

# Operation Manual

REAL TIME DATA ACQUISITION SOFTWARE

**RD-7300**  
Ver.1.7





## Introduction

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This software consists of two software which are RD-7300 and RD-7300-E, works on the Microsoft Windows OS. The purpose of RD-7300 is for controlling our company's Multi-channel recorder TMR-311 to enable monitoring and data collection. The purpose of RD-7300-E is for showing and editing recorded measurement data.

To use this software effectively, read this operation manual thoroughly and understand the functions and operations sufficiently.

This operation manual is written based on the basic operation method of Windows. For the basic operation of Windows, refer to the user's guide supplied to the Windows OS.

## Notational system of this manual

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This manual uses the notational system shown below in the body text for simplifying the description of operation.



: Describes the referential item for operation



: Describes the caution on operation. The body text is indicated in italic type.



: Describes the referential page for operation

Pictorial cut in body text

: For the pictorial cuts in this manual, the screens of Windows 10 are used.

The pictorials cut used for this manual are the pictorial cuts of software under development. Note that the screens may be different from those of actual product.

## Constitution of this operation manual

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This manual consists of two operation manuals which are for real time data recording software RD-7300 and for measurement data editing software RD-7300-E.

Refer to the following chapters for description of each software.

### RD-7300

Chapter 2	Specifications
Chapter 3	Startup and exit
Chapter 4	Setting
Chapter 5	Graph sheet
Chapter 6	Measurement
Chapter 7	Printing

### RD-7300-E

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Chapter 9	Startup and exit
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# Chapter 1

## Setup



This chapter describes setting and connection of hardware, and setup of software.

## **1** Items required for setup

---

Items shown below are required before starting the setup.

- Supplied RD-7300 Setup CD x1
- OS: Microsoft Windows 7 (SP1) / 8.1 / 10/ 11
- PC equipped with CD-ROM drive and LAN port

## 2 Setup of this software

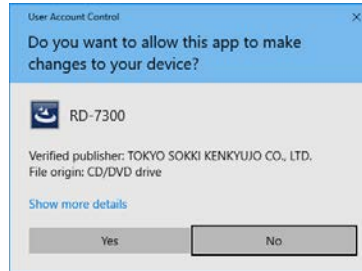
Here explains the procedure for setting up this software.



*Log in as the user with the administrator privilege.*

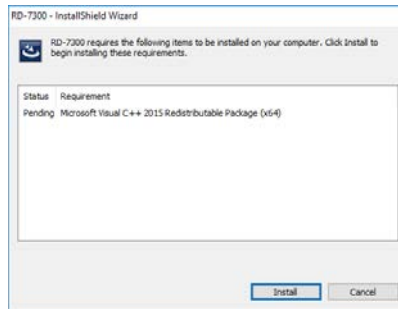
*Ensure all other applications are closed prior to installing the software.*

- (1) Open \RD-7300\English folder in the Setup CD from Explorer, and execute Setup.exe.
- (2) The user account control may be displayed depending on the setting of OS.



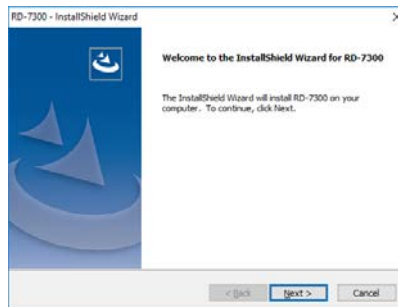
Click [Yes] button.

- (3) The screen shown below may be displayed depending on the used PC.



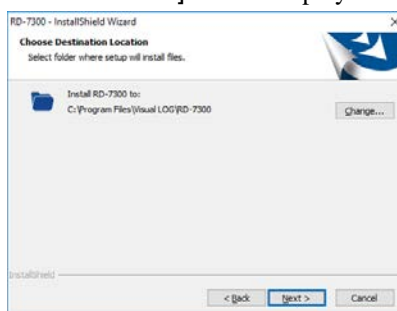
Click [Install] button.

- (4) The setup of this software is started.



Click [Next] button.

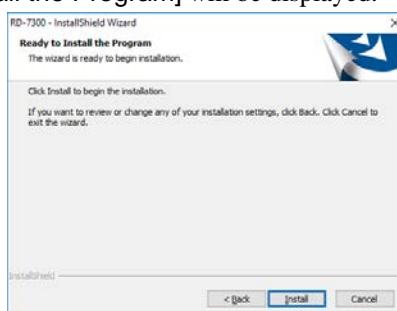
- (5) [Choose Destination Location] will be displayed.



If you want to change the destination, click [Change] button and choose the destination.

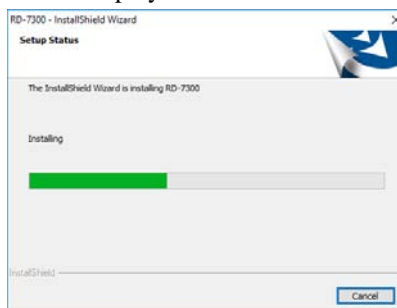
If you do not change the destination, click [Next] button.

- (6) [Ready to Install the Program] will be displayed.

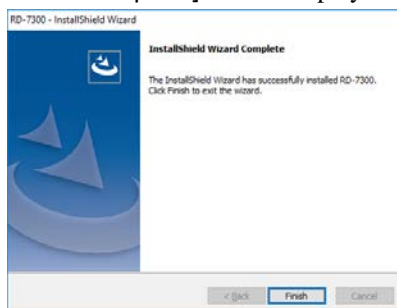


Click [Install] button to start the installation of this software.

- (7) [Setup Status] will be displayed and the installation will be executed.



- (8) [InstallShield Wizard Complete] will be displayed.





Click [Finish] button to complete the installation.

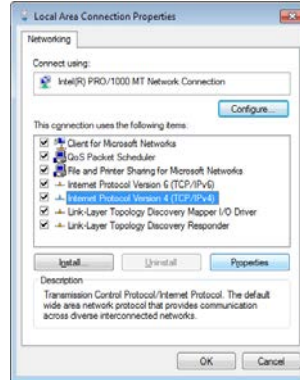
### 3 Connection of measuring instrument

As the measuring instrument is connected by LAN interface, it is necessary to carry out the setting of LAN (local area connection) by PC.

The setting is carried out in Local Area Connection Properties of PC.

 Display method and setting screen of network connection vary depending on the used OS. Please read the help of OS.

 When communication with instrument via network is unstable, please connect PC and instrument directly.



Choose the Internet Protocol Version 4 (TCP/IPv4) and click properties.



When you set the internet protocol for the first time, change only the number at the right end to other value referencing the IP address of the measuring instrument.

If the IP address of the measuring instrument is 192.168.1.1 for example, set the PC to 192.168.1.2. Set the subnet mask to 255.255.255.0.

However, if the number has been set for other device, it is necessary to set it to other number.

If the environment of LAN has been set, set the IP address different from all IP addresses you are using at the current moment for the measuring instrument.

If the LAN is managed in an organized manner, please consult with the network administrator of the organization.

*Real time data acquisition software*

**RD-7300**



# Chapter 2

## Specifications



This chapter describes basic specifications of this software and functions of each part of the screen.

## 1 System configuration

The standard system configuration is shown below. Please check it.

■ OS	Microsoft Windows 7(SP1)/8.1/10/11
■ Computer	Intel i5 with 3.0GHz or faster CPU (excepts Turbo Boost) is recommended. The computer should comply with the system requirements of OS
■ Memory	4GB RAM or larger is recommended
■ Hard Disk	5GB or larger available hard disk space * If the free capacity becomes less than 5GB, a warning message is displayed.
■ Interface	LAN
■ Instrument	<div> <div>TMR-311 (Control Unit)</div> <div>Ver.1.0A</div> </div> <div> <div>TMR-321 (Strain Full Bridge Unit)</div> <div></div> </div> <div> <div>TMR-322 (Strain 1G2G4G Unit)</div> <div></div> </div> <div> <div>TMR-323 (Carrier type Strain Unit)</div> <div>Ver.1.2A</div> </div> <div> <div>TMR-331 (Voltage Input Unit)</div> <div>Ver.1.1A</div> </div> <div> <div>TMR-332 (Thermocouple/Voltage Unit)</div> <div>Ver.1.4A</div> </div> <div> <div>TMR-341 (Voltage Output Unit)</div> <div>Ver.1.3A</div> </div> <div> <div>TMR-353 (Digital I/O Unit)</div> <div>Ver.1.6A</div> </div> <div> <div>TMR-361 (Charge Amplifier Unit)</div> <div>Ver.1.7A</div> </div>



*Embedded wireless LAN on TMR-311 cannot be used for this software.*



*If the TMR-311 is older than the above version, it is necessary to upgrade the firmware of the TMR-311.*



*While controlling the TMR-311 by this software, you cannot operate the TMR-381 (display unit).*

## 2 Basic specifications

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RD-7300 is the dynamic measurement software that controls our company's Multi-channel recorder TMR-311 to enable data monitoring and data collection.

### ■ Measurement conditions

The maximum number of control unit  
1 unit

Number of measurement points  
Up to 80 points (with 10 optional units)

Sampling clock  
The sampling clock is set within the range from 0.1ms to 0.9ms by every 0.1ms and from 1ms to 1000ms by every 1ms.  
However, the fastest speed is 0.2ms when the number of used channels is 41.

Measurement time  
Selection whether the measurement is terminated after the specified time or after recording the specified number of data.  
When the measurement is terminated after the specified time, the data file is divided by the specified number of data.  
The maximum number of data is [one billion / the number of channels] to be measured.

### ■ Input channel

Name  
The name of measurement data is set.

Sensor mode  
The type of sensor to measure is set.

Range  
The measurement range is set.  
Measurement range and resolution are changed by this value.

Reference junction  
The reference junction is set to use a thermocouple.

Low-pass filter  
The frequency for low-pass filter is set from PASS and 1Hz to 1000Hz (by every 1Hz).

Characteristics  
The characteristics for low-pass filter is set from among Bessel(2nd/8th) and Butterworth(2nd/8th).

High-pass filter  
The frequency for high-pass filter is set from among OFF, 0.2Hz and 1Hz.

Coefficient  
The coefficient which is used for converting from measurement value to physical quantity is set.

Rated output  
The rated output of sensor is set.

Capacity  
The capacity of sensor is set.

Offset  
The value to be added to the measured value multiplied by coefficient is set.

Unit  
The unit of physical quantity is set.

Format  
The display format is set.

Alarm  
The upper limit value and lower limit value are set as alarm.  
Both limit values are not used only for plotted on graph but also used for generating warning tone.

■ Expanded channel

The channel data is calculated to create other data.

Number of expanded channels	Max. 1000 channels
Name	The name is set for an expanded channel.
Function	Four arithmetic operations or rosette analyses are performed for two or more channels and the results are displayed in a same way as measured data.
Unit	The unit of physical quantity is set.
Format	The display format is set.
Alarm	The upper limit value and lower limit value are set as alarm. Both limit values are not used only for displayed on a graph but also used for generating warning tone.

■ Voltage output

With the Voltage output unit (TMR-341), the measured data of any channels can be output as a voltage value.

Input Ch.	The input channel is set.
Output voltage	The maximum value for the output voltage is set.
Input value	An input value at the rated output is set.
Rated output	A voltage corresponding to the input value is set.
Calibration	The calibration value is set.

■ Digital input

With the Digital I/O unit (TMR-353), the functions of frequency measurement and pulse counting is available.

Input mode	The input type is set.
Range	The measurement range is set. Measurement range and resolution are changed by this value.
Threshold value	The threshold of the input signal is set.

■ Setting file

The measurement conditions can be restored by writing out measurement conditions and measurement method and creating or reading a setting file.

■ IP address of measurement instrument

User can change the IP address and port number of the measurement instrument.

■ Measurement method

- Manual measurement

Specify start and end of measurement in arbitrary timing.

If the measurement time is set, the measurement is terminated automatically.

## ■ Alarm output

List display	Channel exceeding upper limit value or channel falling below lower limit value are displayed as a list.
Alarm sound	If upper limit value or lower limit value is exceeded, an alarm sound is output.

## ■ Data file

In a data file, measured raw data, coefficient, and name etc. are recorded.  
For an expanded channel, a calculation formula is recorded in addition to name.

### Recording destination

A folder can be arbitrarily specified.  
In the initial status, RD-7300 folder created in the document folder is specified.

Recording format      DADiSP compatible TAffmat format

Capacity of file      The capacity of a data file is obtained by the formula shown below.

$\text{Data number} \times \text{number of channels} \times 2 \text{ bytes}$   
If the measurement is carried out without specifying the measurement time, a file is divided by the capacity obtained by the formula shown above.

## ■ Graph

The current value obtained by monitor measurement is displayed.

Graph sheet      This is a window in which objects such as various graph monitors, numerical monitor, image, and drawing are freely allocated. Multiple windows can be displayed at the same time.

Overdrawing      Multiple construction lines can be overdrawn on a graph.

Array      Multiple objects are organized and allocated.

Grouping      Multiple objects are allocated as an object.

Graph file      A graph sheet can be individually saved in a file.  
A file is read and redisplayed.

Saving of layout      The display positions of all displayed graphs are saved in a file. The display layout is reproduced by reading the file.

■ Type of object	
Numerical monitor	Values of arbitrarily selected multiple channels are displayed
Display item	Name, unit, current value, peak value, and valley value can be displayed Display color can be changed when upper limit value or lower limit value is exceeded
T-Y monitor	Arbitrarily selected multiple channels are displayed in Y-axis with X-axis as temporal axis
Data number	100,000 past data from the current value can be displayed per channel
Display item	Lines of upper limit value and lower limit value can be displayed
X-Y monitor	Both of X-axis and Y-axis are displayed in an arbitrary combination of channels
Data number	Specified within range 2 to 100,000 data from current value per channel
Display item	Lines of upper limit value and lower limit value can be displayed
Bar monitor	Bar graphs of arbitrarily selected multiple channels are displayed
Display item	Lines of peak value and valley value can be displayed Lines of upper limit value and lower limit value can be displayed
Spectrum	FFT analysis of arbitrarily selected channel is carried out to display the spectrum
Type	Select Power spectrum or Amplitude spectrum
Window function	Select Rectangle, Humming, or Hanning
Shift	Shift of zero point is rejected by the method selected from the followings DC cut (removal by average value), trend (removal by primary regression formula)
Data number	Specified by a power of 2 within the range 512 to 65536
Display item	The values of specified number of items can be displayed in descending order of amplitude or power Specified within the range 0 to 20
Dial scale monitor	The current value of arbitrarily selected channel is displayed on the dial scale monitor
Type	Selected from standard, semicircle, vertical, and horizontal
Display item	Name, peak value, valley value, upper limit value, and lower limit value can be displayed
Vector monitor	Principal strain and principal stress of 2-axis or 3-axis gauge are displayed as arrow Display color can be changed when upper limit value or lower limit value is exceeded
Arrow monitor	Size and direction of data are displayed as arrow Display color can be changed when upper limit value or lower limit value is exceeded
Image file	Bitmap image file etc. is displayed
Label	An arbitrary character string is displayed

#### ■ Processing of data file

The recorded data file is processed by bundled software RD-7300-E.

A waveform can be displayed by software that can read a file in DADiSP compatible TAFMat format, however, the data may not be displayed depending on the restriction of the software such as number of characters of name or unit. Carry out the setting following the restriction of the software.

To display the expanded channel, use RD-7300-E or WF-7630.

#### ■ Auto restart

Some personal computers are equipped with a function to automatically restart after power failure depending on BIOS setting.

This software restarts the measurement automatically after the computer restarts during measurement.

In this case, measured data just before the power failure are saved in the computer. However, the data during the power outage are not saved.

For protecting cache data from instantaneous power failure, we recommend that you use the uninterruptible power supply and its attached application.

3

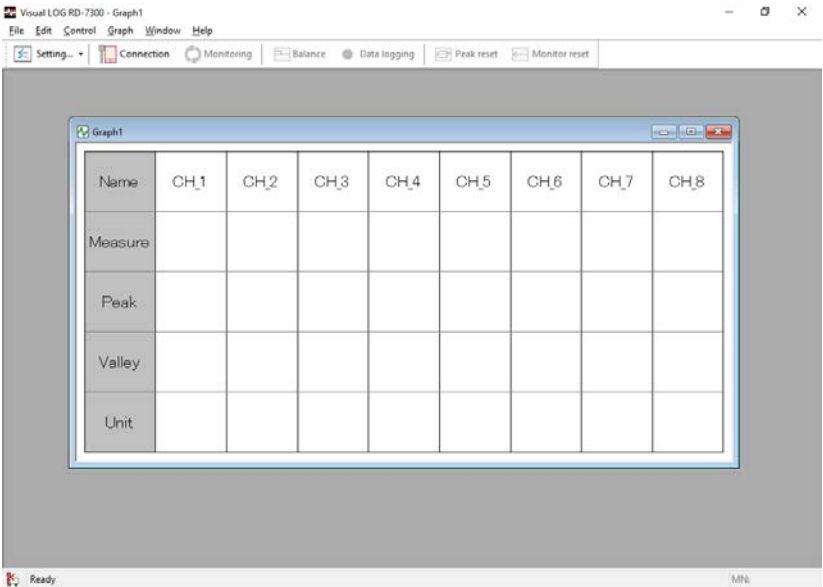
Description of each section of software screen

3-1

Main screen

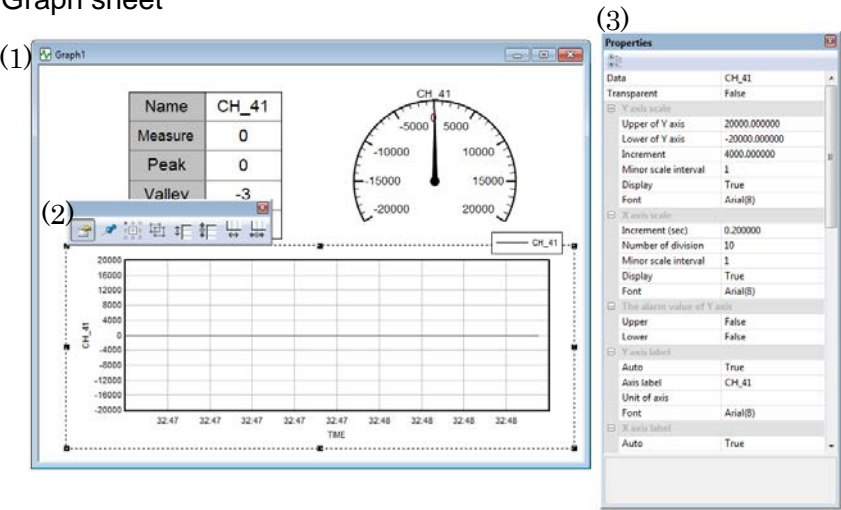
This is a screen that is displayed when this software is activated.

A graph sheet displaying measurement values is displayed. The graph that had been displayed when the software was exited previously is displayed again basically.



3-2

Graph sheet



- (1) Graph sheet

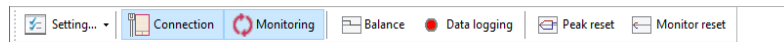
Various monitor objects are allocated to display the measurement values that are currently monitored.
- (2) Graph tools

The buttons for operating the selected object such as display of property and change of scale are displayed.
- (3) Property panel

Setting of selected object is displayed and changed.

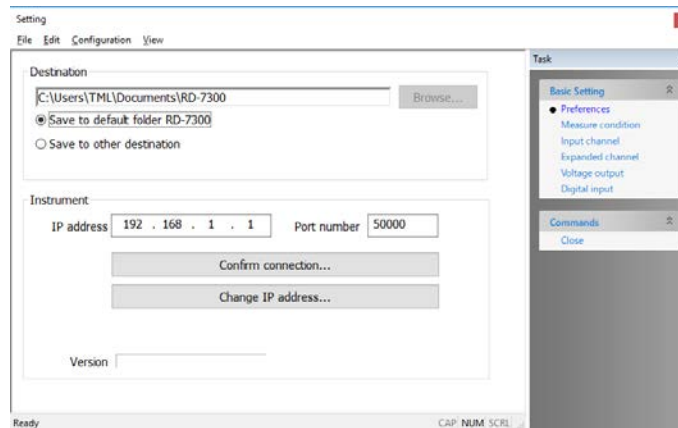
### 3-3 Control tools

The buttons for executing the measurement such as display of setting screen, connection to measuring instrument, monitor, and data collection are displayed.



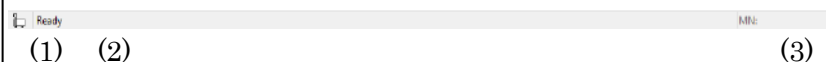
### 3-4 Setting screen

The setting screen is configured with preferences, measurement condition, input channel, expanded channel and voltage output. All settings related to measurement are carried out on this screen.



### 3-5 Status bar

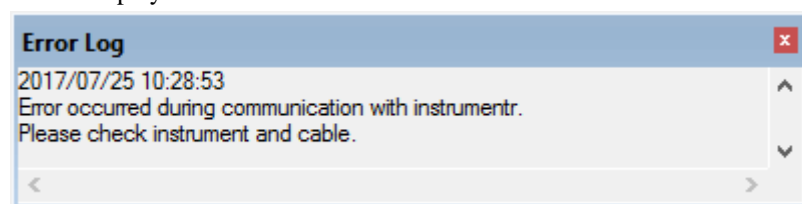
The current status such as connection of measuring instrument is displayed.



- |                     |   |
|---------------------|---|
| (1) Connection icon | The status of connection with a measuring instrument is displayed as an icon. |
| (2) Message         | Explanation of menu and buttons is displayed.                                 |
| (3) MN:             | The elapsed time of data recording is displayed.                              |

### 3-6 Error log

When an error such as communication error of measuring instrument occurs, the content is displayed.



# Chapter 3

## Startup and exit



This chapter explains icons which are used by this software, and startup and exit operations of this software.

## 1 Icons of this software

---

The icons related to this software are four types shown below.

- Icon of this software program

This is an icon of this software program.



- Graph sheet icon

This is an icon of a file in which a graph sheet is saved.



- Setting icon

This is an icon of a file in which setting contents of measurement conditions, input channels, expanded channels and voltage output are saved.



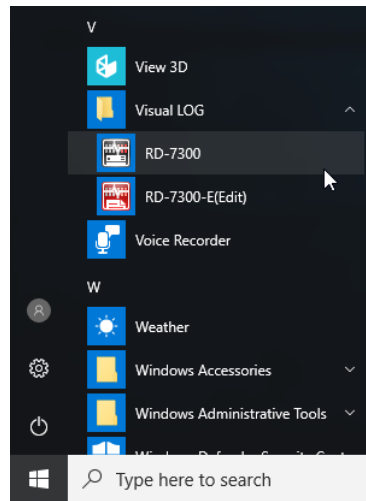
- Display layout channel

This is an icon of a file in which display layout of graph sheet is saved.

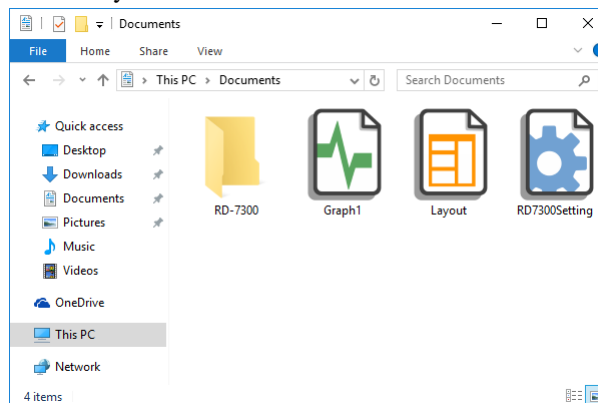


## 2 Activating this software

To activate the program, click [Visual LOG] - [RD-7300] from [Start] menu as shown below.

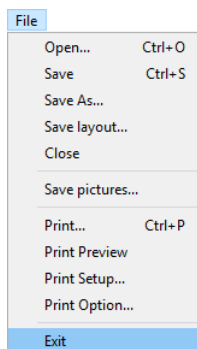


This software can be also activated by double-clicking a file of graph sheet or display layout saved by this software.



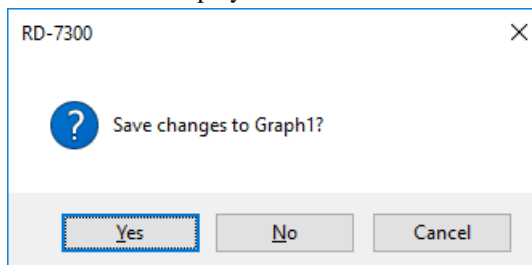
The setting file cannot activate or open the software from the icon.  
Read the setting file from the setting screen.

### 3 Exiting this software



This software is exited or interrupted by selecting [Exit] in [File] menu.

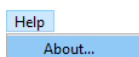
If something is changed in the saved graph sheet, the dialog box for confirming the saving of the sheet will be displayed.



If you save it, click [Yes] button.

A graph sheet that is not saved will be displayed again at the next activation.

### 4 Checking the version



To check the version of this software, select [About...] in [Help] menu.




# Chapter 4

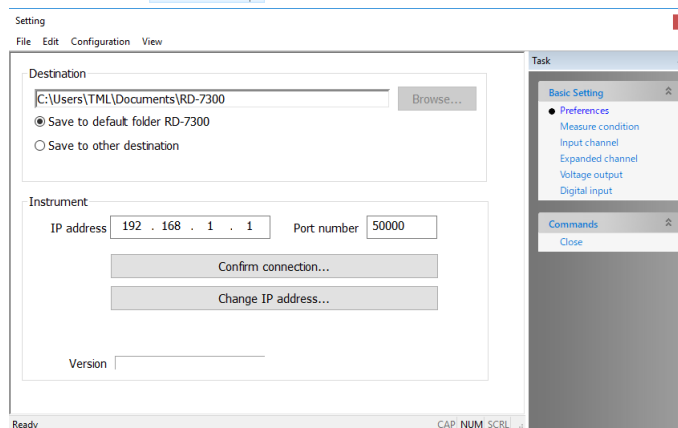
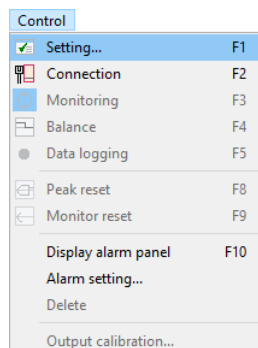
## Setting



This chapter explains the setting related to measurement such as measurement condition and measurement method.

## 1 Displaying the setting screen

To display the setting screen, select [Setting...] from the [Control] menu, or click the control tool  Setting...



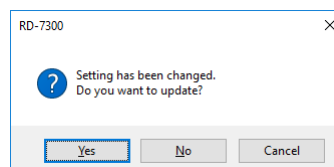
## 2 Fixing the setting

If the setting is changed, the content will not be reflected without fixing the change.

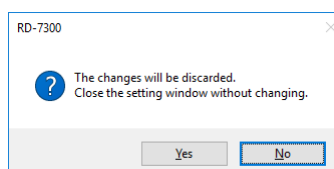
The setting is fixed when you close the setting screen.

To close the setting screen, select [Close] from the [File] menu, or click [Close] in the [Task].

Before the setting screen is closed, the dialog box shown below will be displayed.



- [Yes] : The setting is fixed and the screen is closed.
- [No] : The confirmation dialog box will be displayed again.
- [Cancel] : Closing of setting screen is cancelled.

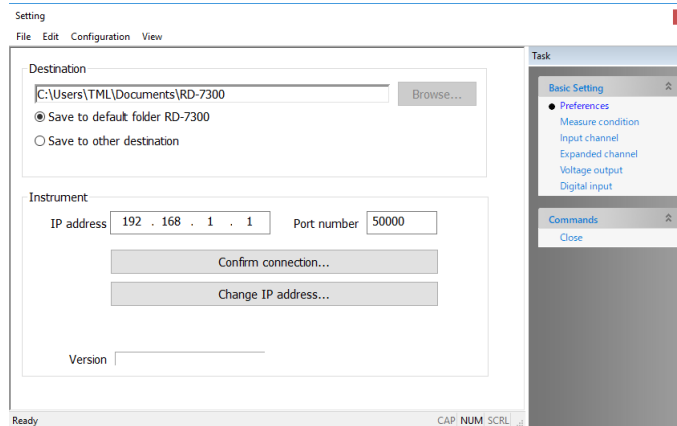
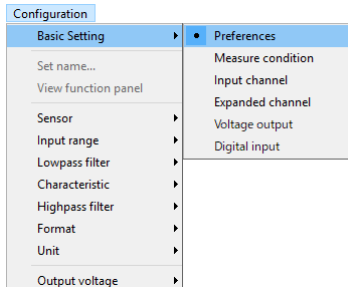


- [Yes] : The changes are discarded and the screen is closed.
- [No] : Closing of setting screen is cancelled.

### 3 Preferences

For the preferences, carry out the setting of destination to save the measurement data and the setting before using the instrument.

To display the screen of preferences, click [Preferences] in the [Task].



#### 3-1 Destination to save the measurement data

Set the destination to save the data which is recorded when measurement is carried out.



*Change is disabled during measurement.*

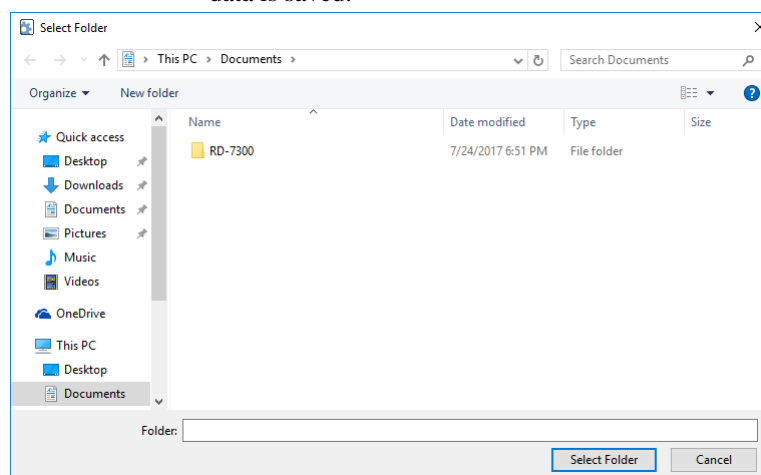
Setting item

[Save to default folder RD-7300]

: The data is saved in folder RD-7300, which is automatically created in the document folder.

[Save to other destination]

: Click [Browse...] button and select a folder in which the data is saved.



### 3-2 Confirming the connection of the measuring instrument

Set the interface of the measuring instrument and confirm the connection.



*Change is disabled while the measuring instrument is connected.*



For the setting of interface, refer to "Chapter 1. 3. Connection of measuring instrument".

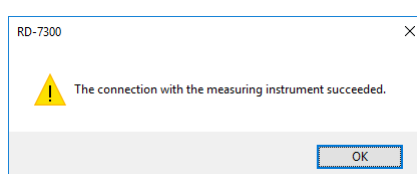
Setting item

[IP address] : Input the IP address set for the measuring instrument.

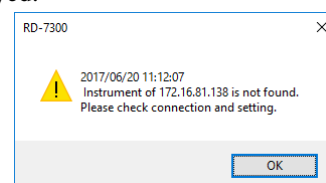
[Port number] : Input the port number set for the measuring instrument.

[Confirm connection]

: The connection to the measuring instrument is carried out following the input IP address and port number and the result will be displayed.



Connection succeeded



Connection failed

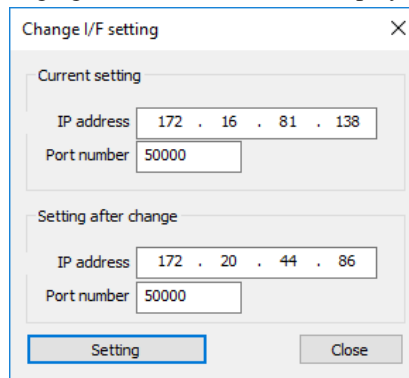
### 3-3 Changing the IP address of the measuring instrument

To change the IP address according to the environment where the measuring instrument is used, click [Change IP address...] button.



*The IP address cannot be changed while the measuring instrument is connected.*

The dialog box for changing the IP address will be displayed.



Setting item

Current setting

[IP address] : Set the current IP address of the measuring instrument.

[Port number] : Set the current port number of the measuring instrument.

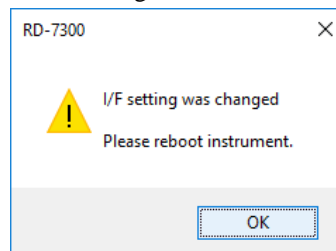
Setting after change

[IP address] : Set the IP address to be set for the measuring instrument.

[Port number] : Set the port number to be set for the measuring instrument.

After confirming the setting, click [Setting] button.

If the change is terminated, the dialog box shown below will be displayed.

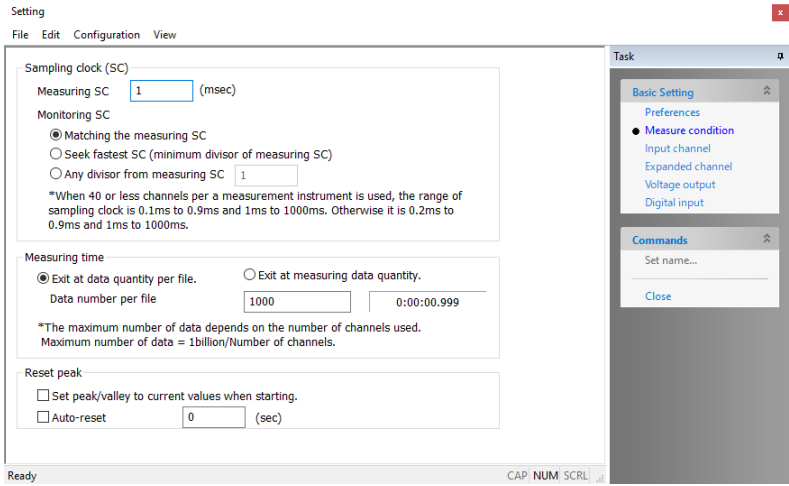
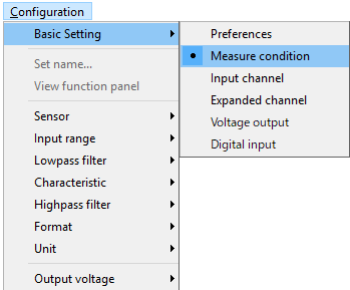


IP address and port number on the setting screen has been changed to the setting after change.

## 4 Measurement condition

For the measurement condition, set sampling clock and measurement time.

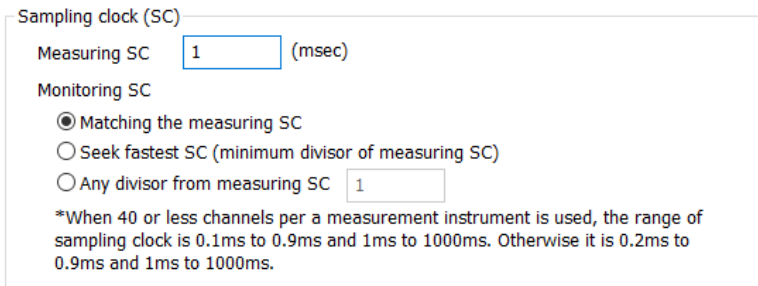
To display the screen of preferences, click [Measure condition] in the [Task].



Edit is disabled during measurement.

### 4-1 Sampling clock (SC)

Sampling clock when recording data and sampling clock when executing monitoring can be separately set.



Setting item

[Measuring SC] : Set the sampling clock when recording data.  
The sampling clock can be set within the range 0.1ms to 0.9ms by 0.1ms unit and 1ms to 1000ms by 1ms unit. However, the fastest value is 0.2ms when the number of used channel is 41 or more for one instrument.

[Matching the measuring SC]  
: Same as the value set by [Measuring SC]

[Seek fastest SC (minimum divisor of measuring SC)]  
: Minimum value available as the divisor of the [Measuring SC] is obtained and set.

[Any divisor from measuring SC]  
: Value available as the divisor of the [Measuring SC] is set.

## 4-2 Measurement time

Set the time to collect the measurement data.

If you input the data number, the measurement time will be obtained from the sampling speed and displayed as hour: minute: second.

Measuring time

☒ Exit at data quantity per file.

☐ Exit at measuring data quantity.

Data number per file

\*The maximum number of data depends on the number of channels used.  
Maximum number of data = 1billion/Number of channels.

[Exit at data quantity per file.]

- : The data collection is continued until the user terminates it.  
The file is divided by the value set in the [Data number per file].

[Exit at measuring data quantity.]

- : The measurement is terminated when the data number reaches the value set in the [Data number per file].

## 4-3 Reset peak

Set the timing to initialize peak value and valley value.

Maximum number of data = 1billion/Number of channels.

Reset peak

☐ Set peak/valley to current values when starting.

☐ Auto-reset  (sec)

[Set peak/valley to current values when starting.]

- : Peak value and valley value are initialized when the measurement is started.

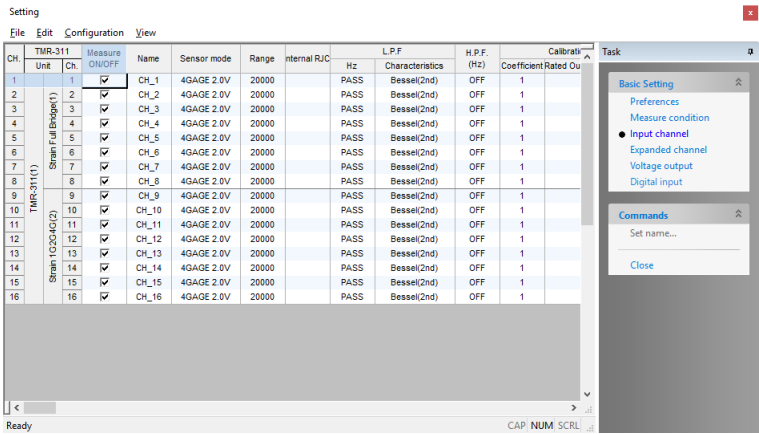
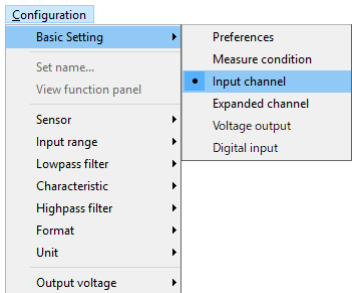
[Auto-reset]

- : Set the time to execute automatic reset by second.  
The auto-reset is valid during monitoring.

## 5 Input channel

For the channel, set the information of a channel to be used for measurement.

To display the screen of a channel, click [Input channel] in the [Task].



During measurement, edit is disabled excluding alarm setting.

### 5-1 Measurement ON/OFF

Select a channel for which measurement is carried out.

☒ The displayed channel will be activated.

To switch ON/OFF, select a channel to be switched, and click ☐ or press the space key on the keyboard.

311	Measure ON/OFF	Name
Ch.		
1	<input checked="" type="checkbox"/>	CH_1
2	<input checked="" type="checkbox"/>	CH_2
3	<input checked="" type="checkbox"/>	CH_3
4	<input checked="" type="checkbox"/>	CH_4
5	<input checked="" type="checkbox"/>	CH_5
6	<input checked="" type="checkbox"/>	CH_6
7	<input checked="" type="checkbox"/>	CH_7
8	<input checked="" type="checkbox"/>	CH_8
9	<input checked="" type="checkbox"/>	CH_9
10	<input checked="" type="checkbox"/>	CH_10
11	<input checked="" type="checkbox"/>	CH_11

↔

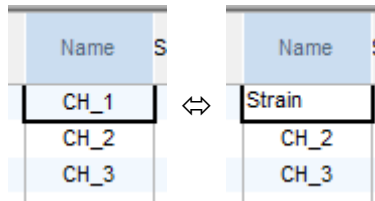
311	Measure ON/OFF	Name
Ch.		
1	<input checked="" type="checkbox"/>	CH_1
2	<input checked="" type="checkbox"/>	CH_2
3	<input checked="" type="checkbox"/>	CH_3
4	<input checked="" type="checkbox"/>	CH_4
5	<input checked="" type="checkbox"/>	CH_5
6	<input checked="" type="checkbox"/>	CH_6
7	<input type="checkbox"/>	CH_7
8	<input type="checkbox"/>	CH_8
9	<input type="checkbox"/>	CH_9
10	<input type="checkbox"/>	CH_10
11	<input checked="" type="checkbox"/>	CH_11

## 5-2 Name

Set the name of the channel.

This item is used for identifying a channel and displayed for graph legends etc.

Select the item to be edited and input the content of edit.



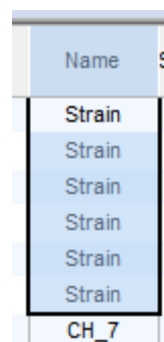
Direct edit from keyboard deletes the content before edit.

To add the content to the data before edit, set the item to edit mode by double-clicking the mouse or pressing F2 key on the keyboard.

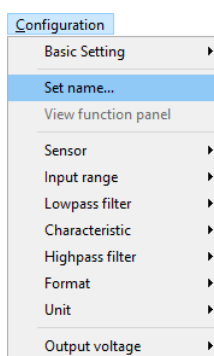
- To give a serial number to the name

A serial number is automatically given to the same names.

Select the cells of names to which a serial numbers is given.

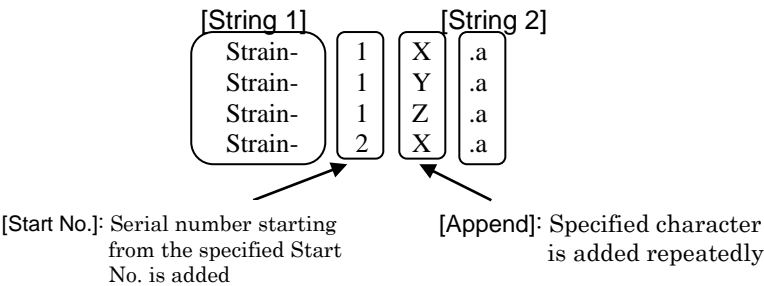


The serial number will be added to the end of the already set name. Set the same name preliminarily or delete the name to make the cell blank.



Select [Set name...] from the [Task]. The name setting dialog box will be displayed.

Setting item



[No.] : Sequential numbers  
Sequential number is added.  
Sequential number XY  
Sequential number is added for each two names.  
Sequential number XYZ  
Sequential number is added for each three names.

Check the setting and click [OK] button.  
A serial number starting from the [Start No] will be added to the end of name.

Name	S
Strain-1	
Strain-2	
Strain-3	
Strain-4	
Strain-5	
Strain-6	
CH_7	

### 5-3 Sensor mode

Set the type of the input signal (bridge excitation or voltage).

The strain resolution will change with the setting of the bridge excitation:

[4GAGE 0.5V] : Full bridge method, Bridge excitation is DC 0.5V

[4GAGE 2.0V] : Full bridge method, Bridge excitation is DC 2.0V

[VOLT] : Voltage

[Thermocouple T] : T type thermocouple


[Thermocouple K] : K type thermocouple

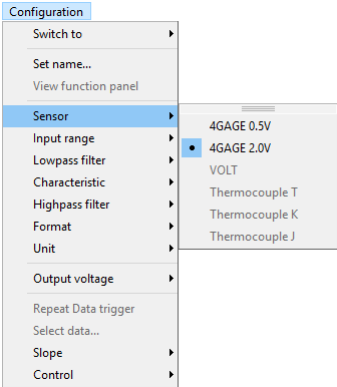
[Thermocouple J] : J type thermocouple

Select a channel to be edited.

IR-311	Unit	Ch.	Measure ON/OFF	Name	Sensor mode	Range	Inter
Strain Full Bridge(1)	1		<input checked="" type="checkbox"/>	CH_1	4GAGE 2.0V	20000	
	2		<input checked="" type="checkbox"/>	CH_2	4GAGE 2.0V	20000	
	3		<input checked="" type="checkbox"/>	CH_3	4GAGE 2.0V	20000	
	4		<input checked="" type="checkbox"/>	CH_4	4GAGE 2.0V	20000	
	5		<input checked="" type="checkbox"/>	CH_5	4GAGE 2.0V	20000	
	6		<input checked="" type="checkbox"/>	CH_6	4GAGE 2.0V	20000	
	7		<input checked="" type="checkbox"/>	CH_7	4GAGE 2.0V	20000	
	8		<input checked="" type="checkbox"/>	CH_8	4GAGE 2.0V	20000	
Strain 1/2G(2)	9		<input checked="" type="checkbox"/>	CH_9	VOLT	20000	
	10		<input checked="" type="checkbox"/>	CH_10	VOLT	20000	
	11		<input checked="" type="checkbox"/>	CH_11	VOLT	20000	
	12		<input checked="" type="checkbox"/>	CH_12	VOLT	20000	
	13		<input checked="" type="checkbox"/>	CH_13	VOLT	20000	
	14		<input checked="" type="checkbox"/>	CH_14	VOLT	20000	
	15		<input checked="" type="checkbox"/>	CH_15	VOLT	20000	
	16		<input checked="" type="checkbox"/>	CH_16	VOLT	20000	

If a sensor mode not corresponding to the unit is set, it will be displayed in red.

Click  of an item or press F2 key on the keyboard.



IR-311	Unit	Ch.	Measure ON/OFF	Name	Sensor mode	Range	Inter
Strain Full Bridge(1)	1		<input checked="" type="checkbox"/>	CH_1	4GAGE 2.0V	20000	
	2		<input checked="" type="checkbox"/>	CH_2	4GAGE 2.0V	20000	
	3		<input checked="" type="checkbox"/>	CH_3	4GAGE 2.0V	20000	
	4		<input checked="" type="checkbox"/>	CH_4	4GAGE 2.0V	20000	
	5		<input checked="" type="checkbox"/>	CH_5	4GAGE 2.0V	20000	
	6		<input checked="" type="checkbox"/>	CH_6	4GAGE 2.0V	20000	
	7		<input checked="" type="checkbox"/>	CH_7	4GAGE 2.0V	20000	
	8		<input checked="" type="checkbox"/>	CH_8	4GAGE 2.0V	20000	
Strain 1/2G(2)	9		<input checked="" type="checkbox"/>	CH_9	VOLT	20000	
	10		<input checked="" type="checkbox"/>	CH_10	4GAGE 0.5V		
	11		<input checked="" type="checkbox"/>	CH_11	4GAGE 2.0V		
	12		<input checked="" type="checkbox"/>	CH_12	VOLT		
	13		<input checked="" type="checkbox"/>	CH_13	Thermocouple T		
	14		<input checked="" type="checkbox"/>	CH_14	Thermocouple K		
	15		<input checked="" type="checkbox"/>	CH_15	Thermocouple J		
	16		<input checked="" type="checkbox"/>	CH_16	Thermocouple J		


If the connected unit is defined, only settable sensor modes can be selected.

Select the content to be set.

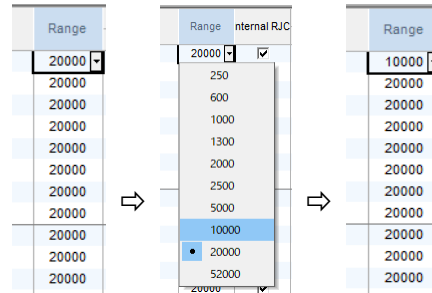
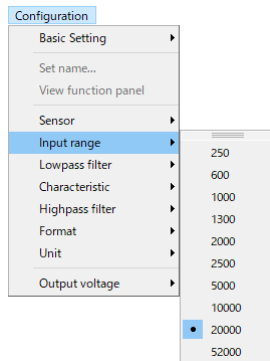
## 5-4 Range

Set the input range of a channel.

When the input range value is lower, the measured value becomes more stable.

Select an item to be edited, and click  or press F2 key on the keyboard.

And then select a range from menu.



For strain measurement

Range	Measuring range (Resolution)		
	4G 2.0V	4G 0.5V	VOLT (CR-4010)
2,000	-2,000~+2,000 (0.1×10 <sup>-6</sup> )	-8,000~+8,000 (0.4×10 <sup>-6</sup> )	-2,000~+2,000 (0.1mV)
5,000	-5,000~+5,000 (1×10 <sup>-6</sup> )	-20,000~+20,000 (4×10 <sup>-6</sup> )	-5,000~+5,000 (1mV)
10,000	-10,000~+10,000 (1×10 <sup>-6</sup> )	-40,000~+40,000 (4×10 <sup>-6</sup> )	-10,000~+10,000 (1mV)
20,000	-20,000~+20,000 (1×10 <sup>-6</sup> )	-80,000~+80,000 (4×10 <sup>-6</sup> )	-20,000~+20,000 (1mV)

For voltage measurement

Range	Measuring range (Resolution)
1000	-1,000~+1,000 (0.1mV)
5000	-5,000~+5,000 (0.5mV)
10000	-10,000~+10,000 (1mV)
20000	-20,000~+20,000 (2mV)
52000	-52,000~+52,000 (5mV)

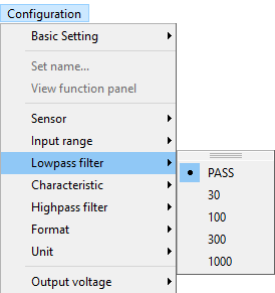
For temperature measurement

Range	Measuring range (Resolution)
600	-200~+600 (0.1°C)
1300	-200~+1,300 (0.2°C)

### 5-5 Reference junction

Set the reference junction used for measuring temperature.  
Set ON when you use the internal RJC of the instrument for thermocouple. If you use an external RJC for thermocouple, set OFF.  
The channel displayed as ☒ will be internal RJC, otherwise it will be external RJC.  
To switch ON/OFF, select a channel to be switched, and click ☐ or press the space key on the keyboard.

### 5-6 Low-pass filter



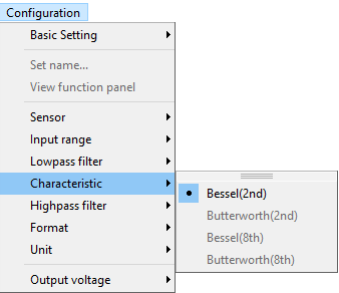
Set the low-pass filter used for measuring strain or voltage.  
This setting attenuates the frequency component higher than the specified frequency in the input signal.  
The settable frequency is within the range 0 to 1000 by 1Hz unit.  
Select an item to be edited and input the content of edit.  
Or select content from the [Lowpass filter] submenu of [Configuration] menu.

L.P.F		L.P.F	
Hz	Characteristics	Hz	Characteristics
PASS	Bessel(2nd)	200	Bessel(2nd)
PASS	Bessel(2nd)	PASS	Bessel(2nd)
PASS	Bessel(2nd)	PASS	Bessel(2nd)



Direct edit from keyboard deletes the content before edit.  
To add the content to the data before edit, set the item to edit mode by double-clicking the mouse or pressing F2 key on the keyboard.

### 5-7 Frequency characteristic



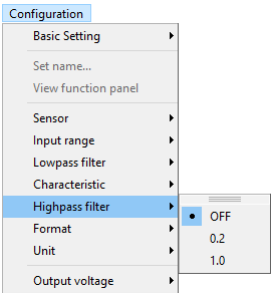
Frequency characteristic setting.  
The settable frequency characteristic is Bessel (2nd), Butterworth (2nd), Bessel (8th), or Butterworth (8th).


Select an item to be edited, and click ☐ or press F2 key on the keyboard.  
And then select a range from menu.

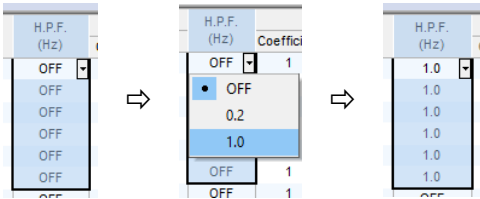
L.P.F		L.P.F		L.P.F	
Hz	Characteristics	Hz	Characteristics	Hz	Characteristics
200	Bessel(2nd)	200	Bessel(2nd)	200	Butterworth(2nd)
PASS	Bessel(2nd)	PASS	Bessel(2nd)	PASS	Bessel(2nd)
PASS	Bessel(2nd)	PASS	Bessel(2nd)	PASS	Bessel(2nd)
PASS	Bessel(2nd)	PASS	Bessel(2nd)	PASS	Bessel(2nd)
PASS	Bessel(2nd)	PASS	Bessel(2nd)	PASS	Bessel(2nd)
PASS	Bessel(2nd)	PASS	Bessel(2nd)	PASS	Bessel(2nd)
PASS	Bessel(2nd)	PASS	Bessel(2nd)	PASS	Bessel(2nd)

### 5-8 High-pass filter

Set the high-pass filter used for measuring strain.  
The frequency lower than the specified frequency in the input signal is attenuated.  
The choices are OFF, 0.2Hz, and 1.0Hz.




Select an item to be edited and click , or press F2 key on the keyboard and display the menu.  
Select the content to be set.



### 5-9 Coefficient

Set a coefficient for each channel.  
If a coefficient is set, rated output and capacity will be deleted.  
A value, which is displayed as a measured value, is "Measured data \* Coefficient + Offset".

Select an item to be edited and input the content of edit.



Calibration coefficients			
Coefficient	Rated Output	Capacity	Offset
1	1000	1000	0
1			0
1			0

Calibration coefficients			
Coefficient	Rated Output	Capacity	Offset
0.5			0
1			0
1			0



Direct edit from keyboard deletes the content before edit.  
To add the content to the data before edit, set the item to edit mode by double-clicking the mouse or pressing F2 key on the keyboard.

## 5-10 Rated output

Set the rated output of a sensor, which is connected to a channel.

If coefficient has been set, it is not necessary to set it.

If capacity has been set, the coefficient will be updated by the value of "capacity divided by rated output" if the rated output is set.

Select an item to be edited and input the content of edit.

Calibration coefficients			
Coefficient	Rated Output	Capacity	Offset
1		50	0
1		0	0
1		0	0

⇒

Calibration coefficients			
Coefficient	Rated Output	Capacity	Offset
0.05	1000	50	0
1		0	0
1		0	0



Direct edit from keyboard deletes the content before edit.

To add the content to the data before edit, set the item to edit mode by double-clicking the mouse or pressing F2 key on the keyboard.

## 5-11 Capacity

Set the capacity of a sensor, which is connected to a channel.

If coefficient has been set, it is not necessary to set it.

