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**User's  
Manual**

**XL100  
(XL121/XL122/XL124)  
Portable Data Station (Datum-Y)  
(XL111/XL112/XL114)  
Portable Data Logger (Datum-Y)**

IM XL120E

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## Introduction

Thank you for purchasing our XL100 Portable Data Station or Portable Data Logger. 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). The Communication Function Manual is used on the XL121, XL122, and XL124.

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

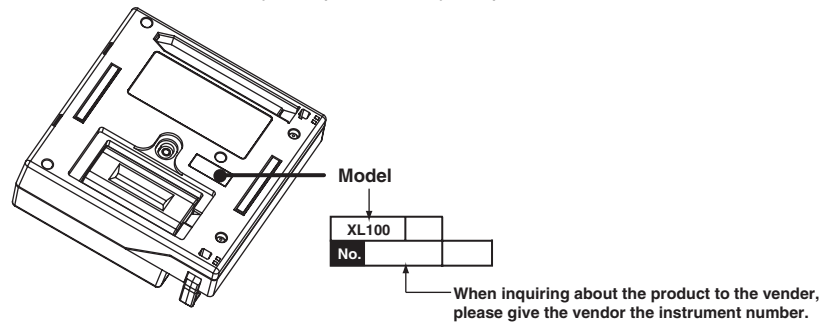
First Edition: April, 2007

# 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 and Suffix Codes

Model	Specifications
XL121	With a terminal block unit (8 channels)
XL122	With a terminal block unit (16 channels)
XL124	With a M3 screws terminal block unit (16 channels)
XL111	With a terminal block unit (8 channels), no SD card storage/communication function
XL112	With a terminal block unit (16 channels), no SD card storage/communication function
XL114	With a M3 terminal block unit (16 channels), no SD card storage/communication function

\* The XL111, XL112, and XL114 are only sold in Japan.

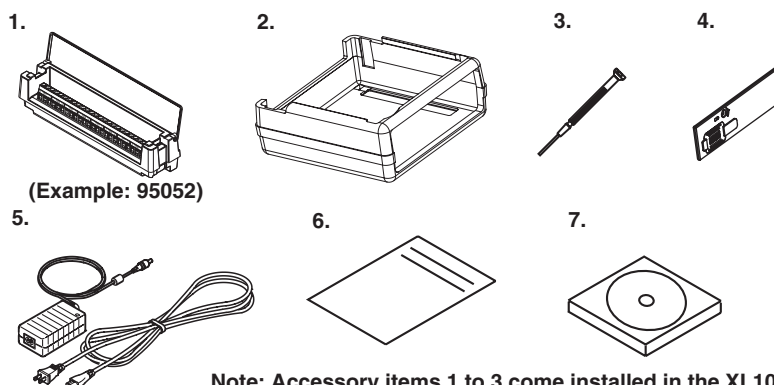
### Instrument Number

An instrument number is also printed on the nameplate. When inquiring about the product to the vendor, 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	95052/95053 /95055	95052, 95053, and 95055 when the model is XL111, XL112, and XL114 or XL121, XL122, and XL124, respectively
2	Rubber boot	93036	For impact resistance
3	Side cover	–	Supplied with the XL121, XL122, and XL124
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 XL120P-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 3 come installed in the XL100.

### Accessories and Spare Parts (Optional)

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

#### Accessories

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
Stand	93039	Supports tilted installation on the desktop, wall mounting, and DIN rail mounting
Application software (Datum-LOGGER)	XL900	For online data acquisition and data analysis

#### Spare Parts

Name	Part No.	Remarks
Terminal block unit (8 channels)	95052	8 channels, clamp terminal type
Terminal block unit (16 channels)	95053	16 channels, clamp terminal type
M3 screws terminal block unit (16 channels)	95055	16 channels, M3 screws terminal 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.

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# 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**

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

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## **CAUTION**

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**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.**

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## **Note**

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**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.**

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## **TIP**

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Indicates information that complements the present topic.

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## **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**

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- **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.**
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## Language Setting at Startup

When you start up the XL100 for the first time (the first time you turn on the XL100 after purchase), you must set the language that you are going to use. Follow the procedure below to set the language.

Once you set the language, the XL100 will start up using the specified language the next time.

1. When you turn the power switch ON, the following screen appears.



2. Use the **arrow keys** to select the language, and press **SELECT**.
3. The language is set, and a self-test starts automatically.

### TIP

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To change the language once you set it, press **SETTING**, select **HARDWARE > LANGUAGE**, and change the setting.

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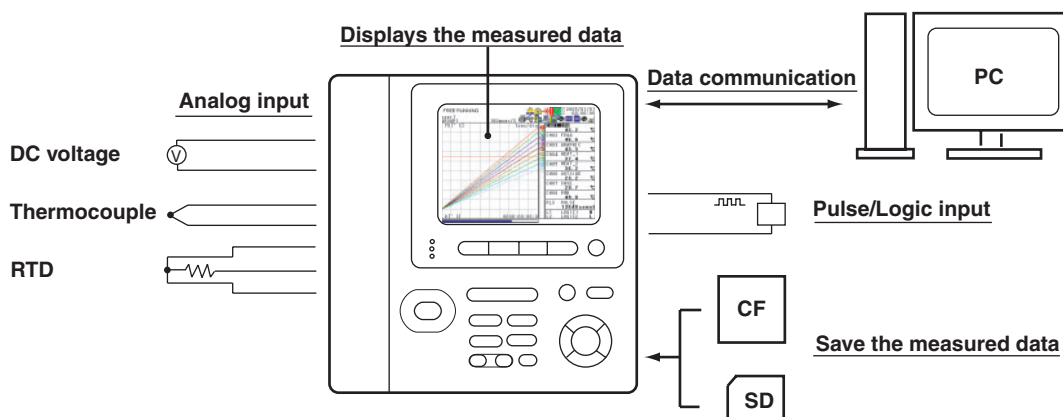
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App

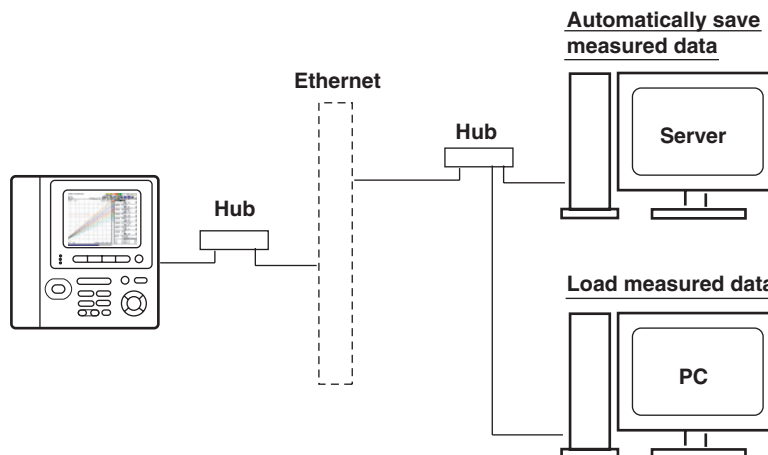
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# 1.1 Overview of the XL100

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.



**Note**

The function for saving the measured data to the SD card and general communication functions including the Ethernet interface are supported only on the XL121, XL122, and XL124.

## 1.2 Functions of the Input Section

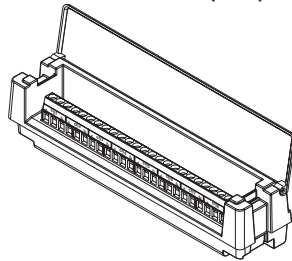
### Number of Measurement Channels and Sampling Interval

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

Terminal block unit (8 ch): 95052

Terminal block unit (16 ch): 95053

M3 screws terminal block unit (16 ch): 95055



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	Sampling 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). Also, addition, subtraction, multiplication, and division 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 $\pm 100$ mV to $\pm 50$ 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).
Arithmetic calculation	When the input type is set to DC voltage, thermocouple, RTD, or pulse input, addition, subtraction, multiplication, and division can be performed with a measured value of another channel, and the result 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 $\mu$ V
500 mV	-500.0 to 500.0 mV	100 $\mu$ V
1 V	-1.0000 to 1.0000 V	100 $\mu$ V
5 V	-5.000 to 5.000 V	1 mV
10 V	-10.000 to 10.000 V	1 mV
50 V	-50.00 to 50.00 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.	50 k/sampling interval
	500 kc/f.s.	
	5 Mc/f.s.	
	50 Mc/f.s.	
	500 Mc/f.s.	
Number of revolutions	500 rpm/f.s.	50 k/sec
	5 krpm/f.s.	
	50 krpm/f.s.	
	500 krpm/f.s.	

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. For pulse input, set the conversion ratio, offset value, upper and lower limits of the scale after the conversion, and unit.

### Burnout

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

## 1.2 Functions of the Input Section

### 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.

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

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

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

...

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

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

$M_n$ : Numeric data of the  $n^{\text{th}}$  time

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

### Filter Function

Digital filter with the cutoff frequencies shown in the table below. The cutoff frequency varies depending on the number of measurement channels and sampling frequency. Set the frequency (50 Hz or 60 Hz) to match the frequency of the power supply that you are using.

When the noise level is high due to the object under measurement or the environment, this filter function can eliminate the noise components allowing correct measurements.

**Sampling Interval vs. Cutoff Frequency Table**

Sampling interval	100 msec	200 msec	500 msec	1 sec	2 sec	5 sec	10 sec	≥ 20 sec	
8 ch	50 Hz	2560 Hz	731 Hz	290 Hz	144 Hz	50 Hz	50 Hz	10 Hz	10 Hz
	60 Hz	2560 Hz	731 Hz	290 Hz	144 Hz	60 Hz	50 Hz	10 Hz	10 Hz
16 ch	50 Hz	–	2560 Hz	731 Hz	290 Hz	144 Hz	50 Hz	50 Hz	10 Hz
	60 Hz	–	2560 Hz	731 Hz	290 Hz	144 Hz	60 Hz	60 Hz	10 Hz
8 ch Filter OFF	2560 Hz	2560 Hz	2560 Hz	2560 Hz	2560 Hz	2560 Hz	2560 Hz	2560 Hz	2560 Hz
16 ch Filter OFF	2560 Hz	2560 Hz	2560 Hz	2560 Hz	2560 Hz	2560 Hz	2560 Hz	2560 Hz	2560 Hz

## 1.3 Display Function

### Display

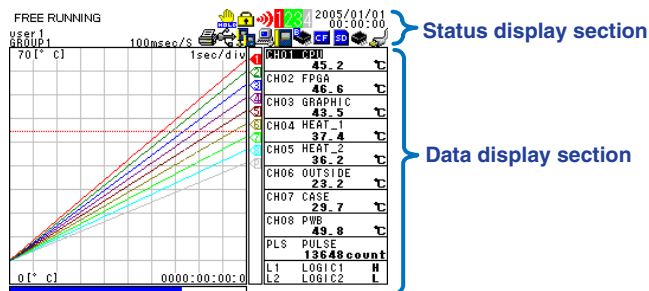
The XL100 is equipped with a 3.5-inch color LCD monitor (320 dots horizontal × 240 dots vertical). The screen consists of the status display section and the data display section.

- 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.

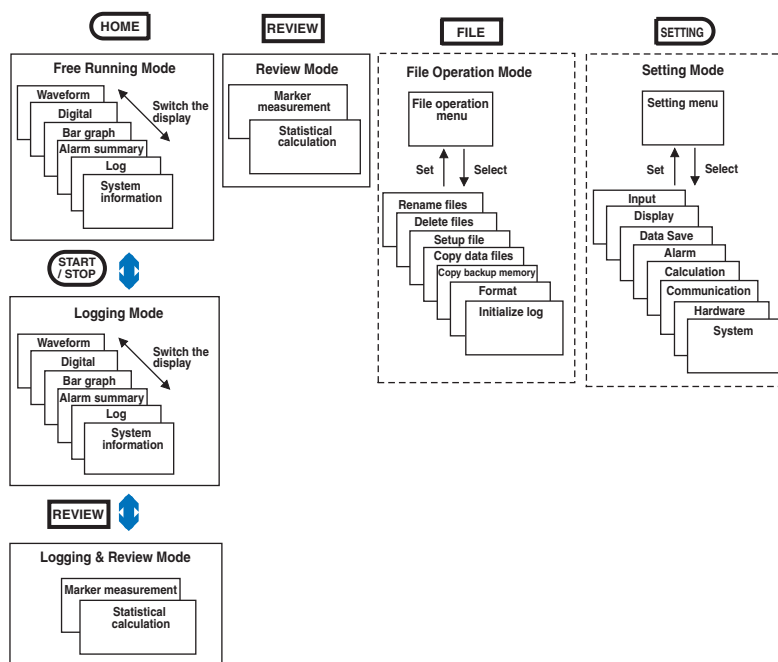
- Data Display Section

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

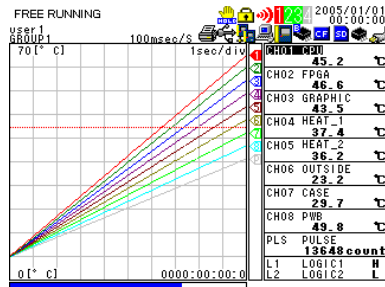
As shown in the figure below, the XL100 has six operation modes: (1) Free Running Mode in which instantaneous values are measured, (2) Logging Mode in which continuous measurement is performed by setting the start and end of data saving, (3) Logging & Review Mode in which past measured data can be viewed 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.



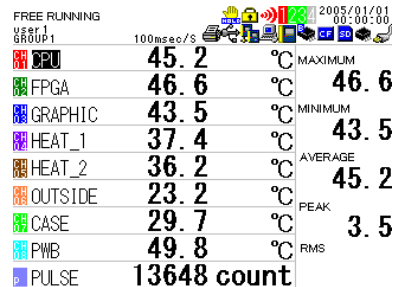
### 1.3 Display Function

The displays shown below are available. For a description of the displayed contents, see section 2.3, "Data Display" and 2.4, "Setup Display."

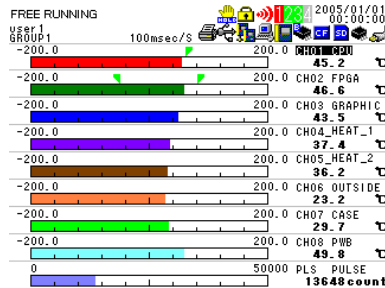
- Waveform & Digital Display



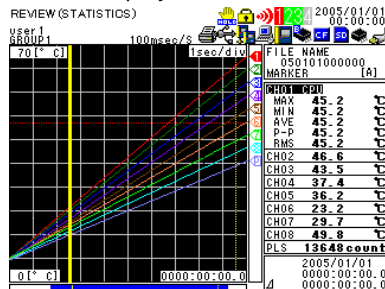
- Digital Display



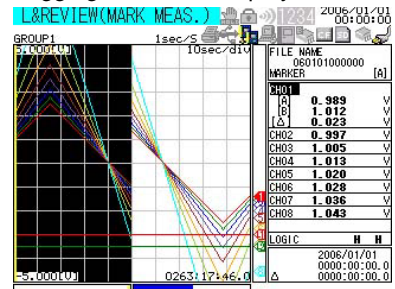
- Bar Graph Display



- Review display



- Logging & Review Display



- Alarm Summary Display

Channel No	Type	Alarm ON	Alarm OFF
1	H	01/01 00:00:00	01/01 00:00:00
1	H	01/01 00:00:00	01/01 00:00:00
1	H	01/01 00:00:00	01/01 00:00:00
1	H	01/01 00:00:00	01/01 00:00:00
1	H	01/01 00:00:00	01/01 00:00:00
1	H	01/01 00:00:00	01/01 00:00:00
1	H	01/01 00:00:00	01/01 00:00:00
1	H	01/01 00:00:00	01/01 00:00:00
1	H	01/01 00:00:00	01/01 00:00:00
1	H	01/01 00:00:00	01/01 00:00:00
1	H	01/01 00:00:00	01/01 00:00:00
1	H	01/01 00:00:00	01/01 00:00:00
1	H	01/01 00:00:00	01/01 00:00:00
1	H	01/01 00:00:00	01/01 00:00:00
1	H	01/01 00:00:00	01/01 00:00:00
1	H	01/01 00:00:00	01/01 00:00:00
1	H	01/01 00:00:00	01/01 00:00:00
1	H	01/01 00:00:00	01/01 00:00:00
1	H	01/01 00:00:00	01/01 00:00:00

- Log (Error) Display

Date	Error No	Message
2005/01/01 00:00:00	210	Media is not inserted
2005/01/01 00:10:00	210	Media is not inserted
2005/01/01 00:20:00	210	Media is not inserted
2005/01/01 00:30:00	210	Media is not inserted
2005/01/01 00:40:00	210	Media is not inserted
2005/01/01 00:50:00	210	Media is not inserted

- Log (Key Login/Logout) Display

Date	I/O	ID	User name
2005/01/01 00:00:00	In	01	user1
2005/01/01 10:00:00	Out		
2005/01/01 12:00:00	In	01	user1



- Log (Communication Command) Display

02/02	Date	ID	I/O	Message
	2005/01/01 00:00:00	01	>	XXXX
	2005/01/01 00:00:00	01	>	XXXXXXXX

- Log (FTP Client) Display

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	XXXXXXXX LOG

- Log (Web Operation) Display

15/15	Date	Request	No	Parameter
	2007/01/09 06:00:50	KEY		ESC
	2007/01/09 06:00:45	KEY		RANGE
	2007/01/09 06:00:41	KEY		SELECT
	2007/01/09 06:00:36	KEY		DISPLAY
	2007/01/09 06:00:35	KEY		ESC
	2007/01/09 06:00:19	KEY		RANGE
	2007/01/09 06:00:15	KEY		HOME
	2007/01/09 06:00:06	KEY		FILE
	2007/01/09 06:00:00	KEY		SETTING
	2007/01/09 05:59:56	KEY		SELECT
	2007/01/09 05:59:53	KEY		UP
	2007/01/09 05:59:42	KEY		ESC
	2007/01/09 05:59:37	KEY		SELECT
	2007/01/09 05:59:32	KEY		DISPLAY

- Log (E-mail Transmission) Display

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

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

Rename a file

- Setup Display

SETTING

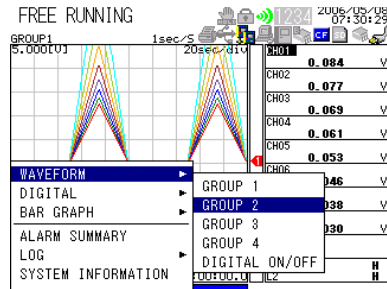
- INPUT
- DISPLAY
- DATA SAVE
- ALARM
- CALCULATION
- COMMUNICATION
- HARDWARE
- SYSTEM

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

### 1.3 Display Function

#### Group Display

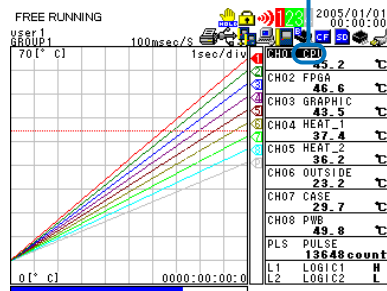
On the waveform display, digital display, and bar graph display, the data of up to eight channels can be shown on a single screen. The eight channels can consist of a combination of analog input channels (hereafter referred to as “measurement channels”), calculation channels (see section 1.6, “Calculation 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.

#### Display using tags



## 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.

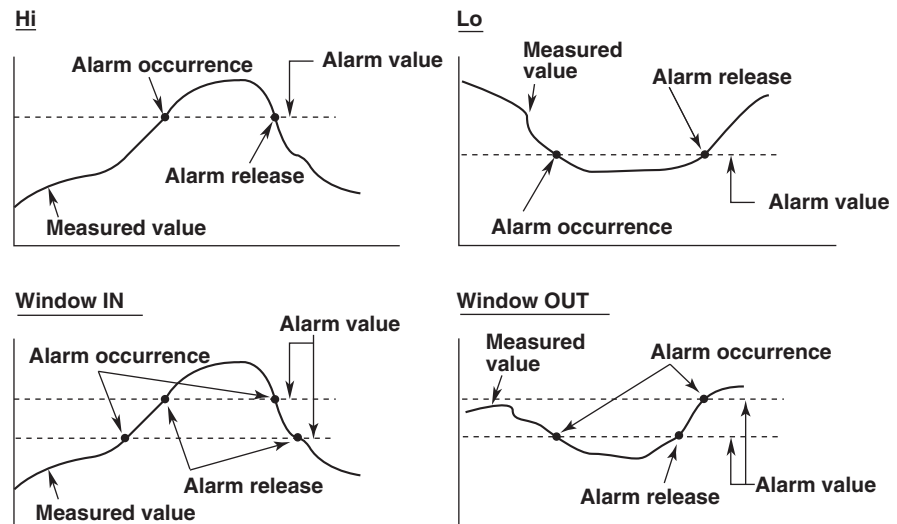
### Number of Alarms

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 or Pulse	OFF	Not set alarm conditions.
	Hi	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	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.



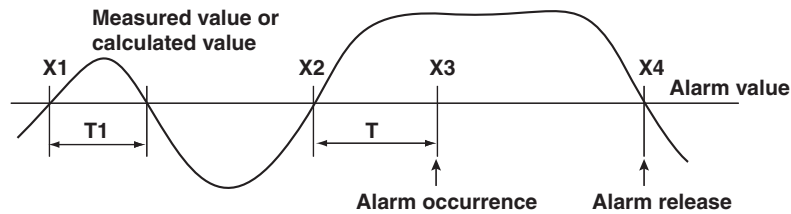
### Alarm Display

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).

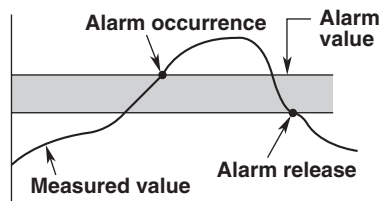
In the figure below, the measured value exceeds the alarm value during period T1, but no alarm is generated, because the condition does not last longer than the specified delay period T. At time X2, the input exceeds the alarm value. However, no alarm is generated, because the delay period has not elapsed.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



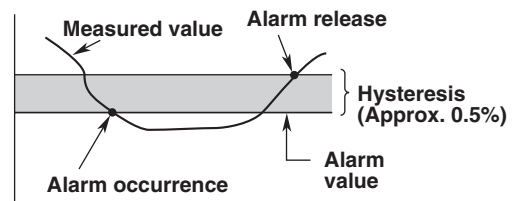
**Alarm Hysteresis**

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).

**When set to high**



**When set to low**



**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**

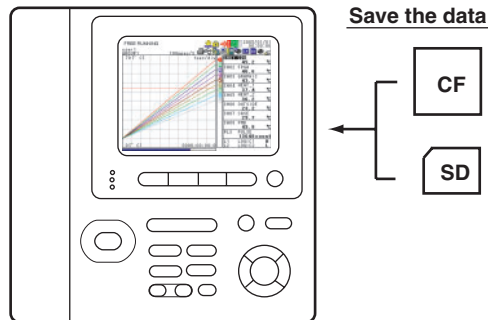
A buzzer can be sounded when an alarm occurs.

**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: 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: Binary
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

## 1.5 Data Save/Load Function and File Operation Function

### 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 SD card is supported only on the XL121, XL122, and XL124.
- 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

### Arithmetic Calculation

Arithmetic calculation on variables such as measured data and calculated data (the result of the 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 arithmetic calculation is executed every sampling interval. The available arithmetic calculations are addition, subtraction, multiplication, and division.

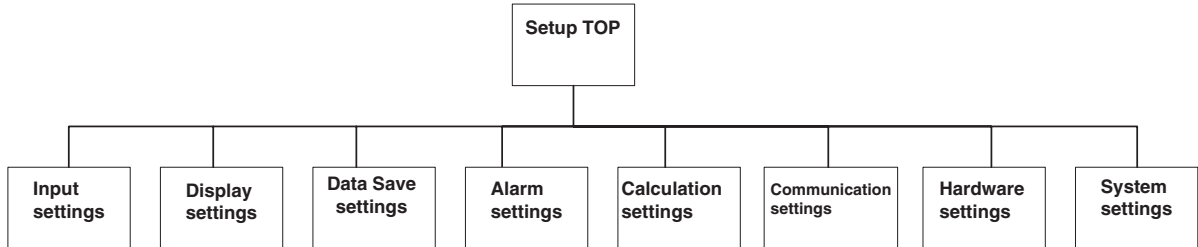
### Statistical Calculation

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 $i^{\text{th}}$ 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 $i^{\text{th}}$ 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.



## 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

▶▶▶CH01

TAG	
MODE	TC
RANGE	K
SPAN LOWER	-200.0
SPAN UPPER	1372.0
COLOR	RED
LINE WIDTH	1dot
AVERAGE	1

Set the tag. (max 8 characters)

▶▶ANALOG INPUT ◀ 2/2 2005/09/30 10:19:46

▶▶▶CH01

SCALING	ON
DECIMAL POINT	□.□□□□
SCALE LOWER	-3.0000
SCALE UPPER	3.0000
UNIT	TEMPERATURE
	°C
	°C

## INPUT > PULSE INPUT

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

▶▶INPUT ◀ 1/3 2006/01/01 00:00:00

▶▶▶PULSE INPUT

TAG	
MODE	INSTANTANEOUS
RANGE	
SPAN LOWER	0
SPAN UPPER	50000
COLOR	RED
LINE WIDTH	1dot

▶▶INPUT ◀ 2/3 2006/01/01 00:00:00

▶▶▶PULSE INPUT

SCALING	ON
DECIMAL POINT	□.□□□□
SCALE LOWER	-9.9999
SCALE UPPER	9.9999
CONV. EXPONENT	0
CONV. COEFFICIENT	1.0000
OFFSET EXPONENT	0
OFFSET COEFFICIENT	0.0000

## Input settings > Logic input settings

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

▶▶INPUT ◀ 2005/09/30 10:21:45

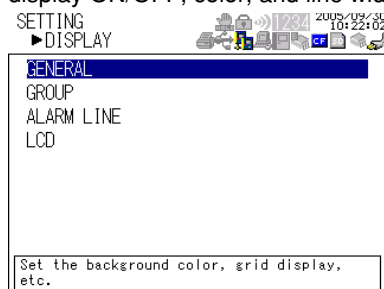
▶▶▶LOGIC INPUT

MODE	ON
L1 TAG	
COLOR	RED
LINE WIDTH	1dot
L2 TAG	
COLOR	GREEN
LINE WIDTH	1dot

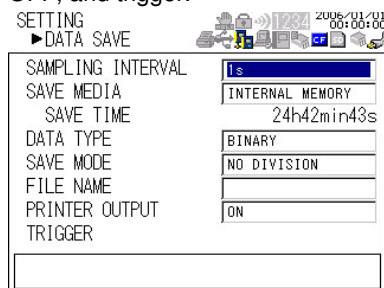


**DISPLAY**

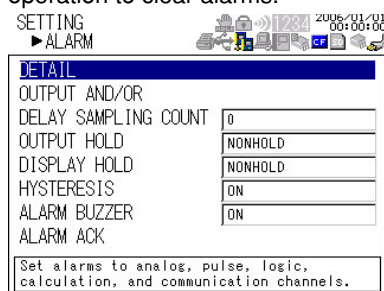
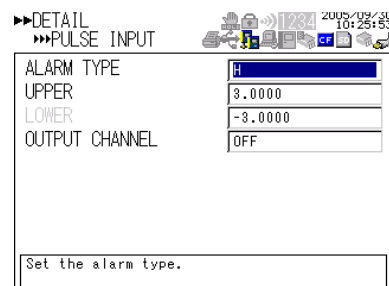
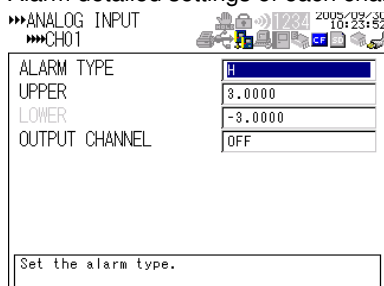
Specify general display settings (background color, grid, and bar graph base position), group settings (group name and channel assignments), alarm line settings (alarm line display ON/OFF, color, and line width), and LCD setting (LCD backlight auto OFF).

**DATA SAVE**

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

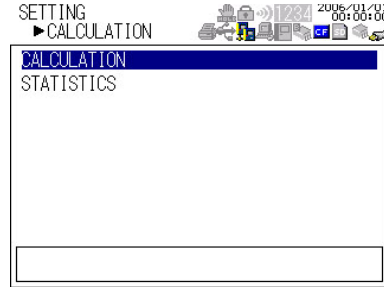
**ALARM**

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.

**Alarm detailed settings of each channel**

**CALCULATION**

Specify calculation settings (assignment of the calculation items 1 and 2, tag, calculation method, constant exponent, and constant coefficient, decimal place, span upper and lower values, unit, color, and line width) and statistical calculation settings (ON/OFF of each statistical calculation item).



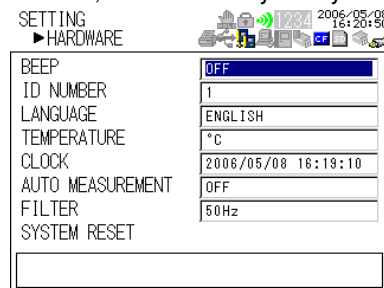
**COMMUNICATION**

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



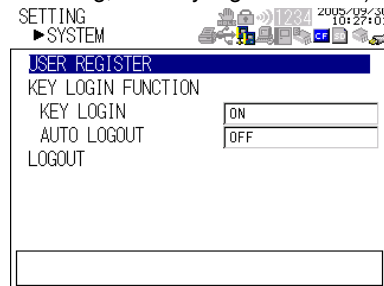
**HARDWARE**

Set the beep sound, ID number, display language, date/time, automated measurement function, and filter. Carry out system reset to reset the settings to their default values.



**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.



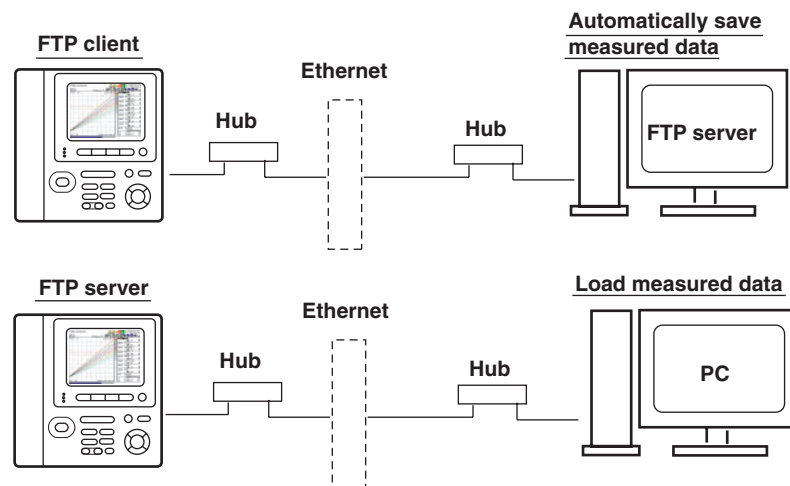
## 1.8 Communication Function

(Supported only on the XL121, XL122, and XL124)

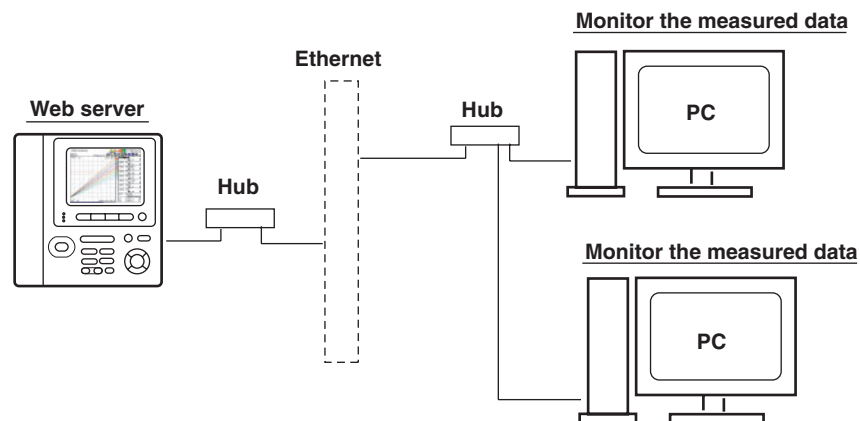
The XL100 comes standard with an Ethernet interface, USB interface, and serial interface (RS-232 and RS-485).

