User's Manual

WX103
MXLOGGER

YOKOGAWA
Yokogawa Electric Corporation

IM WX103-01E
3rd Edition

Foreword

This user's manual contains useful information about the functions and operating procedures of the MXLOGGER and lists the handling precautions of the software. To ensure correct use, please read this manual thoroughly before beginning operation. After reading this manual, keep it in a convenient location for quick reference in the event a question arises during operation.
The following manuals are provided in addition to this one. Read them along with this manual.

Manual Title	Manual No.	Description
MX100 Data Acquisition Unit User's Manual	IM MX100-01E	Contains useful information about the functions, installation and wiring procedures, and handling precautions of the MX100 Data Acquisition Unit.
MX100 Data Acquisition Unit Installation and Connection Guide	IM MX100-72E	Describes concisely the installation and wiring procedures of the MX100 Data Acquisition Unit.

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- 3rd Edition: June, 2007

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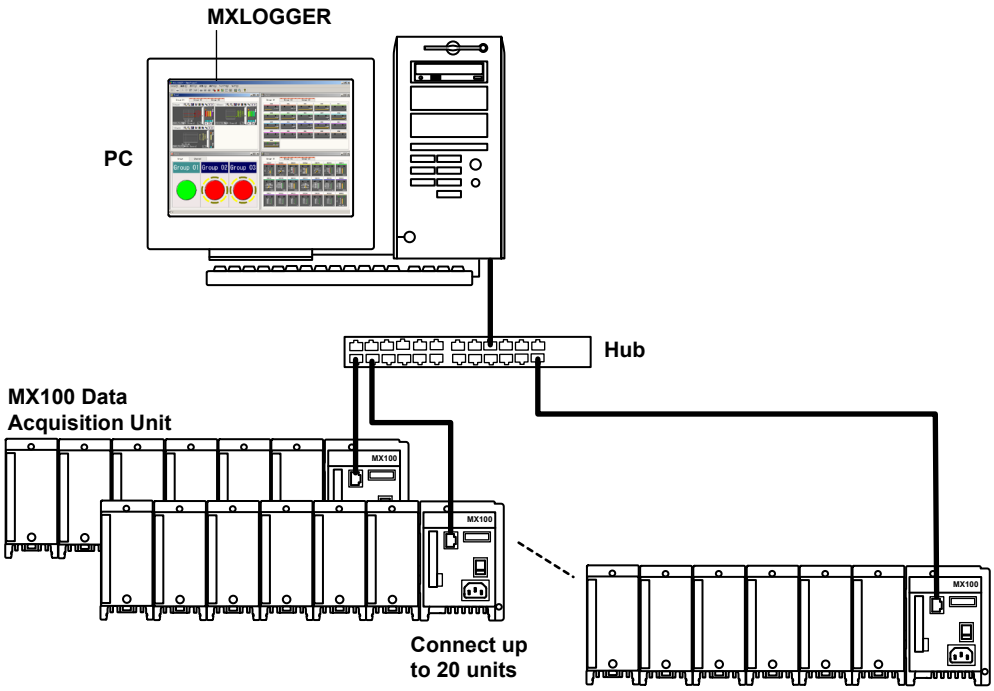
Contents

1.1 Functional Overview of MXLOGGER

Functional Overview

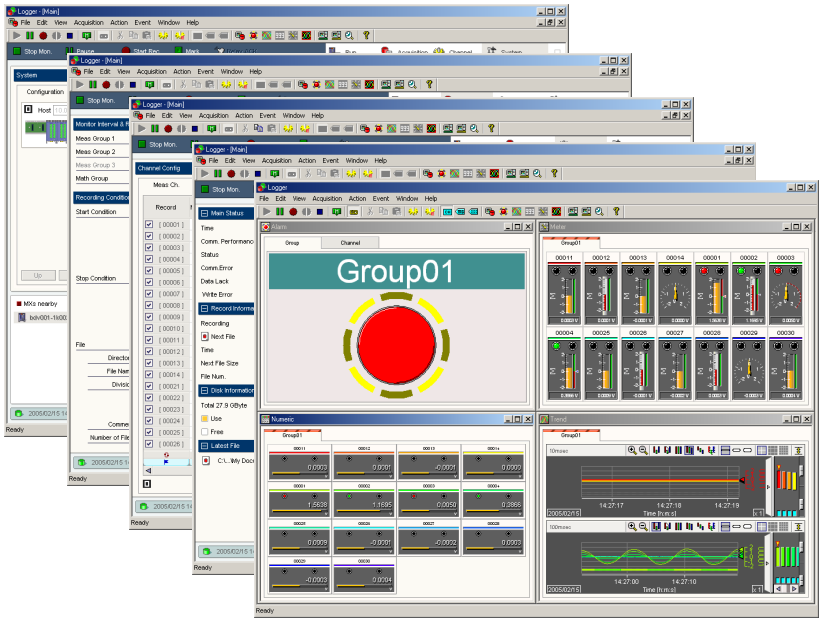
The MXLOGGER can be used to connect up to twenty MX100 Data Acquisition Units (hereinafter, “MX100s”) to a single PC and acquire data.



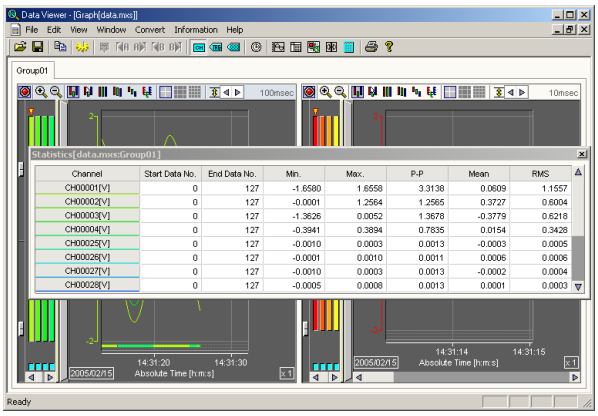
The MXLOGGER consists of the following three software programs: Logger, Viewer, and Calibrator.

- **Logger**

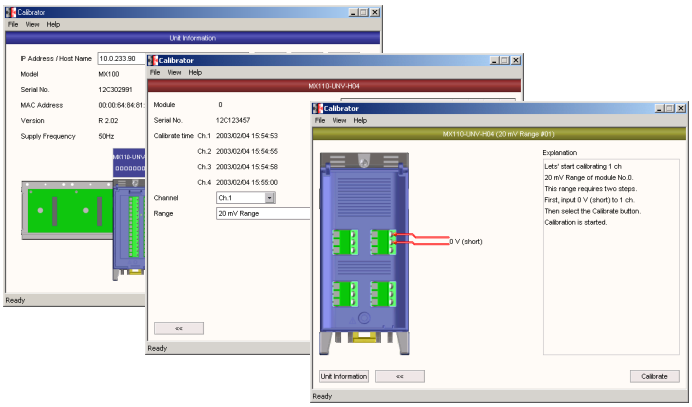
  You can use the Logger to set data record conditions and measurement conditions, set up computations, set alarms, set digital outputs, start/stop data monitoring, display the monitor, record (save) data, and so on.



- **Viewer**
  You can use the Viewer to (1) display measured and computed data that has been recorded (saved), (2) read values and perform statistical computation over an area using cursors, and (3) convert the measured and computed data into various file formats such as Excel.



- **Calibrator**
  You can use the Calibrator to calibrate the MX100 universal input modules.



Logger

On the Logger, the following screens (windows) are used to enter settings.

- **System Screen**
  On this screen, you can search for MX100s in the same network segment, set communication parameters of the detected MX100s such as the IP address, select the MX100s to be connected, select measurement groups (groups that have the same monitor interval/record interval), and perform other functions.

- **Acquisition Screen**
  You can set the monitor interval of the measured data, the record step of the data, and the record start/stop conditions. You can also set the save destination and the file name of the record data, set up the file division function, and perform other functions.

- **Channel Setup Screen**
  For each measurement channel, you can set (1) the measurement conditions such as the input mode, measurement range, and measurement span, (2) whether to carry out measurement/recording, and (3) the alarm conditions. You can also set up computations such as the four arithmetical operations using the measured data (computation channel setting), set the signal to be output from the digital output module (DO channel setting), and set up modules such as the analog output and PWM output modules.

- **General Display Settings Window**
  For each display group, you can set the channels to be displayed, display scale, display zone, trip point (the value of interest in the waveform display), display color, and other parameters.

On the Logger, you can also perform operations such as starting/stopping data monitoring, displaying the monitor window, pausing the monitor, and starting/stopping data recording, as well as displaying the Run screen used to monitor the communication status of the connected MX100s and the status of data monitoring and recording.
The types of monitor windows available are the Trend Monitor that displays the data using waveforms, the Numeric Monitor that displays the data using instantaneous values, the Meter Monitor that displays the data using three types of meters, and the Alarm Monitor that displays the status of alarm occurrences.

- **Monitor Screen**
  You can display the waveforms and numerical values of the measured/computed data, change the display method, start/stop the recording of the measured/computed data, pause the monitor, manually control the digital output, analog output, and PWM output, and perform other operations. When the monitor is paused, you can display the past data and read computed/measured values using cursors.

In addition to the operations described above, you can also save the setup data (project), print a list of settings, and perform other operations from the menu.

Viewer

You can load the measured/computed data that was recorded (saved) in the past and carry out the following operations.

- Synchronization
  When the data file is opened, the measurement time is corrected based on the time information of the PC.
- Display waveforms and numeric values
- Display a list of alarms and marks
- Change the display conditions (group assignments, scale, trip point, display color and other parameters)
- Read the data values using cursors
- Perform statistical computation over an area
- Display and add marks
- Print the displayed waveform and numeric values
- Save or load display conditions
- Display the file information
- Convert data formats (ASCII, Excel, and Lotus)
- Print data (waveforms, numeric values, alarm/marker list, cursor values, statistics over an area, and computed values)
- Using templates and save
- Join divided CF files

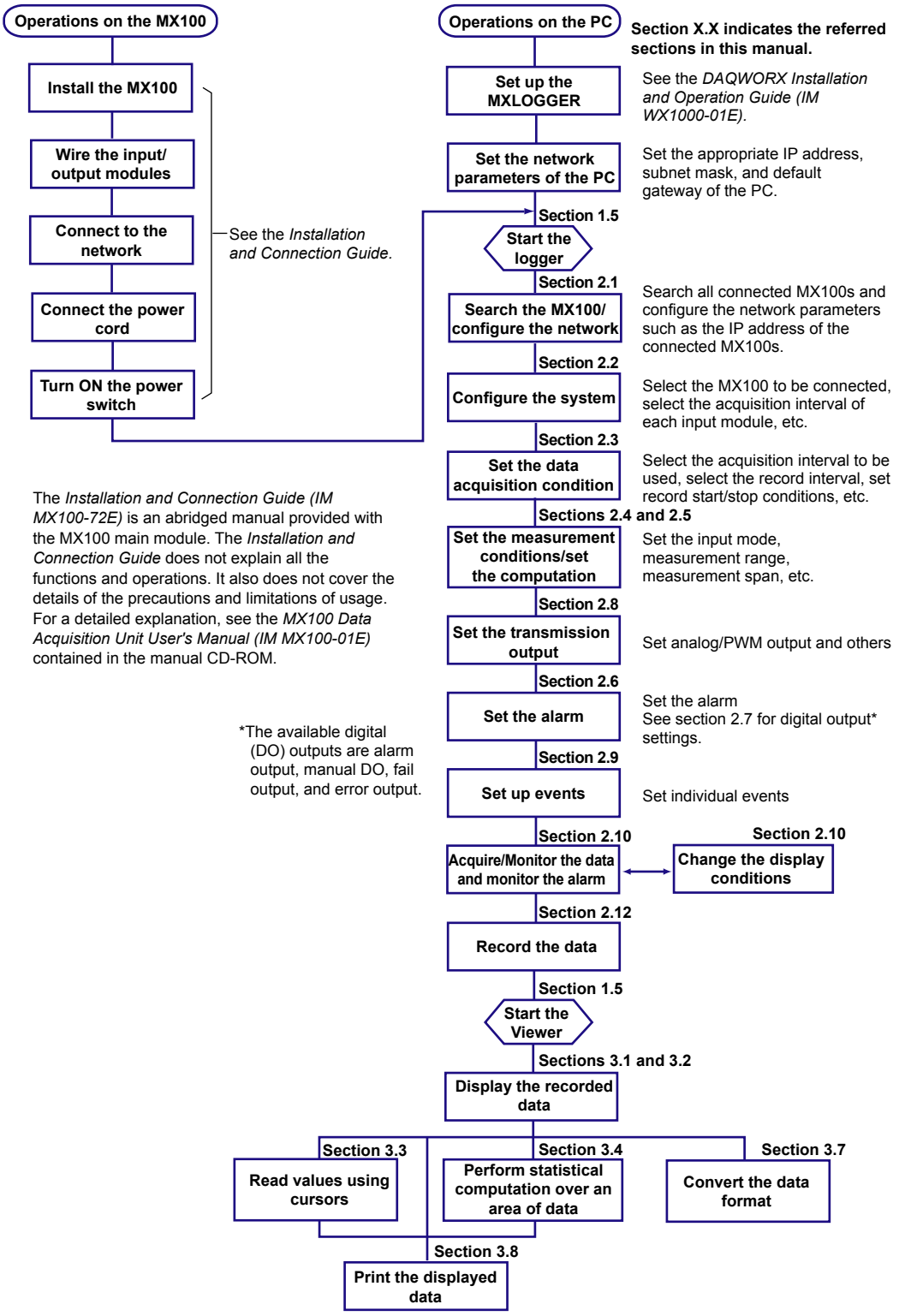
Calibrator

You can connect to the MX100, display the modules that can be calibrated, and carry out calibration of each measurement range.

1.2 MXLOGGER Operation Guide

Flow of Operations during Installation

The figure below shows the general flow of operation when the MX100 is installed initially.



The *Installation and Connection Guide (IM MX100-72E)* is an abridged manual provided with the MX100 main module. The *Installation and Connection Guide* does not explain all the functions and operations. It also does not cover the details of the precautions and limitations of usage. For a detailed explanation, see the *MX100 Data Acquisition Unit User's Manual (IM MX100-01E)* contained in the manual CD-ROM.

*The available digital (DO) outputs are alarm output, manual DO, fail output, and error output.

Overview of Operations

This section briefly explains the operations to be carried out after “Start the Logger” described in the “Flow of Operations during Installation” on the previous page.

Note

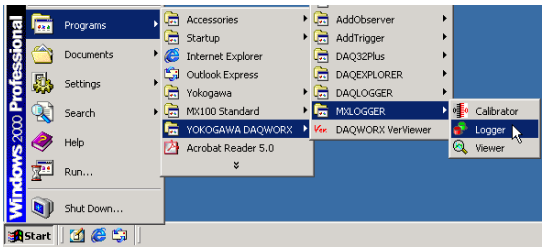
For details on other operations, see the referred sections in this manual or other manuals indicated in “Flow of Operations during Installation.”

Before carrying out the procedure below, connect the PC and the MX100s locally via a hub and turn ON the power to the MX100s that are to monitor the data as indicated on page 1-1.

Start the Logger

For details, see section 1.5.

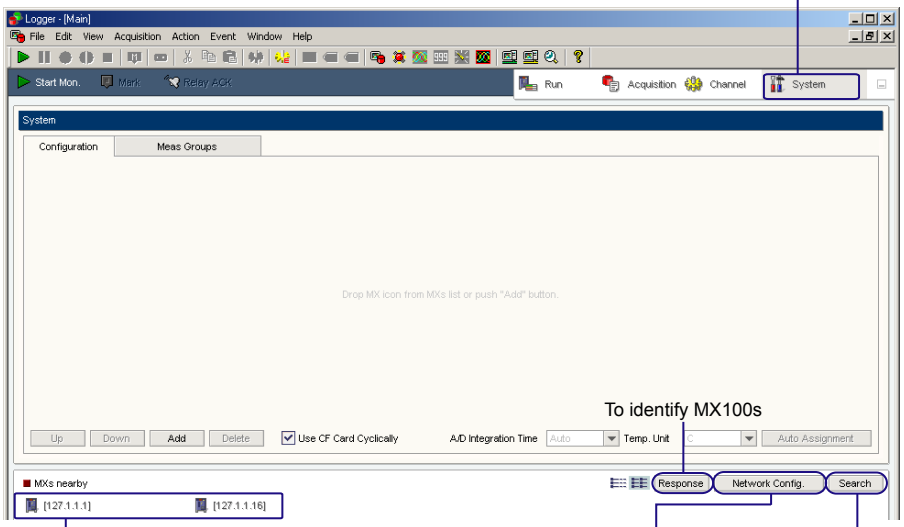
Choose Programs > YOKOGAWA DAQWORX > MXLOGGER > Logger.
The Logger starts and the main window opens.



Search the MX100/ configure the network

For details, see section 2.1.

System screen of the Main window



① Click here.

To identify MX100s

② Click Search.

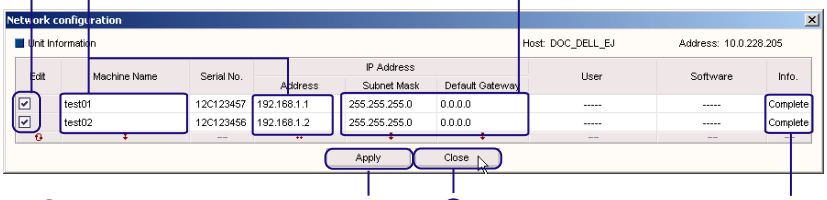
③ Displays the MX100s that are connected in the same segment.

④ Click Network Config.
The Network Config. dialog box opens.

⑤ Select the check boxes for the MX100s whose network settings you wish to change.

⑥ Enter the machine name and IP address.

Default settings can be used for local connection.



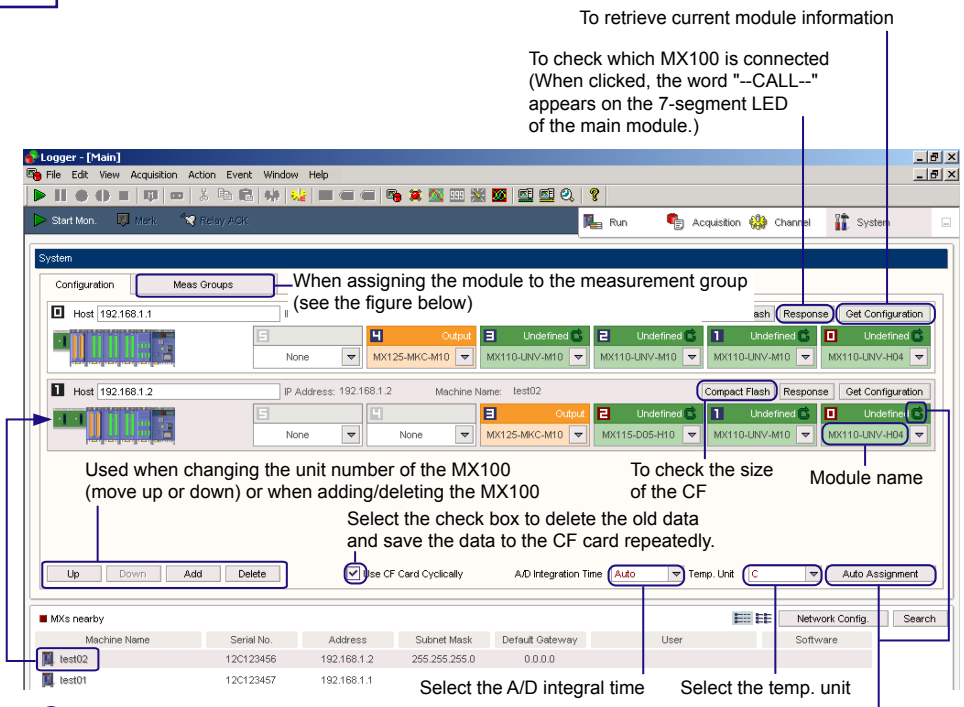
⑦ Click Apply button. Click OK in the dialog box that opens.

⑧ Click Close.

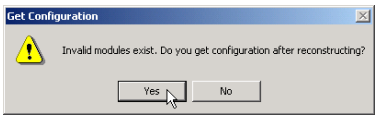
When the network configuration is successful, Complete appears.

Configure the system

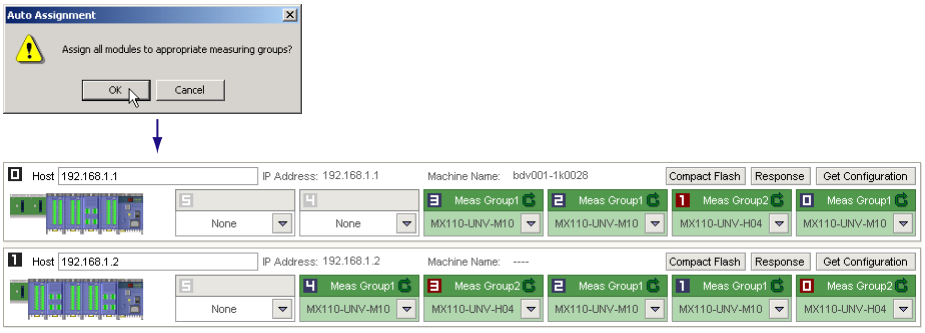
For details, see section 2.2.



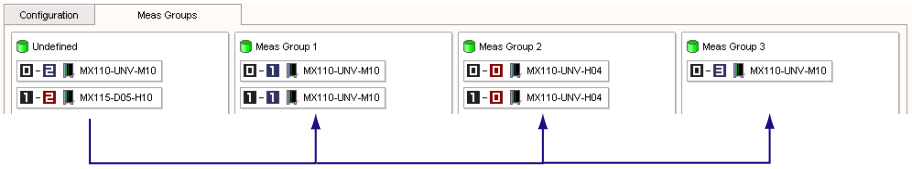
① **Drag and drop the icon of the MX100 you wish to connect to the Configuration area.**
Click Yes when the dialog box below opens.



② **Click the button or the word Undefine to select the measurement group on each module or click Auto Assignment to automatically assign suitable measurement groups.**
If you click the Auto Assignment button, the Auto Assignment dialog box opens.
Click OK.



Assign measurement groups in the Meas Groups area



Drag and drop the module icon to the Meas Group area.

Set the data acquisition condition

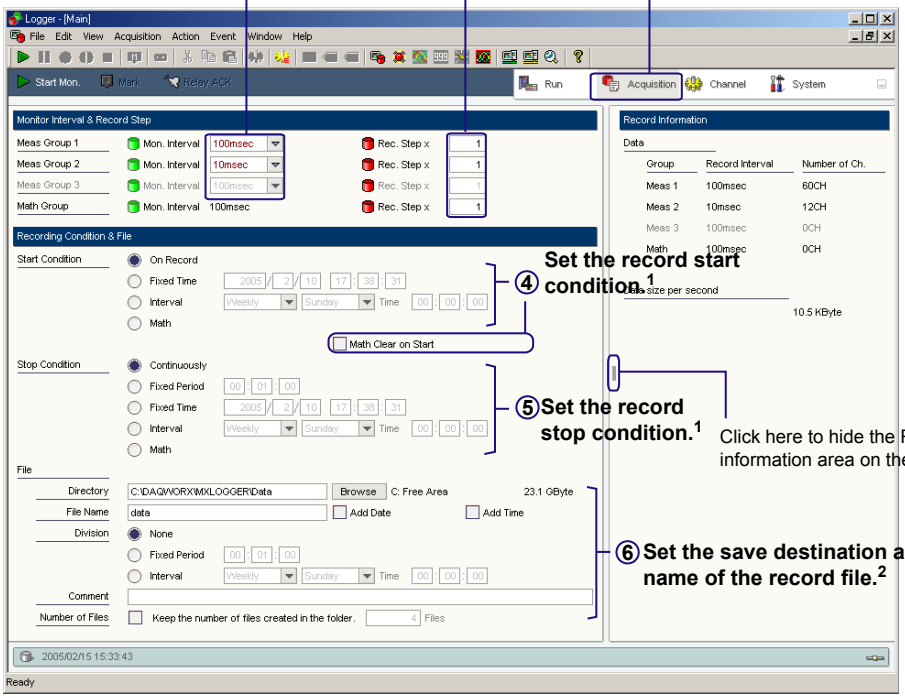
For details, see section 2.3.

②Set the acquisition interval for each measurement group.

You cannot set the acquisition interval of measurement groups that do not have modules assigned in step ② of "Configure the system."

③Set the record step for each group.

①Click here.



④Set the record start condition.[1]

⑤Set the record stop condition.[1]

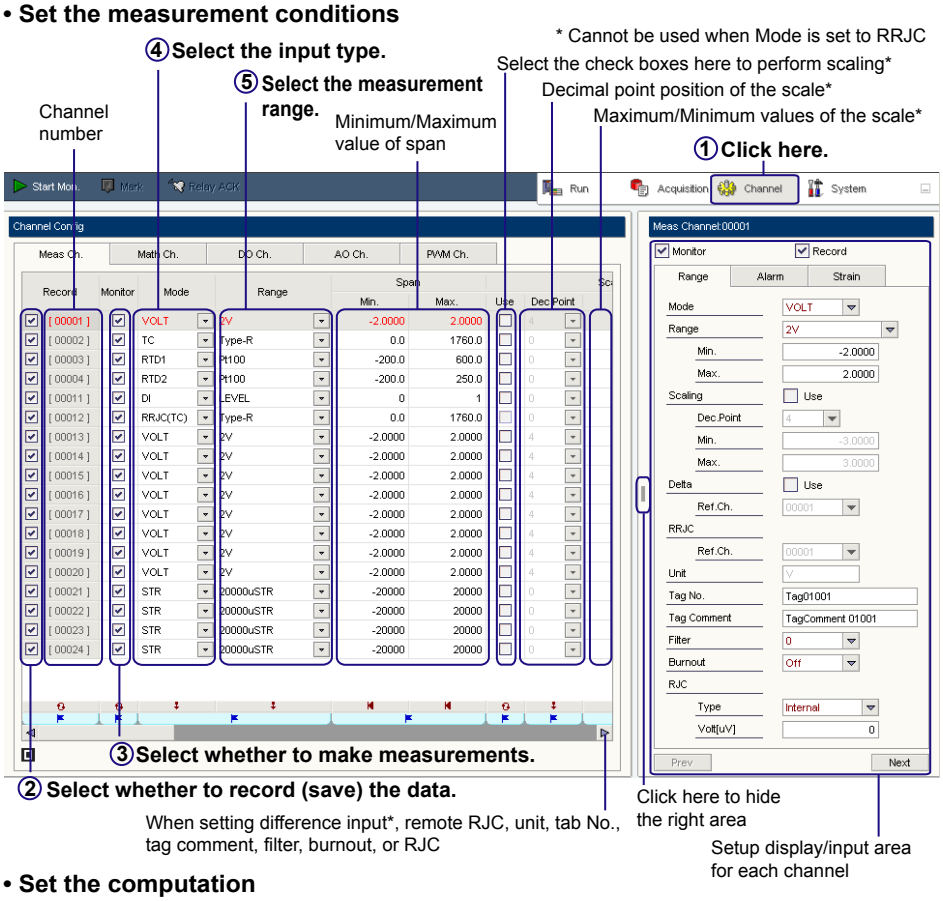
Click here to hide the Record information area on the right.

⑥Set the save destination and name of the record file.[2]

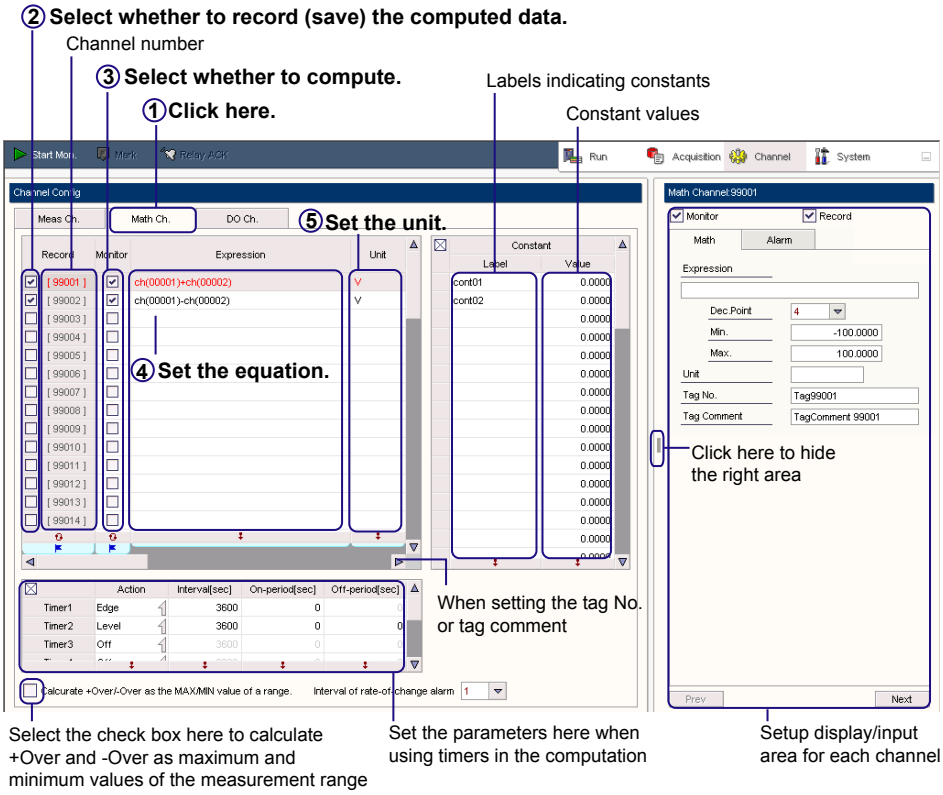
Set the measurement conditions/set the computation

For details, see section 2.4 and 2.5.

• Set the measurement conditions



• Set the computation



Set the alarm

For details, see section 2.6.

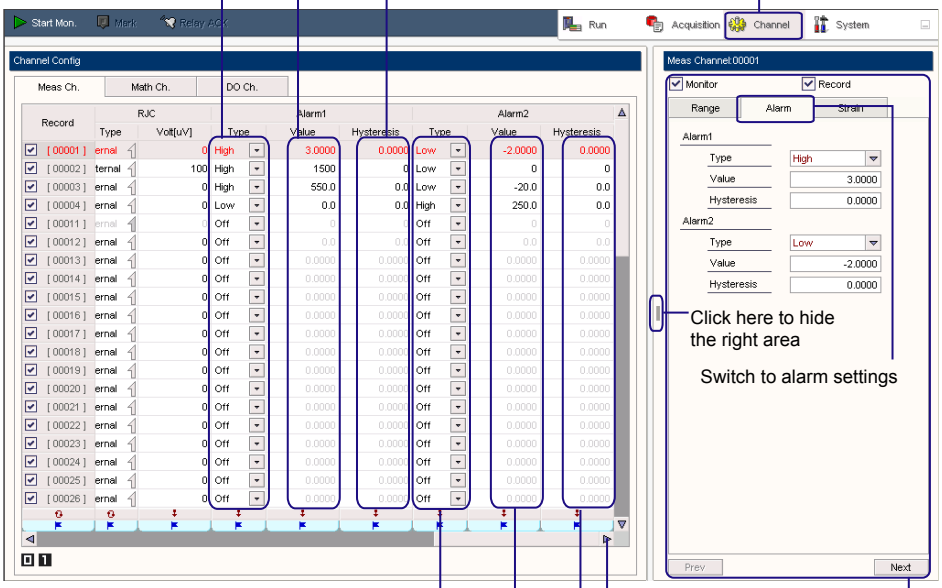
③Select the alarm 1 type.

④Set the alarm value of alarm 1.

⑤Set the hysteresis of alarm 1.

①Click here.

For measurement channels



⑥Set these items when setting two alarms.

Alarm 2 type

Alarm value of alarm 2

Hysteresis of alarm 2

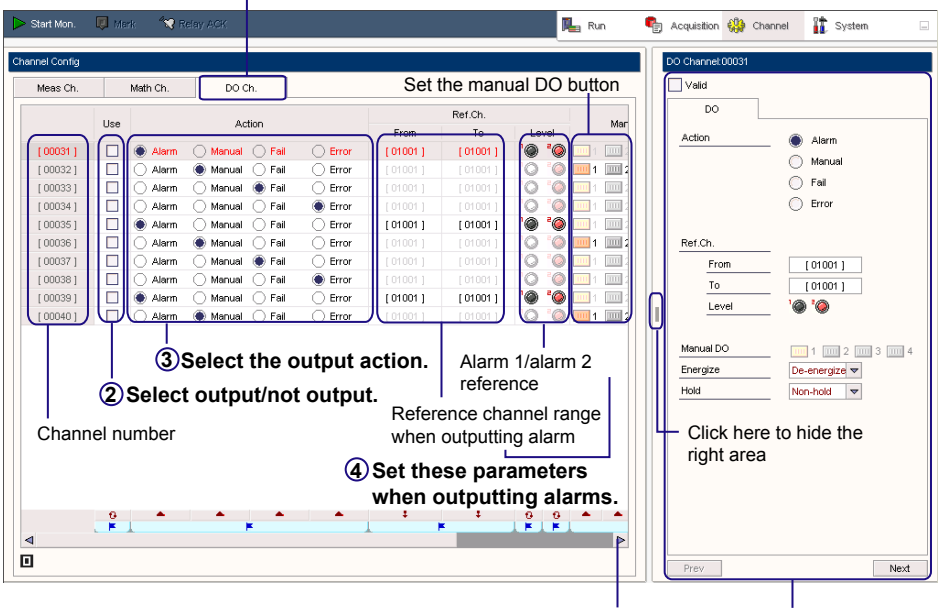
②Scroll the setup parameters to the right to display the alarm setup parameters.

Setup display/input area for each channel

Set the digital output

For details, see section 2.7.

①Click here.



③Select the output action.

②Select output/not output.

Channel number

Alarm 1/alarm 2 reference

Reference channel range when outputting alarm

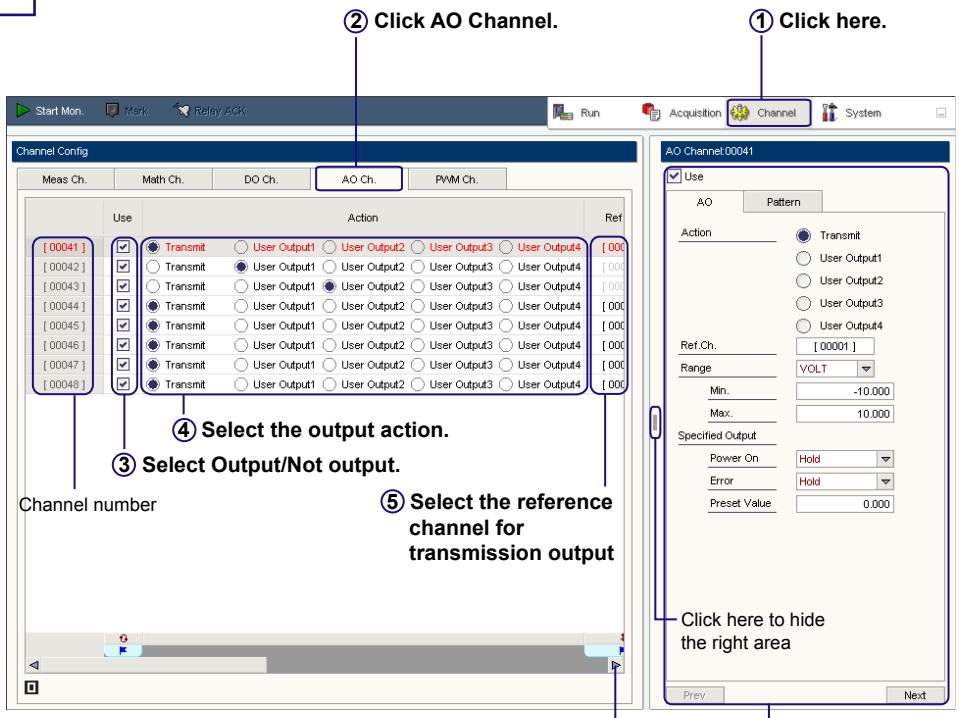
④Set these parameters when outputting alarms.

To set the energize/de-energize of output relay or hold/non-hold of output relay, scroll to the right.

Setup display/input area for each channel

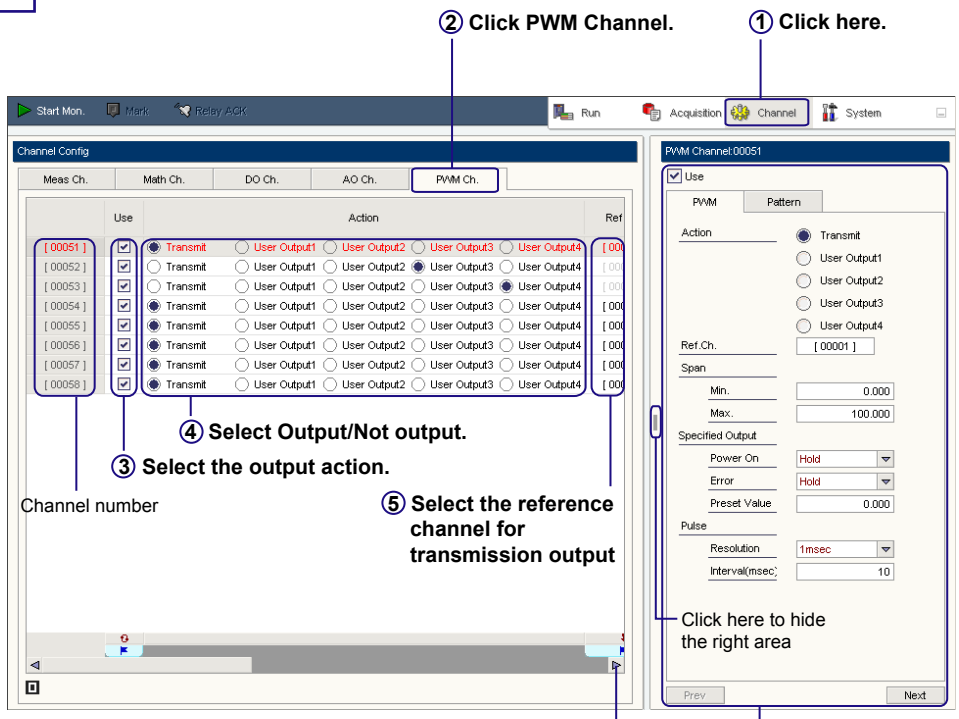
Set up analog output

For details, see section 2.8.



Set up PWM output

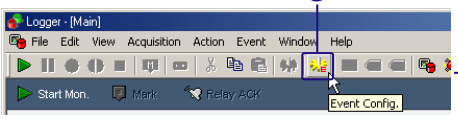
For details, see section 2.8.



Set up events

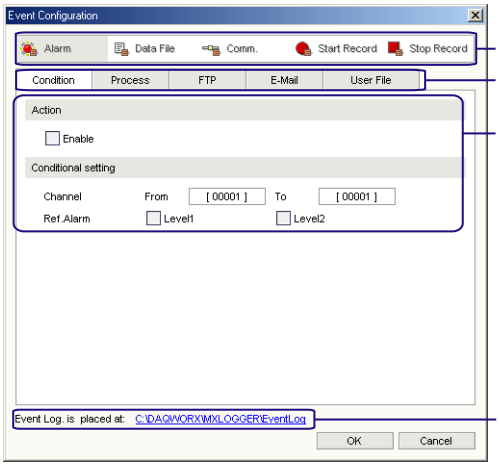
For details, see section 2.9.

①Click here.



The Event Setting window appears.

Event settings window



②Click the event to be set.

③3 Click or input items of the event to be set

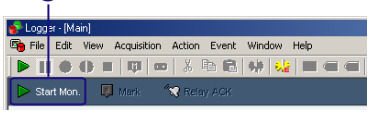
④Input or select each item

Click to open the folder containing the event log file

Start data recording, monitor the data, and monitor the alarm

For details, see section 2.10.

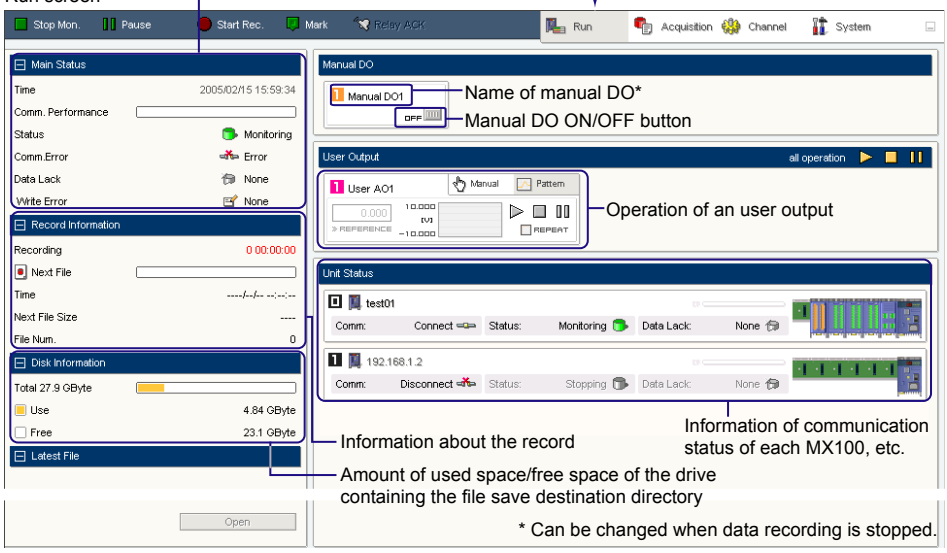
① Click here.



The Run screen appears when data acquisition is started.

Run screen

Main operating status of MXLOGGER and current time



Name of manual DO*

Manual DO ON/OFF button

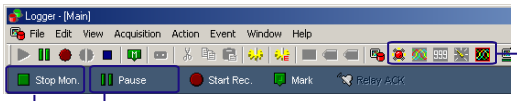
Operation of an user output

Information about the record

Information of communication status of each MX100, etc.

Amount of used space/free space of the drive containing the file save destination directory

* Can be changed when data recording is stopped.



To pause the display updating on the monitor

To stop data recording

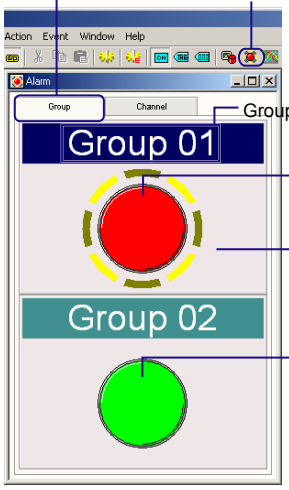
② Click the icon corresponding to the monitor you wish to display.

- Alarm monitor
- Trend monitor
- Digital monitor
- Meter monitor
- All Channel Monitor

- **Alarm Monitor**

To display alarm signals per display group

Click here.



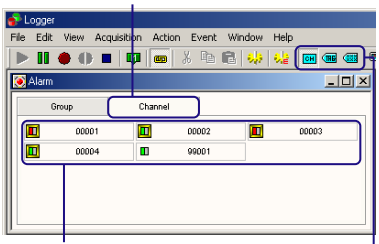
Group number

When an alarm occurs, yellow-green changes to red.

If unacknowledged alarms exist, a blinking yellow ring appears around the signal lamp.

Click here or choose Display-Alarm ACK from the Action menu to acknowledge the alarm. The outer ring disappears.

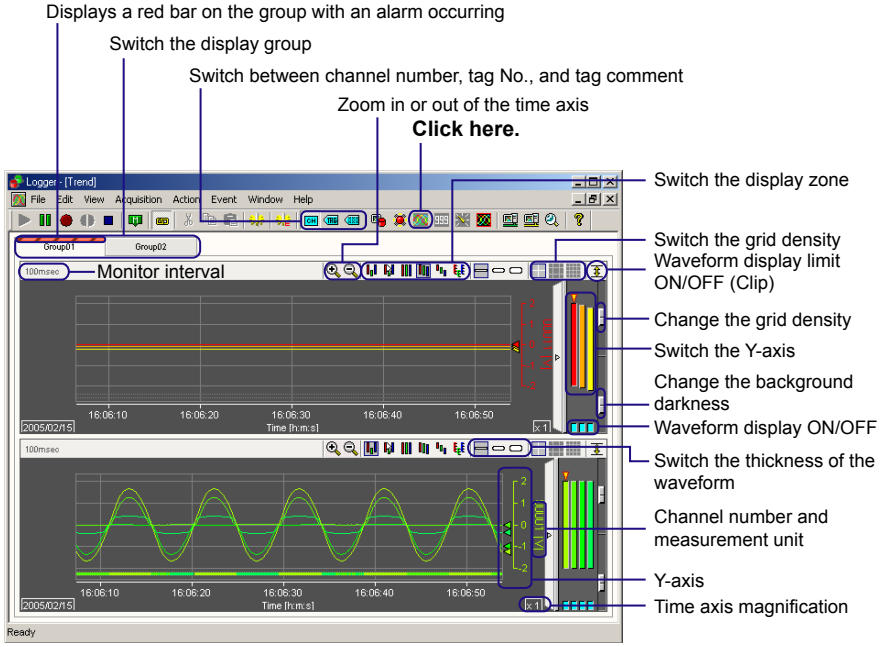
To display alarm signals per channel



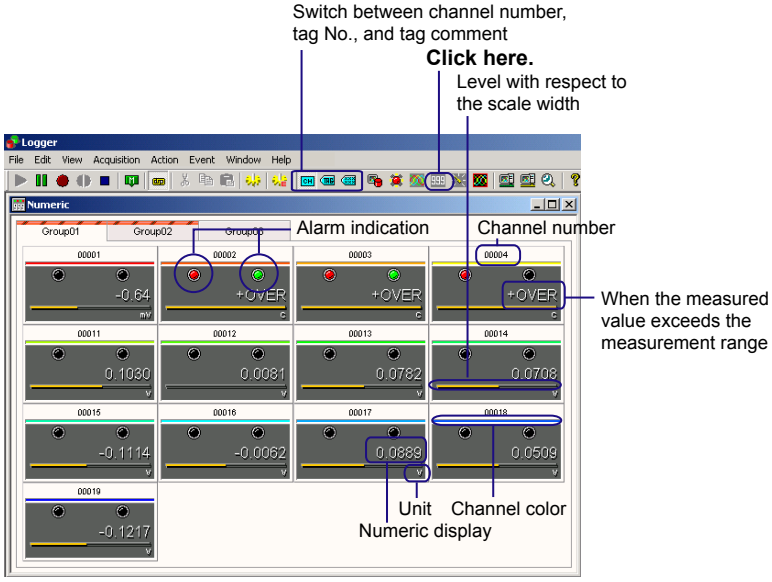
Alarm indication per Channel

Switch between channel number, tag No., and tag comment

- **Trend Monitor**

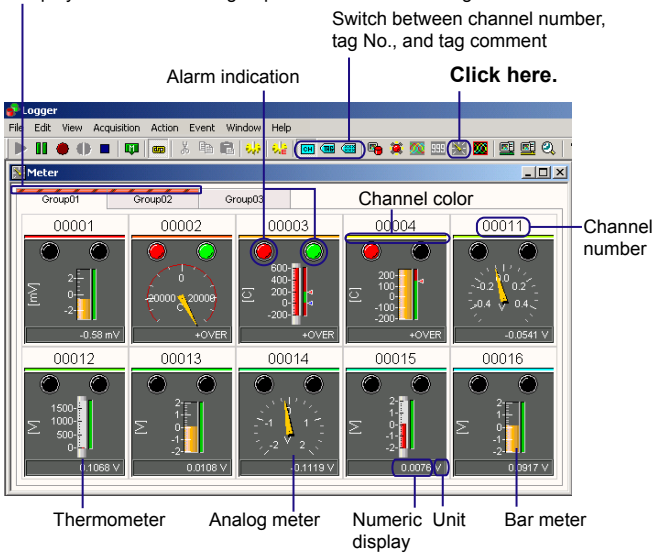


- **Numeric Monitor**

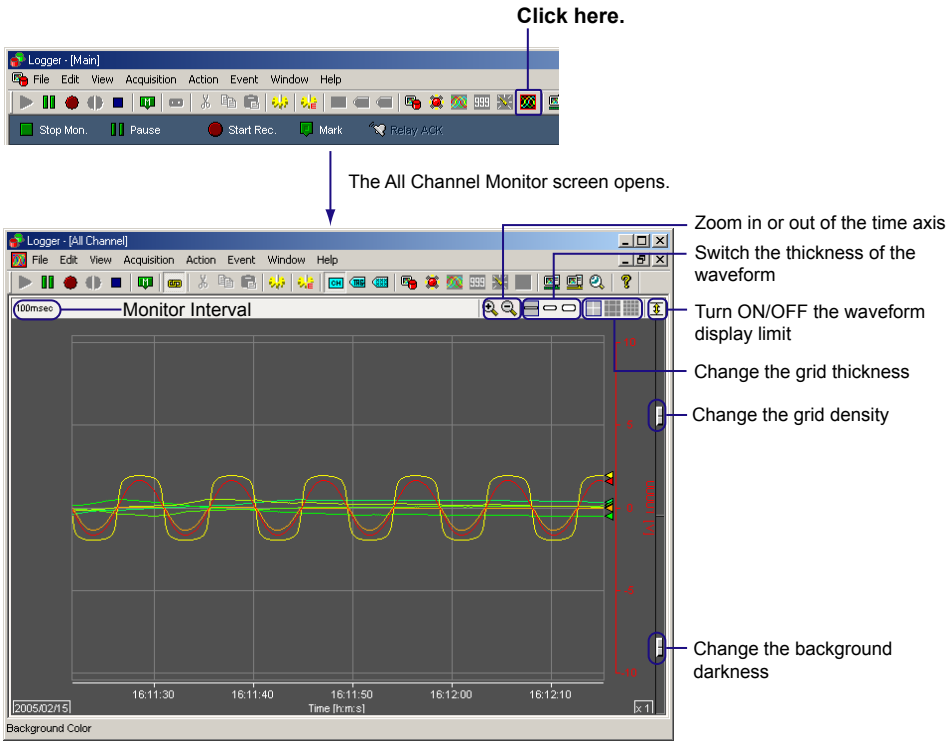


- **Meter Monitor**

Displays a red bar on the group with an alarm occurring



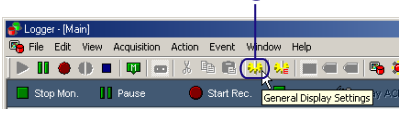
- **All Channel Monitor**



Change the display conditions

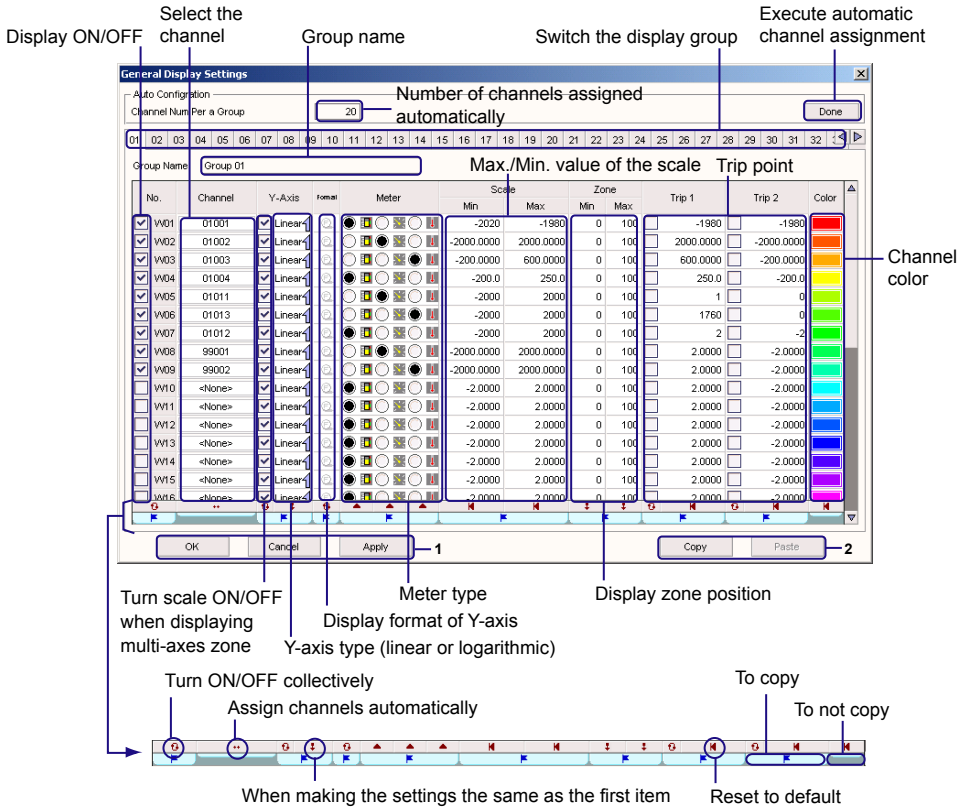
For details, see section 2.10.

