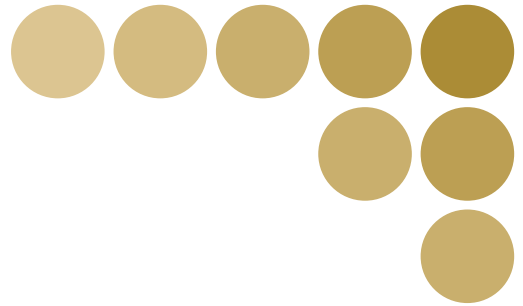


Displacement Sensor

Confocal Fiber Type

ZW Series



Smart Monitor ZW Operation Manual

Introduction

This manual provides information regarding functions, performance and operating methods that are required for using the Smart Monitor ZW.

- The Smart Monitor ZW must be operated by personnel knowledgeable in electrical engineering.
- To ensure correct use, please read this manual thoroughly to deepen your understanding of the product.
- Please keep this manual in a safe place so that it can be referred to whenever necessary.

Smart Monitor ZW

Operation Help

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[Controlling Signals from a Personal Computer](#)

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◆ Sensing Condition Settings (Sensing Window)

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(Function Settings Window)**

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◆ **Did You Know**

[Display measured values](#)

◆ [List of Error Messages](#)

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What is "Smart Monitor ZW?"

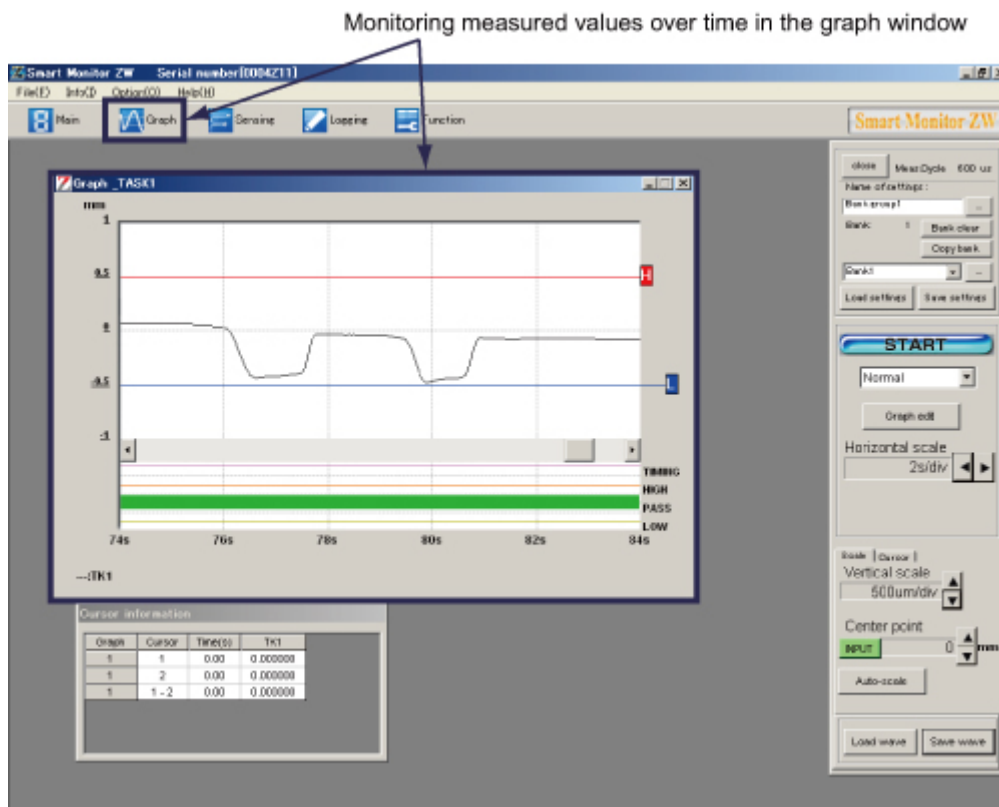
SmartMonitor ZW is software for the ZW Series fiber coaxial displacement sensor. This software allows you to display displacement sensor settings and measured values as they are or in graphs, and load or save settings to/from a personal computer connected to the controller.

- [Logging function](#)
- [Display of waveforms from multiple channels in the graph window \(waveform display\)](#)

Smart Monitor ZW has the following features.

Monitoring of Measurement State

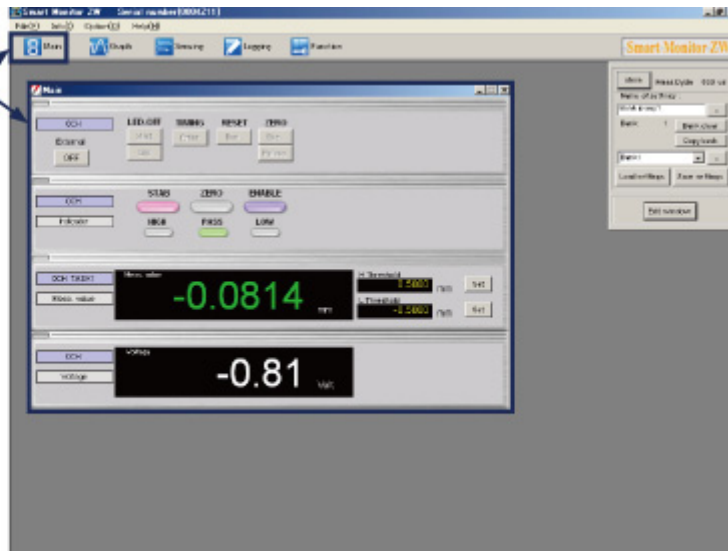
Monitoring of measured values over time



"Monitoring Waveforms (Graph Window) > Sample Waveforms > [Displaying the Waveforms of Measured Values as a Graph \(Normal\)](#)"

Collectively monitoring the measured values of multiple controllers

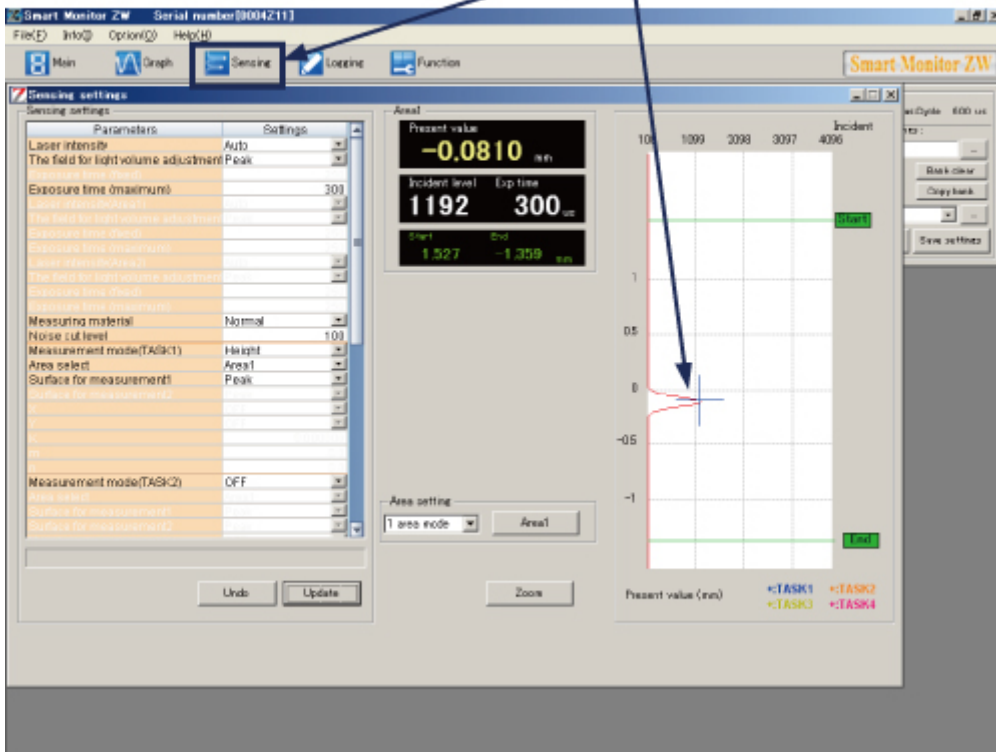
Collectively monitoring multiple measured values in the main window



"Monitoring Digital Values (Main Window) > [Display Details](#)"

Viewing the incident level (sensitivity) of the head

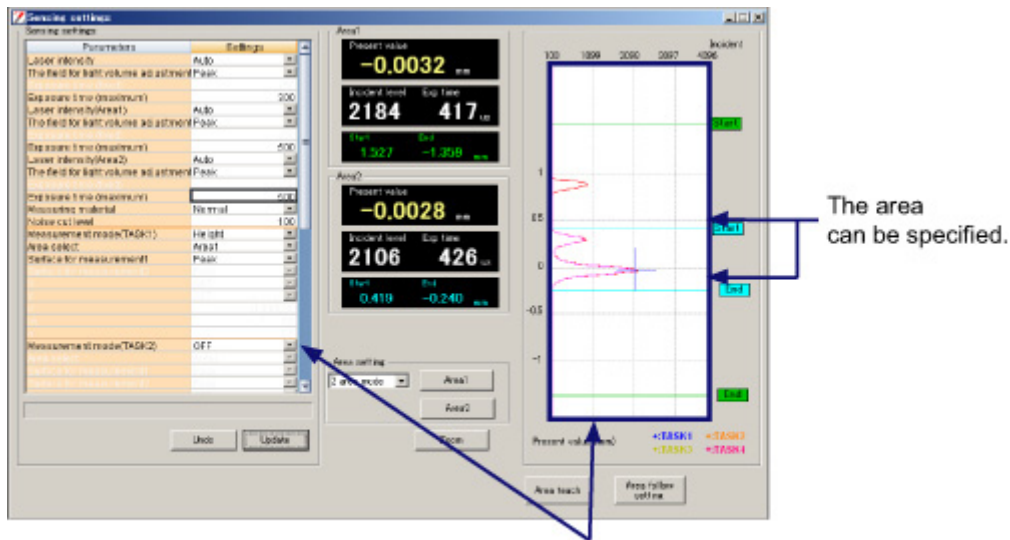
Monitoring the incident level in the sensing window



"Sensing Condition Settings (Sensing Window) > Advanced Setting Functions not Available on a Controller > [Displaying Line Brightness](#)"

Setup Support Functions

Detailed setting of sensing conditions



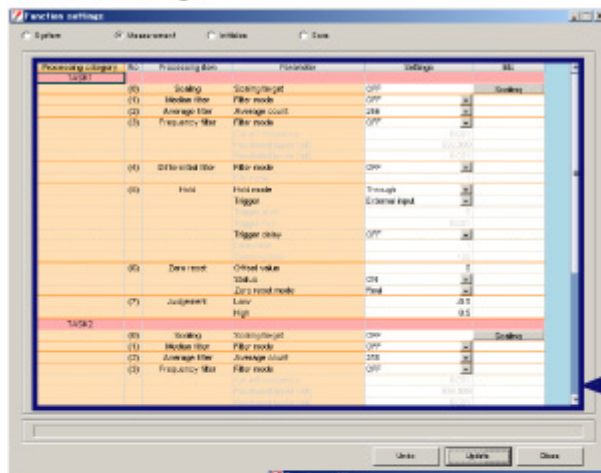
The sensing conditions can be set while confirming the incident level of the Sensor Head.

"Sensing Condition Settings (Sensing Window) > Advanced Setting Functions not Available on a Controller > [Displaying Line Brightness](#)"

"Sensing Condition Settings (Sensing Window) > Advanced Setting Functions not Available on a Controller > [Adjusting Area](#)"

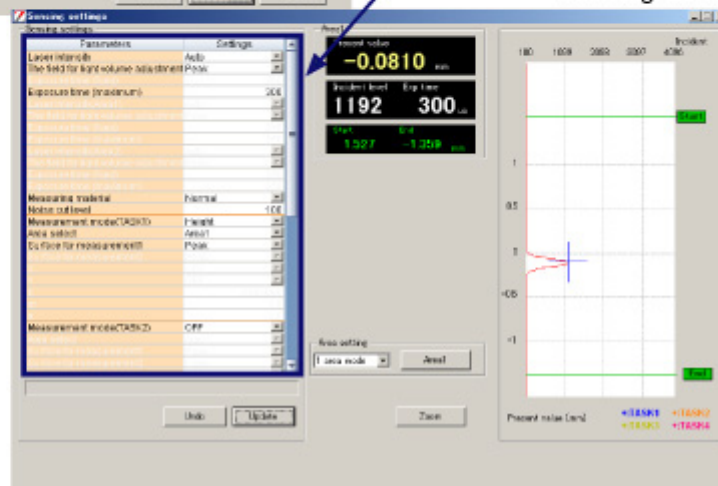
Excellent list display settings

Function settings



Displays a list of parameters.

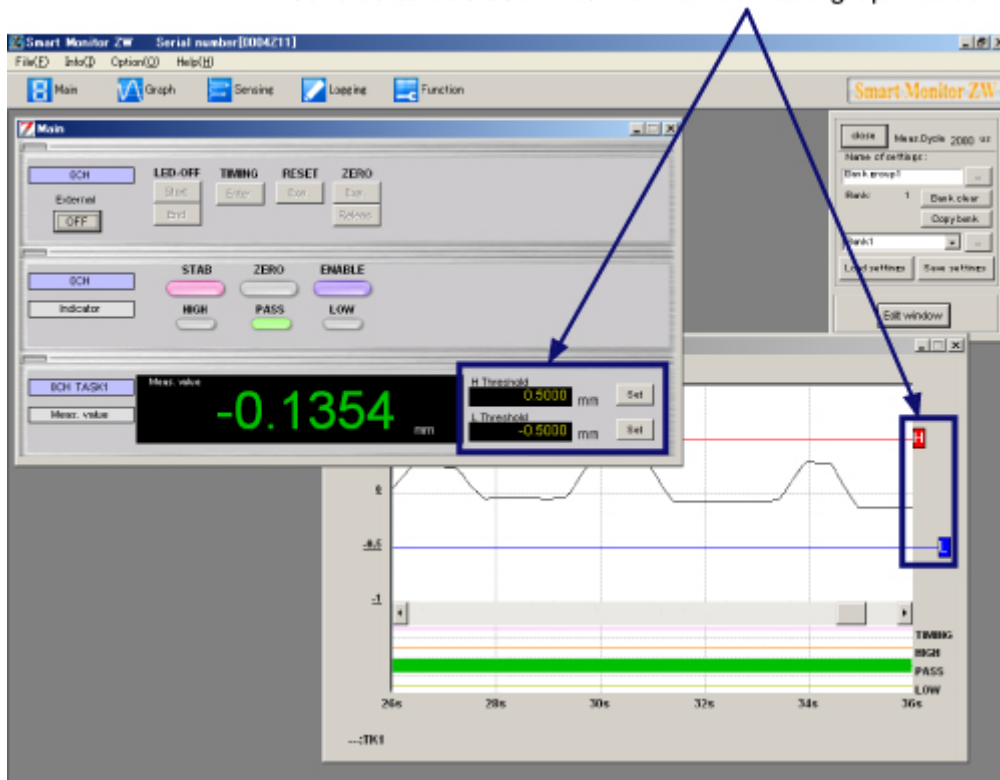
Sensing settings



"Sensing Condition Settings (Sensing Window) > [List of Functions](#)"
"Function Settings (Function Settings Window) > [List of Functions](#)"

Threshold setting

Thresholds can be set in the main window and graph window.



"Monitoring Digital Values (Main Window) > [Threshold Setting](#)"

"Monitoring Waveform (Graph Window) > Changing Thresholds > [Changing Threshold Values](#)"

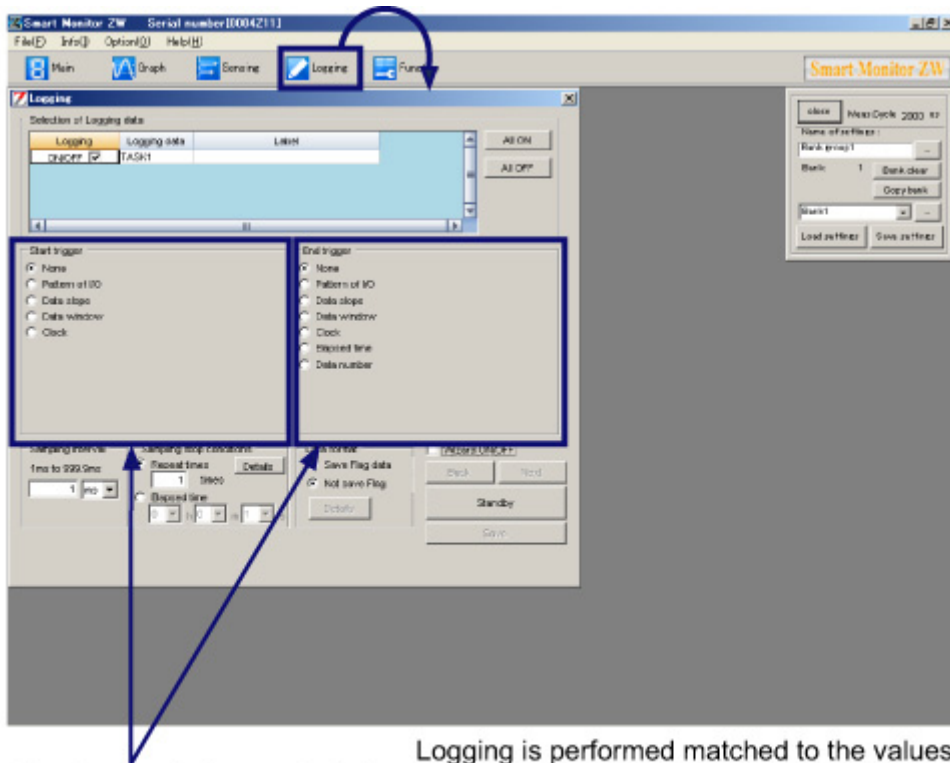
Data backup



Saves the settings of the bank group to the personal computer.

"Bank Functions > [Saving/Loading Bank Settings](#)"

Logging Measured Values



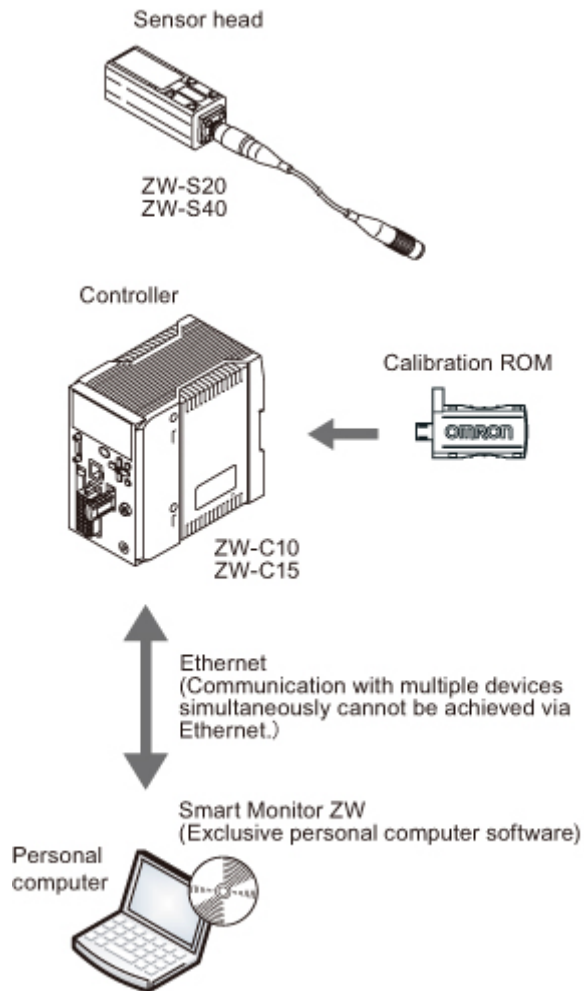
Set the logging timing as desired.

Logging is performed matched to the values set here, and the measured values are saved to the personal computer.

"Data Logging (Logging Window) > Setting Sampling Conditions > [Setting Logging Start/End](#)"

System Configuration

Basic configuration



1. Sensor Head

Detects the sensing object. The Sensor Head is connected from the controller. The Sensor Head for the fiber coaxial displacement sensor ZW Series is used.

2. Controller

Processes measurement, and outputs the processing result.

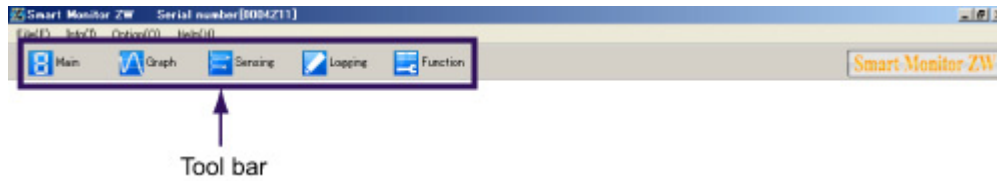
3. Smart Monitor ZW

This software allows you to change the controller settings on a personal computer or monitor measured values.

Configuration of Screens

Tool Bar

The following describes the tool bar on Smart Monitor ZW.



(1) Tool bar

Button	Overview
Main	Displays the [Main] window. "Monitoring Digital Values (Main Window)"
Graph	Displays the [Graph] window. "Monitoring Waveform (Graph Window)"
Sensing	Displays the [Sensing settings] window. "Sensing Condition Settings (Sensing Window)"
Logging	Displays the [Logging] window. "Data Logging (Logging Window)"
Function	Displays the [Function settings] window. "Function Settings (Function Settings Window)"

Menu Bar

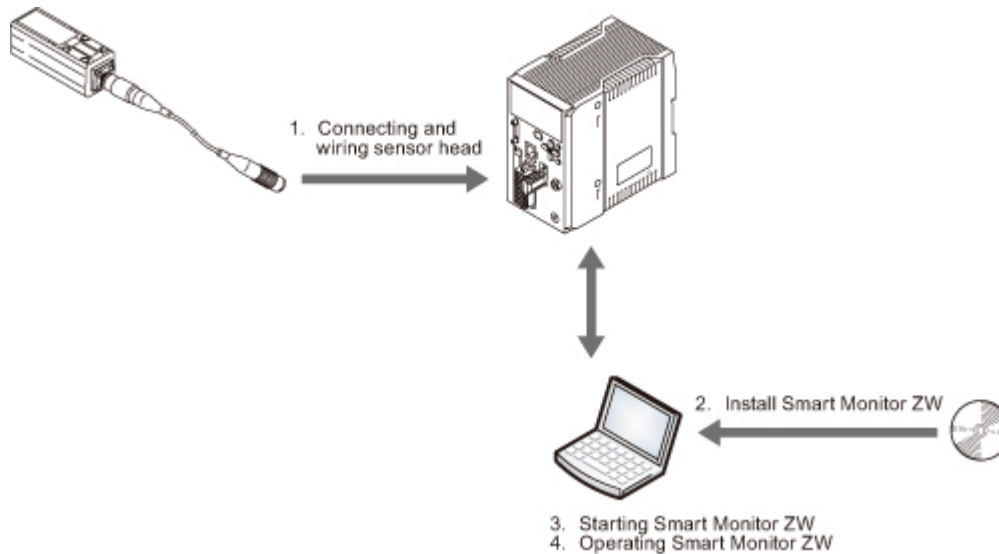
The following describes the menu bar on Smart Monitor ZW.



Menu		Overview
File	Load Settings	Loads the settings currently saved in file.
	Save Settings	Saves the current settings to file.
	Save Screen	Saves the currently displayed window in BMP format.
Info	Settings list	The settings of the controller can be verified in this list.
Option	Data Folder	<p>Sets the destination to save the various data files to. The following file save destinations can be set:</p> <ul style="list-style-type: none"> • Graph data files • One-shot graph data files • Bank group data files • Logging data <p>"Option Functions > Data Folder"</p>
	Graph background color	<p>The background color on the graph screen display can be changed. Select from the following three colors:</p> <ul style="list-style-type: none"> • Standard • Oscilloscope • Blackboard <p>"Option Functions > Changing Graph Background Color"</p>
	Alignment of Windows	<p>Aligns the currently displayed windows to the top of the window.</p> <p>"Option Functions > Alignment of Windows"</p>
	Select connection destination	<p>Specifies the IP address of the destination for a connection via Ethernet.</p> <p>"Option Functions > Selecting Connection Destination"</p>
	ROM recovery	<p>Selects a ROM data file to write into the sensor.</p> <p>"Option Functions > ROM Recovery"</p>
Help	Contents	Displays this Help.
	Version	Displays the version information of Smart Monitor ZW.

Flow of Operations and Setup

The following describes the overall setup procedure.



1. Connection and wiring of Sensor Head

Connect the Sensor Head to the controller.

"Introduction > [System Configuration](#)"

2. Installing Smart Monitor ZW

Install Smart Monitor ZW on the personal computer.

3. Starting up Smart Monitor ZW

Start up Smart Monitor ZW after checking that the controller has been set to the RUN mode.

4. Smart Monitor ZW operations

Display displacement data from controller as a waveform or make measurement-related settings.