XL100 Communication Functions								
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			Standard protocol		HTTP	FTP	SMTP	
Lower layer protocol	MODBUS Protocol		Serial communication control	TCP				
				IP				
Upper interface	Serial		USB	Ethernet				
Lower interface	RS-232/RS-485			10BASE-T/100BASE-TX				

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.

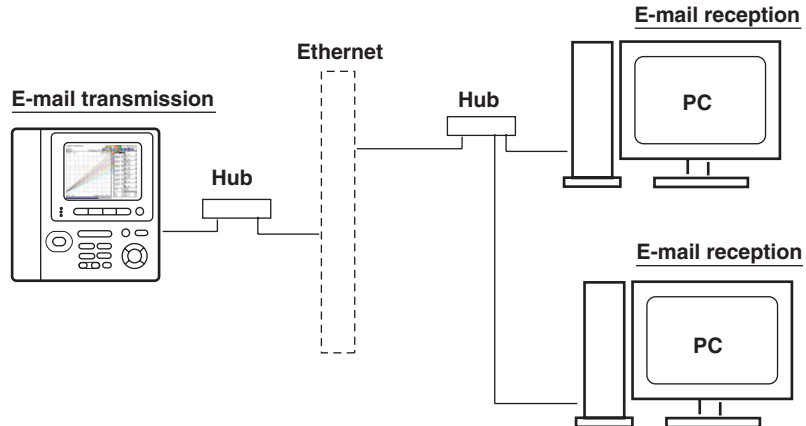


By configuring the XL100 to be a Web server, the XL100 screen can be shown on the PC. You can monitor the measured data and control the XL100 (for example, switch the display) from the PC.

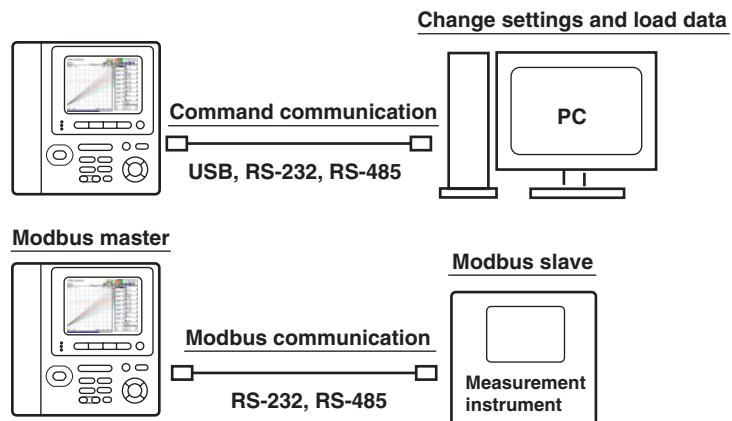


## 1.8 Communication Function

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 (Supported only on the XL121, XL122, and XL124)

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.

### 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 Functions All 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

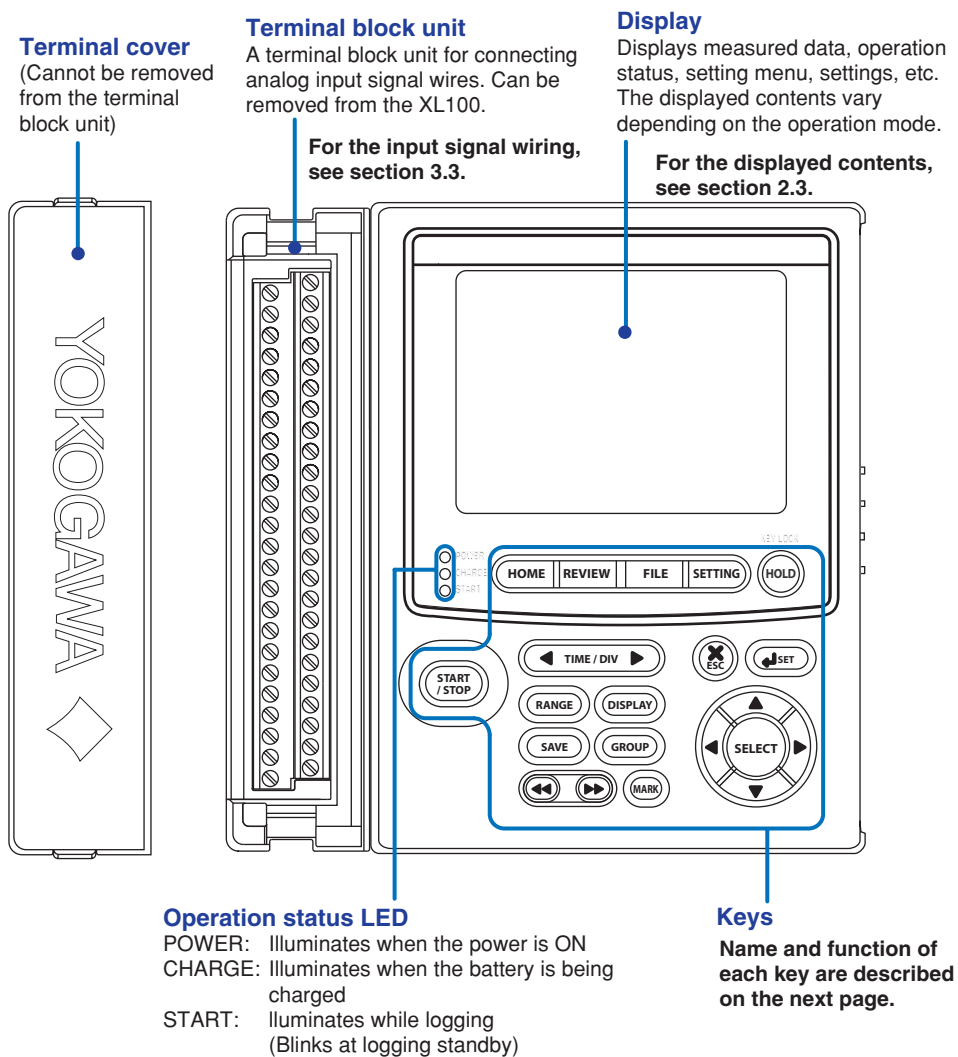
When the automated measurement function is turned ON, the XL100 automatically loads the ATRUN.SET file saved to the external storage medium (CF card, SD card, or USB memory) and starts the logging operation (data save operation). After the logging measurement is finished, the measured data that was saved is copied to the external storage medium. (The SD card is supported only on the XL121, XL122, and XL124.)

### 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

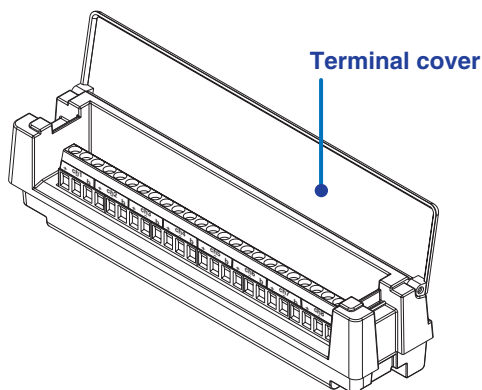


## Terminal Block Unit

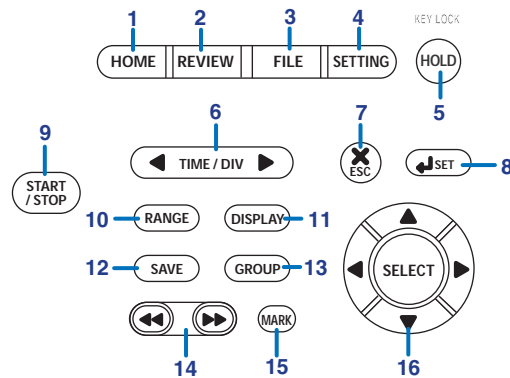
8 ch (95052): Clamp screw

16 ch (95053): Clamp screw

16 ch (95055): M3 screw



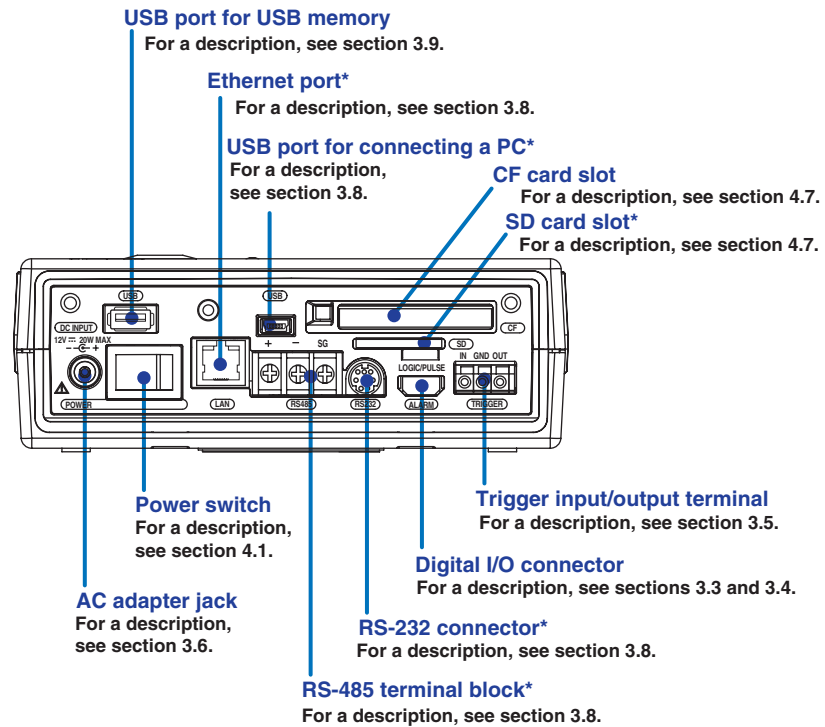
Keys



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 enter the setting mode and set 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.

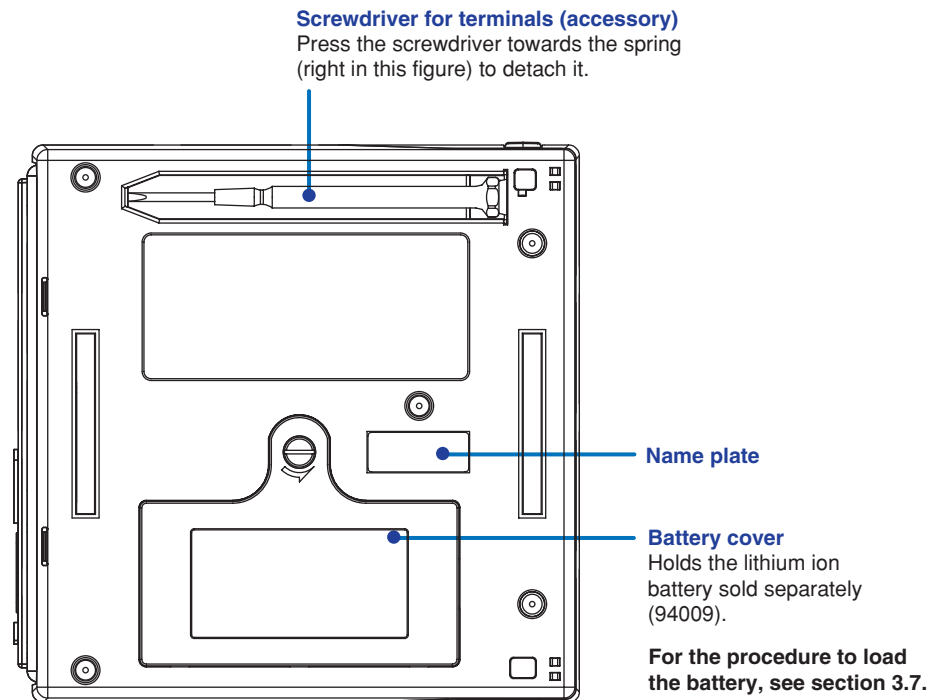
## 2.2 Side Panel and Rear Panel

### Side Panel



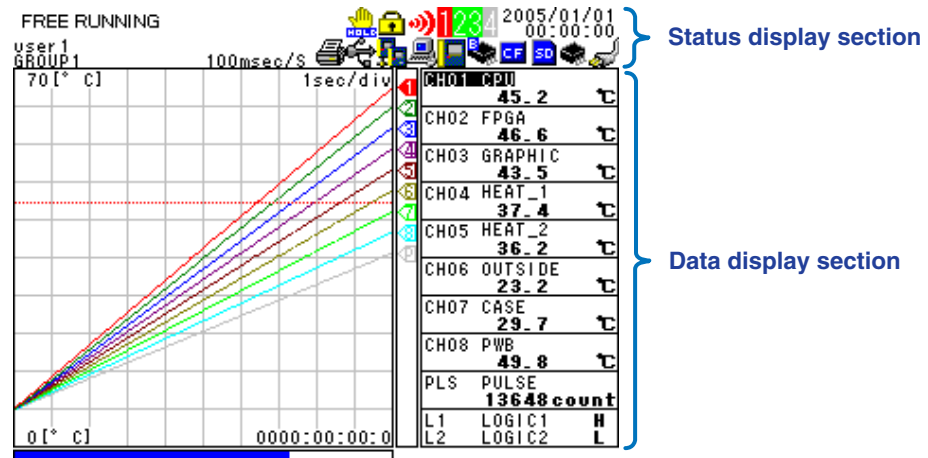
\*Supported only on the XL121, XL122, and XL124.

### Rear Panel

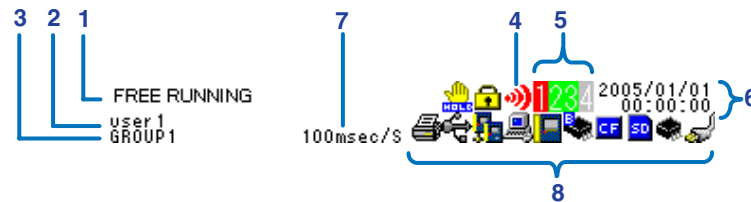




## 2.3 Data Display



### Status Display Section



#### 1. Operation Mode

Displays the mode name: Free Running, Logging, Logging & Review, Setup, or File Operation. For Logging and Logging & Review modes, the text background turns light blue to indicate that logging is in progress.

#### 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 output setting
- Yellow-green: Alarm output 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 "xxxyyy/S" (where xxx is 1, 2, 5, 10, 20, 30, 100, 200, or 500 and yyy 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 internal memory and the save mode is set to DIVISION. The icon blinks when there is access to the internal memory.
-  An icon shown when the data save destination is set to internal memory and the memory full operation is set to REPEAT. The icon blinks when there is access to the internal memory.
-  An icon shown when the data save destination is set to internal memory and the memory full operation is set to DELETE. The icon blinks when there is access to the internal memory.
-  An icon shown when the data save destination is set to internal memory, the save mode is set to DIVISION, and the memory full operation is set to REPEAT. The icon blinks when there is access to the internal memory.
-  An icon shown when the data save destination is set to internal memory, the save mode is set to DIVISION, and the memory full operation is set to DELETE. The icon blinks when there is access to the 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 CF card and the save mode is set to DIVISION. The icon blinks when there is access to the CF card.
-  An icon shown when the data save destination is set to CF card and the memory full operation is set to REPEAT. The icon blinks when there is access to the CF card.
-  An icon shown when the data save destination is set to CF card and the memory full operation is set to DELETE. The icon blinks when there is access to the CF card.
-  An icon shown when the data save destination is set to CF card, the save mode is set to DIVISION, and the memory full operation is set to REPEAT. The icon blinks when there is access to the CF card.
-  An icon shown when the data save destination is set to CF card, the save mode is set to DIVISION, and the memory full operation is set to DELETE. The icon blinks when there is access to the 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. (Supported only on the XL121, XL122, and XL124.)
-  An icon shown when the data save destination is set to SD card and the save mode is set to DIVISION. The icon blinks when there is access to the SD card. (Supported only on the XL121, XL122, and XL124.)

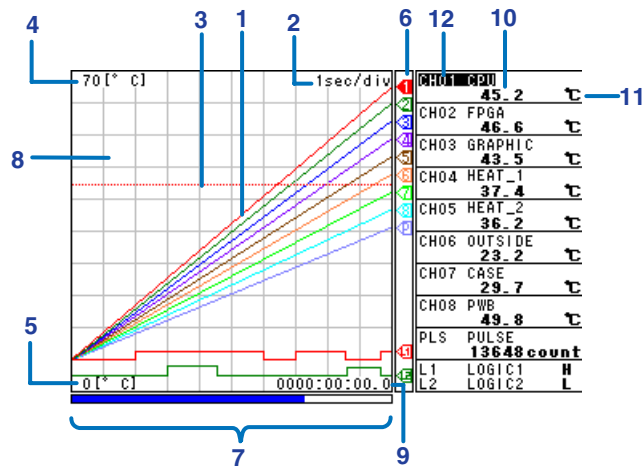
## 2.3 Data Display

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-  An icon shown when the data save destination is set to SD card and the memory full operation is set to REPEAT. The icon blinks when there is access to the SD card. (Supported only on the XL121, XL122, and XL124.)
-  An icon shown when the data save destination is set to SD card and the memory full operation is set to DELETE. The icon blinks when there is access to the SD card. (Supported only on the XL121, XL122, and XL124.)
-  An icon shown when the data save destination is set to SD card, the save mode is set to DIVISION, and the memory full operation is set to REPEAT. The icon blinks when there is access to the SD card. (Supported only on the XL121, XL122, and XL124.)
-  An icon shown when the data save destination is set to SD card, the save mode is set to DIVISION, and the memory full operation is set to DELETE. The icon blinks when there is access to the SD card. (Supported only on the XL121, XL122, and XL124.)
-  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, LAN/RS-232, or LAN/RS-485. For other cases, the icon is gray. (Supported only on the XL121, XL122, and XL124.)
-  An icon shown when the interface is set to USB. For other cases, the icon is gray. (Supported only on the XL121, XL122, and XL124.)
-  An icon shown when the communication protocol is set to Modbus (slave). The icon is gray when set to Modbus (master). (Supported only on the XL121, XL122, and XL124.)
-  An icon shown when the communication protocol is set to Modbus (master). The icon is gray when set to Modbus (slave). (Supported only on the XL121, XL122, and XL124.)
-  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. (Supported only on the XL121, XL122, and XL124.)
-  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. (Supported only on the XL121, XL122, and XL124.)
-  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 &amp; 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 "xyyy/div" (where xx is the value and yyy is sec, min, or h).

## 3. Alarm Line

Displayed with a dotted line using a specified color 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 "www:xx:yy:z" (where www 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.

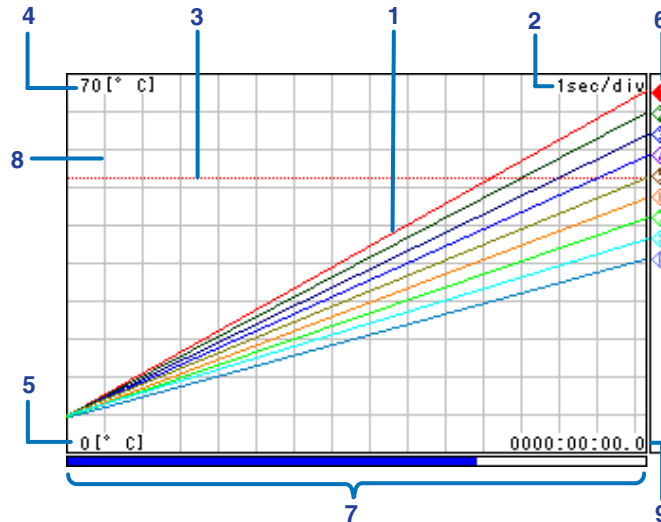
**11. Unit**

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 “xyyy/ div” (where xx is the value and yyy is sec, min, or h).

**3. Alarm Line**

Displayed with a dotted line using a specified color 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**

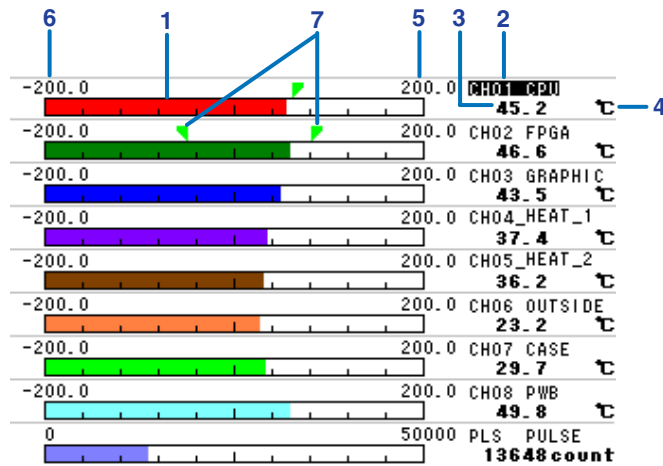
The grid can be turned ON/OFF.

**9. Elapsed Time**

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



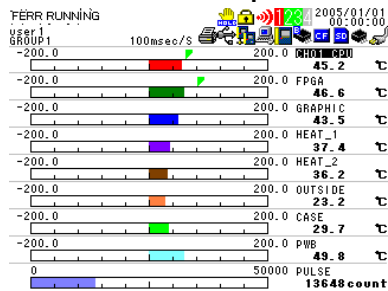
**Bar Graph Display**



**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.

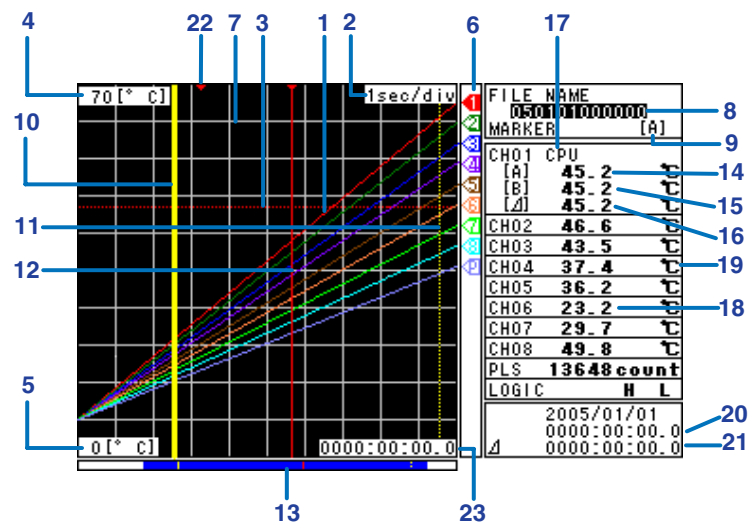
**6. Scale Lower Limit**

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 dotted line using a specified color 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 "www:xx:yy:z" (where www 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 "www:xx:yy:z" (where www is the hour, xx is the minute, yy is the second, and z is one-tenth of a second).

**22. Alarm Mark**

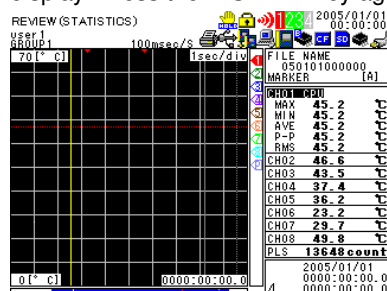
Displayed at the position where the alarm occurred.

**23. Measurement Time**

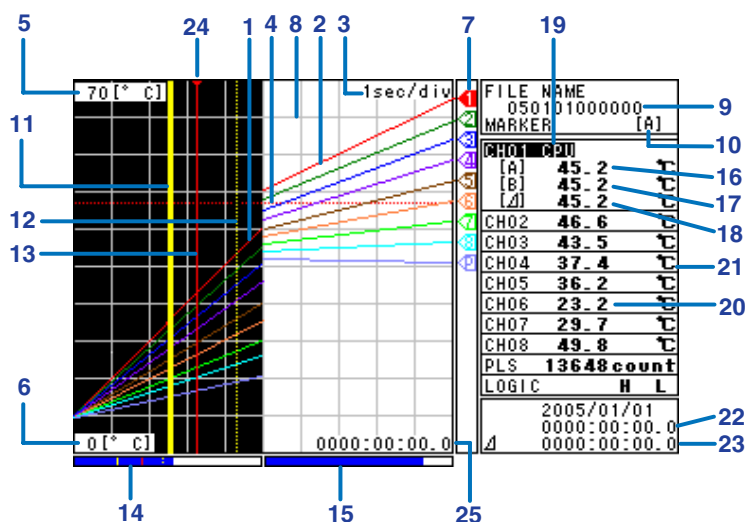
The total measurement time of the data being reviewed is displayed in the format "www:xx:yy:z" (where www is the hour, xx is the minute, yy is the second, and z is one-tenth of a second).

**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 &amp; 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 "xyyy/div" (where xx is the value and yyy is sec, min, or h).

**4. Alarm Line**

Displayed with a dotted line using a specified color 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 "www:xx:yy:z" (where www 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 "www:xx:yy:z" (where www 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 "www:xx:yy:z" (where www is the hour, xx is the minute, yy is the second, and z is one-tenth of a second).



**Log (Key Login/Logout) Display**

03/03	Date	I/O	User No.	User name
2005/01/01 00:00:00	In	01	user1	
2005/01/01 10:00:00	Out			
2005/01/01 12:00:00	In	01	user1	

**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**

02/02	Date	I/O	Message
2005/01/01 00:00:00	01	>	xxxx
2005/01/01 00:00:00	01	>	xxxxxxxx

**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 200\*).

\* If the total number of logs exceeds 200, 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**

No.	Date	Err. No.	Err. code	Tag	File name
02/02	2005/01/01 00:00:00	100	HOSTNAME	P	XXXXXXXX.SET
	2005/01/01 00:00:00	100	HOSTNAME	S	XXXXXXXXX.LOG

**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**

No.	Date	Request	Parameter
15/15	2007/01/09 05:59:50	KEY	ESC
	2007/01/09 06:00:45	KEY	RANGE
	2007/01/09 06:00:41	KEY	SELECT
	2007/01/09 06:00:38	KEY	SELECT
	2007/01/09 06:00:35	KEY	DISPLAY
	2007/01/09 06:00:19	KEY	ESC
	2007/01/09 06:00:15	KEY	RANGE
	2007/01/09 06:00:06	KEY	HOME
	2007/01/09 06:00:03	KEY	FILE
	2007/01/09 06:00:00	KEY	SETTING
	2007/01/09 05:59:56	KEY	SELECT
	2007/01/09 05:59:53	KEY	UP
	2007/01/09 05:59:42	KEY	ESC
	2007/01/09 05:59:37	KEY	SELECT
	2007/01/09 05:59:32	KEY	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\*).

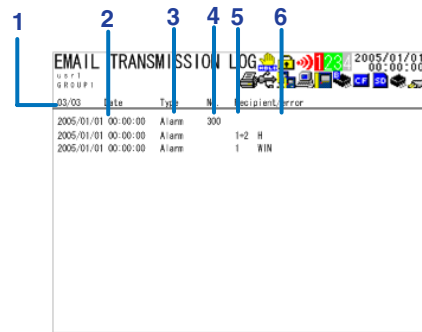
\* If the total number of logs exceeds 50, the log is deleted from the oldest one.

**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



Log No.	Date	Type	No.	Recipient	Error
300	2005/01/01 00:00:00	Alarm		1	
1	2005/01/01 00:00:00	Alarm		2	
1	2005/01/01 00:00:00	Alarm		NIN	

**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, system, 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.”

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**Note**

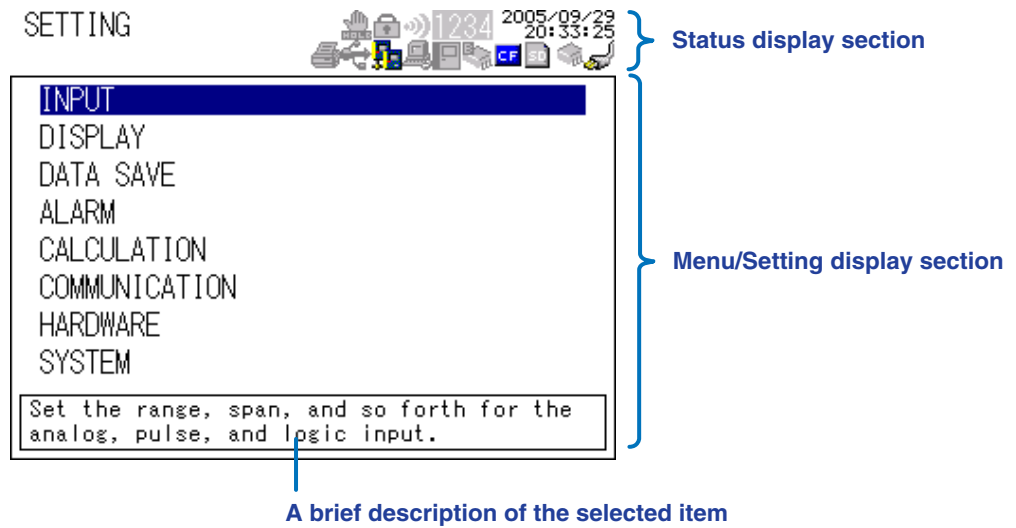
The following displays are supported only on the XL121, XL122, and XL124.

Log (Communication command) display, log(FTP client) display, Log (Web operation) display, and log (E-mail transmission) display

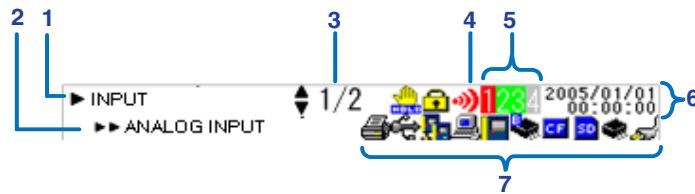
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## 2.4 Setup Display



### Status Display Section



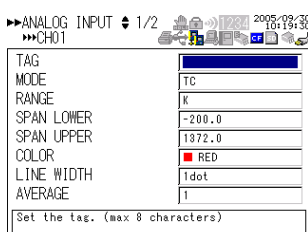
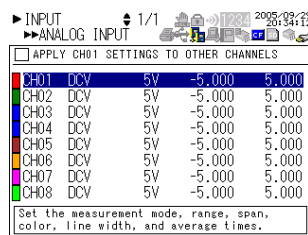
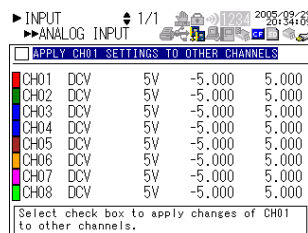
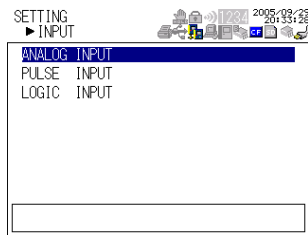
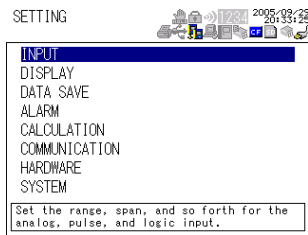
1. **Setup Item 1**  
Displays the item that is one level higher than the current item that you are setting.
2. **Setup Item 2**  
Displays the current item that you are setting.
3. **Page**  
Displays “the current page number/total number of pages” when there are multiple pages of the setup display.
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 output setting  
 Yellow-green: Alarm output 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.