① Click here while data acquisition is in progress



Displays the General Display Settings window

② Change the items on the General Display Settings window



1 To apply the setting changes, click OK. To not apply the changes, click Cancel. To apply the changes and keep the screen opened, click Apply.
2 To copy/paste the settings at the channel level, click the respective buttons.

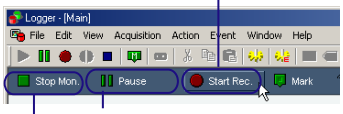
Record the data

For details, see section 2.12.

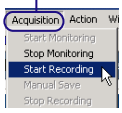
① Click the button or choose 1 Main from the Window menu

The Main window appears.

②Click the Start Recording button while monitoring the data, or choose Start Recording from the Acquisition menu.



or



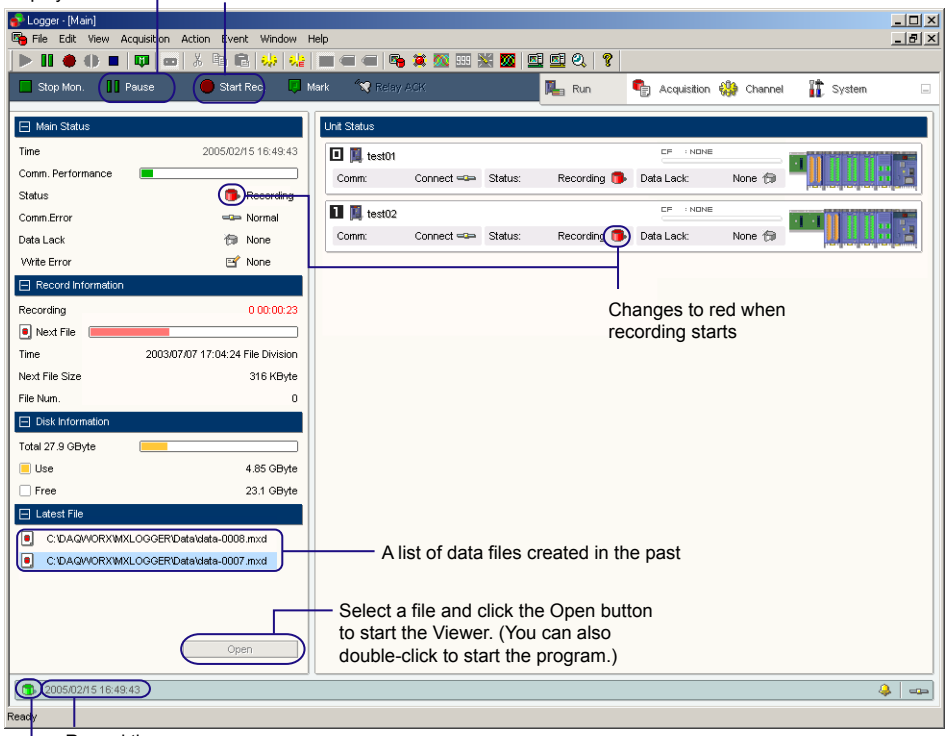
To pause the monitor display, click Pause or choose Pause from the Acquisition menu.

To stop acquisition, click Stop Recording or choose Stop Recording from the Acquisition menu.

To divide the data file, click Manual Save or choose Manual Save from the Acquisition menu.

To stop recording, click Stop Recording or choose Stop Recording from the Acquisition menu.

When Run is displayed



Changes to red when recording starts

A list of data files created in the past

Select a file and click the Open button to start the Viewer. (You can also double-click to start the program.)

Record time

Changes to red when recording starts

For the procedure for setting the record start conditions and setting the data file save destination and file name, see page 1-7.

Display when the program is waiting for the record start condition to be met

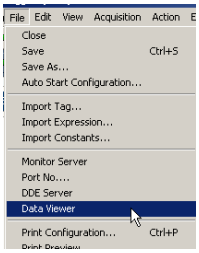
Display when processing record stop

Start the Viewer

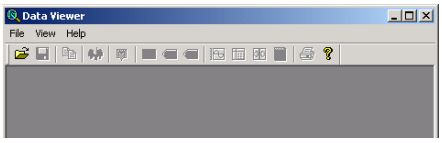
For details, see section 1.5.

Click the button on the Logger toolbar or choose Data Viewer from the File menu.

If the Logger is not running, choose Programs > YOKOGAWA DAQWORX > MXLOGGER > Viewer.



The Viewer window appears.

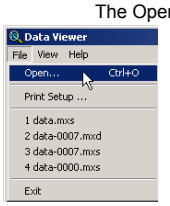


Display the recorded data

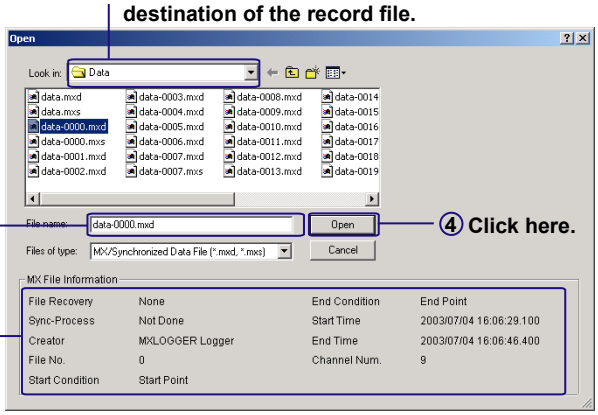
For details, see section 3.1 and 3.2.

① Click the button on the toolbar or choose Open from the File menu.

The Open dialog box opens.



② Select the folder that was specified as the save destination of the record file.

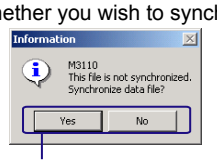


③ Select the file you wish to load.

④ Click here.

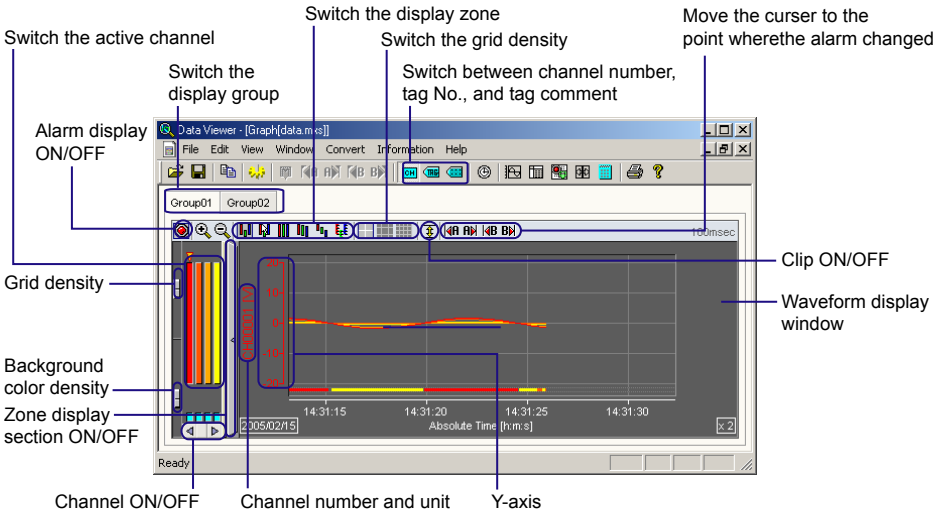
Information about the selected file

⑤ If you open a data file that was recorded using the Logger, a dialog box opens asking you whether you wish to synchronize the data file before the waveform display window opens.



⑥ Click Yes or No.

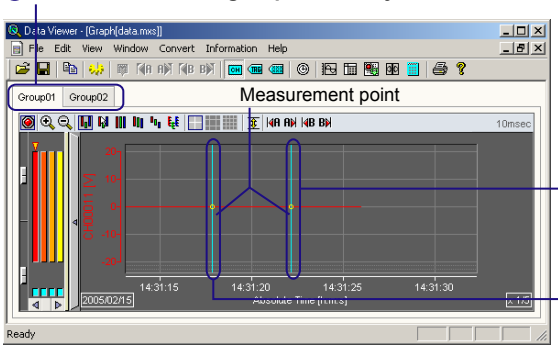
* The time stamp of the MX100 main module is attached to the data. The measurement time is corrected by synchronizing. If you are not synchronizing the data, a Select Unit No. dialog box opens. Select the unit.



Read values using cursors

For details, see section 3.3.

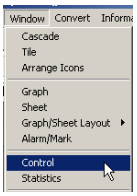
① Click the tab of the group in which you wish to read values using the cursors



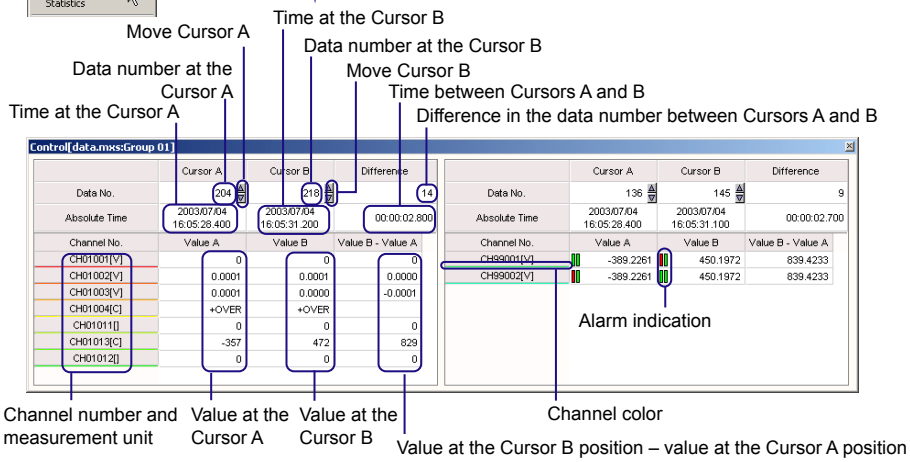
③ If you wish to read another point simultaneously, drag the cursor.
(Cursor B)

② Click the position where you wish to read the data value
(Cursor A)

④ From the Window menu, choose Control.



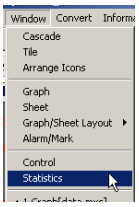
The Control window appears.



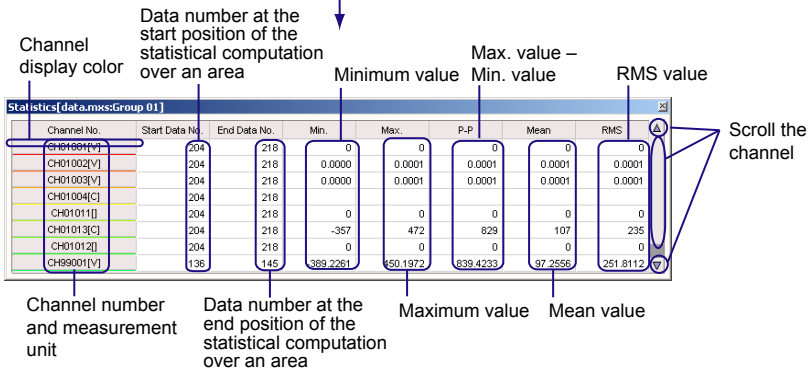
Perform statistical computation over an area of data

For details, see section 3.4.

① From the Window menu, choose Statistics.



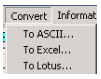
The Statistics window appears.



Convert the data format

For details, see section 3.6.

① From the Convert menu, choose To ASCII, To Excel, or To Lotus.

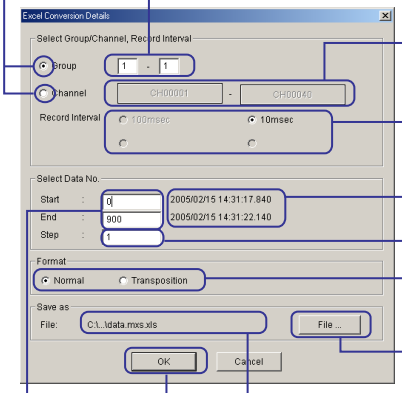


The respective conversion dialog box opens.

② Set the items in the conversion dialog box.

Select whether to set the range to be converted using groups or channels

Range of group numbers to be converted



Select the range of channels to be converted (Show the channel selection dialog box)

Select the record interval (Only the channels with the selected record interval will be converted)

Measurement time of the data atthe specified start and stop points

Step when converting data at certain intervals

Specify the format when converting files

When changing the save destination or file name

③ Click OK.

Save destination and file name

Data range to be converted
(You can specify the data range using the cursor before opening this dialog box.)

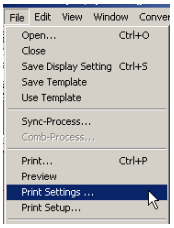
Print the displayed data

For details, see section 3.7.

① Show the window you wish to print

If multiple windows are opened, click the window you wish to print to make it active.

② From the File menu, choose Print Setting.

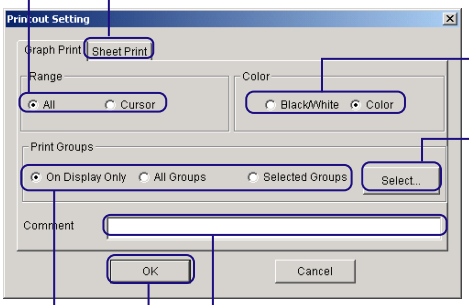


The Printout Setting dialog box opens.

③ Set the items in the Printout Setting dialog box.

Select whether to print all or the range specified by the cursors

Switch to settings for numeric values
(The only item for numeric printing is Range only.)



Select monochrome or color print

Select the groups when Selected Groups is selected (Show the group selection dialog box)

④ Click OK. Enter the comment to be printed

Select the group to be printed

⑤ From the File menu, choose Print.

In the Print dialog box that opens, click OK. Printing is executed.

1.3 PC System Requirements

PC

A PC that runs one of the OS above, and that meets the following CPU and memory requirements.

When Using Windows 2000 or Windows XP

Pentium 4, 1.6 GHz or faster

512 MB or more of memory

When Using Windows Vista

Pentium 4, 3 GHz or faster

2 GB or more of memory

Note

- The specifications above are for a desktop PC, not a notebook PC.
- Even if the PC meets the specifications above, monitoring/recording may not be possible as configured depending on the setup conditions (alarms, computations, etc.) on the Logger.

Operating System

Run DAQWORX under any of the following operating systems.

- Windows 2000 Professional SP4
- Windows XP Home Edition SP2
- Windows XP Professional SP2 (excluding Windows XP Professional x64 Edition)
- Windows Vista Home Premium (excluding the 64-bit edition)
- Windows Vista Business (excluding the 64-bit edition)

The language displayed by the software under different language versions of the OS are as follows.

OS Language	Software Language
Japanese	Japanese
Other	English

File System

NTFS is recommended. With FAT32, the number of files that can be saved in a single folder is much smaller. If the limit is reached and additional files cannot be saved, the software will not function normally. To prevent this, please periodically stop recording by the software and move the data to a different folder.

CD-ROM Drive

The drive is used to install the software.

Free Hard Disk Space and RPMs

Free disk space: 200 MB or more (more may be required depending on the amount of data to be acquired)

RPMs: 7200 rpm or faster recommended

Monitor

When Using Windows 2000 or Windows XP

A monitor supported by the OS of 1024 × 768 dpi or higher and 65,536 colors or more.

When Using Windows Vista

A video card recommended for use with Vista and a monitor supported by the OS of 1024 × 768 dpi or higher and 65,536 colors or more.

Printer and Mouse

Printer and mouse compatible with the OS that you are using.

Sound Board

A sound board is required for sounding the alarm on the PC when alarms occur.

Ethernet Port

An Ethernet compatible port (10BASE-T or 100BASE-TX (100BASE-TX recommended)).

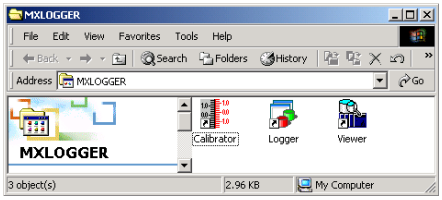
1.4 Setting Up MXLOGGER

Setup Procedure

Set up the MXLOGGER according to the *WX1000 DAQWORX Install & Operation Guide* (IM WX1000-01E) provided on the DAQWORX Installation CD.

Installation Result

If the software is properly installed, a folder named MXLOGGER is created in the specified directory (by default, C:*drive containing the OS*\DAQWORX). MXLOGGER is registered in the program list, and Logger, Viewer, and Calibrator are registered as in the sub list.



Note

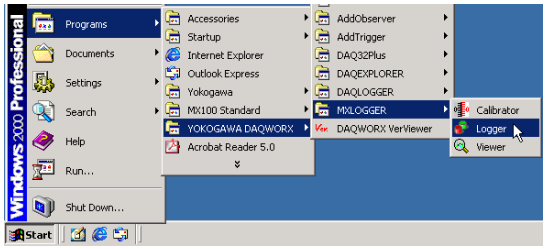
The Data folder and Work folder are created inside the Logger folder. The record files are saved in the Data folder. The Work folder is used to store temporary files by the Logger. Do not delete this folder.

1.5 Starting and Exiting Software Programs

Procedure

Starting the Software Programs

As shown in the figure below, choose **Start** > **Programs** > **YOKOGAWA DAQWORX** > **MXLOGGER** > **Logger**, **Viewer**, or **Calibrator**.



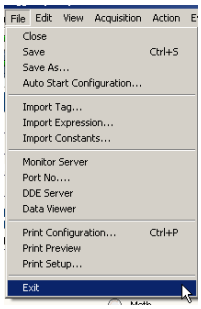
Note

If you enable the automatic start function, Logger starts automatically upon starting of monitoring/recording. For details, see section 2.3, “Setting the Data Acquisition Conditions.”

Exiting the Software

From the **File** menu, choose **Exit**.

The figure below shows an example for the Logger.



Note

When exiting the Viewer, a dialog box used to confirm whether the display settings are to be saved opens if the display settings have been changed.

2.1 Searching MX100 Data Acquisition Units and Configuring the Network

Procedure

Before carrying out the procedure below, turn ON the power to the relevant MX100s and connect the MX100s to the network using Ethernet cables.

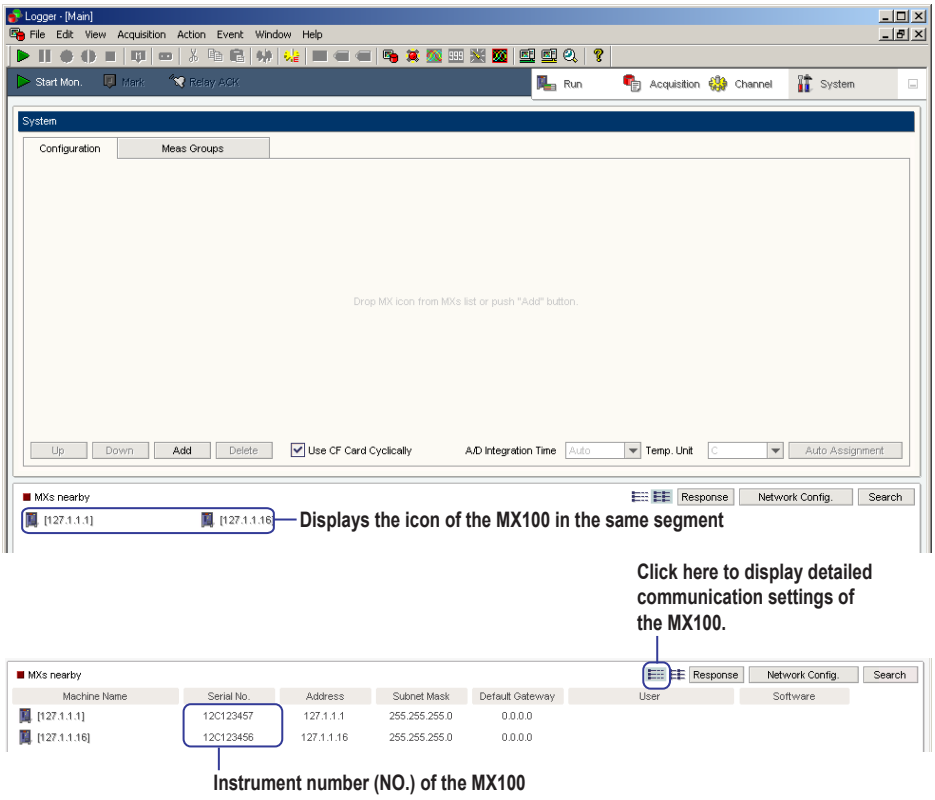
Note

- Connecting MX100s and the PC to a backbone network before proper IP addresses are assigned to the MX100s may adversely affect other connected devices on the network.
- **If running under Windows XP, connection problems may occur if the firewall function is enabled. For details, see the MX Standard Software User's Manual (IM MX180-01E).**

Searching for MX100s

When Starting the Logger for the First Time

1. Start the Logger according to the procedure given in section 1.5.
   The System screen of the Main window appears. Icons indicating the MX100s that are connected to the same network segment are displayed in the MXs nearby area.

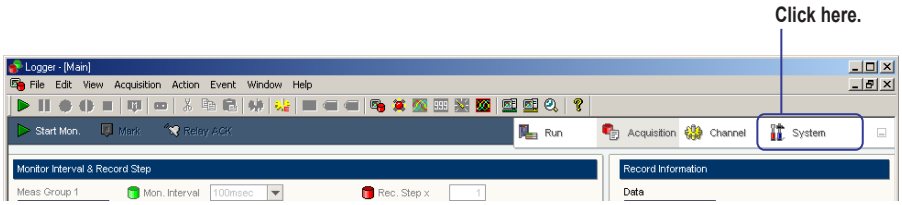


Note

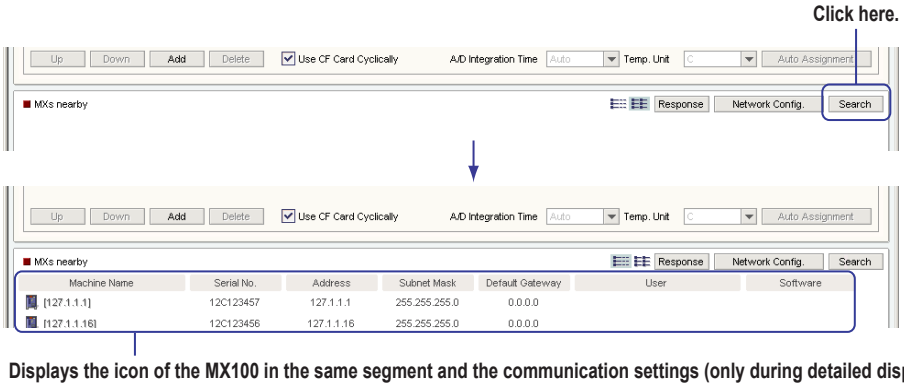
If multiple MX100s are connected in the same network segment, multiple icons are displayed. In this case, the instrument number that is marked on the name plate of the main module is displayed on the icon indicating the MX100 (Serial No. on the screen) allowing you to identify each MX100.

If the Logger Has Been Started Once Before

1. Start the Logger.
   The screen of the Main window that was displaying when you exited the Logger the previous time is displayed.
2. Click **System**.
   The System screen appears.

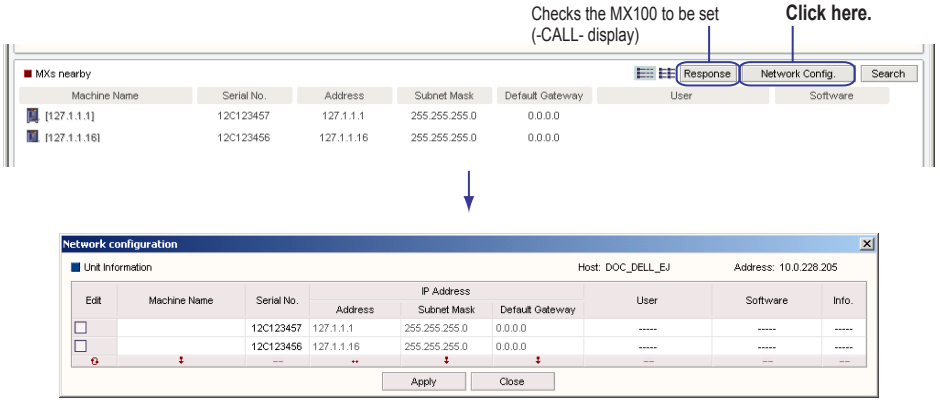


3. Click the **Search** button in the MXs nearby area.
   Icons indicating the MX100s that are connected to the same network segment are displayed in the MXs nearby area.

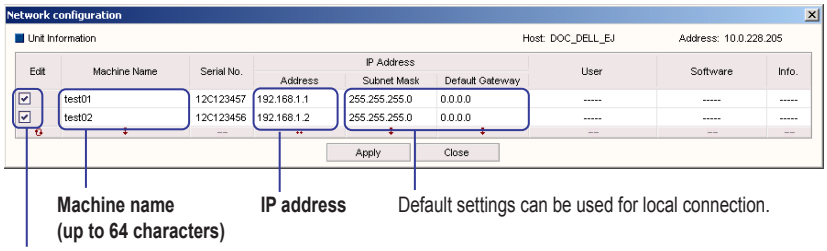


Setting Up the Network

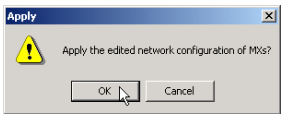
1. Click the **Network Config**. button in the MXs nearby area of the System screen.
   The Network Configuration dialog box opens.



2. Select the **Edit** check boxes of the MX100s whose network configuration you wish to change.
   The **Machine Name**, **Address**, **Subnet Mask**, and **Default Gateway** items turn into text boxes.



3. Refer to the explanations below, and enter the required information in each text box.
4. Click the **Apply** button.
   A dialog box with the message “Apply the edited network configuration of MXs?” appears.
5. Click **OK**.
   When the configuration is complete, the Info. column indicates Complete. If configuration fails, Fail is displayed.



6. Click the **Close** button of the Network Configuration dialog box.

Explanation

Machine Name
As necessary, you can enter a name that is easy to identify using up to 64 characters.

Serial ID
The instrument number (NO.) marked on the name plate of the main module.

IP Address (Address)
Enter the IP address to assign to the MX100. The default address is 127.1.1.XX (where XX is a unique number for the device). This default address cannot be used even when the MX100 is connected locally to the PC. You must change to a different address such as 192.168.1.XX (where XX is a value between 1 and 254). When making connections locally, do not set the PC to obtain the IP address automatically. Enter the IP address manually to an address other than the one that is to be assigned to the MX100.

Note

- To connect to the MX100 by entering a host name in the Host box in the Configuration area of the System screen, the host name (name used on the TCP/IP network) must be registered in a DNS server and the DNS server must be connected to the network. The MX100 does not have a function for registering host names to the DNS server. For the procedure for registering host names, consult your network administrator.
- To initialize all settings including the IP address to the their factory default values, turn OFF the power to the main module, turn OFF dipswitch number 5 on the main module, and turn ON the power. When the 7-segment LED displays bF, all settings are initialized. After confirming the bF display on the 7-segment LED, turn OFF the power to the main module, turn dipswitch number 5 back ON, and then turn ON the power to the main module.

Subnet Mask

Enter the mask value used when determining the subnet network address from the IP address. The default value is 255.255.255.0. When connecting to the PC locally, this value does not need to be changed. In this case, set the subnet mask on the PC also to 255.255.255.0.

Note

Consult your network administrator for the subnet mask value. You may not need to set the value.

Default Gateway

Set the IP address of the gateway (default gateway) used to communicate with other networks. The default value is 0.0.0.0. When connecting to the PC locally, this value does not need to be changed. In this case, you do not have to set the default gateway on the PC.

Note

Consult your network administrator for the IP address of the default gateway.

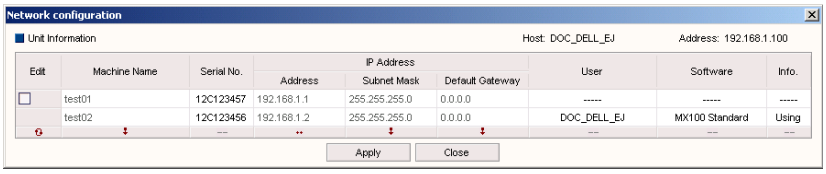
Connected User (User)

Displays the computer name of the PC that is connected to the MX100. This item is blank (- - - - -) if there is no PC connected to it.

Software

Displays the name of the software program that is connected to the MX100. This item is blank (- - - - -) if there is no software program connected to it.

- MXLOGGER: Logger of the MXLOGGER
- MX100 Standard: Integration Monitor of the MX100 Standard Software
- MX Calibrator: Calibrator of the MXLOGGER or the MX100 Standard Software
- API: Software application created using the MX100/DARWIN API (product sold separately)



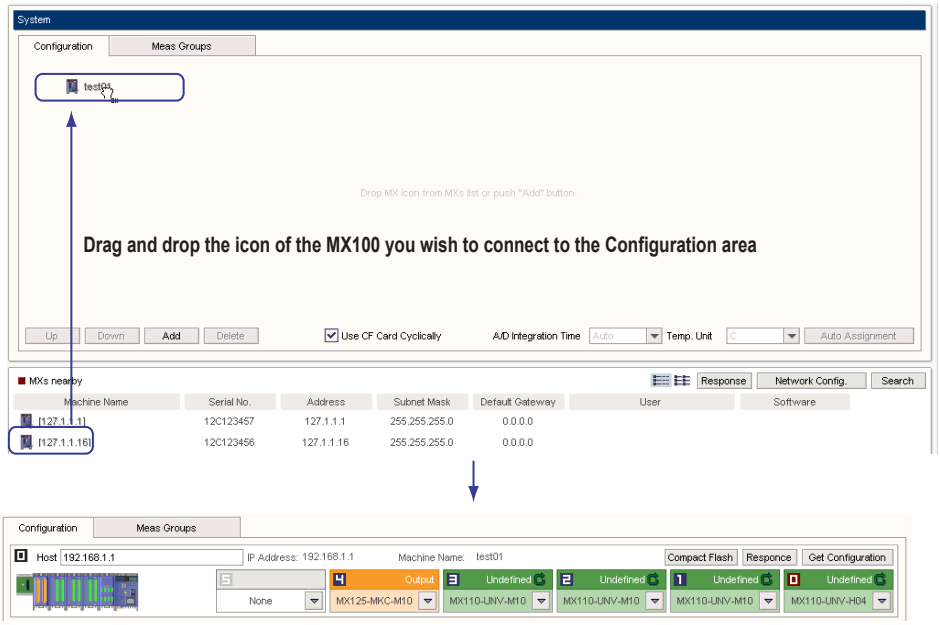
2.2 Configuring the System

Procedure

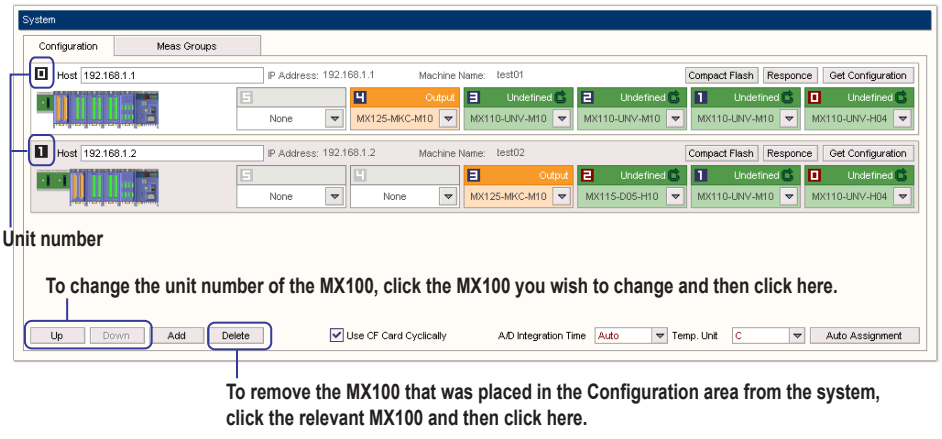
To perform the procedure below, you usually have the icons of the MX100s you wish to connect shown in the MXs nearby area of the System screen according the instructions given in section 2.1, “Searching MX100 Data Acquisition Units and Configuring the Network.”

Selecting the MX100s That Are to Monitor the Data

Drag the MX100 icon displayed in the MXs nearby area onto the Configuration area. A dialog box with the message “Invalid modules exist. Do you get configuration after reconstructing?” appears. Click **Yes**. To monitor the data from multiple MX100s, repeat this procedure.



The order in which the MX100 icon is dragged and dropped determines the unit number, which is the highest two digits of the channel number. The unit number of the first MX100 that is dragged and dropped is assigned the number 0. The following MX100s are assigned numbers 1 to 19 in order. If you wish to change the unit number, click the MX100 you wish to change and click the Up or Down button to move the display position up or down.

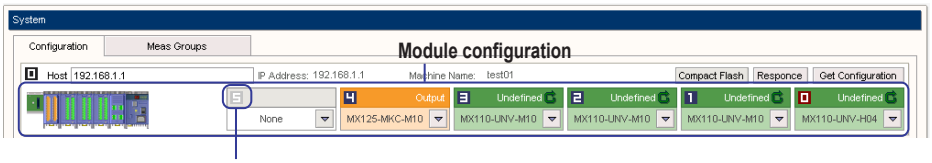


Note

Instead of dragging and dropping the icons onto the Configuration area, you can also drag and drop the icons to the respective measurement groups under Meas Groups. If you do so, all input modules of the MX100 are assigned to the measurement group where the icon was dropped.

Retrieving/Setting Module Configuration Information

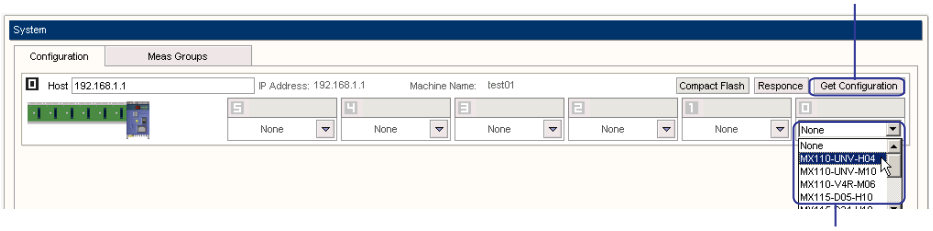
If the MX100 is connected to the network and is not being used by another user, the module information is automatically retrieved when you drag and drop the MX100 icon.



Slot number (see the MX100 Data Acquisition Unit User's Manual)
Red and blue indicate that a module with a minimum measurement interval of 10 ms and a module with a minimum interval of 100 ms are installed, respectively.

If the MX100 is being used by another user and you drag the MX100 icon, the module configuration is not retrieved. In this case, you select the modules by slots using the module selection list box. If the other user releases the connection after you have dragged and dropped the MX100 icon, you can click the Get Information button to retrieve the module configuration.

If another user drops the connection with this MX100, you can click here to retrieve the module configuration.



If the target MX100 is being used by another user, select the module by slots from here.

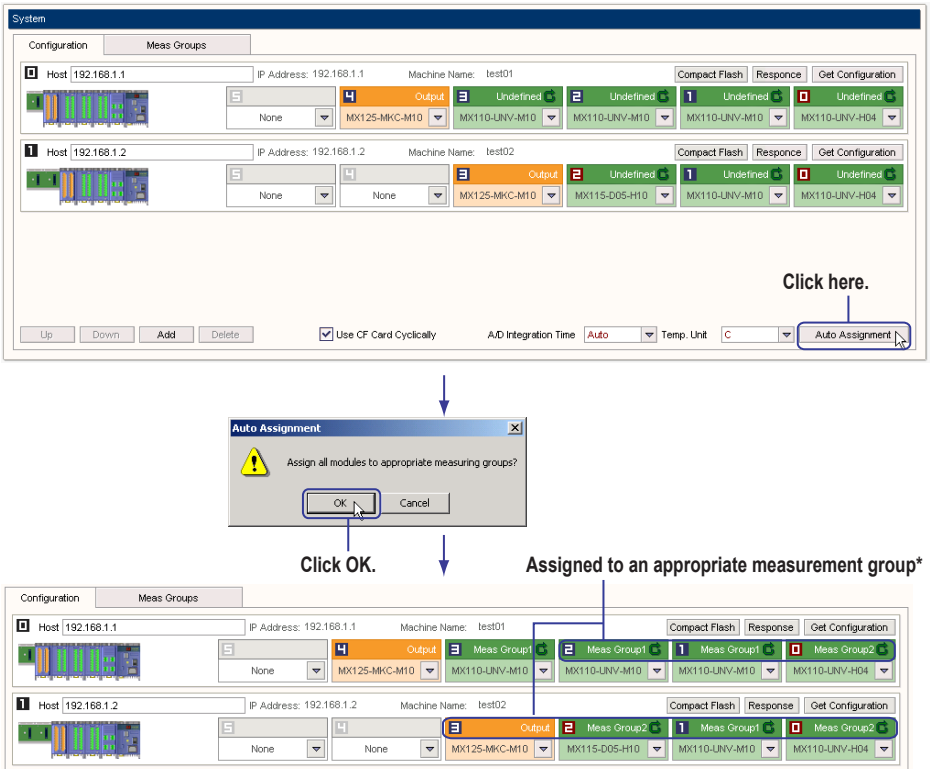
Note

For instructions on configuring a system using MX100s that are not connected, see “Configuring a System Using MX100s That Are Not Connected” in this section.

Assigning Input Modules to Measurement Groups

Auto Assignment

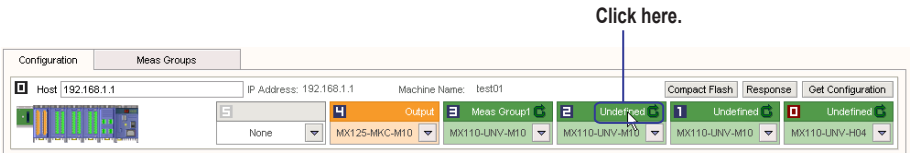
Click the **Auto Assignment** button in the Configuration area. A dialog box with the message “Assign all modules to appropriate measuring groups?” appears.



* In this example, modules with a minimum measurement interval of 100 ms are assigned to Meas Group 1 and those with a minimum measurement interval

Selecting the Measurement Group in the Configuration Area

Click the word “Undefined” (or the icon) of the slot with an input module selected and select the measurement group. The monitor interval that is assigned to the measurement group can be confirmed on the Acquisition setup screen.

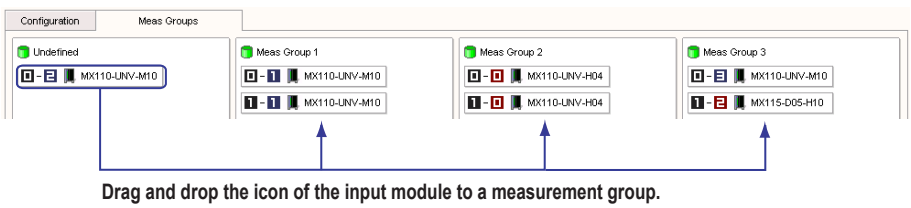


Note

To improve the PC performance, it is recommended that whenever possible, only a single measurement group be assigned to a single unit.

Selecting the Measurement Group in the Meas Groups Area

Drag the module icon in the Undefined area onto the desired measurement group area.

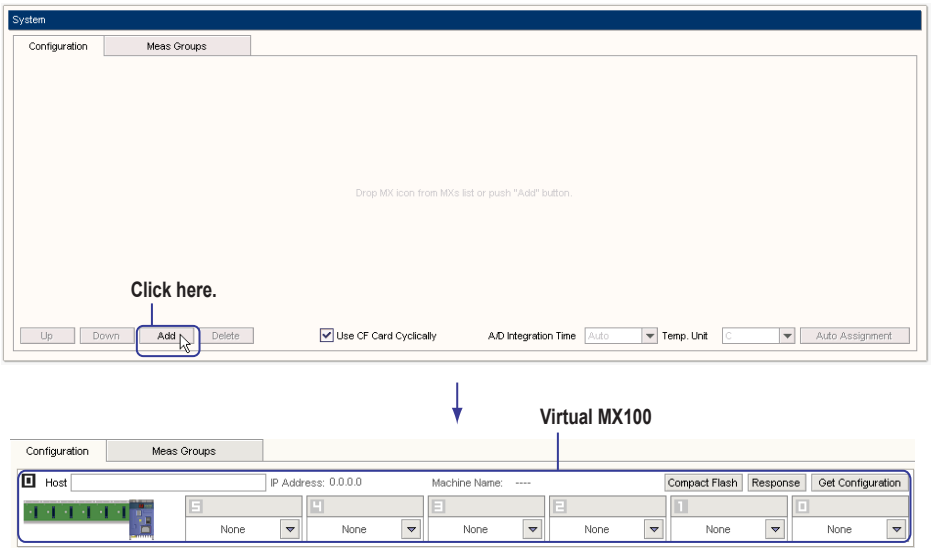


Note

You can select multiple module icons simultaneously to be dragged and dropped by selecting the module icons in the Meas Groups area while holding down the Shift or Ctrl key.The Shift key is used to select a range of icons. The Ctrl key is used to select icons individually.

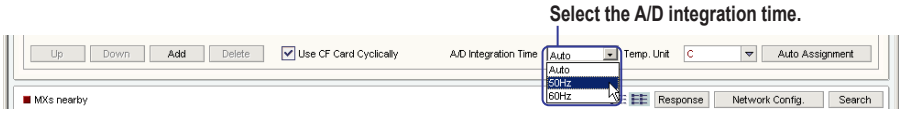
Configuring a System Using MX100s That Are Not Connected

Click the **Add** button in the Configuration area to display a virtual MX100. In this area, you can configure the module and select the measurement group using the procedure described earlier. This function is useful when configuring MX100s that are not connected in advance.



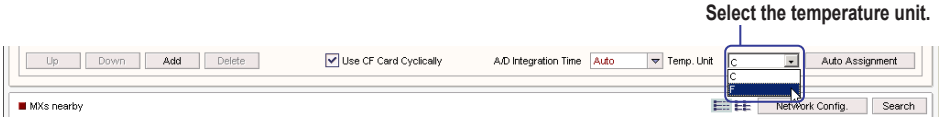
Setting the A/D Integration Time

From the **A/D Integration Time** list box in the Configuration area, select **AUTO**, **50 Hz**, or **60 Hz**.



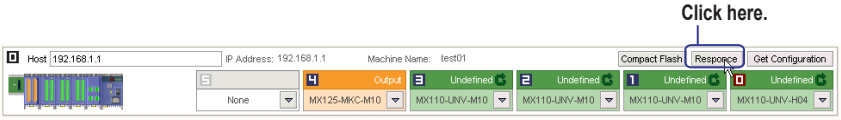
Setting the Temperature Unit for TC and RTD

From the **Temp. Unit** list box, select **C** or **F**.



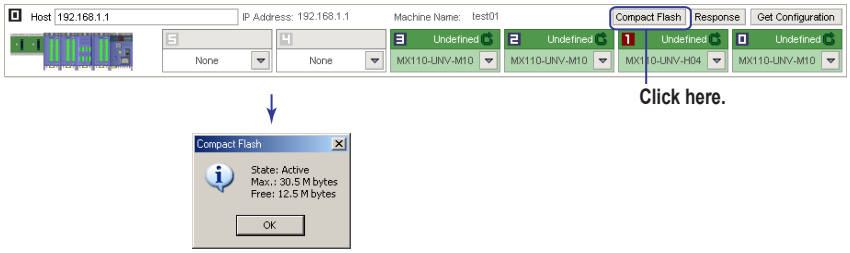
MX100 Response Check

Click the **Response** button in each MX100 in the Configuration area. If the MX100 is connected, the 7-segment LED on the main module of the corresponding MX100 displays —CALL—.



CF Card Information

You can check the status, maximum size, and free area of the CF card inserted into the MX100. To check this information, click the CF Information button of the unit in the Configuration area.

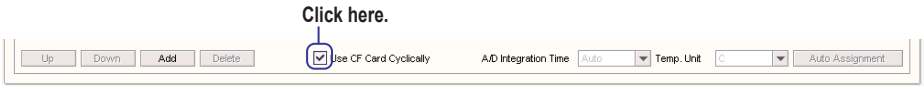


Note

If communications fail when downloading the CF information, a dialog box appears with the message, “Failed to acquire CF information. Check the host name and instrument status.”

Setting the Write Mode of the CF Card

If you wish to save new data files by deleting old files when there is no more free space on the CF card, select the Use CF Card Cyclically check box in the Configuration area. To stop the save operation when there is no more free space, clear the check box.



Explanation

Unit Number

The unit number is assigned in the displayed order in the Configuration area of the System screen from 0 to 19. The unit number is the highest two digits of the five-digit channel number. For example, if the unit number is 2, the channel number is 02XXX (where XXX is the channel number in the unit).

Measurement Group

The system is capable of monitoring the data using three different measurement intervals. Therefore, each input module is assigned to any of the three measurement groups. You can set the measurement interval (Mon. Interval on the screen) of each measurement group on the Acquisition setup screen (see the next section).

Setting the A/D Integration Time of the Universal Input Modules

Settings are possible under the following conditions.

- When the measurement interval of the 4-CH, High-Speed Universal Input Module is 50 ms
- When the measurement interval of the 10-CH, Medium-Speed Universal Input Module is 500 ms
- When the measurement interval of the 6-CH, Medium-Speed 4 Wire RTD Resistance Input Module is 500 ms
- When the measurement interval of the 4-CH, Medium-Speed Strain Input Module is 200 ms

In these cases, you can select from the following. The default setting is AUTO.

- AUTO: Automatically sets the corresponding A/D integration time for 50 Hz or 60 Hz according to the frequency of the power supplied to the main module.
- 50 Hz: Sets the integration time to 20 ms.
- 60 Hz: Sets the integration time to 16.67 ms.

Setting the Write Mode of the CF Card

If a CF card is inserted and the connection to the MX100 is cut off while the measured/computed is being recorded, the measured data is saved (backed up) to the CF card. If the Use CF Card Cyclically check box is selected and measured data is saved in backup mode, the data continues to be saved by deleting the oldest data file when there is no more free space on the CF card. If the check box is cleared, the data save operation stops when there is no more free space on the CF card. This setting applies to all units.

2.3 Setting the Data Acquisition Conditions

This is an explanation of data acquisition condition settings, automatic start function settings, and settings for measurement and computation channels to be recorded.

Data Acquisition Conditions

Click **Acquisition**. The Acquisition setup screen is displayed, and the following items can be set.

- Monitor interval assignments to measurement groups and record step (record interval)
- Record start/stop conditions
- Data file settings

Note

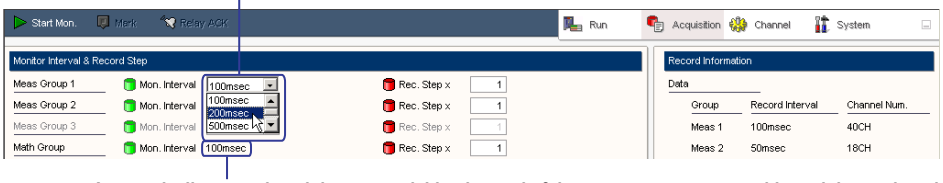
You can set the monitor interval only when monitoring is stopped.

Procedure

Assigning Monitor Intervals to Measurement Groups and Setting the Record Step (Record Interval)

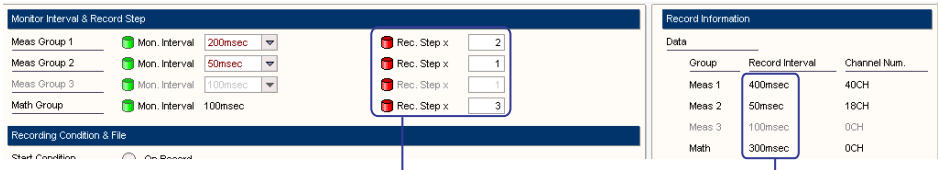
1. In the Monitor Interval & Record Step area, select the monitor intervals of Meas Group 1, Meas Group 2, and Meas Group 3 from the **Mon. Interval** list boxes. The interval cannot be assigned while data monitoring is in progress.

Select the acquisition interval for each measurement group
The selectable acquisition interval varies depending on the types of modules assigned to the same group and the measurement range.



Automatically set to the minimum acquisition interval of the measurement group with modules assigned or 100 ms, whichever is less (cannot be changed).

2. Enter the record step in the **Record Step** text box.
   You cannot set the step while recording is in progress. You can confirm the record step in the Record Information area.

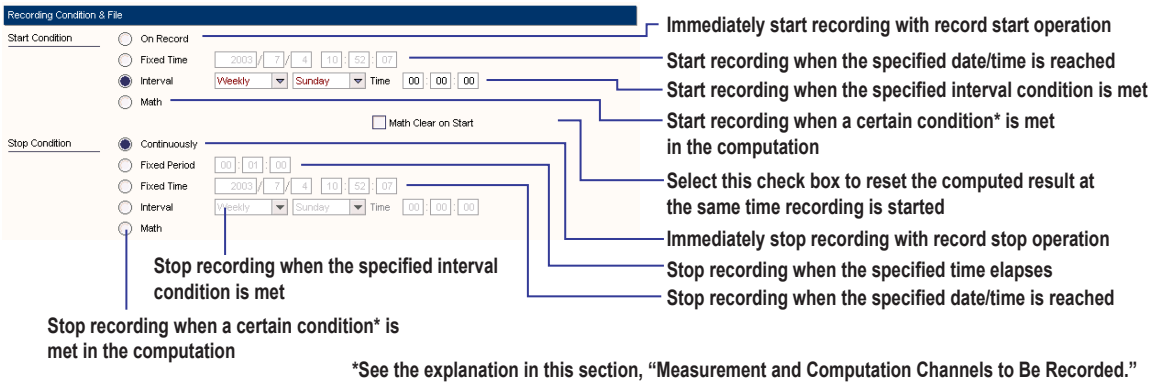


Enter the multiplication factor with respect to the acquisition interval of the measurement group or math group (record step)

Record interval = acquisition interval × record step

Setting the Record Start/Stop Conditions

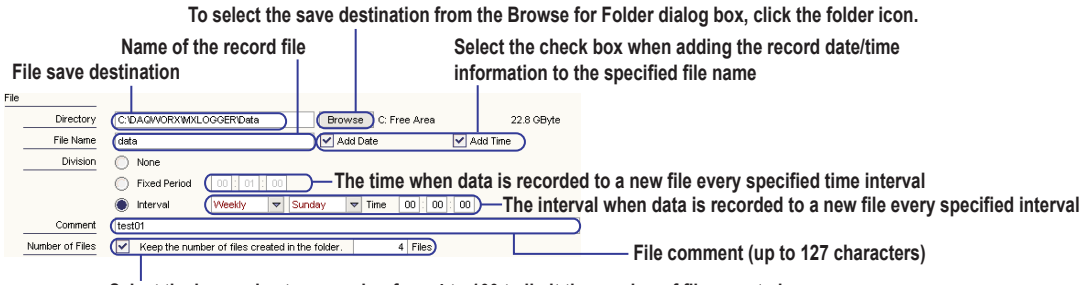
1. In the Recording Condition & File area, select **On Record**, **Fixed Time**, **Interval**, or Math under **Start Condition**.
   If you select Fixed time, enter the start date/time. If you select Interval, enter the interval condition.
2. Select **Continuously**, **Fixed Period**, **Fixed Time**, **Interval**, or Math under **Stop Condition**.
   If you select Fixed Period, enter the record time. If you select Fixed Time, enter the stop date/time. If you select Interval, enter the interval condition.
3. To reset the computed results at the same time recording is started, select the **Math Clear on Start** check box.



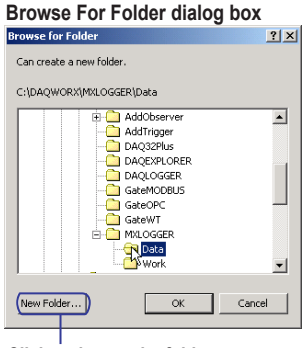
*See the explanation in this section, "Measurement and Computation Channels to Be Recorded."