- Displaying measured values
- Displaying measured values as a graph
- Setting up sensing
- Setting up functions
- Logging measured values

5. Controller operations

Display the present measured values.

The various inputs relating to threshold values set to measured values and relating to measurement can also be typed in from the controller.

Do not perform the following when Smart Monitor ZW is used. Otherwise, a communications error will occur, and prevent normal operation of Smart Monitor ZW.



- Operating keys or changing switch settings on the controller
- Bank switching using external lead signals
- Switching from the RUN to FUN modes
- Disconnecting the Ethernet cable
- Changing the IP address of the personal computer

The same operations as these can also be executed in Smart Monitor ZW.

Display Details

Clicking the **[Main]** button displays the **[Main]** window.

(1) Input buttons
Control signals can be input from a personal computer.


(2) Indicators
These indicate the state of the controller.

(3) Data displays
These indicate the data that is currently being measured on the controller.

The screenshot shows the 'Main' window of the Smart Monitor ZW. It features several sections:

- Input buttons:** A row of buttons labeled 'LED-OFF', 'TIMING', 'RESET', and 'ZERO'. Below them are 'Start', 'Enter', 'Exe.', and 'Release' buttons. An 'External' section has an 'OFF' button.
- Indicators:** A row of buttons labeled 'OCH', 'STAB', 'ZERO', and 'ENABLE'. Below them are 'Indicator', 'HIGH', 'PASS', and 'LOW' buttons.
- Data displays:** A large digital display showing 'Misc. value' as '-0.0814 mm'. To the right, there are 'H.Threshold' and 'L.Threshold' fields, both set to '0.5000 mm'. Below this, a 'Voltage' display shows '-0.81 Volt'.

(1) Input buttons

Item	Description
External input	<p>Enables/disables the buttons (LED-OFF/TIMING/RESET/ZERO).</p> <p> While an input button on Smart Monitor ZW is enabled, the external lead signals of the controller are disabled. Pay attention to this when using external lead signals to perform measurement. (When you exit Smart Monitor ZW, the external lead signals are automatically restored to an enabled state.)</p>
LED-OFF	Stops emission from the Sensor Head. Clicking the [Start] button stops emission. Clicking the [End] button resumes emission.
TIMING	Timing input to the controller is ON while the [Enter] button is clicked. Timing input returns to OFF when the [Enter] button is released.
RESET	Reset input to the controller is ON while the [Exe.] button is clicked. Reset input returns to OFF when the [Exe.] button is released.
ZERO	Clicking the [Exe.] button executes zero reset processing. Clicking the [Release] button cancels zero reset processing.

(2) Indicators

Indicators	Controller body	Description
STAB	STABILITY indicator	The STABILITY indicator lights when the object is placed within the measuring range, and flashes when it is out of the measuring range. It goes out if the intensity is insufficient or saturated.
ZERO	ZERO indicator	The Zero Reset indicator lights when the zero reset function is being executed.
ENABLE	ENABLE indicator	The ENABLE indicator lights when the Sensor is ready for measurement.
HIGH	HIGH indicator	The HIGH indicator lights when the condition "HIGH threshold < measured value" is satisfied.
PASS	PASS indicator	The PASS indicator lights when the condition "LOW threshold ≤ measured value ≤ HIGH threshold" is satisfied.
LOW	LOW indicator	The LOW indicator lights when the condition "measured value < LOW threshold" is satisfied.

(3) Data displays

Main display

The current measured value is displayed. This functions in the same way as the main display on the controller.



When the main display on Smart Monitor ZW is saturated (e.g. too many digits past the decimal point), "**OVER**" is displayed.

Sub-display

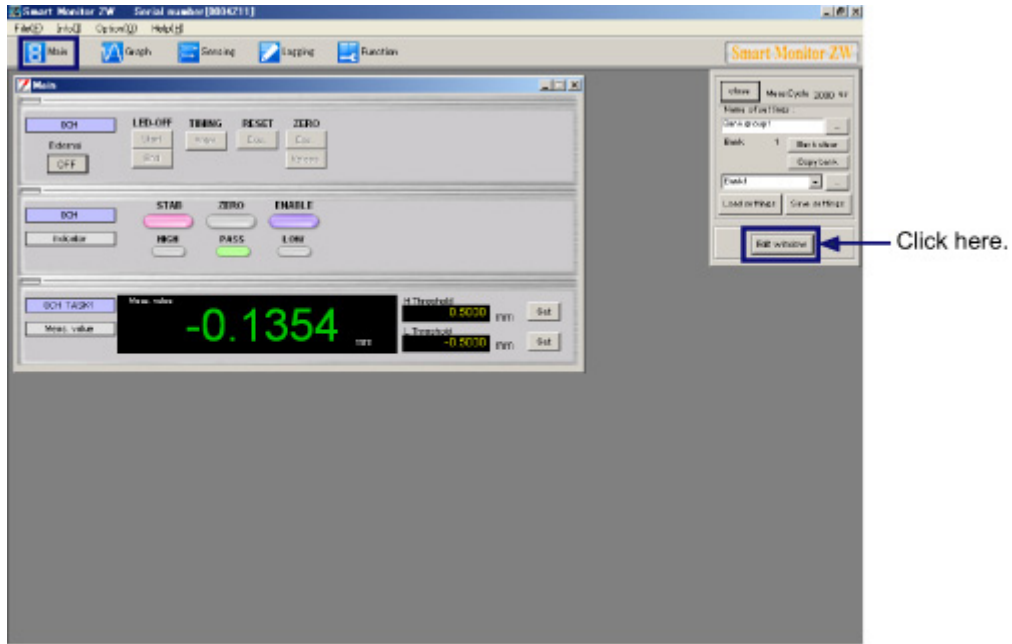
Item	Details
Hide	The sub-display is not displayed.
H threshold	Displays the currently set high threshold value. The high threshold value can be set in the window that is displayed by clicking the [Set] button.
L threshold	Displays the currently set low threshold value. The low threshold value can be set in the window that is displayed by clicking the [Set] button.
Resolution	Displays the unevenness of the measured values on screen.
Present value	Displays the present value.

Switching between Normal (4 items) and Multi-items (10 items) Display Formats

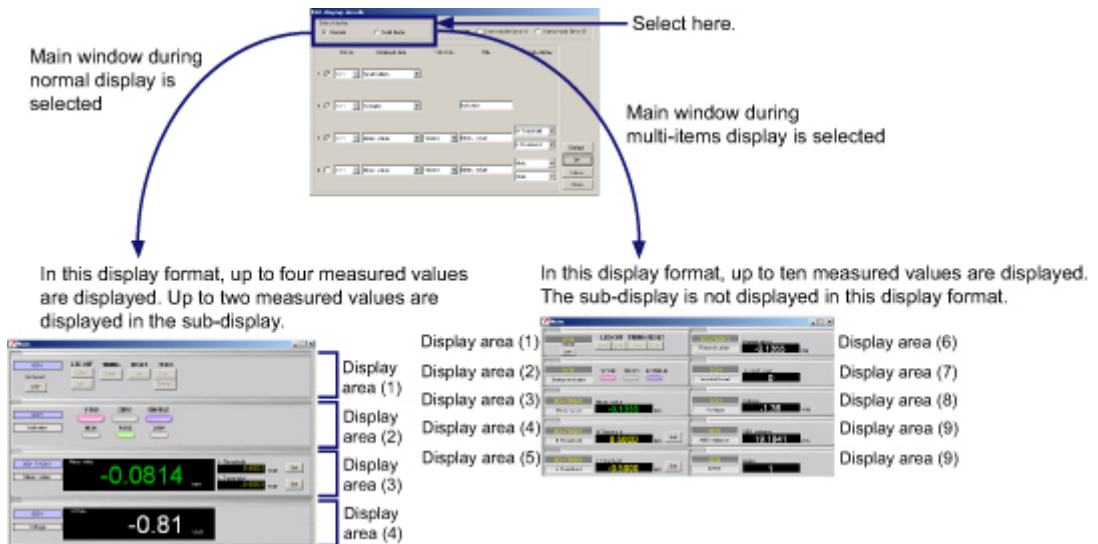
In the **[Main]** window, you can select between Normal (4 items) and Multi-items (10 items) as the number of items to be displayed.

Operation Procedure

1. Display the **[Main]** window and click the **[Edit Window]** button.



2. Select either **[Normal]** or **[Multi-items]** at **Select display**.



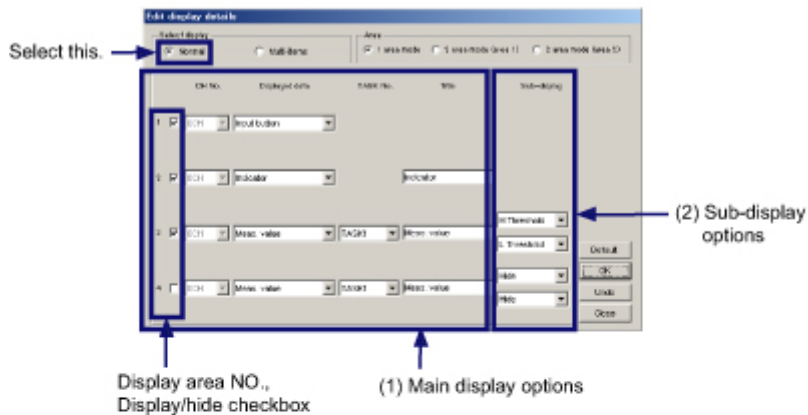
Editing Display Details

You can change the items to be displayed in the [Main] window.

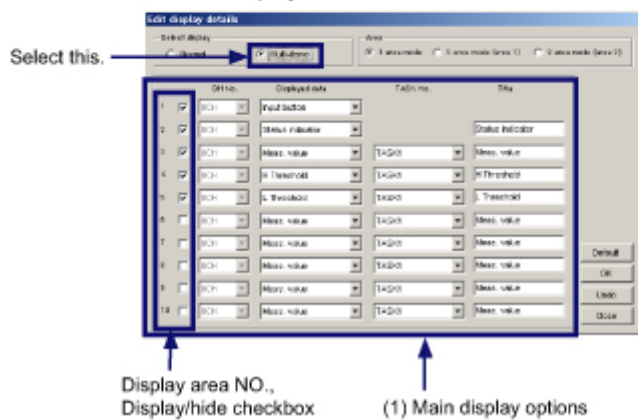
Operation Procedure

1. Select "Select display" in the [Edit display details] window and set the items to be displayed.

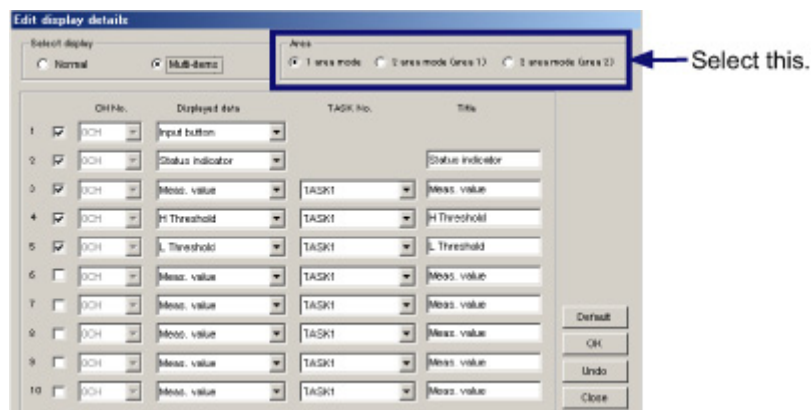
When normal display is selected



When multi-items display is selected



2. Select [Area] to display [Incident level] or [Exposure time].



(1) Main display

Setting item	Details
Display/hide checkbox	Items whose checkbox is marked here are displayed in the [Main] window.
Displayed data	Select the details to be displayed in the [Main] window.
TASK No.	Select the TASK No. whose details are to be displayed. TASK Nos. sometimes cannot be selected depending on the channel and display details.
Title	Enter the title of the measured value to display. [Normal] : Enter eight characters at most. [Multi-items] : Enter five characters at most.

(2) Sub-display

Select the value to be displayed in the sub-display. Up to two values can be displayed in the sub-display.



Nothing is displayed when "Hide" is selected.

Display item options

The items that can be set differ according to the Normal or Multi-items settings.

- Items that can be displayed in normal display format

Item	Display areas (1), (2)	Display areas (3), (4)
Measured value	Yes	Yes
Incident level	Yes	Yes
Exposure time	Yes	Yes
Current	Yes	Yes
Voltage	Yes	Yes
Binary output	Yes	Yes
Absolute distance	Yes	Yes
BANK	Yes	Yes
Indicator	Yes	-
Input button	Yes	-

- Items that can be displayed in multi-item display format

Item	Display areas (1), (2)	Display areas (3) to (10)	Item	Display areas (1), (2)	Display areas (3) to (10)
Measured value	Yes	Yes	Voltage	Yes	Yes
H threshold	Yes	Yes	Binary output	Yes	Yes
L threshold	Yes	Yes	Absolute distance	Yes	Yes
Resolution	Yes	Yes	BANK	Yes	Yes
Present Value	Yes	Yes	ZERO (input)	Yes	-
Incident Level	Yes	Yes	Status indicator	Yes	-
Exposure time	Yes	Yes	Output indicator	Yes	-
Current	Yes	Yes	Input button	Yes	-

Threshold Setting

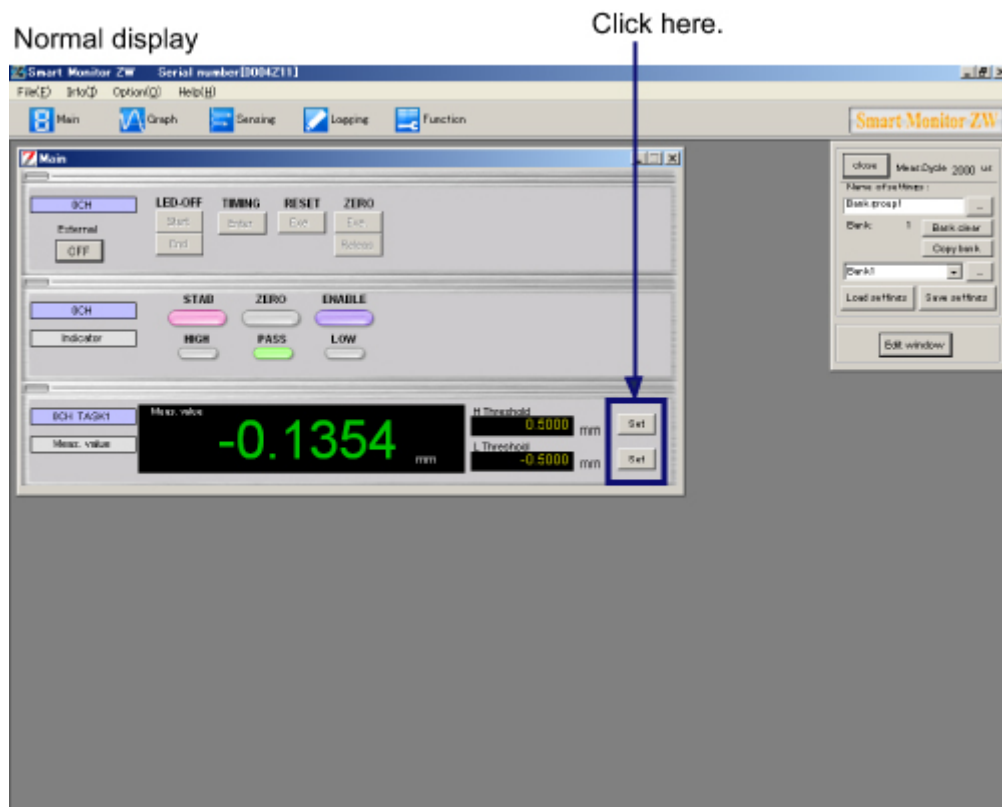
Threshold values can be set.



- When the normal display format is selected, the measured value must be displayed.
- Also, when multi-item display format is selected, the high and low threshold values must be displayed.
- Threshold values can be set only directly.

Operation Procedure

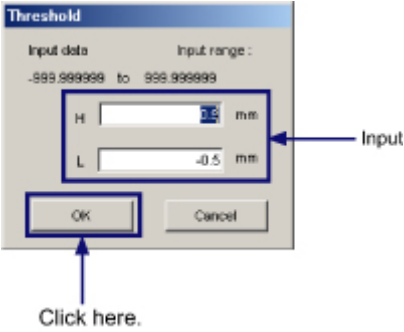
1. Click the [Set] button.




Multi-items display



2. Enter the desired threshold values and click the [OK] button.

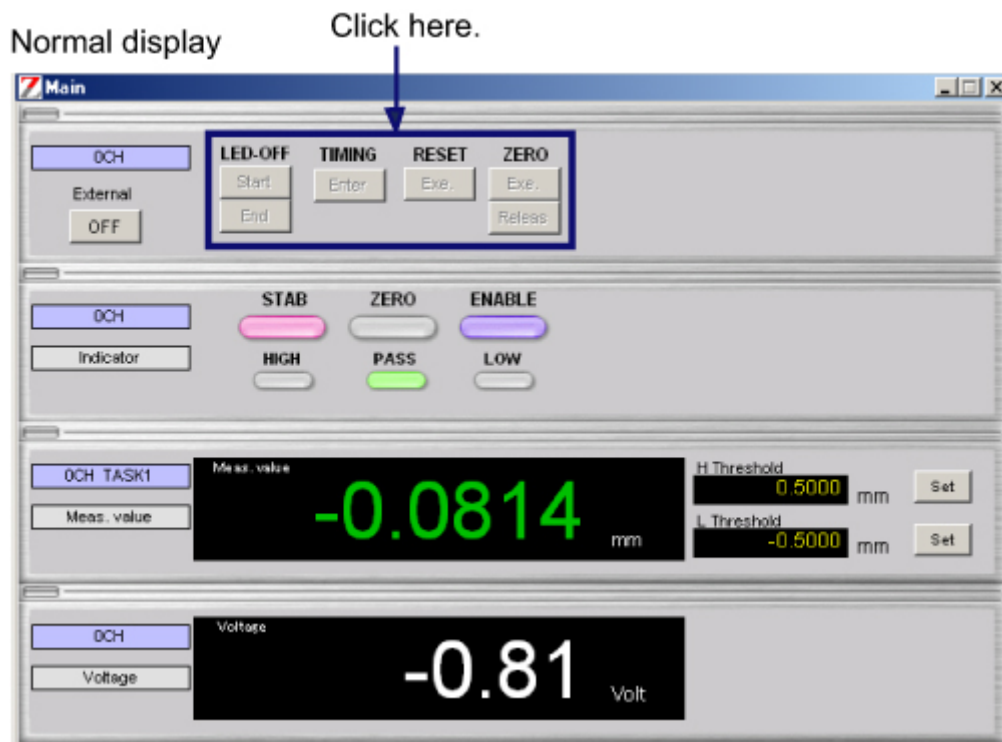


Controlling Signals from a Personal Computer

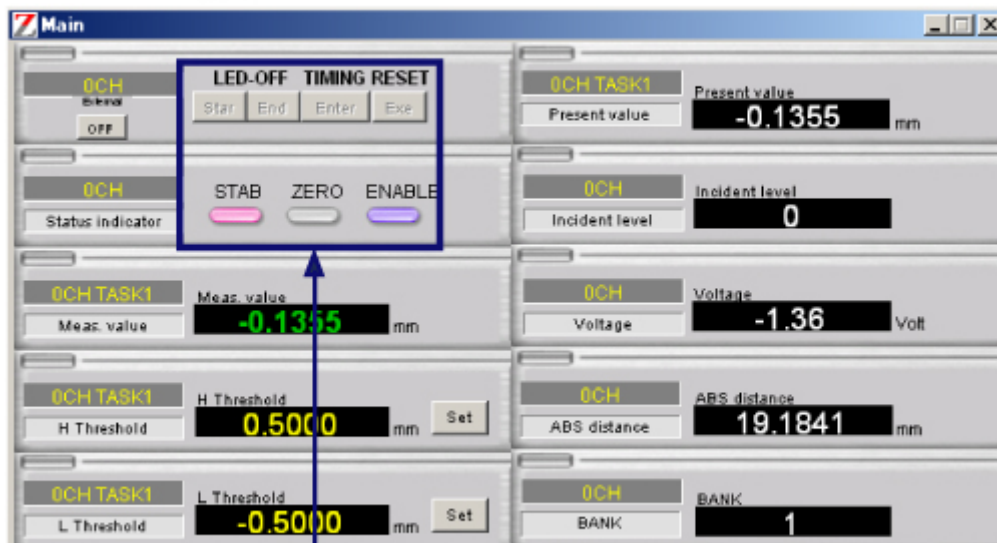
 When the normal display format is selected, the input buttons must be displayed.
Also, when the multi-item display format is selected, ZERO (all) must be displayed.

Operation Procedure


1. Click the respective button.



Multi-items display



Click here.

Item	Description
External input	<p>Enables/disables the buttons (LED-OFF/TIMING/RESET/ZERO).</p> <p>While an input button on Smart Monitor ZW is enabled, the external lead signals of the controller of the channel No. to the left of the display item are disabled.</p>  Pay attention to this when using external lead signals to perform measurement. <p>(When you exit Smart Monitor ZW, the external lead signals are automatically restored to an enabled state.)</p>
LED-OFF	<p>Stops emission from the Sensor Head.</p> <p>Clicking the [Start] button stops emission.</p> <p>Clicking the [End] button resumes emission.</p>
TIMING	<p>Timing input to the controller is ON while the [Enter] button is clicked.</p> <p>Timing input returns to OFF when the [Enter] button is released.</p>
RESET	<p>Reset input to the controller is ON while the [Exe.] button is clicked.</p> <p>Reset input returns to OFF when the [Exe.] button is released.</p>
ZERO	<p>Clicking the [Exe.] button executes zero reset processing.</p> <p>Clicking the [Release] button cancels zero reset processing.</p>

List of Graph Display Modes

How waveforms are displayed differs according to the selected display mode.

	Single		Multi
	1 waveform	Multiple waveforms	
Normal	Yes	Yes	Yes
One-Shot	Yes	No	No
Repeat-Shot	Yes	No	No

List of Graph Window Specifications

	Normal	One-Shot/ Repeat-Shot	Remarks
Data sampling interval	(A)10ms (B)100ms((1))	(A)100μs (B)500μs((2))	(1) (A) In case of 100ms/div, 200ms/div, 400ms/div (B) In case of 500ms/div, 1s/div, 2s/div, 5s/div, 10s/div (2) (A) In case of 5ms/div, 10ms/div, 20ms/div (B) In case of 50ms/div, 100ms/div, 200ms/div
Horizontal Scale	100ms/div, 200ms/div, 400ms/div, 500ms/div, 1s/div, 2s/div, 5s/div, 10s/div	5ms/div, 10ms/div, 20ms/div, 50ms/div, 100ms/div, 200ms/div	-
			(1) Data of total "current window + past 9 windows" is retained regardless of horizontal scale. (A longer horizontal scale results in more points being held.) Max. number of points: 50 s/window x 5 windows = 250 s 250 s / 10

<p>Number of data retention points (This is equivalent to the number of points that can be displayed on window/number of waveforms that can be displayed.)</p>	<p>Max. 25000 points ((1)) (at 10 s/div: data for total of 250 s)</p>	<p>Max. 2000 points (Note 1) x past waveforms (max. 9 waveforms)(Note 2)((2)) (at 200 ms/div: data for total of 1 s)</p>	<p>ms=25000 points (2) (Note 1) Equivalent to number of points that can be displayed in a single window Calculated by horizontal scale x 5 div / data sampling interval Example: When horizontal scale is 10 ms/div, 10 ms/div x 5 div / 100 μs = 500 points (Note 2) Past waveforms obtained at the same conditions are held.</p>
<p>Number of simultaneously plotable windows</p>	<p>4 waveforms(*) ((1))</p>	<p>Only 1 waveform((2))</p>	<p>(1) 1 window multiple waveform plotting and 1 waveform plotting in each multiple window can be selected (2) Past waveforms obtained at the same conditions are held.</p>
<p>Max. number of graph planes</p>	<p>4 planes(*)((1))</p>	<p>Only 1 plane((2))</p>	<p>(2) Past waveforms obtained at the same conditions are held.</p>
<p>Selection of plot data</p>	<p>Select as desired from InputA to I and TASK1 to 4. Max. 4 waveforms (*)</p>	<p>Select a waveform as desired from InputA to I and TASK1 to 4.</p>	<p>-</p>

Browsing past waveforms	Not possible	Current waveform + past 4 waveforms can be retained and browsed/overwritten.	-
Common Specifications			
Vertical Scale	2 μ m/div, 5 μ m/div, 10 μ m/div, 20 μ m/div, ..., 20000mm/div		-
Auto-scale function	The vertical scale is automatically adjusted so that plotted data is enclosed.		-
Cursor information	Waveform data at a specified time is displayed.		This function is also supported on multiple waveforms. Can be displayed at all times.
Waveform save format	[Waveform data] Original data format, csv format (Note), [Settings data] Setting data when waveforms are obtained can be saved in csv file form.(Note)		(Note) Can be selected by selecting options when saving waveforms.