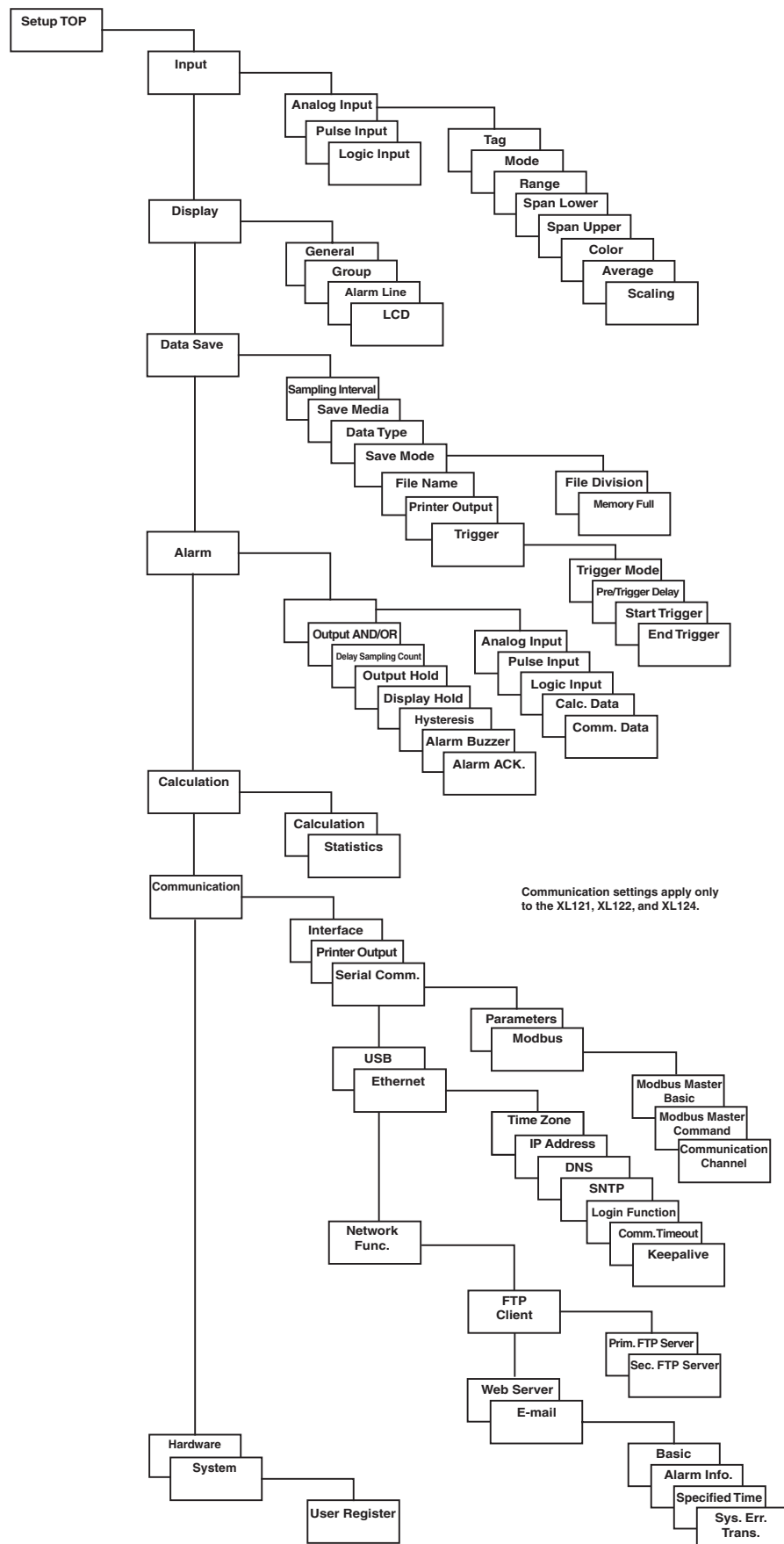
## 2.4 Setup Display

### 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 (0 to 40°C when battery driven)
- 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.

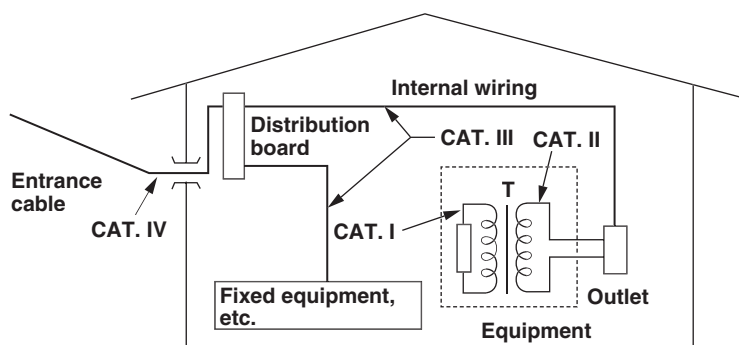


### WARNING

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

#### Measurement Category

Measurement Category	Description	Remarks
I	CAT. I For measurement performed on circuits not directly connected to MAINS.	
II	CAT. II For measurement performed on circuits directly connected to the low voltage installation.	Appliances, portable equipments, etc.
III	CAT. III For measurement performed in the building installation.	Distribution board, circuit breaker, etc.
IV	CAT. IV For measurement performed at the source of low-voltage installation.	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  $23 \pm 5^{\circ}\text{C}$  temperature range and  $55 \pm 10\%$  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  $50^{\circ}\text{C}$  and a relative humidity between 5 to 85% RH.
- When storing the XL100, avoid a location that is:
  - exposed to direct sunlight,
  - $60^{\circ}\text{C}$  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 wiring 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<sup>2</sup> 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**  
100 mV, 500 mV, and 1 V range and TC input:  $\pm 10$  VDC  
5 V, 10 V, 50 V, and 1-5V/f.s. range:  $\pm 60$  VDC
  - **Maximum common mode noise voltage**  
30 VACrms (50/60 Hz) or  $\pm 60$  VDC
- 
-

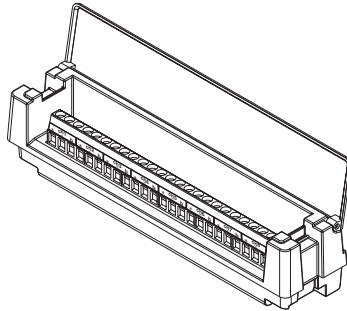
**Terminal Block Unit**

The following two types of terminal block units are available.

8 ch (95052): Clamp screw

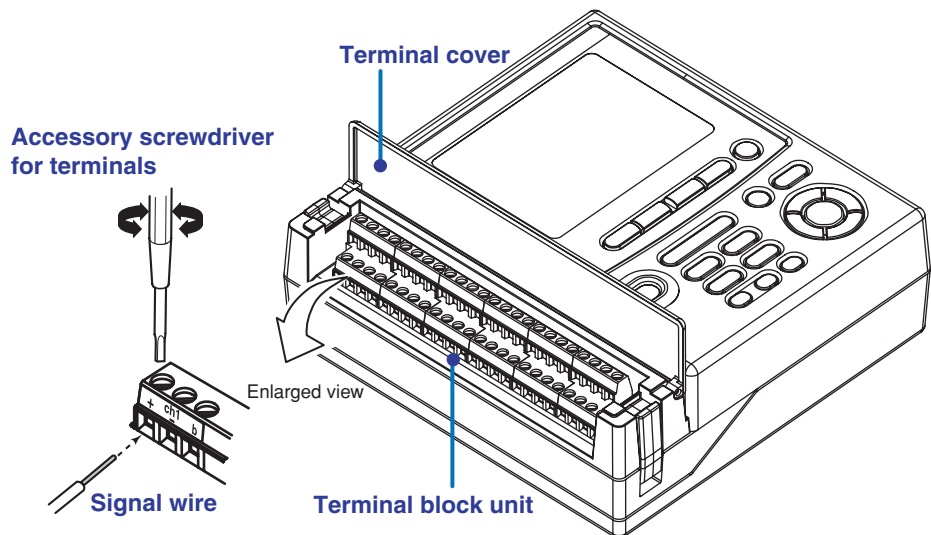
16 ch (95053): Clamp screw

16 ch (95055): M3 screw

**Wiring Procedure**

<Clamp screw>

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.

**Note**

For clamp terminals, use wires of the following specifications.

- **Conductive cross-sectional area for single wire: 0.14 mm<sup>2</sup> to 2.5 mm<sup>2</sup>, stranded wire: 0.14 mm<sup>2</sup> to 1.5 mm<sup>2</sup>**  
**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.**

<M3 screw>

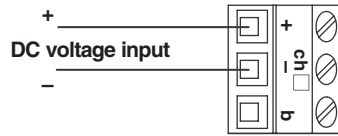
Use a driver sold commercially when using the M3 screws terminal block unit (crimp-on lugs or the like).

(Do not use the accessory screwdriver for terminals (for clamp terminals).)

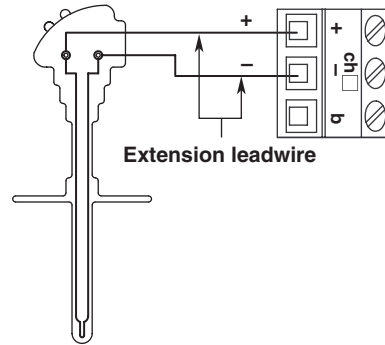
### 3.3 Wiring the Input Signal Cable

#### Wiring Diagram

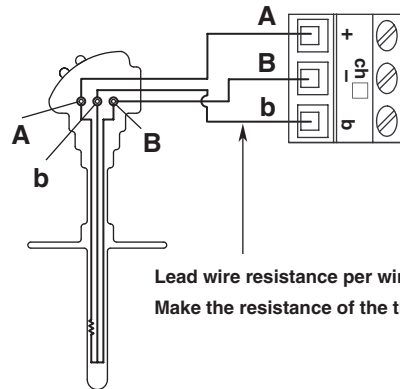
##### DC voltage input



##### TC input

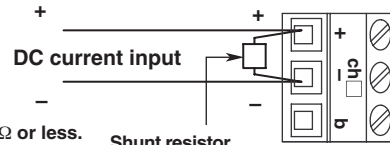


##### RTD input



Lead wire resistance per wire of 10  $\Omega$  or less.  
Make the resistance of the three wires equal.

##### DC current input



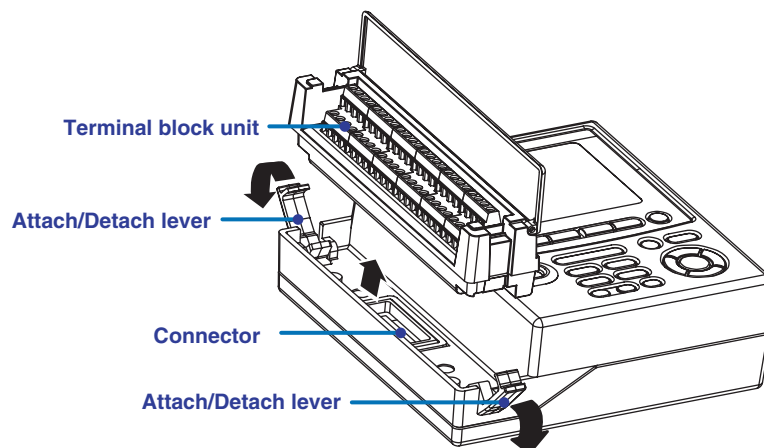
Shunt resistor  
Example: For 4 to 20 mA input, use a  
shunt resistor of 250  $\Omega \pm 0.1\%$ .

#### Note

- RTD input terminals A (+) and B (-) are isolated on each channel. Terminal b is shorted internally across all channels.
- RTD input cannot be used on the M3 screws terminal block unit.

#### 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.



#### 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.



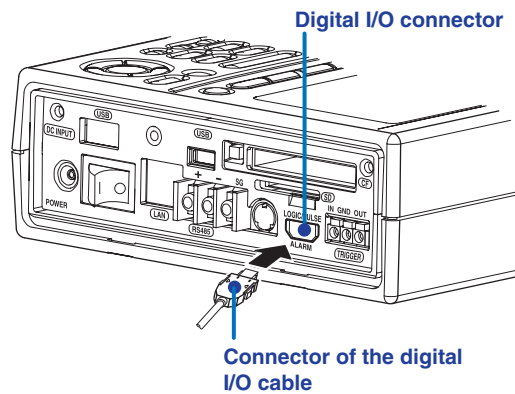
## 3.4 Wiring the Pulse Input, Logic Input, and Signal Cables

### CAUTION

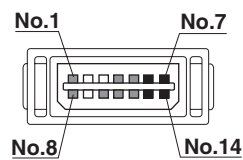
- Do not apply an input exceeding the following values.  
Pulse input or logic input: 10 V. Alarm output: 40 V
- If a strong tension is applied to the cable wired to the terminal, the terminals and/or the cable can be damaged. Allow extra wire for the input signal cable so that direct tension is not 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.



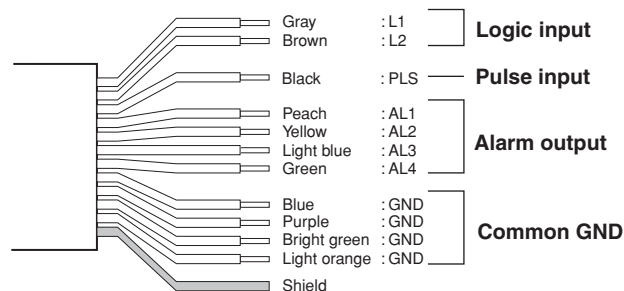
#### Connector Pin Arrangement



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.



#### Output Signal Specifications

5-V pull-up resistance 100 k $\Omega$

Contact capacity: 5 to 40 V, 100 mA

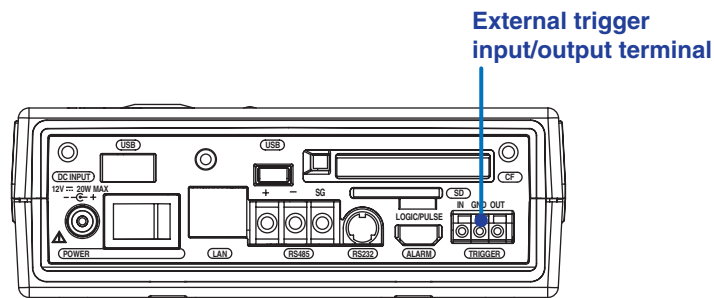
## 3.5 Wiring the External I/O Signal Cables

### 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.

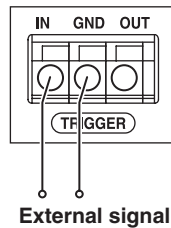
#### Position of the External Trigger I/O Terminal

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



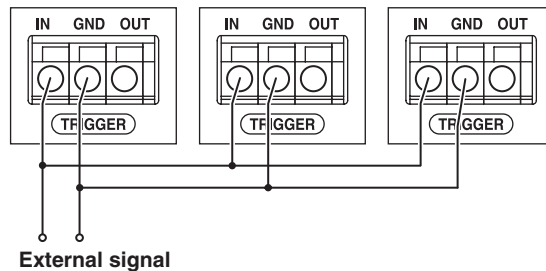
#### Wiring Diagram

- When applying a trigger input signal to a single station



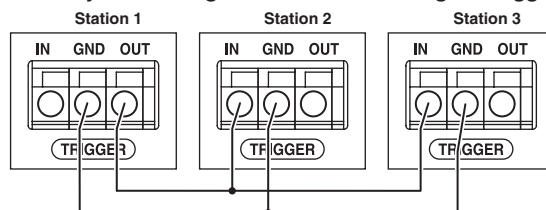
External signal

- 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).

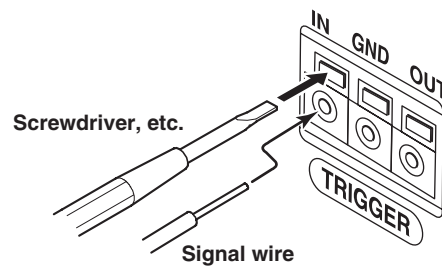
- Input level: Low 0.0 to 0.8 V. High 2.0 to 5.0 V
- Allowable voltage: -0.5 to 10 V

**Signal Wires That Can Be Used**

- Compliant wire Single wire:  $\phi 1.0$  (AWG 18). Stranded wire:  $0.75 \text{ mm}^2$
- Allowable wire Single wire:  $\phi 0.4$  to  $1.0$  (AWG 26 to 18)  
Stranded wire:  $0.3$  to  $0.75 \text{ mm}^2$  (AWG 22 to 20)  
Stranded wire diameter:  $\phi 0.18$  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.

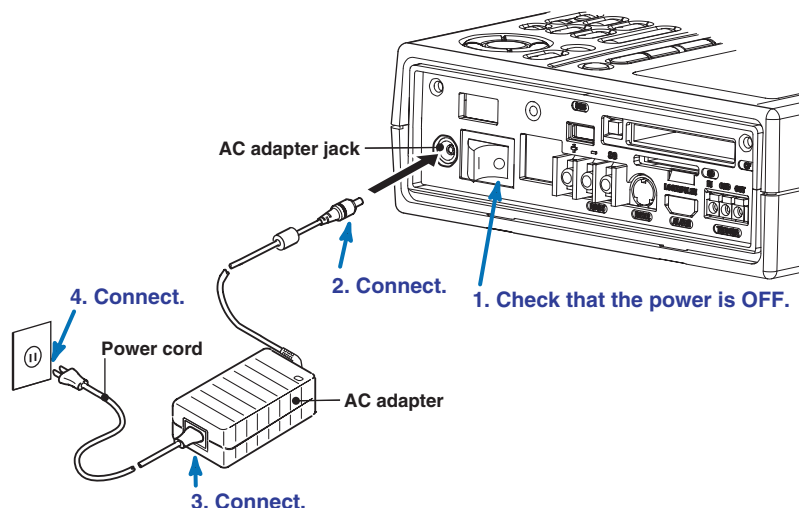
### Connecting the AC Adapter

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

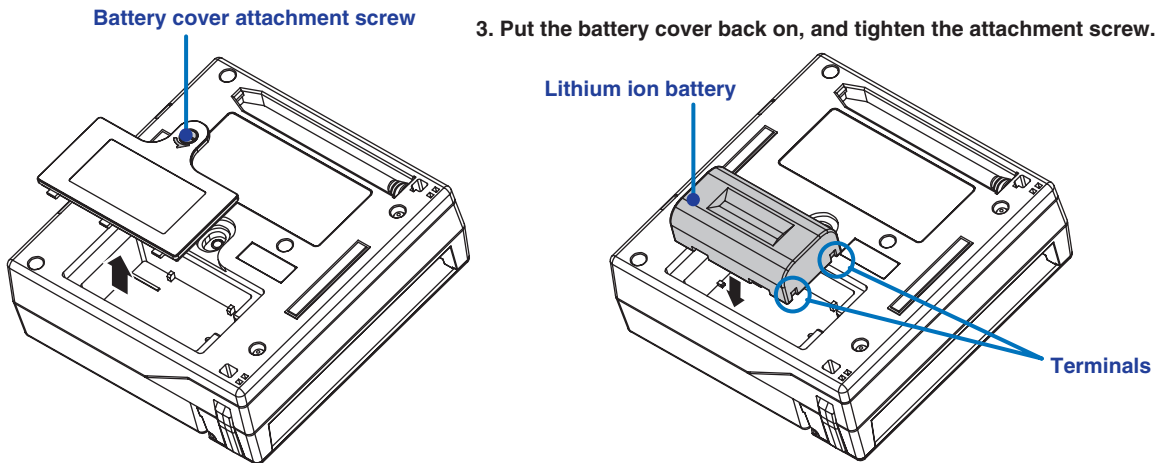


## 3.7 Handling of the Lithium Ion Battery (Sold Separately)

### 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.



### Charging the Battery

#### CAUTION

- Be sure to charge the battery with the XL100.
- For safety reasons, the battery is charged only when the ambient temperature is between +10 and +35°C. Beware that the battery may not be charged even when an AC adapter is connected.

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.



#### 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.



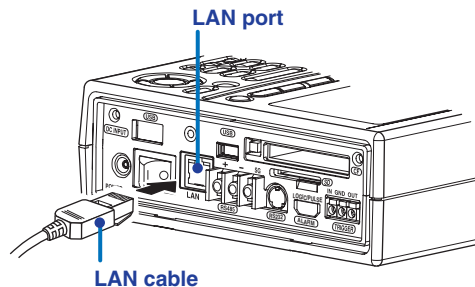
## 3.8 Connecting Communication Cables

(Supported only on the XL121, XL122, and XL124)

### Connecting to the Ethernet Interface

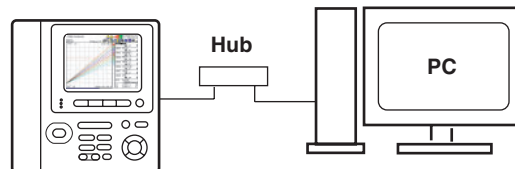
#### LAN Port Position and LAN Cable Connection

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



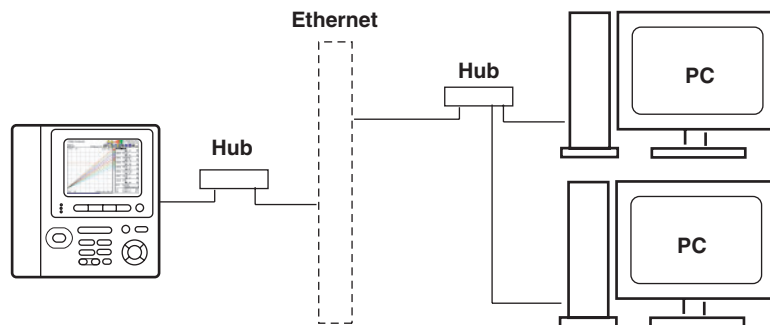
#### When Connecting Only the XL100 and the PC

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.



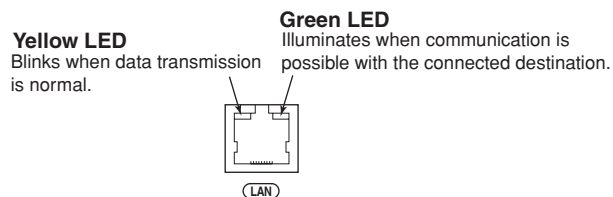
#### When Connecting to an Existing Network

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.



#### Checking the Communication Status

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



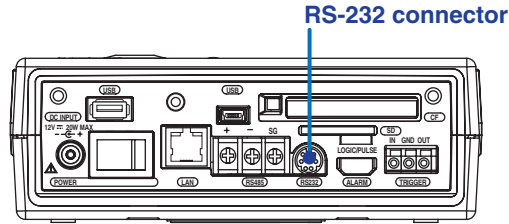
#### Note

If the interface is not set to LAN, LAN/RS-232, or LAN/RS-485, do not connect the LAN cable.

Connecting the Serial Interface

RS-232

- Position of the RS-232 Connector

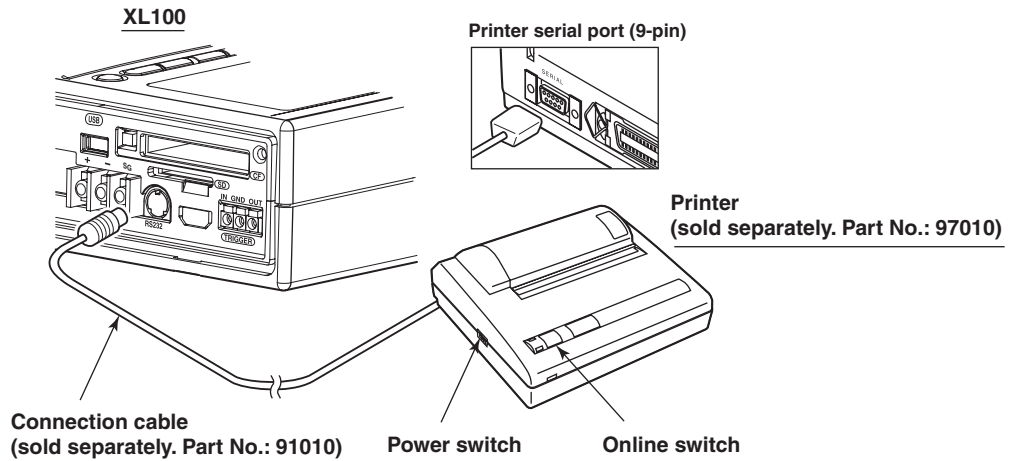


- Connector type: Mini DIN, 8 pins
- Connector pin arrangement

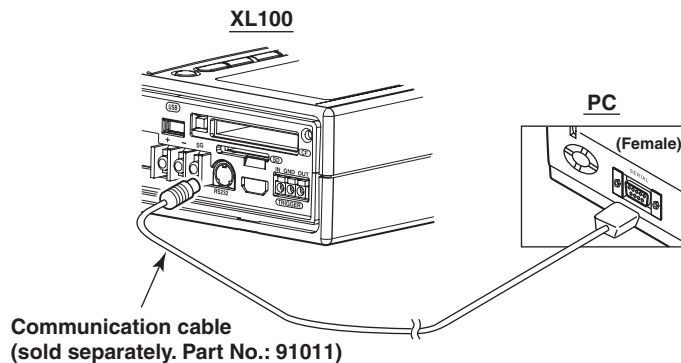
Pin Number	Signal Name	Meaning
1	CS (Clear to Send)	Handshaking signal when transmitting data to the connected device. This is an input signal to the XL100.
2	RD (Received Data)	Received data from the connected device. This is an input signal to the XL100.
3	RS (Request to Send)	Handshaking signal when 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

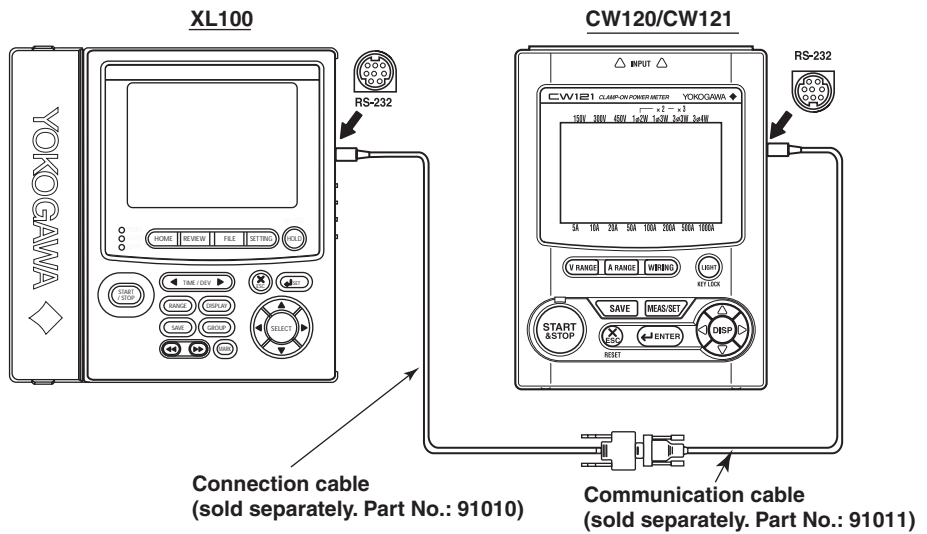


- Connecting to the PC



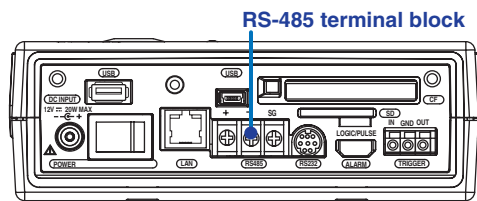
### 3.8 Connecting Communication Cables

- 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.



#### For RS-485

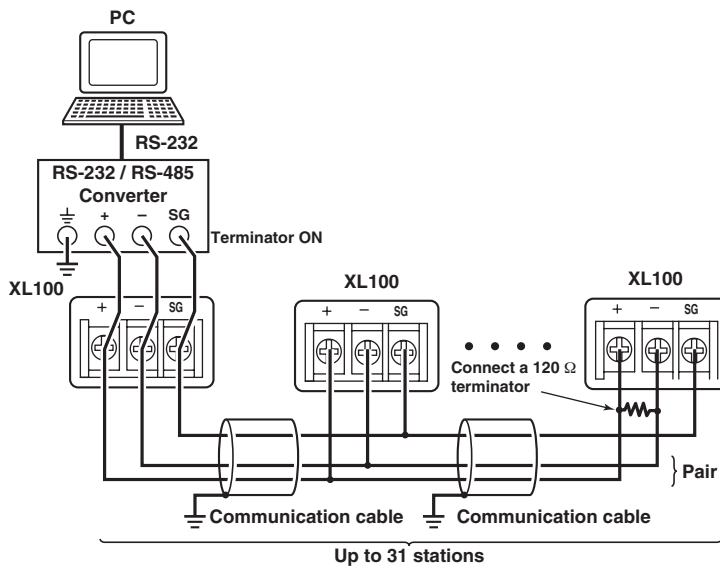
- Position of the RS-485 Terminal Block



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

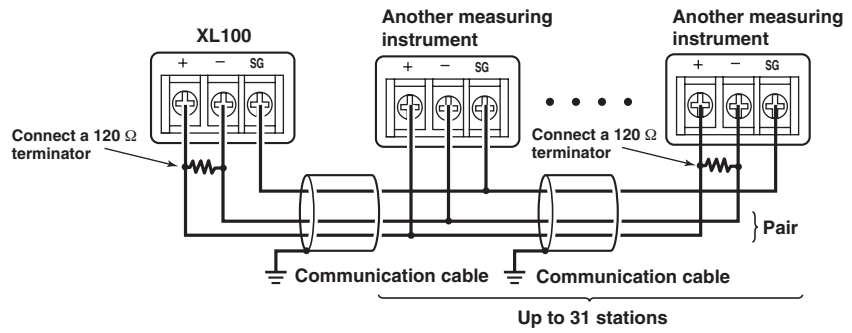
Signal Name	Meaning
+	Data (+).
-	Data (-).
SG (Signal Ground)	Signal ground.

- Connection methods
  - Connecting to the PC





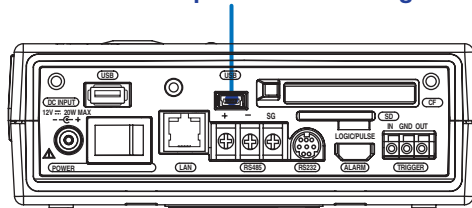
- Connecting to a measuring instrument (Modbus communication)



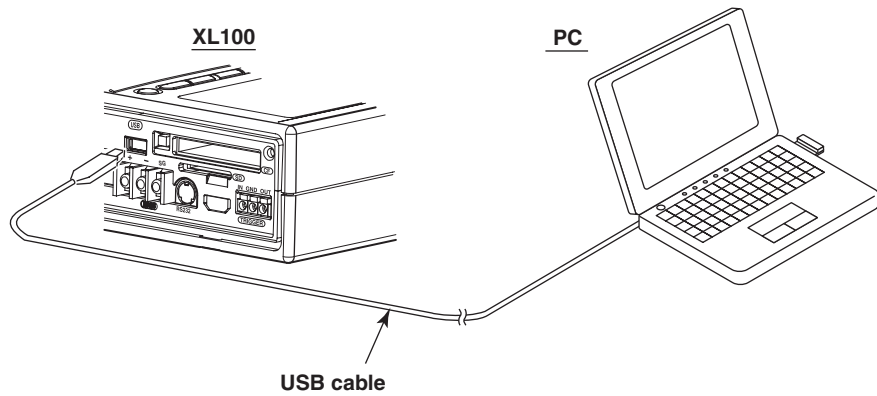
**USB**

- 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



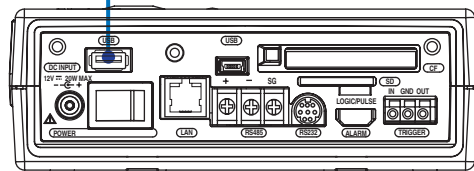
## 3.9 Connecting the USB Memory

### 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



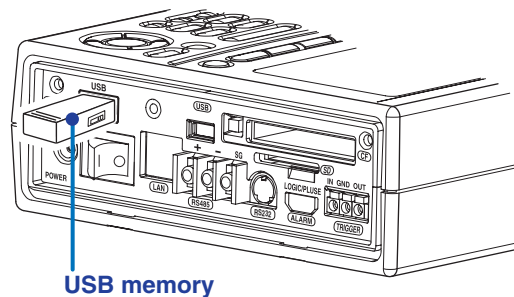
#### Specifications of the USB port for the USB memory

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.



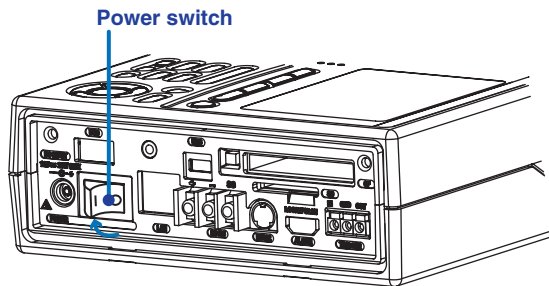
# 4.1 Turning ON/OFF the Power Switch

## 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”).

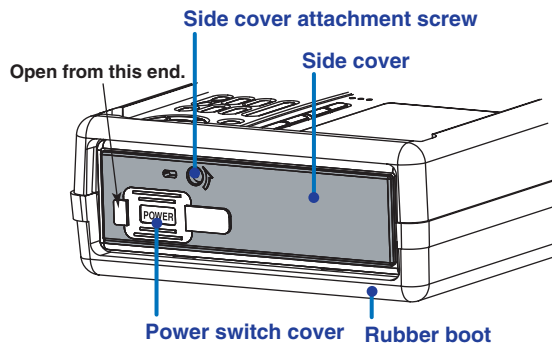
## Location of the Power Switch and ON/OFF Operation

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 Operation When the Side Cover Is Attached (The side cover is supplied only with the XL121, XL122, and XL124.)

You can operate the power switch with the rubber boot and side cover attached by opening the power switch cover. When attaching the accessory side cover, fasten the side cover attachment screw to fix the cover to the XL100.



