compatible with files saved as SES50/51/55.)
- *.SE6 and *.SE7 settings files are a proprietary format that can only be viewed by the customer via the Loader.

- **To read settings data**

(1) After inputting all settings, press [F7] Write Settings.
>> A confirmation screen is displayed.



(2) Click [Yes].
>> The settings are written and settings configuration is complete.

Handling Precautions

- Make sure to write the settings to the memory. If you do not press [F7] Write Settings, all the settings data except the clock data will revert to the previous values once you reset the earthquake sensor or go to the Initialize screen.

- **Setting the earthquake sensor to Measurement mode**

Press [F8] Return to return to the Top screen and then press [F7] Mode Change to switch to Initialize mode. After switching to Initialize mode, the system will transition to Measurement mode automatically.

Handling Precautions

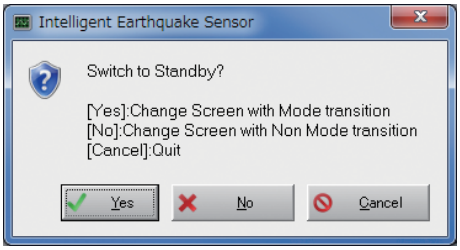
- Please note that the SES60 may produce unstable analog output in Initialize mode.

4 - 3 Record Waveform [F3]

In the main menu, press [F3] Record Waveform to switch to the List of Waveforms screen and display a list of recorded waveforms.

Or, you also can select [Top]>[Waveform]>[Waveform List] in the displayed menu tree.

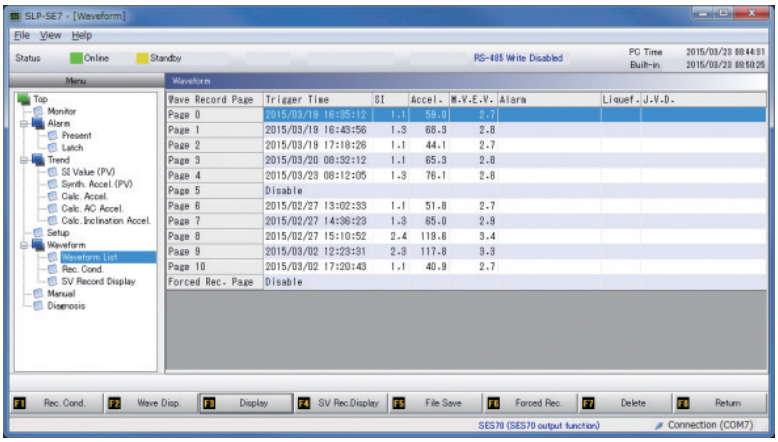
When the earthquake sensor is in Measurement mode and you switch to the List of Waveforms screen, a message will be displayed asking if you want to switch to Standby mode.



- To change waveform recording conditions, click [Yes] and switch to Standby mode.
- To confirm current waveform recording conditions, click [No] to change the screen without switching to Standby mode.
- To cancel, click [Cancel]. The system will return to the Top screen.

When the earthquake sensor is in Measurement mode, normally calculation accelerations for three axes are stored in 12 buffers (auto waveform records 0 to 10, forced waveform record).

A single buffer can store a 10 ms sampling for a total of 360 s (36000 data). There also is a buffer for forced waveform records and while in Standby mode you can confirm whether or not the waveform is being recorded properly. In Standby mode, press [F6] Forced Rec. to force start waveform recording.

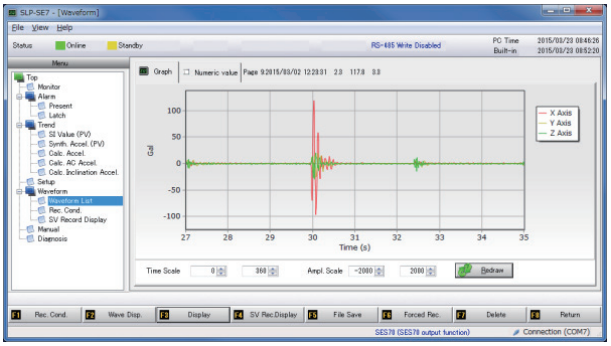


■ Displaying waveform data as a graph

In the List of Waveforms screen, press [F2] Wave Disp. to open a waveform display selection screen. Select the number of the waveform you want to display from the pull-down and click [OK].

You also can go to the waveform graph display window by double-clicking on the row of the waveform you want to display in the List of Waveforms screen.

At first, the entire waveform is displayed.



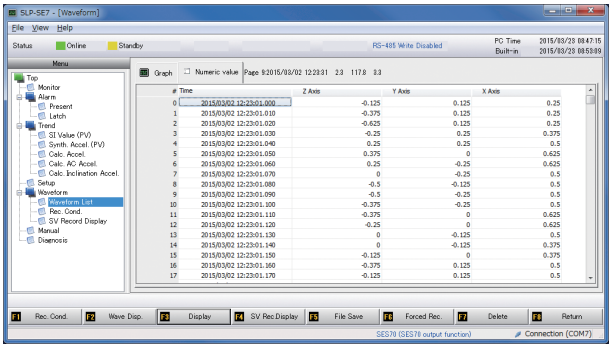
Note

- Displaying simple trends (P. 4-4) for details on changing the waveform display width.

■ Displaying waveform data as numerical acceleration data

Click on [Numeric value] tab inside the graph display to display the waveform data as numeric figures.

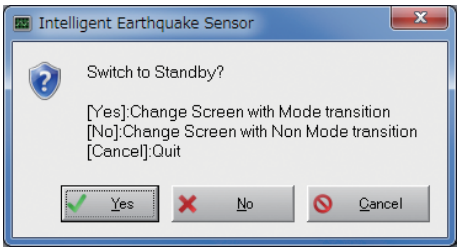
Click the [Graph] tab to return to the wave form graph display window.



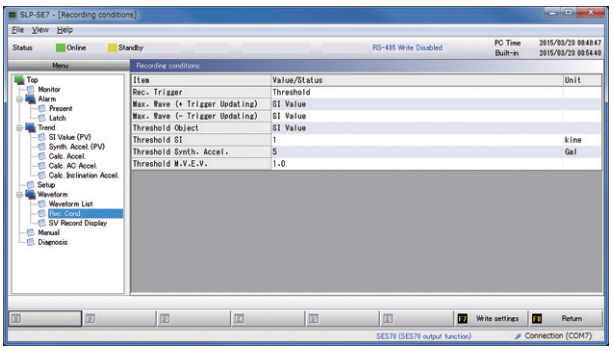
■ Confirming or changing recording conditions

In the List of Waveforms screen, press [F1] Rec. Cond. to switch to a screen displaying the settings fields for recording conditions.

When the earthquake sensor is in Measurement mode, a message will be displayed asking if you want to switch to Standby mode.



- To change waveform recording conditions, click [Yes] and switch to Standby mode.
- To confirm current waveform recording conditions, click [No] to change screens without switching to Standby mode .
- To cancel, click [Cancel]. The system will return to the Top screen.



You can set the following fields at the Waveform Recording Conditions screen.

Refer to the Earthquake Sensor SES70 user manual (for design) for details on the characteristics of each method.

(1) Rec.Trigger:

You can select one of the following Rec.Trigger.

- Max. Wave (+Trigger Updating)
- Max. Wave (–Trigger Updating)
- Threshold

(2) Max. Wave (+Trigger Updating):

When you select Max. Wave (+Trigger Updating) as the Rec.Trigger in (1), select the maximum value object from among the following.

- SI value
- Synth. Accel.
- M.V.E.V

(3) Max. Wave (–Trigger Updating):

When you select Max. Wave (–Trigger Updating) as the Rec.Trigger in (1), select the maximum value object from among the following.

- SI value
- Synth. Accel.
- M.V.E.V

(4) Threshold

When you select Threshold value format as the Rec.Trigger in (1), select the maximum value object from among the following.

- SI value
- Synth. Accel.
- M.V.E.V

(5) Threshold value

When you select Threshold value format as the Rec.Trigger in (1), set the threshold value for each threshold value object.