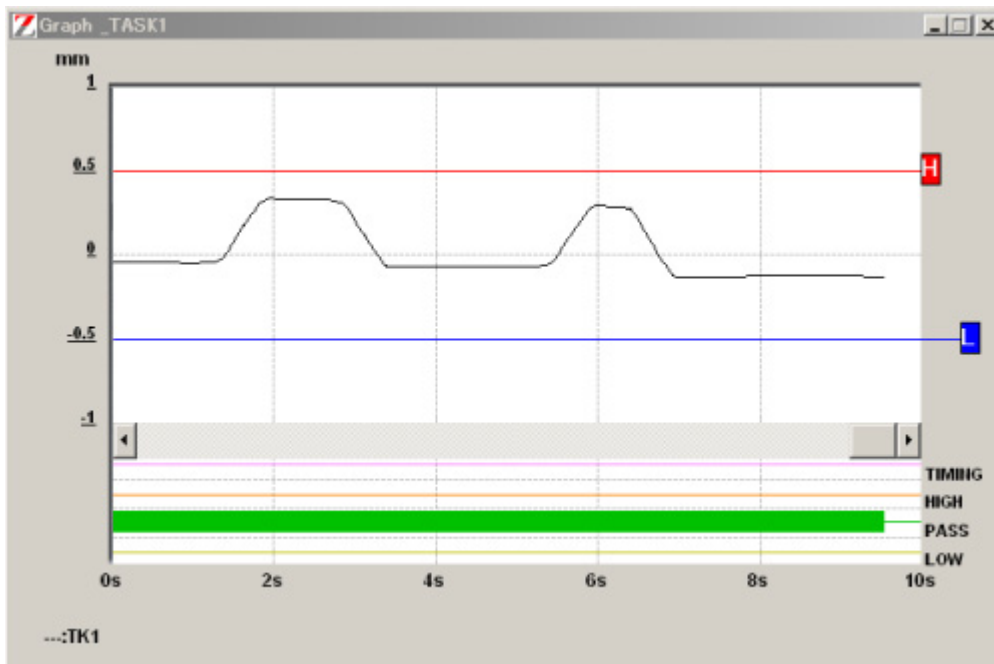
*: Waveforms may be broken off midway depending on the specifications of the personal computer.

Displaying the Waveform of the Measured Value as a Graph (Normal)

The following describes how to display a waveform of the measured values in the **[Normal]** mode.

Waveform Display Example

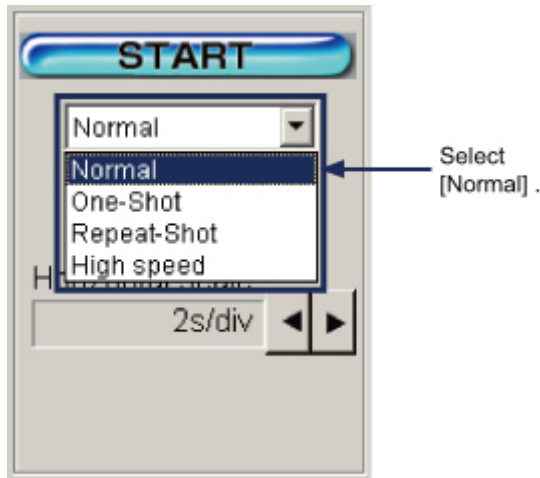
Clicking the **[START]** button displays the transition of measured values and the various outputs. Display is continued until the **[STOP]** button is clicked.



- In the case of one-shot waveforms, The previous and following waveform are displayed with the rising edge of the timing signal (or self-trigger) used as the trigger.

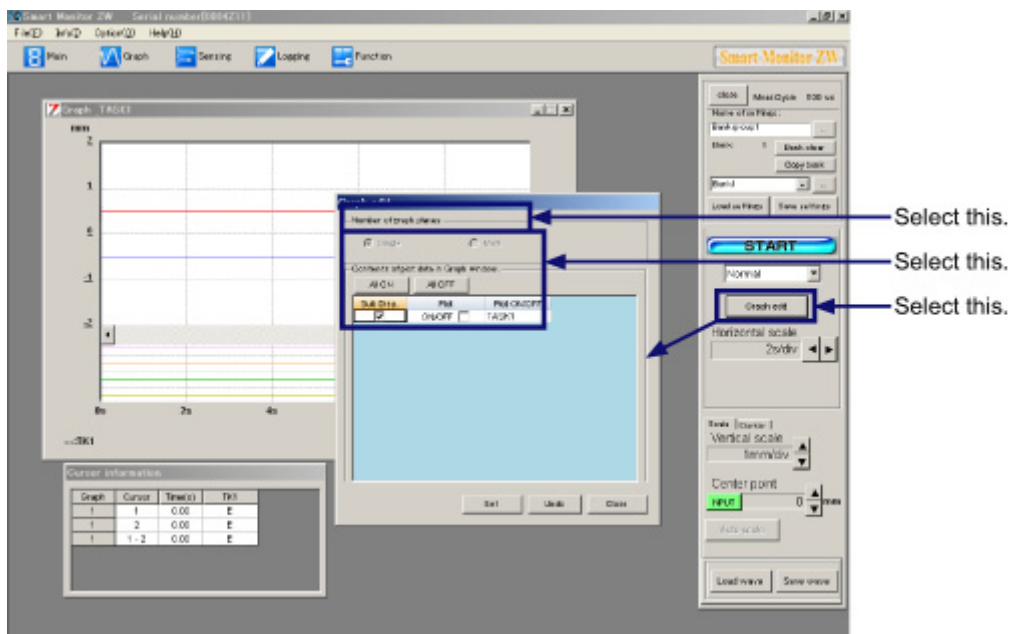
Operation Procedure

1. Display the [Graph] window, and select the [Normal] mode in the mode selection.



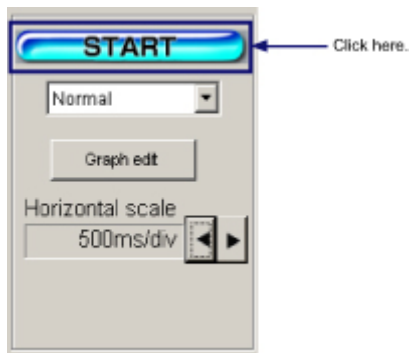
- **Normal**
Plots the waveform in real time.

2. Click the [Graph edit] button, and set the waveform plot mode in the [Graph edit] window.



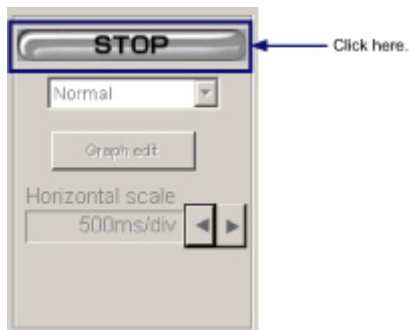
3. Click the [START] button.

Plotting of the waveform starts.



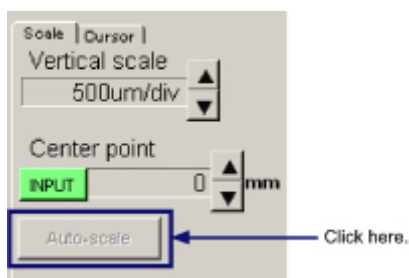
4. Click the [STOP] button.

Plotting of the waveform stops.



5. Click the [Auto-scale] button.

[Vertical Scale]/[Center Point] are automatically adjusted so that all waveforms currently in the graph plotting area are displayed.



[Vertical Scale]/[Center Point] can be set manually.

For details on how to manually set [Vertical Scale]/[Center Point], see "Changing Graph Display Scale and Center Point."

"Monitoring Waveform (Graph Window) > Observing/Editing Waveforms > ["Changing Graph Display Scale and Center Point"](#)"

6. Process and analyze the waveform.

The waveform can be saved or loaded, or values can be verified by the cursor.

Displaying One-shot Waveforms

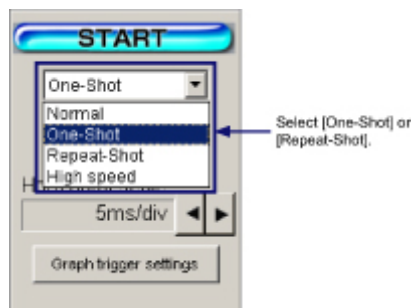
The following describes how to select the mode and set graphic triggers that are required when displaying a waveform of the measured values in the **[One-Shot]** mode or **[Repeat-Shot]** mode.

For details on other settings and the flow of settings in the **[Graph]** window, see "Displaying the Waveform of the Measured Value as a Graph (Normal)."

"Monitoring Waveform (Graph Window) > Sample Waveforms > [Displaying the Waveforms of Measured Values as a Graph \(Normal\)](#)"

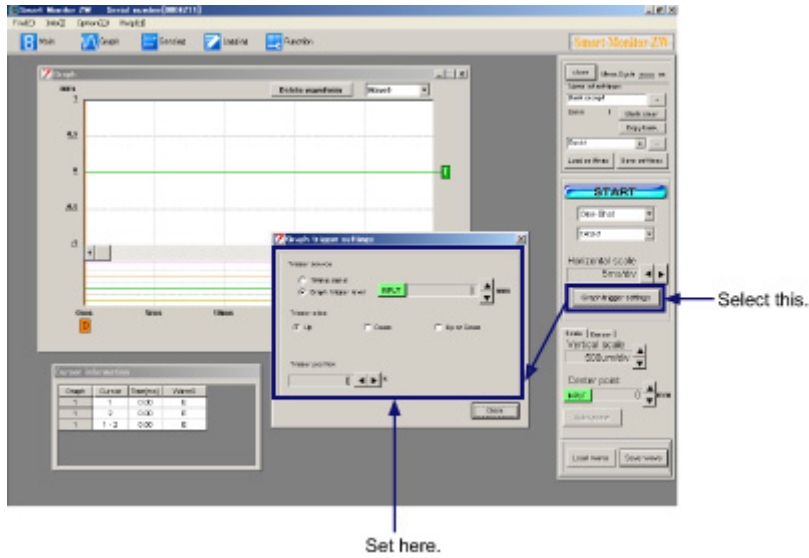
Operation Procedure

1. Display the **[Graph]** window, and select the **[One-Shot]** or **[Repeat-Shot]** mode in the mode selection.



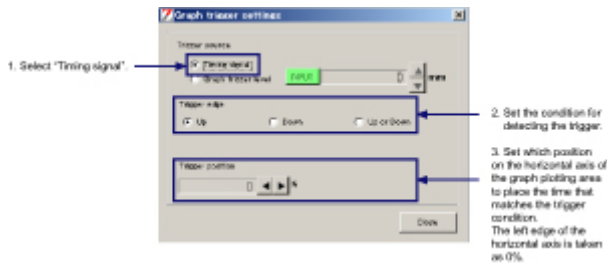
- **One-Shot**
Plots the waveform at a certain moment that satisfies the trigger conditions.
- **Repeat-Shot**
Repeatedly plots a one-shot waveform until the **[STOP]** button is cicked.

2. Set the trigger conditions in the [Graphic trigger settings] window.

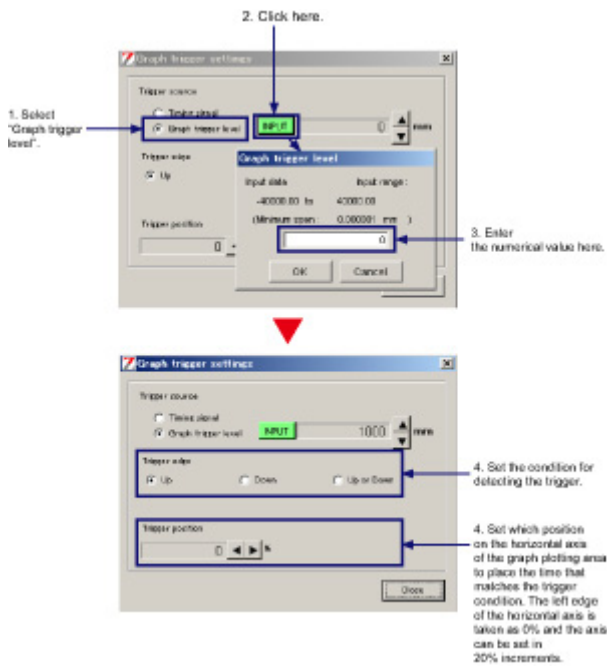


There are two types of graphic triggers, external signal triggers and self-triggers.

- **When starting waveform display by an external signal trigger**



- **When starting waveform display by a self-trigger**

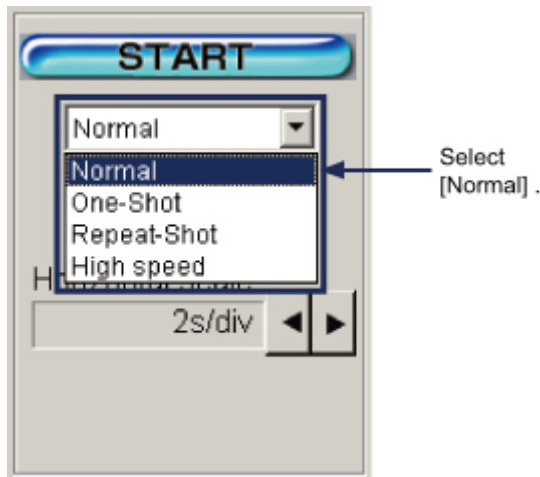


Displaying Multiple Waveforms as a Graph

The following describes how to display the waveforms of multiple TASKs in a single screen in the **[Normal]** mode.

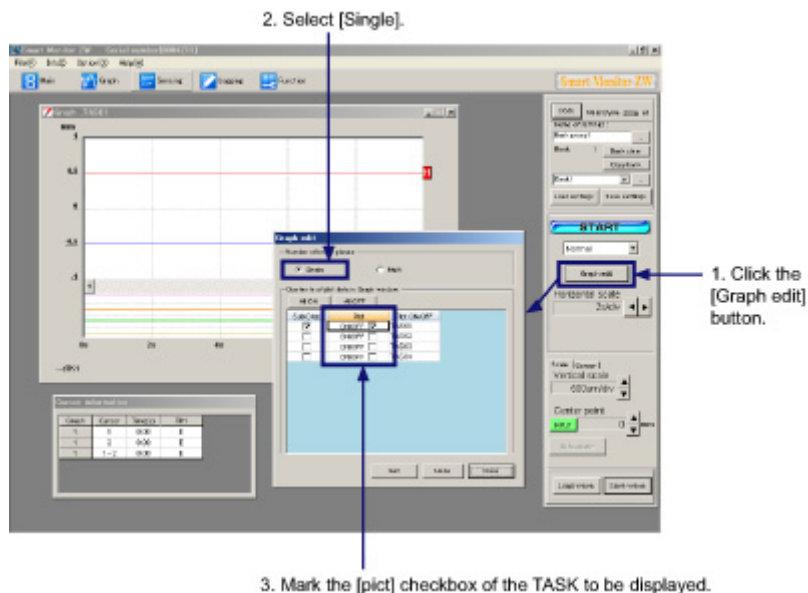
Operation Procedure

1. Display the **[Graph]** window, and select the **[Normal]** mode in the mode selection.



- **Normal**
Plots the waveform in real time.

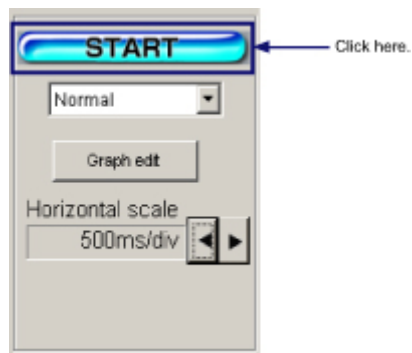
2. Click the **[Graph edit]** button, and set the waveform plot mode in the **[Graph edit]** window.



[Sub Disp.] displays the judgement result (HIGH/PASS/LOW) and timing input state. (This can be selected on only one of the TASKs.)

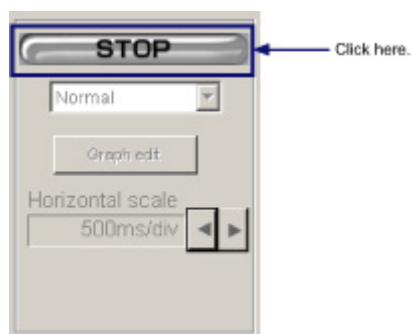
3. Click the [START] button.

Plotting of the waveform starts.



4. Click the [STOP] button.

Plotting of the waveform stops.



5. Set the graph plotting area so that the waveform display is appropriate.

For details on how to manually set [Vertical Scale]/[Center Point], see "Changing Graph Display Scale and Center Point."

"Monitoring Waveform (Graph Window) > Sample Waveforms > [Changing Graph Display Scale and Center Point](#)"

6. Process and analyze the waveform.

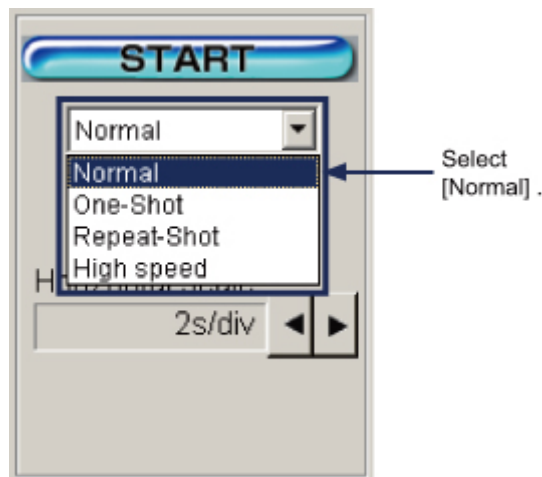
The waveform can be saved, loaded or values verified by the cursor.

Displaying Multiple Waveforms as a Graph in Multiple Screens

The following describes how to display the waveforms of multiple TASKs in multiple respective screens in the **[Normal]** mode.

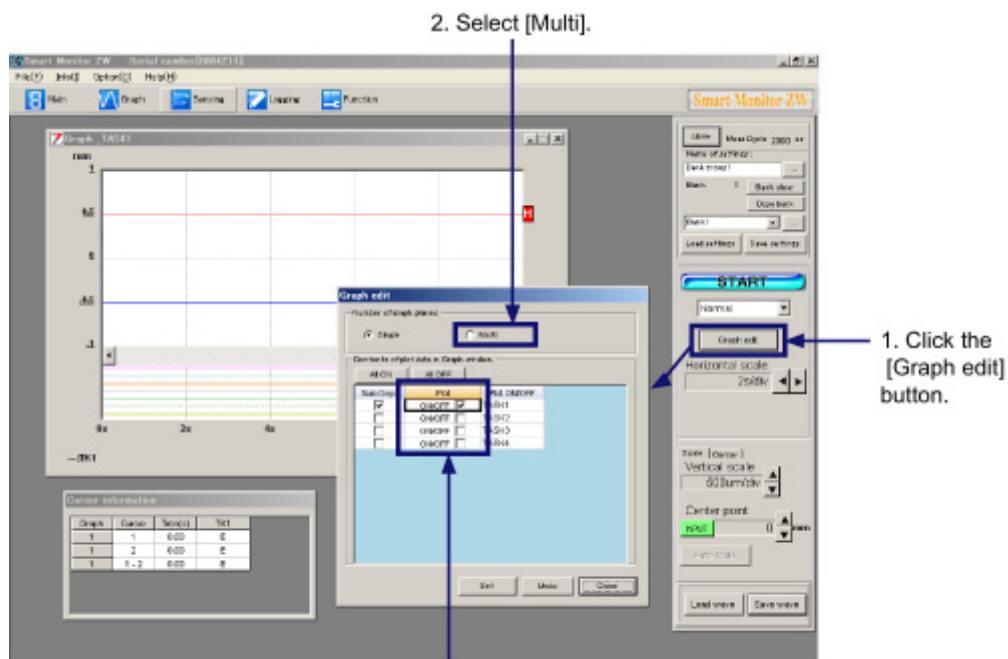
Operation Procedure

1. Display the **[Graph]** window, and select the **[Normal]** mode in the mode selection.



- **Normal**
Plots the waveform in real time.

2. Click the **[Graph edit]** button, and set the waveform plot mode in the **[Graph edit]** window.

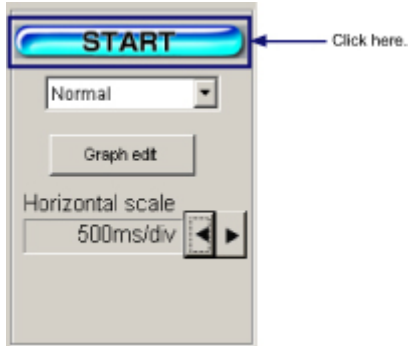


3. Mark the **[pic]** checkbox of the TASK to be displayed.

[Sub Disp.] displays the judgement result (HIGH/PASS/LOW) and timing input state.
(This can be selected on only one of the TASKs.)

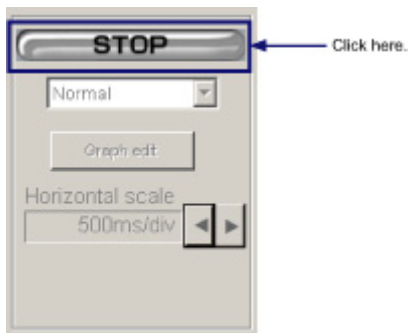
3. Click the [START] button.

Plotting of the waveform starts.



4. Click the [STOP] button.

Plotting of the waveform stops.



5. Set the graph plotting area so that the waveform display is appropriate.

For details on how to manually set **[Vertical Scale]/[Center Point]**, see "Changing Graph Display Scale and Center Point."

"Monitoring Waveform (Graph Window) > Sample Waveforms > [Changing Graph Display Scale and Center Point](#)"

6. Process and analyze the waveform.

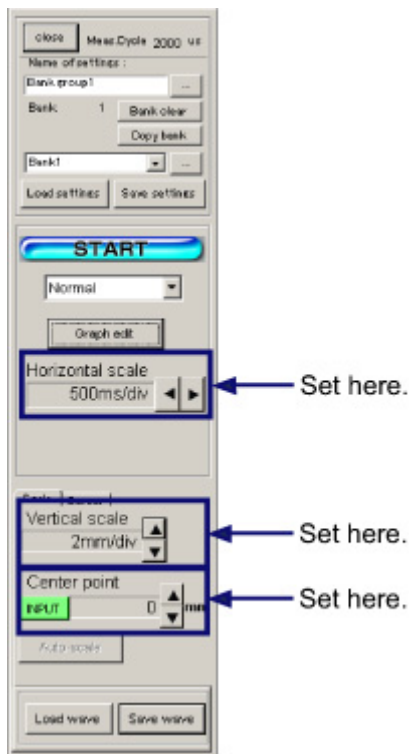
The waveform can be saved, loaded or values verified by the cursor.

Changing Graph Display Scale and Center Point

Here, you adjust the graph so that waveforms are displayed in an easier-to-view format.

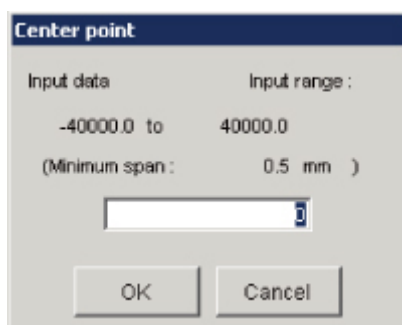
Operation Procedure

1. Determine [Vertical Scale]/[Horizontal Scale]/[Center Point] to suit the values of the waveform data to be measured.



Items	Description
Horizontal Scale	Set the horizontal axis scale of the graph to be plotted. This is applied to all waveforms.
Vertical Scale	Set the vertical axis scale of the graph plotting area.
Center Point	Set the center value of the vertical axis of the graph plotting area.

 Values can be entered directly by clicking the **[INPUT]** button at **[Center Point]**.
(input range: -40000 to 40000/minimum input increment: 0.5 mm)



Using the Cursor to Display the Value of Measurement Points

Here, you set the cursor.