### Note

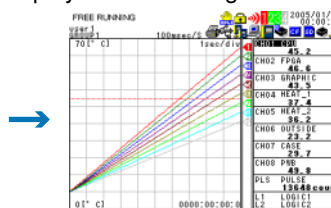
- To accurately measure the signals, let the XL100 warm up at least 30 minutes after turning the power switch ON.
- When turning the power OFF, check that the external storage medium is not being accessed.

## Display at Power-On

When the power is turned ON, the XL100 shows a startup screen followed by the self-test screen. If the self-test completes normally, the XL100 shows “Self Test OK” followed by the Waveform & Digital display of free running mode.

```

XL100 Ver 3.00
FPGA Check OK
SDRAM Check OK
Flash Disk Check OK
RTC Check OK
EEPROM1 Check OK
EEPROM2 Check OK
Settings Check OK
Input Channel:8CH
Self Test OK
    
```



## 4.1 Turning ON/OFF the Power Switch

- **If 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 the message “Self Test Confirm Push any key” 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 the message “Self Test NG” 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	FPGA Check Error	A major hardware error.
SDRAM	SDRAM Check Error	Contact your vendor for repairs.
Flash Disk	Flash Disk Unformatted → Flash Disk Formatting → Flash Disk Format Completed	The Flash file is not formatted. The XL100 automatically formats it.*
	Flash Disk Recovered	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	EEPROM1 Initialized	There is a problem with the internal data, and the XL100 will not function properly. Contact your vendor for repairs.
	EEPROM1 Initialized(Invalid Data)	
EEPROM2	EEPROM2 Initialized	There is a problem with the internal data, and the XL100 will not function properly. Contact your vendor for repairs.
	EEPROM2 Initialized (Check Sum Error)	
Setting	Settings Initialized	An error in the internal settings. The XL100 automatically initializes. If this error appears every time, contact your vendor for repairs. (All settings are initialized.)
	Invalid Settings Corrected	
	Settings Initialized (Terminal changed)	The terminal block was changed. The XL100 automatically initializes. Settings that are initialized are those related to the terminal block change. For details, see appendix 2.

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

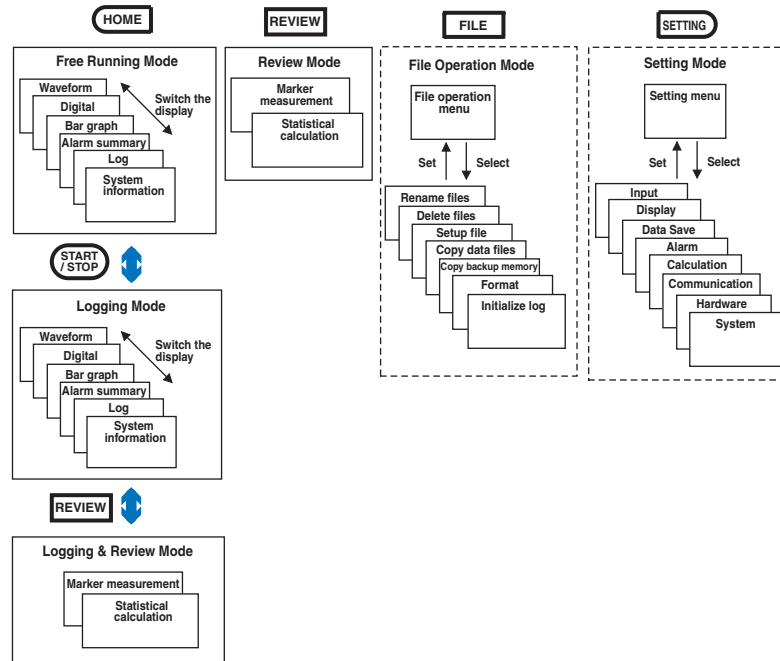
### TIP

- If you change the terminal block (if the number of channels changes), the settings are initialized. The previous setting data (setting data before the terminal block is changed) is automatically stored to the setting memory to a file named “year month date hour minute second Cxx.SET” (where Cxx is C08 for the 8ch terminal block and C16 for the 16ch terminal block).
  - If you need the previous setting data, load the stored setting file using the SETUP FILE menu in the file operation mode.
-

## 4.2 Basic Key Operations

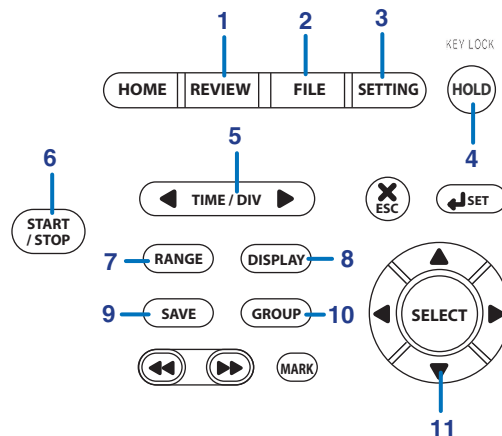
### Operation Mode and Key Operations

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

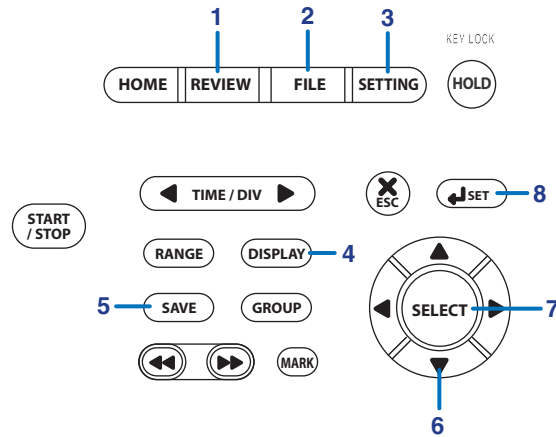
Switches the channel display group each time you press the key in the following order: Group 1, Group 2, Group 3, Group 4, Group 1, and so on.

### 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 (valid only when the data type is binary for inputs other than logic input).

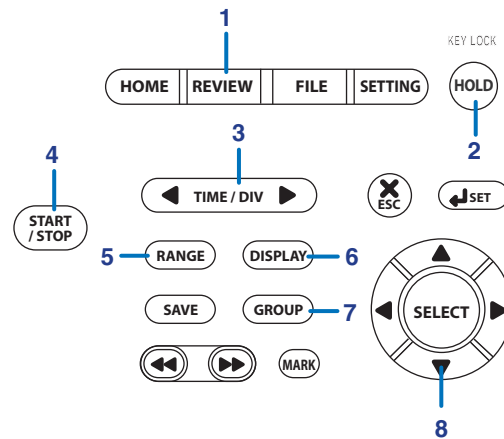
**8. SET key**

The Alarm ACK window is displayed when displaying the alarm summary. Pressing the SET key with this window displayed executes alarm ACK, and the alarm hold is released.



## 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 display span settings can be changed while the logging operation is in progress.

### 6. DISPLAY Key

Displays a pop-up menu for switching the display.

### 7. GROUP Key

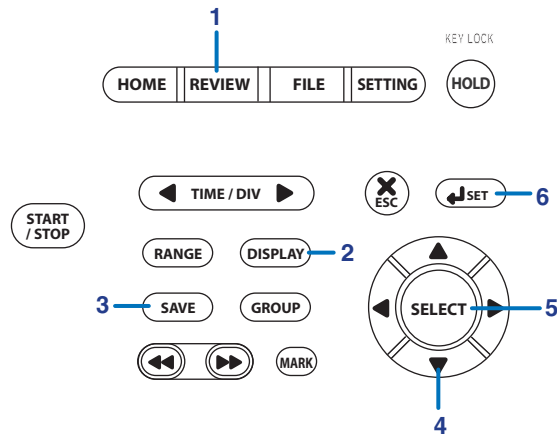
Switches the channel display group each time you press the key in the following order: Group 1, Group 2, Group 3, Group 4, Group 1, and so on.

### 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. DISPLAY Key**

Displays a pop-up menu for switching the display.

**3. 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).

**4. 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.

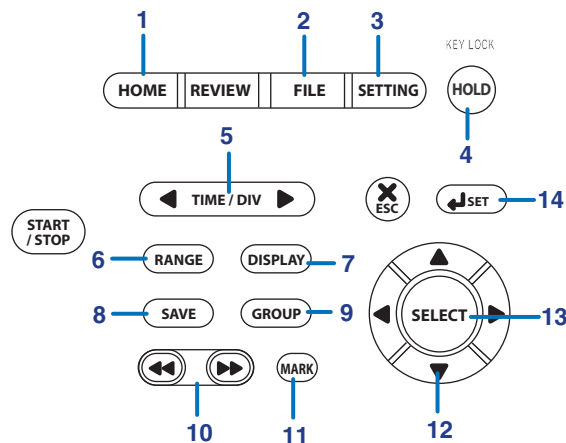
**5. SELECT Key**

Shows the review display containing the selected alarm information when displaying the alarm summary (valid only when the data type is binary for inputs other than logic input).

**6. SET key**

The Alarm ACK window is displayed when displaying the alarm summary. Pressing the SET key with this window displayed executes alarm ACK, and the alarm hold is released.

## 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**  
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 span on the active (selected) channel.
- 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 (screen data) of the marker section (A for A&B) currently active.
- 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.

## 4.2 Basic Key Operations

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### 13. **SELECT Key**

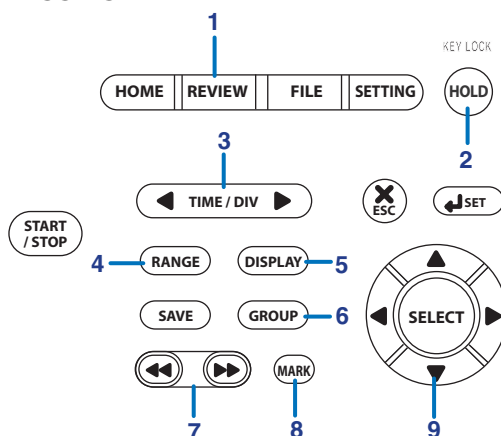
Displays the review file load window when the SELECT FILE box is selected.

### 14. **SET key**

Pressing the SET key calculates statistics between cursors A and B when displaying statistics.

(The statistics between logging start and logging stop are displayed immediately after the screen is switched.)

## Key Operations in Logging &amp; 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).<sup>\*1</sup>
4. **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.
5. **DISPLAY Key**  
Switches between the marker display and statistical calculation display each time you press the key.
6. **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.
7. **Fast Forward Key**  
Moves the active marker left or right by 1 division.
8. **MARK Key**  
Switches the active marker in the following order: A, B, A&B, and ALM.
9. **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.

### CAUTION

#### TIME/DIV Setting

In Logging & Review Mode, time axis settings that would cause over 1000 sampled data points to be displayed in the screen that shows the past measured data are not allowed.

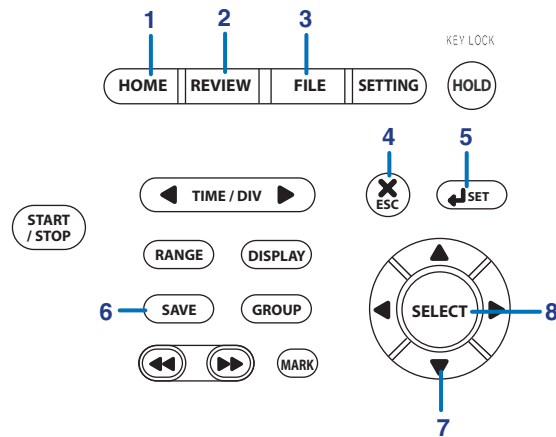
Specified time on the time axis  $\leq$  sampling interval  $\times$  1000 points  $\div$  10 grids

Example: When the sampling interval is 100 ms

$$\begin{aligned} \text{Specified time on the time axis} &\leq 100 \text{ ms} \times 1000 \text{ points} \div 10 \text{ grids} \\ &\leq 10000 \text{ ms} \\ &\leq 10 \text{ s} \end{aligned}$$

The time axis can be set less than or equal to 10 s/div.

### 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.

**6. SAVE Key**

Saves or prints the screen image data.

**7. Arrow Keys**

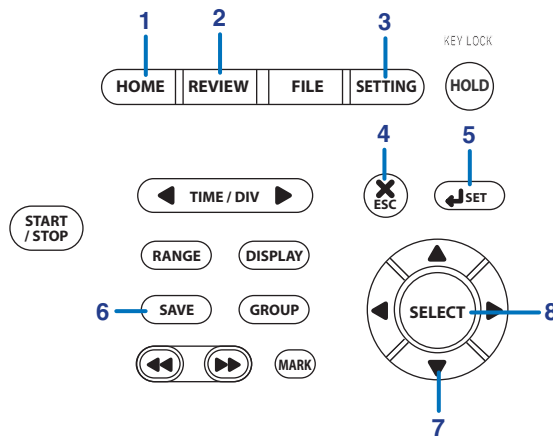
↑/←: Switches the active item to the next higher item. If the highest item is active, the lowest item is activated.

↓/→: 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.

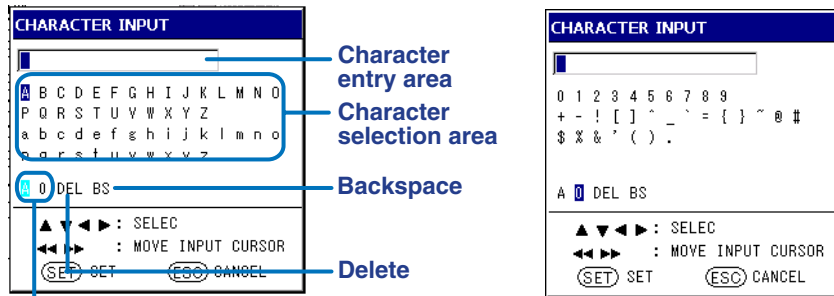
**8. SELECT Key**

Selects the active item and moves one level higher.

### Key Operations for Entering Characters

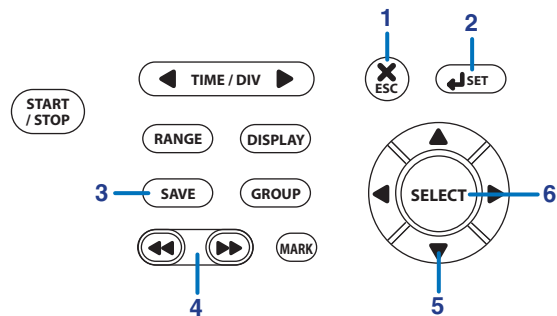
When entering characters, a character entry window opens as shown below.

- Entering alphabet characters
- Entering values and symbols



**Character type selection area**  
**(A: alphabet characters.**  
**0: numeric characters and symbols)**

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

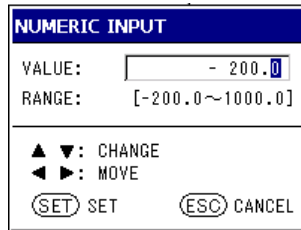


- 1. ESC Key**  
Cancels the settings and closes the window.
- 2. SET Key**  
Sets the entered characters.
- 3. SAVE Key**  
Saves or prints the screen image data.
- 4. Fast Forward Key**  
Moves the cursor in the character entry area left or right by one character.
- 5. Arrow Keys**  
  - ↑/←: Switches 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.

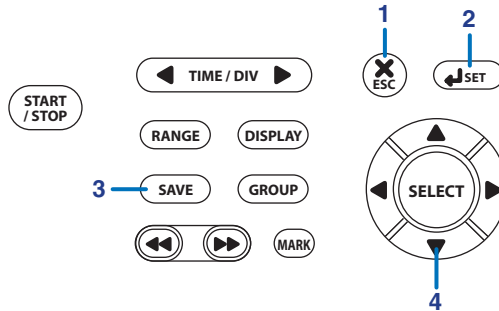


## Key Operations for Entering Values

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



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

Confirms the value and closes the window. The value does not exceed the setting range.

### 3. SAVE Key

Saves or prints the screen image data.

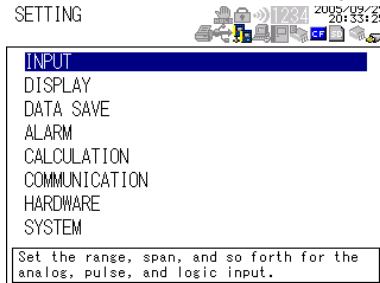
### 4. Arrow Keys

- ↑: Increments the value at the selected digit. Pressing this key when the value is 9 sets the value to 0.
- ↓: Decrements the value at the selected digit. Pressing this key when the value is 0 sets the value to 9.
- ←: Moves the selected digit one digit to the left.
- : Moves the selected digit one digit to the right.

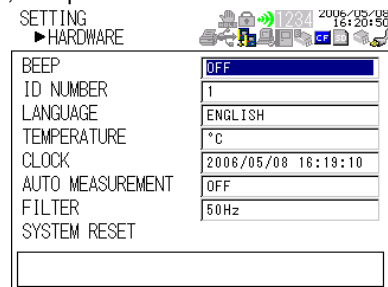
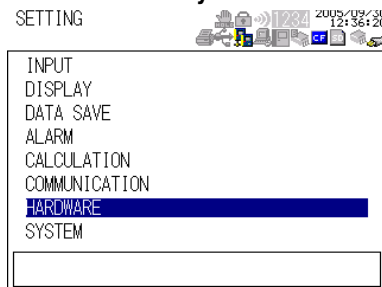
## 4.3 Setting the Date and Time

### Procedure

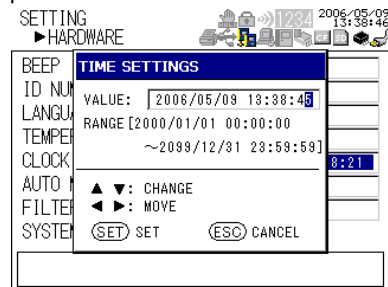
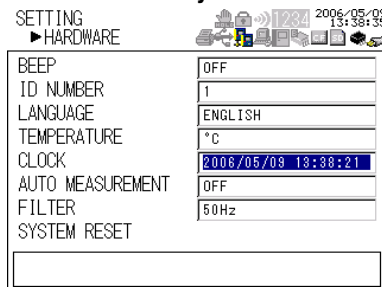
1. Press **SETTING** to enter Setting Mode.



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



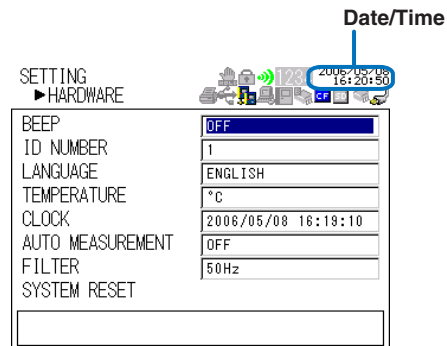
3. Use the **arrow keys** to select **CLOCK**, and press **SELECT**.



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.”

**Selectable Range of Date and Time**

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

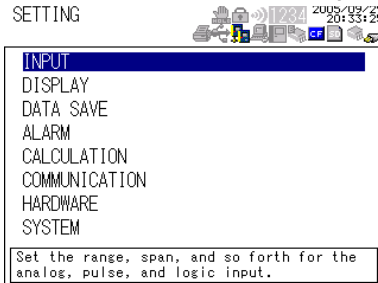
**Note**

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

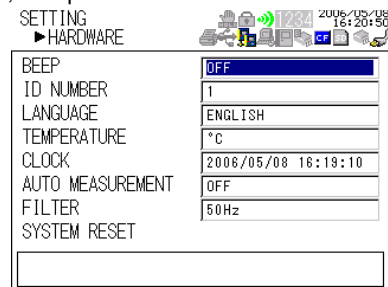
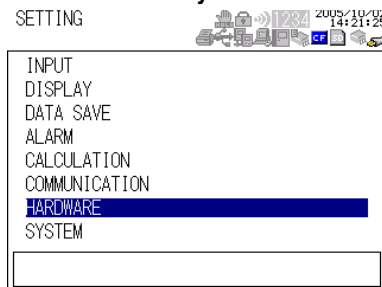
## 4.4 Resetting the System (Initializing the Settings)

### Procedure

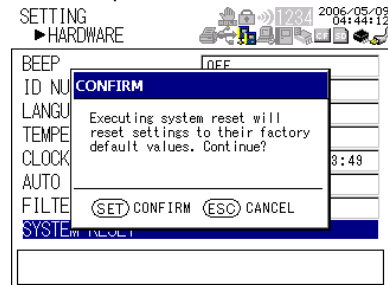
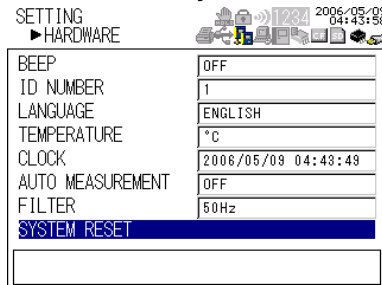
1. Press **SETTING** to enter Setting Mode.



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



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



4. Press **SET**.

### Explanation

#### Resetting the System

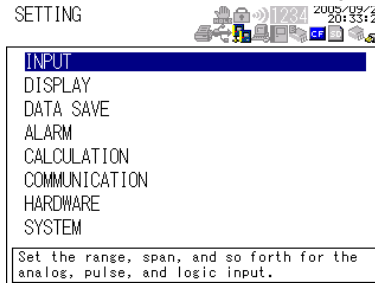
When you carry out the steps above, the settings are reset to the factory default values. However, the following settings are not changed even when the system is reset.

- Clock (date/time)
- ID number
- Language
- Communication settings (supported only on the XL121, X1122, XL124)

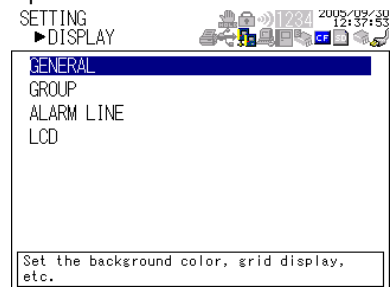
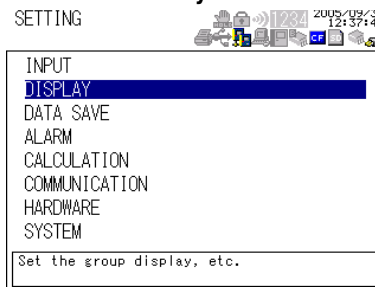
## 4.5 Setting the Display Backlight

### Procedure

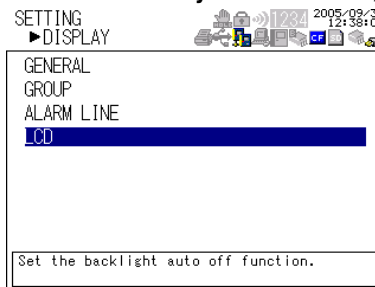
1. Press **SETTING** to enter Setting Mode.



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



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



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

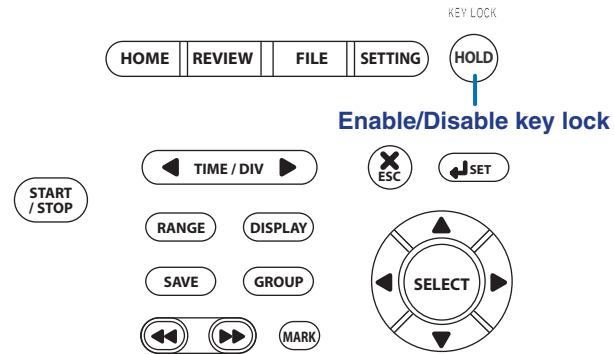
#### TIP

- 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

### Procedure

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



### Explanation



#### 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

### Procedure

#### CAUTION

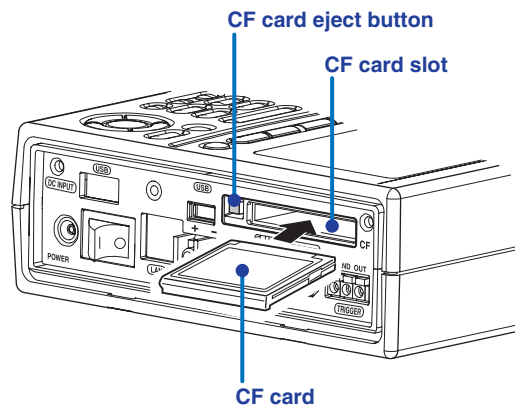
- Use cards that Yokogawa Meters & Instruments have checked for compatibility. When using the card, format it on the XL100 first. (See section 9.10, “Formatting the External Storage Media or Internal Memory.”)
- Before removing the card, check the following items.
- That the XL100 is not logging.
- That the card is not being accessed (the  or  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.



#### TIP

The eject button can be in a popped out or retracted condition.

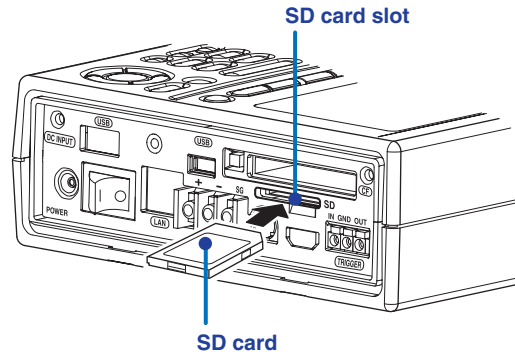
- When popped out: Pressing the button disengages the card from the slot. Pull the card out.
- When retracted: Press the button to pop the button out, and then press the button again. The card is disengaged from the slot. Pull the card out.

## 4.7 Inserting and Removing the External Storage Media

### Inserting or Removing an SD Card (Supported only on the XI121, XL122, and XL124)

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.



### 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 computation ch	16 ch + 32 computation ch + 32 communication ch
0.1 s	36.7 days	4.6 days	–	–	–
0.2 s	73.5 days	9.2 days	4.6 days	22 hours	12 hours
0.5 s	184 days	23 days	9.2 days	2.3 days	30.6 hours
1 s	1 year	46 days	23 days	4.6 days	2.6 days
2 s	2 years	92 days	46 days	9.2 days	5.1 days
3 s	5 years	230 days	92 days	23 days	13 days
10 s	10 years	1.3 years	230 days	46 days	26 days
20 s	Omitted	2.5 years	1.3 years	92 days	51 days
30 s	Omitted	3.8 years	1.9 years	138 days	77 days
1 minute	Omitted	7.6 years	3.8 years	276 days	153 days
2 minutes	Omitted	Omitted	7.6 years	1.5 years	306 days
5 minutes	Omitted	Omitted	Omitted	3.8 years	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

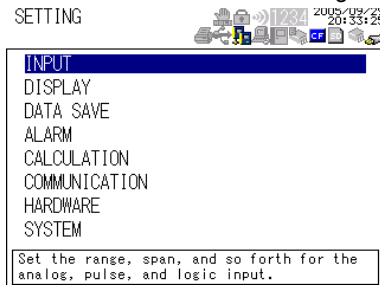
The CF cards that can be used are Type II cards.



# 5.1 Setting the Analog Input Channels

## Procedure

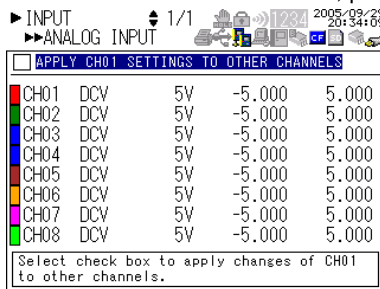
1. Press **SETTING** to enter Setting Mode.



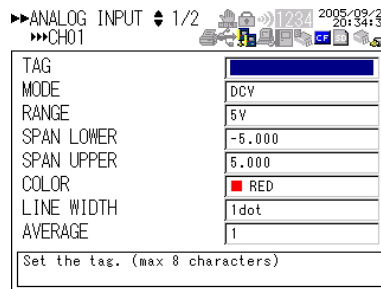
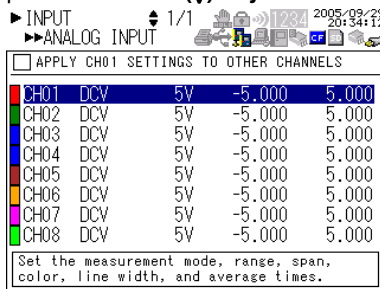
2. With INPUT selected, press **SELECT**.



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**.

## 5.1 Setting the Analog Input Channels

### 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.

#### 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 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 $\mu$ V
500 mV	-500.0 to 500.0 mV	100 $\mu$ V
1 V	-1.0000 to 1.0000 V	100 $\mu$ V
5 V (default setting)	-5.000 to 5.000 V	1 mV
10 V	-10.000 to 10.000 V	1 mV
50 V	-50.00 to 50.00 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  $\pm 10\%$  of the input range. For thermocouple or RTD input, over range occurs when the measured value exceeds approximately  $\pm 10^\circ\text{C}$  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 purple, brown, orange, yellow-green, aqua, magenta, gray, lime, blue green, navy, yellow, olive, and purple.

The default settings are as follows: CH1: red, 2: green, 3: blue, 4: blue purple, 5: brown, 6: orange, 7: yellow-green, 8: aqua, 9: magenta, 10: gray, 11: lime, 12: blue green, 13: navy, 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.XXXXX (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 mm <sup>2</sup> (default setting), cm <sup>2</sup> , m <sup>2</sup> , or km <sup>2</sup> Volume mm <sup>3</sup> (default setting), cm <sup>3</sup> , m <sup>3</sup> , 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/s <sup>2</sup> (default setting) Frequency mHz (default setting), Hz, kHz, rpm, or rph Weight mg (default setting), g, kg, t, or N Work mW (default setting), W, kW, J, Wh, or Ws Pressure Pa (default setting), kPa, MPa, N/m <sup>2</sup> , or bar Flow rate m <sup>3</sup> /s (default setting), m <sup>3</sup> /min, m <sup>3</sup> /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, ml/s, ml/min, ml/h, g/s, g/min, or g/h Temperature °C (default setting) or K Voltage and current mV (default setting), V, kV, MV, mA, A, kA, or MA Power mW (default setting), W, kW, MW, mvar, var, kvar, Mvar, mVA, VA, kVA, or MVA Watt hour Wh (default setting), kWh, MWh, varh, kvarh, or Mvarh Any Up to six characters.

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

## 5.1 Setting the Analog Input Channels

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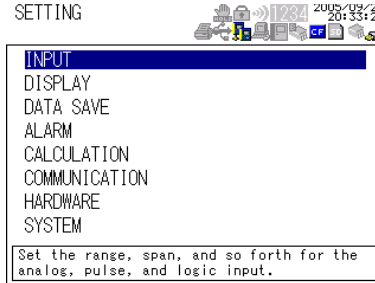
### **SEE ALSO**

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

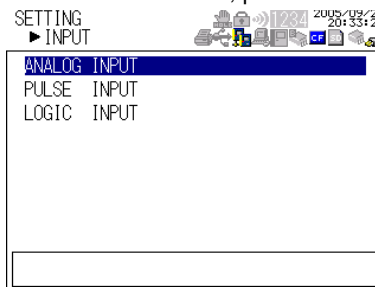
## 5.2 Setting the Pulse Input Channel

### Procedure

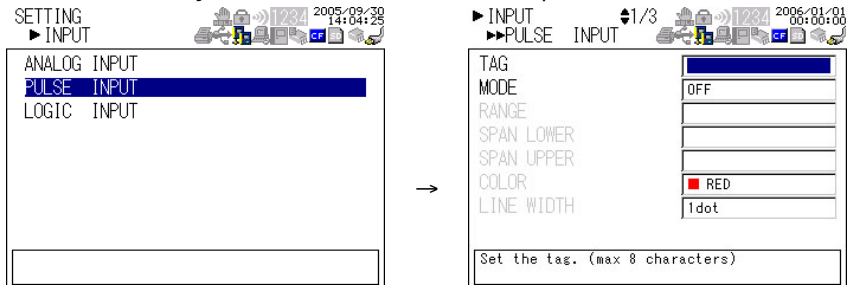
1. Press **SETTING** to enter Setting Mode.



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



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



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 (Pulse). 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.



#### Note

- The pulse input setting takes effect when the sampling interval is greater than or equal to 1 s.

## 5.2 Setting the Pulse Input Channel

---

### 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.	50 k/sampling interval	1 c
	500 kc/f.s.		10 c
	5 Mc/f.s.		100 c
	50 Mc/f.s.		1 kc
	500 Mc/f.s.		10 kc
Number of revolutions	500 rpm/f.s.	50 k/sec	(Counts the number of pulses per second and converts the number to number of revolutions)
	5 krpm/f.s.		
	50 krpm/f.s.		
	500 krpm/f.s.		