If rated output has been set, the coefficient will be updated by the value of "capacity divided by rated output" if the capacity is set.

Select an item to be edited and input the content of edit.

Calibration coefficients			
Coefficient	Rated Output	Capacity	Offset
1	1000		0
1		0	0
1		0	0

⇒

Calibration coefficients			
Coefficient	Rated Output	Capacity	Offset
0.05	1000	50	0
1			0
1		0	0



Direct edit from keyboard deletes the content before edit.

To add the content to the data before edit, set the item to edit mode by double-clicking the mouse or pressing F2 key on the keyboard.

## 5-12 Offset

Set the offset to be added to the measured value.

The value, which is displayed as a measured value, is "Measured data \* Coefficient + Offset".

Select an item to be edited and input the content of edit.

Calibration coefficients			
Coefficient	Rated Output	Capacity	Offset
0.05	1000	50	0
1			0
1			0

⇒

Calibration coefficients			
Coefficient	Rated Output	Capacity	Offset
0.05	1000	50	100
1			0
1			0




Direct edit from keyboard deletes the content before edit.

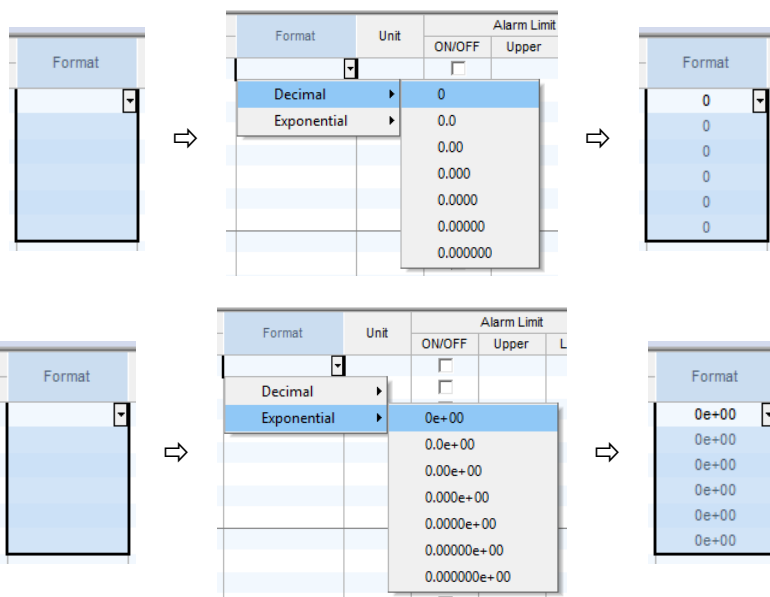
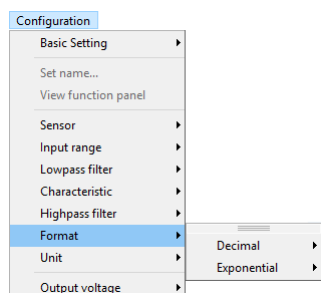
To add the content to the data before edit, set the item to edit mode by double-clicking the mouse or pressing F2 key on the keyboard.

## 5-13 Format

Set the display format of measurement value by display number of decimal places or exponential form.

Select an item to be edited and click , or press F2 key on the keyboard and display the menu.

Select the content to be set.



## 5-14 Unit

Set the unit of the channel.

This item is used for graph legends.

Select an item to be edited and input the content of edit.

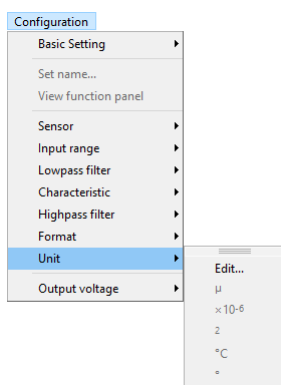



Direct edit from keyboard deletes the content before edit.

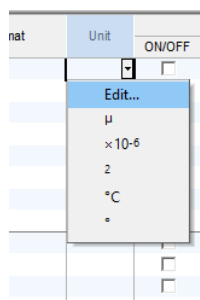
To add the content to the data before edit, set the item to edit mode by double-clicking the mouse or pressing F2 key on the keyboard.

### ● Unit expansion

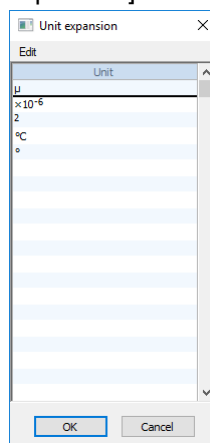
It is possible to register an arbitrary unit and select it from the menu.



Click  on an item of unit, or press F2 key on the keyboard and display the menu.

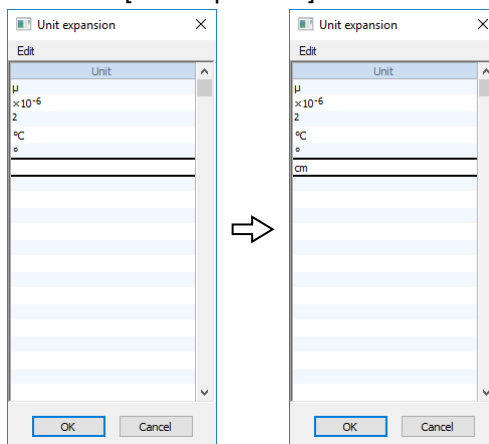


Click [Edit...] to display [Unit expansion] window.



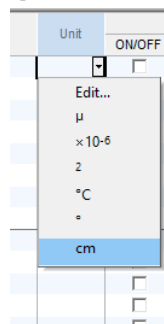
Select an item that has not been entered or an item to be corrected and edit the unit.

Click [OK] button and close [Unit expansion] window.



Click the right mouse button on the item of unit and display the menu.

Select a registered unit from [Unit].



## 5-15 Alarm ON/OFF

Set ON/OFF of alarm function.

Alarm function is activated by setting ☒ display.

To switch ON/OFF, select a channel to be switched, and click ☐ or press the space key on the keyboard.

## 5-16 Upper limit value and lower limit value

Set the upper limit value and lower limit value for alarm function.

The upper limit value and lower limit value can be displayed on a graph.

[Upper] : An alarm is output when the setting value is exceeded.

[Lower] : An alarm is output when the value falls below setting value.

Select an item to be edited and input the content of edit.

Alarm Limit		
ON/OFF	Upper	Lower
<input checked="" type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		

 ⇒ 

Alarm Limit		
ON/OFF	Upper	Lower
<input checked="" type="checkbox"/>	1000	-1000
<input type="checkbox"/>		
<input type="checkbox"/>		



Direct edit from keyboard deletes the content before edit.

To add the content to the data before edit, set the item to edit mode by double-clicking the mouse or pressing F2 key on the keyboard.

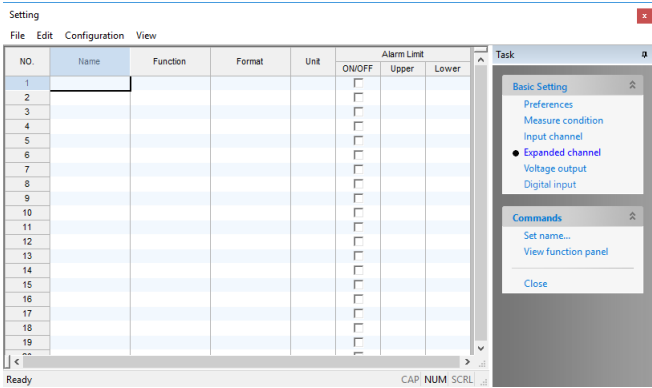
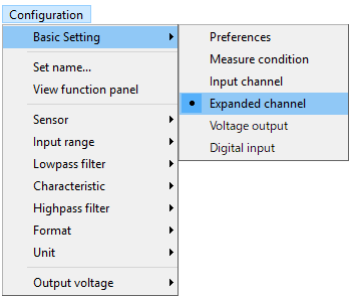
## 6 Expanded channel

An expanded channel can be treated in a same way as usual channel by conducting calculation all the time based on an arbitrarily set calculation formula.

The setting of expanded channel is recorded in the data file, however, the calculation result is not recorded.

The maximum number of expanded channel is 1000.

To display the screen of expanded channel, click [Expanded channel] in the task.



*During measurement, edit is disabled excluding alarm setting.*

### 6-1 Name

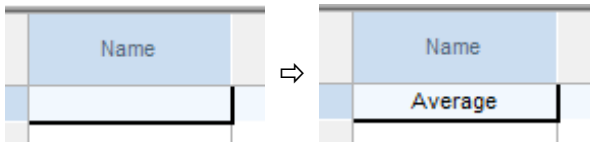
Set the name of the channel.

This item is used for identifying a channel and displayed for graph legends etc.



For the serial number of name, refer to "Chapter 4. 5-2 Name".

Select an item to be edited and input the content of edit.



Direct edit from keyboard deletes the content before edit.

To add the content to the data before edit, set the item to edit mode by double-clicking the mouse or pressing F2 key on the keyboard.

## 6-2 Function

Set a calculation formula of a channel.



For the function, refer to "Chapter 14. List of functions".

Select an item to be edited and input the content of edit.



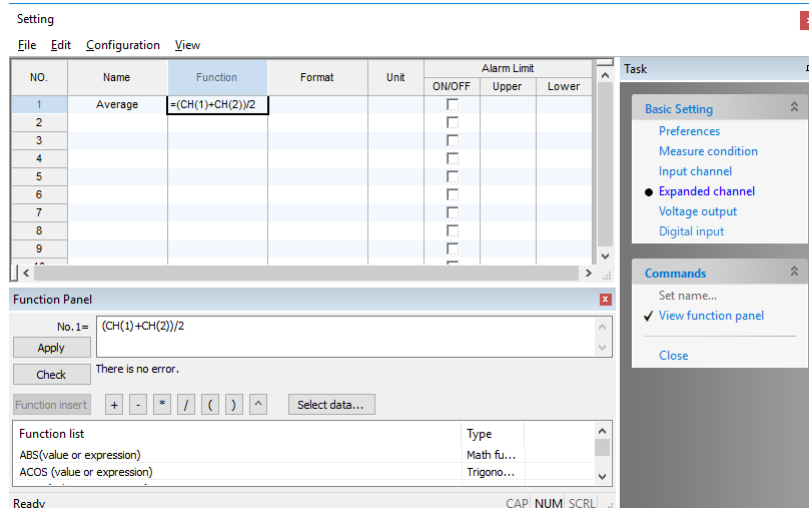
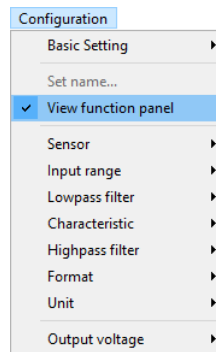
Direct edit from keyboard deletes the content before edit.

To add the content to the data before edit, set the item to edit mode by double-clicking the mouse or pressing F2 key on the keyboard.

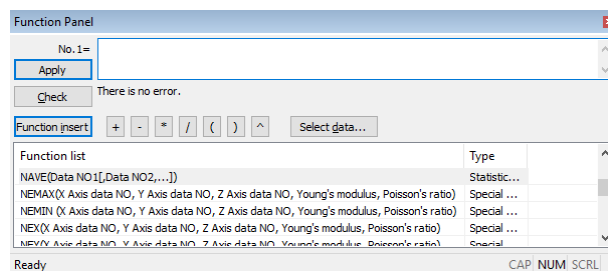
- Insert a function from function panel

It is possible to select a function to be used from the function panel to insert it.

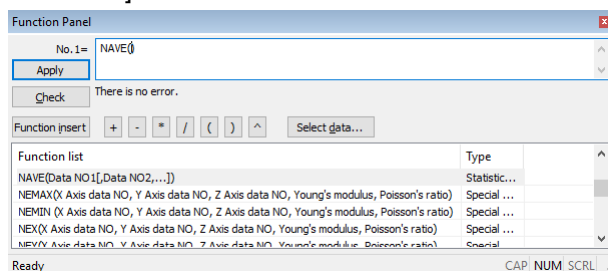
To display the function panel, click [View function panel] in the [Task].



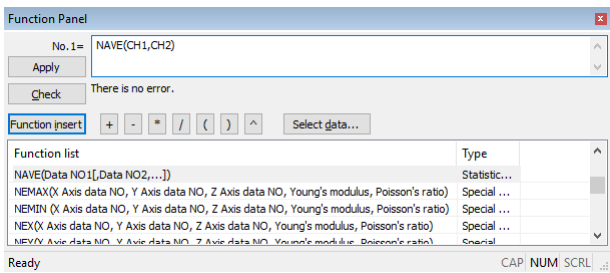
Select a function from function list.



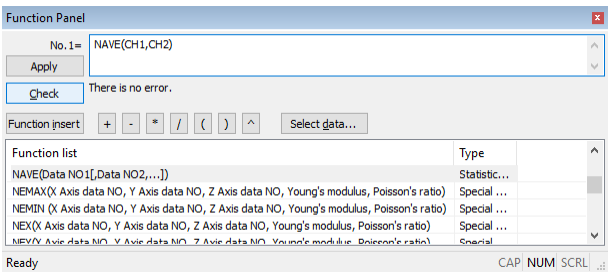
Click [Function insert] button.



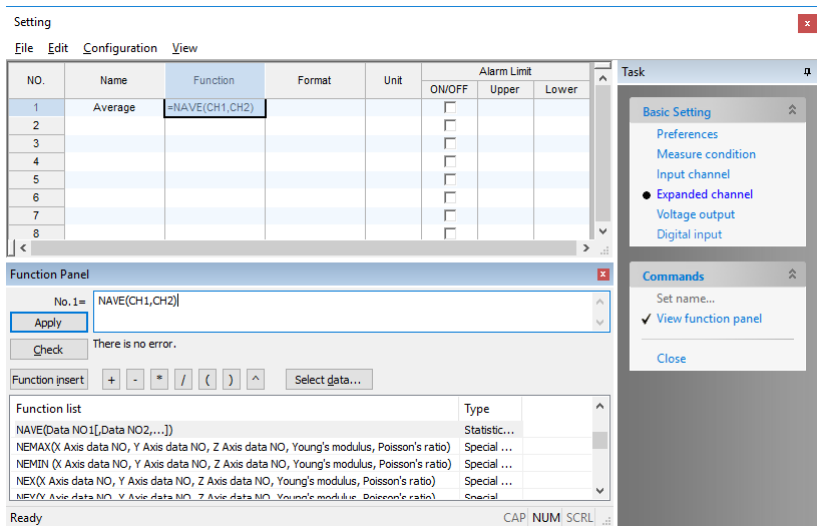
Input an argument.



Click [Check] button to check the format.




Click [Apply] button to fix the content of edit.

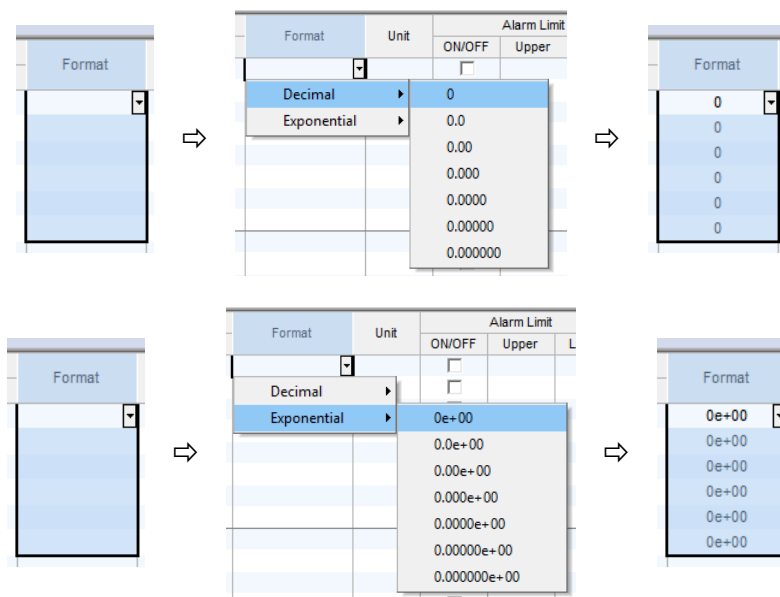


### 6-3 Format

Set the display format of calculation result by display number of decimal places or exponential form.

Select an item to be edited and click , or press F2 key on the keyboard and display the menu.

Select the content to be set.



### 6-4 Unit

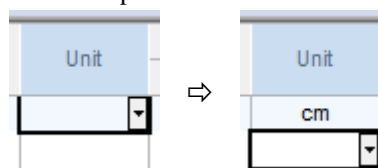
Set the unit of the channel.

This item is used for graph legends.



For the expansion of unit, refer to "Chapter 4. 5-13 Unit".

Select an item to be edited and input the content of edit.



Direct edit from keyboard deletes the content before edit.

To add the content to the data before edit, set the item to edit mode by double-clicking the mouse or pressing F2 key on the keyboard.

## 6-5 Alarm ON/OFF

Set ON/OFF of alarm function.

Alarm function is activated by setting ☒ display.

To switch ON/OFF, select a channel to be switched, and click ☐ or press the space key on the keyboard.

## 6-6 Upper limit value and lower limit value

Set the upper limit value and lower limit value for alarm function.

The upper limit value and lower limit value can be displayed on a graph.

[Upper] : An alarm is output when the setting value is exceeded.

[Lower] : An alarm is output when the value falls below setting value.

Select an item to be edited and input the content of edit.

Alarm Limit		
ON/OFF	Upper	Lower
<input checked="" type="checkbox"/>		
<input type="checkbox"/>		

⇒

Alarm Limit		
ON/OFF	Upper	Lower
<input checked="" type="checkbox"/>	1000	-1000
<input type="checkbox"/>		



Direct edit from keyboard deletes the content before edit.

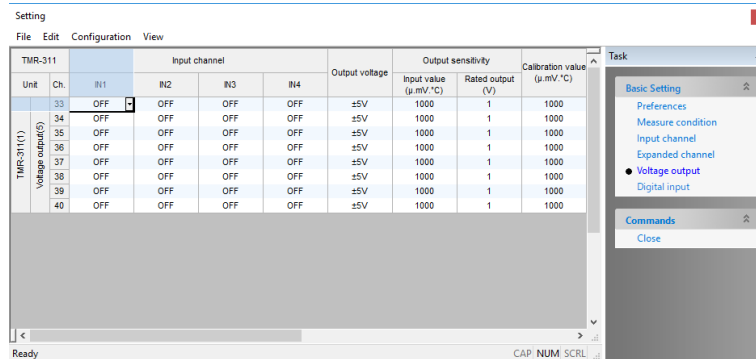
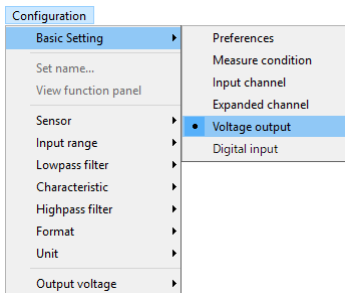
To add the content to the data before edit, set the item to edit mode by double-clicking the mouse or pressing F2 key on the keyboard.

## 7 Voltage output

With the Voltage output unit (TMR-341), the measured data of any channels can be output as a voltage value.

If the Voltage Output unit (TMR-341) is not used, this setting is not necessary.

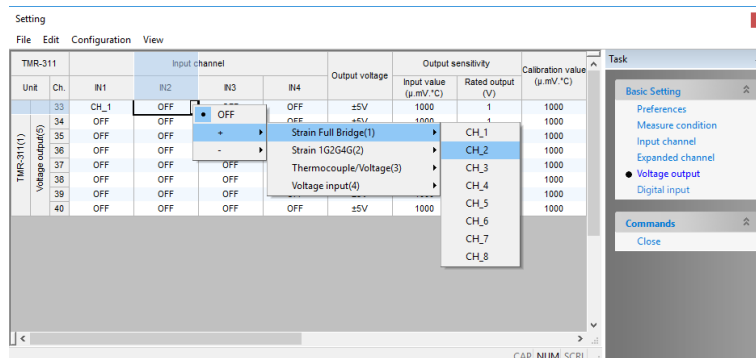
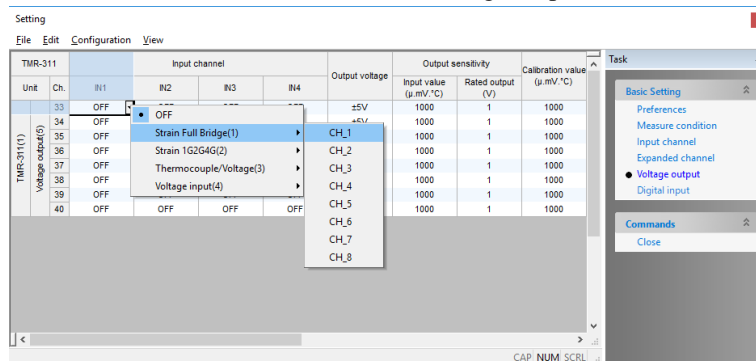
To display the screen of voltage output, click [Voltage output] in the task.



*This data cannot be edited during measurement.*

### 7-1 Input channel

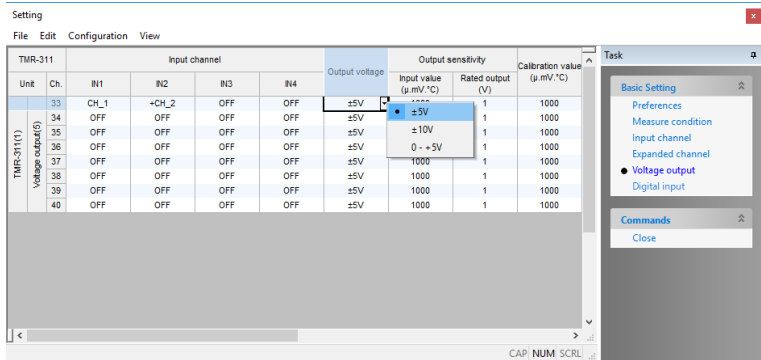
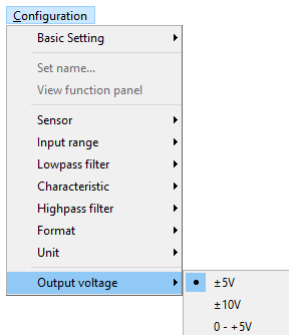
Set channels of measurement data to use for voltage output.



- [IN1] : Select channel for voltage output.  
If you don't need to output, set OFF to this option.
- [IN2] to [IN4] : When outputting voltage by adding or subtracting channels, select the channels for operation.  
If you don't need the operation, set OFF to this option.

## 7-2 Output voltage

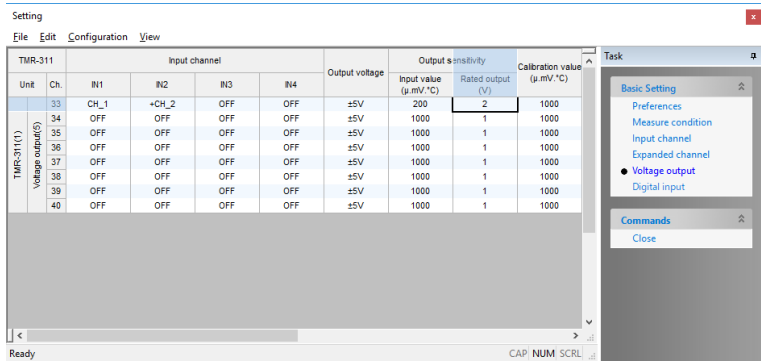
Select the range of output voltage from among  $\pm 5V$ ,  $\pm 10V$ , and  $0 - +5V$ .



The output voltage is set for each unit. And thus, if you change the voltage for one channel, the same setting applies not only to that channel but also to all the channels of the unit.

## 7-3 Output sensitivity

Set the sensitivity of voltage output by input value and rated output.



- [Input value] : When the value in the [Input ch.] becomes the value set in the [Input value], the value set in the [Rated output] is output.
- [Rated output] : Set a voltage output value for the [Input value] by V unit.

## 7-4 Calibration value

Set a calibration value in units of measurement data.

Setting

File Edit Configuration View

TMR-311		Input channel				Output voltage	Output sensitivity		Calibration value
Unit	Ch.	IN1	IN2	IN3	IN4		Input value ( $\mu\text{mV}/^{\circ}\text{C}$ )	Rated output (V)	( $\mu\text{mV}/^{\circ}\text{C}$ )
TMR-311(1) Voltage output(5)	33	CH_1	+CH_2	OFF	OFF	$\pm 5\text{V}$	200	2	100
	34	OFF	OFF	OFF	OFF	$\pm 5\text{V}$	1000	1	1000
	35	OFF	OFF	OFF	OFF	$\pm 5\text{V}$	1000	1	1000
	36	OFF	OFF	OFF	OFF	$\pm 5\text{V}$	1000	1	1000
	37	OFF	OFF	OFF	OFF	$\pm 5\text{V}$	1000	1	1000
	38	OFF	OFF	OFF	OFF	$\pm 5\text{V}$	1000	1	1000
	39	OFF	OFF	OFF	OFF	$\pm 5\text{V}$	1000	1	1000
40	OFF	OFF	OFF	OFF	$\pm 5\text{V}$	1000	1	1000	

Ready

CAP NUM SCRL

Task

Basic Setting

Preferences

Measure condition

Input channel

Expanded channel

Voltage output

Digital input

Commands

Close



For the output of calibration voltage, refer to "Chapter 6: 10 Output of calibration voltage".

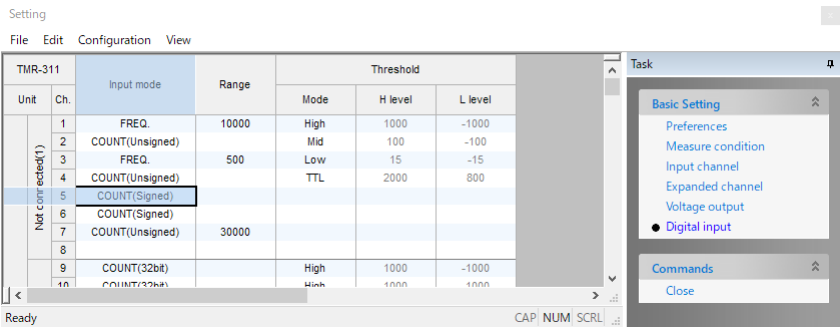
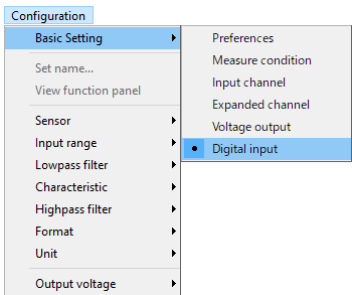
Supposing that the [Input value] is 200 and the [Rated Output] is 2V, when the [Calibration value] is set to 100 for example, calibration voltage of 1V is output by "plus calibration" and -1V is output by "minus calibration".

## 8 Digital input

With the Digital I/O unit (TMR-353), you can use the functions of frequency measurement and pulse counting.

If the Digital I/O unit (TMR-353) is not used, this setting is not necessary.

To display the screen of voltage output, click [Digital input] in the task.

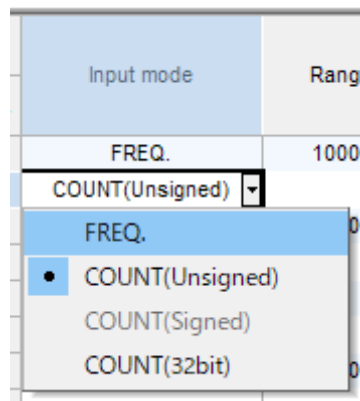


*This data cannot be edited during measurement.  
RD-7300 cannot use the 8th channel of the unit.*

## 8-1 Input mode

Select the input mode of digital I/O.

The settable items vary depending on the channel and the input mode.



### [FREQ.]

CH1~4 : Measures the frequency of the signal input to the input 1, 2, 3, and 4.

### [COUNT(Unsigned)]

CH1~4 : Counts the pulses of the signal input to the input 1, 2, 3, and 4.

CH5,CH6 : Perform 2-phase counting by assigned the input to phase A and B respectively.

(CH5)Phase A : Input 1 / Phase B : Input 2

(CH6)Phase A : Input 3 / Phase B : Input 4

CH7 : Perform 3-phase counting by assigned the input to phase A, B and Z respectively.

Phase A : Input 1 / Phase B : Input 2 / Phase Z : Input 3

### [COUNT(Signed)]

CH5,CH6 : Perform 2-phase counting by assigned the input to phase A and B respectively.

(CH5)Phase A : Input 1 / Phase B : Input 2

(CH6)Phase A : Input 3 / Phase B : Input 4

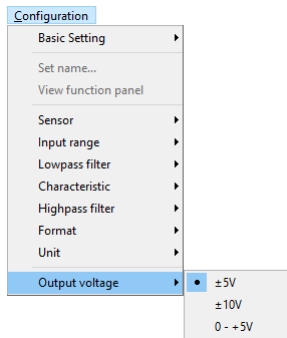
### [COUNT(32bit)]

CH1+CH2 : Counts the pulses of the signal input to the input 1  
 (CH1) Number of pulses input to input 1 (0 to 29999)  
 (CH2) Each time the recorded value of CH1 exceeds 29999, it is incremented by one.

## 8-2 Range

Set the input range of a channel.

The settable items vary depending on the channel and the input mode.



Input mode	Range
COUNT(32bit)	
COUNT(32bit)	
FREQ.	500
COUNT(Unsigned)	100
COUNT(Signed)	500
COUNT(Signed)	1000
COUNT(Unsigned)	5000
COUNT(32bit)	10000
COUNT(32bit)	50000
	100000

Measuring range

Input mode	Range	
	Setting item	Measuring range
FREQ.	100	0 ~ 100 Hz (0.01Hz resolution)
	500	0 ~ 500 Hz (0.05Hz resolution)
	1000	0 ~ 1 kHz (0.1Hz resolution)
	5000	0 ~ 5 kHz(0.5Hz resolution)
	10000	0 ~ 10 kHz (1Hz resolution)
	50000	0 ~ 50 kHz (5Hz resolution)
	100000	0 ~ 100 kHz (10Hz resolution)
COUNT(Unsigned) : CH1~4	30000(Fixed)	0 ~ 29,999 count
COUNT(Unsigned) : CH5~6	2~30000 (variable)	0~1(Max.)/29,999(Min.) count
COUNT(Signed)	-	-29,999 ~ +29,999 count
COUNT(32bit)	30000(Fixed)	0 ~ 899,999,999 count

### 8-3 Threshold value

Set the threshold of the signal input to channels 1 to 4 of the digital I/O unit.

Mode	Threshold	
	H level	L level
High	1000	-1000
Mid	100	-100
Low	15	-15
TTL	2000	800
Edit		
Low		
Mid		
High		
• TTL	1000	-1000
CMOS		
	1000	-1000
	1000	-1000

The mode determines the threshold level.

[Edit] : Input in 100mV steps within the range of  $\pm 10000\text{mV}$ .

Edit	2000	800
------	------	-----

[Low] : Fixed at  $\pm 15\text{mV}$ .

[Mid] : Fixed at  $\pm 100\text{mV}$ .

[High] : Fixed at  $\pm 1000\text{mV}$ .

[TTL] : Fixed at  $+ 2000\text{mV}$ ,  $+ 800\text{mV}$ .

[CMOS] : Fixed at  $+ 3500\text{mV}$ ,  $+ 1500\text{mV}$ .

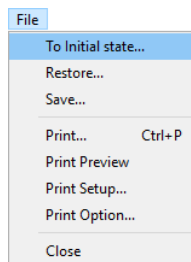
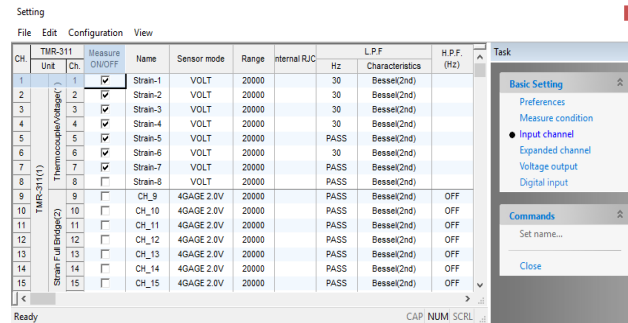


*When input mode is set to COUNT (32bit), this setting is ignored because channel 2 is not used as an input.*

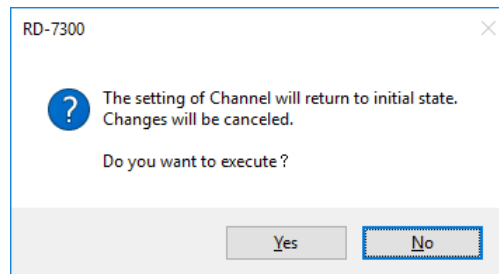
## 9 Initialization

The content of displayed setting screen can be initialized.

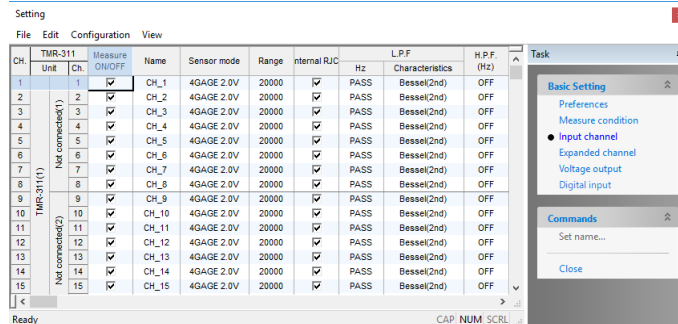
Display the setting screen to be initialized.



Select [To Initial state...] from [File] menu. The confirmation dialog box will be displayed.



If you click [Yes] button, the setting content will be initialized.



This function cannot be used in the following status.

Preferences : Connected to measuring instrument

Measurement condition

: While recording data

Input channel : While recording data

Expanded channel : While recording data

Voltage output : While recording data

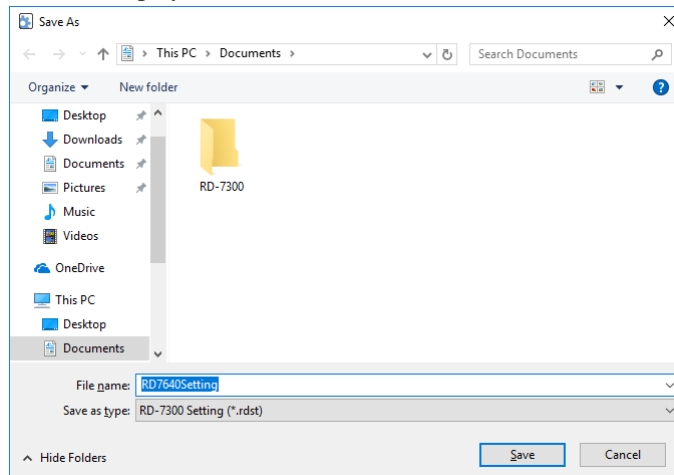
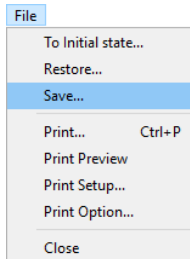
Digital input : While recording data

## 10 Saving the setting content

The setting content can be recorded in a file.

The items to be recorded are the setting content of measurement condition, channel and expanded channel excluding preferences.

Select [Save...] from [File] menu. The dialog box for setting the destination to save a file will be displayed.

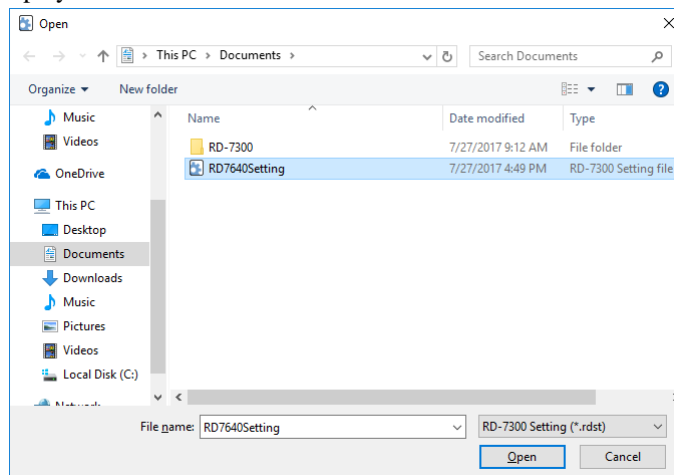
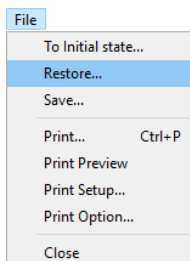


Set the destination to save the file and the file name, and click [Save] button.

## 11 Reading the setting content

A file of the saved setting is read to restore the content.

Select [Restore...] from [File] menu. The dialog box for selecting a setting file will be displayed.



Select a setting file and click [Open] button.



*A setting file cannot be read while connected to measuring instrument, and data trigger measurement is executed.*

# Chapter 5

## Graph sheet

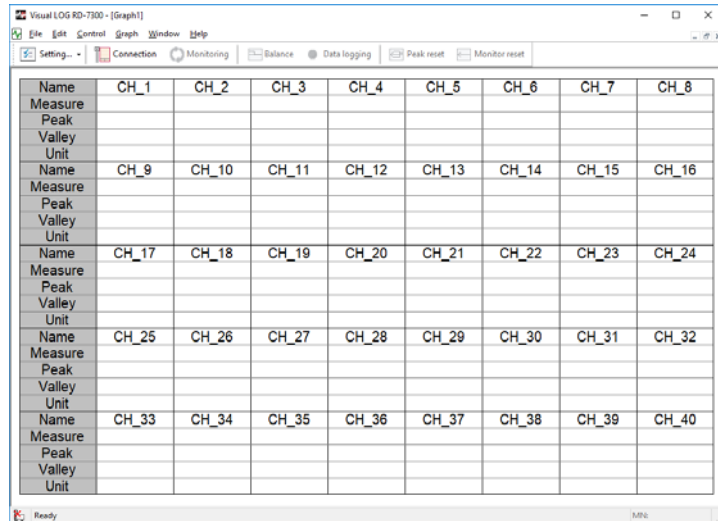


This chapter explains the graph sheet.

## 1 Graph sheet

A graph sheet displays the measurement values under monitoring by allocating various monitoring objects.

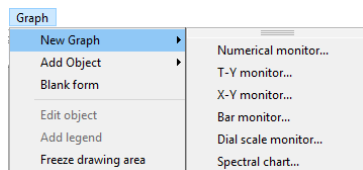
At the initial startup, the numerical monitor will be displayed.



Characteristics of graph sheet

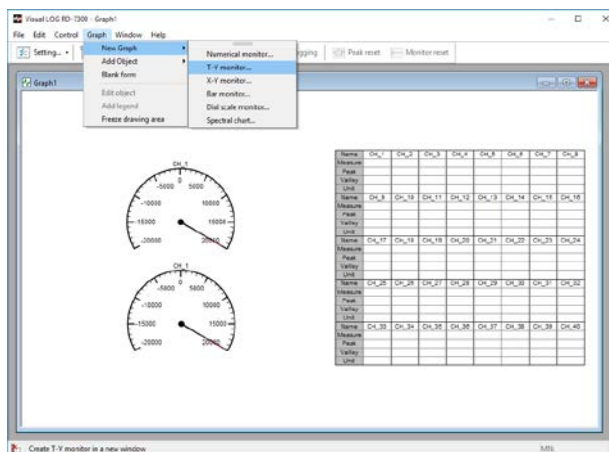
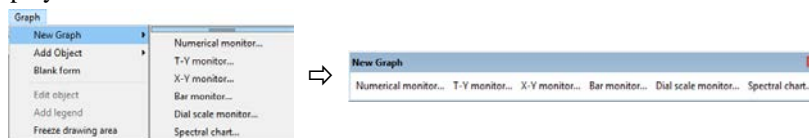
- As multiple graph sheets can be displayed at the same time, a user can lay out them to respond to various tests.
- The display status of a graph sheet can be recorded and the layout can be saved for each test.
- The software can be restarted in the previous status.
- For various monitoring objects, the setting is changed from properties panel. As the content is reflected at the same time as input, the number of steps is small.
- The scale of a monitor can be changed by dragging the mouse or rotating the wheel of mouse in addition to change from properties window.
- The expanded channel is also monitored all the time.

## 2 Creation of graph sheet

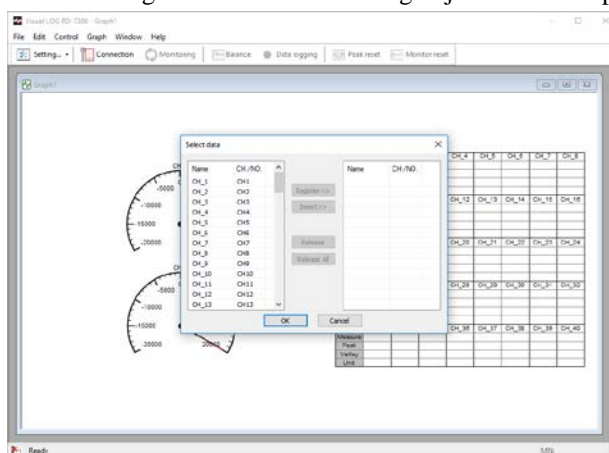


To create a new graph sheet, select a displayed monitoring object from [New Graph] in [Graph] menu.

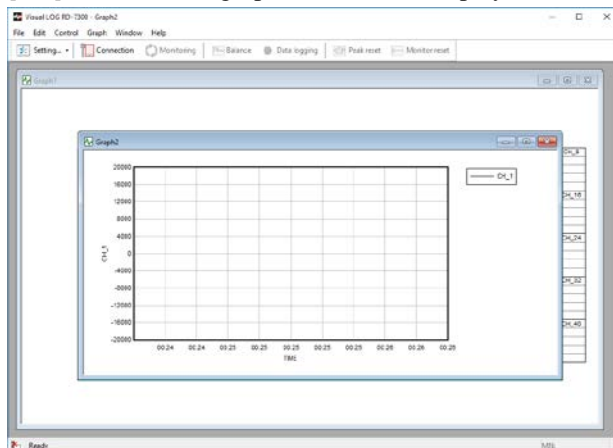
If you drag the bar displayed in the upper part of the menu, the menu can be displayed as a toolbar all the time.



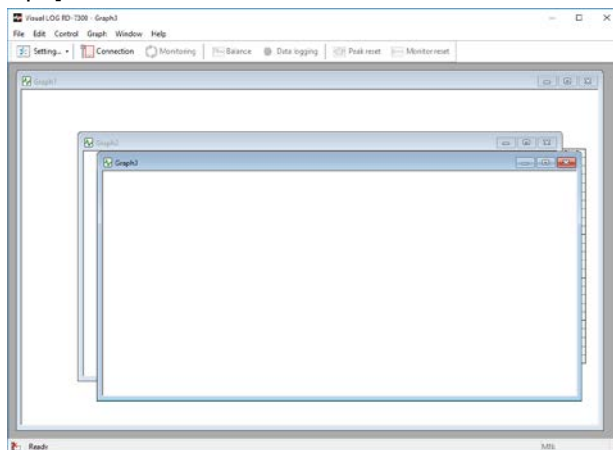
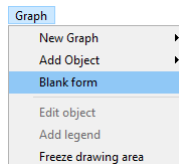
The dialog box for setting the selected monitoring object will be displayed.



If you click [OK] button, a new graph sheet will be displayed.

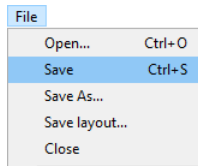


To create a graph sheet that does not contain monitoring object, select [Blank form] in [Graph] menu.

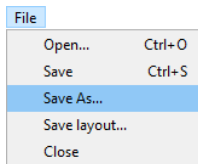


### 3 Saving a graph sheet

To save a graph sheet, select [Save] or [Save As...] from [File] menu.

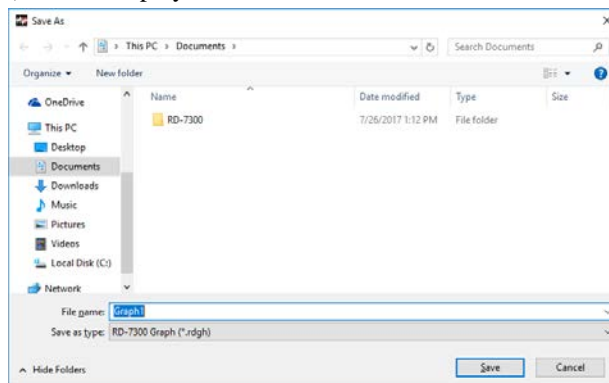


[Save] : When a sheet is saved for the first time, the dialog box for inputting the sheet name and specifying the destination to save the sheet will be displayed. The sheet that is saved once will be saved again as the same sheet name.



[Save As...] : The dialog box for inputting the sheet name and specifying the destination to save the sheet will be displayed all the time.

The dialog box for specifying the sheet name and the destination to save the sheet (folder) will be displayed.

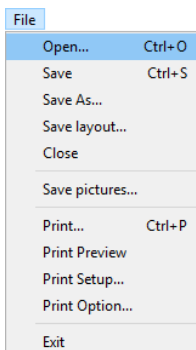


Specify the sheet name and the destination to save the sheet (folder) and click [Save] button.

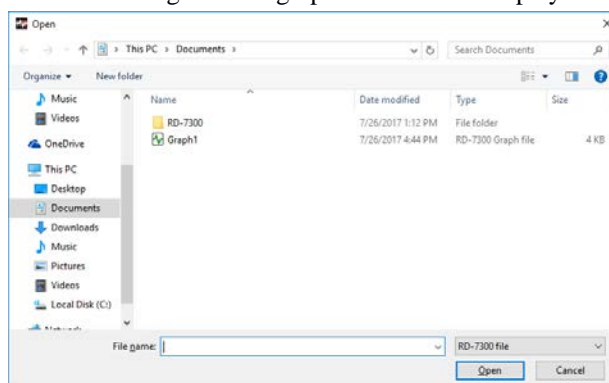
The sheet name will be changed to the specified name.

### 4 Opening a graph sheet

To display the saved graph sheet again, select [Open...] from [File] menu.



The dialog box for selecting a file of graph sheet will be displayed.

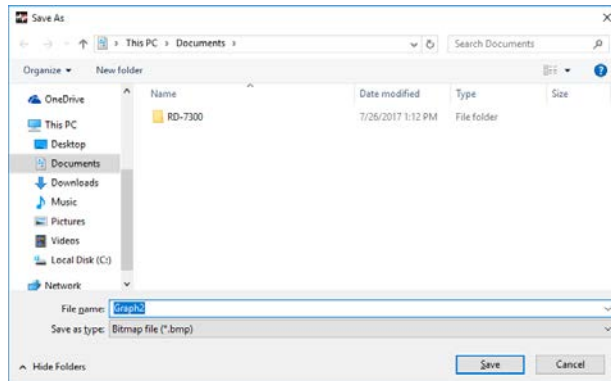
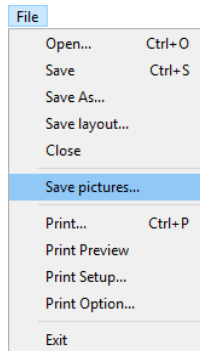


Select a graph sheet and click [Open] button.

## 5 Saving an image

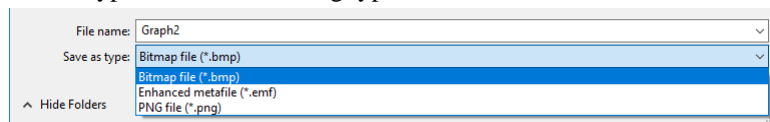
A selected graph sheet will be converted to an image and saved.

If you select [Save pictures...] from [File] menu, "Save As" dialog box will be displayed.



For the file name, the name of graph sheet is set.

Select a file type from the following types.



[Bitmap file] : Standard image format of Windows  
A lot of software supports this file type.

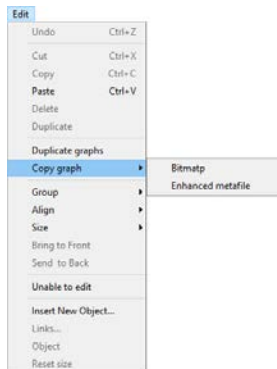
[Enhanced metafile] : Font of character and format are recorded.  
Clear printing is enabled.

[PNG file] : File capacity can be reduced without degrading the quality of image.

Check the content of setting and click [Save] button.

## 6 Pasting to other software

The image of the selected graph sheet will be displayed on other software without creating a file.

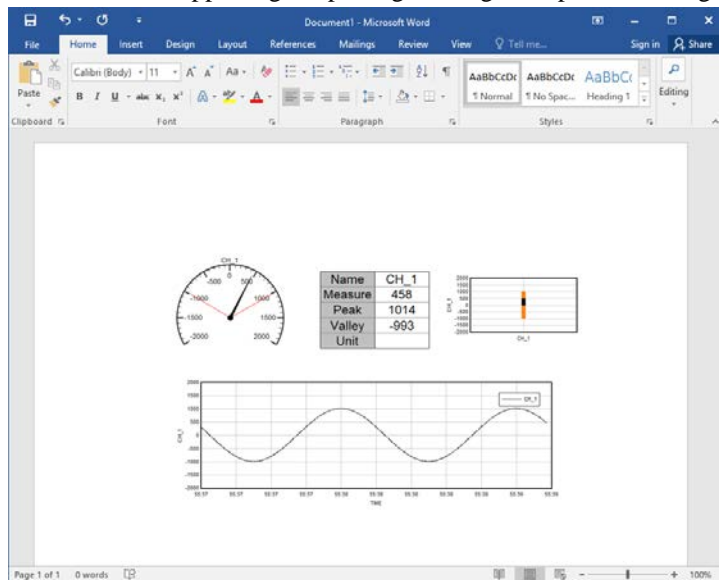


Select [Copy graph] from [Edit] menu and select the copy format from the displayed menu.

[Bitmap] : The image will be copied in the standard image format of Windows.  
A lot of software supports this format.

[Enhanced metafile] : The image will be copied by keeping the font of character and format.  
Clear printing is enabled.

Activate the software supporting the pasting of image and paste the image.

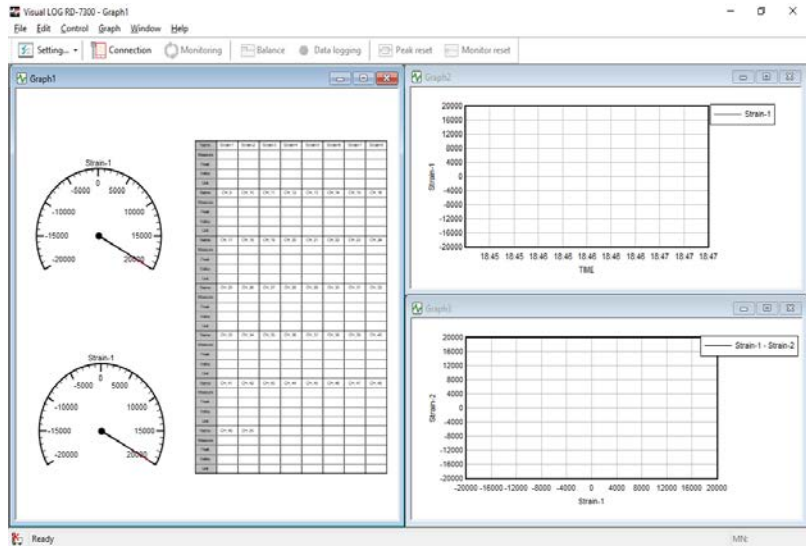


## 7 Display of tab of window

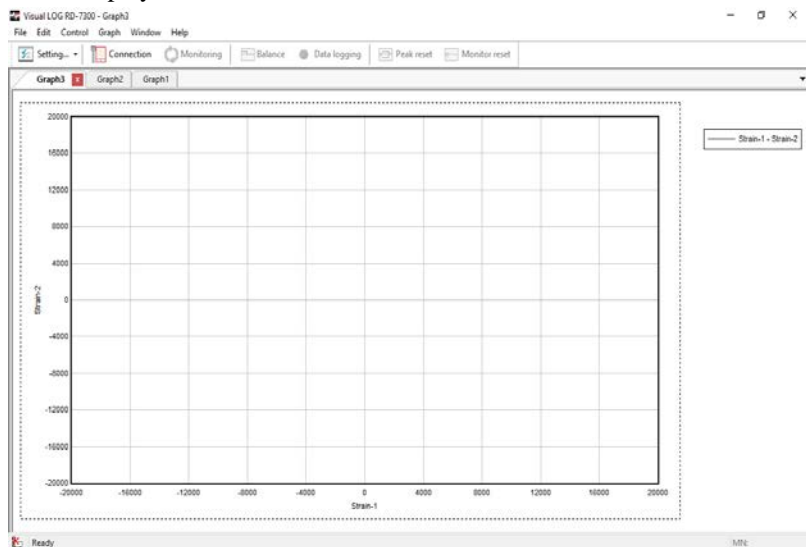
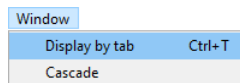
Two or more graph sheets are displayed by tab, and selected one graph sheet is enlarged.

If you select [Display by tab] from [Window] menu while windows are displayed, window display and tab display are switched.

### ■ Window display



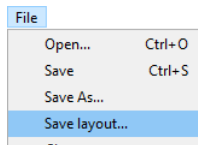
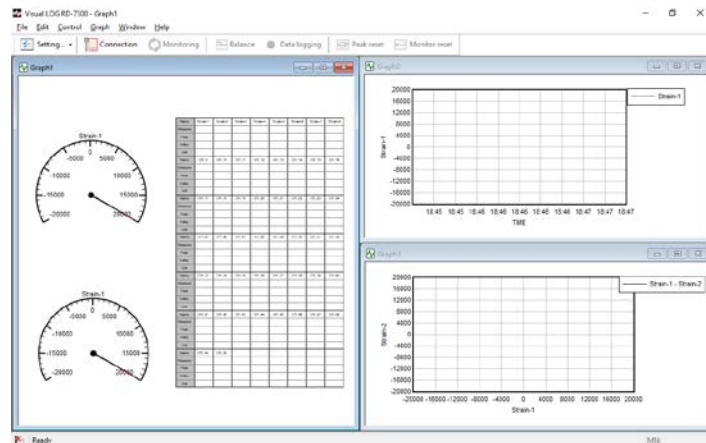
### ■ Tab display



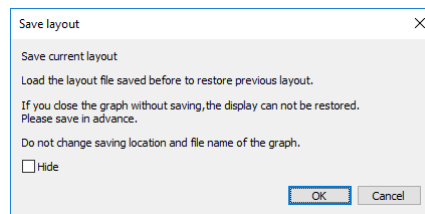
## 8 Window layout

It is possible to arrange two or more windows on a screen and record the display layout.