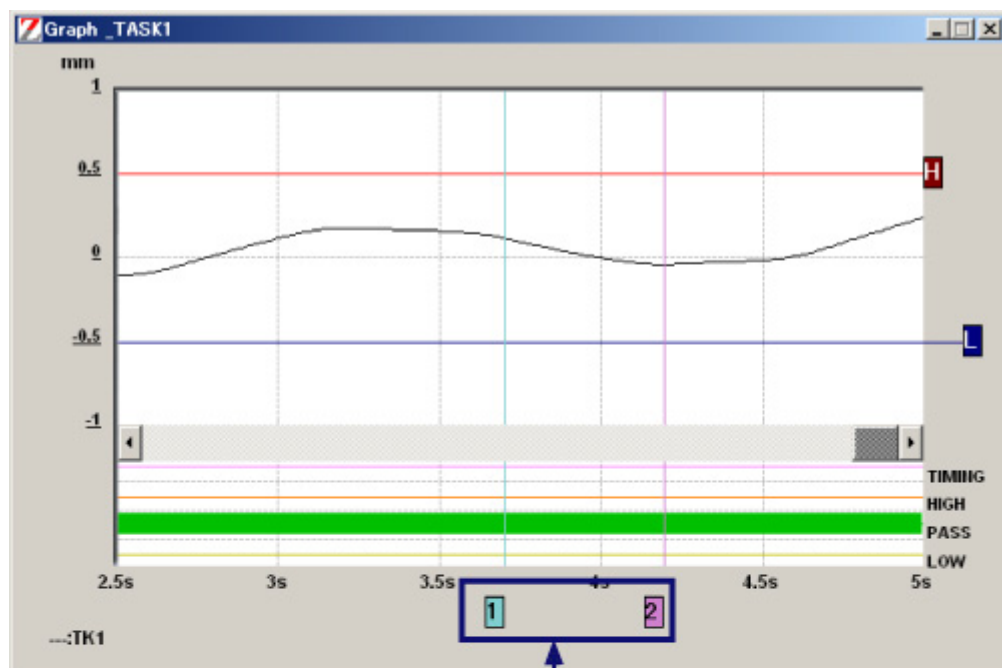
There are two ways of setting the cursor:

- **By dragging the cursor**
This method is used to investigate the distance value (minimum and maximum values) while viewing the graph.
- **By entering the time**
This method is used to learn the distance of an already determined time.

Operation Procedure

By dragging the cursor

1. Drag the cursor inside the graph plotting area.



Select [Cursor 1] or [Cursor 2] with the mouse and drag.

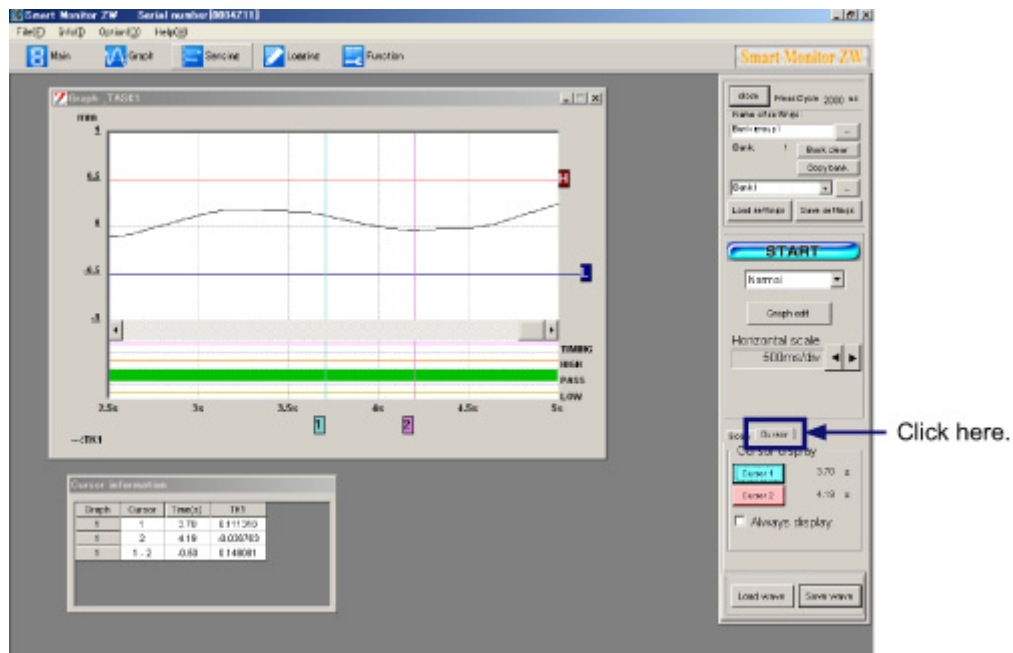


The value set at [Cursor 1] or [Cursor 2] is displayed in the [Cursor information] window.

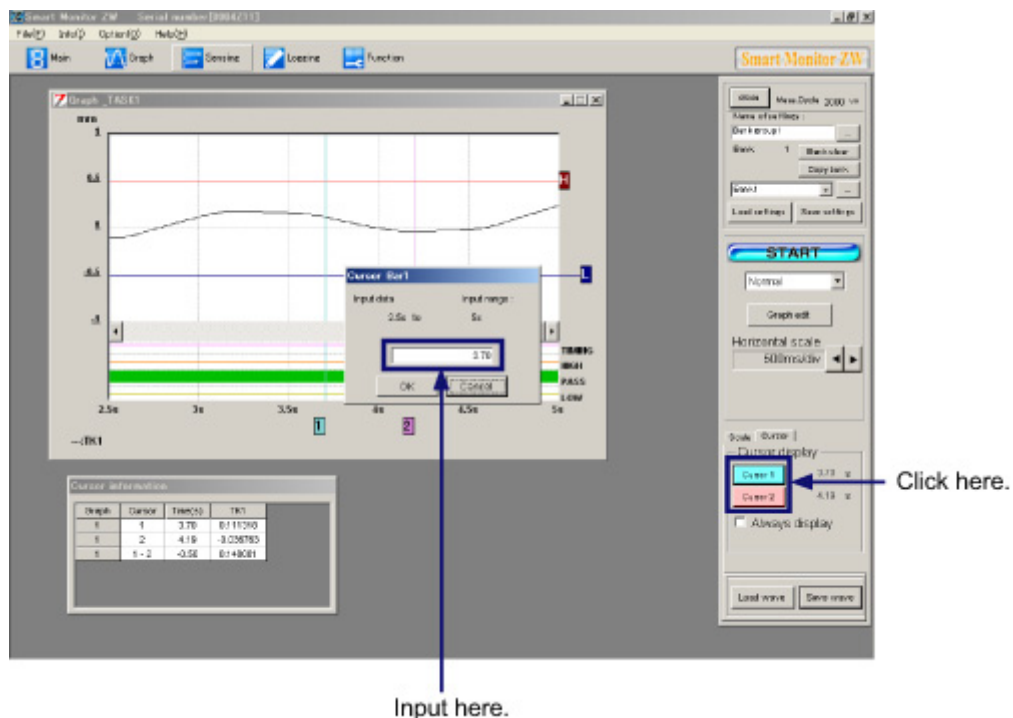
Cursor information			
Graph	Cursor	Time(s)	TK1
1	1	10.46	0.297732
1	2	10.87	0.512424
1	1-2	-0.41	-0.214692

By entering the time

1. Click the [Cursor] tab in the setting areas by individual windows.



2. Click [Cursor 1] or [Cursor 2] button, and enter the desired value in the [Cursor Bar1] or [Cursor Bar2] window to set the cursor position.



Displaying/Overwriting Past Waveforms

The following describes how to display past waveforms obtained in the [One-Shot] or [Repeat-Shot] mode in the [Graph] window.

 This function is enabled only in the [One-Shot] or [Repeat-Shot] mode.

Operation Procedure

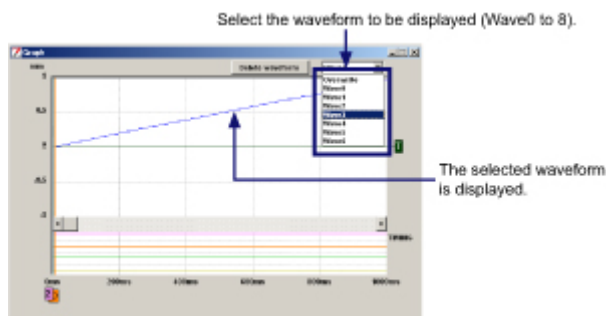
1. Obtain the waveform of the measured values in the [One-Shot] or [Repeat-Shot] mode.

For details on the operations of obtaining waveforms in the [One-Shot] or [Repeat-Shot] mode, see "Displaying One-shot Waveforms."

"Monitoring Waveform (Graph Window) > Sample Waveforms > [Displaying One-shot Waveforms](#)"

2. Display a past waveform obtained by "monitoring waveform (graph window)."

- To display a specified waveform



Setting items	Description
Wave0	Previously obtained waveform
Wave1 to 8	Wave1: Waveform immediately previous to Wave0 to Wave8: Waveform obtained 9 measurements previously to Wave0

Clicking the **[Delete waveform]** button deletes all waveforms currently stored in temporary memory.

- To overwrite the waveform display



Clicking the **[Delete waveform]** button deletes all waveforms currently stored in the temporary memory.

Saving/Loading Waveform Data

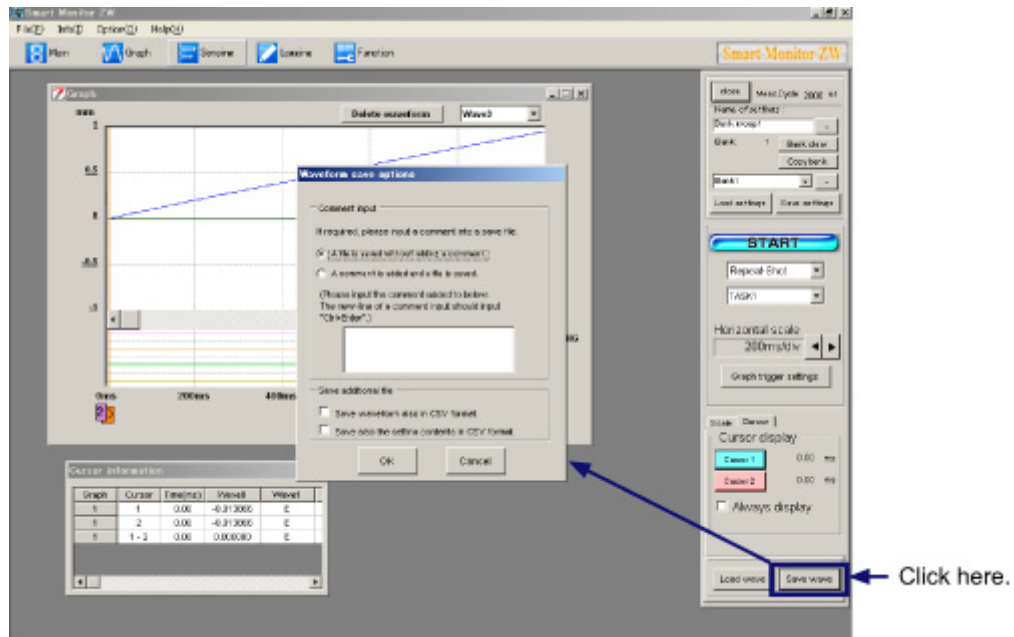
Waveforms displayed on screen can be saved to a file.

Waveforms saved to file can be loaded whenever needed for verification.

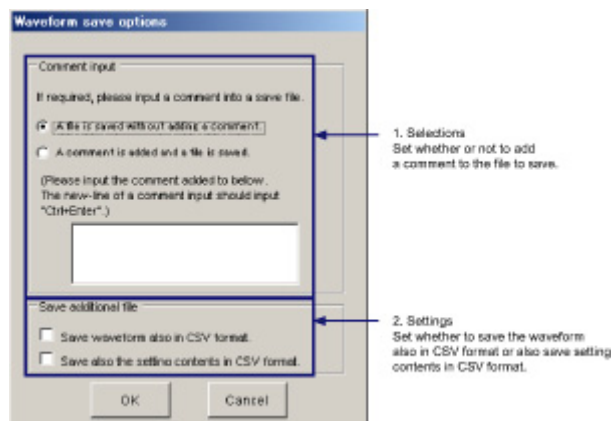
The following describes the procedure for saving and loading waveforms.

Procedure for Saving Waveforms

1. Display the [Waveform save options] window.



2. Set comment Input and save additional files.




1. Selections
Set whether or not to add a comment to the file to save.

2. Settings
Set whether to save the waveform also in CSV format or also save setting contents in CSV format.


Items	Description
Comment Input	<p>Select whether or not to add a comment to the file to save</p> <ul style="list-style-type: none"> A file is saved without adding a comment. The waveform is saved without adding a comment. A comment is added and a file is saved. The waveform is saved with a comment added. Enter comments in the entry field below.

Save additional file	<ul style="list-style-type: none"> • Save waveform also in CSV format. When this checkbox is marked, a graph file and CSV file are saved. If this checkbox is not marked, only the graph file is saved. • Save also the setting contents in CSV format. When this checkbox is marked, the settings and waveform are saved in CSV file format.
[OK] button	Saves the waveform at the settings you specified.
[Cancel] button	Cancels settings, and returns to the [Graph] window.


 CSV format files can also be output for handling in spreadsheet programs such as Microsoft Excel in addition to output in a file format for loading waveforms in Smart Monitor ZW.
 CSV files for graph data and CSV files for setting data can be output. Use these file formats selectively for preparing reports.

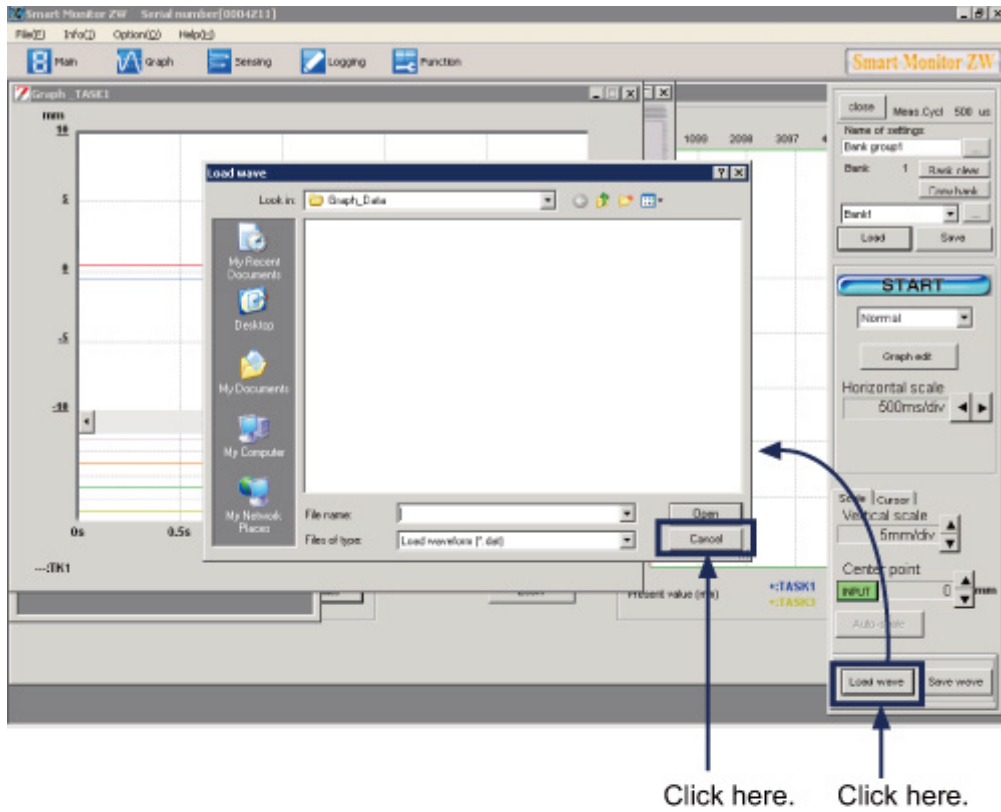
Procedure for Loading Waveforms

1. Click the **[Load Wave]** button and select the waveform file to load.

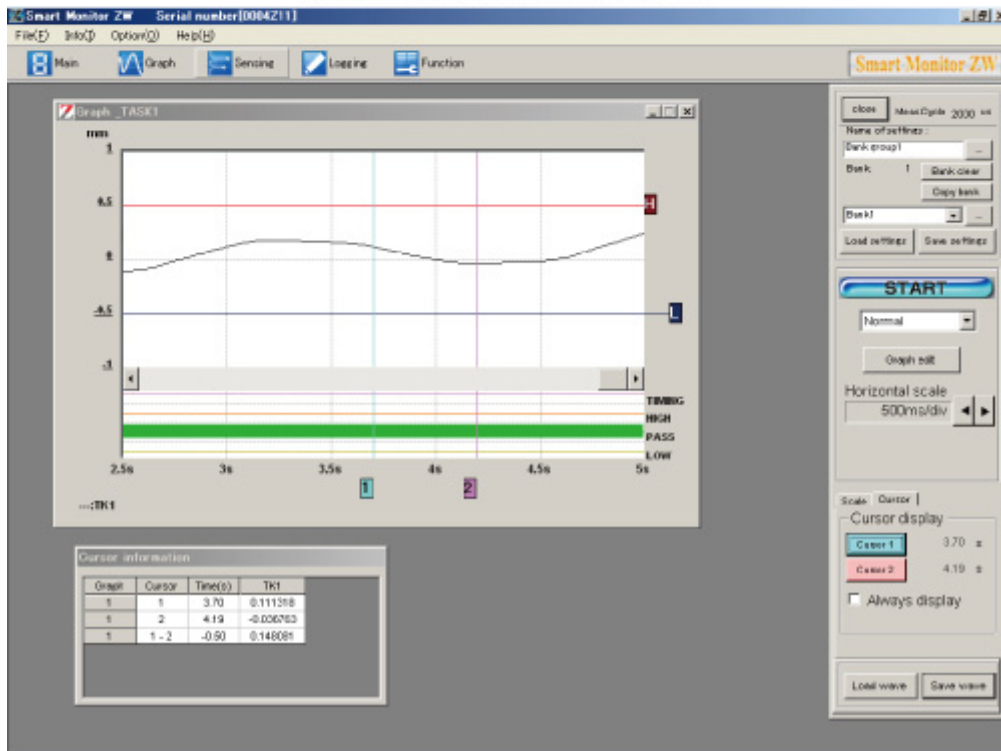

 When you click the **[Load Wave]** button while a waveform is displayed, the following dialog box will be displayed.



To save the currently displayed waveform, click the **[No]** button, save the waveform and then load the waveform again.



Displays the selected graph data.



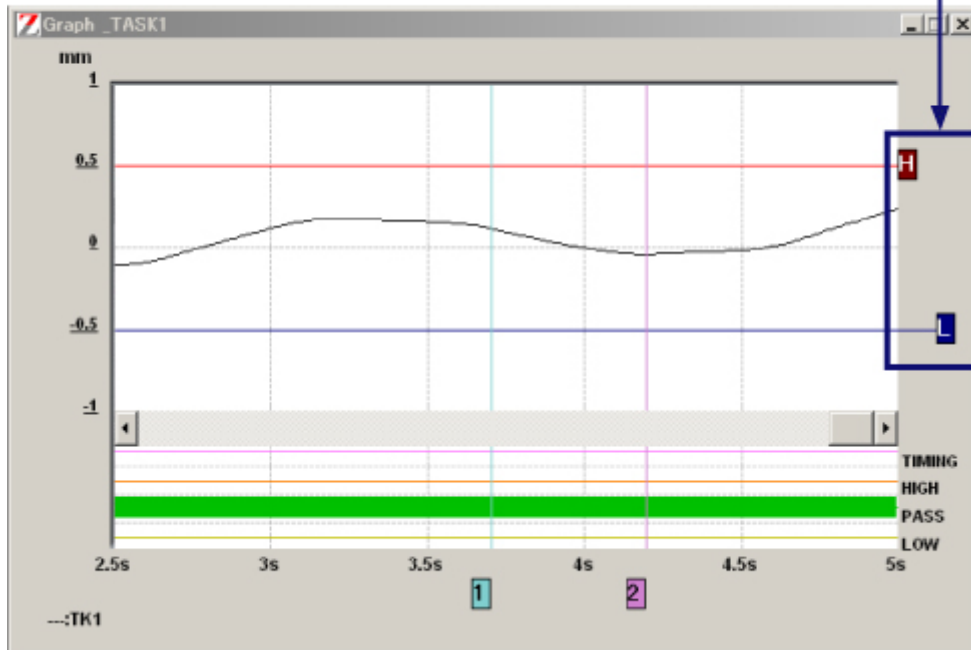
Changing Threshold Values

Threshold values can be changed based on the waveform.

Operation Procedure

1. Click the H or L threshold, and drag.

Click the H or L threshold, and drag.



2. In the confirmation dialog box, click the [Yes] button.

This changes the threshold value.



List of Functions

The following tables list all the functions that can be set for the controller.



Setting items marked in red are settings unique to Smart Monitor ZW. Other settings can also be set on controllers.

When the ZS-LDC is Connected

Basic setting

Only this setting enables stably measuring all measurement objects basically.

Items	Contents	Remarks
Material	Sets the type of workpiece to be measured.	User's Manual Chapter 3

Detailed setting

You can set more detailed parameters according to the condition and environment of a workpiece to be measured.

Please set this if you cannot obtain stable measured values.

Items	Contents	Remarks
Exposure mode	Sets the exposure time for the Sensor Head according to the condition of a workpiece surface.	User's Manual Chapter 5
Surface subject to exposure time control	Sets a reference plane used for adjusting an exposure time.	Detail
Noise cut level	Sets a level of noise reduction.	Detail
Surface for measurement	Sets the data acquisition interval.	Detail
Area select	Selects an area to be measured. Selecting Area 2 for any of the four TASKS moves to the 2-area mode.	
Surface for measurement1,2	Sets a plane to gain measured values within a selected area. * When "Thickness" of the measurement mode(TASK*) is selected, Measurement surface 2 is also set and its thickness is calculated.	
Operation parameter X,Y,K,m,n	Sets for the measurement mode(TASK*) "Calculation between Tasks". K+mX+nY	User's Manual Chapter 5

Displaying Line Brightness

The incident level (line brightness) during measurement can be displayed, and the sensing conditions can be set or changed while viewing whether the intensity is insufficient or saturated.

The line brightness area can also be specified to eliminate the influence of external light or to optimize the incident level to the front and rear surfaces.

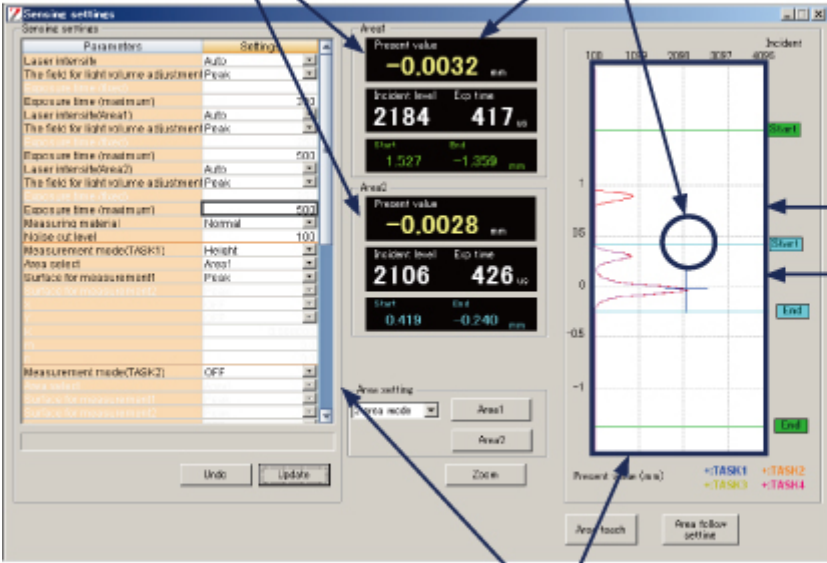
For details on how to adjust area, see "Adjusting Areas."

"Sensing Condition Settings (Sensing Window) > Advanced Setting Functions not Available on a Controller > [Adjusting Areas](#)"

 In the 2-area mode, the 1st area is displayed in green and the 2nd area is displayed in light blue.


Display the received light intensities specified for the surface subject to exposure time control.

The value where the amount of incident level peaks is displayed as the measured value.



The area can be specified.

The sensing conditions can be set while confirming the incident level of the Sensor Head.

 The measured value displayed on the sensing settings window is the value measured for the average count of 1 on the surface subject to exposure time control.

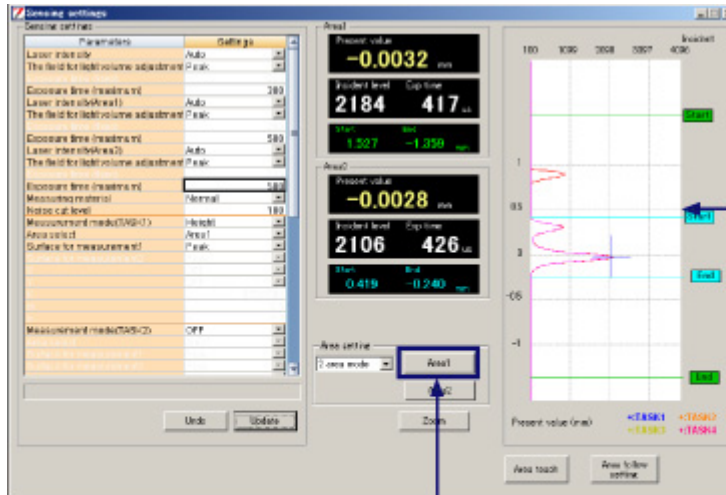
Adjusting Areas

The area used for measurement can be restricted.

The influence of external light can be eliminated by removing the section containing external light from the received light area.

When the measurement object is set to "Glass," measurement may not be performed correctly as measurement will be influenced by reflection from the rear surface. If this happens, set the measurement area of each measurement surface so that they can be correctly measured.