Settings fields and default values

Item name	Setting	Default value	Set increments
Rec.Trigger	Select from Max. Wave (+Trigger Updating) Max. Wave (–Trigger Updating) Threshold format	Threshold format	—
Max. Wave (+Trigger Updating) object	Select from SI, Synth. Accel., or M.V.E.V.	SI value	—
Max. Wave (–Trigger Updating) object	Select from SI, Synth. Accel., or M.V.E.V.	SI value	—
Threshold object	Select from SI, Synth. Accel., or M.V.E.V.	SI value	—
Threshold SI	1 to 300 kine	1 kine	1 kine
Threshold - Synth. Accel.	5 to 4000 Gal	5 Gal	1 Gal
Threshold - M.V.E.V	1.0 to 7.9	1.0	0.1

Handling Precautions

- The default values for SES70 waveform recording conditions have changed compared to the SES60. The changed content is as follows.

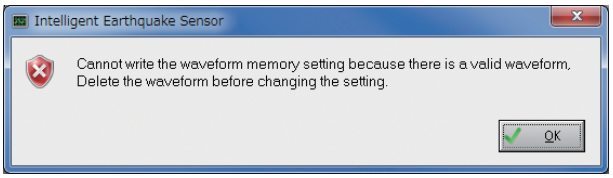
  Default settings for waveform recording conditions (comparison with previous model)

Item	SES70	SES50/51/55/60 (Previous model)
Rec.Trigger	Threshold	Max. Wave (+Trigger Updating)
Max. Wave (+Trigger Updating) object	SI value	SI value
Max. Wave (–Trigger Updating) object	SI value	- (no function)
Threshold object	SI value	SI value
Threshold SI	1 kine	30 kine
Threshold - Synth. Accel.	5 Gal	300 Gal
Threshold - M.V.E.V	1.0	5.3

  Note: The purpose of changing the default value in the SES70 to the Threshold value was to record the most recent earthquakes and vibrations as well as to confirm stability for the setup location. Change this field to Max. Wave if you want to record the largest past vibrations.

- Changing the recording conditions will require the deletion of all recording conditions. If an active waveform exists, the following screen will be displayed when you press [F7] Write Settings.
- Delete the waveform prior to changing the waveform recording conditions.

- Also, make sure to save any required waveforms prior to deleting them.



- **How to change waveform recording conditions**

To change waveform recording conditions, align the cursor (blue inverted character) with the content in the field you want to change in the waveform recording conditions window and double-click.

There are two ways to input values as indicated below. The input method varies with each method.

(1) Select

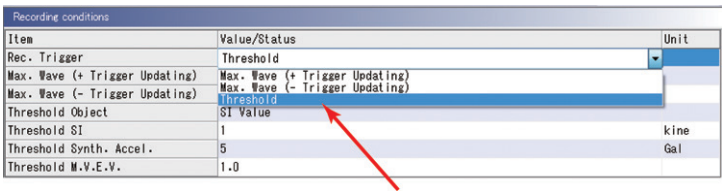
(2) Numeric input

After inputting all waveform recording conditions, press the [F7] Write Settings button. The changed values are written to the earthquake sensor memory. After writing settings to the memory, those values are read and monitored so you can confirm that the correct values have been written.

Make sure to write the settings to the memory. If you do not perform this memory write, the waveform recording conditions will revert to the previous values once you reset the earthquake sensor or go to the Initialize screen.

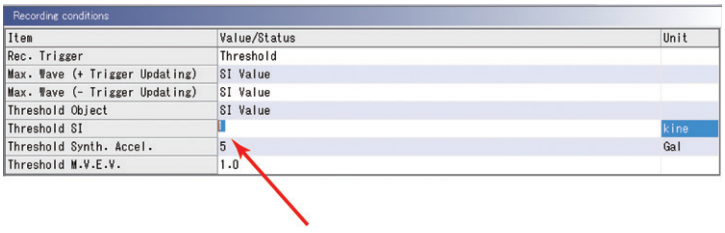
- **How to input settings**

(1) Double-click on a selection method, select the field you want to set from the pull-down, and then press the [Enter] key.



(2) Numeric input method

Click on the desired field line, input the desired values in half-width characters, and then press the [Enter] key. For reference, you can align the cursor with the value field to display the applicable value range at the bottom left of the screen. The field column becomes red to indicate an error if a value exceeding the applicable range is input. Make sure to input an appropriate value.



■ Making graphs easier to view

You can change the number of axis lines displayed if the graph displays of the X, Y, Z axes overlap making the display difficult to view.

While displaying a graph, press [F3] Displayor right-click on the graph to display a list of display change options.

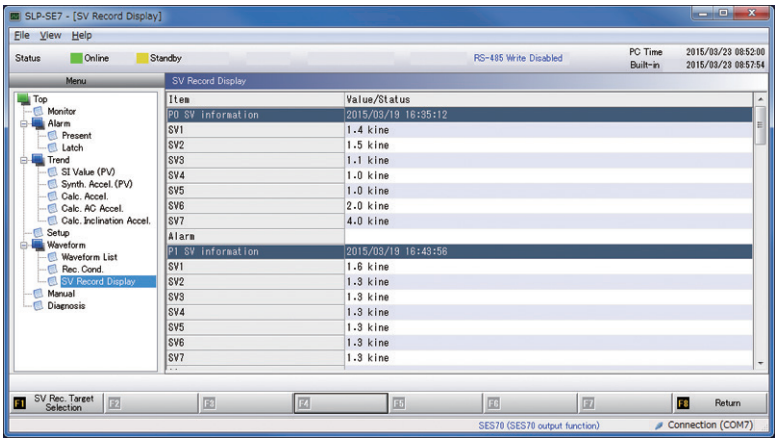
The operation method is the same as for Simple Trends so see ☞ Displaying simple trends (P. 4-4) for details.

■ About SV Record Display (Full Setup only) [SES70 only]

During waveform recording, you can display the SV value (speed response value for each fixed cycle) calculated during the SI value calculation process.

Press [F4] SV Record Display. The following screen is displayed.

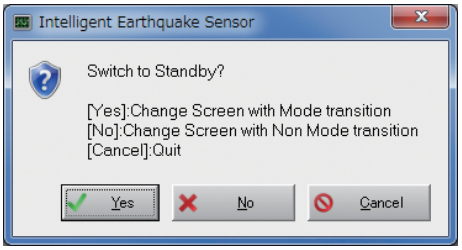
The SV value (SV1 to SV7) is displayed for the seven fixed cycles of each recorded wave. The error flags for each waveform recording are also displayed.



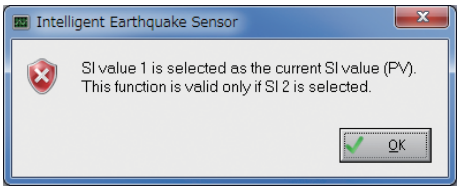
If SI Value 2 (24 fixed cycles, 16-direction projection) is selected for the SI calculation, you can select which 7 fixed cycles are displayed from among the 24 fixed cycles.

At the SV Record Display screen, press [F1] Select SV Record Object.

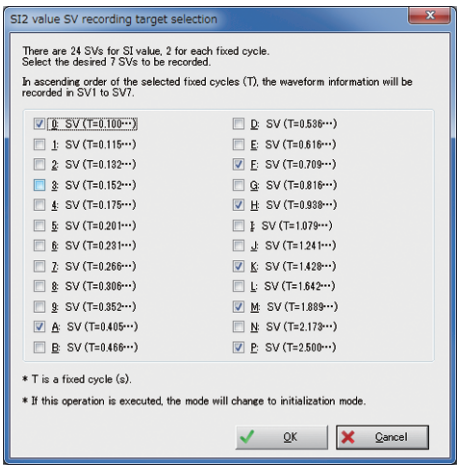
If in Measurement mode when switching to the Select SV Record Object screen, the following screen is displayed and you must return to Standby mode.



Here, the following screen is displayed if SI Value 1 is selected for the SI calculation and you cannot change the SV record object.



If in Standby mode and SI Value 2 is selected for the SI calculation, pressing [F1] Select SV Record Object button will display the following screen and you can select the fixed cycles for the SV record object.



At this screen, select the 7 fixed cycles that you want to record from among the 24 fixed cycles for SI Value 2.

The wave form information is recorded for the selected fixed cycles in order of smallest first (SV1, SV2, SV3... SV7).

■ Saving waveform data to PC

You can save all enabled waveforms displayed in the List of Waveforms to the PC. (You cannot select and save desired waveforms.)