Setting the Data File

1. Enter the file save destination in the **Directory** box in the Recording Condition and File area.
   Click the **Browse** button to open the Browse for Folder dialog box in which you can select the save destination folder. You can also select the save destination folder, click the New Folder button, and enter the folder name to create a new folder within the save destination folder and make it the save destination.
2. Enter the name of the data file in the **File Name** box.
   To add the record date to the file name, select the **Add Date** check box. To add the record time to the file name, select the **Add Time** check box. If you select both check boxes, the record data and time are added to the file name.
   If a file with the same name already exists, a hyphen and a four-digit sequence number starting with 0000 is added to the end of the file name.
3. To divide the file at specified intervals, select **Fixed Period** or **Interval** under **Division**. If you select Fixed Period, enter the time. If you select Interval, select or enter **Monthly**, **Weekly**, **Daily**, **Hourly**, date/day, or time.
4. To attach a comment to the file, enter the comment text in the **Comment** box.
5. To apply a limit to the number of files that can be created in the folder, select the check box then enter a limit value from 4 to 100.



Browse For Folder dialog box

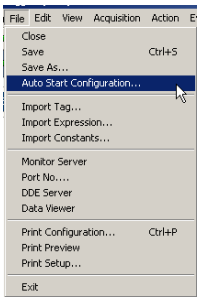


Automatic Start Function

To automatically start monitoring or recording when loading files, perform the following.

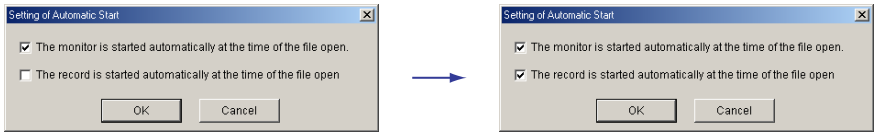
Procedure

1. From the File menu, choose **Auto Start Configuration**.



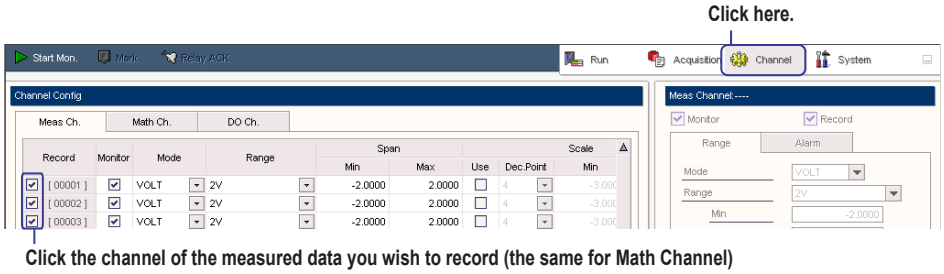
2. To start monitoring when a file is opened, select the check box in the **Auto Start Configuration** dialog box.

3. To start recording when a file is opened, select the “The record is started automatically at the time of the file open” check box in the **Auto Start Configuration** dialog box.



Setting the Measurement Channels and Computation Channels to Be Recorded

1. Click **Channel**. The Channel setup screen appears.
2. Click the **Meas. Channel** tab to set measurement channels to be recorded; click the **Math Channel** tab to set the computation channels to be recorded.
3. Select the **Record** check boxes of the channels whose measurement/computation data you wish to record.



Explanation

Measurement Groups and Monitor Intervals

A data measurement (monitor) interval is assigned to each of the three measurement groups. The monitor update interval of the data and alarm detection interval follow the monitor interval. However, if the specified monitor interval is short, the monitor update interval of the data may be slower depending on the PC environment. If Monitor Interval is set greater than or equal to 2 min, the Logger acquires data from the MX100 at the specified monitor interval, but the measurement interval and alarm detection interval on the MX100 are 1 minute.

Note

The shortest interval that you can specify for the monitor interval is the longest measurement interval of the shortest measurement intervals of all the input modules assigned to the same measurement group. For example, if an input module with the shortest measurement interval of 10 ms and an input module with 100 ms are assigned, 100 ms is the shortest interval that can be specified for the group.

Record Step of Measurement Channels

The record interval is the interval at which the data of measurement channels is saved to a storage medium such as a hard disk. It is set as an integer multiple of the monitor interval (up to ×128).

Monitor Interval and Record Step of Computation Channels

The monitor interval of computation channels (computation interval) is the shortest monitor interval of the measurement group or 100 ms, whichever is greater. The record step set as an integer multiple of the monitor interval (up to ×128).

Record Start Condition

Select the start condition for saving the data of measurement/computation channels from the following.

- On Record
  Immediately starts recording when the Start Recording button is clicked or Start Recording is chosen from the Acquisition menu.
- Fixed Time
  Starts recording at the specified date/time. Set the date/time as “year/month/day hours:minutes:seconds” If the specified time has already been passed, the operation is the same as On Record.
- Interval
  Starts recording at the specified time every day or the specified day. Set the time as “hours:minutes:seconds”

- Math
  Starts recording when the StartRec() event function (see section 2.5, “Event Functions” is executed on a computation channel. This is valid when you click the Start Recording button and the word “Waiting” is displayed.

Record Stop Condition

Select the condition for stopping the recording from the following:

- Continuous
  Immediately stops recording when the Stop Recording button is clicked or Stop Recording is chosen from the Acquisition menu.
- Fixed Period
  Stops recording after the specified time elapses after the recording is started. Set the time as “hours:minutes:seconds”
- Fixed Time
  Stops recording at the specified date/time. Set the date/time as “year/month/day hours:minutes:seconds” If the specified time has already been passed, the operation is the same as Continuously.
- Interval
  Stops recording at the specified time every day or the specified day. Set the time as “hours:minutes:seconds”
- Math
  Stops recording when the StopRec() event function is executed on a computation channel.

Record (Save) Destination and File Name of the Data File

Select the record (save) destination on the hard disk of your PC. The default setting is the Data folder in the MXLOGGER folder where the MXLOGGER is installed.

Note

Do not set the save destination to a storage medium other than the hard disk or to a network drive. Doing so may cause problems in terms of performance.

The default file name is “data” If the multiple files are created, it is “data-XXXX” (where XXXX is a four-digit sequence number starting with 0000). The extension is .mxd. You can also add the file creation date and time to the file name as follows.

- When both the date and time are added: data-0314-1316 (recording started at 13 hours 16 minutes on March 14)
- When only the date is added: data-20030314 (recording started on March 14, 2003)
- When only the time is added: data-1316 (recording started on 13 hours 16 minutes)

If a file with the same name already exists, a hyphen and a four-digit sequence number starting with 0000 are added to the end of the file name.

Setting the Data File Divisions

The file can be divided every specified time interval. Set the time as “hours:minutes: seconds”

Even if file division is not specified, the file is automatically divided when the size of a single file exceeds approximately 1 GB or when the number of data points of any of the channels in the file exceeds 2 million.

Number of Characters That Can Be Entered for the Comment of the Data File

The number of characters that can be entered is up to 127 characters.

2.4 Setting the Measurement Conditions (Measurement Channel Settings)

Procedure

1. Click **Channel**. The Channel setup screen appears.
2. Click the **Meas Ch** tab.

Setting the Input Mode

3. Select the input mode from the **Mode** list box.

Setting the Measuring Range

4. Select the measurement range from the **Range** list box.

Setting the Span

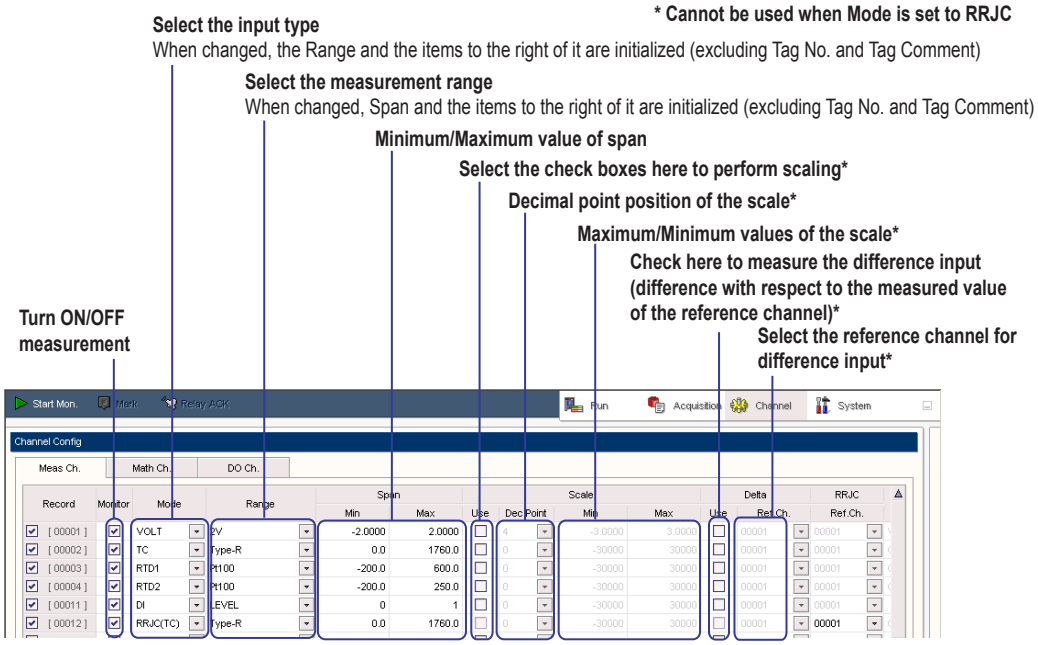
5. Click the **Min** box or **Max** box under **Span** and enter the minimum or the maximum value of the span.

Setting the Scale (Only When Scaling)

6. Select the **Use** check box under **Scale**.
7. Select the decimal point position from the **Point** list box under **Scale**.
8. Click the **Min** box or **Max** box under **Scale** and enter the minimum or the maximum value of the scale.
9. Click the **Unit** box and enter the unit of the scaled value.

Setting the Reference Channel for Difference Input (Valid Only When Measuring the Difference with Respect to the Measured Value of the Reference Channel)

10. Select the **Use** check box under **Difference Input**.
11. Select the reference channel for the difference input from the **Ref. Ch**. list box under **Delta**.

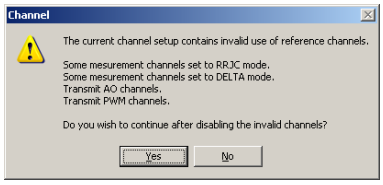


Setting the Remote RJC Reference Channel (Valid Only When the Input Mode Is Set to RRJC (TC))

12. Select the reference channel for the remote RJC from the **Ref. Ch**. list box under **RRJC**.

Note

If the reference channel setting for difference input or the reference channel setting for the remote RJC is inappropriate when switching from the Channel screen to the Display or Monitor screen, a Channel dialog box opens (see the figure below). To disable the measurement channels with inappropriate settings (clear the Monitor check box on the Channel screen) and move to the Display or Monitor screen, click **Yes**. To change the settings of the inappropriate measurement channels without moving to the next screen, click **No**.



Setting the Unit, Tag Number, and Tag Comment

13. Click the Unit, Tag No., and Tag Comment text box and enter the unit, tag number, and tag comment, respectively.

Setting the Time Constant of the First-Order Lag Filter (Valid Only When the Input Mode Is Set to Something Other than DI)

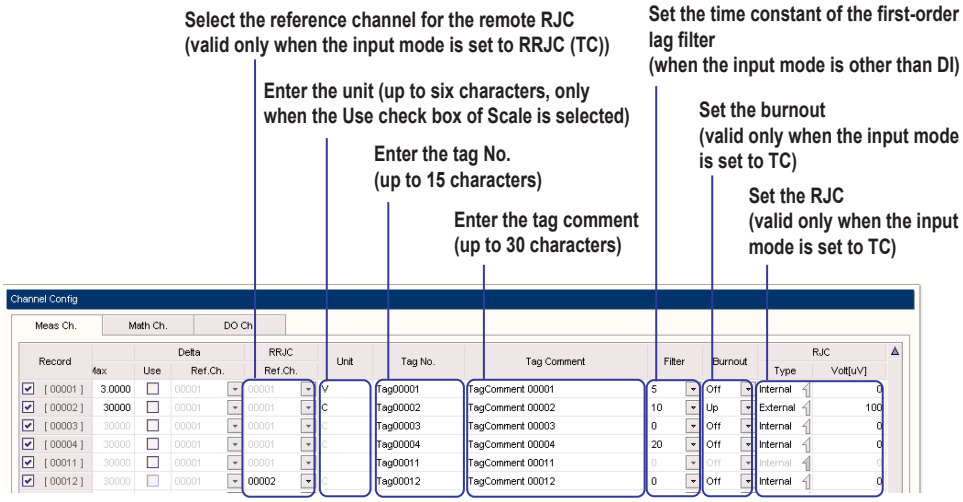
14. Select the time constant from the **Filter** list box.

Setting the Burnout (Valid Only When the Input Mode Is Set to TC)

15. Select the direction in which the measured value is set off the range (+OVER or –OVER) when a burnout occurs from the **Burnout** list box.

Setting the RJC (When the Input Mode Is Set to TC)

16. Click the **Type** box under **RJC** and select **Internal** or **External**.
17. If you select External, click the **Volt** box under **RJC** and enter the compensation voltage.

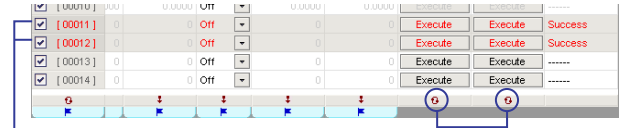


Setting the Initial Balancing for Strain Input Channels (Only When the Input Mode Is Set to STR)

18. Click the **Initial Balance** button under **Strain**, or the **Execute** button under **Reset**. The **Executing Initial** balancing dialog box appears, and **Executing** is displayed in the **Status** box. When **Execution** is complete, the result is displayed in the **Status** box.

Note

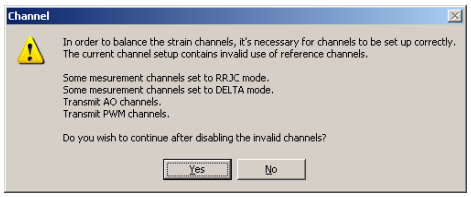
- You can execute initial balancing and reset the initial balance value on multiple recording channels at once by selecting the channels and clicking the Execute All button.



Channel on which to perform initial balancing to select them
Selected channels are displayed with red characters against a gray background

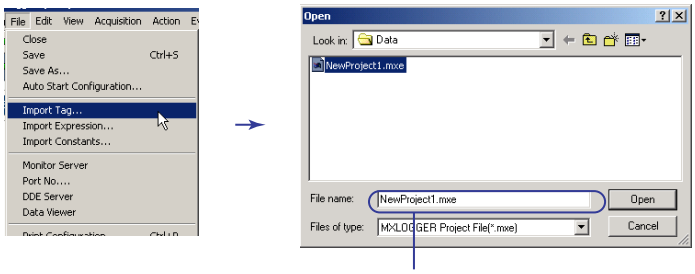
Collective execution ON/OFF button

- To execute initial balancing on a strain input module, you must enter channel settings and send them. Therefore, if invalid channel settings are entered, a dialog box will appear prompting you to correct the settings.



Importing Tag Numbers and Tag Comments

You can import just the tag numbers and tag comments from the saved setup data and replace the current tag numbers and tag comments with the imported information.
From the **File** menu, choose **Import Tag**. Then, select an MXLOGGER project file (a file with the .mxe extension) in the **Open** dialog box.
Only the tag numbers and tag comments are imported.

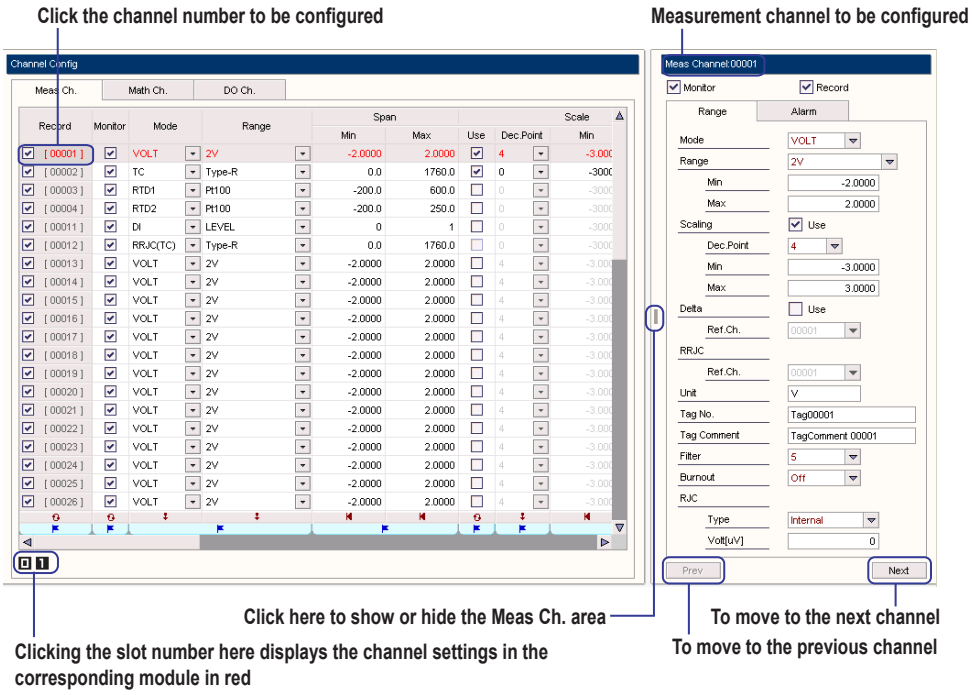


Note

When you carry out the procedure above, the tag numbers and tag comments of computation channels are also imported.

When Setting the Measurement Conditions for Each Channel Individually

Click a desired channel number and enter the settings in the area on the right to set the measurement conditions.



Explanation

Input Mode and Measurement Range

On the channels of the universal input module, select from the modes below according to the input signal. For details of the measurable range, measurement accuracy, and resolution, see chapter 4, “Specifications” in the MX100 Data Acquisition Unit User’s Manual (in the manual CD-ROM)

- VOLT (DC voltage)
  Select the measurement range from 20 mV, 60 mV, 200 mV, 2 V (default), 6 V, 20 V, 100 V, 60 mV (HQ), 1 V (HQ), and 6 V (HQ). HQ denotes high resolution.

Note

Current input is possible by attaching a shunt resistor to the input terminal and converting to voltage input. The shunt resistors in the table below are available for purchase separately. For example, a 250 Ω shunt resistor is used to convert the signal in the range of 1 to 5 V for 4 to 20 mA input.

Part Name	Model	Resistance
Shunt resistor (for clamp terminal)	415920	250 W ± 0.1%
	415921	100 Ω ± 0.1%
	415922	10 Ω ± 0.1%
Shunt resistor (for screw terminal)	438920	250 Ω ± 0.1%
	438921	100 Ω ± 0.1%
	438922	10 Ω ± 0.1%

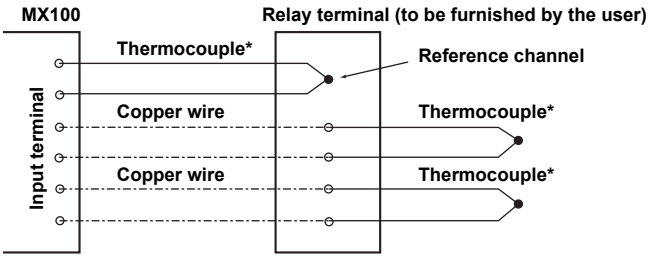
- TC (Thermocouple)
  Select the thermocouple type (referred to as Range in the setup) from Type-R (default), Type-S, Type-B, Type-K, Type-E, Type-J, Type-T, Type-N, Type-W, Type-L, Type-U, and KpvsAu7Fe, PLATINEL, PR40-20, NiNiMo, WRe3-25, W/WRe26, and Type-N(AQG14).
- RTD1 (resistance temperature detector, measurement current: 1 mA) on the 4-CH, High-Speed Universal Input Module
  Select the RTD type (referred to as Range in the setup) from Pt100 (default), JPt100, HQ Pt100, HQJPt100, Ni100:SAMA, Ni100:DIN, Ni120, RN Pt100, and RN JPt100. HQ and RN denote high resolution and noise resistance, respectively.
- RTD2 (resistance temperature detector, measurement current: 2 mA) on the 4-CH, High-Speed Universal Input Module
  Select the RTD type (referred to as Range in the setup) from Pt100 (default), JPt100, HQ Pt100, HQ JPt100, Pt50, Cu10:GE, Cu10:L&N, Cu10 :WEED, Cu10:BAILEY, J263B, Cu10 a=0.00392, Cu10 a=0.00393, Cu25, Cu53, Cu100, Pt25, HQ Cu10:GE, HQ Cu10:L&N, HQ C10:WEED, HQ Cu10:BAILEY, RN Pt100, and RN JPt100. HQ and RN denote high resolution and noise resistance, respectively.
  The RTD2 selection is not available on the 10-CH, Medium-Speed Universal Input Module or the Six-Channel, Medium-Speed, Four-Wire RTD Resistance Input Module.
- RTD1 (resistance temperature detector, measurement current: 1 mA) on the 10-CH, Medium-Speed Universal Input Module/Six-Channel Medium-Speed Four-Wire RTD Resistance Input Module
  Select the RTD type (referred to as Range in the setup) from Pt100 (default), JPt100, HQ Pt100, HQ JPt100, Ni100:SAMA, Ni100:DIN, Ni120, Pt50, Cu10:GE, Cu10:L&N, Cu10 :WEED, Cu10:BAILEY, J263B, Cu10 a=0.00392, Cu10 a=0.00393, Cu25, Cu53, Cu100, Pt25, HQ Cu10:GE, HQ Cu10:L&N, HQ Cu:WEED, and HQ Cu10:BAILEY. HQ denotes high resolution.
- RTDEx (resistance temperature detector, measurement current: 0.25 mA) on the Six-Channel, Medium-Speed Four-Wire RTD Resistance Input Module
  Select the RTD type (referred to as Range in the setup) from Pt500 (default setting) or Pt1000.

- OHM (resistance) on the Six-Channel, Medium-Speed Four-Wire RTD Resistance Input Module
  Choose 20 ohm (measurement current: 1 mA), 200 ohm (measurement current: 1 mA), or 2 kohm (measured current: 0.25 mA).

- DI (Digital Input)
  On the channels of the 10-CH, High-Speed Digital Input Modules, only the DI (digital input) setting is available (no input mode selection). With numerical input module channels, select LEVEL (D10) (voltage input) for -D05, or CONTACT (D10) (contact input) for the measurement range to match the input. -DI24: LEVEL (24 V) only.
  On the 4-CH, High-Speed Universal Input Module, select LEVEL (voltage input) or CONTACT (HS) (contact input) according to the input.
  On the 10-CH, Medium-Speed Universal Input Module or the Six-Channel Medium-Speed Four-Wire RTD Resistance Input Module, select LEVEL (voltage input) or CONTACT (SC) (contact input) according to the input.

- STR (Strain)
  On the 4-CH Medium-Speed Strain Input Modules, select a measurement range of 2000 μSTR, 20000 μSTR (default value), or 200000 μSTR.

- RRJC(TC) (Remote RJC)
  RRJC (TC) refers to temperature measurement using a thermocouple. Select a channel when referring to the temperature of a relay terminal (the temperature input of the relay terminal is specified at RRJC Ref. Ch.). When the item to be measured is located at a great distance, you can setup relay terminals near the item to be measured to make temperature measurements without having to use large quantities of high-cost thermocouples. Connect the item to be measured and the relay terminal using a thermocouple; connect the relay terminal and the MX100 using a copper wire. By connecting one terminal of the MX100 and the relay terminal using a thermocouple and measuring the temperature of the relay terminal, reference junction compensation is carried out on the temperature measurement and the temperature measurement on the item is made.



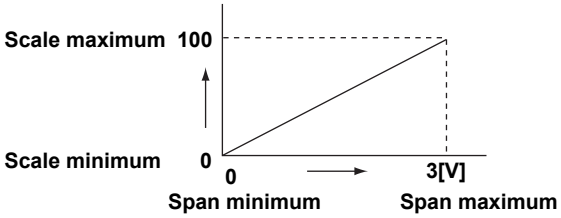
*** Use the same type of thermocouples.**

Setting the Measurement Span

Set the minimum and maximum values of the range that is actually measured within the measurable range.

Setting the Scale

Set this item when linearly scaling the measured values. Set the scale by entering the maximum and minimum values corresponding to the maximum and minimum values of the measurement span and selecting the decimal point position of the scaled value (see the figure below). The selectable range of the scale is -30000 to 30000. The decimal point position can be set to 4 (XXXXX), 3 (XXXXX), 2 (XXXXX), 1 (XXXXX), or 0 (XXXXX). Also, you can specify units for the scale value. You can set the units using up to six characters.



Setting the Reference Channel for Difference Input

Set this item when making the difference between the measured value of the channel and the measured value of the reference channel the measured value (referred to as difference computation). The reference channel can be set to a channel that is scaled. Difference computation can be executed even if the measurement range of its own channel and that of the reference channel are not the same.

If the decimal point position setting is different between its own channel and the reference channel, the decimal point position of the measured value of the reference channel is matched to that of its own channel, and the difference is computed.

Example: When the measured value of the channel set to difference input is 10.00 and the measured value of the reference channel is 100.0
The computed result is 10.00 – 100.0 = –90.00.

Set the reference channel for difference input to a measurement channel that has the Monitor check box selected.

Setting the Remote RJC Reference Channel (Valid Only When the Input Mode Is Set to RRJC (TC))

This item sets the reference channel when the input mode is set to RRJC (TC).

Set the reference channel for remote RJC to a channel that meets the three conditions below.

- The reference channel is a measurement channel (channel existing on the measurement channel page) with the Monitor check box selected.
- The range of the reference channel and that of the corresponding measurement channel are the same.
- The channel is in the same unit (MX100).

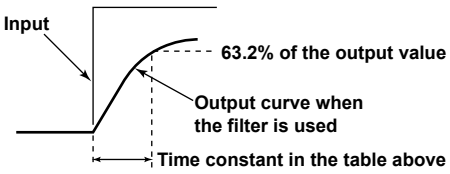
Setting the Time Constant of the First-Order Lag Filter (Valid Only When the Input Mode Is Set to Something Other than DI)

A first-order lag filter is available. Select from the Filter list box, the time constant N (time until 63.2% of the output value is reached) for the case when the measurement interval (Monitor interval in the settings) is set to 1 s. Time constants when the measurement interval is set to a value other than 1 s follow the equation below.

Time constant = measurement interval × N (where N = 5, 10, 20, 25, 40, 50, or 100)

The table below lists the relationship.

Measurement Interval (s)	Selectable Time Constants (s)						
0.01	0.05	0.1	0.2	0.25	0.4	0.5	1
0.05	0.25	0.5	1	1.25	2	2.5	5
0.1	0.5	1	2	2.5	4	5	10
0.2	1	2	4	5	8	10	20
0.5	2.5	5	10	12.5	20	25	50
1	**5**	**10**	**20**	**25**	**40**	**50**	**100**
2	10	20	40	50	80	100	200
5	25	50	100	125	200	250	500
10	50	100	200	250	400	500	1000
20	100	200	400	500	800	1000	2000
30	150	300	600	750	1200	1500	3000
60	300	600	1200	1500	2400	3000	6000



Setting the Burnout

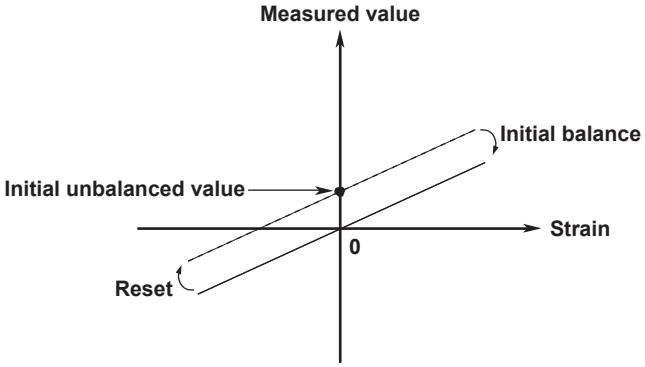
When the input mode is set to TC, you can set the burnout detection behavior. (This setting is possible when the input mode is set to a mode other than DI, but the setting takes effect only when the mode is TC.) If set to Up, the measured value is fixed to +OVER when a burnout is detected (condition in which the input signal level exceeds the upper limit of the measurement range). If set to Down, the measured value is fixed to – OVER (condition in which the input signal level exceeds the lower limit of the measurement range). To not detect burnouts, select Off (default).

Setting the RJC

When the input mode is TC, select whether to use the internal reference junction compensation function of the input module or an external reference junction compensation function. (This setting is possible when the input mode is set to a mode other than DI, but the setting takes effect only when the mode is TC.) When using the external reference junction compensation function, set an appropriate reference junction compensation voltage (Volt in the setup) in the range of –20000 μV to 20000 μV. For example, if the reference junction temperature of the external reference compensation is T_0°C, set the reference compensation junction voltage to the thermoelectromotive force of the 0-°C reference of T_0°C.

Initial Balancing of Strain Input Channels (Initial Unbalance Adjustment)

When configuring a bridge circuit with a strain gauge, due to the slight deviation in resistance of the strain gauge, the bridge circuit will not necessarily be balanced even if the strain of the circuit under test is zero, and the measured value may not be zero (the value in such cases is called the initial unbalanced value.)
Therefore, when taking measurements you must first balance the bridge and, if the strain is zero, obtain a measured value of zero. This is called initial balancing (setting the initial unbalanced value to zero).



With the MX100, initial balancing is performed in the ±10000μ strain range.

Initial balance: The value when the command is executed is taken as the initial unbalanced value, and the measured value is set to zero.

Reset: The value set during initial balancing is reset to zero. The initial unbalanced value is used for the measured value as-is.

Note

If the measuring range is changed, the initial balancing is reset. After a range change, you must redo initial balancing.

The results of initial balancing are as follows.

Status box display	Status
-----	Not executed
Successful	Initial balancing was executed successfully.
Failed	Initial balancing failed.
OVER	Initial balancing succeeded, but the output value exceeded the upper limit or fell below the lower limit, and the value was rounded to the upper or lower limit.
Executing	Executing initial balancing

Note

If initial balancing fails, the 7-segment LED on the MX100 displays "E5" Check the module's installation status, then perform initial balancing again. If the error occurs even after recalibrating, servicing is required. Please contact your nearest Yokogawa representative.

Scaling Settings of the Strain Gauge Sensor

When using the scaling settings to measure physical quantities such as load and length using a strain gauge type sensor, set the scaling. For instructions on entering scaling settings, see chapter 1 of the MX100 Data Acquisition unit User's Manual, "Functional Explanation."

2.5 Setting Computations (Setting the Computation Channels)

Procedure

1. Click **Channel**. The Channel setup screen appears.
2. Click the **Math Ch** tab.

Setting the Expression

3. Click the **Expression** box, and enter the expression.

Setting the Span

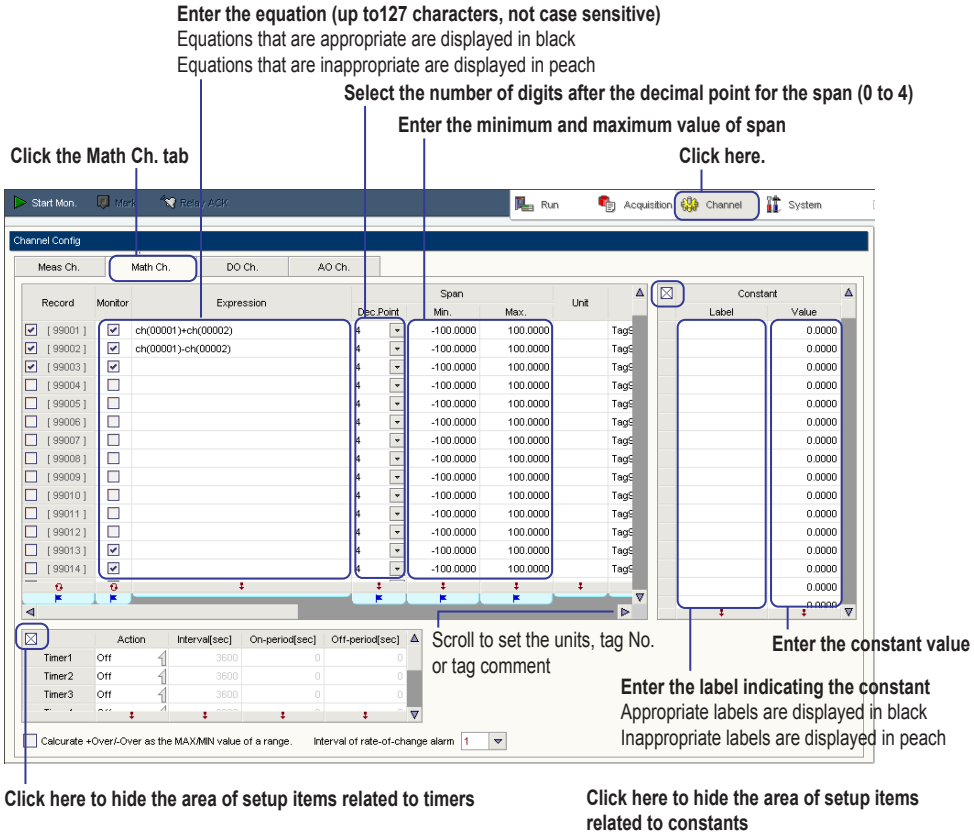
4. Select the decimal point position from the **Point** list box under **Span**.
5. Click the **Min** box or **Max** box under **Span** and enter the minimum or the maximum value of the span.

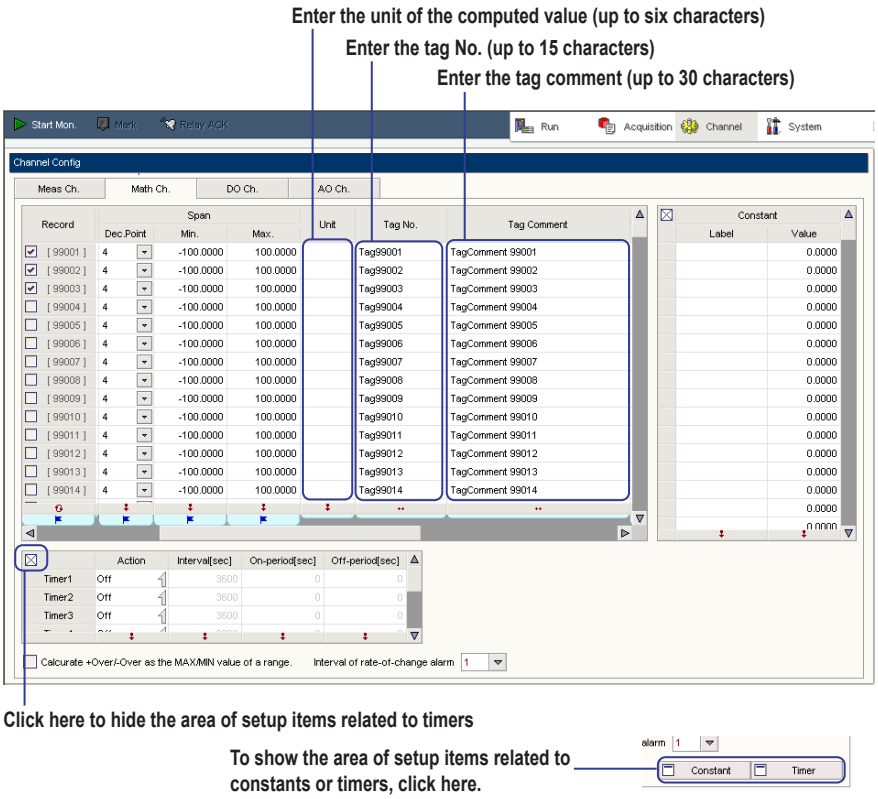
Setting the Unit, Tag Number, and Tag Comment

6. Click the Unit, Tag No., and Tag Comment text box and enter the unit, tag number, and tag comment, respectively.

Setting the User-Defined Constant

7. Click the **Label** box under **Constant** and enter the name to identify the constant.
8. Click the **Value** box under **Constant** and enter the value of the constant.



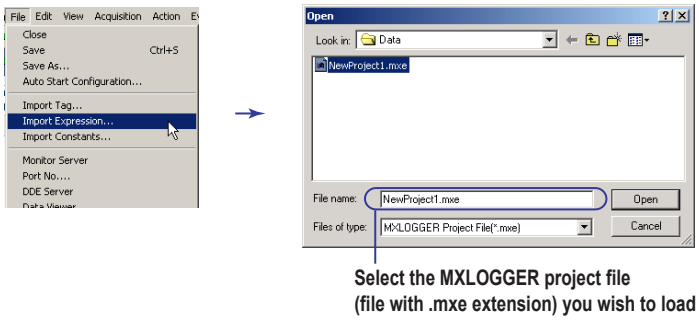


Note

Two hundred and forty computation channels are always shown.

Importing Expressions

From the **File** menu, choose **Import Expression**. Then, select an MXLOGGER project file (a file with .mxe extension) in the **Open** dialog box.
Only the saved expressions are imported.

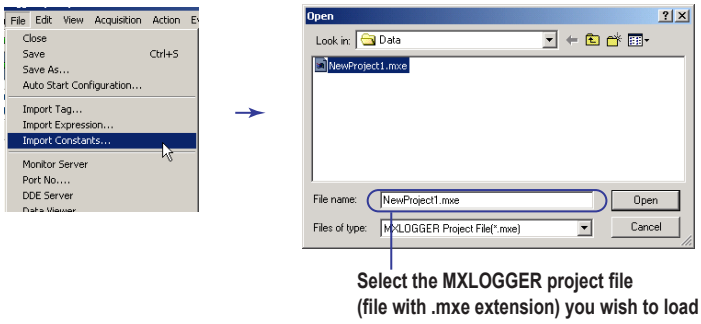


Note

For instructions on saving MXLOGGER project files, see section 2.11, “Saving/Loading and Printing Setup Data (Project).”

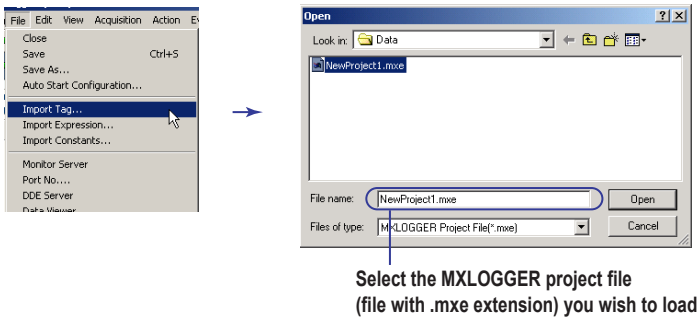
Importing User-Defined Constants

From the **File** menu, choose **Import Constant**. Then, select an MXLOGGER project file (a file with .mxe extension) in the **Open** dialog box.
Only the saved user-defined constants are imported.



Importing Tag Numbers and Tag Comments

You can import just the tag numbers and tag comments from the saved setup data and replace the current tag numbers and tag comments with the imported information. From the **File** menu, choose **Import Tag**. Then, select an MXLOGGER project file (a file with .mxe extension) in the **Open** dialog box.
Only the tag numbers and tag comments are imported.

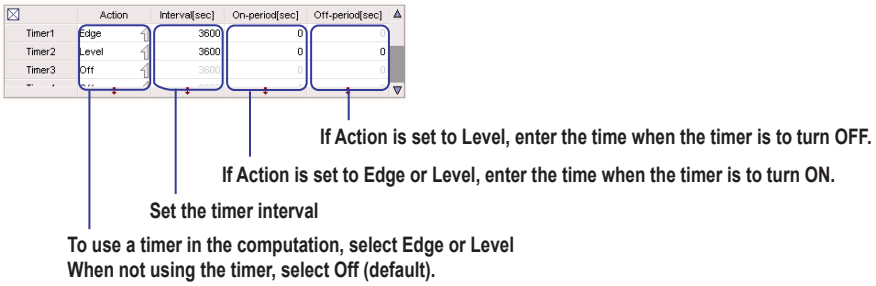


Note

When you carry out the procedure above, the tag numbers and tag comments of measurement channels are also imported.

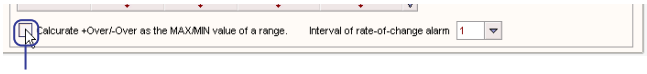
Setting Timers (Only When Using Timers in the Computations)

7. Click **Action** of a timer and select **Edge** or **Level**.
   When not using the timer, select Off (default).
8. Click the **Interval** box, and enter the interval.
9. If Action was set to Edge, click the On-period box and enter the time interval over which the timer is to be turned ON. If Action was set to Level, click the On-period or Off-period box and enter the time over which the timer is turned ON or OFF.



When Calculating ±Overrange Values of Measurement Channels as the Maximum or Minimum Value of the Measurement Range

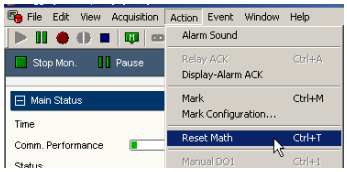
10. Select the **Calculate +Over/–Over as the MAX/MIN value of a range** check box.



Check here to calculate +Over and –Over as maximum and minimum values of the measurement range (see the explanation in this section, “Setting Conputations”).

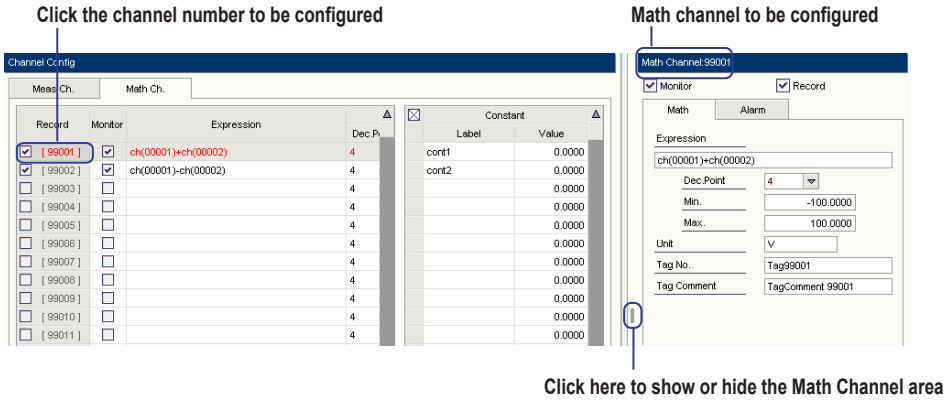
Resetting Computation

From the **Action** menu, choose **Reset Math**.



When Setting Computations for Each Channel Individually

Click a desired channel number and enter the settings in the area on the right to set the computation.



Explanation

Overview of Computation

You can enter computing equations using constants, operators, and functions described below. The computed results can be displayed and recorded (saved) as computed data. Computation allows you to determine the average/maximum/minimum of a specified channel on a specified date/time or output events (start/stop record, reset time, etc.) under specified conditions. The number of available computation channels is 240, and the number of characters that can be used in the equation is 127.

Setting the Computation Span

You can set the span of transmission output for the analog output and PWM output modules.

Constants

The following three types of constants can be used.

- **User Defined Constants**
  A constant can be assigned to an arbitrary string (name). You can set up to 240 user-defined constants. Set the Name of the constant using a string (up to 10 characters) that is not used by predefined constants or functions. They are not case-sensitive. The precision and range of the constant values are the same as the single-precision floating point format (32 bits, negative values: -3.4028235E+38 to -1.401298E-45, and positive values: 1.401298E-45 to 3.4028235E+38).
- **Predefined Constants**
  The five strings below are used for predefined constants. They are not case-sensitive.
  - NaN: Represents an invalid value or error value. For a description of the computed result when NaN is used in the computation, see “Notes on Computation” in this section.
  - POver: Represents +Over (positive overrange). The expression POver > x is satisfied for any arbitrary value x.
  - MOver: Represents –OVER (negative overrange). The expression MOver < x is satisfied for any arbitrary value x.
  - Pi: Represents the ratio of the circumference (3.14...).
  - e: Represents the base of the natural logarithm (2.718...).
- **Numerical Constants**
  Numeric values that are written directly in the equation. They are expressed in the following form.
  [digits][.digits][{d|D|e|E}[digits]]
  Example: 1.0d+1 represents 10.0.

Channel Numbers

Channel numbers can be used to specify the <channel> (measurement or computation channels). The channel number is specified using five digits: the unit number is the highest two digits and the channel number within the unit is the lowest three digits. Measurement channels are specified using 990001 to 99240.

Tag Numbers

Tag numbers can be used to specify the <channel> (measurement or computation channels). The tag numbers are enclosed in double quotation marks as in “TagNo.00001” They are case-sensitive.

Note

If the same tag number is specified on multiple channels, the operation is undefined.

Alarm Level

Use 1 to specify the level of alarm 1; use 2 to specify the level of alarm 2.

Manual, and User Output (DO Channels, AO Channels, and PWM Channels)

Specify an integer starting with 1. The arguments for the ManualDO() and ManualAO() functions are as follows.

<ManualDONo.>: 1-4

<ManualAONo.>: 1-4

Operators

The operators listed below can be used.

Operator	Explanation	Example
+	Unary plus operator	+ch(00010)
-	Unary minus operator	-ch(00010)
!	Logical NOT operator; 1 when 0, or 0 when not 0.	!ch(00010)
+	Addition	ch(00010)+ch(00011)
-	Subtraction	ch(00010)-ch(00011)
*	Multiplication	ch(00010)*ch(00011)
/	Division	ch(00010)/ch(00011)
%	Remainder	ch(00001)%ch(00002)<=1 ? AlarmAck() : 0
<	Less than, 1 when the condition is met and 0 when it is not	ch(00001) > ch(00002) ? AlarmAck() : 0
>	Greater than, 1 when the condition is met and 0 when it is not	ch(00001) < ch(00002) ? AlarmAck() : 0
<=	Less than or equal to, 1 when the condition is met and 0 when it is not	ch(00010)<=1.0 ? StartRec() : 0
>=	Greater than or equal to, 1 when the condition is met and 0 when it is not	ch(00010)>=1.0 ? StartRec() : 0
==	Equal to, 1 when the condition is met and 0 when it is not	ch(00010)==1.0 ? StartRec() : 0
!=	Not equal to, 1 when the condition is met and 0 when it is not	ch(00010)!=0 ? StartRec() : 0
&&	Logical product, also calculated after NOT	ch(00001) && ch(00002)==1 ? AlarmAck() : 0
||	Logical sum, also calculated when true	ch(00001) || ch(00002)==1 ? AlarmAck() : 0
^^	Exclusive OR	ch(00001) ^^ ch(00002)==1 ? AlarmAck() : 0
? :	Conditional operators	ch(00010)>=1.0 ? StartRec() : 0 (“if a then b otherwise c” expressed as [a?b:c])
,	Order operator	Condition?(ResetTimer(), StartRec()) : 0

The order of precedence of the operators is as follows. ← indicates that the left operator has precedence over the right operator.

+ - ! (unary operators) ← + - * / % (arithmetic operators) ← < > <= >= == != (relational operators) ← && || ^^ (logical operators) ← ? (conditional operator) ← ,(order operator)

Reference Functions and TLOG Functions

The functions below are used to retrieve measured values and alarm values. The functions are not case sensitive. For the format used to specify the <channel>, <alarm level>, and <manual> see “Channel Numbers,” ” Alarm Level,” and “Manual” in this section.

Function	Description	Example
ch (<channel>)	Returns the current value of the specified channel (see page 2-31)	ch(00001)/ch(“Tag”)
prech (<channel>)	Returns the previous value of the specified channel (see page 2-31)	prech(00001)/ prech(“Tag”)
alarm (<channel>, <alarm level>)	Returns the alarm value of the specified channel and specified alarm level; ON=1, OFF=0	alarm(00001,2)/ alarm(“Tag” 2)
alarm (<channel>)	Returns the alarm value of the specified channel, ON=1, OFF=0	alarm(00001)/ alarm(“Tag”)
alarm()	Returns the alarm value of an arbitrary channel, ON=1, OFF=0	alarm()==1 ? StartRec() : 0
tlogmax (<channel>)	Returns the maximum value of the TLOG computation of the specified channel	tlogmax(00001)/ tlogmax(“Tag”)
tlogmin (<channel>)	Returns the minimum value of the TLOG computation of the specified channel	tlogmin(00001)/ tlogmin(“Tag”)
tlogpp (<channel>)	Returns the (maximum-minimum) value of the TLOG computation of the specified channel	tlogpp(00001)/ tlogpp(“Tag”)
tlogsum (<channel>)	Returns the sum of the TLOG computation of the specified channel	tlogsum(00001)/ tlogsum(“Tag”)
tlogave (<channel>)	Returns the average value of the TLOG computation of the specified channel	tlogave(00001)/ tlogave(“Tag”)
ManualDO (<manual>)	Returns the values being output on the specified ManualDO.	ManualDO(1)
ManualAO((<manual>)	Returns the values being output on an arbitrary channel.	ManualAO(1)

*1 The TLOG computation computes the maximum, minimum, maximum-minimum, sum, and average values of the specified channel.If the TLOG function is present in the equation, the computation is executed.

*2 The reference function or TLOG function returns NaN in the following cases.

- When the data to be referenced by the CH function or PRECH function does not exist (when disconnected or immediately after starting the monitor operation)
- When the specified channel does not exist or when the specified alarm level is not 1 or 2.
- When the MX100 returns an INVALID value

*3 Select the behavior taken when the value of the measurement channel is ±Over from the following:

- Continue the computation as ±Over (behavior when the check box is not selected)
- Continue the computation by setting ±Over to the maximum or minimum value of the measurement range of the specified channel (see “Notes on Computation” in this section).

The selection is made using the Calculate +Over/-Over as the MAX/MIN value of a range check box.

Arithmetic Functions

Below are the arithmetic functions that are available. They are not case-sensitive.

Function	Description	Example
sin (<value>)	Returns the sine of the <value>	sin(ch(“TagNo.00001”))
cos (<value>)	Returns the cosine of the <value>	cos(ch(“TagNo.00001”))
tan (<tan>)	Returns the tangent of the <value>	tan(ch(“TagNo.00001”))
asin (<value>)	Inverse sine	asin(ch(“TagNo.00001”))
acos (<value>)	Inverse cosine	acos(ch(“TagNo.00001”))
sinh (<value>)	Hyperbolic sine	sinh(ch(“TagNo.00001”))
cosh (<value>)	Hyperbolic cosine	cosh(ch(“TagNo.00001”))
tanh (<value>)	Hyperbolic tangent	tanh(ch(“TagNo.00001”))
pow (<value1>, <value2>)	<value1> to the power of <value 2>	pow(ch(00001), ch(00002))
sqrt (<value>)	Square root	sqrt(ch(00001))
logE (<value>)	Natural logarithm	logE(ch(00001))
log10 (<value>)	Common logarithm	log10(ch(00001))
expE (<value>)	e to the power of <value>	expE(ch(00001))
exp10 (<value>)	10 to the power of <value>	exp10(ch(00001))
abs (<value>)	Absolute value	abs(ch(00001))
max (<value>, ..., <value>)	Maximum value among multiple specified values	max(ch(00001), ch(00002),ch(00003))
min (<value>, ..., <value>)	Minimum value among multiple specified values	min(ch(00001), ch(00002),ch(00003))
pp (<value>, ..., <value>)	(Maximum - minimum) among multiple specified values	pp(ch(00001),ch(00002), ch(00003))
sum (<value>, ..., <value>)	Sum of multiple specified values	sum(ch(00001), ch(00002),ch(00003))
ave (<value>, ..., <value>)	Average of multiple specified values	ave(ch(00001), ch(00002),ch(00003))
poly(<x>,<a_0>,<a_1>, ..., <a_n>)	Polynomial with variable parameters Calculate $_0x^n+a_1x^{n-1}+...+a_nx^0$	poly(ch(00001) ch(00002),ch(00003)),
ceil (<value>)	Returns the minimum integer greater than <value>	ceil(ch(00001))
floor (<value>)	Returns the maximum integer less than <value>	floor(ch(00001))
limit(<x>,<a>,<b>)	If x is outside the range defined by a and b,round the value to b.	limit(ch(00001),10,20)
rnd()	Returns a random number between 0 and 1	ch(00001)*rnd()
IsNaN (<value>)	Returns 1 if \value is NaN, otherwise returns 0.	IsNaN(ch(00001))

Time Functions

The table below shows the functions related to time. The functions are not case sensitive. Only integer numeric constants can be written in the function parameters <year>, <month>, <day>, <hours>, and <minutes> in the table below. The terminology used in the description in the table are defined below.

Edge: Returns 1.0 for computation immediately after the specified absolute or relative time.