Arrange windows on the screen.



If you select [Save layout...] from [File] menu, the confirmation dialog box will be displayed.



Before saving the layout file, it is recommended to save the graph sheet as a file by executing [Save As...] at least once.

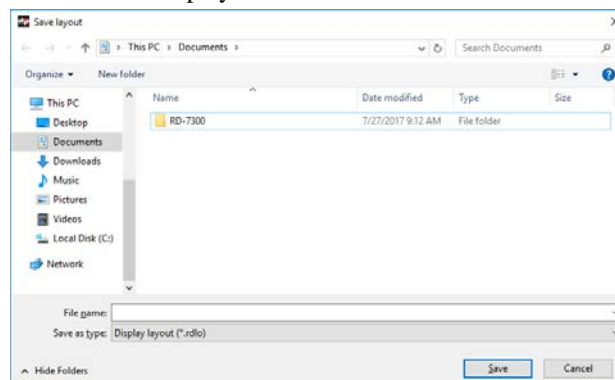


*For a graph sheet that has not been saved, the layout cannot be reproduced after the window is closed.*

*If the saving destination or the file name of the graph sheet is changed, the layout cannot be reproduced.*

If you check-mark [Hide], this dialog box will not be displayed when you carry out this operation next.

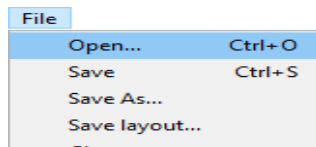
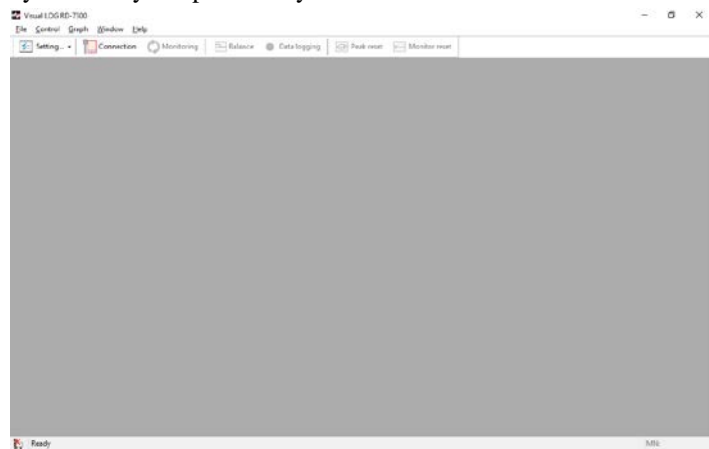
If you click [OK] button, the dialog box for setting the destination to save the file and the file name will be displayed.



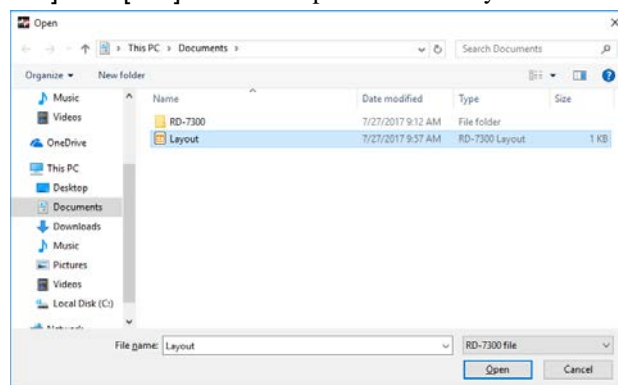
Set the destination and file name, and then click [Save] button.

To reproduce the layout, open the saved layout file.

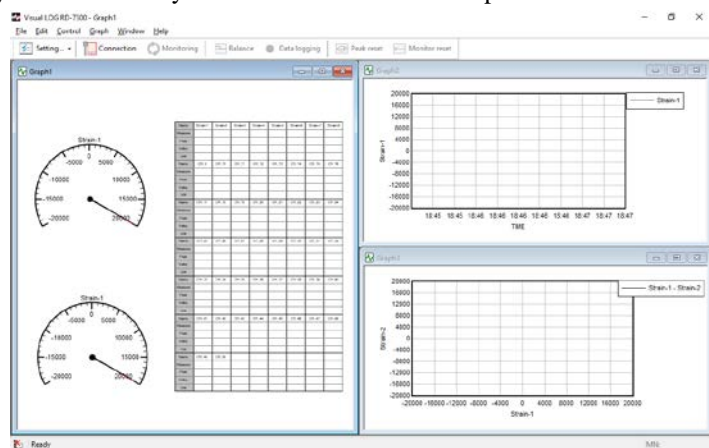
The window that was displayed when you saved the layout file does not need to be displayed when you open the layout file.



Select [Open...] from [File] menu and open the saved layout file.



The layout when the layout file was saved will be reproduced.



Double-clicking the layout file on desktop or Explorer can also reproduce the layout.

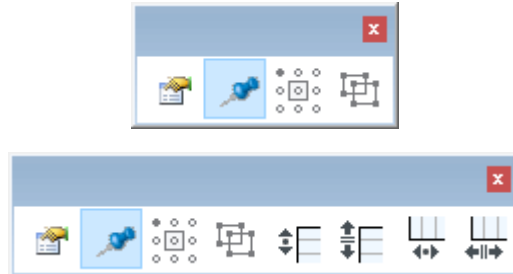


## 9 Allocation of monitoring object

Size and position of a monitoring object can be arbitrarily changed.

### 9-1 Object toolbar

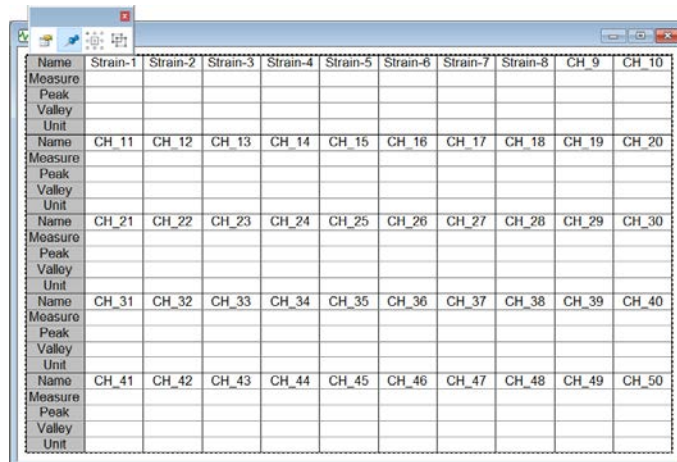
If you click and select an object, the graph toolbar will be displayed.



On the graph toolbar, function buttons corresponding to the selected monitoring object will be displayed. Clicking the button enables various operations.



### 9-2 Fixation of monitoring object

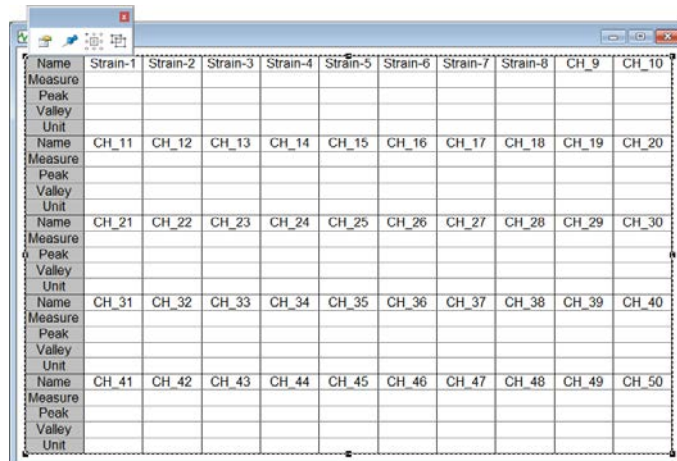
The position of a monitoring object whose position is fixed cannot be changed arbitrarily. Click the monitoring object and display the graph toolbar.



Name	Strain-1	Strain-2	Strain-3	Strain-4	Strain-5	Strain-6	Strain-7	Strain-8	CH_9	CH_10
Measure										
Peak										
Valley										
Unit										
Name	CH_11	CH_12	CH_13	CH_14	CH_15	CH_16	CH_17	CH_18	CH_19	CH_20
Measure										
Peak										
Valley										
Unit										
Name	CH_21	CH_22	CH_23	CH_24	CH_25	CH_26	CH_27	CH_28	CH_29	CH_30
Measure										
Peak										
Valley										
Unit										
Name	CH_31	CH_32	CH_33	CH_34	CH_35	CH_36	CH_37	CH_38	CH_39	CH_40
Measure										
Peak										
Valley										
Unit										
Name	CH_41	CH_42	CH_43	CH_44	CH_45	CH_46	CH_47	CH_48	CH_49	CH_50
Measure										
Peak										
Valley										
Unit										

For the fixed monitoring object,  is displayed on the graph toolbar.

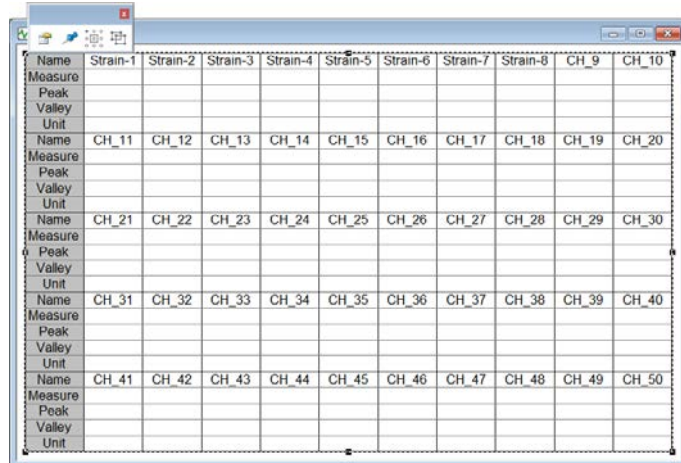
If you click , the display will change to  and the fixation will be released. If you click it again, the monitoring object will be fixed.




Name	Strain-1	Strain-2	Strain-3	Strain-4	Strain-5	Strain-6	Strain-7	Strain-8	CH_9	CH_10
Measure										
Peak										
Valley										
Unit										
Name	CH_11	CH_12	CH_13	CH_14	CH_15	CH_16	CH_17	CH_18	CH_19	CH_20
Measure										
Peak										
Valley										
Unit										
Name	CH_21	CH_22	CH_23	CH_24	CH_25	CH_26	CH_27	CH_28	CH_29	CH_30
Measure										
Peak										
Valley										
Unit										
Name	CH_31	CH_32	CH_33	CH_34	CH_35	CH_36	CH_37	CH_38	CH_39	CH_40
Measure										
Peak										
Valley										
Unit										
Name	CH_41	CH_42	CH_43	CH_44	CH_45	CH_46	CH_47	CH_48	CH_49	CH_50
Measure										
Peak										
Valley										
Unit										

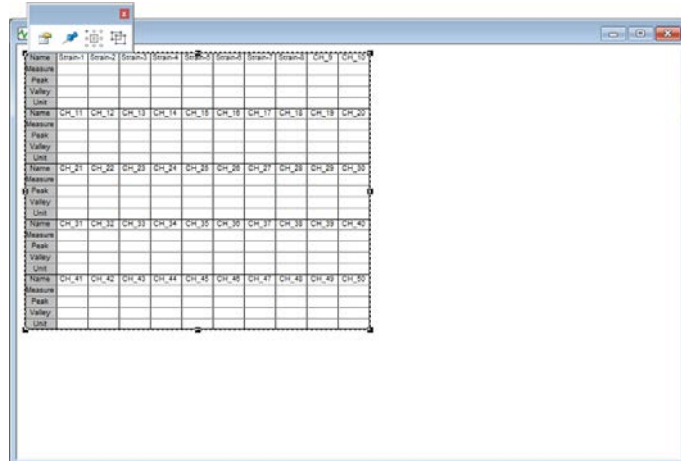
### 9-3 Allocation of monitoring object

Click a monitoring object for which size and position should be changed.



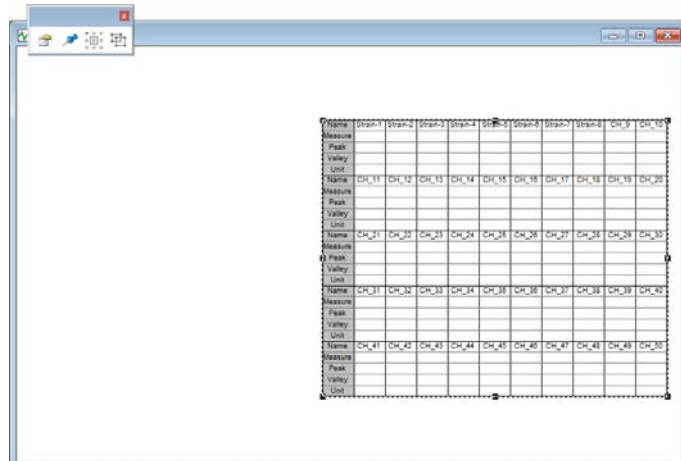
Name	Strain-1	Strain-2	Strain-3	Strain-4	Strain-5	Strain-6	Strain-7	Strain-8	CH_9	CH_10
Measure										
Peak										
Valley										
Unit										
Name	CH_11	CH_12	CH_13	CH_14	CH_15	CH_16	CH_17	CH_18	CH_19	CH_20
Measure										
Peak										
Valley										
Unit										
Name	CH_21	CH_22	CH_23	CH_24	CH_25	CH_26	CH_27	CH_28	CH_29	CH_30
Measure										
Peak										
Valley										
Unit										
Name	CH_31	CH_32	CH_33	CH_34	CH_35	CH_36	CH_37	CH_38	CH_39	CH_40
Measure										
Peak										
Valley										
Unit										
Name	CH_41	CH_42	CH_43	CH_44	CH_45	CH_46	CH_47	CH_48	CH_49	CH_50
Measure										
Peak										
Valley										
Unit										

Drag  at the outer circumference of the monitoring object to change the size.



Name	Strain-1	Strain-2	Strain-3	Strain-4	Strain-5	Strain-6	Strain-7	Strain-8	CH_9	CH_10
Measure										
Peak										
Valley										
Unit										
Name	CH_11	CH_12	CH_13	CH_14	CH_15	CH_16	CH_17	CH_18	CH_19	CH_20
Measure										
Peak										
Valley										
Unit										
Name	CH_21	CH_22	CH_23	CH_24	CH_25	CH_26	CH_27	CH_28	CH_29	CH_30
Measure										
Peak										
Valley										
Unit										
Name	CH_31	CH_32	CH_33	CH_34	CH_35	CH_36	CH_37	CH_38	CH_39	CH_40
Measure										
Peak										
Valley										
Unit										
Name	CH_41	CH_42	CH_43	CH_44	CH_45	CH_46	CH_47	CH_48	CH_49	CH_50
Measure										
Peak										
Valley										
Unit										

Drag the monitoring object to change the position.



Name	Strain-1	Strain-2	Strain-3	Strain-4	Strain-5	Strain-6	Strain-7	Strain-8	CH_9	CH_10
Measure										
Peak										
Valley										
Unit										
Name	CH_11	CH_12	CH_13	CH_14	CH_15	CH_16	CH_17	CH_18	CH_19	CH_20
Measure										
Peak										
Valley										
Unit										
Name	CH_21	CH_22	CH_23	CH_24	CH_25	CH_26	CH_27	CH_28	CH_29	CH_30
Measure										
Peak										
Valley										
Unit										
Name	CH_31	CH_32	CH_33	CH_34	CH_35	CH_36	CH_37	CH_38	CH_39	CH_40
Measure										
Peak										
Valley										
Unit										
Name	CH_41	CH_42	CH_43	CH_44	CH_45	CH_46	CH_47	CH_48	CH_49	CH_50
Measure										
Peak										
Valley										
Unit										



For some types of monitoring objects, the size cannot be changed.

## 9-4 Position of monitoring object

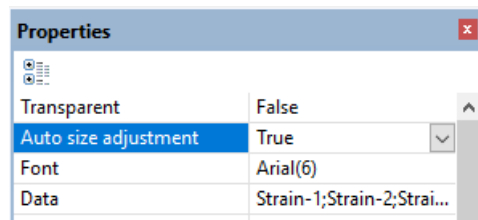
A monitoring object is basically moved according to the size of the window.

At that time, there are a monitoring object that is moved keeping the size and a monitoring object that changes the size according to the size of the window.

Numerical monitor and text monitoring object enable both operations depending on the setting.

### ■ Auto size adjustment

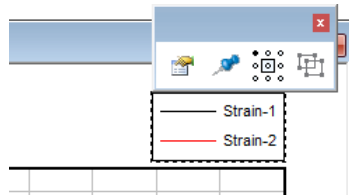
If you set [Auto size adjustment] in the properties to True, the size will be changed according to the size of the windows. If you set it to False, only the movement will be executed.




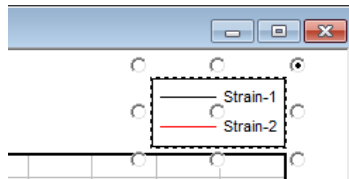
For an object that moves keeping the size, the reference position for movement (anchor point) can be set.

### ■ Setting of anchor point

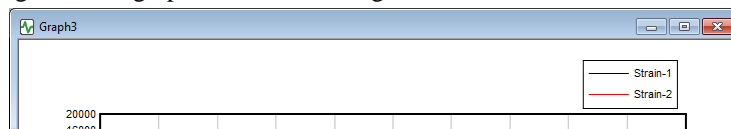
Select an object for which anchor point should be changed.



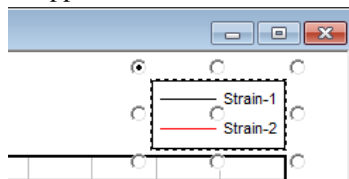
Click  on the graph toolbar. The position of the anchor point will be displayed.



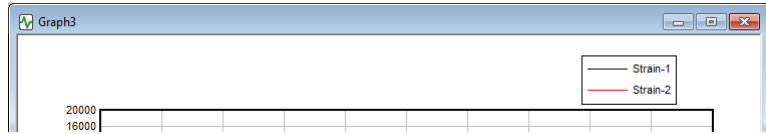
If the window size is changed at this point, the positional relationship from right end of grid of the graph will not be changed.



Set the anchor point to the upper left.

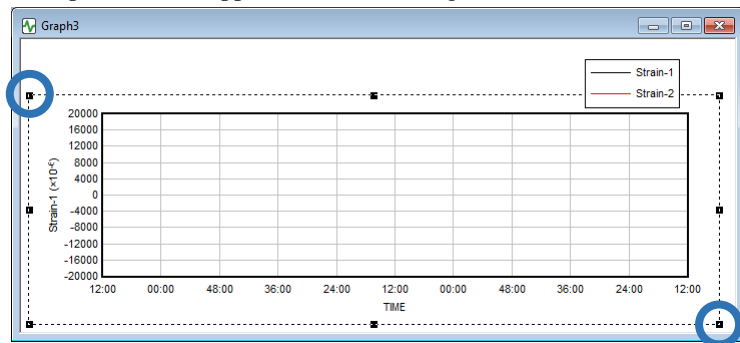


If the window size is changed at this point, the position from right end of grid of the graph will be misaligned.



When the window size is changed, the positional relationship from other object can be adjusted by the anchor point in this way.

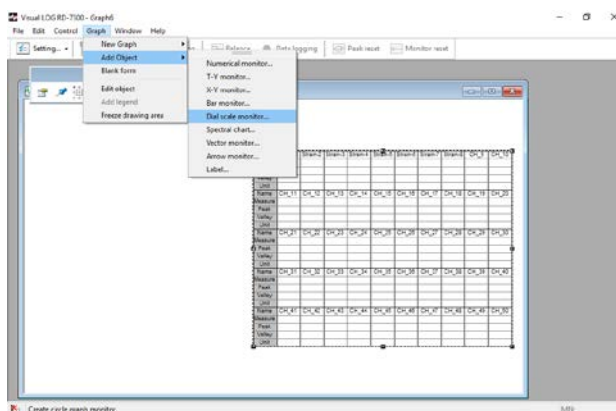
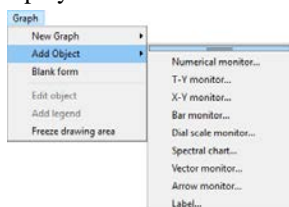
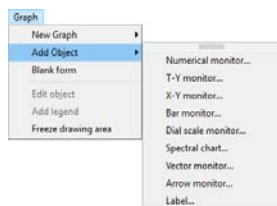
For your information, the object for which the size is automatically adjusted has two anchor points in the upper left and lower right.



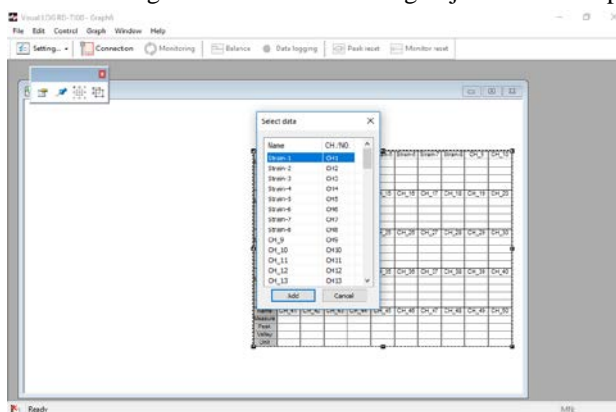
## 9-5 Addition of monitoring object

Select a monitoring object to be added to the graph sheet from [Add Object] in [Graph] menu.

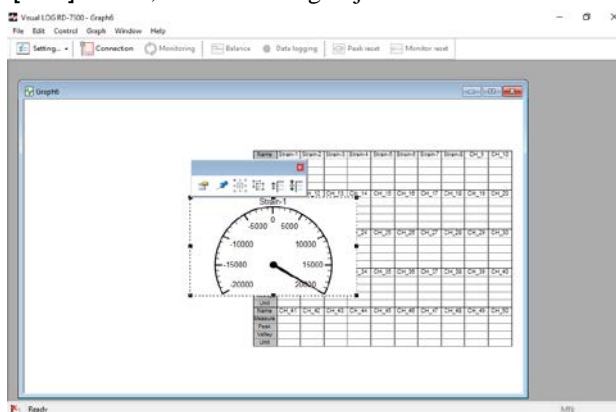
If you drag the bar displayed on the upper part of the menu, the menu can be displayed as a toolbar all the time.



The dialog box for setting the selected monitoring object will be displayed.



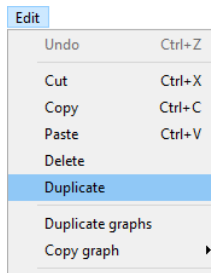
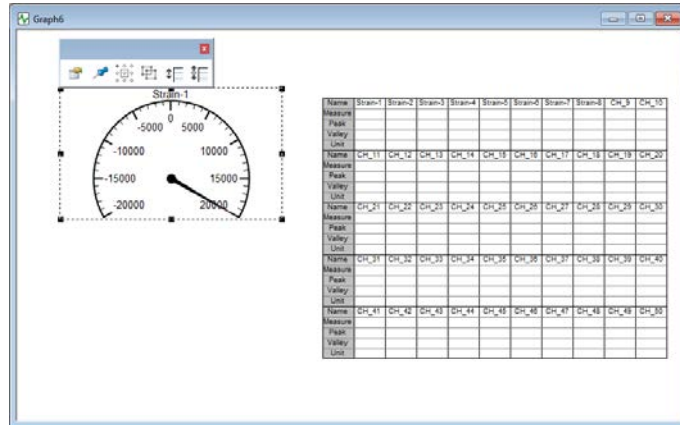
If you click [Add] button, the monitoring object will be added.



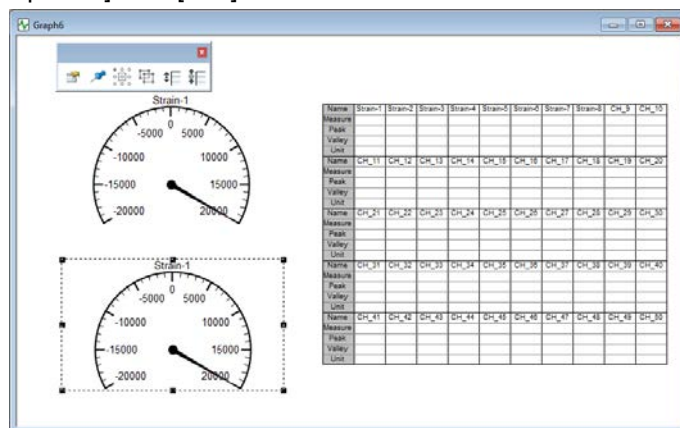
## 9-6 Copy of monitoring object

If you want to allocate multiple monitoring objects in the same format, the already allocated monitoring object can be copied and allocated.

Select a monitoring object to be copied.



Select [Duplicate] from [Edit] menu.

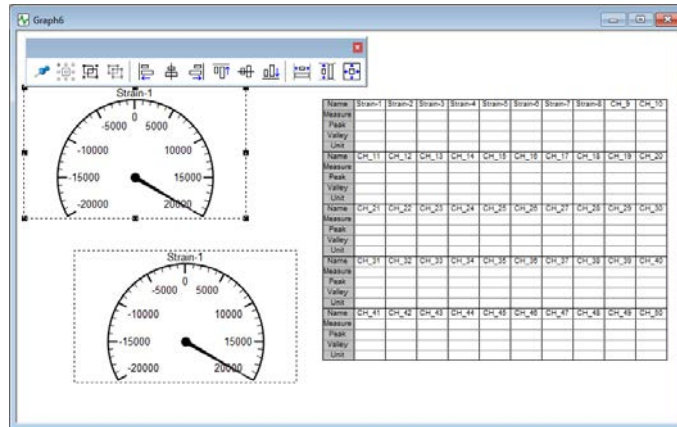


If you hold down Ctrl key on the keyboard and drag the monitoring object, copy and allocation can be executed at the same time.

## 9-7 Arrangement of monitoring objects

Multiple monitoring objects can be arranged at the same position.

Select monitoring objects to be positioned.



If you hold down Shift key and click the monitoring objects, the monitoring objects can be selected in series.

The icons for positioning will be displayed on the graph toolbar.



: Aligned to left



: Aligned to center in horizontal direction



: Aligned to right



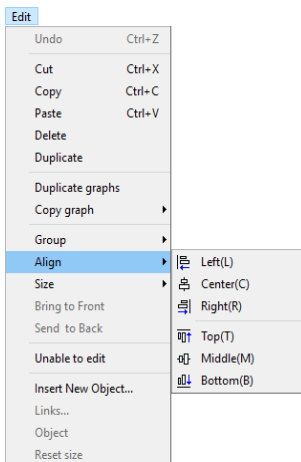
: Aligned to top




: Aligned to center in vertical direction

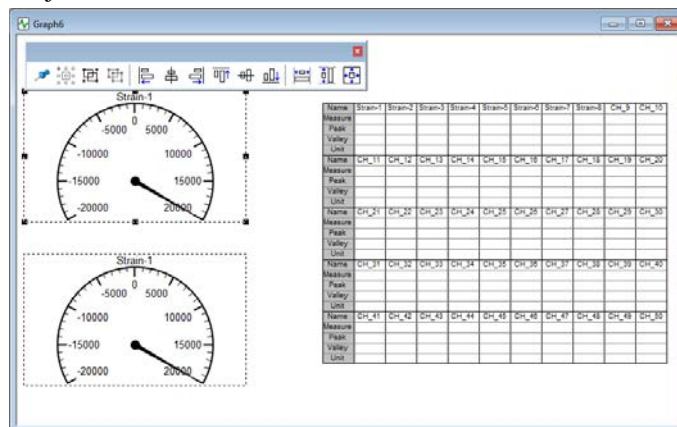


: Aligned to bottom



The reference position is the position of a monitoring object you selected at the beginning. It is the monitoring object for which a marker of size change is displayed.

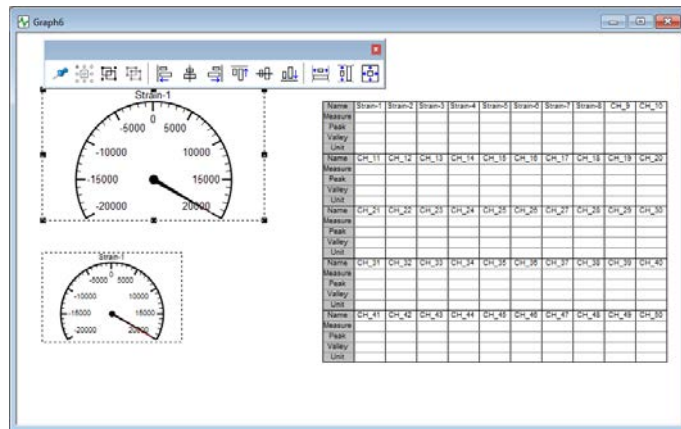
If you click  icon, a monitoring object will be moved according to the reference object.



## 9-8 Matching the size of monitoring objects

The multiple monitoring objects can be made to be of equal size.

Select the monitoring objects to make them equal size.



If you hold down Shift key and click the monitoring objects, the monitoring objects can be selected in series.

Icons for matching the size are displayed on the graph toolbar.



: Width is made equal.




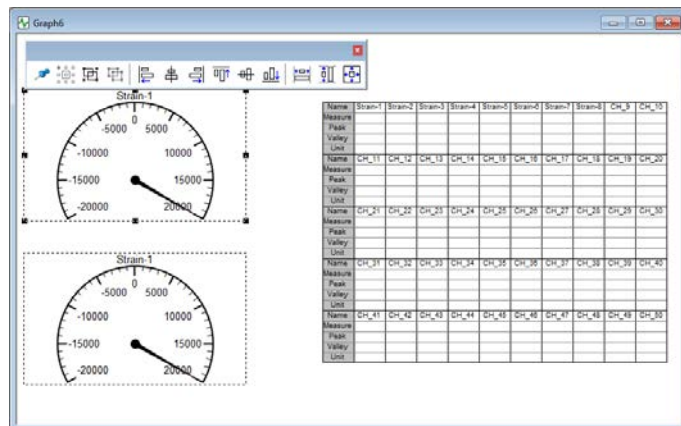
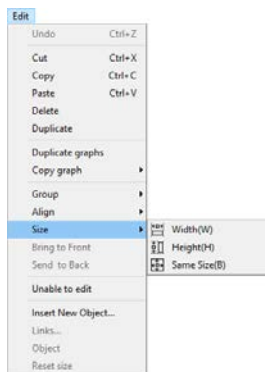
: Height is made equal.



: Height and width are made equal.

The standard size is the size of the monitoring object you selected at the beginning. It is the object for which marker of size change is displayed.

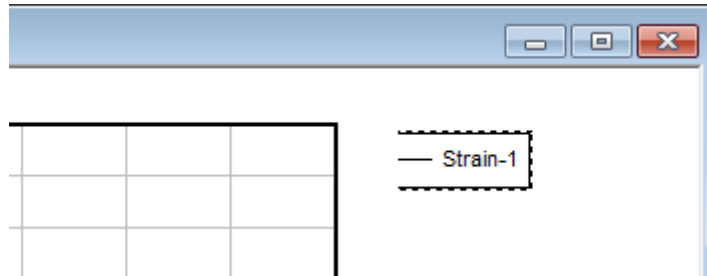
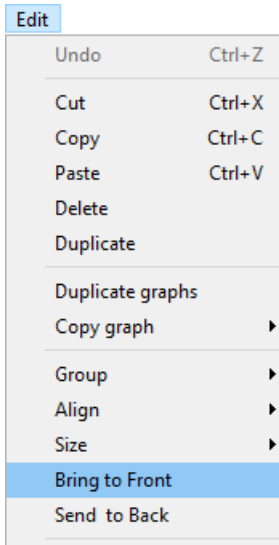
Clicking  icon makes the size same as that of standard monitoring object.



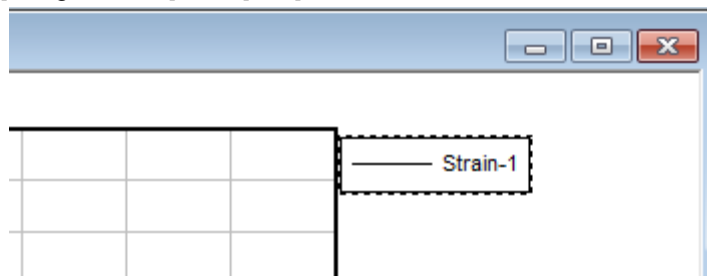
## 9-9 Hierarchical relation of monitoring objects

If opaque objects are overlapped and the monitoring object under them is not displayed, move the monitoring object at the back to the front side to display it.

Select the hidden monitoring object.

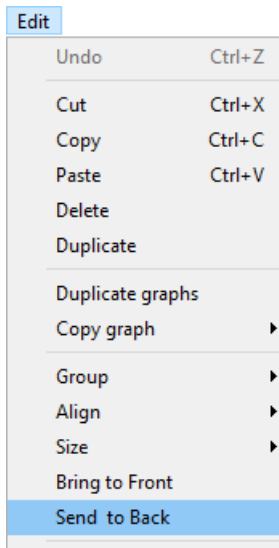


Select [Bring to Front] from [Edit] menu.



The hidden monitoring object will be displayed.

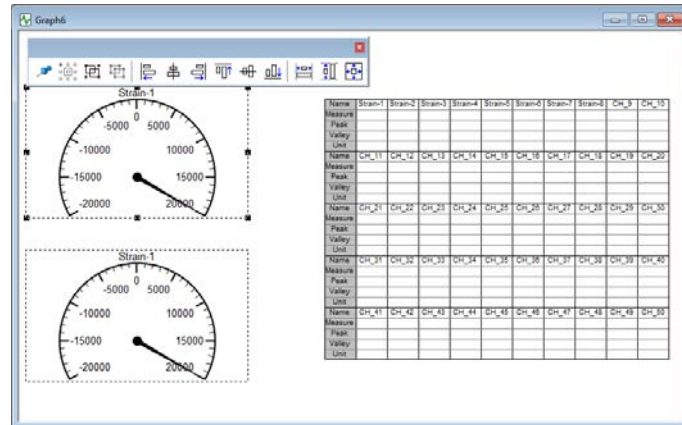
Selecting the monitoring object on front side object and selecting [Send to Back] from [Edit] menu will have the same result.



## 9-10 Grouping of monitoring objects

If multiple monitoring objects are grouped, they can be handled as one monitoring object.

Select monitoring objects to be grouped.




Icons for grouping will be displayed on the graph toolbar.

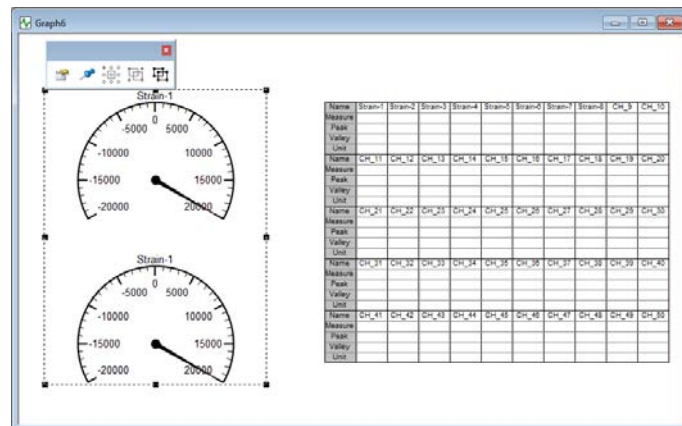
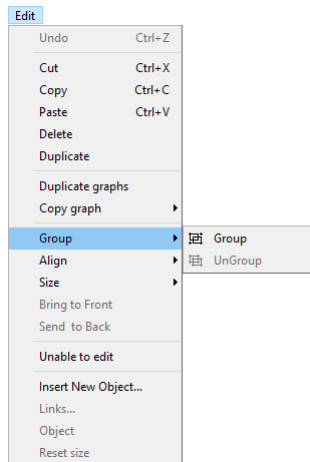


: Grouping is executed.



: Grouping is released.

Clicking  icon creates one group of monitoring objects.



Hereafter, movement and change of size will operate as one monitoring object.

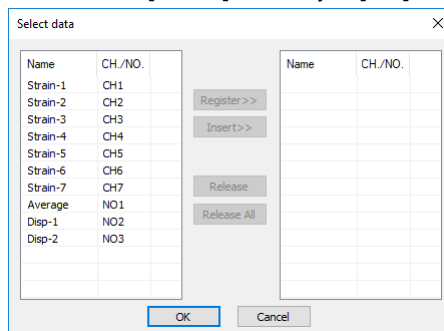
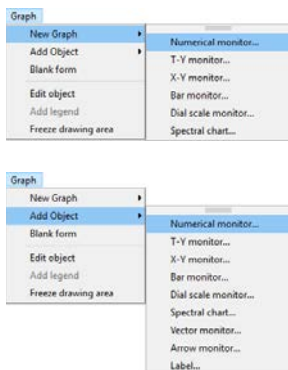
## 10 Creation of monitoring object

### 10-1 Numerical monitor

The numerical monitor displays the measured value in real time. If the conditions of alarm value are fulfilled, the color within the frame will change.

Select [Numerical monitor...] from [New Graph] in [Graph] menu.

Or, select [Numerical monitor...] from [Add Object] in [Graph] menu.



Setting item

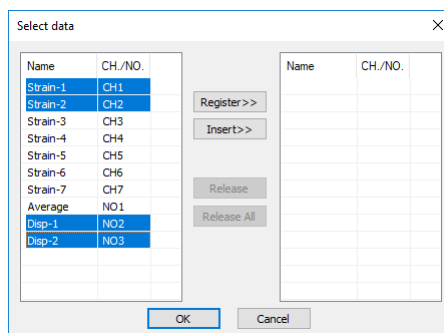
[Register>>] : Items selected from the left list will be added to the right list.

[Insert>>] : Items selected from the left list will be inserted before the item selected in the right list.

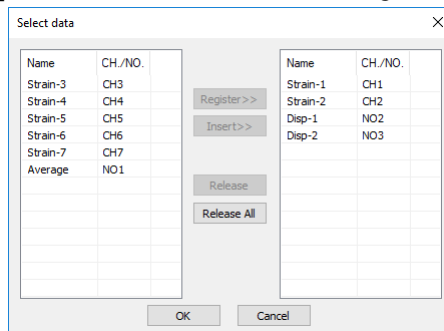
[Release] : The item selected in the right list will be deleted.

[Release All] : All items in the right list will be deleted.

Select a channel to be monitored from the left list.



Click [Register>>] button to transfer the item to the right list.



Click [OK] button to display the numerical monitor.

Name	Strain-1	Strain-2	Disp-1	Disp-2						
Measure										
Peak										
Valley										
Unit	×10 <sup>-6</sup>	×10 <sup>-6</sup>	mm	mm						

#### Displayed content

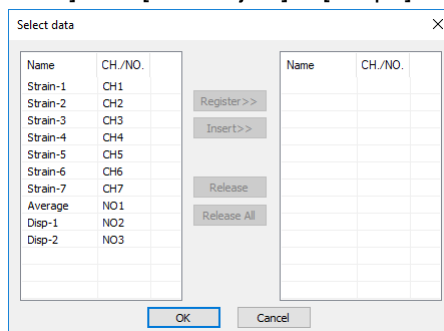
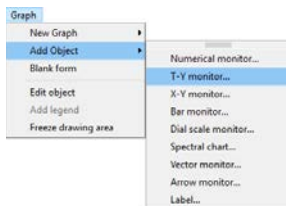
- Name : The name of the channel is displayed.
- Measure : The current measured value is displayed.
- Peak : The maximum value during monitoring is displayed.  
It is different from upper limit value.
- Valley : The minimum value during monitoring is displayed.  
It is different from lower limit value.
- Unit : The unit of the channel is displayed.

## 10-2 T-Y monitor

Time of PC at monitoring is displayed on X-axis and data of monitor channel is displayed on Y-axis as a line graph.

Select [T-Y monitor...] from [New Graph] in [Graph] menu.

Or, select [T-Y monitor...] from [Add Object] in [Graph] menu.



Setting item

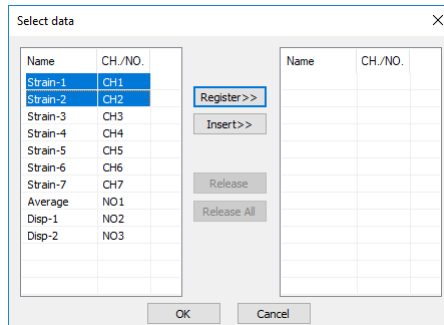
[Register>>] : Items selected from the left list will be added to the right list.

[Insert>>] : Items selected from the left list will be inserted before the item selected in the right list.

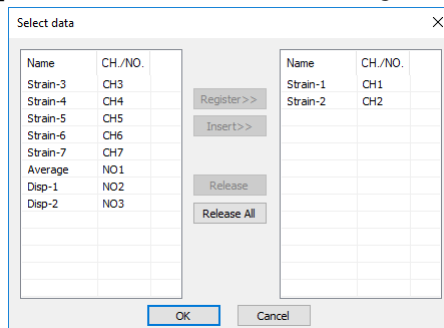
[Release] : The item selected in the right list will be deleted.

[Release All] : All items in the right list will be deleted.

Select a channel to be monitored from the left list.



Click [Register>>] button to transfer the item to the right list.



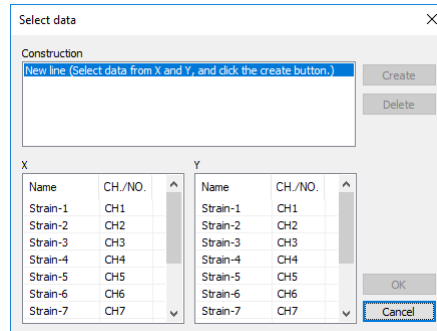
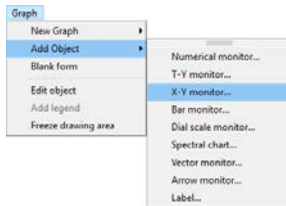
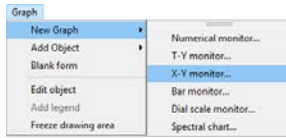
Click [OK] button to display T-Y monitor.

### 10-3 X-Y monitor

The monitor values of channels, which are separately set for X-axis and Y-axis, will be displayed as X-Y graph.

Select [X-Y monitor...] from [New Graph] in [Graph] menu.

Or, Select [X-Y monitor...] from [Add Object] in [Graph] menu.



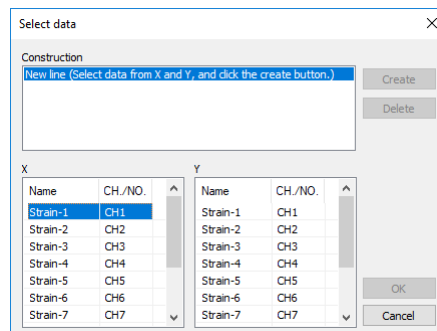
Setting item

[Create] : A new drawing will be created with items selected in the lists of X-axis and Y-axis.

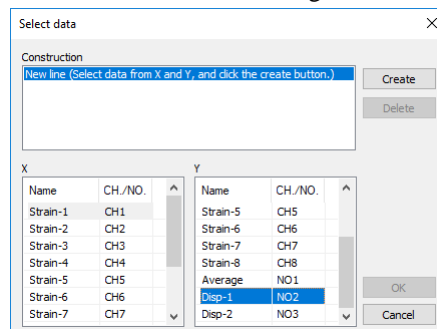
[Delete] : The items selected in [Construction] will be deleted.

Select [New line] from [Construction].

Select a channel that becomes X-axis from the left list.



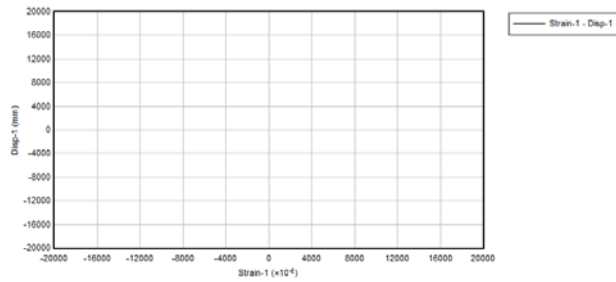
Select a channel that becomes Y-axis from the right list.



Click [Create] button to create a construction line.

X		Y	
Name	CH./NO.	Name	CH./NO.
Strain-1	CH1	Strain-5	CH5
Strain-2	CH2	Strain-6	CH6
Strain-3	CH3	Strain-7	CH7
Strain-4	CH4	Strain-8	CH8
Strain-5	CH5	Average	NO1
Strain-6	CH6	Disp-1	NO2
Strain-7	CH7	Disp-2	NO3

Click [OK] button to display X-Y monitor.



For the method for specifying the data number, refer to "Chapter 5. 11-4 Setting of T-Y monitor and X-Y monitor".

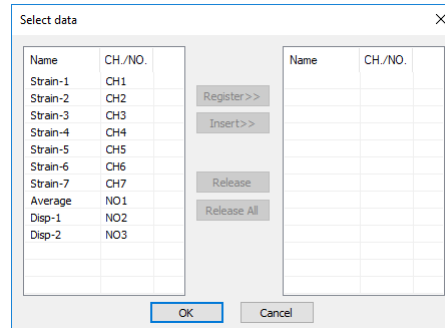
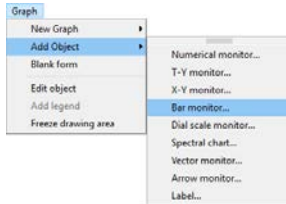
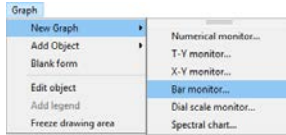
X-Y monitor draws graphs for the specified data number before to the current value.

## 10-4 Bar monitor

The value of the current monitor channel will be displayed as a bar graph.

Select [Bar monitor...] from [New Graph] in [Graph] menu.

Or, Select [Bar monitor...] from [Add Object] in [Graph] menu.



Setting item

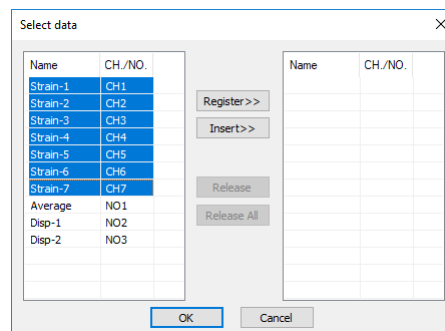
[Register>>] : Items selected from the left list will be added to the right list.

[Insert>>] : Items selected from the left list will be inserted before the item selected in the right list.

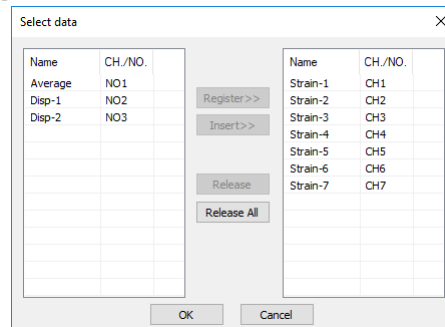
[Release] : The item selected in the right list will be deleted.

[Release All] : All items in the right list will be deleted.

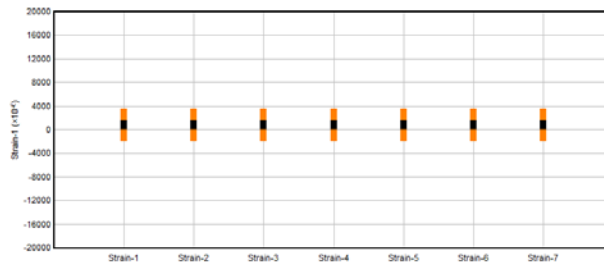
Select a channel to be monitored from the left list.



Click [Register>>] button and transfer the item to the right list.



Click [OK] button to display the bar monitor.

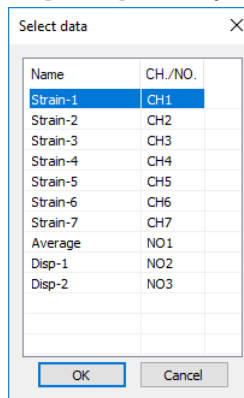
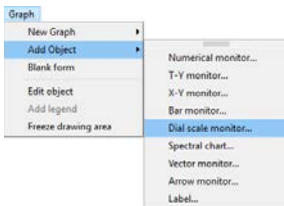
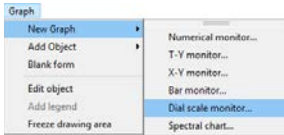


## 10-5 Dial scale monitor

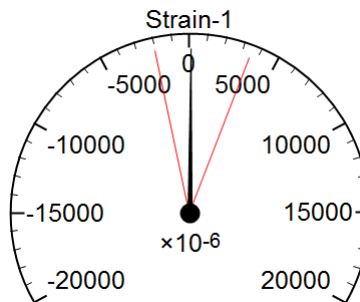
Select a channel arbitrarily and display the values as a circle graph.

Select [Dial scale monitor...] from [New Graph] in [Graph] menu.

Or, select [Dial scale monitor...] from [Add Object] in [Graph] menu.



Select a channel to be monitored and click [OK] button. Then, the dial scale monitor will be displayed.

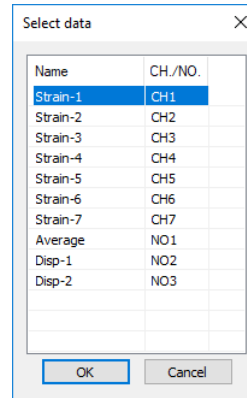
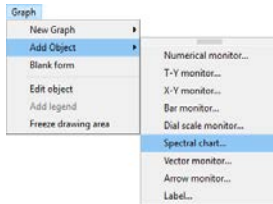
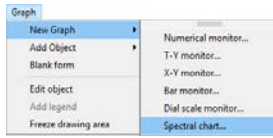


## 10-6 Spectral chart

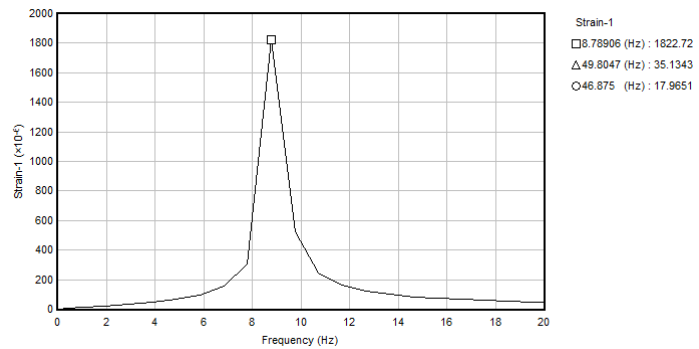
Select a channel arbitrarily and carry out FFT analysis, and then display power spectrum or amplitude spectrum as a graph.

Select [Spectral chart...] from [New Graph] in [Graph] menu.

Or, Select [Spectral chart...] from [Add Object] in [Graph] menu.



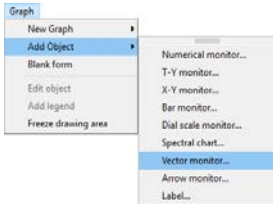
Select a channel to be monitored and click [OK] button. Then, the spectrum monitor will be displayed.



## 10-7 Vector monitor

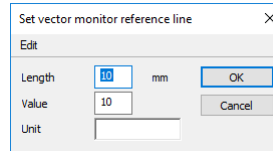
The vector monitor displays the values of 1-axis, 2-axis, and 3-axis gauges as vector.

It displays main strain and main stress as vector. If the conditions of alarm value are fulfilled, the color of line of arrow will change.



Select [Vector monitor...] from [Add Object] in [Graph] menu.

The dialog box for setting the reference line of vector monitor will be displayed.



Setting item

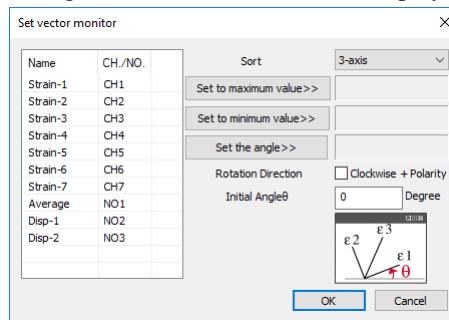
[Length] : Set the length of vector (mm) on the screen (printing).

[Value] : Set the value for the length.

[Unit] : Set the unit of the value.

Check the setting and click [OK] button.

The dialog box for setting the vector monitor will be displayed.



Setting item

[Sort] : Select a type of vector monitor (1-axis, 2-axis, 3-axis).

[Set in horizontal direction>>]

: In case of 1-axis or 2-axis, the selected channel will be set to the horizontal direction.

[Set in vertical direction>>]

: In case of 2-axis, the selected channel will be set to the vertical direction.

[Set to maximum value>>]

: In case of 3-axis, the selected channel will be set to the maximum value.

[Set to minimum value>>]

: In case of 3-axis, the selected channel will be set to the minimum value.

[Set the angle>>]: In case of 3-axis, the selected channel is set to the angle.

[Rotation Direction]

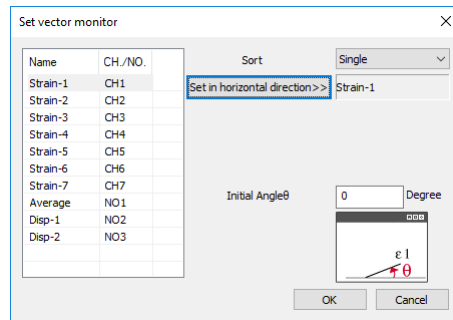
: When a strain gauge is bonded on the back surface of a specimen, set this item if you want to set the vector polarity of the back surface gauge identical with that of the front surface gauge.

[Initial Angle  $\theta$ ] : Set the initial rotation direction  $\theta$

Check the setting and click [OK] button.