When you save waveform data, the settings change file is also saved. (Be careful as the waveform data is not saved if you save the settings change file from the Setup screen.)

● Information saved when the waveform record is saved

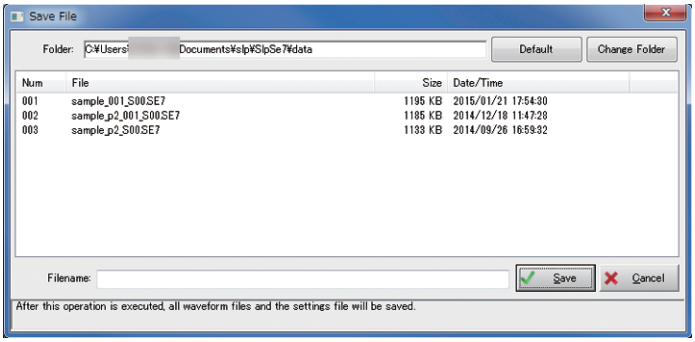
(1) Waveform data: Maximum 11 waves (10 auto-record waveforms + 1 forced record waveform)

(2) Earthquake sensor settings file

How to save

(1) Press [F5] Save File.

>> A file name input dialog box is displayed.



(2) Input the file name and click [Save] or press the [Enter] key.

>> The file is saved. The save file function is available only on online mode when the earthquake sensor is connected to this Loader.

The time required for file save will vary depending on the number of waveforms and communications speed. The approximate times are as follows.

- Loader communication (communications speed 115200 bps, all 11 waves): Approx. 6 min
- RS-485 communication (communications speed 38400 bps, all 11 waves): Approx. 14 min

Note

- When you save waveform file data, the settings file data is saved automatically.

■ About the file name of the saved file

● File save location

The default (standard folder) is as follows. To change the save location, click "Change Folder" to set the save location. Click [Standard Folder] button to reselect the standard folder after changing the folder.

● Default (standard folder)

C:\Users\username\Documents\slp\SlpSe7\data

- **Filename**

The file name is as shown below. Other than the character string specified by the user, the file name is determined automatically.

● Filename: name_VVV_*00.***

Name: filename specified by the user
VVV: Version number (for each name)
*00: Data type
W00 to 11 > Waveform data (number is the same as the page number)
S00> settings file
***: Extension
CSV > waveform data
SE7 > Loader-only file

Note: If a file with the same name exists, the file is not overwritten. Instead, it is saved as a new file with a sequential version number.

- **File format**

(1) Waveform data: Saved as CSV file. The waveform header information and the acceleration for the X, Y, and Z axes are saved. This information can be viewed using Excel, etc.

(2) Settings file: File is saved with the ".SE7" extension ("***.SE7"). You can use the Loader (offline) to view the data. This content is not published.

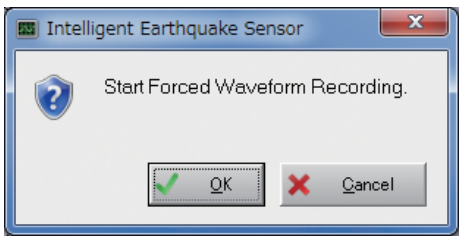
■ Manually recording waveform data

This function enables the manual recording of waveform data. Use when you want to confirm the status of acceleration measurement.

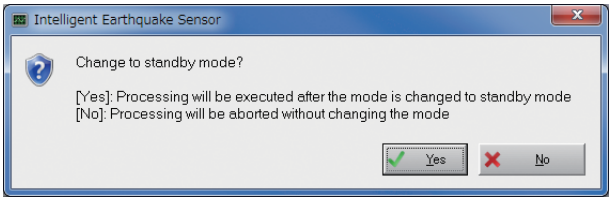
Press [F6] Force Record to begin the manual recording (forced record) of the waveform. This waveform is recorded for a period of 360 s after the start record command is issued to the force record buffer.

(1) Press [F6] Force Record

>> When the earthquake sensor is in Standby mode, a confirmation screen is displayed.



The following screen is displayed if the earthquake sensor is in Measurement mode. Click [Yes] to switch to Standby mode. Then the above confirmation screen is displayed.



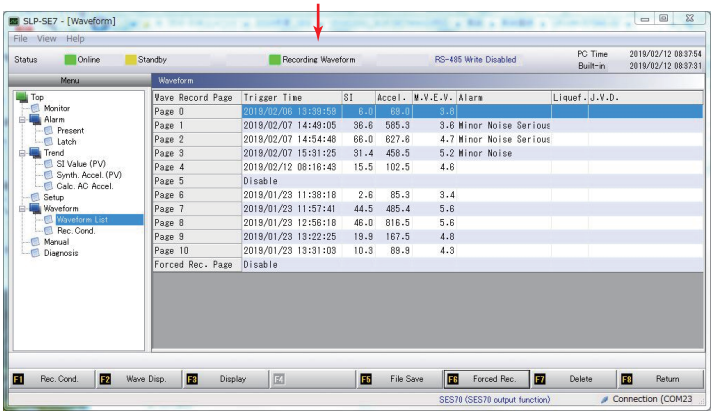
(2) Click [OK].

>> The forced recording of the waveform is started.

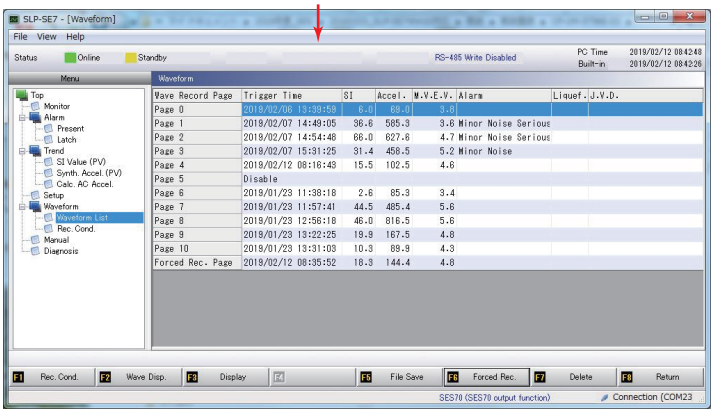
Note

- You can confirm the status of the waveform during and after recording in display area F*.

During recording waveform



After recording waveform

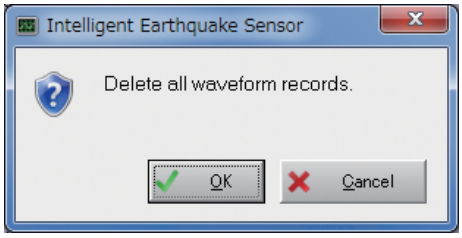


Note: 3-1 Basic Operations (P. 3-2) for information on the display area.

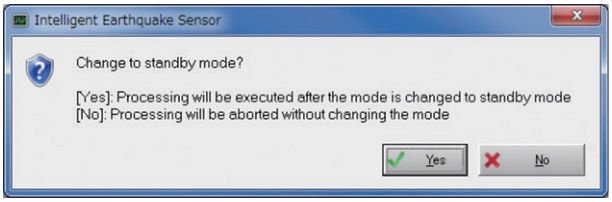
■ Deleting waveform data

(1) Press [F7] Delete Waveform to delete all waveforms.

>> When the earthquake sensor is in Standby mode, a confirmation screen is displayed.



The following screen is displayed if the earthquake sensor is in Measurement mode. Click [Yes] to switch to Standby mode. Then the above confirmation screen is displayed.



(2) Click [OK].

>> All waveform data is deleted.

■ About waveform data content

Waveform data saved via this Loader is saved as a CSV file.

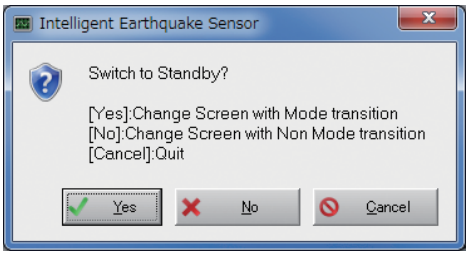
The file contains waveform header information and the acceleration for the X, Y, and Z axes. You can use Microsoft Excel or other spreadsheet application to view the file.

4 - 4 Manual output [F5]

You can select [F5] Manual Output in the main menu to force the output of selected values for the earthquake sensor's output ports (AO, DO, Control).