Previous edge: Returns 1.0 for computation immediately before the specified absolute or relative time.

Level: Returns 1.0 during the specified absolute time or relative time.

- **Parameter Setting Ranges**

  Year: 1970-2036
  <month>: 1-12
  <day>: 1-31
  <week day>: 0 to 6 (0: Sunday, 1: Monday, ..., 6: Saturday)
  <hours>: 0-23
  <minutes>: 0-59

Function	Description	Example
time(<year>,<month>,<day> <hours>, <minutes>)	Edge operation on the date/time	time(2003,6,3,9,53) ? StartRec() : 0
bfTime(<year>,<month>,<day>,<hours>, <minutes>)	Previous edge operation on the date/time	bfTime(2003,6,3,9,3) ? StartRec() : 0
time(<year A>,<month A>,<day A>,<hours A>, <minutes A>,<year B>,<month B>,<day B>, <hours B>,<minutes B>)	Level operation between date/time A and B	time(2003,6,3,8,53,2003,6,3,9,13) ? sum(ch(00001),ch(00002), ch(00003)) : 0
monthly (<day>,<hours>,<minutes>)	Edge operation every month on the specified day, hour, and minute.	monthly(3,9,53) ? StartRec() : 0
bfMonthly (<day>,<hours>,<minutes>)	Previous edge operation every month on the specified day, hour, and minute.	bfMonthly(3,9,53) ? StartRec() : 0
monthly (<day A>,<hours A>,<minutes A>, <day B>,<hours B>, <minutes B>)	Level operation between the specified day, hour, and minute of A to the specified day, hour, and minute of B every month.	monthly (3,9,3,4,9,3) ? StartRec() : 0
weekly (<week day>,<hours>,<minutes>)	Edge operation every week on the specified week day, hour, and minute.	weekly(3,9,53) ? StartRec() : 0
bfWeekly (<week day>,<hours>,<minutes>)	Previous edge operation every week on the specified week day, hour, and minute.	bfWeekly(3,9,53) ? StartRec() : 0
weekly (<week day A>,<hours A>, <minutes A>,<weekday B>, <hours B>,<minutes B>)	Level operation between the specified week day, hour and minute of A to the specified week day, hour, and minute of B every week.	weekly(3,10,00,4,11,05) ? sum(ch(00001),ch(00002), ch(00003)) : 0
daily (<hours>,<minutes>)	Edge operation at the specified hour and minute every day	daily (10,00) ? StartRec() : 0
bfDaily (<hours>,<minutes>)	Previous edge operation at the specified hour and minute every day	dfDaily(10,00) ? StartRec() : 0
daily (<hours A>,<minutes A>,<hours B>, <minutes B>)	Level operation between time A and time B	daily(10,00,11,05) ? sum(ch(00001),ch(00002), ch(00003)) : 0
hourly (<minutes>)	Edge operation at the specified minute every hour	hourly(30) ? StartRec() : 0
bfHourly (<minutes>)	Previous edge operation at the specified minute every hour and minute every hour	bfHourly(30) ? StartRec() : 0
hourly (<minutes A>, <minutes B>)	Level operation between minute A and minute B	hourly (10,20) ? sum(ch(00001), ch(00002),ch(00003)) : 0
timer(<timerNo>)	Returns the status of the specified timer	timer(1)==1.0 ? StartRec() : 0

- **Timer (<timerNo>)**

  Up to eight timers can be specified. The timer is specified using a number between 1 and 8.

  Select the timer operation from the choices below. Select Off to disable the timer.

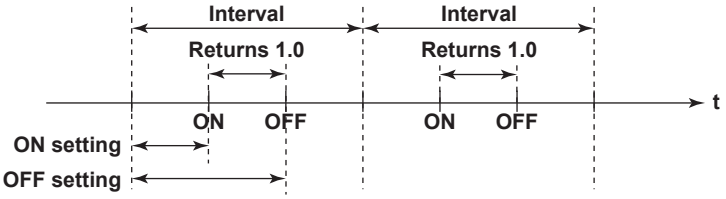
  Edge operation: Returns 1.0 when performing computation after the ON time elapses after the beginning of each interval. Specify the interval for detecting the condition and the ON time in ms.

  Level: Returns 1.0 from the time after the ON time elapses until after the OFF time elapses. Specify the interval for detecting the condition, ON time, and OFF time.

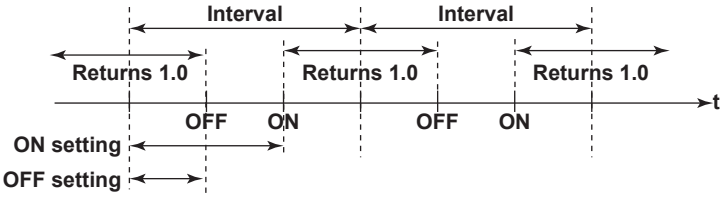
  The condition detection interval that can be set is from 1000 ms to 232–1 ms. The ON/OFF time is specified from the beginning of the interval to the elapsed time.

Timer Level Operation

• When ON < OFF



• When ON > OFF



Manual AO Function

Below are the pattern outputs that are available with the manual AO function. The functions are not case sensitive. Specify <manual> as described in the explanation for manual and user output in this section. The operation does not take place if the relevant user output channel is not set to pattern output mode.

Function	Description	Example
StartPTN()	Start pattern output Description	ch(00010) >=0 ? StartPTN() : 0
StopPTN()	Stop pattern output Description	ch(00010) >=0 ? StopPTN() : 0
SuspendPTN()	Pause pattern output Description	ch(00010) >=0 ? SuspendPTN() : 0
ResumePTN()	Resume pattern output Description	ch(00010) >=0 ? ResumePTN() : 0
StartPTN(<manual>)	Start pattern output on the specified user output channel	ch(00001) ==0 ? StartPTN(1) : 0
StopPTN(<manual>)	Stop pattern output on the specified user output channel	ch(00001) ==0 ? StopPTN(1) : 0
SuspendPTM(<manual>)	Pause pattern output on the specified user output channel	ManualDO(1)==1 ? SuspendPTN(1) : Resume(1)
ResumePTN(<manual>)	Resume pattern output on the specified user output channel	ManualDO(1)==1 ? SuspendPTN(1) : Resume(1)

Event Functions

Function used to carry out a given operation (event). They are not case-sensitive. They are mainly used in conjunction with the conditional operator (?).The return values are indicated below. The event is actually executed after the computation is complete.

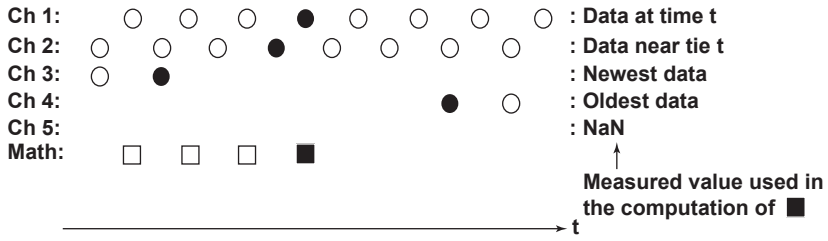
• Execution successful: 1.0
• Execution failed: 0.0
• Invalid parameter: NaN

Function	Description	Example
AlarmAck()	Issue an alarm acknowledge	ch(00001)>ch(00002) ? AlarmAck() : 0
ResetMath()	Reset the computation	ch(00010)>=1.0 ? ResetMath() : 0
ResetTimer()	Reset the values of all timers	ch(00010)>=1.0 ? ResetTimer() : 0
ResetTimer(<timerNo>)	Reset the specified timer	ch(00010)>=1.0 ? ResetTimer(1) : 0
ResetTLog()	Reset the TLOG computation	ch(00010)>=1.0 ? ResetTLog() : 0
StartRec()	Start recording Valid after carrying out the record start procedure. Discarded if the recording is already started (returns 1.0).	ch(00010)>=1.0 ? StartRec() : 0
SplitRec()	Move to the next data file Valid after carrying out the record start procedure.	ch(00010)>=1.0 ? SplitRec() : 0
StopRec()	Stop recording Valid after carrying out the record start procedure. Discarded if the recording is already stopped (returns 1.0).	ch(00010) >=0 ? StopRec() : 0
Mark(“mark”	Create a mark. The text inside the double quotation marks is arbitrary.	ch(00010) >=0 ? Mark(“mark” : 0

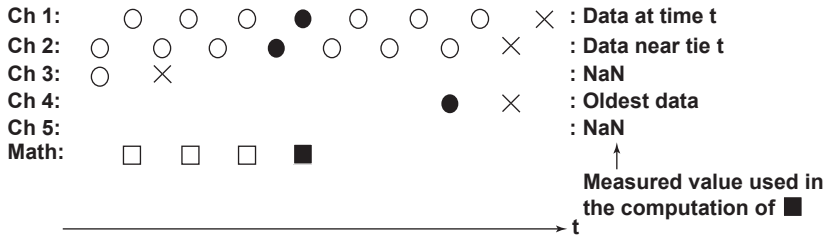
- If the spacing between the execution of StopRec() and StartRec() is short, StartRec() may not be executed. When repeating start/stop frequently, consider using the Split function.
- The computed result at the time record start is executed is not necessarily recorded to the file.

Notes on Computation

- The equation is not case sensitive. The exception is tag numbers specified on the Channel setup screen.
- The precision and range of computed values are the same as data in single-precision floating point format.
- The sampling interval of the computed channel is 100 ms to 10 min.
- Measured values used in computations
  The measured value with the closest time is used among the measured values existing at the time of computation. Resampling of the measured value or interpolation are not performed while computation is being executed.
  Example 1:
  If the measured values indicated by ○ and ● exist and computation indicated by ■ is performed, the measured value indicated by ● on each channel is used. If the measured value does not exist such as in Ch 5, NaN is used as the measured value.



  Example 2:
  If the disconnection (disconnected after ×) is detected, NaN is used as the measured value of Ch 3.



- Alarm values used in computations
  Basically handled the same as measured values except the behavior differs in the following two cases.
  - When the alarm value does not exist (Ch 5 in example 1 above)
    Always returns 0 (no alarm).
  - When the communication is cut off (Ch 3 in example 2 above)
    Always returns the most-recent value.
- Syntax error and execution error
  - Syntax error
    Equations containing items that are inappropriate are indicated in peach when the equation is being entered. If monitoring is started without correcting the equation, they are ignored.
  - Execution error
    Execution errors are detected after starting the execution. Below are the two cases. NaN is returned as the result in either case.
    - When the reference destination does not exist when monitoring is started
    - When the computed result is undefined.

- Handling of NaN values
  - In the case of a TLOG function (tlogmax, tlogmin, tlogpp, tlogsum, and tlogave)
    If NAN exists in the channel values, it is handled as though the value did not exist.
  - In the case of the IsNan() function
    This function can determine whether the value is NaN.
  - In the case of min, max, sum, ave, and pp functions
    NaN values are discarded.
  - In the case of &&, ||, ^^, and ! operators
    NaN values are considered true.
  - For all other computations
    Computation is performed taking NaN as a value. Thus, NaN is returned as the computed result.

  • The numeric value display on the Monitor screen displays INVALID.
- Handling when the value of a measurement channel is ±Over (exceeding the upper and lower limits of the measurement range)
  If the measured value used in the reference function or TLOG function is ±Over, computation continues in one of two ways. Select the handling method using the **Calculate +Over/-Over as the MAX/MIN value of a range** check box.
  - Continue the computation as ±Over.
  - Continue the calculation by setting ±Over to the maximum or minimum value of the measurement range of the specified channel.
    Use the following values as the maximum and minimum value of the measurement range.
    - DC voltage: ±10% of the range
      However, 0/+63.000 mV for 60-mV (HQ) range and 0/+6.3000 V for 6-V (HQ) range.
      Example: 6 V range
      +OVER: +6.6 V
      –OVER: –6.6 V
    - Temperature: ±10°C of the rated measurement range
      However, 0 K and 10 K for KpVsAu7Fe and J263B.
    - Linear scaling: Maximum and minimum values of the scale corresponding to ±10% of the measurement span
      However, ±32000 when the scale value exceeds ±32000.
      Example 1: When the measurement span is set to ±1 V and the scale is set to ±10000 at 2 V range
      +OVER: +22000
      –OVER: –22000
      Example 2: When the measurement span is set to ±1 V and the scale is set to ±30000 at 2 V range
      +OVER: +32000
      –OVER: –32000

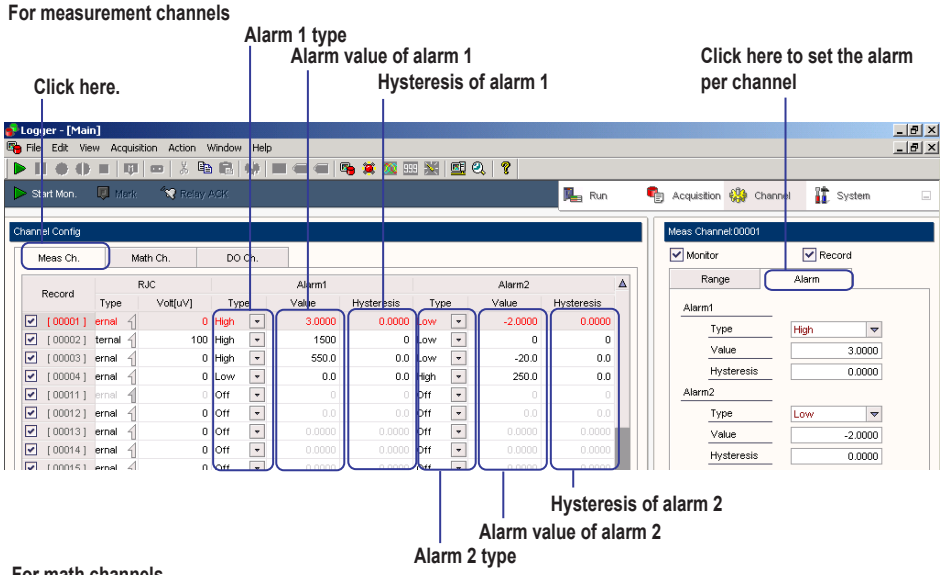
  To suppress ±Over from occurring in the computation, use the limit function.
- Alarms for computation using the Alarm() function
  The alarm corresponding to the current value is used for the alarm of a measurement channel.
  The alarm corresponding to the current value is also used for the alarm of a computation channel. However, for computation channels that have not yet computed the current value, the alarm corresponding to the previous value is used.

2.6 Setting Alarms

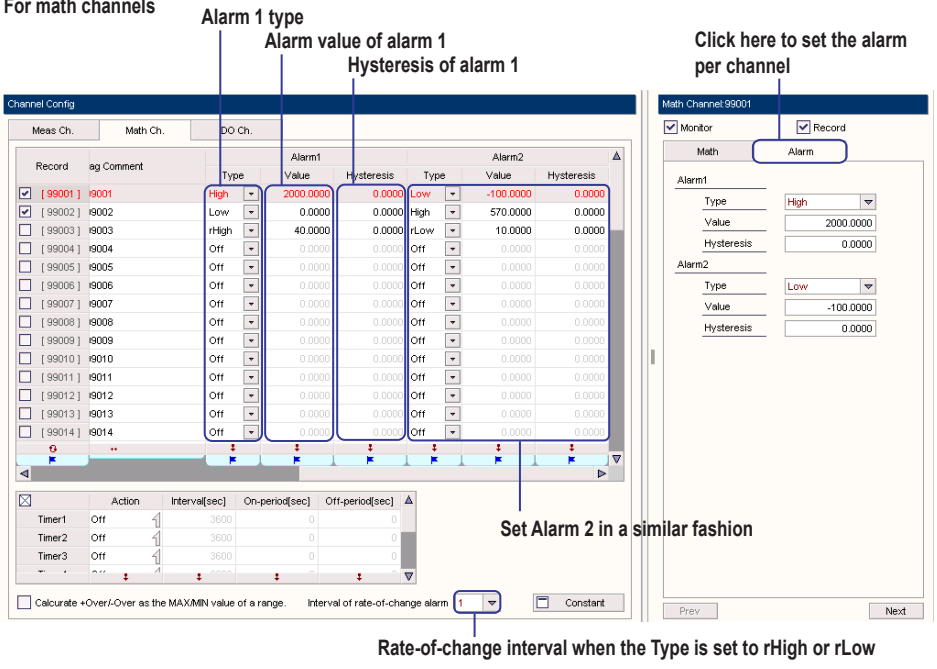
Procedure

1. Click **Channel**.
   The Channel setup screen appears.
2. Click the **Meas. Ch** tab or the **Math Ch** tab.
3. Select the alarm type from the **Type** list box under **Alarm 1** or **Alarm 2**.
   When not using difference input on measurement channels, select OFF, High, or Low. When using difference input, select OFF, dHigh, or dLow.
   On math channels, select OFF, High, Low, rHigh, or rLow.
4. Click the **Value** box, and enter the alarm value.
5. Click the **Hysteresis** box, and enter the alarm hysteresis value.
6. If you selected a rate-of-change alarm rHigh or rLow for the alarm type on a computation channel, select the interval used to detect the rate-of-change from the **Interval of rate-of-change alarm** list box.

For measurement channels



For math channels



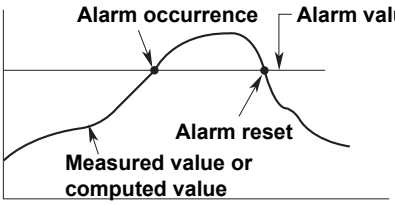
Explanation

Alarm Types

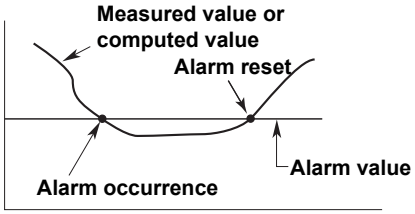
There are six types of alarms.
When not using difference input on measurement channels, select OFF, High, or Low.
When using difference input, select OFF, dHigh, or dLow.
On math channels, select OFF, High, Low, rHigh, or rLow.

- **Upper Limit Alarm (High)**
  An alarm occurs when the measured/computed value exceeds the alarm value.
- **Lower Limit Alarm (Low)**
  An alarm occurs when the measured/computed value falls below the alarm value.
- **Difference Input Upper Limit Alarm (dHigh)**
  An alarm occurs when the difference input (difference between the measured value of its own channel and that of the reference channel) exceeds the alarm value.
- **Difference Input Lower Limit Alarm (dLow)**
  An alarm occurs when the difference input (difference between the measured value of its own channel and that of the reference channel) falls below the alarm value.

Upper-limit alarm/difference input upper limit alarm

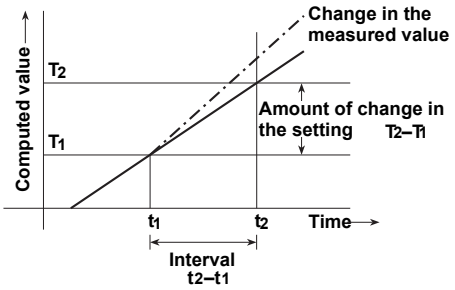


Lower-limit alarm/difference input lower limit alarm

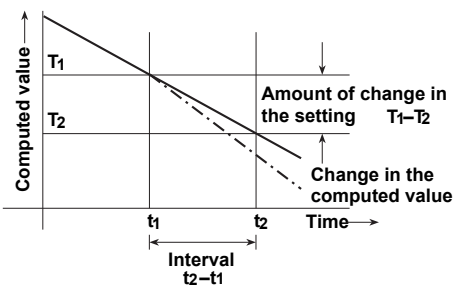


- **Rate of Change Upper Limit Alarm (rHigh)**
  The rate-of-change of the measured values is checked over the rate-of-change detection interval. An alarm occurs if the rate-of-change of the measured value in the rising direction exceeds the specified value.
- **Rate of Change Lower Limit Alarm (rLow)**
  The rate-of-change of the measured values is checked over the rate-of-change detection interval. An alarm occurs if the rate-of-change of the measured value in the falling direction exceeds the specified value.

High limit on rate-of-change alarm



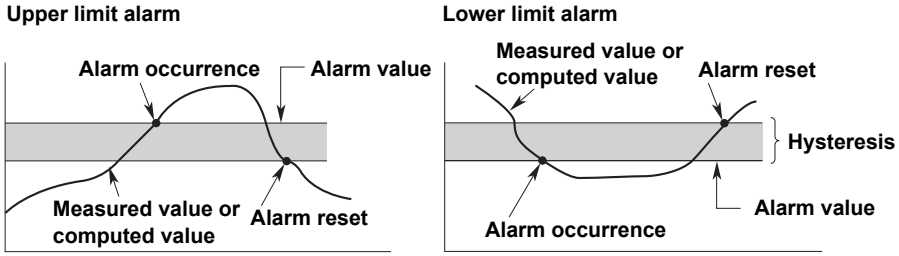
Low limit on rate-of-change alarm



The rate-of-change detection interval is equal to measurement interval x measurement count. Select the measurement count (1 to 15) using the Interval of rate-of-change alarm box.

Alarm Hysteresis

You can set a width (hysteresis) to the values used to activate and release alarms. Alarm hysteresis prevents frequent activation and release of alarms when the measured/computed value is unstable around the alarm value.



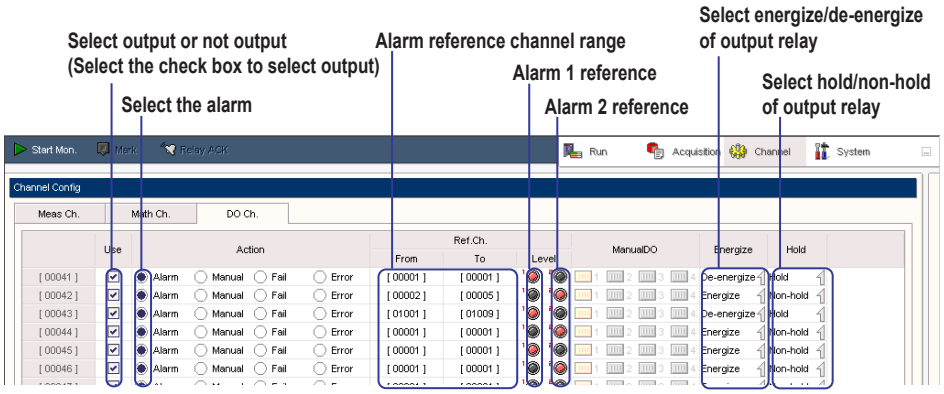
2.7 Digital Output

Procedure

1. Click **Channel**. The Channel setup screen appears.
2. Click the **DO Ch** tab.
3. Select the **Use** check boxes for the DO channels you wish to output.

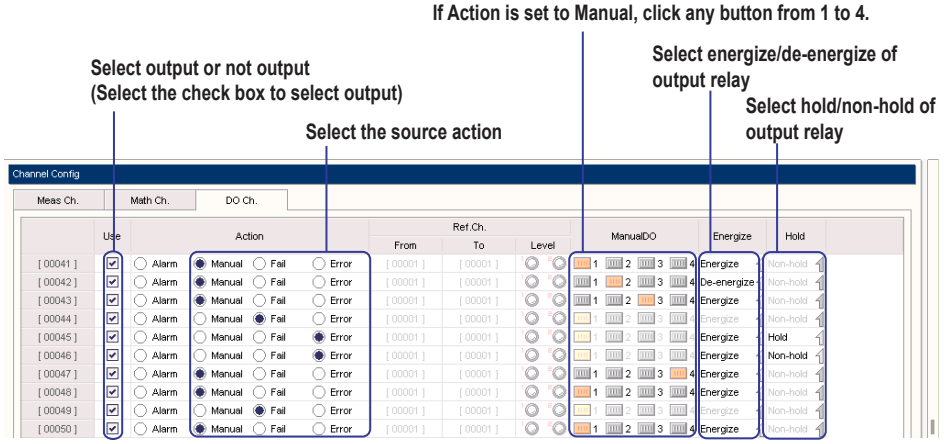
Setting the Digital Output of Alarms

4. Click the **Alarm** button under **Action**.
5. Click **From** or To under **Ref. Ch**. and then enter the range of reference measurement channel numbers or math channel numbers of the alarm output.
6. Click the Level 1 button or the Level 2 button or both under **Ref. Ch.**.
7. Click the **Energize** box to select the output relay action, energize or de-energize.
8. Click the **Hold** box to select the output relay behavior, hold or non-hold.



Setting the Digital Output Other Than Alarms

4. Click the option button under **Action** to select the action used as the digital output source.
5. If you set Action to Manual, click any of the **Manual DO** buttons 1 to 4.
6. If you set Action to Manual or Error, click the **Energize** box to select the output relay action, energize or de-energize.
7. If you set Action to Error, click the **Hold** box to select the output relay behavior, hold or non-hold.



Changing the Manual DO Name and Specified Output

1. Click **Run**. The Run screen opens.

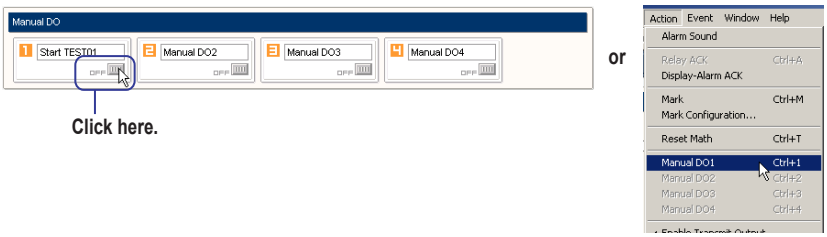
Changing the Name

2. While data monitoring is stopped, click the manual DO button name box shown in the Manual DO area and enter the name.

Output ON/OFF Operation

The procedure below can be carried out when data is being monitored.

2. Click the manual DO button or choose **Manual DO1** to **Manual DO4** from the Action menu.
   The output turns ON, and the word “OFF” on the manual DO button changes to “ON.” If “ON” is displayed, the output is turned OFF, and the word “ON” changes to “OFF.”



Explanation

Alarm Reference Channel Range

The alarm detection of multiple measurement channels and math channels can be assigned to a single DO channel. When an alarm occurs on any of the assigned channels, alarm output is activated. A range of consecutive channel numbers are assigned. The range can span over units.

Note

The alarm detection in the unit and the DO output is processed within the unit. Therefore, the DO output continues even when the connection to the PC is cut off. If the alarm reference channel range spans over multiple units or if the digital output module is not available in the same unit, alarm detection is performed on the PC. In this case, alarm detection stops when the connection is cut off. In addition, even when the connection is established, the alarm detection interval may slow down.

Digital Specified Output Other Than Alarm Output

The digital output can be enabled for the following causes.

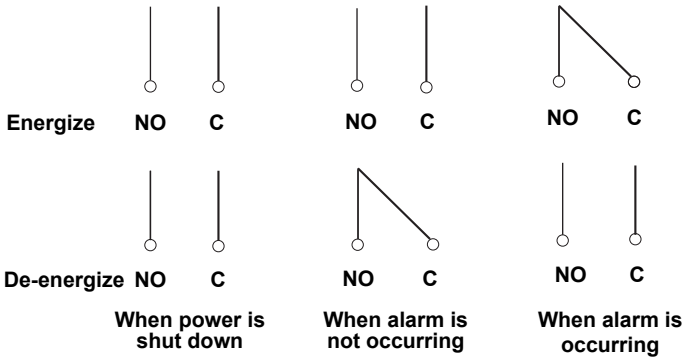
- Manual DO [manual]
  The relay contact signal of specified DO channels are turned ON/OFF collectively when you click the manual DO button shown on the Run screen or when you choose Manual DO1 to Manual DO4 from the Action menu.
- FAIL Output [Fail]
  Outputs a relay contact signal when an error occurs in the main module CPU of a unit containing a digital output module.

- Error Output [Error]
  Outputs a relay contact signal when any of the following events occur in the main module CPU of a unit containing a digital output module.
  - A data output request timeout (60 s) occurs while recording data.
  - A module error occurs.
    - An input module detected at power-on that is able to make measurements is removed.
    - A module breaks down.
    - An unidentifiable module is attached.

When using the energize setting for contact output, the circuit switches from open to short when the output is enabled. When using the de-energize setting, the circuit switches from short to open.

Energized/De-energized Operation of Output Relays

You can select whether the output relay is energized or de-energized when an output event (such as an alarm) occurs. If de-energized is selected, the output relay behaves in the same fashion as when an output event occurs if the power is shut down. The default setting is Energized.

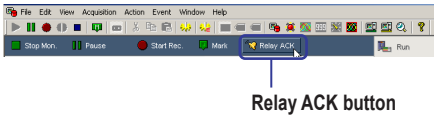


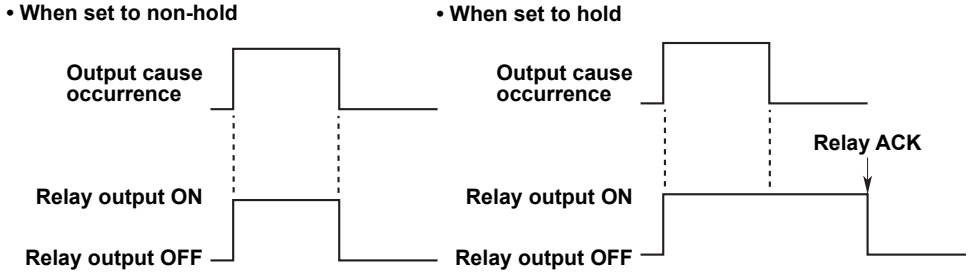
NO: Normally Opened, C: Common

Hold/Non-Hold of Output Relays

Select the behavior of the output relay when an output event is released (recovers to a normal condition). The default setting is Non-hold.

- Turn OFF the output relay with the release of the output event (non-hold).
- Hold the output relay at ON until the Relay ACK button (see below) is clicked.



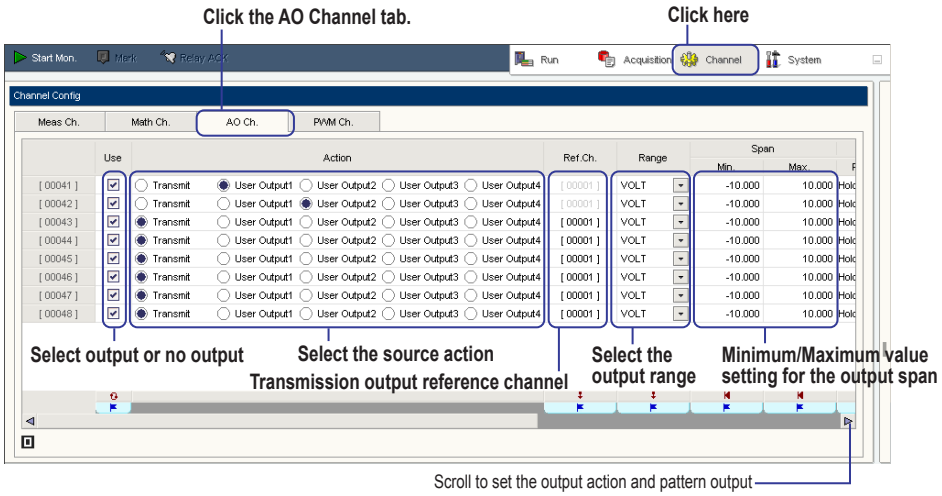


2.8 Analog/PWM Output Settings

Procedure

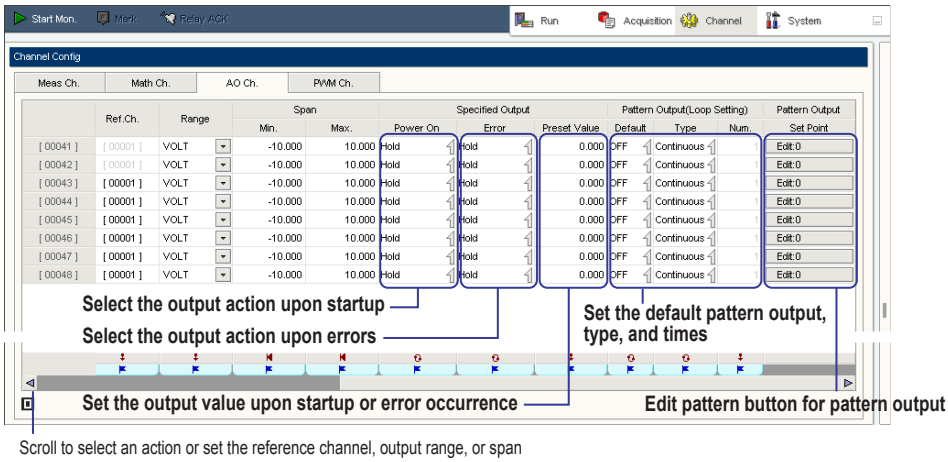
Setting Analog Output

1. Click **Channel** to show the **Channel** setup screen.
2. Click the **AO Channel** tab.
3. Select the **Use** check boxes for the AO channels you wish to output.
4. Specify a channel operation of **Transmission Output** or **User Output 1** through **User Output 4**. If user output is specified, you can enter settings in the monitor screen.
   Of all the AO and PWM channels selected for user output, only one can be specified for each channel, for a total of four.
5. When **Transmission Output** is specified, enter the reference channel. The **Reference Channel** cannot be entered if the channel operation is user output.
6. Select a range from the **Range** list box.
7. Click the **Min** box or **Max** box under **Span** and enter the minimum or the maximum value of the span.



8. Click the **Power ON** box under **Specified Output** and select **Hold** or **Preset Value**.
9. Click the **Error** box under **Specified Output** and select **Hold** or **Preset Value**.
10. If you select **Preset Value** under **Specified Output**, click **Preset Value** under operation, and enter the voltage or current.
11. Click the **Default** box under **Pattern Output** and select **ON** or **OFF** for the initial operation in the loop settings.
12. Click the **Type** box under **Pattern Output** and select **Continuous** or **Times**.
13. If you select **Times** for **Type** under **Pattern Output**, click the **Count** box under **Pattern Output**, and enter the number of loops.

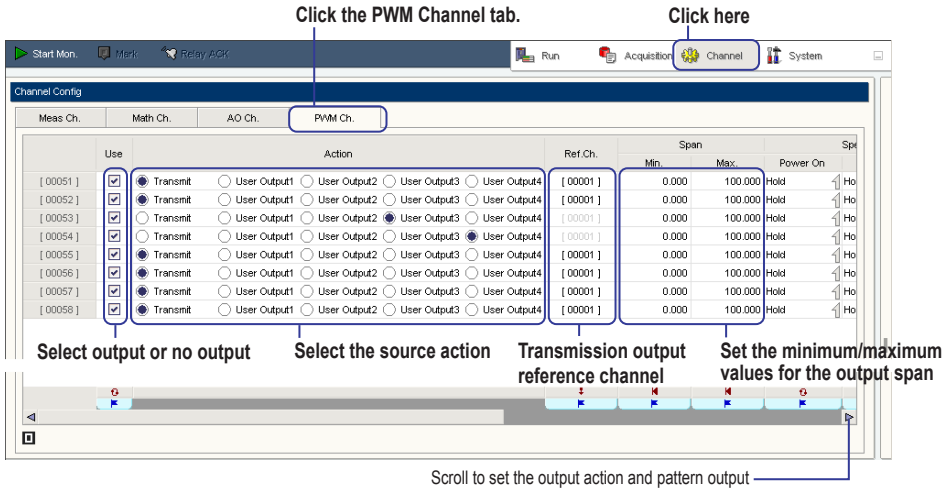
14. Click Edit under **Pattern Output** to open the **Edit Pattern** window.



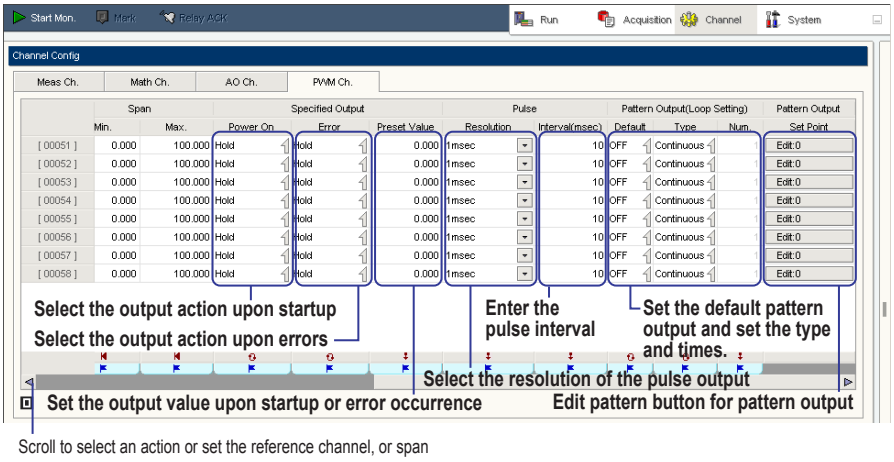
15. Edit the output pattern in the **Edit Pattern** window. For instructions, see “Editing Patterns” in this section.

Setting PWM Output

1. Click **Channel** to show the **Channel** setup screen.
2. Click the **PWM** Channel tab.
3. Select the **Use** check boxes for the **PWM** channels you wish to output.
4. Specify a channel operation of **Transmit** or **User Output 1** through **User Output 4**. If user output is specified, you can enter settings in the monitor screen. Of all the AO and PWM channels selected for user output, only one can be specified for each channel, for a total of four.
5. When **Transmit** is specified, enter the reference channel. The reference channel cannot be entered if the channel operation is **User Output**.
6. Click the **Min** box or **Max** box under **Span** and enter the minimum or the maximum value of the span.



7. Click the **Power ON** box under **Specified Output** and select **Hold** or **Preset Value**.
8. Click the **Error** box under **Specified Output** and select **Hold** or **Preset Value**.
9. If you select **Preset Value** under **Specified Output**, click **Preset Value** and enter the duty.
10. Select 1 msec or 10 msec in the **Resolution** box under **Pulse**.
    Click the **Interval (msec)** box under **Pulse**, and enter the pulse interval.
11. Click the **Default** box under **Pattern Output** and select **ON** or **OFF** for the initial operation in the loop settings.
12. Click the **Type** box under **Pattern Output** and select **Continuous** or **Times**.
13. If you select **Times** for **Type** under **Pattern Output**, click the **Count** box under **Pattern Output**, and enter the number of loops.
14. Click **Edit** under **Pattern Output** to open the **Edit Pattern** window.



15. Edit the output pattern in the **Pattern Edit** window. For instructions, see “Editing Pattern Output” in this section.

Editing Pattern Output

Adding Points

1. Click **Edit** under **Pattern Output** to open the **Edit Pattern** window.
2. Click the **Add** button under **Edit Pattern** to open the **New Point** window. (To edit at a particular time after the previous point, click the **Insert** button instead.)
3. Enter an elapsed time from the start time (or from the previous point) in the **Time** box in the **New Point** window.
4. Enter an output value in the setting box in the **New Point** window.
5. Click **OK** in the **New Point** window to create the new point.

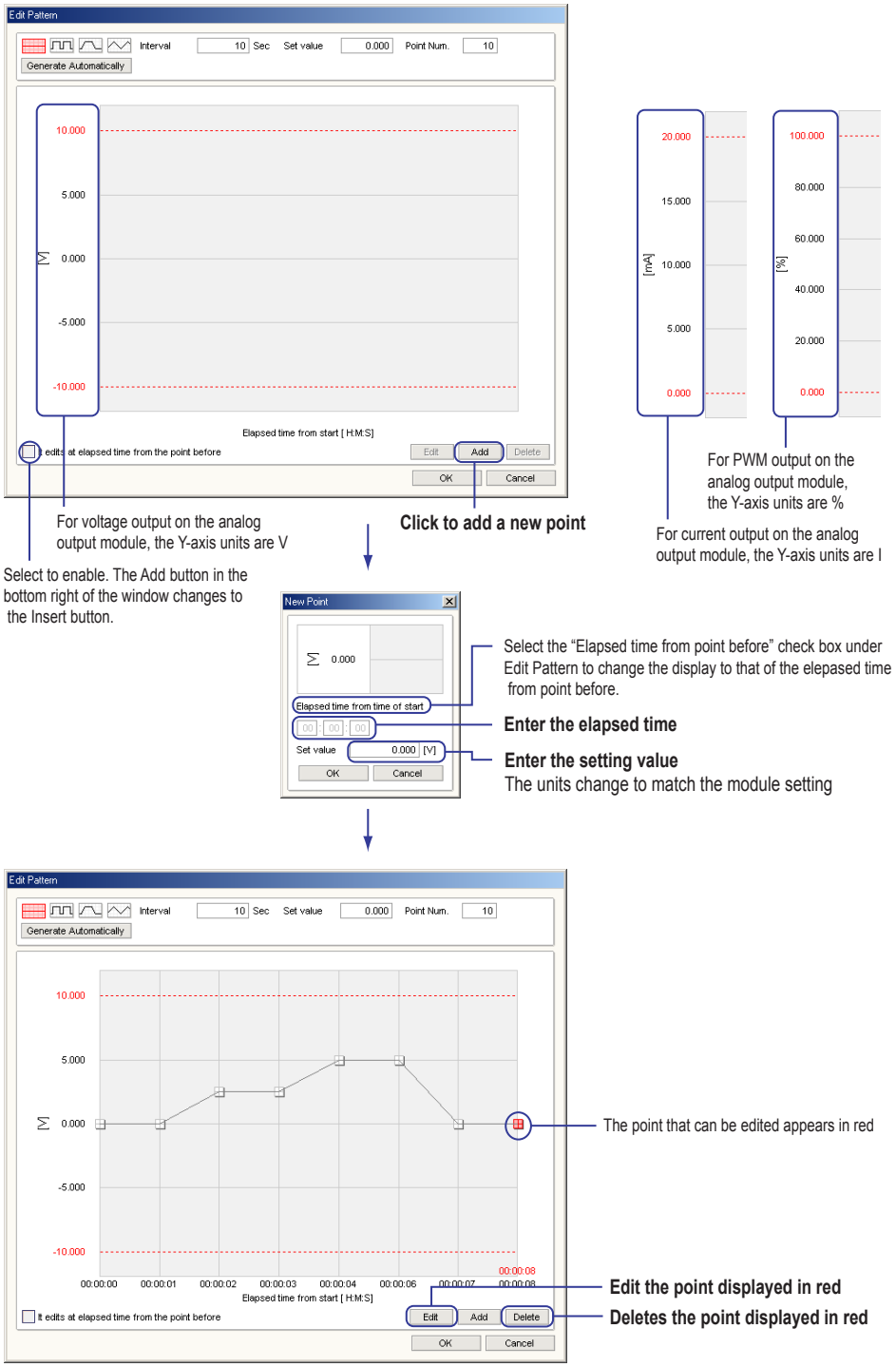
Editing Points

1. Click the point you wish to edit in the **Edit Pattern** window. The point changes from gray (or orange) to red.

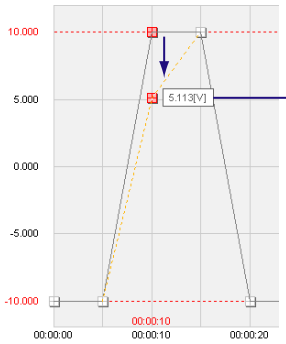
2. Click the **Edit** button under **Edit Pattern** to open the **Edit Point** window (you can double-click a point to open the **Edit Point** window even if it is red.)
3. Perform the same procedure as when editing new points.

Deleting Points

1. Click the point you wish to edit in the **Edit Pattern** window. The point changes from gray (or orange) to red.
2. Click the **Delete** button under **Edit Pattern** to delete a point .



You can edit multiple points at the same time by dragging a selection of editable red points.



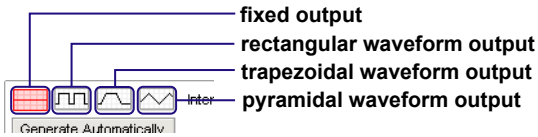
Displays the setting value when the point is moved

“Generate Automatically” Function

The following four types of patterns can be created.

- Fixed output
- Rectangular waveform output
- Trapezoidal waveform output
- Pyramidal waveform output

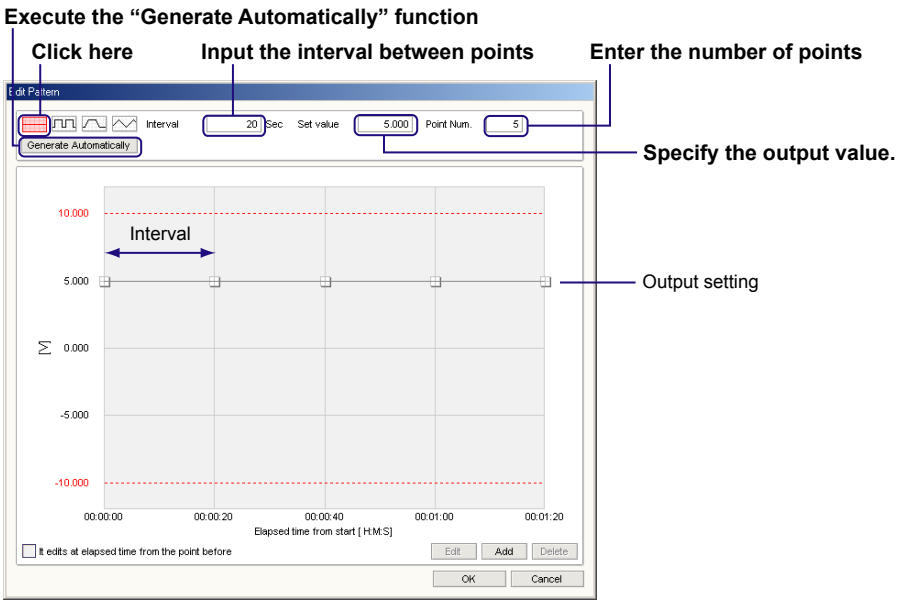
Click the displayed button for any pattern in the upper right of the **Edit Pattern** window. The patterns can be edited after being created.



fixed output
rectangular waveform output
trapezoidal waveform output
pyramidal waveform output

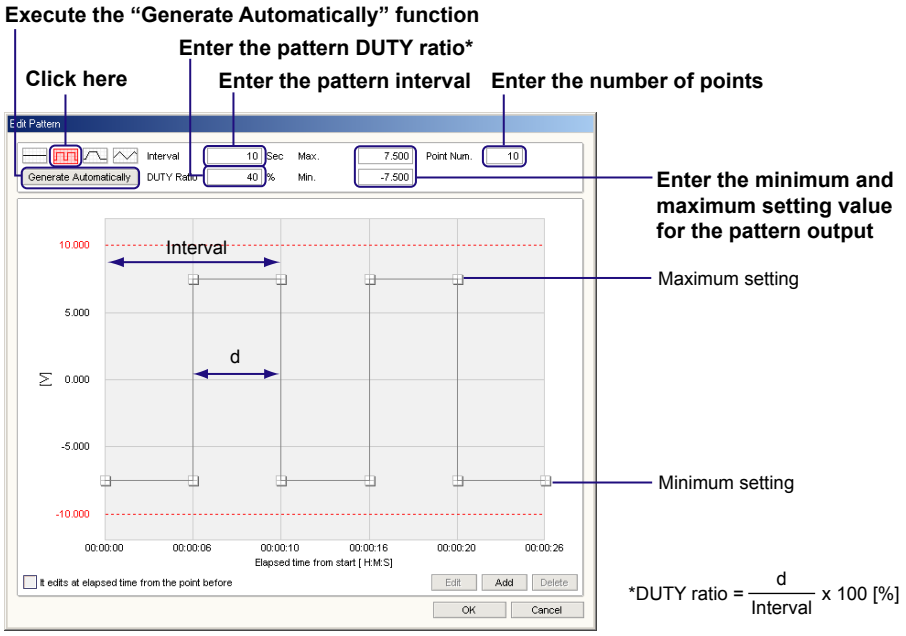
Fixed Output

1. Click the **Fixed Output** button.
2. Enter the time interval for the points in the **Interval** box.
3. Enter an output value in the **Set value** box.
4. Enter the number of points in the **Point Num.** box.
5. Click the **Generate Automatically** button to create the pattern.



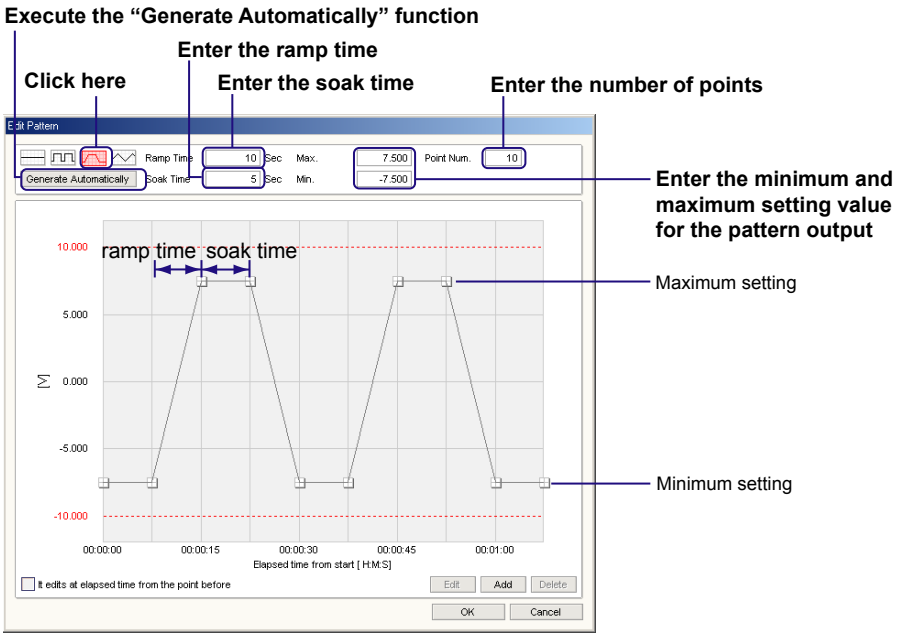
Rectangular Waveform Output

1. Click the **Rectangular Waveform Output** button.
2. Enter the pattern interval in the **Interval** box.
3. Enter the pattern duty ratio in the **DUTY Ratio** box.
4. Enter the maximum setting value for pattern output in the **Max** box. Or, enter the minimum setting value for pattern output in the **Min** box.
5. Enter the number of points in the **Point Num.** box.
6. Click the **Generate Automatically** button to create the pattern.



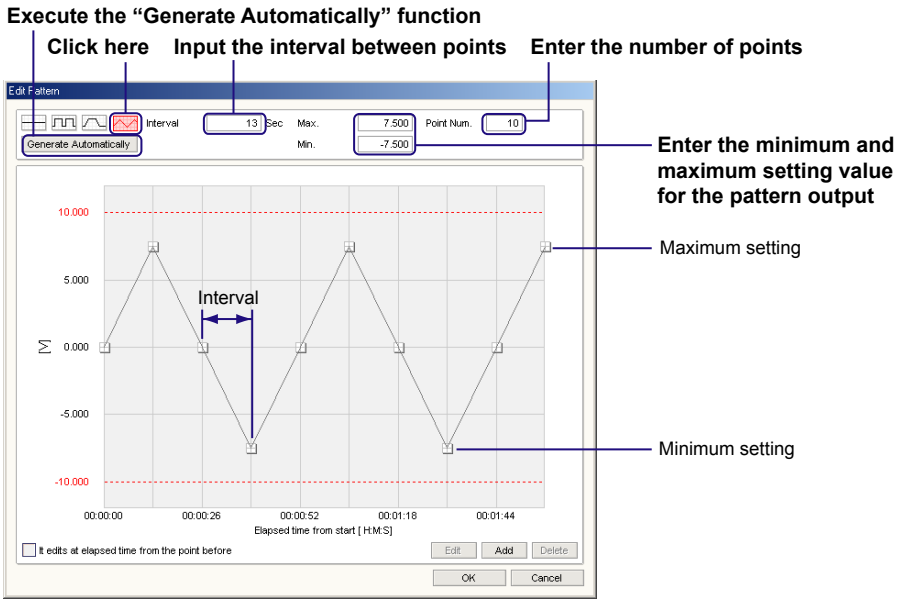
Trapezoidal Waveform Output

1. Click the **Trapezoidal Waveform Output** button.
2. Enter the time for the pattern's slope in the **Ramp Time** box.
3. Enter the time for the pattern's constant portion in the **Soak Time** box.
4. Enter the maximum setting value for pattern output in the **Max** box. Or, enter the minimum setting value for pattern output in the **Min** box.
5. Enter the number of points in the **Point Num.** box.
6. Click the **Generate Automatically** button to create the pattern.



Pyramidal Waveform Output

1. Click the **Pyramidal Waveform** Output button.
2. Enter the time interval for the points in the **Interval** box.
3. Enter the maximum setting value for pattern output in the **Max** box. Or, enter the minimum setting value for pattern output in the **Min** box.
4. Enter the number of points in the **Point Num.** box.
5. Click the **Generate Automatically** button to create the pattern.