1. Set area 1 so that only the peak of the front surface is enclosed.



2. Area setting
Click the left mouse button on the line brightness display window to locate the upper left corner of the area. With the left mouse button clicked, drag the mouse and release the mouse at the bottom right position. This applies the bottom right of the area.

1. Click the [Area1] button.
(This operation changes the name of the button to [Update Area1].)
3. Click the [Update Area1] button.



- Set the area so that the location to be actually measured falls inside the area.
- The measuring cycle for the 2-area measurement mode is twice as long as the one for Area 1 or 2, which is longer than the other.

2. Set area 2 so that only the peak of the rear surface is enclosed.



2. Area setting
Click the left mouse button on the line brightness display window to locate the upper left corner of the area. With the left mouse button clicked, drag the mouse and release the mouse at the bottom right position. This applies the bottom right of the area.

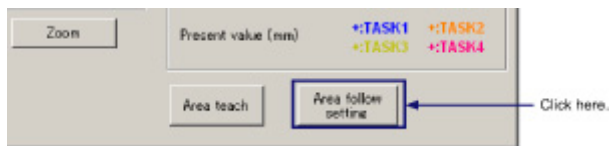
1. Click the [Area2] button.
(This operation changes the name of the button to [Update Area2].)
3. Click the [Update Area1] button.

Area Teaching

When using the 2 area mode, the area on the surface to measure (tracking surface) can be automatically set up based on the reference surface in area 1.

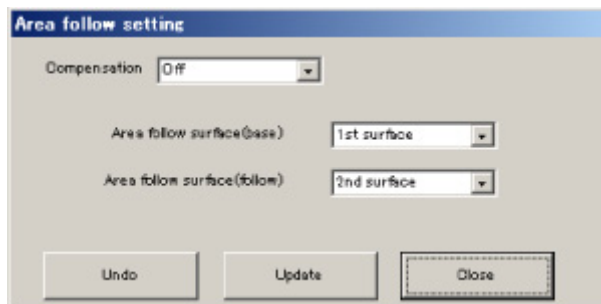
Operating Procedure

1. Click the [Area follow setting] button to open the set-up area tracking window.

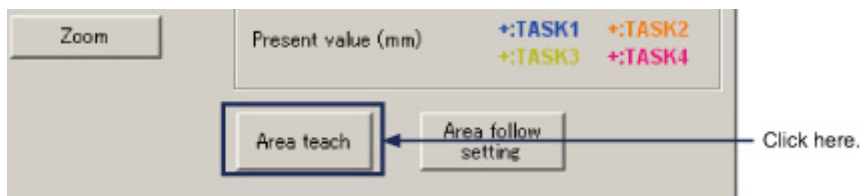


2. Set up the teaching conditions for area 2. After setting the conditions, press the [Update] button.

Parameter	Details
Compensation	This allows the measuring area in area 2 to automatically track based on the reference surface. OFF: The track function is disabled. Starting point: Allows area 2 to track only the starting point. Ending point: Allows area 2 to track only the ending point. Starting and ending points: Allows area 2 to track both the starting and ending points.
Area follow surface(base)	Select a surface from the 1st surface to the 4th surface as a reference for area 2 to automatically track.
Area follow surface(follow)	Select a surface to measure in area 2. The measuring area selected during area teaching is automatically set up.



3. Place a target to measure and press the [Area teaching] button.

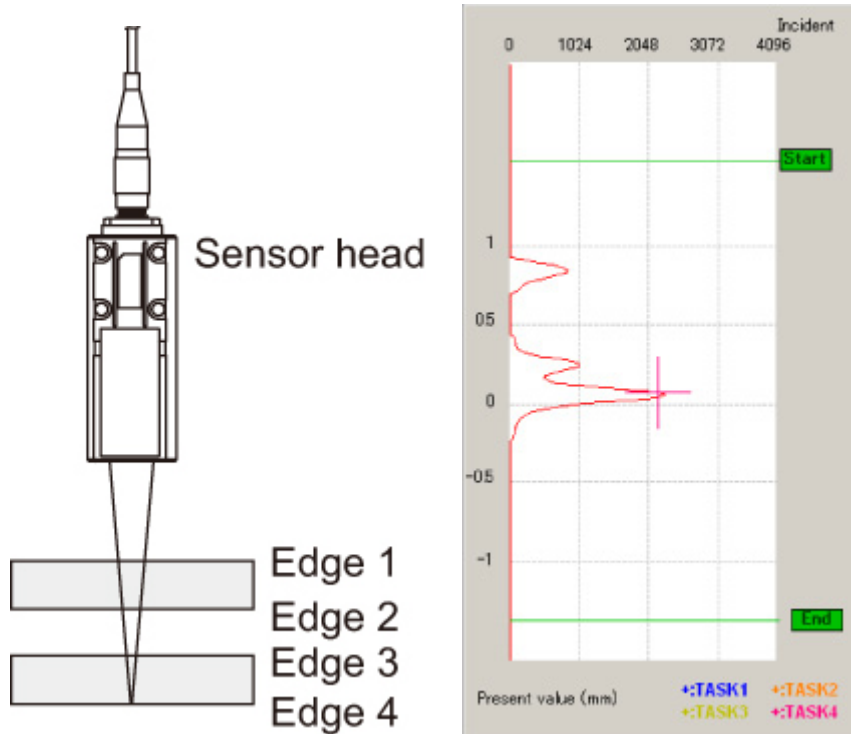


Setting Surface Subject to Exposure Time Control

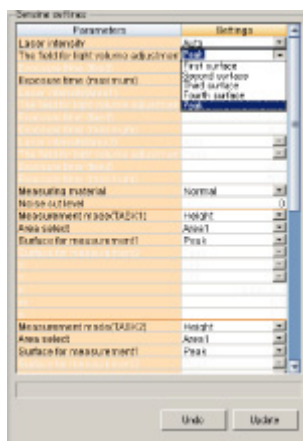
Surface subject to exposure time control

The adjustable parameter when measuring a transparent object.

You can measure an object with a stable received light amount to any plane.



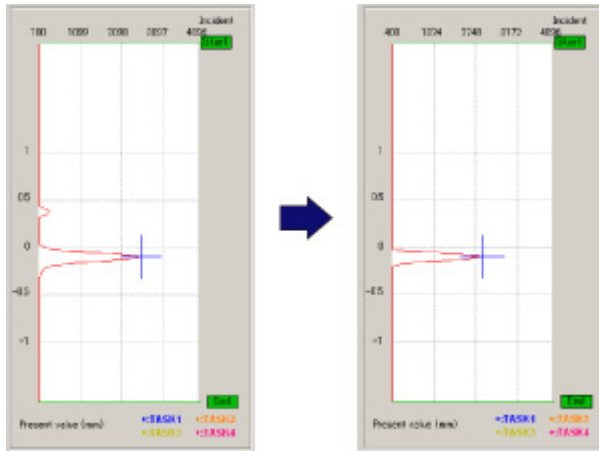
Operating Procedure



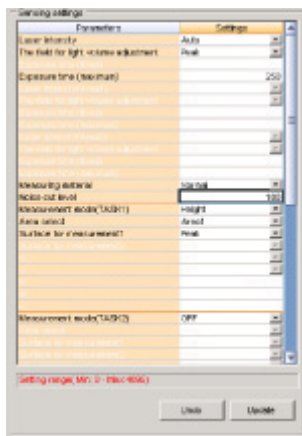
Surface subject to exposure time control	First edge	Adjusts exposure time based on the first plane from NEAR.
	Second edge	Adjusts exposure time based on the second plane from NEAR.
	Third edge	Adjusts exposure time based on the third plane from NEAR.
	Fourth edge	Adjusts exposure time based on the fourth plane from NEAR.
	Peak	Adjusts the exposure time based on a plane with the greatest received light amount in an area.

Setting the Noise Cut Level

You can cut noise by setting a larger value than the noise level.



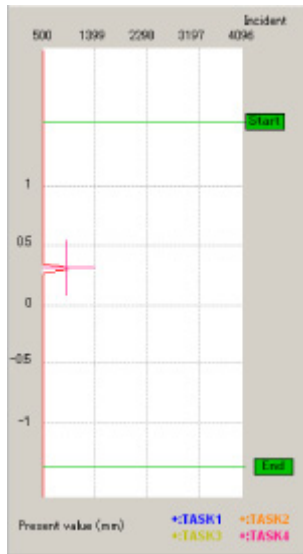
Operation Procedure



Settings	Description
Noise cut level	Enters the noise cut level (0 to 4095).

Notes

A too higher noise cut level makes a signal you want smaller, causing instability.



List of Functions

Setting items differ according to the controller. The following shows lists of functions that can be set by controller type.



Setting items marked in red are settings unique to Smart Monitor ZW. Other settings can also be set on controllers.

System

Item	Setting
Key lock	Key lock OFF, Lock
Decimal place	0dig, 1dig, 2dig, 3dig, 4dig, 5dig
Zero reset memory	OFF, ON
Bank mode	Standard, Judgment value
IP address	IP1.IP2.IP3.IP4 IP1: 1 to 233 IP2: 0 to 255 IP3: 0 to 255 IP4: 1 to 254
Subnet mask	SUB1.SUB2.SUB3.SUB4 SUB1: 0 to 255 SUB2: 0 to 255 SUB3: 0 to 255 SUB4: 0 to 255
Delimiter	CR, LF, CR+LF
Analog output	Voltage/Current output
Sensor Head calibration	Calibrates the Sensor Head. Refer to User's Manual. Calibrations conducted in an inappropriate environment may lead to failures in measurement.
Timing reset	Executes a timing reset.

System information

This provides four types of system information.

Controller version	Displays the version of the controller.
Controller MAC address	Displays the MAC address of the controller.
Controller type	Displays the type of the controller. ZW-XXX
Head serial number	Displays the head serial number.

Measurement(TASK1)

* The following parameters are also applied to TASK2 to TASK4:

Processing item	Parameter	Setting	Remarks
Scaling	Scaling mode	ON, OFF	Scaling setup window
	Span	-999.999999 to 999.999999	
	Offset	-999.999999 to 999.999999	
Median filter	Filter mode	OFF, LOW, MID, HIGH	
Average filter	Average count	1, 2, 4, 8, 16, 32, 64, 128, 256, 512, 1024, 2048, 4096	
Frequency filter	Filter type	OFF, Highpass filter, Lowpass filter, Band pass filter	
	Cut-off frequency	0 to 999.99999 (Hz)	
	Cut-off frequency (upper)	0 to 999.99999 (Hz)	
	Cut-off frequency (lower)	0 to 999.99999 (Hz)	
Differential filter	Filter mode	ON, OFF	Only when Mode is set to "ON"
	Diff cycle	1 to 5000	
Hold	Hold mode	Through, Peak, Bottom, Peak to peak, Auto peak, Auto bottom, Auto peak to peak, Average, Sample	When Trigger is set to "Self up/Self down"
	Trigger	External input, Self up, Self down	
	Trigger level	-999.999999 to 999.999999	
	Trigger hys	-999.999999 to 999.999999	
	Trigger delay	OFF, ON	
	Delay time	1 to 5000	
	Sampling time	1 to 5000	
Zero reset	Offset value	-999.999999 to 999.999999	
	Status	OFF, ON	
	Zero reset mode	Real value, Hold value	
Judgement	Low	-999.999999 to 999.999999	
	High	-999.999999 to 999.999999	

Measurement(I/O)

Processing item	Parameter	Setting	Remarks
Judgement(Setting)	Hysteresis	-999.999999 to 999.999999	
	Timer mode	OFF, OFF-Delay, ON-Delay, One shot	
	Delay time	1 to 5000	
	Output target	TASK1 to 4	
Non-measurement setting	Non-measurement setting	Keep, Clamp	
Analog output	Focus	ON, OFF	Monitor focus window
	1st point Distance Value	-999.999999 to 999.999999	
	2nd point Distance Value	-999.999999 to 999.999999	
	1st point Output Value (Current/Voltage)	4 to 20, -10 to 10	
	2nd point Output Value (Current/Voltage)	4 to 20, -10 to 10	
	Compensate output mode	ON, OFF	Linear output adjust window
	1st point Current/Voltage	4 to 20, -10 to 10	
	2nd point Current/Voltage	4 to 20, -10 to 10	
	1st point Adjustment Value	-999 to 999	
	2nd point Adjustment Value	-999 to 999	
	Output target data	None, TASK1, TASK2, TASK3, TASK4	
	Output type	Current output, Voltage output	
	Clamp output	MAX, 20 to 4 mA (by 1 mA); -10 to 10 V (by 1 V), MIN	
	Binary output	Output cycle	1 to 100
Clamp output		MIN, MAX	
GATE period		1 to 100	
Output target		None, Measured-value 1, Measured-value 2, Judgment result	
Target for measured values 1 to 4		ON, OFF	
Number of decimal places		0 to 6 digits	

Saving Settings to a Controller

The following describes the procedure for saving settings to a controller.



When the **[Update]** button is clicked in each settings screen, the settings are sent to the controller from the personal computer to update the controller's settings.

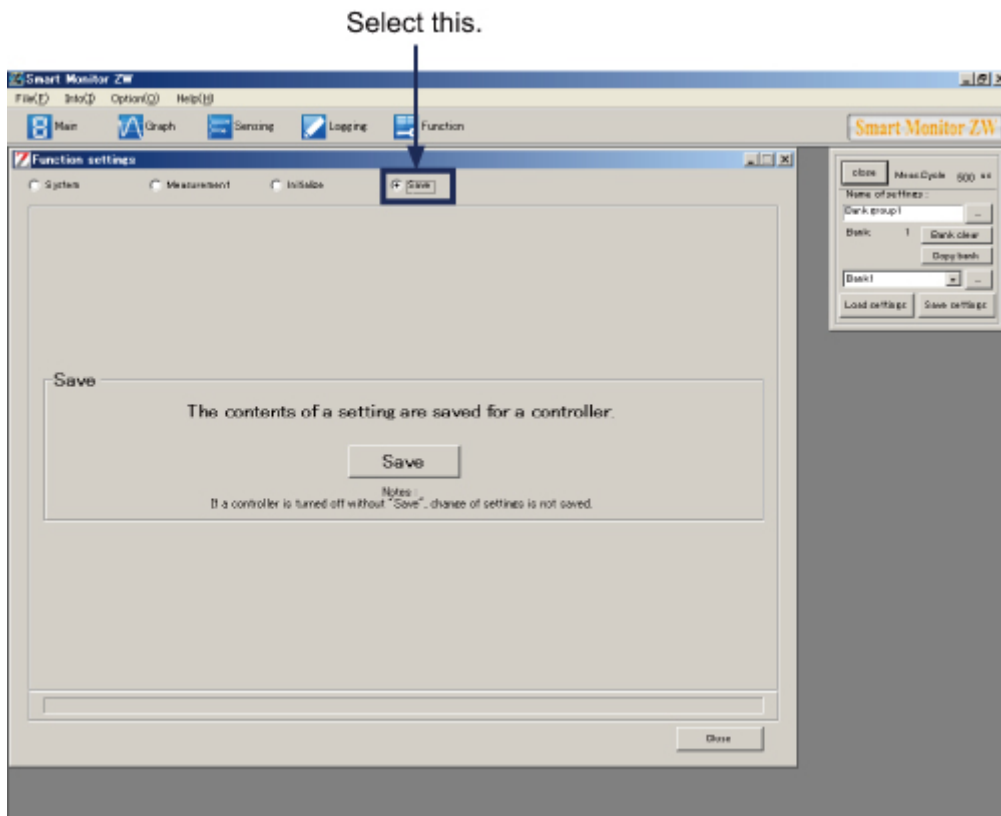
If you turn the controller off in this state, the settings will be cleared from memory.

To save settings on a controller, follow the procedure below.

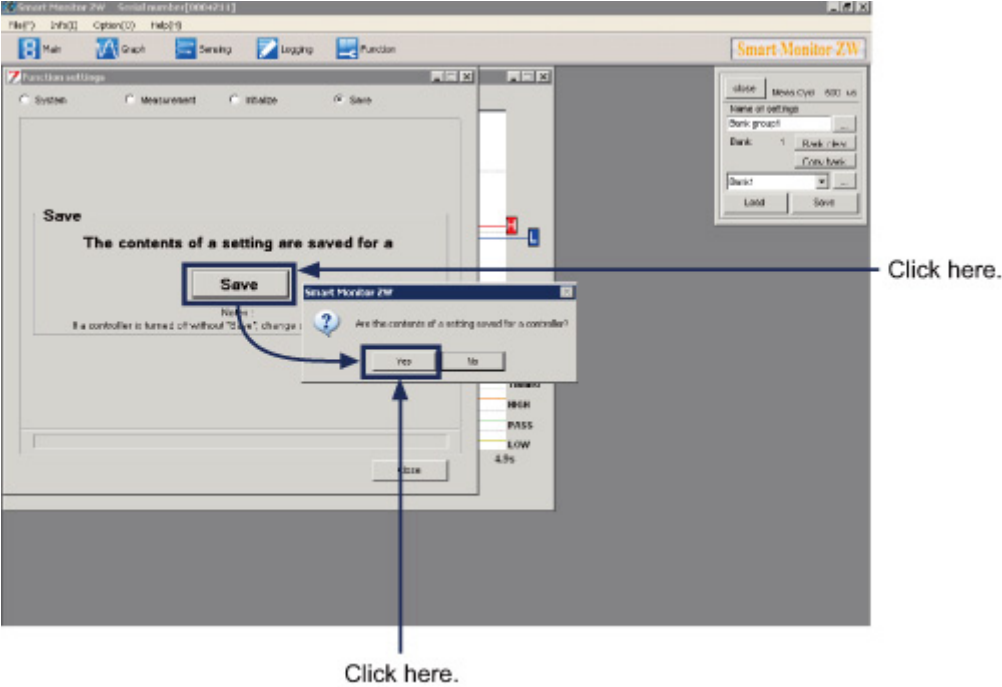
Operation Procedure

1. Select **[Save]** from the **[Function settings]** window.

The **[Function settings (save)]** dialog box appears.



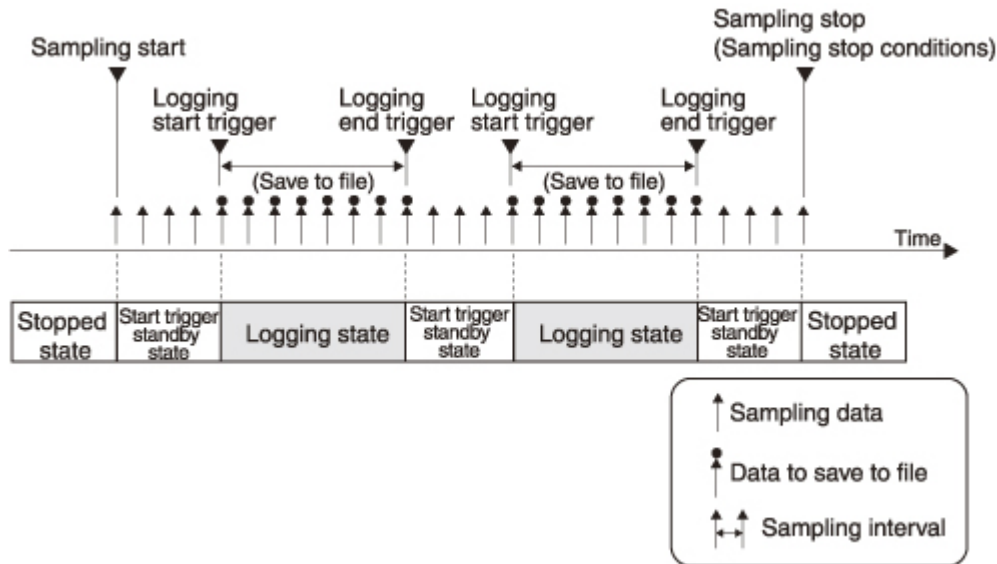
2. Click the [Save] button and then the [Yes] button in the confirmation dialog box.



Logging Function and Flow of Setup

Flow of Logging Operation

The following shows how data is logged.



1. Sampling start

When the **[START]** button is clicked in the **[Logging Standby]** window, logging is started. When logging is started, data is collected at the preset sampling interval. (At this stage, data is not yet saved to file.)

2. Generation of logging start trigger

When the logging start trigger is turned ON, saving of collected data to file starts.


3. Generation of logging end trigger

When the logging end trigger is turned ON, saving of collected data to file ends.

 Saving of data is performed from when the logging start trigger turns ON until the logging end trigger turns ON.

4. Generation of the logging start/end triggers is monitored until a sampling stop condition is generated.

When multiple start/end triggers are generated, you can set whether to save collected data to different files or overwrite one file with the latest data.

 The logging end trigger sometimes also satisfies the sampling stop condition at the same time (logging ends simultaneously with end of data saving).

5. Sampling stop

Collection of data stops when a sampling stop condition is generated.

List of Logging Window Specifications

Item	Specifications	Remarks
Sampling Interval	1 ms to 999.9 ms	The sampling interval can be set to any value regardless of the data to be logged.
Logging data	Select as desired from TASK1 to 4. Max. 4 data (*)	-
Possible number of logging points	Any number of points can be saved as long as there is enough free space on the personal computer's hard disk.	-
Possible logging time	Up to 24h can be set as the longest logging time.	-
Logging start trigger/ Logging end trigger	None	Logging is started without a trigger/ and is continued until the logging stop condition is satisfied.
	Pattern of I/O	Trigger target selection, Trigger edge selection, Delay Trigger setting
	Data Slope	Trigger target selection, Trigger edge selection, TriggerLevel setting, Delay Trigger setting
	Data Window	Trigger target selection, Trigger edge selection, TriggerLevel setting, Delay Trigger setting
	Clock	The clock is specified in hours/minutes/seconds.
	Elapsed time	The elapsed time is specified in hours/minutes/seconds/ms. This can be set only for the end trigger.
	Data number	The number of data after the start trigger is specified. 1 to 500000 This can be set only for the end trigger.
Delay Trigger	-9999 ms to 9999 ms (*)	This can be set only when one of Pattern of I/O, Data Slope or Data Window is selected at Start Trigger or End Trigger.
Sampling Stop conditions	Repeat times	1 to 10000 (times) When "0" is set, sampling is repeated endlessly.
	Elapsed time	The elapsed time is specified in hours/minutes/seconds. 1s to 24h -
Data Format	Whether or not to save flag data can be selected.	-

*: Waveforms may be broken off midway depending on the specifications of the personal computer.



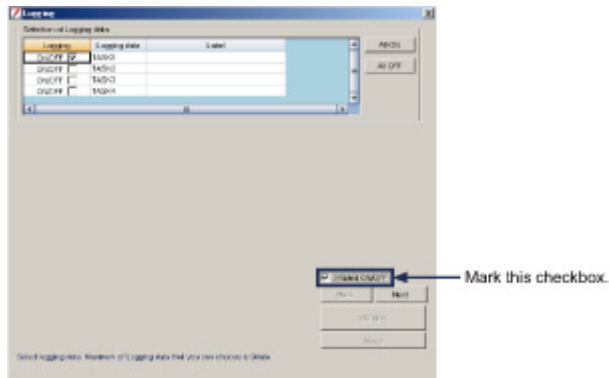
Logging files are divided up into sections of approximately 500 Mbytes in size. Pay attention to the number of data to be logged when executing logging as the maximum number of points that can be displayed on Microsoft(R) Excel is 65536.

About the Wizard Mode

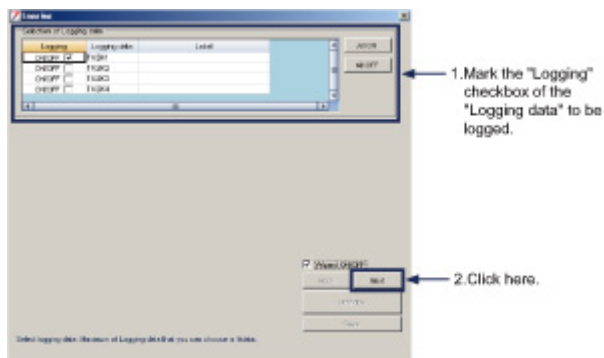
When the logging setting wizard is used, the setting items can be set in order.

Operation Procedure

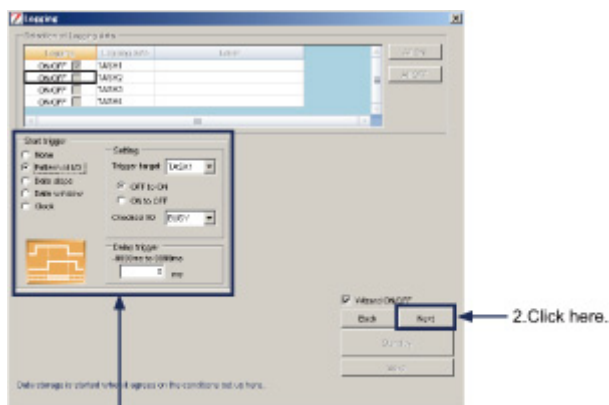
1. Mark the [Wizard ON/OFF] checkbox.