With the earthquake sensor in Standby mode, press [F5] Manual Output in the main menu or select Manual Output in the displayed menu tree to display the Manual Output/Setup screen.

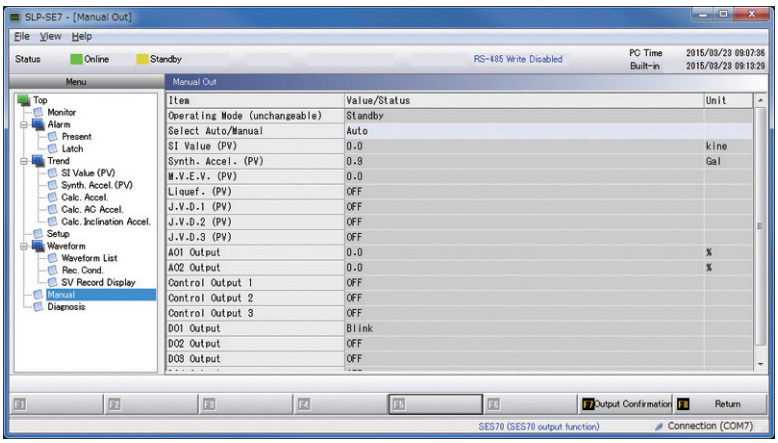
When the earthquake sensor is in Measurement mode, a message will be displayed asking if you want to switch to Standby mode.



- To conduct manual output, click [Yes] and switch to Standby mode.
- To view the Manual Output screen, click [No] to change screens without switching to Standby mode.
- To cancel, click [Cancel]. The system will return to the Top screen.

- **Manual output screen**

You can use this function to conduct an external device test.



Double-click on “Manual Output Selection” in the Manual Output screen. “Auto,” “PV Manual Output,” “AO/DO Manual Output” are displayed in the pull-down menu. Select the item you want to change and press [ENTER].

After completing all input, press the [F7] Output Confirmation button. The changed values are written to the earthquake sensor memory. After writing settings to the memory, those values are read and monitored so you can confirm that the correct values have been written.

Select “Auto” to disable manual output.

- **How to conduct manual output**

The two following ways allow you to conduct manual output

- **PV Manual Output:**

The following PV are output manually.

- SI (PV)
- M.V.E.V. (PV)
- Synth. Accel. (PV)
- Liquef. (PV)

The PV are output manually, so the corresponding AO and DO output is also conducted. (For example, the control output is set to ON/OFF based on the J.V.D. threshold.)

PV Manual Output

Item name	Setting	Default value	Set increments
SI (PV)	0 to 300 kine	*	1 kine
Synth. Accel. (PV)	0 to 4000 Gal	*	1 Gal
M.V.E.V (PV)	0 to 7.9	*	0.1
Liquef. (PV)	Enable/Disable	*	—

* The default value is the output value based on the setting for "PV Manual Output" set under Manual Output Selection.

- **AO/DO Manual Output:**

The following AO/DO/Control Output are output manually.

- AO1 manual output
- AO2 manual output
- Control output 1, 2, 3
- DO1 Output
- DO2 Output
- DO3 Output
- DO4 Output

AO Manual output

Item name	Setting	Default value	Set increments
AO1 Manual output	–10.0 to 110.0%	*	0.1%
AO2 Manual output	–10.0 to 110.0%	*	0.1%

* The default value is the output value based on the setting for "AO/DO Manual Output" set under Manual Output Selection.

Control Output

Item name	Setting	Default value	Set increments
Control Output 1	ON/OFF	*	—
Control Output 2	ON/OFF	*	—
Control Output 3	ON/OFF	*	—

* The default value is the output value based on the setting for "AO/DO Manual Output" set under Manual Output Selection.

DO Output

Item name	Setting	Default value	Set increments
DO1 Output	ON/OFF/Flash	*1	—
DO2 Output	ON/OFF	*1	—
DO3 Output	ON/OFF	*1	—
DO4 Output	ON/OFF/Flash *2	*1	—

*1. The default value is the output value based on the setting for "AO/DO Manual Output" set under Manual Output Selection.

*2. The terminal status is Slow ON/OFF

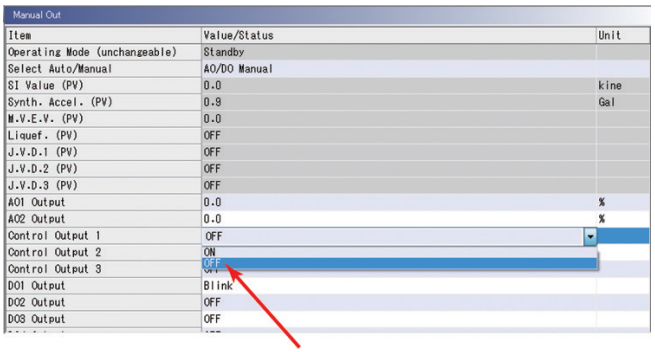
- Set the internal judgment for DO output. As such, if negative logic is selected for DO1 Output, DO2 Output, or DO3 Output, the set values may differ from the status of the actual DO terminal. The following indicates the correlation between the set values and the actual terminal status.

Item	Manual output Setting	SES70 terminal status	
		Positive logic	Negative logic
Minor failure (DO1)	OFF	OFF	ON
	ON	ON	OFF
	Blinking	Slow ON/OFF	Slow ON/OFF
Serious failure (DO2)	OFF	OFF	ON
	ON	ON	OFF
Noise protect (DO3)	OFF	OFF	ON
	ON	ON	OFF

● How to input settings

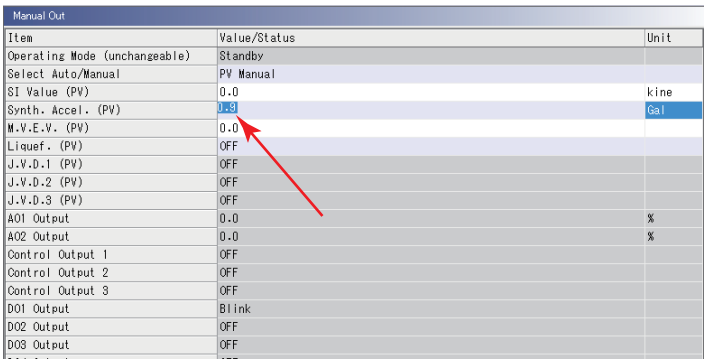
● a selection method

Double-click on a selection method, select the field you want to set from the pull-down, and then press the [Enter] key.



● Numeric input method

Click on the desired field line, input the desired values in half-width characters, and then press the [Enter] key. For reference, you can align the cursor with the value field to display the applicable value range at the bottom left of the screen. The field column becomes red to indicate an error if a value exceeding the applicable range is input. Make sure to input an appropriate value.

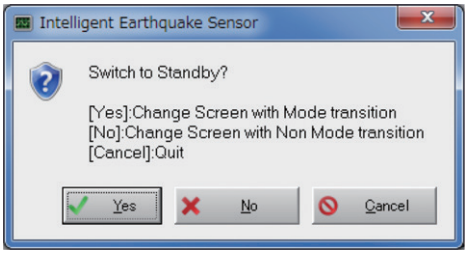


4 - 5 Diagnosis Function [F6]

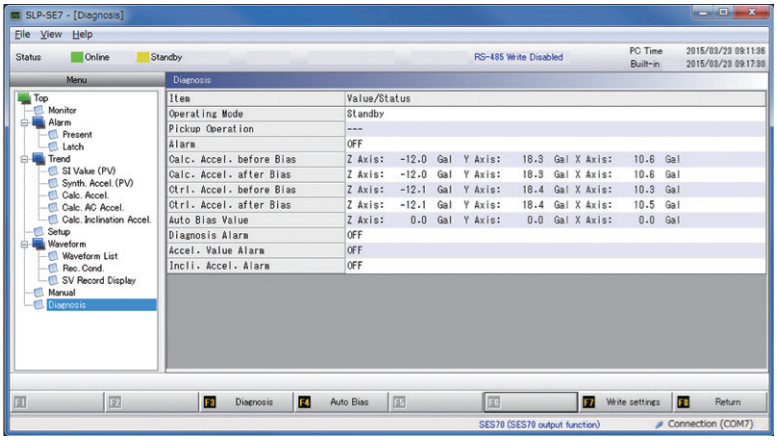
This function allows you to run a self-diagnosis for the accelerator pickup and perform a zero-adjust on the accelerator.