Turning Transmission Output ON and OFF Collectively for Analog Output/PWM Output

1. From the Action menu, choose **Transmit.**
   Transmission output on active channels on the AO and PWM channel tabs is performed collectively (All ON).
2. From the Action menu, choose **Transmit** again.
   Transmission output on active channels on the AO and PWM channel tabs is stopped collectively (All OFF).

Explanation

Setting Output for AO Channels

[Transmit]: Computed values resulting from values measured on the MX100 and computation results set on the computation channels are converted to analog voltages (-10.000 V-10.000 V) or analog current (0.000mA-20.000 mA) and output.

Note

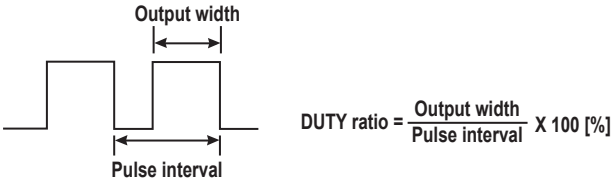
The output range is -11.000-11.000V or 0.000-22.000 mA, but the span setting range is -10.000-10.000V or 0.000-20.000 mA.

[User Output]: Output continuously or a specified number of times an analog voltage or analog current values using a previously set pattern. Also, you can enter an arbitrary setting for User (Manual) in the **Run** screen. The setting ranges are -10.000-10.000 V (voltage), or 0.000-20.000 mA (current).

Setting up Output for PWM Channels

[Transmission Output]: Outputs a duty pulse waveform corresponding to the measurement values from the MX100 and the computation results set on the computation channel.

[User Output]: Output continuously or a specified number of times a pulse duty ratio (0.000 to 100.000%) using a previously set pattern. Also, you can enter an arbitrary setting for User (Manual) in the Run screen.



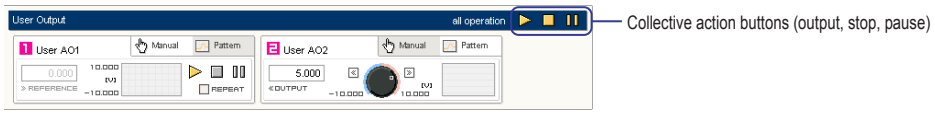
Setting Patterns

You can edit patterns when not monitoring. Point setting values consist of the elapsed time from pattern start and the output value. The elapsed time for the first point is fixed at 0 seconds. Up to thirty-two points can be defined. Up to two points can occupy a single point in time.

Also, you can easily generate four types of patterns using the Generate Automatically function.

User Output

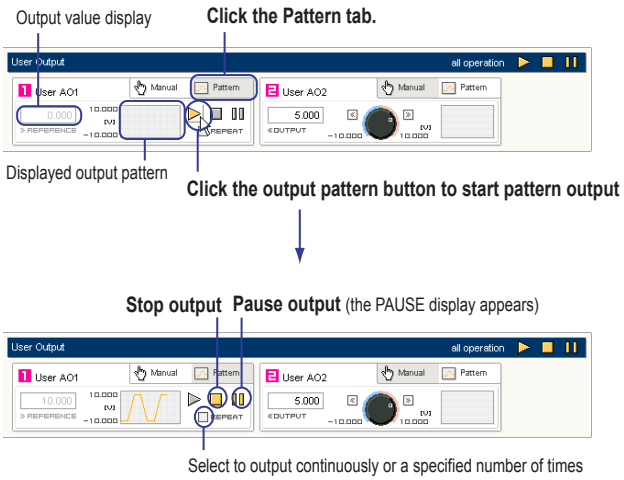
You can set up to four user outputs. With pattern output collective operation buttons, you can output, stop, or pause all user outputs at once.



User Output Procedure

• Pattern

1. Click the Pattern tab in the **User Output** space.
2. Click the triangle button. The previously set pattern is output.

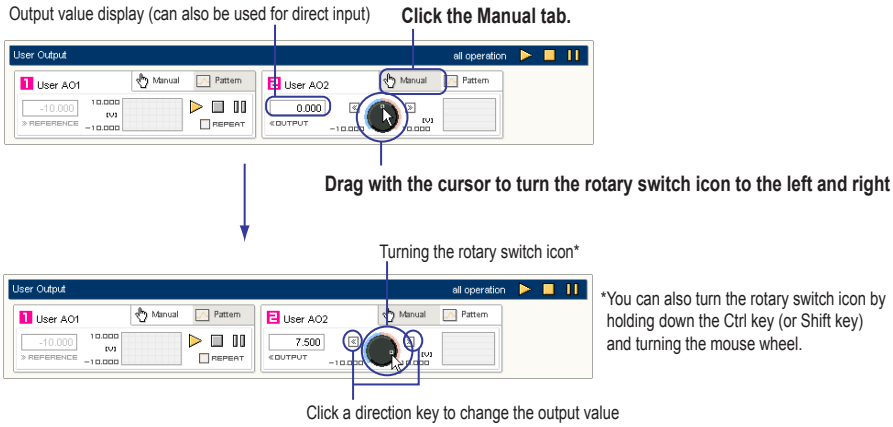


Note

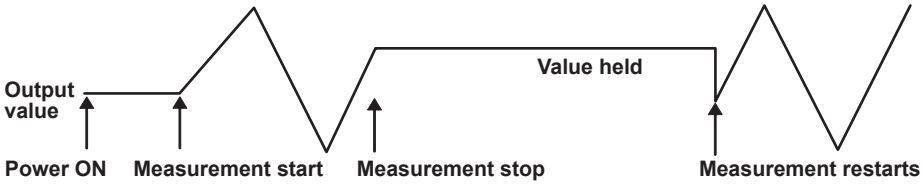
The **Repeat** check box in the **User Output** space is selected when the **Default** box under **Pattern Output** (Loop Setting) in the channel settings is turned **ON**.

• Manual

1. Click the **Pattern** tab in the **User Output** space.
2. To change the output value, turn the rotary switch icon by dragging it to the left or right, click a direction key, or type a value directly into the output value display box.



Overview of Output during When Transmit Is Set



Operation Status of Transmission Output by Communication Status

Operation of analog output, PWM output and other forms of transmission output depend on the communication status as follows.

- For transmission output within the same unit, the operation does not depend on the communication status.
- For computation or transmission from other units, if communication is broken the operation is that specified for **Error** under **Specified Output**.
- For user output, if communication is broken the operation is that specified for **Error** under **Specified Output**.

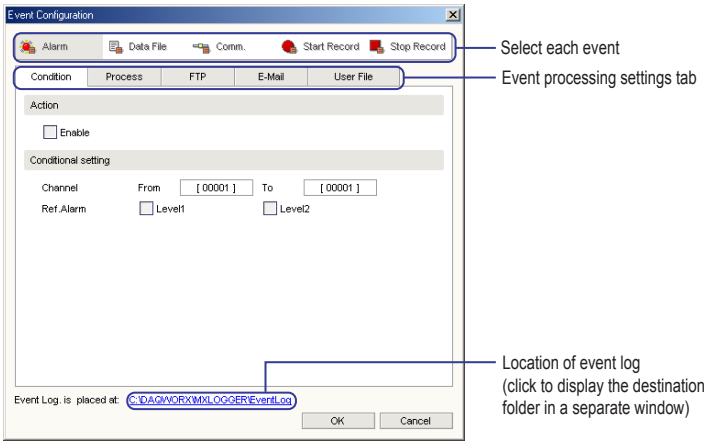
2.9 Event Processing

Event processing means to monitor for the specified type of event, and execute a specified process when conditions are met. The following events are available.

- Alarm Event
- Data file Event
- Communication Event
- Start Record Event
- Stop Record Event

Procedure

Choose Event > Setting on the menu bar or click the Event Setting icon. The Event Setting window appears.



Setting Alarm Events

1. Click **Alarm**. The screen changes to the Alarm Event setting screen.

Entering Conditions

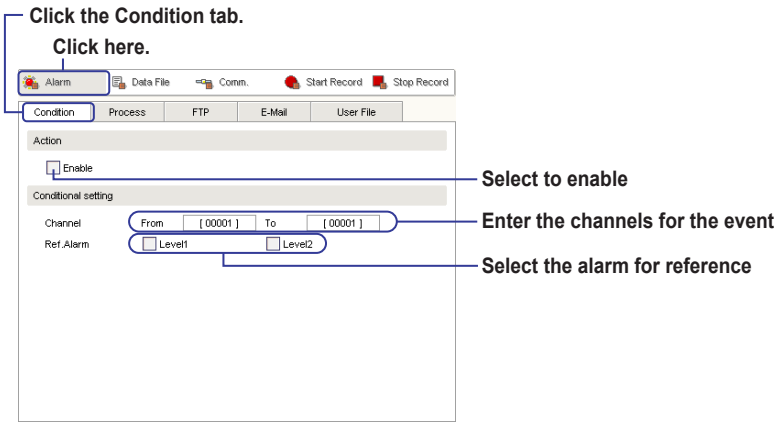
2. Click the **Condition** tab.
3. If the check box in the **Action** space is selected, the event becomes active.
4. Enter the target channel for the event in the **Channel Range** box in the **Condition Setting** space.
5. Select the check box for the desired alarm under **Ref. Alarm** in the **Condition Setting** space.

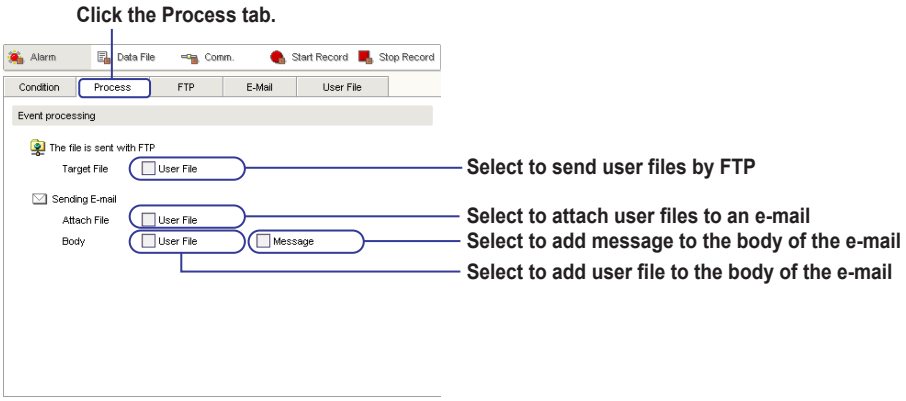
Setting Processes

6. Click the **Process** tab.
7. Select the **The File is set with FTP** check box in the **Event Processing** space to send user files via FTP.
8. Select the **Sending E-Mail** check box in the **Event Processing** space and select the **User File** check box under **Attach File** to send user files as an e-mail attachment.
9. In the **Sending E-Mail** item in the **Event Processing** space, select the User File and Message check boxes under Body to copy the contents of the user file to the body of an e-mail message, and send the message.

Setting Up FTP, E-mail, and User Files

10. For FTP settings, click the **FTP** tab. For e-mail settings, click the **E-mail** tab. For user file settings, click the **User File** tab. For instructions on settings in each of these tabs, see the FTP Settings, E-Mail Setting, or User File Setting items in this section.





Setting Up Data File Events

1. Click **Data File**. The screen changes to the Data File Event setting screen.

Entering Conditions

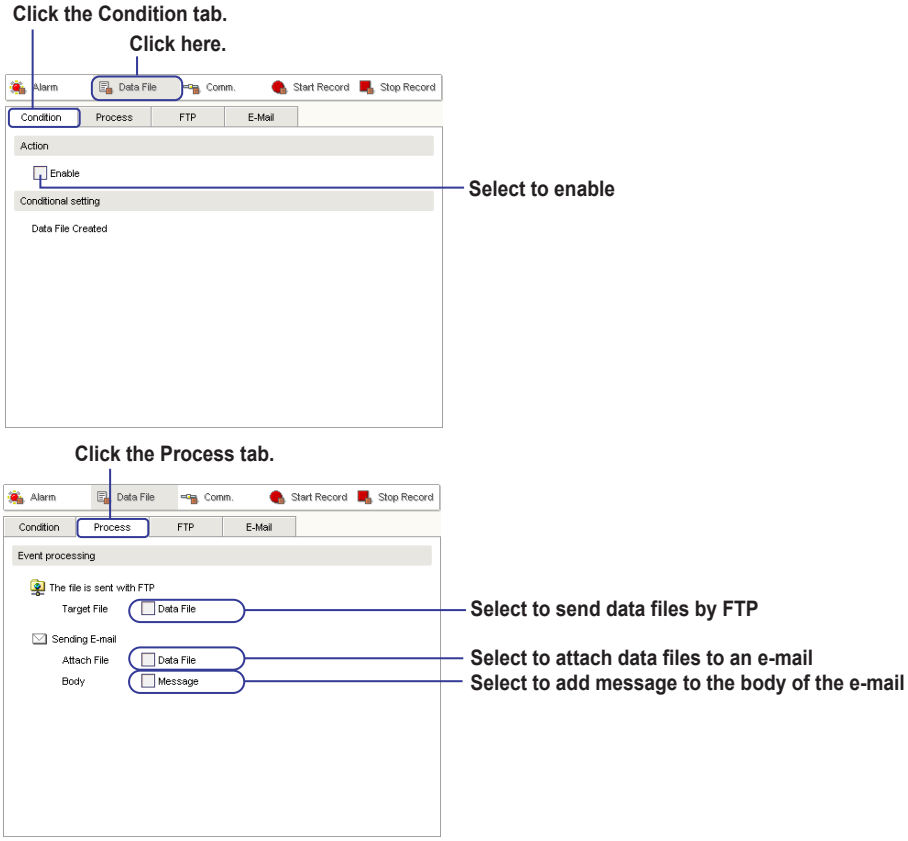
2. Click the **Condition** tab.
3. If the check box in the **Action** space is selected, the event becomes active.

Condition Processing

4. Click the **Process** tab.
5. Select the **The File is set with FTP** check box in the **Event Processing** space to send data files via FTP.
6. Select the **Sending E-Mail** check box in the **Event Processing** space and select the **Data File** check box under **Attach File** to send user files as an e-mail attachment.
7. In the **Sending E-Mail** item in the **Event Processing** space, select the **User File** and **Message** check boxes under **Body** to copy the contents of the message to the body of an e-mail, and send the e-mail.

Setting Up FTP and E-mail

8. For FTP settings, click the **FTP** tab. For e-mail settings, click the **E-mail** tab. For instructions on settings, see the FTP Settings or E-Mail Setting items in this section.



Setting Communication Events

1. Click **Comm.**. The screen changes to the Communication Event setting screen.

Entering Conditions

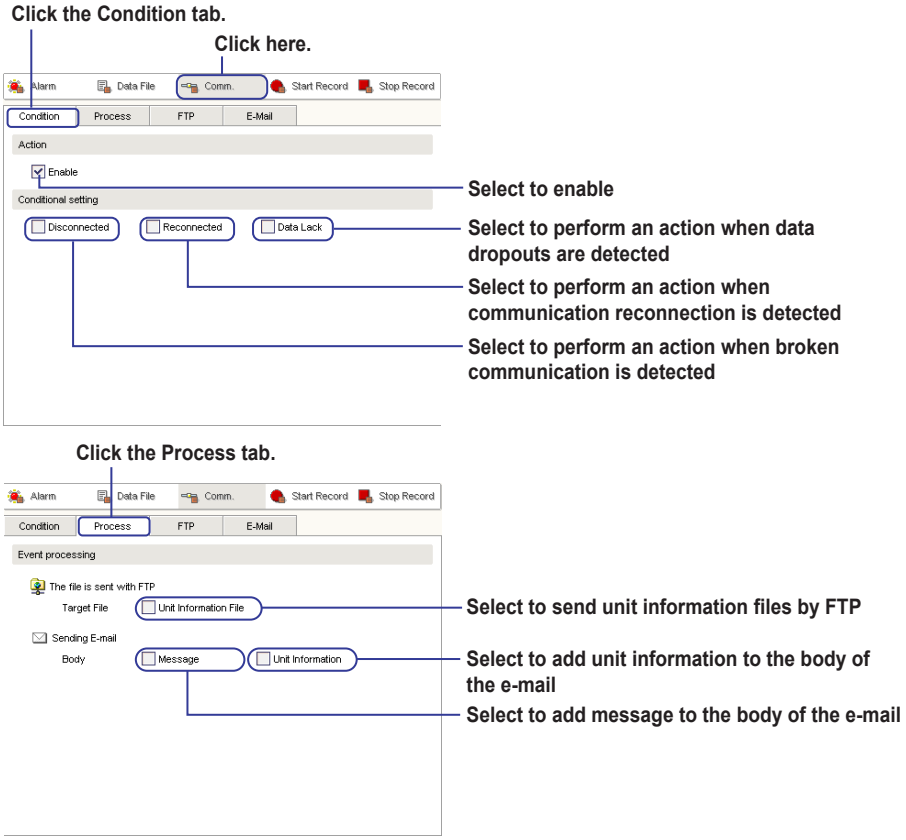
2. Click the **Condition** tab.
3. If the check box in the **Action** space is selected, the event becomes active.
4. If the **Disconnected** check box in the **Condition Settings** space is selected, the condition becomes valid when a communications disconnection is detected.
5. If the **Reconnected** check box in the **Condition Settings** space is selected, the condition becomes valid when a communications reconnection is detected.
6. If the **Data Lack** check box in the **Condition Settings** space is selected, the condition becomes valid when a communications related data dropout is detected.

Setting Processes

7. Click the **Process** tab.
8. Select the **The File is set with FTP** check box in the **Event Processing** space to send unit information files via FTP.
9. In the **Sending E-Mail** item in the **Event Processing** space, select the **Message** and **Unit Information** check boxes under **Body** to copy the message and unit information to the body of an e-mail, and send the e-mail.

Setting Up FTP and E-mail

10. For FTP settings, click the **FTP** tab. For e-mail settings, click the **E-mail** tab. For instructions on settings, see the FTP Settings or E-Mail Setting items in this section.



Setting Start Record Events

1. Click **Start Record**. The screen changes to the Start Record Event setting screen.

Entering Conditions

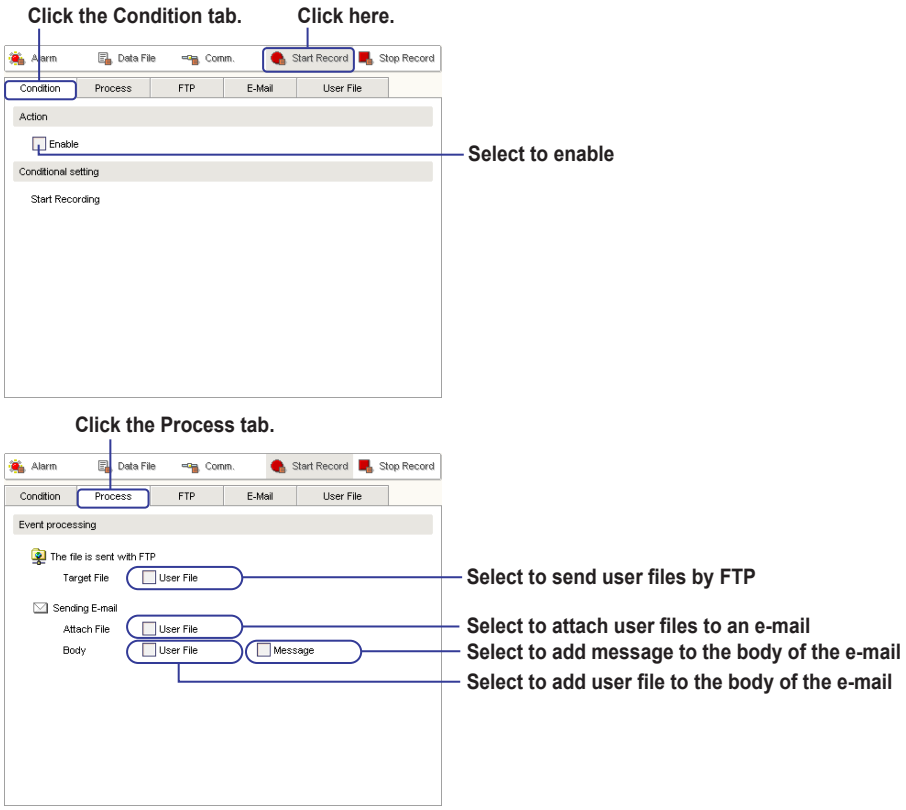
2. Click the **Condition** tab.
3. If the check box in the **Action** space is selected, the event becomes active.

Process Settings

6. Click the **Process** tab.
7. Select the **The File is set with FTP** check box in the **Event Processing** space to send user files via FTP.
8. Select the **Sending E-Mail** check box in the **Event Processing** space and select the **User File** check box under Attach File to send user files as an e-mail attachment.
9. In the **Sending E-Mail** item in the **Event Processing** space, select the **User File** and **Message** check boxes under **Body** to copy the contents of the user file to the body of an e-mail message, and send the message.

Setting Up FTP, E-mail, and User Files

10. For FTP settings, click the **FTP** tab. For e-mail settings, click the **E-mail** tab. For user file settings, click the **User File** tab. For instructions on settings in each of these tabs, see the FTP Settings, E-Mail Setting, or User File Setting items in this section.



Setting Stop Record Events

1. Click **Stop Record** . The screen changes to the Stop Record Event setting screen.

Entering Conditions

2. Click the **Condition** tab.
3. If the check box in the **Action** space is selected, the event becomes active.

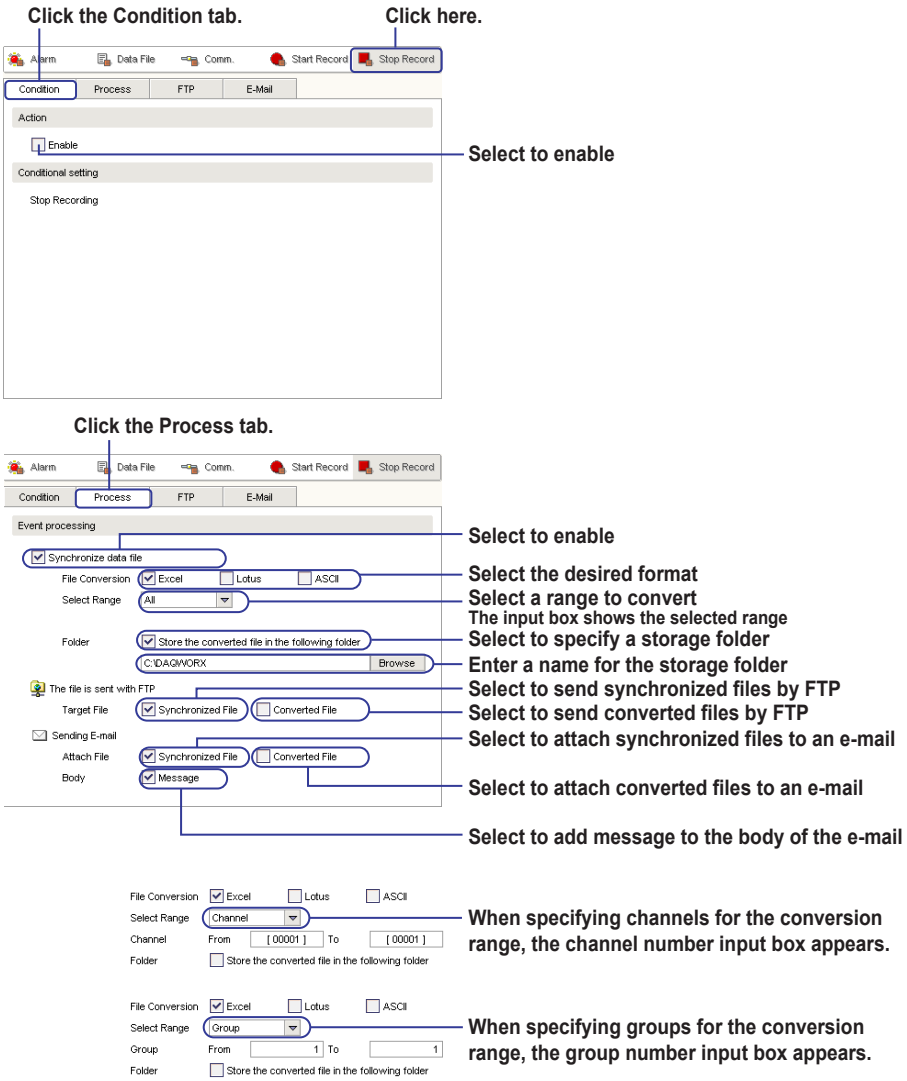
Setting Processes

4. Click the **Process** tab.
5. Select the **Synchronize Data File** check box in the **Event Processing** space to execute synchronization. When doing so, the **File conversion** check box becomes available for selection.
6. Select the **Excel**, **Lotus**, or **ASCII** check box in the **File Processing** space to convert synchronized data to the corresponding format. When doing so, the Select **Range** and **Folder** boxes becomes available for selection.
7. Select the Select **Range** box under **File Conversion** to specify a range of synchronized data for conversion.
8. Enter a folder name for saving the file in the **Folder** box. Select the **Folder** check box to save converted files to the specified folder.

9. Select the **Synchronized File** or **Converted File** check box under **The File is sent with FTP** in the **Event Processing** space to send synchronized or converted files via FTP.
10. Select the **Synchronized File** or **Converted File** check box under the **Sending E-Mail** item in the **Event Processing** space to send synchronized or converted files as e-mail attachments.
11. In the Sending E-Mail item in the **Event Processing** space, select the **User File** and **Message** check boxes under **Body** to copy the contents of the message to the body of an e-mail, and send the e-mail.

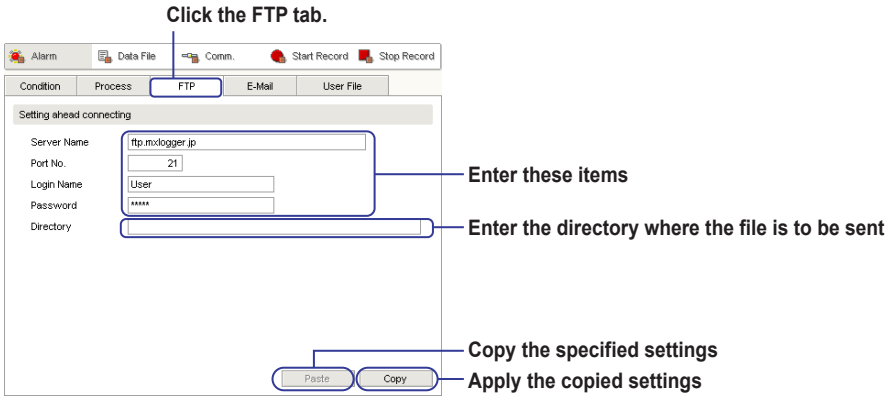
Setting Up FTP and E-mail

12. For FTP settings, click the **FTP** tab. For e-mail settings, click the **E-mail** tab. For instructions on settings, see the FTP Settings or E-Mail Setting items in this section.



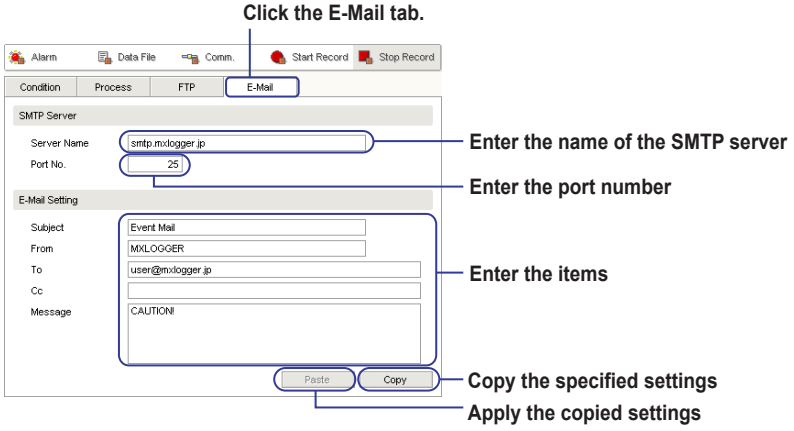
Configuring FTP

1. Click the **FTP** tab for an event.
2. Enter the name of the FTP server in the **Server Name** box.
3. Enter the port used for connection in the **Port No.** box.
4. Enter a login name in the **Login Name** box.
5. Enter a password to be used during login in the **Password** box.
6. Enter a directory name for transferring files in the **Directory** box.



Configuring E-Mail

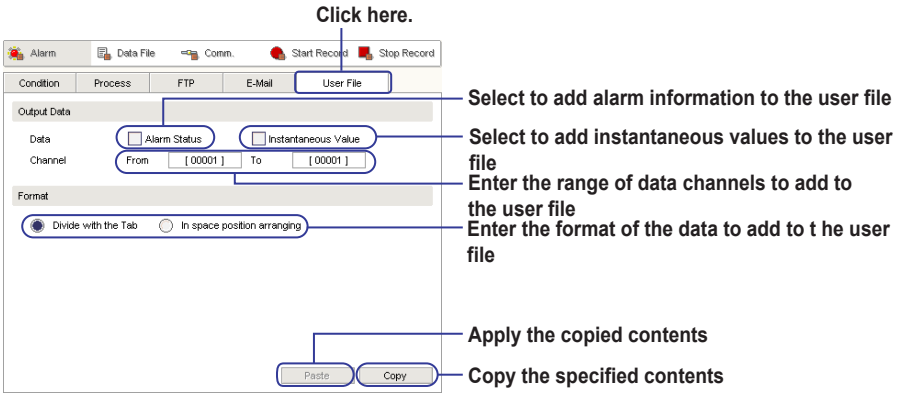
1. Click the **E-Mail** tab for an event.
2. Enter the name of the SMTP server in the **Server Name** box in the **SMTP Server** space.
3. Enter the port used for connection in the **Port No.** box in the **SMTP Server** space.
4. Enter the subject of the e-mail in the **Subject** box in the **E-Mail Setting** space.
5. Enter the sender of the e-mail in the **From:** box in the **E-Mail Setting** space.
6. Enter the recipient of the e-mail in the **To:** box in the **E-Mail Setting** space.
7. Enter recipients of copies of the e-mail in the **Cc:** box in the **E-Mail Setting** space.
8. Enter the message of the e-mail in the **Message** box in the **E-Mail Setting** space.



User File Settings

1. Click the **User File** tab for an event.
2. Select the **Alarm Information** check box to include alarm information in the user file output data.
3. Select the **Instantaneous Value** check box to include instantaneous values in the user file output data.
4. Enter channel numbers in the box to specify a range of output data channels.

5. Select the output data format.



Enabling/Disabling Events

Enabling and disabling of each event can be performed using menus in addition to using the **Event Setting** window.
Choose **Event** > **Alarm Event** (or other events). Select the check box next to an event item to enable it.

Description

Data File Events

If the data file creation interval is extremely short, event processing may not be able to be carried out.

Setting Up FTP and E-mail

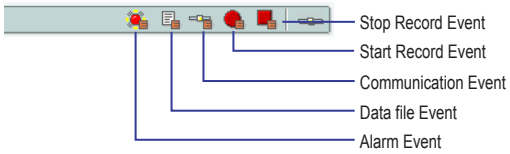
This is available for all events. Also, you can set FTP and E-Mail for each event. To copy selected contents from one event to another, click the **Copy** button in the lower right of the setting screen. Then, click the **Paste** button in the FTP or E-Mail setting screen of the event to which you wish to copy the contents.
Please consult with your network administrator regarding the FTP and SMTP server names.

Note

- When sending e-mail, an extremely large number of e-mails can be generated.
- When attaching files to e-mail, the file sizes can be extremely large.

Executing Event Processing

An icon is displayed in the status bar when events occur and resulting processes are carried out only icons of events processes executed are displayed)



Logging of Events

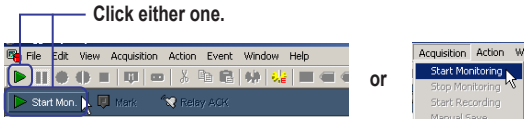
The processing of each event is saved to the created LOG folder. The location of the LOG folder is shown in the lower left of the **Event Setting** window.
The log file contains one week's worth of data.

2.10 Starting/Stopping Data Monitoring and Displaying the Monitor

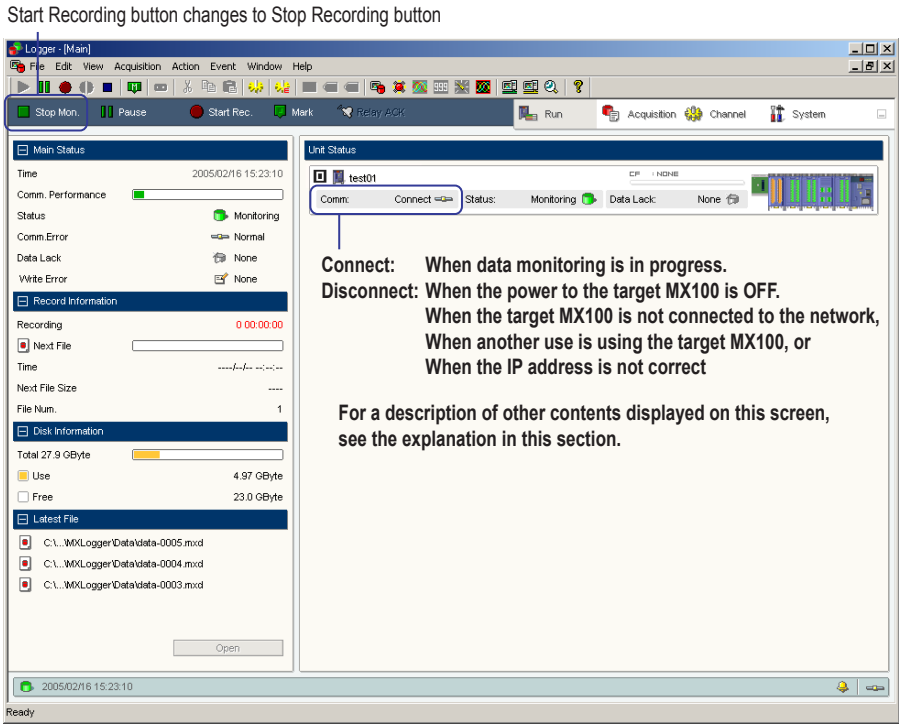
Procedure

Start Data Monitoring

Click the **Start Mon.** button, or choose **Start Monitoring** from the **Acquisition** menu.



When you click the Start Mon. button, the Start Mon. button changes to the Stop Mon. button, and the Run screen appears. If communication is possible, connections to the MX100s selected on the System screen are established, and data monitoring starts. The Comm. column in the Unit Status area shows Connect. If the IP address is not correct or if another use is using the MX100, the Comm. column in the Unit Status area shows Disconnect.

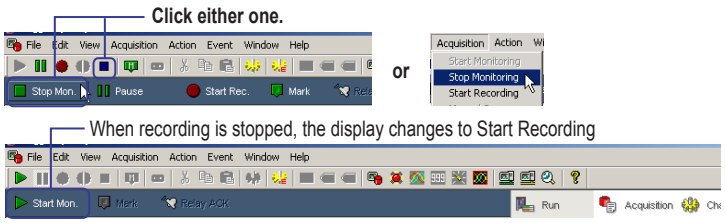


Note

If you enable the automatic start function, monitoring or recording starts automatically upon starting of MXLOGGER. For details, see section 2.3, “Setting the Data Acquisition Conditions.”

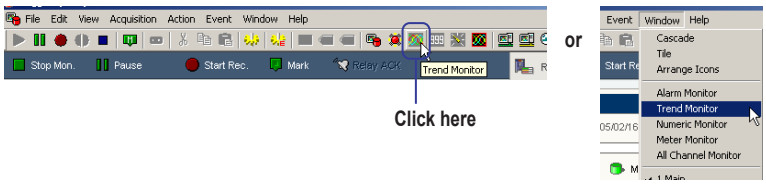
Stop Data Monitoring

Click the **Stop Mon.** button, or choose **Stop Monitoring** from the **Acquisition** menu. Connections to all MX100s on which data monitoring is in progress are dropped, and data monitoring stops.

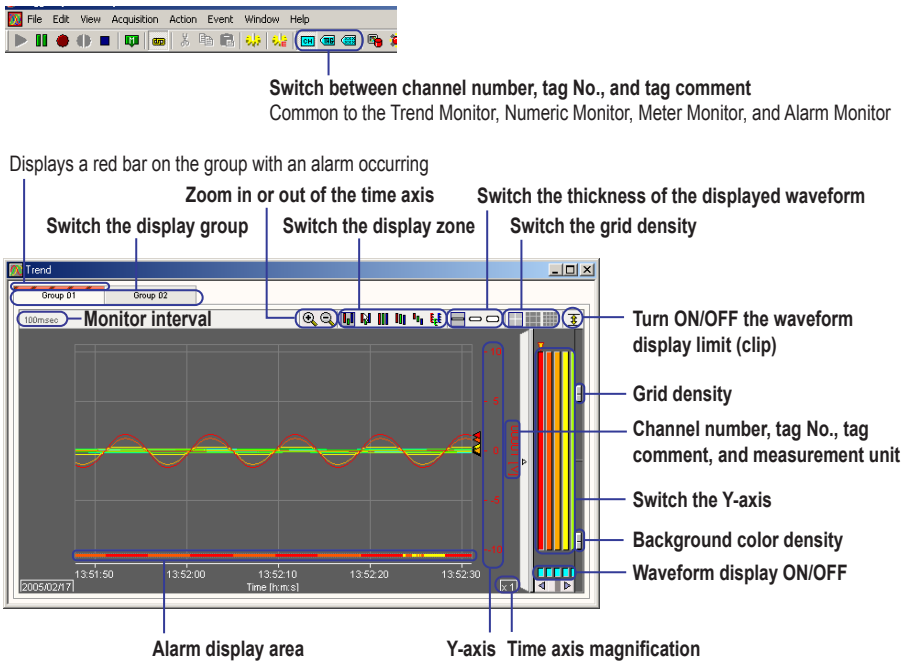


Displaying the Trend Monitor Window and Changing Display Settings

1. Click the Trend Monitor button on the toolbar or choose **Trend Monitor** from the **Window** menu.

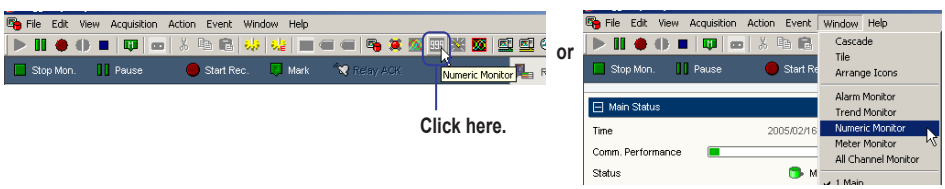


2. To change display settings, follow the instructions in the figure below.
   If the channels of different measurement groups or channels of math groups are assigned to the same display group, a monitor is displayed for each measurement group or math group (see the figure below). (In other words, multiple monitors are displayed.) A single Trend Monitor window can display up to four waveform display areas.

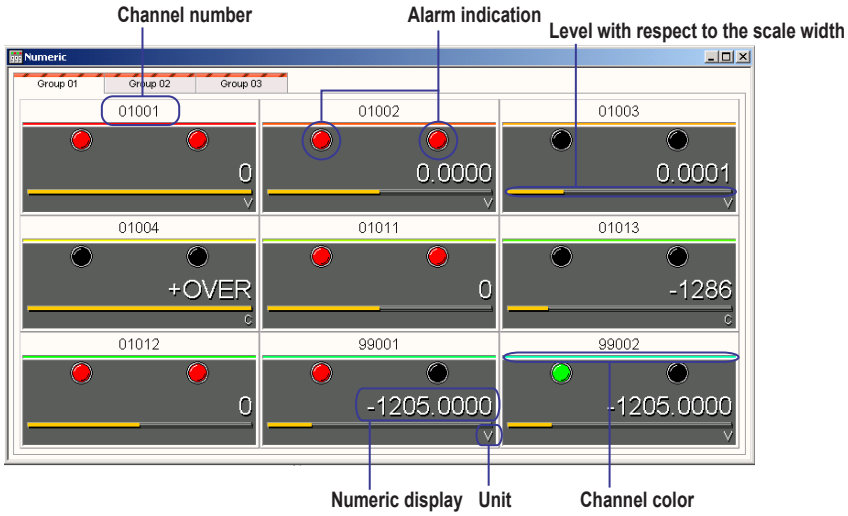


Displaying the Numeric Monitor Window

Click the Numeric Monitor button on the toolbar or choose **Numeric Monitor** from the **Window** menu.



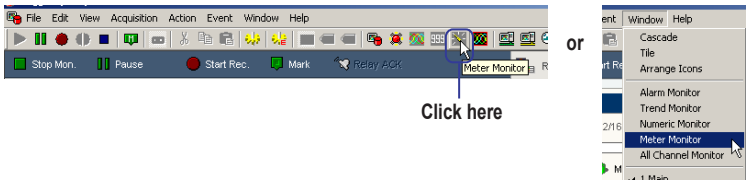
A Numeric Monitor window opens as shown below.



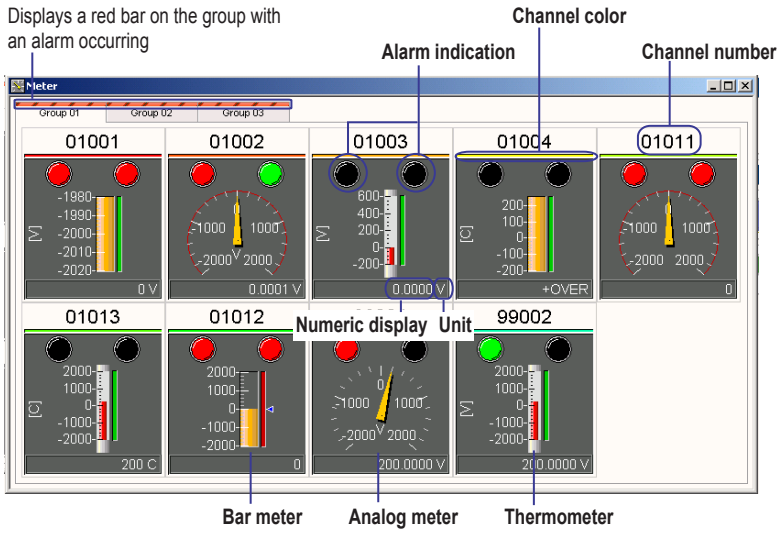
+OVER: When the measured value exceeds the upper limit of the measurement range or scale display range
–OVER: When the measured value exceeds lower limit the measurement range or scale display range
INVALID: After the power is turned ON until the data monitoring is established or when invalid computation is found in the difference computation or remote RJC computation (see pages 2-18 and 2-19)
ILLEGAL: When a module is removed, when a module is broken, or when the MX100 module configuration and the module configuration detected on the PC do not match

Displaying the Meter Monitor Window

Click the Meter Monitor button on the toolbar or choose **Meter Monitor** from the **Window** menu.

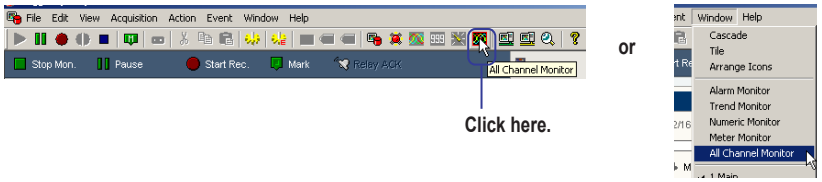


A Meter Monitor window opens as shown below.

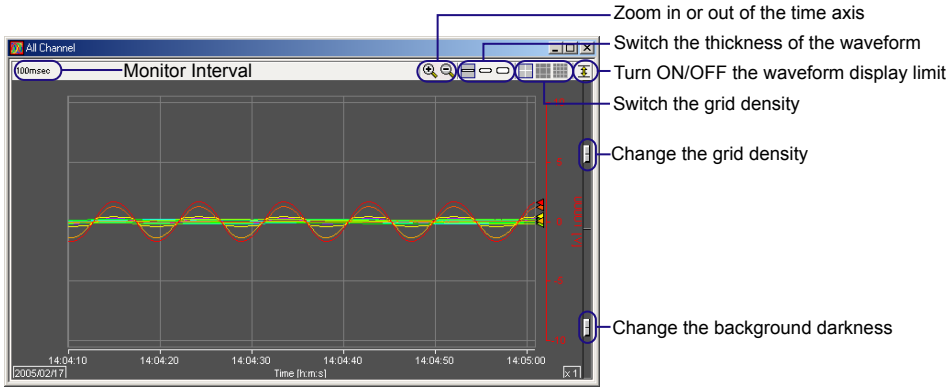


Displaying the All Channel Monitor Window

Click the All Channel Monitor button on the toolbar or choose **All Channel Monitor** from the **Window** menu.



The All Channel Monitor opens as shown below.

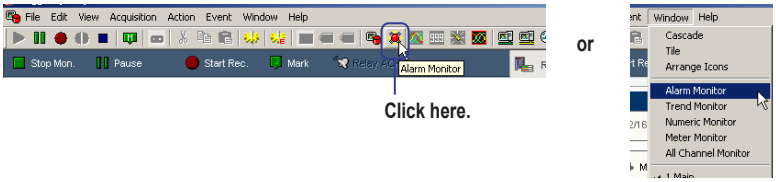


Note

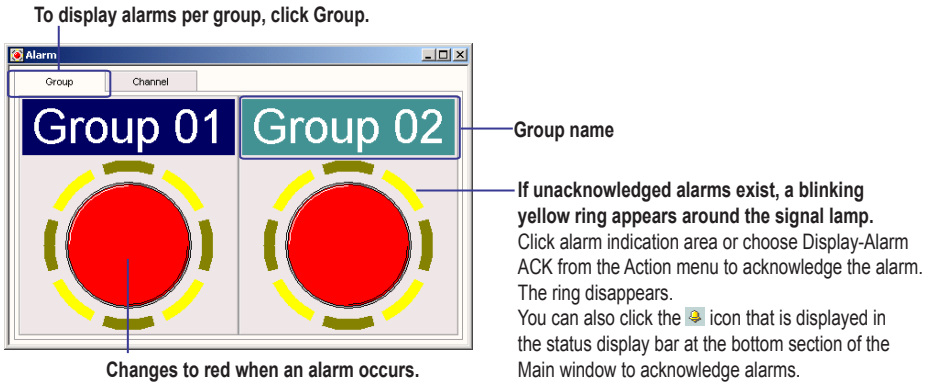
Since data from all channels are displayed, the screen may update more slowly. The **All Channel Monitor** dialog box will be displayed to warn you of this. To compensate, you can increase the display magnification or decrease the size of the window.

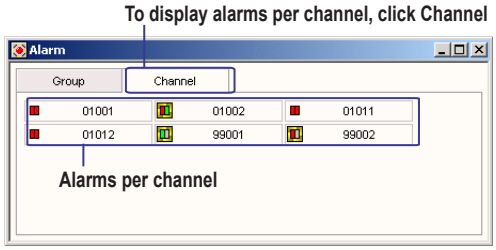
Displaying the Alarm Monitor Window

Click the Alarm Monitor button on the toolbar or choose **Alarm Monitor** from the **Window** menu.



An Alarm Monitor window opens as shown below.
Click the **Group** tab to display alarms by display groups; click the **Channel** tab to display alarms by channels.



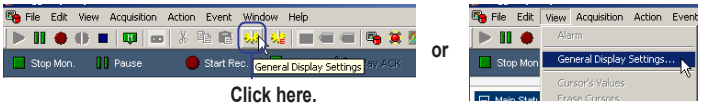


Note

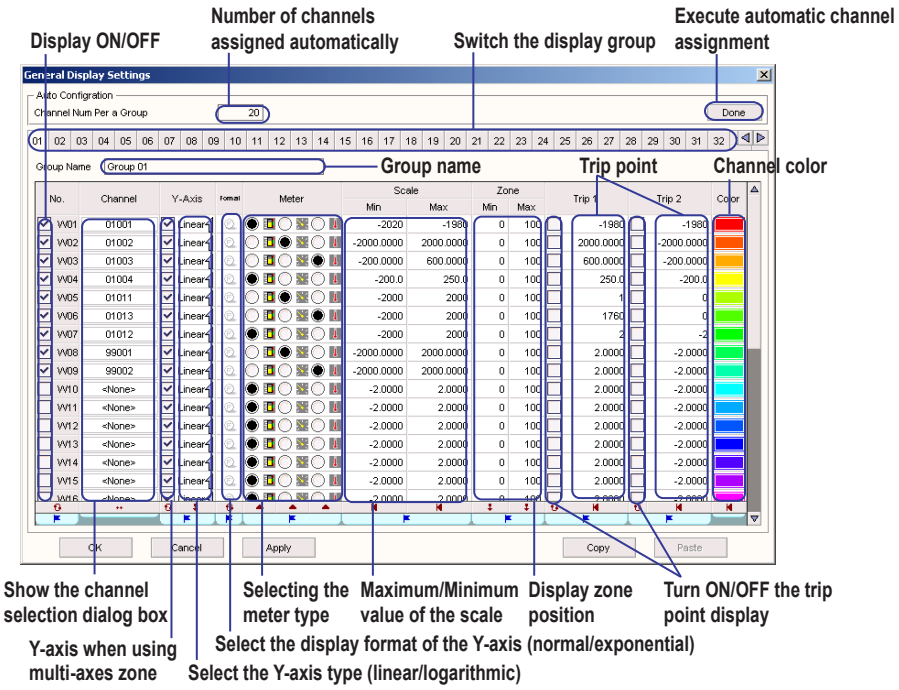
- If you choose Cascade or Tile from the Window menu when multiple windows are displayed, the windows are displayed cascaded or tiled.
  If you choose Arrange Icons from the Window menu when multiple windows are minimized, the icons are rearranged at the bottom of the screen.
- If you click the Link ( ) button on the toolbar to enable the link, you can change the display group of other windows from a single window.
- The maximum number of Monitor Windows that can be displayed for a single project is 20. For Alarm Monitor windows, only up to two windows can be displayed.
- If you choose Alarm Sound from the Action menu, an alarm can be sounded on the PC when an alarm occurs.

Changing Display Settings on the General Display Settings Window

1. While data monitoring is in progress, click the General Display Settings button on the toolbar or choose **General Display Settings** from the **View** menu.

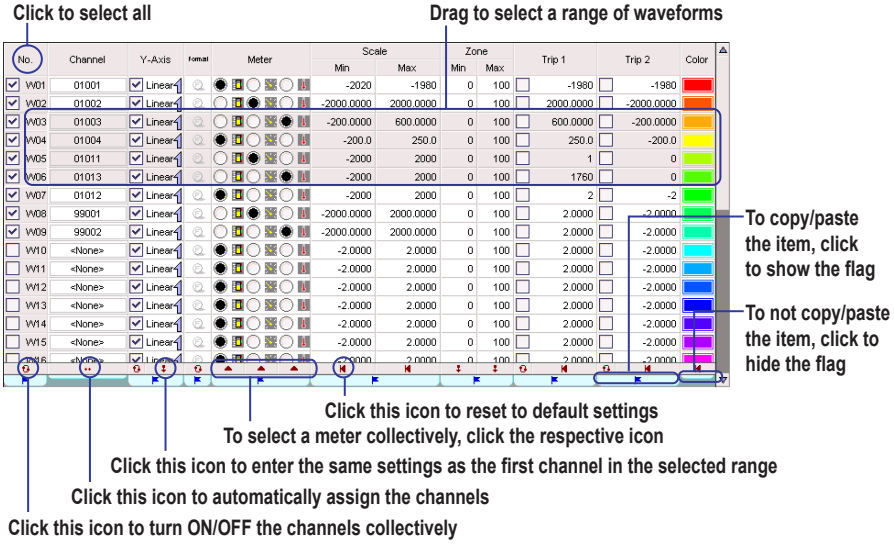


2. Change the display settings according to the explanation in the figure below.
   Display settings are entered for each display group. You can set up to 50 display groups.



Initializing, Copying, and Pasting of Settings on the General Display Settings Window

On the General Display Settings window, you can reset the settings to default or copy and pate the settings of one or multiple waveforms to the settings of other waveforms. You can copy and paste according to the procedure below.
Click the copy source waveform number (No. column), click the **Copy** button at the bottom of the window, click the copy destination waveform number, and click the **Paste** button at the bottom of the window.