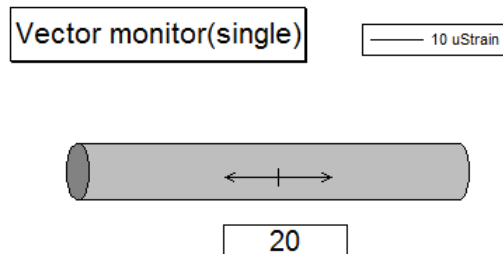
#### ■ 1-axis vector monitor

A 1-axis vector monitor will be added to a graph sheet.



Set the Sort to Single and select a channel, and then click [Set in horizontal direction>>] button.

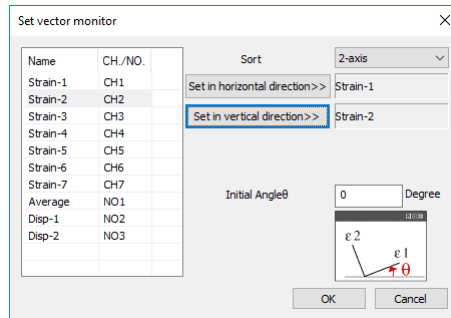
The vector monitor will be added to the graph sheet.



In the graph sheet shown above, a bitmap image and a numerical monitor are added.

## ■ 2-axis vector monitor

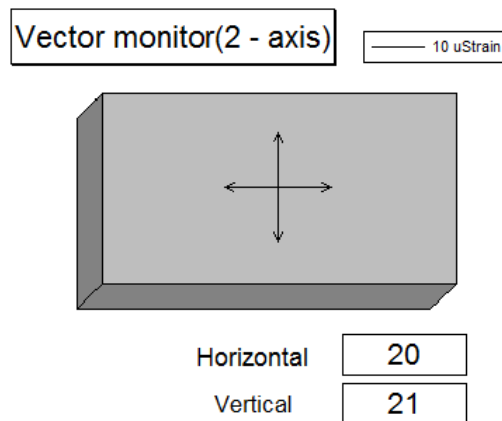
A 2-axis vector monitor will be added to a graph sheet.



Set the Sort to 2-axis and select a channel in horizontal direction, and then click [Set in horizontal direction>>] button.

Select a channel in vertical direction and click [Set in vertical direction>>] button.

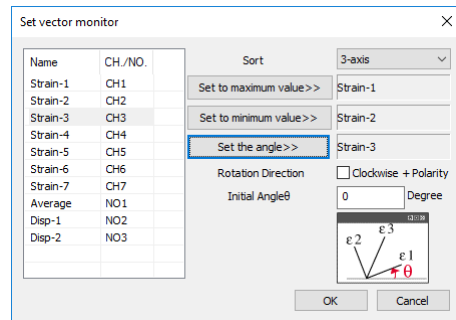
The vector monitor will be added to the graph sheet.



In the graph sheet shown above, a bitmap image and a numerical monitor are added.

### ■ 3-axis vector monitor

A 3-axis (rectangular rosette gauge) vector monitor will be added to a graph sheet.

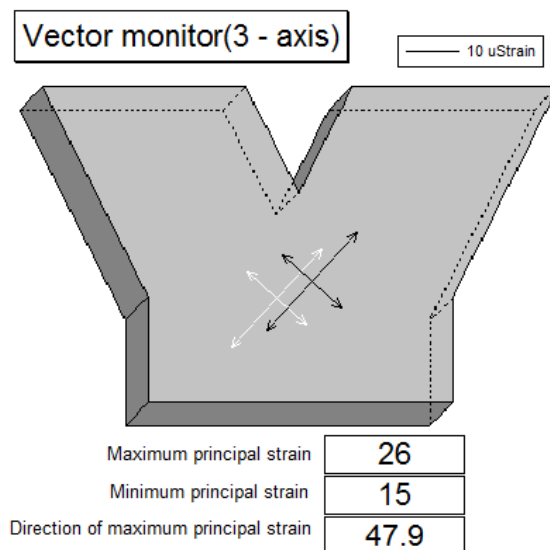


Set the Sort to 3-axis and select a channel of maximum value, and then click [Set to maximum value>>] button.

Select a channel of minimum value and click [Set to minimum value>>] button.

Set a channel of angle and click [Set the angle>>] button.

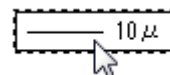
The vector monitor will be added to the graph sheet.



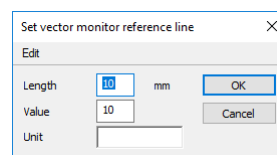
In the graph sheet shown above, a bitmap image and a numerical monitor are added.

### ■ Changing the setting of reference line of vector monitor

To change the setting of reference line of vector monitor, double-click the reference line.



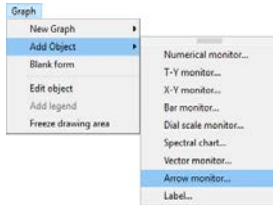
The dialog box for setting the reference line of vector monitor will be displayed.



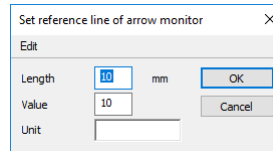
## 10-8 Arrow monitor

The arrow monitor makes measurement value conform to length and angle to indicate it as an arrow.

The current data is displayed as an arrow. If it meets the conditions of alarm value, the color of line of arrow will change.



Select [Arrow monitor...] from [Add Object] in [Graph] menu. The dialog box for setting the reference line of arrow monitor will be displayed. (Note: This dialog box will be displayed at the first operation. It will not be displayed for second operation or later.)



Setting item

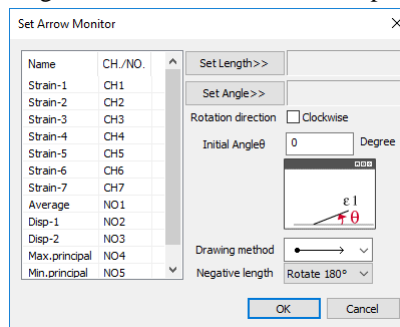
[Length] : Set the length of arrow (mm) on the screen (printing).

[Value] : Set the value for the length.

[Unit] : Set the unit of the value.

Check the setting and click [OK] button.

The dialog box for setting the arrow monitor will be displayed.



Setting item

[Set Length>>] : The selected channel is set to the length.

[Set Angle>>] : The selected channel is set to the angle.

[Rotation direction]

: If you check-mark the checkbox of "Clockwise", the arrow will rotate in clockwise direction with positive (+) polarity of value.

If you deselect the checkbox of "Clockwise", the arrow will rotate in anti-clockwise direction with positive (+) polarity of value.

[Initial Angle  $\theta$ ] : Set the initial rotation direction  $\theta$  (always rotates in anti-clockwise direction)

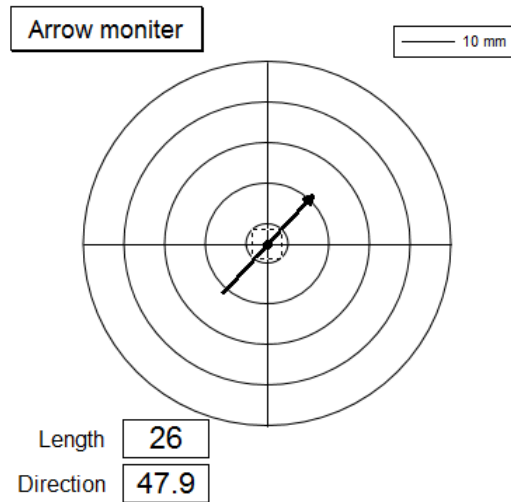
[Drawing method]

: Select whether the central point of rotation of arrow should be set to the start point of arrow or central point or arrow.

[Negative length]: Select whether the arrow should be rotated by 180 degrees or the arrow should be reversed when the value of data No. selected for [Set length] becomes negative.

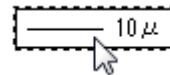
Check the setting and click [OK] button.

The arrow monitor will be added to the graph sheet (the example shown below indicates the addition of bitmap image and numerical monitor)

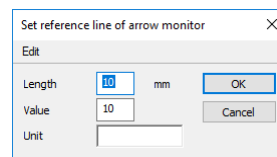


■ Change the setting of reference line of arrow monitor

To change the setting of reference line of arrow monitor, double-click the reference line.

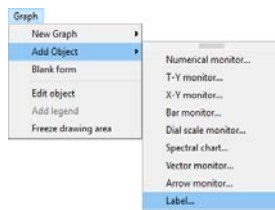


The dialog box for setting the reference line of arrow monitor will be displayed.

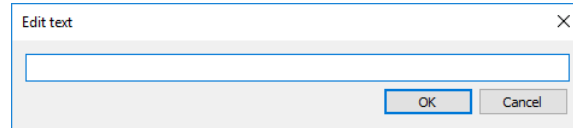


## 10-9 Label

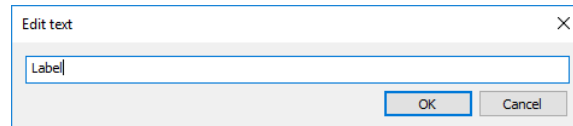
An arbitrary text will be displayed on the monitor screen.



Select [Label...] from [Add Object] in [Graph] menu. The dialog box for editing the text will be displayed.



Input an arbitrary text.

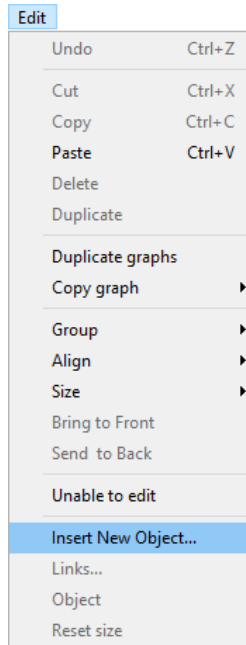


Click [OK] button to display the label.

# Label

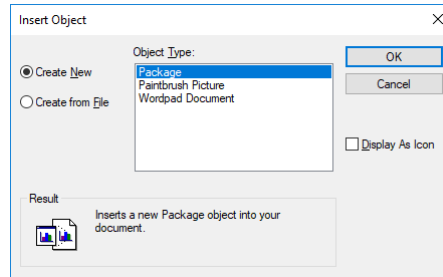
## 10-10 Insertion of OLE object

On the monitor screen, objects that conform to OLE of Windows such as picture of test piece and worksheet of Excel that have been created beforehand can be allocated and displayed with monitor.



To insert an object, select [Insert New Object...] from [Edit] menu.

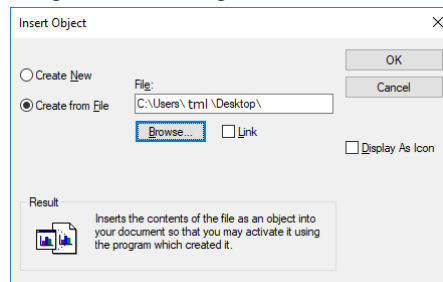
The dialog box for creating an object to be inserted will be displayed.



To create an object newly, click [Create New] and select a type of object from Object Type.

If there is a file to be inserted already, click [Create from File].

The display of the dialog box will change.



Click [Link] to activate it. If a file to be inserted is changed, the created object will be also updated.

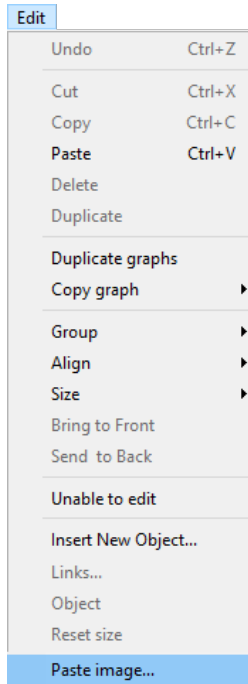
Clicking [Browse...] button will display the dialog box for file reference. Select a file.

Click [OK] button. The object will be inserted.



*All files cannot be displayed all the time.  
Only a file of object displayed on the object type is displayed on the monitor screen.*

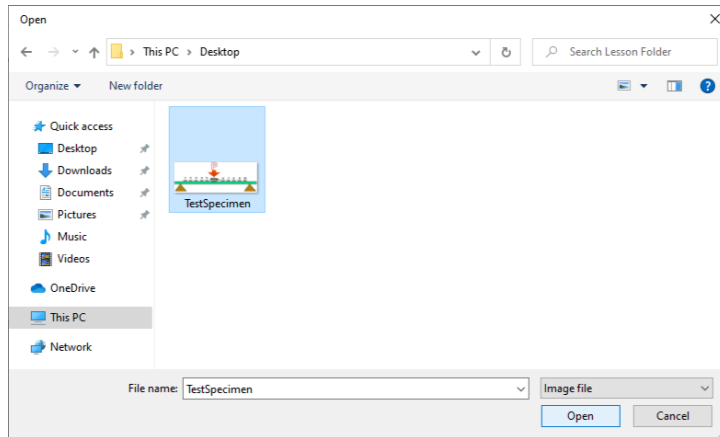
## 10-11 Paste image...



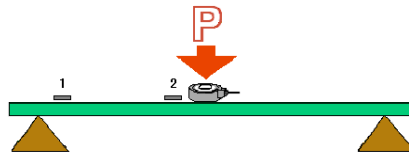
BMP, PNG and JPG format image is displayed with monitor.

To insert an object, select [Paste image...] from [Edit] menu.

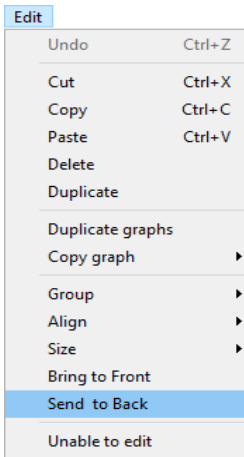
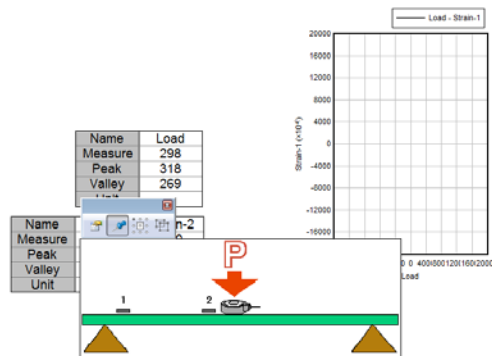
The open file dialog box will be displayed. Select an image file.



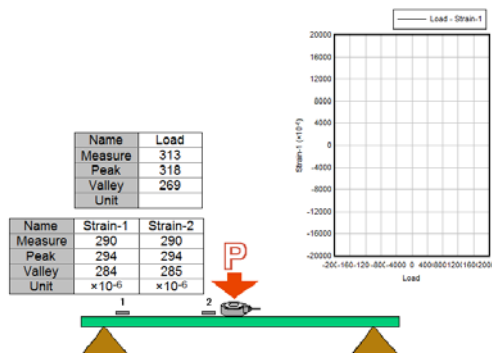
Click [Open] button. The object will be inserted.



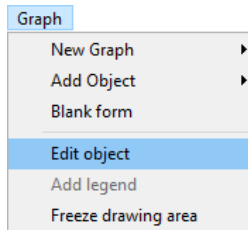
Allocate an object and a monitor to create the monitor screen.



If the monitor is hidden by an object, select the object and select [Send to Back] from [Edit] menu.



## 11 Confirmation and change of setting



When you check or change the setting for a monitoring object, if you double-click the monitoring object to be checked or select [Edit object] from [Graph] menu, the dialog box that was displayed when you created each object will be displayed. Carry out the setting according to the purpose.

It is also possible to change the display format of graph sheet and monitoring object and the setting inherent to monitoring object by displaying the properties panel.

### 11-1 Display of properties panel

On the properties panel, setting of various monitors are carried out.

- Display method 1

Click a monitoring object to display the graph toolbar.

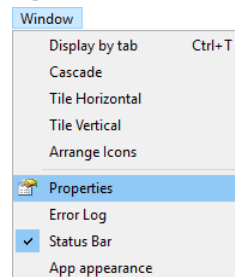
Click .



- Display method 2

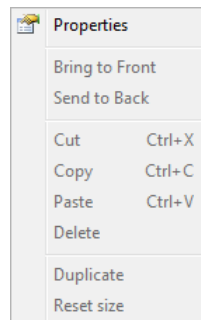
Click [View] menu.

Click [Properties] in [Window] menu.

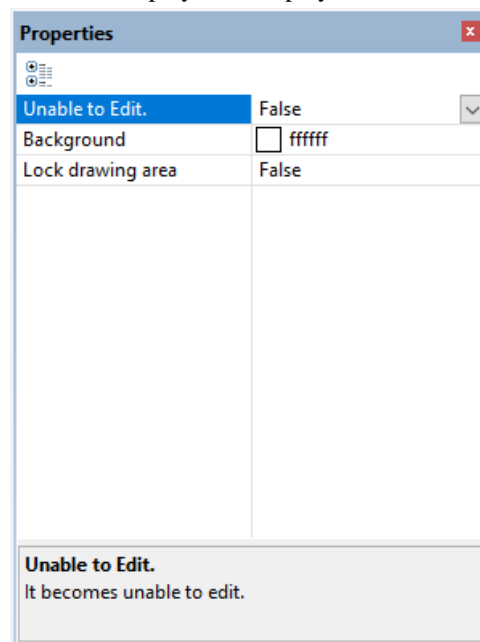


- Display method 3

Click the right mouse button on the monitor screen and display the menu.  
Click [Properties].



The properties panel can be displayed in display methods 1 to 3.



## 11-2 Setting item of graph sheet



Refer to "Chapter 5.  
11-10 Method for  
changing the color".

[Unable to Edit.] : If it is set to "True", all objects in the sheet will be locked to disable movement. Moreover, the change related to sheets will be disabled after that.

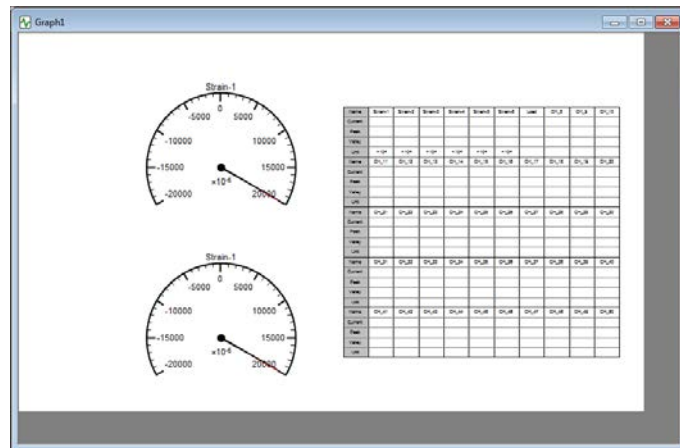
[Background] : Select the background color of the sheet.

Clicking  will display the list of colors.




[Lock drawing area]

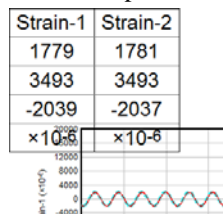
: The drawing area will be separated from the window. By this operation, the drawing area will not be changed even if you change the window size of the sheet. Therefore, the positional relationship of allocated monitoring objects will not be misaligned.



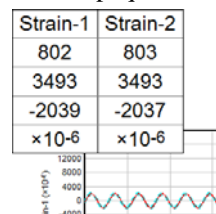
## 11-3 Setting of numerical monitor [Transparent]

: Click  and set the background display.

True: transparent



False: opaque



For details on "Auto size adjustment", refer to "Chapter 5. 9-4 Position of monitoring object".



For the font, refer to "Chapter 5. 11-12 Change of font".




For the dialog box for selecting data, refer to "Chapter 5. 10-1 Numerical monitor"


### [Auto size adjustment]

: The size of object and the size of font will be automatically adjusted according to the window size.


### [Font]

: Click  and set the font.

### [Data]

: Click  and set a channel to be monitored from the displayed dialog box for selecting data.

### [Number of column]

: Click  and set the number of channels to be displayed in the columns.

The setting range is 1 to 10.


Columns number 1

Name	Strain-1
Measure	-210
Peak	3493
Valley	-2039
Unit	$\times 10^{-6}$
Name	Strain-2
Measure	-209
Peak	3493
Valley	-2037
Unit	$\times 10^{-6}$

Columns number 2


Name	Strain-1	Strain-2
Measure	1932	1935
Peak	3493	3493
Valley	-2039	-2037
Unit	$\times 10^{-6}$	$\times 10^{-6}$

### [Number of characters]

: Click  and specify the width of row as number of characters.

The setting range is 1 to 255.

### [Legend]

: Click  and set the display of legend.

True: displayed


Name	Strain-1	Strain-2
Measure	1932	1935
Peak	3493	3493
Valley	-2039	-2037
Unit	$\times 10^{-6}$	$\times 10^{-6}$

False: not displayed

Strain-1	Strain-2
-985	-983
3493	3493
-2039	-2037
$\times 10^{-6}$	$\times 10^{-6}$

### [Legend item]

#### [Name]

: Click  and set the display of name.


True: displayed

Name	Strain-1	Strain-2
Measure	1932	1935
Peak	3493	3493
Valley	-2039	-2037
Unit	$\times 10^{-6}$	$\times 10^{-6}$

False: not displayed

Measure	-1129	-1128
Peak	3493	3493
Valley	-2039	-2038
Unit	$\times 10^{-6}$	$\times 10^{-6}$

#### [Measure]


: Click  and set the display of current value.

True: displayed

Name	Strain-1	Strain-2
Measure	1932	1935
Peak	3493	3493
Valley	-2039	-2037
Unit	$\times 10^{-6}$	$\times 10^{-6}$


False: not displayed

Name	Strain-1	Strain-2
Peak	3493	3493
Valley	-2039	-2038
Unit	$\times 10^{-6}$	$\times 10^{-6}$

[Peak] : Click  and set the display of peak value.  
True: displayed False: not displayed


Name	Strain-1	Strain-2
Measure	1932	1935
Peak	3493	3493
Valley	-2039	-2037
Unit	$\times 10^{-6}$	$\times 10^{-6}$

Name	Strain-1	Strain-2
Measure	-1985	-1983
Valley	-2039	-2038
Unit	$\times 10^{-6}$	$\times 10^{-6}$

[Valley] : Click  and set the display of valley value.  
True: displayed False: not displayed

Name	Strain-1	Strain-2
Measure	1932	1935
Peak	3493	3493
Valley	-2039	-2037
Unit	$\times 10^{-6}$	$\times 10^{-6}$

Name	Strain-1	Strain-2
Measure	-1334	-1334
Peak	3493	3493
Unit	$\times 10^{-6}$	$\times 10^{-6}$

[Unit] : Click  and display the display of unit.  
True: displayed False: not displayed


Name	Strain-1	Strain-2
Measure	1932	1935
Peak	3493	3493
Valley	-2039	-2037
Unit	$\times 10^{-6}$	$\times 10^{-6}$


Name	Strain-1	Strain-2
Measure	1542	1543
Peak	3493	3493
Valley	-2039	-2038


[Alarm Limit]




For the alarm value, refer to "Chapter 4. 5-13 Alarm ON/OFF".

[Alarm Display] : Click  and change it.  
If you set it to "True", the background color will change if the conditions are fulfilled according to the setting of alarm of each channel.

[Upper color] : Click  and set the color to be displayed when the conditions of upper limit value are fulfilled.  
This setting is common to all monitoring objects.

[Lower color] : Click  and set the color to be displayed when the conditions of lower limit value are fulfilled.  
This setting is common to all monitoring objects.

[Upper/Lower color]

: Click  and set the color to be displayed when conditions of upper limit value and lower limit value are fulfilled at the same time.



Refer to "Chapter 5. 11-10 Method for changing the color".




For the outer frame line, refer to "Chapter 5. 11-13 Setting of outer frame line".



Refer to "Chapter 5. 11-10 Method for changing the color".

[Frame] : A line of outer frame is drawn according to the size of monitoring object.


[Color arrangement]

[Background] : Click  and set the background color.


Name	Strain-1	Strain-2
Measure	1610	1612
Peak	3493	3493
Valley	-2039	-2038
Unit	$\times 10^{-6}$	$\times 10^{-6}$

[Legend] : Click  and set the color of legend.


Name	Strain-1	Strain-2
Measure	-1611	-1610
Peak	3493	3493
Valley	-2039	-2038
Unit	$\times 10^{-6}$	$\times 10^{-6}$

[Character] : Click  and set the color of character.


Name	Strain-1	Strain-2
Measure	1500	1504
Peak	3493	3493
Valley	-2039	-2038
Unit	$\times 10^{-6}$	$\times 10^{-6}$

[Item Border] : Click  and set the color of frame line.

Name	Strain-1	Strain-2
Measure	-840	-839
Peak	3493	3493
Valley	-2039	-2038
Unit	$\times 10^{-6}$	$\times 10^{-6}$

[Border] : Click  and set the color of ruled line.

Name	Strain-1	Strain-2
Measure	-1932	-1931
Peak	3493	3493
Valley	-2039	-2038
Unit	$\times 10^{-6}$	$\times 10^{-6}$

[Frame] : Click  and set the color of outer frame line.

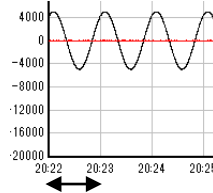
## 11-4 Setting of T-Y monitor and X-Y monitor

### ■ Setting inherent to T-Y monitor

[X axis scale]

[Increment (sec)]

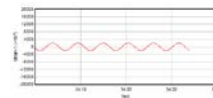
: Set the increment value of scale mark of X-axis by second.



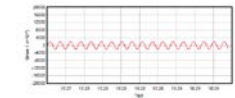
[Number of division]

: Click and set the division number of X-axis scale. The setting range is 4 to 10.

Division number 4



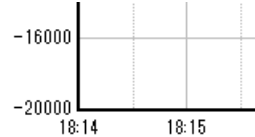
Division number 10



[Minor scale interval]

: Set the division number of subsidiary scale mark. A subsidiary scale mark will not be drawn without setting "grid" - "subsidiary scale" - "X-axis".

If it is set to 2

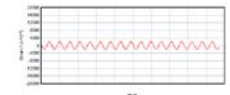
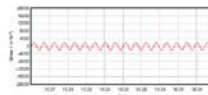


[Display]

: Click and set the display of X-axis scale value.

True: displayed

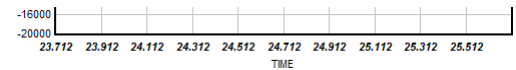
False: not displayed



For the font, refer to "Chapter 5. 11-12 Change of font".

[Font]

: Click and set the font of X-axis scale.



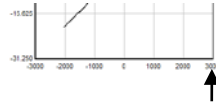
■ Setting inherent to X-Y monitor

[Number of drawing data]

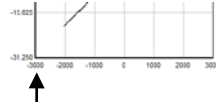
: Set the data number to be drawn per channel within range 2 to 100000.

[X axis scale]

[Right of X axis]: Set the right end value of X-axis scale.



[Left of X axis] : Set the left end value of X-axis scale.



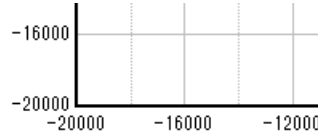
[Increment] : Set the increment value of scale mark of X-axis.




[Minor scale interval]

: Set the division number of subsidiary scale mark.  
A subsidiary scale mark will not be drawn without setting "grid" - "subsidiary scale" - "X-axis".

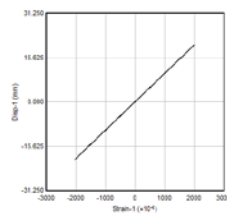
If it is set to 2



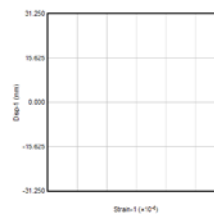
[Display]

: Click  and set the display of X-axis scale value.

True: displayed




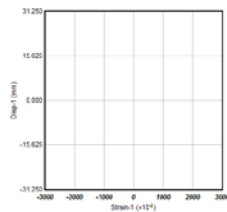
False: not displayed



For the font, refer to "Chapter 5. 11-12 Change of font".

[Font]

: Click  and set the font of X-axis scale.





For the alarm value, refer to "Chapter 4. 5-13 Alarm ON/OFF".

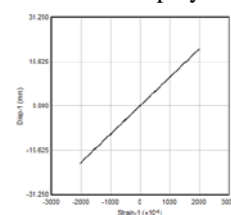
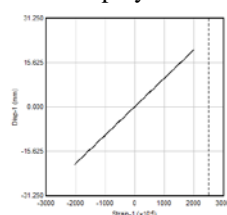
### [The alarm value of X axis]

[Upper]

: Click ☐ and set the display of upper limit value.

True: displayed

False: not displayed

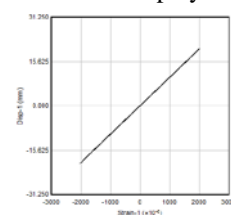
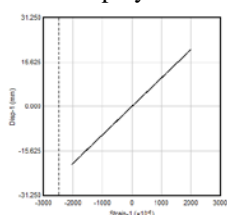


[Lower]

: Click ☐ and set the display of lower limit value.

True: displayed


False: not displayed






For the selection of data, refer to "Chapter 5. 10-2 T-Y monitor" and "10-3 X-Y monitor".

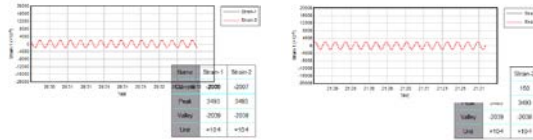
## ■ Common setting item

[Data] : Click  and select a channel to be monitored from the displayed dialog box for selecting data.

[Transparent] : Click  and set the background display.

True: transparent

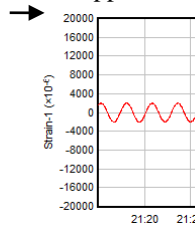
False: opaque



[Y axis scale]

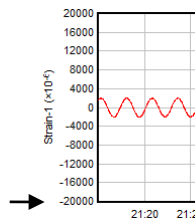
[Upper of Y axis]

: Set the upper end value of Y-axis scale.

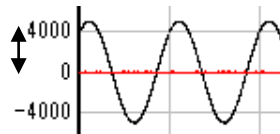


[Lower of Y axis]

: Set the lower end value of Y-axis scale.



[Increment] : Set the increment value of scale mark of Y-axis.



[Minor scale interval]

: Set the division number of subsidiary scale mark.  
A subsidiary scale mark will not be drawn without setting "grid" - "subsidiary scale" - "Y-axis".

If it is set to 2

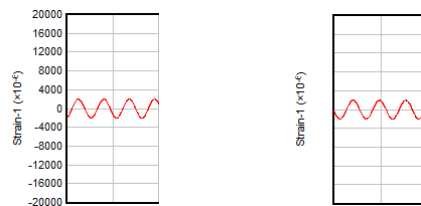


[Display]

: Click  and set the display of value of Y-axis scale.

True: displayed


False: not displayed

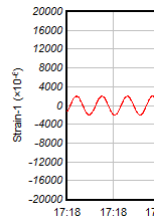




For the font, refer to "Chapter 5. 11-12 Change of font".


[Font]

: Click  and set the font of Y-axis scale.

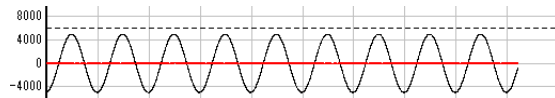


[The alarm value of Y axis]

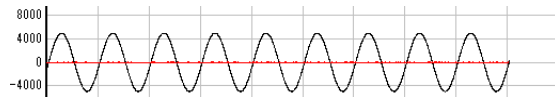
[Upper]

: Click  and set the display of upper limit value.


True: displayed



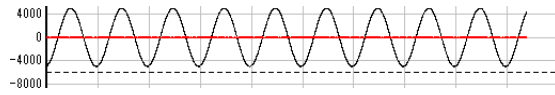
False: not displayed



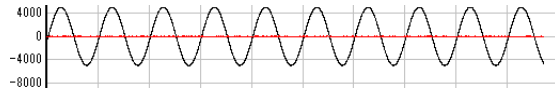
[Lower]

: Click  and set the display of lower limit value.

True: displayed




False: not displayed



[Y axis label]

[Auto]

: Click  and set the display of Y-axis label.  
In case of True, channel name and unit will be set as axis label and unit of axis, respectively.


[Axis label]

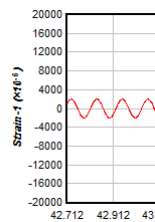
: Set the label of Y-axis.

[Unit of axis]

: Set the unit of Y-axis.

[Font]

: Click  and set the font of Y-axis label.





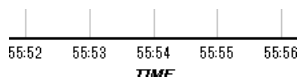
For the font, refer to "Chapter 5. 11-12 Change of font".




For the font, refer to "Chapter 5. 11-12 Change of font".

#### [X axis label]


- [Auto] : Click  and set the display of X-axis label.  
True: Name and unit of channel will be set as axis label and unit of axis, respectively.  
False: Arbitrary characters will be set for axis label and unit of axis.
- [Axis label] : Set X-axis label.
- [Unit of axis] : Set the unit of X-axis.
- [Font] : Click  and set the font of X-axis label.

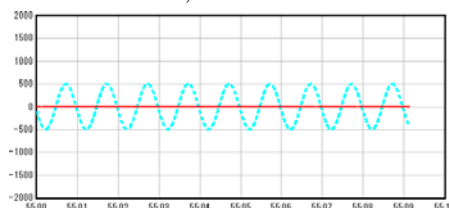


#### [Legend]

- [Auto] : Click  and set the display of label of legend.  
In case of True, name of channel will be set in the label of construction line.


#### [Label & line]

- : Click  and set label of construction line, type of line, thickness of line, and color of line.




#### [Grid]


##### [Frame]

- [Color] : Click  and select the color of frame line.
- [Weight] : Select the thickness of frame line from None / 1 / 2 / 3.

##### [Major scale / Minor scale]

- [Color] : Click  and select the color of scale mark.
- [Y / X axis] : Select the thickness of scale mark of Y / X-axis from None / 1 / 2 / 3.

##### [Tick mark]

- [Color] : Click  and select the color of tick mark.
- [Y / X axis] : Select the thickness of tick mark of Y / X-axis from None / 1 / 2 / 3.



##### [Y / X axis position]

- : Select the position where a tick mark is displayed from None / Left / Right / Left&Right.

##### [Frame]

- : A line of outer frame is drawn according to the size of monitoring object.

##### [Color arrangement]

- [Background] : Click  and select the color of background.
- [Frame] : Click  and select the color of outer frame line.





For the outer frame line, refer to "Chapter 5. 11-13 Setting of outer frame line".

## 11-5 Setting of bar monitor



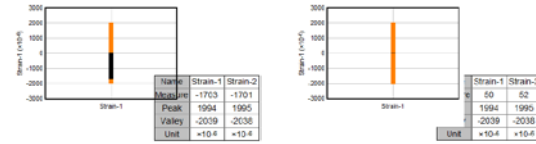
For the selection of data, refer to "Chapter 5. 10-4 Bar monitor".

[Data] : Click  and set a channel to be monitored from the displayed dialog box for selecting data.


[Transparent] : Click  and set the background display.

True: transparent

False: opaque

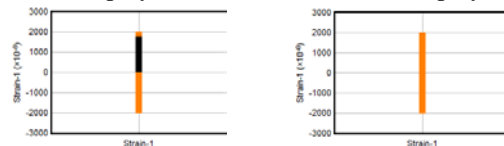



[Type of drawing data]

[Measure] : Click  and set whether the current value is displayed.

True: displayed in black

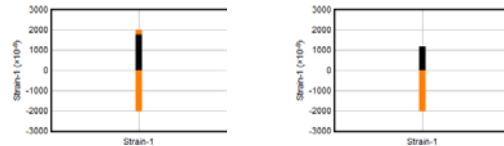
False: not displayed




[Peak] : Click  and set the display of peak value.

True: displayed in orange

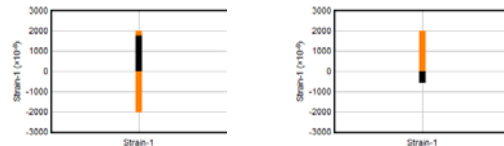
False: not displayed



[Valley] : Click  and set the display of valley value.

True: displayed in orange

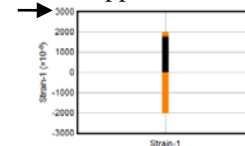
False: not displayed



[Y axis scale]

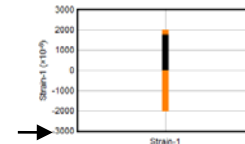
[Upper of Y axis]

: Set the upper end value of Y-axis scale.



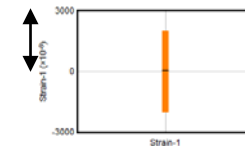
[Lower of Y axis]

: Set the lower end value of Y-axis scale.



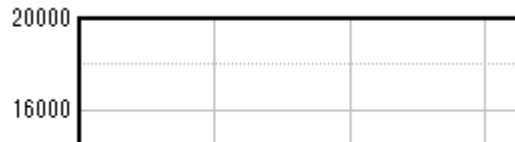
[Increment]

: Set the increment value of scale mark of Y-axis.



[Minor scale interval]

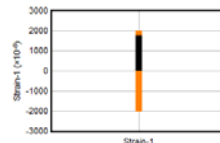
- : Set the division number of subsidiary scale mark.  
A subsidiary scale mark will not be drawn without setting "grid" - "subsidiary scale" - "Y-axis".  
If it is set to 2



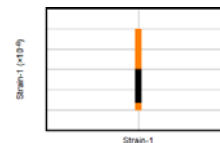
[Display]

- : Click ☐ and set the display of value of Y-axis scale.

True: displayed

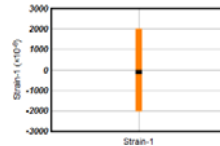


False: not displayed



[Font]

- : Click ☐ and set the font of Y-axis scale.



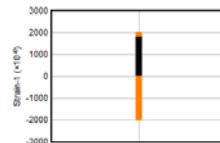
For the font, refer to "Chapter 5. 11-12 Change of font".

[X axis scale]

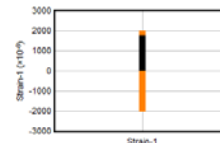
[Label]

- : Click ☐ and set the direction to display the label.

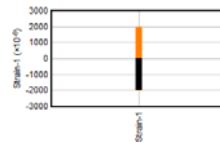
Not displayed



Horizontal

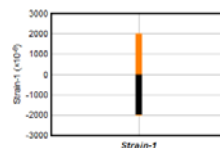


Vertical



[Font]

- : Click ☐ and set the font of label.





For the alarm value, refer to "Chapter 4 5-13 Alarm ON/OFF".

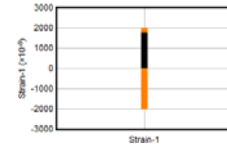
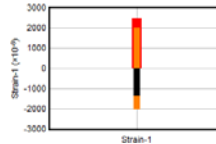
#### [Alarm Limit]

##### [Display upper limit value]

: Click ☐ and set the display of upper limit value.

True: displayed in color of upper limit value

False: not displayed

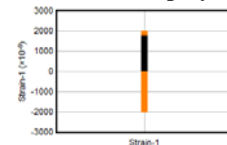
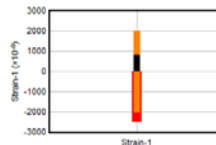


##### [Display lower limit value]

: Click ☐ and set the display of lower limit value.

True: displayed in color of lower limit value

False: not displayed



Refer to "Chapter 5. 11-10 Method for changing the color".

[Upper color] : Click ☐ and select the color to display the upper limit value.

This setting is common to all monitoring objects.

[Lower color] : Click ☐ and select the color to display the lower limit value.

This setting is common to all monitoring objects.

#### [Y axis label]

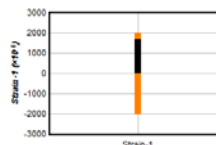
[Auto] : Click ☐ and set the display of Y-axis label.

In case of True, channel name and unit will be set as axis label and unit of axis, respectively.

[Axis label] : Set Y-axis label.

[Unit of axis] : Set the unit of Y-axis.

[Font] : Click ☐ and set the font of Y-axis label.



For the font, refer to "Chapter 5. 11-12 Change of font".

#### [X axis label]

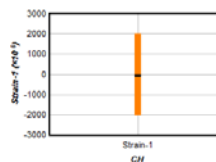
[Auto] : Click ☐ and set the display of X-axis label.

In case of True, the axis label and the unit of axis are set blank.

[Axis label] : Set X-axis label.

[Unit of axis] : Set the unit of X-axis.

[Font] : Click ☐ and set the font of X-axis label.





For the outer frame line,  
refer to "Chapter 5. 11-13  
Setting of outer frame  
line".

[Grid]

[Frame]

[Color] : Click  and select the color of frame line.

[Weight] : Select the thickness of frame line from None / 1 / 2 / 3.

[Major scale / Minor scale]

[Color] : Click  and select the color of scale mark.

[Y / X axis] : Select the thickness of scale mark of Y / X-axis from None / 1 / 2 / 3.

[Tick mark]

[Color] : Click  and select the color of tick mark.

[Y / X axis] : Select the thickness of tick mark of Y / X-axis from None / 1 / 2 / 3.

[Y / X axis position]

: Select the position where a tick mark is displayed from  
None / Left / Right / Left&Right.

[Frame]

: A line of outer frame is drawn according to the size of  
monitoring object.

[Color arrangement]

[Background] : Click  and select the color of background.

[Frame] : Click  and select the color of outer frame line.

## 11-6 Setting of dial scale monitor

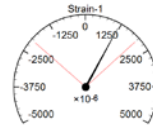


For the selection of data,  
refer to "Chapter 5. 10-5  
Dial scale monitor".

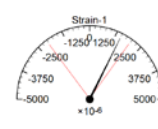
[Data] : Click ☐ and set a channel to be monitored from the displayed dialog box for selecting data.

[Display form] : Click ☐ and set the display format of dial scale monitor.

Standard



Semicircle



Horizontal

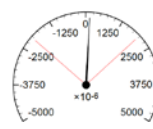


Vertical

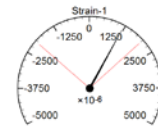


[Legends] : Click ☐ and set the display of legend.

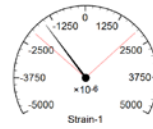
Hide



Top

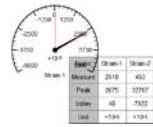


Bottom

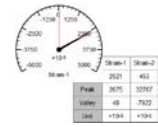


[Transparent] : Click ☐ and set the background display.

True: transparent



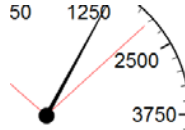
False: opaque



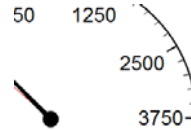
[Type of drawing data]

[Peak] : Click ☐ and set the display of peak value.

True: displayed

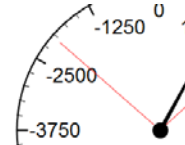


False: not displayed

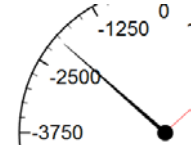


[Valley] : Click ☐ and set the display of valley value.

True: displayed



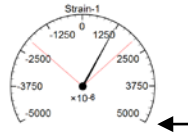
False: not displayed



[Scale]

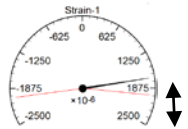
[Upper of Y-axis]

: Set the maximum value of scale.




[Increment]

: Set the increment value of scale.

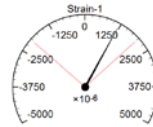
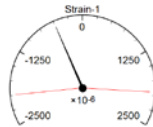


[Number of division]

: Click  and set the division number of scale.  
The setting range is 1 to 10.

Division number 4


Division number 8

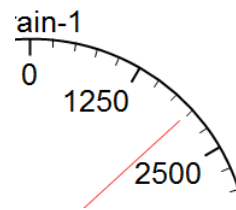
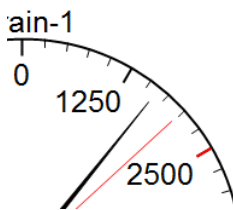


For the alarm value, refer to "Chapter 4. 5-13 Alarm ON/OFF".


[Alarm Limit]

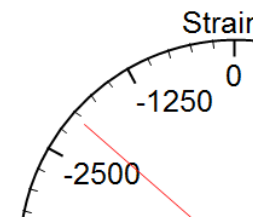
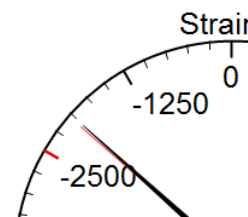
[Upper]

: Click  and set the display of upper limit value.  
True: displayed      False: not displayed




[Lower]


: Click  and set the display of lower limit value.  
True: displayed      False: not displayed



[Upper color]

: Click  and select the color to display the upper limit value.  
This setting is common to all monitoring objects.


[Lower color]


: Click  and select the color to display the lower limit value.  
This setting is common to all monitoring objects.

[Frame]

: A line of outer frame is drawn according to the size of monitoring object.

[Color arrangement]

[Background] : Click  and select the color of background.

[Frame] : Click  and select the color of outer frame line.



Refer to "Chapter 5. 11-10 Method for changing the color".




For the outer frame line, refer to "Chapter 5. 11-13 Setting of outer frame line".


## 11-7 Setting of spectral chart



For the selection of data, refer to "Chapter 5. 10-6 Spectral chart".

[Data] : Click  and set a channel to be monitored from the displayed dialog box for selecting data.

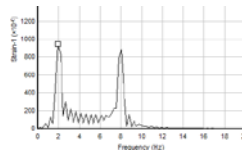
[Mark peak value]

: Click  and set the number of peak values for which a mark is displayed.

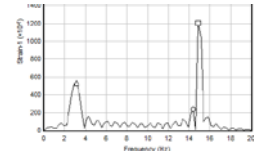
Specified number of peak values will be displayed in descending order.


The setting range is 0 to 20.

Number of marks 1



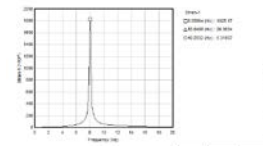
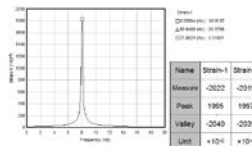
Number of marks 3




[Transparent] : Click  and set the background display.


True: transparent

False: opaque



[Analysis method]

[Type] : Click  and set the display method of spectrum.  
Power spectrum / Amplitude spectrum


[Shift] : Click  and set the method for removing the shift of 0 point.


None Removal will not be carried out.

DC cut Shift will be removed by average value.

Trend Shift will be removed by primary regression equation.

[Window functions]

: Click  and set the window function.  
Rectangular / Humming / Hanning

[Data number] : Click  and set the data number for which FFT analysis is carried out.

512/1024/2048/4096/8192/16384/32768/65536

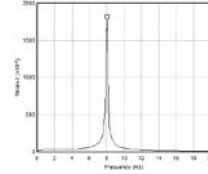
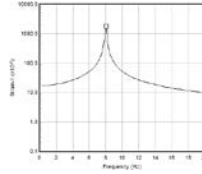
[Y axis scale]

[Logarithmic indicate]

: Click  and set the display method of Y-axis scale.

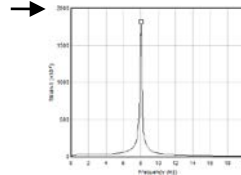
True: logarithm

False: natural number



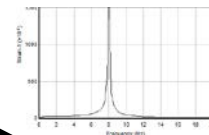
[Upper of Y axis]

: Set the upper end value of Y-axis scale.



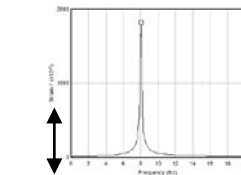
[Lower of Y axis]

: Set the lower end value of Y-axis scale.



[Increment]

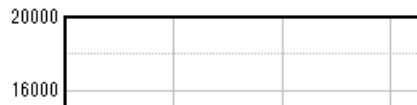
: Set the increment value of scale mark of Y-axis.



[Minor scale interval]

: Set the division number of subsidiary scale mark.  
A subsidiary scale mark will not be drawn without setting "grid" - "subsidiary scale" - "Y-axis".

If it is set to 2

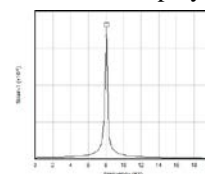
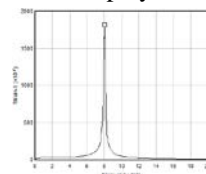


[Display]


: Click  and set the display of value of Y-axis scale.

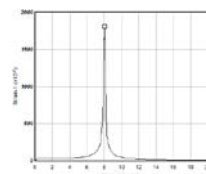
True: displayed

False: not displayed



[Font]

: Click  and set the font of Y-axis scale.

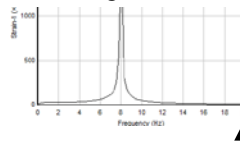


For the font, refer to "Chapter 5. 11-12 Change of font".

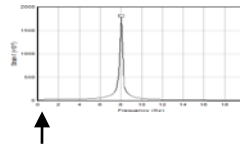
[X axis scale]

[Right of X axis]

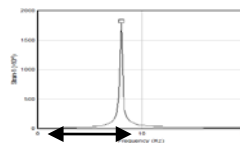
: Set the right end value of X-axis scale.



[Left of X axis] : Set the left end value of X-axis scale.



[Increment] : Set the increment value of scale mark of X-axis.



[Minor scale interval]

: Set the division number of subsidiary scale mark.  
A subsidiary scale mark will not be drawn without setting  
"grid" - "subsidiary scale" - "X-axis".  
If it is set to 2

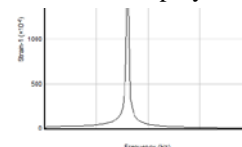
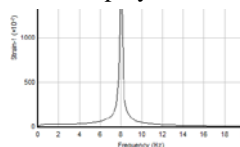


[Display]

: Click ☒ and set the display of X-axis scale value.

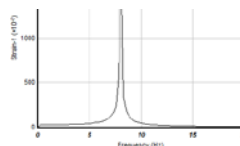
True: displayed

False: not displayed




[Font]

: Click ☒ and set the font of X-axis scale.




For the font, refer to  
"Chapter 5. 11-12 Change  
of font".

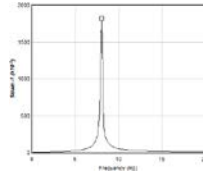
#### [Y axis label]

[Auto] : Click  and set the display of Y-axis label.  
In case of True, channel name and unit will be set as axis label and unit of axis, respectively.


[Axis label] : Set Y-axis label.

[Unit of axis] : Set the unit of Y-axis.

[Font] : Click  and set the font of Y-axis label.




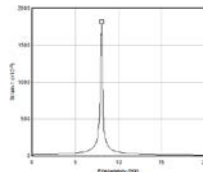
#### [X axis label]

[Auto] : Click  and set the display of X-axis label.  
In case of True, frequency and Hz will be set as axis label and unit of axis, respectively.

[Axis label] : Set X-axis label.


[Unit of axis] : Set the unit of X-axis.


[Font] : Click  and set the font of X-axis label.

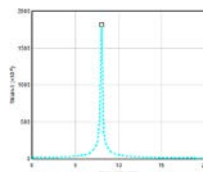


For the font, refer to "Chapter 5. 11-12 Change of font".

#### [Legend]

[Auto] : Click  and set the display of legend.  
In case of True, name of channel will be set in the label of construction line.

[Label & line] : Click  and set label of legend, type of line, thickness of line, and color of line.



[Font] : Click  and set the font of legend.


Strain-1  
□ 7.8125 (Hz) : 2005.42  
△ 50.7813 (Hz) : 19.4875  
○ 42.9688 (Hz) : 7.27658



For label and line, refer to "Chapter 5. 11-11 Change of color and type of construction line".

#### [Grid]

##### [Frame]

[Color] : Click  and select the color of frame line.

[Weight] : Select the thickness of frame line from None / 1 / 2 / 3.



For the outer frame line, refer to "Chapter 5. 11-13 Setting of outer frame line".



For the selection of data, refer to "Chapter 5. 10-7 Vector monitor" and "10-8 Arrow monitor".



For the alarm value, refer to "Chapter 4. 5-13 Alarm ON/OFF".



Refer to "Chapter 5. 11-10 Method for changing the color".

#### [Major scale / Minor scale]

[Color] : Click  and select the color of scale mark.

[Y / X axis] : Select the thickness of scale mark of Y / X-axis from None / 1 / 2 / 3.

#### [Tick mark]

[Color] : Click  and select the color of tick mark.

[Y / X axis] : Select the thickness of tick mark of Y / X-axis from None / 1 / 2 / 3.

#### [Y / X-axis position]

: Select the position where a tick mark is displayed from None / Left / Right / Left&Right.

[Frame] : A line of outer frame is drawn according to the size of monitoring object.

#### [Color arrangement]

[Background] : Click  and select the color of background.

[Frame] : Click  and select the color of outer frame line.

### 11-8 Setting items of vector monitor and arrow monitor

[Data] : Select data to be monitored.

Click  to display the dialog box to be set.

[Weight] : Select the thickness of line from standard / heavy line.

[Color] : Click  and select the color of line.

#### [Alarm Limit]

##### [Alarm Indicator]

: Click  and change it.

If it is set to True, the line color is changed if the conditions are fulfilled following the alarm setting of channel.


[Upper color] : Click  and set the color to be displayed when the conditions of upper limit value are fulfilled. This setting is common to all monitoring objects.

[Lower color] : Click  and set the color to be displayed when the conditions of lower limit value are fulfilled. This setting is common to all monitoring objects.

## 11-9 Setting of legend and label

These are the setting items for legend of X-Y monitor and T-Y monitor, and reference line and label of vector monitor and arrow monitor.

### ■ Setting inherent to label

[Data] : Click  and set the text in the displayed dialog box for editing the text.

[Auto size adjustment]

: The size of object and the size of font will be automatically adjusted according to the window size.




For details on "Auto size adjustment", refer to "Chapter 5. 9-4 Position of monitoring object".

### ■ Setting inherent to legend of X-Y monitor and T-Y monitor

[Legend]


[Auto]

: Click  and set the display of label of legend.

In case of True, name of channel will be set in the label of construction line.

In case of False, arbitrary characters will be set in the label of construction line.


[Label & line]

: Click  and set label of construction line, type of line, thickness of line, and color of line.



For label and line, refer to "Chapter 5.11-11 Change of color and type of construction line".

### ■ Common setting item

[Transparent] : Click  and set the background display.