\* 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 purple, brown, orange, yellow-green, aqua, magenta, gray, lime, blue green, navy, 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, conversion exponent, conversion coefficient, offset exponent, offset coefficient, 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.
Conversion exponent	-38 to +37. The default setting is 0.
Conversion coefficient	-9.9999 to -1.0000, 0, 1.0000 to 9.9999. The default setting is 1.0000.
Offset exponent	-38 to +37. The default setting is 0.
Offset coefficient	-9.9999 to -1.0000, 0, 1.0000 to 9.9999. The default setting is 1.0000.
Unit (The default setting is Any.)	Length mm (default setting), cm, m, or km Area mm <sup>2</sup> (default setting), cm <sup>2</sup> , or m <sup>2</sup> Volume mm <sup>3</sup> (default setting), cm <sup>3</sup> , m <sup>3</sup> , 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/s <sup>2</sup> (default setting), km/h <sup>2</sup> , 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 kg/cm <sup>2</sup> (default setting), Pa, kPa, or MPa Flow rate m <sup>3</sup> /s (default setting), m <sup>3</sup> /min, m <sup>3</sup> /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 cch Temperature °C (default setting), K, °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 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."

**Note**

**If the Data Save > Sampling Interval is set to a value less than 1 s, you cannot set pulse input channels.**

**To use pulse input channels, set the sampling interval greater than or equal to 1 s.**

## 5.2 Setting the Pulse Input Channel

---

### TIP

- The final scaling result is displayed as conversion ratio  $\times$  pulse count + offset (reference).
- You must set the exponent and coefficient for the conversion ratio and offset values.

The relationship between the exponent and coefficient is given by

Conversion ratio or offset = Coefficient  $\times$  E(exponent) where  $E = 10^x$  and x is the exponent

#### Example

Display of the integrated pulse where the flow rate is 1.2 l/s per pulse and the offset is 100l

- Set the mode to Integrated Value.
- Conversion coefficient = 1.2, conversion exponent = 0:  $1.2 \times E(0) = 1.2$
- Offset coefficient = 1, offset exponent = 2:  $1 \times E(2) = 100$
- Set the unit to volume (l).

The integrated pulse display after 60 s is  $1.2 \times 60 + 100 = 172$  l.

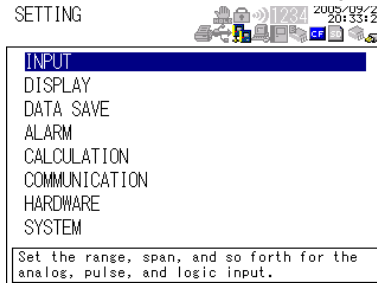
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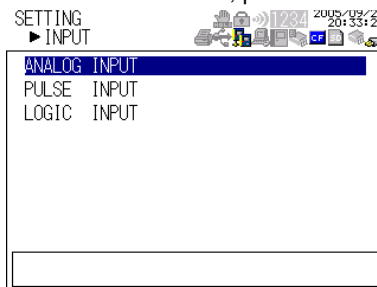
## 5.3 Setting the Logic Input Channel

### Procedure

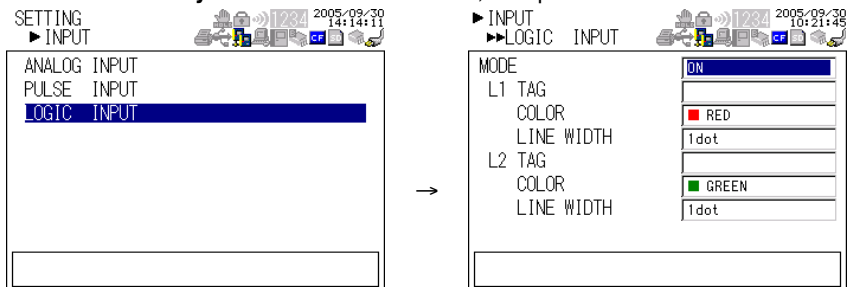
1. Press **SETTING** to enter Setting Mode.



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



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



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

#### 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.

Red (default setting of L1), green (default setting of L2), blue, blue purple, brown, orange, yellow-green, aqua, magenta, gray, lime, blue green, navy, yellow, olive, and purple.

### 5.3 Setting the Logic Input Channel

---

#### 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.”

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

### Procedure

- In Free Running Mode, use the **arrow keys** to select the channel you wish to configure.
- 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.	0.0000
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.	0.0000
SPAN LOWER	-9.9999
SPAN UPPER	9.9999
(SET) SET	(ESC) CANCEL

- 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.
- Select or enter the item on the displayed selection list or window.
- 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  
Scale lower limit, and scale upper limit
- For calculation or communication channels  
Decimal place, span lower limit, and span upper limit

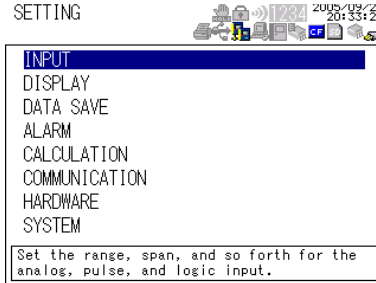
#### TIP

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

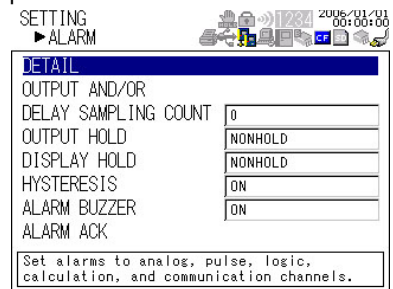
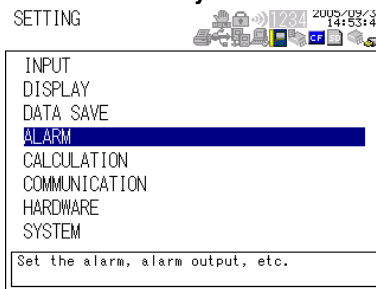
# 6.1 Setting the Alarm on Analog Input Channels

## Procedure

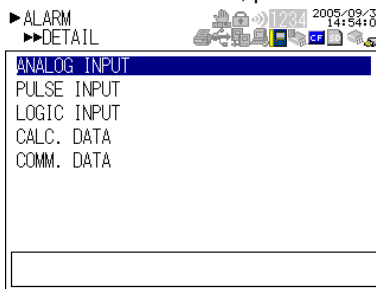
1. Press **SETTING** to enter Setting Mode.



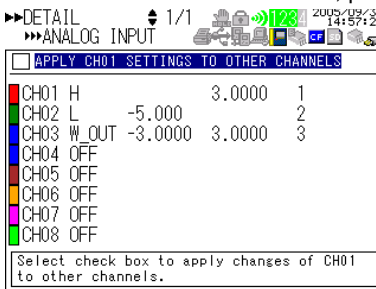
2. Use the **arrow keys** to select **ALARM**, and press **SELECT**.



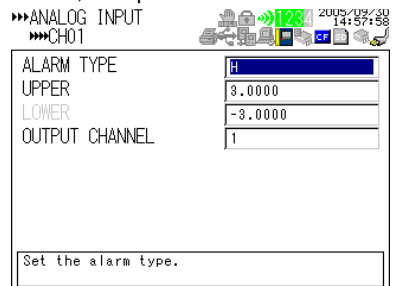
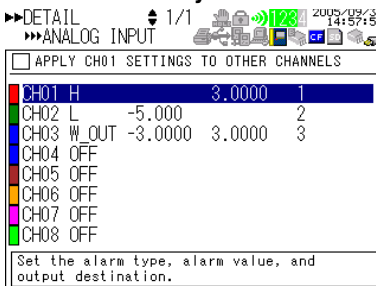
3. With **DETAIL** selected, press **SELECT**.



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



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



## 6.1 Setting the Alarm on Analog Input Channels

---

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.



### CAUTION

---

If the measurement mode or range is different in the analog input settings, the changes are not applied even if the APPLY CH01 SETTING TO OTHER CHANNELS check box is selected.

---

### 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).

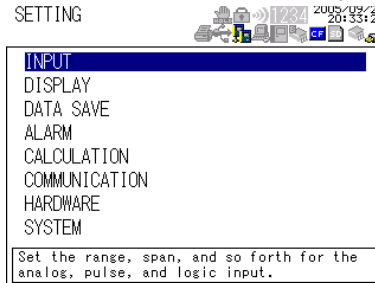
#### SEE ALSO

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

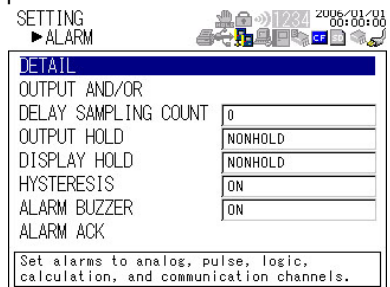
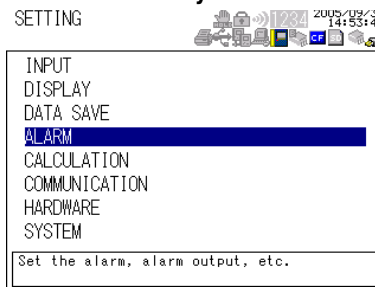
## 6.2 Setting the Alarm on Pulse Input Channels

### Procedure

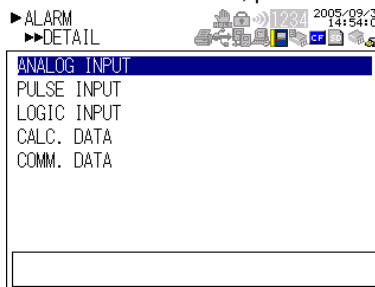
1. Press **SETTING** to enter Setting Mode.



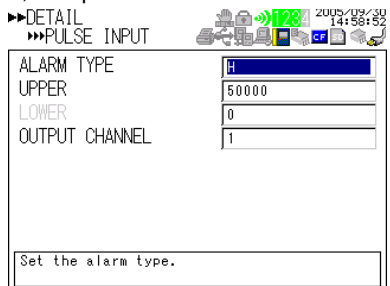
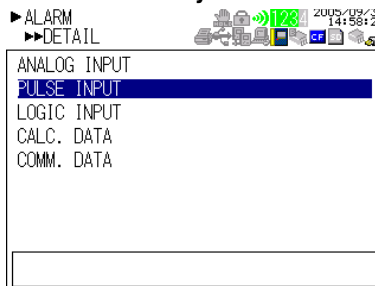
2. Use the **arrow keys** to select **ALARM**, and press **SELECT**.



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



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



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**.

## 6.2 Setting the Alarm on Pulse Input Channels

---

### 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).**

---

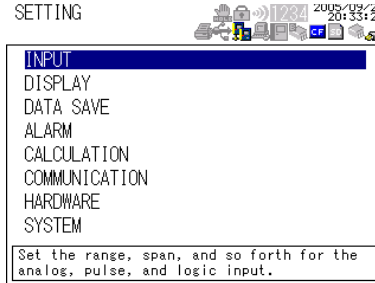
#### SEE ALSO

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

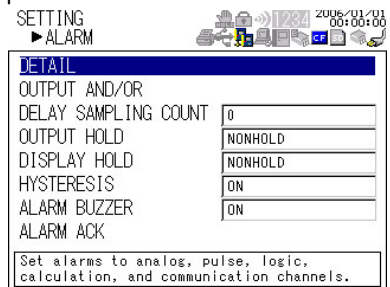
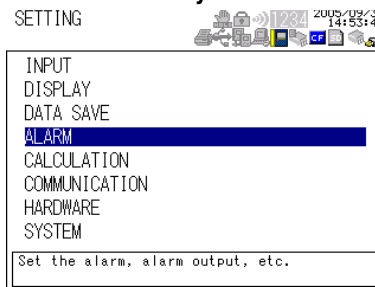
## 6.3 Setting the Alarm on Logic Input Channels

### Procedure

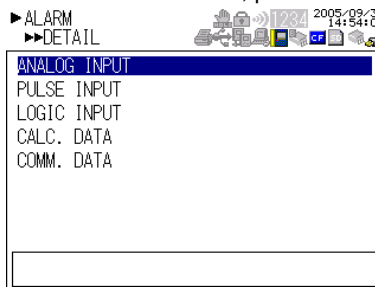
1. Press **SETTING** to enter Setting Mode.



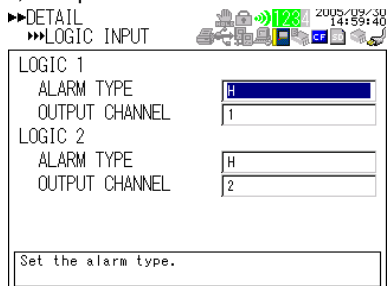
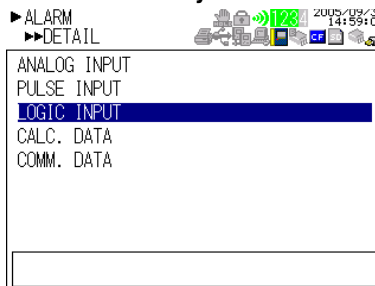
2. Use the **arrow keys** to select **ALARM**, and press **SELECT**.



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



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



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**.



## 6.3 Setting the Alarm on Logic Input Channels

---

### 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).**

---

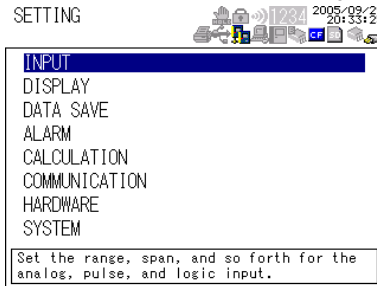
#### SEE ALSO

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

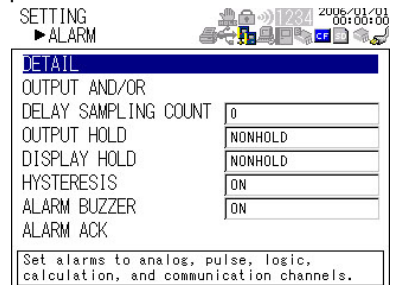
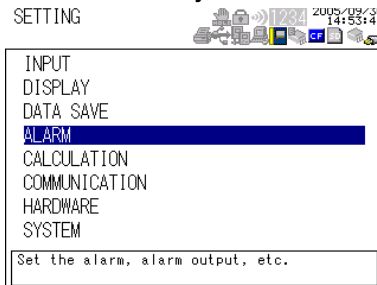
## 6.4 Setting Alarms on Calculation and Communication Channels (Communication channels are supported only on the XL121, XL122, and XL124)

### Procedure

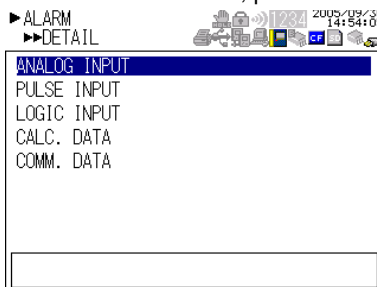
1. Press **SETTING** to enter Setting Mode.



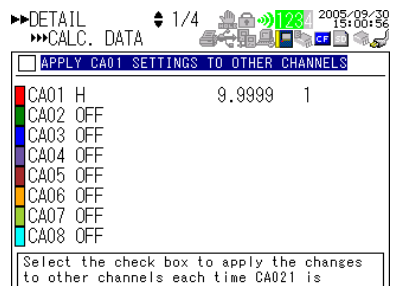
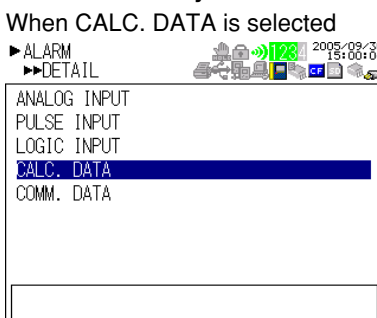
2. Use the **arrow keys** to select **ALARM**, and press **SELECT**.



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



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

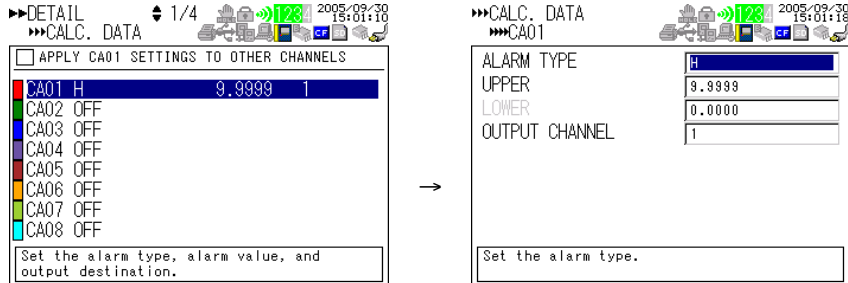


## 6.4 Setting Alarms on Calculation and Communication Channels

- 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



- Select or enter the item on the displayed selection list or window.
- 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 99999 and -99999. (The decimal place is the same as that of the span decimal place of the calculation channel.) 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).**

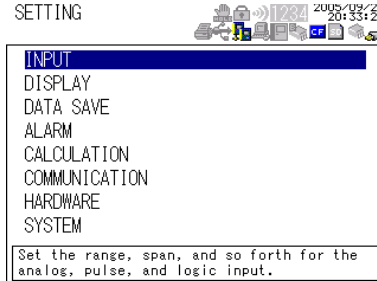
#### SEE ALSO

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

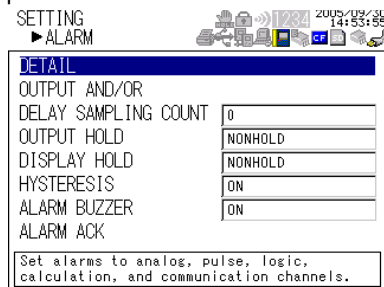
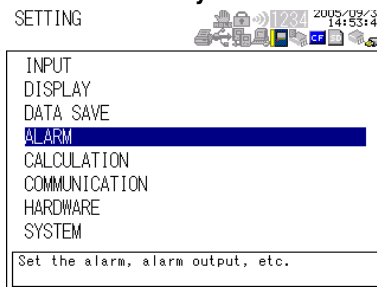
## 6.5 Setting Alarm Output and Display

### Procedure

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



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



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

An alarm occurs when the measured value remains above (or below) the alarm value for the specified sampling count. Set the sampling count in the range of 0 to 36000. The default setting is 0.

#### 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.

## 6.5 Setting Alarm Output and Display

---

### 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 ) changes from red to green.

### TIP

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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."



### Note

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**The alarm output is high when the XL100 is turned ON (including when recovering from a power failure).**

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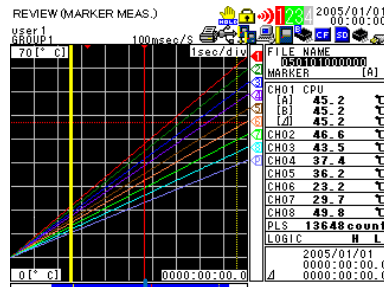
## 6.6 Searching Alarms

### Procedure

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

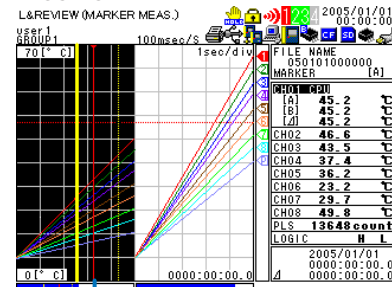
1. Press **REVIEW** to show the review or logging & review display.

Review (marker) display



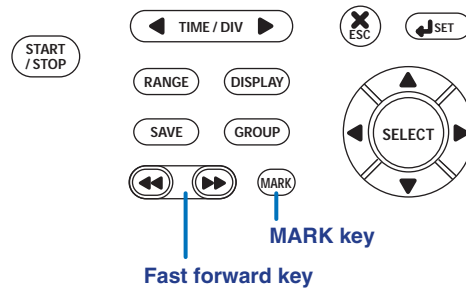
Marker ALM

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.

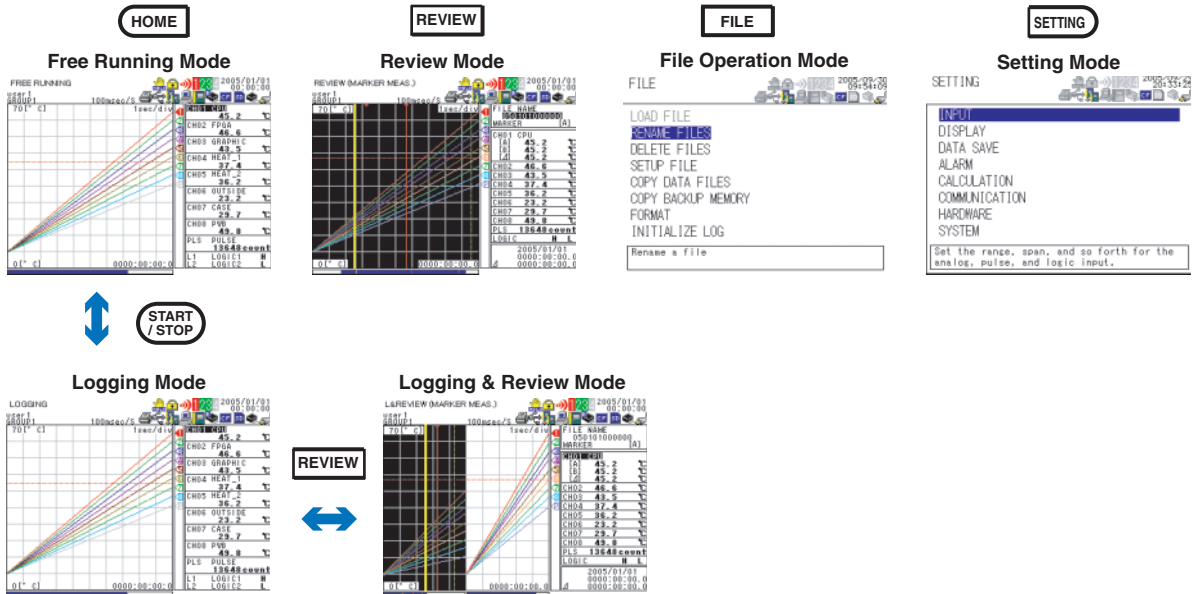


# 7.1 Switching the Operation Mode and Display

## Procedure

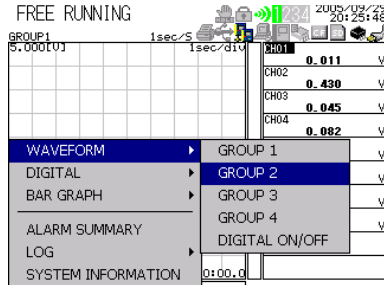
### Switching the Operation Mode

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.



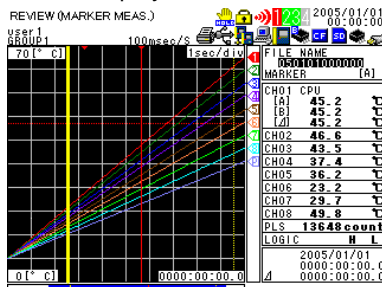
2. Use the **arrow keys** to select the desired display, and press **SELECT**.

### When in Review Mode or Logging & Review Mode

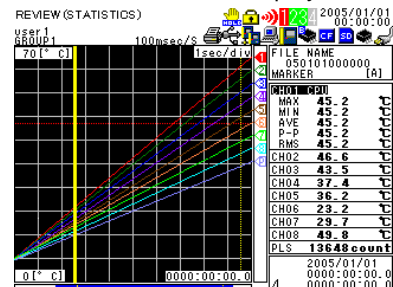
Press **DISPLAY**.

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

- Marker display



- Statistical calculation display



## 7.1 Switching the Operation Mode and Display

---

### 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	Shows a log of communication commands.
	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 (valid only when the data type is binary).

You cannot change the display to Review or Logging & Review in the following cases.

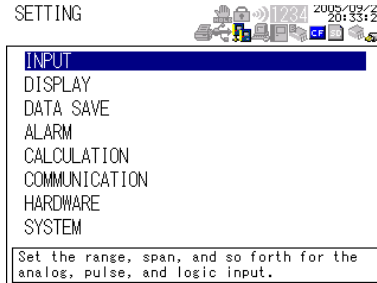
- If the selected alarm is a logic input alarm.
  - If the file division of the save mode is set to DIVISION and the selected alarm does not exist in the file that is currently being written. (You can change from the selected alarm to the review display after the logging is completed.)
  - If the memory full operation of the save mode is set to REPEAT and repetitive save operation is in progress.
  - If the memory full operation of the save mode is set to DELETE and the selected alarm existed in the deleted file.
-



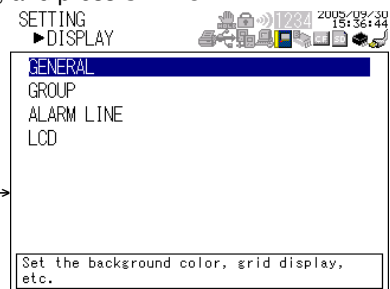
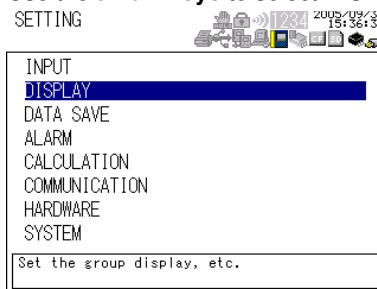
## 7.2 Setting Groups

### Procedure

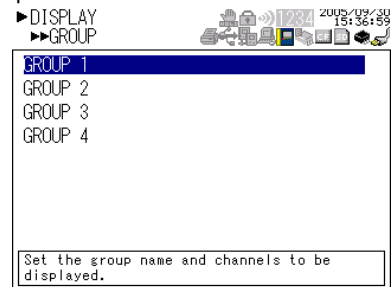
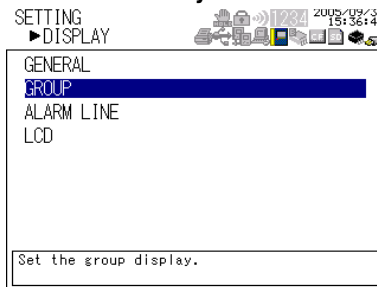
1. Press **SETTING** to enter Setting Mode.



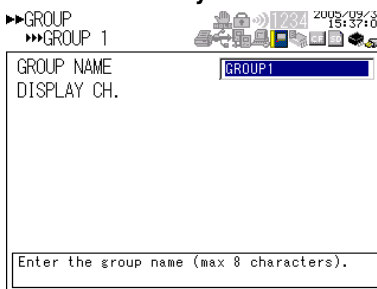
2. Use the **arrow keys** to select **DISPLAY**, and press **SELECT**.



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



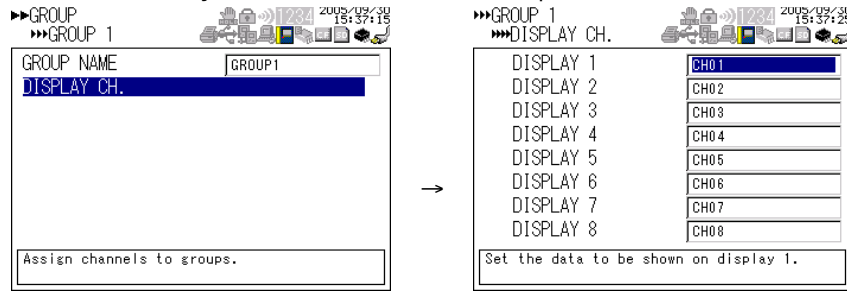
4. Use the **arrow keys** to select the desired group, and press **SELECT**.



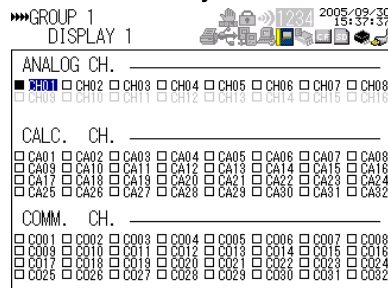
5. With **GROUP NAME** selected, press **SELECT**.  
The Group name setting window opens.
6. Enter the group name.
7. Press **SET**.

**Assigning Channels to Groups**

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



- Use the **arrow keys** to select DISPLAY 1 to 8, and press **SELECT**.



- Use the **arrow keys** to select a channel to be displayed.
- Press **SELECT** to select the check box of the selected channel. Press **SELECT** again to clear the check box.
- 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**

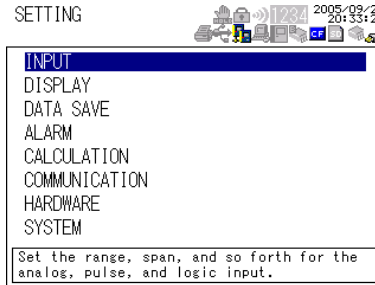
You can assign analog input channels, calculation channels, and communication channels (channels to which communication data through Modbus communications is assigned) to groups. Up to eight channels can be assigned to a group. The default channel assignments are shown below by the number of installed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

Group Number	Number of Installed Channels	
	8	16
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

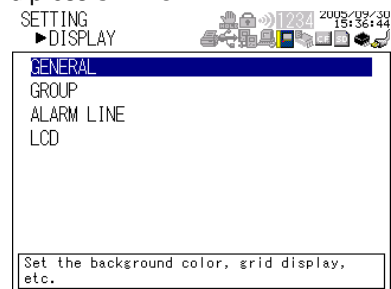
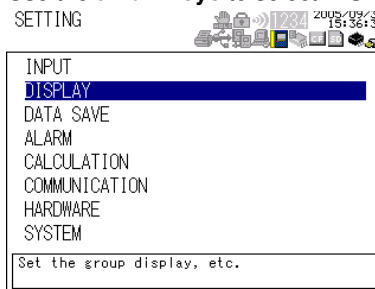
## 7.3 Setting the Background Color, Grid, and Bar Graph Base Position

### Procedure

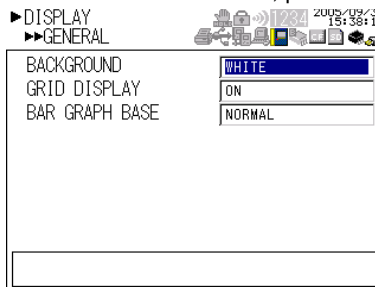
1. Press **SETTING** to enter Setting Mode.



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



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



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**.

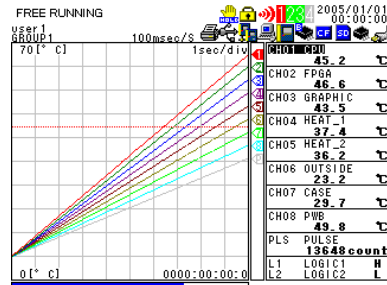
## 7.3 Setting the Background Color, Grid, and Bar Graph Base Position

### Explanation

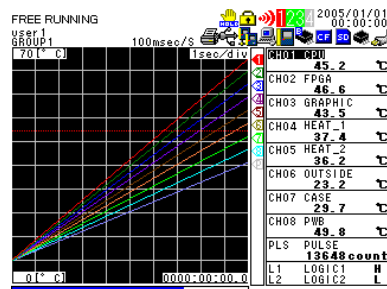
#### Background Color

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 colors specified for measurement channels, calculation channels, and communication channels are not affected by the background color setting.

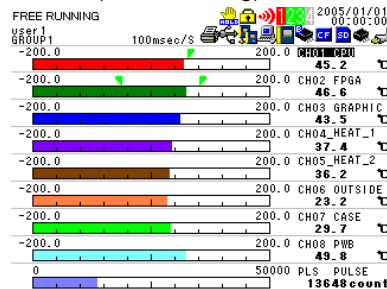
#### Grid Display

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

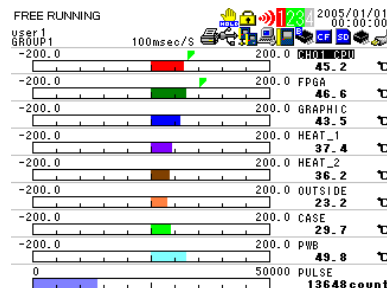
#### Bar Graph Base Position

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

- Normal (default setting)



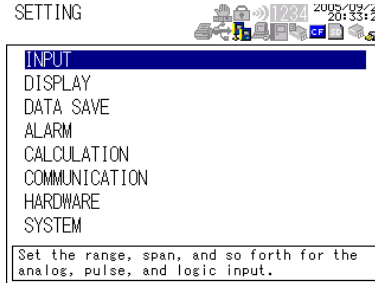
- Center



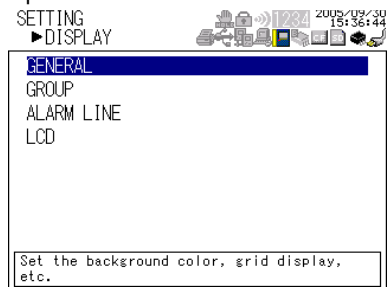
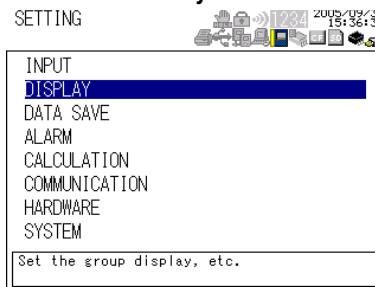
## 7.4 Setting Alarm Lines

### Procedure

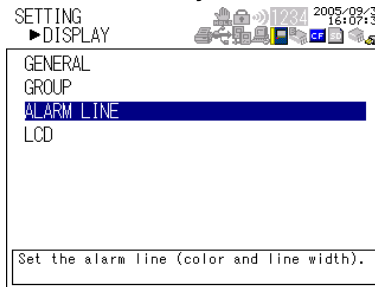
1. Press **SETTING** to enter Setting Mode.



