User's Manual

XL100
Portable Data Station

IM XL100E

Introduction

Thank you for purchasing our XL100 Portable Data Station.

This User's Manual describes the functions of the XL100 as well as its operating methods and handling precautions. Read this manual thoroughly before using the XL100, to ensure correct use.

In addition to this manual, the Quick Setup Manual and Communication Function Manual (contained in the CD-ROM as with this User's Manual) are available separately.

The Quick Setup Manual briefly describes the main functions and the basic procedures for performing such tasks as setup and measurement operations.

Use the Quick Setup Manual together with this in-depth User's Manual. For details on the communication functions, see the Communication Function Manual (contained in the same CD-ROM).

After reading this manual, keep it in an easily accessible place for later reference. This manual will come in handy when you are unsure of how to operate the product.

Notes

- The contents of this manual are subject to change without prior notice.
- Figures and illustrations representing display views in this manual may differ from actual views.
- Every effort has been made to ensure accuracy in the preparation of this manual. However, should any doubts arise or errors come to your attention, please contact the vendor from which you purchased the product.
- The contents of this manual may not be transcribed or reproduced, in part or in their entirety, without prior permission.

Trademark Acknowledgements

The company and product names referred to in this document are either trademarks or registered trademarks of their respective holders.
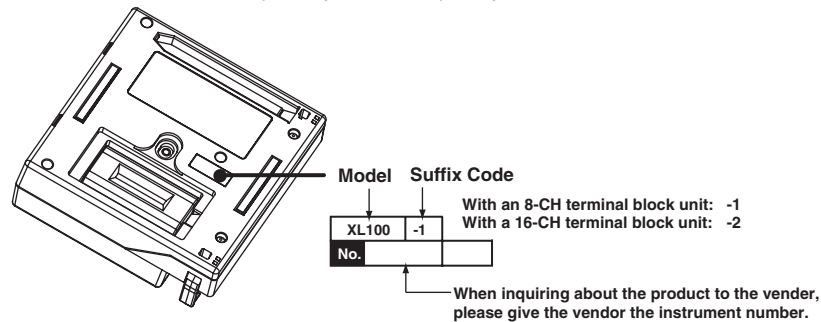
Revision Information

First Edition: October, 2005

Checking the Contents of the Package

After opening the package, be sure to check the product as instructed below before use. Should the product you have received be the wrong model, lack any items, or show any problems in its appearance, contact the vendor from whom you purchased the product.

Instrument Main Unit

Check the model and suffix code printed on the nameplate on the rear panel to ensure that the XL100 is exactly as specified in your purchase order.

Model **Suffix Code**

With an 8-CH terminal block unit: -1
With a 16-CH terminal block unit: -2

| XL100 | -1 |
| No. | |

When inquiring about the product to the vender, please give the vendor the instrument number.

Model and Suffix Codes

| Model	Suffix Code	Specifications
XL100	-1	With an 8-CH terminal block unit
	-2	With a 16-CH terminal block unit

Instrument Number

An instrument number is also printed on the nameplate. When inquiring about the product to the vender, please also give the vendor this number.

Accessories

Make sure that the package contains all the accessories listed below and that they are all free from any damage.

No.	Name	Part No.	Remarks
1	Terminal block unit	95050/95051	Comes with the 95050 and 95051 when the suffix code is -1 and -2, respectively.
2	Rubber boot	93036	For impact resistance
3	Side cover	–	
4	Screwdriver for terminals	–	
5	AC adapter	94010-D	UL/CSA standard
		-F	VDE standard
		-R	SAA standard
		-S	BS standard
		-H	GB standard
6	Quick Setup Manual	IM XL100P-E	
7	CD-ROM	–	Contains Standard Software and PDF manuals (User's Manual (this manual), Quick Setup Manual, and Communication Function Manual)
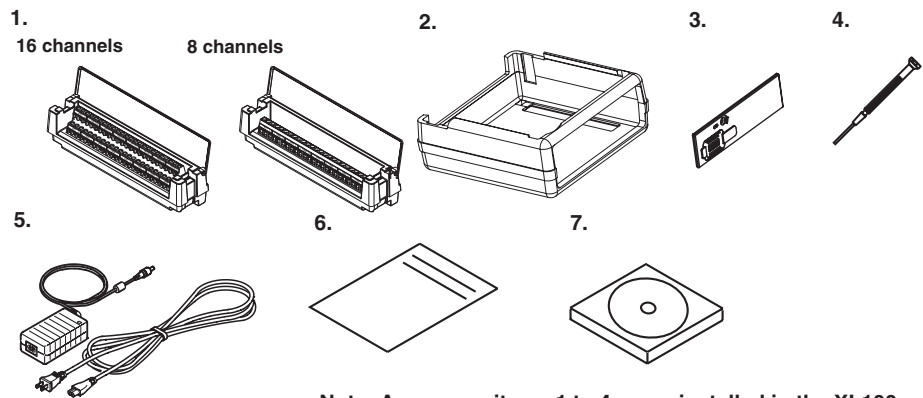
Note: Accessory items 1 to 4 come installed in the XL100.

Peripherals and Spare Parts (Optional)

The products listed below are available as optional peripherals and spare parts. For technical and ordering inquiries concerning peripherals and spare parts, contact the vendor from whom you purchased the product.

Peripherals

Name	Part No.	Remarks
Type-K TC	90060	5 m 4 sets
Carrying case	93037	For storing the XL100 and accessories
Lithium ion battery	94009	Voltage: 7.4 V. Capacity: 2400 mAh
Digital I/O cable	91029	For pulse input, logic input, and alarm output. Length: 3 m
Communication cable	91011	For RS-232 communication with a PC. Number of pins: 9 pins
Printer	97010	With 1 thermal paper roll and battery pack
AC adapter (for printer, Europe)	94006	
AC adapter (for printer, USA)	94007	
RS-232C cable	91010	For connecting the printer. Number of pins: 9 pins
Thermal paper for printer	97080	10 rolls

Spare Parts

Name	Part No.	Remarks
Terminal block unit (8ch)	95050	8 channel type
Terminal block unit (16ch)	95051	16 channel type
Rubber boot	93036	For impact resistance
AC adapter	94010-D	UL/CSA standard
	-F	VDE standard
	-R	SAA standard
	-S	BS standard
	-H	GB standard

TIP

It is advisable that the packing box be saved, as it is useful when you transport the product.

Safety Precautions

When operating the instrument, be sure to observe the cautionary notes given below to ensure correct and safe use of the instrument. If you use the instrument in any way other than as instructed in this manual, the instrument's protective measures may be impaired. Yokogawa Meters & Instruments Corporation is by no means liable for any damage resulting from use of the instrument in contradiction to these cautionary notes.
The following safety symbols are used on the instrument and in this manual.

Danger! Handle with Care. This symbol indicates that the operator must refer to an explanation in the User's Manual or Service Manual in order to avoid risk of injury or death of personnel or damage to the instrument.

This symbol indicates DC voltage/current.

This symbol indicates AC voltage/current.

This symbol indicates ON (power).

This symbol indicates OFF (power).

⚠ WARNING

Indicates a hazard that may result in the loss of life or serious injury of the user unless the described instruction is abided by.

⚠ CAUTION

Indicates a hazard that may result in an injury to the user and/or physical damage to the product or other equipment unless the described instruction is abided by.

⚠ Note

Indicates information that is essential for handling the instrument or, should be noted in order to familiarize yourself with the instrument's operating procedures and/or functions.

TIP
Indicates information that complements the present topic.

SEE ALSO
Indicates the reference location(s) for further information on the present topic.

Strictly observe the following cautionary notes in order to avoid the risk of injury or death of personnel or damage to the instrument due to hazards such as electrical shock.

⚠ **WARNING**

- **Do Not Remove the Case**

  Do not remove the case from the instrument or disassemble/modify the instrument.

  For inspection and/or adjustment of the internal assembly, contact the vendor from which you purchased the instrument.

- **Do Not Operate in an Explosive Atmosphere**

  Do not operate the instrument in a location where any flammable or explosive gas/vapor is present. It is extremely hazardous to operate it in such an atmosphere.

- **Use the Correct Power Supply**

  Before turning on the instrument, always make sure the voltage of the power source to be applied matches the instrument's supply voltage.

- **Unplug If Abnormal Behavior Occurs**

  If the instrument begins to emit smoke, becomes too hot, or gives off an unusual smell, immediately turn it OFF and disconnect the power cord from the outlet. Also turn off power to the object under measurement that is connected to the instrument's input terminals. Never attempt to use the instrument again. If any such anomalies as noted above occurs, contact the vendor from which you purchased the instrument.

  Do not attempt to repair the instrument yourself, as doing so is extremely dangerous.

- **Do Not Damage the Power Cord**
- **To prevent electric shock or fire, be sure to use the power cord supplied by YOKOGAWA.**
- **Do not place any load on the power cord or allow the power cord to come into contact with any heat source. When unplugging the power cord from the outlet, hold its plug, rather than holding and pulling the cord itself.**
- **If the power cord is damaged, contact the vendor from which you purchased the instrument.**

Contents

1

2

3

4

5

6

7

8

9

10

11

12

13

App

Index

Chapter 13 Specifications

Appendix

Index

1

2

3

4

5

6

7

8

9

10

11

12

13

App

Index

1

1.1   Overview of the XL100

The XL100 is a handheld data logger that (1) periodically samples DC voltage or analog input such as thermocouples and RTDs, (2) acquires the sampled measured data in the internal memory, and (3) displays the measured data on a LCD in the form of waveforms, digital display, and bar graphs. The measured data can also be saved to external storage media such as CF cards and SD cards. The saved data can be loaded into the XL100 to be displayed or displayed on a PC using the accompanying software program.
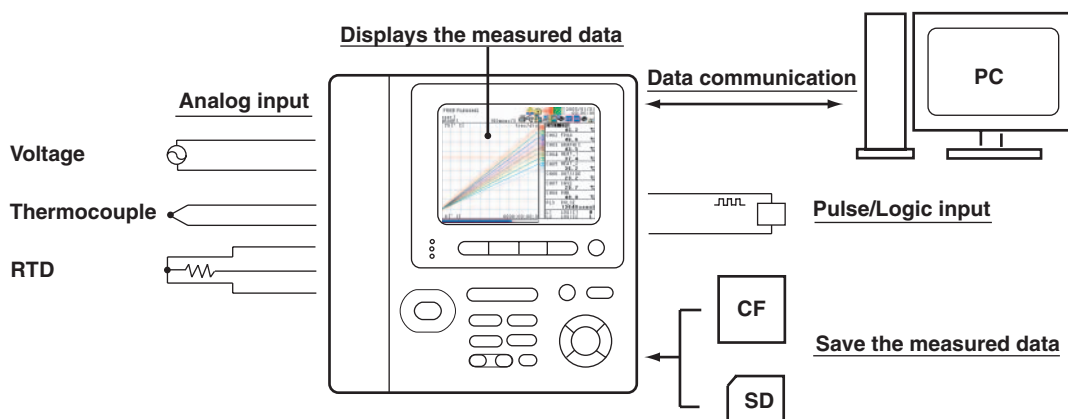
By using the Ethernet interface that comes standard with the XL100, the measured data can be automatically transmitted to a server on a network. The Ethernet interface can also be used to retrieve the measured data saved on the XL100 internal memory or an external storage medium into a PC on the network.
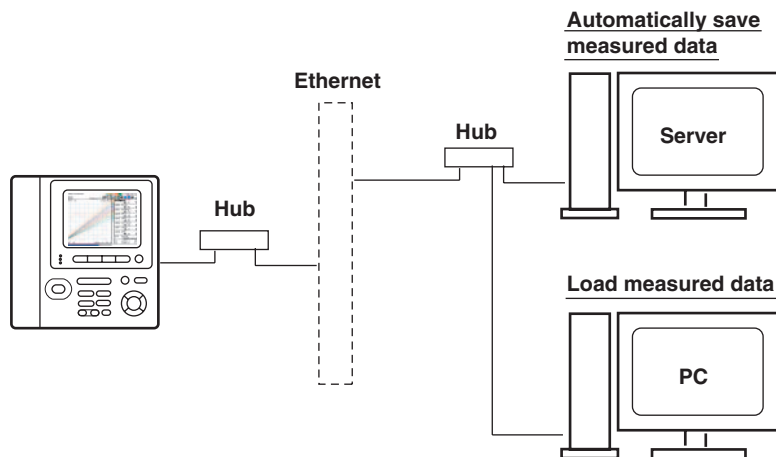
1.2 Functions of the Input Section

Number of Measurement Channels and Sampling Interval

There are two types of analog input terminals, 8 channels or 16 channels.

16 channels   **8 channels**
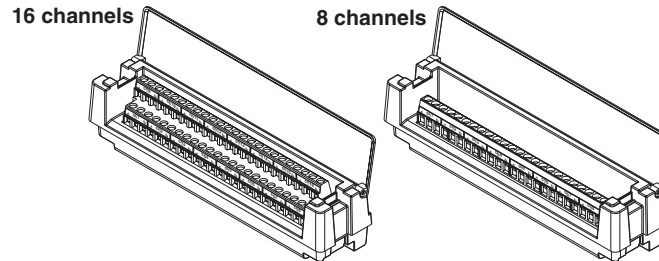
The sampling interval (scan interval and data storage interval) varies depending on the number of input channels as shown in the table below.

Number of Channels	ampling Interval
8	100, 200 ,500 ms, 1 , 2, 5, 10, 20, 30 s, 1, 2, 5, 10, 20 , 30 min, or 1 h
16	200 ,500 ms, 1 , 2, 5, 10, 20, 30 s, 1, 2, 5, 10, 20 , 30 min, or 1 h

Input Type and Calculation

As shown in the table below, the available input types are analog input, which includes DC voltage, thermocouple, and RTD, and other inputs, which consist of pulse signal (1 channel) and logic signals (2 channels). In addition, the difference between two inputs can be calculated and assigned to a calculation channel and displayed in the same fashion as measured values. The statistics of measured values can also be displayed.

Input/Calculation	Description
DC voltage	Measures a DC voltage in the range of ±100 mV to ±30 V.
Thermocouple	Selectable from the following types: R, S, B, K, E, J, T, N, W, L, and U.
RTD	Selectable from Pt100 and JPt100 types.
Pulse signal	Displays the pulse input as number of revolutions, integrated value, or instantaneous value.
Logic signal	Displays the logic waveform by taking input voltage less than or equal to 0.9 V to be OFF (0) and input voltage greater than or equal to 2.1 V to be ON (1).
Difference calculation	When the input type is set to DC voltage, thermocouple, RTD, or pulse input, the value obtained by subtracting the measured value of another channel from the input signal of the channel set to calculate the difference is displayed as the measured value of that channel.
Statistical calculation	Calculates and displays the maximum, minimum, average, peak (P-P), or rms value of the measured value.

Input Range and Measurable Range

Set the input range or type for analog inputs (DC voltage, thermocouple, and RTD) and set the measurable range for a pulse signal digital input.

- DC voltage

  Select from the input ranges listed in the following table.

Input Range	Measurable Range	Maximum Display Resolution
100 mV	−100.00 to 100.00 mV	10 μV
500 mV	−500.0 to 500.0 mV	100 μV
1 V	−1.0000 to 1.0000 V	100 μV
5 V	−5.000 to 5.000 V	1 mV
10 V	−10.000 to 10.000 V	1 mV
30 V	−30.00 to 30.00 V	10 mV
1-5V/f.s.	1.000 to 5.000 V	1 mV

f.s.: measurable range

- Thermocouple or RTD
  Select from the thermocouple types or RTD types listed in the following table.

Input Type	Type	Measurable Range
Thermocouple	**R**	**0 to 1768 °C**
	S	**0 to 1768 °C**
	B	**600 to 1800 °C**
	K	**−200.0 to 1372.0 °C**
	E	**−200.0 to 1000.0 °C**
	J	**−200.0 to 1200.0 °C**
	T	**−200.0 to 400.0 °C**
	N	**−200.0 to 1300.0 °C**
	W	**0 to 2315 °C**
	L	**−200.0 to 900.0 °C**
	U	**−200.0 to 400.0 °C**
RTD	**Pt100**	**−200.0 to 850.0 °C**
	JPt100	**−200.0 to 500.0 °C**

- Pulse Signal
  Measures the following items on the rising edge (from low to high) of the input pulse.
  - Pulse (instantaneous value): Counts and displays the number of pulses per sampling interval.
  - Pulse (integrated value):   Sums and displays the number of pulses per sampling interval from the start of the logging operation.
  - Number of revolutions: Counts the number of pulses per second, converts the number to number of revolutions, and displays the result.

Input Type	Range	Maximum Number of Input Pulses
Pulse (instantaneous value)	None	50 k/sampling interval
Pulse (integrated value)	50 kc/f.s. 500 kc/f.s. 5 Mc/f.s. 50 Mc/f.s. 500 Mc/f.s.	50 k/sampling interval
Number of revolutions	500 rpm/f.s. 5 krpm/f.s. 50 krpm/f.s. 500 krpm/f.s.	50 k/sec

f.s.: measurable range

- Logic Signal
  Fixed as follows:
  Low: 0.9 V or less or shorting of the input terminal
  High: 2.1 V or more or opening of the input terminal

Scaling

For DC voltage, thermocouple, RTD and pulse input, the measured values can be scaled to a value in the appropriate unit and displayed. Set the upper and lower limits of the input's display span, the upper and lower limits after scaling, and the unit.

Burnout

When measuring temperature using a thermocouple and the thermocouple burns out, the measured result is fixed to positive over range (shown as "+*****").

Reference Junction Compensation (RJC)
When measuring temperature with a thermocouple, the XL100 uses its internal reference junction compensation function.

Average Function
The average function performs moving average defined by the equation below on the measured data to suppress the effects of noise riding on the signal. Use this function when the displayed values of the measured data are fluctuating and difficult to read.

$D_n = (M_{n-(m-1)} + ... M_{n-2} + M_{n-1} + M_n)/m$

D_n: Displayed value obtained by linearly averaging m points of numeric data from the $n-(m-1)^{th}$ to n^{th} time

$M_{n-(m-1)}$:   Numeric data of the $n-(m-1)^{th}$ time

•••

M_{n-2}:   Numeric data of the $n-2^{th}$ time

M_{n-1}:   Numeric data of the $n-1^{th}$ time

M_n: Numeric data of the nth time

m: Average count (select 1, 2, 5, 10, or 20)

1.3   Display Function

Display

The XL100 is equipped with a 3.5-inch color LCD monitor (320 dots horizontal × 240 dots vertical). The screen consists of the status display section and the data display section.

• Status Display Section

Displays the screen name, date/time, internal memory and external storage media usage, communication condition, operation mode, alarm occurrence, key lock, user name (key login function), calculation, power condition, etc.

• Data Display Section

Displays the waveform display, digital display, bar graph display as well as alarm, log, and file information of the measured/calculated data. Displays the setting menu and settings when configuring the functions of the XL100.
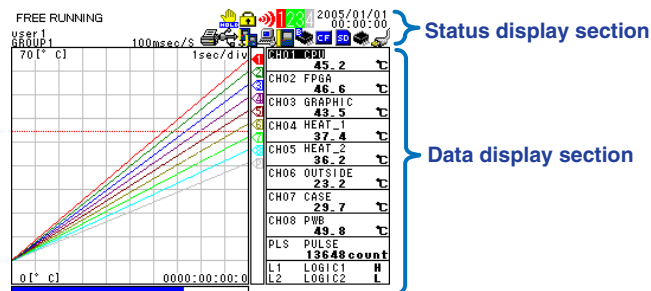
Operation Mode and Display

As shown in the figure below, the XL100 has six operation modes: (1) Free Running Mode in which instantaneous values are measured, (2) Logging Mode in which continuous measurement is performed by setting the start and end of data saving, (3) Logging & Review Mode in which past measured data can be viewed during continuous measurement, (4) Review Mode in which saved data is analyzed, (5) File Operation Mode in which file operations such as saving and loading of the setup data is performed, and (6) Setting Mode in which various settings such as the measurement conditions are specified. The displayed contents vary depending on the operation mode.
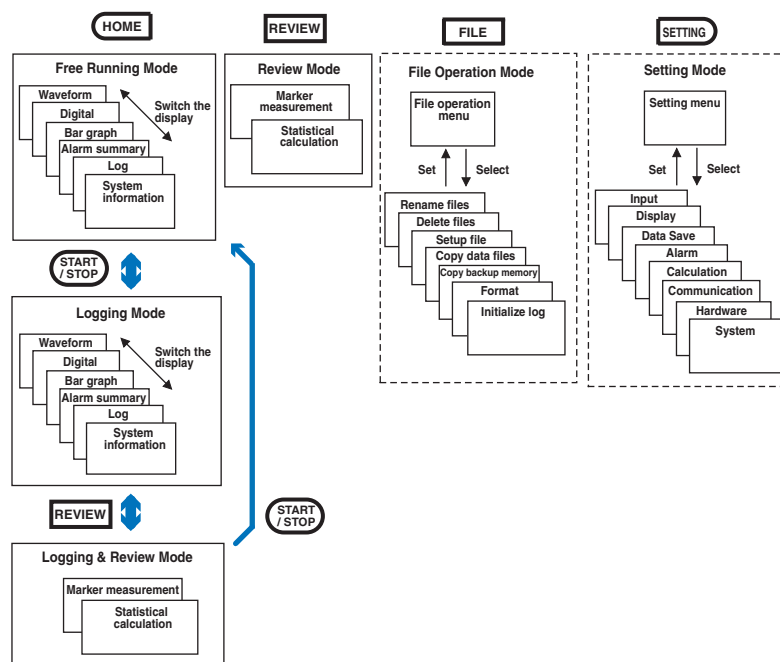
The displays shown below are available. For a description of the displayed contents, see section 2.3, "Data Display" and 2.4, "Setup Display."
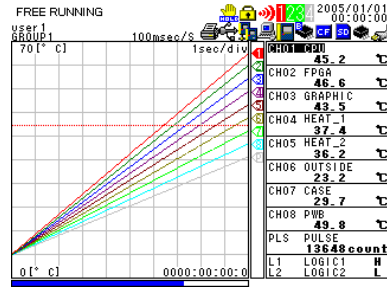
- Waveform & Digital Display
- Digital Display
- Bar Graph Display
- Review display
- Logging & Review Display
- Alarm Summary Display
- Log (Error) Display
- Log (Key Login/Logout) Display
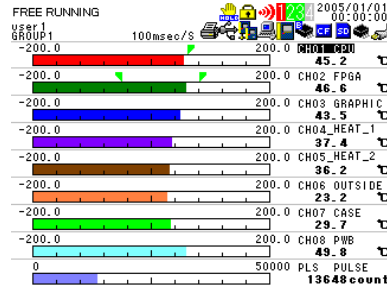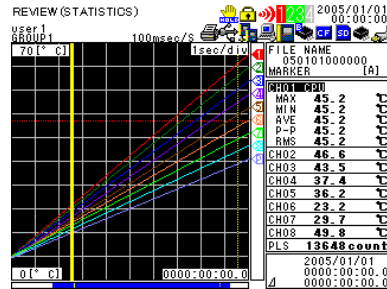
• Log (Communication Command) Display

COM. COMMAND LOG   2005/01/01 00:00:00
uurl
GROUP1

| 02/02 | Date | ID | I/O | Message |

2005/01/01 00:00:00 01 > xxxx
2005/01/01 00:00:00 01 > xxxxxxxxx

• Log (FTP Client) Display

FILE TRANSFER LOG   2005/01/01 00:00:00
uurl
GROUP1

| 02/02 | Date | Err.No. | Err.code | Flag | File name |

2005/01/01 00:00:00 100 HOSTNAME P xxxxxxxx. SET
2005/01/01 00:00:00 100 HOSTNAME S xxxxxxxxxx. LOG

• Log (Web Operation) Display

WEB OPERATION LOG   2005/01/01 00:00:00
uurl
GROUP1

| 02/02 | Date | Request | No. | Parameter |

2005/01/01 00:00:00 Key operation DOWN
2005/01/01 00:00:00 Message 200 start

• Log (E-mail Transmission) Display

EMAIL TRANSMISSION LOG   2005/01/01 00:00:00
uurl
GROUP1

| 03/03 | Date | Type | No. | Recipient/error |

2005/01/01 00:00:00 Alarm 300
2005/01/01 00:00:00 Alarm 1+2 H
2005/01/01 00:00:00 Alarm 1 WIN

• File Operation Screen

FILE   2005/09/30 09:54:09

LOAD FILE
RENAME FILES
DELETE FILES
SETUP FILE
COPY DATA FILES
COPY BACKUP MEMORY
FORMAT
INITIALIZE LOG

Rename a file

• Setup Display

SETTING   2005/09/30 09:54:19

INPUT
DISPLAY
DATA SAVE
ALARM
CALCULATION
COMMUNICATION
HARDWARE
SYSTEM

Set the range, span, and so forth for the
analog, pulse, and logic input.

Group Display

On the waveform display, digital display, and bar graph display, the data of up to eight channels can be shown on a single screen. The eight channels can consist of a combination of analog input channels (hereafter referred to as "measurement channels"), calculation channels (see section 1.6, "Calculation Function), and communication channels (see section 1.8, "Communication Function). You can assign the measurement channels, calculation channels, and communication channels to four groups and switch the displayed group to show the data of 32 channels.
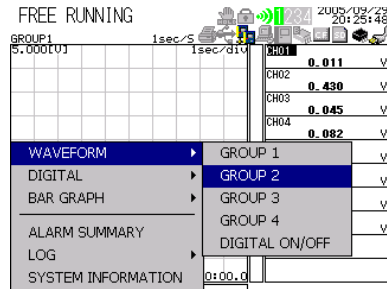
Tag Display

You can assign easily identifiable tags (using up to eight characters) to channels and display them along with the channel numbers.
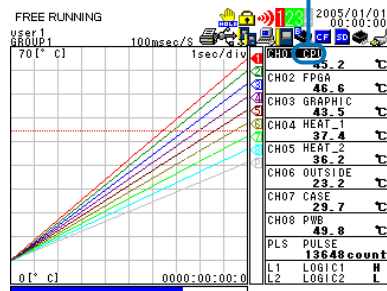
1.4   Alarm Function

This function generates an alarm when the measured/calculated value meets a certain condition. When an alarm occurs, information notifying the alarm occurrence is displayed on the screen. In addition, an alarm signal can be delivered from the output terminal (digital I/O connector) on the rear panel of the XL100.

Number of Alarms

An alarm can be set for each channel.

Alarm Conditions

You can select from the conditions given in the following table.

Input Type	Setting	Alarm Condition
Level	OFF	Not set alarm conditions.
or	Hi Pulse	An alarm occurs when the measured/calculated value is greater than or equal to the alarm value.
	Lo	An alarm occurs when the measured/calculated value is less than or equal to the alarm value.
	Window IN	An alarm occurs when the measured/calculated value is within the lower limits and upper limits of the alarm range.
	Window OUT	An alarm occurs when the measured/calculated value is outside the lower limits and upper limits of the alarm range.
Logic	X	Not set alarm conditions.
	Hi	An alarm occurs when the logic input changes from low to high.
	Lo	An alarm occurs when the logic input changes from high to low.
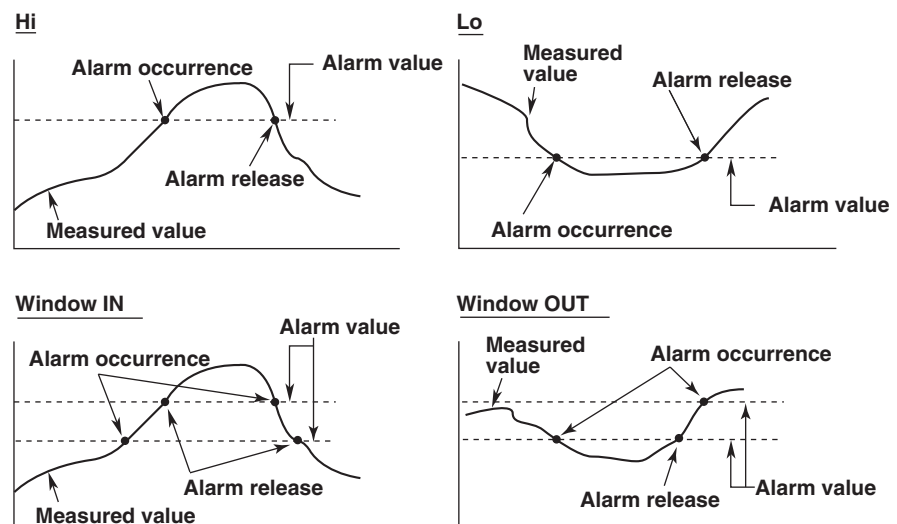
Alarm Display

On the display, an alarm icon is shown in the status display section, and the alarm status is shown in the data display section such as the waveform, digital, and bar graph displays. In addition, the details of the alarm are shown on the alarm summary display. There are two methods for displaying alarms. One method is to clear the alarm display when the cause of the alarm is no longer met (non-hold display). The other method is to keep displaying the alarm until the alarm acknowledge operation is carried out (hold display).

Delay Alarm

An alarm occurs when the measured/calculated value remains above or below the alarm value for a specified time period (delay period).

In the figure below, the measured value exceeds the alarm value during period T1, but no alarm is generated, because the condition does not last longer than the specified delay period T. At time X2, the input exceeds the alarm value. However, no alarm is generated, because the delay period has not elapsed. An alarm occurs at time X3 when the delay period elapses.
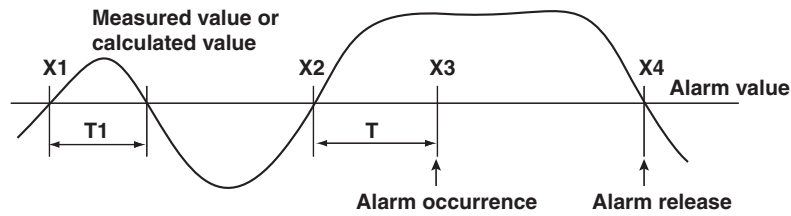
Alarm Hysteresis

A width (hysteresis) can be specified to the values for activating and releasing the alarm. Alarm hysteresis prevents frequent activation and release of alarms when the measured/calculated value is unstable around the alarm value. The hysteresis is fixed to 0.5% of the display span (display scale width if the range is set to scale).
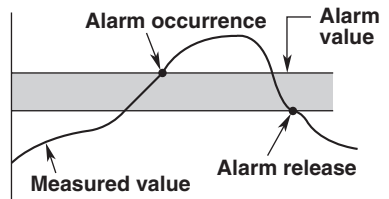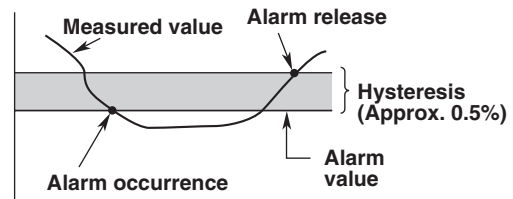
AND/OR of Alarm Output

When a single alarm output is shared among multiple alarms, you can select either of the conditions below for activating the alarm output.

AND: Activated when all assigned alarms are occurring simultaneously.

OR: Activated when any of the specified alarms is occurring.

Hold/Non-Hold of Alarm Output

The method of clearing the alarm output from an alarm generated condition can be set to either of the following settings.

Non-hold: Turn the output OFF when the alarm is cleared.

Hold: Hold the output ON until the alarm acknowledge operation is carried out.

Hold/Non-Hold of Alarm Display

The method of clearing the alarm display from an alarm generated condition can be set to either of the following settings.

Non-hold: Clear the alarm display when the alarm is cleared.

Hold: Hold the alarm display until the alarm acknowledge operation is carried out.

Alarm Buzzer

A buzzer can be sounded when an alarm occurs.

Alarm Search

By using alarm markers in Review Mode, alarms can be searched on the review display.

1.5   Data Save/Load Function and File Operation Function

Measured data, calculated data, setup data, and so forth can be saved to the XL100 internal memory or an external storage medium (CF card or SD card) that is inserted in the XL100
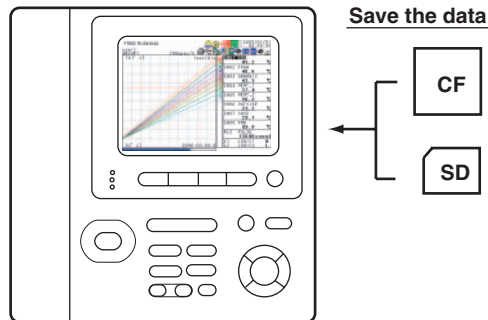
Types of Data That Can Be Saved

Type	Description
Logging data	The instantaneous values of the measured/calculated data can be saved at a specified sampling interval in Logging Mode. The data save operation is started or stopped with the START/STOP key. The save operation can also be started or stopped when a specific event (trigger) occurs. The logging data contains alarm information. Data format: Binary or ASCII
Manual sample data	The measured/calculated data (instantaneous values) of all channels can be saved by pressing the SAVE key in Free Running Mode. Data format: Binary or ASCII
Alarm data	The same information as the alarm summary display can be saved by pressing the SAVE key during alarm summary display. Data format: ASCII
Screen image data	The image data of the screen being displayed can be saved by pressing the SAVE key in Free Running Mode, etc. Data format: BMP
Setup data	The setup data of the XL100 can be saved in File Operation mode. Data format: ASCII
Log data	The same information as the log display can be saved by pressing the SAVE key during log data display. Data format: ASCII
Backup file	If the data save operation is not carried out normally to the internal memory or external storage medium (CF card or SD card), the data is saved to the backup memory of the XL100. The saved data can be copied to an external storage medium. Data format: Same format as the logging data

Triggers

In addition to using the keys to start or stop the logging (data save operation), a trigger for starting (or stopping) the save operation of the logging data (measured/calculated data) can be configured for automatic operation.

The trigger can be selected from the list below and configured. If multiple trigger conditions are selected, the data save operation starts (or stops) when any of the trigger conditions is met.

Type		Description
None		Not set trigger conditions.
External		A trigger is activated by applying a signal to the external trigger input terminal.
Level	High limit	A trigger is activated when the measured value is greater than or equal to the specified value.
	Lower limit	A trigger is activated when the measured value is less than or equal to the specified value.
	Window IN	A trigger is activated when the measured value is within the specified lower and high limits.
	Window OUT	A trigger is activated when the measured value is outside the specified lower and high limits.
Alarm		A trigger is activated when any of the alarms occur.
Time		A trigger is activated at the specified time.
Timer		The time at which the data save operation is stopped can be specified. Logging is stopped after the specified time elapses.

The XL100 has a pre-trigger function that saves data before a trigger is activated and a trigger delay function that starts the data save operation the specified number of samples after a trigger is activated.

In addition, you can select single-shot trigger that saves data once to a file when a trigger is activated or continuous trigger that saves data to a new file each time a trigger is activated.

File Operations

The following file operations are available.

Function	Description
Rename	Renames files saved on an external storage medium (CF card or SD card) internal memory, or setting memory.
Save setup data	Saves setting data to an external storage medium (CF card or SD card) or setting memory.
Load setup data	Loads the setting data saved on an external storage medium (CF card or SD card) or setting memory and changes the settings.
Copy data	Copies the files saved to the internal memory to an external storage medium (CF card, SD card, or USB memory).
Copy backup memory	Copies the files saved to the backup memory (memory to which data is saved when data cannot be saved to an external storage medium or internal memory) to an external storage medium (CF card or SD card).
Format	Formats an external storage medium (CF card or SD card), internal memory, or backup memory.
Initialize log	Clears all log data.

TIP

The XL100 has three types of memories, an internal memory for saving measured data, a setting memory for saving setting data, and backup memory for saving measured data when the measured data cannot be saved to the specified storage medium.

1.6 Calculation Function

Differential Calculation

Differential calculation that uses variables such as measured data and calculated data (the result of a differential calculation) and constants that you can arbitrarily define can be executed. The result of the calculation can be displayed on (save to) any of the 32 channels provided specifically for calculation (hereafter referred to as calculation channels). The differential calculation is executed every sampling interval.

Statistical Calculation

The statistical calculations below can be executed, and the result can be displayed on (save to) the specified channel. The statistical calculation is executed every sampling interval.

Calculated Item	Description
Maximum	Calculates the maximum value from the start of the logging operation to the end.
Minimum	Calculates the minimum value from the start of the logging operation to the end.
Average	Calculates the simple average from the start of the logging operation to the end. $$AVE = \frac{\sum_{i=1}^{n} di}{n}$$ where di is the ith data and n is the number of data values
Peak	Calculates the peak value (maximum – minimum) from the start of the logging operation to the end.
Rms	Calculates the rms value from the start of the logging operation to the end. $$RMS = \sqrt{\frac{\sum_{i=1}^{n} di^{2}}{n}}$$ where di is the ith data and n is the number of data values

1.7 Setup Function

You can specify various settings shown below using keys in Setting Mode.

```
                          ┌──────────┐
                          │ Setup TOP │
                          └──────────┘
                              │
 ┌────────┬────────┬────────┬────────┬────────┬────────┬────────┬────────┐
┌──────┐┌──────┐┌──────┐┌──────┐┌──────┐┌──────────┐┌──────┐┌──────┐
│Input ││Display││Data Save││Alarm ││Calculation││Communication││Hardware││System │
│settings││settings││settings││settings││settings││settings││settings││settings│
└──────┘└──────┘└──────┘└──────┘└──────┘└──────────┘└──────┘└──────┘
```
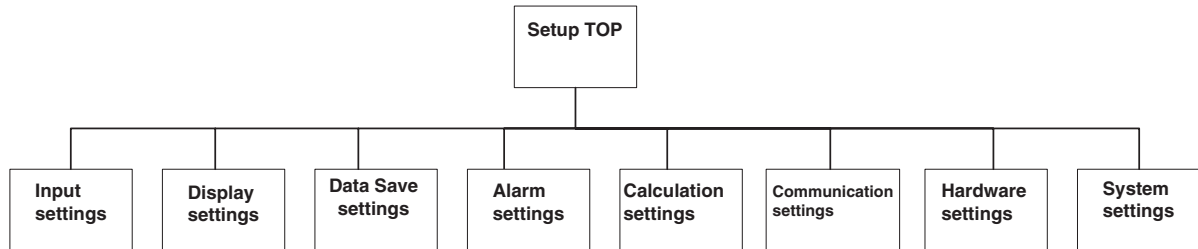
INPUT > ANALOG INPUT

Set the tag, input type (mode), input range, span upper and lower values, color, line width, average, and scaling for the analog input.

| ▶▶ANALOG INPUT ↕ 1/2   2005/09/30 10:19:30 | ▶▶ANALOG INPUT ↕ 2/2   2005/09/30 10:19:46 |
▶▶CH01	▶▶CH01
TAG		SCALING	ON
MODE	TC	DECIMAL POINT	□.□□□□
RANGE	K	SCALE LOWER	-3.0000
SPAN LOWER	-200.0	SCALE UPPER	3.0000
SPAN UPPER	1372.0	UNIT	TEMPERATURE
COLOR	■ RED		°C
LINE WIDTH	1dot		°C
AVERAGE	1		
Set the tag. (max 8 characters)			

INPUT > PULSE INPUT

Set the tag, input type (mode), span upper and lower values, color, line width, and scaling for the pulse input.

| ▶ INPUT ↕ 1/2   2005/09/30 10:20:07 | ▶ INPUT ↕ 2/2   2005/09/30 10:21:28 |
▶▶PULSE INPUT	▶▶PULSE INPUT
TAG		SCALING	ON
MODE	INSTANTANEOUS	DECIMAL POINT	□.□□□□
RANGE		SCALE LOWER	-3.0000
SPAN LOWER	0	SCALE UPPER	3.0000
SPAN UPPER	50000	UNIT	ANY
COLOR	■ RED		
LINE WIDTH	1dot		

Input settings > Logic input settings

Set the tag name, color, and line width for the logic input.

| ▶ INPUT   2005/09/30 10:21:45 |
▶▶LOGIC INPUT
MODE	ON
L1 TAG	
COLOR	■ RED
LINE WIDTH	1dot
L2 TAG	
COLOR	■ GREEN
LINE WIDTH	1dot

DISPLAY

Specify general display settings (background color, grid, and bar graph base position), group settings (group name and channel assignments), alarm line settings (alarm line display ON/OFF, color, and line width), and LCD setting (LCD backlight auto OFF).

```
SETTING                         2005/09/30
  ▶DISPLAY                        10:22:02

 GENERAL
 GROUP
 ALARM LINE
 LCD



 Set the background color, grid display,
 etc.
```
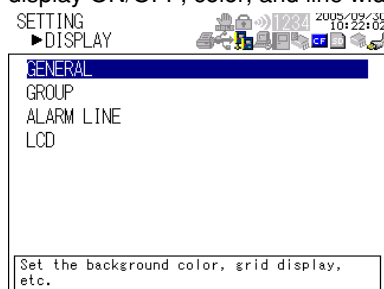
DATA SAVE

Set the sampling interval, data save destination, data type, file name, printer output ON/OFF, and trigger.

```
SETTING                         2005/09/30
  ▶DATA SAVE                      10:22:44

 SAMPLING INTERVAL    1s
 SAVE MEDIA           INTERNAL MEMORY
   SAVE TIME             12h44min13s
 DATA TYPE            BINARY
 FILE NAME
 PRINTER OUTPUT       OFF
 TRIGGER

```
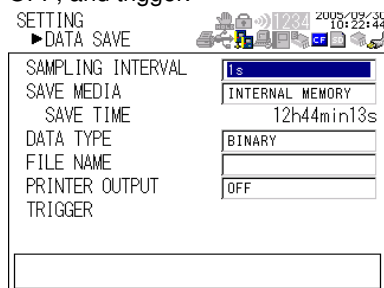
ALARM

For the Alarm detailed settings, set the alarm type, alarm value, and output channel for each of the measurement, calculation, pulse input, logic input, and communication input channels. For other settings, set the output AND/OR, delay time, output/display hold, hysteresis ON/OFF, and alarm buzzer ON/OFF. Carry out an alarm acknowledge operation to clear alarms.

```
SETTING                         2005/09/30
  ▶ALARM                          10:23:11

 DETAIL
 OUTPUT AND/OR
 DELAY SAMPLING COUNT  0
 OUTPUT HOLD           NONHOLD
 DISPLAY HOLD          NONHOLD
 HYSTERESIS            ON
 ALARM BUZZER          ON
 ALARM ACK
 Set alarms to analog, pulse, logic,
 calculation, and communication channels.
```
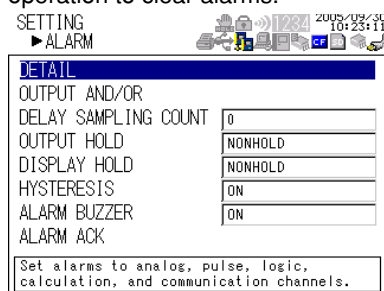
Alarm detailed settings of each channel

```
▶▶ANALOG INPUT                  2005/09/30       ▶▶DETAIL                        2005/09/30
  ▶▶CH01                          10:23:52         ▶▶PULSE INPUT                   10:25:53

 ALARM TYPE          H                           ALARM TYPE          H
 UPPER               3.0000                      UPPER               3.0000
 LOWER               -3.0000                     LOWER               -3.0000
 OUTPUT CHANNEL      OFF                          OUTPUT CHANNEL      OFF




 Set the alarm type.                             Set the alarm type.
```
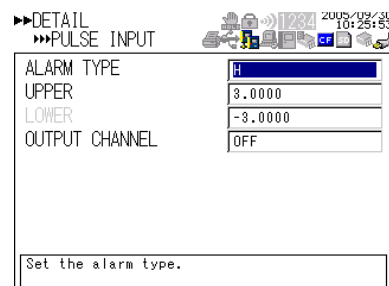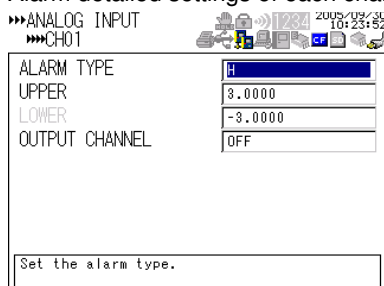
CALCULATION

Specify differential calculation settings (assignment of the difference and reference calculation channels, tag, decimal place, span upper and lower values, unit, color, and line width) and statistical calculation settings (ON/OFF of each statistical calculation item).

```
SETTING                    2005/09/30
  ►CALCULATION              10:26:12
 ┌─────────────────────────────────┐
 │ DIFFERENCE                       │
 │ STATISTICS                       │
 │                                  │
 │                                  │
 │                                  │
 │                                  │
 │                                  │
 │ ┌──────────────────────────────┐│
 │ └──────────────────────────────┘│
 └─────────────────────────────────┘
```
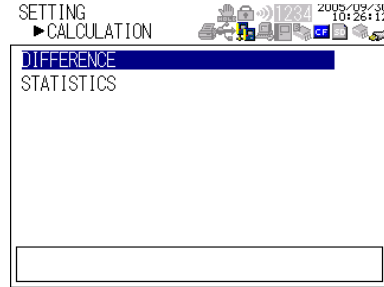
COMMUNICATION

Specify interface settings (communication interface selection), serial communication settings, USB settings (USB ID number), Ethernet settings, FTP client settings, Web server settings, and E-mail transmission settings.

```
SETTING                    2005/09/30
  ►COMMUNICATION            10:26:21
 ┌─────────────────────────────────┐
 │ INTERFACE        LAN             │
 │ PRINTER OUTPUT                   │
 │ SERIAL COMM.                     │
 │ USB                              │
 │ ETHERNET                         │
 │ NETWORK FUNC.                    │
 │ DIAL-UP                          │
 │ ┌──────────────────────────────┐│
 │ │Set the communication interface│
 │ │to be used                     ││
 │ │(LAN, USB, RS-232, or RS-485). ││
 │ └──────────────────────────────┘│
 └─────────────────────────────────┘
```
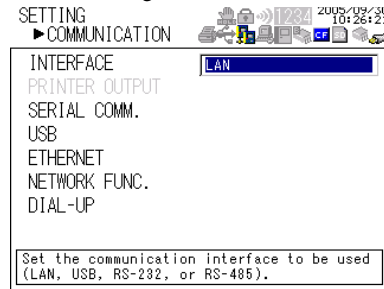
HARDWARE

Set the beep sound, ID number, display language, temperature unit (only when the display language is set to English), date/time, and automated measurement function. Carry out system reset to reset the settings to their default values.

```
SETTING                    2005/09/30
  ►HARDWARE                 10:26:37
 ┌─────────────────────────────────┐
 │ BEEP SOUND       ON              │
 │ ID NUMBER        1               │
 │ LANGUAGE         ENGLISH         │
 │ TEMPERATURE      °C              │
 │ CLOCK            2005/09/30 10:26:26│
 │ AUTO MEASUREMENT OFF             │
 │ SYSTEM RESET                     │
 │ MAC ADDRESS      00-00-64-89-10-24│
 │ ┌──────────────────────────────┐│
 │ └──────────────────────────────┘│
 └─────────────────────────────────┘
```
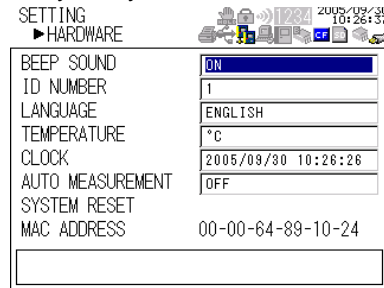
SYSTEM

Register users (registration of the administrator and users for the Ethernet login, Web browsing, and key login functions) and set the key login/logout function.

```
SETTING                    2005/09/30
  ►SYSTEM                   10:27:01
 ┌─────────────────────────────────┐
 │ USER REGISTER                    │
 │ KEY LOGIN FUNCTION               │
 │   KEY LOGIN      ON              │
 │   AUTO LOGOUT    OFF             │
 │ LOGOUT                           │
 │                                  │
 │                                  │
 │ ┌──────────────────────────────┐│
 │ └──────────────────────────────┘│
 └─────────────────────────────────┘
```
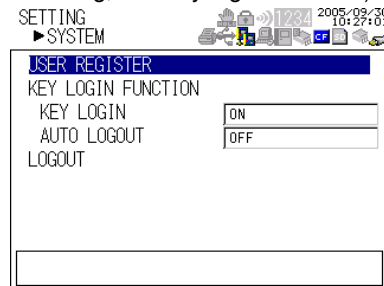
1.8   Communication Function

The XL100 comes standard with an Ethernet interface, USB interface, and serial interface (RS-232 and RS-485).

Application	MODBUS Slave	MODBUS Master	Setting/Measurement server	Maintenance/ Test server	Web server	FTP server	FTP client	E-mail client
				Login (User authentication/ access privileges granting)				
Upper layer protocol			Dedicated protocol		HTTP	FTP		SMTP
Lower layer protocol	MODBUS Protocol		Serial communication control	TCP				
				IP				
Upper interface	Serial (RS-232/RS-485)		USB	Ethernet				
Lower interface				10BASE-T/100BASE-TX				

XL100 Communication Functions (table title)

The Ethernet interface can be used to automatically transfer measurement data files to an FTP server connected to the network or access the XL100 from a PC through FTP to retrieve data on the external storage medium of the XL100.
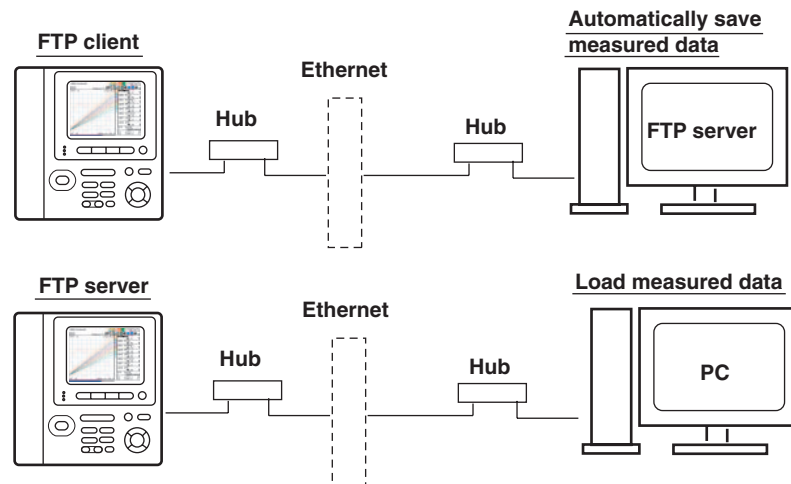
By configuring the XL100 to be a Web server, the XL100 screen can be shown on the PC. You can monitor the measured data and control the XL100 (for example, switch the display) from the PC.
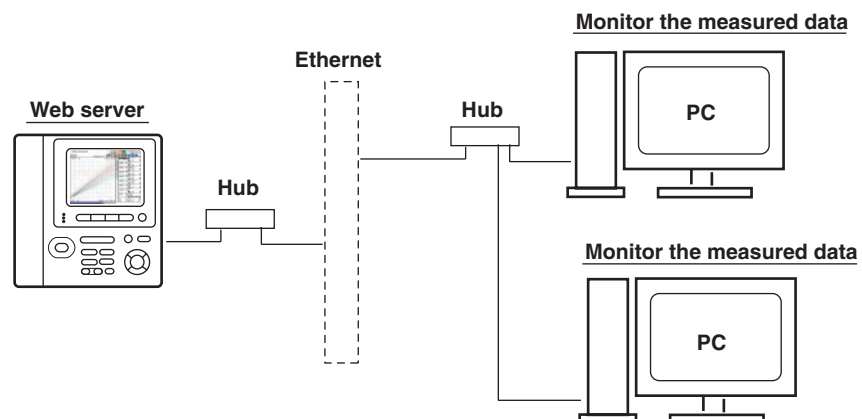
In addition, e-mail can be sent automatically from the XL100 when an alarm occurs.
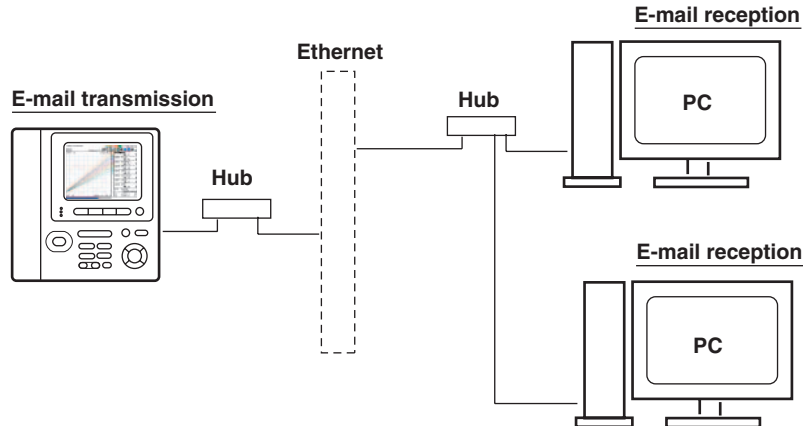
The USB interface or serial interface can be used to change the XL100 settings from a PC or retrieve data into the PC through command communication. In addition, Modbus communication is possible on the serial interface. The Modbus master function enables the measured data of a measuring instrument connected as a Modbus slave to be retrieved as communication input data. The data can be displayed on a communication input data channel (communication channel) on the XL100 in a similar fashion to measurement and calculation channels.
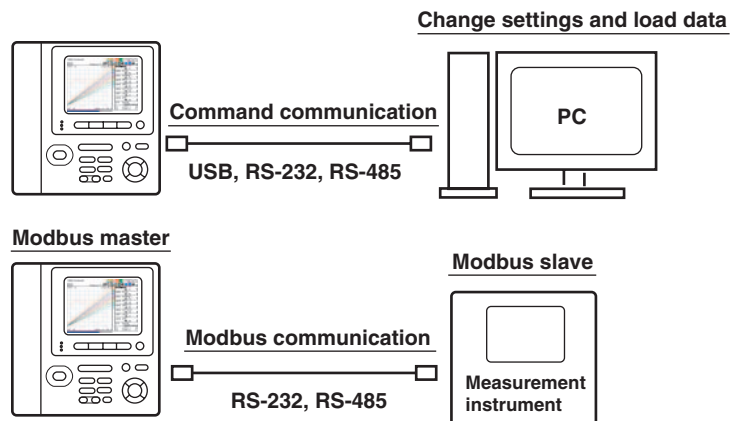
1.9   Other Main Functions

Setting the Displayed Language

The displayed language can be switched between English and Japanese. If English is specified, you can set the temperature unit to °C or °F.