2. Select the logging data, and click the [Next] button.

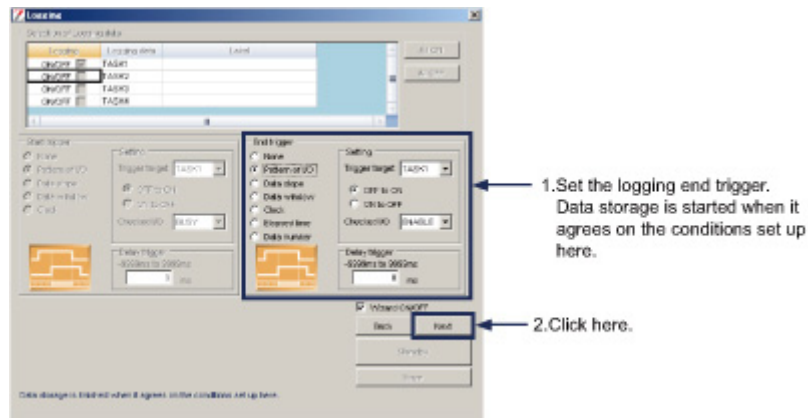


3. Set the logging start trigger, and click the [Next] button.

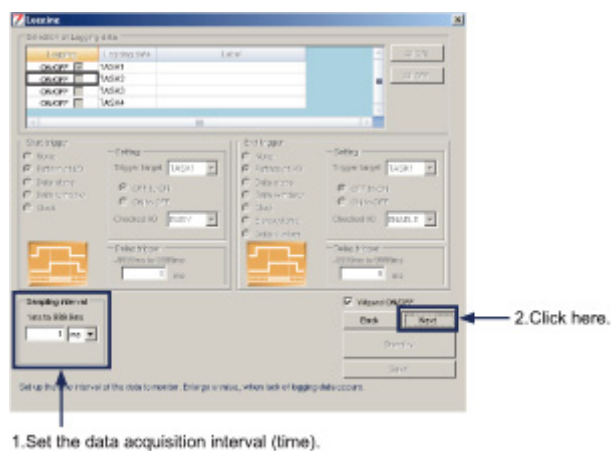


1. Set the logging start trigger.
Data storage is started when it agrees on the conditions set up here.

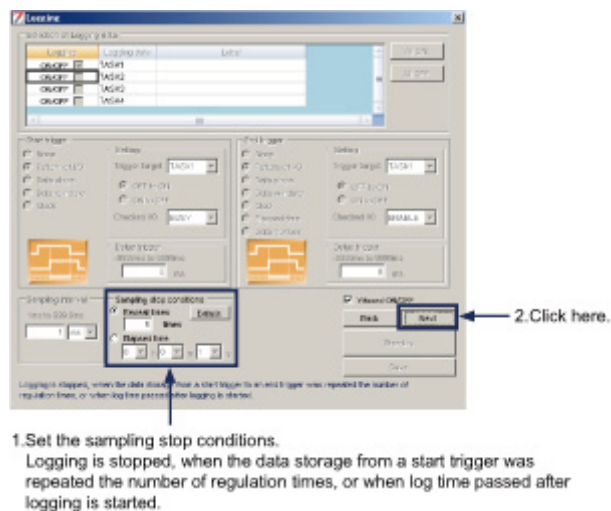
4. Set the logging end trigger, and click the [Next] button.



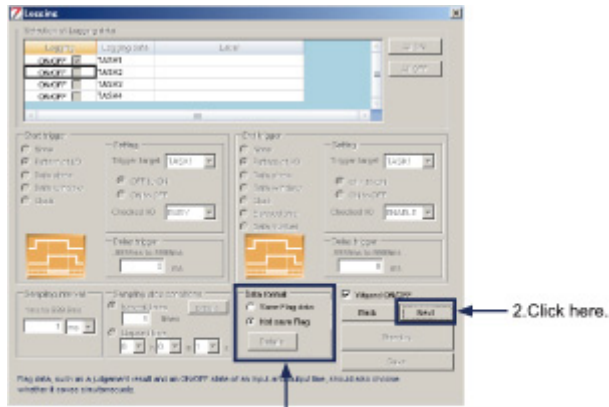
5. Set the sampling interval, and click the [Next] button.



6. Set the sampling stop conditions, and click the [Next] button.

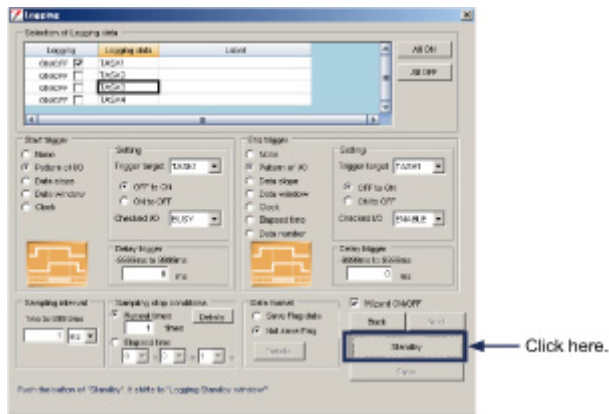


7. Set the data format, and click the [Next] button.



1. Flag data, such as a judgment result and an ON/OFF state of an input-and-output line, should also choose whether it saves simultaneously.

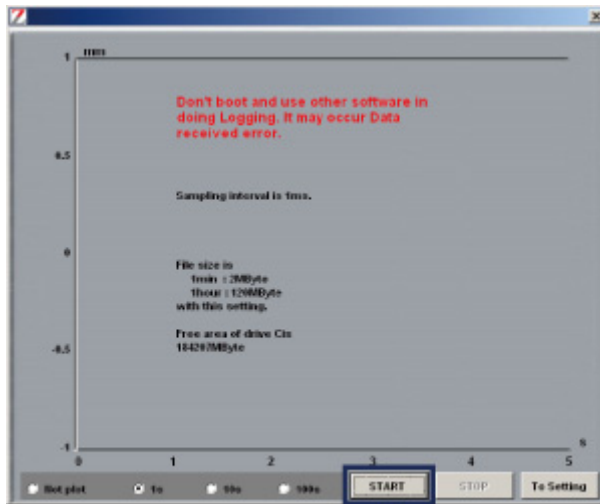
8. Click the [Standby] button.



9. In the confirmation window, click the [OK] button.

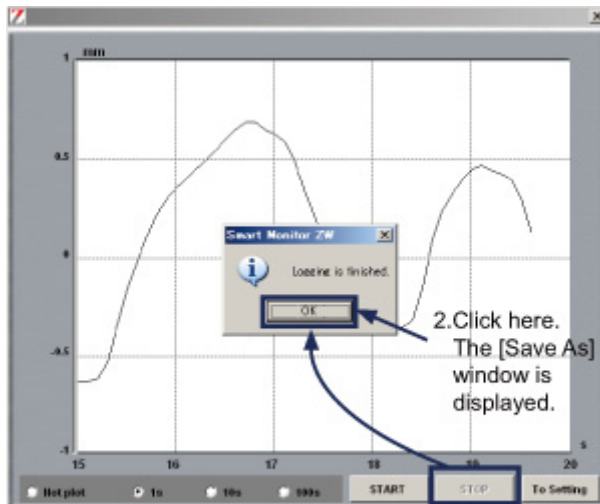


10. Click the [START] button to start logging.



↑
Click the [START] button.

11. Click the [STOP] button to stop logging.

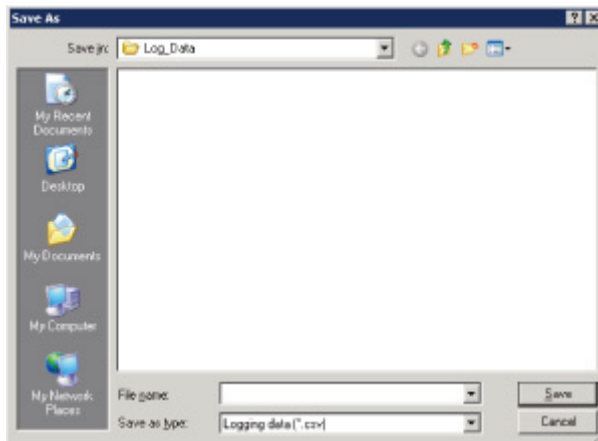


↑
1. Click here.

2. Click here.
The [Save As]
window is
displayed.

12. Save the logging data.

The default save destination is the Log_Data folder in the Smart Monitor ZW installation folder.



Setting Logging Data

Set the data to be logged.

Operation Procedure

1. Display the [Logging] window.

A list of the logging data is displayed.

2. Mark the checkbox of the TASK you want to log.

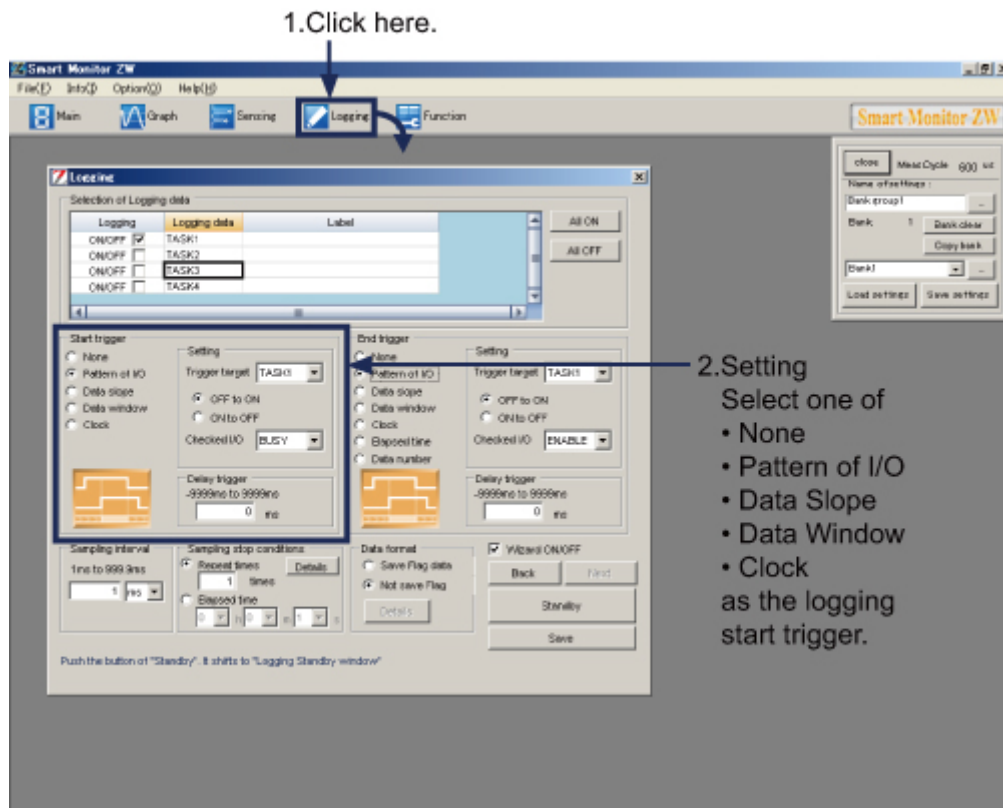
1. Click here.

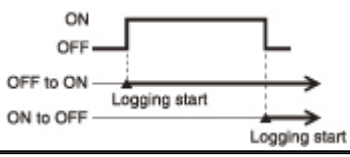
2. Mark the [Logging] checkbox at the "Logging data" to be collected.

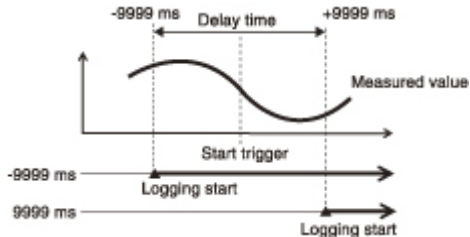
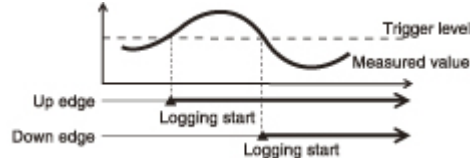
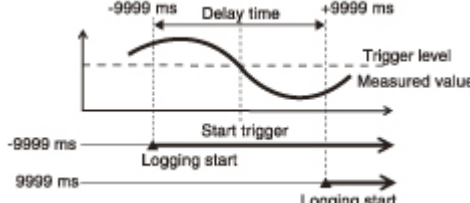
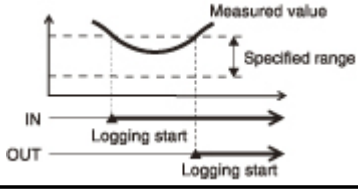
Setting Logging Start/End

Operation Procedure for Setting the Logging Start Trigger

1. Display the [Logging] window and set the logging start trigger.



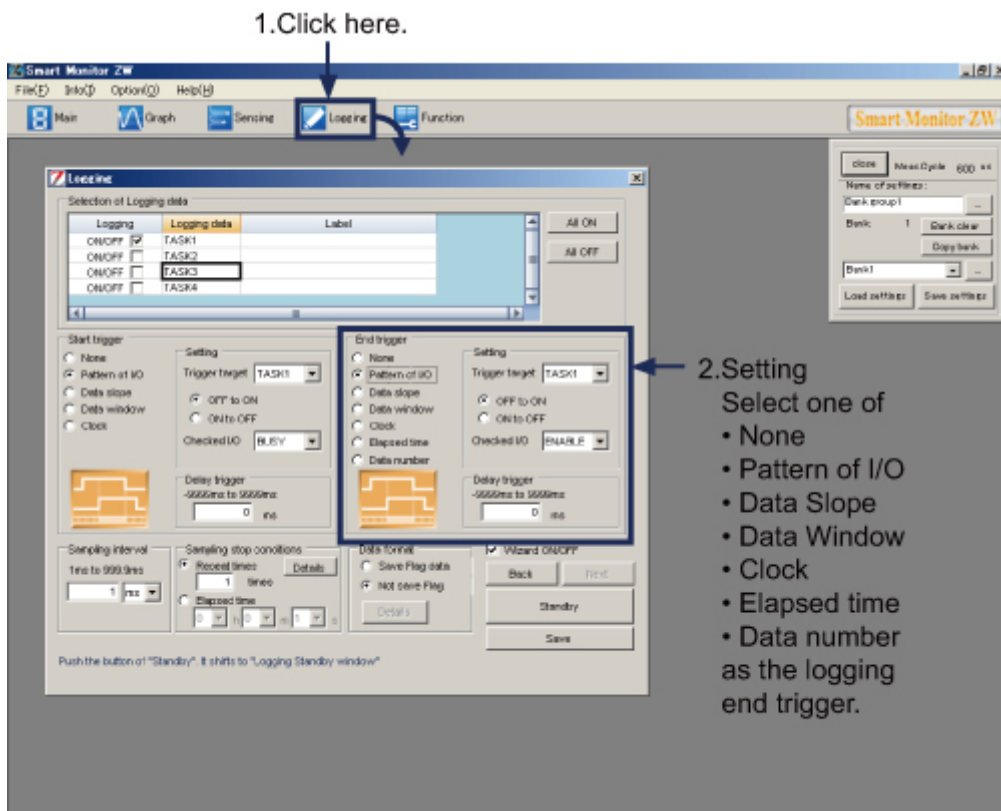
Selection item	Setting	Description
None		No triggers are set. Saving of data starts from the moment that the [START] button is clicked in the [Logging Standby] window.
Pattern of I/O	Trigger target	Set this item when you want to apply a trigger by the input result (e.g. trigger input) from a controller assigned as the trigger target or by the output result (HIGH/PASS/LOW, etc.). Select the trigger target to be used as the logging start trigger. Range: TASK1 to TASK4
	OFF to ON/ ON to OFF	Set which change in state of the signal, from ON to OFF or from OFF to ON, is to be taken as the trigger. Range: OFF to ON, ON to OFF (default: OFF to ON) 
	Checked I/O	Select which I/O signal on the selected trigger target is to be used as the logging start trigger. Range: BUSY, ENABLE, TIMING, ZERO, HIGH, PASS, LOW
		Set the delay time when you want to start logging a little before or a little

	Delay Trigger	<p>after the start trigger. Range: -9999 to 9999 (ms) (default: 0 ms)</p> 
Data Slope		<p>This item is for setting the change in the state of the data (measured value) as the logging start trigger. Set the trigger level. When the data falls above or below this preset trigger level value, this is taken to be the start trigger.</p>
	Trigger target	<p>Select the trigger target to be used as the logging start trigger. Range: TASK1 to TASK4</p>
	Up trigger/ Down trigger	<p>Select which edge, when the data exceeds the trigger level, or when the data falls below the trigger level to be used as the start trigger. Range: Up trigger, Down trigger (default: Up trigger)</p> 
	Delay Trigger	<p>Set the delay time when you want to start logging a little before or a little after the start trigger. Range: -9999 to 9999 (ms) (default: 0 ms)</p> 
Data Window		<p>This item is for setting the change in the state of the data (measured value) as the logging start trigger. Set the upper/lower limit value. When the measured value falls inside or outside of that range, this is taken to be the start trigger.</p>
	Trigger target	<p>Select the trigger target to be used as the logging start trigger. Range: TASK1 to TASK4</p>
	UpperLimit	<p>Set the upper limit value of the specified range. Range: -999.999 to 999.999</p>
	LowerLimit	<p>Set the lower limit value of the specified range. Range: -999.999 to 999.999</p>
	WindowIn/ WindowOut	<p>Select which measured value inside or outside the specified range is to be used as the start trigger. Range: WindowIn, WindowOut (default: WindowIn)</p> 
		<p>Set the delay time when you want to start logging a little before or a little after the start trigger. Range: -9999 to 9999 (ms) (default: 0 ms)</p>

	<p>Delay Trigger</p>	<p>The diagram illustrates the timing of a delay trigger. A measured value curve is shown with a dip that falls within a specified range. A delay time of 9999 ms is indicated between the start of the specified range and the start of logging. The start trigger occurs at -9999 ms, and logging starts at 9999 ms.</p>
<p>Clock</p>	<p>This item is for setting the time (xx h, xx m, xx s) that logging is to be started.</p>	

Operation Procedure for Setting the Logging End Trigger

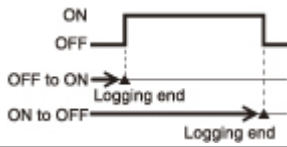
1. Display the [Logging] window and set the logging end trigger.



2. Setting
Select one of

- None
- Pattern of I/O
- Data Slope
- Data Window
- Clock
- Elapsed time
- Data number

as the logging end trigger.

Selection item	Setting	Description
None		No triggers are set. Saving of data stops from the moment that the [STOP] button is clicked in the [Logging Standby] window.
Pattern of I/O	Trigger target	Select the trigger target to be used as the logging end trigger. Range: TASK1 to TASK4
	OFF to ON/ ON to OFF	Set which change in state of the signal, from ON to OFF or from OFF to ON, is to be taken as the trigger. Range: OFF to ON, ON to OFF (default: OFF to ON) 
	Checked I/O	Select which I/O signal on the selected trigger target is to be used as the end trigger. Range: BUSY, ENABLE, TIMING, ZERO, HIGH, PASS, LOW
	Delay Trigger	Set the delay time when you want to start logging a little before or a little after the end trigger. Range: -9999 to 9999 (ms) (default: 0 ms)
		This item is for setting the change in the state of the data (measured value) as the logging end trigger. Set the trigger level. When the data falls above

		or below this preset trigger level value, this is taken to be the end trigger.
Data Slope	Trigger target	Select the trigger target to be used as the logging end trigger. Range: TASK1 to TASK4
	Up trigger/ Down trigger	Select which edge, when the data exceeds the trigger level, or when the data falls below the trigger level to be used as the end trigger. Range: Up trigger, Down trigger (default: Up trigger)
	Delay Trigger	Set the delay time when you want to start logging a little before or a little after the end trigger. Range: -9999 to 9999 (ms) (default: 0 ms)
Data Window		This item is for setting the change in the state of the data (measured value) as the logging end trigger. Set the upper/lower limit value. When the measured value falls inside or outside of that range, this is taken to be the end trigger.
	Trigger target	Select the trigger target to be used as the logging end trigger. Range: TASK1 to TASK4
	UpperLimit	Set the upper limit value of the specified range. Range: -999.999 to 999.999
	LowerLimit	Set the lower limit value of the specified range. Range: -999.999 to 999.999
	WindowIn/ WindowOut	Select either of the measured value inside or outside the specified range is to be used as the end trigger. Range: WindowIn, WindowOut (default: WindowIn)
	Delay Trigger	Set the delay time when you want to end logging a little before or a little after the end trigger. Range: -9999 to 9999 (ms) (default: 0 ms)
Clock		This item is for setting the time (xx h, xx m, xx s) that logging is to end.
Elapsed time		Set the time (xx h, xx m, xx s) from the start trigger up to the end trigger. Data logging ends when the preset time is reached since the start trigger.
data number		Set the number of data points to acquire. Data logging ends when the preset number of data points has been got since start of logging.

Setting the Sampling Interval

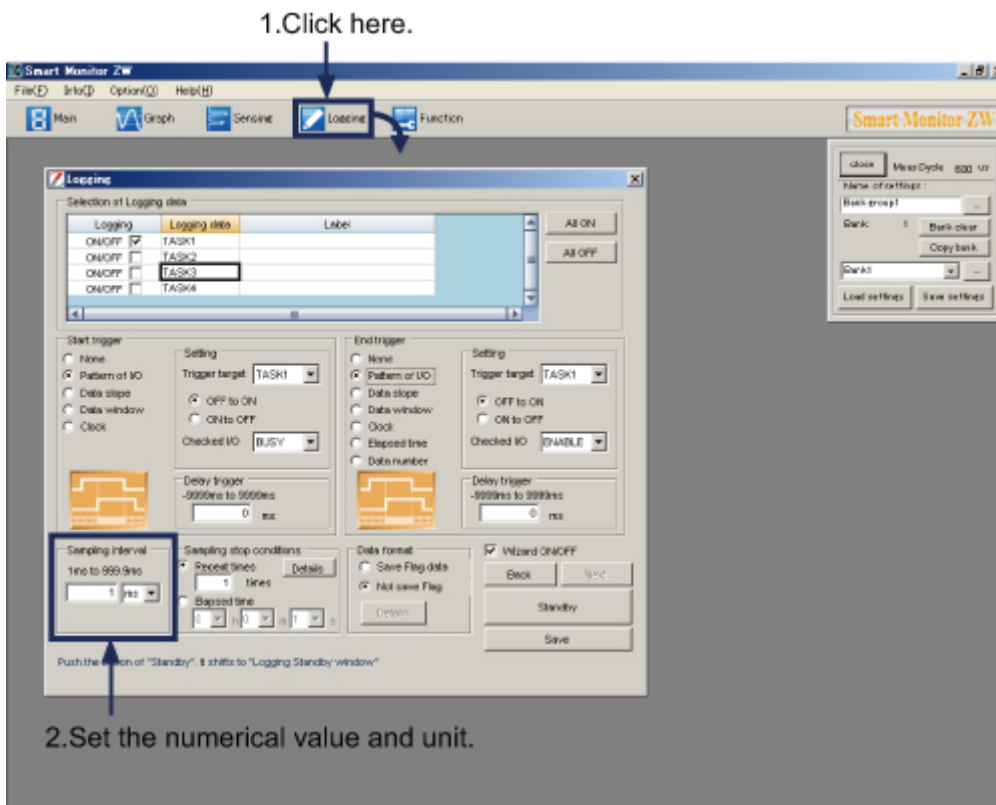
Set the data acquisition interval.

 Note that even if a time shorter than the measurement cycle is set, sampling is performed only at each measurement cycle of the controller.

Operation Procedure

1. Display the [Logging] window and set the sampling interval.

1. Click here.



2. Set the numerical value and unit.

Item		Description
Numerical Value	Unit	
1 to 999.9	ms	Set the data acquisition interval. The numerical value that can be set differs according to the unit.
1 to 3600	s	
1 to 60	min	

Setting the Sampling Stop Conditions

Logging ends when the preset start trigger to end trigger sequence has been repeated for the specified count or when the log time has elapsed since logging was started.