With the earthquake sensor in Standby mode, press [F6] Diagnosis in the main menu or select [Diagnosis] > [Diagnosis] in the displayed menu tree to display the Diagnosis screen.

When the earthquake sensor is in Measurement mode, a message will be displayed asking if you want to switch to Standby mode.



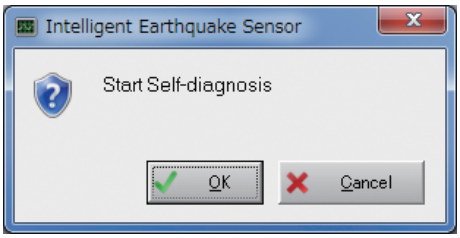
- To run the diagnosis, click [Yes] and switch to Standby mode.
- To view Diagnosis screen details, click [No] to change the screen without switching to Standby mode.
- To cancel, click [Cancel]. The system will return to the Top screen.



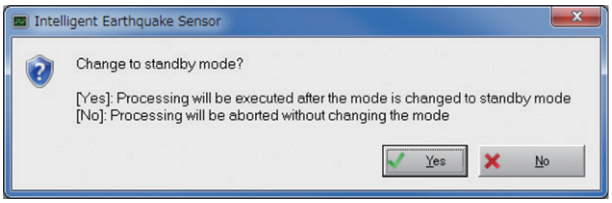
■ Pickup diagnosis

(1) Press [F3] Diagnosis to run the earthquake sensor pickup diagnosis.

>> A confirmation screen is displayed.



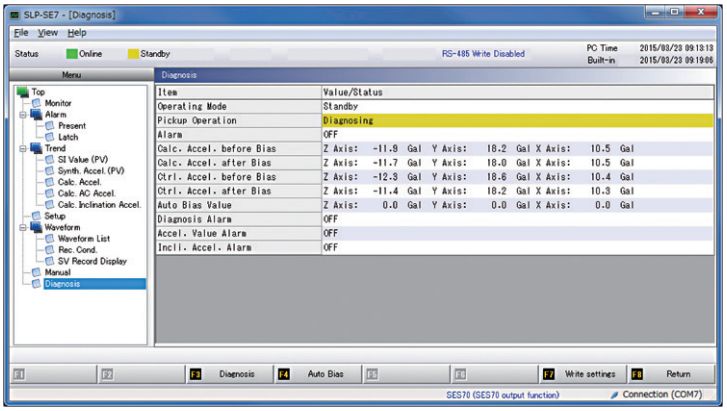
The following screen is displayed if the earthquake sensor is in Measurement mode. Click [Yes].



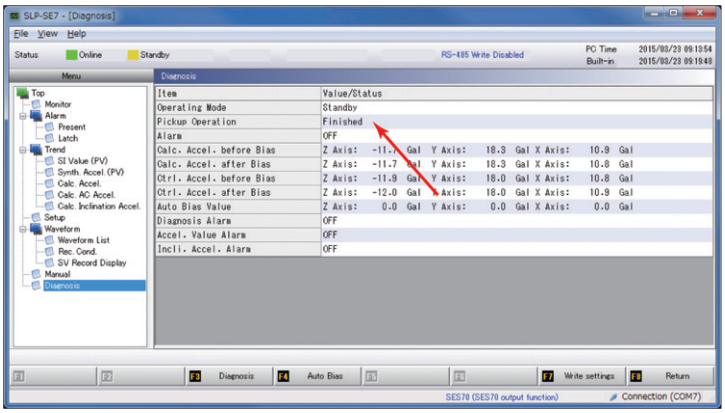
(2) Click [OK].

>> During diagnosis, the pickup operating status switches to “Diagnosing.” Once finished, “Finished” is displayed and the diagnosis results are shown on the screen.

Running Diagnosis screen

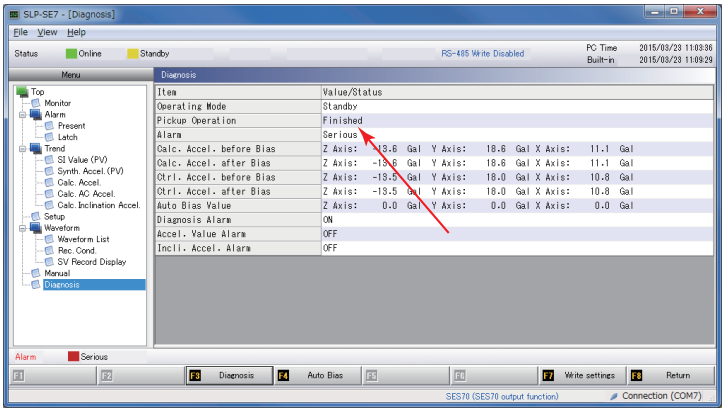


Diagnosis Complete screen (for normal complete)



Diagnosis Complete screen (when an error is discovered)

If an error is discovered, “ON” is displayed under “Diagnosis Alarm.”



Handling Precautions

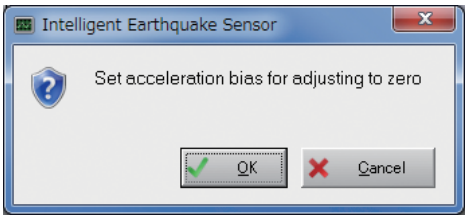
- After starting the diagnosis, error flag noise is produced and “Noise Protect” is displayed in display area K* at the bottom of the screen. This is not an error. This operation is forcefully mimicking acceleration pickup during the diagnosis. This will stop approximately 100 s after the start of the diagnosis.

*☞ 3-1 Basic Operations (P3-2) for information on the display area.

■ Zero-Adjust (Full Setup)

(1) Press [F4] Auto Bias to automatically correct the acceleration to zero.

>> A confirmation screen is displayed.



(2) Click [OK].

After adjustment, the acceleration (adjusted) field value is close to 0 to indicate that the value has been adjusted.

(3) Press [F7] Write Settings to write the adjusted value to the earthquake sensor. The changed values are written to the earthquake sensor memory. After writing settings to the memory, those values are read and monitored so you can confirm that the correct values have been written.

Make sure to write the settings to the memory. If you do not perform this memory write, the zero-adjust value will revert to the previous values once you reset the earthquake sensor or go to the Initialize screen.

[!] Handling Precautions

- In some cases, "Noise Protect" is displayed at the bottom of the screen in display area G during the adjustment. This is not an error. This operation is forcefully adjusting the acceleration to zero. The Noise Protect status will disappear approximately 100 s after the start of the adjustment. However, as the AC acceleration is not changed via the zero-adjust, this has no impact on the Synth. AC Accel., SI, M.V.E.V., or Liquef. Judg. values used as controls. As such, normally this is not used. Zero-adjust cannot be conducted once the acceleration adjustment value calculation reaches ±150 Gal.

4 - 6 Mode Change [F7]

Press [F7] Mode Change in the main menu or select Mode Change in the displayed menu tree to display the Mode Change screen.

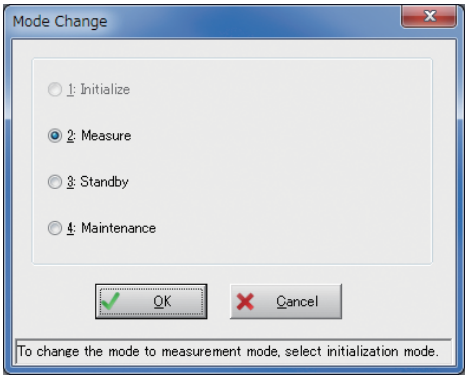
Here, you change the earthquake sensor mode.

1: Initialize mode

2: Measurement mode

3: Standby mode

4: Maintenance mode



Check the radio button of the desired mode and then click [OK].

>> The mode is changed and the dialog box will close.

Select Initialized mode when you want to change to Measurement mode.

Note: If a serious failure has occurred, the system will go to Standby mode automatically and will not go into Measurement mode.

Handling Precautions

- Please note that the SES60 may produce unstable analog output in Initialize mode.