Printer Output

Measured data and screen image data can be printed on a dedicated printer (97010) sold separately by using the RS-232 interface.

Setting the Clock

The year, month, day, and time (hour:minute:second) are shown on the display according to the specified clock time. If the XL100 is connected to a network through the Ethernet interface, the clock can be corrected at any time by accessing the NTP server.

Display Hold

A displayed value can be held through a given key operation. If the display is held in Free Running Mode, the held values can be saved to a file by manually saving the measured data, waveform data, or screen data.

Key Login/Logout

You can set the XL100 so that only certain users can operate the instrument. A user is identified by the user name and password registered in advance. Seven users, administrator and user1 to user6, can be registered. The key login/logout status can be confirmed on the log (key login/logout) display.

Key Lock

Explanation of FunctionsAll key operations except the key lock release operation can be disabled through a given key operation.

Lithium Ion Battery Operation

In addition to the AC power supply, the XL100 can operate on an internal lithium battery (sold separately). The lithium ion battery is automatically charged when the AC adapter is connected.

Automated Measurement Function

When the automated measurement function is turned ON, the XL100 automatically loads the AUTRUN.SET file saved to the external storage medium (CF card, SD card, or USB memory) and starts the logging operation (data save operation). After the logging measurement is finished, the measured data that was saved is copied to the external storage medium.

Synchronized Logging Operation

The XL100 has an external trigger input/output function. By applying the external trigger output signal to multiple XL100s as external trigger input, the logging (data save) operation of measured data among multiple XL100s can be synchronized.

2.1   Front Panel and Terminal Block Unit

Front Panel

Terminal cover
(Cannot be removed from the terminal block unit)

Terminal block unit
A terminal block unit for connecting analog input signal wires. Can be removed from the XL100.

For the input signal wiring, see section 3.3.

Display
Displays measured data, operation status, setting menu, settings, etc. The displayed contents vary depending on the operation mode.

For the displayed contents, see section 2.3.

Operation status LED
POWER: Illuminates when the power is ON
CHARGE: Illuminates when the battery is being charged
START: Iluminates while logging (Blinks at logging standby)

Keys
Name and function of each key are described on the next page.

Terminal Block Unit

16 channels   **8 channels**

Terminal cover

Keys

1. **HOME Key**

   Press this key to enable Free Running Mode for measuring instantaneous values.

2. **REVIEW Key**

   Press this key to enable Logging & Review Mode in which past data can be viewed while logging (saving measured data) or enable Review Mode in which saved data can be analyzed.

3. **FILE Key**

   Press this key to enable File Operation Mode in which file names can be changed, measured data can be copied, setup data can be saved or loaded, and so on.

4. **SETTING Key**

   Press this key to set measurement conditions, conditions for saving measured data, alarm conditions, etc.

5. **HOLD Key**

   Press this key to hold the display so that the measured values are not updated or to release the display. In addition, hold this key down to enable or disable key lock.

6. **TIME/DIV Key**

   Press this key to switch the time scale (the time per grid (division)).

7. **ESC Key**

   Press this key to cancel a key operation.

8. **SET Key**

   Press this key to set settings entered through the keys.

9. **START/STOP Key**

   Press this key to start/stop logging (saving the measured data).

10. **RANGE Key**

    Press this key to change the input range or span (scale).

11. **DISPLAY Key**

    Press this key to switch the displayed information in Free Running Mode or Logging Mode. Press this key also to switch between marker display and statistical calculation display in Review Mode.

12. **SAVE Key**

    Press this key to manually save or print the measured data or screen data.

13. **GROUP Key**

    Press this key to switch the displayed group of measurement channels.

14. **Fast Forward Key**

    Press this key to move the marker to the left or right by 1 division on the review display.

15. **MARK Key**

    Press this key to select a marker to be activated on the Review Mode display.

16. **Arrow/SELECT Key**

    Press the arrow keys to select items on the display. Press this key also to move the marker to the left or right on the review display. Press SELECT to confirm a selection.

2.2   Side Panel and Rear Panel

Side Panel

USB port for USB memory
For a description, see section 3.9.

Ethernet port
For a description, see section 3.8.

USB port for connecting a PC
For a description,
see section 3.8.

CF card slot
For a description, see section 4.7.

SD card slot
For a description, see section 4.7.

Power switch
For a description,
see section 4.1.

Trigger input/output terminal
For a description, see section 3.5.

Digital I/O connector
For a description, see sections 3.3 and 3.4.

AC adapter jack
For a description,
see section 3.6.

RS-232 connector
For a description, see section 3.8.

RS-485 terminal block
For a description, see section 3.8.

TIP

When shipped from the factory, a side cover (see "Standard Accessories" on page 2) is attached to the side panel shown in the figure above. The side cover can be removed by loosening the side cover attachment screws (see section 4.1, "Turning the Power Switch ON/OFF").

Rear Panel

Screwdriver for terminals (accessory)
Press the screwdriver towards the spring
(right in this figure) to detach it.

Name plate

Battery cover
Holds the lithium ion
battery sold separately
(94009).

**For the procedure to load
the battery, see section 3.7.**
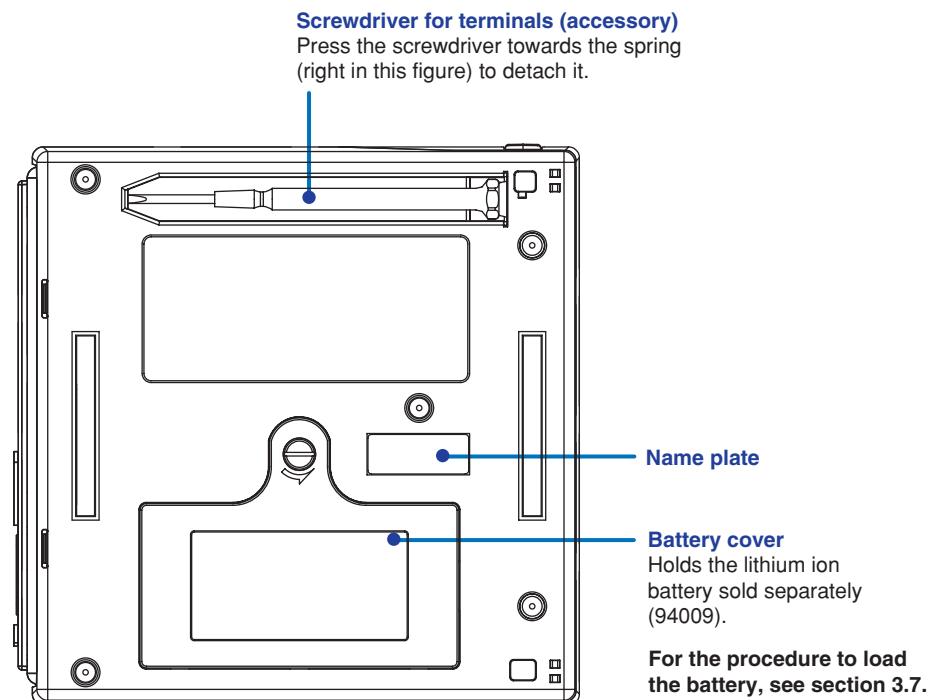
2.3   Data Display

Status display section

Data display section
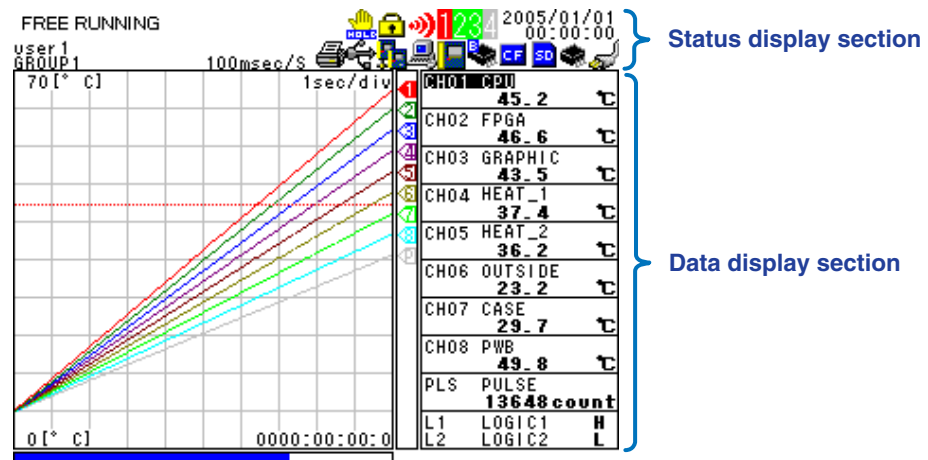
Status Display Section
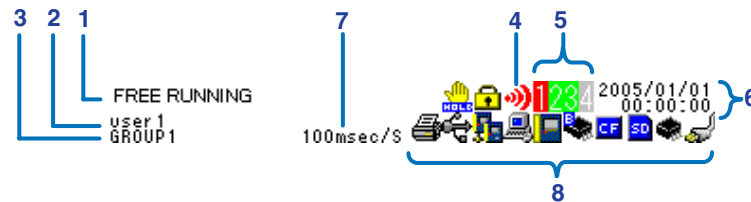
1. **Operation Mode**

    Displays the mode name: Free Running, Logging, Logging & Review, Setup, or File Operation.

2. **User Name**

    Displays the login user name when the key login function is turned ON.

3. **Group Name**

    Displays the group name of the displayed measurement channel.

4. **Alarm Status**

    The status is displayed using different icon colors as follows:

    Gray: No alarm setting

    Yellow-green: Alarm setting enabled

    Red: Alarm activated

5. **Alarm Output Status**

    The status is displayed using different icon colors for each alarm output channel as follows:

    Gray: No alarm setting

    Yellow-green: Alarm setting enabled

    Red: Alarm outputting

6. **Date/Time**

    Displays the year, month, day, hour, minute, and second. For the procedure to set the date/time, see section 4.3, "Setting the Date/Time."

7. **Sampling Interval**

    Displays the sampling interval in the format "xxxyyyy/S" (where xxx is 1, 2, 5, 10, 20, 30, 100, 200, or 500 and yyyy is msec, sec, min, or h) when in Free Running, Logging, or Logging & Review Mode.

8. Various Icons

The following icons are used to display the operation status, interface usage status, etc.

An icon shown when the data save destination is set to internal memory. The icon blinks when there is access to the internal memory. The icon is gray when the data save destination is not set to internal memory.

An icon shown when the data save destination is set to CF card. The icon blinks when there is access to the CF card. The icon is gray when the data save destination is not set to CF card.

An icon shown when the data save destination is set to SD card. The icon blinks when there is access to the SD card. The icon is gray when the data save destination is not set to SD card.

An icon shown when there is data saved in the backup memory. The icon blinks when there is access to the backup memory. The icon is gray when there is no data saved to the backup memory.

An icon shown when the interface is set to LAN, the Ethernet parameters are set (IP address other than 0.0.0.0), and the cable is connected. For other cases, the icon is gray.

An icon shown when the interface is set to USB and a USB device is connected. For other cases, the icon is gray.

An icon shown when the communication protocol is set to Modbus (slave). The icon is gray when set to Modbus (master).

An icon shown when the communication protocol is set to Modbus (master). The icon is gray when set to Modbus (slave).

An icon shown when the printer output is turned ON and the sampling interval is greater than or equal to 1 minute. The icon is gray when the printer output is OFF.

An icon shown when the printer output is turned ON and the sampling interval is less than or equal to 30 seconds. This indicates that only manual print is valid using the SAVE key.

An icon shown when the display update is held. The icon is gray when the display is not held.

An icon shown when key lock is enabled. The icon is gray when key lock is disabled.

An icon shown when the AC adapter is connected.

An icon shown when the AC adapter is not connected, and the XL100 is running on a battery. Shows the remaining battery power using four levels.

Data Display Section

Waveform & Digital Display
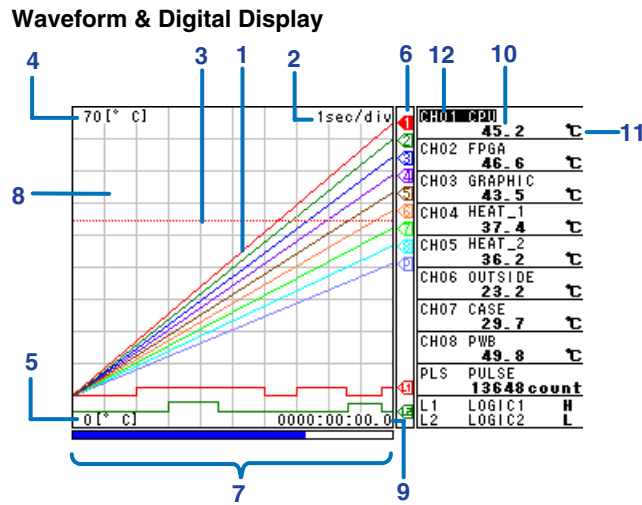
1. **Waveform**

   Waveforms of measured data, calculated data, and communication input data. The display position of logic input waveforms is fixed to the bottom of the display as shown below.

2. **Time Scale**

   The specified time scale (time per grid (division)) is displayed in the format "xxyyy/div" (where xx is the value and yyy is sec, min, or h).

3. **Alarm Line**

   Displayed with a red dotted line at the position of the alarm value of the selected channel (active channel).

4. **Scale Upper Limit**

   The scale upper limit of the active channel. If scaling is turned OFF, the span upper limit is displayed.

5. **Scale Lower Limit**

   The scale lower limit of the active channel. If scaling is turned OFF, the span lower limit is displayed.

6. **Pen**

   Displayed at the current value position of each channel. The active channel is shown highlighted in reverse video.

7. **Usage Indication Bar of the Storage Media**

   Displays using a blue bar the amount of space used with respect to the total space on the storage medium that is specified to be the save destination of the measured data.

8. **Grid**

   The grid can be turned ON/OFF.

9. **Elapsed Time**

   The time elapsed from the start of the logging operation is displayed in the format "wwww:xx:yy:z" (where wwww is the hour, xx is the minute, yy is the second, and z is one-tenth of a second).

10. **Digital Display**

    Displays the current values of the measured data, calculated data, and communication input data using numeric values. When an alarm is occurring, the value is shown in red in reverse video.

11. Unit

Displays preset characters such as °C or an arbitrary specified characters (up to 6 characters).

12. Channel No./Tag

Displays the channel number and the specified tag (up to 8 characters). The active channel is shown highlighted in reverse video.

Waveform Display

1. Waveform

Waveforms of measured data, calculated data, and communication input data.

2. Time Scale

The specified time scale (time per grid (division)) is displayed in the format "xxyyy/div" (where xx is the value and yyy is sec, min, or h).

3. Alarm Line

Displayed with a red dotted line at the position of the alarm value of the selected channel (active channel).

4. Scale Upper Limit

The scale upper limit of the active channel. If scaling is turned OFF, the span upper limit is displayed.

5. Scale Lower Limit

The scale lower limit of the active channel. If scaling is turned OFF, the span lower limit is displayed.

6. Pen

Displayed at the current value position of each channel. The active channel is shown highlighted in reverse video.

7. Usage Indication Bar of the Storage Media

Displays using a blue bar the amount of space used with respect to the total space on the storage medium that is specified to be the save destination of the measured data.

8. Grid

The grid can be turned ON/OFF.

9. Elapsed Time

The time elapsed from the start of the logging operation is displayed in the format "wwww:xx:yy:z" (where wwww is the hour, xx is the minute, yy is the second, and z is one-tenth of a second).

Digital Display

1. **Digital Display**

   Displays the current values of the measured data, calculated data, and communication input data using numeric values. When an alarm is occurring, the value is shown in red in reverse video.

2. **Channel No.**

   Displays the channel number in the specified color.

3. **Tag**

   Displays the specified tag (up to 8 characters). The active channel is shown highlighted in reverse video.

4. **Unit**

   Displays preset characters such as °C or an arbitrary specified characters (up to 6 characters).

5. **Statistical Calculation Value**

   Displays the maximum, minimum, average, peak (P-P), and rms values of the active channel.

Bar Graph Display
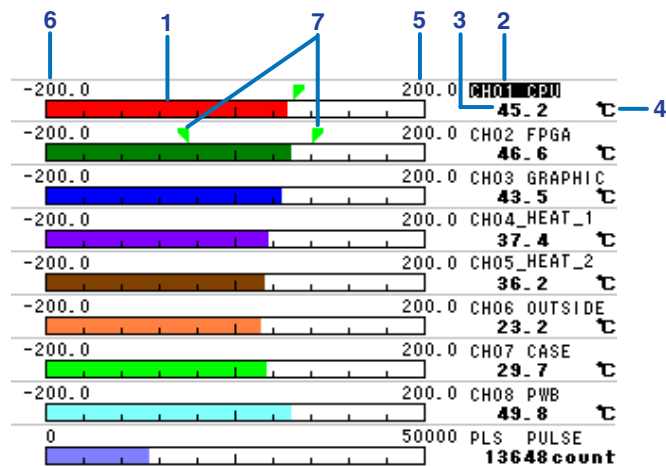
1. Bar

Displays the current values of the measured data, calculated data, and communication input data using bars. The reference position of the bar can be set to normal (left edge of the scale) or center. The color of the bars are the same as the waveform colors.

When the reference position of the bar is set to center
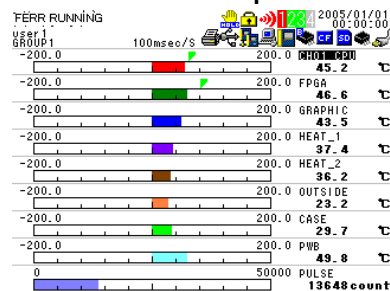
2. Channel No./Tag

Displays the channel number and the specified tag (up to 8 characters). The active channel is shown highlighted in reverse video.

3. Numeric Value

Displays the current values of the measured data, calculated data, and communication input data using numeric values. When an alarm is occurring, the value is shown in red in reverse video.

4. Unit

Displays preset characters such as °C or an arbitrary specified characters (up to 6 characters).

5. Scale Upper Limit

The scale upper limit for each channel. If scaling is turned OFF, the span upper limit is displayed.

6. Scale Lower Limit

The scale lower limit for each channel. If scaling is turned OFF, the span lower limit is displayed.

7. Alarm Mark

Displays arrow marks at the positions corresponding to the specified alarm values. If an alarm is occurring, the alarm marks are displayed in red.

Review Display

1. **Waveform**

   Waveforms of measured data, calculated data, and communication input data.

2. **Time Scale**

   The specified time scale (time per grid (division)) is displayed in the format "xxyyy/div" (where xx is the value and yyy is sec, min, or h).

3. **Alarm Line**

   Displayed with a red dotted line at the position of the alarm value of the selected channel (active channel).

4. **Scale Upper Limit**

   The scale upper limit of the active channel. If scaling is turned OFF, the span upper limit is displayed.

5. **Scale Lower Limit**

   The scale lower limit of the active channel. If scaling is turned OFF, the span lower limit is displayed.

6. **Pen**

   Displayed at the current value position of each channel. The active channel is shown highlighted in reverse video.

7. **Grid**

   The grid can be turned ON/OFF.

8. **File Name**

   Displays the file name of the data currently being reviewed.

9. **Active Marker**

   Displays the marker name currently active.

10. **Marker A**

    Displayed with a yellow solid line.

11. **Marker B**

    Displayed with a yellow broken line.

12. **Marker ALM**

    Displayed with a red solid line.

13. Display Position and Marker Position

Shows the displayed range with respect to the entire data using a blue bar. Marker positions are also displayed.
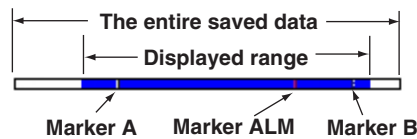
14. Measured Value at Marker A

Displays the measured value, calculated value, and communication input value at the position of marker A.

15. Measured Value at Marker B

Displays the measured value, calculated value, and communication input value at the position of marker B.

16. Measured Value and Calculated Value Difference

Displays the difference in the measured values and calculated values between markers A and B.

17. Channel No./Tag

Displays the channel number and the specified tag (up to 8 characters). The active channel is shown highlighted in reverse video.

18. Numeric Value

Displays the current values of the measured data, calculated data, and communication input data using numeric values. When an alarm is occurring, the value is shown in red in reverse video.

19. Unit

Displays preset characters such as °C or an arbitrary specified characters (up to 6 characters).

20. Marker Position Time

The time of the marker position currently active is displayed in the format "wwww:xx:yy:z" (where wwww is the hour, xx is the minute, yy is the second, and z is one-tenth of a second).

21. Time between Markers

The time difference between markers A and B is displayed in the format "wwww:xx:yy:z" (where wwww is the hour, xx is the minute, yy is the second, and z is one-tenth of a second).

22. Alarm Mark

Displayed at the position where the alarm occurred.

23. Measurement Time

The total measurement time of the data being reviewed is displayed in the format "wwww:xx:yy:z" (where wwww is the hour, xx is the minute, yy is the second, and z is one-tenth of a second).

Statistical Calculation Display When Showing the Review Display

Press the DISPLAY key to switch from the marker display to the statistical calculation display. Press the DISPLAY key again to return to the marker display.
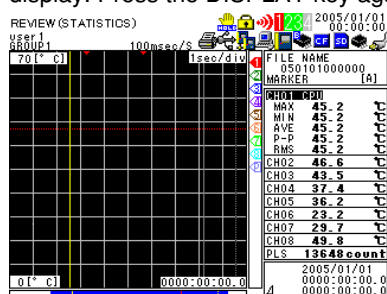
Logging & Review Display
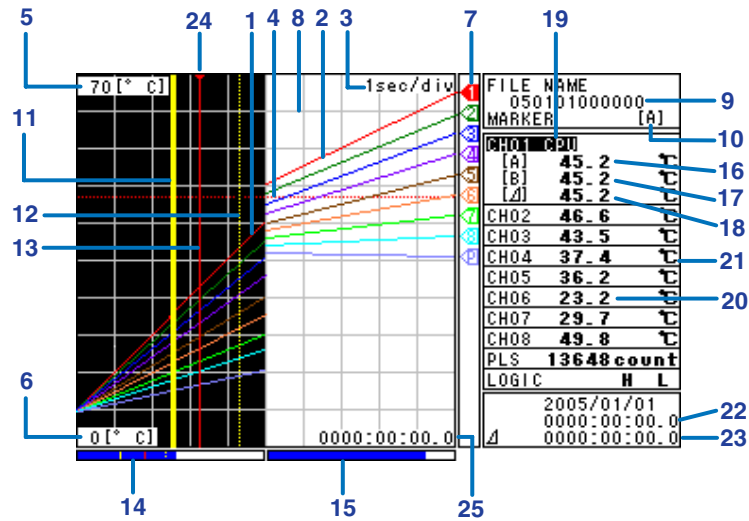
1. **Past Waveforms**

   Waveforms of the past measured data, calculated data, and communication input data.

2. **Current Waveforms**

   Waveforms of the current measured data, calculated data, and communication input data.

3. **Time Scale**

   The specified time scale (time per grid (division)) is displayed in the format "xxyyy/div" (where xx is the value and yyy is sec, min, or h).

4. **Alarm Line**

   Displayed with a red dotted line at the position of the alarm value of the selected channel (active channel).

5. **Scale Upper Limit**

   The scale upper limit of the active channel. If scaling is turned OFF, the span upper limit is displayed.

6. **Scale Lower Limit**

   The scale lower limit of the active channel. If scaling is turned OFF, the span lower limit is displayed.

7. **Pen**

   Displayed at the current value position of each channel. The active channel is shown highlighted in reverse video.

8. **Grid**

   The grid can be turned ON/OFF.

9. **File Name**

   Displays the file name of the data currently being reviewed.

10. **Active Marker**

    Displays the marker name currently active.

11. **Marker A**

    Displayed with a yellow solid line.

12. **Marker B**

    Displayed with a yellow broken line.

13. **Marker ALM**

    Displayed with a red solid line.

14. **Display Position and Marker Position**

Shows the displayed range with respect to the entire data using a blue bar. Marker positions are also displayed.

15. **Usage Indication Bar of the Storage Media**

Displays using a blue bar the amount of space used with respect to the total space on the storage medium that is specified to be the save destination of the measured data.

16. **Measured Value at Marker A**

Displays the measured value, calculated value, and communication input value at the position of marker A.

17. **Measured Value at Marker B**

Displays the measured value, calculated value, and communication input value at the position of marker B.

18. **Measured Value and Calculated Value Difference**

Displays the difference in the measured values and calculated values between markers A and B.

19. **Channel No./Tag**

Displays the channel number and the specified tag (up to 8 characters). The active channel is shown highlighted in reverse video.

20. **Numeric Value**

Displays the current values of the measured data, calculated data, and communication input data using numeric values. When an alarm is occurring, the value is shown in red in reverse video.

21. **Unit**

Displays preset characters such as °C or an arbitrary specified characters (up to 6 characters).

22. **Marker Position Time**

The time of the marker position currently active is displayed in the format "wwww:xx:yy:z" (where wwww is the hour, xx is the minute, yy is the second, and z is one-tenth of a second).

23. **Time between Markers**

The time difference between markers A and B is displayed in the format "wwww:xx:yy:z" (where wwww is the hour, xx is the minute, yy is the second, and z is one-tenth of a second).

24. **Alarm Mark**

Displayed at the position where the alarm occurred.

25. **Elapsed Time**

The time elapsed from the start of the logging operation is displayed in the format "wwww:xx:yy:z" (where wwww is the hour, xx is the minute, yy is the second, and z is one-tenth of a second).

Alarm Summary Display
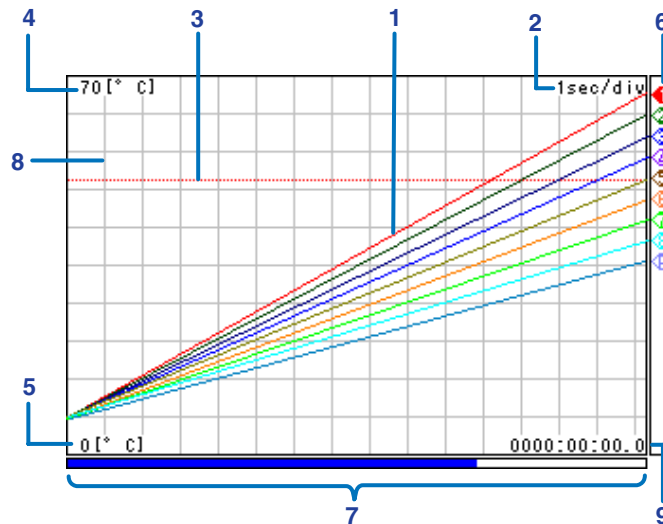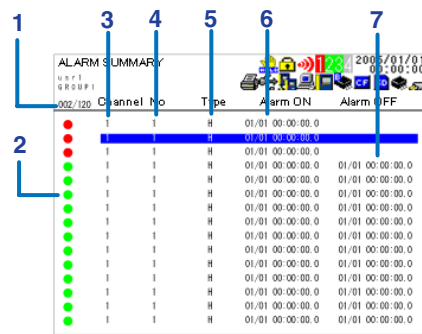

1. **Selected Alarm No./Total Number of Alarms**
    Displays the number of the alarm selected with the arrow keys and the total number of alarms (up to 120*).
    * If the total number of logs exceeds 120, the log is deleted from the oldest one.
2. **Alarm Status Mark (Red Circle When an Alarm Is Activated)**
3. **Alarm Occurring Channel No.**
4. **Alarm No.**
5. **Alarm Type**
    EXT: External, H/L: Level, IN/OUT: Window, PH/PL: Pulse level, PWIN/PWOUT: Pulse window, LX/LH/LL: Logic
6. **Alarm Occurrence Date/Time**
    Displays the date/time when the alarm occurred.
7. **Alarm Release Date/Time**
    Displays the date/time when the alarm was released.

TIP

*   All of the alarm information are cleared when the logging operation is started.
*   Pressing the SET key displays the Alarm ACK window. Pressing the SET key with this window displayed executes alarm acknowledge, and the alarm hold is released.

Log (Error) Display
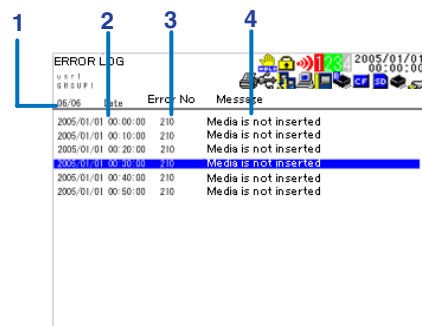
1. **Last Line Log No./Total Number of Logs**
    Displays the log No. shown at the last line of the display and the total number of logs (up to 50*).
    * If the total number of logs exceeds 50, the log is deleted from the oldest one.
2. **Error Occurrence Date/Time**
    Displays the date/time when the error occurred.
3. **Error Code**
4. **Error Message**

Log (Key Login/Logout) Display

1. **Last Line Log No./Total Number of Logs**

   Displays the log No. shown at the last line of the display and the total number of logs (up to 50*).

   * If the total number of logs exceeds 50, the log is deleted from the oldest one.
2. **Date/Time of Key Login/Logout**

   Displays the date/time when the user logged in or logged out using keys.
3. **Login/Logout Distinction**

   IN: Login. OUT: Logout
4. **User Number**

   Displays the user number that logged in.
5. **User Name**

   The name of the user that logged in.

Log (Communication Command) Display

1. **Last Line Log No./Total Number of Logs**

   Displays the log No. shown at the last line of the display and the total number of logs (up to 50*).

   * If the total number of logs exceeds 50, the log is deleted from the oldest one.
2. **Date/Time of Access**

   Displays the date/time when the user connected and accessed the XL100.
3. **Connection User ID Number**

   Displays the ID number (1 to 7) of the user connected to the XL100.
4. **Input/Output Distinction**

   >: Input. <: Output
5. **Message**

   Displays the message (up to 20 characters).

Log (FTP Client) Display

1. **Last Line Log No./Total Number of Logs**

    Displays the log No. shown at the last line of the display and the total number of logs (up to 50*).

    * If the total number of logs exceeds 50, the log is deleted from the oldest one.

2. **Date/Time of File Transfer**

    Displays the date/time when the file was transferred to the FTP server.

3. **Error Code (If an Error Occurred)**

    For details on the error corresponding to each error code, see section 12.2, "Messages and Their Corrective Actions."

4. **Destination FTP Server**

    P: Primary. S: Secondary

5. **File Name**

    Displays the name of the transferred file.

Log (Web Operation) Display

1. **Last Line Log No./Total Number of Logs**

    Displays the log No. shown at the last line of the display and the total number of logs (up to 50*).

    * If the total number of logs exceeds 50, the log is deleted from the oldest one.

2. **Date/Time of Web Screen Operation**

3. **Operation**

4. **Error Code (If an Error Occurred)**

    For details on the error corresponding to each error code, see section 12.2, "Messages and Their Corrective Actions."

5. **Operation Type**

Log (E-mail Transmission) Display

1. **Last Line Log No./Total Number of Logs**
   Displays the log No. shown at the last line of the display and the total number of logs (up to 50*).
   * If the total number of logs exceeds 50, the log is deleted from the oldest one.
2. **Date/Time of E-mail Transmission**
   Displays the date/time of e-mail transmission.
3. **E-mail Transmission Timing**
   Displays the e-mail transmission timing (periodic, power failure, alarm, etc.).
4. **Error Code (If an Error Occurred)**
5. **Destination Number**
   1: Destination 1. 2: Destination 2
6. **Error Details (If an Error Occurred)**

TIP

The log information can be cleared by carrying out "initialize log" in File Operation Mode. For a description of the "initialize log" operation, see section 9.11, "Initializing Log Information."

2.4 Setup Display

SETTING   2005/09/29
                                   20:33:25   } **Status display section**

┌─────────────────────────────────────┐
│ INPUT   │
│ DISPLAY   │
│ DATA SAVE   │   } **Menu/Setting display section**
│ ALARM   │
│ CALCULATION   │
│ COMMUNICATION   │
│ HARDWARE   │
│ SYSTEM   │
├─────────────────────────────────────┤
│ Set the range, span, and so forth for the │
│ analog, pulse, and logic input.   │
└─────────────────────────────────────┘

A brief description of the selected item

Status Display Section

        2 1   3   4 5
    ▶ INPUT   ↕ 1/2   1234 2005/01/01   6
    ▶▶ ANALOG INPUT   00:00:00

                            7
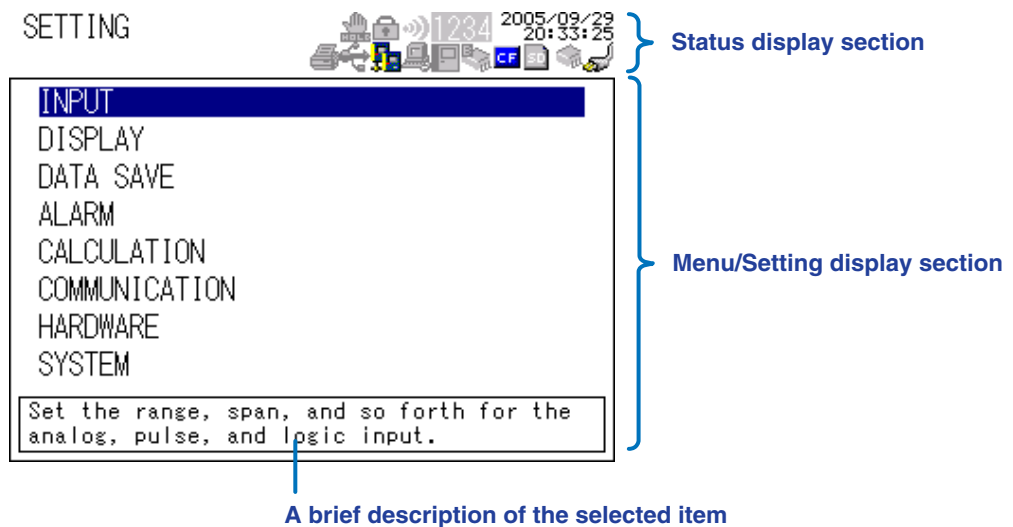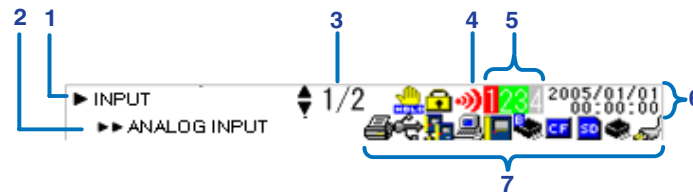
1. **Setup Item 1**

   Displays the item that is one level higher than the current item that you are setting.

2. **Setup Item 2**

   Displays the current item that you are setting.

3. **Page**

   Displays "the current page number/total number of pages" when there are multiple pages of the setup display.

4. **Alarm Status**

   The status is displayed using different icon colors as follows:

   Gray: No alarm setting

   Yellow-green: Alarm setting enabled

   Red: Alarm activated

5. **Alarm Output Status**

   The status is displayed using different icon colors for each alarm output channel as follows:

   Gray: No alarm setting

   Yellow-green: Alarm setting enabled

   Red: Alarm outputting

6. **Date/Time**

   Displays the year, month, day, hour, and minute. For the procedure to set the date/time, see section 4.3, "Setting the Date/Time."

7. **Various Icons**

   Various icons are used to display the operation status, interface usage status, etc. The icons that are displayed are the same as those on the data display. For a description of each icon, see page 2-5.

Menu/Setting Display Section

**The display content changes by selecting the desired item using the arrow/
SELECT** key as shown below.
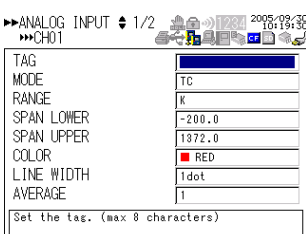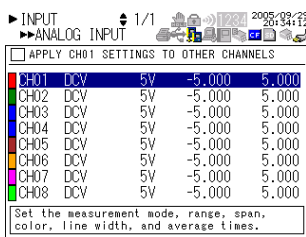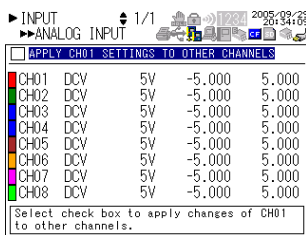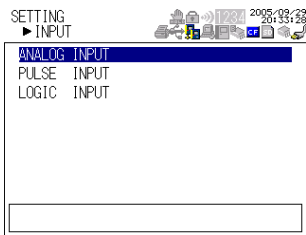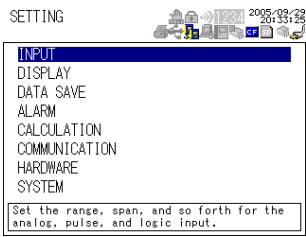
A List of Setup Displays
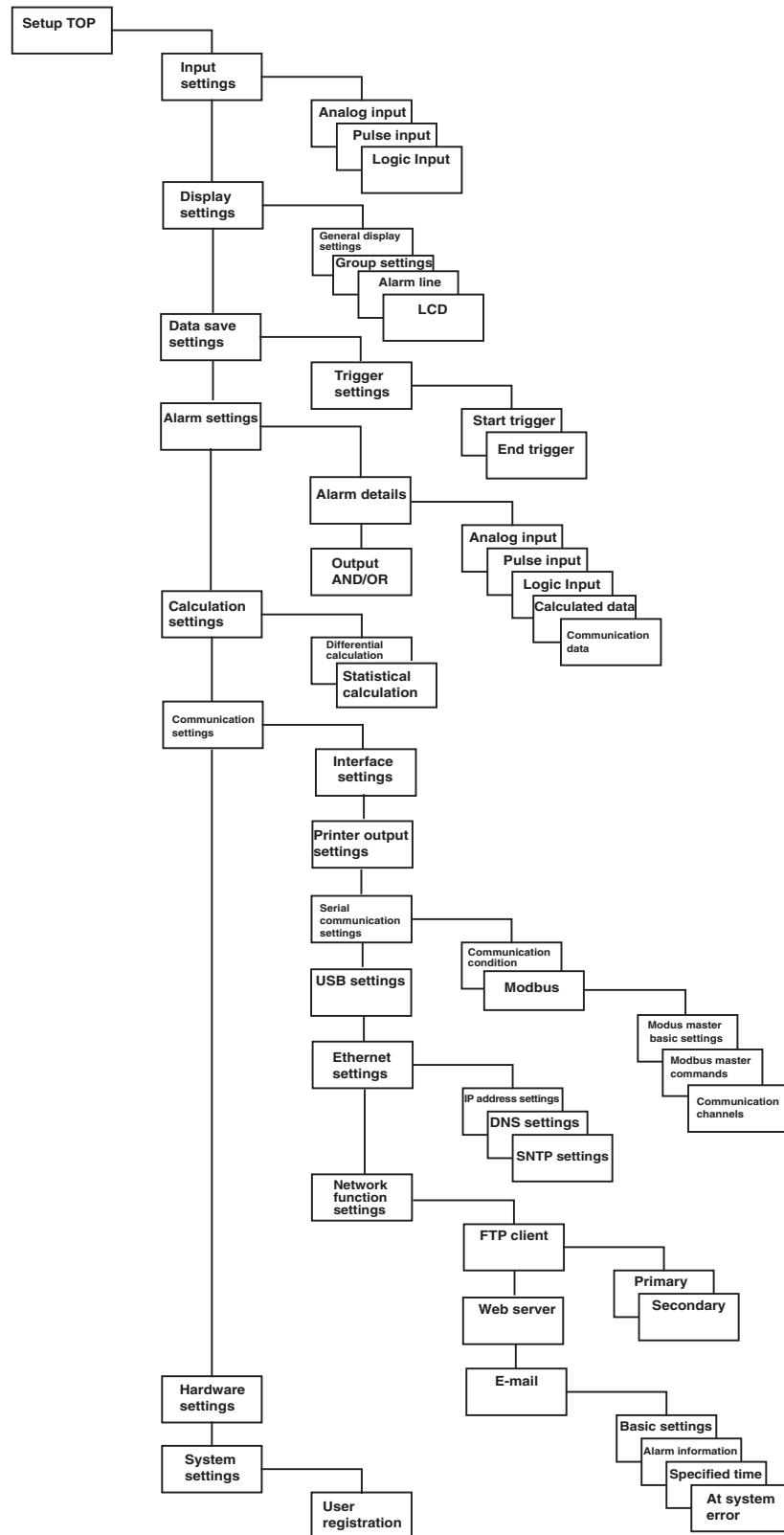
3.1　Handling Precautions

If you are a first-time user, make sure to thoroughly read "Safety Precautions" given on pages 4 and 5.

- **Do not place any objects on the instrument.**
  Do not place other devices or a container filled with water on the instrument, otherwise a breakdown may occur.

- **Moving the instrument**
  Before moving the instrument, check that the power cord and all other cables are disconnected.

- **Input terminals**
  Keep electrically charged objects away from the signal terminals. They may damage the internal circuitry. Do not apply mechanical shock to the signal input terminals. It may turn into electrical noise and enter the instrument.

- **Protecting the case and operation panel**
  Do not pour volatile chemicals on the case or operation panel or leave any rubber or PVC product in contact with the case or operation panel for long periods of time. Otherwise, it may cause discoloring and deformation

- **Cleaning**
  When cleaning the case and/or operation panel, disconnect the power cord from the outlet and gently wipe the external surfaces with a soft clean cloth. Do not use chemicals such as benzine or thinner since these may cause discoloring and deformation.

- **Display**
  When the instrument is shipped from the factory, the LCD is covered with a protective film. Remove it before using the instrument.

- **After use**
  Disconnect the power cord from the wall outlet after use.

3.2 Operating Environment

Installation Location

Indoors.

Do not install the XL100 in a location that is:
- outdoors,
- exposed to direct sunlight or close to a heat source,
- exposed to a relatively large amount of lampblack, steam, dust, corrosive gas,
- close to a strong magnetic field sources,
- close to high-voltage equipment or power lines,
- exposed to frequent mechanical vibration, or
- unstable.

Operating Environment

Ambient Temperature and Humidity

Use the XL100 in the following environment:
- Ambient temperature: 0 to 50°C
- Ambient humidity: 5 to 85% RH
  (no condensation)

Operating Altitude

2000 m max. above sea level.

Measurement Category (CAT.)

The measurement category of the XL100 is I.

⚠ WARNING

Do not use the XL100 for measurements in locations falling under Measurement Categories II, III, and IV.

Measurement Category	Indication	Description	Remarks
I	CAT. I	Measurements on circuits that are not directly connected to the main power supply.	Circuits that are not powered by the main power supply, etc.
II	CAT. II	Measurements on circuits that are connected to a low voltage installation.	Household appliances, portable tools, etc.
III	CAT. III	Measurements performed inside a building structure.	Switchboards, circuit breakers, etc.
IV	CAT. IV	Measurement performed on the power source to low-voltage installations.	Overhead wire, cable systems, etc.
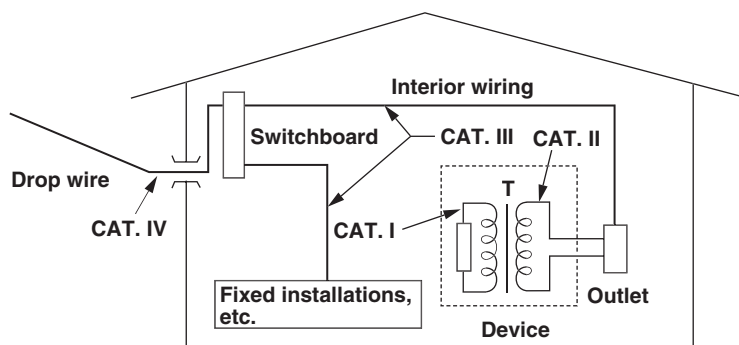
Pollution Degree

Pollution Degree applies to the degree of adhesion of a solid, liquid, or gas which deteriorates withstand voltage or surface resistivity.

The pollution degree of the XL100 in the operating environment is 2. Pollution Degree 2 applies to normal indoor atmospheres. Normally, only non-conductive pollution is emitted. However, a temporary electrical conduction may occur depending on the concentration.

⚠ Note

- **To measure the signals accurately, operate the XL100 in the 23 ± 5°C temperature range and 55 ± 10% RH.**

- **Condensation may occur if the XL100 is moved to another place where the ambient temperature and humidity are higher, or if the temperature changes rapidly. If this happens, let the XL100 adjust to the new environment for at least an hour before using it.**

- **Side cover**

  If you are not using the AC adapter or communications, the side cover (see "Accessories" on page 2) can be attached to protect the card slots and connectors from foreign particles such as dusts. Use the side cover as necessary.

Storage Location

- We recommend you store the XL100 in an environment with a temperature between 0 and 50°C and a relative humidity between 5 to 85% RH.
- When storing the XL100, avoid a location that is:
  - exposed to direct sunlight,
  - 60°C or higher,
  - 90% RH or higher,
  - close to a heat source,
  - exposed to severe vibrations,
  - exposed to corrosive or explosive gas,
  - exposed to excessive amount of soot, dust, salt, and iron, or
  - exposed to water, oil, or chemicals.

3.3 Wiring the Input Signal Cable

Analog Input

⚠ CAUTION

- **If a strong tension is applied to the cord wired to the terminal block, the terminals and/or the cord can be damaged. Allow extra wire for the input signal cable so that direct tension is not applied to the input terminals of the terminal block.**
- **To prevent fire, use signal cables having a temperature rating of 70°C or more.**

Wiring Precautions
Take the following precautions when wring the input signal cables.

Take measures so that noise does not enter the measurement circuit.
- Move the measurement circuit away from the power cable (power circuit) and ground circuit.
- It is desirable that the object being measured does not generate noise. However, if this is unavoidable, isolate the measurement circuit from the object. Also, ground the object being measured.
- Shielded wires should be used to minimize noise caused by electrostatic induction. As necessary, connect the shield to the earth terminal of the XL100 (make sure this does not lead to grounding at two points).
- To minimize noise caused by electromagnetic induction, twist the measurement circuit wires at short, equal intervals.

For thermocouple input, take measures to stabilize the temperature at the input terminal.
- Make sure to close the input terminal cover when in use.
- Do not use thick wires which may cause large heat dissipation (cross sectional area of 0.5 mm^2 or less recommended).
- Make sure that the ambient temperature remains reasonably stable. Large temperature fluctuations can occur if a nearby fan turns ON or OFF.

Connecting the input wires in parallel with other devices can cause signal degradation, affecting all connected device.
If you need to make a parallel connection, then
- Do not turn ON or OFF another instrument during operation. This can have adverse effects on the other instruments
- RTDs cannot be wired in parallel.

⚠ CAUTION

Do not apply an input exceeding the following values. Otherwise, the XL100 may break down.
- **Maximum input voltage**
  ±30 VDC
- **Maximum common mode noise voltage**
  30 VACrms (50/60 Hz)

Terminal Block Unit

The following two types of terminal block units are available.

16 channels
Part No.: 95051

8 channels
Part No.: 95050

3
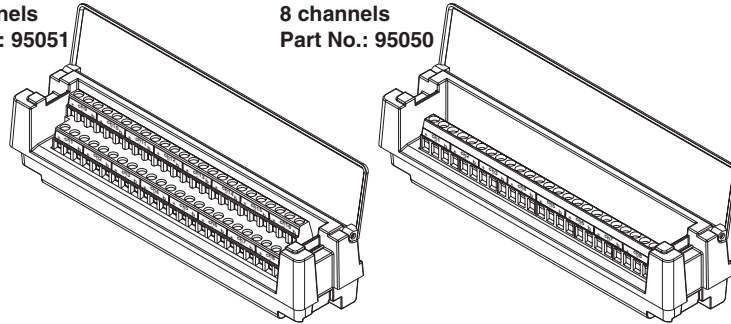
Wiring Procedure

1. Open the terminal cover of the terminal block unit.
2. Wire the input signal cables to the input terminals.
   As shown below, loosen the terminal screws using the screwdriver provided, insert the signal wires, and fasten the terminal screws.
3. Close the terminal cover of the terminal block unit.

Terminal cover

Accessory screwdriver for terminals

Enlarged view

Signal wire   **Terminal block unit**
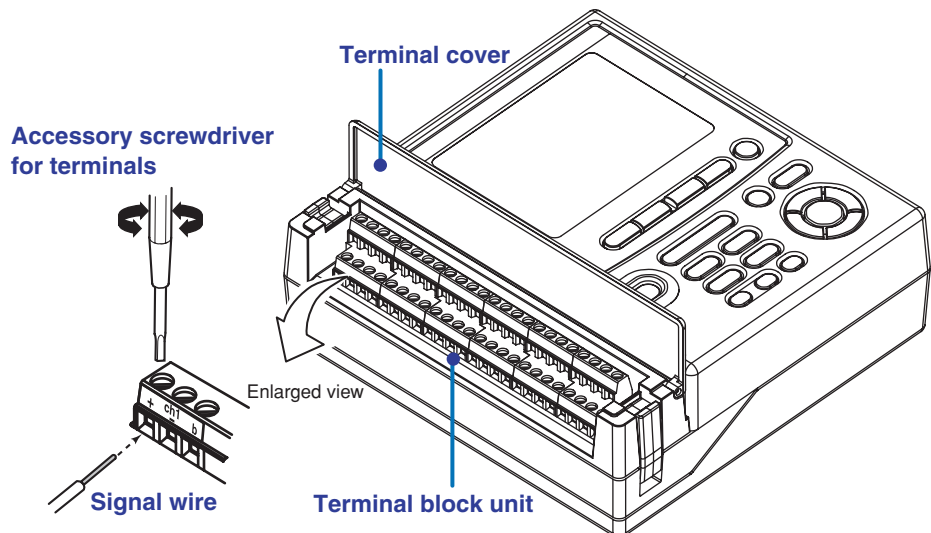
⚠ Note

Use wires of the following specifications.

- **Conductive cross-sectional area for single wire: 0.14 mm² to 2.5 mm², stranded wire: 0.14 mm² to 1.5 mm²**

  AWG: 26 to 14

- **Length of the stripped section of the wire: Approx. 7 mm**

  Input signal wires whose diameter is 0.3 mm or less may not be securely fastened. Fold over the conducting section of the wire, for example, to make sure that the wire is securely fastened to the clamped terminal.

Wiring Diagram

DC voltage input

DC voltage input

TC input

Extension leadwire
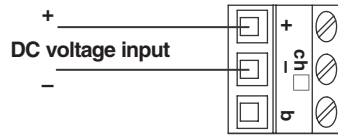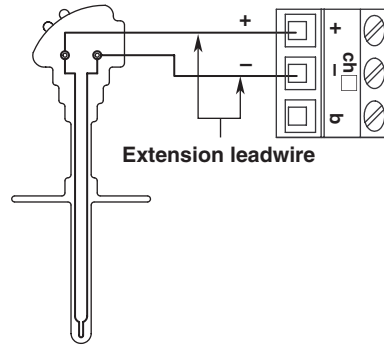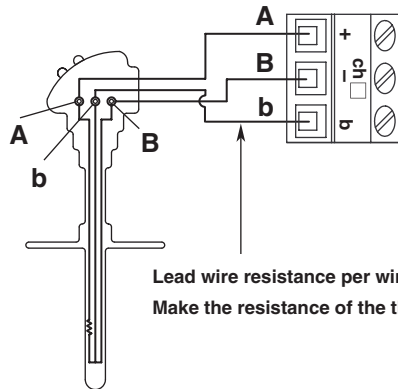
RTD input

Lead wire resistance per wire of 10 Ω or less.
Make the resistance of the three wires equal.