True: transparent

False: opaque

Label

Name	Strain-1	Strain-2
Measure	-1241	-1239
Peak	1995	1997
Valley	-2040	-2039
Unit	$\times 10^{-6}$	$\times 10^{-6}$

Label

Name	Strain-1	Strain-2
Measure	-481	-480
Peak	1995	1997
Valley	-2040	-2039
Unit	$\times 10^{-6}$	$\times 10^{-6}$



For the font, refer to "Chapter 5.11-12 Change of font".

[Font] : Click  and set the font.

[Rotate 90 degrees]

: Select the view of character from none / rotation in clockwise direction / rotation in anti-clockwise direction.

TEXT      TEXT      TEXT




For the outer frame line, refer to "Chapter 5.11-13 Setting of outer frame line".

[Frame]


: A line of outer frame is drawn according to the size of monitoring object.

[Color arrangement]


[Background] : Click  and select the color of background.

Label

[Frame]

: Click  and select the color of outer frame line.

[Character]


: Click  and select the color of character.

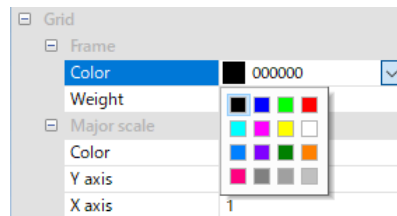
Label

## 11-10 Method for changing the color

The color of background and character can be changed.


For the graph of T-Y monitor and X-Y monitor, the selectable colors are fixed.

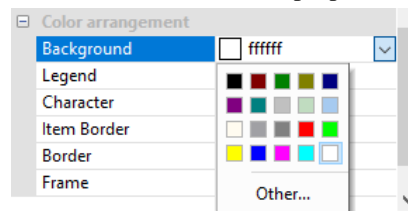
Click  from the items related to the color of properties.



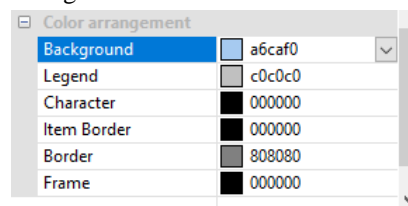
Select the color to be changed.

The color of background etc. can be selected arbitrarily.

Click  from the items related to the color of properties.



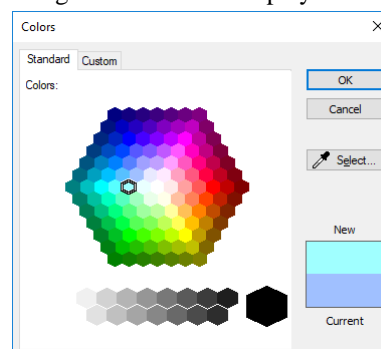
Select the color to be changed.



To select other color, click [Other...].



The dialog box for selecting a color will be displayed. Select a color.



Click [OK] button to fix the color.

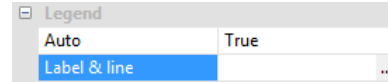
Color arrangement	
Background	<input type="text" value="a0ffff"/>
Legend	<input type="text" value="c0c0c0"/>
Character	<input type="text" value="000000"/>
Item Border	<input type="text" value="000000"/>
Border	<input type="text" value="808080"/>
Frame	<input type="text" value="000000"/>

Name	Strain-1	Strain-2
Measure	-30	-30
Peak	-30	-30
Valley	-39	-38
Unit	$\times 10^{-6}$	$\times 10^{-6}$

## 11-11 Change of color and type of construction line

For T-Y monitor, X-Y monitor, and spectrum, color and type of construction line can be changed from properties.

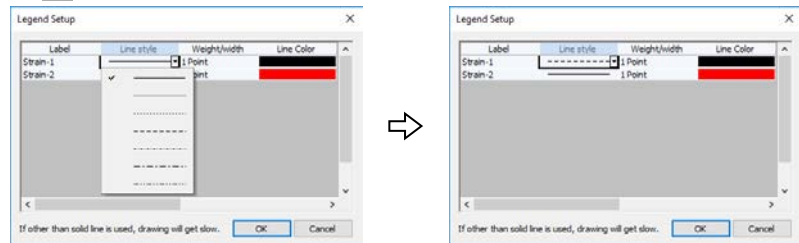
Click ... in [Label & line] in properties.



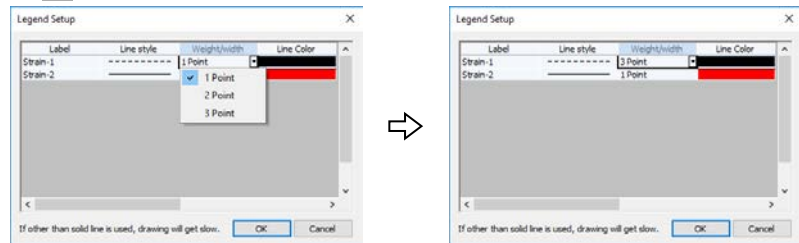
The dialog box for setting the legend will be displayed.



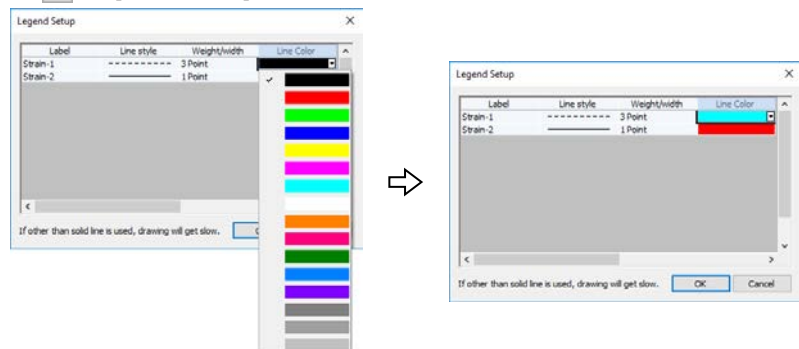
Click ▾ of [Line style] and select a type of construction line.



Click ▾ of [Weight / width] and select the thickness of construction line.

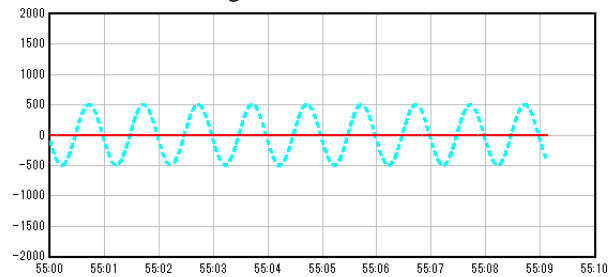


Click ▾ of [Line Color] and select the color of construction line..



The drawing speed is fast at solid line. Select the solid line as much as possible.

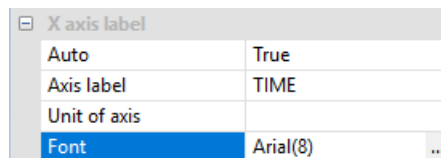
Click [OK] button to fix the change.



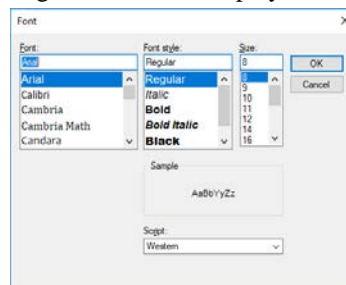
## 11-12 Change of font

For characters to be displayed for monitoring object, font and size etc. can be changed.

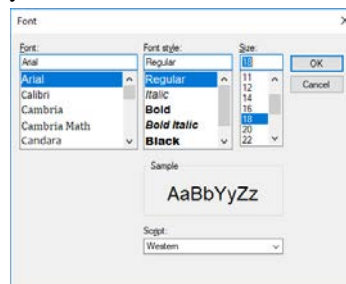
Click ... from [Font] in properties.



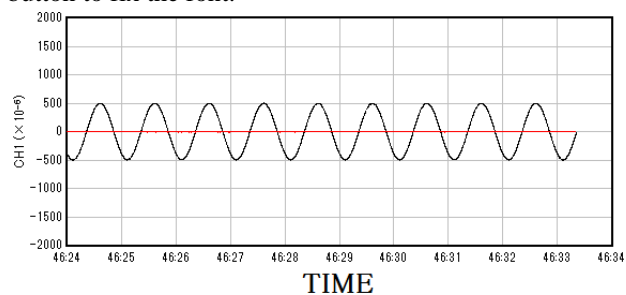
The dialog box for selecting a font will be displayed.



Select font name, font style, and size.



Click [OK] button to fix the font.

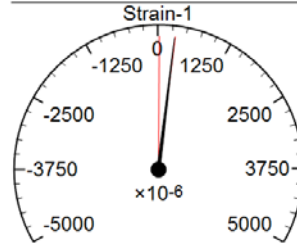


### 11-13 Setting of outer frame line

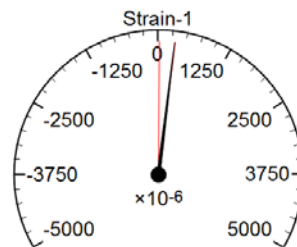
An outer frame line will be drawn at the specified position according to the size of a monitoring object.

[Frame]

[Top] : A line will be drawn above a monitoring object.

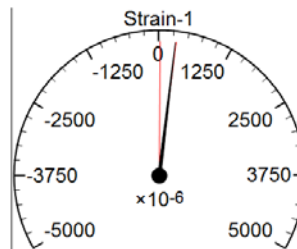


[Bottom] : A line will be drawn under a monitoring object.



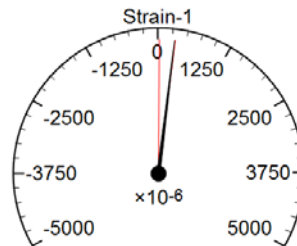
[Left]

: A line will be drawn on the left side of a monitoring object.



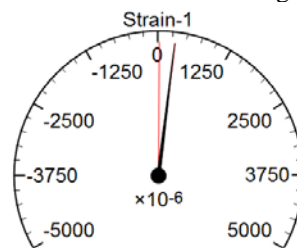
[Right]

: A line will be drawn on the right side of a monitoring object.



[Shadow]

: The shade of a monitoring object will be displayed.



## 12 Change of scale using a mouse


T-Y monitor, X-Y monitor, bar monitor, dial scale monitor, and spectrum have a function that changes the scale of a graph. It can be also set by operating a mouse in addition to setting from properties panel.

Clicking a monitoring object displays the graph tool bar.

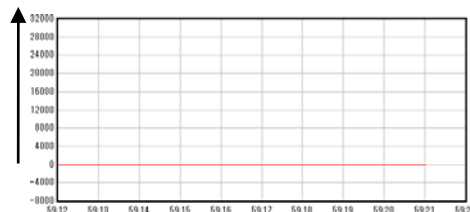
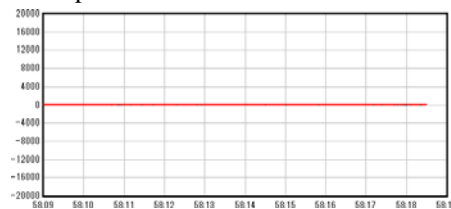


Click the item to be changed from this graph tool bar.

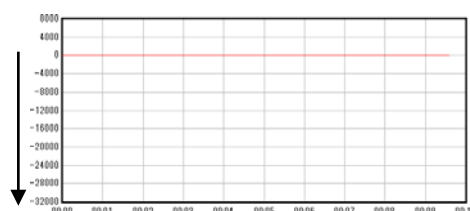
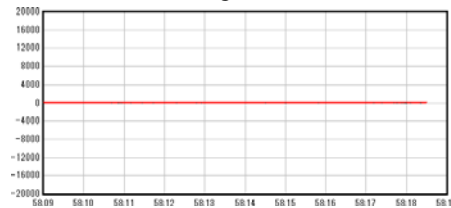
- Movement of Y-axis

Clicking  can move Y-axis.

Rotating the center wheel of a mouse upward or dragging the mouse upward moves the Y-axis scale to positive direction.



Rotating the center wheel of a mouse downward or dragging the mouse downward moves the Y-axis scale to negative direction.




The center wheel is a rotating body between mouse buttons.

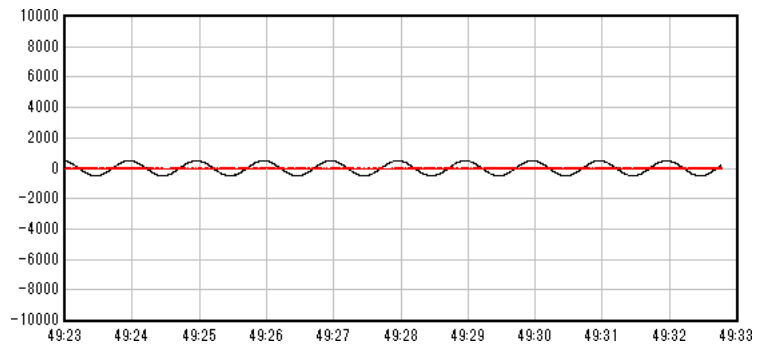
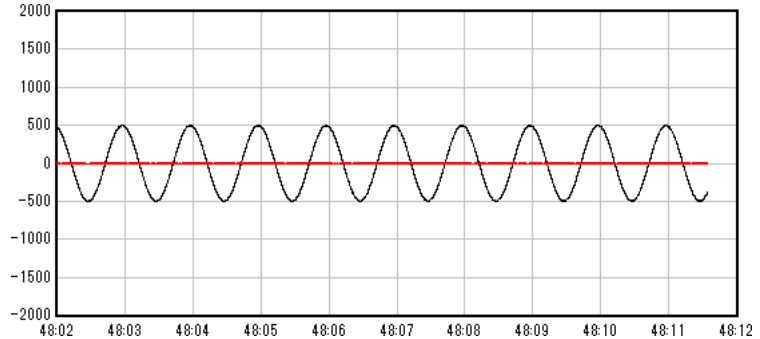


The center wheel is a rotating body between mouse buttons.

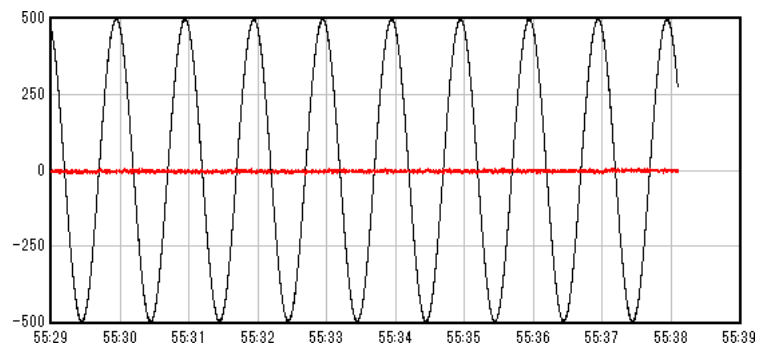
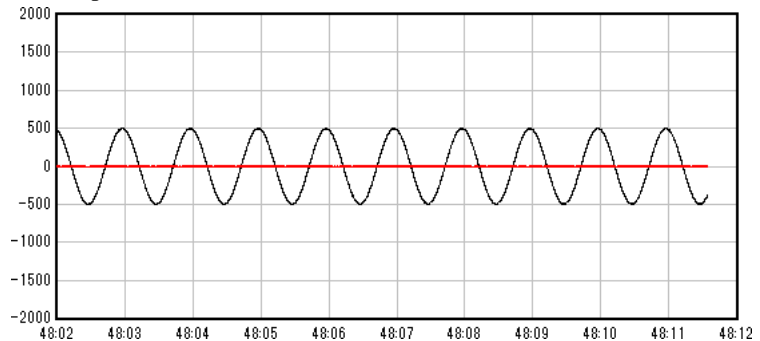
● Expansion and reduction of Y-axis

Clicking  can expand or reduce the Y-axis.

Rotating the center wheel of a mouse upward or dragging the mouse upward reduces the Y-axis scale.




Rotating the center wheel of a mouse downward or dragging the mouse downward expands the Y-axis scale.



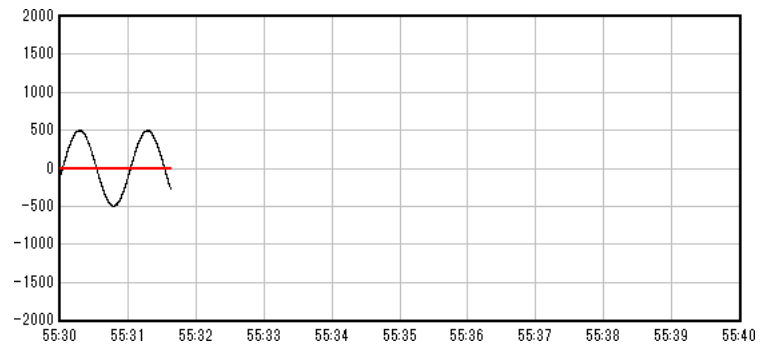
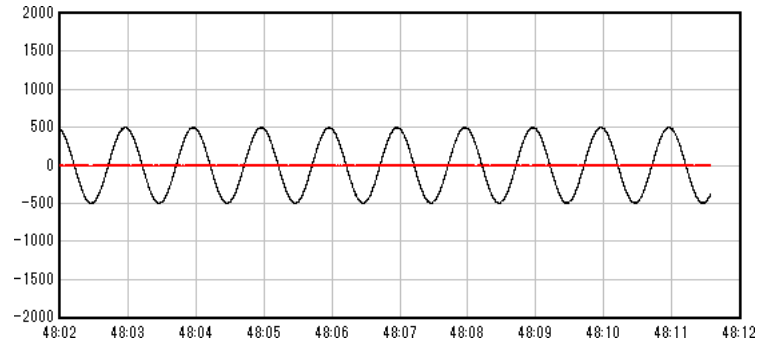


The center wheel is a rotating body between mouse buttons.

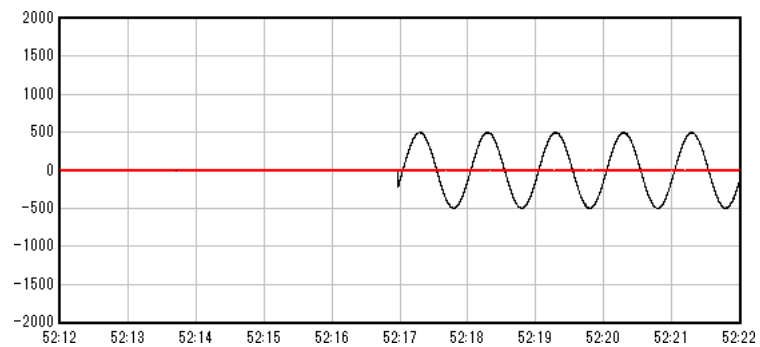
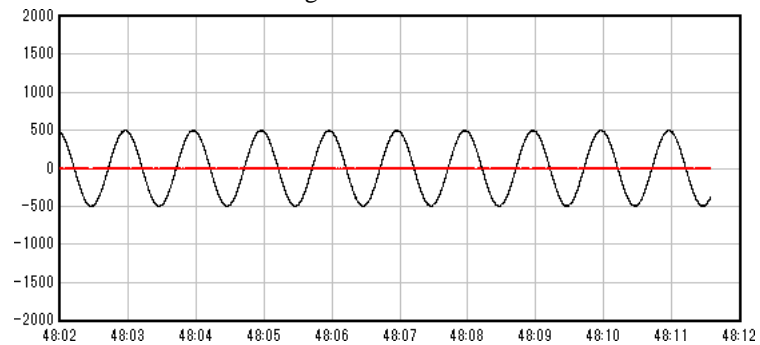
- Movement of X-axis

Clicking  can move the X-axis.

Rotating the center wheel of a mouse upward or dragging the mouse to right side moves the X-axis scale to positive direction.




Rotating the center wheel of a mouse downward or dragging the mouse to left side moves the X-axis scale to negative direction.



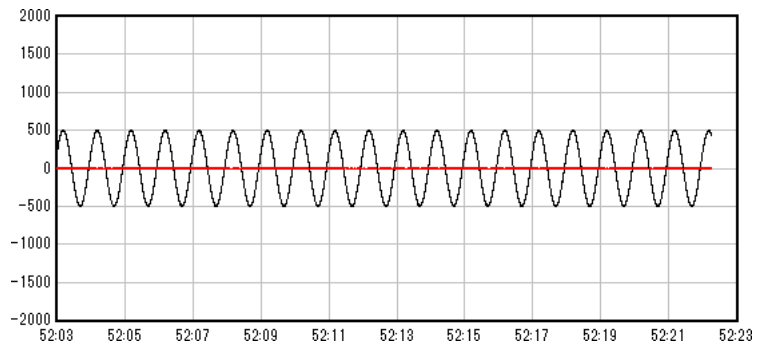
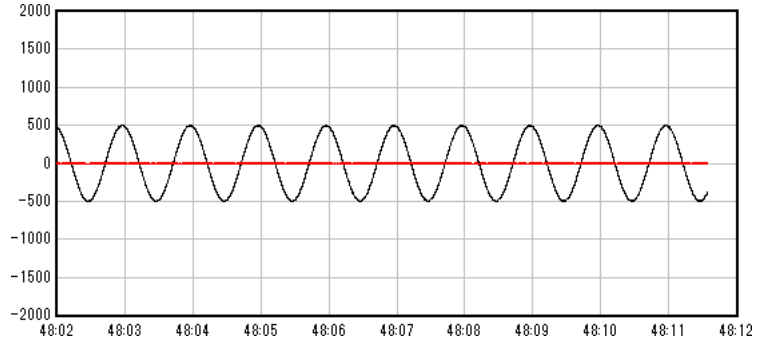


The center wheel is a rotating body between mouse buttons.

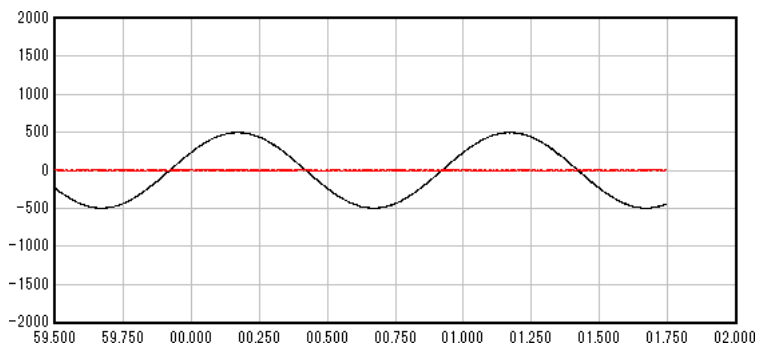
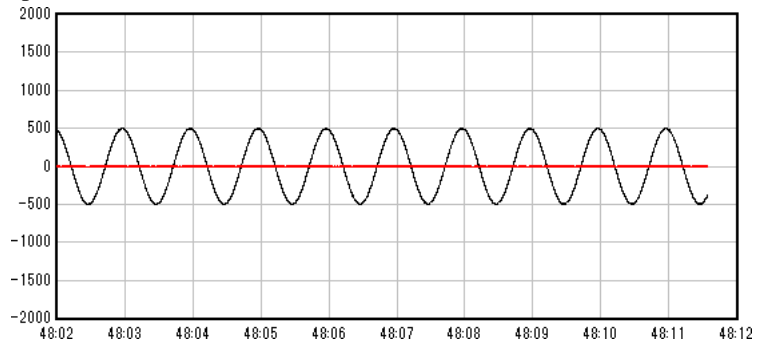
● Expansion and reduction of X-axis

Clicking  can expand or reduce the X-axis.

Rotating the center wheel of mouse upward or dragging the mouse to left side reduces the X-axis scale.



Rotating the center wheel of a mouse downward or dragging the mouse to right side expands the X-axis scale.





# Chapter 6

## Measurement



This chapter explains data file and measurement method.

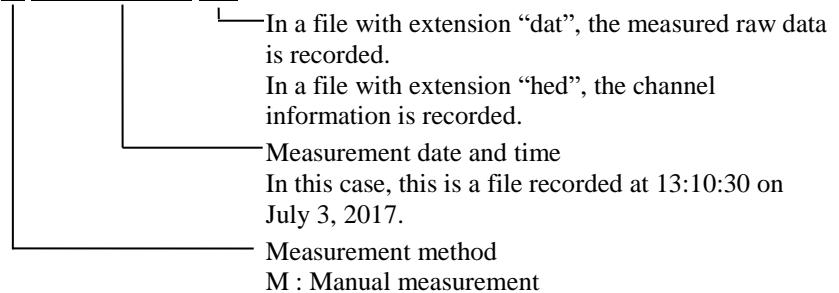
## 1 Data file

Here explains the data file for recording the measurement data.

### 1-1 Name of data file

The name of data file for recording the measurement data is configured with measurement method and measurement date and time.

M 170703131030 .dat



If [Exit at data quantity per file.] is selected for the setting of measurement time, a file may be divided and recorded.

In such a case, "-" and serial number will be added to the end of file name.

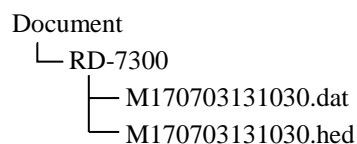
### 1-2 Destination to save a data file

When this software is activated, RD-7300 folder will be created in the document folder.

The measurement data will be saved in this folder by default.



To change the destination to save a data file, refer to "Chapter 4. 3-1 Destination to save the measurement data".



### 1-3 Channel number of data file

Channels that are set to measurement OFF for the setting of channel and the channels for which functions are not defined for the setting of expanded channel are not recorded in a data file.

Consequently, the channel number at measurement and the channel number of data file are different as shown below.

	Measurement ON/OFF	At measurement	Data file
Channel 1	ON	CH1	CH1
Channel 2	OFF	CH2	No record
Channel 3	ON	CH3	CH2

Some functions of expanded channel have a channel number or number of expanded channel as an argument. As the recording of function is carried out according to the channel number of data file, pay attention when you load the data file by other software such as RD-7300E.


2


Display of status of measurement


Status of communication with a measuring instrument and measurement status are displayed on the status bar in the lower part of the screen.


●


Communication status


 Ready

 : A measuring instrument is not connected.

 : The setting is sent to a measuring instrument.

 : The communications with a measuring instrument are performed.

 : Communications are delayed.

 : The firmware of a measuring instrument is being updated.

●

Measurement status

MN:

MN:

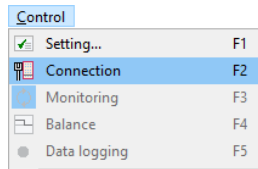
MN: 0:00:10


: Manual measurement is not executed.

: Manual measurement is being executed.  
The measurement time is displayed by hour, minute, and second.

### 3 Connection with an measuring instrument

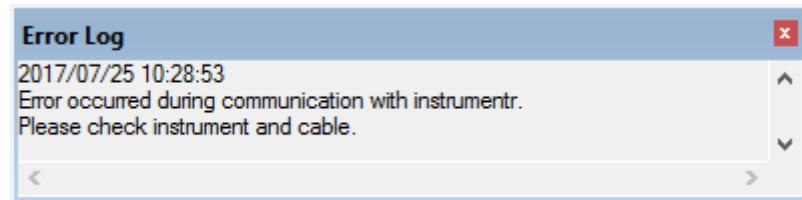
To carry out the measurement, it is necessary to make connection with a measuring instrument to start communications.



Click the control tool  Connection .


The setting is sent to a measuring instrument to enter in the monitoring status.

If the communications with a measuring instrument cannot be performed normally, the content will be displayed in the error log.



For the setting of IP address, refer to "Chapter 4. 3-2 Confirming the connection of measuring the instrument".

Check the connection status of power supply and LAN cable and the IP address of the measuring instrument.

To release the connection, click  Connection again.



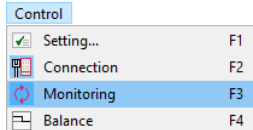
When communication with instrument via network is unstable, please connect PC and instrument directly.

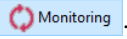
## 4 Monitoring

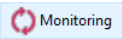
If the monitoring is started, the measurement data of monitoring object will be updated by the current value all the time.

### 4-1 Start and stop of monitoring

With T-Y monitor and X-Y monitor, if the data reaches a constant data number, old data will be deleted. Therefore, if you want to stop and check the waveform, it is necessary to stop the monitoring temporarily.



To stop the monitoring, click the control tool .

To restart the monitoring, click  again.

### 4-2 Cautions on monitoring

Each monitoring object is drawn by calculating the data of each displayed channel all the time. If the specification of PC is low, the drawing may get delayed.

At this time, the status bar in the lower part of the screen changes to notify the user of the delay of drawing.

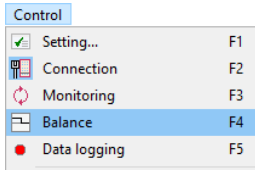


Coping process when delay is generated


1. Decrease the display time (increment or division number of X-axis scale) of T-Y monitor
2. Decrease the data number of X-Y monitor or spectrum
3. Decrease the number of monitoring objects
4. Decrease the number of channels of each monitoring object
5. Change the lines of T-Y and X-Y monitor to solid lines
6. Decrease the number of expanded channel

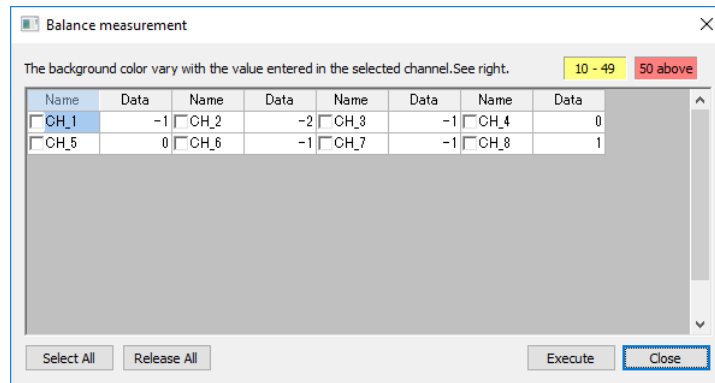
If delay is generated after these coping processes, use a PC with higher speed.

## 5 Balance



If balance is executed, the current value is initialized to 0.

Click the control tool . the dialog box for executing balance will be displayed.



Names and current values of all channels for which measurement is carried out are displayed.

The channels for which ☒ is displayed beside the name are the channels to be initialized.

To switch ON/OFF, select a name to be switched, and click ☐ or press the space key on the keyboard.

[Select All] : All channels are included in the channels to be initialized.

[Release All] : All channels are excluded from the channels to be initialized.

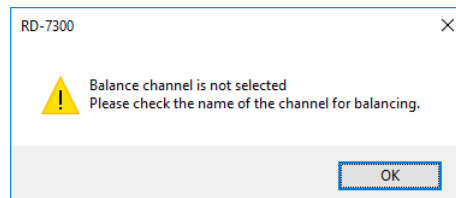
The background color of the selected channel varies depending on the value of data.

Yellow : The value measured by the measuring instrument is within the range 10 to 49( $\mu$ , mV,  $^{\circ}$ C)

Red : The value measured by the measuring instrument is 50 ( $\mu$ , mV,  $^{\circ}$ C) or more

If the background color is yellow or red even after the balance is executed, the dispersion of input value is large or the value exceeds the range of balance. Check the sensor and the wire connection.

If you click [Execute] button, the balance will be executed, however, if a channel is not selected at this time, the confirmation dialog box will be displayed.



Click [OK] button and select a channel.

If balance is executed, the value of the selected channel will be initialized.

After the confirmation, click [Close] button to close the dialog box.

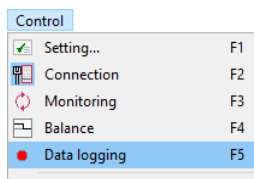


The channels of Voltage input unit cannot be initialized at the measuring instrument. If balance is executed for these channels, this software undertakes a balance that initial values become 0 by setting offset.

## 6 Manual measurement



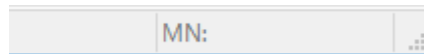
For the setting of measurement time, refer to "Chapter 4. 4-2 Measurement time".



### ● Start of measurement

Click the control tool .

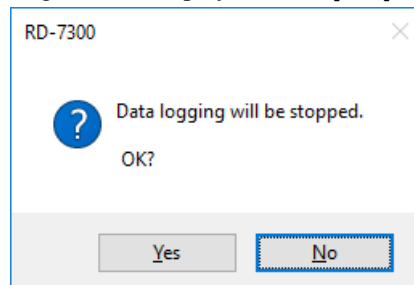
The manual measurement will be executed and the status bar will be changed.



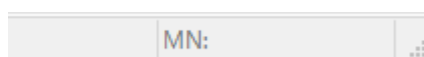
### ● Termination of measurement

Click the control tool .

The confirmation message will be displayed. Click [Yes].



The manual measurement will be terminated and the status bar will be changed.



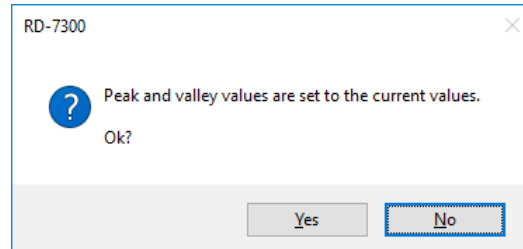
## 7 Peak reset

Reset the current peak value and valley value manually.

Control		
	Setting...	F1
	Connection	F2
	Monitoring	F3
	Balance	F4
	Data logging	F5
	Peak reset	F8
	Monitor reset	F9

Click the control tool Peak reset .

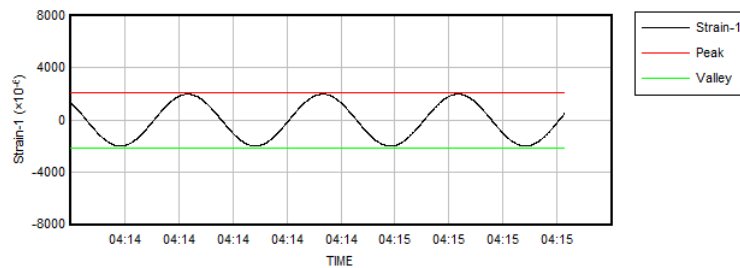
The confirmation message will be displayed. Click [Yes] button. Then, peak value and valley value will be reset.



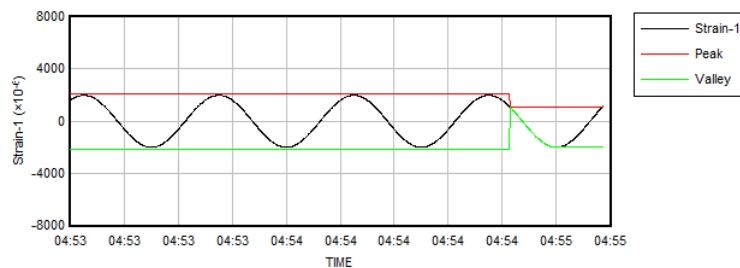
To execute the peak reset automatically, refer to "Chapter 4. 4-3 Reset peak".

### ● Example of operation

Before reset



After reset



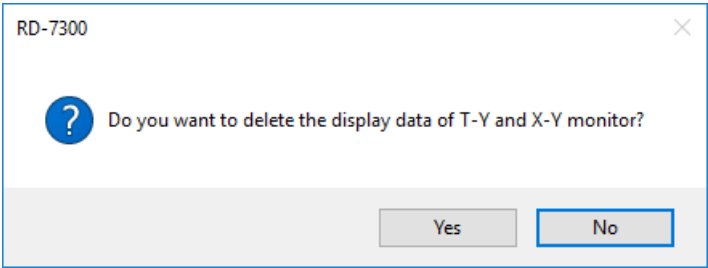
## 8 Monitor reset

Delete the display data of T-Y monitor and X-Y monitor.

Control		
	Setting...	F1
	Connection	F2
	Monitoring	F3
	Balance	F4
	Data logging	F5
	Peak reset	F8
	Monitor reset	F9

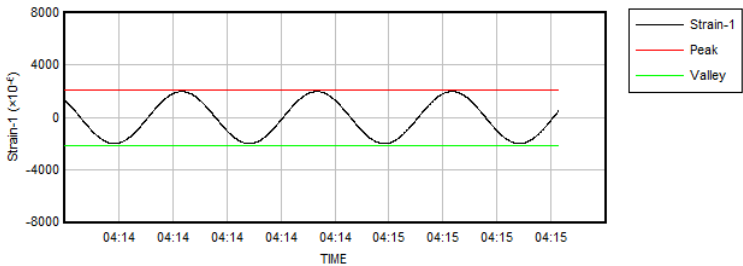
Click the control tool Monitor reset .

The confirmation message will be displayed. Click [Yes] button. Then, the display data will be deleted.

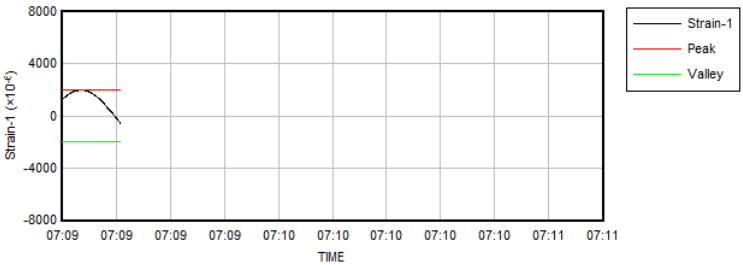


### ● Example of operation

Before reset



After reset



## 9 Display of alarm

Channels that meet the alarm conditions can be displayed as a list while the monitoring is executed.

Moreover, the alarm sound can be output from the PC at the same time.

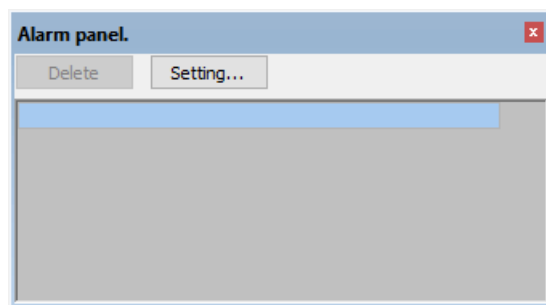
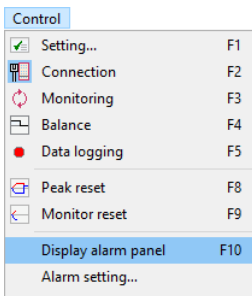


*While the monitor is stopped, the alarm judgment is not carried out.*

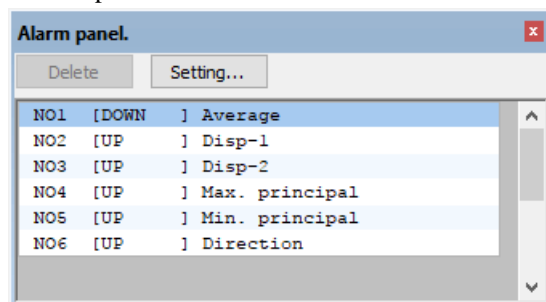
### 9-1 Display of alarm panel

To display the list of alarms that meet the alarm conditions as a list and output the alarm sound, display the alarm panel preliminarily.

Select [Display alarm panel] from [Control] menu. Then, the alarm panel will be displayed.



The channels that meet the alarm conditions while the monitoring is executed is displayed on the alarm panel.



The status of judgment is displayed in [ ].

UP : The value exceeded the upper limit value

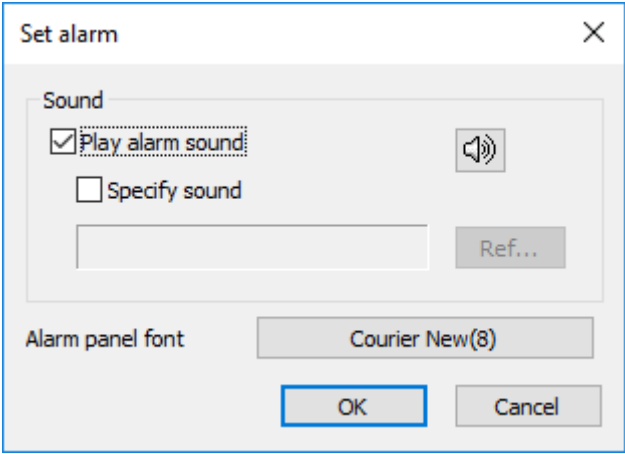
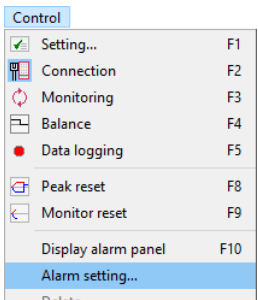
DOWN : The value fell below the lower limit value

UP/DOWN : The value exceeded the upper limit value and fell below the lower limit value

9-2 Alarm panel setting

Set the method for outputting alarm sound etc.

To change the operation of alarm panel, click [Setting...] button.



Setting item

[Play alarm sound]

: If there is a channel that meets the alarm conditions, the alarm sound of PC will be output.



: The sound will be output.

[Specify sound]

: The specified sound file will be set as alarm sound.

[Ref...]

: Click this button when you select a sound file to be used.

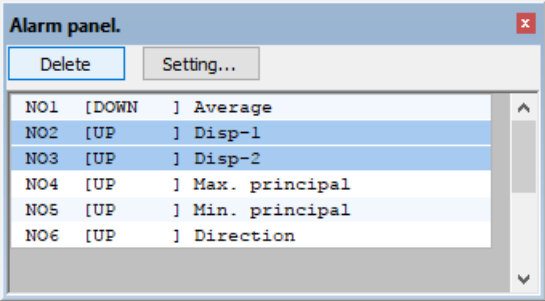
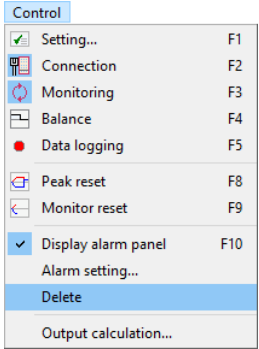
[Alarm panel font]

: Specify a font from the font dialog box.

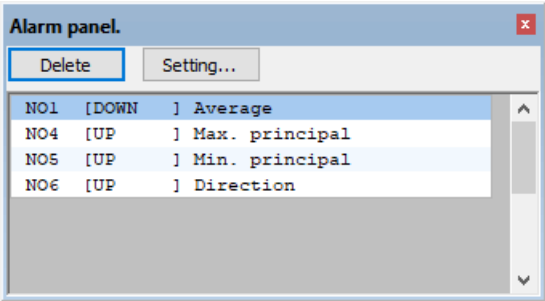
### 9-3 Delete of alarm

Carry out the setting not to carry out the alarm judgment for a channel that meets the alarm conditions.

Select a channel for which alarm is deleted from the alarm panel.



Click [Delete] button. The alarm of the selected channel will be deleted.



For the setting of alarm, refer to "Chapter 4. 5-14 Alarm ON/OFF"

For the channel for which alarm is deleted, the alarm will be disabled on the setting screens of channel and expanded channel.

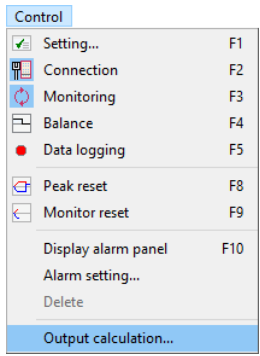
Alarm Limit		
ON/OFF	Upper	Lower
<input checked="" type="checkbox"/>	1000	-1000
<input type="checkbox"/>	1000	-1000
<input type="checkbox"/>	1000	-1000
<input checked="" type="checkbox"/>	1000	-1000
<input checked="" type="checkbox"/>	1000	-1000
<input checked="" type="checkbox"/>	1000	-1000

To activate the alarm judgment again, set the ON/OFF item to ☒.

## 10 Output of calibration voltage

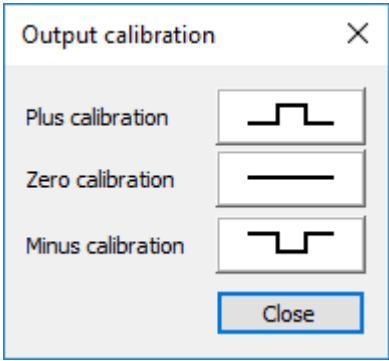


For setting of the calibration values to output, see "Chapter 4: 7-4 How to set the calibration value".



The Voltage output unit (TMR-341) can output voltage for calibration.

Select [Output calibration...] from the [Control] menu.



*The Output calibration dialog cannot be opened during measurement.  
Monitoring is suspended while the Output calibration dialog is opened.*

- [Plus calibration]  
: The positive calibration is output.
- [Zero calibration]  
: The 0mV calibration is output.
- [Minus calibration]  
: The negative calibration is output.

## 11 Auto restart

---

Some kind of computers have power management settings in BIOS setup. And you will see "Restore on AC/Power Loss". Enabling this will allow the computer to power up once power is established.

This software can restart measurement automatically when the computer is recovered from power failure. In this case, measured data up to the moment when the power failure occurs are saved in the computer, but the data during the power failure are not saved.

For protecting cache data from instantaneous power failure, we recommend that you use the uninterruptible power supply and its attached application.



*Since Microsoft Windows needs sign-in for starting applications, you should use only one account and set no password for using auto restart function.*

# Chapter 7

## Printing

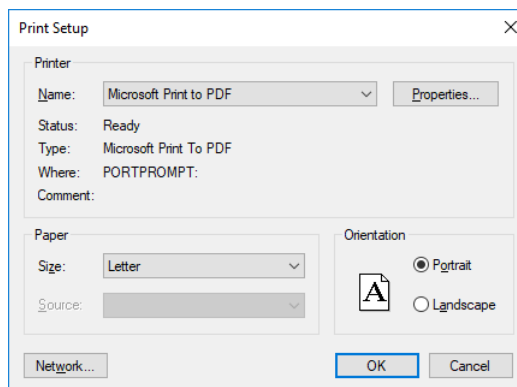
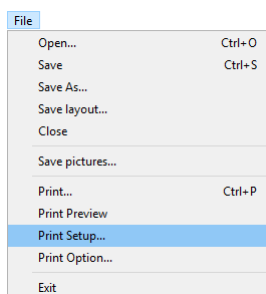


This chapter explains the method for printing each file.

## 1 Select a printer and a paper

Before starting printing, select a printer to be used and paper.

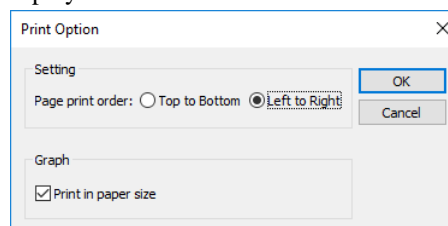
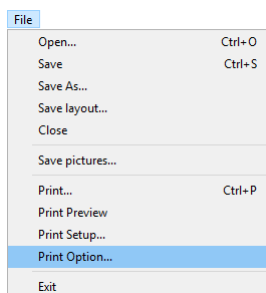
Select [Print Setup...] in [File] menu. The dialog box for setting a printer will be displayed.



Set a printer to be used, size of paper, and orientation, and then click [OK] button.

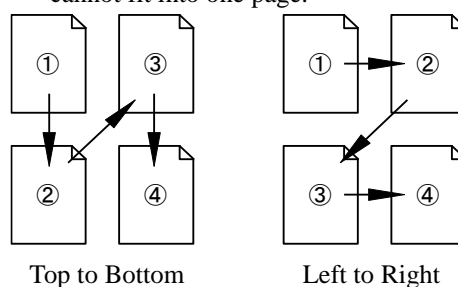
## 2 Set the printing format

To set the conditions of printing, select [Print Option ...] in [File] menu. The dialog box will be displayed.



Setting item

[Page print order] : For the table on the setting screen, the range printed within one sheet varies depending on size and orientation of paper. Set the order for printing the setting screen that cannot fit into one page.



[Print in paper size]

: A graph sheet can be printed according to the specified paper size.

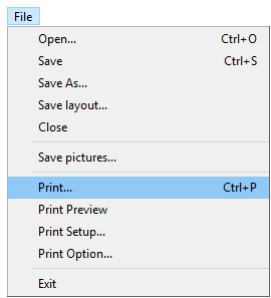
For a graph sheet, the printing varies depending on lock status of drawing area and paper size.

Plotting area	Print with the paper size	Plotting area is smaller than the specified paper size	Plotting area is larger than the specified paper size
Locked	ON	The graph is printed in the same size as it is.	The graph is printed on a reduced scale, with its part layout arranged with equal scaling in the horizontal and vertical directions.
	OFF		The graph is printed on multiple sheets.
Not locked	ON	The graph is printed with its parts layout arranged to fit in the specified paper size.	
	OFF	The graph is printed in the same size as it is.	The graph is printed on multiple sheets.

When the objects of graph are allocated according to paper size, if [Auto size adjustment] is unchecked in the properties of object, a part of object may protrude from the printing area.

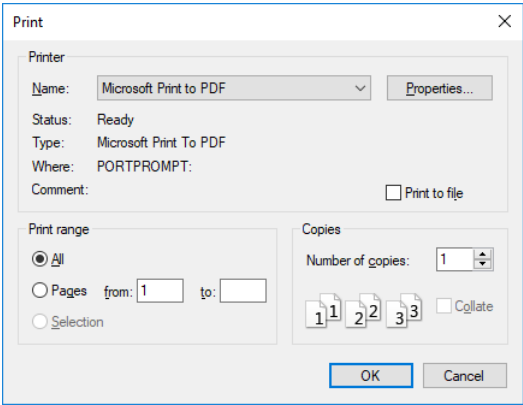
After the setting, click [OK] button.

### 3 Print



Before executing printing, select a window you want to print.  
In case of setting screen, display the items you want to print (preferences, measurement conditions, channel, expanded channel).

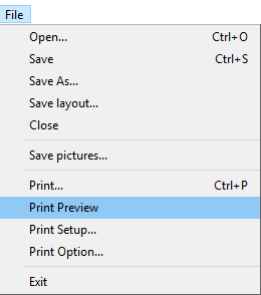
Select [Print...] from [File] menu. The dialog box for setting the print range will be displayed.



Setting item  
Print range : Set the page number to be printed.  
If you select "All", all pages will be printed.

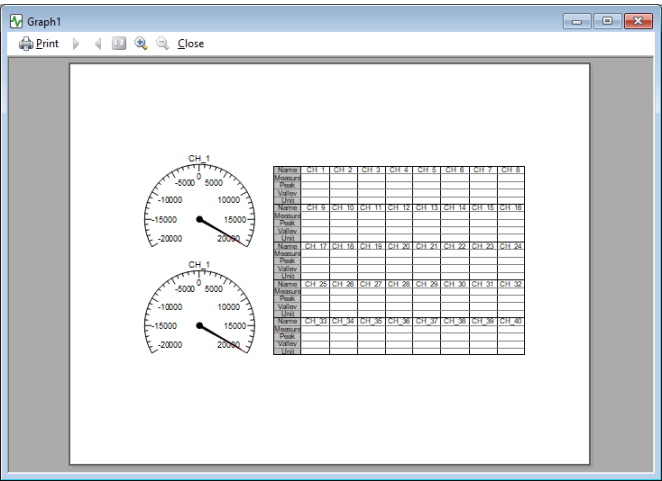
After the setting, click "OK" button.

### 4 Check before printing



To check the preview on screen before printing on paper, select [Print Preview] in [File] menu.

The printing image will be displayed on the screen following the paper size and the print option you set.



*If the print preview is executed during monitoring or measurement, the screen may flicker or the operation may get slow. Avoid print preview during monitoring.*



*Measurement data editing software*

**RD-7300-€**



# Chapter 8

## Specifications



This chapter describes basic specifications of this software and functions of each part of the screen.

## 1 Basic specifications

---

RD-7300-E is software for the purpose of checking recorded measurement data by RD-7300, and of processing data such as text conversion.

### ■ Data file management

All data files in a folder in which data files are recorded are listed.

For the multiple data files that are arbitrarily selected from this list, the following processing is carried out.

Display of file	A file is read and the file processing such as display of file is carried out.
Change of file name	A file name is changed at the same time. It is possible to add serial numbers to the file names.
Movement of file	A file is moved to other folder. The file is deleted from the currently displayed folder.
Text conversion	Converted to a text file in CSV format
Saving format	Standard CSV format, DRA-7610CSV format
Division	A text file is split into specified number of data.
Thin out	Specified number of data is thinned out and converted.
Merge file	Multiple selected files are merged as one file.
Condition	Merging files is possible when the number of channels and the sample clock are the same for the files to be merged, and also when the number of data per channel is 1,073,741,824 or less after merging.

■ Data file processing

The measurement data is displayed for each data file and the processing shown below is carried out.

Channel setting	Name, coefficient, offset, unit, and format for each channel are set again.
Expanded channel	The channel data are calculated to create other data.
Number of points	Max. 1000 points
Name	The name of expanded channel is set.
Function	Four arithmetic operations, calculation between channels, and rosette calculation etc. are set.
Unit	Unit is set.
Format	Display format is set.
Data list	All data are listed.
Graph list	T-Y graphs for each channel are listed.
Maximum / minimum search	Maximum value, minimum value, average value, and standard deviation are obtained from the range that is arbitrarily selected from data list or graph list to display them.
Cutout	Data is cut out from the range that is arbitrarily selected from data list or graph list to create a new data file.
Thin out	The data can be thinned out by the specified number of data when the cutout is carried out.
Text conversion	Converted to a text file in CSV format
Saving format	Standard CSV format, DRA-7610CSV format
Division	The text file is split into specified number of data.
Thin out	The data are thinned out by the specified number and converted.
Range specification	The range for carrying out the conversion is set arbitrarily.
Cursor display	A cursor is displayed on the graph list and the value at the arbitrarily specified position is displayed.
Print	Data list and graph list can be printed.

■ Graph sheet

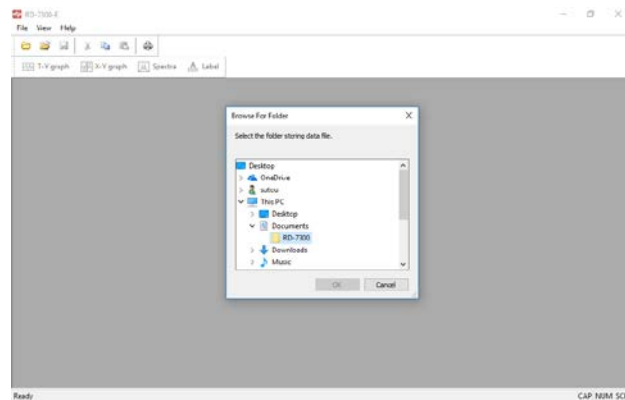
Graph sheet can be drawn multiple objects such as T-Y graph, X-Y graph and Spectrum based on data file. And multiple graph sheets can be created.