● Maintenance mode

Maintenance mode runs the earthquake sensor relay output and AO/DO output in a predetermined sequence to confirm the stability of the earthquake sensor and system.

The Maintenance mode sequence runs sequentially in phases 1 through 3. Screen operation is required to proceed to the next phase.

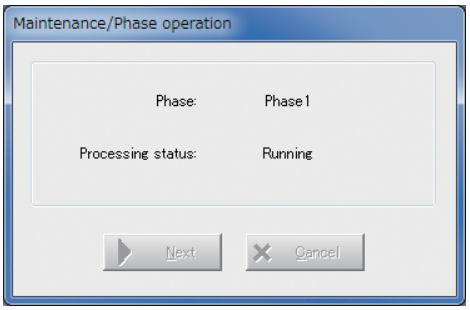
● Switching to Maintenance mode

With the earthquake sensor in Measurement mode, press [F7] Mode Change in the menu screen. Select Maintenance from the Mode Change screen and click [OK]. A screen confirming you want to switch to Maintenance mode is displayed. Click [Yes].

This initiates Maintenance mode phase 1.

- **Maintenance mode: Phase 1**

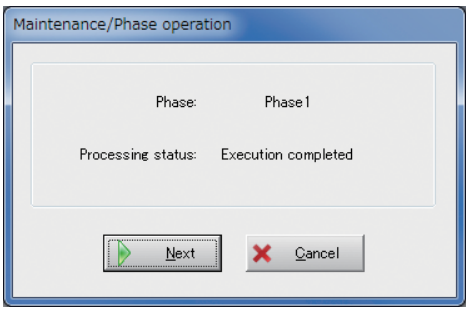
Running: You cannot operate the Loader while running Maintenance mode phase 1.



Execution completed: After phase 1 ends, you can select whether to run phase 2 or to exit Maintenance mode.

Click [Next] to run phase 2.

Click [Cancel] to exit Maintenance mode. Exiting will send the earthquake sensor into Initialize mode.



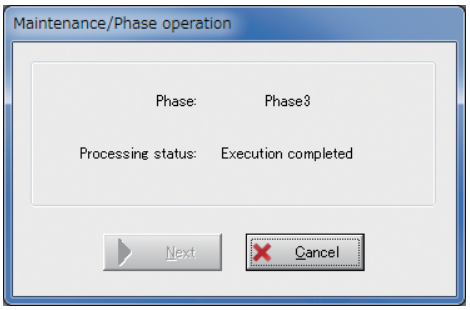
- **Maintenance mode: Phase 2**

Similar to phase 1, after phase 2 ends, you can select whether to continue onto phase 3 or to exit Maintenance mode.

Select whether you want to continue onto phase 3 or to exit.

- **Maintenance mode: Phase 3**

Once phase 3 is ends, the only selection option is the [Cancel] button. Click [Cancel] to exist Maintenance mode. Exiting will send the earthquake sensor into Initialize mode.



Chapter 5. TROUBLESHOOTING

■ List of Error Messages

In the event of a key operation error, an error message is displayed in a message box or in display area K*. The methods for responding to these messages are shown below.

*☞ 3-1 Basic Operations (P. 3-2) for information on the display area.

Message	Countermeasure
No name specified for the save file.	Input a filename.
Waveform updated during read. Process canceled.	The record waveform process was executed during the read waveform process and the specified waveform was updated. Confirm the waveform information from the List of Waveforms.
Waveform disabled during read. Process canceled.	The record waveform process was executed during the read waveform process and the specified waveform was disabled. Confirm the waveform information from the List of Waveforms.
Mode is not Measurement mode. Waveform auto-record not allowed. Exit?	The earthquake sensor is attempting to exit the Loader while in a mode other than Measurement mode. Normally, switch to Measurement mode, the mode in which waveform auto-record is executed, and then exit.
Serious failure Noise protect Minor failure	Typical errors produced by the earthquake sensor. Confirm error details and refer to the user manual for troubleshooting.
File cannot be opened. Invalid changes were made or the file is damaged.	There is a possibility the settings file is damaged or the file is not correct. Reread the file or specify the correct file.
USB loader cable not inserted.	Connect the USB loader cable to the PC.
Connection with earthquake sensor failed. The following are possible causes. • Error in communication transmission settings • Earthquake sensor not connected Startup offline	Communications not possible. Confirm that the communications line (cable or terminal) is connected to the earthquake sensor. Also confirm communications settings.
Error in settings (row number) Change the settings and redo the write settings operation.	Error in set field. Confirm settings details.
Communications error occurred during connection with the earthquake sensor. Exiting program.	Restart the program and confirm communications. Contact us if this error occurs again.
Acceleration adjustment value is ±150 Gal or higher. Zero-adjust not allowed. Confirm settings details.	The earthquake sensor is tiled too far and zero-adjust is not possible. Redo device setup.
Cannot write during Loader communication. Remove the USB loader cable from the SES and retry.	USB loader cable inserted during RS-485 communication with earthquake sensor. Remove the USB loader cable from the SES and retry.
Cannot open help file. Confirm that Acrobat Reader is installed or that the help file exists.	Confirm that Acrobat Reader is installed. Confirm that the help file exists.
Files required for Loader operation not found. Reinstall the Loader.	Reinstall the Loader.
USB loader cable COM port number not selected.	Select a USB loader cable COM port number from the Communications Settings screen.

Message	Countermeasure
RS-485 communication COM port number not selected.	Select a RS-485 communication COM port number from the Communications Settings screen.
Active waveform exists. Cannot write the waveform recording settings. Delete the waveform prior to changing the waveform recording settings.	Delete the waveform prior to changing the waveform recording condition.
Cannot start diagnosis because diagnosis is running.	Conduct operation after the diagnosis is finished.
Conduct operation after changing to Measurement or Standby mode.	Conduct operation after changing to Measurement mode or Standby mode.
Change to Standby mode.	Currently in mode other than Standby mode. Change to Standby mode at the Change Mode screen.
Communications timeout error occurred during connection with the earthquake sensor. Exiting program.	Confirm that the earthquake sensor power is ON and that the loader cable or RS-485 communications line is connected properly.
Target waveform record file does not exist.	Specified waveform record file does not exist. Specify the correct waveform file.
System changed to mode other than Maintenance mode. Canceling operation and returning to main menu.	The earthquake sensor mode was changed while in Maintenance mode. Reset the system to Maintenance mode from the Change Mode screen.
No data changes input. Exit settings without making changes?	Execute the Write Settings function to apply data changes.
No data changes will be input if you exit now? Exit?	Execute the Write Settings function to apply data changes. After the zero-adjust, write the adjusted values to the earthquake sensor before exiting.
Still in Manual Output. Measurement and calculation results will not be reflected in PV, output, etc. Exit this window?	PV, output, etc. are still in Manual Output. To set to normal measurement and calculation status, select Auto Output or switch to Measurement mode.
Connection with earthquake sensor failed. Model number of the connected earthquake sensor not compatible. Startup offline	The connected earthquake sensor is a model other than SES70/SES60. Connect an SES70 or SES60.
Cannot switch to Measurement mode. Confirm the status of the SES.	A serious failure occurred in Initialize mode when changing modes. Confirm the status of the earthquake sensor.
Cannot open or read waveform file of specified page. Exiting.	File is damaged. Specify the correct file.
Mode change failed. Retry operation.	Retry the mode change.
Phase change failed. Retry operation.	Retry running Maintenance mode.
Model other than SES70/60. Cannot open file.	The specified file is for a model other than SES70/SES60. Specify a file for SES70 or SES60.
No data changes input. Changing display will revert data to figures prior to changes. Change display without writing data?	Execute the Write Settings function to apply data changes. After the zero-adjust, write the adjusted values to the earthquake sensor before exiting.
Invalid page. Cannot display waveform.	Specify a valid page.
Incorrect mode. Cannot continue write operation. Check the operating mode and retry.	Check the operating mode and retry.

■ Troubleshooting confirmed errors

☞ 4-1 Monitor [F1] (P. 4-1) to check the error status. Use the following procedures if "Yes" is indicated in the column.