DC current input
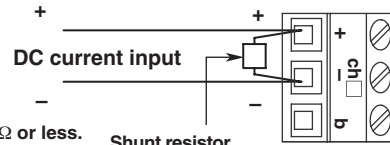
Shunt resistor
Example: For 4 to 20 mA input, use a
shunt resistor of 250 Ω ± 0.1%.

⚠ **Note**

> **RTD input terminals A (+) and B (–) are isolated on each channel. Terminal b is shorted internally across all channels.**

Attaching and Detaching the Terminal Block Unit

To detach the terminal block unit, check that the power is turned OFF, and open the attach/detach lever to the outside. To attach the terminal block unit, align the connector, and press the unit in until the attach/detach lever returns to the original position.

Terminal block unit

Attach/Detach lever

Connector

Attach/Detach lever
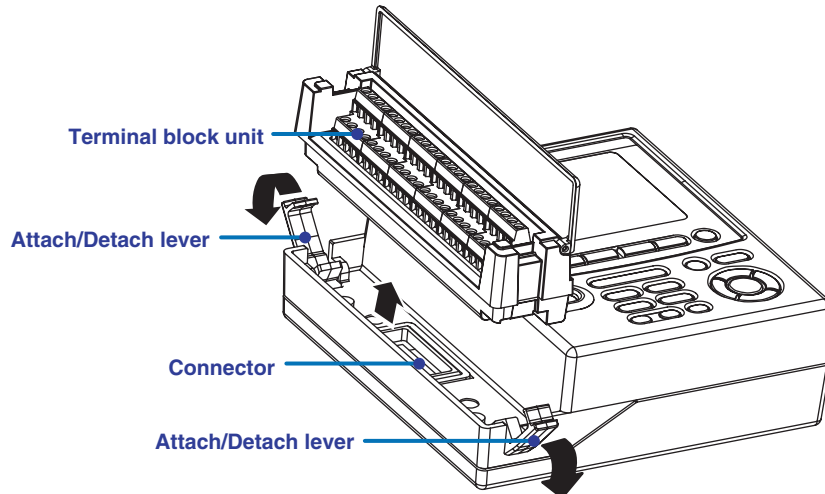
⚠ **Note**

> **The XL100 stops the operation if the terminal block unit is detached while the power is turned ON. If this happens, the XL100 recovers by turning the power ON again.**

3.4 Wiring the Pulse Input, Logic Input, and Signal Cables

⚠ **CAUTION**

- **Do not apply an input exceeding the following values.**
  Pulse input or logic input: 10 V. Alarm output: 40 V

- **If a strong tension is applied to the cable wired to the terminal, the terminals and/or the cable can be damaged. Allow extra wire for the input signal cable so that direct tension is not applied to the input terminals of the terminal block.**

- **For wiring, use the dedicated digital I/O cable (91029).**

Connector Position and Digital I/O Cable Connection

The pulse input, logic input, and alarm output signals are output from the digital I/O connector as shown below. Attach the digital I/O cable connector to the digital I/O connector.

Digital I/O connector

Connector of the digital I/O cable

Connector Pin Arrangement

No.1   No.7

No.8   No.14
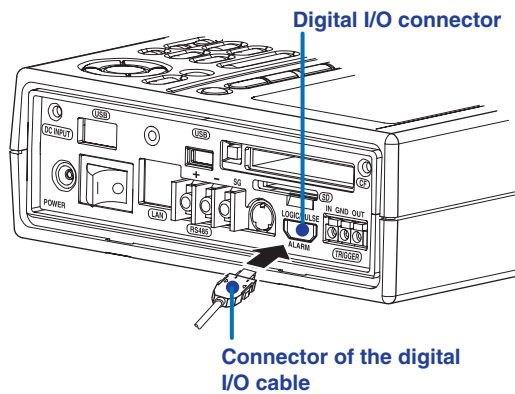
Signal name	Symbol	Pin Number
Logic input 1	L1	8
Logic input 2	L2	1
Pulse input	PLS	10
Alarm output 1	AL1	11
Alarm output 2	AL2	4
Alarm output 3	AL3	12
Alarm output 4	AL4	5
Common GND	GND	6, 7, 13, 14

Digital I/O cable (sold separately. part number: 91029)

Connect the wires according to the figure below.

Gray	: L1	**Logic input**
Brown	: L2	
Black	: PLS	**Pulse input**
Peach	: AL1	**Alarm output**
Yellow	: AL2	
Light blue	: AL3	
Green	: AL4	
Blue	: GND	**Common GND**
Purple	: GND	
Bright green	: GND	
Light orange	: GND	
Shield		
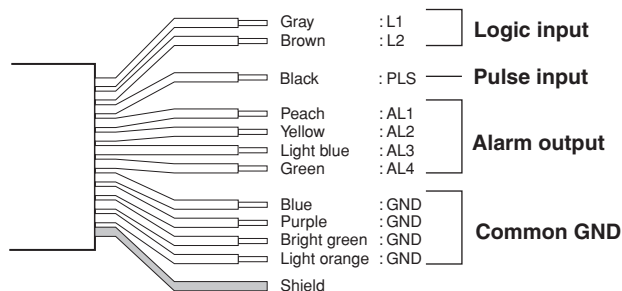
Output Signal Specifications

Open collector, 5-V pull-up resistance 100 kΩ
Contact capacity: 5 to 40 V, 100 mA

3.5 Wiring the External I/O Signal Cables

⚠ CAUTION

- **Applying voltage outside the allowable input voltage (–0.5 to 10 V) to the signal input terminal may damage the internal circuitry.**
- **If the trigger mode is set to Continuous, apply the trigger input signal at an interval greater than or equal to 30 s.**
- **When connecting the cables, be sure not to reverse the connection to the input and output terminals.**

Position of the External Trigger I/O Terminal

The terminal is located on the right side panel at the position indicated below.

External trigger input/output terminal
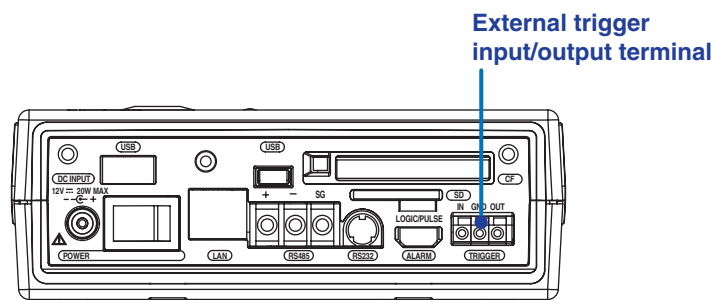
Wiring Diagram

• **When applying a trigger input signal to a single station**
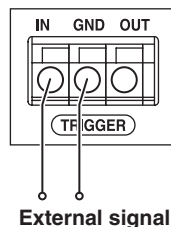
External signal

• **When synchronizing multiple stations by applying an external trigger input signal**
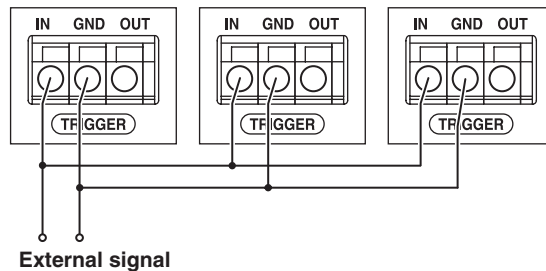
External signal

• **When synchronizing stations 2 and 3 using the trigger output signal from station 1**
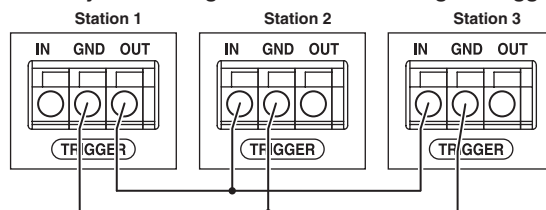
Trigger Input Signal Specifications

Apply the signal using 0 V (low) and 5 V (high).

*   Input level: Low 0.0 to 0.8 V. High 2.0 to 5.0 V
*   Allowable voltage: −0.5 to 10 V

Signal Wires That Can Be Used

*   Compliant wire   Single wire: $\phi1.0$ (AWG 18). Stranded wire: 0.75 mm^2
*   Allowable wire   Single wire: $\phi0.4$ to 1.0 (AWG 26 to 18)

    Stranded wire: 0.3 to 0.75 mm^2 (AWG 22 to 20)

    Stranded wire diameter: $\phi0.18$ or greater

    standard length of stripped wire: 10 mm

Connecting the Signal Wires

To connect the signal wire, insert the signal wire while pushing in the rectangular section above the terminal with a flat-blade screwdriver and then pull the screwdriver out.
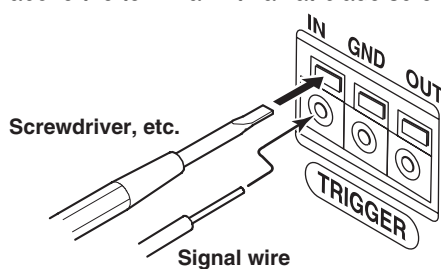
3.6 Connecting the Power Supply

Use the AC adapter supplied with the XL100 when connecting the XL100 to a power supply.

⚠ WARNING

- **Use only the power cord supplied by YOKOGAWA Meters & Instruments for the XL100.**
- **Check that the power source voltage matches the supply voltage rating (100 to 240 VAC), and then connect the power cord.**
- **Check that the power switch of the XL100 is turned OFF and then connect the power cord.**
- **If the XL100 is not used for a prolonged period, disconnect the AC adapter power cord from the outlet.**
- **Use only the AC adapter (94010) for the XL100.**
- **Do not place any objects on the AC adapter or power cord, and do not let the power cord come into contact with a heat generating object.**
- **When unplugging the power cord from the outlet, never pull the cord itself. Always hold and pull by the plug. If the power cord is damaged, contact your vendor for replacement.**

Connecting the AC Adapter

Follow the steps below to connect the AC adapter.

1. Check that the power switch is OFF.
2. Connect the AC adapter to the AC adapter jack of the XL100.
3. Connect the plug of the power cord supplied with the AC adapter to the power connector of the AC adapter.
4. Connect the other end of the power cord to the power outlet that meets the power rating (requirements).

AC Adapter's Power Rating

Supply voltage rating	100 to 240 VAC
Allowable supply voltage range	90 to 264 VAC
Power supply frequency rating	50/60 Hz
Allowable power supply frequency range	47 to 63 Hz
Maximum input current	1.4 A
Output voltage rating of AC adapter	12.0 VDC
Maximum output current rating of AC adapter	3.0 A

AC adapter jack

4. Connect.

2. Connect.

1. Check that the power is OFF.

Power cord

AC adapter

3. Connect.
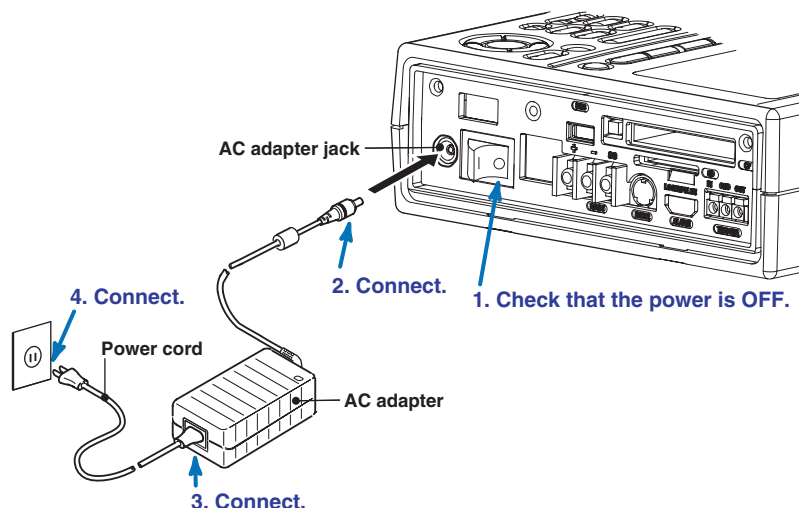
3.7 Handling of the Lithium Ion Battery (Sold Separately)

Loading the Lithium Ion Battery

If you purchased a lithium ion battery (94009), follow the steps below to load it into the XL100.

1. Loosen the battery cover attachment screw with a flat-blade screwdriver and remove the battery cover.

2. Load the battery in the direction shown in the figure below.

3. Put the battery cover back on, and tighten the attachment screw.

Battery cover attachment screw

Lithium ion battery

Terminals
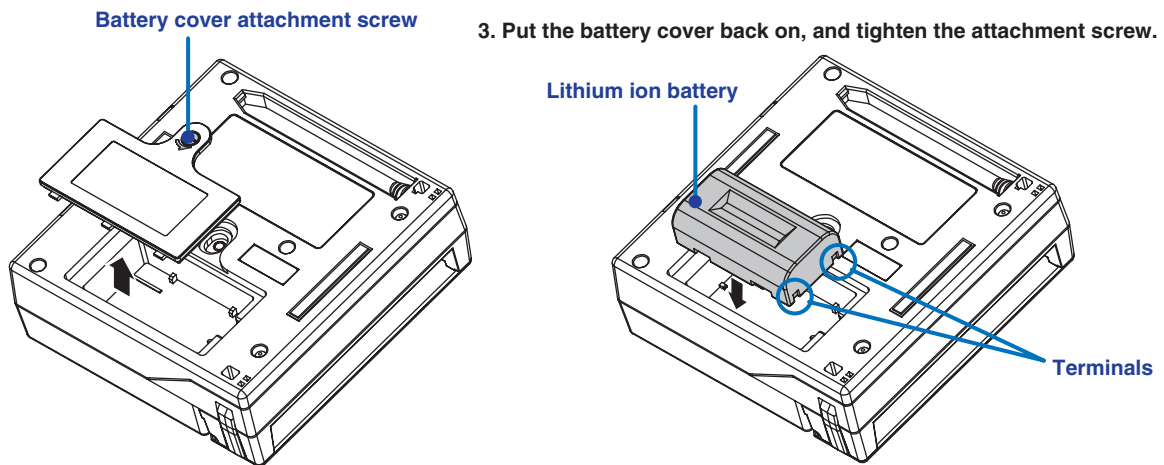
Charging the Battery

⚠ **CAUTION**

• **Be sure to charge the battery with the XL100.**
• **Charge the battery when the ambient temperature is between +10 and +35°C. If the battery is charged outside this range, the battery may be charged inadequately or may leak or generate heat.**

To start charging the battery, simply connect the XL100 to a power supply with the AC adapter with the power switch turned OFF.
While the battery is being charged, the CHARGE LED illuminates as shown below.
When it is fully charged, the LED turns OFF.

CHARGE LED
Illuminates when the battery is being charged.

POWER
CHARGE
START

HOME   REVIEW   FILE   SETTING   HOLD

KEY LOCK

Indication of the Amount of Remaining Power during Battery Operation
If the AC power is not connected and the XL100 is running on the battery, the amount of remaining power is indicated with an icon at the status display section (top section) on the display. Four levels are indicated as follows:

Indication of AC Power Operation
The icon shown below is displayed in the status display section (top section) on the display. When this icon is displayed, the XL100 is running on AC power. If the battery is not fully charged, it is charged.

3.8   Connecting Communication Cables

Connecting to the Ethernet Interface

LAN Port Position and LAN Cable Connection

Connect a LAN cable to the LAN port on the rear panel of the XL100 as shown below.

LAN port

LAN cable
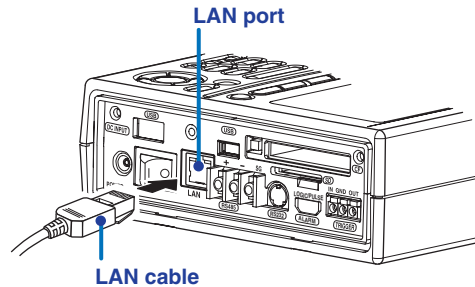
When Connecting Only the XL100 and the PC

Connect the XL100 and the PC via a HUB as shown in the following figure. If you are not going through a hub, connect the XL100 and the PC with a cross cable.

Hub

PC
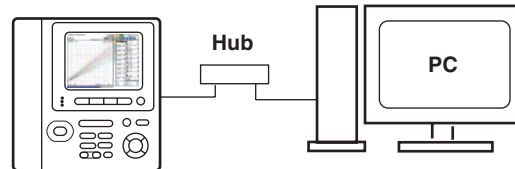
When Connecting to an Existing Network

The figure below shows an example of connecting the XL100 and the PC. When connecting the XL100 or the PC to an existing network, communication parameters such as the transfer rate and connector type must be matched. For details, consult your system or network administrator.

Ethernet

Hub

Hub

PC

PC
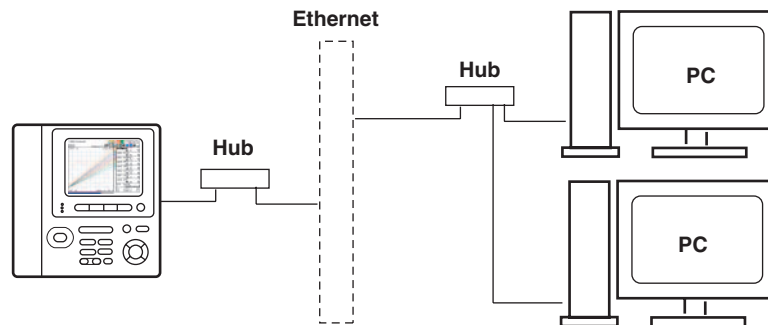
Checking the Communication Status

There are two LEDs on the LAN port that indicate the communication status.

Green LED
Illuminates when communication is possible with the connected destination.

Yellow LED
Blinks when data transmission is normal.

LAN
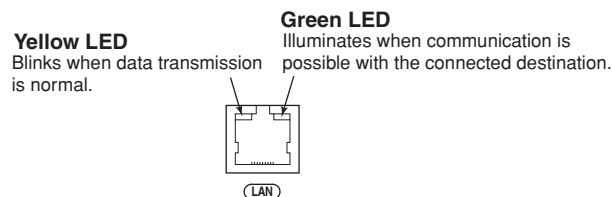
⚠ Note

If the interface is not set to LAN, do not connect the LAN cable.

Connecting the Serial Interface

RS-232

- Position of the RS-232 Connector

RS-232 connector
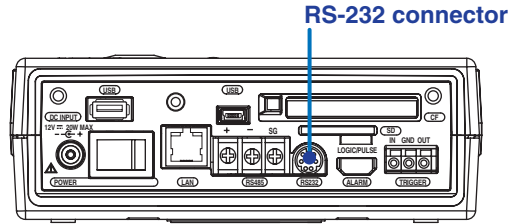
- Connector type: Mini DIN, 8 pins
- Connector pin arrangement

Pin Number	Signal Name	Meaning
1	CS (Clear to Send)	Handshaking signal when transmitting data to the connected device. This is an input signal to the XL100.
2	RD (Received Data)	Received data from the connected device. This is an input signal to the XL100.
3	RS (Request to Send)	Handshaking signal when receiving data from the connected device. This is an output signal from the XL100.
4	SD (Send Data)	Transmitted data to the connected device. This is an output signal from the XL100.
8	SG (Signal Ground)	Signal ground.

* Pins 5, 6, and 7 are not used.

- Connection methods
  - Connecting to a printer

XL100

Printer serial port (9-pin)

**Printer
(sold separately. Part No.: 97010)**

**Connection cable
(sold separately. Part No.: 91010)**   **Power switch**   **Online switch**

  - Connecting to the PC

XL100

PC

(Female)

**Communication cable
(sold separately. Part No.: 91011)**

3

Handling Precautions and Wiring
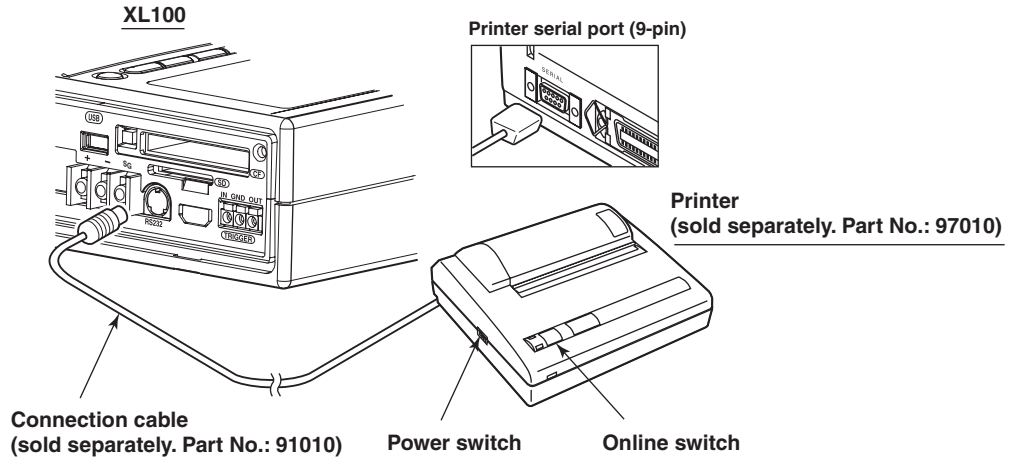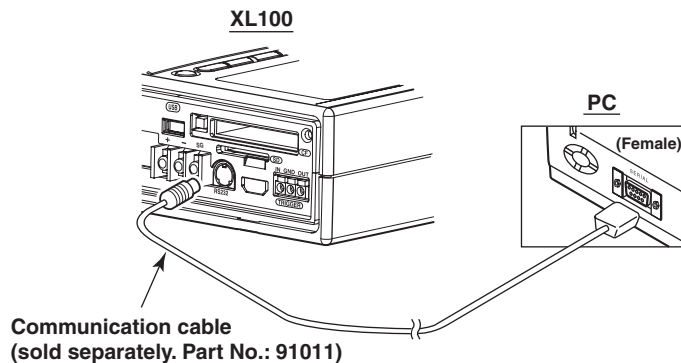
- Connecting to another measuring instrument (Modbus communication)

  The figure below shows an example when connecting the XL100 to our CW120/CW121 Clamp-on Power Meter.

XL100   **CW120/CW121**

**Connection cable
(sold separately. Part No.: 91010)**

**Communication cable
(sold separately. Part No.: 91011)**
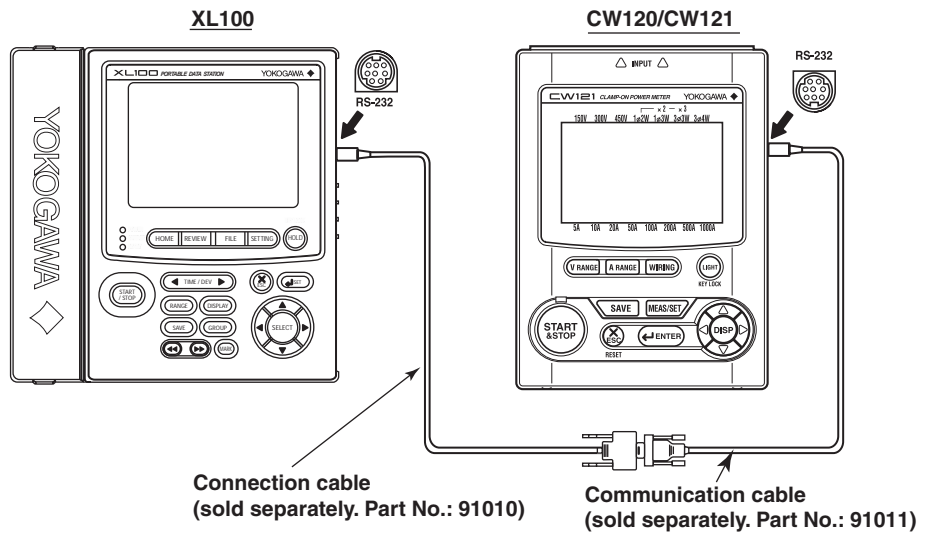
For RS-485

- Position of the RS-485 Terminal Block

RS-485 terminal block
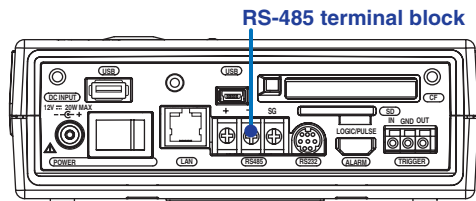
- Terminal block type: Three terminals. Clamp on with screws.
- Signal names

Signal Name	Meaning
+	Data (+).
–	Data (–).
SG (Signal Ground)	Signal ground.

- Connection methods
  - Connecting to the PC

Up to 31 stations
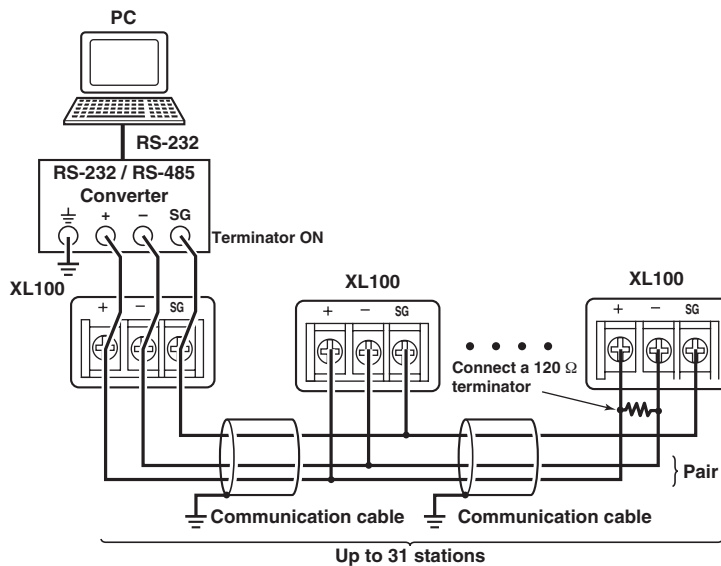
• Connecting to a measuring instrument (Modbus communication)
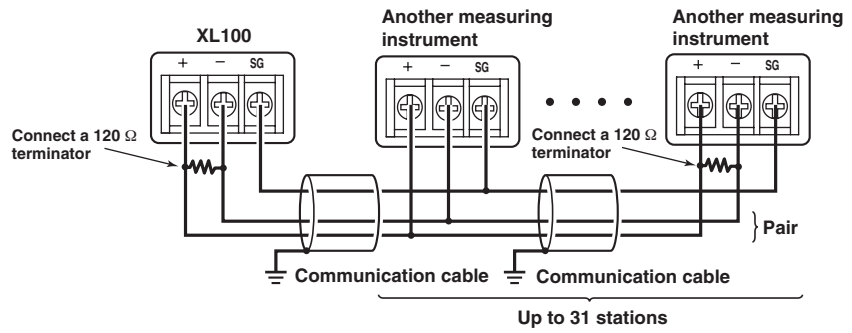
USB

• Position of the USB port for connecting to a PC

USB port for connecting a PC
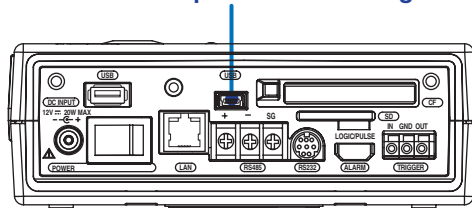
• Specifications of the USB port for connecting to a PC
Electrical/Mechanical specifications: Conforms to USB Rev 1.1
Connector type: 5-pin Mini-B receptacle

• Connecting with the PC
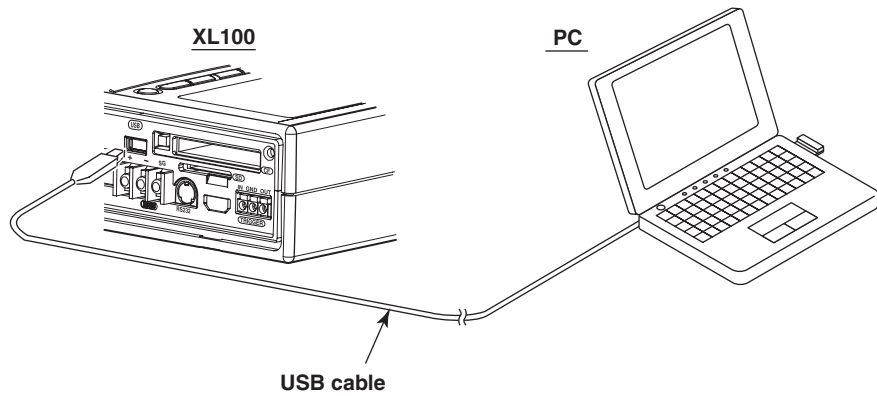
3.9 Connecting the USB Memory

> ⚠ **CAUTION**
>
> - **Use USB memories that Yokogawa Meters & Instruments have checked for compatibility.**
> - **Before removing the USB memory, check that it is not being accessed. If you remove the USB memory while it is being accessed, files stored on the USB memory or the XL100 may be damaged.**
> - **When transporting the XL100, remove the USB memory from the XL100.**

Position of the USB Port

USB port for USB memory
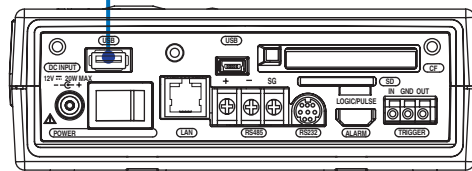
Specifications of the USB port for the USB memory

Electrical/Mechanical specifications: Conforms to USB Rev 1.1

Connector type: 4-pin type A receptacle

Connecting a USB Memory

By connecting a USB memory as shown below, the data stored to the internal memory, CF card, and SD card can be copied to the memory. In addition, if the automated measurement function is turned ON, the setup file stored in the USB memory (AUTORUN.SET) is automatically loaded, and the logging operation automatically starts.

USB memory
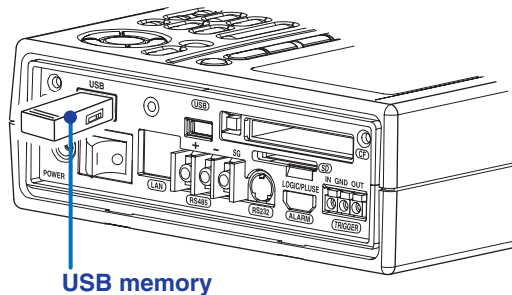
4.1   Turning ON/OFF the Power Switch

Items to Be Checked before Turning ON the Power

- Check that the instrument is installed properly (see section 3.2, "Operating Environment").
- Check that the power cord and AC adapter are connected properly (see section 3.6, "Connecting the Power Supply").

Location of the Power Switch and ON/OFF Operation

The power switch is located on the right side panel of the XL100. To turn the power ON, press the **I** (ON) side of the power switch. Press the **O** on the other side to turn the power OFF.
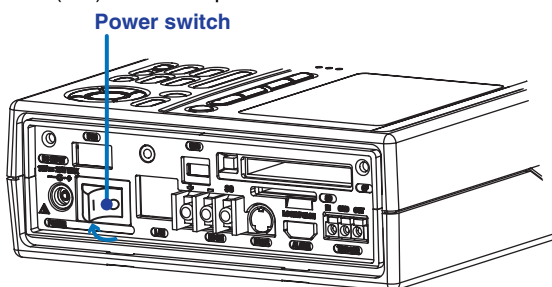
Power switch

- **Power Switch Operation When the Side Cover Is Attached**
  You can operate the power switch with the rubber boot and side cover attached by opening the power switch cover. To remove the side cover, loosen the side cover attachment screw.

Side cover attachment screw
Side cover
Open from this end.
Power switch cover
Rubber boot
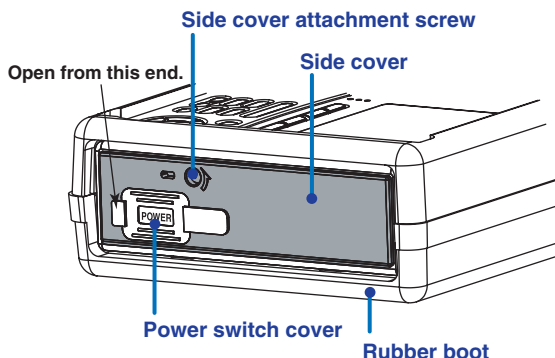
⚠ Note

- **To accurately measure the signals, let the XL100 warm up at least 30 minutes after turning the power switch ON.**
- **When turning the power OFF, check that the external storage medium is not being accessed.**

Display at Power-On

When the power is turned ON, the XL100 shows "XL100 YOKOGAWA" followed by the self-test screen. When the self-test completes normally, the XL100 shows "Self Test OK" followed by the Waveform & Digital display of Free Running Mode.

4

Basic Operation

- **When the Key Login Function Is Turned ON**
  When you press a key after the Free Running Mode display appears, a window for entering a user name and password opens. If you enter the user name and password correctly according to the explanation given in section 11.7, "Key Login/Logout Setup and Operation."

- **If a Minor Error Occurs during the Self-Test**
  The XL100 displays an error message "Self Test NG" and waits for you to acknowledge the message. If you press any key, the Free Running Mode display appears. If logging is in progress, it is aborted.

- **If a Major Error Occurs during the Self-Test**
  The XL100 displays an error message and stops the operation. If logging is in progress, it is aborted.

- **Error Messages during the Self-Test and Their Corrective Action**

Test Item	Error Display	Corrective Action
FPGA SDRAM	FPGA Check Error SDRAM Check Error	A major hardware error. Contact your vendor for repairs.
Flash file	Flash Disk Unformatted → Flash Disk Formatting	The Flash file is not formatted. The XL100 automatically formats it.*
	→ Flash Disk Format Completed	A file system error. The XL100 automatically recovers.*
RTC	RTC Check Error → RTC Initialized	An RTC error such as the stopping of the clock. The XL100 automatically initializes it. Set the date and time again, because they are reset. If this error appears every time, the internal backup battery is worn down. The user cannot replace the backup battery. Contact your vendor to have the battery replaced. The lifetime of the backup battery is approx. 10 years.
EEPROM1 EEPROM2	EEPROM1(2) Initialized (Check Sum Error)	There is a problem with the internal data, but the XL100 will function properly.
	EEPROM Initialized (Invalid Data)	There is a problem with the internal data, and the XL100 will not function properly. Contact your vendor for repairs.

* Files stored in the internal memory are cleared. Check that data can be saved correctly to the internal memory and loaded.

4.2   Basic Key Operations

Operation Mode and Key Operations

There are six modes in the XL100 as shown below. You can switch the operation mode using the five keys, HOME, REVIEW, FILE, SETTING, and START/STOP, at the top section.
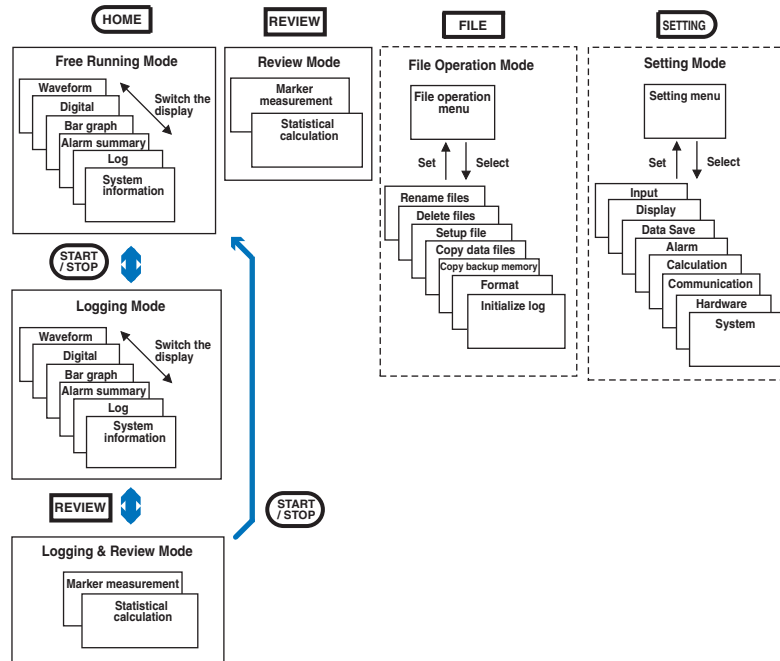
Key Operations in Free Running Mode

• **When Displaying the Waveform, Numeric Values, or Bar Graph**
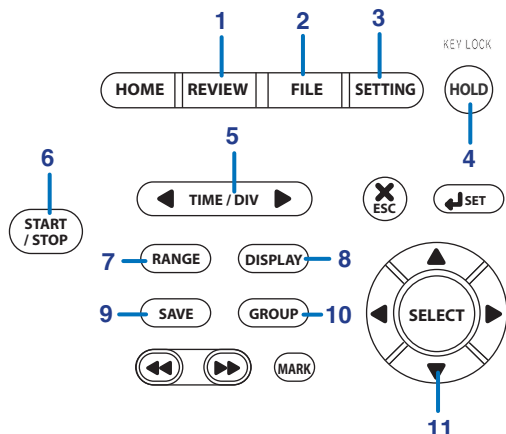
1. **REVIEW Key**

   Switches to Review Mode in which saved data can be analyzed.

2. **FILE Key**

   Switches to File Operation Mode in which saved measured data can be loaded, file can be renamed, measured data can be copied, and setup data can be saved or loaded.

3. **SETTING Key**

   Switches to Setting Mode in which measurement conditions, save conditions of measured data, and alarm conditions are specified.

4. **HOLD Key**

   Stops the display updating. Press the key again to resume display updating.

   Hold the key down to enable key lock. Hold the key down again to disable key lock.

5. **TIME/DIV Key**

   Press this key to switch the time scale (the time per grid (division)).

6. **START/STOP Key**

   Starts the logging operation (saving of the measured data) if a trigger is not set. If a trigger is set, the XL100 enters the logging standby state. If you press this key while the logging operation is in progress, the operation stops.

7. **RANGE Key**

   Displays a window for setting the upper and lower limits of the range or span on the active (selected) channel.

8. **DISPLAY Key**

   Displays a pop-up menu for switching the display.

9. **SAVE Key**

   Saves or prints the measured data (or screen data).

10. **GROUP Key**

    Switches the channel display group each time you press the key in the following order: Group 1, Group 2, Group 3, Group 4, Group 1, and so on.

11. **Arrow Keys**

    ↑/←:   Switches the active channel to a channel of the next smaller number. If the channel of the smallest number is active, the channel of the largest number is activated.

    ↓/→:   Switches the active channel to a channel of the next larger number. If the channel of the largest number is active, the channel of the smallest number is activated.

• **When Displaying the Alarm Summary/Log**

1. REVIEW Key

Switches to Review Mode in which saved data can be analyzed.

2. FILE Key

Switches to File Operation Mode in which saved measured data can be loaded, file can be renamed, measured data can be copied, and setup data can be saved or loaded.

3. SETTING Key

Switches to Setting Mode in which measurement conditions, save conditions of measured data, and alarm conditions are specified.

4. DISPLAY Key

Displays a pop-up menu for switching the display.

5. SAVE Key

•   When displaying the alarm summary
     Saves or prints the alarm summary data (or screen image data).
•   When displaying the log
     Saves or prints the log data (or screen image data).

6. Arrow Keys

•   When displaying the alarm summary
     ↑/←:   Switches the active alarm (highlighted alarm) to the next higher alarm. If the highest alarm is active, the lowest alarm is activated.
     ↓/→:   Switches the active alarm to the next lower alarm. If the lowest alarm is active, the highest alarm is activated.
•   When displaying the log
     ↑/←:   Switches the active log item (highlighted log item) to the next higher log item. If the highest log item is active, the lowest log item is activated.
     ↓/→:   Switches the active log item to the next lower log item. If the lowest log item is active, the highest log item is activated.

7. SELECT Key

Shows the review display containing the selected alarm information when displaying the alarm summary.

Key Operations in Logging Mode

• **When Displaying the Waveform, Numeric Values, or Bar Graph**
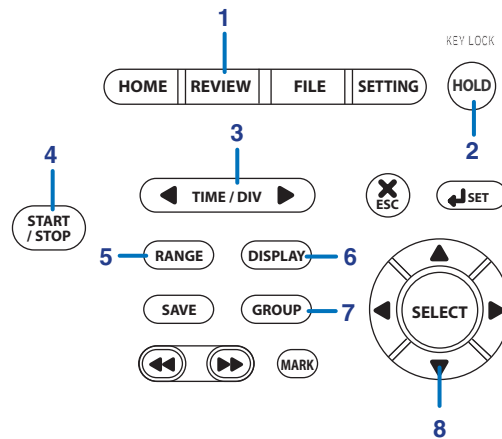
1. **REVIEW Key**

   Switches to Logging & Review Mode in which the current and past data are shown on split screens.

2. **HOLD Key**

   Stops the display updating. Press the key again to resume display updating.

   Hold the key down to enable key lock. Hold the key down again to disable key lock.

3. **TIME/DIV Key**

   Press this key to switch the time scale (the time per grid).

4. **START/STOP Key**

   Stops logging and switches to Free Running Mode.

5. **RANGE Key**

   Displays a window containing the upper and lower limits of the range or span on the active (selected) channel. The settings cannot be changed while the logging operation is in progress.

6. **DISPLAY Key**

   Displays a pop-up menu for switching the display.

7. **GROUP Key**

   Switches the channel display group each time you press the key in the following order: Group 1, Group 2, Group 3, Group 4, Group 1, and so on.

8. **Arrow Keys**

   ↑/←: Switches the active channel to a channel of the next smaller number. If the channel of the smallest number is active, the channel of the largest number is activated.

   ↓/→: Switches the active channel to a channel of the next larger number. If the channel of the largest number is active, the channel of the smallest number is activated.

• **When Displaying the Alarm Summary/Log**
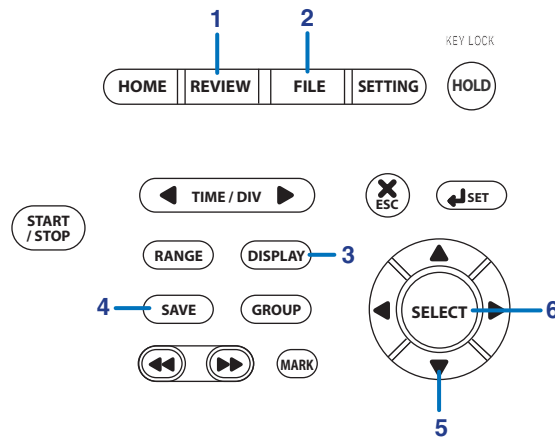
1. REVIEW Key

Switches to Logging & Review Mode in which the current and past data are shown on split screens.

2. FILE Key

Switches to File Operation Mode in which saved measured data can be loaded, file can be renamed, measured data can be copied, and setup data can be saved or loaded.

3. DISPLAY Key

Displays a pop-up menu for switching the display.

4. SAVE Key

•   When displaying the alarm summary

    Saves or prints the alarm summary data (or screen image data).

•   When displaying the log

    Saves or prints the log data (or screen image data).

5. Arrow Keys

•   When displaying the alarm summary

    ↑/←:   Switches the active alarm (highlighted alarm) to the next higher alarm. If the highest alarm is active, the lowest alarm is activated.

    ↓/→:   Switches the active alarm to the next lower alarm. If the lowest alarm is active, the highest alarm is activated.

•   When displaying the log

    ↑/←:   Switches the active log item (highlighted log item) to the next higher log item. If the highest log item is active, the lowest log item is activated.

    ↓/→:   Switches the active log item to the next lower log item. If the lowest log item is active, the highest log item is activated.

6. SELECT Key

Shows the review display containing the selected alarm information when displaying the alarm summary.

Key Operations in Review Mode
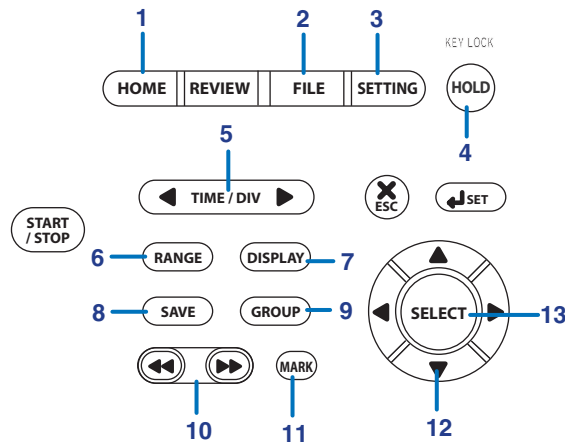
1. **HOME Key**

   Switches to Free Running Mode in which instantaneous values are measured.

2. **FILE Key**

   Switches to File Operation Mode in which saved measured data can be loaded, file can be renamed, measured data can be copied, and setup data can be saved or loaded.

3. **SETTING Key**

   Switches to Setting Mode in which measurement conditions, save conditions of measured data, and alarm conditions are specified.

4. **HOLD Key**

   Stops the display updating. Press the key again to resume display updating.
   Hold the key down to enable key lock. Hold the key down again to disable key lock.

5. **TIME/DIV Key**

   Press this key to switch the time scale (the time per grid).

6. **RANGE Key**

   Displays a window containing the upper and lower limits of the range or span on the active (selected) channel. The settings cannot be changed while the logging operation is in progress.

7. **DISPLAY Key**

   Switches between the marker display and statistical calculation display each time you press the key.

8. **SAVE Key**

   Saves or prints the measured data (or screen data) between markers A and B.

9. **GROUP Key**

   Switches the channel display group each time you press the key in the following order: Group 1, Group 2, Group 3, Group 4, Group 1, and so on.

10. **Fast Forward Key**

    Moves the active marker left or right by 1 division.

11. **MARK Key**

    Switches the active marker in the following order: A, B, A&B, and ALM.

12. **Arrow Keys**

    ↑/↓:   Switches the active channel to a channel of the next smaller or larger number. If the channel of the smallest or largest number is active, the channel of the largest or smallest number is activated.

    ←/→: Moves the active marker horizontally. Hold down the key to move the marker quickly. If the active marker is ALM, pressing these keys moves the active marker to the previous or next alarm.

13. **SELECT Key**

    Displays the review file load window when the SELECT FILE box is selected.

Key Operations in Logging & Review Mode
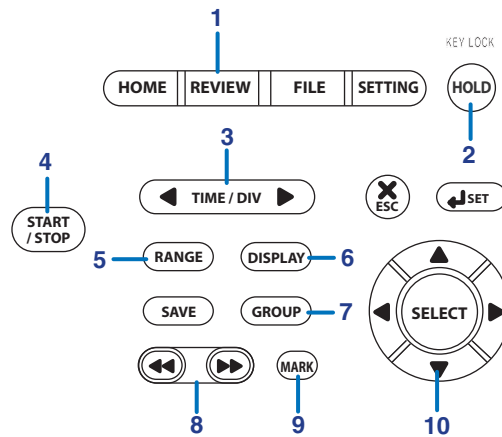
1. **REVIEW Key**

   Switches to Logging Mode.

2. **HOLD Key**

   Hold the key down to enable key lock. Hold the key down again to disable key lock.

3. **TIME/DIV Key**

   Press this key to switch the time scale (the time per grid).

4. **START/STOP Key**

   Stops logging and switches to Free Running Mode.

5. **RANGE Key**

   Displays a window containing the upper and lower limits of the range or span on the active (selected) channel. The settings cannot be changed while the logging operation is in progress.

6. **DISPLAY Key**

   Switches between the marker display and statistical calculation display each time you press the key.

7. **GROUP Key**

   Switches the channel display group each time you press the key in the following order: Group 1, Group 2, Group 3, Group 4, Group 1, and so on.

8. **Fast Forward Key**

   Moves the active marker left or right by 1 division.

9. **MARK Key**

   Switches the active marker in the following order: A, B, A&B, and ALM.

10. **Arrow Keys**

    ↑/↓: Switches the active channel to a channel of the next smaller or larger number. If the channel of the smallest or largest number is active, the channel of the largest or smallest number is activated.

    ←/→: Moves the active marker horizontally. Hold down the key to move the marker quickly. If the active marker is ALM, pressing these keys moves the active marker to the previous or next alarm.

Key Operations in the Setting Mode
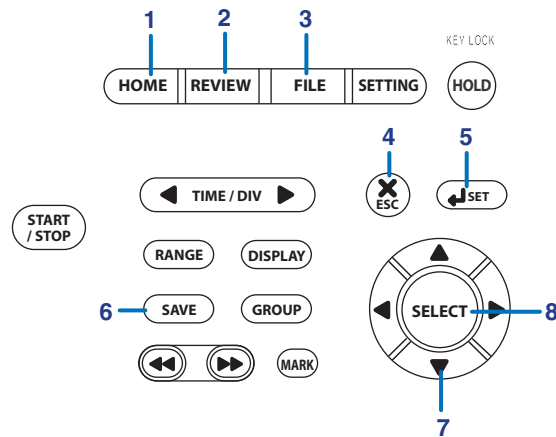
1. **HOME Key**

   Switches to Free Running Mode in which instantaneous values are measured.

2. **REVIEW Key**

   Switches to Review Mode in which saved data can be analyzed.

3. **FILE Key**

   Switches to File Operation Mode in which saved measured data can be loaded, file can be renamed, measured data can be copied, and setup data can be saved or loaded.

4. **ESC Key**

   Cancels the settings and moves one level higher.

5. **SET Key**

   Sets the settings and moves one level higher.

6. **SAVE Key**

   Saves or prints the screen image data.

7. **Arrow Keys**

   ↑/←: Switches the active item to the next higher item. If the highest item is active, the lowest item is activated.

   ↓/→: Switches the active item to the next lower item. If the lowest item is active, the highest item is activated.

8. **SELECT Key**

   • When a menu item is selected using the arrow keys
     Shows the setting display of the selected item.
   • When a channel is selected using the arrow keys
     Shows the detailed setting display of the channel.
   • When an item that is set with the drop-down menu is selected
     Shows a drop-down menu.
   • When an item that is set by entering characters is selected
     Shows the character entry window.
   • When a numeric item is selected
     Shows the numeric entry window.

Key Operations in File Operation Mode
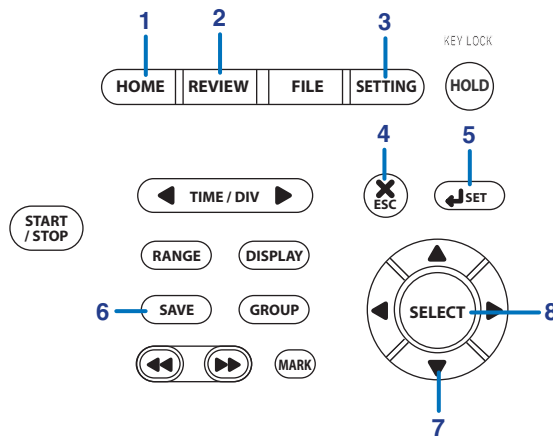
1. HOME Key

Switches to Free Running Mode in which instantaneous values are measured.

2. REVIEW Key

Switches to Review Mode in which saved data can be analyzed.

3. SETTING Key

Moves to the top setting display.

4 ESC Key

Cancels the selected procedure and moves one level higher.

5. SET Key

Executes the selected procedure and moves one level higher.

6. SAVE Key

Saves or prints the screen image data.

7. Arrow Keys

↑/←:   Switches the active item to the next higher item. If the highest item is active, the lowest item is activated.

↓/→:   Switches the active item to the next lower item. If the lowest item is active, the highest item is activated.

8. SELECT Key

Selects the active item and moves one level higher.

4

Basic Operation

Key Operations for Entering Characters

When entering characters, a character entry window opens as shown below.

- Entering alphabet characters
- Entering values and symbols

CHARACTER INPUT

A B C D E F G H I J K L M N O
P Q R S T U V W X Y Z
a b c d e f g h i j k l m n o
p q r s t u v w x y z

A 0 DEL BS

▲ ▼ ◀ ▶ : SELEC
◀◀ ▶▶ : MOVE INPUT CURSOR
(SET) SET   (ESC) CANCEL

→ Character entry area
→ Character selection area
→ Backspace
→ Delete
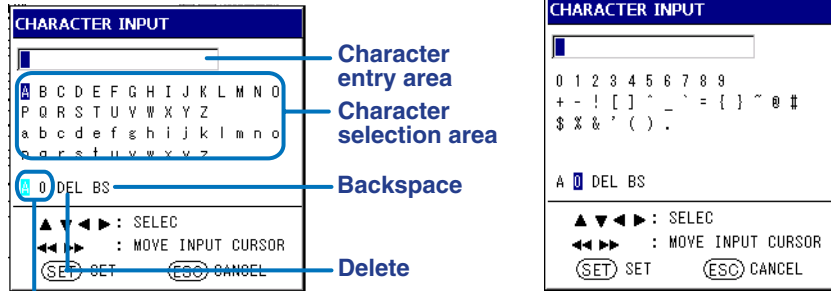
Character type selection area
(A: alphabet characters.
 0: numeric characters and symbols)

CHARACTER INPUT

0 1 2 3 4 5 6 7 8 9
+ - ! [ ] ^ _ ` = { } ~ @ #
$ % & ' ( ) .