T-Y graph	Multiple channels you selected arbitrarily are displayed by setting X-axis to time axis. Channels of different data files can be overlapped.
X-Y graph	For both of X and Y-axes, an arbitrary combination of channels is displayed. Channels of different data files can be overlapped.
Spectrum	FFT analysis is carried out for an arbitrarily selected channel and the spectrum is displayed.
Type	Power spectrum or Amplitude spectrum is selected.
Window function	Rectangle, Hamming or Hanning is selected.
Shift	Shift of zero point is rejected by the method selected from the followings DC cut (removal by average value), Trend (removal by primary regression equation)
Number of data	Up to 16,777,216 ( $2^{24}$ ) data can be processed within an arbitrarily specified range.
Displayed item	A specified number of values can be displayed in descending order of amplitude or power. Specified within the range 0 to 20
Label	Arbitrary character string can be displayed in the window.
Saving	The graph can be saved as file.
Text saving	Data displayed in T-Y graph, X-Y graph, and Spectrum can be output as a text file in CSV format.
Copy of graph	The content of the window can be copied as an image to paste it to other software.
Saving of image	The content of the window can be output to a file as an image.
File format	Bitmap, Enhanced metafile, PNG
Print	The content of window can be printed.

## 2 Description of each section of software screen

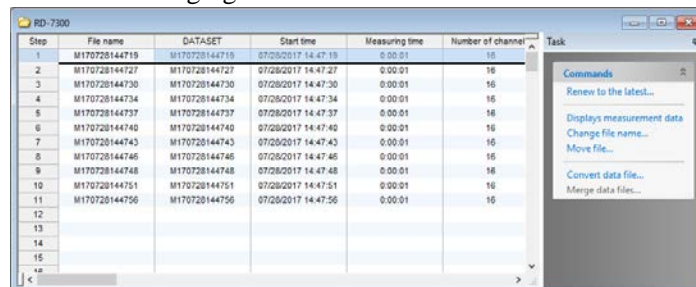
### 2-1 Main screen

This is a screen that is displayed when this software is started up.  
In the initial status, the RD-7300 folder in which RD-7300 stores data files is selected.



### 2-2 List of data files

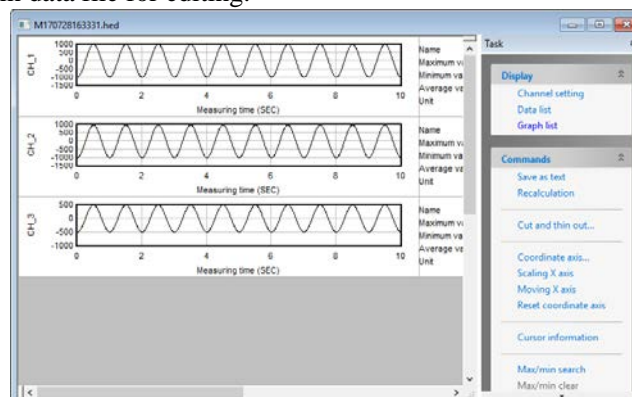
This screen is for managing of data files.



Step	File name	DATASET	Start time	Measuring time	Number of channel
1	M170728144719	M170728144719	07/28/2017 14:47:19	0:00:01	16
2	M170728144727	M170728144727	07/28/2017 14:47:27	0:00:01	16
3	M170728144730	M170728144730	07/28/2017 14:47:30	0:00:01	16
4	M170728144734	M170728144734	07/28/2017 14:47:34	0:00:01	16
5	M170728144737	M170728144737	07/28/2017 14:47:37	0:00:01	16
6	M170728144740	M170728144740	07/28/2017 14:47:40	0:00:01	16
7	M170728144743	M170728144743	07/28/2017 14:47:43	0:00:01	16
8	M170728144746	M170728144746	07/28/2017 14:47:46	0:00:01	16
9	M170728144748	M170728144748	07/28/2017 14:47:48	0:00:01	16
10	M170728144751	M170728144751	07/28/2017 14:47:51	0:00:01	16
11	M170728144756	M170728144756	07/28/2017 14:47:56	0:00:01	16
12					
13					
14					
15					
16					

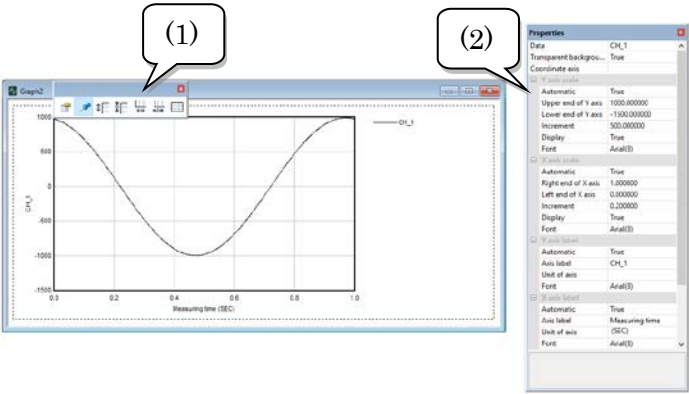
### 2-3 Edit screen

This screen shows measurement data and channel information which were recorded in data file for editing.



2-4

Graph sheet



- (1) Graph tools

The buttons for operating the selected object such as display of property and change of scale are displayed.
- (2) Property panel

Setting of selected object is displayed and changed.



# Chapter 9

## Startup and exit



This chapter explains icons created by this software and startup and exit operations of this software.

## 1 Icons of this software

---

The icons related to this software are two types shown below.

- Icon of this software program

This is an icon of this software program.



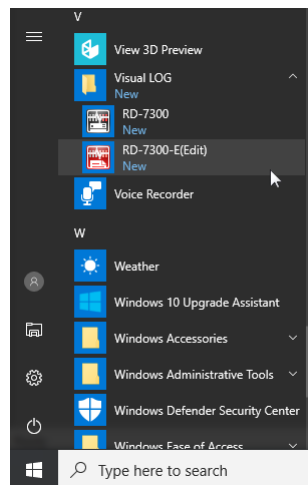
- Graph sheet icon

This is an icon of a file in which a graph sheet is saved.

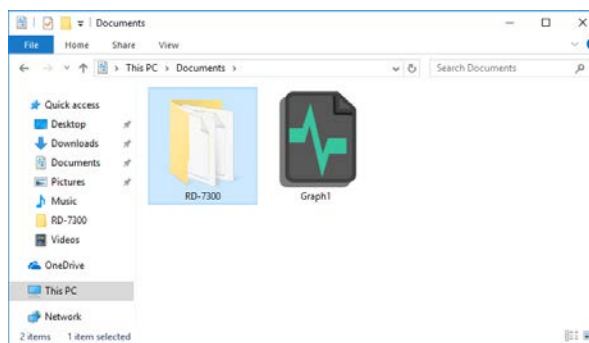


## 2 Activating this software

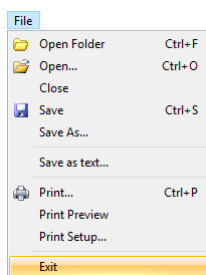
To activate the program, click [Visual LOG] - [RD-7300-E(Edit)] from [Start] menu as shown below.



This software can be also activated by double-clicking the graph sheet saved by this software.

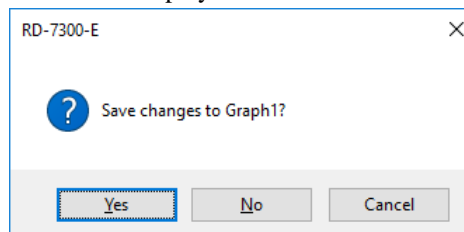


### 3 Exiting this software

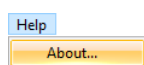


This software is exited or interrupted by selecting [Exit] in [File] menu.

If something is changed in the saved graph sheet, the dialog box for confirming the saving of the sheet will be displayed.



### 4 Checking the version



To check the version of this software, select [About...] in [Help] menu.



# Chapter 10

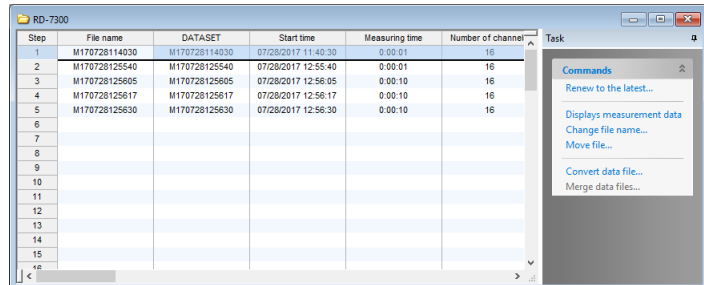
## List of data files



This chapter explains the method for managing the data files recorded by RD-7300 and the method for collectively processing multiple data files.

## 1 List of data files

The list of data file is displayed for each folder in which data files are stored. The maximum number of displayable data files is 50,000.

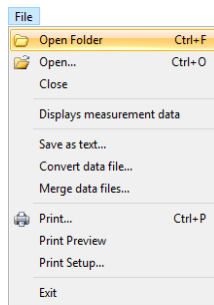


Step	File name	DATASET	Start time	Measuring time	Number of channel
1	M170728114030	M170728114030	07/28/2017 11:40:30	0:00:01	16
2	M170728125540	M170728125540	07/28/2017 12:55:40	0:00:01	16
3	M170728125605	M170728125605	07/28/2017 12:56:05	0:00:10	16
4	M170728125617	M170728125617	07/28/2017 12:56:17	0:00:10	16
5	M170728125630	M170728125630	07/28/2017 12:56:30	0:00:10	16
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					

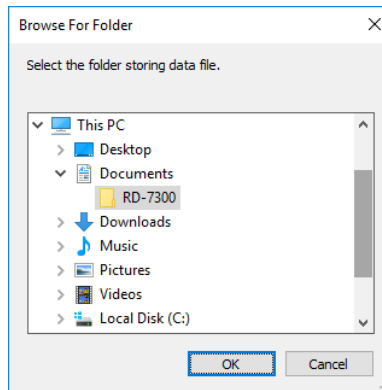
For the list of data files, following items are displayed.

- [File name] :Name of data file  
The first character indicates the measurement method.  
M: manual measurement  
The second character or later indicate year, month, day, hour, minute, and second when the measurement is started.
- [DATASET] :Basically, DATASET is same as file name, however, it cannot be changed.  
The data file that is measured without setting the measuring time and is automatically split has the same DATASET.
- [Start time] :Date and time when the measurement is started
- [Measuring time] :The duration of measurement is indicated as hour:minute:second.
- [Number of channels] :Number of channels for which measurement is carried out using a measuring instrument
- [Sampling speed]: Measurement interval for measured data

## 1-1 Opening a folder



To display the list of data files, specify a folder in which data files are stored. A folder is specified from the dialog box for selecting a folder, which is displayed when this software is activated. This dialog box can be also displayed by clicking [Open Folder] from [File] in the menu or clicking on the toolbar.



In the initial status, RD-7300 folder in which RD-7300 stores data files is selected.

Select a folder which you want to display the list of data files. If data files are stored in the folder, you can click [OK] button.

## 1-2 Task

[Task] is displayed on the right side of the "list of data files" window.

Various processing can be carried out for a data file selected in the list of data files from [Task].

If you want to delete [Task] display, click the button displayed in the upper right.

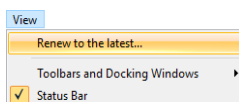
Step	File name	DATASET	Start time	Measuring time	Number of channels	Sampling speed
1	M170728114030	M170728114030	07/28/2017 11:40:30	0:00:01	16	1ms
2	M170728125540	M170728125540	07/28/2017 12:55:40	0:00:01	16	1ms
3	M170728125605	M170728125605	07/28/2017 12:56:05	0:00:10	16	10ms
4	M170728125617	M170728125617	07/28/2017 12:56:17	0:00:10	16	10ms
5	M170728125630	M170728125630	07/28/2017 12:56:30	0:00:10	16	10ms
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						

To display it again, move the mouse cursor on [Task] on the right edge.

## 1-3 Update of list

If the measurement is carried out with RD-7300 after RD-7300 folder is displayed, a data file is created in the folder, however, the list of data files is not automatically renewed and the new data file is not displayed.

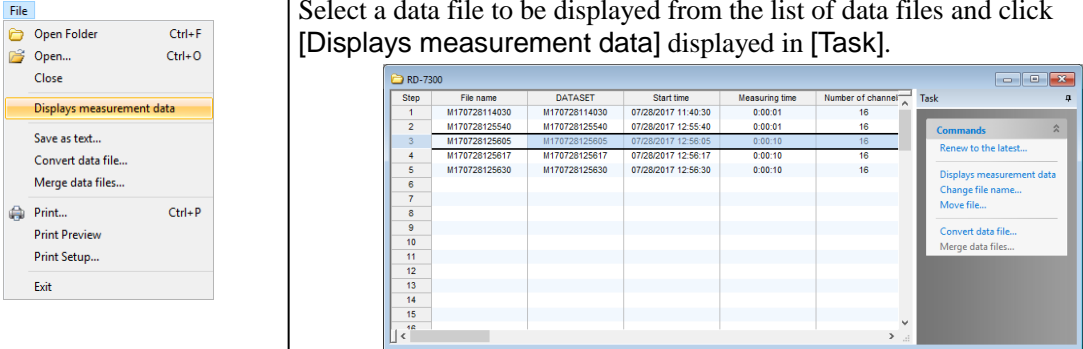
To reflect the data file added to the folder after the list of data files is displayed to the list, click [Renew to the latest...] displayed in [Task].



2

Display of measured data

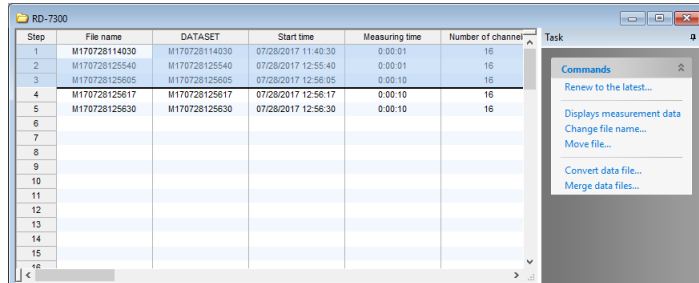
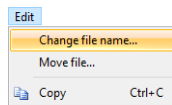
A data file displayed in the list of data files can be individually displayed. Select a data file to be displayed from the list of data files and click [Displays measurement data] displayed in [Task].



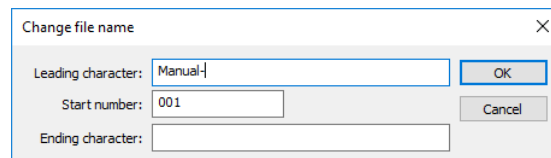
### 3 Change of file name

The name of a data file is decided by measurement method and measurement start date and time. It can be changed to an arbitrary name.

Select a data file you want to change the file name from the list of data files and click [Change file name...] displayed in [Task].

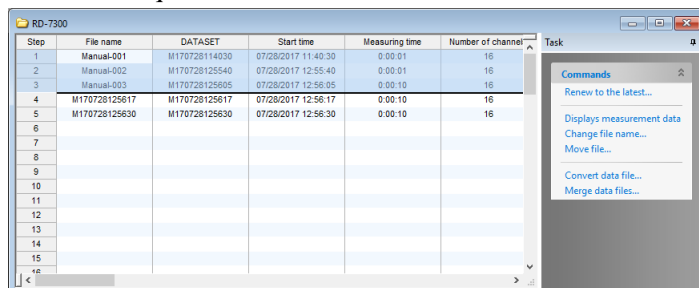


The dialog box for changing the file name is displayed. Input the Leading (beginning) character, Start number and Ending character, and then click [OK] button.



If one data file is selected, the start number can be omitted.

If 0 is added to the beginning of the start number, 0 is added to the beginning of the serial numbers to be added to the following files keeping the number of characters to be equal to that of the start number.



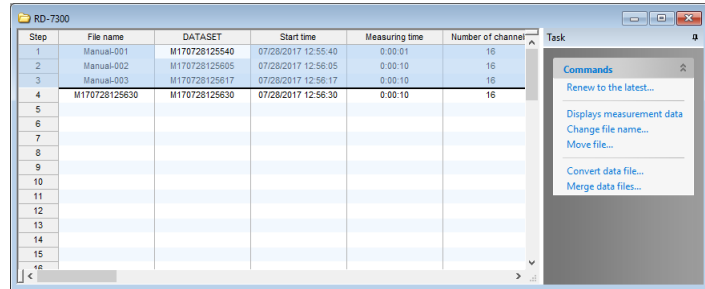
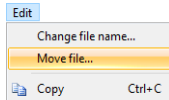
## 4 Movement of file

The maximum number of data files that can be displayed in the list of data files is 50,000.

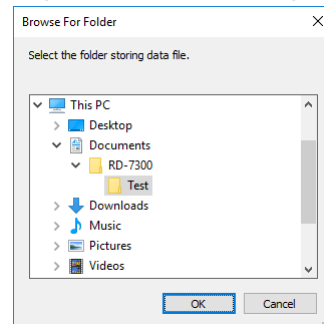
RD-7300 stores a data file in predefined RD-7300 folder. If the recording is continued without any change, the number of files in the folder becomes large and the operation may get slow.

The data files can be moved for the purpose of improving the slow operation and/or classifying the data files for each test.

Select data files to be moved from the list of data files and click [Move file...] displayed in [Task].



The dialog box for selecting the folder for moving data files is displayed.

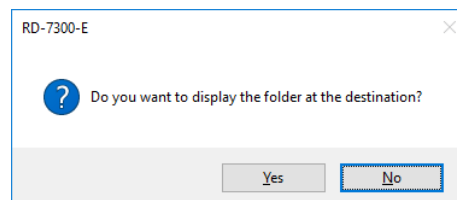


Select a folder for moving data files and click [OK] button.

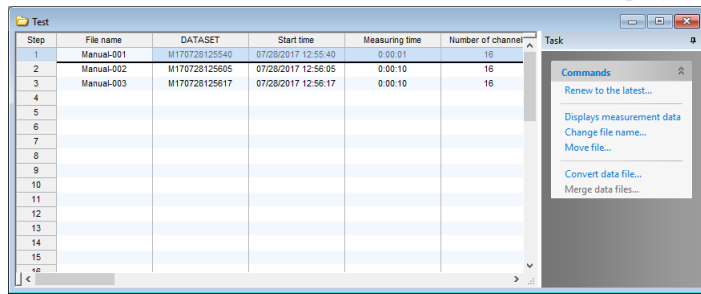
If you want to move data files to a new folder, select a location where the folder is created and click [Make New Folder] button, and then input the folder name.

If a data file with same name exists at the destination, the movement is canceled.

If the movement of data files is completed, the dialog box for confirming whether the folder at the destination is opened and the new list of data files is displayed.



If [Yes] is selected, the list of data files at the destination is displayed.



The screenshot shows a window titled 'Test' with a table of data files and a 'Task' panel on the right. The table has columns for Step, File name, DATASET, Start time, Measuring time, and Number of channel. The 'Task' panel contains a 'Commands' section with several options.

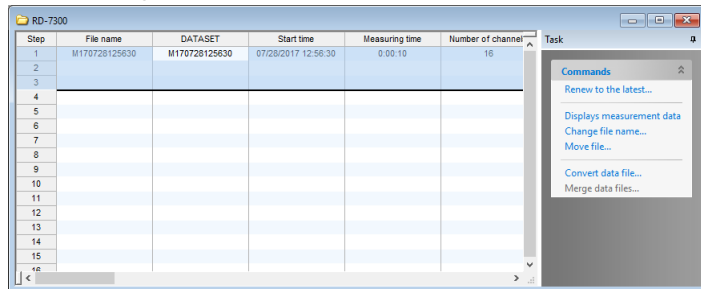
Step	File name	DATASET	Start time	Measuring time	Number of channel
1	Manual-001	M170728125540	07/28/2017 12:55:40	0:00:01	16
2	Manual-002	M170728125605	07/28/2017 12:56:05	0:00:10	16
3	Manual-003	M170728125617	07/28/2017 12:56:17	0:00:10	16
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

**Task**

**Commands**

- Renew to the latest...
- Displays measurement data
- Change file name...
- Move file...
- Convert data file...
- Merge data files...

The transferred data files are deleted from the original folder. They are not displayed in the original list of data files.



The screenshot shows a window titled 'RD-7300' with a table of data files and a 'Task' panel on the right. The table has columns for Step, File name, DATASET, Start time, Measuring time, and Number of channel. The 'Task' panel contains a 'Commands' section with several options.

Step	File name	DATASET	Start time	Measuring time	Number of channel
1	M170728125630	M170728125630	07/28/2017 12:56:30	0:00:10	16
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					

**Task**

**Commands**

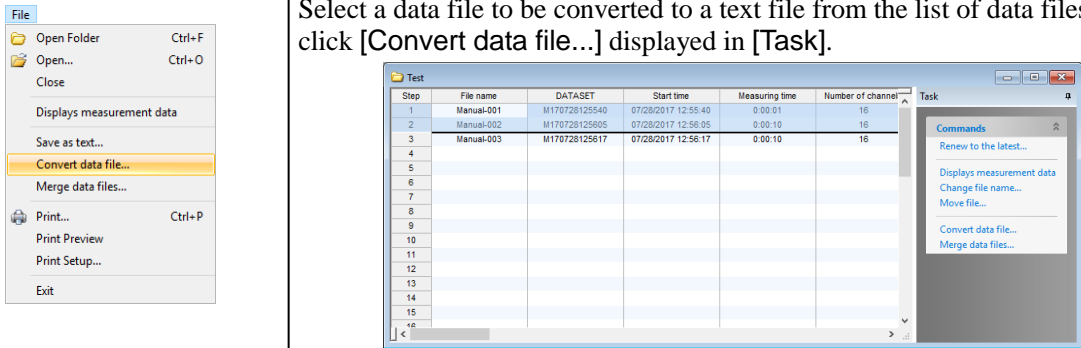
- Renew to the latest...
- Displays measurement data
- Change file name...
- Move file...
- Convert data file...
- Merge data files...

## 5 Conversion of data file

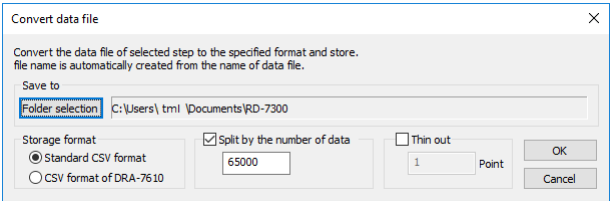
When the measurement data is processed using other software, the data file is converted to a text file for the processing.

In the list of data files, multiple data files can be converted collectively.

Select a data file to be converted to a text file from the list of data files and click [Convert data file...] displayed in [Task].



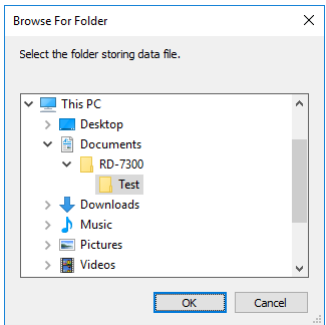
The dialog box for converting the data file is displayed.



Setting item

[Folder selection]

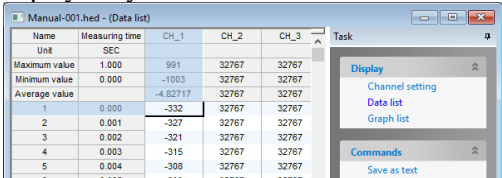
:Select a folder to save a text file.



[Standard CSV format]

:The measurement data is converted in comma-delimited format.

It is the same format as that of data list of data file displayed by this software.





#### [CSV format of DRA-7610]

:The converted file is a text file that can be read by our company's FFT Analysis Software DFA-7610.

The data file can be directly read by [Displaying DADiSP data] of DFA-7610. However, since expanded channels are not recorded in the data file, the data of expanded channels are not displayed by DFA-7610.

If you want to display the data of expanded channels, convert the file to [CSV format of DRA-7610].

#### [Split by the number of data]

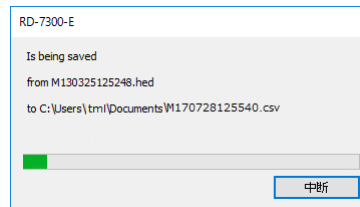
:This setting is used when the software that processes a text file has a restriction in the number of rows (number of data for each channel).

A text file is split by the specified number of data.

#### [Thin out]

:The data is thinned out for each channel by the specified number of data, and converted.

If you check the setting and click [OK] button, the dialog box that indicates the progress is displayed.



The file name of the text file becomes same as that of data file and the extension becomes ".CSV".

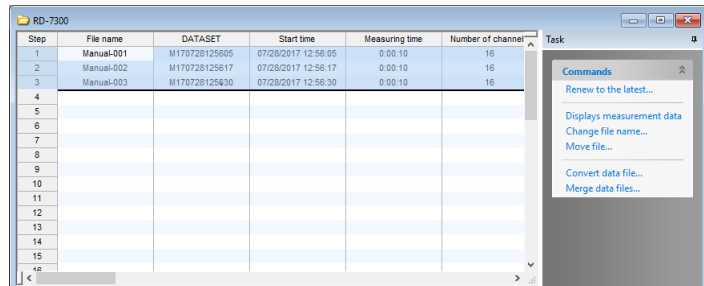
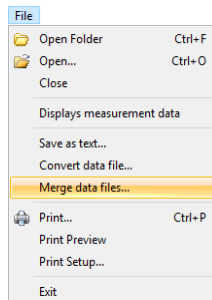
If the file is split, a serial number like \_N1, \_N2 is given to the end of file name.

If there is a text file with same name at the conversion destination, it is overwritten and saved.

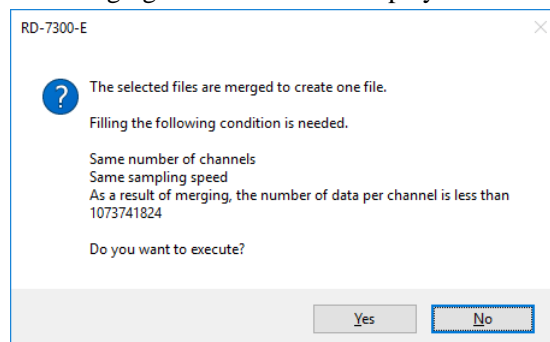
## 6 Merge data files

If the measurement is carried out without setting the measurement time with RD-7300, the measurement data may be split into multiple data files after long-time measurement is carried out.

If you want to carry out processing such as drawing a graph over the boundary of data files, merge the data files to create one new data file. Select data files you want to merge into one file from the list of data files, and click [Merge data files...] displayed in [Task].



The conditions for merging the data files are displayed.

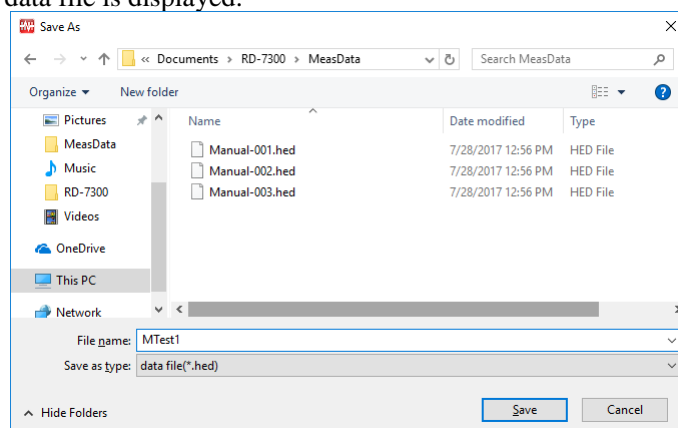


The three conditions for merging files are shown below.

- The number of channels of selected data files is same
- The sampling speed of selected data files is same
- The number of data per channel after merging is 1,073,741,824 or less

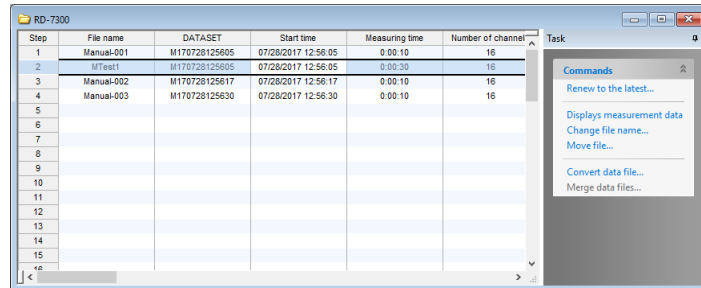
If there is a setting of expanded channel, the setting of the beginning data file is effective.

If [Yes] button is clicked, the conditions are checked. If the data files meet the conditions, the dialog box for specifying the destination to record the merged data file is displayed.



Set the destination to save the file and file name, and then click [Save] button.

If the file is saved in the same folder as that of data files before merging, the merged data file is displayed in the list of data files by clicking [Renew to the latest...].



# Chapter 11

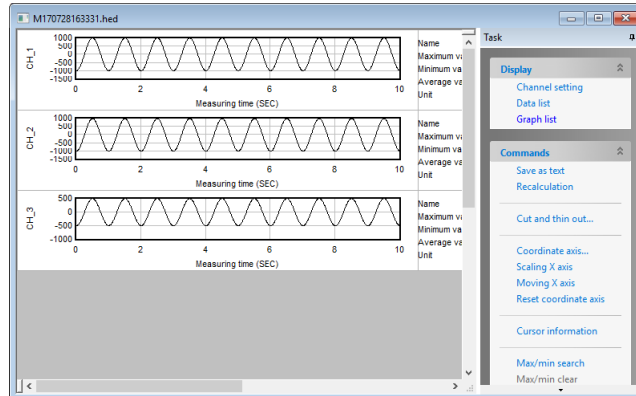
## Edit of data



This chapter explains the method for processing a data file recorded by RD-7300.

## 1 Data file


The data file is a file in which data measured by RD-7300 is recorded. As the recorded data is raw data measured by a measuring instrument, it is possible to modify the data by a method such as changing coefficient, resetting expanded channel and/or recalculating measured data. It is also possible to edit data by converting to text and/or cutting out data with its range specified.

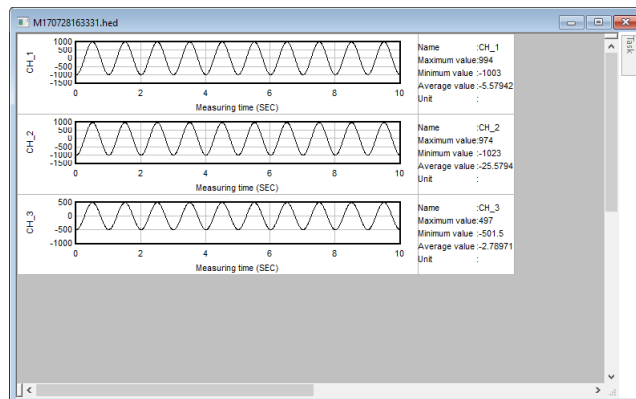


### 1-1 Task

[Task] is displayed on the right side of the data file window.

It is possible to switch display and edit data from [Task].

If you want to delete [Task] display, click  button displayed in the upper right.



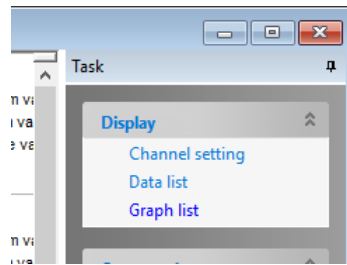
If you want to display it again, move the mouse cursor on [Task] at the right end.

## 1-2 Switching of display

For the window of data file, the displayed content can be changed to three patterns shown below.

- Channel setting  
Setting of channel and expanded channel is carried out.
- Data list  
The list of measurement values is displayed.
- Graph list  
The list of T-Y graphs for each channel is displayed.

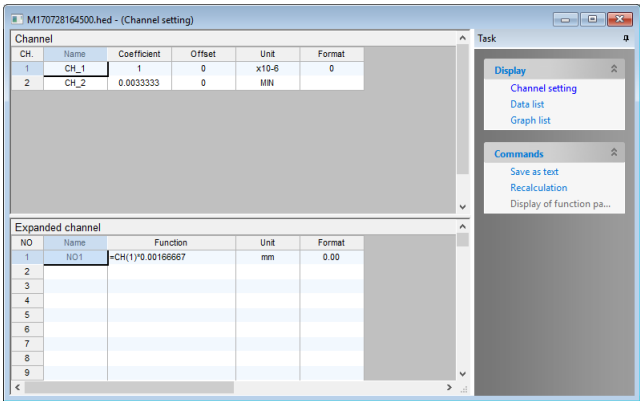
If you want to switch the display, click an item to be displayed from [Display] displayed in [Task].



2

Channel setting

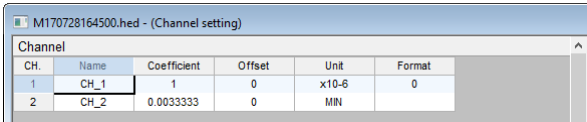
Setting of channel and expanded channel is carried out.



2-1

Channel

For channel, the information of channels recorded in the data file is set.

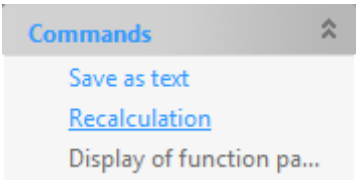
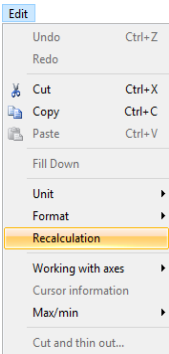


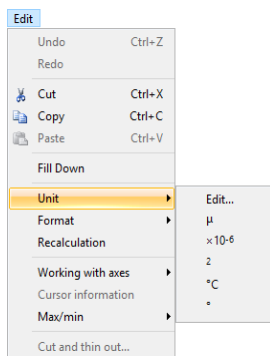
Setting item

- [Name] :The name of the channel is set.
- [Coefficient] :The coefficient for each channel is set.
- [Offset] :The offset to be added to the measured value is set.

The value displayed as measured value is "Measured value \* Coefficient + Offset".

If coefficient or offset is edited, click [Recalculation] displayed in [Task].



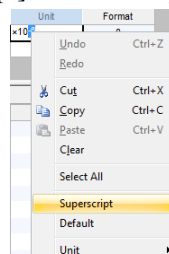


[Unit]

:The unit of the channel is set.

The unit can be input directly or set by selecting it from the menu.

At the direct input, if you want to input the superscript such as cm<sup>2</sup>, select the character to be displayed as superscript and right-click on it, and then select [Superscript] from the displayed menu.



If you want to reset it, select [Default].

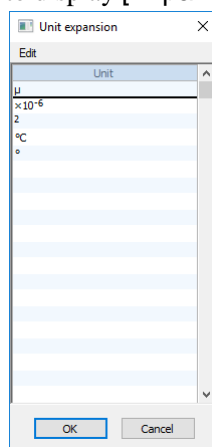
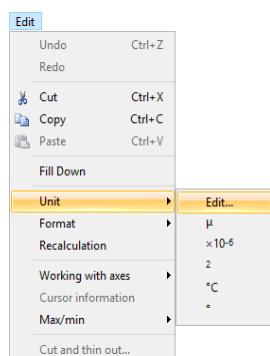
When you want to select it from the menu, select [Unit] from the menu that is displayed by right clicking and select the unit to be displayed.

#### ● Expansion of unit

You can register an arbitrary unit and select it from the menu.

Right-click on the item of unit to display the menu.

Click [Edit...] from [Unit] to display [Expansion of units] window.



Select an item that is not entered or an item to be corrected and edit the unit.

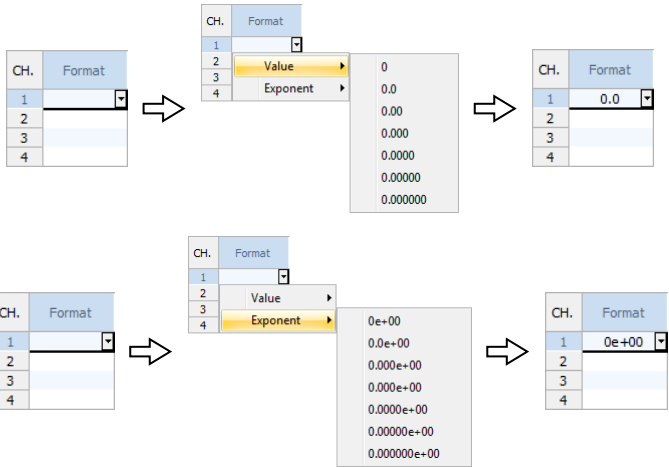
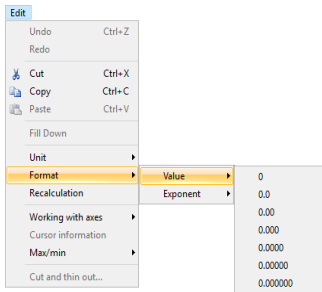
Click [OK] button to close [Expansion of units] window.

Right-click on an item of unit to display the menu. Then, the registered unit is displayed.

Select the registered unit from [Unit].

[Format]

:The display format is set by number of digits after decimal point or index.  
Click ▾ of an item to be edited to display the menu.  
Select the content to be set.

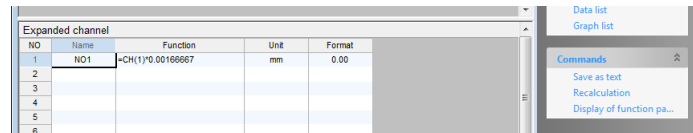


## 2-2 Expanded channel

An expanded channel is defined based on arbitrarily set calculation formula. The calculation result of expanded channel can be treated in a same way as that of usual channel.

The maximum number of expanded channels is 1000.

In the initial status, an expanded channel that has been set when the measurement is carried out by RD-7300 is set as an expanded channel of data file.

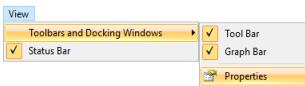


Setting item

[Name] :Name of channel is set.

[Function] :A calculation formula of a channel is set.

Select an item to be edited and input the content of edit.



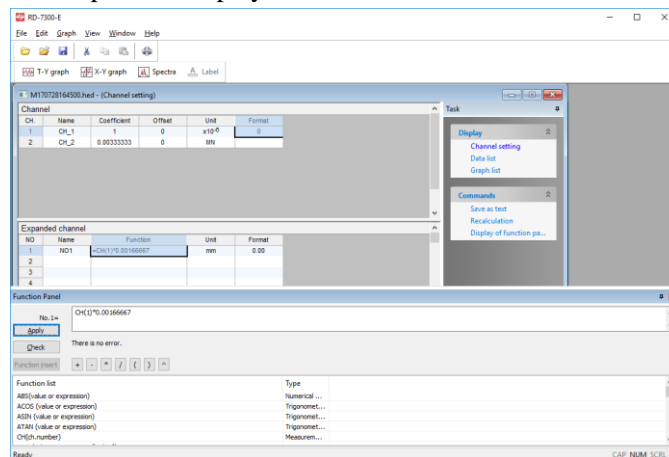
### ● Insert a function from function panel

It is possible to select a function to be used from the function panel to insert it.

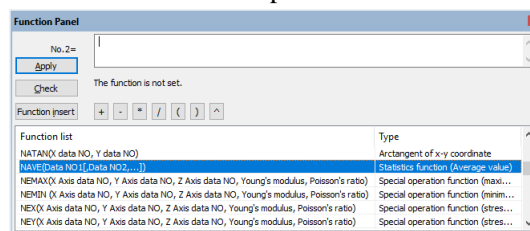
If you click [Display of function panel] displayed in [Task], the function panel is displayed.



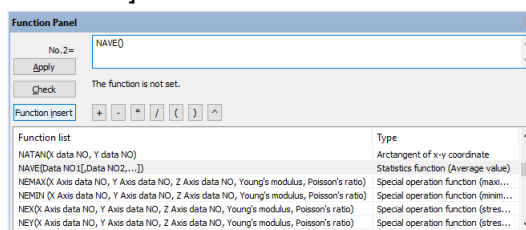
The function panel is displayed.



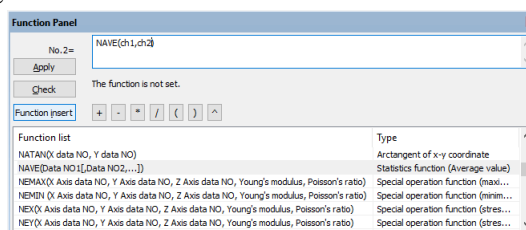
Select a function from the function panel.



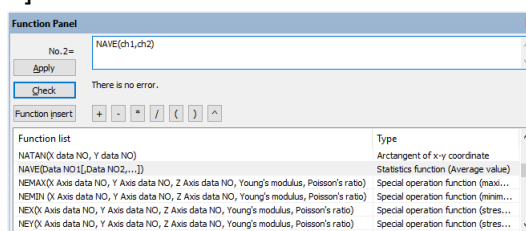
Click [Function insert] button.



Input an argument.



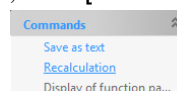
If you want to specify a channel, input it by CH and channel number (CH1, CH2 etc.). If you want to specify an expanded channel, input it by NO and expanded channel number (NO1, NO2 etc.). Click [Check] button and check the formula.



Click [Apply] button to fix the content of edit.

Expanded channel				
NO	Name	Function	Unit	Format
1	NO1	=CH(1)*0.00166667	mm	0.00
2		=NAVE(CH1,CH2)		
3				
4				

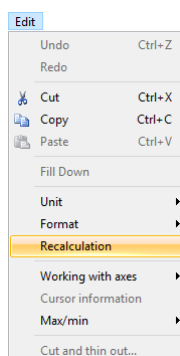
If you have edited the function, click [Recalculation] displayed in [Task].



[Unit]

:The unit of channel is set.


The unit can be input directly or set by selecting it from the menu.



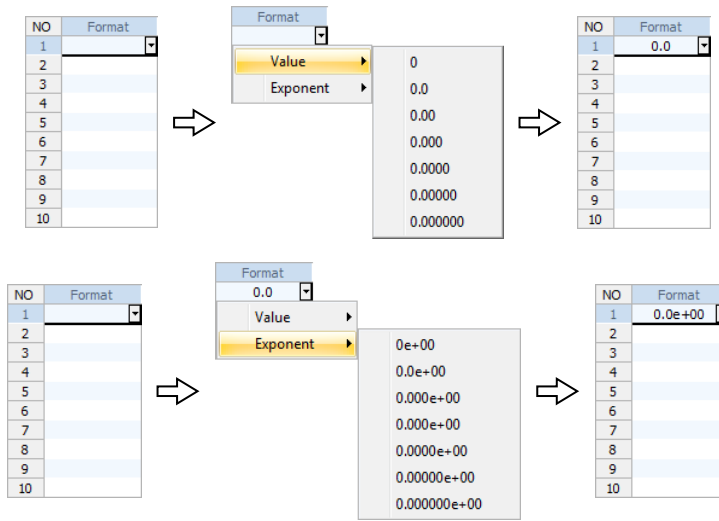
For the expansion of unit, refer to "Chapter 11. 2-1 Channel".

[Format]

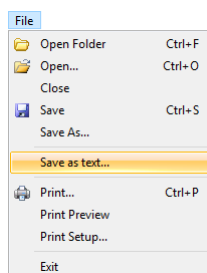
:The display format is set by number of digits after decimal point or index.

Click  of an item to be edited to display the menu.

Select the content to be set.



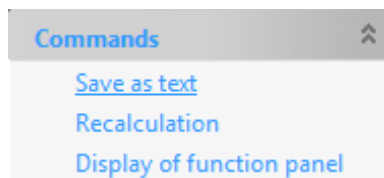
## 2-3 Save as text



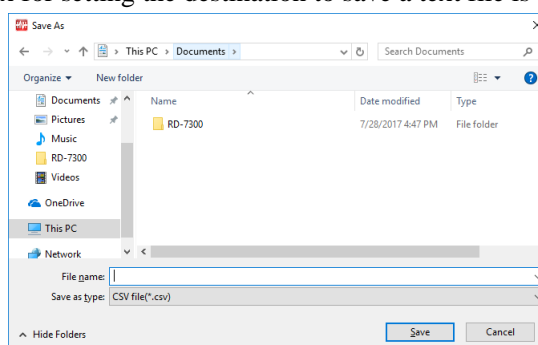
The content of setting can be saved as a text file.

Setting of channel and setting of expanded channel are recorded in a file.

When you save the measurement data as a text file, click [Save as text...] displayed in [Task].

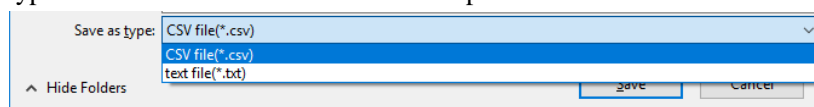


The dialog box for setting the destination to save a text file is displayed.



Set the destination to save the file and the file name.

A type of the file can be selected from two patterns.



[CSV file] :Comma-delimited text file

[text file] :Tab-delimited text file

Check the setting and click [Save] button.

### 3 Data list

Measured value, maximum value, minimum value, and average value for each channel are displayed as a list.

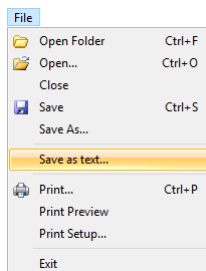
Name	Measuring time	CH1	CH2	NO1	NO2
Unit	SEC	$\times 10^{-8}$	MN	mm	
Maximum value	10.000	12628	0.009999999	21.05	6314
Minimum value	0.000	-2	-0.006666666	-0.00	-1
Average value		3126	3.13302e-005	5.21	1562.91
1	0.000	10	0	0.02	5
2	0.001	7	0	0.01	3.5
3	0.002	7	0	0.01	3.5
4	0.003	11	0	0.02	5.5
5	0.004	12	0	0.02	6
6	0.005	15	0	0.03	7.5
7	0.006	18	0	0.03	9
8	0.007	22	0	0.04	11
9	0.008	26	0	0.04	13
10	0.009	33	0	0.06	16.5
11	0.010	39	0	0.07	19.5
12	0.011	44	0	0.07	22
13	0.012	52	0	0.09	26
14	0.013	61	0	0.10	30.5
15	0.014	69	0	0.12	34.5
16	0.015	80	0	0.13	40
17	0.016	89	0	0.15	44.5
18	0.017	101	0	0.17	50.5

#### 3-1 Save as text

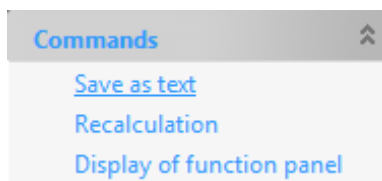
With the data list, the measured value can be saved as a text file by specifying range or thin-out.

If you want to specify the range, specify the range on the data list.

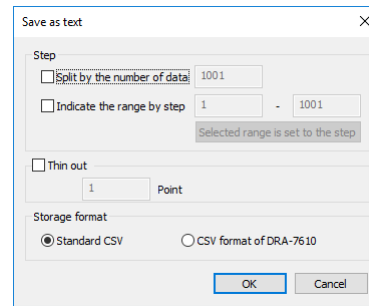
Name	Measuring time	CH1	CH2	NO1	NO2
Unit	SEC	$\times 10^{-8}$	MN	mm	
Maximum value	10.000	12628	0.009999999	21.05	6314
Minimum value	0.000	-2	-0.006666666	-0.00	-1
Average value		3126	3.13302e-005	5.21	1562.91
5	0.004	12	0	0.02	6
6	0.005	15	0	0.03	7.5
7	0.006	18	0	0.03	9
8	0.007	22	0	0.04	11
9	0.008	26	0	0.04	13
10	0.009	33	0	0.06	16.5
11	0.010	39	0	0.07	19.5
12	0.011	44	0	0.07	22
13	0.012	52	0	0.09	26
14	0.013	61	0	0.10	30.5
15	0.014	69	0	0.12	34.5
16	0.015	80	0	0.13	40
17	0.016	89	0	0.15	44.5
18	0.017	101	0	0.17	50.5
19	0.018	113	0	0.19	56.5
20	0.019	123	0	0.21	61.5
21	0.020	136	0	0.23	68
22	0.021	149	0	0.25	74.5



When you save the measurement data as a text file, click [Save as text...] displayed in [Task].



The dialog box for setting the conditions for saving the measurement data as a text file is displayed.



Setting item

[Split by the number of data]

:This setting is used if the software that processes a text file has a restriction in the number of rows (number of data per channel).

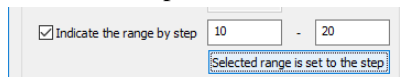
A text file is split by the specified number of data.

[Indicate the range by step]

:The range to be saved is specified by the number of steps (left end row of data list).

[Selected range is set to the step]

:If you click this button, the range selected in the data list is set to the step.



[Thin out]

:The data is thinned out for each channel by the specified number of data, and saved.

[Standard CSV] :The measurement data is saved in comma delimited format.

The format is same as that of data list.

[CSV format of DRA-7610]

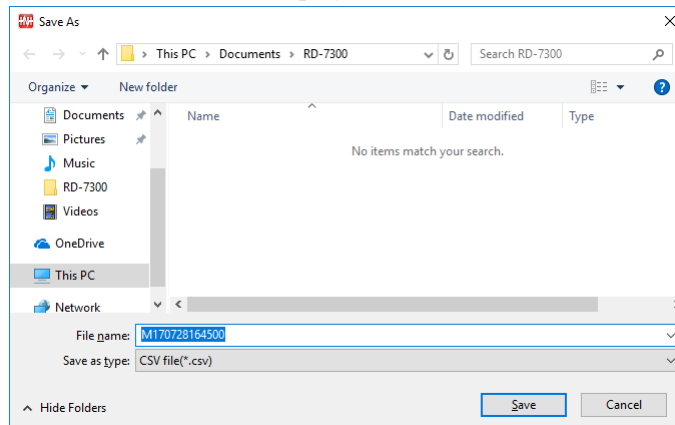
:The measurement data is saved as a text file that can be read by our company's FFT Analysis Software DFA-7610.



The data file can be directly ready by [Displaying DADiSP data] of DFA-7610. However, since expanded channels are not recorded in the data file, the data of expanded channels are not displayed by DFA-7610.

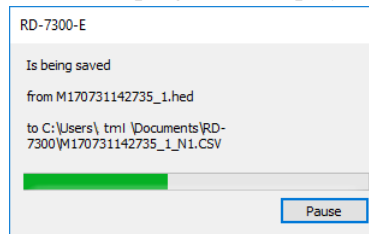
If you want to display the data of expanded channels, convert the file to [CSV format of DRA-7610].

Check the setting and click [OK] button. The dialog box for setting the destination to save a text file is displayed.



For the file name, the name same as that of data file is set.  
Set the destination to save a text file and file name, and then click [Save] button.

The dialog box that indicates the progress is displayed.

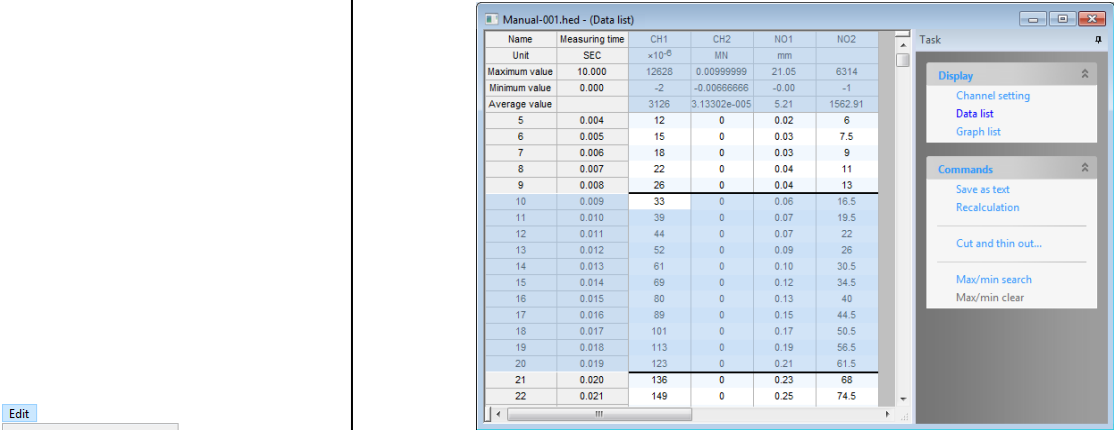


If the file is split, a serial number like \_N1, \_N2 is given to the end of file name.

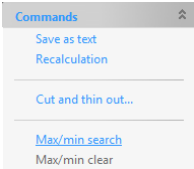
If there is a text file with same name at the conversion destination, it is overwritten and saved.

### 3-2 Maximum / minimum search

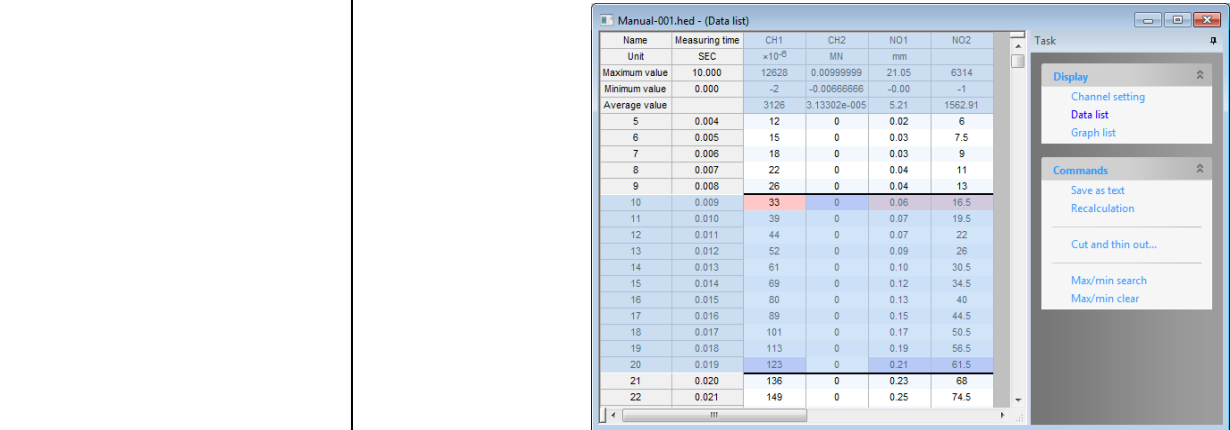
Maximum value and minimum value are searched from the data within the specified range for each channel and the position and the value are displayed. If the range is not specified, the maximum value and the minimum value are searched from all data.