General error information	Description	Countermeasure
Sensor memory (Serious failure)	Memory content or read error	Confirm error details and then reboot This may result in the deletion of waveform record data. Contact us if the problem occurs again.
A/D Converter (Serious failure)	A/D converting part error	Confirm error details and then reboot Contact us if the problem occurs again.
Sensor clock H/W (Serious failure)	Operational error by the internal clock	
Output relay (Serious failure)	Control Output circuit error	An error was detected in the control output circuit of the earthquake sensor. Replace the earthquake sensor.
Other H/W (Serious failure)	Other H/W errors	Confirm error details and then reboot Contact us if the problem occurs again.
Accelerometer (Serious failure)	Acceleration pickup diagnosis output error	Confirm error details and then reboot Run pickup diagnosis. Contact us if the problem occurs again.
Accel. Value (Serious failure)	Acceleration value error	Confirm error details and earthquake sensor setup status and then reboot. Contact us if the problem occurs again.
Inclination Accel. (Serious) (Serious failure)	Earthquake sensor leveling error	Same as above
Accel. noise continuous (Serious failure)	Continuous non-vibration waveform error	Confirm error details and then reboot Contact us if the problem occurs again.
Battery level (Minor failure)	Battery voltage decline error	Replace with a new battery Refer to "SES60 Intelligent Earthquake Sensor User's Manual For System Design (CP-SP-1156E)" for replacement procedures. Contact us if the problem occurs again.
Temperature (Minor)/ Temperature (Serious) (Minor failure)/(Serious failure)	Earthquake sensor internal temperature error	Turn device OFF, confirm that the ambient temperature is normal, and then reboot. Contact us if the problem occurs again.
Sensor clock data (Minor failure)	Internal clock data error	Confirm that the earthquake sensor internal clock is set to the correct time. Contact us if the problem occurs again.
Inclination Accel. (Minor) (Minor failure)	Earthquake sensor leveling error	Confirm error details and earthquake sensor setup status and then reboot. Contact us if the problem occurs again.
Accel. Noise (Noise protect)	Non-vibration waveform detection error	Wait for approximately 100 s. Contact us if the problem does not disappear or occurs frequently.

■ Other

Phenomenon	Countermeasure
After the loader was installed on Windows 10, the SLP-SE7 (SES70) icon for starting up the loader is not displayed on the desktop.	Reinstall the loader . ☞ Installing the Loader (P. 1-5) During the process, make sure to select [All users] on the [Make short-cut on desktop] screen in step 7.
After the loader was installed on Windows 10, the SLP-SE7 (SES70) icon for starting up the loader is not displayed by clicking Start → [SLP].	Depending on the account privileges of the user who installed the loader , the icon may not be generated. Start the loader from the SLP-SE7 (SES70) icon on the desktop.

APPENDIX

■ Explanation of terminology

A description of the terminology used in user manuals related to the Intelligent Earthquake Sensor SES70 is provided below.

Terminology	Description
Acceleration Pickup diagnosis	Acceleration detection element mounted in the device. Able to detect 3-axis directions X, Y, Z
SI value	Numeric value correlated to earthquake damage Unit kine = cm/s The actual read value and output value are the maximum values for a 10 to 20 second period. SI value 1: 8-direction, 7 fixed cycle SI calculation SI value 2: 16-direction, 24 fixed cycle SI calculation
Synth. AC Accel.	Horizontal plane 2-axis or 3-axis vector synthetic AC acceleration unit Gal=cm/s^2. The actual read value and output value are the maximum values for a 10 to 20 second period.
M.V.E.V	Damage measurement value calculated using the SI value only or using a relative equation based on the SI value and the synthetic AC acceleration
Characterization correction	Uses temperature sensor values to correct the acceleration pickup output temperature characteristics to improve the accuracy of the measured acceleration.
Calculation acceleration	Acceleration value containing frequency domain required for SI and M.V.E.V. calculation. Also used in waveform recording and the synthetic AC acceleration PV.
Control Accel.	Acceleration value cut at a higher frequency domain compared to the Calculation Accel. in order to reduce background noise for AO, monitoring, etc.
Adjusted Accel.	Acceleration adjusted for bias.
Inclination Accel.	Value representing static acceleration factoring in temperature drift and inclination due to setup conditions.
AC Accel.	Value representing dynamic acceleration (=adjusted acceleration - inclination acceleration)
J.V.D.	J.V.D. status initiated when values set for SI and Synth. Accel. are exceeded and output conditions are satisfied.
Control Output	When J.V.D. Condition is fulfilled and there is no error status, the control output relay is set to ON.
Liquef. (PV)	Liquef. detect status is enabled when the SI, Synth. Accel., estimate variance, and zero-cross count Liquef. (PV) conditions are fulfilled.
Liquefaction Output	When J.V.D. Condition is fulfilled and there is no error status, the Lique. control output DO3 is set to ON.
Record waveform	There are two functions: auto-record (10 waveforms) and force record (1 waveform).
Error diagnosis	Four types of errors are detected: reset, serious failure, minor failure, and noise detection.
Reset	Reset is conducted in the event of a serious failure, which can impact all functions.
Serious failure	Error status that can impact control output, liquefaction output, and other control functions. Serious failure output is set to ON and control output is set to OFF.
Minor failure	Error status with no impact on control output but requires confirmation of waveform record and clock data retention status, clock data errors, and setup conditions. Minor failure output set to ON.
Noise detection Noise protect	Status for detection of non-seismic signals that can impact calculation results. PV values set to 0 or OFF and minor failure flashes.
Maintenance Sequence	The output status in Maintenance mode will change depending on the sequence. This makes it possible to check operations of externally connected instruments.
Pickup diagnosis	Physically operates pickups via the diagnosis circuit to detect pickup operation errors.
Auto bias	Automatically adjusts the bias value using the Loader.
FSG	Acceleration range subject to performance guarantee: 1960 Gal (weighted acceleration standard ±980 Gal) span value.
%FSG	1960 Gal span percentage (±2 %FSG = ±39.2 Gal)
FSO	Measurable acceleration range: 4000 Gal span value (±2000 Gal)
%FSO	4000 Gal span percentage (±2 %FSO = ±80 Gal)

■ How to set the SES70 to the same output method as the SES60 (SES60 compatibility function)

You can change the following settings to set the SES70 to perform the same operations as the SES60. (The following is a comparison with default values. Make the necessary changes if you have changed the default values.)

Item	SES70 output	SES60 compatible output
Select output function	SES70 output	SES60 compatible output
J.V.D. OR condition	OR condition: None	OR condition: SI value
J.V.D. AND condition	AND condition: None	AND condition: None
J.V.D. SI Threshold	300 kine	30 kine
J.V.D. Synth. Accel. Threshold	4000 Gal	300 Gal
J.V.D. M.V.E.V. threshold	7.9	5.3
Rec.Trigger	Threshold	– Max. Wave (+ Trigger Updating)
Max. Wave (+ Trigger Updating) object	SI value	SI value
Max. Wave (– Trigger Updating) object	SI value	— (no function)
Threshold object	SI value	SI value
Threshold SI	1 kine	30 kine
Threshold - Synth. Accel.	5 Gal	300 Gal
Threshold - M.V.E.V	1.0	5.3
RS-485 communication speed	38400 bps	19200 bps
Minor Failure Outp Choice (DO1)	Positive logic value Status/Minor Failure	Positive logic value Status/Minor Failure (Functions as Status/Noise/Minor Failure)
Serious Fail. Outp Choice (DO2)	Positive logic	Positive logic
SI PV low cut	1.0 kine	0.0 kine
Synth. Accel. PV low cut	5.0 Gal	0.0 Gal
M.V.E.V. PV low cut	1.0	0.0

Revision History (CP-UM-5756E)

Printed	Edn.	Revised pages	Description
Apr. 2015	**1**		
Mar. 2017	**2**	4-14, App-2 End of the manual	Tables were changed. Terms and Conditions were changed (to version No. AA511A-014-09).
Feb. 2019	**3**	1-2, 1-7 1-8 5-3	Tables were changed. Explanation was added to Handling Precautions. Explanation was changed to Handling Precautions. Tables were changed.

Terms and Conditions

We would like to express our appreciation for your purchase and use of Azbil Corporation's products.

You are required to acknowledge and agree upon the following terms and conditions for your purchase of Azbil Corporation's products (system products, field instruments, control valves, and control products), unless otherwise stated in any separate document, including, without limitation, estimation sheets, written agreements, catalogs, specifications and instruction manuals.