A 0 DEL BS

▲ ▼ ◀ ▶ : SELEC
◀◀ ▶▶ : MOVE INPUT CURSOR
(SET) SET   (ESC) CANCEL

The key operations when the character entry window is open are described below.

1
2
3
4
5
6

START / STOP
◀ TIME / DIV ▶
RANGE   DISPLAY
SAVE   GROUP
◀◀ ▶▶   MARK
ESC
SET
▲ ◀ SELECT ▶ ▼
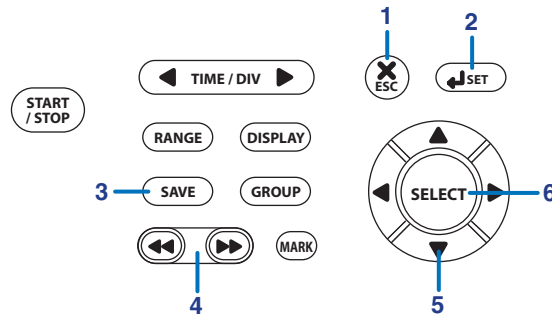
1. ESC Key

Cancels the settings and closes the window.

2. SET Key

Sets the entered characters.

3. SAVE Key

Saves or prints the screen image data.

4. Fast Forward Key

Moves the cursor in the character entry area left or right by one character.

5. Arrow Keys

↑/←: Switches the active item (highlighted item) to the next higher item. If the highest item is active, the lowest item is activated.

↓/→: Switches the active item to the next lower item. If the lowest item is active, the highest item is activated.

6. SELECT Key

Confirms the character type that is selected using the arrow keys or enters the character.

Key Operations for Entering Values

When entering values, a value entry window opens as shown below.

```
NUMERIC INPUT
VALUE:      [    - 200.0]
RANGE:      [-200.0~1000.0]

  ▲ ▼: CHANGE
  ◄ ►: MOVE
 (SET) SET      (ESC) CANCEL
```
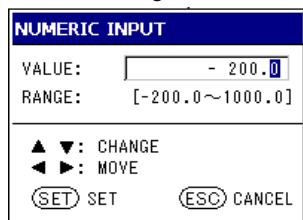
The key operations when the value entry window is open are described below.
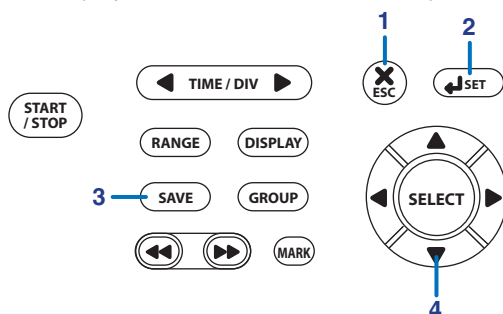
1. ESC Key

Cancels the settings and closes the window.

2. SET Key

Sets the value.

3. SAVE Key

Saves or prints the screen image data.

4. Arrow Keys

↑:   Increments the value at the selected digit. Pressing this key when the value is 9 sets the value to 0. The value does not exceed the setting range.

↓:   Decrements the value at the selected digit. Pressing this key when the value is 0 sets the value to 9. The value does not exceed the setting range.

←:   Moves the selected digit one digit to the left. If the selected digit is the left most digit, the cursor moves to the right most digit.

→:   Moves the selected digit one digit to the right. If the selected digit is the right most digit, the cursor moves to the left most digit.

4

Basic Operation

4.3 Setting the Date and Time

1. Press **SETTING** to enter Setting Mode.
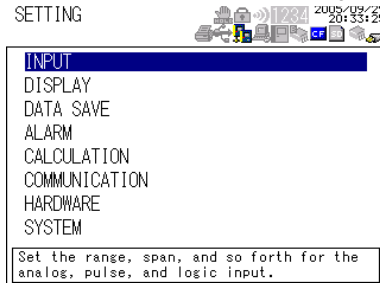
2. Use the **arrow keys** to select HARDWARE, and press **SELECT**.
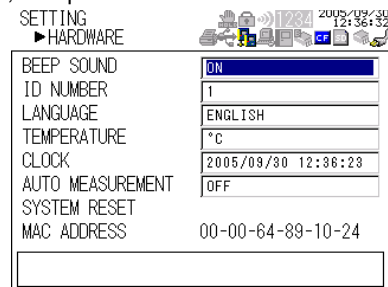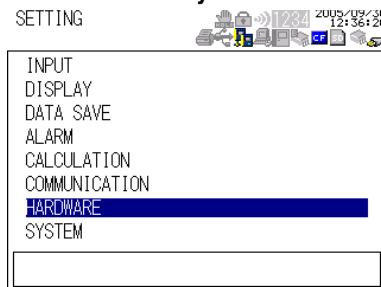
3. Use the **arrow keys** to select CLOCK, and press **SELECT**.
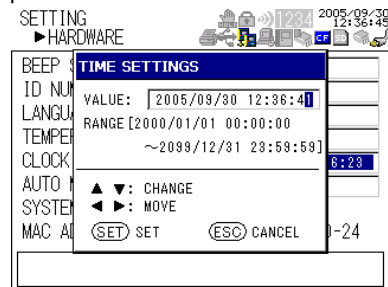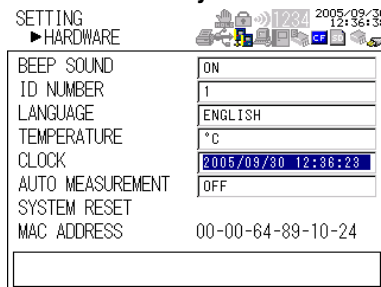
4. Use the **left and right arrow keys** to select the desired digit, and use the **up and down arrow keys** to select the value.

5. When the data and time are set to the desired values, press **SET**.
   The date/time is updated, and the TIME SETTINGS window closes.

Explanation

Display Format and Position of the Date and Time

The date and time are shown at the upper right corner of the display in the form "year/month/day hour:minute:second."

Date/Time

```
SETTING                                    2005/09/30
 ►HARDWARE                                  10:26:37
                                        CF
BEEP SOUND        ON
ID NUMBER         1
LANGUAGE          ENGLISH
TEMPERATURE       °C
CLOCK             2005/09/30 10:26:26
AUTO MEASUREMENT  OFF
SYSTEM RESET
MAC ADDRESS       00-00-64-89-10-24
```
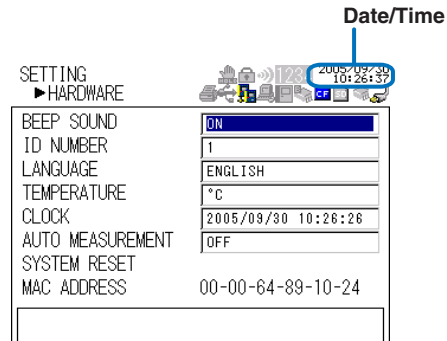
Selectable Range of Date and Time

2000/01/01 00:00:00 to 2099/12/31 23:59:59.

✋ **Note**

The date/time setting does not change even when the system is reset (settings are initialized).

4

Basic Operation

4.4 Resetting the System (Initializing the Settings)
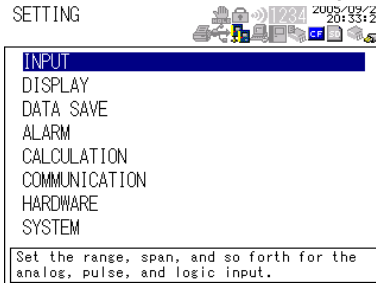
1. Press **SETTING** to enter Setting Mode.

   SETTING
   2005/09/29
   20:33:25

   INPUT
   DISPLAY
   DATA SAVE
   ALARM
   CALCULATION
   COMMUNICATION
   HARDWARE
   SYSTEM

   Set the range, span, and so forth for the
   analog, pulse, and logic input.

2. Use the **arrow keys** to select HARDWARE, and press **SELECT**.

   SETTING
   2005/10/02
   14:21:25

   INPUT
   DISPLAY
   DATA SAVE
   ALARM
   CALCULATION
   COMMUNICATION
   HARDWARE
   SYSTEM

   →

   SETTING
   ►HARDWARE
   2005/09/30
   10:26:37

   BEEP SOUND   ON
   ID NUMBER   1
   LANGUAGE   ENGLISH
   TEMPERATURE   °C
   CLOCK   2005/09/30 10:26:26
   AUTO MEASUREMENT OFF
   SYSTEM RESET
   MAC ADDRESS   00-00-64-89-10-24

3. Use the **arrow keys** to select SYSTEM RESET, and press **SELECT**.

   SETTING
   ►HARDWARE
   2005/09/30
   12:37:26

   BEEP SOUND   ON
   ID NUMBER   1
   LANGUAGE   ENGLISH
   TEMPERATURE   °C
   CLOCK   2005/09/30 12:37:21
   AUTO MEASUREMENT OFF
   SYSTEM RESET
   MAC ADDRESS   00-00-64-89-10-24

   →

   SETTING
   ►HARDWARE
   2005/09/30
   12:37:33

   BEEP SOUND   ON
   ID NU OK
   LANGU
   TEMPE Executing system reset will
          reset settings to their factory
   CLOCK default values. Continue?   7:21
   AUTO
   SYSTE (SET) OK   (ESC) CANCEL
   MAC A   10-24
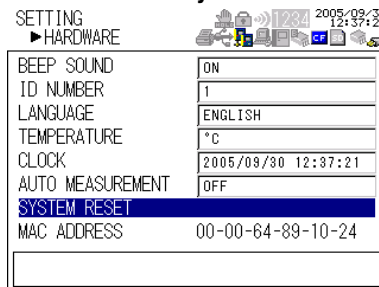
4. Press **SET**.

Resetting the System

When you carry out the steps above, the settings are reset to the factory default values.

However, the following settings are not changed even when the system is reset.

- Clock (date/time)
- ID number
- Language
- Communication settings

4.5 Setting the Display Backlight

Procedure

1. Press **SETTING** to enter Setting Mode.

   ```
   SETTING                    2005/09/29
                              20:33:25
   INPUT
   DISPLAY
   DATA SAVE
   ALARM
   CALCULATION
   COMMUNICATION
   HARDWARE
   SYSTEM
   Set the range, span, and so forth for the
   analog, pulse, and logic input.
   ```

2. Use the **arrow keys** to select DISPLAY, and press **SELECT**.

   ```
   SETTING              2005/09/30
                        12:37:49
   INPUT
   DISPLAY
   DATA SAVE
   ALARM
   CALCULATION
   COMMUNICATION
   HARDWARE
   SYSTEM
   Set the group display, etc.
   ```
   →
   ```
   SETTING              2005/09/30
    ►DISPLAY            12:37:53
   GENERAL
   GROUP
   ALARM LINE
   LCD



   Set the background color, grid display,
   etc.
   ```
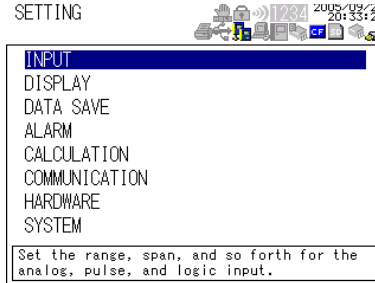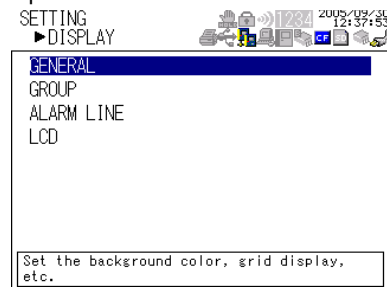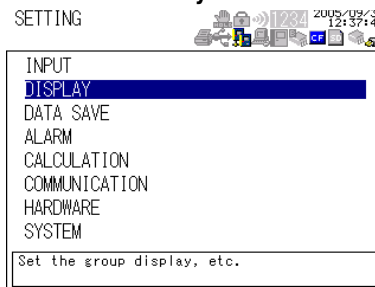
3. Use the **arrow keys** to select LCD, and press **SELECT**.

   ```
   SETTING              2005/09/30
    ►DISPLAY            12:38:06
   GENERAL
   GROUP
   ALARM LINE
   LCD




   Set the backlight auto off function.
   ```
   →
   ```
    ►DISPLAY            2005/09/30
    ►►LCD              12:38:17
   BACKLIGHT AUTO OFF  10min





   Turn OFF the backlight when there is no
   key operation for a specified time.
   ```
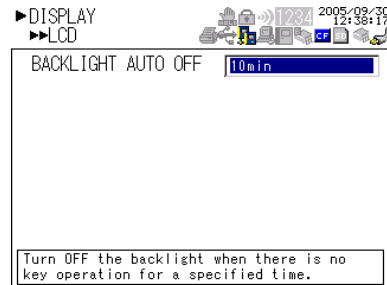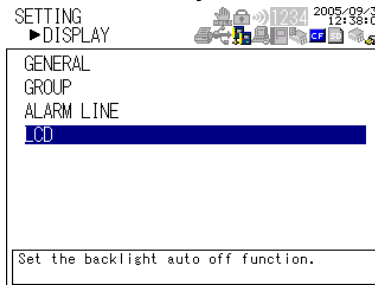
4. Press **SELECT** to show the BACKLIGHT AUTO OFF selection list.

5. Use the **arrow keys** to select the desired time, and press **SELECT**.

6. Press **SET**.

Explanation

Backlight Auto Off

This function automatically turns the LCD backlight OFF when there is no key operation for the specified time. It can prolong the lifetime of the battery and backlight.

Select the time until the LCD backlight automatically turns OFF from the values listed below. The default setting is 10 min.

OFF, 10 s, 1 min, 2 min, 5 min, 10 min, 30 min, and 60 min

TIP

• If OFF is selected, the backlight remains ON.
• Press any key when the backlight is OFF to turn the backlight ON.

4.6   Locking the Keys

To lock the keys, hold down **HOLD**. Hold down **HOLD** also to unlock the keys.
The keys cannot be locked or unlocked when displaying the alarm summary or log or during Setting Mode or File Operation Mode.

KEY LOCK

HOME | REVIEW | FILE | SETTING | HOLD

Enable/Disable key lock

START / STOP

◀ TIME / DIV ▶   ✖ ESC   ↵ SET

RANGE   DISPLAY

SAVE   GROUP   ▲ ◀ SELECT ▶ ▼

◀◀ ▶▶ MARK
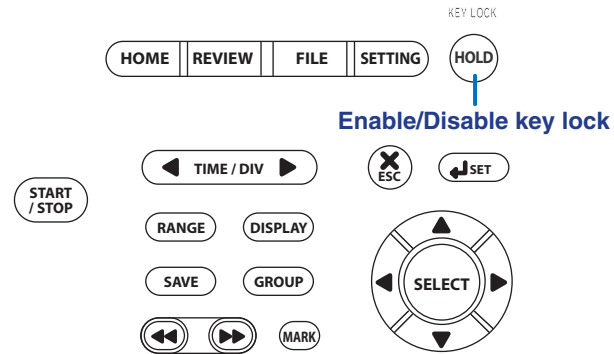
Key Lock
When the keys are locked, all key operations except the unlock operation are disabled. However, if the display backlight turns OFF while the keys are locked, pressing any key turns the backlight ON.

4.7 Inserting and Removing the External Storage Media

⚠ CAUTION

- **Use cards that Yokogawa Meters & Instruments have checked for compatibility.**
- **Before removing the card, check the following items.**
- **That the XL100 is not logging.**
- **That the card is not being accessed (the** CF **or** SD **icon on the display blinks while the card is being accessed).**
  If you remove the card while it is being accessed, files stored on the card or the XL100 may be damaged.
- **When transporting the XL100, remove the card from the XL100.**

You can use CF cards and SD cards for external storage media.

Inserting or Removing a CF Card
Insert the CF card firmly into the CF card slot on the side panel of the XL100.
To remove the CF card, press the CF card eject button to the left of the CF card slot, and pull the CF card out.

CF card eject button

CF card slot

CF card
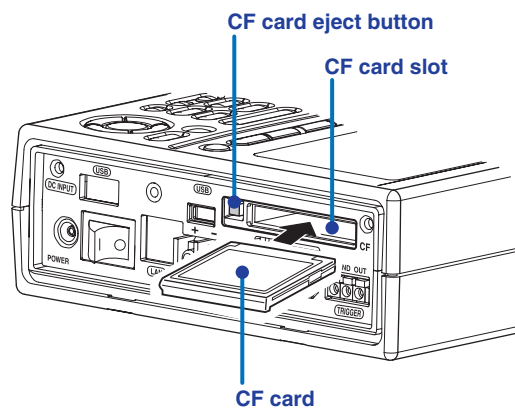
TIP

The eject button can be in a popped out or retracted condition.
- When popped out: Pressing the button disengages the card from the slot. Pull the card out.
- When retracted: Press the button to pop the button out, and then press the button again. The card is disengaged from the slot. Pull the card out.

Inserting or Removing an SD Card

Insert the SD card firmly into the SD card slot on the side panel of the XL100.

To remove the SD card, press the SD card, and then pull it out.

SD card slot

SD card
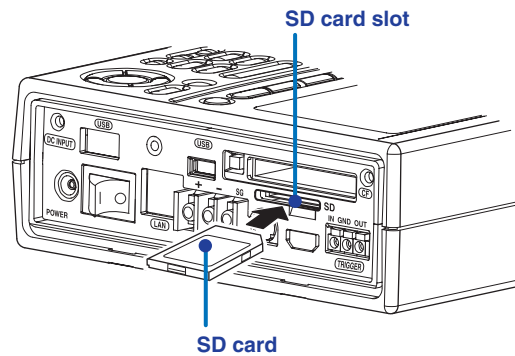
Explanation

Estimated Amount of Stored Data

The table below indicates the estimated amount of binary data that can be stored when the card capacity is 64 MB.

Sampling Interval	Number of Measurement Channels				
	1 ch	8 ch	16 ch	16 ch + 32 calculation ch	16 ch + 32 calculation ch + 32 communication ch
0.1 s	38.8 days	4.8 days	–	–	–
0.2 s	77 days	9.7 days	4.8 days	23 hours	12 hours
0.5 s	194 days	24 days	12 days	2.4 days	32 hours
1 s	1 year	48 days	24 days	4.8 days	2.6 days
2 s	2.1 years	97 days	48.5 days	9.7 days	5.3 days
3 s	5.3 years	242 days	121 days	24 days	13 days
10 s	10.6 years	1.3 years	242 days	48.5 days	26 days
20 s	21.2 years	2.6 years	1.3 years	97 days	54 days
30 s	32 years	4 years	2 years	145 days	81 days
1 minute	63.8 years	7.9 years	4 years	291 days	161 days
2 minutes	Omitted	1.59 years	7.9 years	2 years	291 days
5 minutes	Omitted	39.5 years	19.8 years	4 years	2.2 years

The figures above have been derived through calculation, and may differ from actual values.
One year is calculated as 365 days.

CF Card Type

The CF cards that can be used are Type II cards.

5.1 Setting the Analog Input Channels

Procedure

1. Press **SETTING** to enter Setting Mode.
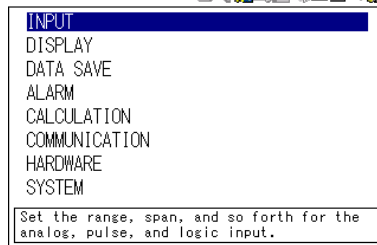
2. With INPUT selected, press **SELECT**.
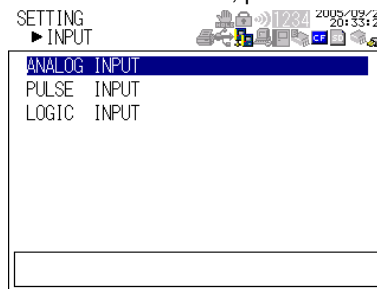
3. With ANALOG INPUT selected, press **SELECT**.
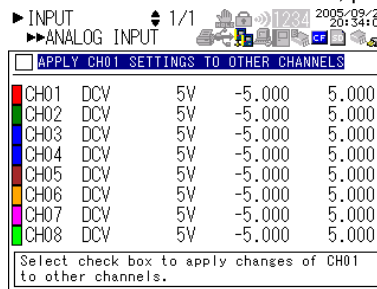
4. Use the **arrow keys** to select the desired channel, and press **SELECT**.
   On the 16-channel model, CH09 to CH16 are shown on page 2. To show page 2, press the **arrow (↓) key** after selecting CH08.

5. Use the **arrow keys** to select the desired item, and press **SELECT**.
   Press **SELECT** to show a selection list or window for setting the item.

6. Select or enter the item on the displayed selection list or window.

7. Press **SET**.

Setting All the Channels to the Same Settings

When the channel selection display is shown, use the **arrow keys** to select "Apply the CH01 settings to other channels," and press **SELECT** to select the check box. If this check box is selected, all changes (except the color) made on CH01 are applied to the other channels (CH02 to CH08). On the 16-channel model, the settings of CH9 on page 2 are applied to CH10 to CH16.

Tag

This is the character string that can be shown along with the channel number. Up to 8 characters can be used to set the tags.

Mode

This is the input type. Select DCV (DC voltage), TC (thermocouple), RDT (resistance temperature detector) The default setting is DCV. Set the channels without input signals to OFF. If you change the mode, the range and span upper and lower limit settings are reset to default values.

Range

Select the input range (type in the case of a thermocouple or RTD) from the following:

- DCV (DC voltage)

Input Range	Measurable Range	Maximum Display Resolution
100 mV	-100.00 to 100.00 mV	10 μV
500 mV	-500.0 to 500.0 mV	100 μV
1 V	-1.0000 to 1.0000 V	100 μV
5 V (default setting)	-5.000 to 5.000 V	1 mV
10 V	-10.000 to 10.000 V	1 mV
30 V	-30.00 to 30.00 V	10 mV
1-5 V/f.s.	1.000 to 5.000 V	1 mV

- TC (thermocouple)

Type	Measurable Range	Maximum Display Resolution
R	0 to 1768°C	1°C
S	0 to 1768°C	1°C
B	600 to 1800°C	1°C
K (default setting)	-200.0 to 1372.0°C	0.1°C
E	-200.0 to 1000.0°C	0.1°C
J	-200.0 to 1200.0°C	0.1°C
T	-200.0 to 400.0°C	0.1°C
N	-200.0 to 1300.0°C	0.1°C
W	0 to 2315°C	1°C
L	-200.0 to 900.0°C	0.1°C
U	-200.0 to 400.0°C	0.1°C

- RTD (resistance temperature detector)

Type	Measurable Range	Maximum Display Resolution
Pt100	-200.0 to 850.0°C	0.1°C
JPt100 (default setting)	-200.0 to 500.0°C	0.1°C

⚠ Note

When the input type is DC voltage, over range occurs when the measured value exceeds ±10% of the input range. For thermocouple or RTD input, over range occurs when the measured value exceeds approximately ±10°C of the measurable range. When an over range occurs, the display shows "+***" or "–*****."**

Span Upper/Lower

Set the upper and lower limits of the display span within the measurable range indicated above. The default span lower limit is the lower limit of each range; the default span upper limit is the upper limit of each range. The span lower limit and span upper limit cannot be set to the same value.

Color

For each channel, select the color from the choices below: The color applies to both waveform and bar graph.

Red, green, blue, blue violet, brown, orange, yellow-green, light blue, violet, gray, lime, blue green, dark blue, yellow, olive, and purple.

The default settings are as follows: CH1: red, 2: green, 3: blue, 4: blue violet, 5: brown, 6: orange, 7: yellow-green, 8: light blue, 9: violet, 10: gray, 11: lime, 12: blue green, 13: dark blue, 14: yellow, 15: olive, and 16: purple

Line width

Set the waveform line width to 1dot (thin), 2dot (medium), or 3dot (thick). The default setting is 1dot.

Average

Sets the average function. Select the number of sampled data values for taking the moving average. The default setting is 1.

1, 2, 5, 10, or 20

Scaling

Sets the items below. The decimal place, scale lower limit, scale upper limit, and unit take effect when the scaling function is turned ON. The measured values are scaled to a span derived by the difference between the scale upper limit and scale lower limit with the decimal point removed. For example, if the scale is set to –5 to 5, the measured values are scaled to a span of 10. If the scale is set to –5.0 to 5.0, the measured values are scaled to a span of 100. In this case, the resolution of the value scaled to a span of 10 is lower than the value scaled to a span of 100.

Item	Setting		
Scaling function ON/OFF	ON or OFF. The default setting is OFF.		
Decimal place	X.XXXX (default setting), XX.XXX, XXX.XX, XXXX.X, or XXXXX		
Scale lower limit*	-30000 to 30000. The default setting is -3.0000.		
Scale upper limit*	-30000 to 30000. The default setting is 3.0000.		
Unit	Length	mm (default setting), cm, m, or km
	Area	mm2 (default setting), cm2, or m2
	Volume	mm3 (default setting), cm3, m3, cc, ml, l, or kl
	Velocity	mm/s (default setting), mm/min, mm/h, cm/s, cm/min, cm/h, m/s, m/min, m/h, km/s, km/min, or km/h
	Acceleration	m/s2 (default setting), km/h2, Gal, or G
	Frequency	mHz (default setting), Hz, kHz, or rpm
	Weight	mg (default setting), g, kg, t, N, or kgf
	Work	mW (default setting), W, kW, PS, HP, J, Wh, or cal
	Pressure	kgf/cm2 (default setting), Pa, kPa, or MPa
	Flow rate	m3/s (default setting), m3/min, m3/h, t/s, t/min, t/h, ls, l/min, l/h, kg/s, kg/min, kg/h, kl/s, kl/min, kl/h, cc/s, cc/min, or cc/h
	Temperature	°C (default setting), K, or °F
	Voltage and current	
		mV (default value), V, kV, MV, mA, A, kA, MA
	Power	mW (default value), W, kW, MW, mvar, var, kvar, Mvar, mVA, VA, kVA, MVA, deg
	Watt hour	Wh (default value), kWh, MWh, varh, kvarh, Mvarh
	Any	Up to six characters. The default setting is the unit of the range selected in the range setting.

* The scale lower limit and scale upper limit cannot be set to the same value.

5

Setting the Input Channels

SEE ALSO

For a description of the analog input wiring, see "Analog Input" in section 3.3, "Wiring the Input Signal Cable."

5.2 Setting the Pulse Input Channel

Procedure

1. Press **SETTING** to enter Setting Mode.
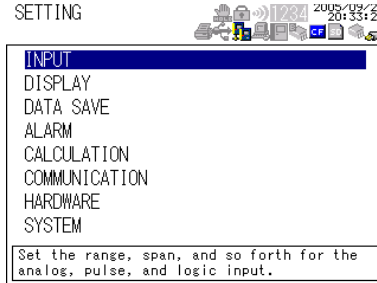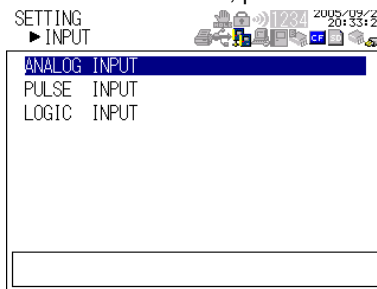
   ```
   SETTING                    2005/09/29
                                20:33:25
   ┌─────────────────────────────────────┐
   │ INPUT                                │
   │ DISPLAY                              │
   │ DATA SAVE                            │
   │ ALARM                                │
   │ CALCULATION                          │
   │ COMMUNICATION                        │
   │ HARDWARE                             │
   │ SYSTEM                               │
   ├─────────────────────────────────────┤
   │ Set the range, span, and so forth for the │
   │ analog, pulse, and logic input.      │
   └─────────────────────────────────────┘
   ```

2. With INPUT selected, press **SELECT**.

   ```
   SETTING                    2005/09/29
    ▶ INPUT                     20:33:28
   ┌─────────────────────────────────────┐
   │ ANALOG INPUT                         │
   │ PULSE  INPUT                         │
   │ LOGIC  INPUT                         │
   │                                      │
   │                                      │
   │                                      │
   │                                      │
   │                                      │
   ├─────────────────────────────────────┤
   │                                      │
   └─────────────────────────────────────┘
   ```

3. Use the **arrow keys** to select PULSE INPUT, and press **SELECT**.

   ```
   SETTING              2005/09/30        ▶ INPUT       ↕ 1/2        2005/09/30
    ▶ INPUT               14:04:25        ▶▶PULSE  INPUT              15:08:33
   ┌───────────────────────────┐        ┌───────────────────────────────┐
   │ ANALOG INPUT              │        │ TAG                           │
   │ PULSE  INPUT              │        │ MODE            OFF           │
   │ LOGIC  INPUT              │   →    │ RANGE                         │
   │                           │        │ SPAN LOWER                    │
   │                           │        │ SPAN UPPER                    │
   │                           │        │ COLOR           ■ RED         │
   │                           │        │ LINE WIDTH      1dot          │
   │                           │        ├───────────────────────────────┤
   │                           │        │ Set the tag. (max 8 characters)│
   └───────────────────────────┘        └───────────────────────────────┘
   ```

4. Use the **arrow keys** to select the desired item, and press **SELECT**.
   Press **SELECT** to show a selection list or window for setting the item.

5. Select or enter the item on the displayed selection list or window.

6. Press **SET**.

Explanation

Tag

This is the character string that can be shown along with the channel number. Up to 8 characters can be used to set the tags.

Mode

This is the input type. Select Instantaneous, Integrated Value, or Revolution. Set the channels without input signals to OFF (default setting). If you change the mode, the range and span upper and lower limit settings are reset to default values.

Range

Select the input range from the table below.

Input Type	Range	Maximum Number of Input Pulses	Maximum Display Resolution
Pulse (instantaneous value)	None	50 k/sampling interval	1 c
Pulse (integrated value)*	50 kc/f.s. 500 kc/f.s. 5 Mc/f.s. 50 Mc/f.s. 500 Mc/f.s.	50 k/sampling interval	1 c 10 c 100 c 1 kc 10 kc
Number of revolutions	500 rpm/f.s. 5 krpm/f.s. 50 krpm/f.s. 500 krpm/f.s.	50 k/sec (Counts the number of pulses per second and converts the number to number of revolutions)	

* Pulse (integrated value) returns to 0 when it counts to the upper limit of the range. The count operation continues even after the count returns to 0.

Span Upper/Lower

Set the upper and lower limits of the display span within the measurable range indicated above. The default span lower limit is the lower limit of each range; the default span upper limit is the upper limit of each range. The span lower limit and span upper limit cannot be set to the same value.

Color

Select the color from the choices below. The color applies to both waveform and bar graph. Red (default setting), green, blue, blue violet, brown, orange, yellow-green, light blue, violet, gray, lime, blue green, dark blue, yellow, olive, and purple.

Line width

Set the waveform line width to 1dot (thin), 2dot (medium), or 3dot (thick). The default setting is 1dot.

Scaling

Sets the items below. The decimal place, scale lower limit, scale upper limit, and unit take effect when the scaling function is turned ON.

Item	Setting		
Scaling function ON/OFF	ON or OFF. The default setting is OFF.		
Decimal place	X.XXXX (default setting), XX.XXX, XXX.XX, XXXX.X, or XXXXX		
Scale lower limit*	-30000 to 30000. The default setting is -3.0000.		
Scale upper limit*	-30000 to 30000. The default setting is 3.0000.		
Unit (The default setting is Any.)	Length	mm (default setting), cm, m, or km	
	Area	mm2 (default setting), cm2, or m2	
	Volume	mm3 (default setting), cm3, m3, cc, ml, l, or kl	
	Velocity	mm/s (default setting), mm/min, mm/h, cm/s, cm/min, cm/h, m/s, m/min, m/h, km/s, km/min, or km/h	
	Acceleration	m/s2 (default setting), km/h2, Gal, or G	
	Frequency	mHz (default setting), Hz, kHz, or rpm	
	Weight	mg (default setting), g, kg, t, N, or kgf	
	Work	mW (default setting), W, kW, PS, HP, J, Wh, or cal	
	Pressure	kgf/cm2 (default setting), Pa, kPa, or MPa	
	Flow rate	m3/s (default setting), m3/min, m3/h, t/s, t/min, t/h, l/s, lmin, l/h, kg/s, kg/min, kg/h, kl/s, kl/min, kl/h, cc/s, cc/min, or cch	
	Temperature	°C (default setting), K, or °F	
	Voltage and current		
		mV (default value), V, kV, MV, mA, A, kA, MA	
	Power	mW (default value), W, kW, MW, mvar, var, kvar, Mvar, mVA, VA, kVA, MVA, deg	
	Watt hour	Wh (default value), kWh, MWh, varh, kvarh, Mvarh	
	Any	Up to six characters. The default setting is the unit of the range selected in the range setting.	

* The scale lower limit and scale upper limit cannot be set to the same value.

SEE ALSO

For a description of the pulse input wiring, see section 3.4, "Wiring the Pulse Input, Logic Input, and Signal Cables."

5

Setting the Input Channels

5.3 Setting the Logic Input Channel

1. Press **SETTING** to enter Setting Mode.

```
SETTING                              2005/09/29
                                        20:33:25
┌──────────────────────────────────┐
│INPUT                             │
│DISPLAY                           │
│DATA SAVE                         │
│ALARM                             │
│CALCULATION                       │
│COMMUNICATION                     │
│HARDWARE                          │
│SYSTEM                            │
├──────────────────────────────────┤
│Set the range, span, and so forth for the│
│analog, pulse, and logic input.   │
└──────────────────────────────────┘
```

2. With INPUT selected, press **SELECT**.

```
SETTING                              2005/09/29
 ►INPUT                                 20:33:28
┌──────────────────────────────────┐
│ANALOG INPUT                      │
│PULSE  INPUT                      │
│LOGIC  INPUT                      │
│                                  │
│                                  │
│                                  │
│                                  │
├──────────────────────────────────┤
│                                  │
└──────────────────────────────────┘
```

3. Use the **arrow keys** to select LOGIC INPUT, and press **SELECT**.

```
SETTING                  2005/09/30        ►INPUT                    2005/09/30
 ►INPUT                     14:14:11        ►►LOGIC  INPUT              10:21:45
┌──────────────────────┐                  ┌──────────────────────────┐
│ANALOG INPUT          │                  │MODE              ON       │
│PULSE  INPUT          │                  │ L1 TAG                    │
│LOGIC  INPUT          │        →         │    COLOR         ■ RED    │
│                      │                  │    LINE WIDTH    1dot     │
│                      │                  │ L2 TAG                    │
│                      │                  │    COLOR         ■ GREEN  │
│                      │                  │    LINE WIDTH    1dot     │
├──────────────────────┤                  ├──────────────────────────┤
│                      │                  │                          │
└──────────────────────┘                  └──────────────────────────┘
```
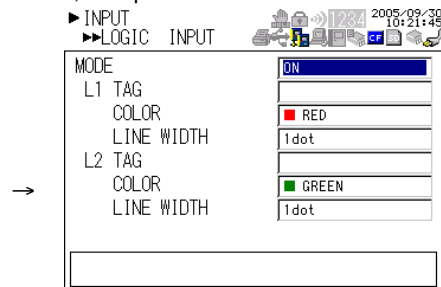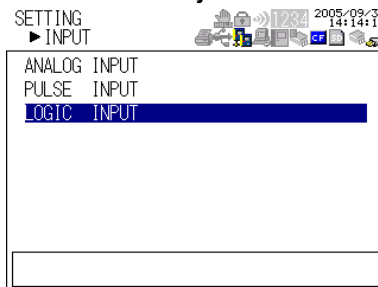
4. Use the **arrow keys** to select the desired item, and press **SELECT**.
Press **SELECT** to show a selection list or window for setting the item.

5. Select or enter the item on the displayed selection list or window.

6. Press **SET**.

Mode
Turn ON/OFF the logic input channels (L1 and L2) to which voltage or contact signal is to be applied. The default setting is OFF.

Tag
This is the character string that can be shown along with the channel number (L1 or L2). Up to 8 characters can be used to set the tags.

Color
For each channel, select the color from the choices below: The color applies to both waveform and bar graph.
Red (default setting of L1), green (default setting of L2), blue, blue violet, brown, orange, yellow-green, light blue, violet, gray, lime, blue green, dark blue, yellow, olive, and purple.

Line width

Set the waveform line width to 1dot (thin), 2dot (medium), or 3dot (thick). The default setting is 1dot.

Logic Input Waveform Display

The display position of the logic input waveforms is fixed to the lower section of the display as indicated below.

SEE ALSO

For a description of the logic input wiring, see section 3.4, "Wiring the Pulse Input, Logic Input, and Signal Cables."

5

Setting the Input Channels

5.4 Directly Setting the Range, Span, and Scale Using the RANGE key

Procedure

1. In Free Running Mode, use the **arrow keys** to select the channel you wish to configure.

2. Press **RANGE**.
   - When scaling is OFF for analog input or pulse input channels
     The following window opens.

     ```
     RANGE SETTINGS
     
     RANGE          K
     SPAN LOWER     - 200.0
     SPAN UPPER     1372.0
     
     (SET) SET      (ESC) CANCEL
     ```

   - When scaling is ON for analog input or pulse input channels
     The following SPAN SETTINGS window opens.

     ```
     SPAN SETTINGS
     
     DECIMAL P.     □.□□□□
     SPAN LOWER     -3.0000
     SPAN UPPER     3.0000
     
     (SET) SET      (ESC) CANCEL
     ```

   - For calculation or communication channels
     The following SPAN SETTINGS window opens.

     ```
     SPAN SETTINGS
     
     DECIMAL P.     □.□□□□
     SPAN LOWER     -9.9999
     SPAN UPPER     9.9999
     
     (SET) SET      (ESC) CANCEL
     ```

3. Use the **arrow keys** to select the desired item, and press **SELECT**.
   Press **SELECT** to show a selection list or window for setting the item.

4. Select or enter the item on the displayed selection list or window.

5. Press **SET**.

Explanation

Directly Setting the Range, Span, and Scale
The settings change depending on the type of selected channel. For details on the settings, see sections 5.1, 5.2, or 8.1.
- When scaling is OFF for analog input or pulse input channels
  Range, span lower limit, and span upper limit
- When scaling is ON for analog input or pulse input channels
  Decimal place, scale lower limit, and scale upper limit
- For calculation or communication channels
  Decimal place, span lower limit, and span upper limit

TIP

If you press RANGE in Logging Mode, Logging & Review Mode, or Review Mode, the range/span upper and lower limits are shown on the window regardless of the type of channel input.

6.1 Setting the Alarm on Analog Input Channels

Procedure

1. Press **SETTING** to enter Setting Mode.

```
SETTING                        2005/09/29
                               20:33:25
┌─────────────────────────────────────┐
│ INPUT                                │
│ DISPLAY                              │
│ DATA SAVE                            │
│ ALARM                                │
│ CALCULATION                          │
│ COMMUNICATION                        │
│ HARDWARE                             │
│ SYSTEM                               │
│ ┌──────────────────────────────────┐│
│ │Set the range, span, and so forth for the││
│ │analog, pulse, and logic input.   ││
│ └──────────────────────────────────┘│
└─────────────────────────────────────┘
```

2. Use the **arrow keys** to select ALARM, and press **SELECT**.

```
SETTING             2005/09/30          SETTING              2005/09/30
                    14:53:41            ▶ALARM               14:53:55
┌─────────────────────────┐            ┌─────────────────────────────┐
│ INPUT                   │            │ DETAIL                      │
│ DISPLAY                 │            │ OUTPUT AND/OR               │
│ DATA SAVE               │            │ DELAY SAMPLING COUNT  0     │
│ ALARM                   │    →       │ OUTPUT HOLD       NONHOLD   │
│ CALCULATION             │            │ DISPLAY HOLD      NONHOLD   │
│ COMMUNICATION           │            │ HYSTERESIS        ON        │
│ HARDWARE                │            │ ALARM BUZZER      ON        │
│ SYSTEM                  │            │ ALARM ACK                   │
│ ┌─────────────────────┐ │            │ ┌─────────────────────────┐ │
│ │Set the alarm, alarm output, etc.│ │            │ │Set alarms to analog, pulse, logic,│ │
│ └─────────────────────┘ │            │ │calculation, and communication channels.│ │
└─────────────────────────┘            └─────────────────────────────┘
```

3. With DETAIL selected, press **SELECT**.

```
▶ALARM                         2005/09/30
 ▶▶DETAIL                      14:54:05
┌─────────────────────────────────────┐
│ ANALOG INPUT                         │
│ PULSE INPUT                          │
│ LOGIC INPUT                          │
│ CALC. DATA                           │
│ COMM. DATA                           │
│                                      │
│ ┌──────────────────────────────────┐│
│ │                                  ││
│ └──────────────────────────────────┘│
└─────────────────────────────────────┘
```

4. With ANALOG INPUT selected, press **SELECT**.

```
▶▶DETAIL        ↕ 1/1          2005/09/30
 ▶▶▶ANALOG INPUT               14:57:29
┌─────────────────────────────────────┐
│ □ APPLY CH01 SETTINGS TO OTHER CHANNELS│
│ ■CH01 H          3.0000    1         │
│ ■CH02 L     -5.000         2         │
│ ■CH03 W_OUT -3.0000  3.0000  3       │
│ ■CH04 OFF                            │
│ ■CH05 OFF                            │
│ ■CH06 OFF                            │
│ ■CH07 OFF                            │
│ ■CH08 OFF                            │
│ ┌──────────────────────────────────┐│
│ │Select check box to apply changes of CH01││
│ │to other channels.                ││
│ └──────────────────────────────────┘│
└─────────────────────────────────────┘
```

5. Use the **arrow keys** to select the desired channel, and press **SELECT**.

```
▶▶DETAIL        ↕ 1/1     2005/09/30    ▶▶▶ANALOG INPUT       2005/09/30
 ▶▶▶ANALOG INPUT          14:57:51       ▶▶▶CH01              14:57:58
┌─────────────────────────┐            ┌─────────────────────────────┐
│ □ APPLY CH01 SETTINGS TO OTHER CHANNELS│            │ ALARM TYPE       H          │
│ ■CH01 H      3.0000    1 │            │ UPPER            3.0000     │
│ ■CH02 L   -5.000      2  │            │ LOWER            -3.0000    │
│ ■CH03 W_OUT -3.0000 3.0000 3│    →    │ OUTPUT CHANNEL   1          │
│ ■CH04 OFF               │            │                             │
│ ■CH05 OFF               │            │                             │
│ ■CH06 OFF               │            │                             │
│ ■CH07 OFF               │            │                             │
│ ■CH08 OFF               │            │                             │
│ ┌─────────────────────┐ │            │ ┌─────────────────────────┐ │
│ │Set the alarm type, alarm value, and│ │            │ │Set the alarm type.      │ │
│ │output destination.  │ │            │ └─────────────────────────┘ │
│ └─────────────────────┘ │            │                             │
└─────────────────────────┘            └─────────────────────────────┘
```

6

Setting Alarms

6. Use the **arrow keys** to select the desired item, and press **SELECT**.
Press **SELECT** to show a selection list or window for setting the item.

7. Select or enter the item on the displayed selection list or window.

8. Press **SET**.

Setting All the Channels to the Same Settings

When the channel selection display is shown, use the **arrow keys** to select "Apply the CH01 settings to other channels," and press **SELECT** to select the check box. If this check box is selected, all changes made on CH01 are applied to the other channels (CH02 to CH08). On the 16-channel model, the settings of CH09 on page 2 are applied to CH10 to CH16.

Explanation

Alarm Type

Set the conditions for activating an alarm. Select from the following:

Setting	Alarm Condition
Hi	An alarm occurs when the measured value exceeds the alarm value.
Lo	An alarm occurs when the measured value falls below the alarm value.
Window IN	An alarm occurs when the measured value is within the upper and lower limits of the alarm range.
Window OUT	An alarm occurs when the measured value is outside the upper and lower limits of the alarm range.

Upper Limit/Lower Limit

Set the upper and lower limits for the alarm type selected above within the measurable range. The default upper limit is the upper limit of each range; the default lower limit is the lower limit of each range. The upper limit and lower limit cannot be set to the same value.

Output Channel

Select the channel for outputting alarms from 1 to 4. If not outputting alarms, select OFF (default setting).

SEE ALSO

For a description of the alarm output wiring, see section 3.4, "Wiring the Pulse Input, Logic Input, and Signal Cables."

6.2 Setting the Alarm on Pulse Input Channels

1. Press **SETTING** to enter Setting Mode.

```
SETTING                           2005/09/29
                                  20:33:25

 INPUT
 DISPLAY
 DATA SAVE
 ALARM
 CALCULATION
 COMMUNICATION
 HARDWARE
 SYSTEM
 Set the range, span, and so forth for the
 analog, pulse, and logic input.
```

2. Use the **arrow keys** to select ALARM, and press **SELECT**.

```
SETTING                2005/09/30        SETTING          2005/09/30
                       14:53:41          ►ALARM           14:53:55

 INPUT                                    DETAIL
 DISPLAY                                  OUTPUT AND/OR
 DATA SAVE                                DELAY SAMPLING COUNT  0
 ALARM                                    OUTPUT HOLD          NONHOLD
 CALCULATION                             DISPLAY HOLD         NONHOLD
 COMMUNICATION                           HYSTERESIS           ON
 HARDWARE                                ALARM BUZZER         ON
 SYSTEM                         →         ALARM ACK
 Set the alarm, alarm output, etc.        Set alarms to analog, pulse, logic,
                                          calculation, and communication channels.
```

3. With DETAIL selected, press **SELECT**.

```
►ALARM                            2005/09/30
 ►►DETAIL                         14:54:05

 ANALOG INPUT
 PULSE INPUT
 LOGIC INPUT
 CALC. DATA
 COMM. DATA
```

4. Use the **arrow keys** to select PULSE INPUT, and press **SELECT**.

```
►ALARM              2005/09/30        ►►DETAIL          2005/09/30
 ►►DETAIL           14:58:27           ►►►PULSE INPUT   14:58:52

 ANALOG INPUT                          ALARM TYPE       H
 PULSE INPUT                           UPPER            50000
 LOGIC INPUT                           LOWER            0
 CALC. DATA                            OUTPUT CHANNEL   1
 COMM. DATA
                              →
                                       Set the alarm type.
```

5. Use the **arrow keys** to select the desired item, and press **SELECT**.
Press **SELECT** to show a selection list or window for setting the item.

6. Select or enter the item on the displayed selection list or window.

7. Press **SET**.

Explanation

Alarm Type

Set the conditions for activating an alarm. Select from the following:

Setting	Alarm Condition
Hi	An alarm occurs when the measured value of the pulse input exceeds the alarm value.
Lo	An alarm occurs when the measured value of the pulse input falls below the alarm value.
Window IN	An alarm occurs when the measured value of the pulse input is within the upper and lower limits of the alarm range.
Window OUT	An alarm occurs when the measured value of the pulse input is outside the upper and lower limits of the alarm range.

Upper Limit/Lower Limit

Set the upper and lower limits for the alarm type selected above within the measurable range. The default upper limit is the upper limit of each range; the default lower limit is the lower limit of each range. The upper limit and lower limit cannot be set to the same value.

Output Channel

Select the channel for outputting alarms from 1 to 4. If not outputting alarms, select OFF (default setting).

⚠ Note

When setting alarms on pulse input channels, set the Mode (input type) in the pulse input channel settings (see section 5.2).

SEE ALSO

For a description of the alarm output wiring, see section 3.4, "Wiring the Pulse Input, Logic Input, and Signal Cables."

6.3 Setting the Alarm on Logic Input Channels

Procedure

1. Press **SETTING** to enter Setting Mode.

   SETTING

   INPUT
   DISPLAY
   DATA SAVE
   ALARM
   CALCULATION
   COMMUNICATION
   HARDWARE
   SYSTEM

   Set the range, span, and so forth for the analog, pulse, and logic input.

2. Use the **arrow keys** to select ALARM, and press **SELECT**.

   SETTING

   INPUT
   DISPLAY
   DATA SAVE
   ALARM
   CALCULATION
   COMMUNICATION
   HARDWARE
   SYSTEM

   Set the alarm, alarm output, etc.

   →

   SETTING
   ►ALARM

   DETAIL
   OUTPUT AND/OR
   DELAY SAMPLING COUNT   0
   OUTPUT HOLD   NONHOLD
   DISPLAY HOLD   NONHOLD
   HYSTERESIS   ON
   ALARM BUZZER   ON
   ALARM ACK

   Set alarms to analog, pulse, logic, calculation, and communication channels.

3. With DETAIL selected, press **SELECT**.

   ►ALARM
   ►►DETAIL

   ANALOG INPUT
   PULSE INPUT
   LOGIC INPUT
   CALC. DATA
   COMM. DATA

4. Use the **arrow keys** to select LOGIC INPUT, and press **SELECT**.

   ►ALARM
   ►►DETAIL

   ANALOG INPUT
   PULSE INPUT
   LOGIC INPUT
   CALC. DATA
   COMM. DATA

   →

   ►►DETAIL
   ►►►LOGIC INPUT

   LOGIC 1
      ALARM TYPE   H
      OUTPUT CHANNEL   1
   LOGIC 2
      ALARM TYPE   H
      OUTPUT CHANNEL   2

   Set the alarm type.

5. Use the **arrow keys** to select the desired item, and press **SELECT**.
   Press **SELECT** to show a selection list or window for setting the item.

6. Select or enter the item on the displayed selection list or window.

7. Press **SET**.

Explanation

Alarm Type

Set the conditions for activating an alarm. Select from the following:

Setting	Alarm Condition
OFF	Not set alarm conditions.
Hi	An alarm occurs when the logic input changes from low to high.
Lo	An alarm occurs when the logic input changes from high to low.

Output Channel

Select the channel for outputting alarms from 1 to 4. If not outputting alarms, select OFF (default setting).

☝ Note

When setting alarms on logic input channels, set the Mode (input type) in the logic input channel settings (see section 5.3).

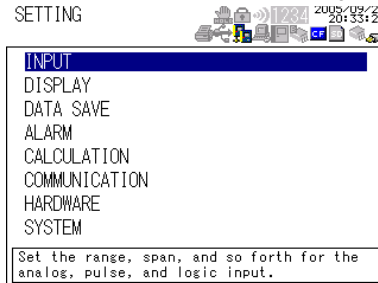### SEE ALSO

For a description of the alarm output wiring, see section 3.4, "Wiring the Pulse Input, Logic Input, and Signal Cables."

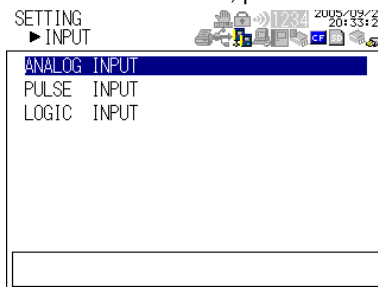## 6.4 Setting Alarms on Calculation and Communication Channels

1. Press **SETTING** to enter Setting Mode.

```
SETTING                        2005/09/29
                               20:33:25
  INPUT
  DISPLAY
  DATA SAVE
  ALARM
  CALCULATION
  COMMUNICATION
  HARDWARE
  SYSTEM
  Set the range, span, and so forth for the
  analog, pulse, and logic input.
```

2. Use the **arrow keys** to select ALARM, and press **SELECT**.

```
SETTING                        2005/09/30
                               14:53:41
  INPUT
  DISPLAY
  DATA SAVE
  ALARM
  CALCULATION
  COMMUNICATION
  HARDWARE
  SYSTEM
  Set the alarm, alarm output, etc.
```
→
```
SETTING                        2005/09/30
 ►ALARM                        14:53:55
  DETAIL
  OUTPUT AND/OR
  DELAY SAMPLING COUNT   0
  OUTPUT HOLD            NONHOLD
  DISPLAY HOLD           NONHOLD
  HYSTERESIS             ON
  ALARM BUZZER           ON
  ALARM ACK
  Set alarms to analog, pulse, logic,
  calculation, and communication channels.
```

3. With DETAIL selected, press **SELECT**.

```
 ►ALARM                        2005/09/30
 ►►DETAIL                      14:54:05
  ANALOG INPUT
  PULSE INPUT
  LOGIC INPUT
  CALC. DATA
  COMM. DATA
```

4. Use the **arrow keys** to select CALC. DATA or COMM. DATA, and press **SELECT**.
When CALC. DATA is selected

```
 ►ALARM                        2005/09/30
 ►►DETAIL                      15:00:04
  ANALOG INPUT
  PULSE INPUT
  LOGIC INPUT
  CALC. DATA
  COMM. DATA
```
→
```
 ►►DETAIL          ↕ 1/4       2005/09/30
 ►►►CALC. DATA                 15:00:56
  □ APPLY CA01 SETTINGS TO OTHER CHANNELS
  CA01 H              9.9999   1
  CA02 OFF
  CA03 OFF
  CA04 OFF
  CA05 OFF
  CA06 OFF
  CA07 OFF
  CA08 OFF
  Select the check box to apply the changes
  to other channels each time CA021 is
```

5. Use the **arrow keys** to select the desired channel for setting the alarm, and press **SELECT**.

There are 32 calculation and 32 communication channels. The number of channels shown on a page is eight; thus, there are four channel selection pages. To show the next page, press the **arrow (↓) key** after selecting the channel at the bottom.