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



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



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**.

### Explanation

#### 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 purple, brown, orange, yellow-green, aqua, magenta, gray, lime, blue green, navy, yellow, olive, and purple.

## 7.4 Setting Alarm Lines

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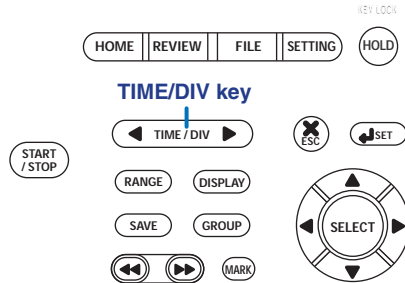
### **Line width**

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.



### 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.

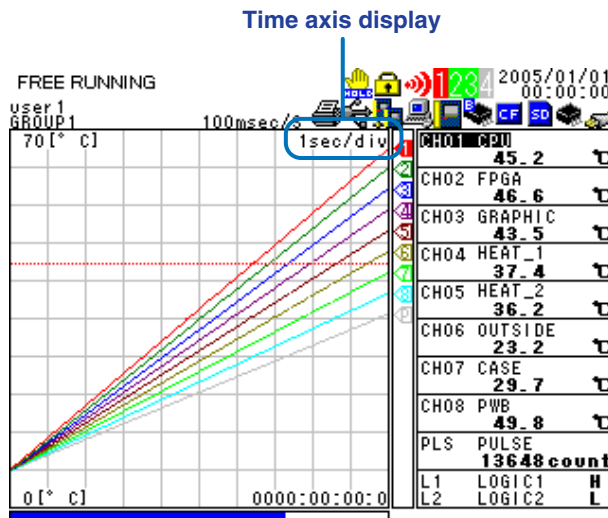
1, 2, 5, 10, 20, or 30 sec/div

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

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

#### Displaying the Time Scale

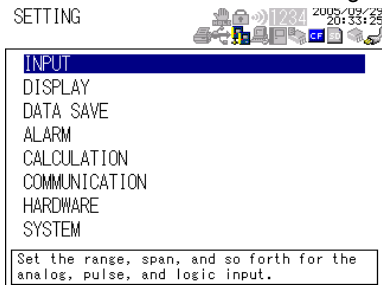
The time scale is shown on the waveform display as indicated below.



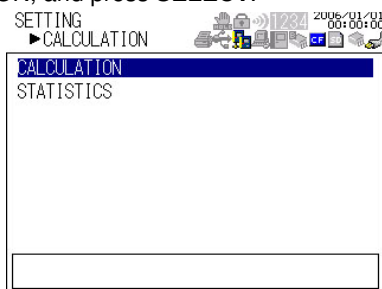
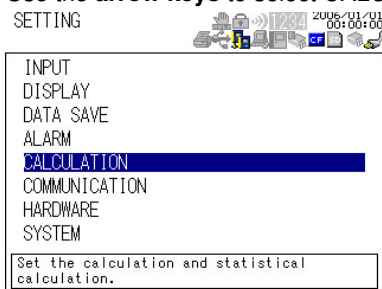
# 8.1 Setting the Calculation

## Procedure

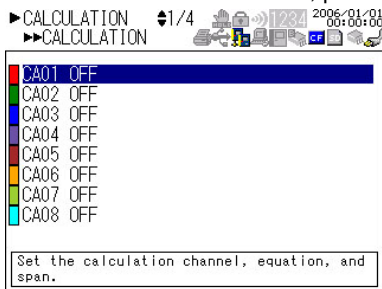
1. Press **SETTING** to enter Setting Mode.



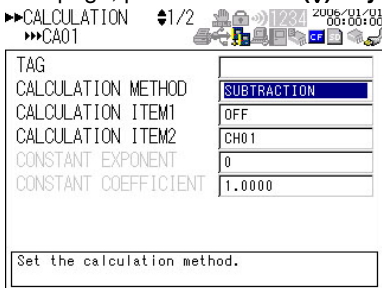
2. Use the **arrow keys** to select **CALCULATION**, and press **SELECT**.



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



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.



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.

#### Calculation Method, Calculation Items 1 and 2, and Constant

The following two types of calculations are available. You set the calculation method, calculation items 1 and 2, and constant used in the calculation below.

- Calculation item 1 (+, -, ×, ÷) Calculation item 2
- Calculation item 1 (+, -, ×, ÷) Calculation constant

You can specify measurement channels, computation channels (CA01 to CA32), or communication channels (CO01 to CO32) for calculation items 1 and 2. When specifying a computation channel, you can only select channel numbers that are smaller than the number of the computation channel that you are setting.

The default settings are as follows: SUBTRACTION for the calculation method, OFF for calculation item 1, and CH01 for calculation item 2. For measurement channels, the scaled value is used in the computation.

The selectable range of the calculation constant is  $-9.9999E+37$  to  $-1.0000E-38$ , 0,  $1.0000E-38$  to  $9.9999E+37$ .

#### Constant Exponent

Set the exponent of the calculation constant. The selectable range is  $-38$  to  $37$ . The default setting is 0.

#### Constant Coefficient

Set the mantissa of the calculation constant. The selectable range is  $-9.9999$  to  $-1.0000$ , 0,  $1.0000$  to  $9.9999$ . The default setting is 1.0000.

#### 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)
  - Division by zero (Calculation error. Displayed as “+\*\*\*\*\*”)
-

**Unit**

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

Length	mm (default setting), cm, m, or km
Area	mm <sup>2</sup> (default setting), cm <sup>2</sup> , m <sup>2</sup> , or km <sup>2</sup>
Volume	mm <sup>3</sup> (default setting), cm <sup>3</sup> , m <sup>3</sup> , 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/s <sup>2</sup> (default setting)
Frequency	mHz (default setting), Hz, kHz, rpm, or rph
Weight	mg (default setting), g, kg, t, or N
Work	mW (default setting), W, kW, J, Wh, or Ws
Pressure	Pa (default setting), kPa, MPa, N/m <sup>2</sup> , or bar
Flow rate	m <sup>3</sup> /s (default setting), m <sup>3</sup> /min, m <sup>3</sup> /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, ml/s, ml/min, ml/h, g/s, g/min, or g/h
Temperature	°C (default setting) or K
Voltage/current	mV (default setting), V, kV, MV, mA, A, kA, or MA
Power	mW (default setting), W, kW, MW, mvar, var, kvar, Mvar, mVA, VA, kVA, or MVA
Watt hour	Wh (default setting), kWh, MWh, varh, kvarh, or Mvarh
Any	Up to six characters.

**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 purple, brown, orange, yellow-green, aqua, magenta, gray, lime, blue green, navy, yellow, olive, and purple.

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

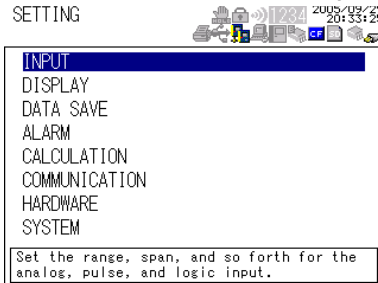
**Line width**

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

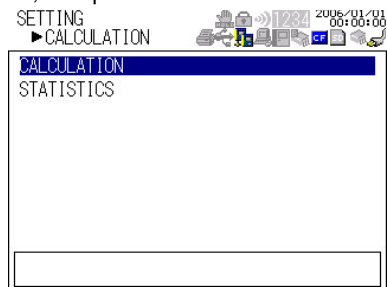
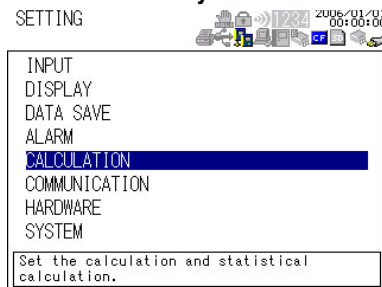
## 8.2 Setting the Statistical Calculation

### Procedure

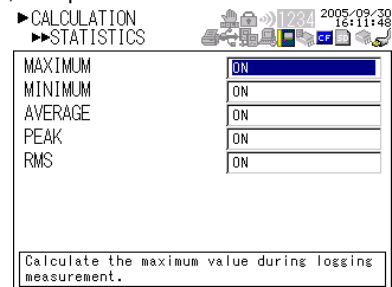
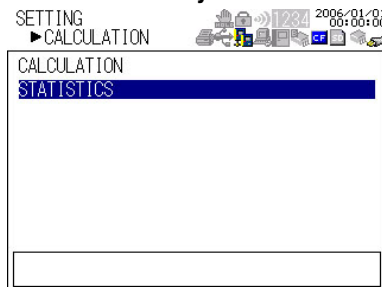
1. Press **SETTING** to enter Setting Mode.



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



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



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 i<sup>th</sup> 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.

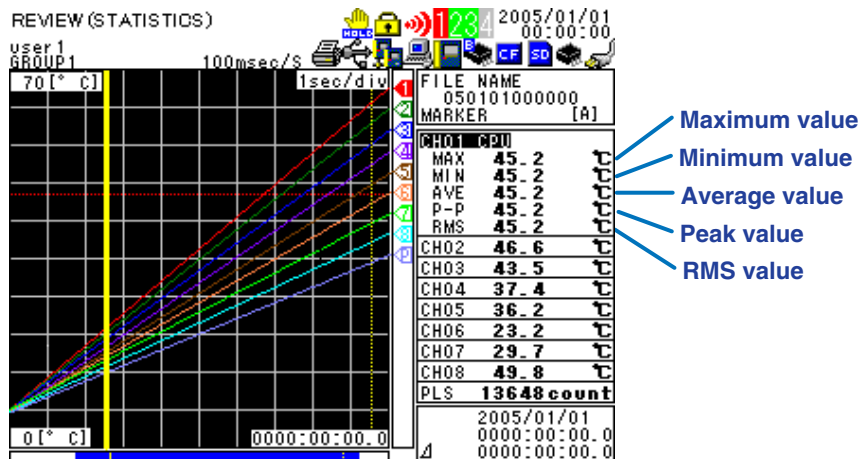
$$RMS = \sqrt{\frac{\sum_{i=1}^n di^2}{n}}$$

where di is the i<sup>th</sup> 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”)

Pressing the SET key on the statistical calculation display calculates statistics between cursors A and B.



**Handling of Error Data during Statistical Calculation**

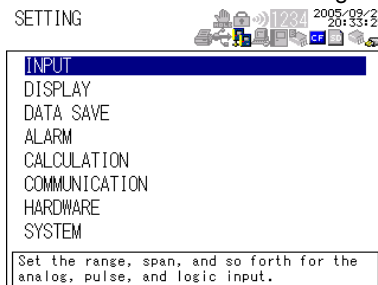
If there is an error in the measured or calculated data, the data is handled as follows:

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

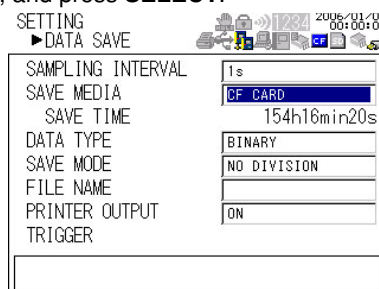
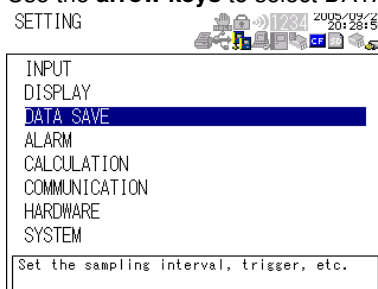
## 9.1 Setting the Save Operation of Measured and Calculated Data

### Procedure

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



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



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, 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 when using the 8-channel terminal block unit)



#### Note

- If the sampling interval is 10 s or less (100 ms, 200 ms, 1 s, 2 s, or 5 s), the data is temporarily stored to the internal buffer memory and saved every 10 seconds.
- The pulse input setting takes effect when the sampling interval is greater than or equal to 1 s.

## 9.1 Setting the Save Operation of Measured and Calculated Data

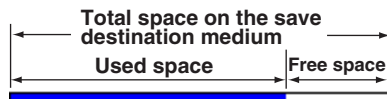
---

### 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." (The SD card is supported only on the XL121, XL122, and XL124.)

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.

### Save Mode

Set the save mode of the logging data to NO DIVISION or DIVISION.

Also, set the operation that is carried out when the data save destination is full to STOP, REPEAT, or DELETE.

### File Division

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NO DIVISION	Creates a file for each measurement.
DIVISION	Creates files by dividing the data at a given interval from the start of the logging measurement.

---

### TIP

Set the division time to an integer multiple of the sampling interval.

If you set the division time to 1 hour, the XL100 creates measurement files by dividing the data every hour with respect to the time the data is first saved.

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### Note

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If you change the sampling interval and the division time is no longer an integer multiple of the sampling interval, the XL100 operates as follows:

- If the sampling interval is greater than the division time  
The division time is set equal to the sampling interval.  
Example: If you try to set the sampling interval to 1 hour when the division time is 3 minutes, the division time is set to 1 hour.
  - If the sampling interval is less than the division time  
The division time is set to an integer multiple of the sampling interval that is smaller than the specified value.  
Example: If you try to set the sampling interval to 2 minutes when the division time is 7 minutes, the division time is set to 6 minutes.
  - If the division time is not an integer multiple of the sampling interval, you cannot set the division time.
- 
-

### Memory Full Operation

STOP	If the free space on the data save destination becomes small, the XL100 saves the data to the backup memory.
REPEAT	If the free space on the data save destination becomes small, the XL100 starts overwriting from the first data in the file being recorded. The most recent data of the file size is saved. The data is not saved to the backup memory.
DELETE	If the free space on the data save destination falls below a given level, the XL100 starts deleting from the oldest measurement file (*.DLO) in the medium to which the data is being recorded. If files can no longer be deleted, the XL100 operates in the same way as REPEAT. The data is not saved to the backup memory.

### TIP

The conditions for the delete operation are as follows:

- The file timestamp (date of creation) is used to determine the oldest file.
- If only a single file or no file is present in the data save destination, the file is not deleted.
- If the files are saved using file division, the operation is the same as when multiple files are saved automatically without file division. Thus, files are deleted from the oldest file even if the files are created through file division in a single measurement.



### Note

- If the data type is set to ASCII, the memory full operation cannot be set to REPEAT or DELETE. The memory full operation is automatically set to STOP.
- If the memory full operation is set to REPEAT and overwriting is in progress, you cannot change to Logging & Review Mode.
- If the memory full operation is set to REPEAT and overwriting is started in Logging & Review Mode, the mode automatically changes to Logging.
- If the file division is set to DIVISION and the file is divided in Logging & Review Mode, the mode automatically changes to Logging.
- If a power failure occurs during the logging measurement, the XL100 operates as follows:
  - If the memory full operation is set to REPEAT
    - After the power recovers, the XL100 creates a new file by adding Pxxx (where xxx is a sequence number between 001 and 997) the file name before the power failure.
    - If the XL100 was overwriting the first data of the file being recorded due to the free space of the data save destination becoming small, the XL100 stops the logging measurement after the power recovers. (The file that was recorded before the power failure remains in the data save destination.)
  - If the memory full operation is set to DELETE
    - After the power recovers, the XL100 creates a new file by adding Pxxx (where xxx is a sequence number between 001 and 997) the file name before the power failure.
    - If the free space on the data save destination falls below a given level, the XL100 deletes the oldest file in the data save destination and creates a new file.
    - If no files can be deleted, the XL100 stops the logging measurement.
- If the memory full operation is set to REPEAT or DELETE and data cannot be saved within the sampling interval such as due to insufficient free space at the data save destination, the logging measurement is stopped.

## 9.1 Setting the Save Operation of Measured and Calculated Data

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### 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	YYMMDDhhmmss.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	FTPYMMDDhhmmss.LOG
Web	COMYYMMDDhhmmss.LOG
E-mail transmission	EMLYMMDDhhmmss.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:

ABCDEFGHIJKLRxxx.XXX

Rxxx: R001 to R997

XXX: Extension of each data

The file name of different types of data is the same.

When a file with the same name exists, a sequence number is added to the file name and saved. The sequence number attached to the file name is R001 to R997. If the sequence number reaches R997, a message stating that the file cannot be created appears.

### TIP

If a power failure occurs while logging, a new file is created and the measured data is saved when the power recovers.

A sequence number Pxxx (where xxx is a value between 001 and 997) is added to the file name that was used before the power failure for the file that is created after the power recovers.

If the file name before the power failure was 050101000000.DLO, the file created after the power recovers is 050101000000P001.DLO.



### Note

If the data save destination is set to internal memory, the maximum number of files that can be saved to the internal memory is 168.

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**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.**
- **If the trigger mode is set to Continuous, you cannot set the start trigger or end trigger to Time. If the start trigger or end trigger is set to Time, it is automatically set to None.**

- 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 if the measured value rises to a value greater than or equal to the specified value.
	Lower limit	A trigger is activated if the measured value falls to a value less than or equal to the specified value.
	Window IN	A trigger is activated when the measured value enters within the range specified by the lower and upper limits.
	Window OUT	A trigger is activated when the measured value exits from the range specified by the lower and upper 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."

## 9.1 Setting the Save Operation of Measured and Calculated Data

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- 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).  
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 start trigger 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  icon appears in the status display section on the display. The data saved to the 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 (approx. 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 a file name with Rxxx added to the name of the file on the storage medium inserted earlier.
- 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.

### TIP

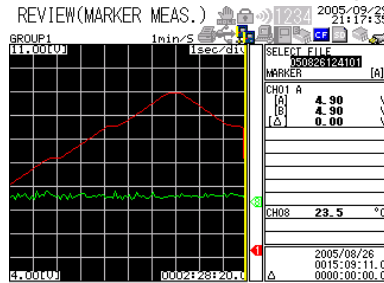
If the start trigger is set to Time or External, it may take time for the measured data to be displayed after the trigger condition is met depending on the sampling interval setting.

## 9.2 Loading Measurement or Calculation Data Files

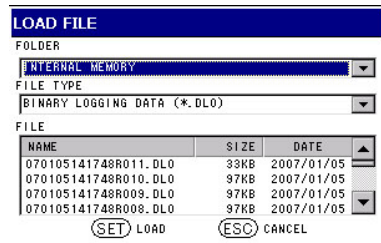
### Procedure

#### Loading on the Review or Logging

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 **SELECT**.
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**.

### Explanation

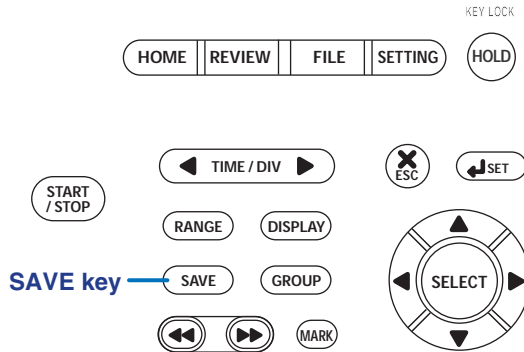
#### Loading Measurement and Calculation Data Files

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

### Procedure

In Free Running Mode, press **SAVE**.



### 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 automatic file name is YYMMDDhhmmss.DMN (YY: year, MM: month, DD: day, hh: hour, mm: minute, ss: second).

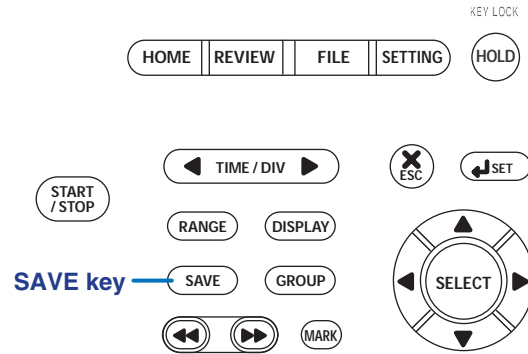
#### TIP

Press **HOLD** to hold the displayed contents at that point. Press **HOLD** again to release the hold.

## 9.4 Saving the Alarm Summary Data

### Procedure

Press **SAVE** on the alarm summary display.



### Explanation

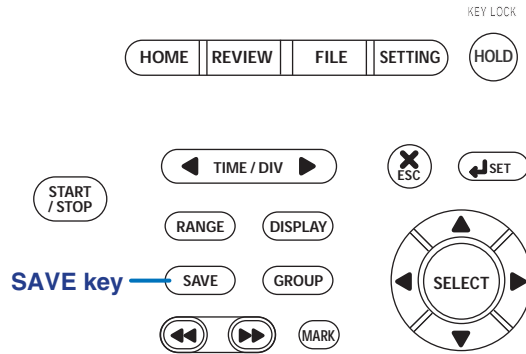
#### Saving the Alarm Summary Data

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 automatic file name is YYMMDDhhmmss.ALM (YY: year, MM: month, DD: day, hh: hour, mm: minute, ss: second).

## 9.5 Saving the Log Data

### Procedure

Press **SAVE** on the log display.



### 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 automatic file name is as shown in the following table.

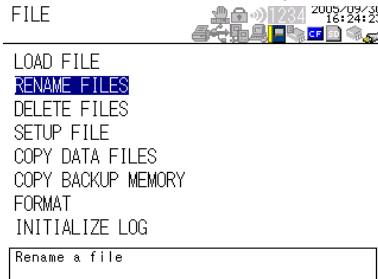
Type of Log File	File Name
Error	ERRYYMMDDhhmmss.LOG
Key login	KEYYYMMDDhhmmss.LOG
Communication command	COMYYMMDDhhmmss.LOG
FTP client	FTPYYMMDDhhmmss.LOG
Web	COMYYMMDDhhmmss.LOG
E-mail transmission	EMLYYMMDDhhmmss.LOG

YY: year, MM: month, DD: day, hh: hour, mm: minute, ss: second

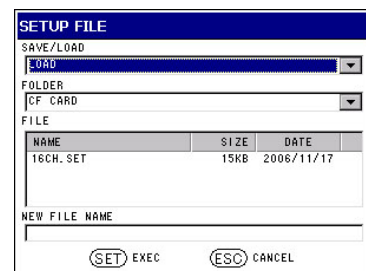
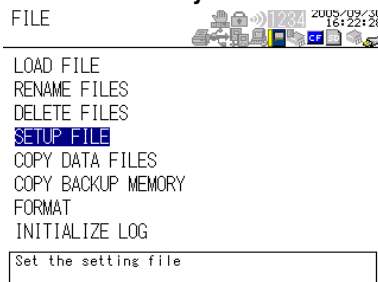
## 9.6 Saving and Loading Setup Data

### Procedure

1. Press **FILE** to enter File Operation Mode.



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



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), INTERNAL MEMORY, or SETTING MEMORY), and press **SELECT**.
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

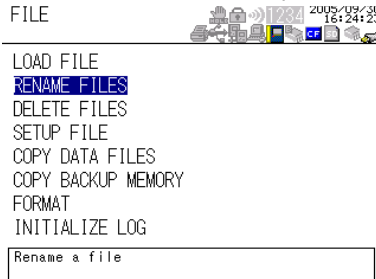
4. Use the **arrow keys** to select **LOAD**, and press **SELECT**.
5. Use the **arrow keys** to select **FOLDER**, and press **SELECT**.
6. Use the **arrow keys** to select the folder (external storage medium (CF CARD or SD CARD), INTERNAL MEMORY, or SETTING MEMORY), and press **SELECT**.
7. Use the **arrow keys** to select the file to be loaded, and press **SELECT**.
8. Press **SET**.  
The settings of the loaded file are applied.



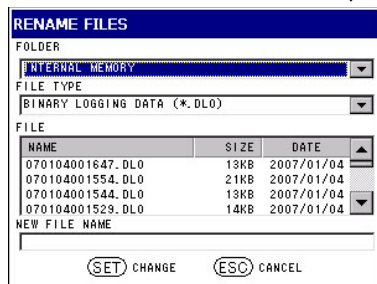
## 9.7 Renaming Files

### Procedure

1. Press **FILE** to enter File Operation Mode.



2. With RENAME FILES selected, press **SELECT**.



3. With FOLDER selected, press **SELECT**.
4. Use the **arrow keys** to select the target folder, and press **SELECT**.
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

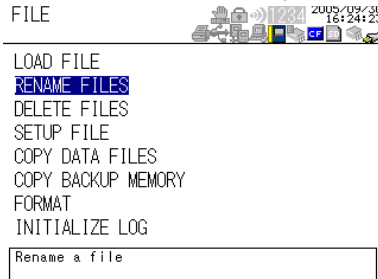
#### Renaming Files

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. Save using a different file name.

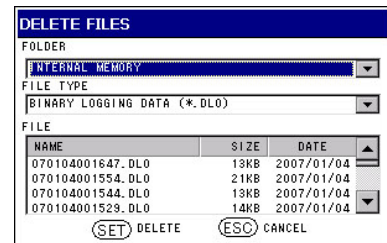
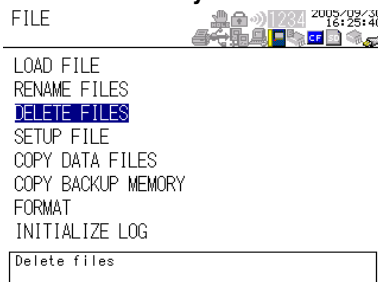
## 9.8 Deleting Files

### Procedure

1. Press **FILE** to enter File Operation Mode.



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



3. With FOLDER selected, press **SELECT**.
4. Use the **arrow keys** to select the target folder, and press **SELECT**.
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**.

### Explanation

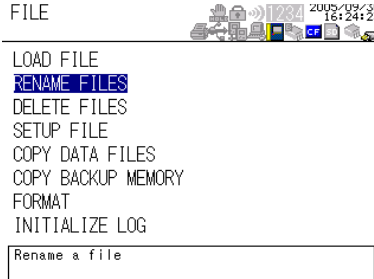
#### Deleting Files

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.

## 9.9 Copying Data

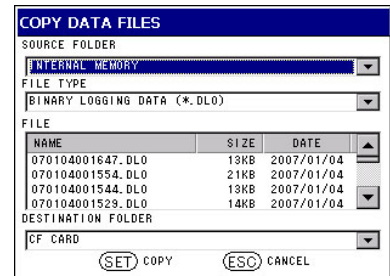
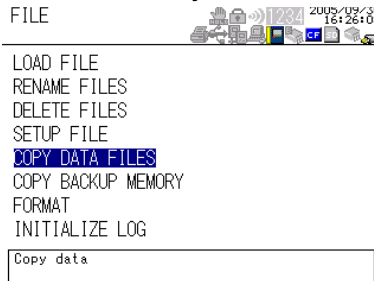
### Procedure

1. Press **FILE** to enter File Operation Mode.



### Copying Data

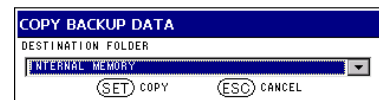
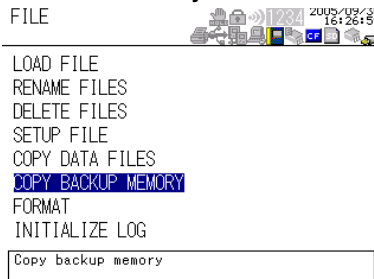
2. Use the **arrow keys** to select **COPY DATA FILES**, and press **SELECT**.



3. With **SOURCE FOLDER** selected, press **SELECT**.
4. Use the **arrow keys** to select the target folder, and press **SELECT**.
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 **SELECT**.
10. Press **SET**.

### Copying Backup Memory

2. Use the **arrow keys** to select **COPY BACKUP MEMORY**, and press **SELECT**.



3. Use the **arrow keys** to select the folder, and press **SELECT**.
4. Press **SET**.

### Explanation

#### **Copying Data**

Specify a file from a list of files saved in an external storage medium (CF card, SD card, or USB memory), the internal memory and the setting memory, and copy it to an external storage medium (CF card, SD card, or USB memory), the internal memory, or the setting memory. If the file cannot be copied for some reason, an error message appears.

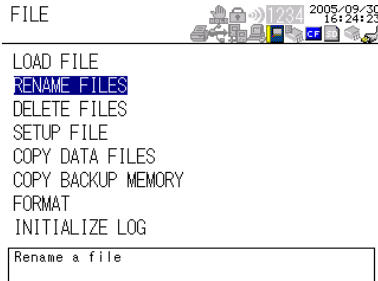
#### **Copying Backup Memory**

Copy the data saved to the internal memory to an external storage medium (CF card or SD card) or the internal memory. If the data cannot be copied normally for some reason, an error message appears.

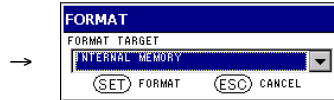
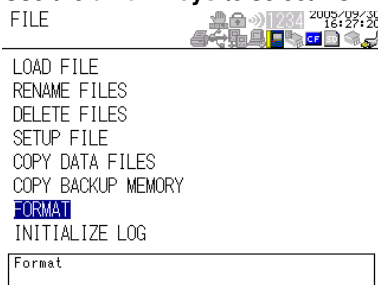
## 9.10 Formatting the External Storage Media or Internal Memory

### Procedure

1. Press **FILE** to enter File Operation Mode.



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



3. Use the **arrow keys** to select the external storage medium, the internal memory, or the backup memory to be formatted, and press **SELECT**.
4. Press **SET**.

### Explanation

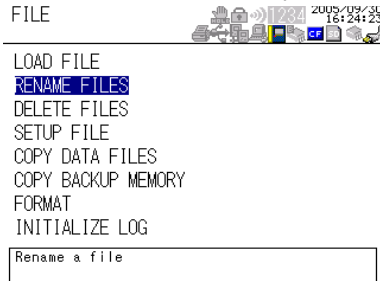
#### Formatting

Format an external storage medium (CF card or SD card), the internal memory, or the backup memory to FAT32 format.

## 9.11 Initializing Log Information

### Procedure

1. Press **FILE** to enter File Operation Mode.



FILE

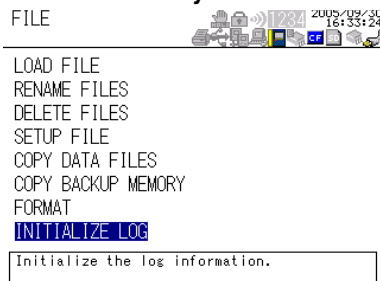
---

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

Rename a file

Detailed description: This screenshot shows the File Operation Mode menu. At the top, the word 'FILE' is displayed. Below it is a horizontal line. Under the line, a list of menu options is shown: 'LOAD FILE', 'RENAME FILES', 'DELETE FILES', 'SETUP FILE', 'COPY DATA FILES', 'COPY BACKUP MEMORY', 'FORMAT', and 'INITIALIZE LOG'. The 'RENAME FILES' option is highlighted with a blue background. Below the menu is a text input field containing the text 'Rename a file'. In the top right corner, there is a status bar with icons for a lock, Wi-Fi, signal strength, battery, and a clock showing '2009/05/20 18:33:23'.

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



FILE

---

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

Initialize the log information.

Detailed description: This screenshot shows the File Operation Mode menu with 'INITIALIZE LOG' selected. The menu options are the same as in the previous screenshot, but 'INITIALIZE LOG' is now highlighted with a blue background. Below the menu is a text input field containing the text 'Initialize the log information.'. The status bar in the top right corner is identical to the previous screenshot, showing '2009/05/20 18:33:23'.

### Explanation

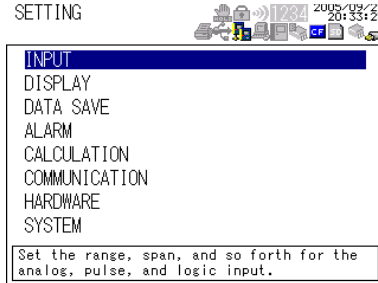
#### Initializing the Log

Initialize all of the log information.