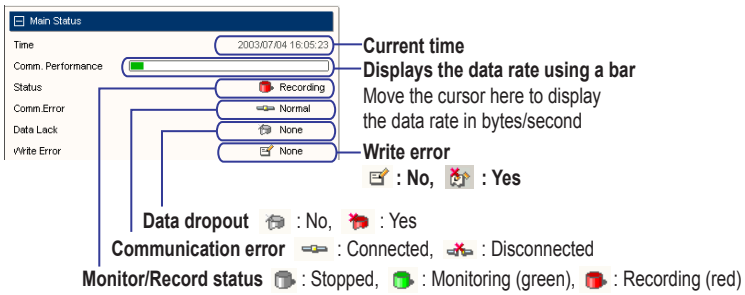
Explanation

Run Display

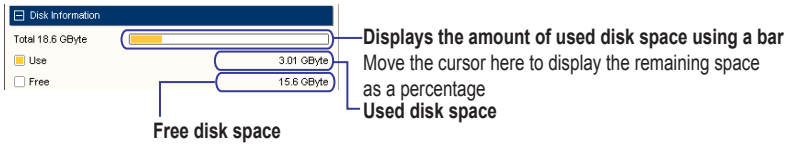
See the explanation in section 2.11, “Pausing/Resuming the Updating of the Monitor Display and Reading Measured Values Using Cursors” for further information on “Record Information.”

- **Main Status**

  Displays the main operating status of the MXLOGGER.

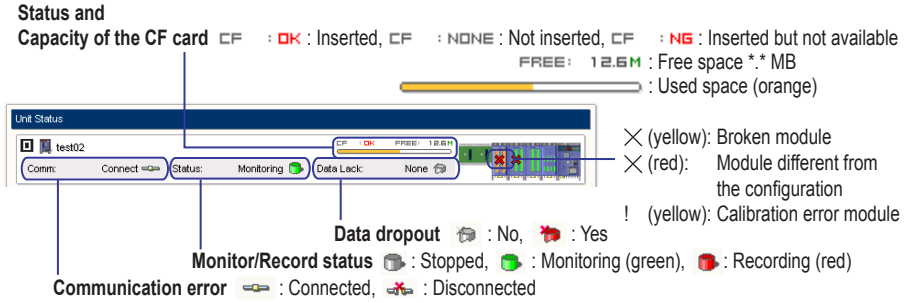


- **Disk Information**

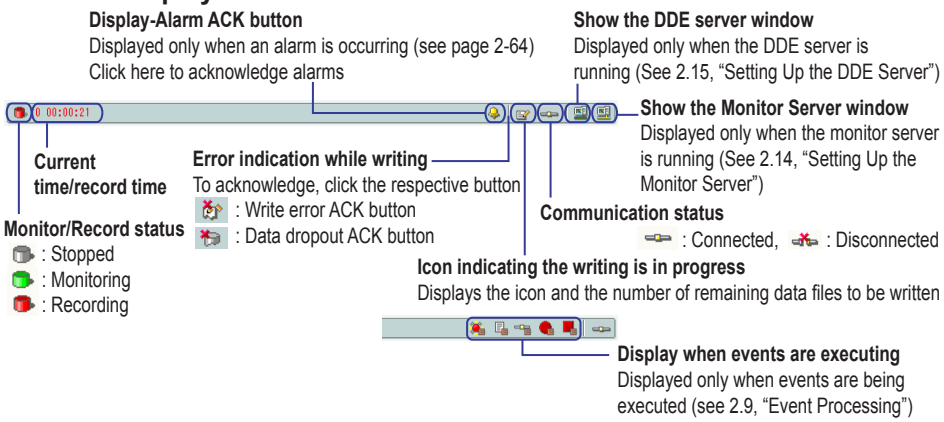


- **Unit Status**

  Displays the status of each unit.



- **Status display bar at the bottom section of the Main window**

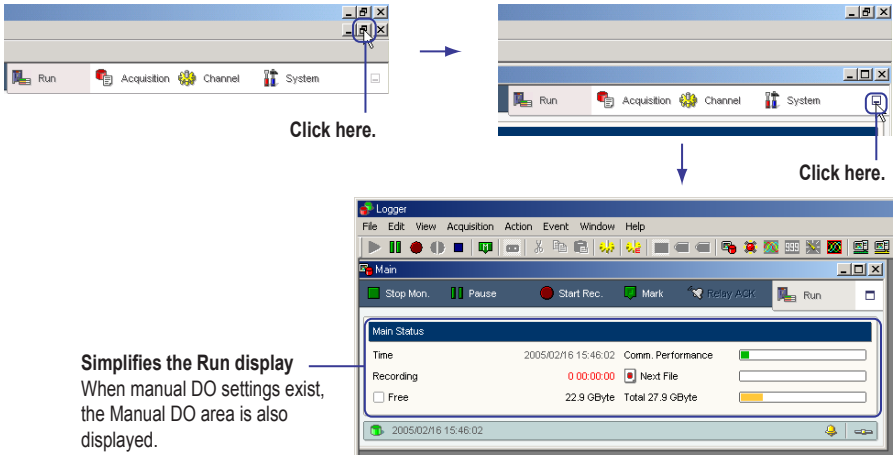


Note

If there are data files that have not been finalized (data writing have not been completed) in the previous connection, the finalization of the data file is carried out immediately when the Logger is started. If this happens, the remaining number of data files that have not been finalized is shown to the left of the icon indicating that the writing is in progress on the status display bar at the bottom section of the Main window. The remaining number indicates the progress of finalization. If the remaining number is zero, it is not displayed.

Simplified Display of the Run Screen

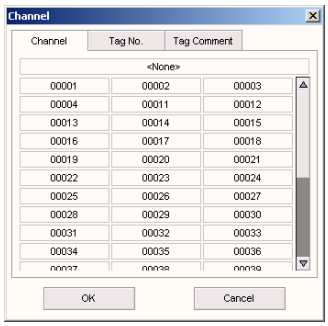
If you carry out the procedure described in the figure below when the Run screen is displayed, the Run screen is reduced to a simplified display.
This is useful such as when displaying the Run screen next to Trend Monitor windows.



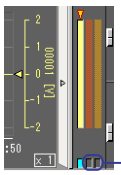
Simplifies the Run display
When manual DO settings exist, the Manual DO area is also displayed.

Display Groups and Group Names

Trend, Numeric, Meter, and Alarm Monitor windows show channels using groups. The measured/computed values can be divided into up to 50 groups. Up to 32 channels can be registered to a single group. The channels that can be registered are those that have the Monitor check box selected on the Channel setup screen. When you click a channel selection button on the General Display Settings window, the numbers of the channels that can be registered are displayed (see the figure below).



To turn ON/OFF the trend waveform display on the Trend Monitor window, click the lightblue button below the scale bar as shown in the figure below.



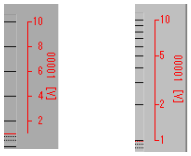
Hide the waveform

You can enter a group name using up to thirty characters. By default, group names Group 01 to Group 50 are assigned. The names of the display groups that have channels registered are displayed on each monitor window.

Y-Axis Type

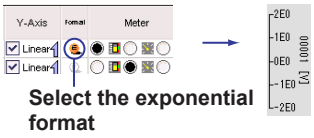
You can select linear or logarithmic scale for the Y-axis when displaying the waveforms.

Linear **Logarithmic**



Maximum and Minimum Values of the Y-Axis and the Display Format of the Scale Values

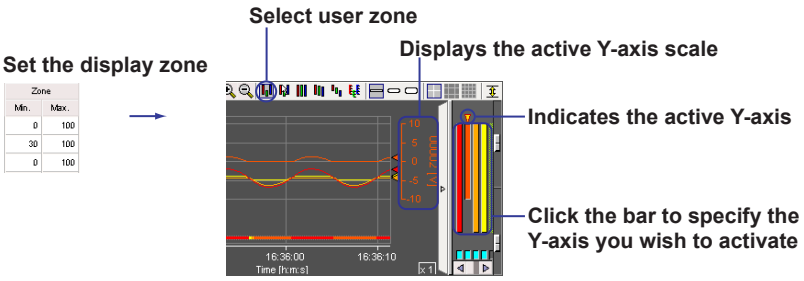
Specify the maximum and minimum values of the Y-axis scale. The scale values can also be displayed using logarithmic format as shown below.



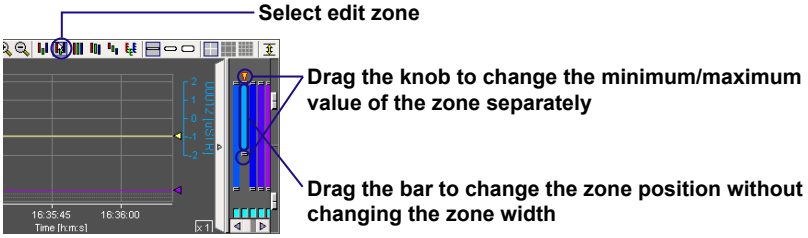
Selecting the Display Zone of the Waveform

You can select from the following. In the Zone setting on the General Display Settings window, assume the bottom and top edges of the waveform display area to be 0% and 100%, respectively, and set the waveform display position by specifying the minimum value (0 to 99%) and the maximum value (1 to 100%).

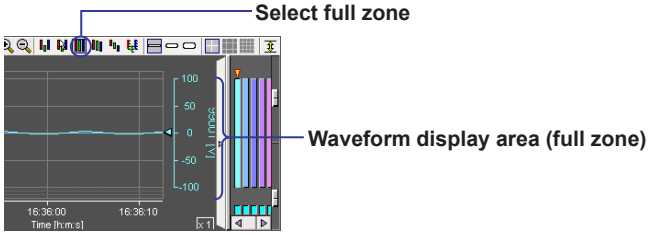
- User Zone
  Displays each waveform at the position specified by Zone on the General Display Settings window. A single Y-axis scale of the active waveform is displayed.



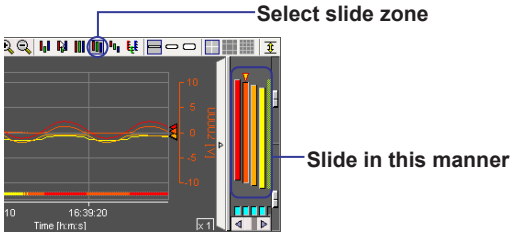
- Edit Zone
  Like the user zone, each waveform is displayed at the position specified by Zone on the General Display Settings window. However, you can change the zone on the Trend Monitor window. A single Y-axis scale of the active waveform is displayed.



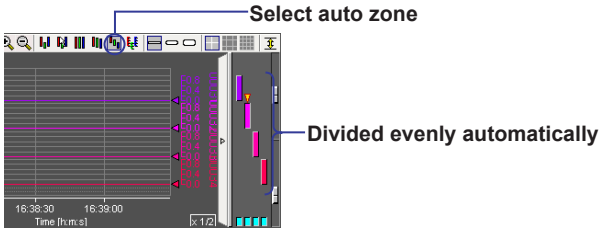
- Full Zone
  Displays all the waveforms over the full zone of the waveform display area regardless of the Zone settings on the General Display Settings window. A single Y-axis scale of the active waveform is displayed.



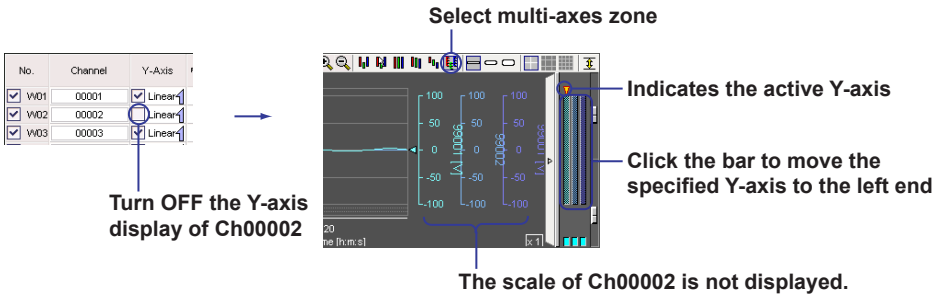
- Slide Zone
  Displays the waveforms by slightly offsetting the display position of each waveform vertically regardless of the Zone settings on the General Display Settings window. A single Y-axis scale of the active waveform is displayed.



- Auto Zone
  Displays the waveforms by dividing the waveform display area evenly according to the number of displayed waveforms regardless of the Zone settings on the General Display Settings window.

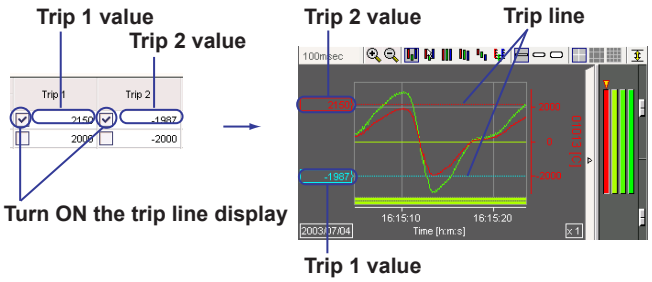


- Multi-Axes Zone
  All the Y-axes of the displayed waveforms are aligned horizontally. To hide a Y-axis, clear the **Y-Axis** check box on the General Display Settings window. The display zone is set to the position specified by Zone on the General Display Settings window.



Trip Points

You can display a trip line to indicate a particular value of interest (trip point) in the waveform display area. Two trip points (trip 1 is red, trip 2 is blue) can be set on each waveform. The trip line of the waveform corresponding to the left-most Y-axis is shown in the waveform display area.

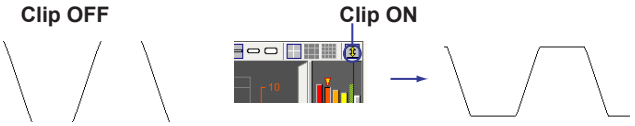


Channel Colors

Clicking the channel color displayed in the Color column on the General Display Settings window opens the Color dialog box. You can select the color of each channel using the Color dialog box. To create custom colors, click the Define Custom Colors button in the Color dialog box.

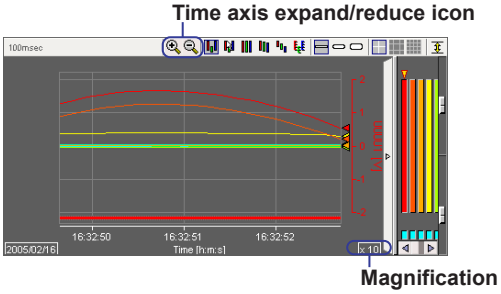
Clipping of Waveforms

By default (clip OFF), the waveform is not displayed when the measured/computed value exceeds the minimum/maximum value of the scale (see the lower left figure). When clip is turned ON, values that are smaller than the minimum value of the scale are displayed as the minimum value and the values that are larger than the maximum value of the scale are displayed as the maximum value.



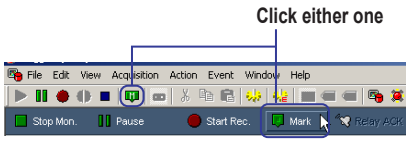
Expanding or Reducing the Time Axis on the Waveform Display

On the waveform display, you can click the expand/reduce icon to expand or reduce the time axis for each waveform display area. The maximum magnification is x20. The minimum magnification varies depending on the size of the waveform display area.

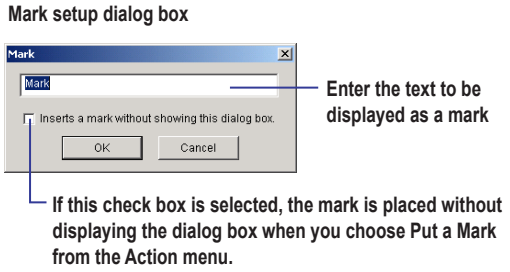


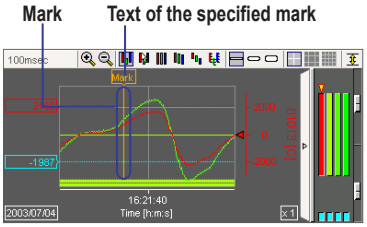
Adding Marks

You can display marks in the waveform display area (see the figure below). You can enter a text to be attached to the mark (“Mark” by default) using up to 15 characters. Click the Mark button or choose Mark Configuration from the Action menu. You can enter the text in the dialog box that opens.



Up to two hundred marks can be displayed. When two hundred is exceeded, marks are overwritten starting from the oldest ones. However, when recording is in progress, the marks that are overwritten are saved to the data file.



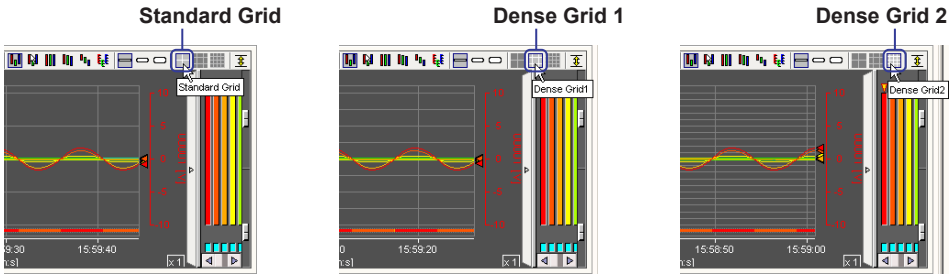


Note

Marks cannot be placed when the monitor update is paused.

Grid Density

You can change the displayed grid density. The available settings are standard, dense grid 1, or dense grid 2.

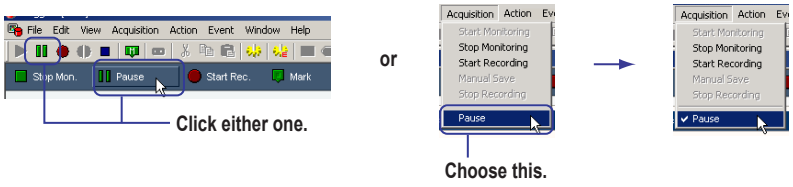


2.11 Pausing/Resuming the Updating of the Monitor Display and Reading Measured Values Using Cursors

Procedure

Pausing and Resuming the Updating of the Monitor Display

To pause the updating of the monitor display, click the **Pause** button or choose **Pause** from the **Acquisition** menu. When paused, the word “Pause” on the button toggles between red and orange.



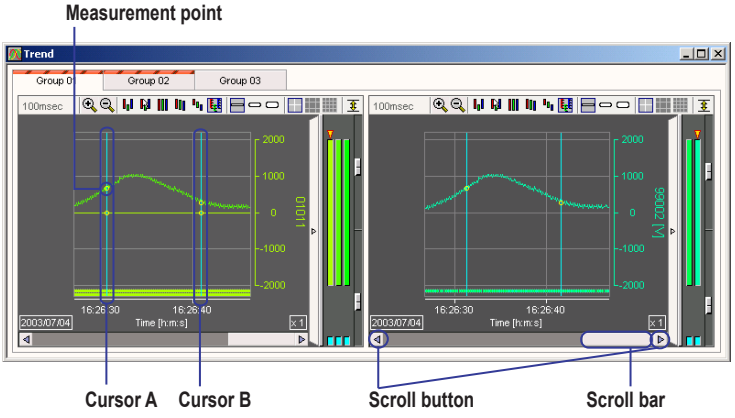
Note

Recording continues even when the updating of the monitor display is paused.

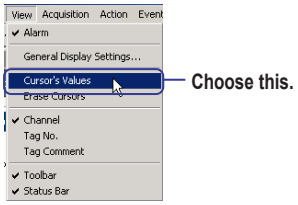
To resume the monitor display, click the **Pause** button or choose **Pause** from the **Acquisition** menu.

Reading Measured/Computed Values Using Cursors

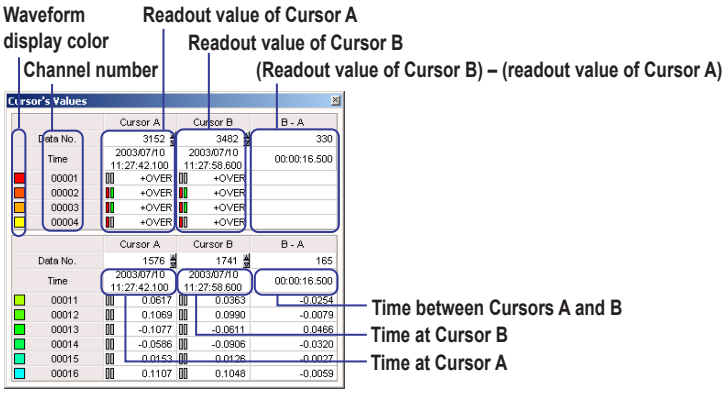
1. Click the position where you wish to read the measured/computed data in the waveform display area of the Monitor screen. If you wish to read another point simultaneously, drag the cursor. Cursor A appears at the position where you first clicked; Cursor B appears at the position where you released the mouse button. A yellow circle is displayed where the waveform and the cursor cross.
   You can move the waveform that is displayed in the waveform display area using the scroll buttons or scroll bar.



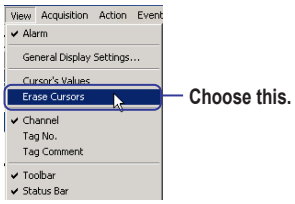
2. From the **View** menu, choose **Cursor’s Values**.



A Cursor's Values window opens as shown below.



To clear the cursors, choose Erase Cursor from the View menu.



Explanation

Pausing the Updating of the Waveform Display

While monitoring the waveform, you can pause the updating of the waveform display and check the past waveforms.

Pausing the display on the numeric display holds the current values immediately before the pause operation on display.

Reading Measured/Computed Values Using Cursors

When the updating of the waveform display is paused, you can read values using cursors. Two cursors can be displayed. Below are the values that can be read using cursors.

- Values at the cursors.
- Difference in the value between the cursors.
- The time at the cursor position.
- The time between the cursors.

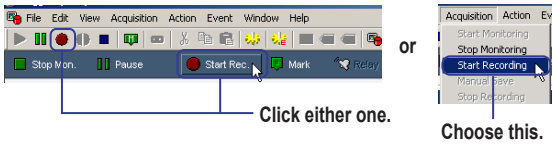
2.12 Starting and Stopping Data Recording

Procedure

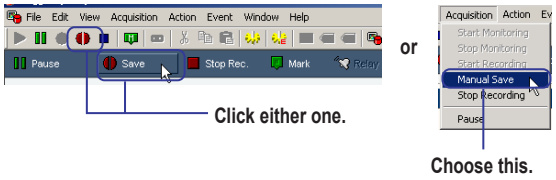
Data monitoring must be in progress to start the recording operation. For instructions on starting the data monitoring, see section 2.10, “Starting/Stopping Data Monitoring and Displaying the Monitor.”

Starting the Recording

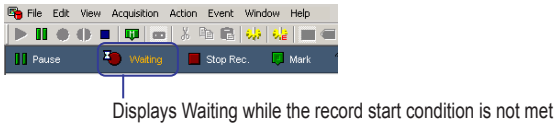
Click the **Start Recording** button, or choose **Start Recording** from the **Acquisition** menu.



When recording starts, the display changes as shown in the figure below. To divide the file during recording, click the **Save** button or choose **Manual Save** from the **Acquisition** menu.



While the Record Start Condition specified on the Acquisition Condition screen is not met, the word “Waiting” appears on the Record Start button (see figure below).

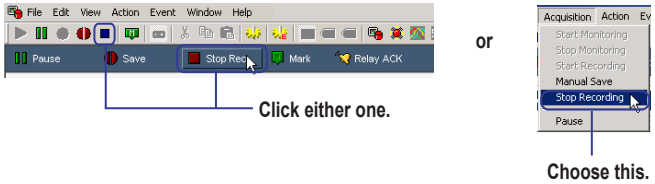


Note

Clicking the Start Rec. or Stop Rec. buttons repetitively at short intervals or clicking the Manual Save button many times may hinder the measurement operation and file division process.

Stopping the Recording

To stop recording when Stop Condition specified on the Acquisition screen is set to Continuous or before the Stop Condition is met, click the **Stop Rec.** button or choose **Stop Recording** from the **Acquisition** menu.



Click the **Stop Rec** button or the Stop button on the tool bar, or select **Stop Recording** from the **Acquisition** menu. Click **OK** in the dialog box that is displayed (like the one below).

Click OK. When you click OK, the word “Stop Rec.” on the button changes to “Saving” until the recording actually stops.

Explanation

Starting/Stopping the Recording

Data is recorded according to the Start condition and Stop condition specified on the Acquisition setup screen. Recording starts immediately when you click the Start Rec button only when Start Condition is set to On Record. For all other settings, the detection of whether the start condition is met is started when you click the Start Rec button.

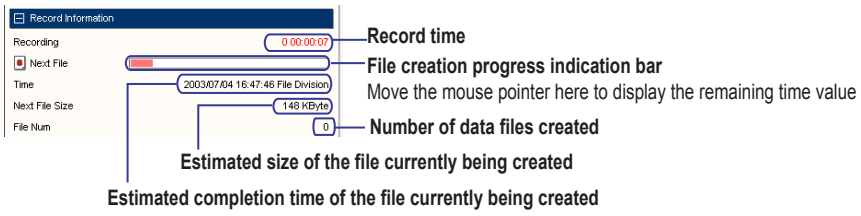
Note

- The creation of the data file starts after the recording is stopped. Therefore, it may take time for the data save operation to complete.
- You cannot exit the software if the saving of the data is not complete. If you attempt to do so, a dialog box with the message “Writing data files Currently” opens. In this case, the remaining number of data files to be finalized is displayed to the left of the icon indicating that the writing is in progress on the status display bar (see page 2-43) at the bottom section of the Main window. You can close the software when this number indication clears.
- If the specified directory for saving files does not exist when recording is started, the directory is created. If the directory cannot be created, the files are saved to the Data directory in the MXLOGGER installation directory.
- Do not specify the file save destination to a non-writable drive.

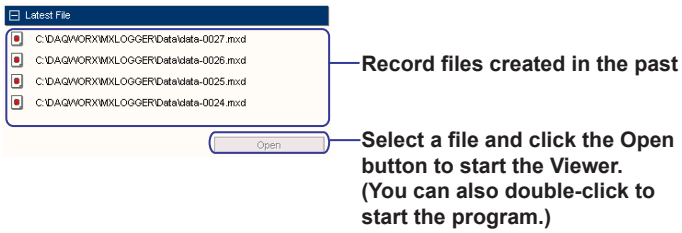
Run Display

The Run screen displays the run information. For a description of the displayed contents on the Run screen other than those described below, see the explanation in section 2.10, “Starting/Stopping Data Monitoring and Displaying the Monitor.”

- **Record Information**



- **Files created in the past**

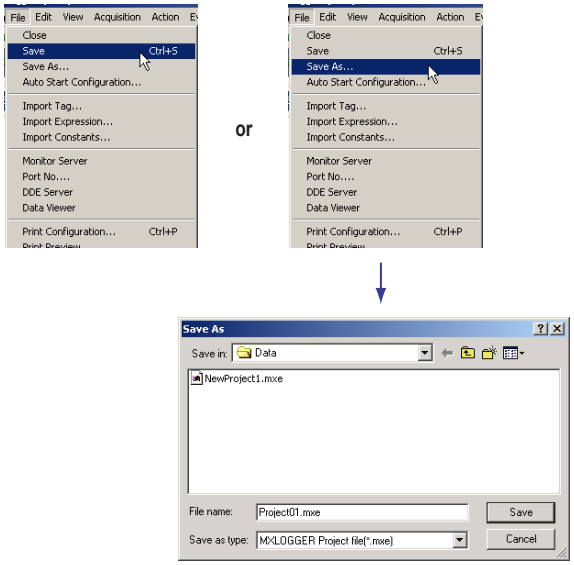


2.13 Saving/Loading and Printing Setup Data (Project)

Procedure

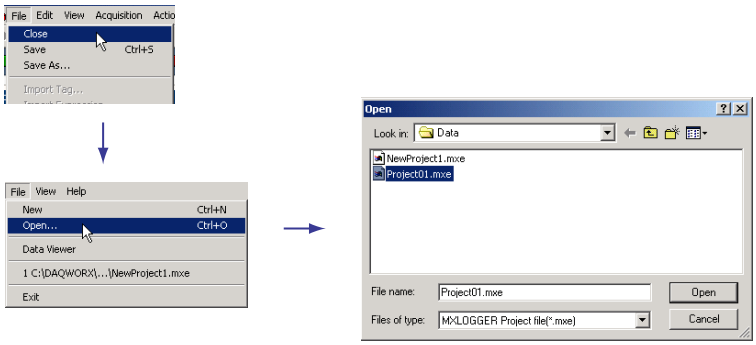
Saving Setup Data (Project)

1. From the **File** menu, choose **Save** or **Save As**.
2. If you choose Save As or choose Save when saving the setup data for the first time, enter the file name in the Save As dialog box and click **Save**.
   If you attempt to save the file using an existing file name, a dialog box appears for you to confirm whether the file is to be overwritten.



Loading Setup Data (Project)

1. From the **File** menu, choose **Close**.
   If data monitoring is in progress, a message “Stop monitoring and quit?” appears. Click **OK**.
2. From the **File** menu, choose **Open**.
3. In the Open dialog box, select a project file and click the **Open** button.

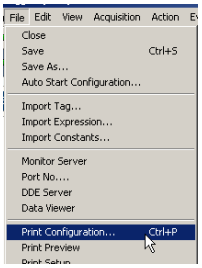


Note

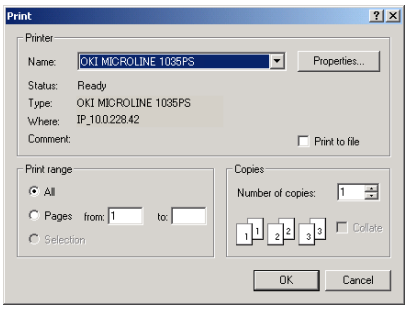
When you carry out the procedure above, the current setup data is discarded and changed to the setup data of the project that is loaded. If you need the current settings, save the project first before loading the setup data.

Printing Setup Data

1. From the **File** menu, choose **Print**.
   The Print dialog box opens.
2. In the Print dialog box, select the printer, print range, and the number of copies, and then click the **OK** button.

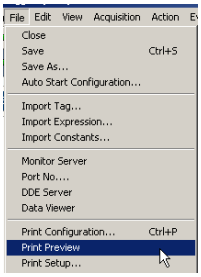


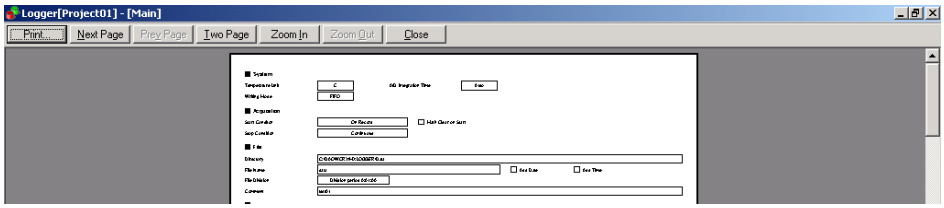
Display example of the Print Setup dialog box



Print Preview

From the **File** menu, choose **Print Preview**.
The print image is displayed.

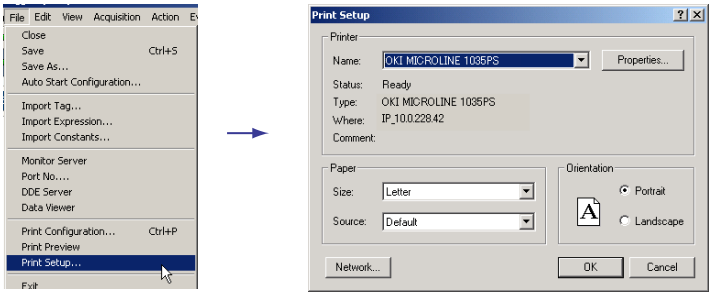




Setting Up the Printer

1. From the **File** menu, choose **Print Setup**.
   The Print Setup dialog box opens.
2. Set the paper size, orientation, etc. Then, click the **OK** button.

Display example of the Print Setup dialog box



Explanation

Saving Setup Data (Project)

When the Logger is started, the screens are displayed according to the setup data of the project file that is automatically created (latest.mxe in the MXLOGGER folder). In this case, the setup specified on each screen is automatically saved when the Logger is closed.

If you save the setup data (project) as a project file by assigning a name and you open the project file, the setup specified on each screen is not automatically saved when the Logger is closed. To save the setup data, you must choose Save from the File menu.

Save Destination

The default save destination varies depending on the system that is running.

File Name

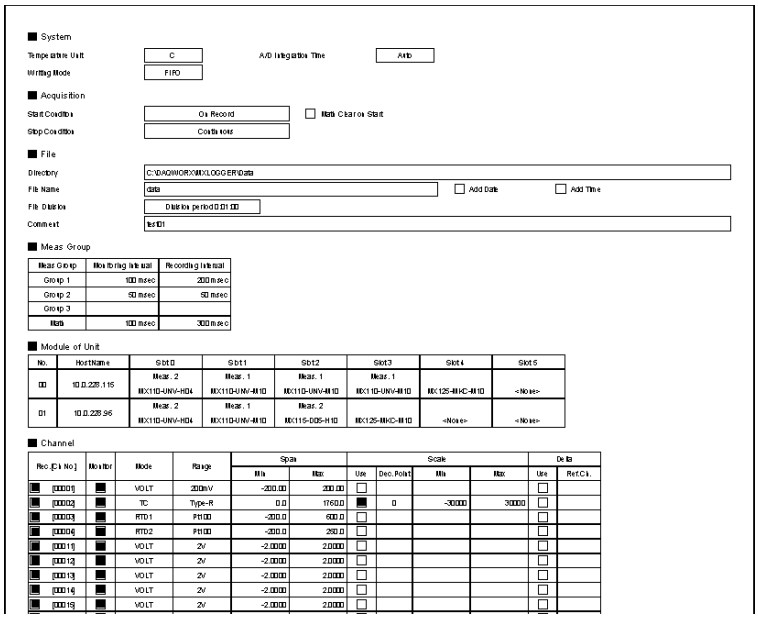
The extension is .mxe. The default file name is NewProject1.mxe.

Creating a New Project

Create a new project when you wish to monitor the measured/computed data using new settings.

Print Contents of Setup Data

The following figure show how the setup data is printed.



■ System

Temperature Unit: C — A/D Integration Time: Auto

Writing Mode: FIFO

■ Acquisition

Start Condition: On Record — Math Clear on Start

Stop Condition: Continuous

■ File

Directory: C:\DAQMX\MX\LOGGER\Data

File Name: data — Add Date — Add Time

File Division: Division period:0 01:00

Comment: test01

■ Meas. Group

Meas Group	Monitoring Interval	Recording Interval
Group 1	100 msec	200 msec
Group 2	50 msec	50 msec
Group 3		
Math	100 msec	300 msec

■ Module of Unit

No.	HostName	Slot0	Slot1	Slot2	Slot3	Slot4	Slot5
00	10.0.228.115	Mear.:2 MX110-UNV-H04	Mear.:1 MX110-UNV-M10	Mear.:1 MX110-UNV-M10	Mear.:1 MX110-UNV-M10	MX125-MHC-M10	<None>
01	10.0.228.96	Mear.:2 MX110-UNV-H04	Mear.:1 MX110-UNV-M10	Mear.:2 MX115-D05-H10	MX125-MHC-M10	<None>	<None>

■ Channel

Rec.[Ch No.]	Monitor	Mode	Range	Span Min	Span Max	Scale Use	Scale Dec.Point	Scale Min	Scale Max	Delta Use	Delta Ref.Ch.
[0001]	■	VOLT	200mV	-200.00	200.00	□				□	
[0002]	■	TC	Type-R	0.0	1760.0	■	0	-30000	30000	□	
[0003]	■	RTD1	Pt100	-200.0	600.0	□				□	
[0004]	■	RTD2	Pt100	-200.0	260.0	□				□	
[0011]	■	VOLT	2V	-2.0000	2.0000	□				□	
[0012]	■	VOLT	2V	-2.0000	2.0000	□				□	
[0013]	■	VOLT	2V	-2.0000	2.0000	□				□	
[0014]	■	VOLT	2V	-2.0000	2.0000	□				□	
[0015]	■	VOLT	2V	-2.0000	2.0000	□				□	

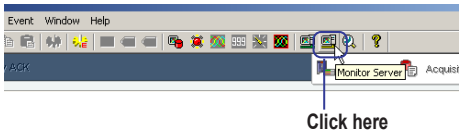
2.14 Setting Up the Monitor Server

Procedure

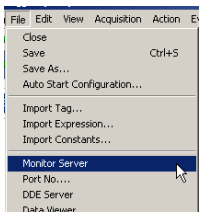
Starting and Exiting the Monitor Server

Starting

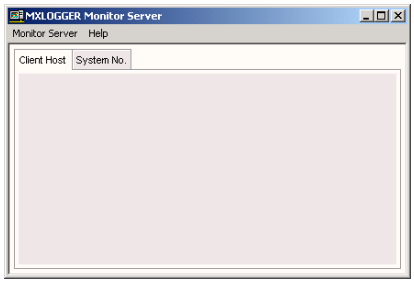
Click the Monitor Server button on the toolbar or choose **Run Server** from the **File** menu.



or



The Monitor Server window opens as shown below.

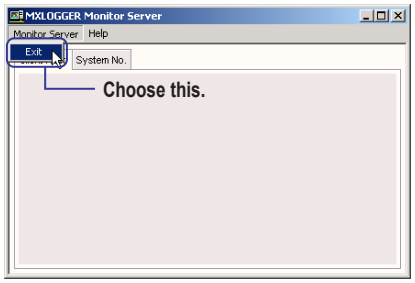


Status display bar at the bottom section of the Main window

Click here to display the Monitor Server window
Displayed only when the Monitor Server is running

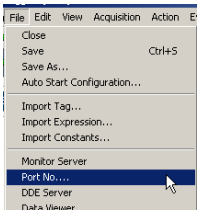
Exiting

On the Monitor Server window, choose **Exit** from the **Monitor Server** menu.

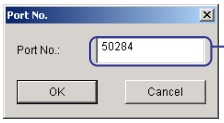


Changing the Port Number

1. From the **File** menu, choose **Port No.**.
   The Port No. dialog box opens.



2. Enter the desired port number in the Port No. box and click **OK**.



Port number (50284 by default)
Use this port number unless this number is being used by another software program

3. In the dialog box with the message “Port No. is available for next time.” click **OK**.
   Then, restart the server to activate the new port number.

Explanation

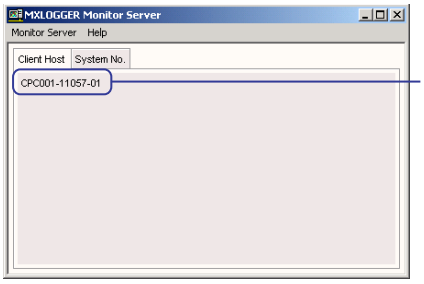
Monitor Server Function

The Monitor Server function allows PCs running the following software programs to monitor the data that the MXLOGGER is monitoring.

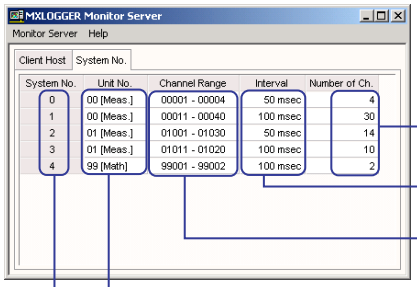
- AddObserver
- AddObserver Runtime
- AddMulti
- AddTrigger

The MXLOGGER can hold up to 61 data memories*. A system No. between 0 and 60 is assigned to each data memory according to the monitor interval of the individual units specified on the Logger. Each system number has information on the unit No., the channel range, the monitor interval, and the number of channels.
Clients (PCs running AddObserver, AddObserver Runtime, AddMulti, or AddTrigger) can monitor the data by specifying this system number.
For instructions on monitoring the data on each software program, see the user's manual for each software.

* Each unit (MX100) has three monitor intervals, and the MXLOGGER can connect up to 20 MX100s. Therefore, the maximum number of data memories is 3 × 20 = 60. Adding the monitor interval of the computation channel makes it 61.



Host name (computer name) of the connected client
Maximum number of connections: 32



Number of channels
Number of channels being monitored within the channel range

Monitor interval
Data monitor interval of the respective measurement group

Channel range
Channel range corresponding to the unit NO. and monitor interval

Unit No.
Unit number on the Logger
00 [Meas.] to 19 [Meas.]: Measurement data that the MX100 acquired
99 [Math]: Computed data

System No.
Number assigned to each data memory (0 to 60)

Port Numbers

The default value is 50284. Unless other software programs are using a different port number, it is recommended that this port number be used.

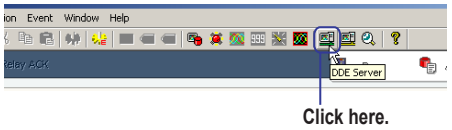
2.15 Setting Up the DDE Server

Procedure

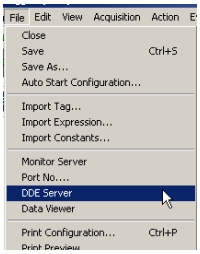
Starting and Exiting the DDE Server

Starting

Click the DDE Server button on the toolbar or choose **DDE Server** from the **File** menu.

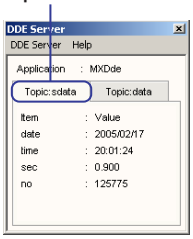


or

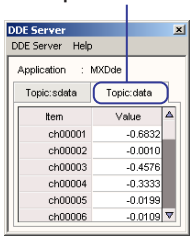


The DDE Server window opens as shown below.

Topic sdata tab



Topic data tab



Status display bar at the bottom section of the Main window

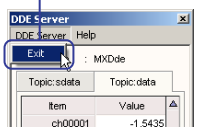
Click here to display the DDE Server window

Displayed only when the DDE Server is running

Exiting

On the DDE Server window, choose **Exit** from the **DDE Server** menu.

Choose this.



Description

DDE Server Function

The DDE server function displays the following data on application software that supports the DDE server.

Parentheses indicate item names.

Measured Data

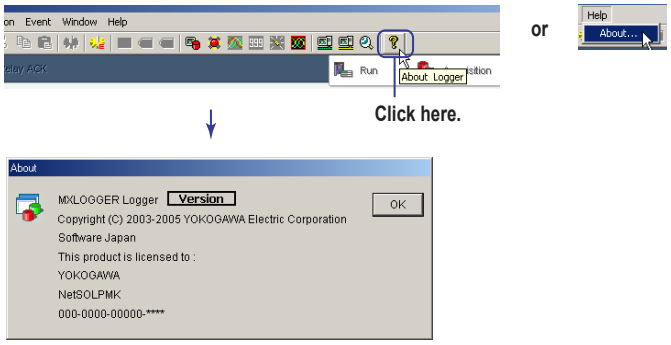
- Computed data
- Date and time (date)
- Time (time)
- Seconds (sec)
- Data number (no)

For Excel, enter “application|topics!item” in a cell. For example, to display measured data from channel 1, enter “MXDde|data!ch0001.” For details on data specification, see the documentation for the software you are using.

2.16 Displaying the Software Version and Other Information

Procedure

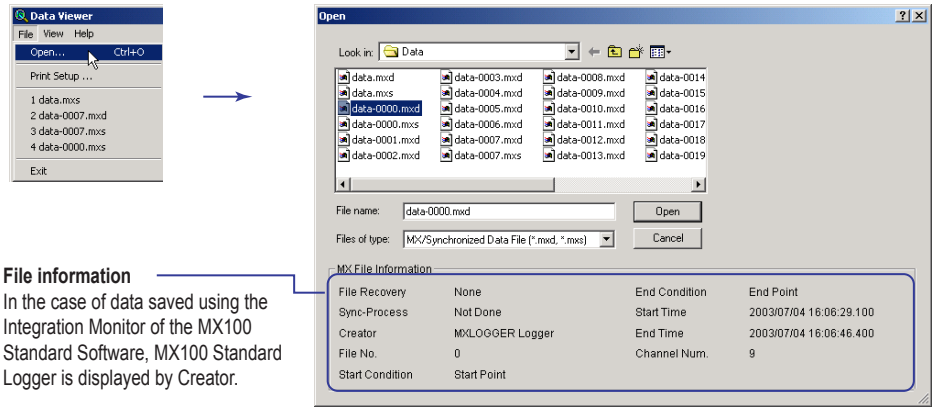
Click the About button on the toolbar or choose **About** from the **Help** menu.
A dialog box showing the version number and other information opens.



3.1 Loading Data Files

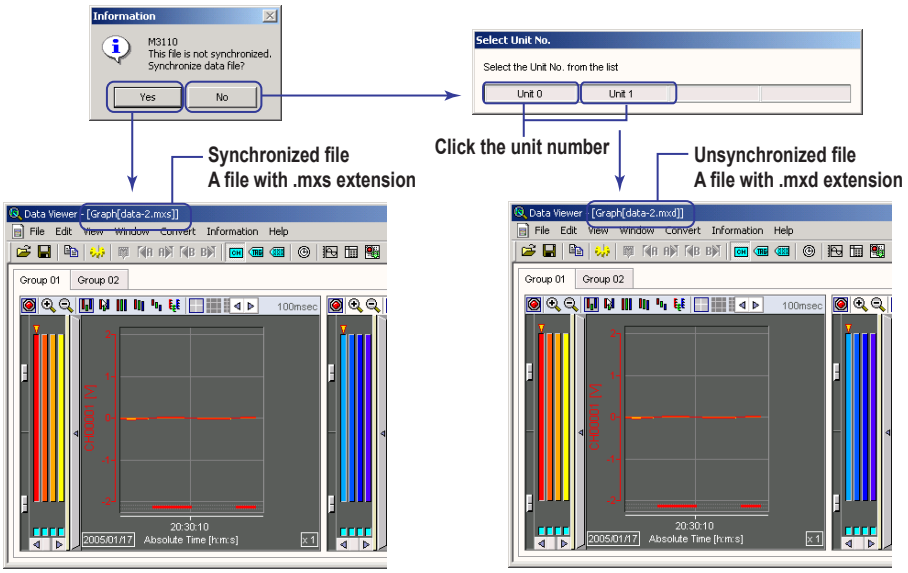
Procedure

1. Start the Viewer.
2. From the **File** menu, choose **Open**.
   You can also click the button on the toolbar.
   The Open dialog box opens.



File information
In the case of data saved using the Integration Monitor of the MX100 Standard Software, MX100 Standard Logger is displayed by Creator.

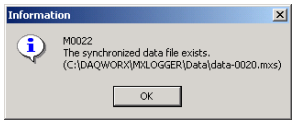
3. Select the file you wish to load and click **Open**.
   The waveform display window opens.
   If you open data files that were recorded using the Logger of the MXLOGGER or the Integration Monitor of the MX100 Standard Software, a dialog box is opened with the message, “File not synchronized. Synchronize data file?” before the waveform display screen appears. To synchronize the data, click **Yes**, otherwise, click **No**.
   If you open a file containing recorded data of multiple MX100s and you click the No button, the Select Unit No. dialog box opens. Click the desired MX100 unit number to display the data corresponding to the unit. When displaying data without synchronization, data of different units cannot be displayed simultaneously.
   Opening Data Saved to the CF Card on the MX100
   Before the waveform display window is displayed, if a CF file that can be joined exists, a dialog box appears with the message “Join Related Files?” To join the data files, click Yes, otherwise, click No.



The waveforms of the measurement channels and math channels are divided by the Mon.
Interval specified on the Acquisition screen of the Logger even when in the same group.

Note

If you click the Yes button in the synchronization confirmation dialog box when a synchronized file already exists, the message dialog box below opens. Click OK to load the synchronized file and open the waveform display window.



Explanation

Loadable Files

- Data files recorded using the Logger of the MXLOGGER or the Integration Monitor of the MX100 Standard Software (.mxd extension).
- Data files saved after performing synchronization using the Viewer (.mxs extension).
- Data files saved to the CF card using the MX100 (.mxd extension).
- Data files saved after being joined on the Viewer (with the .mxc extension)

Display Range, File Size, and Number of Data Points of the Loadable Data

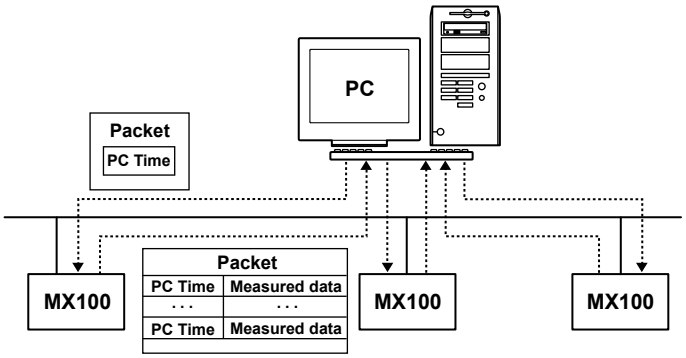
- 50 groups
- Maximum channels per group: 32
- Example: 2 GB
- Data points: 5 million

Note

- When loading a file of close to five million points, the error message “Insufficient Memory. Close immediately.” appears. If this happens, set Total paging file size for all drives to 2 GB or more. On Windows XP, you can change the setting in the dialog box that opens by choosing from the **System Properties** dialog box, **Advanced** > **Settings** under **Performance** > **Advanced** > **Change** under **Virtual memory**.
- Please avoid loading multiple files containing close to five million data points. Doing so may degrade the PC performance greatly.

Synchronization

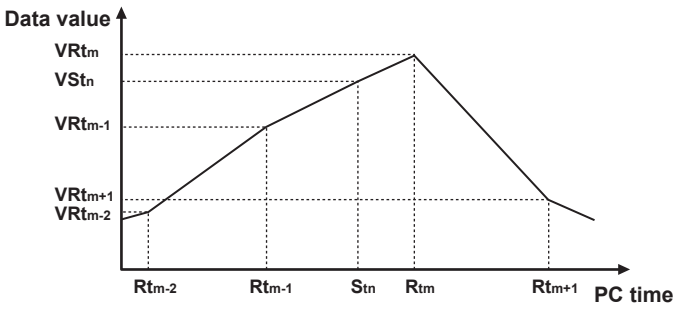
The Logger of the MXLOGGER or the Integration Monitor of the MX100 Standard Software sends PC's time information to the MX100 at measurement intervals. The PC's time information is received along with the measured data when the data is received from the MX100. When measured data is recorded, the PC time information (the MX100's time information is used on the monitor display of the Logger) is also recorded.



On the other hand, each MX100 makes measurements based on the main module clock. Therefore, the PC's time that is recorded with the measured data and the PC's time when measurements were made may be offset. When loading the data, the Viewer can process the time information to match the PC's time that was present at time of measurement. This process is called *synchronization* (for details, see *Note* on the next page).

Note

- Details of Synchronization
  Given M recorded data points of a given channel of a data file that has not been synchronized, synchronization (linear interpolation) is carried out as follows:
  1. From the record start/stop time and record interval, determine N, the number of data points that will result after synchronization of the relevant channel.
  2. From the record start time and record interval, determine Stn (n=0, ... , N-1), the PC time after synchronization of each data point.
  3. From the record start/stop time and the PC millisecond clock counter values at record start/stop, determine PCcntPerms, the clock counter value per millisecond.
  4. From the PC millisecond clock counter values recorded with the data before synchronization and PCcntPerms, determine Rtm (m=0, ... , M-1), the PC time of the data before synchronization.
  5. Determine m such that the expression Rtm-1 ≤ Stn < Rtm is satisfied and retrieve the data values before synchronization VRtm-1 and VRtm at the PC time of Rtm-1 and Rtm.
  6. Determine the data values after synchronization from the expression VStn = (Stn – Rtm-1) × (VRtm – VRtm-1)/(Rtm – Rtm-1) + VRtm-1 where (n=0, ... , N-1 and m=0, ... , M-1).
  7. Determine the data values after synchronization for N data points, and then write them to the synchronized file.



- When loading a data file saved by the MX100 to the CF card, synchronization is not possible because the PC time information needed in the data synchronization is not present.

- Synchronization may take time depending on the number of divided files and the number of data points in the divided files.
- It is recommended that synchronization be performed on a hard disk with adequate free space.
- Even when synchronization is performed, the files before synchronization (.mxd extension) are not deleted.
- Performing synchronization on the Viewer or loading a file with a great number of data points while data monitoring/computation is in progress on the Logger of the MXLOGGER or the Integration Monitor of the MX100 Standard Software may adversely affect the data monitoring and computation (such as data dropouts).
- If you change the PC's time while data is being monitored on the Logger of the MXLOGGER or the Integration Monitor of the MX100 Standard Software, the error in the clock counter value per millisecond of the PC used in the synchronization process will become large. If the error in this value is greater than or equal to 2% when synchronizing the data file created at the time PC's time was changed, the clock counter value of 1 millisecond is considered to be 1 for the purpose of synchronization.
- If communication is disrupted temporarily due to power failure or network failure during the recording operation, the PC time of the data measured by the MX100 while communication is disrupted (see "Details of Synchronization" above) is recorded as the old PC time before communication was disrupted in the file created immediately after communication recovers. If you attempt to synchronize this file, a dialog box with the message "Some channels do not have enough information to synchronize." appears. In this case, synchronization is performed with the premise that the MX100 measured the data using the logical (estimated) record interval.