When MATH DATA is selected
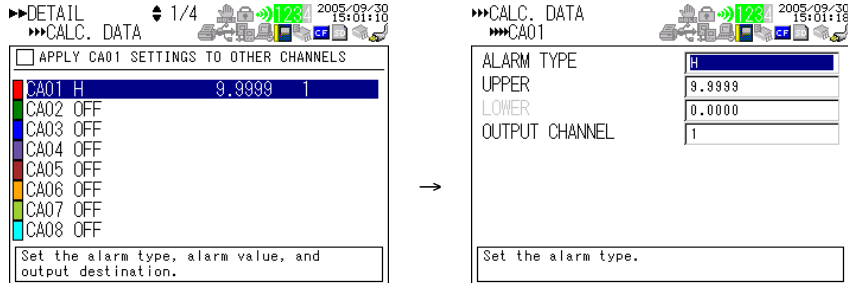
6. Select or enter the item on the displayed selection list or window.

7. Press **SET**.

Setting the Same Settings to the Channels Shown on the Same Page

When the channel selection display is shown, use the **arrow keys** to select "Apply the CAXX* (COXX* for communication channels) settings to other channels," and press **SELECT** to select the check box. If this check box is selected, all changes made on CAXX* (COXX* for communication channels) are applied to the other channels on the same page.* XX varies depending on the displayed page.

Explanation

Alarm Type

Set the conditions for activating an alarm. Select from the following:

Setting	Alarm Condition
Hi	An alarm occurs when the calculated or communication input value is greater than or equal to the alarm value.
Lo	An alarm occurs when the calculated or communication input value is less than or equal to the alarm value.
Window IN	An alarm occurs when the calculated or communication input value is within the upper and lower limits of the alarm range.
Window OUT	An alarm occurs when the calculated or communication input value is outside the upper and lower limits of the alarm range.

Upper Limit/Lower Limit

Set the upper and lower limits for the alarm type selected above within the range of –99999 to 99999. The default values for the upper and lower limits are 0. The upper limit and lower limit cannot be set to the same value.

Output Channel

Select the channel for outputting alarms from 1 to 4. If not outputting alarms, select OFF (default setting).

⚠ Note

When setting alarms on calculation channels, set the calculation channels (see section 8.1). Likewise, when setting alarms on communication channels, set the communication channels (see section 10.2).

SEE ALSO

For a description of the alarm output wiring, see section 3.4, "Wiring the Pulse Input, Logic Input, and Signal Cables."

6.5   Setting Alarm Output and Display

1. Press **SETTING** to enter Setting Mode.

    SETTING   2005/09/29
                                           20:33:25

    | INPUT |
    | DISPLAY |
    | DATA SAVE |
    | ALARM |
    | CALCULATION |
    | COMMUNICATION |
    | HARDWARE |
    | SYSTEM |

    Set the range, span, and so forth for the
    analog, pulse, and logic input.

2. Use the **arrow keys** to select ALARM, and press **SELECT**.

    SETTING   2005/09/30
                                           14:53:41

    | INPUT |
    | DISPLAY |
    | DATA SAVE |
    | ALARM |
    | CALCULATION |
    | COMMUNICATION |
    | HARDWARE |
    | SYSTEM |

    Set the alarm, alarm output, etc.

    →

    SETTING   2005/09/30
    ▶ALARM   14:53:55

    | DETAIL | |
    | OUTPUT AND/OR | |
    | DELAY SAMPLING COUNT | 0 |
    | OUTPUT HOLD | NONHOLD |
    | DISPLAY HOLD | NONHOLD |
    | HYSTERESIS | ON |
    | ALARM BUZZER | ON |
    | ALARM ACK | |

    Set alarms to analog, pulse, logic,
    calculation, and communication channels.

3. Use the **arrow keys** to select the desired item (other than DETAIL), and press
    SELECT.
    Press **SELECT** to show a selection list or window for setting the item.

4. Select or enter the item on the displayed selection list or window.

5. Press **SET**.

Explanation

Output AND/OR

When a single alarm output is shared among multiple alarms, you can select either of the
conditions below for activating the alarm output. Set the condition for each alarm output
(1 to 4). The default setting of each alarm output (1 to 4) is OR.

AND: Activated when all assigned alarms are occurring simultaneously.

OR: Activated when any of the specified alarms is occurring.

Delay Sampling Count

An alarm occurs when the measured value remains above (or below) the alarm value for
the specified time period. Set this time period in the range of 0 to 3600 s. The default
setting is 0 s.

TIP

The delay time is determined by the sampling interval. Therefore, the actual delay time
may differ from the specified time when the sampling interval is greater than 1 s.

Output Hold

Set the method of clearing the alarm output from an alarm generated condition to either
of the settings below. The default setting is Non-hold.

Non-hold: Turn the output OFF when the alarm is cleared.

Hold: Hold the output ON until the alarm acknowledge operation is carried out.

Display Hold

The method of clearing the alarm display from an alarm generated condition can be set to either of the following settings. The default setting is Non-hold.

Non-hold: Clear the alarm display when the alarm is cleared.

Hold: Hold the alarm display until the alarm acknowledge operation is carried out.

Hysteresis

A width (hysteresis) can be specified to the values for activating and releasing the alarm. The hysteresis is fixed to 0.5% of the display span (display scale width if the range is set to scale). Select whether to turn the hysteresis ON or OFF. The default setting is ON.

Alarm Buzzer

Set whether to sound a buzzer (ON or OFF) when an alarm occurs. The default setting is ON.

Alarm ACK

If alarm output or alarm display is set to Hold and you select Alarm ACK and press SELECT, the alarm output or alarm display is cleared. When the alarm output or alarm display is cleared, the alarm icon in the status display section (🔊 or 1) changes from red to green.

TIP

You can also carry out alarm acknowledge on the alarm summary display by pressing the SET key to show the Alarm ACK window and pressing the SET key.
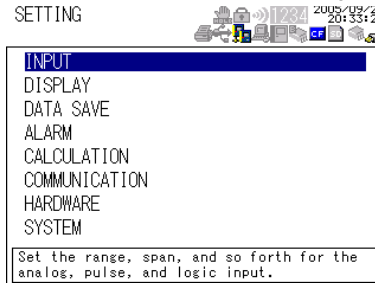
SEE ALSO

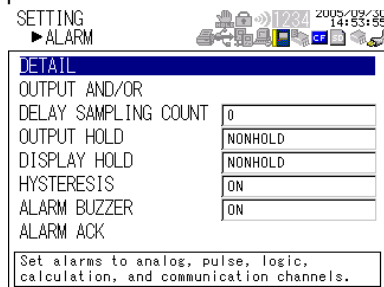For a description of the alarm output wiring, see section 3.4, "Wiring the Pulse Input, Logic Input, and Signal Cables."

6.6 Searching Alarms

You can search alarms on the review display by using the alarm marker that is shown in Review Mode.

1. Press **REVIEW** to show the review or logging & review display.

Review (marker) display
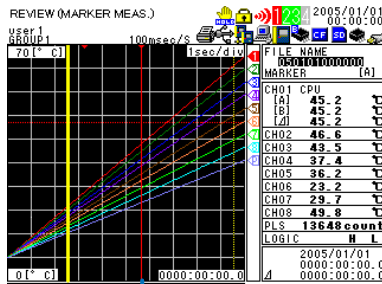
Marker ALM

Logging & review (marker) display
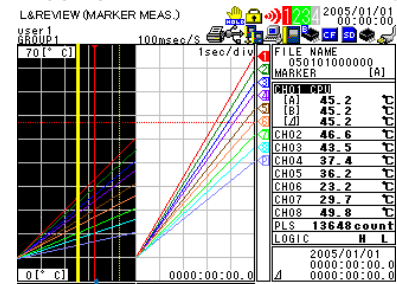
Marker ALM

2. Press **MARK** to set the active marker to marker ALM (red solid line). The waveform around the position where the alarm occurred is shown.
    If there is no alarm, the active marker cannot be set to marker ALM.

3. Press **Fast Forward key (←←)** to show the waveform around the position where the previous alarm occurred.
    Press **Fast Forward key (→→)** to show the waveform around the position where the next alarm occurred.

MARK key

Fast forward key

6

Setting Alarms
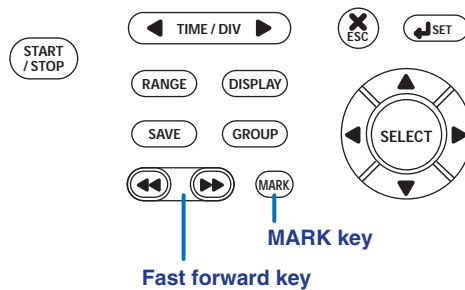
7.1   Switching the Operation Mode and Display

Switching the Operation Mode

Pressing **HOME**, **REVIEW**, **FILE**, **SETTING**, or **START/STOP** switches the operation mode and changes the displayed contents.
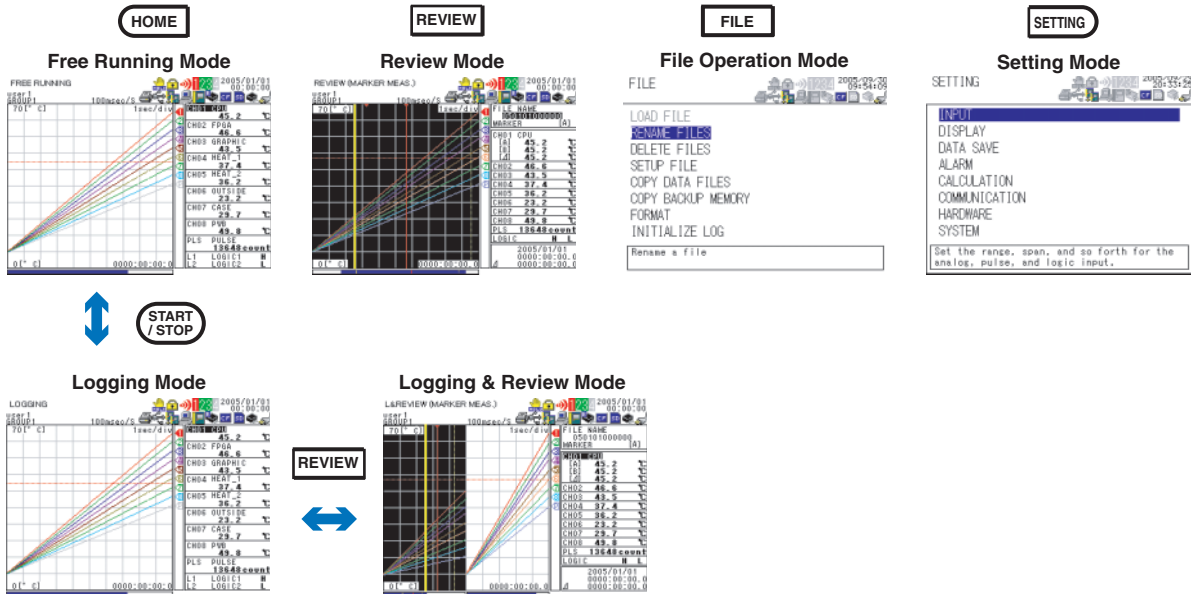
When in Free Running Mode or Logging Mode

1.   Press **DISPLAY** to show a pop-up menu for switching the display.
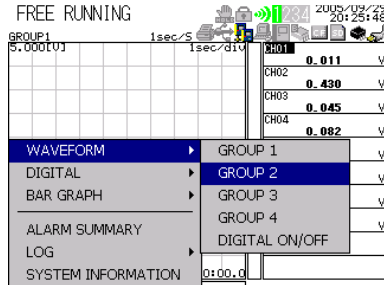
2.   Use the **arrow keys** to select the desired display, and press **SELECT**.

When in Review Mode or Logging & Review Mode

Press **DISPLAY**.

Each time you press **DISPLAY**, the display switches between marker display and statistical calculation display.

•   Marker display   •   Statistical calculation display

7

Setting the Displayed Contents and Operating the Displays
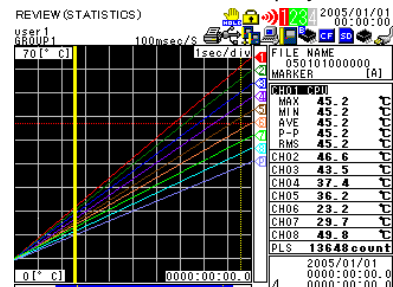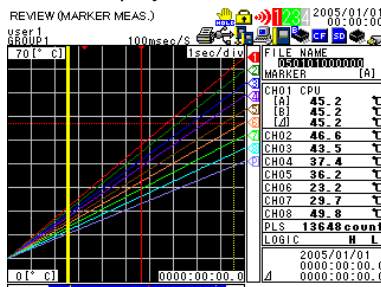
Explanation

Switching the Display in Free Running Mode or Logging Mode

The pop-up menu for switching the display has two levels as shown in the table below. When showing a display other than alarm summary, you select the second level to switch the display.

First Level	Second Level	Operation
Waveform	Group 1	Shows the waveforms of group 1.
	Group 2	Shows the waveforms of group 2.
	Group 3	Shows the waveforms of group 3.
	Group 4	Shows the waveforms of group 4.
	Digital ON/OFF	Turns the digital display ON/OFF.
Digital	Group 1	Shows the numeric values of group 1.
	Group 2	Shows the numeric values of group 2.
	Group 3	Shows the numeric values of group 3.
	Group 4	Shows the numeric values of group 4.
Bar Graph	Group 1	Shows the bar graphs of group 1.
	Group 2	Shows the bar graphs of group 2.
	Group 3	Shows the bar graphs of group 3.
	Group 4	Shows the bar graphs of group 4.
Alarm Summary	–	Shows the alarm summary.
Log	Error	Shows the error log.
	Key Login/Logout	Shows the log of key login and logout operations.
	Communication Commands	Shows a log of communication commands.
	FTP Client	Shows a log of FTP file transfers.
	Web	Shows a log of Web browser operations.
	E-mail Transmission	Shows a log of e-mail transmissions.
System Information	–	Shows the system information (see section 11.8).

TIP

On the alarm summary display, select an alarm using the arrow keys and press SELECT to switch to a review display containing information of that alarm.

7.2 Setting Groups

Procedure

1. Press **SETTING** to enter Setting Mode.

   ```
   SETTING                         2005/09/29
                                   20:33:25
   INPUT
   DISPLAY
   DATA SAVE
   ALARM
   CALCULATION
   COMMUNICATION
   HARDWARE
   SYSTEM
   Set the range, span, and so forth for the
   analog, pulse, and logic input.
   ```

2. Use the **arrow keys** to select DISPLAY, and press **SELECT**.

   ```
   SETTING                 2005/09/30        SETTING                 2005/09/30
                           15:36:35           ▶DISPLAY               15:36:44
   INPUT                                      GENERAL
   DISPLAY                                     GROUP
   DATA SAVE                                   ALARM LINE
   ALARM                                       LCD
   CALCULATION                      →
   COMMUNICATION
   HARDWARE
   SYSTEM
   Set the group display, etc.                Set the background color, grid display,
                                              etc.
   ```
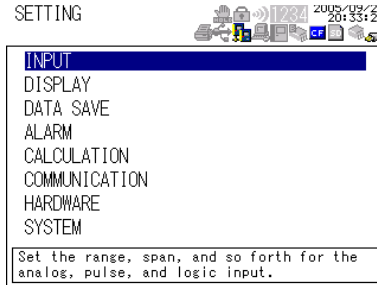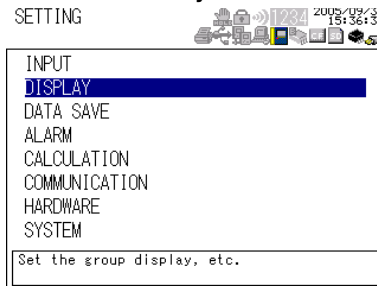
3. Use the **arrow keys** to select GROUP, and press **SELECT**.

   ```
   SETTING                 2005/09/30        ▶DISPLAY                2005/09/30
    ▶DISPLAY               15:36:49           ▶▶GROUP                15:36:59
   GENERAL                                    GROUP 1
   GROUP                                      GROUP 2
   ALARM LINE                                 GROUP 3
   LCD                                        GROUP 4

                                    →
   Set the group display.                     Set the group name and channels to be
                                              displayed.
   ```
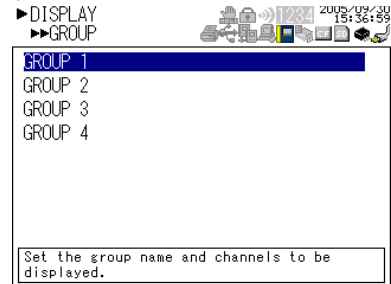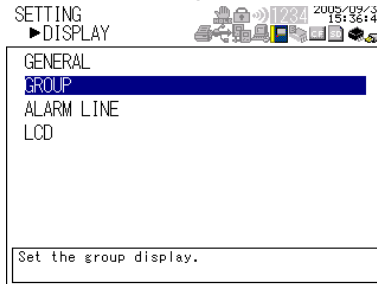
4. Use the **arrow keys** to select the desired group, and press **SELECT**.

   ```
   ▶▶GROUP                 2005/09/30
     ▶▶▶GROUP 1            15:37:09
   GROUP NAME              GROUP1
   DISPLAY CH.



   Enter the group name (max 8 characters).
   ```
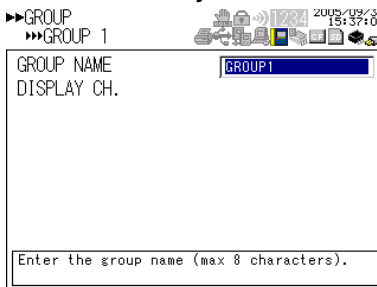
   Setting the Group Name

5. With GROUP NAME selected, press **SELECT**.
   The Group name setting window opens.

6. Enter the group name.

7. Press **SET**.

7

Setting the Displayed Contents and Operating the Displays

Assigning Channels to Groups

5. Use the **arrow keys** to select DISPLAY CH., and press **SELECT**.
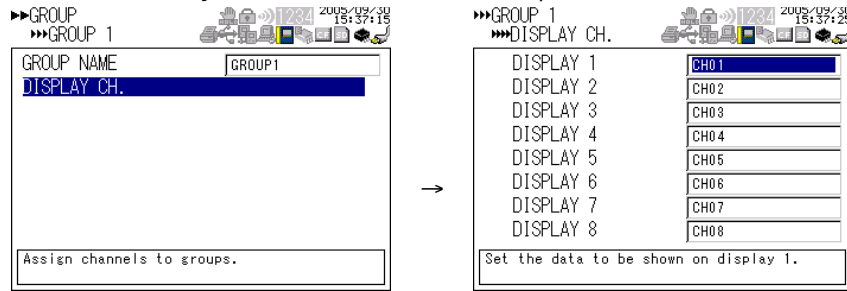
6. Use the **arrow keys** to select DISPLAY 1 to 8, and press **SELECT**.
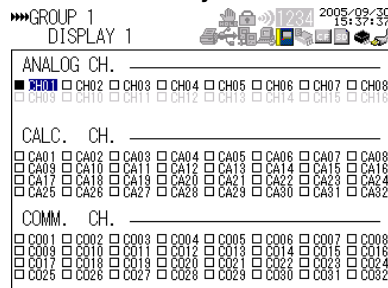
7. Use the **arrow keys** to select a channel to be displayed.

8. Press **SELECT** to select the check box of the selected channel.
Press **SELECT** again to clear the check box.

9. After selecting the check boxes for all channels to be included in the group, press **SET**.

Explanation

Group Name
Set the group name using up to 8 characters. The default settings are as follows:
Group 1: GROUP 1
Group 2: GROUP 2
Group 3: GROUP 3
Group 4: GROUP 4

Assigning Channels
You can assign analog input channels, calculation channels, and communication channels (channels to which communication data through Modbus communications is assigned) to groups. Up to eight channels can be assigned to a group. The default channel assignments are shown below by the number of installed channels.

Group Number	Number of Installed Channels	
	8CH	16CH
Group 1	01, 02, 03, 04, 05, 06, 07, 08	01, 02, 03, 04, 05, 06, 07, 08
Group 2	01, 02, 03, 04, 05, 06, 07, 08	09, 10, 11, 12, 13, 14, 15, 16
Group 3	01, 02, 03, 04, 05, 06, 07, 08	01, 02, 03, 04, 05, 06, 07, 08
Group 4	01, 02, 03, 04, 05, 06, 07, 08	09, 10, 11, 12, 13, 14, 15, 16

7.3 Setting the Background Color, Grid, and Bar Graph Base Position

1. Press **SETTING** to enter Setting Mode.

```
SETTING                          2005/09/29
                                  20:33:25
INPUT
DISPLAY
DATA SAVE
ALARM
CALCULATION
COMMUNICATION
HARDWARE
SYSTEM
Set the range, span, and so forth for the
analog, pulse, and logic input.
```

2. Use the **arrow keys** to select DISPLAY, and press **SELECT**.

```
SETTING                          2005/09/30
                                  15:36:35
INPUT
DISPLAY
DATA SAVE
ALARM
CALCULATION
COMMUNICATION
HARDWARE
SYSTEM
Set the group display, etc.
```
→
```
SETTING                          2005/09/30
▶DISPLAY                          15:36:44
GENERAL
GROUP
ALARM LINE
LCD



Set the background color, grid display,
etc.
```
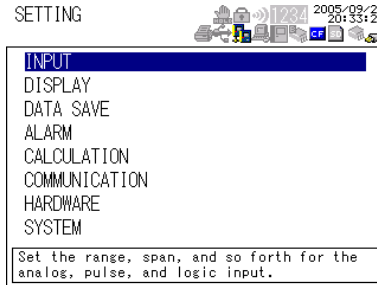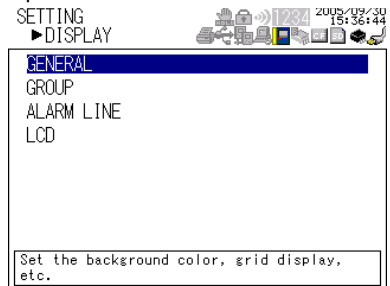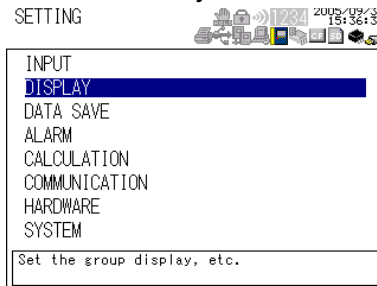
3. With GENERAL selected, press **SELECT**.

```
▶DISPLAY                         2005/09/30
 ▶▶GENERAL                        15:38:12
BACKGROUND        WHITE
GRID DISPLAY      ON
BAR GRAPH BASE    NORMAL




```

4. Use the **arrow keys** to select the desired item, and press **SELECT**.
Press **SELECT** to show a selection list for setting the item.

5. Select the item from the displayed list.

6. Press **SET**.

Explanation

Background Color

Set the background color of the waveform display section of the display to white (default setting) or black.

• When set to white
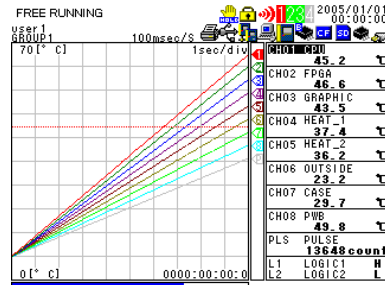
• When set to black
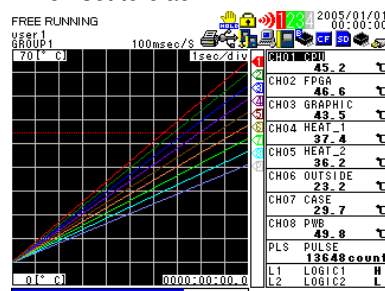
TIP
• The actual background color of the review display is always white even if the background is set to black.
• The colors specified for measurement channels, calculation channels, and communication channels are not affected by the background color setting.

Grid Display

Select whether to turn the grid ON (default setting) or OFF on the waveform display.

Bar Graph Base Position

Set the reference position of the bar graph to Normal (left end of the scale) or Center.

• Normal (default setting)
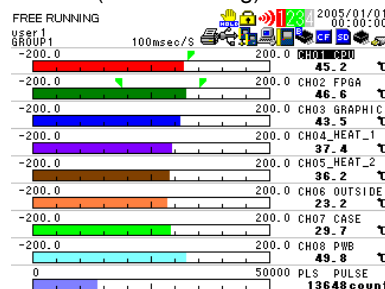
• Center
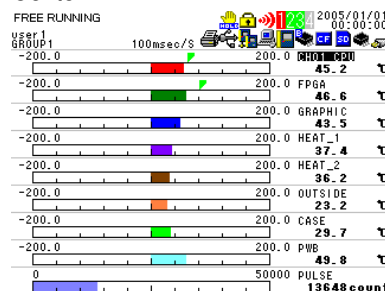
7.4 Setting Alarm Lines

1. Press **SETTING** to enter Setting Mode.

```
SETTING                          2005/09/29
                                 20:33:25
┌──────────────────────────────────────┐
│ INPUT                                  │
│ DISPLAY                                │
│ DATA SAVE                              │
│ ALARM                                  │
│ CALCULATION                            │
│ COMMUNICATION                          │
│ HARDWARE                               │
│ SYSTEM                                 │
├──────────────────────────────────────┤
│ Set the range, span, and so forth for the │
│ analog, pulse, and logic input.        │
└──────────────────────────────────────┘
```

2. Use the **arrow keys** to select DISPLAY, and press **SELECT**.

```
SETTING                  2005/09/30        SETTING          ▶DISPLAY      2005/09/30
                         15:36:35                                         15:36:44
┌──────────────────────────────────┐      ┌──────────────────────────────────┐
│ INPUT                              │      │ GENERAL                            │
│ DISPLAY                            │      │ GROUP                              │
│ DATA SAVE                          │      │ ALARM LINE                         │
│ ALARM                              │      │ LCD                                │
│ CALCULATION                        │ →    │                                    │
│ COMMUNICATION                      │      │                                    │
│ HARDWARE                           │      │                                    │
│ SYSTEM                             │      │                                    │
├──────────────────────────────────┤      ├──────────────────────────────────┤
│ Set the group display, etc.        │      │ Set the background color, grid display, │
│                                    │      │ etc.                               │
└──────────────────────────────────┘      └──────────────────────────────────┘
```
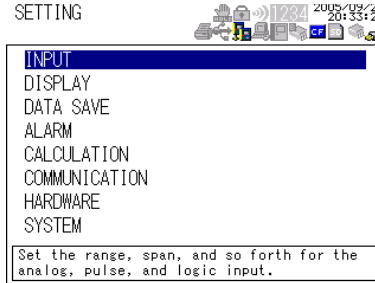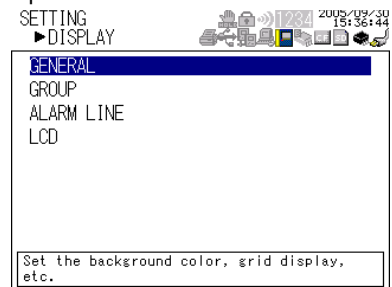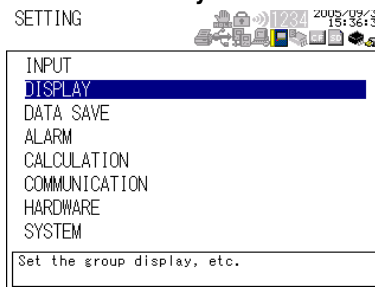
3. Use the **arrow keys** to select ALARM LINE, and press **SELECT**.

```
SETTING                  2005/09/30        ▶DISPLAY        ▶▶ALARM LINE    2005/09/30
   ▶DISPLAY              16:07:32                                          16:07:43
┌──────────────────────────────────┐      ┌──────────────────────────────────┐
│ GENERAL                            │      │ DISPLAY SWITCH     ON              │
│ GROUP                              │      │ COLOR              ■ RED           │
│ ALARM LINE                         │      │ LINE WIDTH         1dot            │
│ LCD                                │      │                                    │
│                                    │ →    │                                    │
│                                    │      │                                    │
│                                    │      │                                    │
│                                    │      │                                    │
├──────────────────────────────────┤      ├──────────────────────────────────┤
│ Set the alarm line (color and line width). │      │                                    │
└──────────────────────────────────┘      └──────────────────────────────────┘
```

4. Use the **arrow keys** to select the desired item, and press **SELECT**.
Press **SELECT** to show a window for setting the item.

5. Select the item from window.

6. Press **SET**.
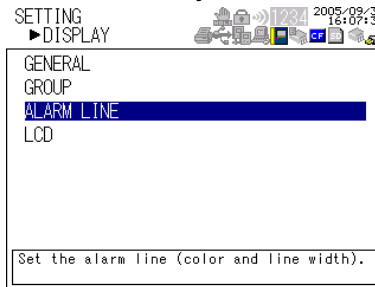
Display Switch
Select whether to show lines indicating the alarm positions (ON or OFF) on the waveform display. The default setting is ON.

TIP

This setting also turns ON/OFF the alarm marks (▮ and ▮) on the bar graph display.

Color
Select the color of the lines indicating the alarm positions on the waveform display. Red (default setting), green, blue, blue violet, brown, orange, yellow-green, light blue, violet, gray, lime, blue green, dark blue, yellow, olive, and purple.

Line width
Set the alarm line width to 1dot (thin), 2dot (medium), or 3dot (thick). The default setting is 1dot.

7.5   Switching the Time Scale

Procedure

Press **TIME/DIV** when the waveform is displayed.

KEY LOCK

```
( HOME )( REVIEW )   ( FILE )( SETTING )   (HOLD)
```

TIME/DEV key

```
( START        ( ◄ TIME / DIV ► )      ( ESC )    ( ◄| SET )
 / STOP )
               ( RANGE )  ( DISPLAY )         ▲
               ( SAVE )   ( GROUP )      ◄ SELECT ►
               ( ◄◄ )( ►► )  (MARK)          ▼
```
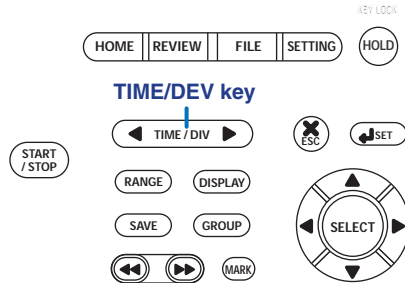
Explanation

Switching the Time Scale

The time per grid (division) can be changed in the range of 1 sec/div to 24 h/div.

The selectable time scales are shown below. The default setting is 1 sec/div.

1, 2, 5, 10, 20, or 30 sec/div

1, 2, 5, 10, 20, or 30 min/div

1, 2, 5, 10, 12, or 24 h/div

Displaying the Time Scale

The time scale is shown on the waveform display as indicated below.

Time axis display

Setting the Displayed Contents and Operating the Displays
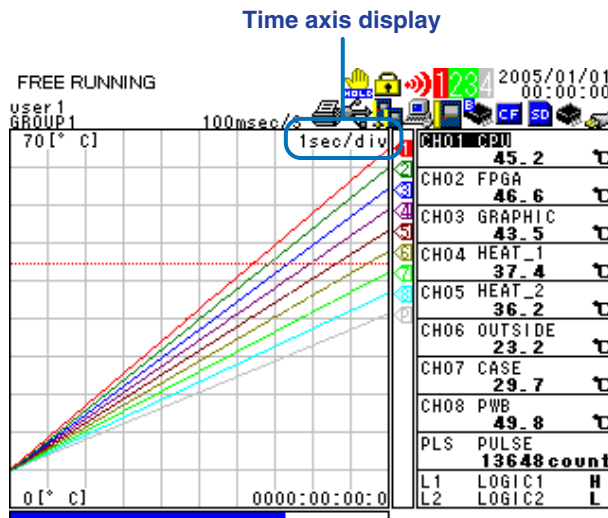
8.1   Setting the Differential Calculation

Procedure

1.   Press **SETTING** to enter Setting Mode.

```
SETTING                              2005/09/29
                                     20:33:25
 ┌─────────────────────────────────┐
 │INPUT                            │
 │DISPLAY                          │
 │DATA SAVE                        │
 │ALARM                            │
 │CALCULATION                      │
 │COMMUNICATION                    │
 │HARDWARE                         │
 │SYSTEM                           │
 ├─────────────────────────────────┤
 │Set the range, span, and so forth for the
 │analog, pulse, and logic input.  │
 └─────────────────────────────────┘
```

2.   Use the **arrow keys** to select CALCULATION, and press **SELECT**.

```
SETTING          2005/09/30        SETTING            2005/09/30
                 16:08:13          ►CALCULATION       16:08:20
 ┌──────────────────────┐          ┌──────────────────────┐
 │ INPUT                │          │DIFFERENCE           │
 │ DISPLAY              │          │STATISTICS           │
 │ DATA SAVE            │          │                      │
 │ ALARM                │    →     │                      │
 │ CALCULATION          │          │                      │
 │ COMMUNICATION        │          │                      │
 │ HARDWARE             │          │                      │
 │ SYSTEM               │          │                      │
 ├──────────────────────┤          └──────────────────────┘
 │Set the difference calculation and
 │statistical calculation.
 └──────────────────────┘
```
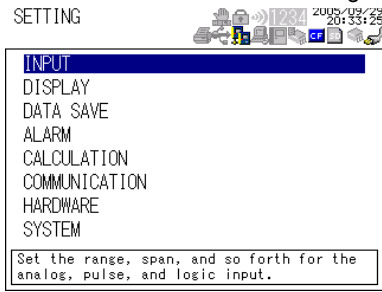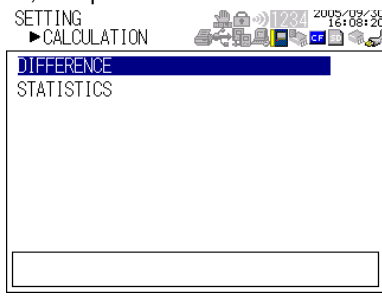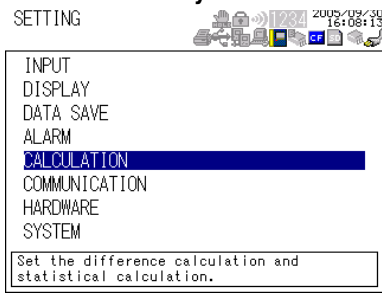
3.   With DIFFERENCE selected, press **SELECT**.

```
►CALCULATION   ‡ 1/4             2005/09/30
 ►►DIFFERENCE                    16:10:31
 ┌──────────────────────────────────┐
 │CA01 CH02-CH01    -9.9999  9.9999 │
 │CA02 CH02-1.0000  -9.9999  9.9999 │
 │CA03 OFF                          │
 │CA04 OFF                          │
 │CA05 OFF                          │
 │CA06 OFF                          │
 │CA07 OFF                          │
 │CA08 OFF                          │
 ├──────────────────────────────────┤
 │Set the calculation channel, equation, and
 │span.
 └──────────────────────────────────┘
```
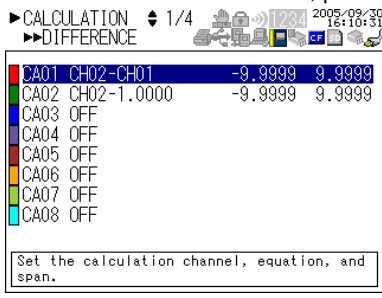
4.   Use the **arrow keys** to select the desired channel, and press **SELECT**.
There are 32 calculation channels. The number of calculation channels shown on a page is eight; thus, there are four calculation channel selection pages. To show the next page, press the **arrow (↓) key** after selecting the channel at the bottom.

```
►►DIFFERENCE   ‡ 1/2             2005/09/30
 ►►►CA01                         16:10:58
 ┌──────────────────────────────────┐
 │TAG                 [          ]  │
 │DIFFERENCE CHANNEL  [CH02]        │
 │REFERENCE CHANNEL   [CH01]        │
 │CONSTANT DECIMAL P. [□.□□□□]      │
 │CONSTANT            [0.0000]      │
 │SPAN DECIMAL POINT  [□.□□□□]      │
 │SPAN LOWER          [-9.9999]     │
 │SPAN UPPER          [9.9999]      │
 ├──────────────────────────────────┤
 │Set the tag. (max 8 characters)   │
 └──────────────────────────────────┘
```

5.   Use the **arrow keys** to select the desired item, and press **SELECT**.
Press **SELECT** to show a selection list or window for setting the item.

6.   Select or enter the item on the displayed selection list or window.

7.   Press **SET**.

Explanation

Tag

This is the character string that can be shown along with the channel number. Up to 8 characters can be used to set the tags.

Differential Channel, Reference Channel, and Constants

There are two types of differential calculations. You set the reference channel, difference channel, and constants used in the calculations below.

- Difference channel – reference channel
- Difference channel – constant

You can specify measurement channels and calculation channels (CA01 to CA32) to the reference channel and difference channel. When specifying a calculation channel, you can only select channel numbers that are smaller than the number of the calculation channel that you are setting.

The default reference channel is CH01. The default difference channel is OFF. For measurement channels, the scaled value is used in the calculation.

The selectable range of constants is –99999 to 99999 (default setting is 00000) excluding the decimal point.

Decimal place

Select from the following positions: The default setting is X.XXXX.

X.XXXX, XX.XXX, XXX.XX, XXXX.X, or XXXXX

Span Upper/Lower

Set the upper and lower limits of the display span within the measurable range. The span lower limit and span upper limit cannot be set to the same value. The default lower limit is –99999, and the default upper limit is 99999.

⚠ **Note**

The display shows "+***" or "–*****" for the following calculation results.**

- **The –99999 to 99999 range is exceeded (– or +display over range)**
- **Calculated on a channel set to OFF (display shown as "+*****" on error)**

Unit

Select the unit from the list below. The default setting is Any.

Length	mm (default setting), cm, m, or km
Area	mm2 (default setting), cm2, or m2
Volume	mm3 (default setting), cm3, m3, cc, ml, l, or kl
Velocity	mm/s (default setting), mm/min, mm/h, cm/s, cm/min, cm/h, m/s, m/min, m/h, km/s, km/min, or km/h
Acceleration	m/s2 (default setting), km/h2, Gal, or G
Frequency	mHz (default setting), Hz, kHz, or rpm
Weight	mg (default setting), g, kg, t, N, or kgf
Work	mW (default setting), W, kW, PS, HP, J, Wh, or cal
Pressure	kgf/cm2 (default setting), Pa, kPa, or MPa
Flow rate	m3/s (default setting), m3/min, m3/h, t/s, t/min, t/h, l/s, l/min, l/h, kg/s, kg/min, kg/h, kl/s, kl/min, kl/h, cc/s, cc/min, or cc/h
Temperature	°C (default setting), K, or °F
Voltage/current	mV (default value), V, kV, MV, mA, A, kA, MA
Power	mW (default value), W, kW, MW, mvar, var, kvar, Mvar, mVA, VA, kVA, MVA, deg
Watt hour	Wh (default value), kWh, MWh, varh, kvarh, Mvarh
Any	Up to six characters. The default setting is the unit of the range selected in the range setting.

⚠ **Note**

The differential calculation does not take into account the unit of the measured or calculated values. The measured and calculated values are handled as plain numbers without the unit. For example, if the measured value of CH01 is 40 mV and the measured value of CH02 is 20 V, the result of the differential calculation between CH01 and CH02 is 20.

Color

For each channel, select the color from the choices below: The color applies to both waveform and bar graph.

Red, green, blue, blue violet, brown, orange, yellow-green, light blue, violet, gray, lime, blue green, dark blue, yellow, olive, and purple.

Default settings are as follows: channel 1: red, 2: green, 3: blue, 4: blue violet, 5: brown, 6: orange, 7: yellow-green, 8: light blue, 9: violet, 10: gray, 11: lime, 12: blue green, 13: dark blue, 14: yellow, 15: olive, 16: purple, 17: red, 18: green, 19: blue, 20: blue violet, 21: brown, 22: orange, 23: yellow-green, 24: light blue, 25: violet, 26: gray, 27: lime, 28: blue green, 29: dark blue, 30: yellow, 31: olive, 32: purple

Line width

Set the waveform line width to 1dot (thin), 2dot (medium), or 3dot (thick). The default setting is 1dot.

8

Setting the Calculation of Measured Data

8.2 Setting the Statistical Calculation

Procedure

1. Press **SETTING** to enter Setting Mode.

   SETTING
   ```
   INPUT
   DISPLAY
   DATA SAVE
   ALARM
   CALCULATION
   COMMUNICATION
   HARDWARE
   SYSTEM
   ```
   ```
   Set the range, span, and so forth for the
   analog, pulse, and logic input.
   ```

2. Use the **arrow keys** to select CALCULATION, and press **SELECT**.

   SETTING
   ```
   INPUT
   DISPLAY
   DATA SAVE
   ALARM
   CALCULATION
   COMMUNICATION
   HARDWARE
   SYSTEM
   ```
   ```
   Set the difference calculation and
   statistical calculation.
   ```
   →
   SETTING
   ►CALCULATION
   ```
   DIFFERENCE
   STATISTICS
   ```
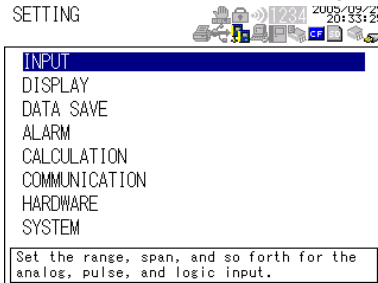
3. Use the **arrow keys** to select STATISTICS, and press **SELECT**.
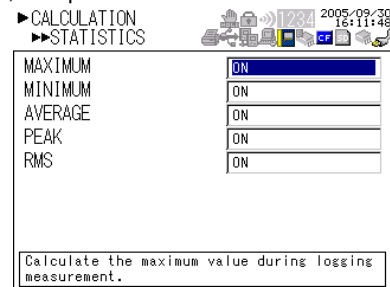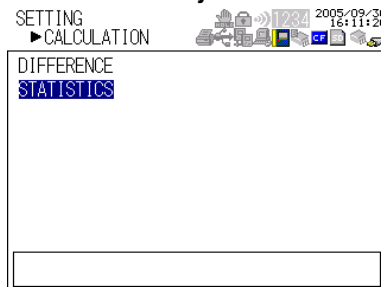
   SETTING
   ►CALCULATION
   ```
   DIFFERENCE
   STATISTICS
   ```
   →
   ►CALCULATION
   ►►STATISTICS
MAXIMUM	ON
MINIMUM	ON
AVERAGE	ON
PEAK	ON
RMS	ON
   ```
   Calculate the maximum value during logging
   measurement.
   ```

4. Use the **arrow keys** to select the desired item, and press **SELECT**.
   Press **SELECT** to show a selection list for setting the item.

5. Select the item from the displayed list.

6. Press **SET**.

Explanation

Statistical Calculation

Calculates the values below for the specified channel. Turn ON/OFF the statistical calculation items below.

Calculated Item	Description
Maximum	Calculates the maximum value from the start of the logging operation to the end.
Minimum	Calculates the minimum value from the start of the logging operation to the end.
Average	Calculates the simple average from the start of the logging operation to the end. $$AVE = \frac{\sum_{i=1}^{n} di}{n}$$ where di is the ith data value and n is the number of data values
Peak	Calculates the peak value (maximum – minimum) from the start of the logging operation to the end.
Rms	Calculates the rms value from the start of the logging operation to the end. $$RMS = \sqrt{\frac{\sum_{i=1}^{n} di^2}{n}}$$ where di is the ith data value and n is the number of data values

Displaying the Statistical Calculation Values

Press DISPLAY during Review Mode or Logging & Review Mode as explained in section 7.1, "Switching the Operation Mode and Display." Each time you press DISPLAY, the display switches between marker display and statistical calculation display. In addition, the statistical calculation values are shown also on the digital display (see section 2.3, "Data Display")
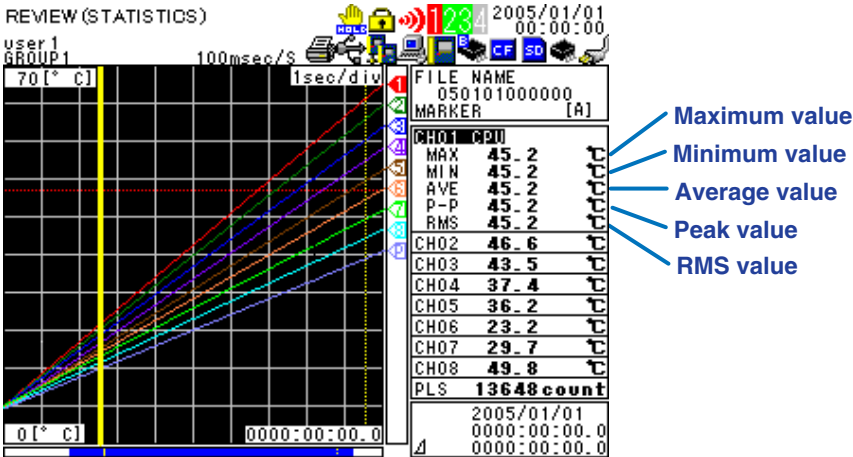
Handling of Error Data during Statistical Calculation

If there is an error in the measured or calculated data, the data is handled as follows:

Type of Error Data	Average Value	Maximum, Minimum, or Peak Value	RMS Value
+Over	Not used	Used	Not used
–Over	Not used	Used	Not used
Error	Not used	Not used	Not used

9.1 Setting the Save Operation of Measured and Calculated Data

Procedure

1. Press **SETTING** to enter Setting Mode.

    SETTING
    ```
    INPUT
    DISPLAY
    DATA SAVE
    ALARM
    CALCULATION
    COMMUNICATION
    HARDWARE
    SYSTEM
    Set the range, span, and so forth for the
    analog, pulse, and logic input.
    ```
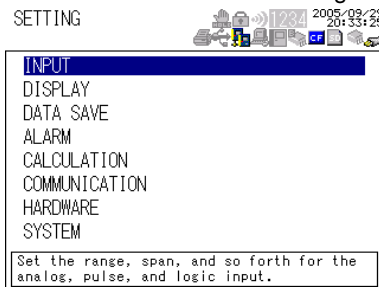
2. Use the **arrow keys** to select DATA SAVE, and press **SELECT**.

    SETTING
    ```
    INPUT
    DISPLAY
    DATA SAVE
    ALARM
    CALCULATION
    COMMUNICATION
    HARDWARE
    SYSTEM
    Set the sampling interval, trigger, etc.
    ```
    →
    SETTING
    ►DATA SAVE
    ```
    SAMPLING INTERVAL    1s
    SAVE MEDIA           INTERNAL MEMORY
      SAVE TIME              13h00min01s
    DATA TYPE            BINARY
    FILE NAME
    PRINTER OUTPUT       OFF
    TRIGGER
    ```
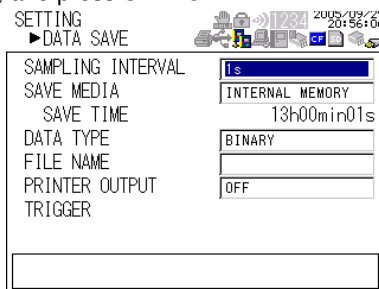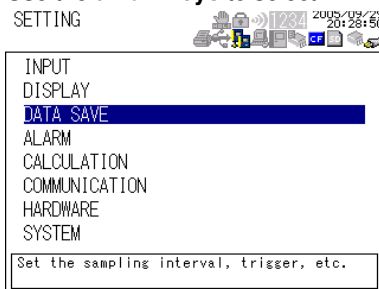
3. Use the **arrow keys** to select the desired item (other than PRINTER OUTPUT), and press **SELECT**.
    For the procedure to set PRINTER OUTPUT, see section 11.1, "Setting the Print Output and Executing the Print Operation."

4. Use the **arrow keys** to select the desired item, and press **SELECT**.
    Press **SELECT** to show a selection list or window for setting the item.

5. Select or enter the item on the displayed selection list or window.

6. Press **SET**.

Explanation

Sampling Interval

Select the save interval of the measured and calculated data in Logging Mode from the following:

100 ms (XL100-1 only), 200 ms, 500 ms, 1 s (default setting), 2 s, 5 s, 10 s, 20 s, 30 s, 1 min, 2 min, 5 min, 10 min, 20 min, 30 min, or 1 h

Note

If the sampling interval is less than 1 s (100 ms, 200 ms, or 500 ms), the data is temporarily stored to the internal buffer memory and saved every 10 seconds.

9

Setting and Controlling the Data Saving and Loading Operations

Save Media

Select Internal Memory, SD Card, or CF Card.

When the data save destination is specified, the total time that data can be saved is shown under it. For estimates on the amount of data that can be saved, see section 4.7, "Inserting and Removing the External Storage Media."

In Logging or Logging & Review Mode, the amount of space used on the destination storage medium is shown using a bar graph at the bottom section of the display.

Data Type

Set the save data format of the logging data to BINARY or ASCII.

File Name

The file is automatically assigned the name "(sampling year, month, day, hour, minute, second).extension as shown in the table below, but you can also assign an arbitrary file name.

Type	Auto File Name
Logging data	YYMMDDhhmmss.DLO
Alarm data	YYMMDDdhhmmss.ALM
Screen image data	YYMMDDhhmmss.BMP
Setup data	YYMMDDhhmmss.SET
Log data	
Error	ERRYYMMDDhhmmss.LOG
Key login	KEYYYMMDDhhmmss.LOG
Communication command	COMYYMMDDhhmmss.LOG
FTP client	FTPYYMMDDhhmmss.LOG
Web	COMYYMMDDhhmmss.LOG
E-mail transmission	EMLYYMMDDhhmmss.LOG

YY: year, MM: month, DD: day, hh: hour, mm: minute, ss: second

The arbitrary file name is set using up to 12 characters as follows:
ABCDEFGHIJKLxxx.XXX

    xxx: 000 to 999

    XXX: Extension of the data

The file name of different types of data is the same.

If a file with the same name exists, you can overwrite the file or attach a sequence number to save the file. The sequence number attached to the file name is 000 to 999. If the sequence number reaches 999, a message stating that the file cannot be created appears.

Trigger setting

- Trigger mode

  Select the data write mode from the following:

Mode	Description
Single	One data file is created. When you press START/STOP, the XL100 enters the trigger-wait state (START LED blinking at logging standby). Data is acquired from the point when the start trigger is activated (START LED illuminates while logging) to the point the end trigger is activated or when you press START/STOP. If the data acquisition area becomes full, data continues to be acquired to the backup memory. If the backup memory also becomes full, acquisition stops (however, measurement continues). Beyond this point, no more data is acquired even if the trigger condition is met.
Continuous	A data file is created each time the trigger is activated. When you press START/STOP, the XL100 enters the trigger-wait state (START LED blinking at logging standby). Data is acquired from the point when the start trigger is activated (START LED illuminates while logging) to the point the end trigger is activated. Then, the XL100 enters the start-trigger-wait state again. When a trigger is activated, a new file is created, and the data is acquired there. Data acquisition is repeated each time a trigger is activated while the XL100 is in the start-trigger-wait state. To stop the data acquisition, press START/STOP. If the save destination memory becomes full, data is not acquired even when a trigger is activated.

☝ Note

If the trigger mode is set to Continuous, apply the trigger input signal at an interval greater than or equal to 30 s.

- Selecting pre-trigger or trigger delay and setting the sampling count

  Select pre-trigger or trigger delay. Set the sampling count in the range of 0 to 600.

  Pre-trigger: Saves data the specified sampling counts before a trigger is activated.

  Trigger delay: Saves data the specified sampling counts after a trigger is activated.

- Start trigger and end trigger

  The conditions for starting and ending the data save operation can be set separately.

  - Trigger type

    Select the trigger type from below.

Type		Description
None		Not set trigger conditions.
External		A trigger is activated when a signal* is applied to the external trigger input terminal.
Level	High limit	A trigger is activated when the measured value is greater than or equal to the specified value.
	Lower limit	A trigger is activated when the measured value is less than or equal to the specified value.
	Window IN	A trigger is activated when the measured value is within the specified lower and high limits.
	Window OUT	A trigger is activated when the measured value is outside the specified lower and high limits.
Alarm		A trigger is activated when any of the alarms occur.
Time		A trigger is activated at the specified time.
Timer		The time at which the data save operation is stopped can be specified. Logging is stopped after the specified time elapses.