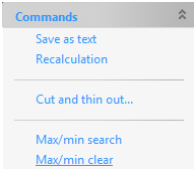
To search maximum value and minimum value, click [Max/min search] displayed in [Task].



For the search result, the background of the value is colored separately. Blue indicates the maximum value and red indicates the minimum value.



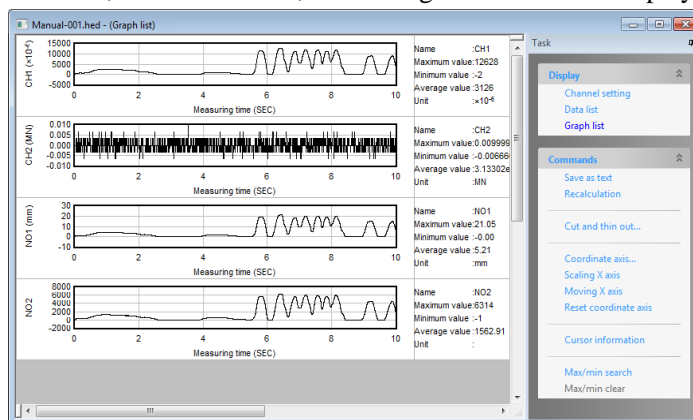
To clear the search result, click [Max/min clear] displayed in [Task].



## 4 Graph list

T-Y graph for each channel is displayed.

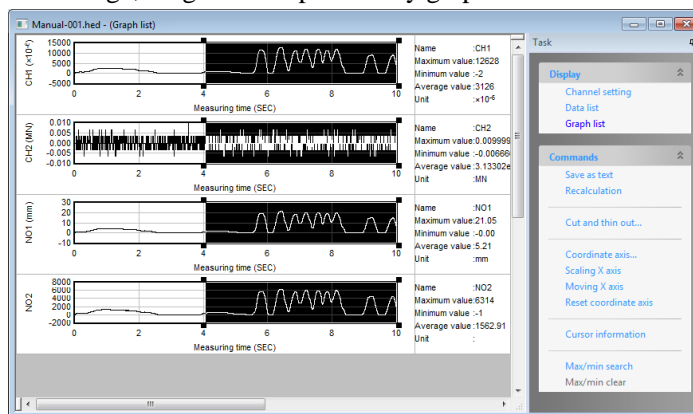
Maximum value, minimum value, and average value are also displayed.



### 4-1 Selection of range

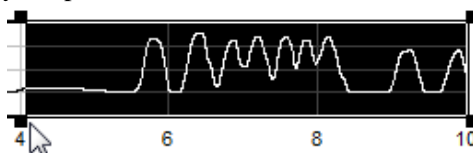
When you carry out conversion to text or display of cursor for the graph list, it is necessary to select the range on the graph.

To select the range, drag the data part of any graph.



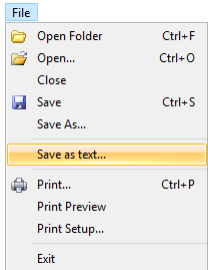
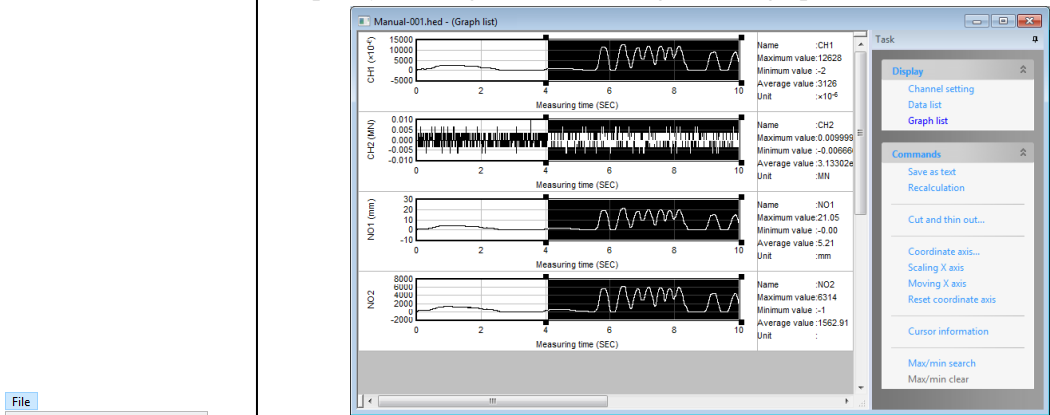
All graphs are selected within the same range.

To change the selection range, drag ■ displayed at four corners of the selection range by the pointer.



4-2 Save as text

With the graph list, the measured value can be saved as a text file by specifying range or thin-out.  
To specify the range, select the range on the graph list.



When you save the measurement data as a text file, click [Save as text...] displayed in [Task].



The dialog box for setting the conditions for saving the measurement data as a text file is displayed.

The screenshot shows a 'Save as text' dialog box. It has a 'Step' section with a checkbox for 'Split by the number of data' (checked) and a text box containing '1001'. Below this is a checkbox for 'Indicate the range by step' (unchecked) with a text box containing '1' and a text box containing '1001'. A button labeled 'Selected range is set to the step' is next to the 'Indicate the range by step' checkbox. Below this is a checkbox for 'Thin out' (unchecked) with a text box containing '1' and a label 'Point'. At the bottom is a 'Storage format' section with two radio buttons: 'Standard CSV' (selected) and 'CSV format of DRA-7610'. 'OK' and 'Cancel' buttons are at the bottom right.

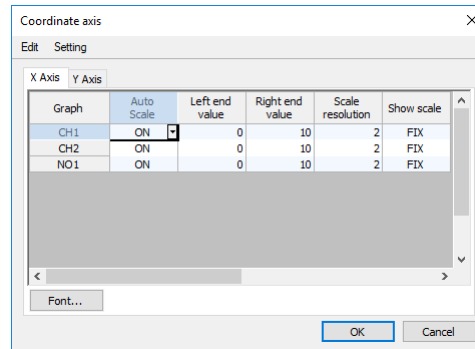
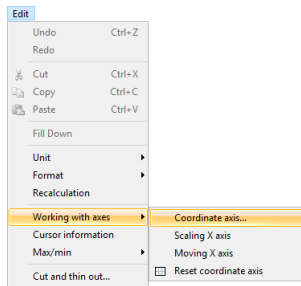


The description on setting item for dialog box and the following operation methods are same as those of text saving for data list. Refer to “Chapter 11. 3-1 Save as text”.

## 4-3 Coordinate axis

The coordinate axis for the graph list can be changed.

If you click [Coordinate axis] displayed in [Task], the dialog box for setting the coordinate axis is displayed.



To change the coordinate axis of X-axis, click the tab of X-axis. To change the coordinate axis of Y-axis, click the tab of Y-axis. Scale and scale interval can be set for each channel.

Setting item

[Auto Scale] :Set ON/OFF of auto scale.

[Left end value] :Set the left end value of graph when auto scale is not set.

[Right end value] :Set the right end value of graph when auto scale is not set.

[Upper end value] :Set the upper end value of graph when auto scale is not set.

[Lower end value] :Set the lower end value of graph when auto scale is not set.

[Scale resolution]: Set the scale resolution of graph when auto scale is not set.

[Show scale]

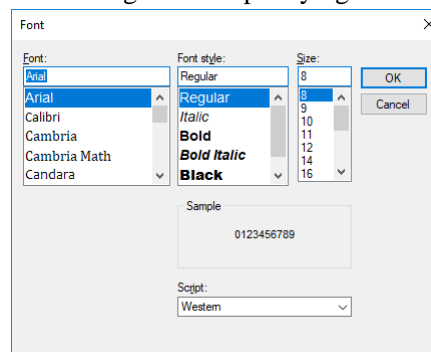
[None] :Scale is not displayed.

[Fixed] :Displayed with value

[Float] :Displayed with index

[Font...] :Specify the font of the displayed axis.

The dialog box for specifying the font is displayed.



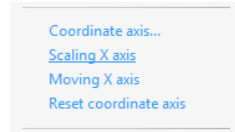
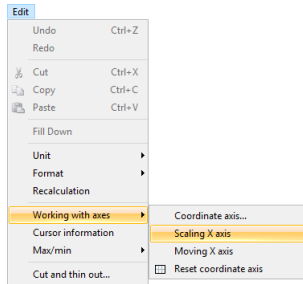
Specify style and size of font, and then click [OK] button.


If upper end value, lower end value or scale resolution is changed, the auto scale is set to OFF.

Confirm the setting, and click [OK] button. The graph list is updated.

## 4-4 Scaling X axis

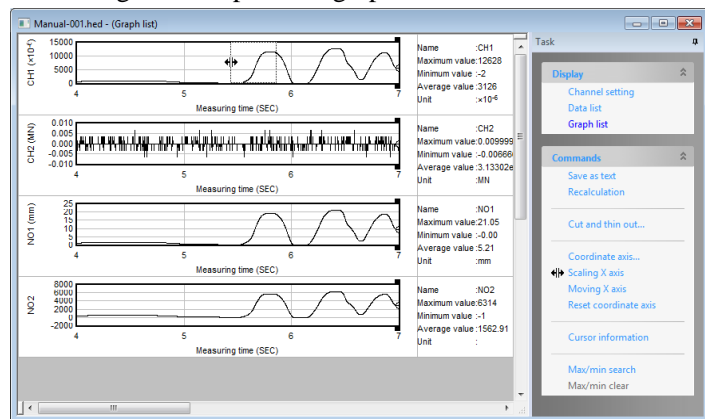
The scale of X-axis can be zoomed by operating the mouse.  
Click [Scaling X axis] displayed in [Task].



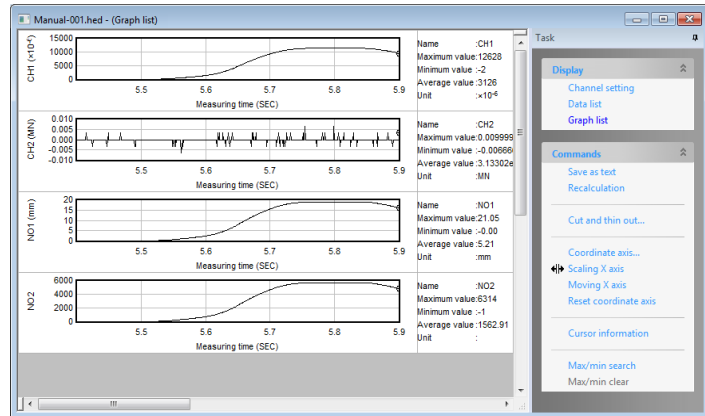
 is displayed.



In this status, drag the data part of a graph to be zoomed.



If the mouse button is released, the selected part is zoomed.



The center wheel means the rotating part existing between buttons of mouse.

The selected part is adjusted to an appropriate scale, so some other part than the selected part may also be zoomed.

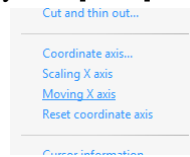
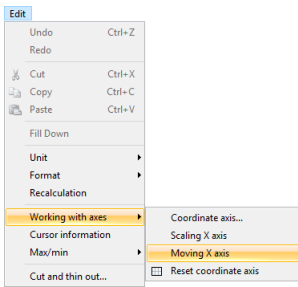
If you rotate the center wheel of the mouse, the scale of X-axis is automatically zoomed.

To release the zoom, click [Scaling X axis] again.

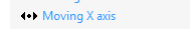
To return graphs to its original scale, click [Reset coordinate axis].

## 4-5 Moving X axis

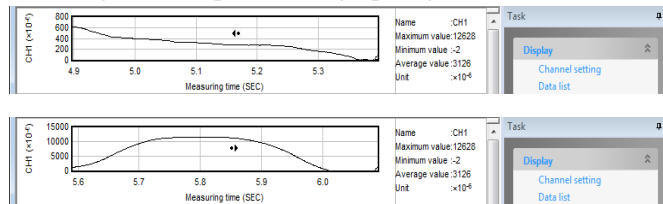
The scale of X-axis can be moved by operating the mouse.  
Click [Moving X axis] displayed in [Task].



↔ is displayed.



In this status, drag the data part of the graph right or left.



The center wheel means the rotating part existing between buttons of mouse.

The displayed area of the graph moves right or left.

The displayed area of the graph also moves right or left by rotating the center wheel of the mouse.

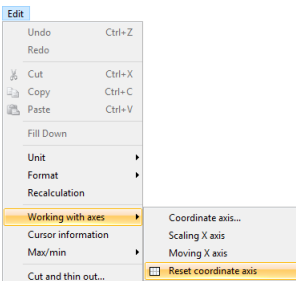
To release the movement, click [Moving X axis] again.

To return graphs to its original position, click [Reset coordinate axis].

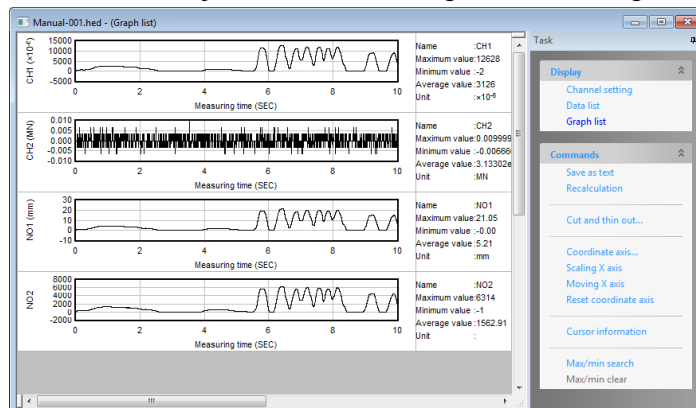
## 4-6 Reset coordinate axis

The coordinate axis is automatically adjusted depending on measurement value and measurement time.

Click [Reset coordinate axis] displayed in [Task].

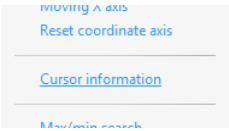
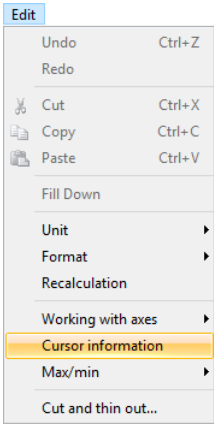


The coordinate axis is adjusted and the drawing is carried out again.

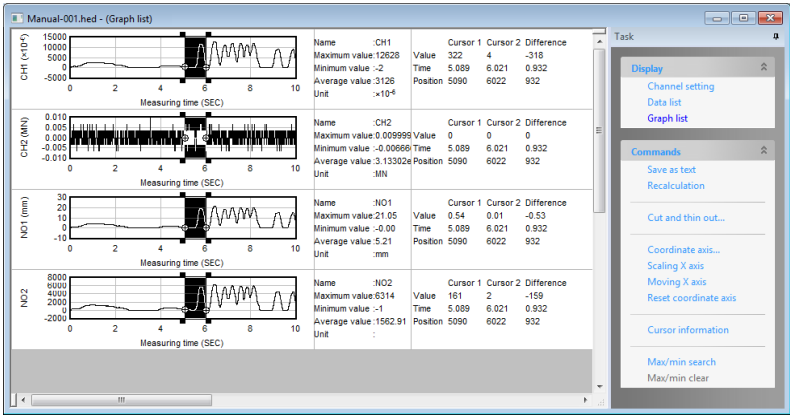


### 4-7 Cursor information

When the range is selected on the graph list, the left end (cursor 1) and the right end (cursor 2) in the selected range are set to cursor. The elapsed time and the measurement value at that point are displayed and the value subtracting the value of cursor 1 from the value of cursor 2 is also displayed. To display the cursor, click [Cursor information] displayed in [Task].



The third column is added to the graph list and the cursor information is displayed.



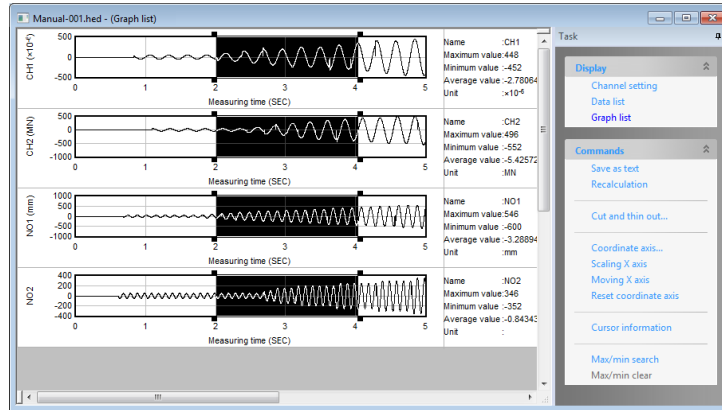
Cursor 1 can be moved by←→ keys on keyboard and cursor 2 can be moved by↑↓ keys.

To clear the cursor information, click [Cursor information] again.

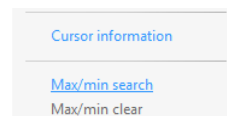
## 4-8 Maximum / minimum search

Maximum value and minimum value are searched from the data within the specified range for each channel and the position, value, average value, and standard deviation are displayed.

If the range is not specified, maximum value and minimum value are searched from all data.

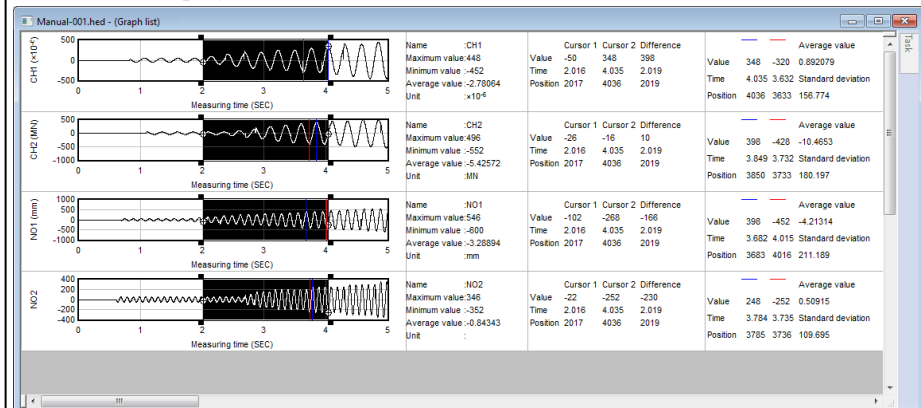


To search maximum value and minimum value, click [Max/min search] displayed in [Task].

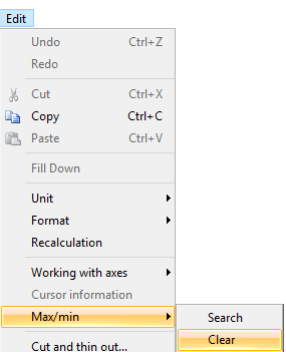
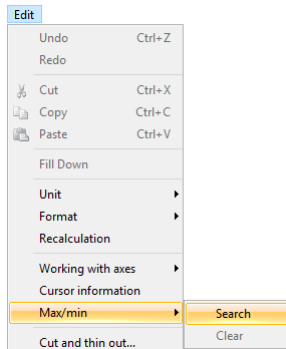
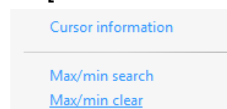


As the search result, two lines are displayed on the graph. Blue indicates the maximum value and red indicates the minimum value.

The cursor information is displayed in third column of the graph list. Information of maximum value, minimum value, average value, and standard deviation is displayed in fourth column.



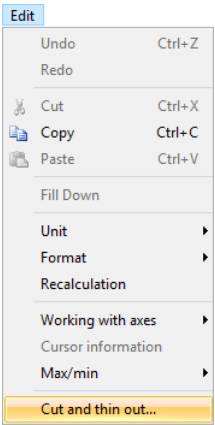
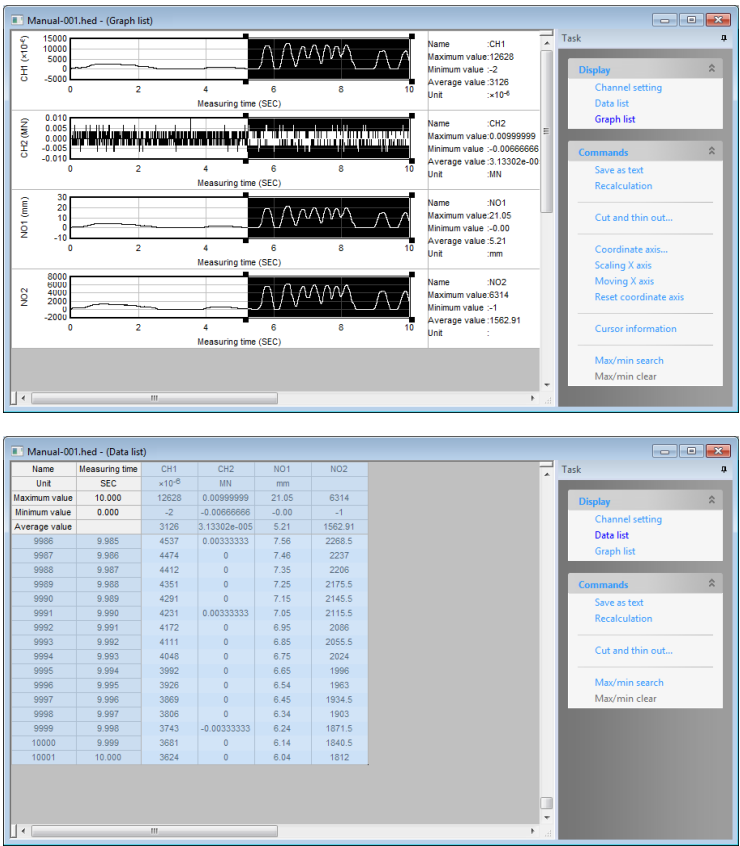
To clear the search result, click [Max/min clear] displayed in [Task].



5 Cut and thin out

Only a necessary part in the measured value is cut and a new data file is created.  
At the same time as cut, thin-out of measured value can be carried out to reduce the number of data.

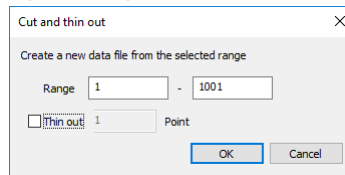
Select the cut range in advance.



If only thin-out is carried out, it is not necessary to select the range.  
Click [Cut and thin out...] displayed in [Task].



The dialog box for setting cut range and thin-out is displayed.



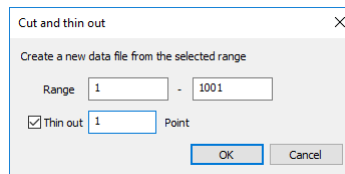
Setting item  
[Range]

:The range for cut specified by number of steps (in the left end column of the data list).

If a range has been selected in the graph list or data list, the selected range is indicated here.

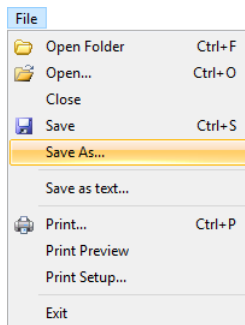
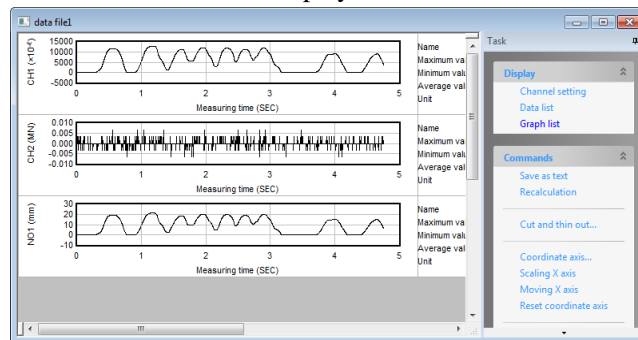
[Thin out]

:The data is thinned out by the specified number for each channel to cut it out.

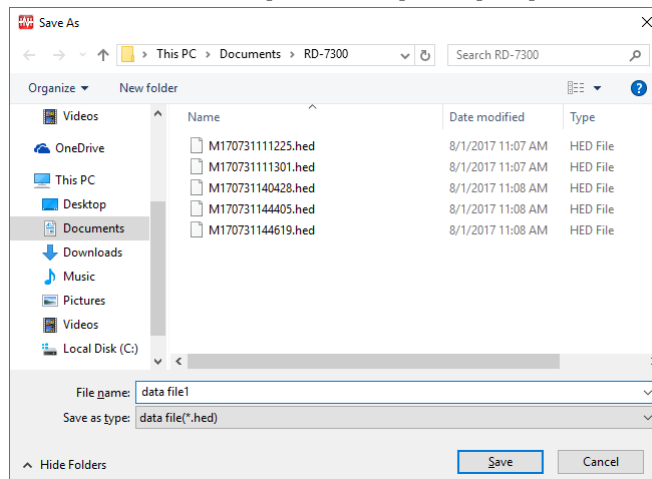


Confirm the setting and click [OK] button.

The window of a new data file is displayed.



To save the new data file, select [Save As...] from [File] menu.



The dialog box for setting the destination to save the file and file name is displayed.

Check the setting and click [Save] button.

# Chapter 12

## Graph sheet



This chapter explains the method for displaying a data file recorded by RD-7300 as a graph.


## 1 Graph sheet

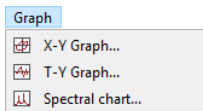
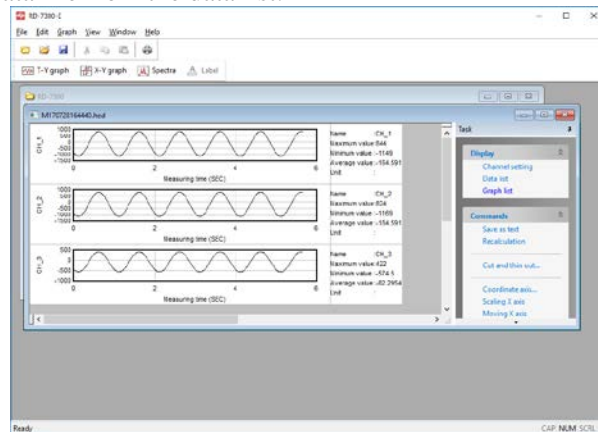
Graph sheet is a window which can be drawn multiple objects such as T-Y graph, X-Y graph and Spectrum based on data file.

### 1-1 Display of graph

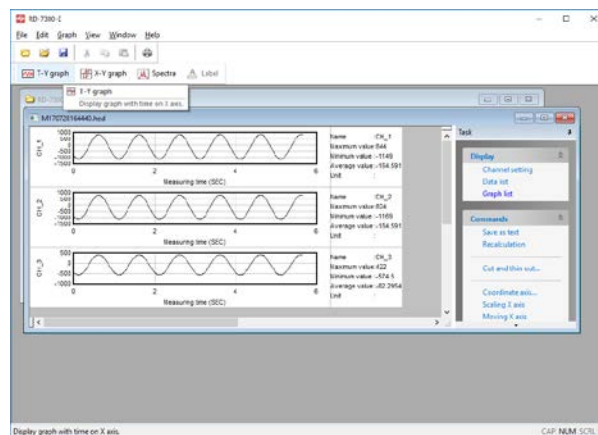
There are two methods for displaying a graph; new creation of a graph window from a data file and addition to currently displayed graph window.

- New creation from a data file  
Display a data file from the data list.

 For the display of data file, refer to "Chapter 10. 2 Display of measured data".



When the data file is displayed frontmost, click a graph to be displayed from the toolbar.



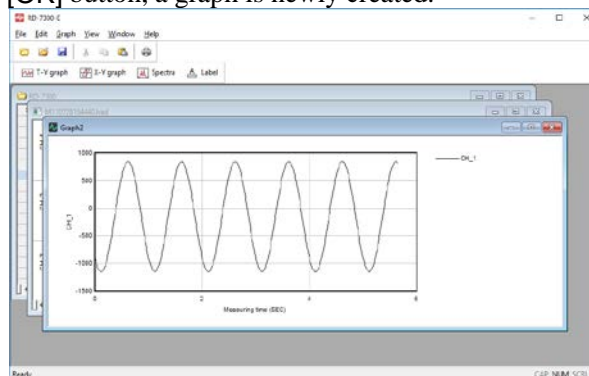


For T-Y graph, refer to  
"Chapter 12. 2 T-Y graph"  
For X-Y graph, refer to  
"Chapter 12. 3 X-Y graph"  
For spectrum, refer to  
"Chapter 12. 4-1 Setting of  
spectrum".

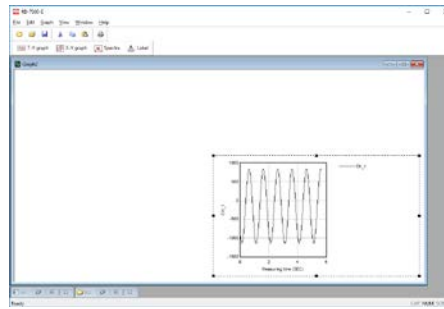
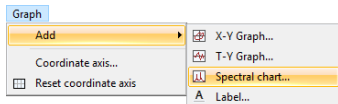
The dialog box for selecting the drawing data is displayed. Set the drawing line.

X		Y	
Name		Name	
Measuring time		NO	
		CH_1	CH1
		CH_2	NO1
		CH_3	NO2

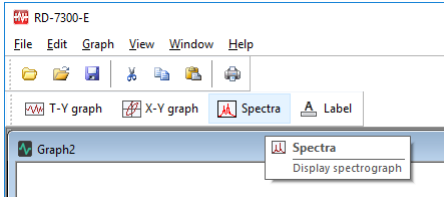
If you click [OK] button, a graph is newly created.



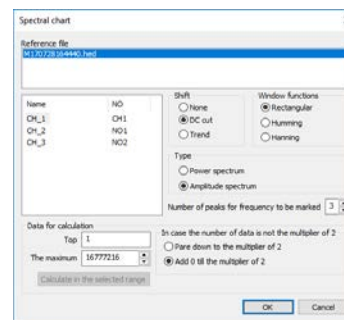
- Addition to graph sheet  
Bring the graph sheet for addition to front.



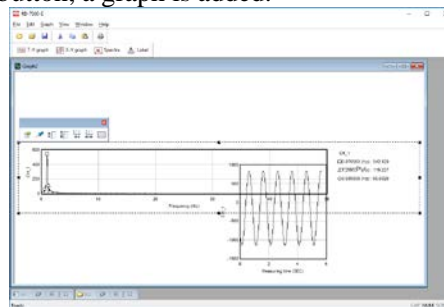
Click a graph to be added from the toolbar.



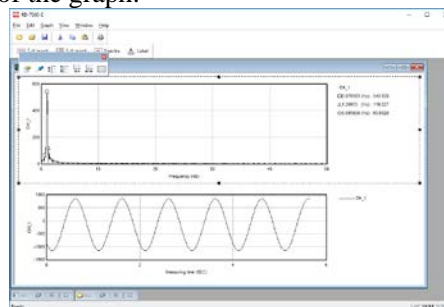
The dialog box for selecting the drawing data is displayed. Set the drawing line.



If you click [OK] button, a graph is added.



Adjust the layout of the graph.



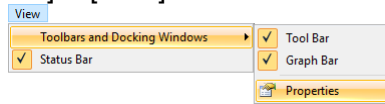
Click  from the toolbar of graph to fix the layout.

## 1-2 Display of properties panel

On the properties panel, setting of each graph is carried out.

### ● Display method 1

While the graph window is brought to front, click [Toolbars and Docking Windows] - [Properties] in [View] menu.



### ● Display method 2

Click a graph to display the toolbar.



Click .

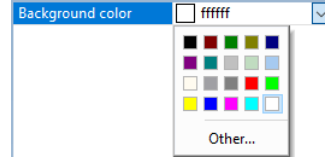
The properties panel is displayed by display method 1 or 2.



### 1-3 Change of color

For graph sheet and label, the background color and the character color can be changed from properties.

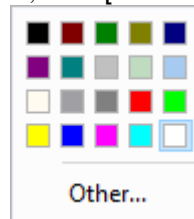
Click  from an item related to colors in properties.



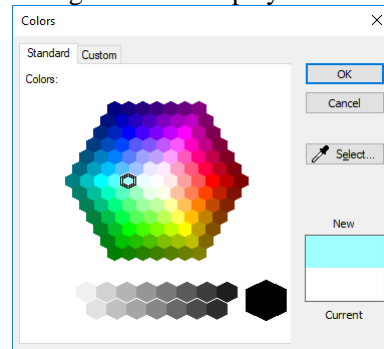
Select a color to be changed.



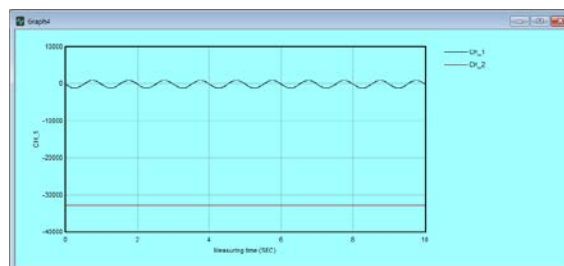
If you want to select other color, click [Other...].



The dialog box for selecting a color is displayed. Select a color.




Click [OK] button to fix the color.



## 1-4 Change of color and type of drawing line

For T-Y graph, X-Y graph, and spectrum, the color and the type of a drawing line can be changed from properties.

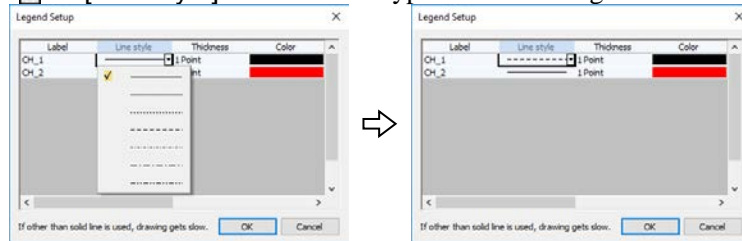
Click  from [Label & line] in properties.




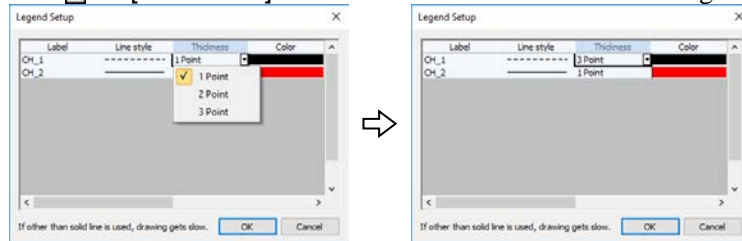
The dialog box for setting legend is displayed.




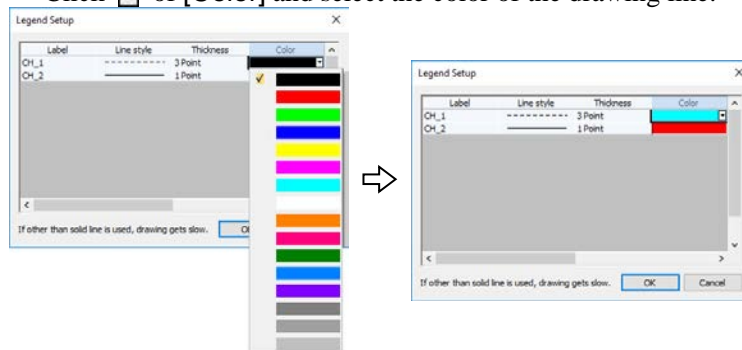
Click  of [Line style] and select the type of the drawing line.



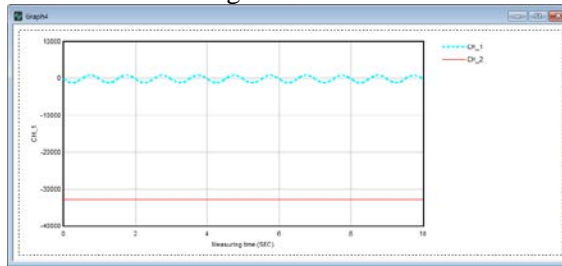
Click  of [Thickness] and select the thickness of the drawing line.



Click  of [Color] and select the color of the drawing line.



Click [OK] button to fix the change.



## 1-5 Change of font

For T-Y graph, X-Y graph, and spectrum, the font of scale and label can be changed from properties.

Click ... from [Font] in properties.

X axis label	
Automatic	True
Axis label	TIME
Unit of axis	
Font	Arial(8) ...

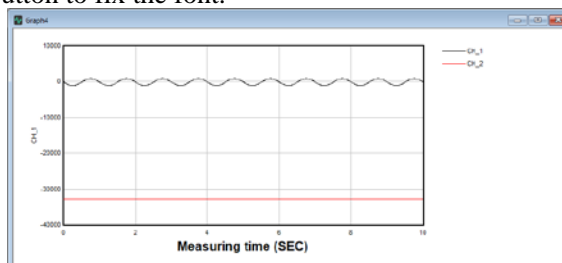
The dialog box for setting font is displayed.

Font		
Font	Font style	Size
Arial	Regular	8
Arial	Regular	8
Calibri	Italic	9
Cambria	Bold	10
Cambria Math	Bold Italic	11
Candara	Black	12
		14
		16
Sample		
AaBbYyZz		
Script		
Western		
		OK
		Cancel

Select font name, style, and size.

Font		
Font	Font style	Size
Arial	Bold	12
Arial	Italic	12
Calibri	Bold	18
Cambria	Bold Italic	20
Cambria Math	Black	22
Candara	Black Obliq	24
		26
		28
Sample		
AaBbYyZz		
Script		
Western		
		OK
		Cancel

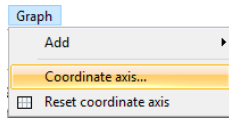
Click [OK] button to fix the font.



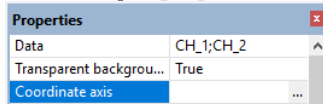
## 1-6 Collective setting of graph scale

For T-Y graph, X-Y graph, and spectrum, the scale can be directly input from properties, however, the drawing is carried out every time when it is changed, so it takes time to display a graph with the final scale if the number of data is large.

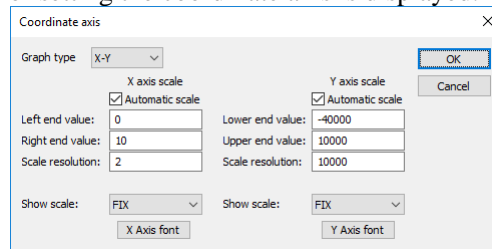
For this reason, each graph has a function to set the scales collectively.



Click  from [Coordinate axis] in properties.



The dialog box for setting the coordinate axis is displayed.



After the setting is changed, click [OK] button to reflect the content of setting to the graph.

Setting items

[Graph type]	:The display method of graph scale is set.
X-Y	Displayed with natural number
Log-Log	X-axis and Y-axis are displayed with logarithm
LogX-Y	X-axis is displayed with logarithm and Y-axis is displayed with natural number
X-LogY	X-axis is displayed with natural number and Y-axis is displayed with logarithm

X axis scale

[Automatic scale]	: If it is enabled, X-axis scale is set automatically.
[Left end value]	: The left end value of X-axis scale is set.
[Right end value]	: The right end value of X-axis scale is set.
[Scale resolution]	: The increment value of X-axis scale mark is set.
[Show scale]	: The method for displaying scale value is set.
None	Not displayed
FIX	Displayed with natural number
FLOT	Displayed with index
[X axis font]	: Font of scale value is set.

Y axis scale

[Automatic scale]	: If it is enabled, Y-axis scale is set automatically.
[Lower end value]	: The lower end value of Y-axis scale is set.
[Upper end value]	: The upper end value of Y-axis scale is set.
[Scale resolution]	: The increment value of Y-axis scale mark is set.

[Show scale] : The method for displaying scale value is set.  
 None Not displayed  
 FIX Displayed with natural number  
 FLOT Displayed with index  
 [Y axis font] : Font of scale value is set.

## 1-7 Change of scale using a mouse


Each graph has a function to change the scale. It can be set by operating the mouse in addition to setting from properties panel.

If you click a graph, the toolbar is displayed.

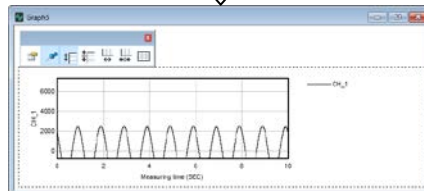
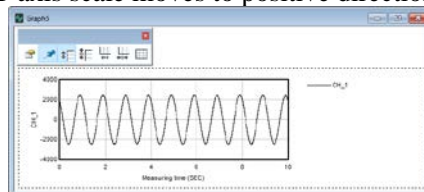


Click an item to be changed from this toolbar.

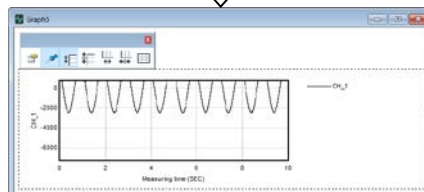
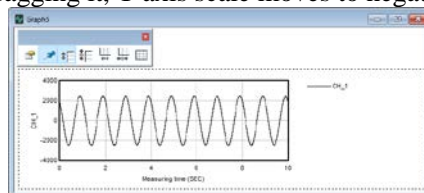
### ● Movement of Y-axis

If you click , Y-axis can be moved.


If you move the center wheel of mouse upward or move the mouse upward while dragging it, Y-axis scale moves to positive direction.



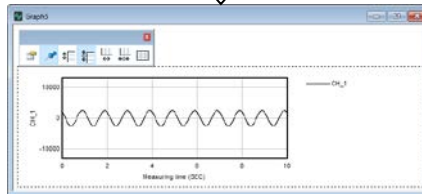
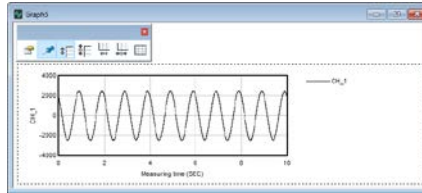
If you move the center wheel of mouse downward or move the mouse downward while dragging it, Y-axis scale moves to negative side.



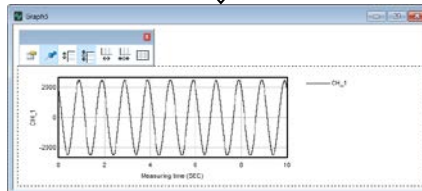
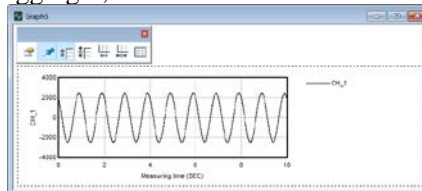
- Scaling of Y-axis

If you click  , Y-axis can be scaled.


If you move the center wheel of mouse upward or move the mouse upward while dragging it, Y-axis scale is zoomed out.



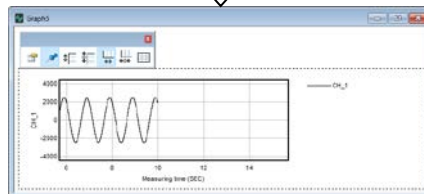
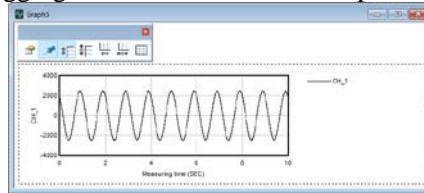
If you move the center wheel of mouse downward or move the mouse downward while dragging it, Y-axis scale is zoomed in.



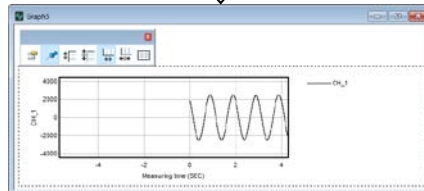
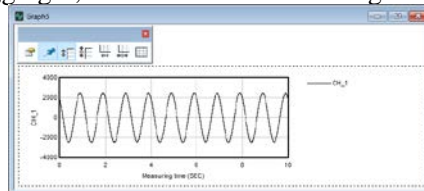
- Movement of X-axis

If you click , X-axis can be moved.


If you move the center wheel of mouse upward or move the mouse to the right side while dragging it, X-axis scale moves to positive side.



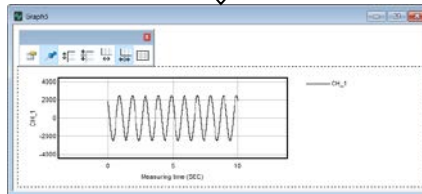
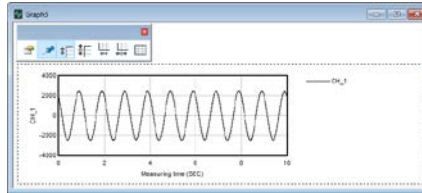
If you move the center wheel of mouse downward or move the mouse to the left side while dragging it, X-axis scale moves to negative side.



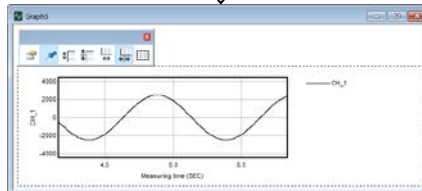
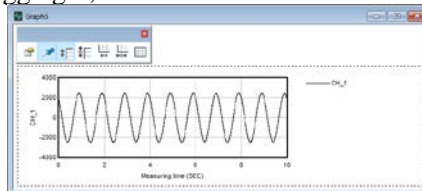
- Scaling of X-axis

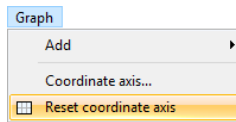
If you click , X-axis can be scaled.

If you move the center wheel of mouse upward or move the mouse to left side, X-axis scale is zoomed out.




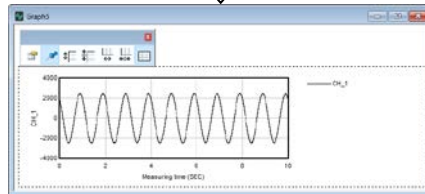
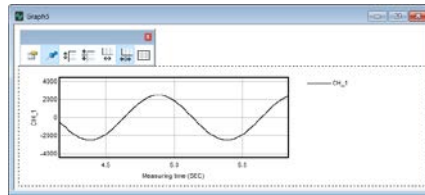
If you move the center wheel of mouse downward or move the mouse to the right side while dragging it, X-axis scale is zoomed in.





● Reset of scale

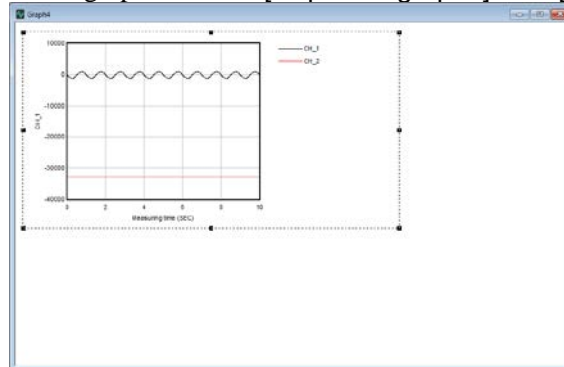
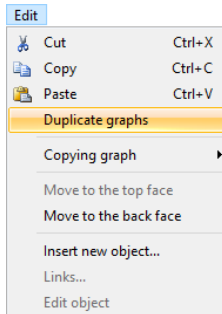
If you click , the graph scale is reset to the initial status.



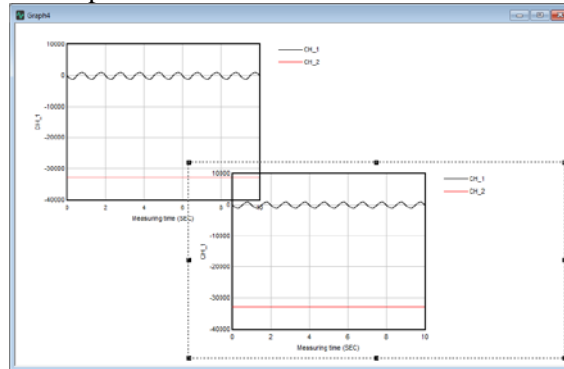
## 1-8 Duplicate objects

A selected object can be duplicated on the graph sheet.

Select object on the graph and click [Duplicate graphs] from [Edit] menu.



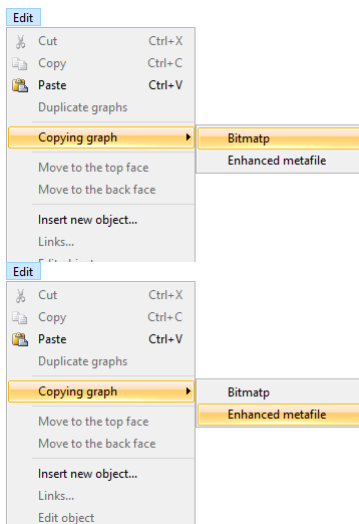
Selected object is duplicated.



## 1-9 Copying graph as image

The frontmost window of graph sheet can be copied as image, and pasted to other software.

Select [Copying graph] from [Edit] menu, and select the copy method from the displayed menu.



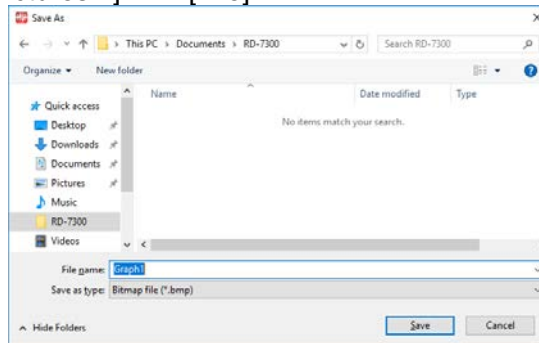
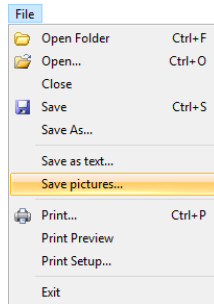
[Bitmap] :The graph is copied in standard image format of Windows. Various types of software support this file type.

[Enhanced metafile] :The graph is copied with the font of character and format retained. Clear printing is enabled.

## 1-10 Save pictures

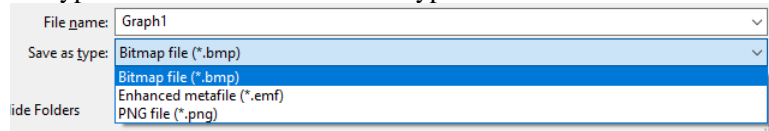
The frontmost window of graph sheet can be saved as image file.

Click [Save pictures...] from [File] menu.



Set the destination to save the file and the file name.

The file type can be selected from three types.



[Bitmap file] : Standard image format of Windows  
Various types of software support this file type.

[Enhanced metafile]  
: Font of character and format are recorded.  
Clear printing is enabled.

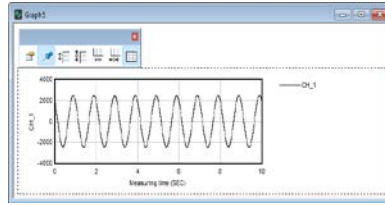
[PNG file] : File capacity can be reduced without degrading the  
quality of image.

Check the content of setting and click [Save] button.

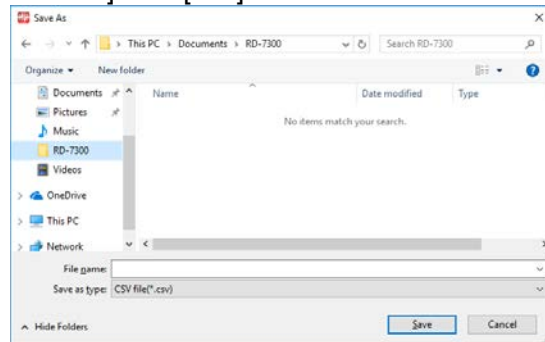
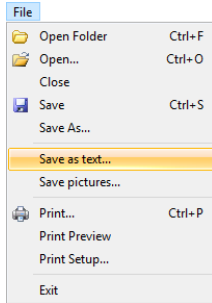
## 1-11 Saving graph data as text

The measurement value displayed on a graph can be saved as a text file.

Select a graph to be saved as a text file.

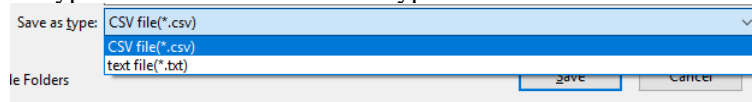


Select [Save as text...] from [File] menu.



Set the destination to save the file and the file name.

The file type can be selected from two types.



[CSV file] :comma-delimited text file

[text file] :tab-delimited text file

Check the setting and click [Save] button.

For X-Y graph and T-Y graph, X-axis and Y-axis are saved in this order by repeating the operation for the number of drawing lines.

In case of X-Y graph

CH1	CH2	CH1	CH3
x10-6	x10-6	x10-6	x10-6
13	3032	13	4949

In case of T-Y graph

Measurement time	CH1	Measurement time	CH2
SEC	x10 <sup>-6</sup>	SEC	x10 <sup>-6</sup>
0	13	0	3032
0.00004	13	0.00004	3032

For the spectrum, values of frequency, real part, imaginary part, and amplitude or power are saved.

Frequency	Real part	Imaginary part	CH1
Hz			x10 <sup>-6</sup>
0	-0.00012	0	0.000244
1.525879	0.001568	0.005275	0.011006

## 1-12 Saving graph sheet

A graph sheet can be saved as a file in the disk.



To save a graph, select [Save...] or [Save as...] from [File] menu.

Saving method

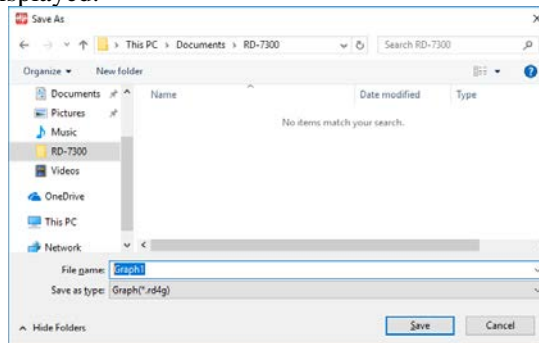
[Save...]

:When a graph is saved for the first time, the dialog box for inputting the name of the graph and specifying the location to save it is displayed. A graph that is saved once is resaved with the same name.