Data Files Created by Synchronization

The data file created by synchronization takes on the same file name with .mxs extension.
When synchronizing, if the backup file is placed in the same folder, data dropout from the recording file is embedded in the backup file (data saved to the CF card), and synchronization of channel data is performed. Also, the between channel delay in the medium speed modules is compensated during synchronization.
Synchronized files created by the synchronization process are created in the same directory as the data file normally displayed. The file name is "the name of the file being displayed (excluding the .mxd extension)" + "mxs extension" However, if the destination storage medium is write-protected, the file is created in the temporary file directory. The temporary file directory is displayed in an error message dialog box.

Joining of Divided Files

When divided data files are loaded, they are joined by the synchronization process.
If a file that can be joined to the displayed data exists and you synchronize the data, the existing synchronized file is overwritten. If the existing synchronized file cannot be overwritten (set to read-only attribute, for example), a new synchronized file is created. A sequence number is added to the name of the new synchronized file ("the name of the file being displayed" + "sequence number" + "mxs extension" For example, if the existing synchronized file name is "data-0000.mxs" the new file name is "data-0000- 1.mxs"
The following limitations exist in the joining of files through synchronization.

- If any of the divided data files are missing, the data files after (or before) the missing file are not joined.
- If the total number of measured data points in the divided data files exceeds 5 million (including data that is dropped due to power failures and other failures), files that would not cause the total number of displayed data points to exceed 5 million are joined.

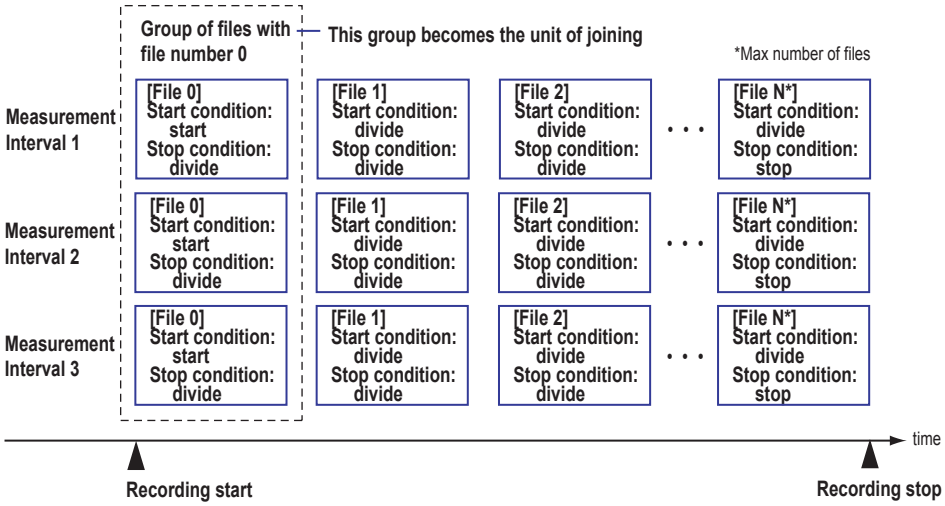
When synchronizing data files that exceed the 5 million point range, the file is used as the start file and succeeding files are joined. If 5 million points is not exceeded when the last file is joined, files before the start file is searched in order, and files that would not cause 5 million points to be exceeded are joined. In this case, because the files before the start file are also joined to the previous synchronized file, two synchronized files for this file would exist. If you open a file before the start file and perform synchronization, the viewer displays the first file the OS finds (either of the two existing synchronized files). In such cases, it is recommended that the files you wish to join are selected so that the limit is not exceeded, copied to the user's working folder, and synchronized there.

- Divided files can be joined up to the point in which the size of the joined file reaches 2 GB.

CF File Joining Function

Data saved to the CF card on the MX100 can be joined.

- The data that can be joined are CF files that were created on the same unit from record start to record stop.



- Data are joined by file groups of data with multiple measurement intervals of the same file number.
- If a number of files equalling the number of measurement intervals of the specified file number (if three measurement intervals are specified, the number would be 3) does not exist in the file group, files just prior to the file group of the relevant file number are joined.
- The resulting files that are created are limited to five million points/2 GB.
- The extension of the joined files is .mxc.

The operation is carried out by choosing File > Join in the menu. Also, when opening data files, if you choose data saved to the CF card in the MX100 main unit, the "Join related files" dialog box appears and the files are joined.

CF files or joined data files displayed in the active window can themselves be joined, and Join in the menu is enabled.

If the data files displayed in the active window are not CF or joined files, Join is disabled in the menu.

Note

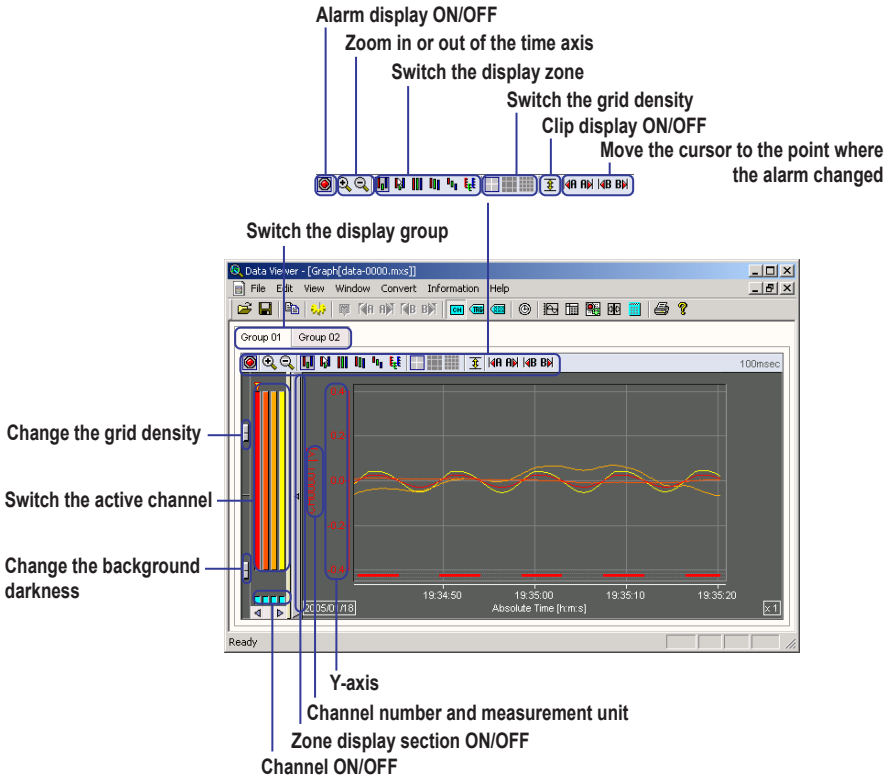
When joining or performing other such processes, copy the data files onto the hard disk of the PC from the CF card first.

3.2 Setting the Display

Procedure

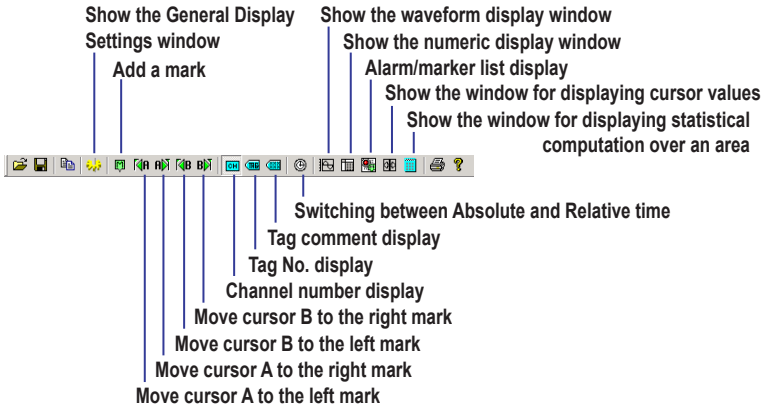
Changing the Display on the Waveform Display Window

Change the display settings according to the explanation is the figure below.



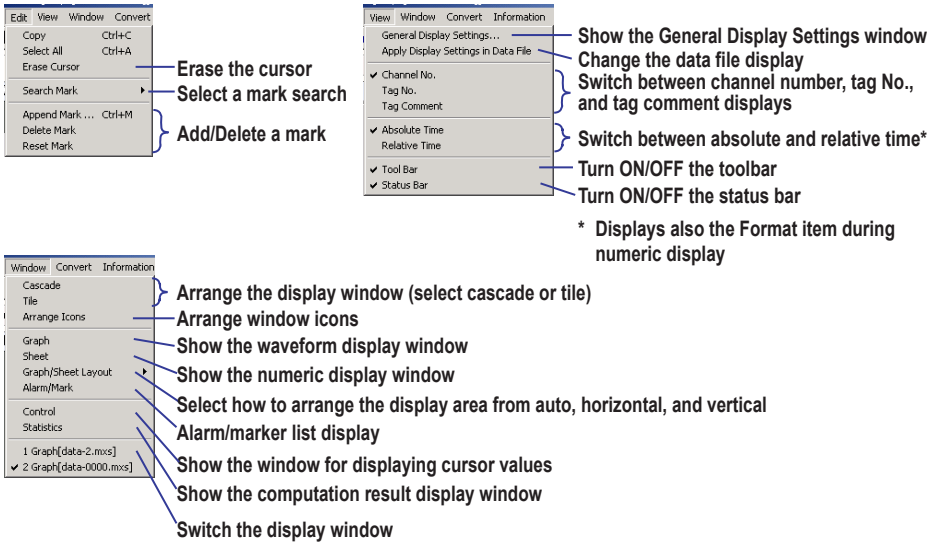
Changing the Display Using the Toolbar

Change the display settings according to the explanation is the figure below.



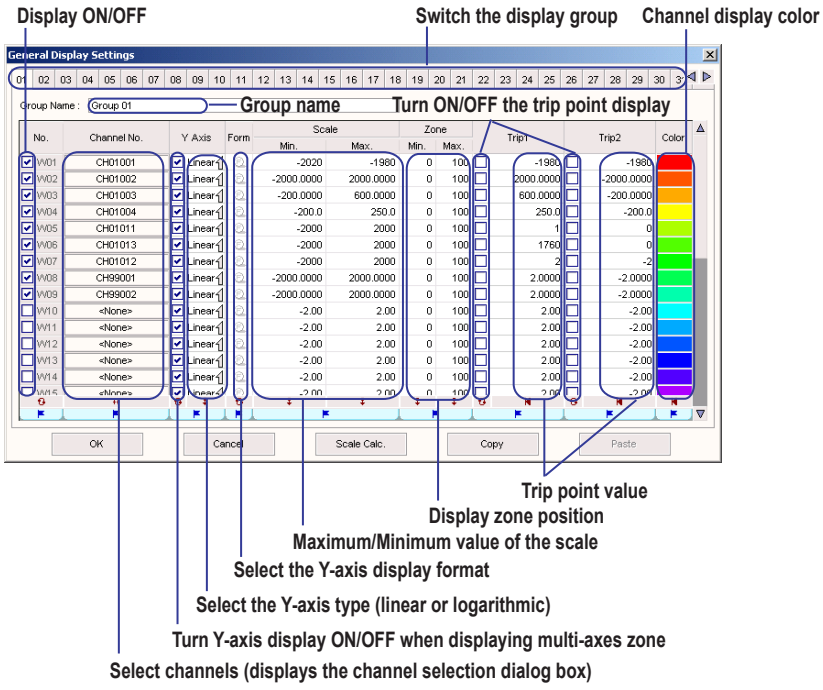
Changing the Display Using the Menu

Choose appropriate commands from the **Edit**, **View**, and **Window** menus to change the display.



Changing the Display Using the Display Settings Window

See the explanation in the figure below. Change the display settings and click **OK**. Set the display for each display group.

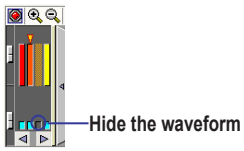


Explanation

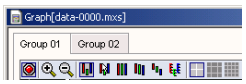
Display Groups and Group Names

The values of each channel that are loaded are divided into groups that were used during recording and displayed using waveforms or numeric values. The measured/computed values can be divided into up to 50 groups. Up to 32 channels can be registered to a single group. If you click the channel selection button on the General Display Settings window, the Channel No. dialog box opens (see the figure below). The labels used to identify the waveforms can be set to tag numbers or tag comments in addition to channel number on the View menu. The selected label type (channel number, tag number, or tag comment) is used in the Channel No. dialog box. Select <None>, if you are not assigning a channel.

To turn ON/OFF the trend waveform display on the waveform display window, click the button below the active channel switch bar as shown in the figure below.



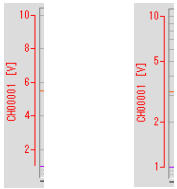
The name assigned to each group can be changed using up to 30 characters. The names of the display groups that have channels registered are displayed on the waveform display window or numeric display window.



Y-Axis Type

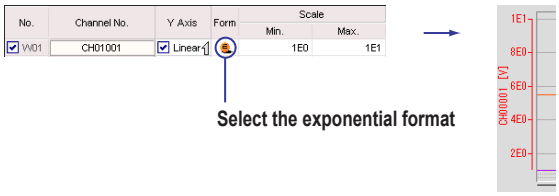
You can select linear or logarithmic Y-axis for displaying the waveforms.

Linear **Logarithmic**



Maximum and Minimum Values of the Y-Axis and the Display Format of the Y-Axis Values

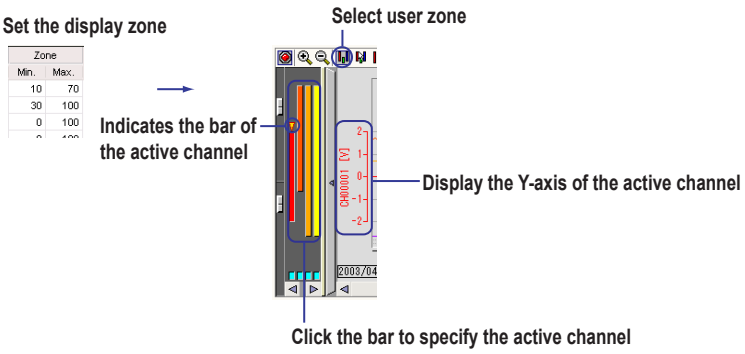
The maximum and minimum values of the scale on the waveform display can be changed. If you click the Scale Calc. button on the General Display Settings window, the maximum and minimum values of the scale on the selected channels are calculated automatically according to the maximum and minimum values of the data.
The Y-axis can also be displayed using logarithmic format as shown below.



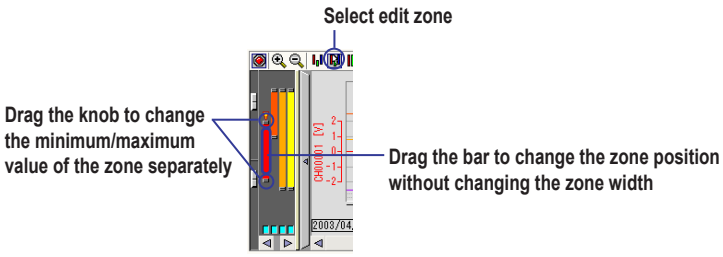
Selecting the Waveform Display Zone

You can select from the following. In the Zone setting on the General Display Settings window, assume the bottom and top edges of the waveform display area to be 0% and 100%, respectively, and set the waveform display position by specifying the minimum value (0 to 99%) and the maximum value (1 to 100%).

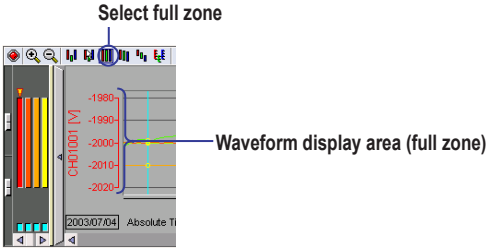
- User Zone
  Displays each waveform at the position specified by Zone on the General Display Settings window. A single Y-axis active channel waveform can be displayed.



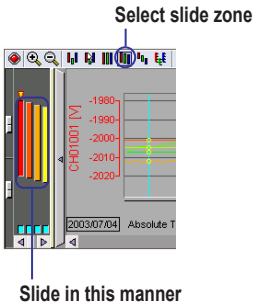
- Edit Zone
  Like the user zone, each waveform is displayed at the position specified by Zone on the General Display Settings window. However, you can change the zone on the waveform display window. A single Y-axis of the active waveform can be displayed.



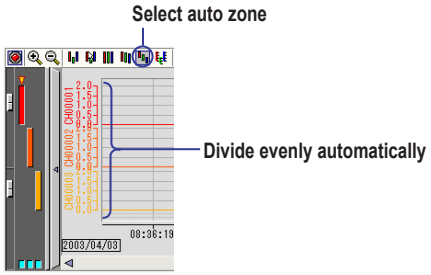
- Full Zone
  Displays all the waveforms over the full zone of the waveform display area regardless of the Zone settings on the General Display Settings window. A single Y-axis of the active waveform is displayed.



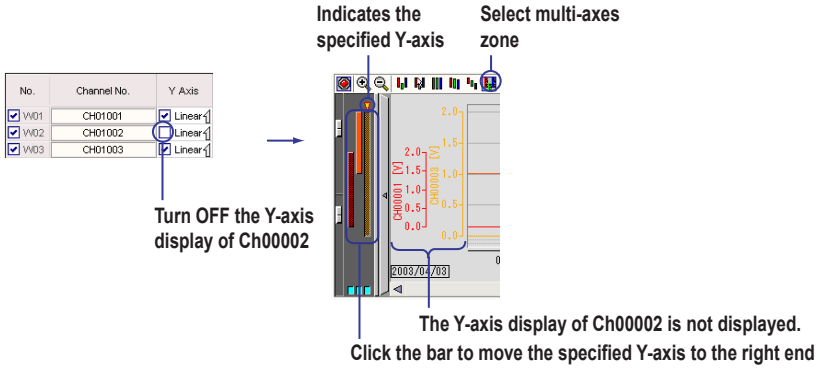
- Slide Zone
  Displays the waveforms by slightly offsetting the display position of each waveform vertically regardless of the Zone settings on the General Display Settings window. A single Y-axis of the active waveform is displayed.



- Auto Zone
  Displays the waveforms by dividing the waveform display area evenly according to the number of displayed waveforms regardless of the Zone settings on the General Display Settings window.

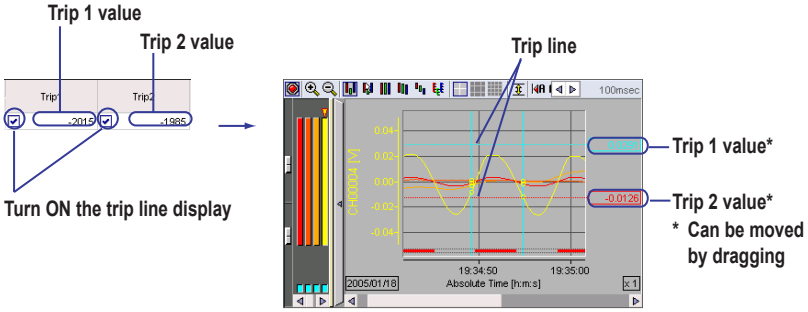


- Multi-Axes Zone
  All the specified Y-axes of the displayed waveforms are aligned horizontally. To hide a Y-axis, clear the **Y-Axis** check box on the General Display Settings window. The display position is set using Zone on the General Display Settings window. Dragging the channel bar to the waveform display area shows the Y-axis of the corresponding channel. Drag the Y-axis to the zone display area hides the Y-axis of the corresponding channel.



Trip Points

You can display a trip line to indicate a particular value of interest (trip point) in the waveform display area. Two trip points (trip 1 is red, trip 2 is blue) can be set on each waveform using the Trip 1 and Trip 2 settings on the General Display Settings window. The trip line of the waveform corresponding to the right-most Y-axis bar is shown in the waveform display area.

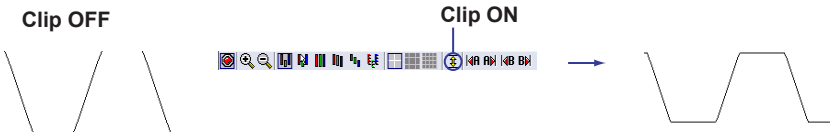


Channel Colors

Clicking the channel color displayed in the Color column on the Display setup screen opens the Color dialog box. You can select the color of each channel using the Color dialog box. To create custom colors, click the Define Custom Colors button in the Color dialog box.

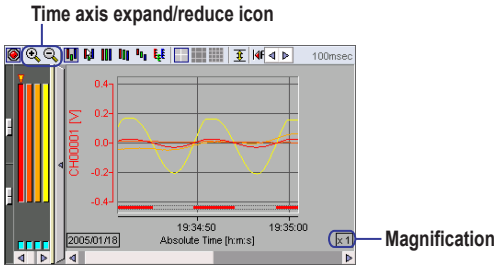
Clipping of Waveforms

By default (clip OFF), the waveform is not displayed when the measured/computed value exceeds the minimum/maximum value of the scale (see the lower left figure). When clip is turned ON, values that are smaller than the minimum value of the scale are displayed as the minimum value and the values that are larger than the maximum value of the scale are displayed as the maximum value.



Expanding or Reducing the Time Axis on the Waveform Display

On the waveform display window, you can click the expand/reduce icon to expand or reduce the time axis in the range of 20 to 1/1000 times for each waveform display area.

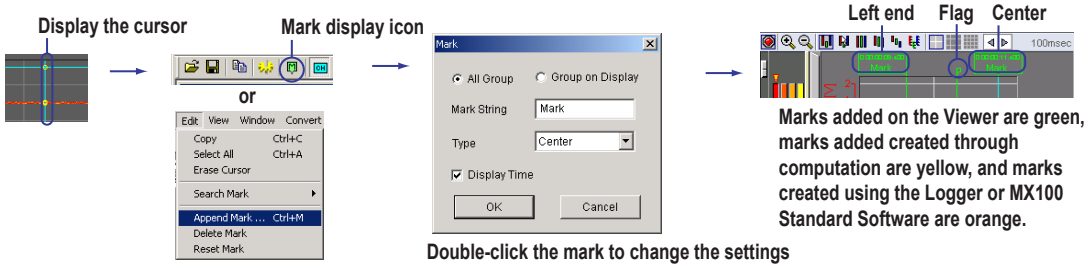


Adding Marks

In addition to the marks placed using other programs such as the Logger, you can add marks at the positions where you click (displays a cursor) on the waveform display area. You can enter a text to be attached to the mark (“Mark” by default) using up to 15 characters. You can also select Left, Center (default), Right, or Flag (small mark without text) for the Type. For types other than Flag, the specified string and the relative or absolute time at the mark position are displayed.

You can set the string and type in the Mark dialog box that opens when you click the Append Mark icon (or choose Append Mark from the Edit menu). In the Mark dialog box, you can select whether to add the mark to the waveforms of all groups (default) or only the waveforms of the displayed group.

To delete specific displayed marks, select the range using cursors, and then choose **Delete Mark** from the **Edit** menu. To delete all the marks added using the Viewer, choose **Reset Mark** from the **Edit** menu.

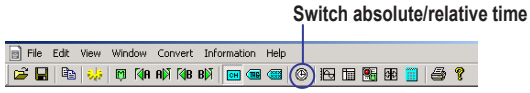


Grid Density

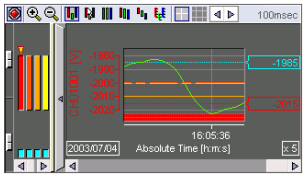
You can change the displayed grid density. The available settings are standard, dense grid 1, or dense grid 2. For instructions, see section 2.10, “Starting/Stopping Data Monitoring and Displaying the Monitor.”

Switching between Absolute and Relative Time

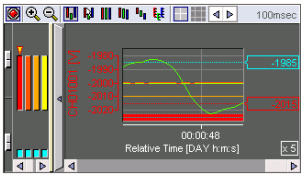
By default, the time axis is displayed using absolute time. The time axis can also be displayed using time relative to the first data position.



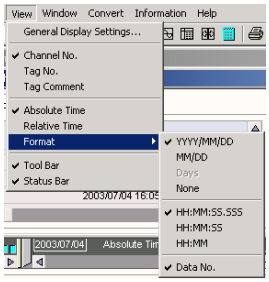
Absolute time

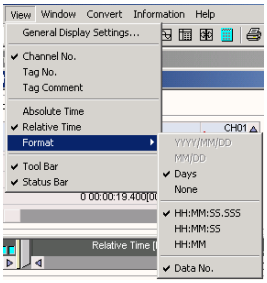


Relative time



On the numeric display, you can select the display format of the absolute or relative time and turn ON/OFF the data numbers using Format on the View menu.

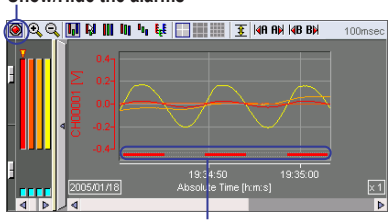




Showing/Hiding Alarms

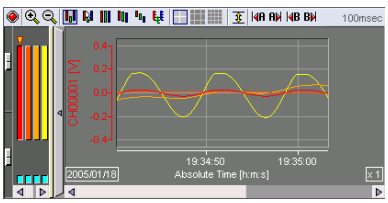
You can hide the alarm display area that indicates the status of alarm occurrence. The alarms are displayed in the same fashion as the alarms displayed in the waveform display area of the Integration Monitor.

Show/Hide the alarms



Alarm display area

No alarm display



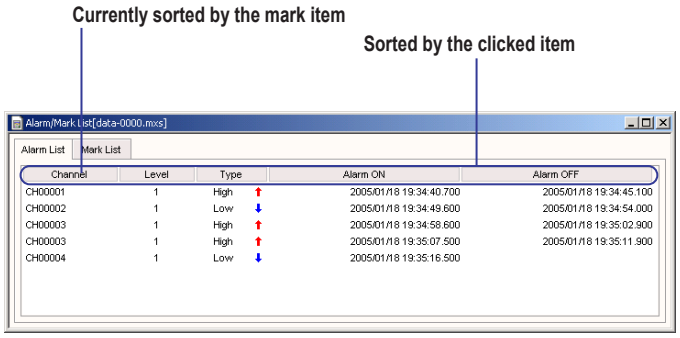
Alarm/Mark List Display

Displays a detailed list of alarms and marks.

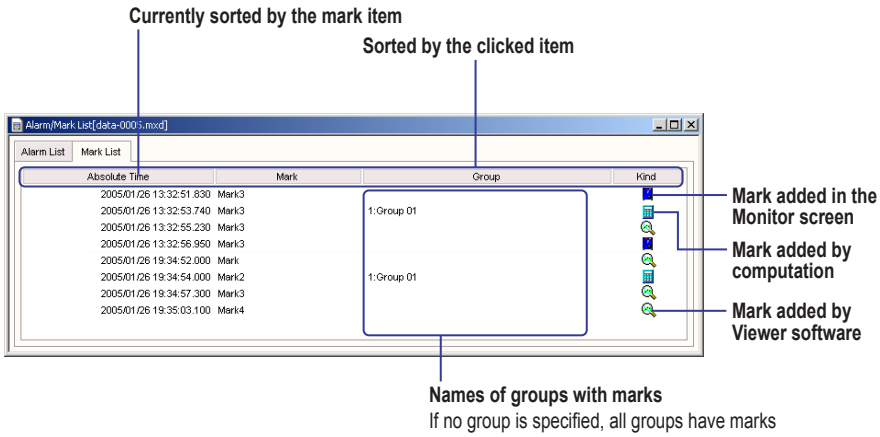
From the Window menu, choose Alarm/Mark List Display.

You can also click the button on the toolbar.

- Alarm List Display



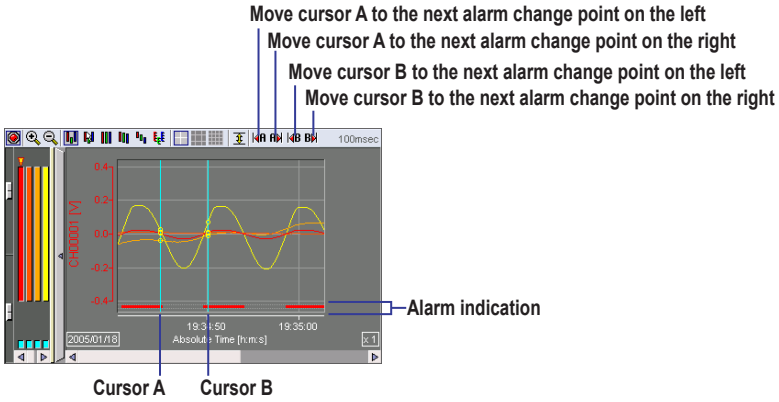
- Marker List Display



The alarm/marker list display's cursors are linked with those of the waveform display and numeric display layout screens. Alarms or marks selected with the cursor in the alarm/mark list display can be copied to the clipboard using the Edit > Copy command.
The alarm/mark list can be converted to ASCII, Excel, or Lotus format (see section 3.7).

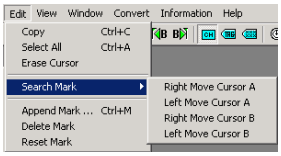
Alarm display limitation: One file can display a maximum of 10000 alarms.

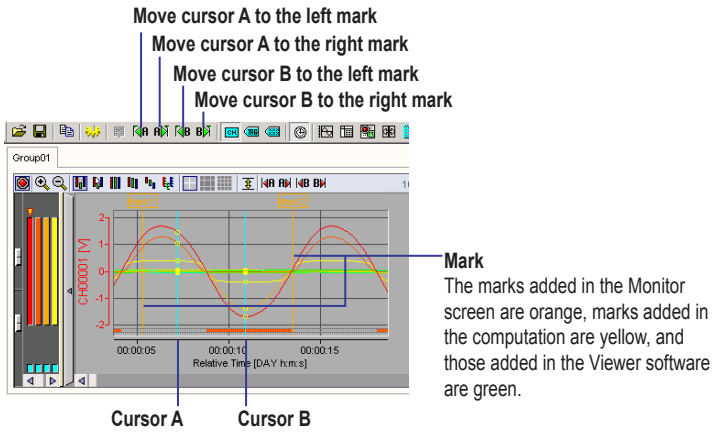
Left-to-Right Alarm Search (Waveform Display Screen Only)



Left-to-Right Mark Search (Waveform Display Screen Only)

In the waveform display screen, move cursor A and B to the right or left side of the mark. From the Edit menu, choose Mark Search. Or click the corresponding toolbar button.

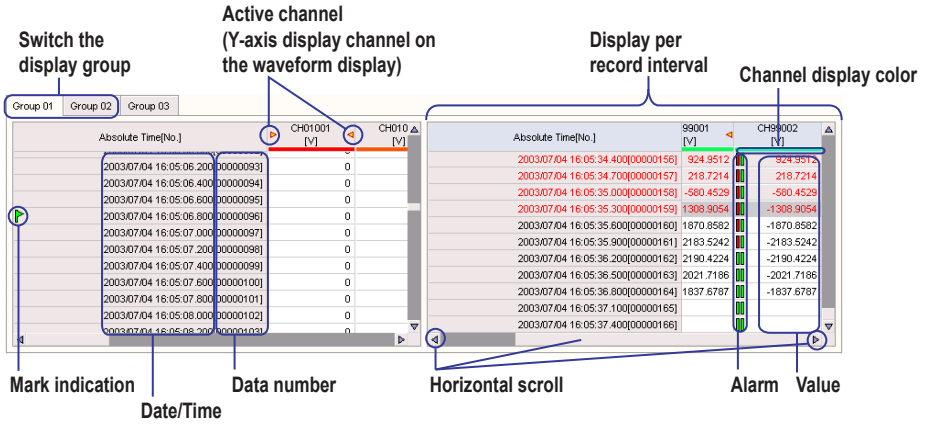




Numeric Display

Numeric display can be shown along with the waveform display window. When channels with different record intervals exist within the same group, the screen is divided. The display group, active channel, and mark display are synchronized to the waveform display.

If cursors are displayed on the waveform display window, the data values between the cursors are displayed in red. Also, the data column corresponding to the cursor position is displayed in gray.



Note

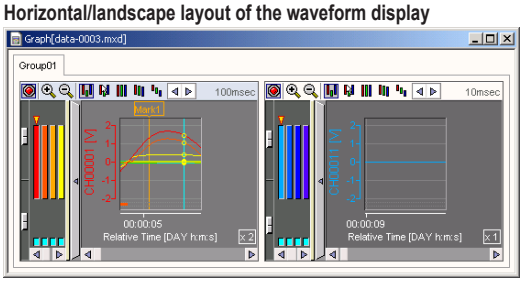
- If you open the numeric display window when two cursors are shown on the waveform display window, the numeric values in the interval between the cursors is displayed in red. If you choose Copy from the Edit menu (press the Ctrl + C key) in this condition, the data in the interval is copied to the clipboard as text data.
- Up to 1000 lines can be copied. (Copy on the Edit menu is not available if the number of lines specified by the cursors is above 1000.)
- If data with multiple record intervals is being displayed, the numeric values between the cursors on the data sheet of the active record interval are copied. The title line displaying the “Absolute Time [No.]” and channel number of the data sheet of the active record interval is displayed using grayish light blue color. The color of the title line and the color of the “Absolute Time [No.]” column are displayed using the same color on inactive sheets. You can activate a sheet by clicking the sheet.

Waveform/Numerical Display Layout

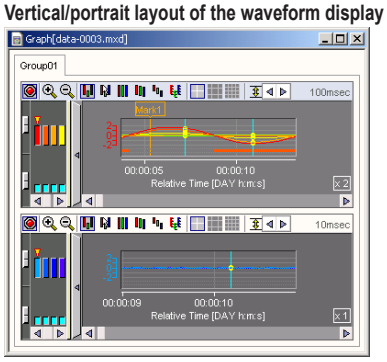
The waveform or numeric display of data with differing measurement intervals is arranged according to those intervals, but the layout of the display can be selected from Auto, Horizontal, or Vertical.

- Auto Switches between vertical and horizontal automatically according to the window size.
- Horizontal Sets horizontal orientation regardless of the window size.
- Vertical Sets vertical orientation regardless of the window size.

Horizontal/landscape layout of the waveform display



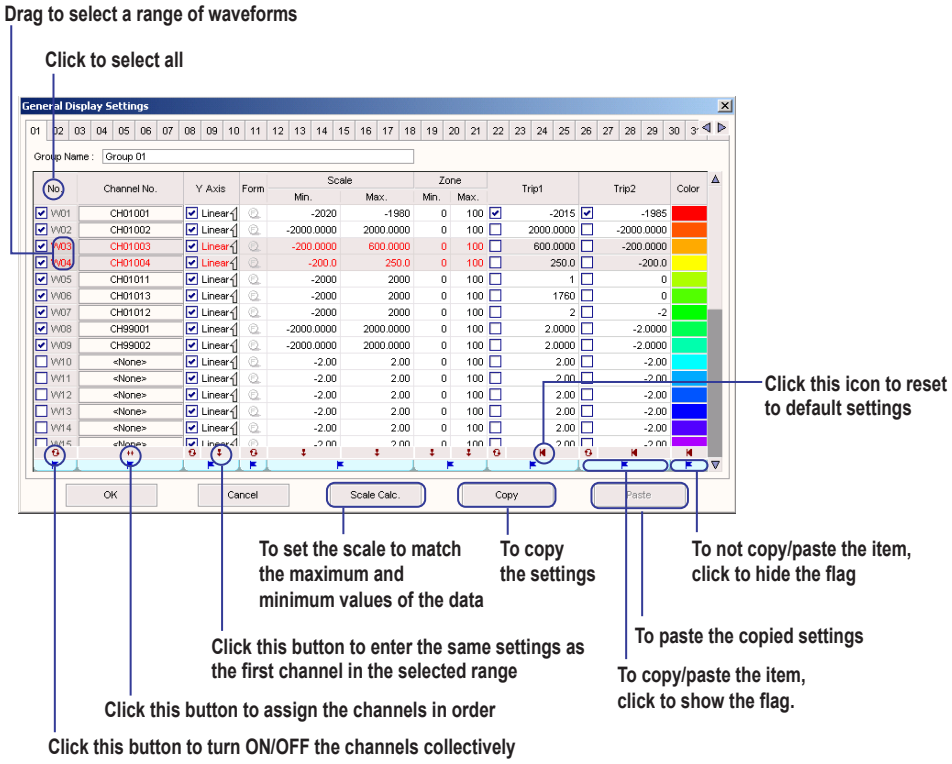
Vertical/portrait layout of the waveform display



Initializing, Copying, and Pasting of Settings on the General Display Settings Window

On the General Display Settings window, you can reset the settings to default or copy and paste the settings of one or multiple waveforms to the settings of other waveforms. You can copy and paste according to the procedure below.

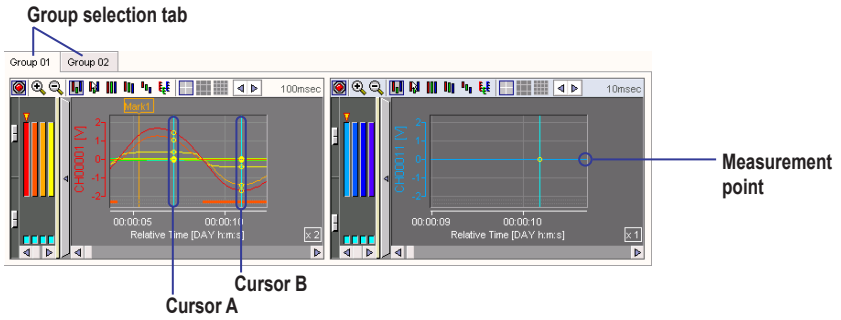
Drag the copy source waveform number (No. column), click the **Copy** button, drag the copy destination waveform number, and click the **Paste** button.



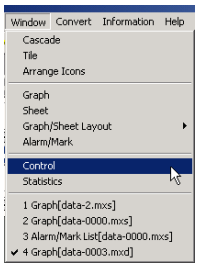
3.3 Reading Values Using Cursors

Procedure

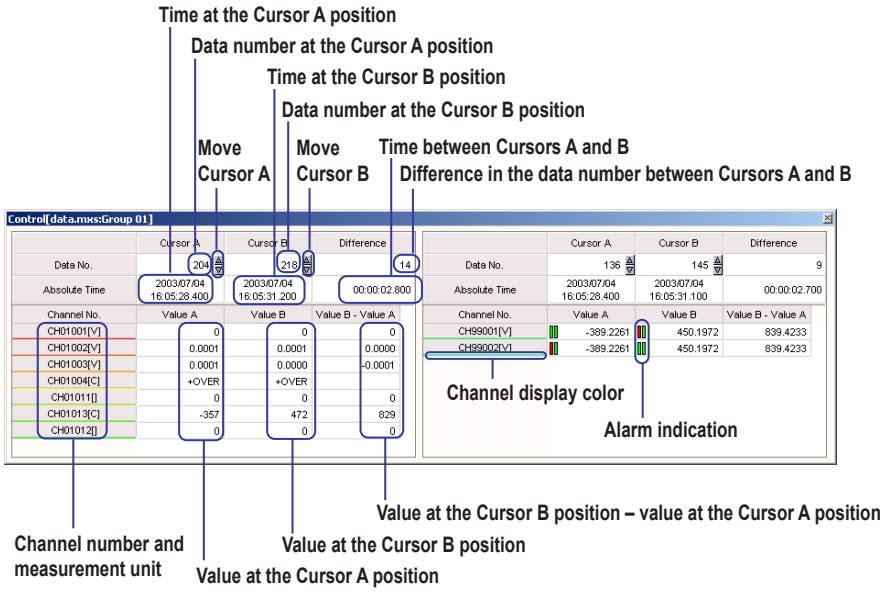
1. On the waveform display window, click the tag of the group from which you wish to read the value using cursors.
2. Click the position where you wish to read the data in the waveform display area of the waveform display window.
   If you wish to read another point simultaneously, drag the cursor. Cursor A appears at the position where you first clicked; Cursor B appears at the position where you released the mouse button. A yellow circle is displayed where the waveform and the cursor cross.
   You can move the waveform that is displayed in the waveform display area using the scroll buttons or scroll bar.



3. From the **Window** menu, choose **Control**.



The Cursor Value window opens.



Clearing Cursors

From the **Edit** menu, choose **Erase Cursor**.
The cursors are cleared as well as the cursor values displayed in the Control dialog box.

Explanation

Reading Measured/Computed Values Using Cursors

Two cursors can be displayed. The following values can be read on the Control window.

- Values at the cursors.
- Difference in the value between the cursors.
- Absolute time and data number at the cursor position.
- Time between the cursors and the difference between the data numbers.
- Alarm status of the value at the cursor.

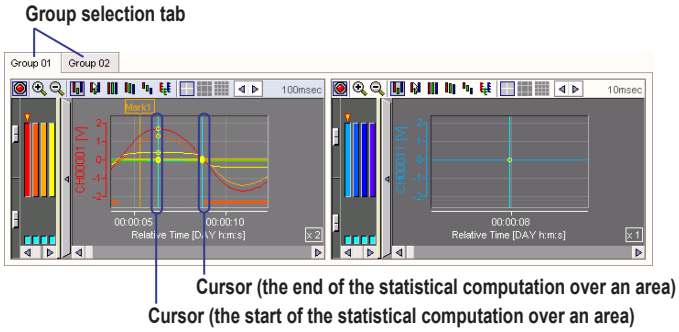
Note

- The cursors used to display cursor values and those used to specify the interval for statistical computation over an area are the same.
- The Cursor Value window and the Statistics window can be displayed simultaneously.
- If you click the tab of another group on the waveform display window while the Cursor Value window is open, the cursor values of the selected group are displayed on the Cursor Value window.
- You can change the cursor positions on the waveform display window while the Cursor Value window is open.
- If you choose Select All from the Edit menu, Cursor A is displayed at the first data position and Cursor B is displayed at the last data position.

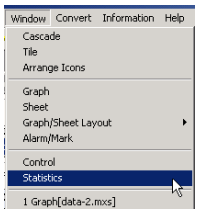
3.4 Statistical Computation over an Area of Measured/Computed Data

Procedure

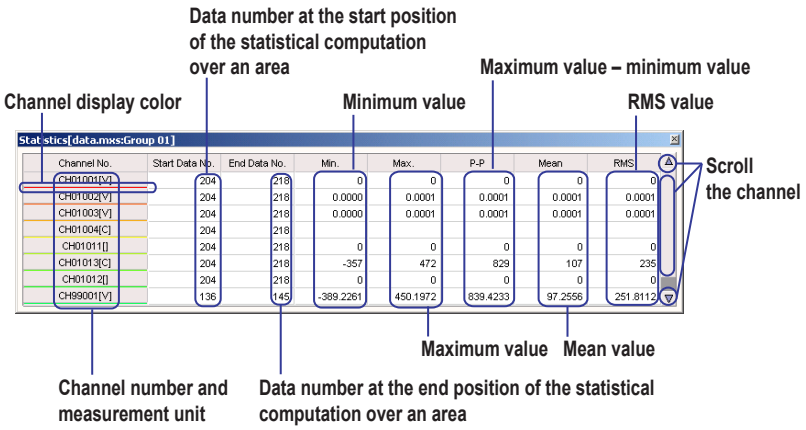
1. On the waveform display window, click the tab of the group on which you wish to perform statistical computation over an area.
2. Click the start position of the computation area in the waveform display area.
   A light-blue cursor appears in the waveform display area. If multiple waveform display areas are displayed, the cursor is displayed at the time position each waveform display area.
3. Drag the cursor to the end position of the computation area
   Another light-blue cursor appears at the position where the cursor was dragged.



4. From the **Window** menu, choose **Statistics**.



The Statistics window opens.



Explanation

Statistical Computation over an Area

Specify using two cursors the interval over which computation is to be performed.
If the cursors are not displayed, all the data are used in the statistical computation.
The statistical parameters are the minimum value, the maximum value, the P-P value (maximum – minimum), the average value, and the rms value.

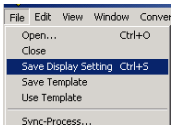
Note

- To redo the computation after changing the computation area, you must select the button or the menu again.
- The cursors used to specify the interval for statistical computation over an area and those used to read values are common.
- The Statistics window and the Cursor Value window can be displayed simultaneously.
- You can press the Ctrl + C key when the Statistics window is active to copy the displayed results as text data to the clipboard.

3.5 Saving Display Settings

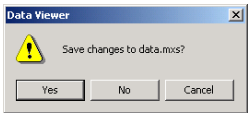
Procedure

From the **File** menu, choose **Save Display Setting File**.
You can also click the button on the toolbar.
The display setting file is created in the same folder as the data files.



When Closing the Viewer

If you open a file and change the display settings, the dialog box below opens when you attempt to close the Viewer. To save the changed display settings, click **Yes**.



Explanation

Display Settings That Are Saved

- Information about the group whose waveform or numeric display is open.
- Settings entered using the tool buttons at the top section of the waveform display area of each group.
  Alarm display ON/OFF, magnification, scale, clip ON/OFF of the waveform display.
- Cursor position (absolute time).
- General Display Settings on the View menu.
- Channel No., Tag ID, or Tag comment setting on the View menu.
- Absolute Time or Relative Time setting on the View menu.
- Graph/Sheet Layout setting on the Window menu.
- Check box items in the File Information dialog box on the Information menu
  The items are used as headers when the data is printed.
- Print Setting on the File menu.
  Range, Color, Print Groups, and Comment.
- Marks created on the Viewer.
- Position of the display screen

Display Settings File

The display setting file (with .mxv extension) is created in the folder containing the data files. If the data file name is data.mxs, the display setting file name is data.mxs.mxv. The next time the data file is opened, the display opens according to the information in the display setting file.
If the display setting file is deleted or moved to another folder, the display opens according to the display settings used when the data file was created.

Note

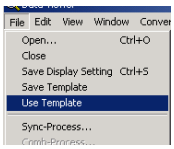
- You cannot open a file containing the data you wish to view by selecting a file with .mxv extension.

3.6 Saving the Display Template

Procedure

Saving Templates

1. From the **File** menu, choose **Save Template**.
   The currently displayed settings are saved as a template file to the same folder as the displayed data.



Using Templates

1. From the **File** menu, choose **Use Template**.
   If the currently displayed data file is not accompanied by its display settings file, it is displayed according to the setting information of the template file residing in the same folder.
   If the currently displayed data file is accompanied by its display settings file, it is displayed according to the setting information of the display settings file.

Explanation

The template file is saved with the name default.mxt in the folder of the currently displayed data.

When using a template file, the template file residing in the same folder as the displayed data is used.

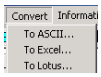
The setting information saved to the template file is as follows.

- Information about the group whose waveform or numeric display is open.
- Settings entered using the tool buttons at the top section of the waveform display area of each group.
  Alarm display ON/OFF, magnification, scale, clip ON/OFF of the waveform display.
- General Display Settings on the View menu.
- Channel No., Tag ID, or Tag comment setting on the View menu.
- Absolute Time or Relative Time setting on the View menu.
- Graph/Sheet Layout setting on the Window menu.
- Check box items in the File Information dialog box on the Information menu
  The items are used as headers when the data is printed.
- Print Setting on the File menu.
  Range, Color, Print Groups, and Comment.
- Position of the display screen

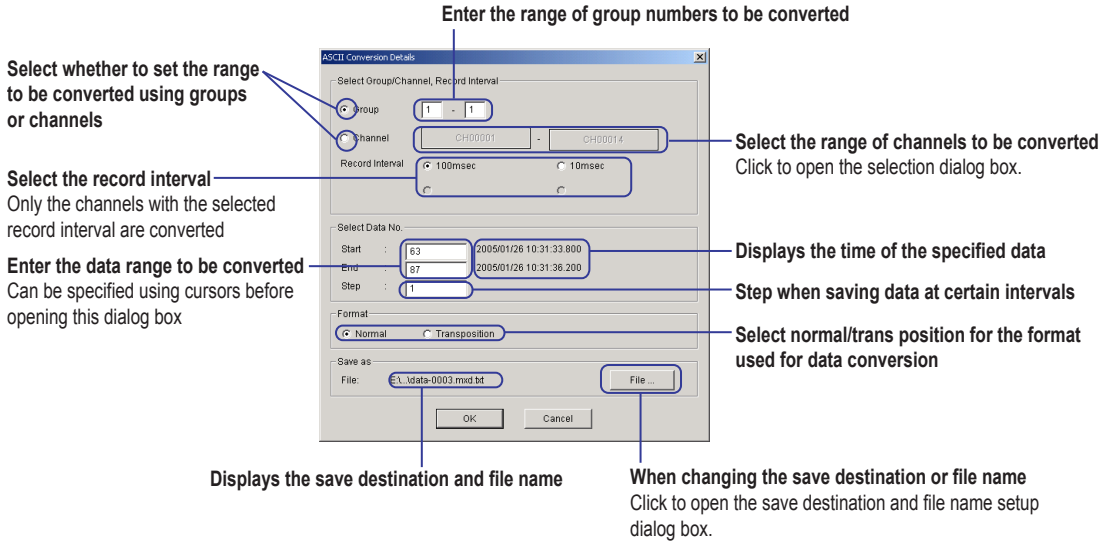
3.7 Converting Data Formats

Procedure

1. From the **Convert** menu, choose **To ASCII**, **To Excel**, or **To Lotus**.



2. After entering required settings in the dialog box that opens, click **OK**.
   The file is created at the specified destination.



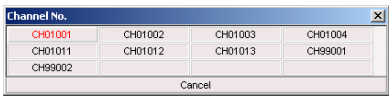
Explanation

Convertable Data Formats

- ASCII
  Text data with each data point separated by a comma. The extension is .txt.
- Excel
  Data that can be opened using Microsoft's spreadsheet application Excel version 4.0 or later. The extension is .xls.
- Lotus
  Data that can be opened using Lotus" spreadsheet application 1-2-3 version 2.0 or later. The extension is .wj2.

Converted Data

Specify the range using group numbers or channel numbers. You can select the channel number by clicking in the dialog box as shown below.



If multiple recording intervals exist in the data to be converted, select the recording interval. Only the data of the channels having the selected record interval is converted.

Conversion Range and Step

You can specify the range using data numbers or by using cursors. For the method of specifying the range using cursors, see the procedure in section 3.4, “Statistical Computation over an Area of Measured/Computed Data.”

By specifying the step, you can save data sampled at certain intervals rather than converting all the data in the range (when step is set to 1).

Specifying Formats

Select the format for the converted data. When outputting channel data in columns select Normal, and for rows, select Trans position.