*   For a description of the external trigger input wiring, see section 3.5, "Wiring the External Trigger I/O Signal Cables."

- When the trigger type is set to Level

  Channel: Trigger source channel

  Mode: Select H (high limit), L (low limit), W_IN (window IN), or W_OUT (window OUT).

9

Setting and Controlling the Data Saving and Loading Operations

Trigger high limit: Set the high limit used in the high limit, window IN, and window OUT modes. The default setting is the upper limit of the range of the trigger source channel.

Trigger low limit: Set the low limit used in the low limit, window IN, and window OUT modes. The default setting is the lower limit of the range of the trigger source channel.

- When the trigger type is set to Alarm

  Select the alarm output (1 to 4) used for the trigger. The default setting is 1.

- When the trigger type is set to Time

  Set the date and time (year/month/date hour:minute:second). The default setting is the current date/time.

TIP

If the logging start condition is set to Time and you press START/STOP after the specified time is passed, the XL100 start the logging operation in JUST start mode. In JUST start mode, however, the logging operation starts from a well-rounded time. Until the well-rounded time arrives, the operation mode display shows "Logging (Standby)" and the START LED blinks. Well-rounded time refer to an hour on the hour (XX hour 00 minute 00 second) and every second after it. If the sampling interval is greater than or equal to 1 s, it is the time obtained by adding the sampling interval to an hour on the hour.

Example:

If the current time is 11 hours 09 minutes on August 17, 2005 and the sampling interval is set to 15 minutes, the logging operation starts at 11 hours 15 minutes on August 17, 2005.

- When the trigger type is set to Timer

  Set the time in the range of 1 second to 8760 hours. The default setting is 30 minutes.

Backup Memory

If the memory becomes full during the logging operation or if the external storage medium is removed, data is saved to the backup memory. The file name is YYMMDDhhmmssbak.XXX (YY: year, MM: month, DD: day, hh: hour, mm: minute: ss: second, and XXX: extension of each type of data).

If data is saved to the backup memory, the ![B] icon appears in the status display section on the display. The data saved to backup memory is retained even when the power is turned OFF. However, the data is cleared when the data logging operation is started. If the backup memory (1 MB) becomes full, the XL100 shows an error message, and aborts the data save operation to the backup memory. However, measurement continues.

The duration over which data can be backed up varies depending on the specified sampling interval.

The data processing in the backup memory is as follows:

- If an external storage medium with empty space is installed while logging

  When the external storage medium is inserted, the subsequent data is saved to the external storage medium with the same file name.

- If an external storage medium with empty space is not installed while logging

  The data continues to be saved to the backup memory.

If the logging operation ends with the external storage medium full or with the external storage medium removed, you need to take the following action.

- If you need the data, copy the data from the backup memory to a new external storage medium (already formatted) in File Operation Mode.

- If you do not need the data, the data in the backup memory can be deleted by starting the next logging operation.

9.2 Loading Measurement or Calculation Data Files

Loading on the Review or Logging & Review Display

1. Use the **up and down arrow keys** to choose SELECT FILE, and press **SELECT**.
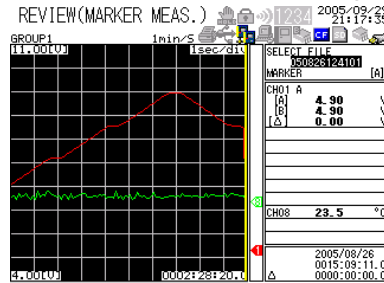
2. With FOLDER selected, press **SELECT**.
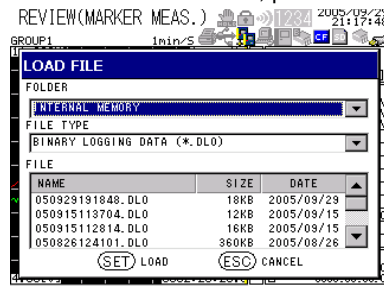
3. Select the folder containing the file you want to load, and press **SET**.

4. Use the arrow keys to select FILE TYPE, and press **SELECT**.

5. Select the type of file you want to load, and press **SELECT**.

6. Select the file you want to load, and press **SET**.

Loading Measurement and Calculation Data Files

The measured and calculated data displayed immediately after switching to the review display is the most recent measured and calculated data that is saved to the internal memory or the external storage medium (CF card or SD card). If there is no saved measured and calculated data, a message "File not selected. Specify a file" appears.

9.3 Manually Saving Measured and Calculated Data

In Free Running Mode, press **SAVE**.

KEY LOCK

HOME | REVIEW | FILE | SETTING | HOLD

TIME / DIV

START / STOP

ESC | SET

RANGE | DISPLAY

SAVE key —— SAVE | GROUP | SELECT

MARK
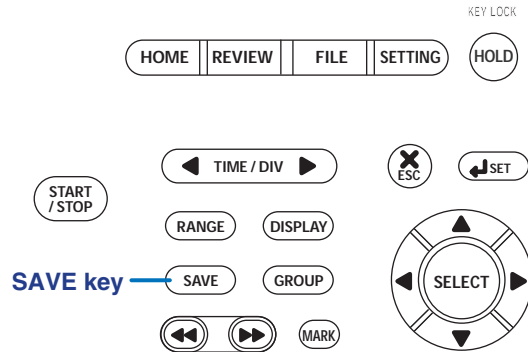
Explanation

Manually Saving the Data

Press SAVE in Free Running Mode to save all measured and calculated values (excluding measurement and calculation channels set to OFF) at that point. The data is saved to the destination specified by Data Save Destination in Data Save settings. The file name is set to the name specified by File Name in Data Save Destination. The automatic file name is YYMMDDhhmmss.DMN (YY: year, MM: month, DD: day, hh: hour, mm: minute, ss: second).

TIP

Press HOLD to hold the displayed contents at that point. If you press SAVE while the display is held, the held contents are saved. Press HOLD again to release the hold.

9.4 Saving the Alarm Summary Data

Press **SAVE** on the alarm summary display.

KEY LOCK

HOME | REVIEW | FILE | SETTING | HOLD

◀ TIME / DIV ▶   ✖ ESC   ⏎ SET

START / STOP

RANGE   DISPLAY

SAVE key —— SAVE   GROUP   ◀ SELECT ▶

◀◀ ▶▶ MARK
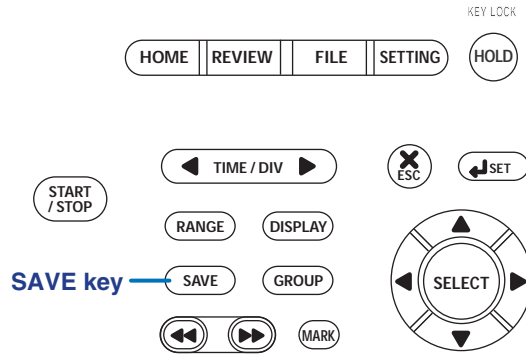
Explanation

Saving the Alarm Summary Data
If you press SAVE on the alarm summary display, the data corresponding to the alarm summary display is saved. The data is saved to the destination specified by Data Save Destination in Data Save settings. The file name is set to the name specified by File Name in Data Save Destination. The automatic file name is YYMMDDhhmmss.ALM (YY: year, MM: month, DD: day, hh: hour, mm: minute, ss: second).

9

Setting and Controlling the Data Saving and Loading Operations

9.5 Saving the Log Data

Press **SAVE** on the log display.

KEY LOCK

HOME | REVIEW | FILE | SETTING | HOLD

START / STOP | ◀ TIME / DIV ▶ | ✖ ESC | ⏎ SET

RANGE | DISPLAY

SAVE key — SAVE | GROUP | ▲ ◀ SELECT ▶ ▼

◀◀ | ▶▶ | MARK
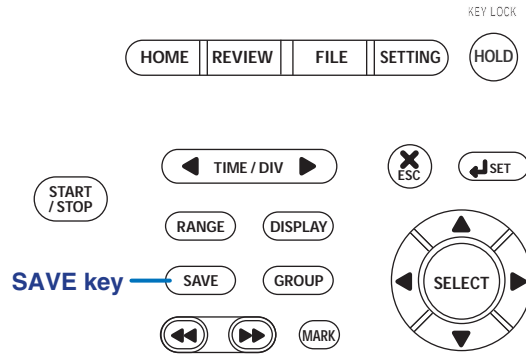
Explanation

Saving the Log Data

If you press SAVE on the log display, the data corresponding to the log display is saved. The data is saved to the destination specified by Data Save Destination in Data Save settings. The file name is set to the name specified by File Name in Data Save Destination.

The automatic file name is as shown in the following table.

Type of Log File	File Name
Error	ERRYYMMDDhhmmss.LOG
Key login	KEYYYMMDDhhmmss.LOG
Communication command	COMYYMMDDhhmmss.LOG
FTP client	FTPYYMMDDhhmmss.LOG
Web	COMYYMMDDhhmmss.LOG
E-mail transmission	EMLYYMMDDhhmmss.LOG

YY: year, MM: month, DD: day, hh: hour, mm: minute, ss: second

9.6 Saving and Loading Setup Data

1. Press **FILE** to enter File Operation Mode.

```
FILE                    2005/09/30
                        16:24:23

LOAD FILE
RENAME FILES
DELETE FILES
SETUP FILE
COPY DATA FILES
COPY BACKUP MEMORY
FORMAT
INITIALIZE LOG
Rename a file
```
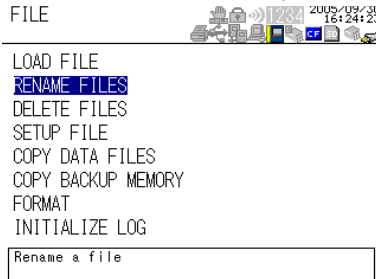
2. Use the **arrow keys** to select SETUP FILE, and press **SELECT**.

```
FILE                    2005/09/30
                        16:22:28

LOAD FILE
RENAME FILES
DELETE FILES
SETUP FILE
COPY DATA FILES
COPY BACKUP MEMORY
FORMAT
INITIALIZE LOG
Set the setting file
```
→
```
SETUP FILE
SAVE/LOAD
SAVE
FOLDER
CF CARD
FILE
NAME        SIZE    DATE
TEST1.SET   14KB    2005/09/30

NEW FILE NAME

(SET) EXEC    (ESC) CANCEL
```
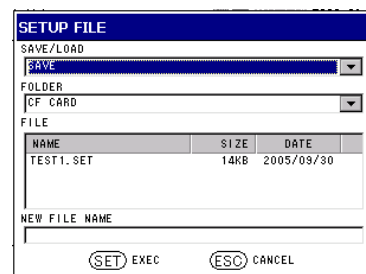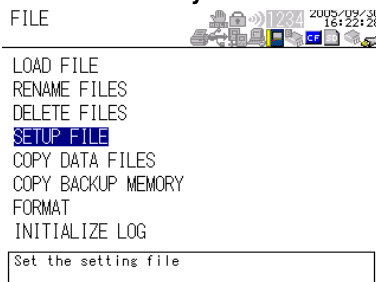
3. With SAVE/LOAD selected, press **SELECT**.

Saving the Setup Data

4. Use the **arrow keys** to select SAVE, and press **SELECT**.

5. Use the **arrow keys** to select FOLDER, and press **SELECT**.

6. Use the **arrow keys** to select the folder (external storage medium (CF CARD or SD CARD) or SETTING MEMORY), and press **SET**.

7. Use the **arrow keys** to select NEW FILE NAME, and press **SELECT**.

8. Enter the new file name and press **SET**.

9. Press **SET**.

Loading the Setup Data

4. Use the **arrow keys** to select LOAD, and press **SELECT**.

5. Use the **arrow keys** to select FOLDER, and press **SELECT**.

6. Use the **arrow keys** to select the folder (external storage medium (CF CARD or SD CARD) or SETTING MEMORY), and press **SET**.

7. Use the **arrow keys** to select the file to be loaded, and press **SELECT**.

8. Press **SET**.
The settings of the loaded file are applied.

9

Setting and Controlling the Data Saving and Loading Operations

9.7 Renaming Files

1. Press **FILE** to enter File Operation Mode.

   FILE

   LOAD FILE
   RENAME FILES
   DELETE FILES
   SETUP FILE
   COPY DATA FILES
   COPY BACKUP MEMORY
   FORMAT
   INITIALIZE LOG

   Rename a file
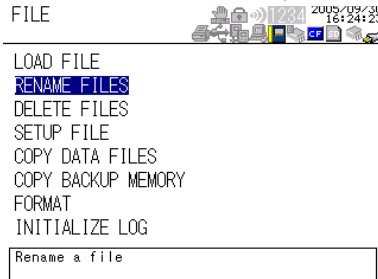
2. With RENAME FILES selected, press **SELECT**.
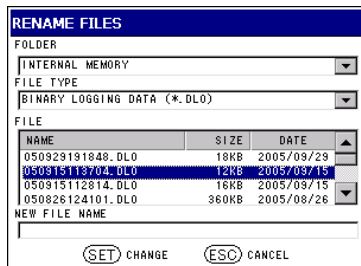
   RENAME FILES
   FOLDER
   INTERNAL MEMORY
   FILE TYPE
   BINARY LOGGING DATA (*.DL0)
   FILE

NAME	SIZE	DATE
050929191848.DL0	18KB	2005/09/29
050915113704.DL0	12KB	2005/09/15
050915112814.DL0	16KB	2005/09/15
050826124101.DL0	360KB	2005/08/26

   NEW FILE NAME

   (SET) CHANGE   (ESC) CANCEL

3. With FOLDER selected, press **SELECT**.

4. Use the **arrow keys** to select the target folder, and press **SET**.

5. Use the **arrow keys** to select FILE TYPE, and press **SELECT**.

6. Use the **arrow keys** to select the file type, and press **SELECT**.

7. Use the **arrow keys** to select the file to be renamed, and press **SELECT**.
   The cursor moves to NEW FILE NAME.

8. Press **SELECT** to open the file name entry window.

9. Enter the file name and press **SET**.

10. Press **SET**.
    The file is renamed.

Explanation

Renaming Files
Specify a file from a list of files saved to the external storage medium (CF card or SD card), internal memory, or setting memory, and rename the file. If a file with the same name already exists, a message appears. Check the message, and select overwrite or cancel.

9.8   Deleting Files

1.   Press **FILE** to enter File Operation Mode.

```
FILE                          2005/09/30
                              16:24:23

LOAD FILE
RENAME FILES
DELETE FILES
SETUP FILE
COPY DATA FILES
COPY BACKUP MEMORY
FORMAT
INITIALIZE LOG
┌─────────────────────────────┐
│ Rename a file               │
└─────────────────────────────┘
```
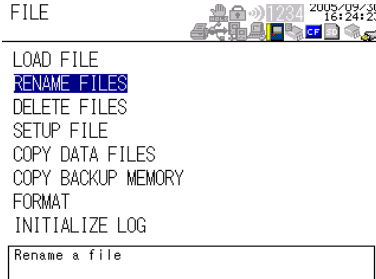
2.   Use the **arrow keys** to select DELETE FILES, and press **SELECT**.
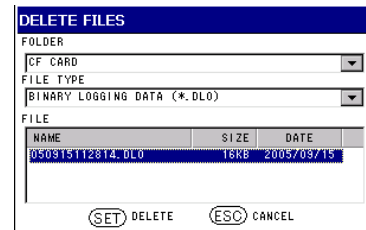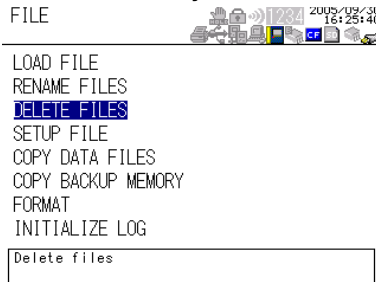
```
FILE                          2005/09/30
                              16:25:40

LOAD FILE
RENAME FILES
DELETE FILES
SETUP FILE
COPY DATA FILES
COPY BACKUP MEMORY
FORMAT
INITIALIZE LOG
┌─────────────────────────────┐
│ Delete files                │
└─────────────────────────────┘
```
→
```
DELETE FILES
FOLDER
CF CARD                  ▼
FILE TYPE
BINARY LOGGING DATA (*.DL0)  ▼
FILE
NAME            SIZE    DATE
050915112814.DL0  16KB  2005/09/15

(SET) DELETE    (ESC) CANCEL
```

3.   With FOLDER selected, press **SELECT**.

4.   Use the **arrow keys** to select the target folder, and press **SET**.

5.   Use the **arrow keys** to select FILE TYPE, and press **SELECT**.

6.   Use the **arrow keys** to select the file type, and press **SELECT**.

7.   Use the **arrow keys** to select the file to be deleted, and press **SELECT**.
        Repeat the operation to select multiple files as necessary.

8.   Press **SET**.

Deleting Files
Specify files from a list of files saved to the external storage medium (CF card or SD card), internal memory, or setting memory, and delete the files. If the files cannot be deleted for some reason, an error message appears.

9

Setting and Controlling the Data Saving and Loading Operations

9.9 Copying Data

1. Press **FILE** to enter File Operation Mode.

```
FILE                              2005/09/30
                                    16:24:23

LOAD FILE
RENAME FILES
DELETE FILES
SETUP FILE
COPY DATA FILES
COPY BACKUP MEMORY
FORMAT
INITIALIZE LOG
Rename a file
```

Copying Data

2. Use the **arrow keys** to select COPY DATA FILES, and press **SELECT**.

```
FILE                              2005/09/30
                                    16:26:08

LOAD FILE
RENAME FILES
DELETE FILES
SETUP FILE
COPY DATA FILES
COPY BACKUP MEMORY
FORMAT
INITIALIZE LOG
Copy data
```
→
```
COPY DATA FILES
SOURCE FOLDER
INTERNAL MEMORY          ▼
FILE TYPE
BINARY LOGGING DATA (*.DL0)  ▼
FILE
 NAME           SIZE    DATE    ▲
050929191848.DL0  18KB  2005/09/29
050915113704.DL0  12KB  2005/09/15
050915112814.DL0  16KB  2005/09/15
050826124101.DL0  360KB 2005/08/26 ▼
DESTINATION FOLDER
¥CFCard¥                 ▼
   (SET) COPY      (ESC) CANCEL
```

3. With SOURCE FOLDER selected, press **SELECT**.

4. Use the **arrow keys** to select the target folder, and press **SET**.

5. Use the **arrow keys** to select FILE TYPE, and press **SELECT**.

6. Use the **arrow keys** to select the file type, and press **SELECT**.

7. Use the **arrow keys** to select the file to be copied, and press **SELECT**.

8. Use the **arrow keys** to select DESTINATION FOLDER, and press **SELECT**.

9. Use the **arrow keys** to select the folder, and press **SET**.

10. Press **SET**.

Copying Backup Memory

2. Use the **arrow keys** to select COPY BACKUP MEMORY, and press **SELECT**.

```
FILE                              2005/09/30
                                    16:26:59

LOAD FILE
RENAME FILES
DELETE FILES
SETUP FILE
COPY DATA FILES
COPY BACKUP MEMORY
FORMAT
INITIALIZE LOG
Copy backup memory
```
→
```
COPY BACKUP DATA
DESTINATION FOLDER
INTERNAL MEMORY          ▼
   (SET) COPY      (ESC) CANCEL
```
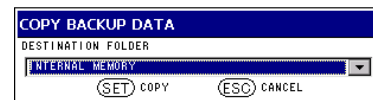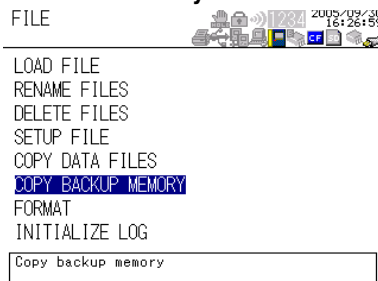
3. Use the **arrow keys** to select the folder, and press **SET**.

Explanation

Copying Data
Specify a file from a list of files saved in the internal memory, and copy it to an external storage medium (CF card, SD card, or USB memory). If the file cannot be copied for some reason, an error message appears.

Copying Backup Memory
Copy the data saved to the internal memory to an external storage medium (CF card, SD card, or USB memory). If the data cannot be copied normally for some reason, an error message appears.

9

Setting and Controlling the Data Saving and Loading Operations

9.10 Formatting the External Storage Media or Internal Memory

1. Press **FILE** to enter File Operation Mode.

   ```
   FILE                              2005/09/30
                                     16:24:23

   LOAD FILE
   RENAME FILES
   DELETE FILES
   SETUP FILE
   COPY DATA FILES
   COPY BACKUP MEMORY
   FORMAT
   INITIALIZE LOG
   ┌─────────────────────────────────────────┐
   │ Rename a file                            │
   └─────────────────────────────────────────┘
   ```
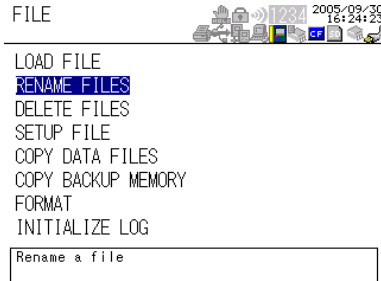
2. Use the **arrow keys** to select FORMAT, and press **SELECT**.

   ```
   FILE                              2005/09/30
                                     16:27:20

   LOAD FILE
   RENAME FILES
   DELETE FILES
   SETUP FILE          →     FORMAT
   COPY DATA FILES           FORMAT TARGET
   COPY BACKUP MEMORY        INTERNAL MEMORY    ▼
   FORMAT
   INITIALIZE LOG            (SET) FORMAT  (ESC) CANCEL
   ┌─────────────────────┐
   │ Format              │
   └─────────────────────┘
   ```
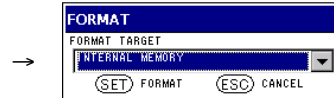
3. Use the **arrow keys** to select the external storage medium to be formatted, and press **SET**.

Formatting

Format an external storage medium (CF card or SD card), internal memory, or setting memory to MS-DOS format.

9.11 Initializing Log Information

1. Press **FILE** to enter File Operation Mode.

```
FILE                            2005/09/30
                                16:24:23
LOAD FILE
RENAME FILES
DELETE FILES
SETUP FILE
COPY DATA FILES
COPY BACKUP MEMORY
FORMAT
INITIALIZE LOG
Rename a file
```
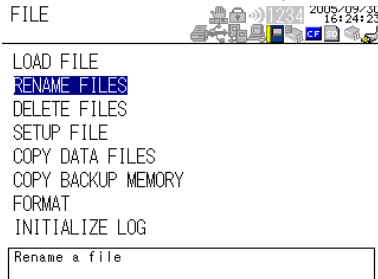
2. Use the **arrow keys** to select INITIALIZE LOG, and press **SELECT**.

```
FILE                            2005/09/30
                                16:33:24
LOAD FILE
RENAME FILES
DELETE FILES
SETUP FILE
COPY DATA FILES
COPY BACKUP MEMORY
FORMAT
INITIALIZE LOG
Initialize the log information.
```

→

```
INITIALIZE LOG
Initialize log information?

SET  OK        ESC  CANCEL
```
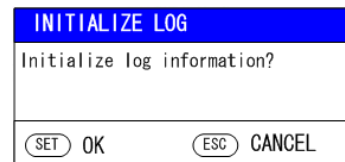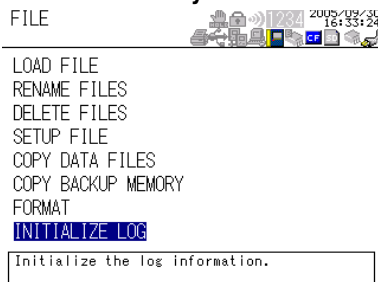
3. Press **SET**.

Explanation

Initializing the Log
Initialize all of the log information.

9.12 Automated Measurement and Save Function

1. Press **SETTING** to enter Setting Mode.

```
SETTING                      2005/09/29
                             20:33:25
┌─────────────────────────────────────┐
│ INPUT                                │
│ DISPLAY                              │
│ DATA SAVE                            │
│ ALARM                                │
│ CALCULATION                          │
│ COMMUNICATION                        │
│ HARDWARE                             │
│ SYSTEM                               │
├─────────────────────────────────────┤
│ Set the range, span, and so forth for the │
│ analog, pulse, and logic input.      │
└─────────────────────────────────────┘
```

2. Use the **arrow keys** to select HARDWARE, and press **SELECT**.

```
SETTING                2005/09/30          SETTING                2005/09/30
                       16:35:27            ►HARDWARE              16:35:43
┌────────────────────────┐                ┌────────────────────────────────┐
│ INPUT                  │                │ BEEP SOUND        ON           │
│ DISPLAY                │                │ ID NUMBER         1            │
│ DATA SAVE              │                │ LANGUAGE          ENGLISH      │
│ ALARM                  │     →          │ TEMPERATURE       °C           │
│ CALCULATION            │                │ CLOCK             2005/09/30 16:35:32 │
│ COMMUNICATION          │                │ AUTO MEASUREMENT  OFF          │
│ HARDWARE               │                │ SYSTEM RESET                   │
│ SYSTEM                 │                │ MAC ADDRESS       00-00-64-89-10-24 │
├────────────────────────┤                ├────────────────────────────────┤
│                        │                │                                │
└────────────────────────┘                └────────────────────────────────┘
```
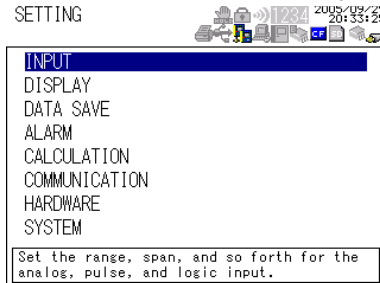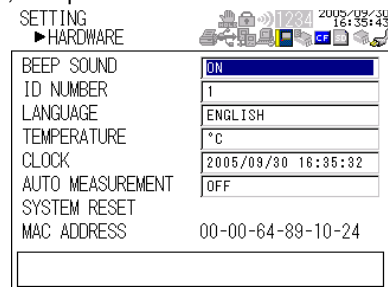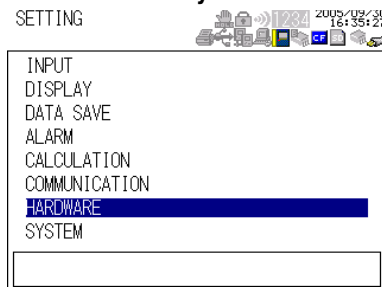
3. Use the **arrow keys** to select AUTO MEASUREMENT, and press **SELECT**.

```
SETTING                2005/09/30
►HARDWARE              16:36:03
┌────────────────────────────────┐
│ BEEP SOUND        ON           │
│ ID NUMBER         1            │
│ LANGUAGE          ENGLISH      │
│ TEMPERATURE       °C           │
│ CLOCK             2005/09/30 16:35:32 │
│ AUTO MEASUREMENT  OFF          │
│ SYSTEM RESET                   │
│ MAC ADDRESS       00-00-64-89-10-24 │
├────────────────────────────────┤
│                                │
└────────────────────────────────┘
```
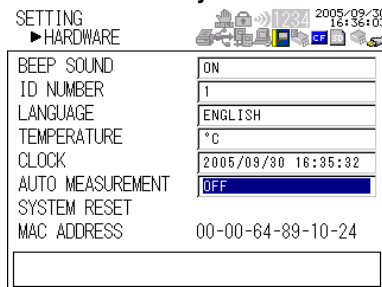
4. Use the **arrow keys** to select ON, and press **SET**.

5. Press **SET**.

Explanation

Automated Measurement Function

If the power is turned ON with the automated measurement function turned ON and an external storage medium (USB memory, CF card, or SD card) is inserted, the setup file (file name: AUTORUN.SET) saved in the external storage medium is automatically loaded. The same operation takes place when an external storage medium on which a setting file is saved (file name: AUTORUN.SET) is inserted in Free Running Mode.

If you select OK at the message confirming the start of the automated measurement, the XL100 enters Logging Mode, and automatically starts logging. If the start trigger is specified, the XL100 enters a logging standby state and starts the logging operation when the trigger is activated. If the end trigger is specified, the XL100 stops the logging operation when the trigger is activated. If the end trigger is not specified, stop the logging operation by pressing START/STOP.

When the logging operation stops, a message appears asking if you want to save the data to an external storage medium (USB memory, CF card, or SD card). If you select OK, the measured data is copied to the external storage medium from which the setup file (AUTORUN.SET) was loaded.

Auto Loading of the Setup File

When there are multiple external storage media inserted and the power is turned ON, the XL100 searches in order the USB memory, CF card, and SD card for a setup file (AUTORUN.SET) and automatically loads the first one that is finds. If no external storage media is inserted or there is no setup file (AUTORUN.SET), the XL100 enters Free Running Mode.

9

Setting and Controlling the Data Saving and Loading Operations

10.1   Selecting the Communication Interface

Procedure

1.   Press **SETTING** to enter Setting Mode.

```
SETTING                          2005/09/29
                                 20:33:25
 INPUT
 DISPLAY
 DATA SAVE
 ALARM
 CALCULATION
 COMMUNICATION
 HARDWARE
 SYSTEM
 Set the range, span, and so forth for the
 analog, pulse, and logic input.
```

2.   Use the **arrow keys** to select COMMUNICATION, and press **SELECT**.

```
SETTING                2005/10/02      SETTING                2005/10/02
                       13:36:34        ►COMMUNICATION        13:36:44
 INPUT                                  INTERFACE        LAN
 DISPLAY                                PRINTER OUTPUT
 DATA SAVE                              SERIAL COMM.
 ALARM                                  USB
 CALCULATION                            ETHERNET
 COMMUNICATION                          NETWORK FUNC.
 HARDWARE                               DIAL-UP
 SYSTEM
                              →
                                        Set the communication interface to be used
                                        (LAN, USB, RS-232, or RS-485).
```
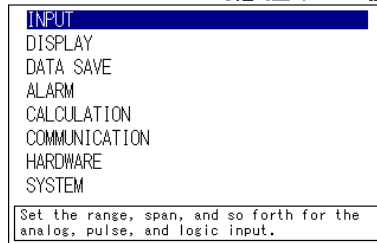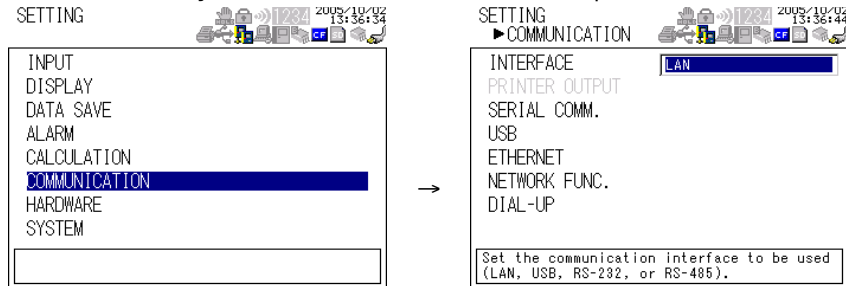
3.   With INTERFACE selected, press **SELECT**.
An interface selection list is displayed.

4.   Use the **arrow keys** to select a communication interface, and press **SELECT**.

5.   Press **SET**.

Explanation

Setting the Interface
Communication can only be performed on a single interface at any given time. Select the communication interface you want to use from below. The default setting is LAN (Ethernet).
LAN, USB, RS-232, RS-485, or RS-232 (PRINTER)

⚠ **Note**

- **If you are outputting to a printer, select RS-232 (PRINTER) not RS-232.**
- **If the interface is not set to LAN, do not connect the LAN cable.**

10

Setting the Communication Function

10.2 Setting the Serial Communication (RS-232, RS-485, Modbus, and Communication Channel)
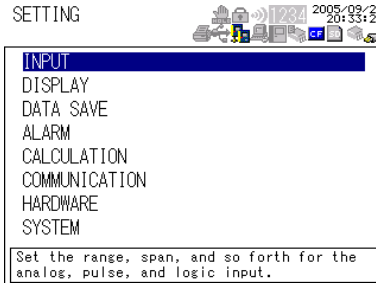
1. Press **SETTING** to enter Setting Mode.

   SETTING   2005/09/29 20:33:25
   ```
   INPUT
   DISPLAY
   DATA SAVE
   ALARM
   CALCULATION
   COMMUNICATION
   HARDWARE
   SYSTEM

   Set the range, span, and so forth for the
   analog, pulse, and logic input.
   ```

2. Use the **arrow keys** to select COMMUNICATION, and press **SELECT**.

   SETTING   2005/10/02 13:36:34
   ```
   INPUT
   DISPLAY
   DATA SAVE
   ALARM
   CALCULATION
   COMMUNICATION
   HARDWARE
   SYSTEM
   ```
   →
   SETTING ▶COMMUNICATION   2005/10/02 13:37:05
   ```
   INTERFACE          RS-232
   PRINTER OUTPUT
   SERIAL COMM.
   USB
   ETHERNET
   NETWORK FUNC.
   DIAL-UP

   Set the communication interface to be used
   (LAN, USB, RS-232, or RS-485).
   ```
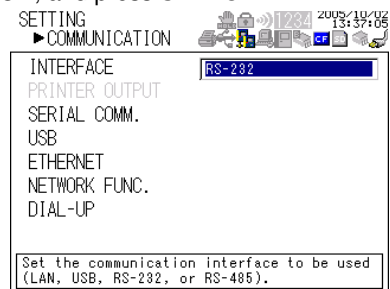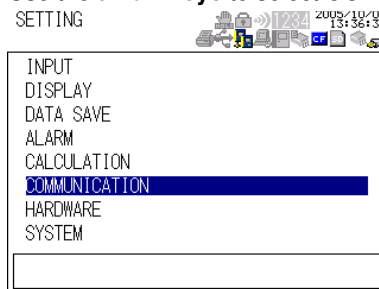
3. Use the **arrow keys** to select SERIAL COMM., and press **SELECT**.
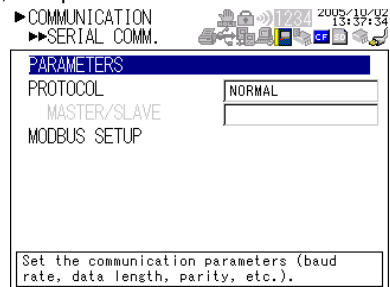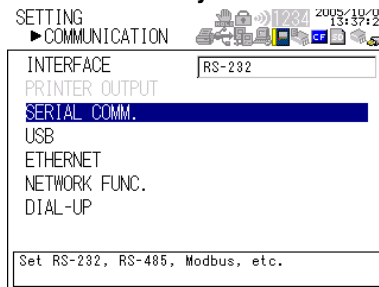
   SETTING ▶COMMUNICATION   2005/10/02 13:37:23
   ```
   INTERFACE          RS-232
   PRINTER OUTPUT
   SERIAL COMM.
   USB
   ETHERNET
   NETWORK FUNC.
   DIAL-UP

   Set RS-232, RS-485, Modbus, etc.
   ```
   →
   ▶COMMUNICATION ▶▶SERIAL COMM.   2005/10/02 13:37:34
   ```
   PARAMETERS
   PROTOCOL           NORMAL
      MASTER/SLAVE
   MODBUS SETUP

   Set the communication parameters (baud
   rate, data length, parity, etc.).
   ```

4. Use the **arrow keys** to select the desired item, and press **SELECT**.

   Press **SELECT** to show a selection list or window for setting the item.

   • Communication Conditions Setting display

   ▶▶SERIAL COMM. ▶▶▶PARAMETERS   2005/10/02 13:38:20
   ```
   SLAVE ADDRESS      1
   BAUD RATE          9600bps
   DATA LENGTH        8bits
   STOP BIT           1bit
   PARITY             NONE
   HANDSHAKING        OFF

   Set the slave address of the Modbus
   communication.
   ```

• Modbus setting display

• Modbus setting > Communication channel setting display
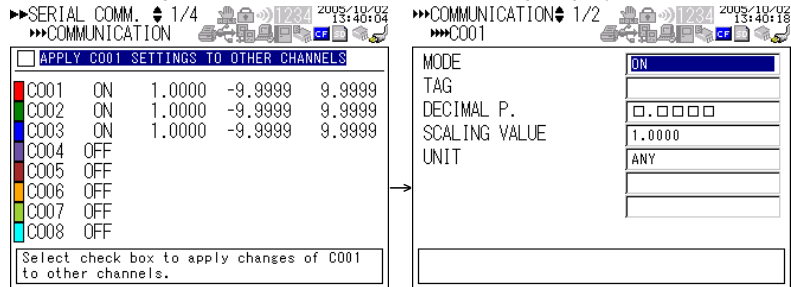
5. Select or enter the item on the displayed selection list or window.

6. Press **SET**.

When Setting the Channels Displayed on the Same Page to the Same Settings on the Modbus setting > Communication channel setting Display

When the channel selection display is shown, use the **arrow keys** to select "Apply the COXX* settings to other channels," and press **SELECT** to select the check box. If this check box is selected, all changes (except the color) made on COXX* are applied to the other channels.

* XX varies depending on the displayed page.

10

Setting the Communication Function

Explanation

Setting the Serial Communication

If you are using RS-232 or RS-485 serial communication, set the items below. For a detailed explanation, see the *Communication Function Manual* (IMXL100C-E).

Item	Setting
Protocol	Select Normal (default setting), Modbus (ASCII), or Modbus (RTU). If you select Modbus, select master (default setting) or slave.
Communication conditions	
Slave address	This setting applies to RS-485 and Modbus communication. Select a number from 1 to 32. The default setting is 1.
Baud rate	Select 2400, 4800, 9600, 19200, 38400 (default setting), 57600, or 115200 (however, 57600 and 115200 are selectable only for RS-485).
Data length	Select 7 bits or 8 bits. The default setting is 8 bits.
Stop bit	Select 1 bit (default setting) or 2 bits.
Parity	Select ODD, EVEN, or NONE. The default setting is NONE.
Handshaking	This setting applies to RS-232 communication. Select OFF (default setting), XON/XOFF, or CS/RS.

Modbus setting

If Protocol is set to Modbus Master, set the items below. For a detailed explanation, see the *Communication Function Manual* (IMXL100C-E).

- Modbus master basic settings

Item	Setting
Communication interval	Select 100 ms, 200 ms, 500 ms, 1 s (default setting), 2 s, 5 s, or 10 s.
Timeout value	Select 100 ms, 200 ms, 500 ms, 1 s (default setting), 2 s, 5 s, 10 s, or 1 min.
Retrials	Select OFF (default setting), 1, 2, 3, 4, 5, 10, or 20.

- Modbus master command settings

Item	Setting
ON/OFF	Select whether to use the command by turning the corresponding box ON or OFF. The default setting is OFF.
First CH	Set the communication input data to which the data loaded from the slave device is to be assigned. Select the first channel from CO01 (default setting) to CO32.
Last CH	Set the communication input data to which the data loaded from the slave device is to be assigned. Select the last channel from CO01 (default setting) to CO32.
Address	Select the address of the slave device from 001 (default setting) to 247.
Register	Set the register number of the slave device.
Type	Specify the data type assigned to the Modbus register of the slave device. Select INT16, UINT16, INT32_B, INT32_L, UINT32_B, UINT32_L, FLOAT_B, or FLOAT_L.

• Communication Channel Settings

Item	Setting
Mode	Select ON (default setting) or OFF.
Tag	Set the tag to assign to the communication channel using up to eight characters.
Decimal place	Select X.XXXX (default setting), XX.XXX, XXX.XX, XXXX.X, or XXXXX.
Scaling value	Set the scaling value in the range of –99999 to 99999. The default setting is 1.
Unit (The default setting is Any.)	
	Set the unit to assign to the communication input data. Select the unit group and then the unit within the group.
Length	mm (default setting), cm, m, or km
Area	mm2 (default setting), cm2, or m2
Volume	mm3 (default setting), cm3, m3, cc, ml, l, or kl
Velocity	mm/s (default setting), mm/min, mm/h, cm/s, cm/min, cm/h, m/s, m/min, m/h, km/s, km/min, or km/h
Acceleration	m/s2 (default setting), km/h2, Gal, or G
Frequency	mHz (default setting), Hz, kHz, or rpm
Weight	mg (default setting), g, kg, t, N, or kgf
Work	mW (default setting), W, kW, PS, HP, J, Wh, or cal
Pressure	kgf/cm2 (default setting), Pa, kPa, or MPa
Flow rate	m3/s (default setting), m3/min, m3/h, t/s, t/min, t/h, l/s, l/min, l/h, kg/s, kg/min, kg/h, kl/s, kl/min, kl/h, cc/s, cc/min, or cc/h
Temperature	°C (default setting), K, or °F
Voltage/current	mV (default value), V, kV, MV, mA, A, kA, MA
Power	mW (default value), W, kW, MW, mvar, var, kvar, Mvar, mVA, VA, kVA, MVA, deg
Watt hour	Wh (default value), kWh, MWh, varh, kvarh, Mvarh
Any	Up to six characters. The default setting is the unit of the range selected in the range setting.
Span setting	
	Set the span of the communication input data.
Span upper limit	Set the value in the range of –99999 to 99999. The default setting is –99999).
Decimal place	Select X.XXXX (default setting), XX.XXX, XXX.XX, XXXX.X, or XXXXX.
Span lower limit	Set the value in the range of –99999 to 99999. The default setting is 99999).
Color	Select from Red, green, blue, blue violet, brown, orange, yellow-green, light blue, violet, gray, lime, blue green, dark blue, yellow, olive, and purple. (Default settings are as follows: channel 1: red, 2: green, 3: blue, 4: blue violet, 5: brown, 6: orange, 7: yellow-green, 8: light blue, 9: violet, 10: gray, 11: lime, 12: blue green, 13: dark blue, 14: yellow, 15: olive, 16: purple, 17: red, 18: green, 19: blue, 20: blue violet, 21: brown, 22: orange, 23: yellow-green, 24: light blue, 25: violet, 26: gray, 27: lime, 28: blue green, 29: dark blue, 30: yellow, 31: olive, 32: purple)
Waveform line width	Select 1dot (default setting), 2dot, or 3dot.

10

Setting the Communication Function

10.3 Setting the USB ID

1. Press **SETTING** to enter Setting Mode.

   SETTING 2005/09/29 20:33:25

   INPUT
   DISPLAY
   DATA SAVE
   ALARM
   CALCULATION
   COMMUNICATION
   HARDWARE
   SYSTEM

   Set the range, span, and so forth for the analog, pulse, and logic input.

2. Use the **arrow keys** to select COMMUNICATION, and press **SELECT**.

   SETTING 2005/10/02 13:36:34

   INPUT
   DISPLAY
   DATA SAVE
   ALARM
   CALCULATION
   COMMUNICATION
   HARDWARE
   SYSTEM

   →

   SETTING 2005/10/02 13:40:38
   ►COMMUNICATION

   INTERFACE   USB
   PRINTER OUTPUT
   SERIAL COMM.
   USB
   ETHERNET
   NETWORK FUNC.
   DIAL-UP

   Set the communication interface to be used (LAN, USB, RS-232, or RS-485).
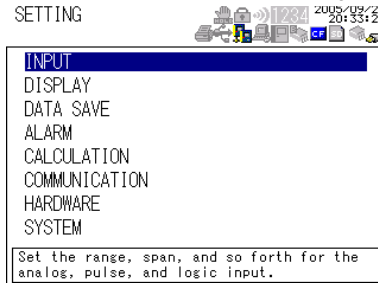
3. Use the **arrow keys** to select USB, and press **SELECT**.

   SETTING 2005/10/02 13:40:43
   ►COMMUNICATION

   INTERFACE   USB
   PRINTER OUTPUT
   SERIAL COMM.
   USB
   ETHERNET
   NETWORK FUNC.
   DIAL-UP

   Set the USB ID.

   →

   ►COMMUNICATION 2005/10/02 13:40:50
   ►►USB

   USB ID   1

   Set the USB ID number.
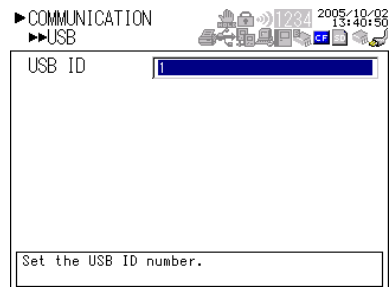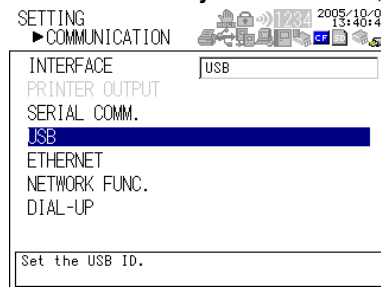
4. Press **SELECT** to show the USB ID selection list.

5. Use the **arrow keys** to select the USB ID, and press **SELECT**.

6. Press **SET**.

USB ID
Select the USB ID number from 0 to 31. The default setting is 0.

10.4 Setting the Ethernet Interface
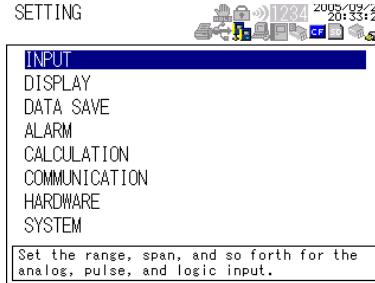
1. Press **SETTING** to enter Setting Mode.

```
SETTING                        2005/09/29
                               20:33:25
┌─────────────────────────────────────┐
│ INPUT                                │
│ DISPLAY                              │
│ DATA SAVE                            │
│ ALARM                                │
│ CALCULATION                          │
│ COMMUNICATION                        │
│ HARDWARE                             │
│ SYSTEM                               │
├─────────────────────────────────────┤
│ Set the range, span, and so forth for the │
│ analog, pulse, and logic input.      │
└─────────────────────────────────────┘
```

2. Use the **arrow keys** to select COMMUNICATION, and press **SELECT**.

```
SETTING                 2005/10/02         SETTING                 2005/10/02
                        13:36:34           ►COMMUNICATION          13:36:44
┌─────────────────────────────┐           ┌─────────────────────────────┐
│ INPUT                       │           │ INTERFACE      │LAN        │ │
│ DISPLAY                     │           │ PRINTER OUTPUT             │
│ DATA SAVE                   │           │ SERIAL COMM.              │
│ ALARM                       │           │ USB                       │
│ CALCULATION                 │     →     │ ETHERNET                  │
│ COMMUNICATION               │           │ NETWORK FUNC.             │
│ HARDWARE                    │           │ DIAL-UP                   │
│ SYSTEM                      │           │                           │
├─────────────────────────────┤           ├─────────────────────────────┤
│                             │           │ Set the communication interface to be used │
│                             │           │ (LAN, USB, RS-232, or RS-485). │
└─────────────────────────────┘           └─────────────────────────────┘
```
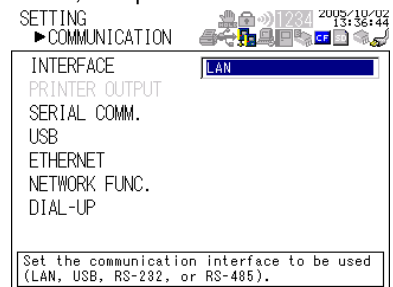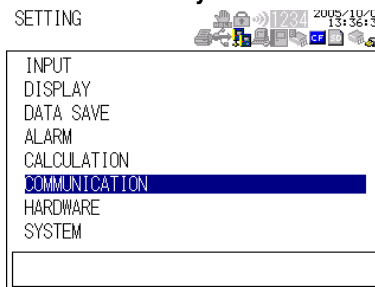
3. Use the **arrow keys** to select ETHERNET, and press **SELECT**.
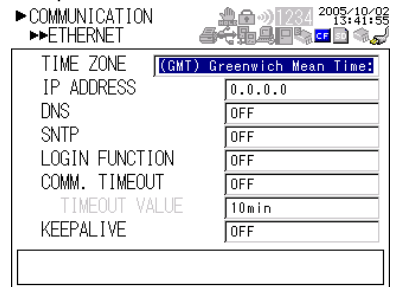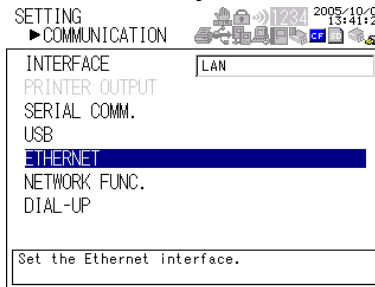
```
SETTING                 2005/10/02         ►COMMUNICATION          2005/10/02
►COMMUNICATION          13:41:26           ►►ETHERNET             13:41:55
┌─────────────────────────────┐           ┌─────────────────────────────┐
│ INTERFACE      │LAN       │  │           │ TIME ZONE │(GMT) Greenwich Mean Time:│
│ PRINTER OUTPUT             │           │ IP ADDRESS     │0.0.0.0  │ │
│ SERIAL COMM.              │           │ DNS            │OFF      │ │
│ USB                       │           │ SNTP           │OFF      │ │
│ ETHERNET                  │     →     │ LOGIN FUNCTION │OFF      │ │
│ NETWORK FUNC.             │           │ COMM. TIMEOUT  │OFF      │ │
│ DIAL-UP                   │           │    TIMEOUT VALUE │10min  │ │
│                           │           │ KEEPALIVE      │OFF      │ │
├─────────────────────────────┤           ├─────────────────────────────┤
│ Set the Ethernet interface. │           │                           │
└─────────────────────────────┘           └─────────────────────────────┘
```

4. Use the **arrow keys** to select the desired item, and press **SELECT**.

Press **SELECT** to show a selection list or display for setting the item.

- IP Address Setting display

```
►►ETHERNET                     2005/10/02
  ►►►IP ADDRESS                13:43:08
┌─────────────────────────────────────┐
│ DHCP              │ON              │ │
│   IP ADDRESS      │0.0.0.0         │ │
│   SUBNET MASK     │0.0.0.0         │ │
│   DEFAULT GATEWAY │0.0.0.0         │ │
│                                     │
│   IPV6 INFO.                        │
│                                     │
├─────────────────────────────────────┤
│ Turn ON/OFF the DHCP function (auto │
│ assignment of IP addresses).        │
└─────────────────────────────────────┘
```

10

Setting the Communication Function
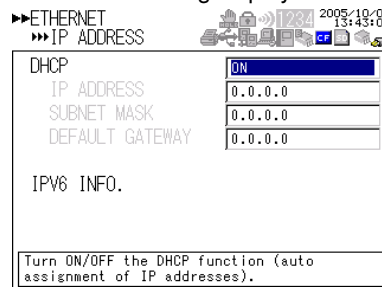
- • DNS Setting display

```
▶▶ETHERNET                           2005/10/02
  ▶▶DNS                                13:43:21

DNS                        [ON]
   PRIM. DNS SERVER    [0.0.0.0]
   SEC.  DNS SERVER    [0.0.0.0]
HOST NAME              [        ]
DOMAIN NAME            [        ]
PRIM. DOMAIN SUFFIX    [        ]
SEC. DOMAIN SUFFIX     [        ]
```

- • SNTP Setting display

```
▶▶ETHERNET                           2005/10/02
  ▶▶SNTP                               13:43:30

SNTP                    [ON]
   SERVER NAME          [        ]
   CONFIRM TIME         [24h]




Turn ON/OFF the SNTP function (clock
synchronization).
```

5. Select or enter the item on the displayed selection list or window.

6. Press **SET**.

Explanation

Setting the Ethernet Interface
Specify the items below. For a detailed explanation, see the *Communication Function Manual* (IMXL100C-E).