Operation Procedure

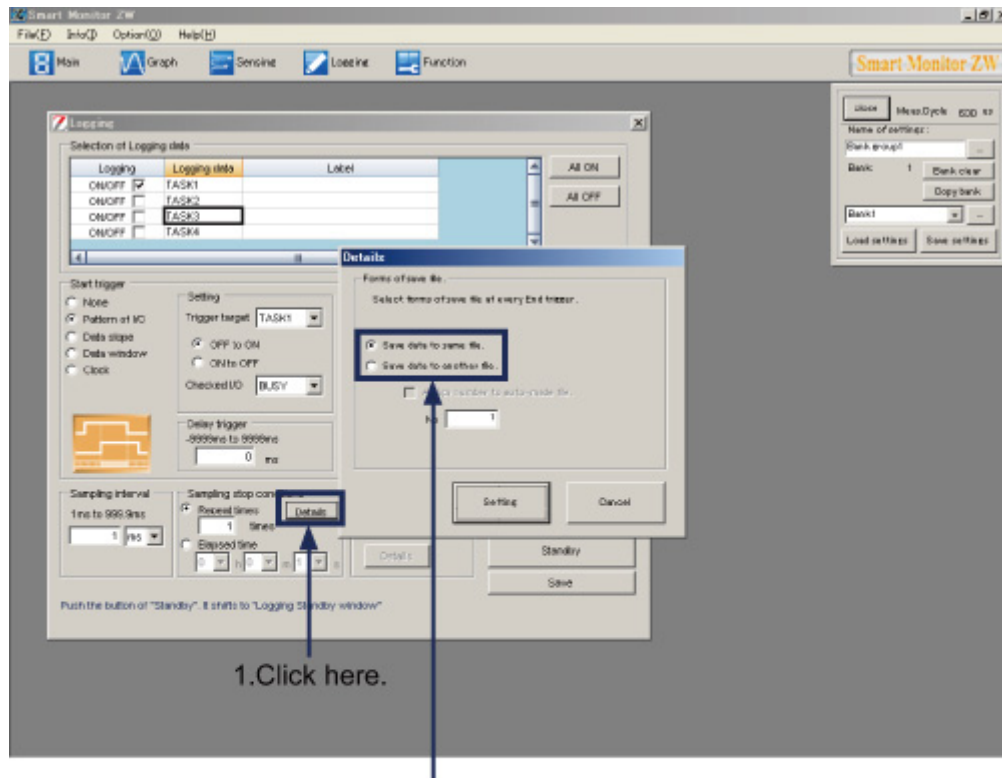
1. Display the [Logging] window and set the sampling stop conditions.

1. Click here.

2. Selection
Select one of
• Repeat times
• Elapsed time
as the sampling stop conditions.

Setting item	Description
Repeat times	Set how many times the start trigger to end trigger sequence is to be executed. Sampling stops when the preset start trigger to end trigger sequence count is repeated. (default: 1)
Elapsed time	Stops sampling when the specified time has elapsed since the start of logging.

2. Set the file save form for each trigger end.



1. Click here.

2. Selection

Select one of

- Save data to same file
 - Save data to another files
- as the forms of save file.

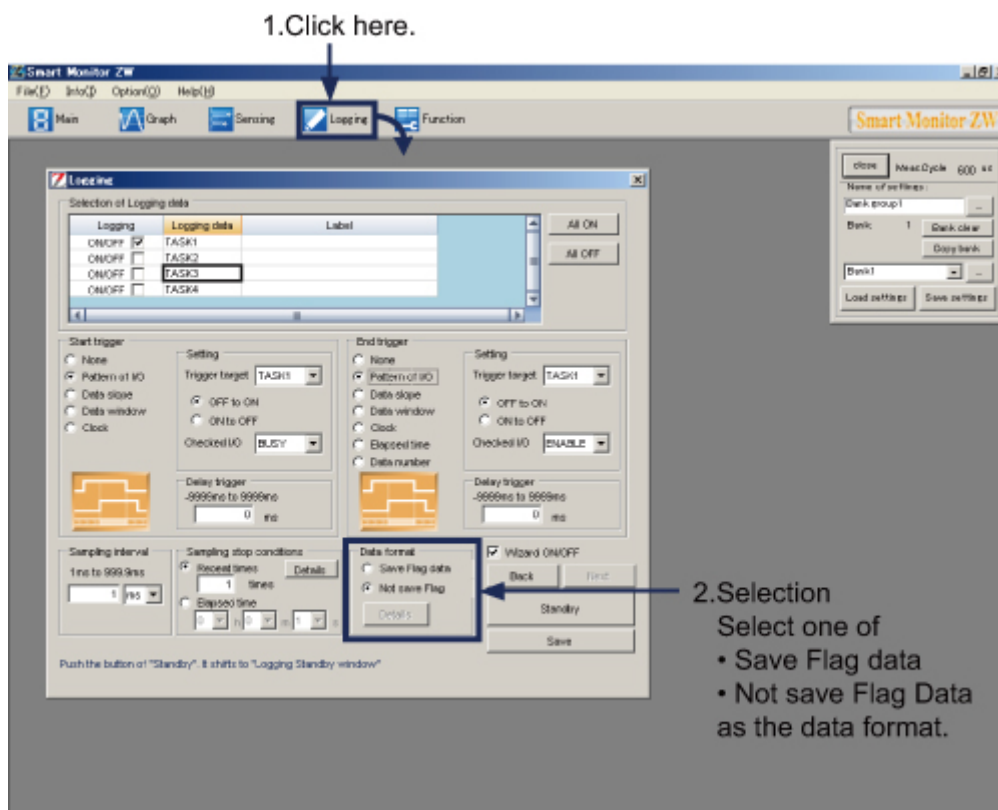
Setting item	Description
Save data to same file.	Adds and saves data to an existing file at each trigger end.
Save data to another file.	Saves data to another file at each trigger end.
Assign number to auto-made file.	This item is active when "Save data to another file." When appending a new file with a number, mark this checkbox and set the file number.
No.	Set the number to append to the auto-made file.

Setting the Data Format

Select whether or not to also save flag data (e.g. judgment results and ON/OFF state of I/O wires) at the same time.

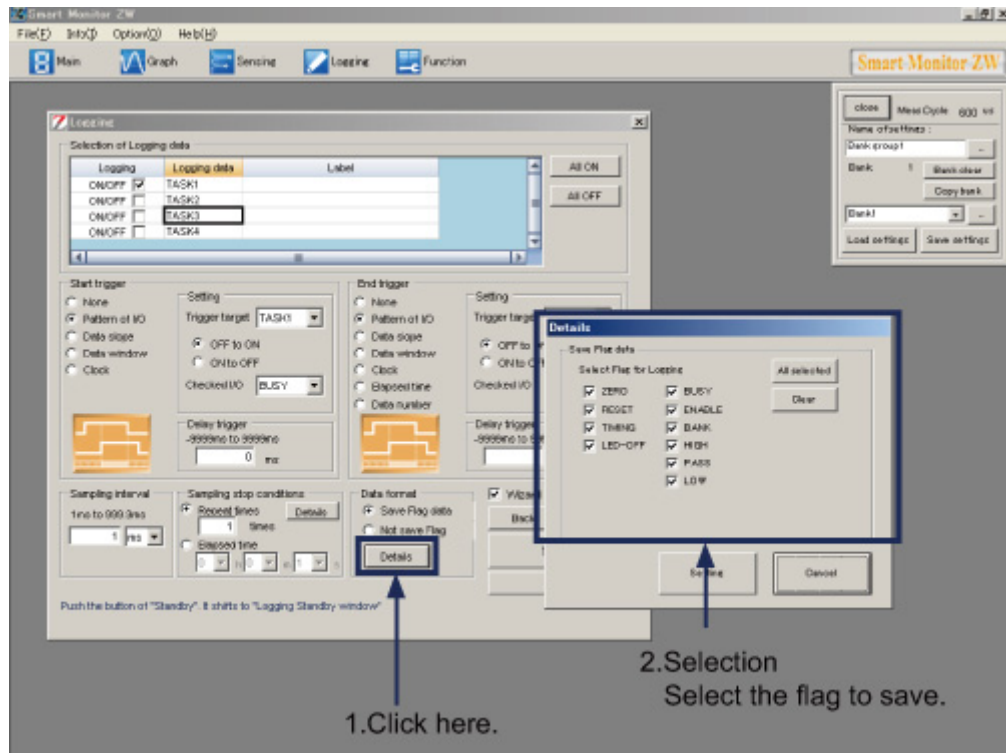
Operation Procedure

1. Display the [Logging] window and set the data format.



Setting item	Description
Save Flag data	Data is logged with information (e.g. I/O, states) appended to the measured values. The following information can be selected to the checkbox settings. (1) I/O terminal (ZERO, RESET, TIMING, LED-OFF) states (2) I/O terminal (BUSY, ENABLE, BANK) states (3) Judgment result (HIGH/PASS/LOW) states
Not save Flag	Only the measured values are logged.

2. When Save Flag data is selected, click the [Details] button and set the flag to save.

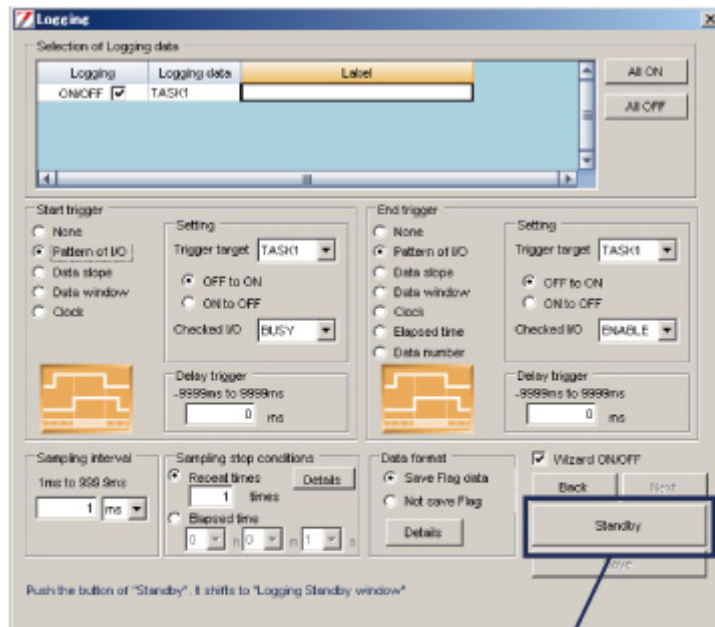


Logging Start

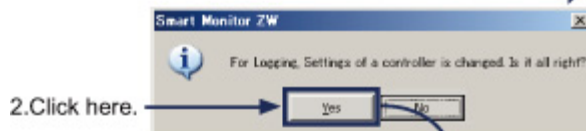
Start logging after you have finished setting up logging.

Operation Procedure

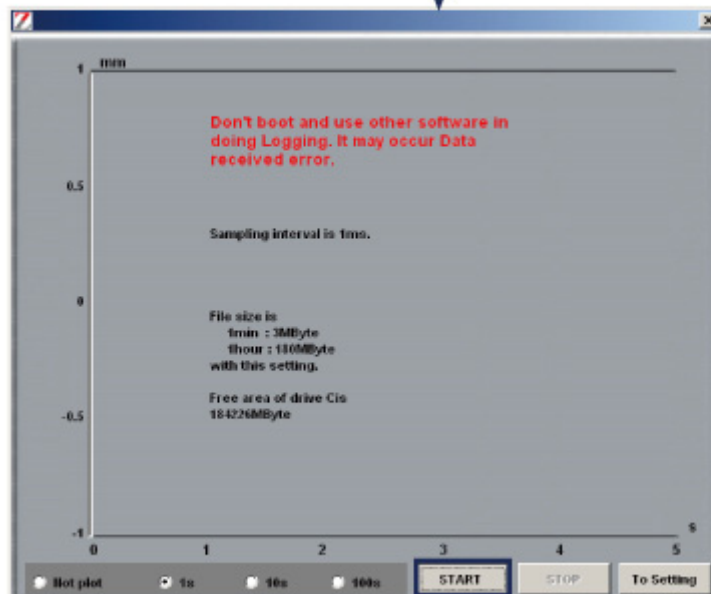
1. Display the [Logging Standby] window and start logging.



1. When setting in the [Logging] window is complete, click the [Standby] button.



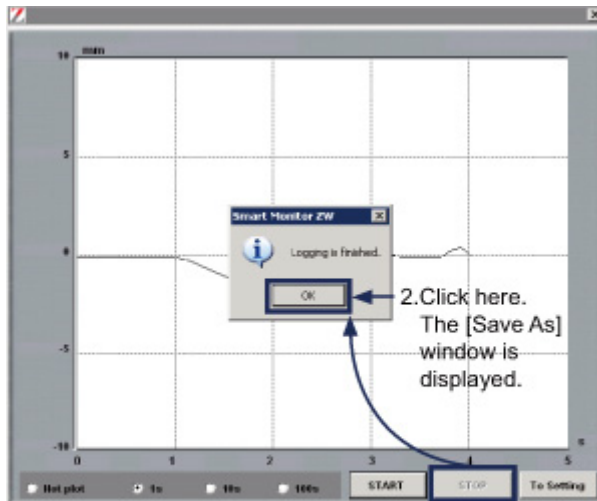
2. Click here.



3. Click the [START] button.

Setting item	Description
Horizontal axis of graph	You can select the width of the horizontal axis of the graph according to the logging time. (Not plot, 1 s, 10 s, 100 s)
[START] button	Starts sampling. Data collection is started, and Smart Monitor ZW stands by for the logging start trigger. Data collection is not started unless logging is started. For this reason, note that data will not be saved even if the logging start/end trigger conditions are satisfied.
[STOP] button	Logging is stopped regardless of the logging end trigger.
[To Setting] button	Returns to the [Logging] window.

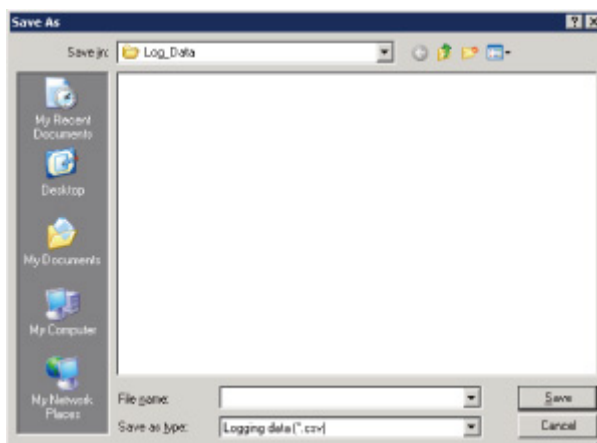
2. Stop logging.



1. Logging is stopped when the logging stop condition is satisfied or when the [STOP] button is clicked.

3. Save the logging data.

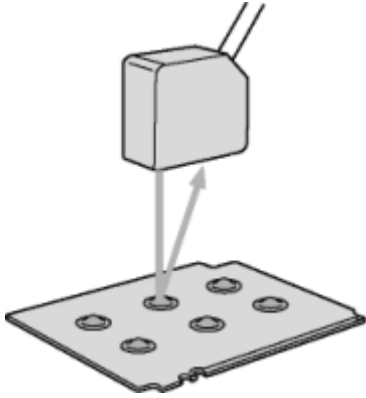
Save the logging data. The default save destination is the Log_Data folder in the Smart Monitor ZW installation folder.



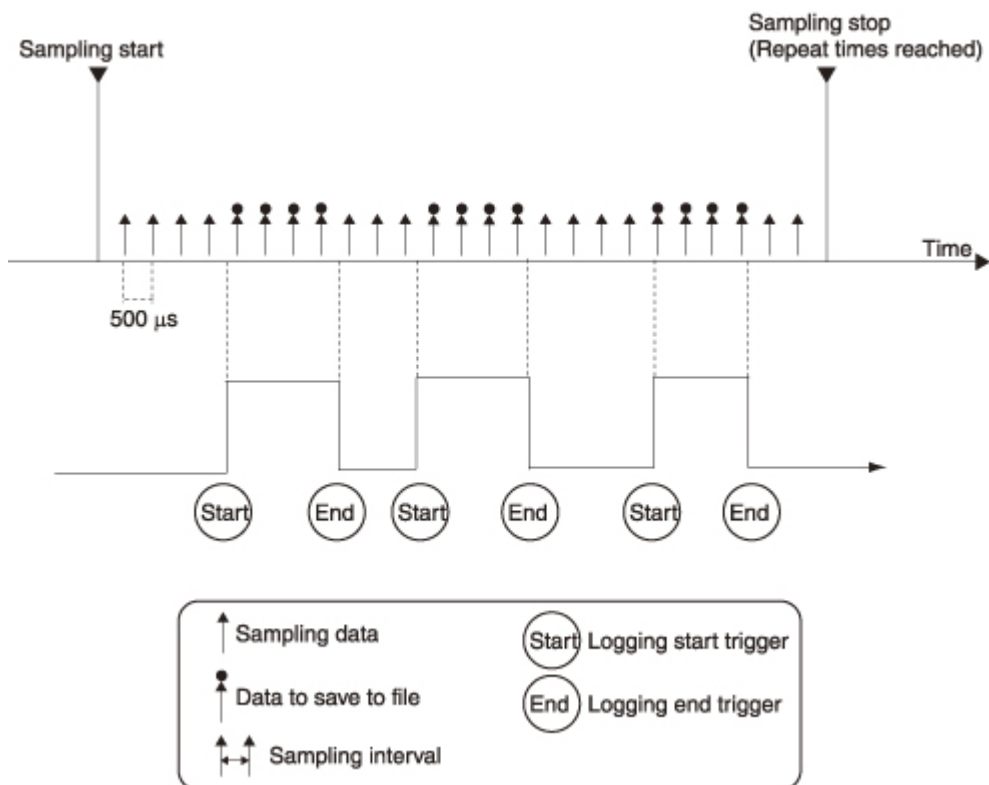
To Log the Shape for Each Detected Workpiece

This is an example of data obtained by sampling for each workpiece (e.g. shape logging) at high speed.

The following describes an example of how to log all measurement data for the duration that the timing signal is being input on a single Sensor Controller.



Overview



Settings list

Logging Settings			
[Logging data]	-	TASK1 to TASK4	
[Start Trigger]	[Pattern of I/O]	[Trigger target]	TASK1 to TASK4
		[OFF to ON]/ [ON to OFF]	Select [OFF to ON].
		[Checked I/O]	TIMING
[End Trigger]	[Pattern of I/O]	[Trigger target]	TASK1 to TASK4
		[OFF to ON]/ [ON to OFF]	Select [ON to OFF].
		[Checked I/O]	TIMING
[Sampling Interval]	-	-	1 ms
[Sampling Stop conditions]	[Repeat times]	-	(desired number of repeat loggings)
		-	[Save data to another file.] Mark the "Assign number to auto-made file." checkbox.
[Data Format]	-	-	Not save Flag data



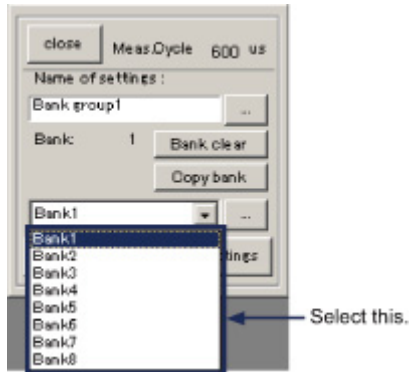
When "Assign number to auto-made file." is set in the sampling stop conditions, a No. for each measured and detected workpiece can be assigned to the save data file.

Switching Banks

The present bank No. can be switched.

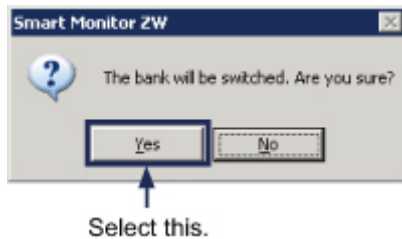
Operation Procedure

1. Select the bank to be changed.



2. Click the [Yes] button.

The bank is switched to the selected bank.

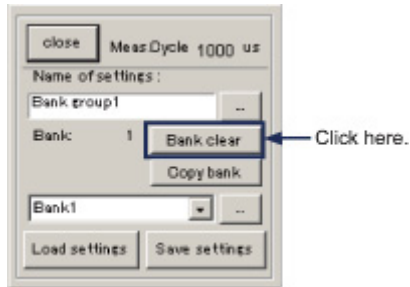


Clearing Banks

The bank settings of the currently selected bank are initialized (cleared) to their default values.

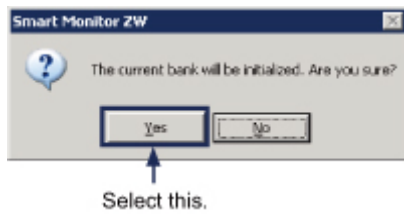
Operation Procedure

1. Click the [Bank Clear] button.



2. Click the [Yes] button.

The bank setting values are cleared.

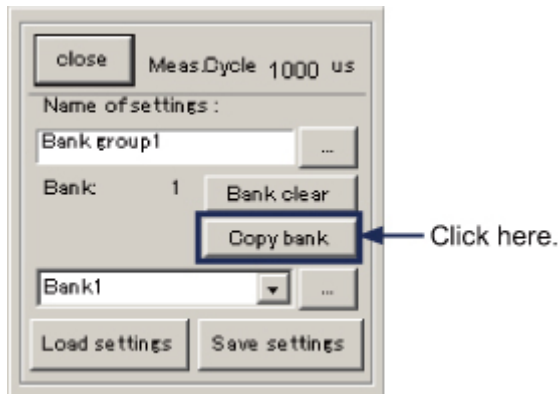


Copying Bank

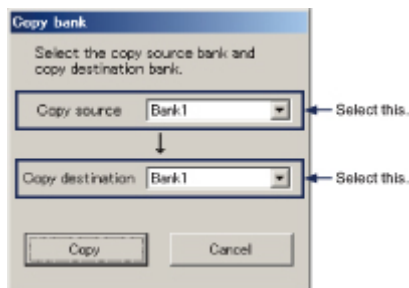
Copies a bank.

Operating Procedure

1. Click the [Copy bank] button.

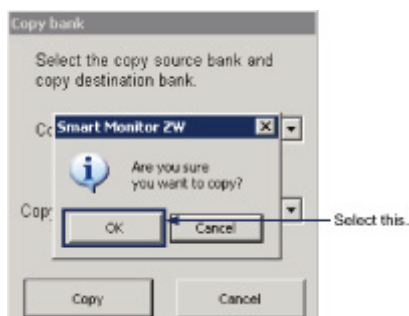


2. Select the copy source bank and copy destination bank.



3. Click the [OK] button.

The bank is copied from the source to destination.



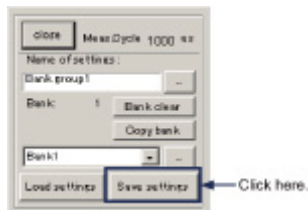
Saving/Loading Bank Settings

The following describes how to save and load bank settings.

Procedure for Saving Bank Settings

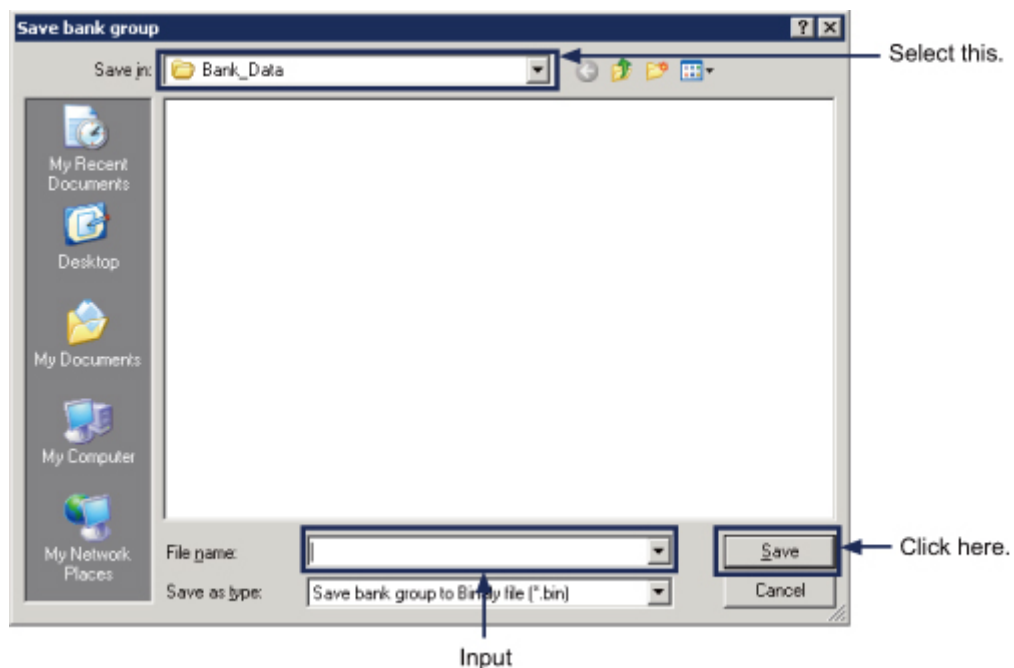
Save the settings of the bank group to the personal computer.

1. Click the [Save Settings] button.



2. Set the directory to save the file and set the file name, and click the [Save] button.

The settings are saved.

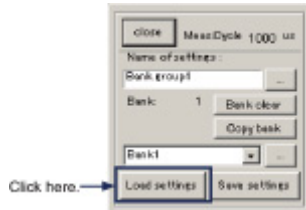


 If you set a different file name, files can be saved as long as there is enough space on the personal computer's hard disk.