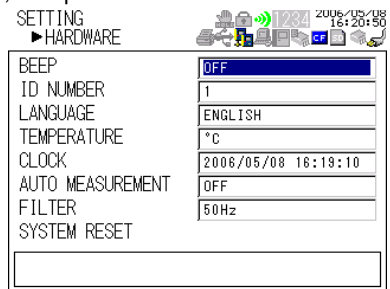
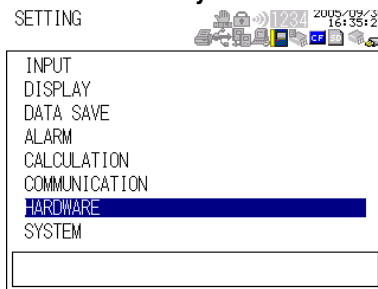
## 9.12 Automated Measurement and Save Function

### Procedure

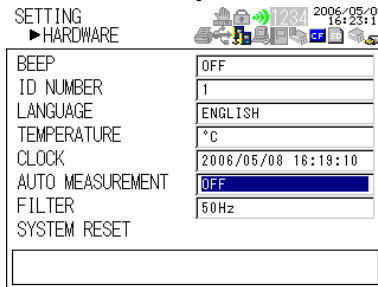
1. Press **SETTING** to enter Setting Mode.



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



3. Use the **arrow keys** to select **AUTO MEASUREMENT**, and press **SELECT**.



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

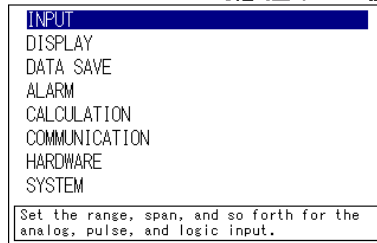
When there are multiple external storage media inserted and the power is turned ON, the XL100 searches in order the USB memory, CF card, and SD card for a setup file (AUTORUN.SET) and automatically loads the first one that it finds. If no external storage media is inserted or there is no setup file (AUTORUN.SET), the XL100 enters Free Running Mode.



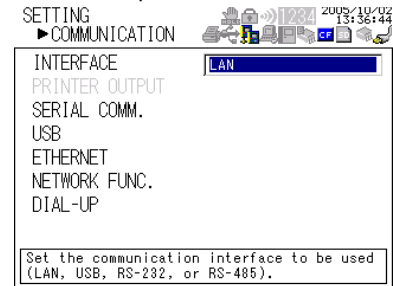
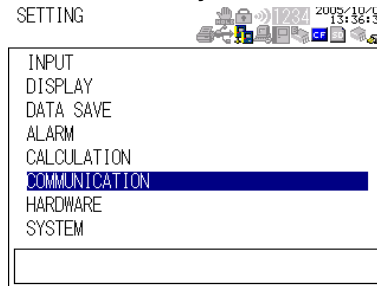
# 10.1 Selecting the Communication Interface

## Procedure

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



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



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, RS-232 (PRINTER), LAN/RS-232, or LAN/RS-485

## 10.1 Selecting the Communication Interface

The table below indicates the communication function that can be used simultaneously, if you set the interface to LAN/RS-232 or LAN/RS-485.

Operable Functions			Serial Communication Setting (Protocol)				
			Normal	Modbus (ASCII)		Modbus (RTU)	
				Master	Slave	Master	Slave
Serial	Normal		Yes	–	–	–	–
	Modbus (ASCII)	Master	–	Yes	–	–	–
		Slave	–	–	Yes	–	–
	Modbus (RTU)	Master	–	–	–	Yes	–
		Slave	–	–	–	–	Yes
LAN	Setting/Measurement server		No	Yes	Yes	Yes	Yes
	Test server		Yes	Yes	Yes	Yes	Yes
	FTP server		Yes	Yes	Yes	Yes	Yes
	HTTP server		Yes	Yes	Yes	Yes	Yes
	FTP client		Yes	Yes	Yes	Yes	Yes
	E-mail		Yes	Yes	Yes	Yes	Yes

\* If the serial communication setting > protocol is set to NORMAL, the normal commands of the serial interface, the test server, FTP server, HTTP server, FTP client, and e-mail functions of the LAN interface can be used simultaneously. However, the measurement/setting server of the LAN interface cannot be used simultaneously.



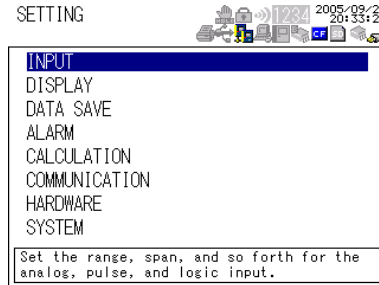
### Note

- If the interface is set to LAN/RS-232 or LAN/RS-485, the sampling interval cannot be set to a value less than equal to 5 s. If such value is specified, it is set to 10 s.
- If the interface is set to LAN/RS-232 or LAN/RS-485, the read cycle of the Modbus master cannot be set to a value less than or equal to 2 s. If such value is specified, it is set to 5 s.
- If you are outputting to a printer, select RS-232 (PRINTER) not RS-232.
- Connect the LAN cable only iff the interface is set to LAN, LAN/RS-232, or LAN/RS-485.

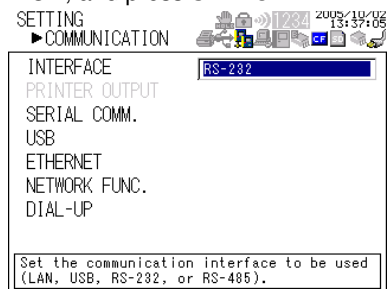
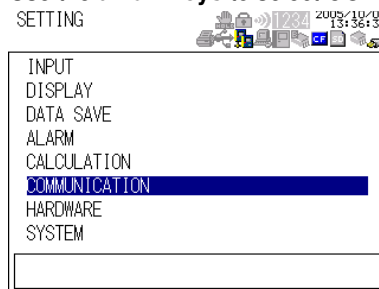
# 10.2 Setting the Serial Communication (RS-232, RS-485, Modbus, and Communication Channel)

## Procedure

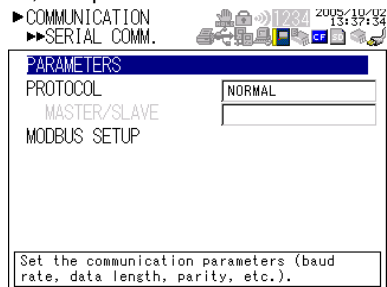
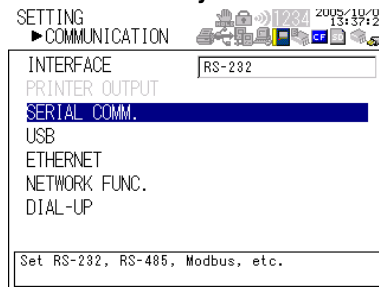
1. Press **SETTING** to enter Setting Mode.



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

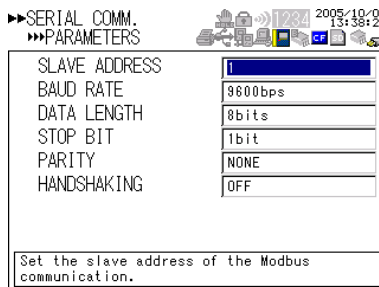


3. Use the **arrow keys** to select **SERIAL COMM.**, and press **SELECT**.



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

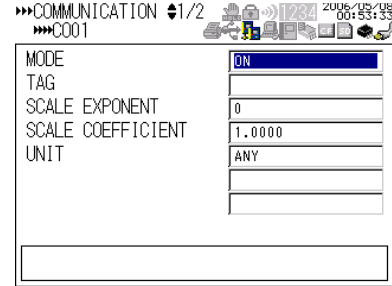
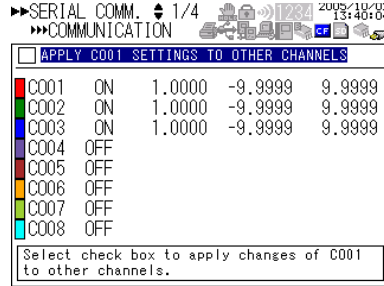


**10.2 Setting the Serial Communication (RS-232, RS-485, Modbus, and Communication Channel)**

- 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.

**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* (IMXL120C-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* (IMXL120C-E).

- Modbus master basic settings

Item	Setting
Communication interval	Select 100 ms, 200 ms, 500 ms, 1 s (default setting), 2 s, 5 s, 10 s, 20 s, 30 s, or 1 min.
Timeout value	Select 100 ms, 200 ms, 500 ms, 1 s (default setting), 2 s, 5 s, 10 s, 20 s, 30 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.

## 10.2 Setting the Serial Communication (RS-232, RS-485, Modbus, and Communication Channel)

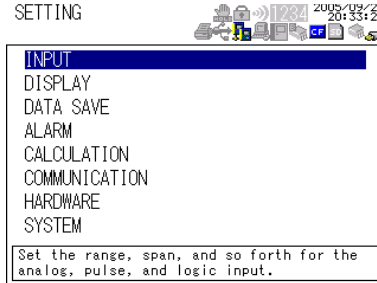
- Communication Channel Settings

Item	Setting
Mode	Select ON (default setting) or OFF.
Tag	Set the tag to assign to the communication channel using up to eight characters.
Scale exponent	Set the exponent ( $\pm YY$ ) of the scale value specified in floating point format. -38 to 37 (the default setting is +00)
Scale coefficient	Set the coefficient ( $\pm X.XXXXX$ ) of the scale value ( $\pm X.XXXXXE\pm YY$ ) specified in floating point format. -9.9999 to 9.9999 (the default setting is +1.0000)
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	mm <sup>2</sup> (default setting), cm <sup>2</sup> , m <sup>2</sup> , or km <sup>2</sup>
Volume	mm <sup>3</sup> (default setting), cm <sup>3</sup> , m <sup>3</sup> , 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/s <sup>2</sup> (default setting)
Frequency	mHz (default setting), Hz, kHz, rpm, or rph
Weight	mg (default setting), g, kg, t, or N
Work	mW (default setting), W, kW, J, Wh, or Ws
Pressure	Pa (default setting), kPa, MPa, N/m <sup>2</sup> , or bar
Flow rate	m <sup>3</sup> /s (default setting), m <sup>3</sup> /min, m <sup>3</sup> /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, ml/s, ml/min, ml/h, g/s, g/min, or g/h
Temperature	°C (default setting) or K
Voltage/current	mV (default setting), V, kV, MV, mA, A, kA, or MA
Power	mW (default setting), W, kW, MW, mvar, var, kvar, Mvar, mVA, VA, kVA, or MVA
Watt hour	Wh (default setting), kWh, MWh, varh, kvarh, or Mvarh
Any	Up to six characters.
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 purple, brown, orange, yellow-green, aqua, magenta, gray, lime, blue green, navy, yellow, olive, and purple. (Default settings are as follows: channel 1: red, 2: green, 3: blue, 4: blue purple, 5: brown, 6: orange, 7: yellow-green, 8: aqua, 9: magenta, 10: gray, 11: lime, 12: blue green, 13: navy, 14: yellow, 15: olive, 16: purple, 17: red, 18: green, 19: blue, 20: blue purple, 21: brown, 22: orange, 23: yellow-green, 24: aqua, 25: magenta, 26: gray, 27: lime, 28: blue green, 29: navy, 30: yellow, 31: olive, 32: purple)
Waveform line width	Select 1dot (default setting), 2dot, or 3dot.

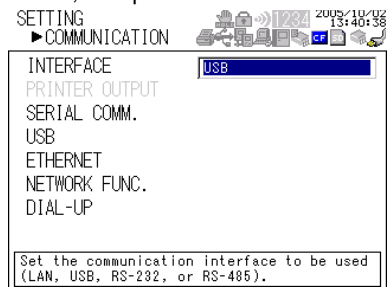
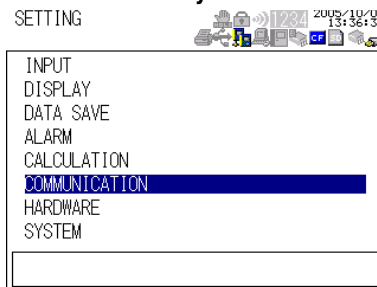
## 10.3 Setting the USB ID

### Procedure

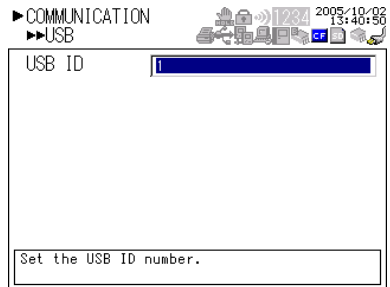
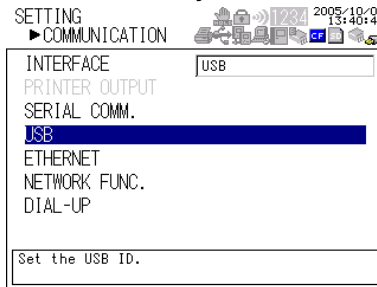
1. Press **SETTING** to enter Setting Mode.



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



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



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**.

### Explanation

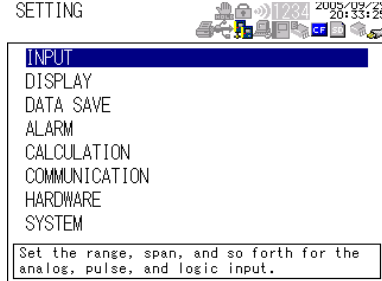
#### USB ID

Select the USB ID number from 0 to 31. The default setting is 0.

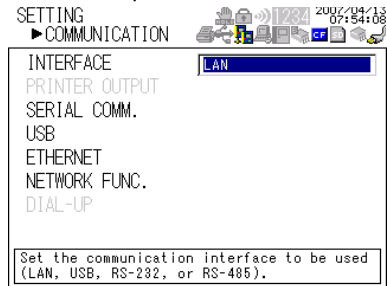
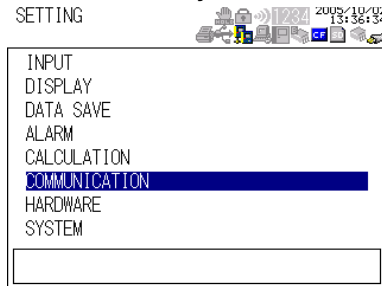
# 10.4 Setting the Ethernet Interface

## Procedure

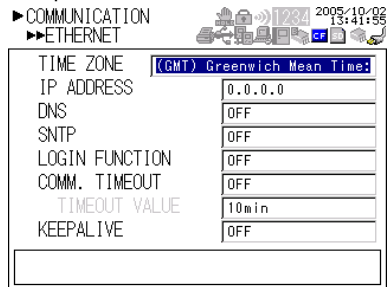
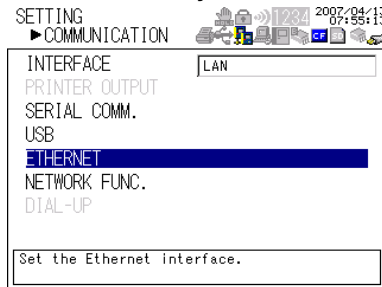
1. Press **SETTING** to enter Setting Mode.



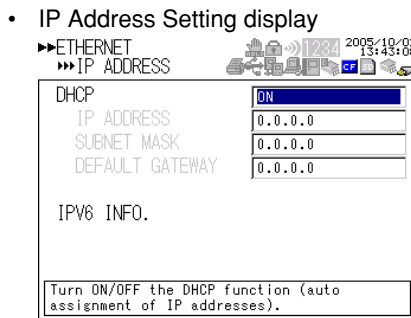
2. Use the **arrow keys** to select COMMUNICATION, and press **SELECT**.



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

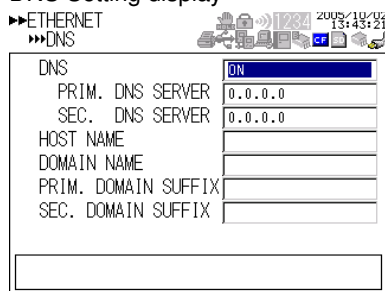


4. Use the **arrow keys** to select the desired item, and press **SELECT**. Press **SELECT** to show a selection list or display for setting the item.

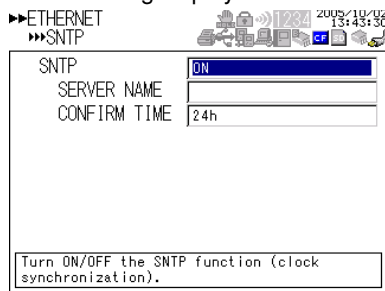




• DNS Setting display



• SNTP Setting display



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* (IMXL120C-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

## 10.4 Setting the Ethernet Interface

---

(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, Beirut, 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+9:00.

---

DHCP	Select ON or OFF. The default setting is ON.
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.

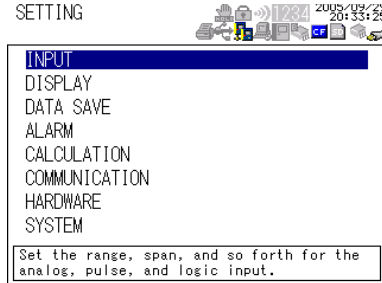
---

Item	Setting
IPv6 information (display only)	
Default gateway	Global
Link local	6to4
Automatic tunnel	Automatic tunnel 2
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.

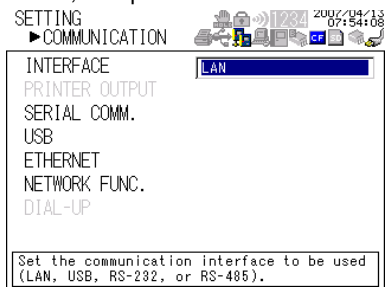
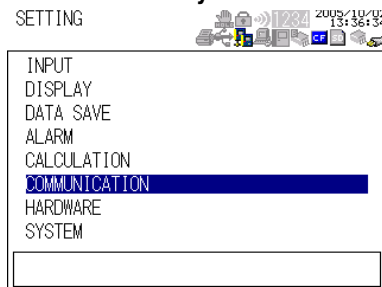
# 10.5 Setting the FTP Client

## Procedure

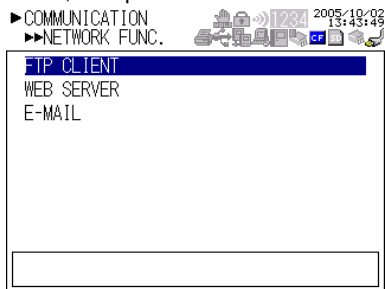
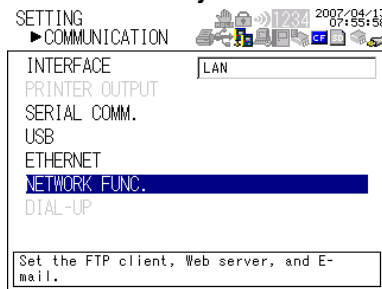
1. Press **SETTING** to enter Setting Mode.



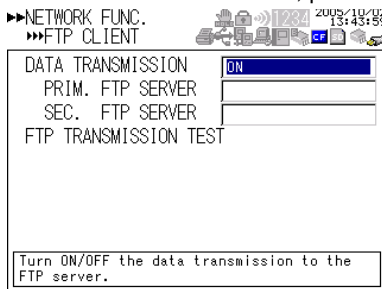
2. Use the **arrow keys** to select COMMUNICATION, and press **SELECT**.



3. Use the **arrow keys** to select NETWORK FUNC., and press **SELECT**.



4. With **FTP CLIENT** selected, press **SELECT**.



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
>>>PRIMARY SERVER
SERVER NAME
PORT NUMBER 21
LOGIN NAME
PASSWORD
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* (IMXL120C-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.
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.
PASV mode	Select ON or OFF. The default setting is OFF.
Initial path	Set the initial path using up to 64 characters.

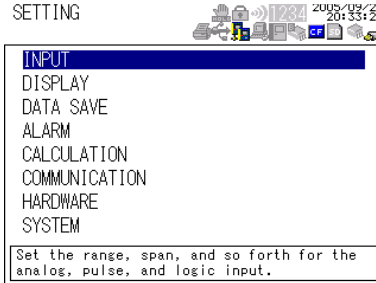
#### Note

**If the file transfer to both primary and secondary servers fails, the XL100 aborts the file transfer. When the connection to the destination recovers, the XL100 transfers the data files that failed to be transmitted (up to 16 data values) along with the new data file.**

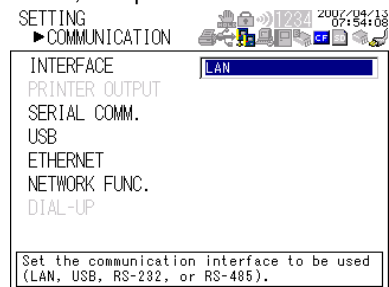
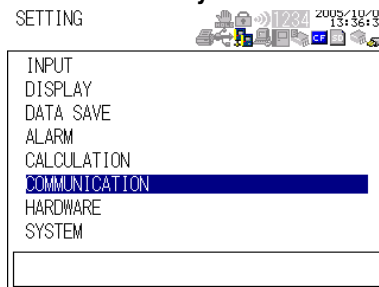
## 10.6 Setting the Web Server

### Procedure

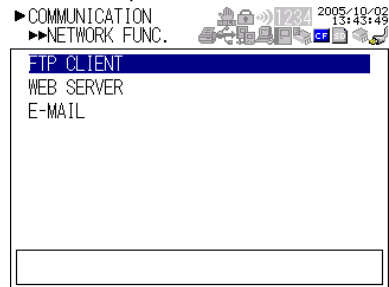
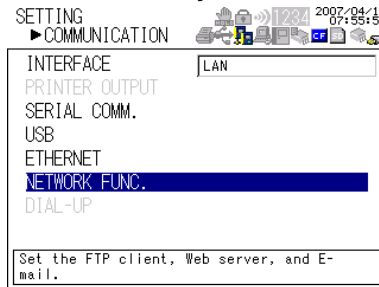
1. Press **SETTING** to enter Setting Mode.



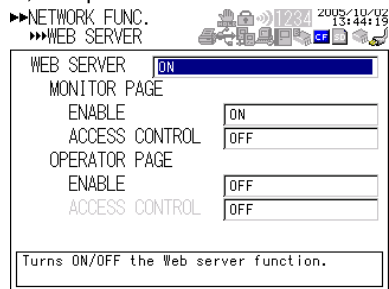
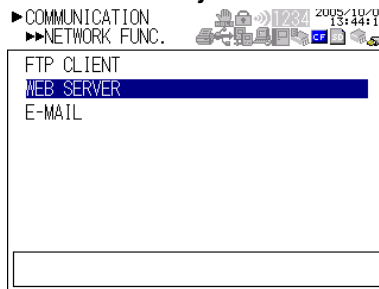
2. Use the **arrow keys** to select **COMMUNICATION**, and press **SELECT**.



3. Use the **arrow keys** to select **NETWORK FUNC.**, and press **SELECT**.



4. Use the **arrow keys** to select **WEB SERVER**, and press **SELECT**.



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****Setting the Web Server**

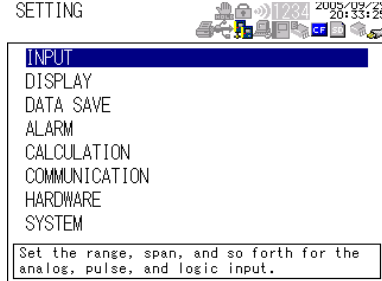
Specify the items below. For a detailed explanation, see the *Communication Function Manual* (IMXL120C-E).

<b>Item</b>	<b>Setting</b>
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.

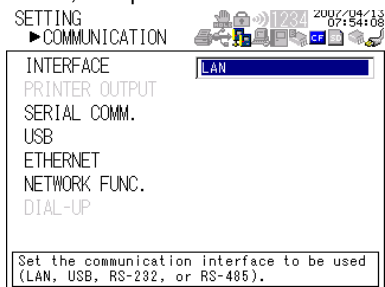
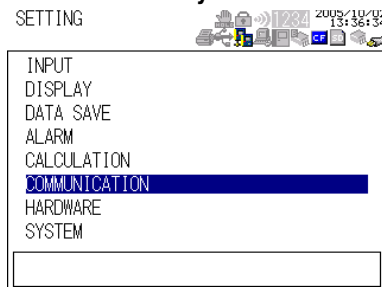
# 10.7 Setting the E-mail Transmission

## Procedure

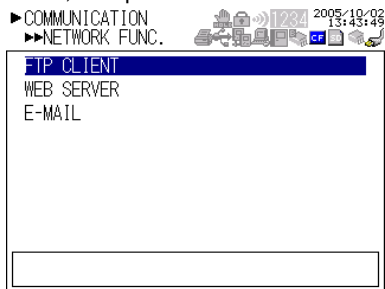
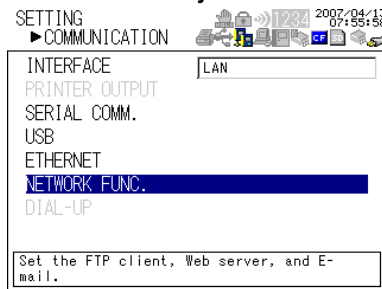
1. Press **SETTING** to enter Setting Mode.



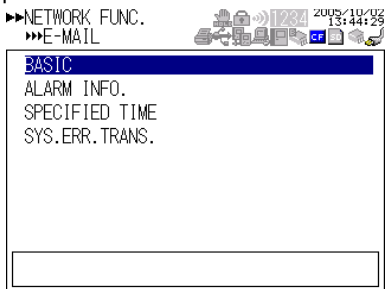
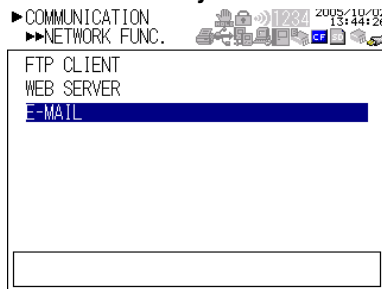
2. Use the **arrow keys** to select COMMUNICATION, and press **SELECT**.



3. Use the **arrow keys** to select NETWORK FUNC., and press **SELECT**.



4. Use the **arrow keys** to select E-MAIL, and press **SELECT**.





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 2005/10/01 06:00:00  
 »»BASIC

E-MAIL TRANSMISSION	OFF
SMTP SERVER NAME	
PORT NUMBER	25
RECIPIENT 1	
RECIPIENT 2	
SENDER	
MAIL AUTHENTICATION	OFF
E-MAIL TRANSMISSION TEST	

Start or stop the e-mail transmission.

- Alarm information transmission setting display

»E-MAIL 2005/10/02 13:46:21  
 »»ALARM INFO.

RECIPIENT 1	ON
RECIPIENT 2	ON
ADD INST. DATA	ON
ADD SOURCE URL	ON
SUBJECT	<XL100> Alarm_sumi
HEADER 1	
HEADER 2	

- Designated time setting page 1/2

»E-MAIL 2005/10/02 13:46:51  
 »»SPECIFIED TIME 1/2

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 2005/10/02 13:46:51  
 »»SPECIFIED TIME 2/2

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 13:49:13  
 »»SYS.ERR. TRANS.

RECIPIENT 1	ON
RECIPIENT 2	OFF
ADD INST. DATA	ON
ADD SOURCE URL	OFF
SUBJECT	<XL100> System_wa
HEADER 1	
HEADER 2	

## 10.7 Setting the E-mail Transmission

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* (IMXL120C-E).

Item	Setting
<b>Basic settings</b>	
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 server name using up to 150 characters or 10 addresses.
Recipient 2	Set the server name using up to 150 characters or 10 addresses.
Sender	Set the sender using up to 64 characters.
<b>Mail authentication</b>	
Mail authentication	Select POP authentication or OFF. The default setting is OFF.
Server name	Set the IP address or name (when using DNS) of the POP server.
Account name	Set the account name for the POP server using up to 32 alphanumeric characters.
Password	Set the password for the POP server using up to 32 alphanumeric characters.
E-mail transmission test	Performs a e-mail transmission test.
<b>Alarm information transmission setting</b>	
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.
<b>Specified time transmission</b>	
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.
<b>System error transmission setting</b>	
	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.

#### TIP

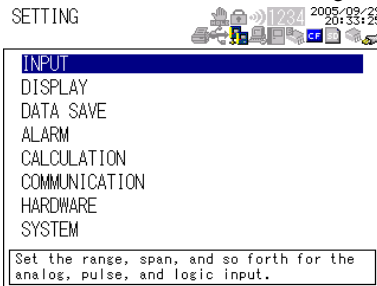
If e-mail transmission fails, the message is retransmitted up to twice at 30-s intervals. If retransmission fails, the e-mail message is discarded.

# 11.1 Setting the Print Output and Executing the Print Operation (Supported only on the XL121, XL122, and XL124)

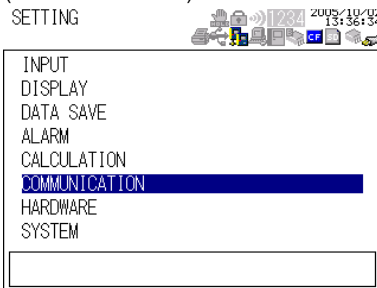
**Procedure**

**Setting the Print Output**

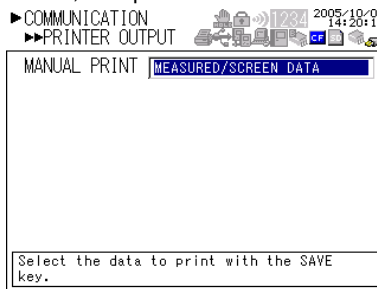
1. Press **SETTING** to enter Setting Mode.



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.



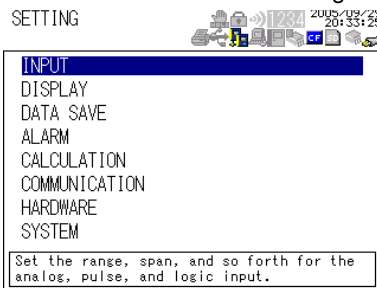
3. Use the **arrow keys** to select **PRINTER OUTPUT**, and press **SELECT**.



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.



## 11.1 Setting the Print Output and Executing the Print Operation

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

SETTING 2008-01-01 14:20:46

INPUT	
DISPLAY	
<b>DATA SAVE</b>	
ALARM	
CALCULATION	
COMMUNICATION	
HARDWARE	
SYSTEM	

Set the sampling interval, trigger, etc.

SETTING 2008-01-01 09:00:00

▶ DATA SAVE

SAMPLING INTERVAL	1s
SAVE MEDIA	INTERNAL MEMORY
SAVE TIME	23h47min48s
DATA TYPE	BINARY
SAVE MODE	NO DIVISION
FILE NAME	
PRINTER OUTPUT	ON
TRIGGER	

3. Use the **arrow keys** to select PRINTER OUTPUT, and press **SELECT**.

SETTING 2008-01-01 06:00:00

▶ DATA SAVE

SAMPLING INTERVAL	1s
SAVE MEDIA	INTERNAL MEMORY
SAVE TIME	23h47min48s
DATA TYPE	BINARY
SAVE MODE	NO DIVISION
FILE NAME	
PRINTER OUTPUT	ON
TRIGGER	

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

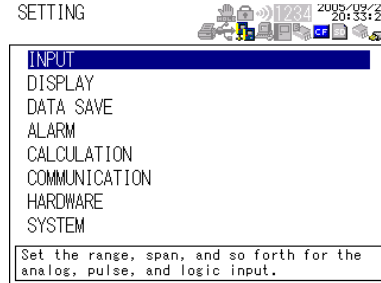
Press **HOLD** to hold the displayed contents at that point. Press **HOLD** again to release the hold.

---

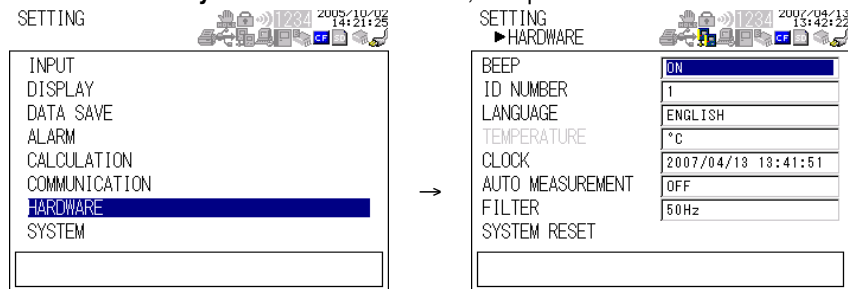
## 11.2 Setting the Beep Sound

### Procedure

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



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



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**.

### Explanation

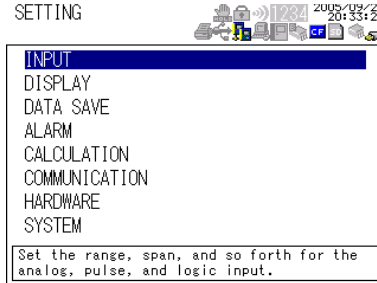
#### Beep sound

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.