Display Example of the Converted Data (normal)

	A	B	C	D	E	F	G	H
1	MXLOGGER		R2.01					
2	Data Viewer		R2.01					
3	<CompanyName>		<UserName>		000-0000-00000-****			
4								
5	File Name		data.mxs					
6	File Recovery		None					
7	Creator		Data Viewer					
8	Sync-Process		Done					
9	Start Condition		Start Point					
10	End Condition		End Point					
11	Start Time		2005/01/19	12:44:31	0.070			
12	End Time		2005/01/19	12:45:04	0.940			
13	File Message							
14	File No.		0					
15	Num. of Ch.		16					
16	Num. of Ref. File		1					
17	Ref. File No.		0 -		0			
18	Record Interval		0.100	Second				
19	Converted Step		1					
20	Num. of Converted Ch.		4					
21	Num. of Converted Data		339					
22	Converted Group		1 -		1			
23				Ch.	CH00001	CH00002	CH00003	CH00004
24				Tag No.	Tag00001	Tag00002	Tag00003	Tag00004
25				Tag Comme	TagCommer	TagCommer	TagCommer	TagCommer
26	Mark	Date	Time	Second	V	V	V	V
27		2005/01/19	12:44:31	0.100	0.0010	0.0001	-0.0070	0.0024
28		2005/01/19	12:44:31	0.200	0.0001	0.0001	-0.0070	0.0016
29		2005/01/19	12:44:31	0.300	-0.0011	0.0002	-0.0070	0.0006
30		2005/01/19	12:44:31	0.400	-0.0022	0.0001	-0.0071	-0.0005
31		2005/01/19	12:44:31	0.500	-0.0033	0.0003	-0.0071	-0.0014
32		2005/01/19	12:44:31	0.600	-0.0044	0.0003	-0.0071	-0.0024

Display Example of the Converted Data (trans position)

	A	B	C	D	E	F	G	H	I
1	MXLOGGER		R2.01						
2	Data Viewer		R2.01						
3	<CompanyName>		<UserName>		000-0000-00000-****				
4									
5	File Name		data.mxs						
6	File Recovery		None						
7	Creator		Data Viewer						
8	Sync-Process		Done						
9	Start Condition		Start Point						
10	End Condition		End Point						
11	Start Time		2005/01/19	12:44:31	0.070				
12	End Time		2005/01/19	12:45:04	0.940				
13	File Message								
14	File No.		0						
15	Num. of Ch.		16						
16	Num. of Ref. File		1						
17	Ref. File No.		0 -		0				
18	Record Interval		0.100	Second					
19	Converted Step		1						
20	Num. of Converted Ch.		4						
21	Num. of Converted Data		87						
22	Converted Group		1 -		1				
23				Mark					
24				Date	2005/01/19	2005/01/19	2005/01/19	2005/01/19	2005/01/19
25				Time	12:44:56	12:44:56	12:44:56	12:44:56	12:44:56
26	Ch.	Tag No.	Tag Comme	Second	0.300	0.400	0.500	0.600	0.700
27	CH00001	Tag00001	TagCommer	V	0.0153	0.0148	0.0142	0.0134	0.0124
28	CH00002	Tag00002	TagCommer	V	0.0012	0.0012	0.0013	0.0012	0.0013
29	CH00003	Tag00003	TagCommer	V	-0.0033	-0.0030	-0.0029	-0.0027	-0.0026
30	CH00004	Tag00004	TagCommer	V	0.0118	0.0115	0.0112	0.0107	0.0102

Notes When Converting Data

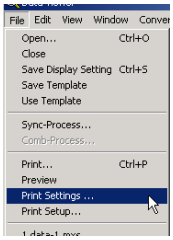
- There is a limit in the number of data points that Excel and Lotus1-2-3 can handle. Before executing the conversion, set the channels/groups to be converted, the conversion range, and the step so that the number of data points is appropriate. If the limit is exceeded, perform automatic division prior to conversion. Serial numbers are attached to divided-converted files. In addition, if the free memory space on the PC is low, you may not be able to load the data using Excel or Lotus 1-2-3.
- If you set the save destination to a storage medium that has slow access such as a floppy disk, the saving of the data may take an extended time. It is recommended that such storage medium not be selected for the save destination.
- Select a save destination with adequate free space.
- The measured data during a burnout or measured data that exceeds the upper/lower limit of the measurement range are indicated as “+OVER” or “-OVER”
- If invalid data exists in the converted data (measured value of a channel without input or computed value when the data used in the equation does not exist), the data is indicated as “INVALID”

3.8 Printing Data

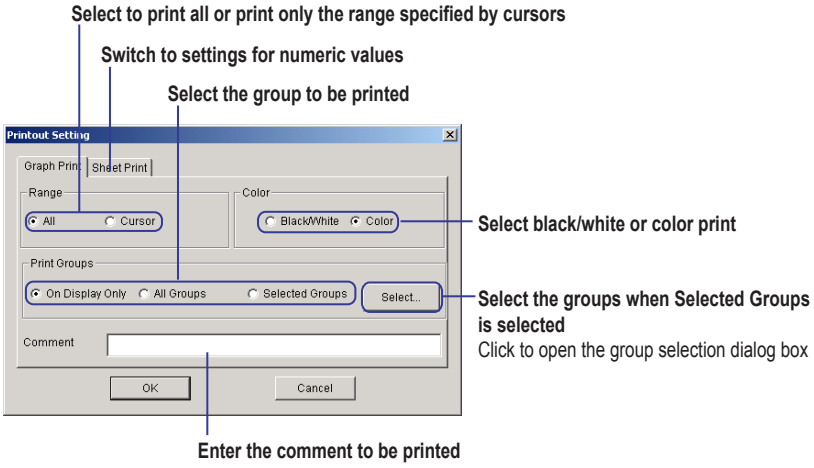
Procedure

Setting the Contents to Be Printed

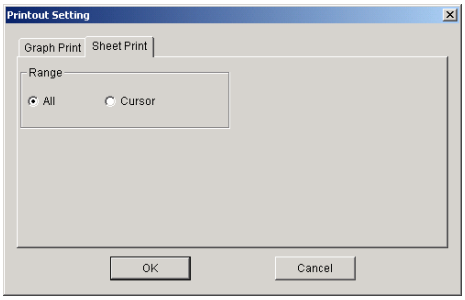
1. From the **File** menu, choose **Print Setting**.



2. In the Print Setting dialog box, set Range, Color, and Print Group, and then click **OK**.
   Enter a comment in the **Comment** box as necessary.
   When printing numeric values, you only need to set the range.

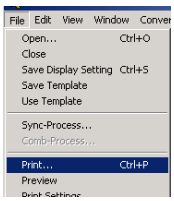


Settings for numeric values

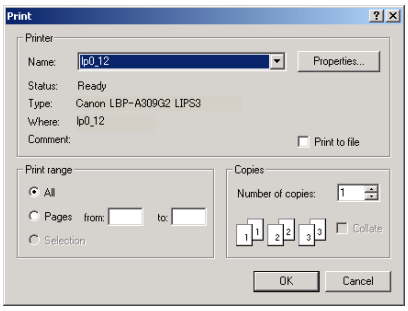


Executing the Print Operation

1. From the **File** menu, choose **Print**.
   The Print dialog box opens.
2. In the Print dialog box, select the printer, print range, and the number of copies, and then click the **OK** button.
   When printing waveforms, you cannot set the print range.

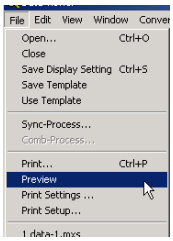


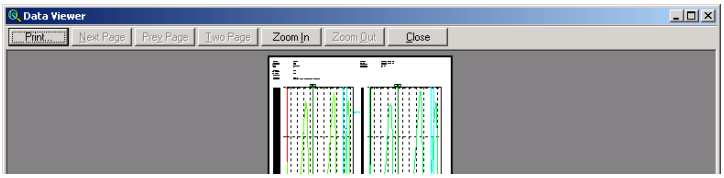
Display example of the Print dialog box



Print Preview

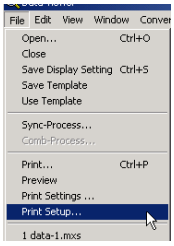
From the **File** menu, choose **Print Preview**.
The print image is displayed.



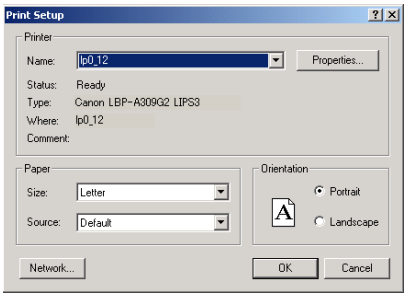


Setting Up the Printer

1. From the **File** menu, choose **Print Setup**.
   The Print Setup dialog box opens.
2. Set the paper size, orientation, etc. Then, click the **OK** button.



Display example of the Print Setup dialog box



Explanation

Printed Items

To print waveforms, open the waveform display window; to print numeric values, open the numeric display window. If multiple waveform display windows or numeric display windows are open, click the window you wish to print.
To print cursor values or statistical computation over an area, open those windows also. You can also print a list of alarms and marks.

Print Range

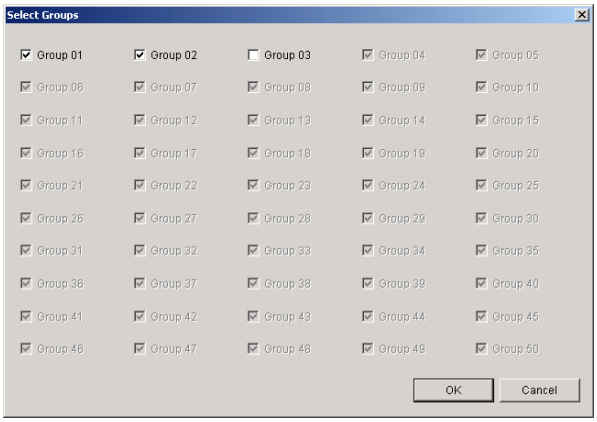
If you wish to print a specified range of the waveform, specify the range using cursors. For the method of specifying the range using cursors, see the procedure in section 3.4, “Statistical Computation over an Area of Measured/Computed Data.”

Printed Colors of Waveforms

You can select black/white print or color print.

Print Groups

- On Display Only
  Only the groups whose waveforms are displayed are printed.
- All Groups
  All groups that can be displayed on the waveform display window are printed.
- Selected Groups
  Groups selected in the dialog box that opens (see the figure below) when the Select button is clicked are printed.

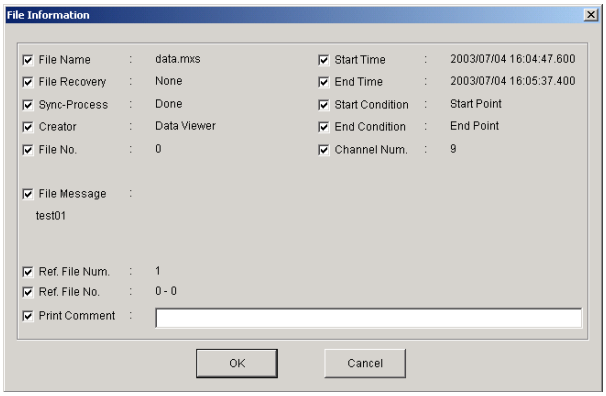


Printing a Comment

You can enter a comment using up to 127 characters. The comment is printed in the Print Comment column.

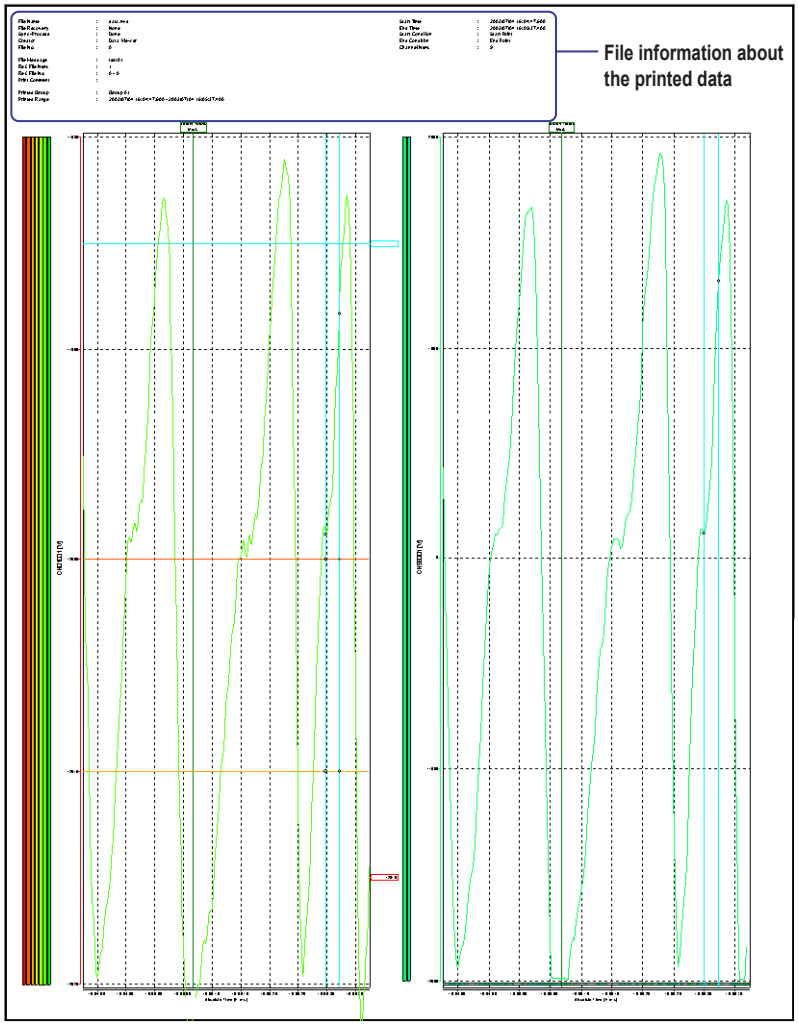
Printing File Information

When you print data, the file information is also printed. You can check the file information in the dialog box that opens by choosing About Data from the Information menu. You can also select the items to be printed using the check boxes.



Print Example

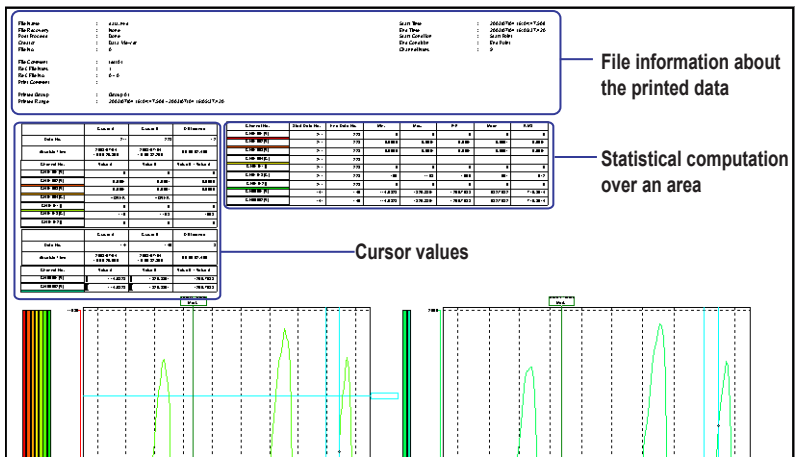
- When only the waveforms are printed



Note

If you wish to arrange the waveform graphs vertically when printing the waveforms of multiple record intervals, choose **Tile Vertical** under **Graph/Sheet Layout** from the **Window** menu. To arrange the waveform graphs horizontally, choose **Tile Horizontally**.

- When cursor values, values of statistical computation over an area, and waveforms are printed



- When printing a list of numeric values

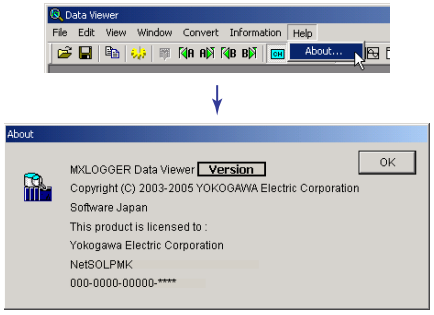
Data List [data-0045.mxs]　　1/35

時刻[No.]	CH00001 [mV]	CH00002 [mV]	CH00003 [mV]	CH00004 [mV]
2003/06/05 16:02:11.750[00000000]	+OVER	-OVER	-OVER	-OVER
2003/06/05 16:02:11.800[00000001]	+OVER	-OVER	-OVER	-OVER
2003/06/05 16:02:11.850[00000002]	+OVER	-OVER	-OVER	-OVER
2003/06/05 16:02:11.900[00000003]	+OVER	-OVER	-OVER	-OVER
2003/06/05 16:02:11.950[00000004]	+OVER	-OVER	-OVER	-OVER
2003/06/05 16:02:12.000[00000005]	+OVER	-OVER	-OVER	-OVER
2003/06/05 16:02:12.050[00000006]	+OVER	-OVER	-OVER	-OVER
2003/06/05 16:02:12.100[00000007]	+OVER	-OVER	-OVER	-OVER
2003/06/05 16:02:12.150[00000008]	+OVER	-OVER	-OVER	-OVER
2003/06/05 16:02:12.200[00000009]	+OVER	-OVER	-OVER	-OVER
2003/06/05 16:02:12.250[00000010]	+OVER	-OVER	-OVER	-OVER
2003/06/05 16:02:12.300[00000011]	+OVER	-OVER	-OVER	-OVER
2003/06/05 16:02:12.350[00000012]	+OVER	-OVER	-OVER	-OVER
2003/06/05 16:02:12.400[00000013]	+OVER	-OVER	-OVER	-OVER
2003/06/05 16:02:12.450[00000014]	+OVER	-OVER	-OVER	-OVER
2003/06/05 16:02:12.500[00000015]	+OVER	-OVER	-OVER	-OVER
2003/06/05 16:02:12.550[00000016]	+OVER	-OVER	-OVER	-OVER
2003/06/05 16:02:12.600[00000017]	+OVER	-OVER	-OVER	-OVER
2003/06/05 16:02:12.650[00000018]	+OVER	-OVER	-OVER	-OVER
2003/06/05 16:02:12.700[00000019]	+OVER	-OVER	-OVER	-OVER
2003/06/05 16:02:12.750[00000020]	+OVER	-OVER	-OVER	-OVER
2003/06/05 16:02:12.800[00000021]	+OVER	-OVER	-OVER	-OVER
2003/06/05 16:02:12.850[00000022]	+OVER	-OVER	-OVER	-OVER
2003/06/05 16:02:12.900[00000023]	+OVER	-OVER	-OVER	-OVER
2003/06/05 16:02:12.950[00000024]	+OVER	-OVER	-OVER	-OVER
2003/06/05 16:02:13.000[00000025]	+OVER	-OVER	-OVER	-OVER
2003/06/05 16:02:13.050[00000026]	+OVER	-OVER	-OVER	-OVER
2003/06/05 16:02:13.100[00000027]	+OVER	-OVER	-OVER	-OVER
2003/06/05 16:02:13.150[00000028]	+OVER	-OVER	-OVER	-OVER
2003/06/05 16:02:13.200[00000029]	+OVER	-OVER	-OVER	-OVER
2003/06/05 16:02:13.250[00000030]	+OVER	-OVER	-OVER	-OVER
2003/06/05 16:02:13.300[00000031]	+OVER	-OVER	-OVER	-OVER
2003/06/05 16:02:13.350[00000032]	+OVER	-OVER	-OVER	-OVER
2003/06/05 16:02:13.400[00000033]	+OVER	-OVER	-OVER	-OVER
2003/06/05 16:02:13.450[00000034]	+OVER	-OVER	-OVER	-OVER
2003/06/05 16:02:13.500[00000035]	+OVER	-OVER	-OVER	-OVER
2003/06/05 16:02:13.550[00000036]	+OVER	-OVER	-OVER	-OVER
2003/06/05 16:02:13.600[00000037]	+OVER	-OVER	-OVER	-OVER
2003/06/05 16:02:13.650[00000038]	+OVER	-OVER	-OVER	-OVER
2003/06/05 16:02:13.700[00000039]	+OVER	-OVER	-OVER	-OVER
2003/06/05 16:02:13.750[00000040]	+OVER	-OVER	-OVER	-OVER
2003/06/05 16:02:13.800[00000041]	+OVER	-OVER	-OVER	-OVER
2003/06/05 16:02:13.850[00000042]	+OVER	-OVER	-OVER	-OVER
2003/06/05 16:02:13.900[00000043]	+OVER	-OVER	-OVER	-OVER
2003/06/05 16:02:13.950[00000044]	+OVER	-OVER	-OVER	-OVER
2003/06/05 16:02:14.000[00000045]	+OVER	-OVER	-OVER	-OVER
2003/06/05 16:02:14.050[00000046]	+OVER	-OVER	-OVER	-OVER
2003/06/05 16:02:14.100[00000047]	+OVER	-OVER	-OVER	-OVER
2003/06/05 16:02:14.150[00000048]	+OVER	-OVER	-OVER	-OVER
2003/06/05 16:02:14.200[00000049]	+OVER	-OVER	-OVER	-OVER
2003/06/05 16:02:14.250[00000050]	+OVER	-OVER	-OVER	-OVER
2003/06/05 16:02:14.300[00000051]	+OVER	-OVER	-OVER	-OVER
2003/06/05 16:02:14.350[00000052]	+OVER	-OVER	-OVER	-OVER
2003/06/05 16:02:14.400[00000053]	+OVER	-OVER	-OVER	-OVER
2003/06/05 16:02:14.450[00000054]	+OVER	-OVER	-OVER	-OVER
2003/06/05 16:02:14.500[00000055]	+OVER	-OVER	-OVER	-OVER

3.9 Displaying the Software Version and Other Information

Procedure

Click the About button on the toolbar or choose **About** from the **Help** menu.
A dialog box showing the version number and other information opens.



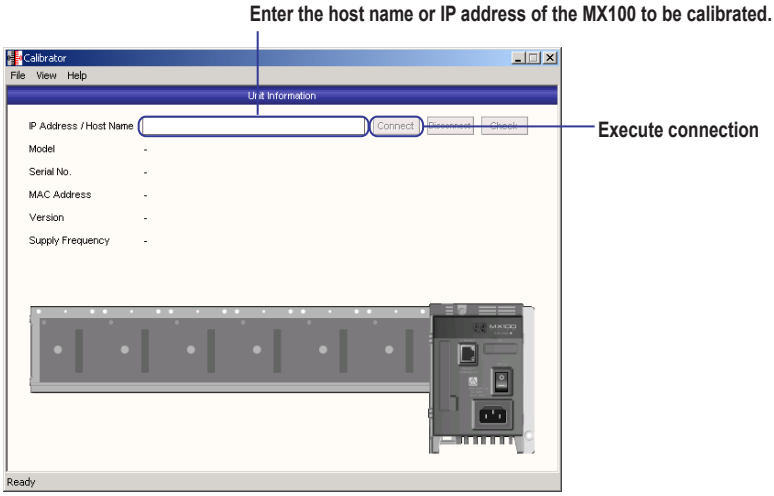
4.1 Connecting the MX100 Data Acquisition Unit

Notes on Using the Calibration Software

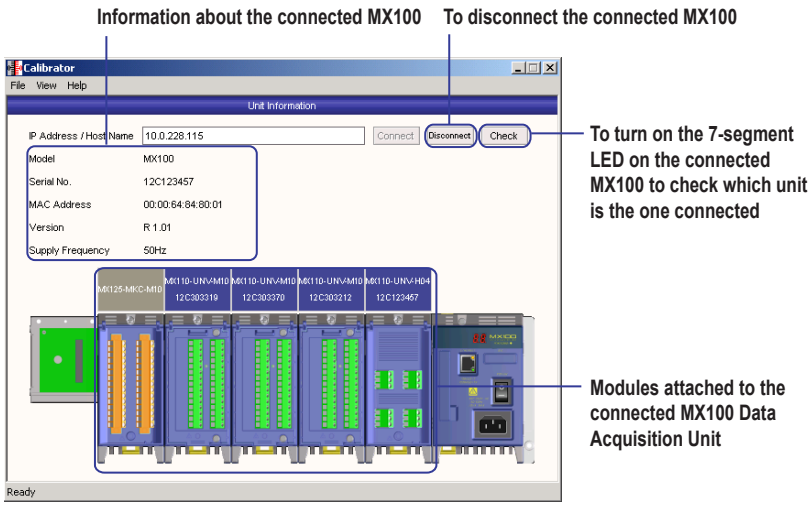
- If another user or another software program is connected to the MX100, drop the connection before connecting with the Calibration Software.
- If you change the module configuration before connecting with the Calibration Software, carry out system configuration on the Logger (see section 2.2, “Configuring the System”).
- When calibrating, do not perform other operations. Use extra caution in the operation, because the module may malfunction if you execute a wrong operation while calibration is in progress.

Procedure

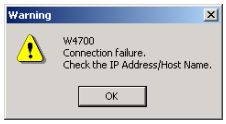
1. Start the Calibrator.
   The Unit Information window opens.
2. In the **IP Address/Host Name** box, enter the IP address or host name of the MX100 to be calibrated.
3. Click **Connect**.



When the connection is established, information about the unit’s module configuration is displayed. If you click the Check button, the 7-segment LED on the main module of the connected unit shows the text “—CALL—” flowing from right to left.

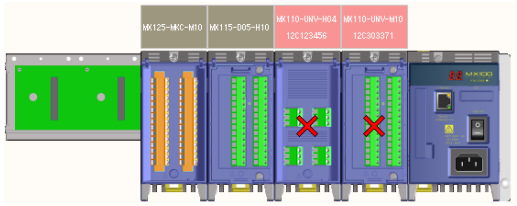


If the specified IP address or host name is not correct, or the MX100 is connected by another software program, the following dialog box opens.



Note

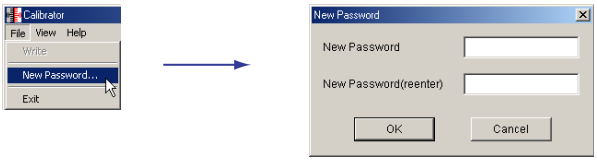
- The Calibrator cannot be used to change the MX100 network settings (such as the IP address). Use the Logger for this purpose.
- If you change the module configuration before connecting with the Calibrator or if modules that are not operating properly exist, X marks are displayed on the modules as shown below. If you change the module configuration, reconfigure the system.



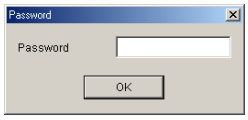
When Setting a Password for Startup

You can use the following procedure to set the Calibrator up so that it prompt the user to enter a password upon startup.

1. From the **File** menu, click **Set Password**.
   The New Password dialog box opens.



2. Click the New Password box, and enter a password.
   There are no restrictions on the characters that can be used in the password. You can enter up to 30 characters for the password.
3. Enter the same password in the **Confirm New Password** box, then click **OK**.
   If you restart the Calibrator, a password confirmation dialog box opens. If you enter a wrong password and click OK, a dialog box with the message “The password is wrong.” opens. Click OK to close the Calibrator.



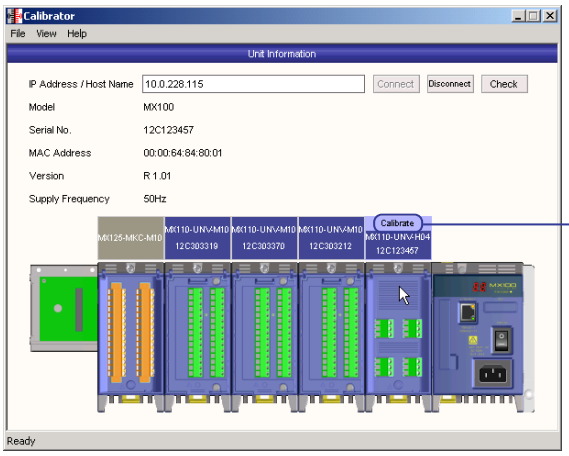
Note

To set up the Calibrator so that no password dialog box is displayed, open the password setting dialog box, make sure the entry boxes are blank, and click **OK**. There are no other means of clearing the password. Be sure not to forget the password.

4.2 Calibration Procedure

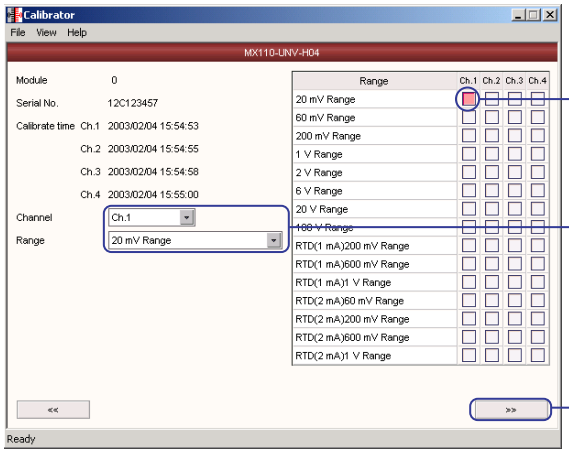
Procedure

1. Click the illustration of the universal input module that you wish to calibrate.



Moving the cursor over an input module that can be calibrated shows the word "Calibrate"

2. On the calibration detail setup screen that appears, select the channel and measurement range to be calibrated and click the >> button.
   The figure below is an example of the 4-CH, High-Speed Universal Input Module.

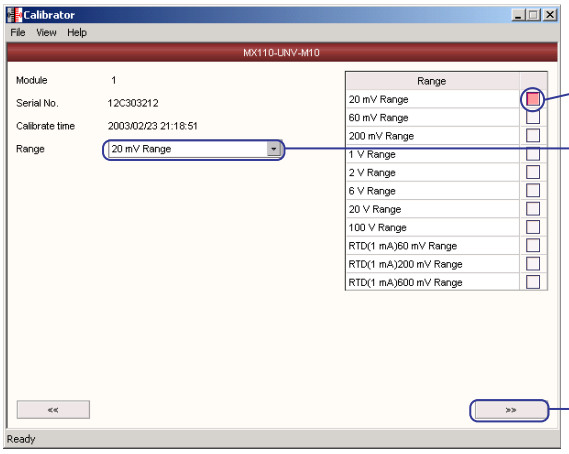


Items to be calibrated
You can also click to select

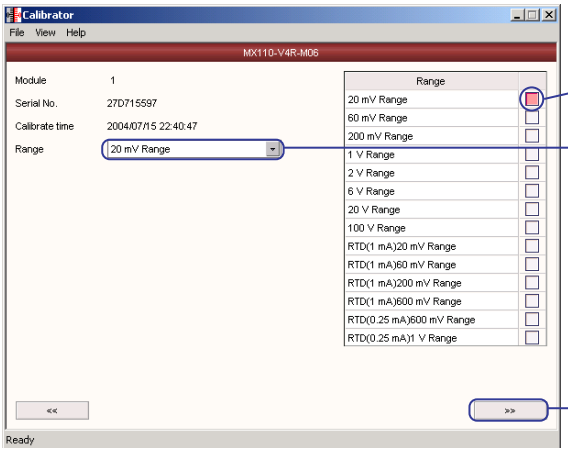
Select the channel and the measurement range to be calibrated from the list

To move to the calibration execution screen 1

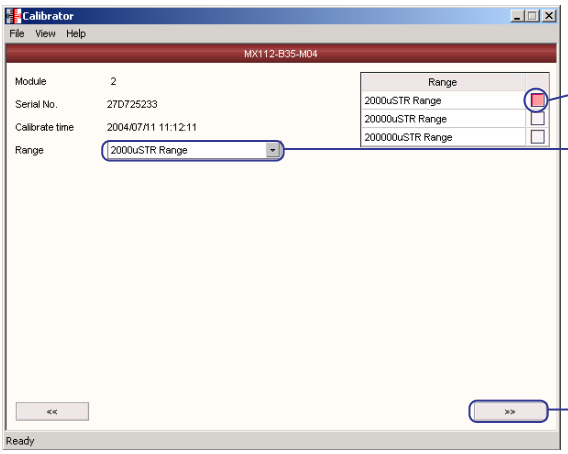
The figure below is an example of the 10-CH, Medium-Speed Universal Input Module. Channels are not selected.



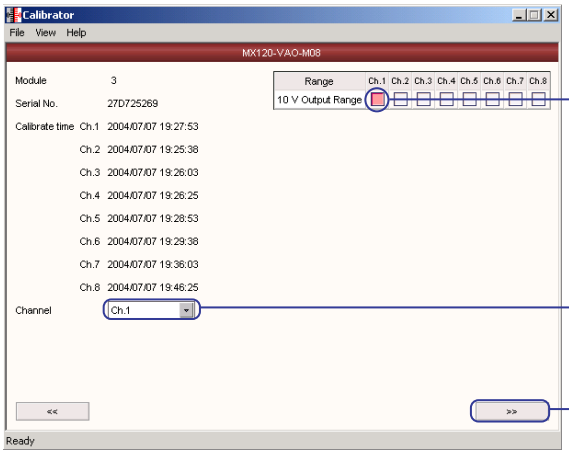
The figure below is an example of the 6-Channel, Medium-Speed, Four-Wire RTD Resistance Input Module. Channels are not selected.



The figure below is an example of the 4-CH, Medium-Speed Strain Input Module. Channels are not selected.



The figure below is an example of the 8-CH, Medium-Speed Analog Output Module. A range is not selected.

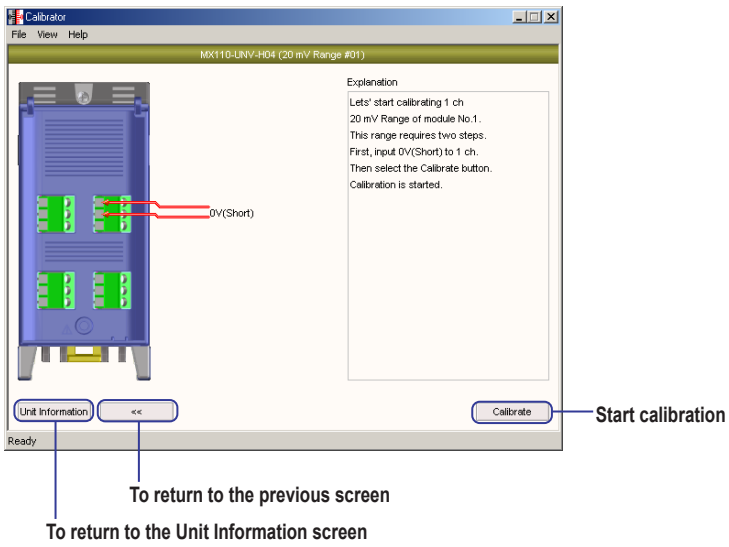


Items to be calibrated
You can also click to select

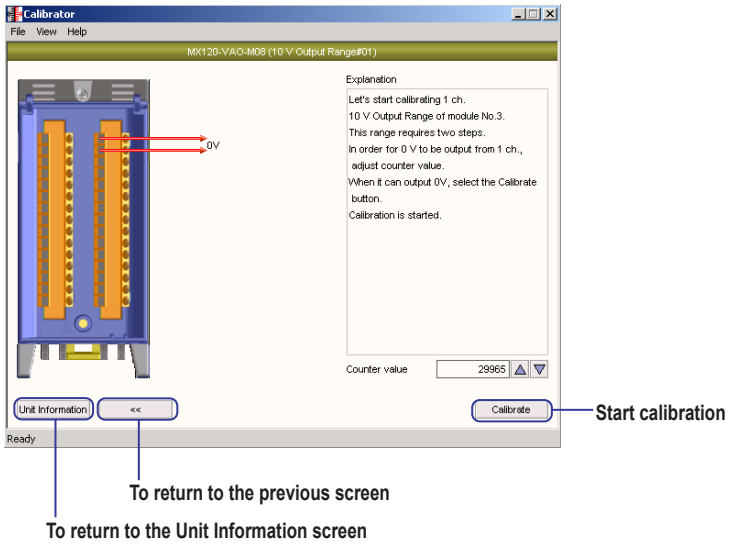
Select the measurement range to be calibrated from the list

To move to the calibration execution screen 1

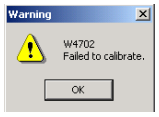
3. After making the connections according to the explanation given on the calibration execution screen 1, click the **Calibrate** button.
   The figure below is an example of the 4-CH, High-Speed Universal Input Module.



   The figure below is an example of the 8-CH, Medium-Speed Analog Output Module.



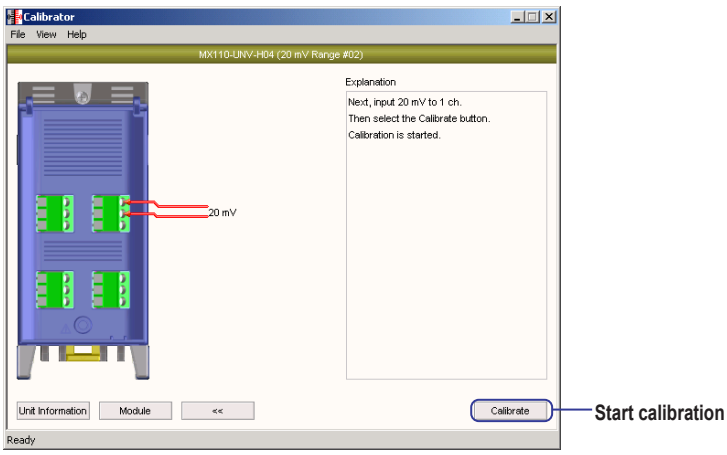
   When you click the Calibrate button, a message “Please wait and do not perform any other operation.” appears.
   When the calibration completes successfully, the calibration execution screen 2 appears.
   If the calibration fails, a message “Failed to calibrate.” appears.



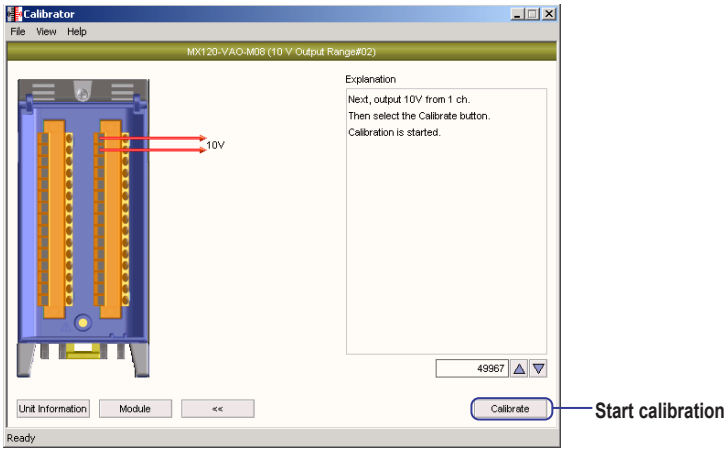
Note

For a description of the accuracy of the connected input module, the calibration accuracy, and the environmental conditions for calibration, see the MX100 Data Acquisition Unit User’s Manual.

4. After making the connections according to the explanation given on the calibration execution screen 2, click the **Calibrate** button.
   The figure below is an example of the 4-CH, High-Speed Universal Input Module.



   The figure below is an example of the 8-CH, Medium-Speed Analog Output Module.



   When you click the Calibrate button, a message “Please wait and do not perform any other operation.” appears.

5. Repeat steps 1 to 4 until all calibrations are completed.

6. From the **File** menu, choose **Write**.
   The calibration values are written to the input module.

Note

During calibration, do not perform any other operations (particularly turning OFF the MX100 or dropping the connection). Doing so may cause the MX100 to malfunction.

Explanation

Calibrated Parameters

- 4-CH, High-Speed Universal Input Module (MX110-UNV-H04)

Measurement Range to Be Calibrated	Input Value 1	Input Value 2
20 mV	0 mV	20 mV
60 mV	0 mV	60 mV
200 mV	0 mV	200 mV
1 V	0 V	1 V
2 V	0 V	2 V
6 V	0 V	6 V
20 V	0 V	20 V
100 V	0 V	100 V
RTD (1 mA) 200 mV	0 Ω	200 Ω
RTD (1 mA) 600 mV	0 Ω	300 Ω
RTD (1 mA) 1 V	0 Ω	500 Ω
RTD (2 mA) 60 mV	0 Ω	30 Ω
RTD (2 mA) 200 mV	0 Ω	100 Ω
RTD (2 mA) 600 mV	0 Ω	300 Ω
RTD (2 mA) 1 V	0 Ω	250 Ω

- 10-CH, Medium-Speed Universal Input Module (MX110-UNV-M10)

Measurement Range to Be Calibrated	Input Value 1	Input Value 2
20 mV	0 mV on Ch1	20 mV on Ch2
60 mV	0 mV on Ch1	60 mV on Ch2
200 mV	0 mV on Ch1	200 mV on Ch2
1 V	0 V on Ch1	1 V on Ch2
2 V	0 V on Ch1	2 V on Ch2
6 V	0 V on Ch1	6 V on Ch2
20 V	0 V on Ch1	20 V on Ch2
100 V	0 V on Ch1	100 V on Ch2
RTD (1 mA) 60 mV	0 Ω on Ch3	60 Ω on Ch6
RTD (1 mA) 200 mV	0 Ω on Ch3	200 Ω on Ch4
RTD (1 mA) 600 mV	0 Ω on Ch3	300 Ω on Ch5

- Six-Channel, Medium-Speed Four-Wire RTD Resistance Input Module (MX110-V4R-M06)

Measurement Range to Be Calibrated	Input Value 1	Input Value 2
20 mV	0 mV on Ch1	20 mV on Ch2
60 mV	0 mV on Ch1	60 mV on Ch2
200 mV	0 mV on Ch1	200 mV on Ch2
1 V	0 V on Ch1	1 V on Ch2
2 V	0 V on Ch1	2 V on Ch2
6 V	0 V on Ch1	6 V on Ch2
20 V	0 V on Ch1	20 V on Ch2
100 V	0 V on Ch1	100 V on Ch2
RTD (1 mA) 20 mV	0 Ω on Ch3	20 Ω on Ch4
RTD (1 mA) 60 mV	0 Ω on Ch3	60 Ω on Ch5
RTD (1 mA) 200 mV	0 Ω on Ch3	200 Ω on Ch6
RTD (1 mA) 600 mV	0 Ω on Ch3	300 Ω on Ch4
RTD (0.25 mA) 600 mV	0 Ω on Ch3	2400 Ω on Ch5
RTD (0.25 mA) 1 V	0 Ω on Ch3	3000 Ω on Ch6

- 4-CH, Medium-Speed Strain Input Module (MX112-B12-M04, MX112-B35-M04, MX112-NDI-M04)

Measurement Range to Be Calibrated	Connect1	Connect2
2000 µSTR (strain)	120.000 Ω on Ch2	117.154 Ω on Ch2
20000 µSTR (strain)	120.000 Ω on Ch2	113.010 Ω on Ch2
200000 µSTR (strain)	120.000 Ω on Ch2	80,000 Ω on Ch2

Use a 4-gauge method connection when performing calibration. For information on this connection, see section 2.4 of the MX100 Data Acquisition Unit User's Manual (IM MX100-01E).

- 8-CH, Medium-Speed Analog Output Module (MX120-VAO-M08)
Adjust so that all channels output 0 V and 10 V. This differs from other input modules.

Range to Be Calibrated	Output val. 1	Output val. 2
10 V	0 V	10 V

Note

For a description of the measurement range and accuracy of each input module, see sections 4.4 and 4.5 in the MX100 Data Acquisition Unit User's Manual (IM MX100-01E).

5.1 Troubleshooting

If servicing is necessary, or if the instrument is not operating correctly after performing the corrective actions below, contact your nearest YOKOGAWA dealer for repairs.

The 7-segment LED does not illuminate.

Probable Cause	Corrective Action	Reference Page
The power switch is not ON.	Turn ON the power switch.	*
The supply voltage is too low.	Check whether the voltage is within the supply voltage rating range.	*
The fuse is blown.	Servicing required.	-
The power supply is broken.	Servicing required.	-

* See the *MX100 User's Manual (IM MX100-01E).*

The 7-segment LED blinks repeatedly.

Probable Cause	Corrective Action	Reference Page
The power supply is shorted inside the input/output module.	Remove the module one by one and determine which module is broken. (Servicing required.)	*
The power supply is shorted inside the main module.	Replace the main module. (Servicing required.)	*

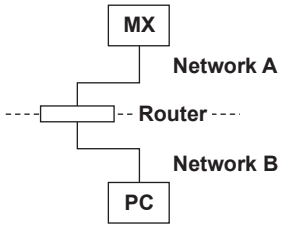
* See the *MX100 Data Acquisition Unit User's Manual (IM MX100-01E).*

After power up, the 7-segment LED displays something other than "00"(when the unit number is 00).

Probable Cause	Corrective Action	Reference Page
The display is b* (where * is any character other than F) The dipswitch settings are not correct.	Turn OFF the power, remove the CF card, turn ON all dipswitches, and power up again. If the situation does not change, servicing required.	*
The display is bF. The dipswitch settings are not correct.	Powering up in setup reset mode. Turn OFF the power, turn ON all dipswitches, and power up again. Since all settings such as the IP address are initialized, reconfiguration is necessary.	2-3,2-4 *
The display is F* (where * is any character). Hardware error on the main module	Servicing required.	-
The display is E* (where * is any character). Hardware error on the input/output module.	The slot number is indicated by * in the n* display following the E* display. Remove the relevant module and power up again. The relevant module must be serviced.	*
The display is P0. Media (CF card) operation error.	Do not manipulate the CF card while it is being accessed.	*
The display is P1. Media (CF card) error.	Reformat the CF card or replace the CF card.	*
The display is P2. Format error.	Check whether the CF card is inserted correctly. Then, reformat the CF card or replace the card.	*
The display is P3. Insufficient free space	Delete the files on the CF card to free up some space.	-
The display is P4. Number of files over the limit	The number of created files exceeded the allowed amount. Stop the recording. Replace the CF card or delete files and restart.	*
The display is P5. Overwrite error in the data storage buffer	The time needed to store the file must be reduced. Delete unneeded data to increase the free space, or format the CF card.	*
The display is C1. Multiple TCP connections	Turn OFF the power and reconnect.	*

* See the *MX100 Data Acquisition Unit User's Manual (IM MX100-01E).*

The MX100 cannot be detected from the PC or cannot be detected with the Search button.

Probable Cause	Corrective Action	Reference Page
The LINK LED does not turn ON. The cable is broken.	Replace the Ethernet cable.	-
The LINK LED does not turn ON. There is a problem with the hub.	Check the hub's power supply. If it still does not work, replace the hub and check the hub's operation. Also, try to connect the MX100 using the 10-Mbps fixed mode.	-
The LINK LED does not turn ON. There is a problem with the PC.	Check whether the PC can connect to the network. Replace the PC's NIC.	-
The ACT LED does not turn ON. There is a problem in the connection between the hub and the MX100.	Check the hub's power supply. If it still does not work, replace the hub and check the hub's operation. Also, try to connect the MX100 using the 10-Mbps fixed mode.	*
The ACT LED does not turn ON. There is a problem with the PC.	Check whether the PC can connect to the network. Replace the PC's NIC.	-
There is a problem in the network configuration. The settings are not correct.	Check that the IP address, subnet mask, and default gateway settings of the PC correspond to the MX100 settings.	2-3, 2-4
There is a problem in the network configuration. The setting changes have not taken effect.	Turn OFF the power to the PC and the MX100, and carry out reconnection.	-
The PC and the MX100 are not in the same segment.	Connect the PC and the MX100 in the same network segment. If the PC and the MX100 are connected as shown in the following figure, the Search button cannot be used to detect teh MX100. However, you can make a connection manually by specifying the IP address.  	2-3, 2-4

* See the *MX100 Data Acquisition Unit User's Manual (IM MX100-01E).*

The MX100 is detected by clicking the Search button, but connection cannot be made.

Probable Cause	Corrective Action	Reference Page
The IP address is set to the default value. The default value cannot be used to make the connection.	Enter the correct IP address.	2-3, 2-4
There is a problem in the network configuration.	Check that the IP address, subnet mask, and default gateway settings of the PC and the MX100 settings are correct.	2-3, 2-4
Follow the rules for I/O on the PC software module style number, and release number	Check the PC software release number and main unit style number Upgrade to a later style. [PC software release no.] ≥ [main unit style no.] ≥ [module style no.]	*

* See the *MX100 User's Manual (IM MX100-01E).*

Six-Channel Four-Wire RTD resistance input module recognized as a 10-CH universal input module

Probable Cause	Corrective Action	Reference Page
The MX100 main unit style number remains at 1.	Upgrade to a later style.	**

** See the *MX100 Upgrade Kit user's manual (IM MX100-77).*

MX100 cannot be connected using the Calibrator

Probable Cause	Corrective Action	Reference Page
Attempting to make multiple connections. Another software program is already connected.	Exit all other software programs.	-

The connected input/output module is not detected.

Probable Cause	Corrective Action	Reference Page
Module connection or module startup error. Attached the module while the power was ON.	Turn OFF the power. Detach the input/output module once and attach it again.	*
Carried out an incorrect calibration.	Recalibrate.	4-1

* See the *MX100 User's Manual (IM MX100-01E).*

Alarms are not output.

Probable Cause	Corrective Action	Reference Page
There is a problem in the alarm setting.	Both the alarm and output relay must be set appropriately. Make the alarm and output relay settings appropriate.	2-37~2-42

Current is not output from the analog output module, and no output comes from the PWM output module.

Probable Cause	Corrective Action	Reference Page
External power supply required.	Connect an external power supply.	*

Transmission output is not output from the analog output module, nor from the PWM output module.

Probable Cause	Corrective Action	Reference Page
"Transmit not enabled" Enable it.	Enable it.	2-50

No output from the PWM output module

Probable Cause	Corrective Action	Reference Page
The output current limit (1A) has been exceeded. Turn OFF the external power supply, check the load, power cycle.	Once the limit is exceeded the protection circuit activates, and you must power cycle the external power supply or it will not recover.	-

No output from the PWM output module

Probable Cause	Corrective Action	Reference Page
The fuse is blown. (4A/module limit has been exceeded)	Servicing required.	-

The CF card is not detected.

Probable Cause	Corrective Action	Reference Page
There is a problem with the CF card.	Replace the CF card. Eject and format the CF card, then insert it again.	*

* See the *MX100 Data Acquisition Unit User's Manual (IM MX100-01E).*

The measured value is not correct.

Probable Cause	Corrective Action	Reference Page
The input wiring is not correct.	Check the input wiring.	*
The measured value is at +Over or –Over. The measurement range setting and input range do not match.	Change to an appropriate setting.	*
The temperature error is large or is unstable. The TC type setting and the type actually connected are different.	Change to the correct setting.	*
The temperature error is large or is unstable. The RJC setting is not correct.	Change to the correct setting.	*
The temperature error is large or is unstable. The wind is hitting the terminals.	Block the wind from hitting the terminals.	-
The temperature error is large or is unstable. The ambient temperature change is drastic.	Suppress changes in the ambient temperature such as by placing the MX100 in a box.	-
The temperature error is large or is unstable. There is an error in the wiring resistance (in the case of an RTD).	Match the thickness and length of the three wires.	*
The measurement error is large or is unstable. Noise effects.	Take measures against noise.	*
The measurement error is large or is unstable. Effects from the signal source resistance.	Reduce the signal source resistance such as by inserting a converter.	-
The temperature error is large or is unstable. Effects from parallel connections.	Stop parallel connections. Do not use the burnout setting.	-
Measured value from strain gauge type sensor not correct.	When using a sensor without a remote sensing wire, use the DV450-001 (conversion cable).	*
On the strain module (-B12, -B35), the gauge method dipswitch settings is not correct.	Enter the correct settings.	*
On the strain module (-B12, -B35), the gauge resistance and internal bridge resistance values are different.	Use a module that supports the resistance value of the strain gauge (120For 120Ω, -B12, and for 350Ω, -B35.)	*
On the strain module, scaling corresponding to the gauge method is not set. (for 2 gauge, 4 gauge methods, the amount of strain is doubled or quadrupled.)	Displayed with 1 gauge method conversion. Depending on the gauge method, set scaling appropriately.	*
On the strain module (-NDI), a strain gauge type sensor without a remote sensing wire is being used.	When using a sensor without a remote sensing wire, use the DV450-001 (conversion cable).	*

* See the *MX100 User's Manual (IM MX100-01E).*

5.2 Error Messages and Their Corrective Actions

Error Messages on the Logger

Message	Corrective Action/Description	Reference Page
Undetermined Directory.	The save destination of the record file cannot be found. Check whether the save destination exists.	2-11
In the channel setup, reference channels and reference channels exist that are inappropriate. Channels whose mode is set to RRJC Channels used for difference input Transmission AO channels Transmission PWM channels	Click No and change the settings of inappropriate channels. To disable the inappropriate channels, click Yes.	2-20 to 2-23
To balance strain channels, correct channels must be set. In the following channel settings, reference channels exist that are inappropriate. Channels used for difference input Transmission AO channels Transmission PWM channels	Click No and change the settings of inappropriate channels. To disable the inappropriate channels, click Yes.	2-20 to 2-23

Error Messages on the Viewer

Message	Corrective Action/Description	Reference Page
Channels of the specified recording interval do not exist.	Channels with the specified measurement interval do not exist in the conversion of the data format. Change to the correct setting.	3-24
Sampling data number is over the Viewer display limit of 5 M.	Attempting to load a file containing 5 million or more data points.	3-2
Converting operation exceeded the limitation of MS Excel.	Change the range to be converted so that it is within the allowed range of Excel.	3-25
Converting operation exceeded the limitation of Lotus 1-2-3.	Change the range to be converted so that it is within the allowed range of 1-2-3.	3-25
Can't read file.	The file cannot be loaded, or the file has been deleted.	3-2
Not an MX file.	Cannot load the file.	3-2
File write error.	The file cannot be created for some reason.	-
Insufficient memory. Please close at once.	Attempting to load multiple files containing close to five million data points. Insufficient free memory in the PC virtual memory. Set the size of the PC's virtual memory to 2 GB or more.	3-2

Error Messages on the Calibrator

Message	Corrective Action	Reference Page
Connection failure. Check the IP Address/Host Name.	To change the network settings such as the IP address, start the Logger.	2-3
Failed to write the calibrated value.	Recalibrate. If still displayed, service required.	4-3 to 4-7
Failed to calibrate.	Recalibrate. If still displayed, service required.	4-3 to 4-7

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