Item	Setting
Time zone	Select from the following: (GMT-12:00) International Date Line West (GMT-11:00) Midway Island, Samoa (GMT-10:00) Hawaii (GMT-09:00) Alaska (GMT-08:00) Pacific Time (US and Canada); Tijuana (GMT-07:00) Arizona (GMT-07:00) Chihuahua, La Paz, Mazatlan (GMT-07:00) Mountain Time (US and Canada) (GMT-06:00) Guadalajara, Mexico City, Monterrey (GMT-06:00) Saskatchewan (GMT-06:00) Central America (GMT-06:00) Central Time (US and Canada) (GMT-05:00) Indiana (East) (GMT-05:00) Bogota, Lima, Quito (GMT-05:00) Eastern Time (US and Canada) (GMT-04:00) Caracas, La Paz (GMT-04:00) Santiago (GMT-04:00) Atlantic Time (Canada) (GMT-03:30) Newfoundland (GMT-03:00) Greenland (GMT-03:00) Buenos Aires, Georgetown (GMT-03:00) Brasilia (GMT-02:00) Mid-Atlantic (GMT-01:00) Azores (GMT-01:00) Cape Verde Islands (GMT) Casablanca, Monrovia (GMT) Greenwich Mean Time: Dublin, Edinburgh, Lisbon, London (GMT+01:00) Amsterdam, Berlin, Bern, Rome, Stockholm, Vienna (GMT+01:00) Sarajevo, Skopje, Warsaw, Zagreb

	(GMT+01:00) Brussels, Copenhagen, Madrid, Paris (GMT+01:00) Belgrade, Bratislava, Budapest, Ljubljana, Prague (GMT+01:00) West Central Africa (GMT+02:00) Athens, Istanbul, Minsk (GMT+02:00) Jerusalem (GMT+02:00) Cairo (GMT+02:00) Harare, Pretoria (GMT+02:00) Bucharest (GMT+02:00) Helsinki, Kiev, Riga, Sofia, Tallinn, Vilnius (GMT+03:00) Kuwait, Riyadh (GMT+03:00) Nairobi (GMT+03:00) Baghdad (GMT+03:00) Moscow, St. Petersburg, Volgograd (GMT+03:00) Tehran (GMT+04:00) Abu Dhabi, Muscat (GMT+04:00) Baku, Tbilisi, Yerevan (GMT+04:30) Kabul (GMT+05:00) Islamabad, Karachi, Tashkent (GMT+05:00) Ekaterinburg (GMT+05:30) Chennai, Kolkata, Mumbai, New Delhi (GMT+05:45) Kathmandu (GMT+06:00) Astana, Dhaka (GMT+06:00) Almaty, Novosibirsk (GMT+06:00) Sri Jayawardenepura (GMT+06:30) Yangon Rangoon (GMT+07:00) Krasnoyarsk (GMT+07:00) Bangkok, Hanoi, Jakarta (GMT+08:00) Irkutsk, Ulaanbaatar (GMT+08:00) Kuala Lumpur, Singapore (GMT+08:00) Perth (GMT+08:00) Taipei (GMT+08:00) Beijing, Chongqing, Hong Kong SAR, Urumqi (GMT+09:00) Seoul (GMT+09:00) Yakutsk (GMT+09:00) Osaka, Sapporo, Tokyo (GMT+09:30) Adelaide (GMT+09:30) Darwin (GMT+10:00) Vladivostok (GMT+10:00) Canberra, Melbourne, Sydney (GMT+10:00) Guam, Port Moresby (GMT+10:00) Brisbane (GMT+10:00) Hobart (GMT+11:00) Magadan, Solomon Islands, New Caledonia (GMT+12:00) Auckland, Wellington (GMT+12:00) Fiji Islands, Kamchatka, Marshall Islands (GMT+13:00) Nuku'alofa The default setting is GMT and GMT+9:00 if the display language is set to English and Japanese, respectively
DHCP	Select ON or OFF. The default setting is OFF.
IP address	Set ***.***.***.***. The default setting is 0.0.0.0.
Subnet mask	Set ***.***.***.***. The default setting is 0.0.0.0.
Default gateway	Set ***.***.***.***. The default setting is 0.0.0.0.

10

Setting the Communication Function

Item	Setting
IPv6 information (display only)	
Default gateway	
Global	
Site-local	
Link local	
6to4	
Automatic tunnel	
Automatic tunnel 2	
Automatic tunnel 3	
DNS	
DNS use	Select ON or OFF. The default setting is OFF.
Primary DNS server	Set ***.***.***.***. The default setting is 0.0.0.0.
Secondary DNS server	Set ***.***.***.***. The default setting is 0.0.0.0.
Host name	Set the host name using up to 64 characters.
Domain name	Set the domain name using up to 64 characters.
Primary domain suffix	Set the primary domain suffix using up to 64 characters.
Secondary domain suffix	Set the secondary domain suffix using up to 64 characters.
SNTP	
SNTP use	Select ON or OFF. The default setting is OFF.
Server name	Set the server name using up to 64 characters or an IP address.
Confirmation time	Set the value in the range of 1 to 24 hours. The default setting is 24 hours.
Login function	Select ON or OFF. The default setting is OFF.
Communication timeout	
Timeout enable	Select ON or OFF. The default setting is OFF.
Timeout value	Set the value in the range of 1 to 120 min. The default setting is 10 min.
Keepalive	Select ON or OFF. The default setting is OFF.

10.5 Setting the FTP Client

Procedure

1. Press **SETTING** to enter Setting Mode.

```
SETTING                          2005/09/29
                                  20:33:25
 ┌─────────────────────────────────────────┐
 │ INPUT                                     │
 │ DISPLAY                                   │
 │ DATA SAVE                                 │
 │ ALARM                                     │
 │ CALCULATION                               │
 │ COMMUNICATION                             │
 │ HARDWARE                                  │
 │ SYSTEM                                    │
 ├─────────────────────────────────────────┤
 │ Set the range, span, and so forth for the │
 │ analog, pulse, and logic input.           │
 └─────────────────────────────────────────┘
```

2. Use the **arrow keys** to select COMMUNICATION, and press **SELECT**.

```
SETTING                 2005/10/02        SETTING                     2005/10/02
                         13:36:34         ►COMMUNICATION               13:36:44
 ┌──────────────────────────────┐          ┌──────────────────────────────────────┐
 │ INPUT                         │          │ INTERFACE          │LAN         │     │
 │ DISPLAY                       │          │ PRINTER OUTPUT                   │     │
 │ DATA SAVE                     │          │ SERIAL COMM.                     │     │
 │ ALARM                         │          │ USB                             │     │
 │ CALCULATION                   │    →     │ ETHERNET                        │     │
 │ COMMUNICATION                 │          │ NETWORK FUNC.                   │     │
 │ HARDWARE                      │          │ DIAL-UP                         │     │
 │ SYSTEM                        │          │                                 │     │
 ├──────────────────────────────┤          ├──────────────────────────────────────┤
 │                               │          │ Set the communication interface to be used │
 │                               │          │ (LAN, USB, RS-232, or RS-485).           │
 └──────────────────────────────┘          └──────────────────────────────────────┘
```

3. Use the **arrow keys** to select NETWORK FUNC., and press **SELECT**.

```
SETTING                 2005/10/02        ►COMMUNICATION              2005/10/02
►COMMUNICATION           13:43:46         ►►NETWORK FUNC.              13:43:49
 ┌──────────────────────────────┐          ┌──────────────────────────────────────┐
 │ INTERFACE      │LAN      │    │          │ FTP CLIENT                       │     │
 │ PRINTER OUTPUT                │          │ WEB SERVER                       │     │
 │ SERIAL COMM.                  │          │ E-MAIL                           │     │
 │ USB                           │    →     │                                  │     │
 │ ETHERNET                      │          │                                  │     │
 │ NETWORK FUNC.                 │          │                                  │     │
 │ DIAL-UP                       │          │                                  │     │
 ├──────────────────────────────┤          ├──────────────────────────────────────┤
 │ Set the FTP client, Web server, and E- │  │                                  │     │
 │ mail.                         │          │                                  │     │
 └──────────────────────────────┘          └──────────────────────────────────────┘
```

4. With FTP CLIENT selected, press **SELECT**.
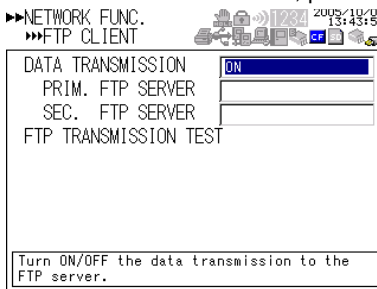
```
►►NETWORK FUNC.          2005/10/02
►►►FTP CLIENT            13:43:59
 ┌──────────────────────────────────────┐
 │ DATA TRANSMISSION     │ON         │    │
 │   PRIM. FTP SERVER    │          │    │
 │   SEC.  FTP SERVER    │          │    │
 │ FTP TRANSMISSION TEST                  │
 │                                        │
 │                                        │
 ├──────────────────────────────────────┤
 │ Turn ON/OFF the data transmission to the │
 │ FTP server.                            │
 └──────────────────────────────────────┘
```

10

Setting the Communication Function

5. Use the **arrow keys** to select the desired item, and press **SELECT**.

Press **SELECT** to show a selection list or window for setting the item.

• Primary server setting display

```
▸▸FTP CLIENT                    2005/10/02
   ▸▸▸PRIMARY SERVER            13:44:07

    SERVER NAME    [              ]
    PORT NUMBER    [21            ]
    LOGIN NAME     [              ]
    PASSWORD       [              ]
    ACCOUNT        [              ]
    PASV MODE      [OFF           ]
    INITIAL PATH   [              ]

    Set the primary FTP server by IP address
    or host name (max 64 characters).
```

6. Select or enter the item on the displayed selection list or window.

7. Press **SET**.

Explanation

Setting the FTP Client

Specify the items below. For a detailed explanation, see the *Communication Function Manual* (IMXL100C-E).

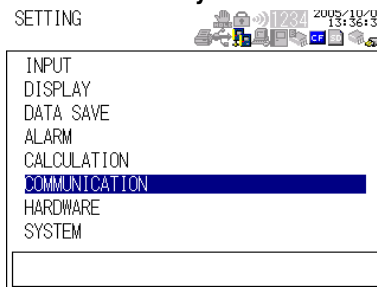| Item	Setting
Data transmission	Select ON or OFF. The default setting is OFF.
Primary FTP server	
FTP server name	Set the IP address or name (when using DNS).
Port number	Set the value in the range of 1 to 65535. The default setting is 21.
Login name	Set the login name using up to 32 characters.
Password	Set the password using up to 32 characters.
Account	Set the account using up to 32 characters.
PASV mode	Select ON or OFF. The default setting is OFF.
Initial path	Set the initial path using up to 64 characters.
Secondary FTP server	
FTP server name	Set the IP address or name (when using DNS).
Port number	Set the value in the range of 1 to 65535. The default setting is 21.
Login name	Set the login name using up to 32 characters.
Password	Set the password using up to 32 characters.
Account	Set the account using up to 32 characters.
PASV mode	Select ON or OFF. The default setting is OFF.
Initial path	Set the initial path using up to 64 characters.

10.6   Setting the Web Server

Procedure

1. Press **SETTING** to enter Setting Mode.

```
SETTING                      2005/09/29
                             20:33:25
┌─────────────────────────────────────┐
│ INPUT                                │
│ DISPLAY                              │
│ DATA SAVE                            │
│ ALARM                                │
│ CALCULATION                          │
│ COMMUNICATION                        │
│ HARDWARE                             │
│ SYSTEM                               │
│ Set the range, span, and so forth for the │
│ analog, pulse, and logic input.      │
└─────────────────────────────────────┘
```

2. Use the **arrow keys** to select COMMUNICATION, and press **SELECT**.

```
SETTING              2005/10/02       SETTING              2005/10/02
                     13:36:34          ►COMMUNICATION      13:36:44
┌──────────────────────────┐          ┌──────────────────────────────┐
│ INPUT                    │          │ INTERFACE          LAN       │
│ DISPLAY                  │          │ PRINTER OUTPUT               │
│ DATA SAVE                │          │ SERIAL COMM.                 │
│ ALARM                    │    →     │ USB                          │
│ CALCULATION              │          │ ETHERNET                     │
│ COMMUNICATION            │          │ NETWORK FUNC.                │
│ HARDWARE                 │          │ DIAL-UP                      │
│ SYSTEM                   │          │                              │
│                          │          │ Set the communication interface to be used │
│                          │          │ (LAN, USB, RS-232, or RS-485). │
└──────────────────────────┘          └──────────────────────────────┘
```

3. Use the **arrow keys** to select NETWORK FUNC., and press **SELECT**.

```
SETTING              2005/10/02       ►COMMUNICATION      2005/10/02
 ►COMMUNICATION      13:43:46          ►►NETWORK FUNC.    13:43:49
┌──────────────────────────┐          ┌──────────────────────────────┐
│ INTERFACE          LAN   │          │ FTP CLIENT                   │
│ PRINTER OUTPUT           │          │ WEB SERVER                   │
│ SERIAL COMM.             │          │ E-MAIL                       │
│ USB                      │    →     │                              │
│ ETHERNET                 │          │                              │
│ NETWORK FUNC.            │          │                              │
│ DIAL-UP                  │          │                              │
│ Set the FTP client, Web server, and E- │          │                              │
│ mail.                    │          │                              │
└──────────────────────────┘          └──────────────────────────────┘
```

4. Use the **arrow keys** to select WEB SERVER, and press **SELECT**.
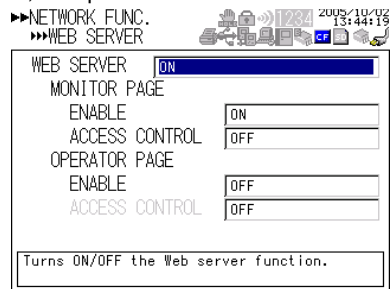
```
►COMMUNICATION       2005/10/02       ►►NETWORK FUNC.     2005/10/02
 ►►NETWORK FUNC.     13:44:15          ►►►WEB SERVER      13:44:19
┌──────────────────────────┐          ┌──────────────────────────────┐
│ FTP CLIENT               │          │ WEB SERVER      ON           │
│ WEB SERVER               │          │   MONITOR PAGE               │
│ E-MAIL                   │          │     ENABLE        ON         │
│                          │    →     │     ACCESS CONTROL OFF        │
│                          │          │   OPERATOR PAGE              │
│                          │          │     ENABLE        OFF        │
│                          │          │     ACCESS CONTROL OFF        │
│                          │          │                              │
│                          │          │ Turns ON/OFF the Web server function. │
└──────────────────────────┘          └──────────────────────────────┘
```

5. Use the **arrow keys** to select the desired item, and press **SELECT**.
   Press **SELECT** to show a selection list or window for setting the item.

6. Select or enter the item on the displayed selection list or window.

7. Press **SET**.

10

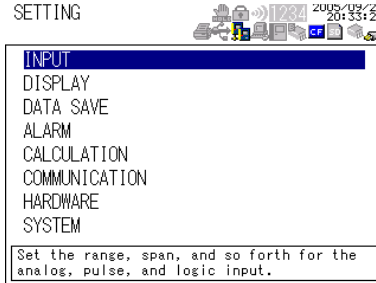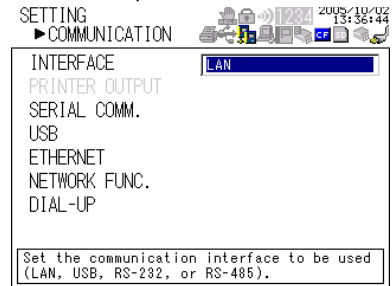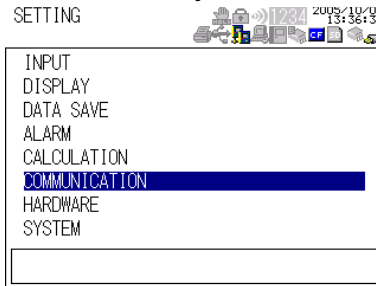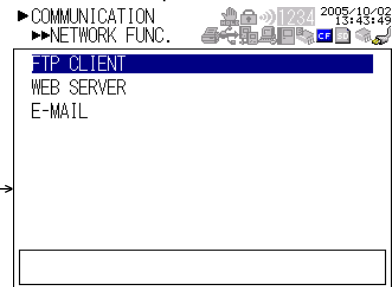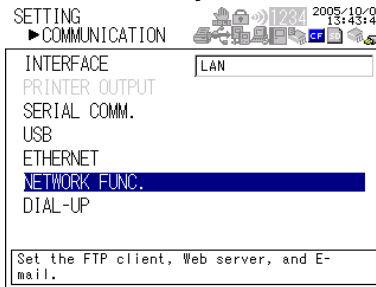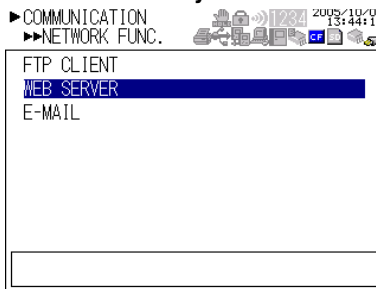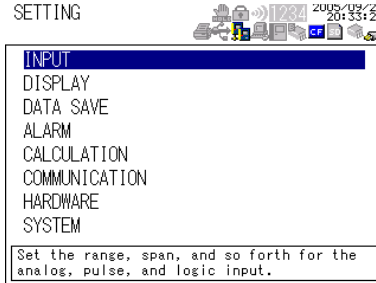Setting the Communication Function

Explanation

Setting the Web Server

Specify the items below. For a detailed explanation, see the *Communication Function Manual* (IMXL100C-E).

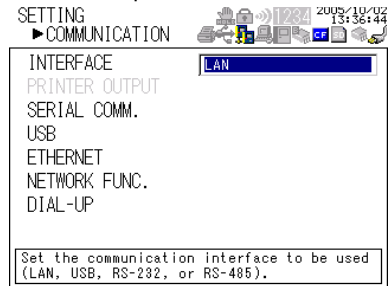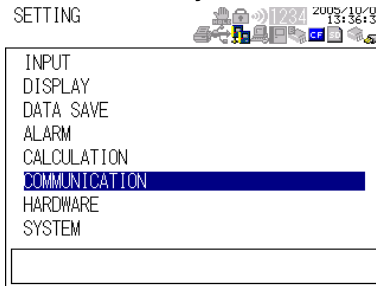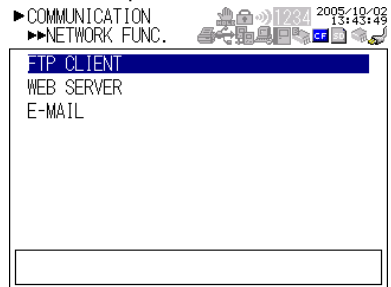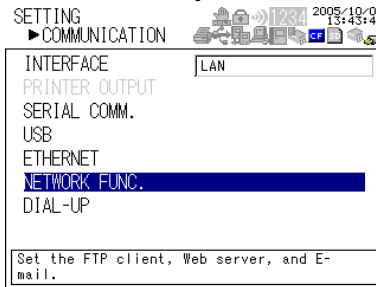| Item	Setting
Web server function	Select ON or OFF. The default setting is OFF.
Monitor page	
Monitor page use	Select ON or OFF. The default setting is OFF.
Access control	Select ON or OFF. The default setting is OFF.
Operator page	
Operator page use	Select ON or OFF. The default setting is OFF.
Access control	Select ON or OFF. The default setting is OFF.

10.7 Setting the E-mail Transmission

Procedure

1. Press **SETTING** to enter Setting Mode.

   SETTING   2005/09/29
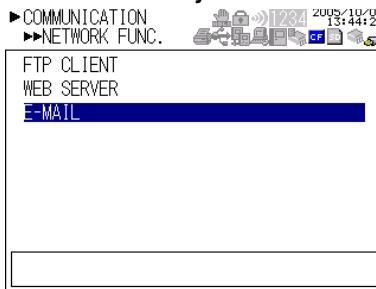   20:33:25
   ```
   INPUT
   DISPLAY
   DATA SAVE
   ALARM
   CALCULATION
   COMMUNICATION
   HARDWARE
   SYSTEM
   ```
   Set the range, span, and so forth for the
   analog, pulse, and logic input.

2. Use the **arrow keys** to select COMMUNICATION, and press **SELECT**.

   SETTING   2005/10/02   SETTING   2005/10/02
                                    13:36:34   ►COMMUNICATION   13:36:44
   ```
   INPUT                                            INTERFACE          LAN
   DISPLAY                                          PRINTER OUTPUT
   DATA SAVE                                        SERIAL COMM.
   ALARM                                            USB
   CALCULATION                                      ETHERNET
   COMMUNICATION                                    NETWORK FUNC.
   HARDWARE                                         DIAL-UP
   SYSTEM
   ```
                          →   Set the communication interface to be used
                                                    (LAN, USB, RS-232, or RS-485).

3. Use the **arrow keys** to select NETWORK FUNC., and press **SELECT**.

   SETTING   2005/10/02   ►COMMUNICATION   2005/10/02
   ►COMMUNICATION   13:43:46   ►►NETWORK FUNC.   13:43:49
   ```
   INTERFACE          LAN                           FTP CLIENT
   PRINTER OUTPUT                                   WEB SERVER
   SERIAL COMM.                                     E-MAIL
   USB
   ETHERNET
   NETWORK FUNC.
   DIAL-UP
   ```
   Set the FTP client, Web server, and E-
   mail.
                          →

4. Use the **arrow keys** to select E-MAIL, and press **SELECT**.
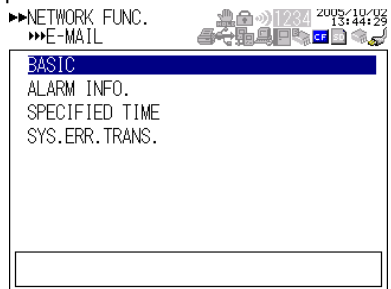
   ►COMMUNICATION   2005/10/02   ►►NETWORK FUNC.   2005/10/02
   ►►NETWORK FUNC.   13:44:26   ►►►E-MAIL   13:44:29
   ```
   FTP CLIENT                                       BASIC
   WEB SERVER                                       ALARM INFO.
   E-MAIL                                           SPECIFIED TIME
                                                    SYS.ERR.TRANS.
   ```
                          →

5. Use the **arrow keys** to select the desired item, and press **SELECT**.

Press **SELECT** to show a window for setting the item.

- Basic setting display

```
▸▸▸E-MAIL                    2005/10/02
   ▸▸▸BASIC                     13:44:49

   E-MAIL TRANSMISSION │ON        │
   SMTP SERVER NAME    │          │
   PORT NUMBER         │25        │
   RECIPIENT 1         │          │
   RECIPIENT 2         │          │
   SENDER              │          │
   E-MAIL TRANSMISSION TEST

  ┌─────────────────────────────────┐
  │ Start or stop the e-mail transmission. │
  └─────────────────────────────────┘
```

- Alarm information transmission setting display

```
▸▸▸E-MAIL                    2005/10/02
   ▸▸▸ALARM INFO.               13:46:21

   RECIPIENT 1     │ON               │
   RECIPIENT 2     │ON               │
   ADD INST. DATA  │ON               │
   ADD SOURCE URL  │ON               │
   SUBJECT         │<XL100> Alarm_sum│
   HEADER 1        │                 │
   HEADER 2        │                 │

  ┌──────────────────────────────────┐
  │                                  │
  └──────────────────────────────────┘
```

- Designated time setting page 1/2

```
▸▸▸E-MAIL        ⬍ 1/2       2005/10/02
   ▸▸▸SPECIFIED TIME            13:46:35

   RECIPIENT 1     │ON               │
   INTERVAL        │24h              │
   REFERENCE TIME  │00:00            │
   ADD INST. DATA  │OFF              │
   ADD SOURCE URL  │OFF              │
   SUBJECT         │<XL100> Periodic_│
   HEADER 1        │                 │
   HEADER 2        │                 │

  ┌──────────────────────────────────┐
  │                                  │
  └──────────────────────────────────┘
```

- Designated time setting page 2/2

```
▸▸▸E-MAIL        ⬍ 2/2       2005/10/02
   ▸▸▸SPECIFIED TIME            13:46:51

   RECIPIENT 2     │ON               │
   INTERVAL        │24h              │
   REFERENCE TIME  │00:00            │
   ADD INST. DATA  │OFF              │
   ADD SOURCE URL  │OFF              │
   SUBJECT         │<XL100> Periodic_│
   HEADER 1        │                 │
   HEADER 2        │                 │

  ┌──────────────────────────────────┐
  │                                  │
  └──────────────────────────────────┘
```

- System error transmission setting display

```
▸▸▸E-MAIL                    2005/10/02
   ▸▸▸SYS.ERR.TRANS.            13:47:13

   RECIPIENT 1     │ON               │
   RECIPIENT 2     │OFF              │
   ADD INST. DATA  │ON               │
   ADD SOURCE URL  │OFF              │
   SUBJECT         │<XL100> System_wa│
   HEADER 1        │                 │
   HEADER 2        │                 │

  ┌──────────────────────────────────┐
  │                                  │
  └──────────────────────────────────┘
```

6. Select or enter the item on the displayed selection list or window.

7. Press **SET**.

Explanation

Setting the E-mail Transmission

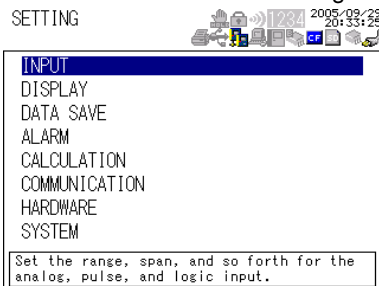Specify the items below. For a detailed explanation, see the *Communication Function Manual* (IMXL100C-E).

Item	Setting
Basic settings	
E-mail transmission	Select whether to start transmitting e-mail (ON/OFF). The default setting is OFF.
SMTP server name	Set the IP address or name (when using DNS).
Port number	Set the value in the range of 1 to 65535. The default setting is 25.
Recipient 1	Set the recipient using up to 150 characters.
Recipient 2	Set the recipient using up to 150 characters.
Sender	Set the sender using up to 64 characters.
E-mail transmission test	
	Performs a e-mail transmission test.
Alarm information transmission setting	
Recipient 1	Select ON or OFF. The default setting is OFF.
Recipient 2	Select ON or OFF. The default setting is OFF.
Add inst. data	Select ON or OFF. The default setting is OFF.
Add source URL	Select ON or OFF. The default setting is OFF.
Subject	Set the subject using up to 32 characters.
Header 1	Set the header using up to 64 characters.
Header 2	Set the header using up to 64 characters.
Specified time transmission	
Recipient 1	
Recipient 1 On/Off	Select ON or OFF. The default setting is OFF.
Interval	Select 1, 2, 3, 4, 6, 8, 12, or 24 h. The default setting is 24h.
Reference time	Set the time in the range of 00:00 to 23:59. The default setting is 00:00.
Add inst. data	Select ON or OFF. The default setting is OFF.
Add source URL	Select ON or OFF. The default setting is OFF.
Subject	Set the subject using up to 32 characters.
Header 1	Set the header using up to 64 characters.
Header 2	Set the header using up to 64 characters.
Recipient 2	
Recipient 2 On/Off	Select ON or OFF. The default setting is OFF.
Interval	Select 1, 2, 3, 4, 6, 8, 12, or 24 h. The default setting is 24h.
Reference time	Set the time in the range of 00:00 to 23:59. The default setting is 00:00.
Add inst. data	Select ON or OFF. The default setting is OFF.
Add source URL	Select ON or OFF. The default setting is OFF.
Subject	Set the subject using up to 32 characters.
Header 1	Set the header using up to 64 characters.
Header 2	Set the header using up to 64 characters.
System error transmission setting	
	This setting is used when sending e-mail when a system error (recovery from a power failure, external storage media error, or FTP client error) occurs.
Recipient 1	Select ON or OFF. The default setting is OFF.
Recipient 2	Select ON or OFF. The default setting is OFF.
Subject	Set the subject using up to 32 characters.
Header 1	Set the header using up to 64 characters.
Header 2	Set the header using up to 64 characters.

10

Setting the Communication Function

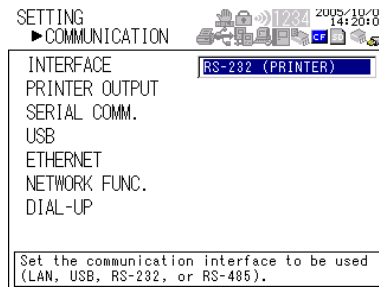# 11.1 Setting the Print Output and Executing the Print Operation
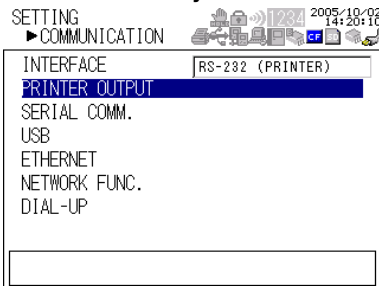
Procedure

Setting the Print Output

1. Press **SETTING** to enter Setting Mode.

```
SETTING                          2005/09/29
                                 20:33:25

 INPUT
 DISPLAY
 DATA SAVE
 ALARM
 CALCULATION
 COMMUNICATION
 HARDWARE
 SYSTEM

 Set the range, span, and so forth for the
 analog, pulse, and logic input.
```

2. Use the **arrow keys** to select COMMUNICATION, and press **SELECT**.

Before carrying out the steps below, the interface must be set to RS-232 (printer) (see section 10.1) in advance.

```
SETTING                  2005/10/02          SETTING                  2005/10/02
                         13:36:34            ►COMMUNICATION          14:20:07

 INPUT                                        INTERFACE        RS-232 (PRINTER)
 DISPLAY                                      PRINTER OUTPUT
 DATA SAVE                                    SERIAL COMM.
 ALARM                                        USB
 CALCULATION                                  ETHERNET
 COMMUNICATION                                NETWORK FUNC.
 HARDWARE                                     DIAL-UP
 SYSTEM
                                     →
                                              Set the communication interface to be used
                                              (LAN, USB, RS-232, or RS-485).
```

3. Use the **arrow keys** to select PRINTER OUTPUT, and press **SELECT**.

```
SETTING                  2005/10/02          ►COMMUNICATION          2005/10/02
 ►COMMUNICATION          14:20:10            ►►PRINTER OUTPUT        14:20:17

 INTERFACE      RS-232 (PRINTER)             MANUAL PRINT   MEASURED/SCREEN DATA
 PRINTER OUTPUT
 SERIAL COMM.
 USB
 ETHERNET
 NETWORK FUNC.
 DIAL-UP
                                     →
                                              Select the data to print with the SAVE
                                              key.
```

4. Use the **arrow keys** to select MEASURED/ SCREEN DATA, MEASURED DATA, or SCREEN DATA, and press **SELECT**.

5. Press **SET**.

Turning ON the Print Output for Automatic Printing

1. Press **SETTING** to enter Setting Mode.
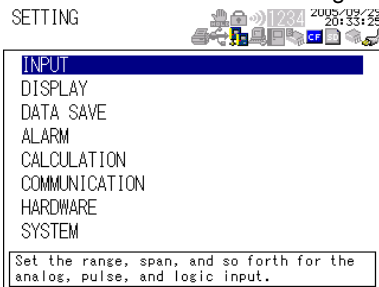
```
SETTING                          2005/09/29
                                 20:33:25

 INPUT
 DISPLAY
 DATA SAVE
 ALARM
 CALCULATION
 COMMUNICATION
 HARDWARE
 SYSTEM
 Set the range, span, and so forth for the
 analog, pulse, and logic input.
```

11

Other Functions

2. Use the **arrow keys** to select DATA SAV, and press **SELECT**.

3. Use the **arrow keys** to select PRINTER OUTPUT, and press **SELECT**.

4. Use the **arrow keys** to select ON, and press **SELECT**.

5. Press **SET**.

Manually Printing

Press **SAVE** in Free Running, Review, Setting, or File Operation Mode.

Explanation

✋ Note

If you are outputting to a printer, Communication settings > Interface settings must be set to RS-232 (printer). For the setup procedure, see section 10.1, "Selecting the Communication Interface."

Measured Data

Select whether to print the measured data. When displaying the log, the log data is printed.

Screen Data

Select whether to print the screen image data.

Printer Output Destination

A dedicated printer (97010) sold separately can be connected to the RS-232 interface. Connect the printer according to the explanation given in section 3.8, "Connecting Communication Cables."

Automatic Printing

The XL100 automatically prints the measured data at the specified sampling interval in Logging and Logging & Review Mode. The statistical calculation data is printed at end of the logging operation not at every sampling interval. The XL100 does not carry out automatic printing, if the sampling interval is set less than or equal to 30 s.

Manually Printing

Press **SAVE** in Free Running, Review, Setting, or File Operation Mode to print. In Free Running and Review Modes, the XL100 prints the measured data and screen data. However, if log data is displayed in Free Running Mode, the XL100 prints the log data in place of the measured data. In Setting or File Operation Mode, the XL100 only prints the screen data.

TIP

Press HOLD to hold the displayed contents at that point. If you press SAVE while the display is held, the held contents are printed. Press HOLD again to release the hold.

11

Other Functions

11.2 Setting the Beep Sound

1. Press **SETTING** to enter Setting Mode.

```
SETTING                          2005/09/29
                                   20:33:25

INPUT
DISPLAY
DATA SAVE
ALARM
CALCULATION
COMMUNICATION
HARDWARE
SYSTEM

Set the range, span, and so forth for the
analog, pulse, and logic input.
```

2. Use the **arrow keys** to select HARDWARE, and press **SELECT**.

```
SETTING                          2005/10/02          SETTING                          2005/10/02
                                   14:21:25            ►HARDWARE                         14:21:35

 INPUT                                                BEEP SOUND          ON
 DISPLAY                                              ID NUMBER           1
 DATA SAVE                                            LANGUAGE            ENGLISH
 ALARM                                                TEMPERATURE         °C
 CALCULATION                             →            CLOCK               2005/10/02 14:21:27
 COMMUNICATION                                        AUTO MEASUREMENT    OFF
 HARDWARE                                             SYSTEM RESET
 SYSTEM                                               MAC ADDRESS         00-00-64-89-10-24
```
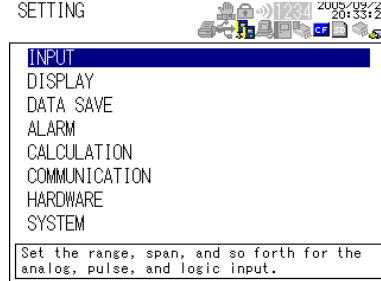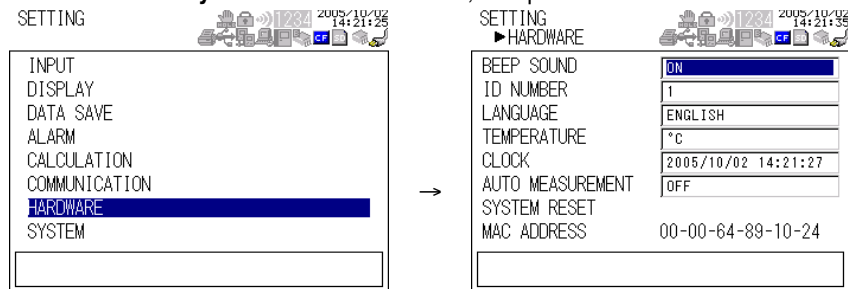
3. With BEEP SOUND selected, press **SELECT**.

4. In the window shown, select ON, and press **SELECT**.

5. Use the **arrow keys** to select ON, and press **SELECT**.

6. Press **SET**.

Beep sound

If the beep sound is turned ON, the XL100 generates a beep sound when you press a key. However, the beep does not sound for invalid keys. If turn OFF, the XL100 does not generate beep sounds. The default setting is ON.

11.3   Set the ID Number

1.   Press **SETTING** to enter Setting Mode.

```
SETTING                                2005/09/29
                                          20:33:25
┌──────────────────────────────────────────────┐
│ INPUT                                          │
│ DISPLAY                                        │
│ DATA SAVE                                      │
│ ALARM                                          │
│ CALCULATION                                    │
│ COMMUNICATION                                  │
│ HARDWARE                                       │
│ SYSTEM                                         │
│ ┌────────────────────────────────────────────┐│
│ │Set the range, span, and so forth for the   ││
│ │analog, pulse, and logic input.             ││
│ └────────────────────────────────────────────┘│
└──────────────────────────────────────────────┘
```

2.   Use the **arrow keys** to select HARDWARE, and press **SELECT**.

```
SETTING                 2005/10/02        SETTING                    2005/10/02
                           14:21:25        ►HARDWARE                    14:21:35
┌──────────────────────────────┐         ┌──────────────────────────────────────┐
│ INPUT                        │         │ BEEP SOUND      ON                     │
│ DISPLAY                      │         │ ID NUMBER       1                      │
│ DATA SAVE                    │         │ LANGUAGE        ENGLISH                 │
│ ALARM                        │         │ TEMPERATURE     °C                     │
│ CALCULATION                  │    →    │ CLOCK           2005/10/02 14:21:27     │
│ COMMUNICATION                │         │ AUTO MEASUREMENT OFF                    │
│ HARDWARE                     │         │ SYSTEM RESET                           │
│ SYSTEM                       │         │ MAC ADDRESS     00-00-64-89-10-24       │
│                              │         │                                        │
└──────────────────────────────┘         └──────────────────────────────────────┘
```
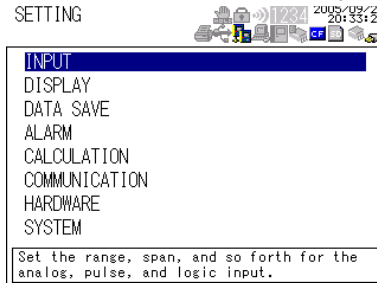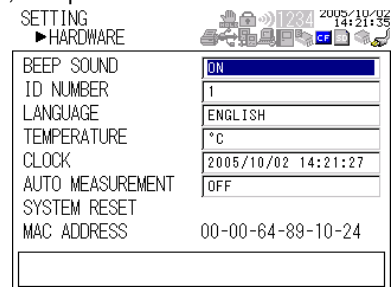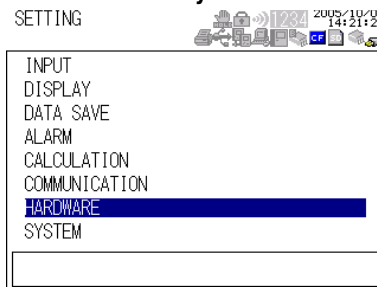
3.   Use the **arrow keys** to select ID NUMBER, and press **SELECT**.

```
SETTING                 2005/10/02
 ►HARDWARE                 14:22:05
┌──────────────────────────────────────┐
│ BEEP SOUND      ON                     │
│ ID NUMBER       1                      │
│ LANGUAGE        ENGLISH                 │
│ TEMPERATURE     °C                     │
│ CLOCK           2005/10/02 14:21:27     │
│ AUTO MEASUREMENT OFF                    │
│ SYSTEM RESET                           │
│ MAC ADDRESS     00-00-64-89-10-24       │
│                                        │
└──────────────────────────────────────┘
```
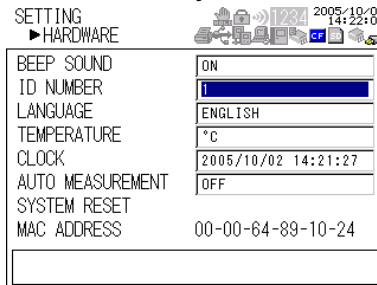
4.   Use the **arrow keys** to select the ID number, and press **SELECT**.

5.   Press **SET**.

ID Number

The ID number is used to identify each XL100 when making measurements using multiple XL100s.
Set the number in the range from 01 to 99. The default setting is 01.

11

Other Functions

11.4 Setting the Language

1. Press **SETTING** to enter Setting Mode.

        SETTING   2005/09/29
                                            20:33:25
        ┌──────────────────────────────┐
        │ INPUT   │
        │ DISPLAY   │
        │ DATA SAVE   │
        │ ALARM   │
        │ CALCULATION   │
        │ COMMUNICATION   │
        │ HARDWARE   │
        │ SYSTEM   │
        │ Set the range, span, and so forth for the │
        │ analog, pulse, and logic input. │
        └──────────────────────────────┘

2. Use the **arrow keys** to select HARDWARE, and press **SELECT**.

        SETTING   2005/10/02   SETTING   2005/10/02
                                14:21:25   ▶HARDWARE   14:21:35
        ┌──────────────────────────┐   ┌──────────────────────────────────┐
        │ INPUT   │   │ BEEP SOUND   ON   │
        │ DISPLAY   │   │ ID NUMBER   1   │
        │ DATA SAVE   │   │ LANGUAGE   ENGLISH   │
        │ ALARM   │   →   │ TEMPERATURE   °C   │
        │ CALCULATION   │   │ CLOCK   2005/10/02 14:21:27 │
        │ COMMUNICATION   │   │ AUTO MEASUREMENT OFF   │
        │ HARDWARE   │   │ SYSTEM RESET   │
        │ SYSTEM   │   │ MAC ADDRESS   00-00-64-89-10-24 │
        │   │   │   │
        └──────────────────────────┘   └──────────────────────────────────┘
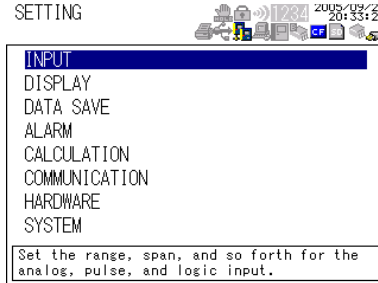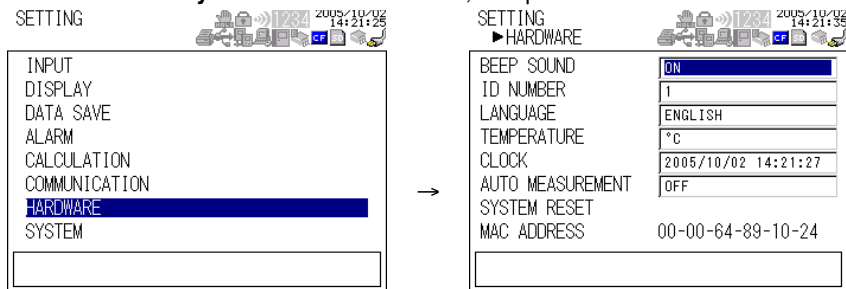
3. Use the **arrow keys** to select LANGUAGE, and press **SELECT**.

        SETTING   2005/10/02
          ▶HARDWARE   14:22:16
        ┌──────────────────────────────────┐
        │ BEEP SOUND   ON   │
        │ ID NUMBER   1   │
        │ LANGUAGE   ENGLISH   │
        │ TEMPERATURE   °C   │
        │ CLOCK   2005/10/02 14:21:27 │
        │ AUTO MEASUREMENT OFF   │
        │ SYSTEM RESET   │
        │ MAC ADDRESS   00-00-64-89-10-24 │
        │   │
        └──────────────────────────────────┘
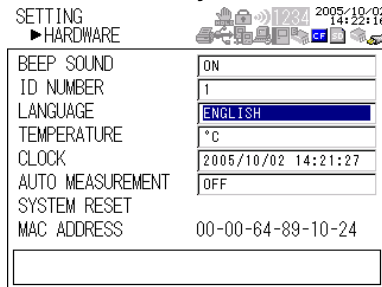
4. Use the **arrow keys** to select the desired language, and press **SELECT**.

5. Press **SET**.

Language
Select whether to show setup items and messages on the display in English or
Japanese.

11.5   Setting the Temperature Unit

Procedure

1. Press **SETTING** to enter Setting Mode.

   ```
   SETTING                        2005/09/29
                                  20:33:25

   INPUT
   DISPLAY
   DATA SAVE
   ALARM
   CALCULATION
   COMMUNICATION
   HARDWARE
   SYSTEM
   Set the range, span, and so forth for the
   analog, pulse, and logic input.
   ```

2. Use the **arrow keys** to select HARDWARE, and press **SELECT**.

   ```
   SETTING                2005/10/02          SETTING                  2005/10/02
                          14:21:25             ►HARDWARE               14:21:35

   INPUT                                       BEEP SOUND      ON
   DISPLAY                                     ID NUMBER       1
   DATA SAVE                                   LANGUAGE        ENGLISH
   ALARM                                       TEMPERATURE     °C
   CALCULATION                                 CLOCK           2005/10/02 14:21:27
   COMMUNICATION                     →         AUTO MEASUREMENT OFF
   HARDWARE                                    SYSTEM RESET
   SYSTEM                                      MAC ADDRESS     00-00-64-89-10-24
   ```
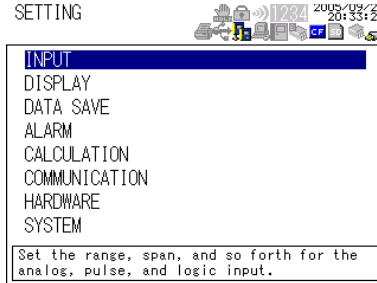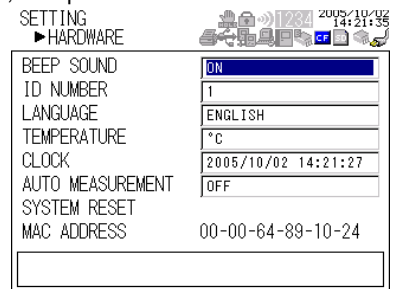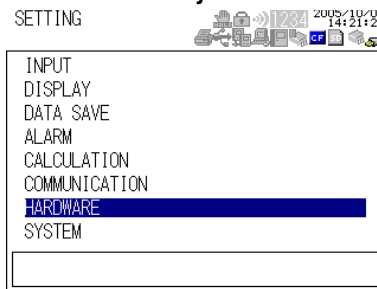
3. Use the **arrow keys** to select TEMPERATURE, and press **SELECT**.

   ```
   SETTING                2005/10/02
    ►HARDWARE             14:22:21

   BEEP SOUND      ON
   ID NUMBER       1
   LANGUAGE        ENGLISH
   TEMPERATURE     °C
   CLOCK           2005/10/02 14:21:27
   AUTO MEASUREMENT OFF
   SYSTEM RESET
   MAC ADDRESS     00-00-64-89-10-24
   ```
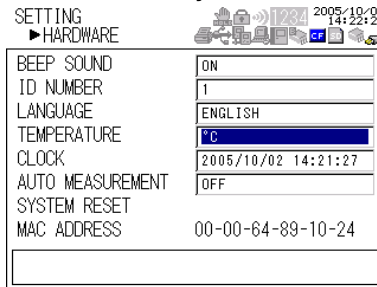
4. Use the **arrow keys** to select the desired temperature unit, and press **SELECT**.

5. Press **SET**.

Explanation

Temperature

When the language is set to English, set the temperature unit to °C (Celsius) or °F (Fahrenheit).

TIP

The conversion from Celsius to Fahrenheit is performed using the equation "Fahrenheit temperature = $1.8 \times$ Celsius temperature + 32."

11.6 Registering Users

1. Press **SETTING** to enter Setting Mode.

```
SETTING                    2005/09/29
                            20:33:25
   INPUT
   DISPLAY
   DATA SAVE
   ALARM
   CALCULATION
   COMMUNICATION
   HARDWARE
   SYSTEM
   Set the range, span, and so forth for the
   analog, pulse, and logic input.
```

2. Use the **arrow keys** to select SYSTEM, and press **SELECT**.

```
SETTING              2005/10/02        SETTING              2005/10/02
                      14:22:31          ▶SYSTEM              14:22:37
   INPUT                                   USER REGISTER
   DISPLAY                                 KEY LOGIN FUNCTION
   DATA SAVE                                  KEY LOGIN       OFF
   ALARM                                      AUTO LOGOUT     ON
   CALCULATION                             LOGOUT
   COMMUNICATION
   HARDWARE                →
   SYSTEM
```
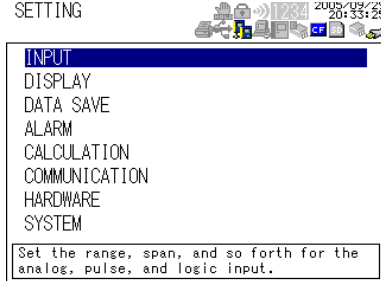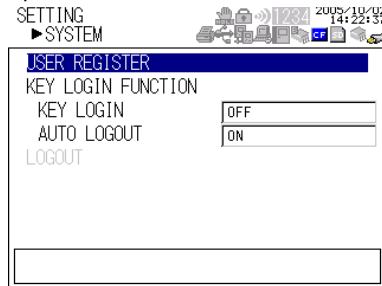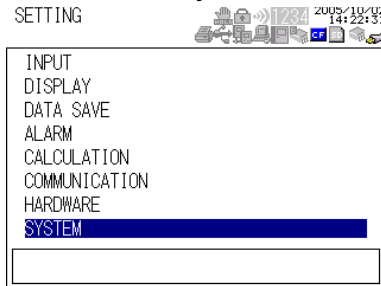
3. With USER REGISTER selected, press **SELECT**.

4. Use the **arrow keys** to select the desired user, and press **SELECT**.

5. In the window shown, set the items, and press **SELECT**.

6. Press **SET**.

User registration

Set the items below used in the Ethernet login, Web browsing, and key login functions. All registrations (administrator and user 1 to user 6) cannot be turned OFF. At least one registration must be turned ON. For details on the privileges, see appendix 1, "A List of Settings and User Registration Privileges."

Item	Setting
Administrator	
Register	Select ON or OFF. The default setting is OFF.
User name	Set the user name using up to 16 characters. The default setting is admin.
Password	Up to 6 alphanumeric characters
User 1 to 6	
Register	Select ON or OFF. The default setting is OFF.
User name	Set the user name using up to 16 characters. The default values are user1 to user6.
Password	Up to 6 alphanumeric characters
Ethernet login	Select administrator or user privilege. The default setting is user privilege.
Web browsing	Select administrator or user privilege. The default setting is user privilege.
Key login	Select administrator or user privilege. The default setting is user privilege.

11.7 Setting and Executing Key Login/Logout and

Procedure

Setting Key Login/Logout

1. Press **SETTING** to enter Setting Mode.

```
SETTING                        2005/09/29
                               20:33:25
 INPUT
 DISPLAY
 DATA SAVE
 ALARM
 CALCULATION
 COMMUNICATION
 HARDWARE
 SYSTEM
 Set the range, span, and so forth for the
 analog, pulse, and logic input.
```

2. Use the **arrow keys** to select SYSTEM, and press **SELECT**.

The System setting display appears.

```
SETTING              2005/10/02
                     14:22:31
 INPUT
 DISPLAY
 DATA SAVE
 ALARM
 CALCULATION
 COMMUNICATION
 HARDWARE
 SYSTEM
```
→
```
SETTING              2005/10/02
 ►SYSTEM              14:22:37
 USER REGISTER
 KEY LOGIN FUNCTION
  KEY LOGIN         OFF
  AUTO LOGOUT       ON
 LOGOUT
```
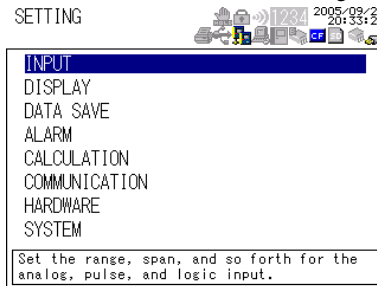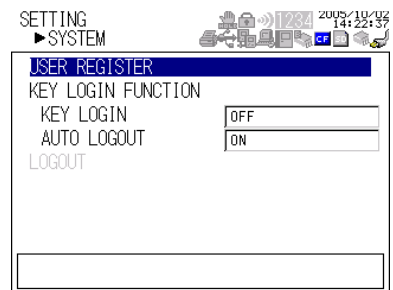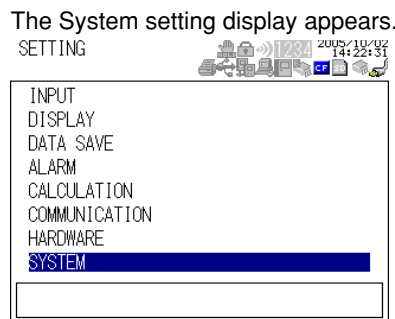
3. Use the **arrow keys** to select KEY LOGIN or AUTO LOGOUT, and press **SELECT**.

```
SETTING              2005/10/02
 ►SYSTEM              14:23:14
 USER REGISTER
 KEY LOGIN FUNCTION
  KEY LOGIN         ON
  AUTO LOGOUT       OFF
 LOGOUT
```
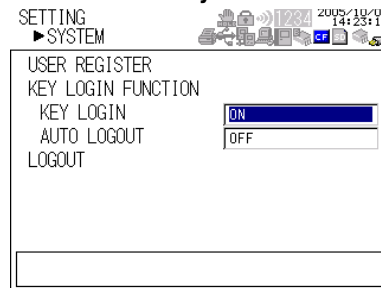
4. Enter the item on the window.

5. Press **SET**.

Executing the Key Login Operation

1. Press any key.

The following dialog box opens.

```
FREE RUNNING                   2005/01/01
User1                          00:00:00
GROUP1
50.0 [                              °C
         KEY LOGIN                  °C
                                    °C
   USER NAME: User1                 °C
   PASSWORD:                        V
                                    V
                                    V
   SET  SETTING   ESC  CANCEL       V
                            50000  COUNT
 0  [°C]       0000:00:00.0  L1      H
                            L2      L
```

11

Other Functions

2. With USER NAME selected, press **SELECT**.

The user selection window appears.

```
USER NAME LIST

        USER NAME   ETHERNET  Web  KEY LOGIN

admin:  admin
user1:  suzuki      OFF       ON   ON
user2:  satou       ON        ON   ON
user3:
user4:
user5:
user6:
```

3. Use the **arrow keys** to select the user, and press **SELECT**.

4. Use the **arrow keys** to select PASSWORD, and press **SELECT**.

The password entry window appears.