Procedure for Loading Bank Settings

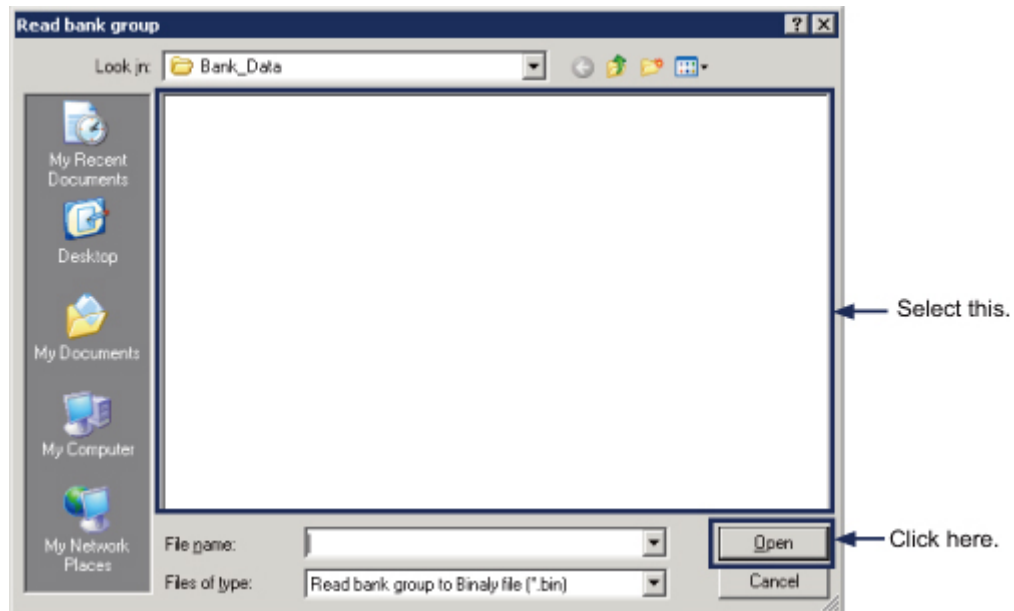
The settings of a saved bank can be loaded to the controller selected at "**OperatingCH**" whenever needed.


1. Click the [Load Settings] button.



2. Select the file to load, and click the [Open] button.

The settings are loaded.



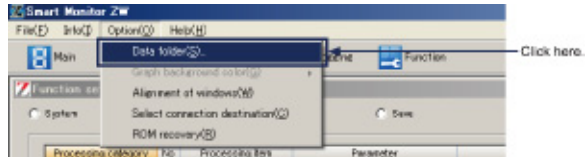
 Only operation of files saved by [**Save Settings**] on Smart Monitor ZW or compatible controllers is assured.

Data Folder

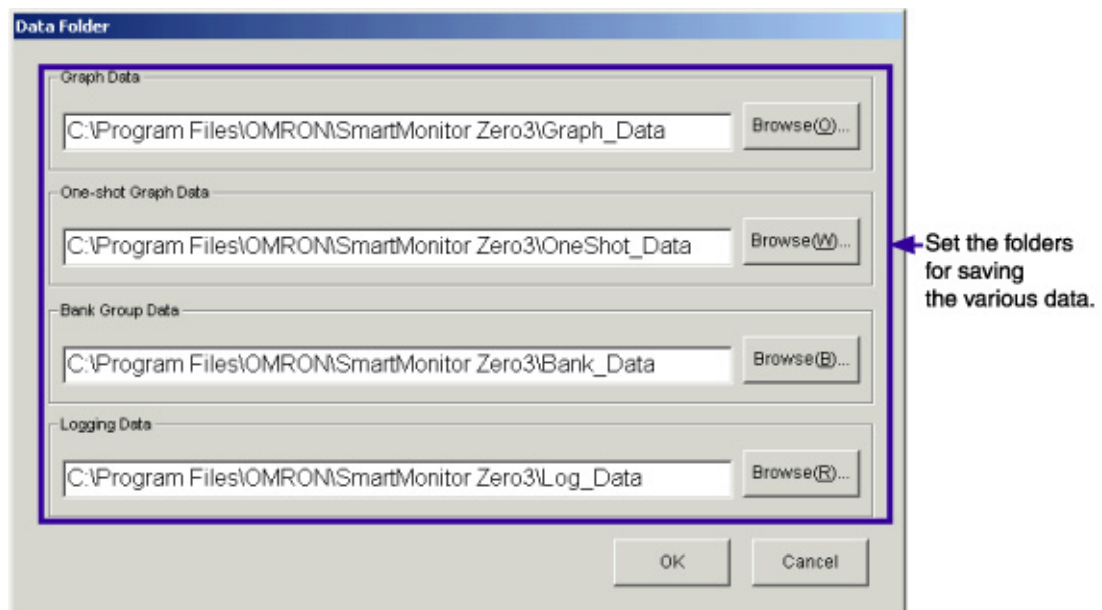
The folder for saving graph data or logging to can be set.

Operation Procedure

1. Select [Option(O)] - [Data Folder(S)] from the SmartMonitor ZW menu bar.



2. Set the folders for saving the various data.



Changing Graph Background Color

The background color of the graph window display can be selected from the following three colors:

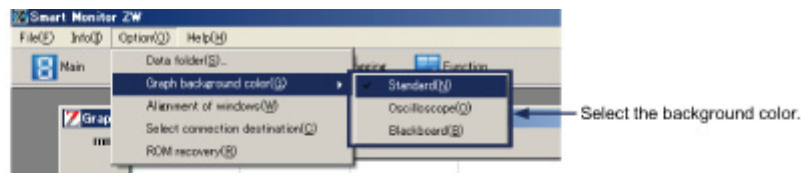
- Standard
- Oscilloscope
- Blackboard



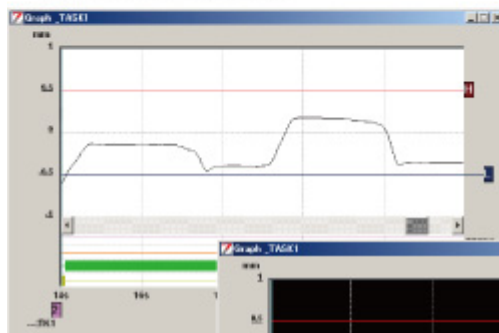
When changing the background color of a graph, the graph window must be displayed.

Operation Procedure

1. Select [Option(O)] - [Graph background color(G)] - [Standard(N)]/[Oscilloscope(O)]/[Blackboard(B)] from the SmartMonitor ZW menu bar.



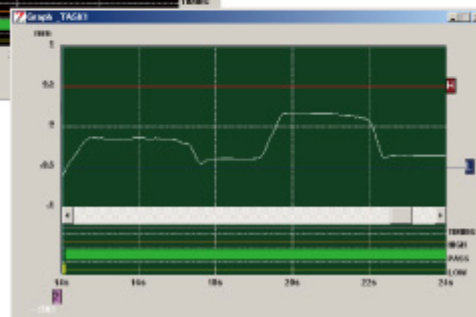
When [Standard] is selected, the background changes to white.



When [Oscilloscope] is selected, the background changes to black.



When [Blackboard] is selected, the background changes to green.

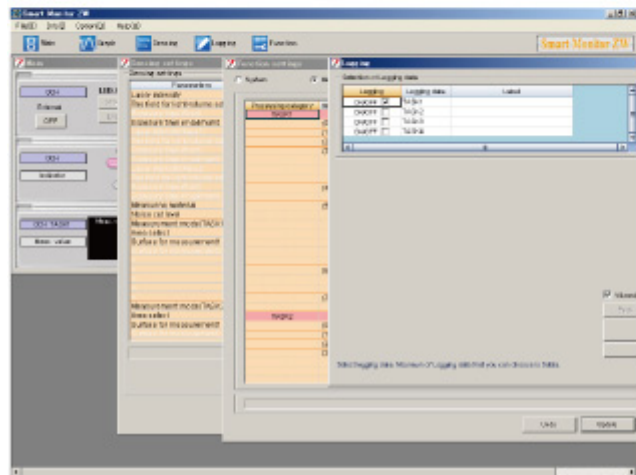
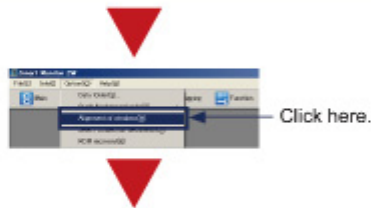
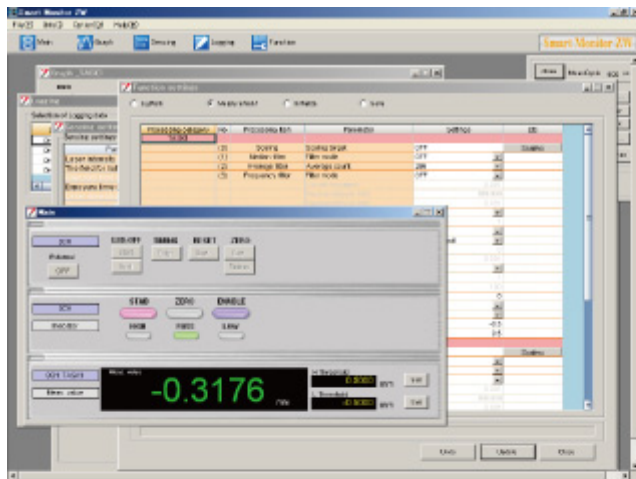


Alignment of Windows

The currently displayed windows can be aligned to the top of the window. When a window protrudes outside the screen and can no longer be displayed, this option allows you to redisplay the window in the screen.

Operation Procedure

1. Select [Option(O)]-[Alignment of Windows(W)] from the Smart Monitor ZW menu bar.



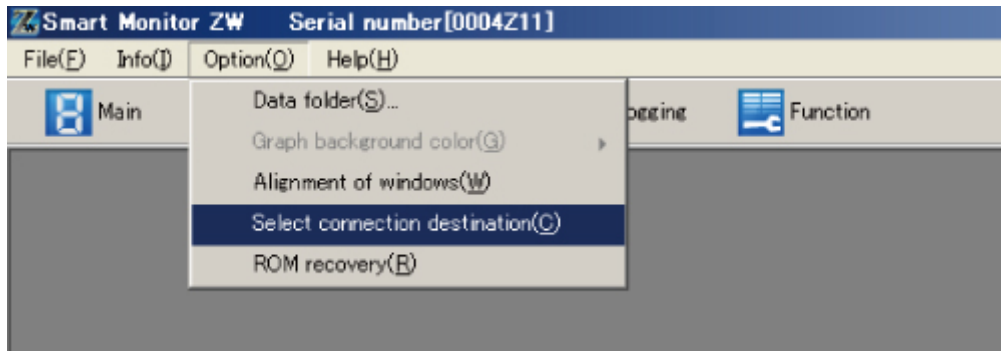
Windows are aligned to the top of the window.

Selecting Connection Destination

Specifies the IP address of the destination for a connection via Ethernet.

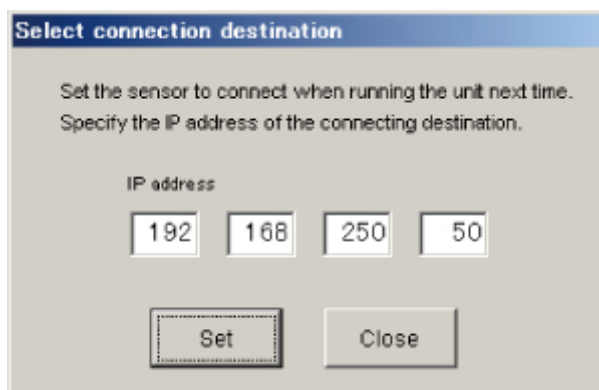
Operating Procedure

1. Select [Option(O)] - [Select Destination(C)] from the SmartMonitor ZW menu bar.



2. Enter an IP address and click the [Set] button.

The value will be effective when starting the system next.

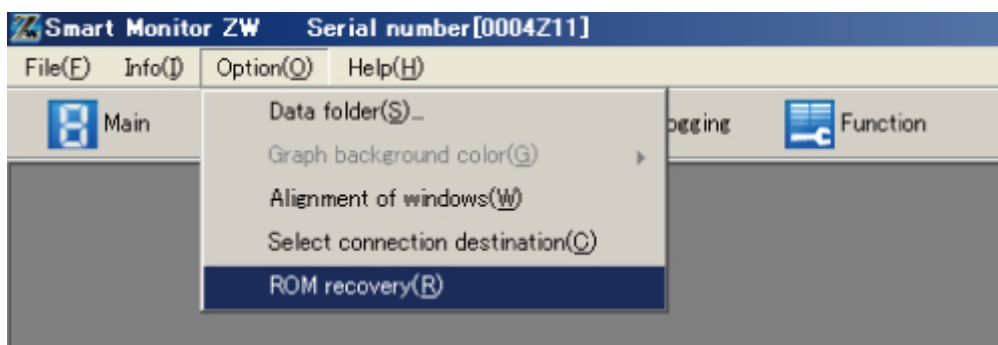


ROM Recovery

This allows ZW controller to operate the sensor temporarily using the Calibration ROM data backed up in the internal memory, if the Calibration ROM broken or was lost. The Calibration ROM data stored in the internal memory can be overwritten.

Operating Procedure

1. Select [Option(O)] - [ROM recovery(R)] from the SmartMonitor ZW menu bar.



2. Select a ROM data file to write into the controller and click the [Set] button.

The ROM recovery cannot be run when the error window is opened. Before starting the ROM recovery, close the error window.

Operation method:

- (1) With error code 3 displayed on the sub-display, press and hold the Mode switching key.
- (2) With "OK/CAN" is displayed on the sub-display, press the ZERO/SET key.
- (3) The measurement can be resumed using the Calibration ROM data read in previously.



Cautions:

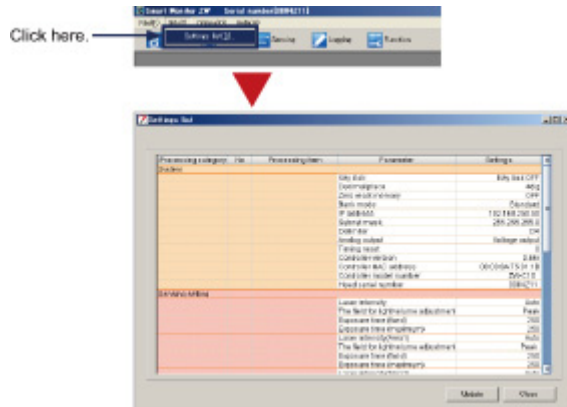
- When using this method, always check the Calibration ROM serial number read in previously in the "controller information" and check that it matches the Sensor Head side serial number. Measurement will not be correct unless they match.
- This operation is disabled for a controller into which no Calibration ROM has ever been inserted and started up.
- The ROM data file name format is [Sensor Head serial number].bin. Make sure that the serial number matches the one on the Sensor Head side. Measurement will not be correct unless they match.

Settings List

The settings of the controller can be verified in this list.

Operation Procedure

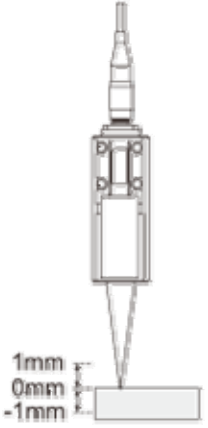
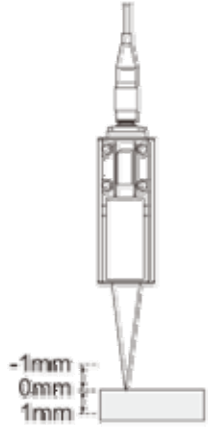
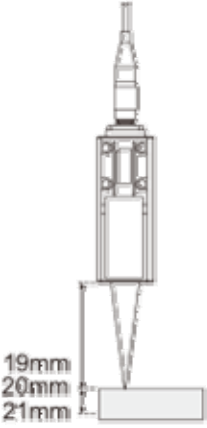
1. Select [Info(I)]-[Settings list(D)] from the Smart Monitor ZW menu bar.



Display measured values

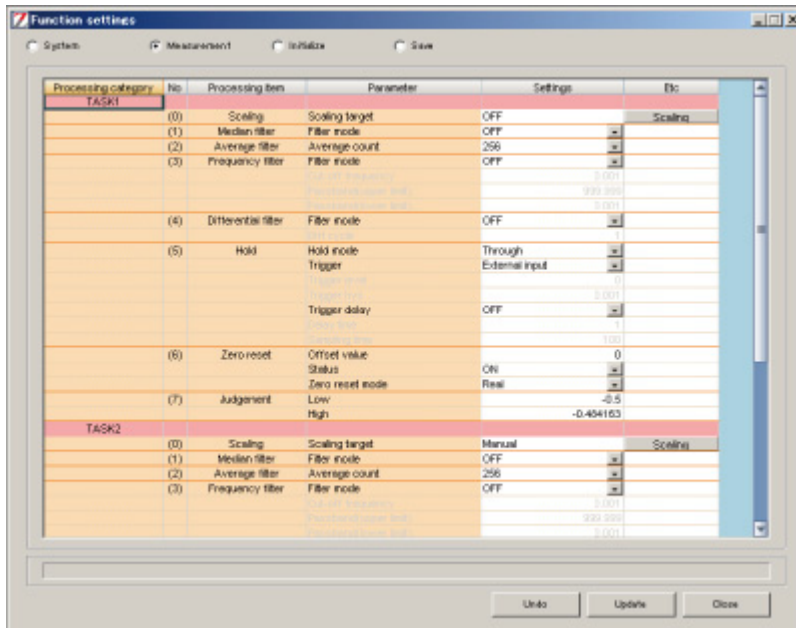
You can change a measurement result to any value by setting "Offset span input" for scaling.
Sets an offset value and span value.

Example: For the ZW-S20
Measurement center length : 20mm
Measurement range : +/-1mm

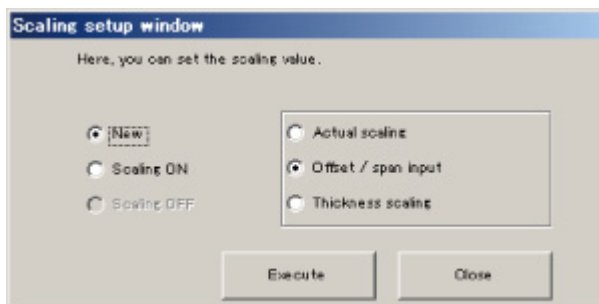
Displaying method	Relative value		Absolute value			
	1 - -1	-1 - 1	19 - 21			
	 <p>1mm 0mm -1mm</p> <p>Basic displaying method</p>	 <p>-1mm 0mm 1mm</p> <p>To output the result as a relative distance from the sensor</p>	 <p>19mm 20mm 21mm</p> <p>To output the result as an absolute distance from the sensor</p>			
Setting value	Offset	Span	Offset	Span	Offset	Span
	Default		0	-1	20	-1

Operation Procedure

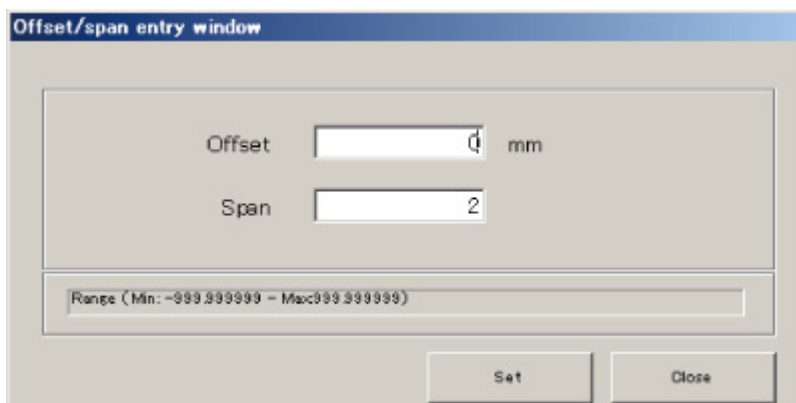
1. Open the [Function settings] window and click the [Scaling] button.



2. After selecting [New] and [Offset span input], click the [Execute] button.



3. Enter an offset value and span value.

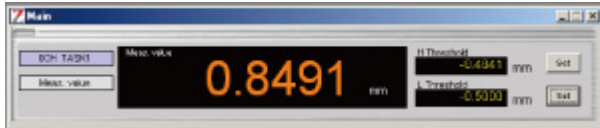


4. Display measured values

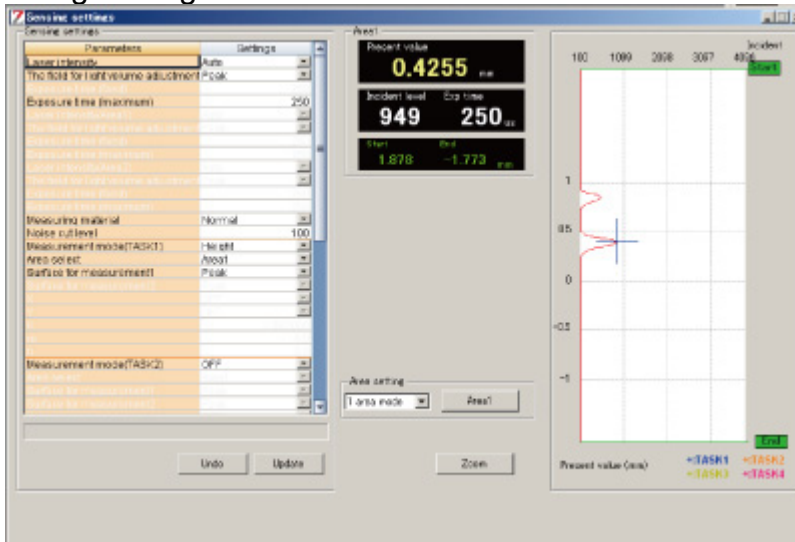
You can check the measured values after setting scaling on the main window and those before scaling on the sensing settings window, respectively.

Example: When setting absolute value display

Main Window



Sensing Settings Window



List of Error Messages

At Startup

Smart Monitor ZW is already started.

Smart Monitor ZW is already started up. Another Smart Monitor ZW cannot be started up. Use Smart Monitor ZW that is already started up.

Failed to read (write) the setting file.

A probable cause is that reading (writing) of the Smart Monitor ZW setting file failed at program startup.

Delete "Smart Monitor ZW" from [Control Panel]-[Add/delete applications], and install Smart Monitor ZW again.

An error is in a setting of a COM port. The present communication port (COM*) is not effective.

Either the target communication port does not exist on the personal computer, or it is being used by a different application.

Either specify a different communication port, or quit the application that is using the communication port in question.

A communication port does not open. Please end the application which uses a communication port and start again.

A probable cause is that the target port is being used by another application, for example. Quit that application, and restart Smart Monitor ZW.

Check the operating mode.

The controller has been set to the FUN mode.

A model not supported on this software is connected.

Check the following:

- **Make sure that the ZS Series is connected.**

Failed to communicate with the controller.

Check the following items:

- Check the IP address of the connecting destination.
- Check the LAN cable connections.
- Check the controller has been turned on.
- If "SYSERR CODE3" is displayed on the controller, make sure that the Calibration ROM has been connected.

If it is the case, make sure that the **Calibration ROM** has been inserted properly.

If the error occurs when it is correctly inserted, the **Calibration ROM** or the controller may be broken. Please contact an OMRON branch or sales office.

If error code 3 is displayed, as a temporary measure, you can restart measurement using the Calibration ROM data read in the previous time.

Operation method:

With error code 3 displayed on the sub-display, hold down the Mode switching key, then when "OK/CAN" is displayed, press the ZERO/SET key.



Cautions:

- When using this method, always check the serial number in the "controller information" and check that it matches the Sensor Head side serial number. Measurement will not be correct unless they match.
- When restarting the main unit, perform the same operations again.
- This is disabled for a controller into which no Calibration ROM has ever been inserted.

Common

Please input a value.

A value is not entered in the number entry field.
Set a value.

There is the possibility which the file to overwrite is under use.

The file you tried to save as setting data or waveform data is in use by another application.
Quit the other application, and either try to save the file again, or save it under a different name.

An error is in the decimal point or the number of digit.

The position of the decimal point or the number of digits you entered is in error.
Enter number values in the specified format.

Only numerical values can be entered.

A text string other than a numerical value is entered in the number entry box.
Enter numerical values.

Communication error occurred.

Check the following items. When this message is displayed, you can click the **[OK]** button and retry.

If the retry does not solve the communication error, click the **[Cancel]** button, and quit Smart Monitor ZW.

- **Is the Ethernet cable connected correctly?**
- **Is the controller in the RUN mode?**

The controller must be turned ON to use Smart Monitor ZW online.

Smart Monitor ZW can be started up without a controller connected (i.e. in the offline mode).

The input range is xxx to yyy. Entered value is out of range.

The value entered in the number entry box is outside the specified range.

Enter the numerical value again inside the minimum to maximum range displayed on the window.

A path was not found.

The specified folder path could not be found on the personal computer.

Enter the correct folder path.

The following characters cannot be used for a file name.

Characters that cannot be used as file names were specified.

Specify a different file name.

There is no data to save.

The waveform could not be saved as there is no waveform.

Get the waveform and then save it.

Graph

The format of data is different. It cannot load.

A probable cause is that the data of the file you tried to load is for a different type of data or that the data is corrupted.

Specify the correct file data.

Sensing settings/Function settings

The setting of scaling cannot be changed.

The entered data could not be scaled.

Check input data ranges in the manual for the controller, and set the entered data again.

The setting of monitor focus cannot be changed.

Monitor focus could not be set for the entered data.

Check input data ranges in the manual for the controller, and set the entered data again.

The compensation parameters of analog output are unusual.

The parameters for the entered linear output compensation mode are abnormal.

Check input data ranges in the manual for the controller, and set the entered data again.

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