1. Warranty period and warranty scope

1.1 Warranty period

Azbil Corporation's products shall be warranted for one (1) year from the date of your purchase of the said products or the delivery of the said products to a place designated by you.

1.2 Warranty scope

In the event that Azbil Corporation's product has any failure attributable to azbil during the aforementioned warranty period, Azbil Corporation shall, without charge, deliver a replacement for the said product to the place where you purchased, or repair the said product and deliver it to the aforementioned place. Notwithstanding the foregoing, any failure falling under one of the following shall not be covered under this warranty:

(1) Failure caused by your improper use of azbil product (noncompliance with conditions, environment of use, precautions, etc. set forth in catalogs, specifications, instruction manuals, etc.);
(2) Failure caused for other reasons than Azbil Corporation's product;
(3) Failure caused by any modification or repair made by any person other than Azbil Corporation or Azbil Corporation's subcontractors;
(4) Failure caused by your use of Azbil Corporation's product in a manner not conforming to the intended usage of that product;
(5) Failure that the state-of-the-art at the time of Azbil Corporation's shipment did not allow Azbil Corporation to predict; or
(6) Failure that arose from any reason not attributable to Azbil Corporation, including, without limitation, acts of God, disasters, and actions taken by a third party.

Please note that the term "warranty" as used herein refers to equipment-only-warranty, and Azbil Corporation shall not be liable for any damages, including direct, indirect, special, incidental or consequential damages in connection with or arising out of Azbil Corporation's products.

2. Ascertainment of suitability

You are required to ascertain the suitability of Azbil Corporation's product in case of your use of the same with your machinery, equipment, etc. (hereinafter referred to as "Equipment") on your own responsibility, taking the following matters into consideration:

(1) Regulations and standards or laws that your Equipment is to comply with.
(2) Examples of application described in any documents provided by Azbil Corporation are for your reference purpose only, and you are required to check the functions and safety of your Equipment prior to your use.
(3) Measures to be taken to secure the required level of the reliability and safety of your Equipment in your use
Although azbil is constantly making efforts to improve the quality and reliability of Azbil Corporation's products, there exists a possibility that parts and machinery may break down. You are required to provide your Equipment with safety design such as fool-proof design,*1 and fail-safe design*2 (anti-flame propagation design, etc.), whereby preventing any occurrence of physical injuries, fires, significant damage, and so forth. Furthermore, fault avoidance,*3 fault tolerance,*4 or the like should be incorporated so that the said Equipment can satisfy the level of reliability and safety required for your use.

*1. A design that is safe even if the user makes an error.
*2. A design that is safe even if the device fails.
*3. Avoidance of device failure by using highly reliable components, etc.
*4. The use of redundancy.

3. Precautions and restrictions on application

3.1 Restrictions on application

Please follow the table below for use in nuclear power or radiation-related equipment.

	Nuclear power quality*5 required	Nuclear power quality*5 not required
Within a radiation controlled area*6	Cannot be used (except for limit switches for nuclear power*7)	Cannot be used (except for limit switches for nuclear power*7)
Outside a radiation controlled area*6	Cannot be used (except for limit switches for nuclear power*7)	Can be used

*5. Nuclear power quality: compliance with JEAG 4121 required
*6. Radiation controlled area: an area governed by the requirements of article 3 of "Rules on the Prevention of Harm from Ionizing Radiation," article 2 2 4 of "Regulations on Installation and Operation of Nuclear Reactors for Practical Power Generation," article 4 of "Determining the Quantity, etc., of Radiation-Emitting Isotopes,"etc.
*7. Limit switch for nuclear power: a limit switch designed, manufactured and sold according to IEEE 382 and JEAG 4121.

Any Azbil Corporation's products shall not be used for/with medical equipment.

The products are for industrial use. Do not allow general consumers to install or use any Azbil Corporation's product. However, azbil products can be incorporated into products used by general consumers. If you intend to use a product for that purpose, please contact one of our sales representatives.

3.2 Precautions on application

you are required to conduct a consultation with our sales representative and understand detail specifications, cautions for operation, and so forth by reference to catalogs, specifications, instruction manual, etc. in case that you intend to use azbil product for any purposes specified in (1) through (6) below. Moreover, you are required to provide your Equipment with fool-proof design, fail-safe design, anti-flame propagation design, fault avoidance, fault tolerance, and other kinds of protection/safety circuit design on your own responsibility to ensure reliability and safety, whereby preventing problems caused by failure or nonconformity.

(1) For use under such conditions or in such environments as not stated in technical documents, including catalogs, specification, and instruction manuals
(2) For use of specific purposes, such as:
    * Nuclear energy/radiation related facilities
      [When used outside a radiation controlled area and where nuclear power quality is not required]
      [When the limit switch for nuclear power is used]
    * Machinery or equipment for space/sea bottom
    * Transportation equipment
      [Railway, aircraft, vessels, vehicle equipment, etc.]
    * Antidisaster/crime-prevention equipment
    * Burning appliances
    * Electrothermal equipment
    * Amusement facilities
    * Facilities/applications associated directly with billing
(3) Supply systems such as electricity/gas/water supply systems, large-scale communication systems, and traffic/air traffic control systems requiring high reliability
(4) Facilities that are to comply with regulations of governmental/public agencies or specific industries
(5) Machinery or equipment that may affect human lives, human bodies or properties
(6) Other machinery or equipment equivalent to those set forth in items (1) to (5) above which require high reliability and safety

4. Precautions against long-term use

Use of Azbil Corporation's products, including switches, which contain electronic components, over a prolonged period may degrade insulation or increase contact-resistance and may result in heat generation or any other similar problem causing such product or switch to develop safety hazards such as smoking, ignition, and electrification. Although acceleration of the above situation varies depending on the conditions or environment of use of the products, you are required not to use any Azbil Corporation's products for a period exceeding ten (10) years unless otherwise stated in specifications or instruction manuals.

5. Recommendation for renewal

Mechanical components, such as relays and switches, used for Azbil Corporation's products will reach the end of their life due to wear by repetitious open/close operations.

In addition, electronic components such as electrolytic capacitors will reach the end of their life due to aged deterioration based on the conditions or environment in which such electronic components are used. Although acceleration of the above situation varies depending on the conditions or environment of use, the number of open/close operations of relays, etc. as prescribed in specifications or instruction manuals, or depending on the design margin of your machine or equipment, you are required to renew any Azbil Corporation's products every 5 to 10 years unless otherwise specified in specifications or instruction manuals. System products, field instruments (sensors such as pressure/flow/level sensors, regulating valves, etc.) will reach the end of their life due to aged deterioration of parts. For those parts that will reach the end of their life due to aged deterioration, recommended replacement cycles are prescribed. You are required to replace parts based on such recommended replacement cycles.

6. Other precautions

Prior to your use of Azbil Corporation's products, you are required to understand and comply with specifications (e.g., conditions and environment of use), precautions, warnings/cautions/notices as set forth in the technical documents prepared for individual Azbil Corporation's products, such as catalogs, specifications, and instruction manuals to ensure the quality, reliability, and safety of those products.

7. Changes to specifications

Please note that the descriptions contained in any documents provided by azbil are subject to change without notice for improvement or for any other reason. For inquires or information on specifications as you may need to check, please contact our branch offices or sales offices, or your local sales agents.

8. Discontinuance of the supply of products/parts

Please note that the production of any Azbil Corporation's product may be discontinued without notice. After manufacturing is discontinued, we may not be able to provide replacement products even within the warranty period.

For repairable products, we will, in principle, undertake repairs for five (5) years after the discontinuance of those products. In some cases, however, we cannot undertake such repairs for reasons, such as the absence of repair parts. For system products, field instruments, we may not be able to undertake parts replacement for similar reasons.

9. Scope of services

Prices of Azbil Corporation's products do not include any charges for services such as engineer dispatch service. Accordingly, a separate fee will be charged in any of the following cases:

(1) Installation, adjustment, guidance, and attendance at a test run
(2) Maintenance, inspection, adjustment, and repair
(3) Technical guidance and technical education
(4) Special test or special inspection of a product under the conditions specified by you

Please note that we cannot provide any services as set forth above in a nuclear energy controlled area (radiation controlled area) or at a place where the level of exposure to radiation is equivalent to that in a nuclear energy controlled area.

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