[Save as...]

:The dialog box for inputting the name and specifying the location to save the graph is always displayed.

The dialog box for specifying the name of the graph and the location to save it (folder) is displayed.

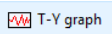


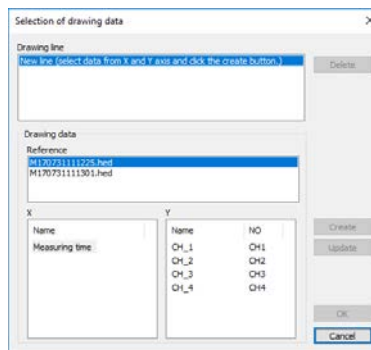
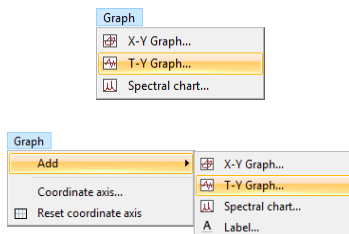
Specify the name of the graph and the location to save it (folder) and click [Save] button.

The name of the graph is changed to the specified name.

## 2 T-Y graph

The line graph is displayed by setting measurement time and measurement data for X-axis and Y-axis, respectively.

Click  on the toolbar to display the dialog box for selecting the drawing data.



Setting items

[Create]

:It is necessary to select the first drawing line.

A new drawing line is created with selected items.

[Delete]

:The selected item in second line or later in the Drawing line is deleted.

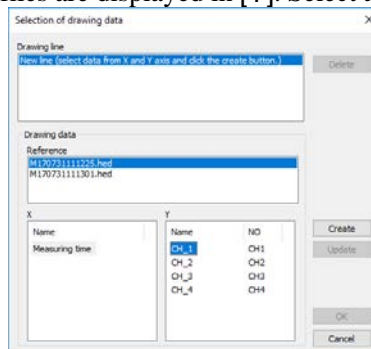
[Update]

:The setting of selected item in second line or later in the Drawing line is updated.

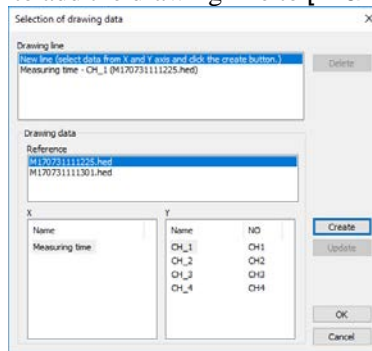
Select the first drawing line.

The currently displayed data files are displayed in [Reference]. Select a file to be drawn.

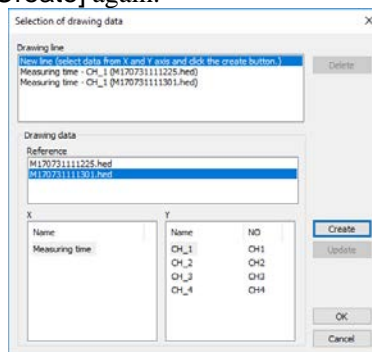
The channels of data files are displayed in [Y]. Select a channel to be drawn.



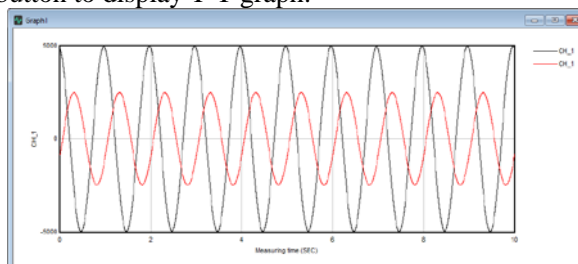
Click [Create] button to add the drawing line to [Drawing line].



If you want to add a drawing line from other data file, carry out the steps [Reference] - [Y] - [Create] again.




Click [OK] button to display T-Y graph.




## ● Property

### Data

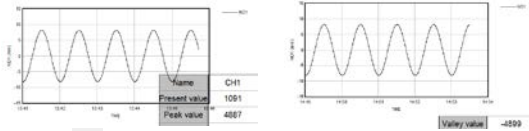
:Click . The dialog box for selecting the drawing data is displayed. Set a channel for which the graph is displayed.

### Transparent background


:Click  to set the display of background.

True: transparent

False: opaque



### Coordinate axis

:Click . The dialog box of coordinate axis is displayed. Set the scales collectively.

### Y axis scale

#### Automatic

: Y-axis scale is automatically set according to the data.

True: automatically set / False: arbitrarily set

#### Upper end of Y axis

: The upper end value of Y-axis scale is set.

#### Lower end of Y axis

: The lower end value of Y-axis scale is set.

#### Increment

: The increment value of Y-axis scale mark is set.

#### Display


:Click  to set the display of value of Y-axis scale.

True: displayed

False: not displayed



### Font

:Click  and set the font of Y-axis scale.

### X axis scale

#### Automatic

: X-axis scale is automatically set according to the data.

True: automatically set / False: arbitrarily set

#### Right end of X axis

: The right end value of X-axis scale is set.

#### Left end of X axis

: The left end value of X-axis scale is set.

#### Increment

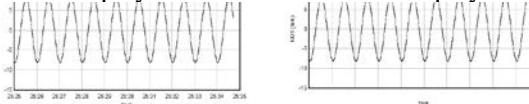
: The increment value of X-axis scale mark is set.

#### Display

:Click  and set the display of value of X-axis scale.

True: displayed

False: not displayed



### Font

:Click  and set the font of X-axis scale.




For the dialog box of coordinate axis, refer to "Chapter 12. 1-6 Collective setting of graph scale".



For the font, refer to "Chapter 12. 1-5 Change of font".

## Y axis label

Automatic

: Click  and set the display of Y-axis label.  
True: automatically set / False: arbitrarily set




Axis label

: Y-axis label is set.

Unit of axis


: Y-axis unit is set.

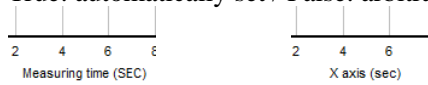
Font

: Click  and set the font of Y-axis label.

## X axis label

Automatic

: Click  and set the display of X-axis label.  
True: automatically set / False: arbitrarily set




Axis label

: X-axis label is set.

Unit of axis


: X-axis unit is set.

Font

: Click  and set the font of X-axis label.


## Legend

Automatic


: Click  and set the display of label of legend.  
True: automatically set / False: arbitrarily set



Label & line

: Click  and set label, style of line, thickness of line, and color of line.

Font

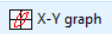
: Click  and set the font of legend.

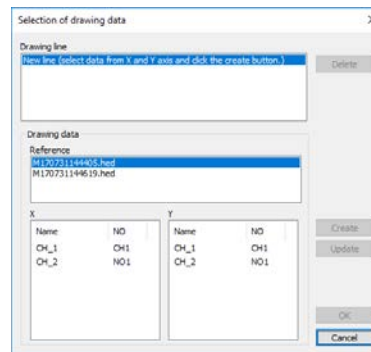
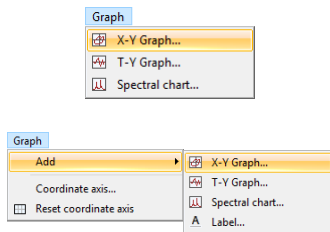


For label and line, refer to  
"Chapter 12. 1-4 Change  
of color and type of  
drawing line".

### 3 X-Y graph

The setting values of channels set for X-axis and Y-axis separately are displayed as X-Y graph.

Click  on the toolbar to display the dialog box for selecting the drawing data.



Setting items

[Create]

:It is necessary to select the first drawing line.

A new drawing line is created with the selected item.

[Delete]

:The selected item in second line or later in the Drawing line is deleted.

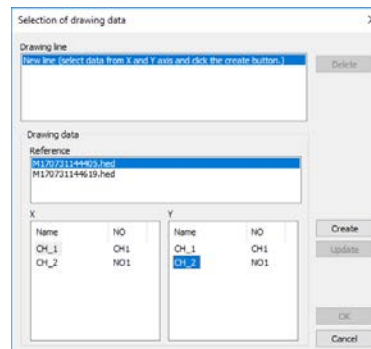
[Update]

:The setting of selected item in second line or later in the Drawing line is updated.

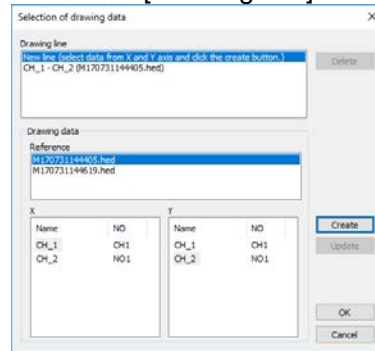
Select the first drawing line.

The currently displayed data files are displayed in [Reference]. Select a file to be drawn.

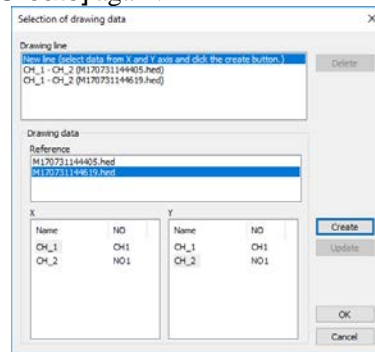
The channels of data files are displayed in [X] and [Y]. Select a channel to be drawn.



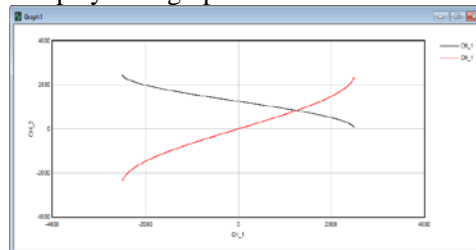
Click [Create] button to add it to [Drawing line].



If you want to add a drawing line from other data file, carry out the steps [Reference] - [Y] - [Create] again.




Click [OK] button to display X-Y graph.




## ● Property

### Data

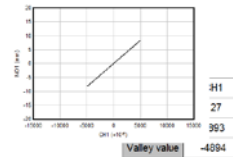
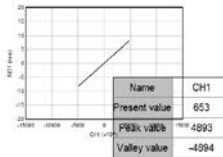
: Click . The dialog box for selecting the drawing data is displayed. Set a channel for which the graph is displayed.

### Transparent background

: Click  to set the display of background.


True: transparent

False: opaque



For the dialog box of coordinate axis, refer to "Chapter 12. 1-6 Collective setting of graph scale".

### Coordinate axis

: Click . The dialog box of coordinate axis is displayed. Set the scales collectively.

### Y axis scale

#### Automatic

: Y-axis scale is automatically set according to the data.

True: automatically set / False: arbitrarily set

#### Upper end of Y-axis

: The upper end value of Y-axis scale is set.

#### Lower end of Y-axis

: The lower end value of Y-axis scale is set.

#### Increment

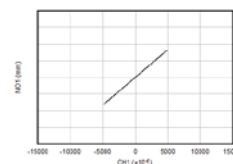
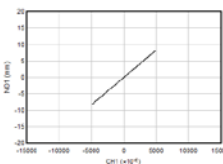
: The increment value of Y-axis scale mark is set.

#### Display


: Click  to set the display of value of Y-axis scale.

True: displayed

False: not displayed



### Font

: Click  and set the font of Y-axis scale.

### X axis scale

#### Automatic

: X-axis scale is automatically set according to the data.

True: automatically set / False: arbitrarily set

#### Right end of X-axis

: The right end value of X-axis scale is set.

#### Left end of X-axis

: The left end value of X-axis scale is set.

#### Increment

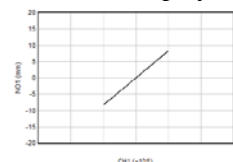
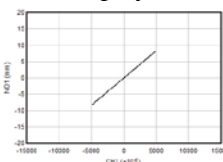
: The increment value of X-axis scale mark is set.

#### Display


: Click  and set the display of value of X-axis scale.

True: displayed

False: not displayed



### Font


: Click  and set the font of X-axis scale.

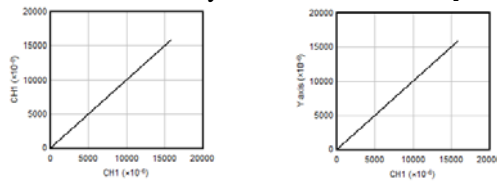


For the font, refer to "Chapter 12. 1-5 Change of font".

## Y axis label

Automatic

: Click  and set the display of Y-axis label.  
True: automatically set / False: arbitrarily set



Axis label

: Y-axis label is set.

Unit of axis


: Y-axis unit is set.

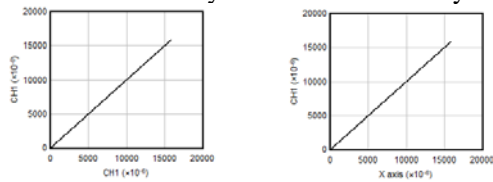
Font

: Click  and set the font of Y-axis label.

## X axis label

Automatic

: Click  and set the display of X-axis label.  
True: automatically set / False: arbitrarily set




Axis label

: X-axis label is set.

Unit of axis


: X-axis unit is set.

Font

: Click  and set the font of X-axis label.


## Legend

Automatic


: Click  and set the display of label of legend.  
True: automatically set / False: arbitrarily set

—— CH\_1 - CH\_1      —— Strain1- Disp1

Label & line

: Click  and set label, style of line, thickness of line, and color of line.

Font


: Click  and set the font of legend.

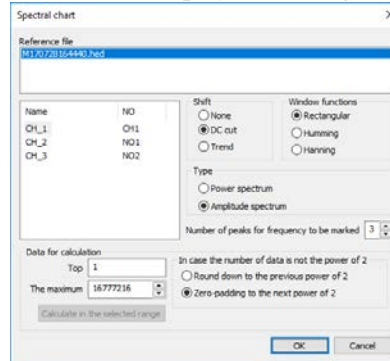
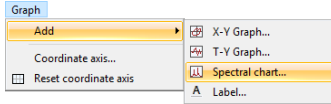
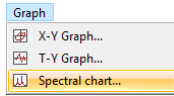


For label and line, refer to "Chapter 12. 1-4 Change of color and type of drawing line".

## 4 Spectrum

Performs FFT analysis on one arbitrarily selected channel and displays power spectrum or amplitude spectrum as a graph.

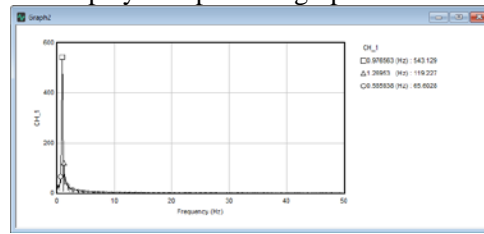
Click  on the toolbar to display the setting of spectrum.



For the content of setting, refer to "Chapter 12. 4-1 Setting of spectrum".


Select a channel to be drawn from the data file and carry out the setting related to spectrum.

Click [OK] button to display the spectrum graph.




### ● Property

Data

:Click  and carry out the setting related to the channel to be displayed in graph and the spectrum in the spectrum setting.

Mark peak value

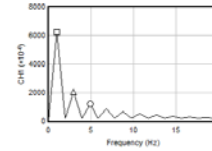
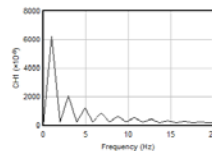
:Click  and set the number of peak values for which mark is displayed.

The specified number of peak values are displayed in descending order.


The setting value is 0 to 20.

Number of marks 0

Number of marks 3

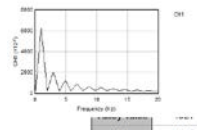
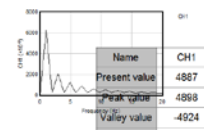


Transparent background


:Click  to set the display of background.

True: transparent

False: opaque



Coordinate axis

:Click . The dialog box of coordinate axis is displayed. Set the scales collectively.



For the dialog box of coordinate axis, refer to "Chapter 12. 1-5 Collective setting of graph scale".

## Y axis scale

Automatic : Y-axis scale is automatically set according to the data.  
True: automatically set / False: arbitrarily set

## Logarithmic display

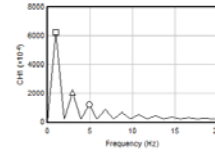
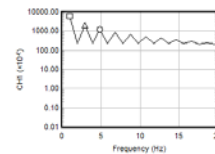
: Click  and set the increment method of Y-axis scale.

True:

logarithmic display

False:

natural number display



## Upper end of Y-axis

: The upper end value of Y-axis scale is set.

## Lower end of Y-axis

: The lower end value of Y-axis scale is set.

## Increment

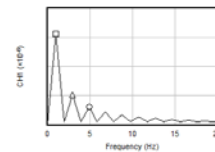
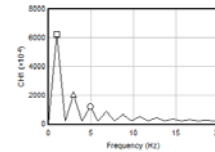
: The increment value of Y-axis scale mark is set.

## Display

: Click  to set the display of value of Y-axis scale.

True: displayed

False: not displayed



For the font, refer to  
"Chapter 12. 1-5 Change  
of font".

## Font

: Click  and set the font of Y-axis scale.

## X axis scale

Automatic : X-axis scale is automatically set according to the data.  
True: automatically set / False: arbitrarily set

## Right end of X-axis

: The right end value of X-axis scale is set.

## Left end of X-axis

: The left end value of X-axis scale is set.

## Increment

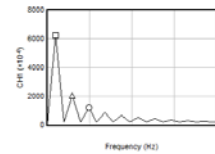
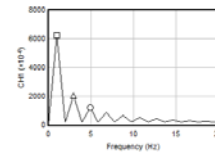
: The increment value of X-axis scale mark is set.

## Display

: Click  and set the display of value of X-axis scale.

True: displayed


False: not displayed

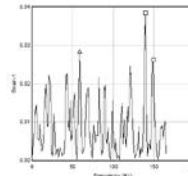
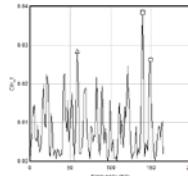


## Font

: Click  and set the font of X-axis scale.

## Y axis label

Automatic : Click  and set the display of Y-axis label.  
True: automatically set / False: arbitrarily set



## Axis label

: Y-axis label is set.

## Unit of axis

: Y-axis unit is set.

## Font


: Click  and set the font of Y-axis label.

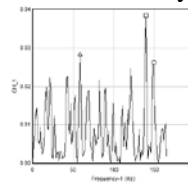
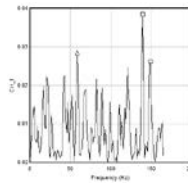


For label and line, refer to "Chapter 12. 1-4 Change of color and type of drawing line".

## X axis label

Automatic

: Click  and set the display of X-axis label.  
True: automatically set / False: arbitrarily set




Axis label

: X-axis label is set.

Unit of axis


: X-axis unit is set.

Font

: Click  and set the font of X-axis label.

## Legend

Automatic

: Click  and set the display of legend.  
True: automatically set / False: arbitrarily set

CH\_1

Strain-1

□139.323 (Hz) : 0.0384887

□139.323 (Hz) : 0.0384887


△58.5938 (Hz) : 0.0283639

△58.5938 (Hz) : 0.0283639


○149.74 (Hz) : 0.0261335

○149.74 (Hz) : 0.0261335

Label & line

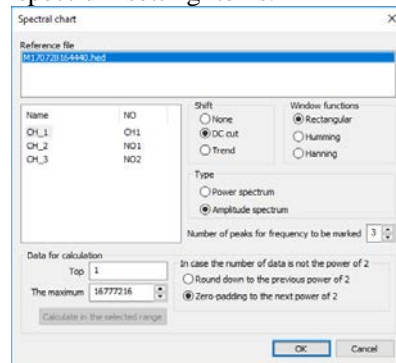
: Click  and set the label and the style/thickness/color of line of legend.

Font

: Click  and set the font of legend.

## 4-1 Setting of spectrum

This is the content of spectrum setting items.



Setting items

[Reference file] :Select a data file to be drawn.

[Name] :Select a channel to be drawn.

[Shift] :Set the method for removing the shift of 0 point.

None Removal is not carried out.

DC cut Removed by average value.

Trend Removed by primary regression equation.

[Window functions]

:Set the window function.

Rectangle / Hamming / Hanning

[Type]

:Set the display method of spectrum.

Amplitude spectrum / Power spectrum

[Number of peaks for frequency to be marked]

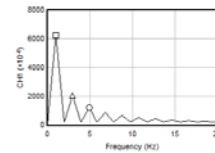
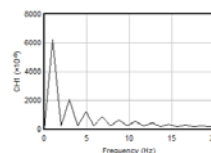
:Set the number of peak values for which mark is displayed.

The specified number of peak values are displayed in descending order.

The setting value is 0 to 20.

Number of marks 0

Number of marks 3



Data for calculation

[Top] : Set the top data for which FFT analysis is carried out.

[The maximum]

: Set the number of data for which FFT is carried out.

[Calculate in the selected range]

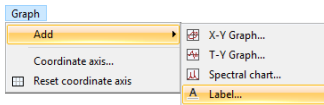
: The data for which range is selected in the data file is reflected to [Top] and [The maximum].


[In case the number of data is not the power of 2]

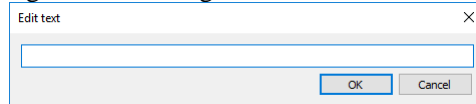
: If [The maximum] is not the power of 2, select whether it is cut down or 0 is added.

## 5 Label

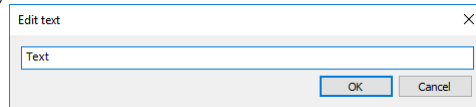
An arbitrary text is displayed on the graph window.



When the graph window is displayed frontmost, click  on the toolbar to display the dialog box for editing the text.




Input an arbitrary text.




Click [OK] button to display the label.



### ● Property


**Data** :Click . The dialog box for editing the text is displayed.  
Set the text in it.

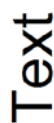
**Transparent background**

:Click  to set the display of background.  
True: transparent      False: opaque




**Turn by 90°**

:Click  and set the display method of label.  
True: rotated by 90 degrees      False: displayed in horizontal direction




**Color arrangement**

**Background color**

:Click  and set the background color.

**Character color**


:Click  and set the character color.



For the coloration, refer to "Chapter 12. 1-3 Change of color".

Border

Top

: Click  and set the frame border at the upper part of the label.


True: displayed

False: not displayed

Text

Text

Bottom

: Click  and set the frame border at the lower part of the label.


True: displayed

False: not displayed

Text

Text

Left

: Click  and set the frame border on the left side of the label.


True: displayed

False: not displayed

| Text

Text

Right

: Click  and set the frame border on the right side of the label.

True: displayed

False: not displayed

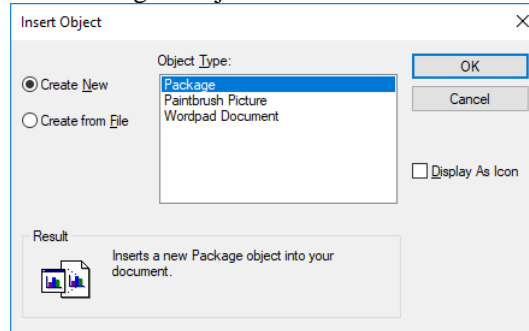
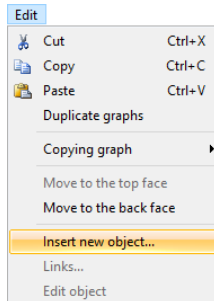
Text |

Text

## 6 Insertion of object

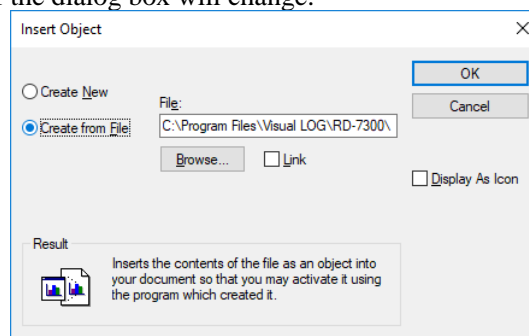
On the monitor screen, objects conforming to OLE of Windows such as picture of specimen and worksheet of Excel that have been created beforehand can be allocated and displayed.

To insert an object, select [Insert new Object...] from [Edit] menu.  
The dialog box for creating an object to be inserted will be displayed.



To create an object newly, click [Create New] and select a type of object from Object Type.

If there is a file to be inserted already, click [Create from File].  
The display of the dialog box will change.



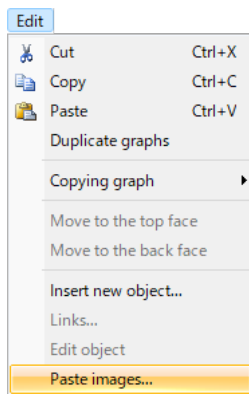
If [Link] is enabled by clicking it, the created object will be updated when the file to be inserted is changed.

Clicking [Browse...] button will display the dialog box for file reference.  
Select a file.

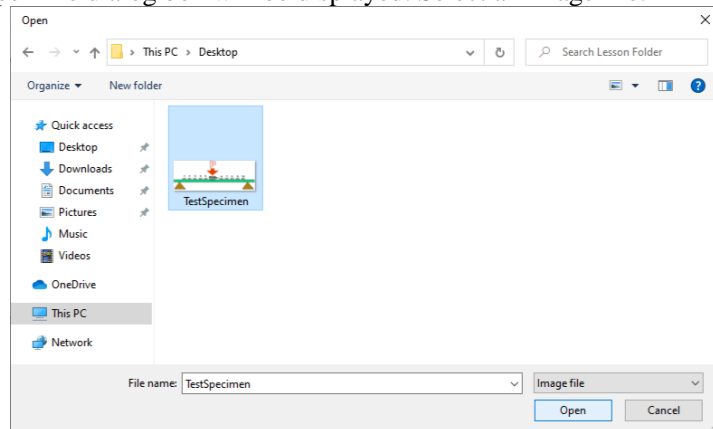


All files cannot be displayed all the time.  
Only files of objects which are displayed in [Object Type] are displayed.

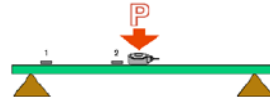
## 7 Paste image...



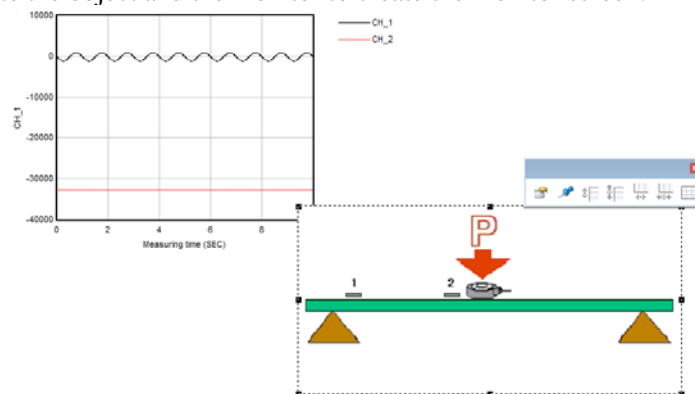
BMP, PNG and JPG format image is displayed with monitor.  
To insert an object, select [Paste image...] from [Edit] menu.  
The open file dialog box will be displayed. Select an image file.



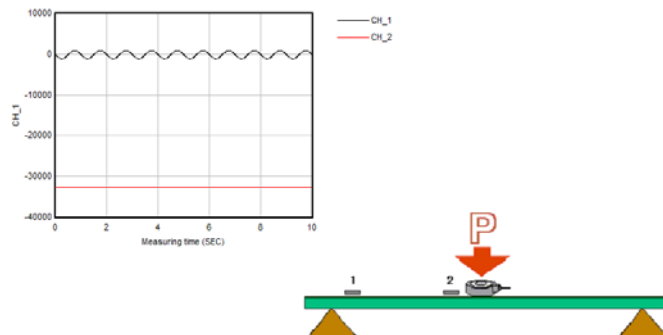
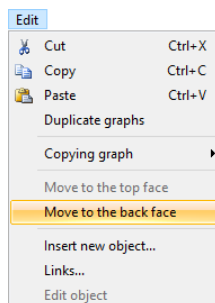
Click [Open] button. The object will be inserted.



Allocate the object and the monitor to create the monitor screen.



If the monitor is hidden by an object, select the object and select [Move to the back face] from [Edit] menu.





# Chapter 13

## Printing

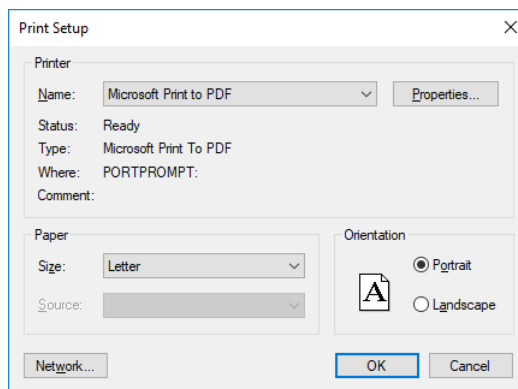
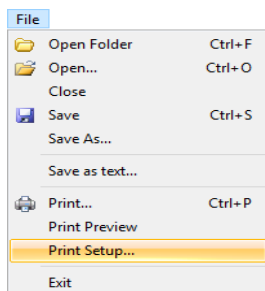


This chapter explains the method for printing each file.

## 1 Select a printer and a paper

Before starting printing, select a printer to be used and paper.

Select [Print Setup...] in [File] menu. The dialog box for setting a printer will be displayed.



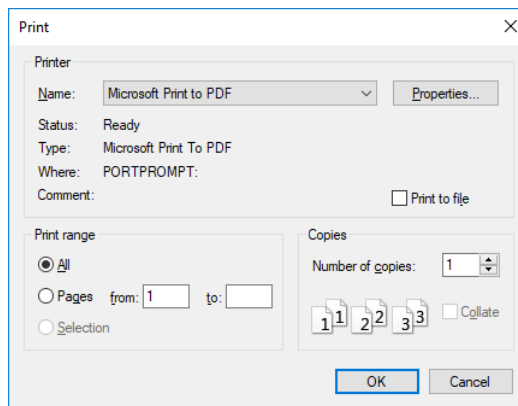
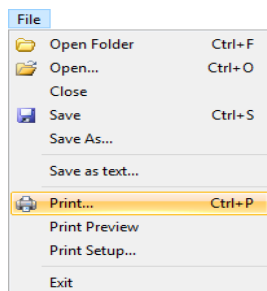
Set a printer to be used, size of paper, and orientation, and then click [OK] button.

## 2 Print

Select a window to be printed.

In case of data file, display the items to be printed (Channel setting, Data list or Graph list).

Select [Print...] from [File] menu. The dialog box for setting the print range will be displayed.



Setting item

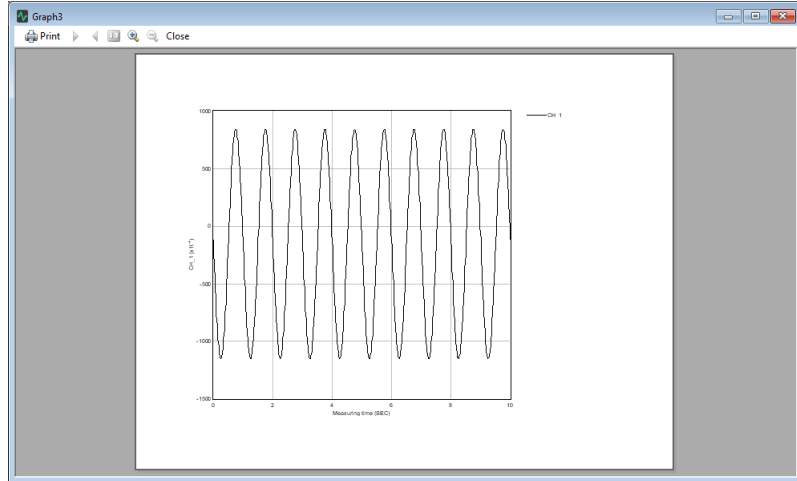
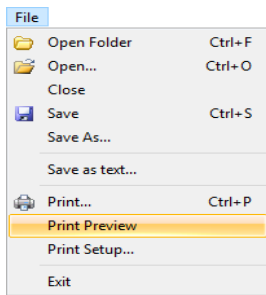
Print range : Set the page number to be printed.  
If you select "All", all pages will be printed.

After the setting, click "OK" button.

### 3 Check before printing

To check the preview on screen before printing on paper, select [Print Preview] in [File] menu.

The printing image will be displayed on the screen following the paper size and the print option you set.



# Chapter 14

## List of functions



This chapter introduces the function expressions used for sequence of functions of this software, and explains the meaning of functions and its usage.

**1** How to enter the function expression

---

The method for inputting a function expression is same as that of calculating formula for general spreadsheet software. A calculating formula can be combined with a function. The function name is selected using the function panel or directly input.  
For the function name, both of upper case and lower case can be used.

**1-1** Argument

The argument is the data used for a function. The arguments used by this software are roughly classified into three types; usual functions such as SIN and COS that uses value or other function expression, CH function and NO function that use the data of CH number and NO number, and function whose name starts from "N" such as NAVE and NMAX and CNT32 function that uses data NO.

The "data No" shown in this chapter indicates CH number displayed by a channel and NO number displayed as an expanded channel.  
If CH number of a channel is used as an argument, input a number after "CH". For example, CH number 20 is indicated as "CH20".  
If NO number of an expanded channel is used as an argument, input a number after "NO". For example, NO number 20 is indicated as "NO20".

**1-2** Description of function

The elision mark ([,...]) in the form means that the same type of argument as the previous argument can be repeatedly specified. For example, the form of NAVE() function is described as following. The number of repetitions has no restriction if the operational expression is written within 255 characters.

NAVE (data No [, data No, ...])

If the values repeatedly specified are consecutive values, — can be used for the setting instead of , .  
For example, NAVE(2,4,5,6,8) can be entered as NAVE(2,4-6,8).

### 1-3 Entering the comment

It is possible to enter a comment into the function line.

Enter ` or // .

The character string after that is treated as a comment.

=CH(0) `Strain

=CH(1)\*0.25 //Displacement transducer

If the symbol is entered on the top of the line, that data No. is treated as a comment line.

Measurement data are not recorded in the comment line.

//Comment



Use one-byte character for ` and //. If two-byte character is used, it is not treated as comment.

### 1-4 Assignment of channel number

The assignment of measurement data CH numbers differs between the RD-7300 and RD-7300-E.

RD-7300

The CH number of the measuring instrument is assigned.

RD-7300-E

Unused channel numbers during measurement are deleted, and new numbers are re-assigned with the remaining data.

The argument specified in the expanded channel of RD-7300 is automatically rewritten so that RD-7300-E refers to the same data. No manual rewriting required.

RD-7300		RD-7300-E	
TMR-321	<input checked="" type="checkbox"/> CH1 : STRAIN	(Input Ch.)	CH1 : STRAIN
	<input checked="" type="checkbox"/> CH2 : WEIGTH		CH2 : WEIGTH
	<input type="checkbox"/> CH3 : CH_03		<b>CH3</b> : TEST_A
	<input type="checkbox"/> CH4 : CH_04		CH4 : TEST_C
	<input checked="" type="checkbox"/> <b>CH5</b> : TEST_A		<b>CH5</b> : TEST_D
	<input type="checkbox"/> CH6 : TEST_B		<b>CH6</b> : COUNT
	<input checked="" type="checkbox"/> CH7 : TEST_C		CH7 : INCL
	<input checked="" type="checkbox"/> <b>CH8</b> : TEST_D		
TMR-353	<input checked="" type="checkbox"/> <b>CH9</b> : COUNT	<div>The unused channels at the time of measurement (CH3, CH4, CH6, CH11 ~) are deleted and reassigned.</div>	
	<input checked="" type="checkbox"/> CH10 : INCL		
	<input type="checkbox"/> CH11 : CH_11		
	<input type="checkbox"/> CH12 : CH_12		
	<input type="checkbox"/> CH13 : CH_13		
	<input type="checkbox"/> CH14 : CH_14		
	<input type="checkbox"/> CH15 : CH_15		
(Ex. Ch.)	NO1 : COUNT32 =CNT32( <b>CH9</b> )	(Ex. Ch.)	NO1 : COUNT32 =CNT32( <b>CH6</b> )
	NO2 : SUM =CH( <b>5</b> )+CH( <b>8</b> )		NO2 : SUM =CH( <b>3</b> )+CH( <b>5</b> )
	NO3		NO3
	NO4		NO4
	NO5		NO5
	⋮		⋮

\* Expanded CH argument is automatically rewritten

## 2 List of functions

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Functions are classified for each functional capability as shown below.

- Information function
  - NO (expanded CH NO number)
  - NPEAK (data No)
  - NVALLEY (data No)
- Numerical function
  - ABS (value or formula)
  - LN (value or formula)
  - LOG10 (value or formula)
  - PI ()
  - SQRT (value or formula)
  - IROUND (value or formula)
  - SGN (value or formula)
- Statistical function
  - NAVE (data No1 [, data No2, ...])
  - NMAX (data No1 [, data No2, ...])
  - NMIN (data No1 [, data No2, ...])
  - NSUM (data No1 [, data No2, ...])
- Trigonometric function
  - ACOS (value or formula)
  - ASIN (value or formula)
  - ATAN (value or formula)
  - COS (value or formula)
  - NATAN (X coordinate data No, Y coordinate data No)
  - SIN (value or formula)
  - TAN (value or formula)
- Measurement information function
  - CH (CH number)
  - CLK ()
- Specific calculation function
  - CNT32 (First CH data NO of unit)
  - NEMAX (X-axis data No, Y-axis data No, Z-axis data No, Young's modulus, Poisson's ratio)
  - NEMIN (X-axis data No, Y-axis data No, Z-axis data No, Young's modulus, Poisson's ratio)
  - NEX (X-axis data No, Y-axis data No, Young's modulus, Poisson's ratio)
  - NEY (X-axis data No, Y-axis data No, Young's modulus, Poisson's ratio)
  - NFSUB (data No)
  - NFX5 (data No, quintic equation coefficient a, b, c, d, e, f)
  - NPDEG (X-axis data No, Y-axis data No, Z-axis data No)
  - NSMAX (X-axis data No, Y-axis data No, Z-axis data No)
  - NSMIN (X-axis data No, Y-axis data No, Z-axis data No)
  - NTEMAX (X-axis data No, Y-axis data No, Z-axis data No, Young's modulus, Poisson's ratio)
  - NTSMAX (X-axis data No, Y-axis data No, Z-axis data No)
  - NTR (data No, cycle)

### 3 Function reference

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#### ABS (value or formula)

This function returns the absolute value. The absolute value is the value itself excluding sign (+, -).

##### Example of use

If data No1: -135,  
the result of =ABS(NO(1)) is 135

##### Reference

CH() function

NO() function

#### ACOS (value or formula)

This function returns the arc cosine of a specified value.

##### Example of use

The result of =ACOS (-0.5) is 2.09 ( $2\pi/3$  radian)  
The result of =ACOS(-0.5)\*180/PI() is 120 (degrees)

##### Reference

PI() function

#### ASIN (value or formula)

This function returns the arc sine of a specified value.

##### Example of use

The result of =ASIN(-0.5) is -0.52 ( $-\pi/6$  radian)  
The result of =ASIN(-0.5)\*180/PI() is -30 (degrees)

##### Reference

PI() function

#### ATAN (value or formula)

This function returns the arc tangent of a specified value.

##### Example of use

The result of =ATAN(1) is 0.79 ( $\pi/4$  radian)  
The result of =ATAN(1)\*180/PI() is 45 (degrees)

##### Reference

PI() function

**CH (CH number)**

This function returns the calculation value of a specified measurement CH number.

The same CH number can be used for other operational expression too.

**Example of use**

If data of CH1: -646,

The result of =CH(1)\*0.5 is -323

**Reference**

NO() function

**CLK ()**

This function returns the sampling clock (sec) at the time of measurement.

**Example of use**

When the sampling clock is 1 ms,

The result of =CLK() is 0.001

**CNT32 (First CH data NO of unit)**

This function returns the converted count value from data measured in the COUNT(32bit) mode.

For the argument, specify the data NO of the first channel of the unit that uses in the COUNT(32bit) mode.

*The specifiable arguments are different between RD-7300 and RD-7300-E*

*RD-7300 :First CH of unit (ex. :CH1, CH9, CH17...)*

*RD-7300-E :CH1 ~CH79*

$$\text{CNT32(Data NO)} = \text{Data1} + (\text{Data2} \times 30000)$$

Data1 : Data of CH given by argument

Data2 : Data of the next CH given by the argument

**Example**      The value of CH1                : 1500  
                     The value of CH2                : 12  
                     The result of =CNT32(CH1) is 361500

*An error does not occur even if data NO is set for an input mode other than COUNT(32bit), and the calculation result is returned according to the above formula.*

*When calculating the count using the CNT32 function, do not set a coefficient or offset for the input CH.*

*If the same calculation is performed on the expanded channel without using the CNT32 function, the correct value will not be gotten.*



### **COS (value or formula "radian")**

This function obtains the cosine of "radian" which is specified by value or formula.

#### **Example of use**

The result of =COS(1.047) is 0.5

The result of =COS(60\*PI()/180) is 0.5

#### **Reference**

ACOS() function

PI() function

### **IROUND (value or formula)**

This function returns the rounded value to the specified value or formula.

#### **Example of use**

The result of =IROUND(1.3) is 1

The result of =IROUND(2.6) is 3

#### **Application**

When the tenths place is rounded off for the data of data No1,  
if the data of data No1: 1053,  
the result of =IROUND(NO(1)/100)\*100 is 1100

### **LN (value or formula)**

This function returns the natural logarithm of a value that is given as an argument.

If the value is 0 or less, it does not return the value.

#### **Example of use**

The result of =LN(86) is 4.45

#### **Reference**

LOG10() function

### **LOG10 (value or formula)**

This function returns the common logarithm (logarithm with base 10) of a value.

If the value is 0 or less, the result is not returned.

#### **Example of use**

The result of =LOG10(86) is 1.93

#### **Reference**

LN() function

**NATAN (X coordinate data No, Y coordinate data No)**

This function returns the arc tangent of X-Y coordinate indicated by specified X coordinate and Y coordinate.

**Example of use**

If NO1 of expanded CH (X coordinate ): 0  
 NO2 of expanded CH (Y coordinate ): 1,  
 the result of =NATAN(NO1,NO2)\*180/PI() is 90 (degrees)

**Reference**

PI() function

**NAVE (data No1 [, data No2, ...])**

This function returns the average value of data No that is given as an argument.

If the argument contains error, blank cell, or disconnection data, it does not return the value.

**Example of use**

If data of expanded CH NO1 to 4: -135, -125, -153, -127,  
 the result of =NAVE (NO1, NO2, NO3, NO4) is -135

**Reference**

NSUM() function

**NEMAX (X-axis data No, Y-axis data No, Z-axis data No, Young's modulus, Poisson's ratio)**

This function obtains the maximum principal stress of rectangular rosette gauge.

For the argument, input X-axis data No, Y-axis data No, Z-axis data No, Young's modulus, and Poisson's ratio in series.

**Example of use**

Young's modulus = 205,900 (MPa) Poisson's ratio = 0.3  
 If CH1 (X-axis) of CH number: -561  
 CH2 (Y-axis) of CH number: 1561  
 CH3 (Z-axis) of CH number: -801  
 the result of =NEMAX(CH1, CH2, CH3,205900,0.3) is  
 413.0 (MPa)

**Reference**

NEMIN() function  
 NSMAX() function  
 NSMIN() function  
 NPDEG() function

**NEMIN (X-axis data No, Y-axis data No, Z-axis data No, Young's modulus, Poisson's ratio)**

This function obtains the minimum principal stress of rectangular rosette gauge.

For the argument, input X-axis data No, Y-axis data No, Z-axis data No, Young's modulus, and Poisson's ratio in series.

**Example of use**

Young's modulus=205,900(MPa) Poisson's ratio=0.3  
If CH1 (X-axis) of CH number: -561  
CH2 (Y-axis) of CH number: 1561  
CH3 (Z-axis) of CH number: -801,  
the result of =NEMIN(CH1, CH2, CH3,205900,0.3) is  
-118.8 (MPa)

**Reference**

NEMAX() function  
NSMAX() function  
NSMIN() function  
NPDEG() function

**NEX (X-axis data No, Y-axis data No, Young's modulus, Poisson's ratio)**

This function obtains X-axis principal stress of 2-axis gauge.

For the argument, input X-axis data No, Y-axis data No, Young's modulus, and Poisson's ratio in series.

**Example of use**

Young's modulus=205,900(MPa) Poisson's ratio=0.3  
If CH1 (X-axis) of CH number: -561  
CH2 (Y-axis) of CH number: 1561,  
the result of =NEX(CH1, CH2,205900,0.3) is -21.0 (MPa)

**Reference**

NEY() function  
NEMAX() function  
NEMIN() function  
NPDEG() function

**NEY (X-axis data No, Y-axis data No, Young's modulus, Poisson's ratio)**

This function obtains Y-axis principal stress of 2-axis gauge.

For the argument, input X-axis data No, Y-axis data No, Young's modulus, and Poisson's ratio in series.

**Example of use**

Young's modulus=205,900(MPa) Poisson's ratio=0.3  
If CH1 (X-axis) of CH number: -561  
CH2 (Y-axis) of CH number: 1561,  
the result of =NEY(CH1, CH2,205900,0.3) is 315.1 (MPa)

**Reference**

NEX() function  
NEMAX() function  
NEMIN() function  
NPDEG() function

**NFSUB (data No)**

This function returns the deviation from the previous data for the data number given as an argument.

By its nature, it does not return a value for the first time.

**Example of use**

Previous data of No1: 100

Data of No1: 90

The result of =NFSUB(NO1) is -10

**NFX5 (data No, quintic equation coefficient a, b, c, d, e, f)**

This function obtains the result of quintic expression of data No given as an argument.

**Example of use**

If data of NO1 of expanded CH: 28

Quintic equation coefficient a:  $1.6 \times 10^{-11}$

Quintic equation coefficient b:  $-3.1 \times 10^{-8}$

Quintic equation coefficient c:  $2.1 \times 10^{-5}$

Quintic equation coefficient d:  $-5.6 \times 10^{-3}$

Quintic equation coefficient e: 1.2

Quintic equation coefficient f: 1.4,

the result of

=NFX5(NO1,1.6e-11,-3.1e-8,2.1e-5,-5.6e-3,1.2,1.4) is 31

**NMAX (data No1 [, data No2, ...])**

This function returns the maximum value in data No that is given as an argument.

If the argument contains error, blank cell, or disconnection data, the data of the argument is excluded from the target of comparison.

**Example of use**

If values of NO1 to NO4 of expanded CH: 135, 125, 153, 127

the result of =NMAX(NO1, NO2, NO3, NO4) is 153

**Reference**

NMIN() function

**NMIN (data No1 [, data No2, ...])**

This function returns the minimum value in data No that is given as an argument.

If the argument contains error, blank cell, or disconnection data, the data of the argument is excluded from the target of comparison.

**Example of use**

If values of NO1 to NO4 of expanded CH: 135, 125, 153, 127

the result of =NMIN(NO1, NO2, NO3, NO4) is 125

**Reference**

NMAX() function

#### NO (NO number)

This function returns the calculation value of NO number of the specified expanded CH. This function is used for carrying out an operation among data.

##### Example of use

=NO(1)+NO(2)  
=ABS(NO(1)) etc.

##### Reference

CH() function

#### NPEAK (data No)

This function returns the peak value of the specified data No.

*RD-7300 displays the peak value during monitoring, however, RD-7300-E obtains the peak value based on the beginning value of the measured values, so the value during measurement may vary from the value of data file.*



##### Example of use

=NPEAK(CH1)  
=NPEAK(NO1) etc.

##### Reference

NVALLEY() function

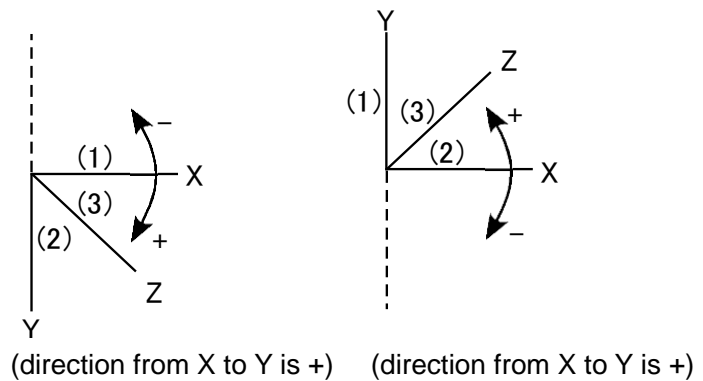
**NPDEG (X-axis data No, Y-axis data No, Z-axis data No)**

This function obtains the maximum principal strain direction of rectangular rosette gauge.

For argument, input X-axis data No, Y-axis data No, and Z-axis data No in series.

The principal strain direction and the direction of gauge axis have a relationship shown below.

The calculation value is indicated between the first quadrant and the fourth quadrant.



The number in brackets shown in the figure indicates the gauge axis number.

**Example of use**

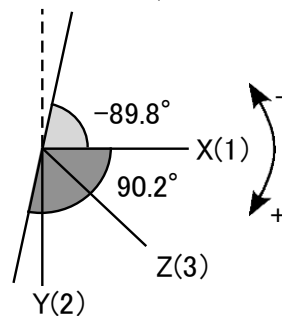
If the calculation value exceeds 90 degrees,

if CH1 (X-axis) of CH number: 1.7

CH2 (Y-axis) of CH number: 3.412

CH3 (Z-axis) of CH number: 2.55,

the result of =NPDEG(CH1, CH2, CH3) is -89.8 (degrees)

**Reference**

NEMAX() function

NEMIN() function

NSMAX() function

NSMIN() function

### NSMAX (X-axis data No, Y-axis data No, Z-axis data No)

This function obtains the maximum principal strain of rectangular rosette gauge.

For argument, input X-axis data No, Y-axis data No, and Z-axis data No in series

#### Example of use

If CH1 (X-axis) of CH number: -561  
CH2 (Y-axis) of CH number: 1561  
CH3 (Z-axis) of CH number: -801,  
the result of =NSMAX(CH1, CH2, CH3) is  
2179 ( $\times 10^{-6}$  strain)

#### Reference

NSMIN() function  
NEMAX() function  
NEMIN() function  
NPDEG() function

### NSMIN (X-axis data No, Y-axis data No, Z-axis data No)

This function obtains the minimum principal strain of rectangular rosette gauge.

For argument, input X-axis data No, Y-axis data No, and Z-axis data No in series.

#### Example of use

If CH1 (X-axis) of CH number: -561  
CH2 (Y-axis) of CH number: 1561  
CH3 (Z-axis) of CH number: -801,  
the result of =NSMIN(CH1, CH2, CH3) is  
-1179( $\times 10^{-6}$  strain)

#### Reference

NSMAX() function  
NEMAX() function  
NEMIN() function  
NPDEG() function

### NSUM (data No1 [, data No2, ...])

This function returns the sum of data No. that is given as an argument.

If the argument contains error, blank cell, or disconnection data, it does not return the value.

#### Example of use

If data of expanded CH NO1 to CH NO4  
: -135,-125,-153,-127,  
the result of =NSUM(NO1, NO2, NO3, NO4) is -540

#### Reference

NAVE() function

**NTEMAX (X-axis data No, Y-axis data No, Z-axis data No, Young's modulus, Poisson's ratio)**

This function obtains the maximum shear stress of rectangular rosette gauge.

For argument, input X-axis data No, Y-axis data No, Z-axis data No, Young's modulus, and Poisson's ratio in series.

**Example of use**

Young's modulus = 205,900 (MPa) Poisson's ratio=0.3

If CH1 (X-axis) of CH number: -561

CH2 (Y-axis) of CH number: 1561

CH3 (Z-axis) of CH number: -801,

the result of

=NTEMAX(CH1, CH2, CH3, 205900, 0.3) is 265.9(MPa)

**Reference**

NTSMAX() function

**NTR (data No, cycle)**

This function returns the difference between the value of data number and a multiple of cycle value (if the value of data number is negative, sum of the value of data number and a multiple of cycle value). The returned value V is  $0 \leq V < \text{Cycle}$ .

For the argument, input data No and cycle in series.

**Example of use**

If NO1 of expanded CH: 480

cycle: 360,

the result of =NTR(NO1, 360) is 120

**NTSMAX (X-axis data No, Y-axis data No, Z-axis data No)**

This function obtains the maximum shear strain of rectangular rosette gauge.

For argument, input X-axis data No, Y-axis data No, and Z-axis data No in series.

**Example of use**

If CH1 (X-axis) of CH number: -561

CH2 (Y-axis) of CH number: 1561

CH3 (Z-axis) of CH number: -801,

the result of =NTSMAX(CH1, CH2, CH3) is

$3358 \times 10^{-6}$  strain

**Reference**

NTEMAX() function



#### NVALLEY (data No)

This function returns the valley value of the specified data No.  
*RD-7300 displays the valley value during monitoring, however, RD-7300-E obtains the valley value based on the beginning value of the measured values, so the value during measurement may vary from the value of data file.*

##### Example of use

=NVALLEY(CH1)  
=NVALLEY(NO1) etc.

##### Reference

NPEAK() function

#### PI ()

This function returns circular constant ( $\pi$ ).  
PI() function does not take an argument, however, be sure to add the brackets ().

##### Example of use

The result of =SIN(PI()/2) is 1

#### SGN (value or formula)

This function obtains the signum that depends on the specified value or formula.  
Signum is calculated as  $\text{SGN}(0) = 0$ ,  $\text{SGN}(x) = x/|x|$ .

##### Example of use

The result of =SGN(0) is 0  
The result of =SGN(-30) is -1

#### SIN (value or formula "radian")

This function obtains the sine of "radian" that depends on the specified value or formula.

##### Example of use

The result of =SIN(PI()/2) is 1  
The result of =SIN(30\*PI()/180) is 0.5

##### Reference

ASIN() function  
PI() function

#### SQRT (value or formula)

This function returns the square root of value that is given as an argument.  
If the value is negative, it does not return the value.

##### Example of use

The result of =SQRT(16) is 4

**TAN (value or formula "radian")**

This function obtains the tangent of "radian" that depends on the specified value or formula.

**Example of use**

The result of =TAN(45\*PI()/180) is 1

**Reference**

ATAN() function

PI() function

Real Time Data Acquisition Software **RD-7300**

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