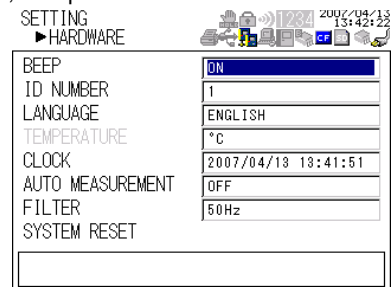
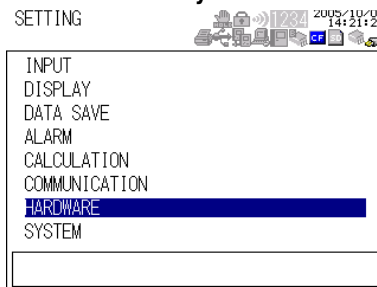
## 11.3 Set the ID Number

### Procedure

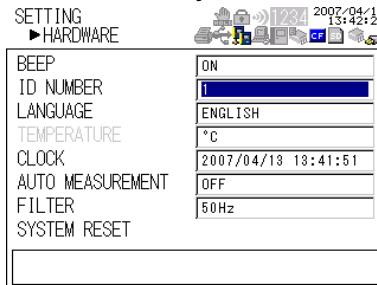
1. Press **SETTING** to enter Setting Mode.



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



3. Use the **arrow keys** to select **ID NUMBER**, and press **SELECT**.



4. Use the **arrow keys** to select the ID number, and press **SELECT**.
5. Press **SET**.

### Explanation

#### ID Number

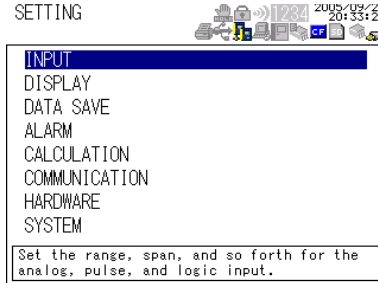
The ID number is used to identify each XL100 when making measurements using multiple XL100s.

Set the number in the range from 01 to 99. The default setting is 01.

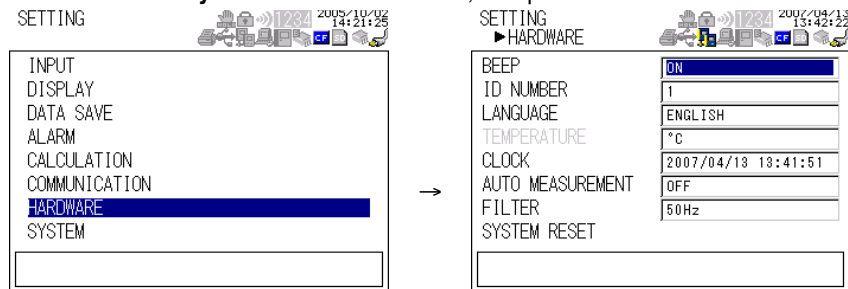
## 11.4 Setting the Language

### Procedure

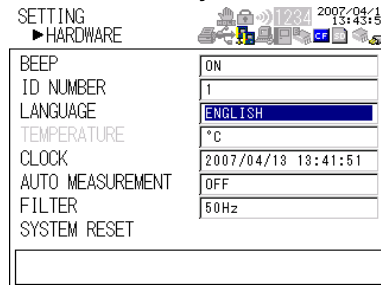
1. Press **SETTING** to enter Setting Mode.



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



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



4. Use the **arrow keys** to select the desired language, and press **SELECT**.
5. Press **SET**.

### Explanation

#### Language

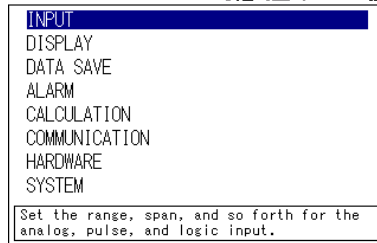
Select whether to show setup items and messages on the display in English or Japanese.



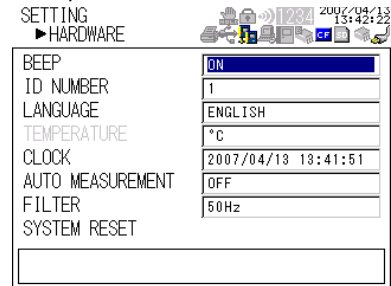
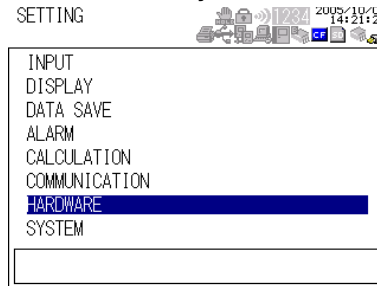
# 11.5 Setting the Temperature Unit

## Procedure

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



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



## Explanation

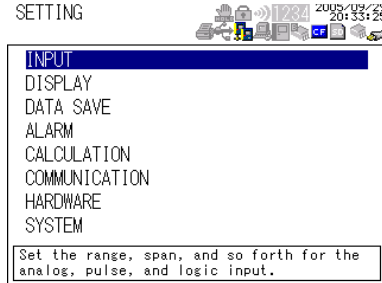
### Temperature

Check that the temperature unit is °C.

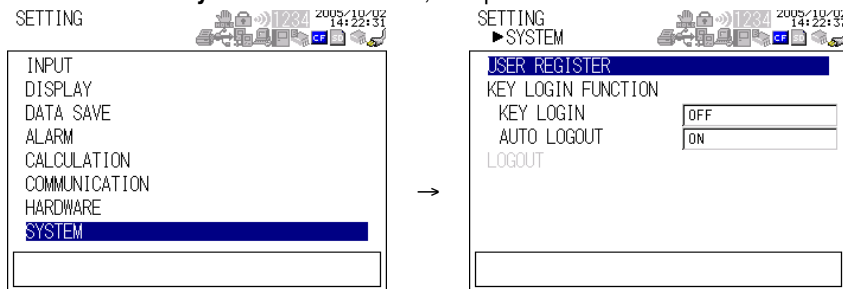
# 11.6 Registering Users

## Procedure

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



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



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**.

## Explanation

### 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."

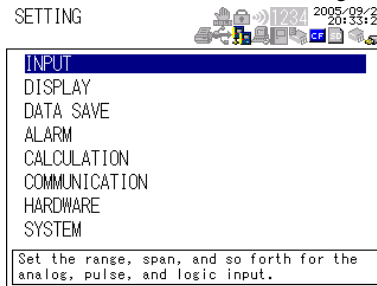
Item	Setting
Administrator	
Register	Select ON or OFF. The default setting is ON.
User name	Set the user name using up to 16 characters. The default setting is admin.
Password	Up to 6 alphanumeric characters
User 1 to 6	
Register	Select ON or OFF. The default setting is OFF.
User name	Set the user name 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

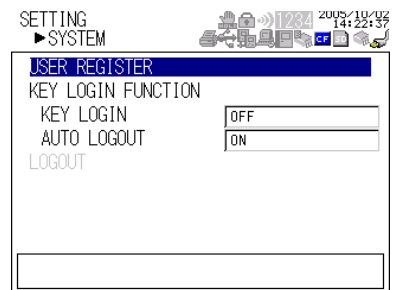
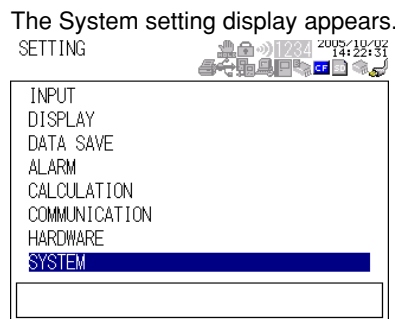
## Procedure

### Setting Key Login/Logout

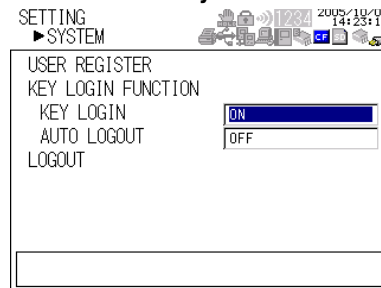
1. Press **SETTING** to enter Setting Mode.



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



3. Use the **arrow keys** to select **KEY LOGIN** or **AUTO LOGOUT**, and press **SELECT**.



4. Enter the item on the window.
5. Press **SET**.

### Executing the Key Login Operation

1. Press any key.

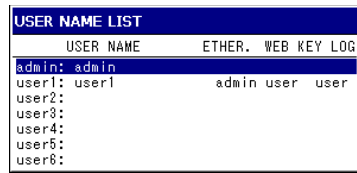
The following dialog box opens.



## 11.7 Setting and Executing Key Login/Logout and

2. With USER NAME selected, press **SELECT**.

The user selection window appears.



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.



### 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.

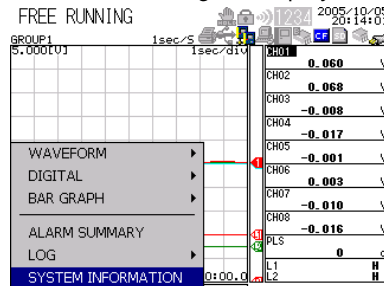
If Auto logout is turned OFF, you can log out by carrying out the logout operation on the System setting display. In addition, when you turn the power OFF, you are automatically logged out. When you turn the power ON again, you must log in.

The key login/logout status can be confirmed on the log (key login/logout) display (see section 2.3, "Data Display").

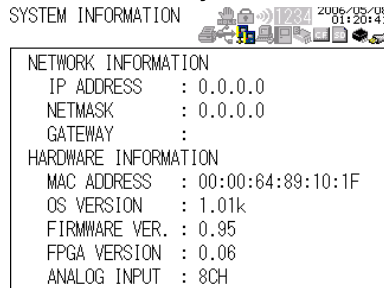
# 11.8 Displaying System Information

## Procedure

1. When in Free Running Mode or Logging Mode, press **DISPLAY** to show a pop-up menu for switching the display.



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



## Explanation

### System Information

- Network information

Item	Description
IP address	Currently assigned IP address
Net mask	Currently assigned subnet mask
Gateway	Currently assigned default gateway

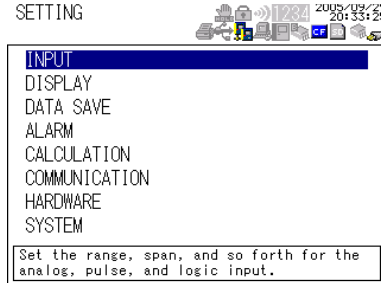
- Hardware information

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

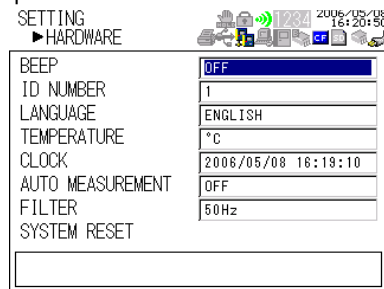
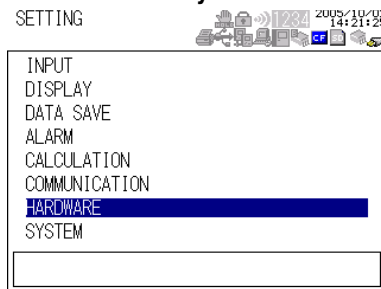
# 11.9 Setting the Filter

## Procedure

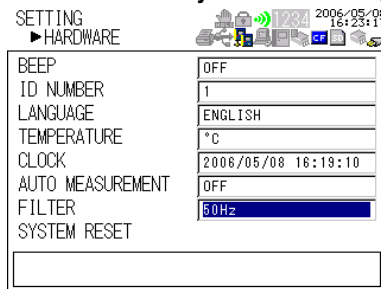
1. Press **SETTING** to enter Setting Mode.



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



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



4. Use the **arrow keys** to select desired filter, and press **SELECT**.
5. Press **SET**.

## Explanation

### Filter

Select 50 Hz, 60 Hz, or OFF. Set the frequency (50 Hz or 60 Hz) to match the frequency of the power supply that you are using.


The cutoff frequency varies depending on the number of measurement channels and sampling frequency as shown in the table below.

**Sampling Interval vs. Cutoff Frequency Table**

Sampling interval	100 msec	200 msec	500 msec	1 sec	2 sec	5 sec	10 sec	≥ 20 sec	
8 ch	50 Hz	2560 Hz	731 Hz	290 Hz	144 Hz	50 Hz	50 Hz	10 Hz	10 Hz
	60 Hz	2560 Hz	731 Hz	290 Hz	144 Hz	60 Hz	50 Hz	10 Hz	10 Hz
16 ch	50 Hz	–	2560 Hz	731 Hz	290 Hz	144 Hz	50 Hz	50 Hz	10 Hz
	60 Hz	–	2560 Hz	731 Hz	290 Hz	144 Hz	60 Hz	60 Hz	10 Hz
8 ch Filter OFF		2560 Hz	2560 Hz	2560 Hz	2560 Hz	2560 Hz	2560 Hz	2560 Hz	2560 Hz
16 ch Filter OFF		2560 Hz	2560 Hz	2560 Hz	2560 Hz	2560 Hz	2560 Hz	2560 Hz	2560 Hz

# 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 <ul style="list-style-type: none"> <li>• Check that the power cord is properly connected to the power outlet.</li> <li>• Check that the power supply is within the allowed supply voltage range.</li> </ul>	3.6
	For battery operation <ul style="list-style-type: none"> <li>• Check that the battery case is attached correctly.</li> <li>• Check that the battery is charged adequately.</li> </ul>	3.7
The measurement display is odd.	<ul style="list-style-type: none"> <li>• Check that noise is not riding on the input signal.</li> <li>• Check that the wires are correctly connected.</li> <li>• Check that the ambient temperature and humidity are within the allowed specifications.</li> </ul>	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.	4.1
	• 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.	9.10
Unable to save/load from the external storage medium.	• Check that the external storage medium is correctly inserted.	4.7
	• Check that the external storage medium is formatted. • Check that there is sufficient free space on the external storage medium.	9.10 2.3
Unable to set or control the instrument using communication commands.	• Check that the communication parameters are matched.	10.2
	• Check that the specifications of the cable is suitable for the application. • Check that the electrical specifications are correct.	3.8 3.8
Unable to print.	• Check that the printer is turned ON.	–
	• Check that the specifications of the connection cable are correct.	3.8
	• Check that the cable is correctly connected.	3.8
	• Check that the communication parameters on the XL100 and printer are matched. • Check that the chart is loaded correctly in the printer.	– –

## 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. Messages (normal messages) displayed on the screen automatically closes after 5 minutes.

### SettingError Messages

No.	Messages	Description and Corrective Action	Reference Section
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
221	Could not save within the save interval. Aborting the measurement.	Use a recommended medium or set a longer sampling interval.	9.10
223	Could not make the file. Aborting the measurement.	Increase the free space on the media.	–
230	There is no setting file.	There is no setting file available for loading.	9.8
231	Abnormal setting exists in file (xxx).	Abnormal information found in the setting file while loading.	9.6
235	An error occurred while loading the review file.	Check that the data type is binary.	9.1, 9.2
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.	–



## 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.	–
270	POP authentication failed.	POP server authentication failed. Check the server name, account name, and password.	–
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.	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.	10.4
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.	–

## 12.2 Messages and Their Corrective Actions

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
613	Copy the measured data?	Confirmation when copying measured data after the automated measurement is completed.
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.
655	The stop time has passed. Please end logging by manual.	A power failure recovery message. If the specified time of the end trigger has already been passed when you pressed START&STOP.
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 retrieval count.
702	Communication with the slave device that was suspended recovered normally.	When the communication with the slave device that was suspended recovers normally.

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## 12.3 Disposing the Product

This Product complies with the WEEE Directive (2002/96/EC) marking requirement. The affixed product label (see below) indicates that you must not discard this electrical/ electronic product in domestic household waste.

### **Product Category**

With reference to the equipment types in the WEEE directive Annex 1, this product is classified as a “Monitoring and Control instrumentation” product.

To return unwanted products within the EU area, contact your local Yokogawa Europe B. V. office.

Do not dispose in domestic household waste.



# 13.1 Input Specifications

## Analog Input

### Input method:

Floating balanced input and isolation between channels (common b terminal for the RTD)

### Number of inputs:

XL111/XL121: 8 channels. XL112/XL114/XL122/XL124: 16 channels

### Terminal type:

XL111/XL112/XL121/XL122: Clamp terminal, XL114/XL124: M3 screws terminal

Input type: TC (thermocouple), RTD (resistance temperature detector), and DCV (DC voltage) (RTD available on the XL111, XL112, XL121, and XL122 only)

### 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
50 V	-50.00 to 50.00 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

## 13.1 Input 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:

- Voltage range less than or equal to 1 VDC and TC: ±10 VDC
- Voltage range greater than or equal to 5 VDC: ±60 VDC

Input resistance:

Approx. 1 MΩ

Maximum common-mode voltage:

30 VACrms (50/60 Hz) or ±60 VDC

Common mode rejection ratio:

- 100 dB or more (50/60 Hz)  
With the digital filter turned OFF
- 140 dB or more (50/60 Hz)  
Scan interval 5 s (8 ch)/10 s (16 ch) with the digital filter turned ON

Normal-mode rejection ratio:

- 50 dB or more (50/60 Hz)  
Scan interval 5 s (8 ch)/10 s (16 ch) or higher with the digital filter turned ON

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.

Filter function:

Select OFF, 50 Hz, or 60 Hz (digital filter set automatically according to the sampling interval when 50 Hz or 60 Hz is specified)

## 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.	50 k/sampling interval	1 c
	500 kc/f.s.		10 c
	5 Mc/f.s.		100 c
	50 Mc/f.s.		1 kc
	500 Mc/f.s.		10 kc
Number of revolutions	500 rpm/f.s.	50 k/sec (Counts the number of pulses per second and converts the number to number of revolutions)	
	5 krpm/f.s.		
	50 krpm/f.s.		
	500 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

Calculation:

Arithmetic calculation between channels. Performs addition, subtraction, multiplication, and division between measured, calculated, and communication data and constants.

Linear scaling:

Available for DCV, TC, RTD, and pulse ranges.

Scaling limits: -30000 to 30000 (Pulse: -99999 to 99999)

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 mm<sup>2</sup> (default setting), cm<sup>2</sup>, m<sup>2</sup>, or km<sup>2</sup>
- Volume mm<sup>3</sup> (default setting), cm<sup>3</sup>, m<sup>3</sup>, 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/s<sup>2</sup> (default setting)
- Frequency mHz (default setting), Hz, kHz, rpm, or rph
- Weight mg (default setting), g, kg, t, or N
- Work mW (default setting), W, kW, J, Wh, or Ws
- Pressure Pa (default setting), kPa, MPa, N/m<sup>2</sup>, or bar
- Flow rate m<sup>3</sup>/s (default setting), m<sup>3</sup>/min, m<sup>3</sup>/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, ml/s, ml/min, ml/h, g/s, g/min, or g/h
- Temperature °C (default setting) or K
- Voltage/current mV (default setting), V, kV, MV, mA, A, kA, or MA
- Power mW (default setting), W, kW, MW, mvar, var, kvar, Mvar, mVA, VA, kVA, or MVA
- Watt hour Wh (default setting), kWh, MWh, varh, kvarh, or 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.

**Sampling Interval vs. Cutoff Frequency Table**

Sampling interval		100 msec	200 msec	500 msec	1 sec	2 sec	5 sec	10 sec	≥ 20 sec
8 ch	50 Hz	2560 Hz	731 Hz	290 Hz	144 Hz	50 Hz	50 Hz	10 Hz	10 Hz
	60 Hz	2560 Hz	731 Hz	290 Hz	144 Hz	60 Hz	50 Hz	10 Hz	10 Hz
16 ch	50 Hz	–	2560 Hz	731 Hz	290 Hz	144 Hz	50 Hz	50 Hz	10 Hz
	60 Hz	–	2560 Hz	731 Hz	290 Hz	144 Hz	60 Hz	60 Hz	10 Hz
8 ch	Filter OFF	2560 Hz	2560 Hz	2560 Hz	2560 Hz	2560 Hz	2560 Hz	2560 Hz	2560 Hz
16 ch	Filter OFF	2560 Hz	2560 Hz	2560 Hz	2560 Hz	2560 Hz	2560 Hz	2560 Hz	2560 Hz

---

## 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 purple, brown, orange, yellow-green, aqua, magenta, gray, lime, blue green, navy, 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

Time axis display:

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

Update rate:

Approx. 1 s

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

Update rate:

Approx. 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:

Approx. 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:

Black

### 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 (200 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)\*

\* Supported only on the XL121, XL122, and XL124.

### LCD settings:

Backlight auto off:

Select OFF, 10 s, 1, 2, 5, 10, 30, or 60 min

## 13.3 Data Storage Specifications

Internal memory:

Approx. 16 MB

External storage medium:

CF card Type II, SD card, or USB memory

(The SD card is supported only on the XL121, XL122, and XL124. Only the copy function is available for the USB memory. USB memories tested for compatibility recommended)

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 when using the 8-channel terminal block unit)

\* The sampling interval during pulse input is greater than or equal to 1 s.

\* If the communication is set to LAN/RS-232 or LAN/RS-485, the sampling interval is set greater than or equal to 10 s.

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: 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: 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: Binary
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	36.7 days	4.6 days	–	–	–
0.2 s	73.5 days	9.2 days	4.6 days	22 hours	12 hours
0.5 s	184 days	23 days	9.2 days	2.3 days	30.6 hours
1 s	1 year	46 days	23 days	4.6 days	2.6 days
2 s	2 years	92 days	46 days	9.2 days	5.1 days
3 s	5 years	230 days	92 days	23 days	13 days
10 s	10 years	1.3 years	230 days	46 days	26 days
20 s	Omitted	2.5 years	1.3 years	92 days	51 days
30 s	Omitted	3.8 years	1.9 years	138 days	77 days
1 minute	Omitted	7.6 years	3.8 years	276 days	153 days
2 minutes	Omitted	Omitted	7.6 years	1.5 years	306 days
5 minutes	Omitted	Omitted	Omitted	3.8 years	2 years

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

Save mode:

- File division: Select NO DIVISION or DIVISION. Specify DIVISION to save the data by dividing the data at constant time intervals from the start of the logging operation.
- Memory full operation: Select STOP, REPEAT, or DELETE.

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. (The SD card is supported only the XL121, XL122, and XL124.)

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## 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:

0 to 36000 times (specified with the sampling count)

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 k $\Omega$

Contact capacity:

5 to 40 V, 100 mA

---

## 13.5 Communication Specifications

(Supported only on the XL121, XL122, and XL124)

### Ethernet (10BASE-T/100BASE-TX)

Protocol: SMTP, HTTP, FTP, TCP/IP, SNMP, 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. POP before SMTP is supported. Retransmission is performed if transmission fails.

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 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. Retransmission is performed if retransmission fails.

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 NTP 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 to prevent third parties from operating the XL100.

### 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 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  $\Omega$ , 1/2 W recommended (externally attach between terminals A and B)

### Modbus Communication

Function: Master and slave

Transmission media:  
RS-232 or RS-485

Transmission mode:  
RTU mode or ASCII mode

Communication channels:  
32 channels, Modbus master

### TIP

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Simultaneous communication of Ethernet and RS-232 or Ethernet and RS-485 is possible. However, there are conditions for performing simultaneous communication. For details on the conditions for simultaneous communication, see the Communication Function manual.

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### Simultaneous Use of the Communication Interfaces

Simultaneous communication of Ethernet and RS-232 or Ethernet and RS-485 is possible.

---

## 13.6 Specifications of Other Functions

**Clock function:**

Set the year, month, day, hour, and minute (24-hour clock).

Accuracy:  $\pm 10$  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 (supported only on the XL121, XL122, and XL124):**

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 (0 to 40°C when using the battery)
	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
Size:	Approx. 155 (W) × 155 (H) × 55 (D) mm (without projecting parts and rubber boot)
Weight:	Approx. 800 g (without battery and rubber boot)
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 8 hours to charge the battery when the power is OFF.
	Operation time under continuous use: Approx. 7 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, LAN/RS-232, or LAN/RS-485)
Power consumption:	Approx. 4.3 W (interface: LAN, sampling interval: 100 ms, backlight: ON)



## Safety standards:

Complying standard: EN61010-1  
 Measurement category I (circuit voltage used:  $\pm 60$  VDC)  
 Pollution degree 2  
 Rated transient overvoltage 350 Vp-p

## Emission:

Complying standard:  
 EN61326 Class A, EN55011 Class A Group 1  
 EN61000-3-2, EN61000-3-3  
 This product class A for use in an industrial environment and may cause radio interference if used for domestic use.  
 Therefore, appropriate measures must be taken when using it for domestic use.

## 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 cable or better cable.
- Other (communications and I/O)  
Shielded cable, less than 3m.

## Immunity:

Complying standard: EN61326 Annex A  
 Immunity test requirement for equipment used in commercial environment.  
 Performance criterion under immunity test environments: B  
 (self-returnable performance deterioration)

## Cable condition:

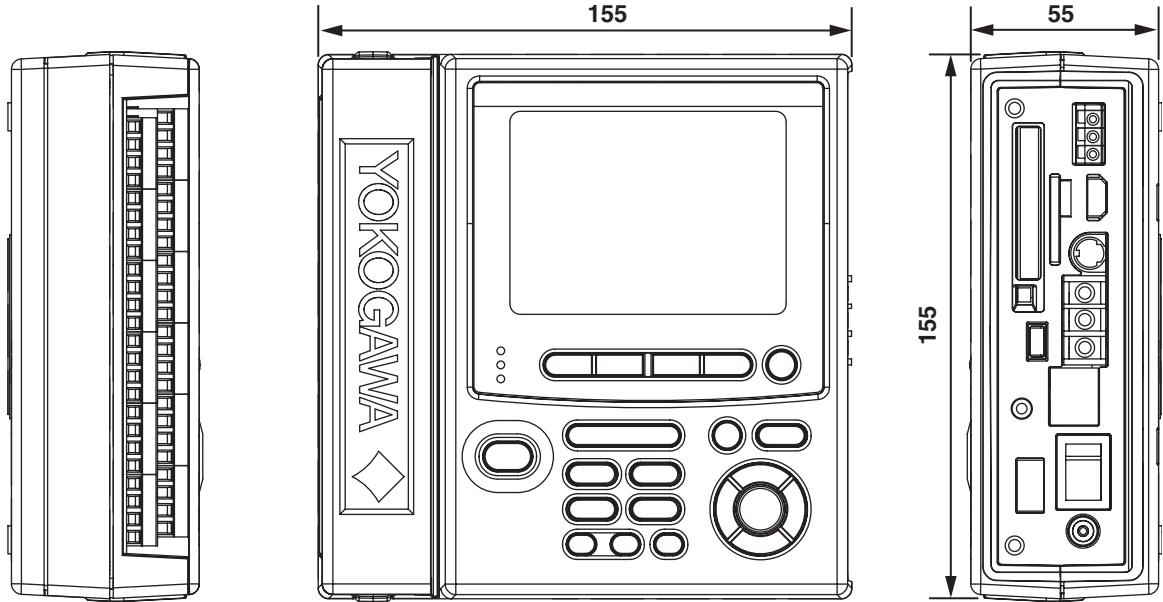
Same as the cable condition for emission.

## Accessories:

Terminal block unit:	8 ch (95052) or 16 ch (95053, 95055)
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 (supplied with the XL121, XL122, and XL124).
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. Create setup and setup files. Supported OS: Windows 2000 or Windows XP.

## 13.8 External Dimensions

Unit: mm



# 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
	Conv. exponent	Yes	Yes	
	Conv. Coefficient	Yes	Yes	
	Offset Exponent	Yes	Yes	
	Offset Coefficient	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

## Appendix 1 A List of Settings and User Registration Privileges

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	
	SAVE MODE	File division	Yes	Yes
		Division time	Yes	Yes
		Mem. full op.	Yes	Yes
	File name	Yes	Yes	
	Printer output	Yes	Yes	
	Trigger	Trigger mode	Yes	Yes
		Pre/Trigger delay	Yes	Yes
		Sampling count	Yes	Yes
		Start trigger setting	Yes	Yes
		End trigger setting	Yes	Yes

**Calculation Settings**

Setup Item		Administrator Privileges	User Privileges
Calculation	Tag name	Yes	Yes
	Calculation method	Yes	Yes
	Calculation item1	Yes	Yes
	Calculation item2	Yes	Yes
	Constant exponent	Yes	Yes
	Constant coefficient	Yes	Yes
	Unit	Yes	Yes
	Color	Yes	Yes
	Line width	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
	LAN/RS-232	Yes	No
	LAN/RS-485	Yes	No

• **Printer output setting**

Setup Item		Administrator Privileges	User Privileges
Printer output	Manual print	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

**Appendix 1 A List of Settings and User Registration Privileges**

Setup Item		Administrator Privileges	User Privileges
Modbus master command	ON/OFF	Yes	No
	First CH	Yes	No
	Last CH	Yes	No
	Address	Yes	No
	Register	Yes	No
	Type	Yes	No
	Communication channel	Mode	Yes
Tag		Yes	No
Scale exponent		Yes	No
Scale coefficient		Yes	No
Unit		Yes	No
Span Settings	Decimal point	Yes	No
	Span lower	Yes	No
	Span upper	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	IP address	Yes	No		
			Subnet mask	Yes	No		
			Default gateway	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		
		Communication timeout		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		

**Appendix 1 A List of Settings and User Registration Privileges**

Setup Item			Administrator Privileges	User Privileges
		Password	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
		Password	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
			Mail auth.	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

## Appendix 1 A List of Settings and User Registration Privileges

Setup Item		Administrator Privileges	User Privileges
	System error transmission	Recipient 1	No
		Recipient 2	No
		Add inst. data	No
		Add source URL	No
		Subject	No
		Header 1	No
		Header 2	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
	Filter	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
	User 3	Register	Yes	No
		User name	Yes	No
		Password	Yes	No
		Ethernet login	Yes	No
		Web browsing	Yes	No
	User 4	Register	Yes	No
User name		Yes	No	
Password		Yes	No	
Ethernet login		Yes	No	
Web browsing		Yes	No	



## Appendix 1 A List of Settings and User Registration Privileges

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

## Appendix 2 System Reset and Initialized Items When the Terminal Block Is Changed

### Input Settings

Setup Item	System Reset Communication Command (YC)	Terminal Block Change
Analog input	Yes	Yes
Pulse input	Yes	No
Logic input	Yes	No

### Alarm Settings

Setup Item	System Reset Communication Command (YC)	Terminal Block Change
Alarm settings	Analog input	Yes
	Pulse input	Yes
	Logic input	Yes
	Calculation data	Yes
	Communication data	Yes
Delay sampling count	Yes	No
Output AND/OR	Yes	No
Output hold	Yes	No
Display hold	Yes	No
Hysteresis	Yes	No
Alarm buzzer	Yes	No

### Display Settings

Setup Item	System Reset Communication Command (YC)	Terminal Block Change
General	Background	Yes
	Grid display	Yes
	Bar graph base	Yes
	Group name	Yes
	Display channel	Yes
Alarm line	Yes	No
LCD	Backlight auto off	Yes

### Data Storage Settings

Setup Item	System Reset Communication Command (YC)	Terminal Block Change
Data save	Sampling interval	Yes
	Save media	Yes
	Data type	Yes
	SAVE MODE	Yes
	File name	Yes
	Printer output	Yes
	Trigger	Yes

### Calculation Settings

Setup Item		System Reset Communication Command (YC)	Terminal Block Change
Calculation		Yes	Yes
Statistics		Yes	No

### Communication Settings

Setup Item		System Reset Communication Command (YC)	Terminal Block Change
Interface		No	No
Printer output	Manual print	Yes	No
Serial communication	Parameters	No	No
	Protocol	No	No
	Modbus setup	Yes	No
	Modbus master command	Yes	No
	Communication channel	Yes	No
USB	USB ID	No	No
Ethernet	Time zone	No	No
Network function	FTP client	No	No
	Web Server	No	No
	E-mail	No	No

### Hardware Settings

Setup Item		System Reset Communication Command (YC)	Terminal Block Change
Hardware	Beep sound	Yes	No
	ID number	No	No
	Language	No	No
	Temperature	Yes	No
	Clock	No	No
	Automated measurement	Yes	No
	Filter	Yes	No

### System Settings

Setup Item		System Reset Communication Command (YC)	Terminal Block Change
User register	Administrator	Yes	No
	User 1	Yes	No
	User 2	Yes	No
	User 3	Yes	No
	User 4	Yes	No
	User 5	Yes	No
	User 6	Yes	No
Key login function		Yes	No
Auto logout		Yes	No

Yes: Item that is initialized. No: Item that is not initialized.

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