5. Enter the password and press **SET**.

The entered characters appear as asterisks on the display.

```
CHARACTER INPUT

****A

A B C D E F G H I J K L M N O
P Q R S T U V W X Y Z
a b c d e f g h i j k l m n o
p q r s t u v w x y z

A  O DEL BS

▲ ▼ ◄ ► :SELECT
◄◄ ►►     :MOVE CHARACTER CURSOR
(SET) SETTING   (ESC) CANCEL
```

Explanation

Key Login

You can set the XL100 so that only certain users can operate the instrument. Users are identified by their user name and password.

When Key login is turned ON and you press any key immediately after the power is turned ON, a window appears for you to enter the user name and password that were specified during user registration (see the previous section). When you enter the correct user name and password, key operations become available.

When logged in, the user name is shown in the status display section on the display.

Logout

If Auto logout is turned ON and there is no key operation for 10 minutes, you are automatically logged out and key operation is disabled. If this happens, enter the correct user name and password again, and key operations become available.

If Auto logout is turned OFF, you can log out by carrying out the logout operation on the System setting display. In addition, when you turn the power OFF, you are automatically logged out. When you turn the power ON again, you must log in.

The key login/logout status can be confirmed on the log (key login/logout) display (see section 2.3, "Data Display").

11.8 Displaying System Information

1. When in Free Running Mode or Logging Mode, press **DISPLAY** to show a pop-up menu for switching the display.

```
FREE RUNNING              2005/10/05
                          20:14:01
GROUP1        1sec/S              CH01
5.000[U]      1sec/div                0.060    V
                                 CH02
                                      0.068    V
                                 CH03
                                     -0.008    V
                                 CH04
                                     -0.017    V
   WAVEFORM            ▶           CH05
   DIGITAL             ▶               -0.001   V
                                 CH06
   BAR GRAPH           ▶               0.003    V
                                 CH07
   ALARM SUMMARY                       -0.010   V
                                 CH08
   LOG                 ▶               -0.016   V
   SYSTEM INFORMATION  0:00.0    PLS
                                       0        c
                                 L1             H
                                 L2             H
```
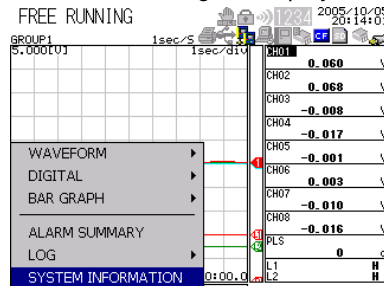
2. Use the **arrow keys** to select SYSTEM INFORMATION, and press **SELECT**.

```
SYSTEM INFORMATION        2005/09/30
                          17:16:48

  NETWORK INFORMATION
    IP ADDRESS     : 10.0.109.138
    NETMASK        : 255.255.255.0
    GATEWAY        : 10.0.109.1
  HARDWARE INFORMATION
    MAC ADDRESS    : 00:00:64:89:10:0A
    OS VERSION     : 1.00
    FIRMWARE VER.  : 0.39
    FPGA VERSION   : 1.00
    ANALOG INPUT   : 16CH
```
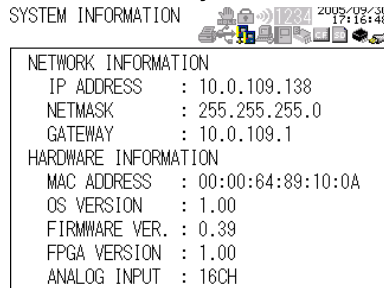
System Information

• Network information

Item	Description
IP address	Currently assigned IP address
Net mask	Currently assigned subnet mask
Gateway	Currently assigned default gateway

• Hardware information

Item	Description
MAC address	XL100 MAC address
OS version	OS version
Firmware version	Firmware version
FPGA version	FPGA version
Analog input	Number of channels of the terminal block unit

11

Other Functions

12.1   Troubleshooting

- If a message is displayed on the screen, read the next section.
- If servicing is necessary, or if the instrument is not operating correctly after performing the corrective actions, contact your vendor from which you purchased the product.

Symptom	Things to Check	Reference Section
Nothing appears even when the power is turned ON.	For AC power operation • Check that the power cord is properly connected to the power outlet. • Check that the power supply is within the allowed supply voltage range.	3.6
	For battery operation • Check that the battery case is attached correctly. • Check that the battery is charged adequately.	3.7
The measurement display is odd.	• Check that noise is not riding on the input signal. • Check that the wires are correctly connected. • Check that the ambient temperature and humidity are within the allowed specifications.	3.3
Keys do not work.	Check that the key lock icon (🔒) is not shown at the upper right corner of the display.	2.1, 2.3
Unable to save/load from the internal memory.	• Turn the power switch OFF and then back ON. It may be restored by the power-on self-test. • There may have been a power problem while the internal memory was being accessed. Format the internal memory in File Operation Mode. Note that the data saved in the memory will be lost in the process.	4.1 – 9.10
Unable to save/load from the external storage medium.	• Check that the external storage medium is correctly inserted. • Check that the external storage medium is formatted. • Check that there is sufficient free space on the external storage medium.	4.7 9.10 2.3
Unable to set or control the instrument using communication commands.	• Check that the communication parameters are matched. • Check that the specifications of the cable is suitable for the application. • Check that the electrical specifications are correct.	10.2 3.8 3.8
Unable to print.	• Check that the printer is turned ON. • Check that the specifications of the connection cable are correct. • Check that the cable is correctly connected. • Check that the communication parameters on the XL100 and printer are matched. • Check that the chart is loaded correctly in the printer.	– 3.8 3.8 – –

12

Troubleshooting

12.2 Messages and Their Corrective Actions

Messages may appear on the screen during operation. This section gives descriptions of the messages and their corrective actions. If the corrective action requires servicing, contact the vendor from which you purchased the product.

In addition to the error messages listed below, there are communication error messages. The communication error messages are described in the Communication Function Manual.

SettingError Messages

No.	Messages	Description and Corrective Action	Reference Section
22	The upper and lower span limits are equal.	Set different values for the upper and lower span limits.	5.1, 5.2
23	The upper and lower scale limits are equal.	Set different values for the upper and lower scale limits.	5.1, 5.2
91	Password is incorrect.	Enter the correct password.	11.6
94	More than one address cannot be specified.	Only a single address can be set for the sender.	10.7
105	Press SET to confirm changed settings.	You tried to change to another mode without confirming the settings with the SET key.	4.2

Execution Error Messages

No.	Messages	Description and Corrective Action	Reference Section
170	This key operation is invalid while logging.	The XL100 does not save or print the data if you press SAVE while logging is in progress.	4.2

External Storage Media Error Messages

No.	Messages	Description and Corrective Action	Reference Section
200	Operation aborted because an error was found in media.	Exchange the external storage medium.	4.7
201	Not enough free space on media.	Increase the free space on the external storage medium.	9.8
202	Media is read-only.	Clear the read-only feature on the external storage medium.	–
203	Unsupported card.	Load a compatible CF card or SD card.	4.7
210	Media has not been inserted.	Insert an external storage medium.	4.7
211	Media is damaged or not formatted.	Format or exchange the external storage medium.	9.10
214	There is no file or directory.	Exchange to an external storage medium that has files or directories saved.	4.7
215	Exceeded the allowable number of files.	Exchange the external storage medium, or delete unneeded data.	9.8
216	The file or directory name is incorrect.	Change the file name or directory name to a correct one.	9.7
217	Unknown file type.	Use a file that the XL100 can handle.	9.2, 9.6
220	The file is already in use.	Try again later.	2.3
230	There is no setting file.	There is no setting file available for loading.	9.6
231	Abnormal setting exists in file (xxx).*	Abnormal information found in the setting file while loading.	9.6
240	No files available.	There are no files available for loading.	9.2, 9.6
241	No files selected.	No files are selected for deleting, copying, etc.	9.8, 9.9
250	Backup memory is full.	There is no more free space in the backup memory.	9.1
255	An error occurred while printing.	Some kind of error occurred while printing, and the data was not printed correctly.	–

* The (xxx) section displays a sub code according to the operation (see the next page).

• **Sub Codes for Error Code 231**

No.	Setting		Error Description
00	Input settings	Analog input	Tab setting error (analog)
01			Mode setting error (analog)
02			Range setting error (analog)
03			Span lower error (analog)
04			Span upper error (analog)
05			Color setting error (analog)
06			Line width setting error (analog)
07			Scaling setting error (analog)
08			Decimal place setting error (analog)
09			Scale lower limit setting error (analog)
10			Scale upper limit setting error (analog)
11			Unit setting error (analog)
12			Average setting error (analog)
13		Pulse input	Tab setting error (pulse)
14			Mode setting error (pulse)
15			Range setting error (pulse)
16			Span lower error (pulse)
17			Span upper error (pulse)
18			Color setting error (pulse)
19			Line width setting error (pulse)
20			Scaling setting error (pulse)
21			Decimal place setting error (pulse)
22			Scale lower limit setting error (pulse)
23			Scale upper limit setting error (pulse)
24			Unit setting error (pulse)
25		Logic input	Mode setting error (logic)
26			Color setting error (logic)
27			Line width setting error (logic)
28	Alarm settings	Analog input	Alarm type setting error (analog)
29			Alarm value setting error (analog)
30			Alarm output destination setting error (analog)
31		Pulse input	Alarm type setting error (pulse)
32			Alarm value setting error (pulse)
33			Alarm output destination setting error (pulse)
34		Logic input	Alarm type setting error (logic)
35			Alarm output destination setting error (logic)
36		Calculated data	Alarm type setting error (math)
37			Alarm value setting error (math)
38			Alarm output destination setting error (math)
39		Communication input data	Alarm type setting error (communication)
40			Alarm value setting error (communication)
41			Alarm output destination setting error (communication)
42			Alarm delay setting error
43			Alarm output AND/OR setting error
44			Alarm output hold setting error
45			Alarm display hold setting error
46			Alarm hysteresis setting error
47			Alarm buzzer setting error
48	Display settings	General display settings	Background setting error
49			Grid display setting error
50			Bar graph base position setting error
51		Group setting	Group name setting error
52			Display channel setting error
53		Alarm line settings	Display ON/OFF setting error
54			Color setting error
55			Line width setting error
56		LCD settings	Backlight auto off setting error

12

Troubleshooting

No.	Setting			Error Description
57	Data save	Sampling interval setting		Sampling interval setting error
58				Data save destination setting error
59				Data save type setting error
60				File name setting error
61				Printer output setting error
62	Trigger settings	Trigger mode setting		Trigger mode setting error
63		Trigger delay setting		Pre-trigger setting error
64				Trigger delay setting error
65		Start trigger setting		Start trigger setting error
66		End trigger setting		End trigger setting error
67	Math settings	Differential setting		Tab setting error (math)
68				Reference channel setting error (math)
69				Difference channel setting error (math)
70				Constant setting error (math)
71				Span lower limit setting error (math)
72				Span upper limit setting error (math)
73				Color setting error (math)
74				Line width setting error (math)
75				Decimal place setting error (math)
76				Scale lower limit setting error (math)
77				Scale upper limit setting error (math)
78				Unit setting error (math)
79		Statistical calculation settings		Maximum setting error
80				Minimum setting error
81				Average setting error
82				Peak setting error
83				RMS setting error
84	Communication settings	Interface		Interface setting error
85		Serial communication		Printer output setting error
86				Protocol setting error
87			Communication conditions	Slave address
88				Baud rate setting error
89				Data length setting error
90				Stop bit setting error
91				Parity setting error
92				Handshaking setting error
99		Modbus master setting		Communication interval setting error
100				Timeout value setting error
101				Retrial setting error
102		Modbus command setting		Command ON/OFF setting error
103				First CH setting error
104				Last CH setting error
105				Address setting error
106				Register input setting error
107				Type setting error
108		Communication channel settings		Mode setting error (communication)
109				Tab setting error (communication)
110				Scaling value setting error (communication)
111				Scaling decimal place setting error (communication)
112				Span decimal place setting error (communication)
113				Span lower limit setting error (communication)
114				Span upper limit setting error (communication)
115				Unit setting error (communication)
116				Color setting error (communication)
117				Line width setting error (communication)
118		Ethernet settings		Time zone setting error
119				DHCP setting error
120				IP address setting error
121				Subnet mask setting error
122				Default gateway setting error
123		DNS		DNS ON/OFF setting error
124				Primary DNS server setting error

No.	Setting	Error Description
125		Secondary DNS server setting error
126		Host name setting error (DNS)
127		Domain name setting error
128		Primary domain suffix setting error
129		Secondary domain suffix setting error
130	SNTP	SNTP ON/OFF setting error
131		Server name setting error (SNTP)
132		Confirmation time setting error (SNTP)
133	Login function	Login function ON/OFF setting error
134	Communication timeout	Timeout enable setting error
135		Timeout value setting error
136	Keepalive	Keepalive setting error
137	FTP client settings	Data transmission ON/OFF setting error
138	Primary FTP server	FTP server name setting error (primary)
139		FTP server port number setting error (primary)
140		Login name setting error (primary)
141		Password setting error (primary)
142		Account setting error (primary)
143		PASV setting error (primary)
144		Initial path setting error (primary)
145	Secondary FTP server	FTP server name setting error (secondary)
146		FTP server port number setting error (secondary)
147		Login name setting error (secondary)
148		Password setting error (secondary)
149		Account setting error (secondary)
150		PASV setting error (secondary)
151		Initial path setting error (secondary)
152	Web server function	Web server ON/OFF setting error
153	Monitor page	Monitor page ON/OFF setting error
154		Access control setting error
155	Operator page	Monitor page ON/OFF setting error
156		Access control setting error
157	E-mail Basic settings	E-mail transmission setting error
158		SMTP server name setting error
159		Port number setting error (e-mail)
160		Recipient address 1 setting error
161		Recipient address 2 setting error
162		Sender address setting error
163	Alarm information transmission settings	Recipient 1 setting error (alarm)
164		Recipient 2 setting error (alarm)
165		Include INST setting error (alarm)
166		Include source URL setting error (alarm)
167		Subject setting error (alarm)
168		Header 1 setting error (alarm)
169		Header 2 setting error (alarm)
170	Specified time transmission settings	Recipient 1 setting error (specified time 1)
171		Interval setting error (specified time 1)
172		Reference time setting error (specified time 1)
173		Include INST (specified time 1)
174		Include source URL setting error (specified time 1)
175		Subject setting error (specified time 1)
176		Header 1 setting error (specified time 1)
177		Header 2 setting error (specified time 1)
178		Recipient 2 setting error (specified time 2)
179		Interval setting error (specified time 2)
180		Reference time setting error (specified time 2)
181		Include INST (specified time 2)
182		Include source URL setting error (specified time 2)
183		Subject setting error (specified time 2)
184		Header 1 setting error (specified time 2)
185		Header 2 setting error (specified time 2)

12

Troubleshooting

No.	Setting			Error Description
186		System error transmission settings		Recipient 1 setting error (system)
187				Recipient 2 setting error (system)
188				Include source URL setting error (system)
189				Subject setting error (system)
190				Header 1 setting error (system)
191				Header 2 setting error (system)
224	Hardware settings			Beep sound setting error
225				ID number setting error
226				Language setting error
227				Temperature unit setting error
228				Clock setting error
229				Automated measurement function setting error
230	System settings	User registration	Administrator	Registration setting error
231				User name setting error
232				Password setting error
233			User x	Registration setting error (user x)
234			x: 1 to 6	User name setting error (user x)
235				Password setting error (user x)
236				Ethernet login setting error (user x)
237				Web browsing setting error (user x)
238				Key login setting error (user x)
239		Key login function		Key login function ON/OFF setting error
240				Auto logout setting error

Communication Error Messages

No.	Messages	Description and Corrective Action	Reference Section
260	IP address is not set or ethernet function is not available.	Check whether the XL100 IP address is set.	10.4
261	SMTP server is not found.	Check whether the SMTP server is set by name.	10.4
262	Cannot initiate E-mail transmission.	Set the XL10 host name correctly. Set the port number of the SMTP server correctly.	10.7
263	Sender's address rejected by the server.	Sender's address was rejected by the server.	10.7
264	Some recipients' addresses are invalid.	Check that the recipients' addresses are valid.	10.7
265	SMTP protocol error.	An error occurred on the network while sending e-mail.	10.7
266	Ethernet cable is not connected.	The LAN cable is not connected correctly, or an error occurred on the network.	3.8
267	Could not connect to SMTP server.	The connection to the SMTP server is cut off or the specified IP address is not correct.	10.4
268	E-mail transmission request failed.	Displayed when e-mail transmission request fails.	10.7
269	E-mail transfer error.	An error occurred on the network while sending e-mail.	–
275	The current image cannot be output to the Web.	Displayed on the Web screen when the XL100 is showing the setting display.	10.6
276	Image data currently being created. Unable to perform key operation on the Web browser.		–
277	Could not output screen to Web. Failed to create the image.	Failed to create the display.	–
280	IP address is not set or FTP function is not available.		10.4
		Further details are provided by the character string that appears after error code 280. Character String: Details	
		HOSTADDR: The XL100's IP address has not been specified.	
		DORMANT: Internal processing error	
		LINK: Data link is disconnected.	
281	FTP mail box operation error.	Further details are provided by the character string that appears after error code 281. Character String: Details	–
		MAIL: Internal processing error related to mail	
		STATUS: Internal processing error related to status	
		TIMEOUT: Internal processing error related to timeout	
		PRIORITY: Internal processing error related to priority	
		NVRAM: Internal processing error related to NVRAM	
282	FTP control connection error.	Further details are provided by the character string that appears after error code 282. Character String: Details	–
		HOSTNAME: Failed the DNS lookup (search the IP address corresponding to the host name).	
		TCPIP: Internal processing error related to TCPIP	
		UNREACH: Failed to connect to a control connection server.	
		OOBINLINE: Internal processing error related to OOBINLINE	
		NAME: Internal processing error related to NAME	
		CTRL: The control connection does not exist.	
		IAC: Failed to respond in the TELNET sequence.	
		ECHO: Failed to transmit data on the control connection.	
		REPLY: Failed to receive data on the control connection.	
		SERVER: The server is not in a condition to provide the service.	

12

Troubleshooting

No.	Messages	Description and Corrective Action	Reference Section
283	FTP command was not accepted.	Further details are provided by the character string that appears after error code 283. Character String: Details USER: Failed the user name verification. PASS: Failed the password verification. ACCT: Account verification failed. TYPE: Failed to change the transfer type. CWD: Failed to change the directory. PORT: Failed to set the transfer connection. PASV: Failed to set the transfer connection. SCAN: Failed to read the transfer connection settings.	–
284	FTP transfer setting error.	Further details are provided by the character string that appears after error code 284. Character String: Details MODE: Internal processing error related to MODE. LOCAL: Internal processing error related to LOCAL. REMOTE: The destination file name is not correct. ABORT: File transfer abort was requested by the server.	–
285	FTP data connection error.	Further details are provided by the character string that appears after error code 285. Character String: Details SOCKET: Failed to create a socket for the transfer connection. BIND: Failed the transfer connection command. CONNECT: Failed the transfer connection. LISTEN: Failed the transfer connection reception. ACCEPT: Failed to accept the transfer connection. SOCKNAME: Internal processing error related to SOCKNAME. RECV: Failed to receive data over the transfer connection. SEND: Failed to send data over the transfer connection.	–
286	FTP file transfer error.	Further details are provided by the character string that appears after error code 286. Character String: Details READ: Internal processing error related to READ. WRITE: Internal processing error related to WRITE.	–

Status Messages

Status messages are displayed while an operation is in progress. When the operation completes, the message window automatically closes.

No.	Message
500	Operation in progress. Please wait a moment...
501	The data file is being transferred.
502	FTP test is being executed...

Warning Messages

• **Confirmation Messages**

No.	Message	Description
600	Executing system reset will reset settings to their factory default values. Continue?	Confirmation when executing a system reset.
601	The automated measurement function is enabled. Start automated measurements?	When the automated measurement function is ON and the AUTORUN.SET file is stored on the external storage medium.
610	Delete the files?	Confirmation when deleting files.
611	Continue with the format?	Confirmation when formatting.
612	Copy the data?	Confirmation when copying data.

No.	Message	Description
620	Copy the data saved in the backup memory to the PC card. Copy the data?	Confirmation when copying backup memory.
621	Delete the data saved in the backup memory. Delete the data?	Confirmation when deleting backup memory.

- **Normal Messages**

No.	Message	Description
650	System reset was executed.	When system reset is executed.
651	The battery power is low. Use the AC adapter.	When the icon is displayed.
652	The terminal block unit was removed.	When the terminal block unit is removed during operation Insert the terminal block unit and restart the XL100.
653	A power failure occurred.	A power failure recovery message.
660	The same user name is already registered.	When the same user name is already registered.
670	The file to be displayed is not specified. Specify a file.	When there is no measured data file to be displayed in Review Mode.

Modbus Errors

- **Confirmation Messages**

No.	Message	Description
700	Could not retrieve data within the read cycle.	When the communication does not complete within the specified read cycle.
701	Communication with the slave device is temporarily suspended.	When the communication with the slave device is temporarily suspended, because the number of times the slave device did not respond within the timeout value exceeded the retrial count.
702	Communication with the slave device that was suspended recovered normally.	When the communication with the slave device that was suspended recovers normally.

12

Troubleshooting

13.1 Input Specifications

Analog Input

Input method:

Floating unbalanced input and isolation between channels (common b terminal for the RTD)

Number of inputs:

XL100-1: 8 channels. XL100-2: 16 channels

Sampling Interval:

100 ms, 200 ms, 500 ms, 1 s (default setting), 2 s, 5 s, 10 s, 20 s, 30 s, 1 min, 2 min, 5 min, 10 min, 20 min, 30 min, or 1 h (100 ms available only on the XL100-1)

Input type: TC (thermocouple), RTD (resistance temperature detector), and DCV (DC voltage)

Range and Measurable Range:

The following specifications apply to operation of the XL100 under standard operation conditions:

Temperature:	23 ± 2°C
Humidity:	55% ± 10%RH
Power supply voltage:	100 to 240 VAC
Power supply frequency:	50/60 Hz ± 1%
Warm-up time:	At least 30 minutes.

Other ambient conditions such as vibration should not adversely affect the operation

- DCV (DC voltage)

Input Range	Measurable Range	Measurement Accuracy	Maximum Display Resolution
100 mV	-100.00 to 100.00 mV	±0.1% of f.s.	10 μV
500 mV	-500.0 to 500.0 mV	±0.1% of f.s.	100 μV
1 V	-1.0000 to 1.0000 V	±0.1% of f.s.	100 μV
5 V	-5.000 to 5.000 V	±0.1% of f.s.	1 mV
10 V	-10.000 to 10.000 V	±0.1% of f.s.	1 mV
30 V	-30.00 to 30.00 V	±0.1% of f.s.	10 mV
1-5V/f.s.	1.000 to 5.000 V	±0.1% of f.s.	1 mV

f.s.: measurable range

- TC (thermocouple)

Type	Measurable Range	Measurement Accuracy	Maximum Display Resolution
R[1]	0 to 1768°C	±0.05% of f.s. ± 2°C	1°C
S[1]	0 to 1768°C	±0.05% of f.s. ± 2°C	1°C
B[1]	600 to 1800°C	±0.05% of f.s. ± 2°C	1°C
K[1]	-200.0 to 1372.0°C	±0.05% of f.s. ± 1°C	0.1°C
E[1]	-200.0 to 1000.0°C	±0.05% of f.s. ± 1°C	0.1°C
J[1]	-200.0 to 1200.0°C	±0.05% of f.s. ± 1°C	0.1°C
T[1]	-200.0 to 400.0°C	±0.05% of f.s. ± 1°C	0.1°C
N[1]	-200.0 to 1300.0°C	±0.05% of f.s. ± 1°C	0.1°C
W[2]	0 to 2315°C	±0.05% of f.s. ± 2°C	1°C
L[3]	-200.0 to 900.0°C	±0.05% of f.s. ± 1°C	0.1°C
U[3]	-200.0 to 400.0°C	±0.05% of f.s. ± 1°C	0.1°C

[1] R, S, B, K, E, J, T, N: IEC584-1(1995), DIN IEC584, JIS C 1602-1995
[2] W: W-5% Rd/W-26% Rd(Hoskins Mfg. Co.), ASTM E988
[3] L: Fe-CuNi, DIN43710, U: Cu-CuNi, DIN43710

f.s.: measurable range

13

Specifications

• RTD (resistance temperature detector)

Type	Measurable Range	Measurement Accuracy	Maximum Display Resolution
Pt100[*4]	-200.0 to 850.0°C	±0.05% of f.s. ± 0.5°C	0.1°C
JPt100[*4]	-200.0 to 500.0°C	±0.05% of f.s. ± 0.5°C	0.1°C

[*4] Pt100 :   JIS C 1604-1997, IEC 751-1995, DIN IEC751-1996
    JPt100 : JIS C 1604-1989, JIS C 1606-1989
  f.s.: measurable range

Reference junction compensation:
　　　Uses an internal reference junction compensation.
Reference junction compensation accuracy:
　　　±1°C
Maximum input voltage:
　　　30 VDC
Input resistance:
　　　Approx. 1 MΩ
Thermocouple burnout detection:
　　　Always ON when making thermocouple measurements. Upscale only (the display is "+*****")
Average function:
　　　Moving average ON/OFF. Set the average count to 1, 2, 5, 10, or 20.

Numeric Input

Input Specifications:
　　　Low:　Less than 0.9 V or terminals shorted.
　　　High:　2.1 V or greater or terminals opened
Maximum input voltage:
　　　10 VDC

• Pulse signal (1 channel)

Input Type	Range	Maximum Number of Input Pulses	Maximum Display Resolution
Instantaneous value	None	50 k/sampling interval	1 c
Integrated value	50 kc/f.s. 500 kc/f.s. 5 Mc/f.s. 50 Mc/f.s. 500 Mc/f.s.	50 k/sampling interval	1 c 10 c 100 c 1 kc 10 kc
Number of revolutions	500 rpm/f.s. 5 krpm/f.s. 500 krpm/f.s.	50 k/sec (Counts the number of pulses per second and converts the number to number of revolutions) 50 krpm/f.s.	

• Logic signal (2 channels)

Input Type	Measurement Range
Voltage input	OFF: Less than 0.9 V. ON: Greater than or equal to 2.1 V
Contact input	Contact ON/OFF

Calculation

Number of channels:

32

Differential calculation:

Calculate the difference between channels. Calculate the difference between measured, calculated, and communication data and constants.

Linear scaling:

Available for DCV, TC, RTD, and pulse ranges.

Scaling limits: −30000 to 30000

Decimal place: Select 0.0000, 00.000, 000.00, 0000.0, or 00000

Unit: User defined (up to 6 characters) or select from below.

Length	mm (default setting), cm, m, or km
Area	mm2 (default setting), cm2, or m2
Volume	mm3 (default setting), cm3, m3, cc, ml, l, or kl
Velocity	mm/s (default setting), mm/min, mm/h, cm/s, cm/min, cm/h, m/s, m/min, m/h, km/s, km/min, or km/h
Acceleration	m/s2 (default setting), km/h2, Gal, or G
Frequency	mHz (default setting), Hz, kHz, or rpm
Weight	mg (default setting), g, kg, t, N, or kgf
Work	mW (default setting), W, kW, PS, HP, J, Wh, or cal
Pressure	kgf/cm2 (default setting), Pa, kPa, or MPa
Velocity	mm/s (default setting), mm/min, mm/h, cm/s, cm/min, cm/h, m/s, m/min, m/h, km/s, km/min, or km/h
Flow rate	m3/s (default setting), m3/min, m3/h, t/s, t/min, t/h, l/s, l/min, l/h, kg/s, kg/min, kg/h, kl/s, kl/min, kl/h, cc/s, cc/min, or cc/h
Temperature	°C (default setting), K, or °F
Voltage/current	mV (default value), V, kV, MV, mA, A, kA, MA
Power	mW (default value), W, kW, MW, mvar, var, kvar, Mvar, mVA, VA, kVA, MVA, deg
Watt hour	Wh (default value), kWh, MWh, varh, kvarh, Mvarh

Statistical calculation:

Maximum (MAX), minimum (MIN), average (AVE), peak (P-P), and RMS value from the time logging is started to the time logging is ended.

13

Specifications

13.2 Display Specifications

Display unit:
    3.5-inch TFT color LCD (320 × 240 dots)

Display color:
    Trend/Bar graph display:
        Selectable from 16 colors (Red, green, blue, blue violet, brown, orange, yellow-green, light blue, violet, gray, lime, blue green, dark blue, yellow, olive, and purple)
    Background (waveform):
        White or black

Waveform display:
    Direction: Horizontal
    Number of channels:
        Up to eight channels per display (group) (excluding pulse and logic channels)
    Number of displays:
        Four displays (four groups)
    Thickness:
        Selectable from 1, 2, and 3 dots
    Update rate:
        Selectable from 1, 2, 5, 10, 20, 30 sec/div, 1, 2, 5, 10, 20, 30 min/div, 1, 2, 5, 10, 12, and 24 h/div

Bar graph display:
    Direction: Horizontal
    Number of channels:
        Up to eight channels per display (group) (excluding pulse and logic channels)
    Number of displays:
        Four displays (four groups)
    Scale: Fixed to 10 divisions
    Base position:
        Left edge or center (selectable for each channel)
    Update rate:
        1 s

Digital display:
    Number of channels:
        Up to eight channels per display (group) (excluding pulse and logic channels)
    Number of displays:
        Four displays (four groups)
    Update rate:
        1 s

Review display:
    Displays past log data saved to the internal memory or external storage media
    Display: Waveform & digital display only
    Display method:
        Select the most recent log data or select a file
    Background:
        White or black (a color opposite to the color selected for background)

Information display:

    Alarm summary:

        Displays a list of the most recent alarms. Displays up to 120 incidents by scrolling the screen using keys. Select arbitrary alarm information and switch to the review display

    Log display:

        Displays the following lists:

        A log of errors (the 50 most recent)

        A log of key login and logout (50 most recent logins)

        A log of communication commands (50 most recent commands)

        A log of file transfers using FTP (50 most recent transfers)

        A log of e-mail transmissions (the 50 most recent)

        A log of Web operations (the 50 most recent)

LCD settings:

    Backlight auto off:

        Select OFF, 10 s, 1, 2, 5, 10, 30, or 60 min

13

Specifications

13.3 Data Storage Specifications

Internal memory:
> 16 MB

External storage medium:
> CF card Type II, SD card, or USB memory
>
> (Only the copy function is available for the USB memory.
>
> USB memories tested for compatibility recommended)

Stored data types:

Type	Description
Logging data	The instantaneous values of the measured/calculated data can be saved at a specified sampling interval in Logging Mode. The data save operation is started or stopped with the START/STOP key. The save operation can also be started or stopped when a specific event (trigger) occurs. The logging data contains alarm information. Data format: Binary or ASCII
Manual sample data	The measured/calculated data (instantaneous values) of all channels can be saved by pressing the SAVE key in Free Running Mode. Data format: Binary or ASCII
Alarm Data	The same information as the alarm summary display can be saved by pressing the SAVE key during alarm summary display. Data format: ASCII
Screen image data	The image data of the screen being displayed can be saved by pressing the SAVE key in Free Running Mode, etc. Data format: BMP
Setup data	The setup data of the XL100 can be saved in File Operation mode. Data format: ASCII
Log data	The same information as the log display can be saved by pressing the SAVE key during log data display. Data format: ASCII
Backup file	If the data save operation is not carried out normally to the internal memory or external storage medium (CF card or SD card), the data is saved to the backup memory of the XL100. The saved data can be copied to an external storage medium. Data format: Same format as the logging data

Logging time (estimated value):
> Binary format (when using a 64-MB card)

Sampling Interval	Number of Measurement Channels				
	1 ch	8 ch	16 ch	16 ch + 32 calculation ch	16 ch + 32 calculation ch + 32 communication ch
0.1 s	38.8 days	4.8 days	–	–	–
0.2 seconds	77 days	9.7 days	4.8 days	23 hours	12 hours
0.5 seconds	194 days	24 days	12 days	2.4 days	32 hours
1 seconds	1 years	48 days	24 days	4.8 days	2.6 days
2 seconds	2.1 years	97 days	48.5 days	9.7 days	5.3 days
3 seconds	5.3 years	242 days	121 days	24 days	13 days
10 seconds	10.6 years	1.3 years	242 days	48.5 days	26 days
20 seconds	21.2 years	2.6 years	1.3 years	97 days	54 days
30 seconds	32 years	4 years	2 years	145 days	81 days
1 minutes	63.8 years	7.9 years	4 years	291 days	161 days
2 minutes	Omitted	1.59 years	7.9 years	2 years	291 days
5 minutes	Omitted	39.5 years	19.8 years	4 years	2.2 years

The figures above have been derived through calculation, and may differ from actual values. One year is calculated as 365 days.

Trigger function:

Type: Input to the external trigger input terminal, level (upper limit, lower limit, window IN, and window OUT), alarm occurrence, time, timer (only for an end trigger)

Specify the trigger source channel for level triggers

Mode: Simple (stop after the end trigger is activated) or continuous (create a file each time the trigger is activated)

Pre-trigger:

Saves data before the trigger is activated

Trigger delay:

Saves data by taking the trigger point to be the number of specified samples after the trigger is activated.

Sampling count:

0 to 600

Automated measurement function:

Automatically loads a setup file (file name: AUTORUN.SET) that is saved to a CF card, SD card, or USB memory and starts logging according to the settings.

13

Specifications

13.4　Alarm Specifications

Number of alarms:
  One per channel

Alarm types:
  High (high limit), low (low limit), window IN (within the upper and lower limits), and window OUT (outside the upper and lower limits) High and low only for logic inputs.

Alarm delay time:
  1 s to 1 h

Display:　Displays the alarm status in the status display section and the measured value in highlighted red when an alarm condition occurs. Hold/Nonhold can be switched.

Hysteresis:
  ON/OFF switch (fixed to 0.5% of the span. Common to all channels)

Output:　Up to 4 channels (non-isolated)

Buzzer:　ON/OFF can be switched

Number of saved incidents:
  The most 120 incidents.

Output format:
  Open collector, 5-V pull-up resistance 100 kΩ

Contact capacity:
  5 to 40 V, 100 mA

13.5 Communication Specifications

Ethernet (10BASE-T/100BASE-TX)

Protocol: SMTP, HTTP, FTP, TCP/IP, SNTP, PPP, and IPv6

E-mail transmission function:

Send mail when an alarm is activate or released, when the XL100 recovers from a power failure, when a media error occurs, when an FTP client error occurs, or at the specified time. Up to two groups can be specified for the mail recipient.

Web server function:

Shows the display image of the XL100 on a Web browser. Two modes available: monitor and display operation mode and configuration mode. A password can be set for each mode.

FTP client function:

Transfers the measurement, alarm, and log data files that are created in the internal memory or external storage media to a specified FTP server. The transfer result is shown as an FTP log on the XL100. Two destinations, primary and secondary, can be specified for the file transfer.

FTP server function:

Output a list of directories and files of the internal memory or external storage medium, transfer files, and delete files.

Time synchronization function:

Synchronizes the time by connecting to an SNTP server at specified time intervals (1 to 24 h).

User authentication:

Restricts the access to seven persons (one administrator and six users) that are registered in advance. Can be used on the Web server and FTP server

USB

Number of ports: 1

Electrical and mechanical specifications:

Conforms to USB Revision 1.1.

Connector: 5-pin Mini-B receptacle.

PC system supported:

PCs with standard USB ports running Windows 2000* or Windows XP*.

* Windows is a registered trademark of Microsoft Corporation in the United States and/or other countries.

RS-232

Connector type:

8-pin Mini DIN.

Synchronization:

Start-stop synchronization.

Transmission mode:

Full duplex, point-to-point.

Data rate: Select 2400, 4800, 9600, 19200, or 38400 bps.

Start bit: Fixed to 1 bit.

Data length:

Select 7 bits or 8 bits.

Parity: Select Odd, Even, or None (no parity).

Stop bit: Select 1 or 2.

Handshaking:

Select XON/XOFF control or CS/RS control.

RS-485

Terminal block type:
> Three terminals. Clamp on with screws.

Synchronization:
> Start-stop synchronization

Transmission mode:
> Half-duplex multi-drop (1:N (N = 1 to 31))

Data rate: Select 1200, 2400, 4800, 9600, 19200, 38400, 57600, or 115200 bps

Start bit: Fixed to 1 bit

Data length:
> Select 7 bits or 8 bits

Parity: Select Odd, Even, or None (no parity).

Stop bit: Select 1 or 2

Communication distance:
> 1.2 km (when using two shielded twisted-pair cables, AWG 24)

Terminator:
> External. 120 Ω, 1/2 W recommended (externally attach between terminals A and B)

Modbus Communication

Transmission media:
> RS-232 or RS-485

Transmission mode:
> RTU mode or ASCII mode

Communication channels:
> 32 channels, Modbus master

⚠ Note

Select Ethernet, USB, RS-232, or RS-485 to perform communications.

13.6 Specifications of Other Functions

Clock function:

Set the year, month, day, hour, and minute (24-hour clock).

Accuracy: ±10 ppm (at 25°C).

Keylock function:

Operate a given key to disable key operations except the key for releasing the key lock.

Key login function:

Enter the user name and password to access the XL100 after the self-test at power-on.

Display hold:

Operate a given key to hold the displayed value at that point.

Beep sound:

Sounds a beep when keys are pressed. ON/OFF selectable.

Remaining storage time display:

Displays the remaining amount of storage time from the remaining memory space on the selected data storage destination for the specified number of data items.

Printer output:

Print on a dedicated printer (97010).

13.7 General Specifications

Installation location:
    Indoors, up to 2,000 m

Operating conditions:
    Operating temperature range: 0 to 50°C
    Operation humidity range: 5 to 85% RH (no condensation)

Storage conditions:
    Storage temperature range: –20 to 60°C
    Storage humidity range: 90% RH or less (no condensation)

Insulation resistance:
    Between each input terminal and case:
        20 MΩ or greater (500 VDC)
    Between input terminals (excluding the b terminal):
        20 MΩ or greater (100 VDC)
    Between each input terminal and digital I/O:
        20 MΩ(100 VDC)

    Withstand voltage:
        Between each input terminal and case:
            350 Vp-p (50/60 Hz) for 1 minute
        Between input terminals (excluding the b terminal):
            350 Vp-p (50/60 Hz) for 1 minute
        Between each input terminal and digital I/O:
            350 Vp-p (50/60 Hz) for 1 minute

AC power supply:
    Rated supply voltage: 100 to 240 VAC
    Allowable supply voltage range: 90 to 132 or 180 to 264 VAC
    Rated supply frequency: 50/60 Hz

Battery power operation:
    Battery used: Dedicated lithium ion battery (2400 mAh, 7.4 V)
    Operation: Battery can be charged only on the XL100. When used together with an AC adapter, the AC adapter has precedence.
    Charge function: The battery can be charged while using the XL100 Approximately 4.5 hours to charge the battery when the power is OFF.
    Operation time under continuous use:
        Approx. 8 hours (at an ambient temperature of 25°C, sampling interval set to 5 minutes or longer, backlight auto off set to 5 minutes or less, and the interface is not set to LAN)

Safety Standards:
    Complying standard: EN61010-1
    Measurement Category: I (circuit voltage used: 30 VDC)
    Pollution Degree: 2
    Rated transient overvoltage: 350 Vp-p

Emission:

    Complying standard: EN61326 Class A, EN55011 Class A Group 1
                                         EN61000-3-2, and EN61000-3-3.
The XL100 is a Class A (for commercial environment) product. Operation of this product in a residential area may cause radio interference in which case the user is required to correct the interference.

Cable condition:

- RS-232
  Use the communication cable (91011).
- Pulse input, logic input, and alarm output
  Use the digital I/O cable (91029).
- Ethernet
  Use category 5 Ethernet cables or better cables.
- Other communications and I/O
  Shielded cable, less than 3 m.

Immunity:

    Complying standard: EN61326 Annex A.
Immunity test requirement for equipment used in commercial environment.
The criterion in the immunity environment is B (self-recoverable performance degradation).

    Cable condition: Same as the cable condition for emission.

Accessories:

    Terminal block unit: 8ch (95050) or 16ch (95051)
    AC adapter: One of the following adapters.
                                         UL/CSA standard
                                       VDE standard
                                       SAA standard
                                       BS standard
                                       GB standard
    Rubber boot: For impact resistance (93036).

Side cover: For protecting the connectors.
Screwdriver: For the terminal block.
Quick Setup Manual:
              1 pc.
CD-ROM: Standard Software and electronic data of the User's Manual (this manual), Communication Function Manual, and Quick Setup Manual.
              Main functions of the Standard Software:
                    Easily carry out basic settings on the XL100. Load the XL100 binary file and draw graphs or save the data as CSV data.
                    Supported OS: Windows 2000 or Windows XP.

13

Specifications

13.8 External Dimensions

155

55

155
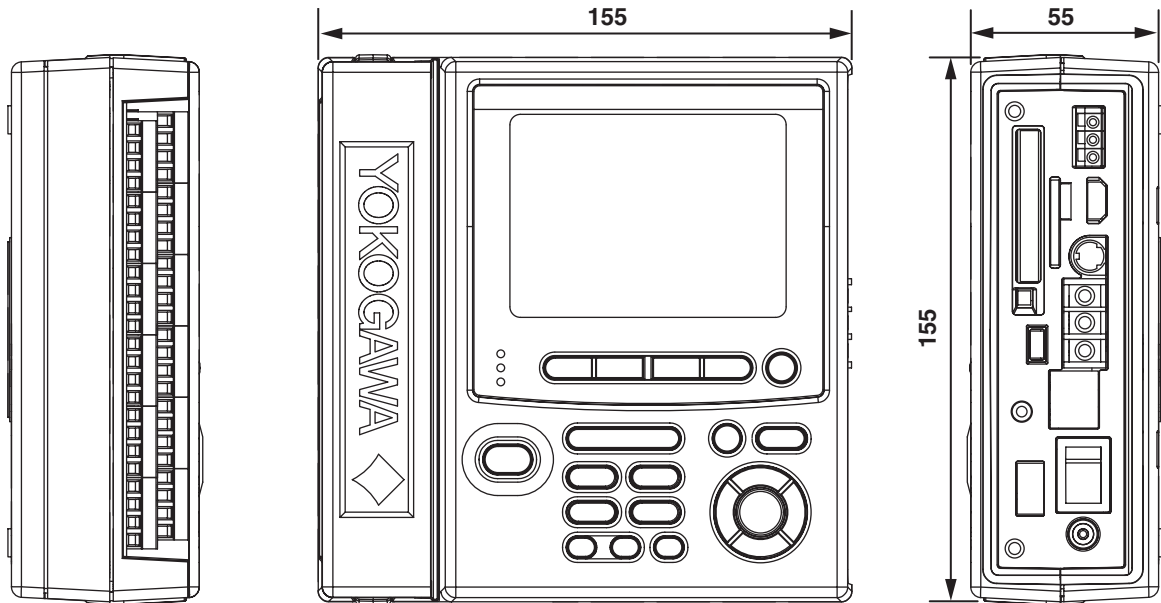
Appendix 1   A List of Settings and User Registration Privileges

Input Settings

Setup Item			Administrator Privileges	User Privileges
Analog input	Tag		Yes	Yes
	Mode		Yes	Yes
	Range		Yes	Yes
	Span lower/upper		Yes	Yes
	Color		Yes	Yes
	Line width		Yes	Yes
	Scaling		Yes	Yes
	Scale settings	Scale lower	Yes	Yes
		Decimal place	Yes	Yes
		Scale upper	Yes	Yes
	Unit		Yes	Yes
	Average		Yes	Yes
Pulse input	Tag		Yes	Yes
	Mode		Yes	Yes
	Range		Yes	Yes
	Span lower/upper		Yes	Yes
	Color		Yes	Yes
	Line width		Yes	Yes
	Scaling		Yes	Yes
	Scale settings	Scale lower	Yes	Yes
		Decimal place	Yes	Yes
		Scale upper	Yes	Yes
	Unit		Yes	Yes
Logic input	Mode		Yes	Yes
	Color		Yes	Yes
	Line width		Yes	Yes

Alarm Settings

Setup Item			Administrator Privileges	User Privileges
Alarm settings	Analog input	Alarm type	Yes	Yes
		Upper/lower	Yes	Yes
		Output channel	Yes	Yes
	Pulse input	Alarm type	Yes	Yes
		Upper/lower	Yes	Yes
		Output channel	Yes	Yes
	Logic input	Alarm type	Yes	Yes
		Output channel	Yes	Yes
	Calculation data	Alarm type	Yes	Yes
		Upper/lower	Yes	Yes
		Output channel	Yes	Yes
	Communication data	Alarm type	Yes	Yes
		Upper/lower	Yes	Yes
		Output channel	Yes	Yes

App

Appendix

Setup Item			Administrator Privileges	User Privileges
Output AND/OR	Alarm output 1		Yes	Yes
	Alarm output 2		Yes	Yes
	Alarm output 3		Yes	Yes
	Alarm output 4		Yes	Yes
Delay sampling count			Yes	Yes
Output hold			Yes	Yes
Display hold			Yes	Yes
Hysteresis			Yes	Yes
Alarm buzzer			Yes	Yes
Alarm ACK			Yes	Yes

Display Settings

Setup Item			Administrator Privileges	User Privileges
General	Background		Yes	Yes
	Grid display		Yes	Yes
	Bar graph base		Yes	Yes
Group	Group name	Group 1	Yes	Yes
		Group 2	Yes	Yes
		Group 3	Yes	Yes
		Group 4	Yes	Yes
	Display channel	Group 1	Yes	Yes
		Group 2	Yes	Yes
		Group 3	Yes	Yes
		Group 4	Yes	Yes
Alarm line	Display switch		Yes	Yes
	Color		Yes	Yes
	Line width		Yes	Yes
LCD	Backlight auto off		Yes	Yes

Data Storage Settings

Setup Item			Administrator Privileges	User Privileges
Data save	Sampling interval		Yes	Yes
	Save media		Yes	Yes
	Data type		Yes	Yes
	File name		Yes	Yes
	Printer output	Manual print	Yes	Yes
	Trigger	Trigger mode	Yes	Yes
		Trigger delay	Yes	Yes
		Start trigger setting	Yes	Yes
		End trigger setting	Yes	Yes

Calculation Settings

Setup Item			Administrator Privileges	User Privileges
Difference	Tag		Yes	Yes
	Difference channel		Yes	Yes
	Reference channel		Yes	Yes
	Constant	Decimal place	Yes	Yes
		Constant	Yes	Yes
	Span	Decimal place	Yes	Yes
		Span upper	Yes	Yes
		Span lower	Yes	Yes
	Color		Yes	Yes
	Line width		Yes	Yes
	Unit		Yes	Yes
Statistics	Maximum		Yes	Yes
	Minimum		Yes	Yes
	Average		Yes	Yes
	Peak		Yes	Yes
	RMS		Yes	Yes

Communication Settings

• Interface settings

Setup Item		Administrator Privileges	User Privileges
Interface	LAN	Yes	No
	USB	Yes	No
	RS-232	Yes	No
	RS-485	Yes	No
	RS-232 (printer)	Yes	No

• Serial communication settings

Setup Item				Administrator Privileges	User Privileges
Serial communication	Parameters	Slave address		Yes	No
		Baud rate		Yes	No
		Data length		Yes	No
		Stop bit		Yes	No
		Parity		Yes	No
		Handshaking		Yes	No
	Protocol				
	Modbus setup	Modbus master basic			
			Communication interval	Yes	No
			Timeout value	Yes	No
			Retrials	Yes	No
		Modbus master command			
			ON/OFF	Yes	No
			First CH	Yes	No
			Last CH	Yes	No
			Address	Yes	No
			Register	Yes	No
			Type	Yes	No

App

Appendix

Appendix 1 A List of Settings and User Registration Privileges

Setup Item				Administrator Privileges	User Privileges
		Communication channel			
			Mode	Yes	No
			Tag	Yes	No
			Decimal place	Yes	No
			Scaling value	Yes	No
			Unit	Yes	No
			Color	Yes	No
			Line width	Yes	No

• **USB settings**

Setup Item			Administrator Privileges	User Privilege
USB	USB ID		Yes	No

• **Ethernet interface settings**

Setup Item				Administrator Privileges	User Privileges
Ethernet	Time zone			Yes	No
	IP address	DHCP		Yes	No
			IP address	Yes	No
			Subnet mask	Yes	No
			Default gateway	Yes	No
		IPV6 infomation		Yes	No
	DNS	DNS		Yes	No
			Primary DNS server	Yes	No
			Secondary DNS server	Yes	No
		Host name		Yes	No
		Domain name		Yes	No
		Primary domain suffix		Yes	No
		Secondary domain suffix		Yes	No
	SNTP	SNTP		Yes	No
			Server name	Yes	No
			Confirm time	Yes	No
	Login function			Yes	No
	Commucation timeout			Yes	No
		Timeout value		Yes	No
	Keepalive			Yes	No
Network function	FTP client	Data transmission		Yes	No
		Primary FTP server	Server name	Yes	No
			Port number	Yes	No
			Login name	Yes	No
			Password	Yes	No
			Account	Yes	No
			PASV mode	Yes	No
			Initial path	Yes	No
		Secondary FTP server	Server name	Yes	No
			Port number	Yes	No
			Login name	Yes	No
		FTP transmission test		Yes	No

Setup Item				Administrator Privileges	User Privileges
			Password	Yes	No
			Account	Yes	No
			PASV mode	Yes	No
			Initial path	Yes	No
	Web Server	Web server		Yes	No
		Monitor page	Enable	Yes	No
			Access control	Yes	No
		Operator page	Enable	Yes	No
			Access control	Yes	No

- **Basic e-mail transmission settings**

Setup Item				Administrator Privileges	User Privileges
Network function	E-mail	Basic	E-mail transmission	Yes	No
			SMTP server name	Yes	No
			Port number	Yes	No
			Recipient 1	Yes	No
			Recipient 2	Yes	No
			Sender	Yes	No
			E-mail transmission test	Yes	No
		Alarm information	Recipient 1	Yes	No
			Recipient 2	Yes	No
			Add inst. data	Yes	No
			Add source URL	Yes	No
			Subject	Yes	No
			Header 1	Yes	No
			Header 2	Yes	No
		Specified time			
		Recipient 1		Yes	No
			Interval	Yes	No
			Reference time	Yes	No
			Add inst. data	Yes	No
			Add source URL	Yes	No
			Subject	Yes	No
			Header 1	Yes	No
			Header 2	Yes	No
		Recipient 2	Yes	No	
			Interval	Yes	No
			Reference time	Yes	No
			Add inst. data	Yes	No
			Add source URL	Yes	No
			Subject	Yes	No
			Header 1	Yes	No
			Header 2	Yes	No

App

Appendix

Setup Item			Administrator Privileges	User Privileges
	System error transmission	Recipient 1	Yes	No
		Recipient 2	Yes	No
		Add inst. data	Yes	No
		Add source URL	Yes	No
		Subject	Yes	No
		Header 1	Yes	No
		Header 2	Yes	No

Hardware Settings

Setup Item		Administrator Privileges	User Privileges
Hardware	Beep sound	Yes	No
	ID number	Yes	No
	Language	Yes	No
	Temperature	Yes	No
	Clock	Yes	No
	Automated measurement	Yes	No
	System reset	Yes	No

System Settings

Setup Item			Administrator Privileges	User Privileges
User register	Administrator	Register	Yes	No
		User name	Yes	No
		Password	Yes	No
	User 1	Register	Yes	No
		User name	Yes	No
		Password	Yes	No
		Ethernet login	Yes	No
		Web browsing	Yes	No
		Key login	Yes	No
	User 2	Register	Yes	No
		User name	Yes	No
		Password	Yes	No
		Ethernet login	Yes	No
		Web browsing	Yes	No
		Key login	Yes	No
	User 3	Register	Yes	No
		User name	Yes	No
		Password	Yes	No
		Ethernet login	Yes	No
		Web browsing	Yes	No
		Key login	Yes	No
	User 4	Register	Yes	No
		User name	Yes	No
		Password	Yes	No
		Ethernet login	Yes	No
		Web browsing	Yes	No
		Key login	Yes	No

Setup Item			Administrator Privileges	User Privileges
	User 5	Register	Yes	No
		User name	Yes	No
		Password	Yes	No
		Ethernet login	Yes	No
		Web browsing	Yes	No
		Key login	Yes	No
	User 6	Register	Yes	No
		User name	Yes	No
		Password	Yes	No
		Ethernet login	Yes	No
		Web browsing	Yes	No
		Key login	Yes	No
Key login function			Yes	No
	Auto logout		Yes	Yes
Logout			Yes	Yes

App

Appendix

Index

Symbols

A

B

C

Index

Index

Index

Index