**Operation
Guide**

Model FX103/FX106/FX112
FX100

YOKOGAWA ◆
Yokogawa Electric Corporation

Contents

Foreword

Thank you for purchasing the FX100. This operation guide briefly explains the functions and operating procedures of the FX100. The installation and wiring procedures, and handling precautions of the FX100 are also explained. For information about all the functions excluding the communication functions, see the electronic manual "*FX100 User's Manual*" (IM 04L20A01-01E) provided on the accompanying CD-ROM. The following three manuals are provided in addition to this manual. Read them along with this manual.

Electronic Manuals Provided on the Accompanying CD-ROM

Manual Title	Manual No.	Description
FX100 User's Manual	IM 04L20A01-01E	Describes all functions and procedures of the FX100 excluding the communication functions.
FX100 Communication Interface User's Manual	IM 04L20A01-17E	Describes the communication functions of the FX100 using the Ethernet/serial interface.
DAQSTANDARD User's Manual	IM 04L20A01-61E	Describes the functions and operating procedure of the software "DAQSTANDARD" that comes with the package.

For models, suffix codes, and accessories, see the "*FX100 User's Manual*" (IM 04L20A01-01E). For information on opening the electronic manuals, see page 6.

Note

- The contents of this manual are subject to change without prior notice as a result of continuing improvements to the instrument's performance and functions.
- Every effort has been made in the preparation of this manual to ensure the accuracy of its contents. However, should you have any questions or find any errors, please contact your nearest YOKOGAWA dealer as listed on the back cover of this manual.
- Copying or reproducing all or any part of the contents of this manual without the permission of Yokogawa Electric Corporation is strictly prohibited.
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Safety Precautions

The FX100 conforms to IEC safety class I (provided with terminal for protective grounding), Installation Category II, and EN61326-1 (EMC standard), class A (use in a commercial, industrial, or business environment).

This product is a measurement category II (CAT II) instrument.

* Measurement category II (CAT II)
  Applies to measuring circuits connected to low voltage installation, and electrical instruments supplied with power from fixed equipment such as electric switchboards.

The following general safety precautions must be observed during all phases of operation. If the FX100 is used in a manner not specified in this manual, the protection provided by the FX100 may be impaired. YOKOGAWA Electric Corporation assumes no liability for the customer's failure to comply with these requirements.

About This Manual

- This manual should be read by the end user.
- Read this manual thoroughly and have a clear understanding of the product before operation.
- This manual explains the functions of the product. YOKOGAWA does not guarantee that the product will suit a particular purpose of the user.
- Under absolutely no circumstances may the contents of this manual be transcribed or copied, in part or in whole, without permission.
- The contents of this manual are subject to change without prior notice.
- Every effort has been made in the preparation of this manual to ensure the accuracy of its contents. However, should you have any questions or find any errors or omissions, please contact your nearest YOKOGAWA dealer.

Precautions Related to the Protection, Safety, and Alteration of the Product

- The following safety symbols are used on the product and in this manual.

  ⚠ "Handle with care." (To avoid injury, death of personnel or damage to the instrument, the operator must refer to the explanation in the manual.)

  ⏚ Protective grounding terminal

  ∿ Alternating current

- For the protection and safe use of the product and the system that integrates the product, be sure to follow the instructions and precautions on safety that are stated in this manual whenever you handle the product. Take special note that if you handle the product in a manner that violate these instructions, the protection functionality of the product may be damaged or impaired. In such cases, YOKOGAWA does not guarantee the quality, performance, function, and safety of the product.
- If you are replacing parts or consumable items of the product, make sure to use parts specified by YOKOGAWA.
- Do not modify this product.

WARNING

- **Power Supply**
  Ensure that the source voltage matches the voltage of the power supply before turning ON the power.
- **Protective Grounding**
  Make sure to connect the protective grounding to prevent electric shock before turning ON the power.
- **Necessity of Protective Grounding**
  Never cut off the internal or external protective earth wire or disconnect the wiring of the protective earth terminal. Doing so invalidates the protective functions of the instrument and poses a potential shock hazard.
- **Defect of Protective Grounding**
  Do not operate the instrument if the protective earth might be defective. Make sure to check them before operation.
- **Do Not Operate in an Explosive Atmosphere**
  Do not operate the instrument in the presence of flammable liquids or vapors. Operation in such environments constitutes a safety hazard.
- **Do Not Remove Covers**
  The cover should be removed by YOKOGAWA's qualified personnel only. Opening the cover is dangerous, because some areas inside the instrument have high voltages.
- **External Connection**
  Connect the protective grounding before connecting to the item under measurement or to an external control unit.
- **Damage to the Protective Structure**
  Operating the FX100 in a manner not described in this manual may damage its protective structure.

Exemption from Responsibility

- YOKOGAWA makes no warranties regarding the product except those stated in the WARRANTY that is provided separately.
- YOKOGAWA assumes no liability to any party for any loss or damage, direct or indirect, caused by the user or any unpredictable defect of the product.

Handling Precautions of the Software

- YOKOGAWA makes no warranties regarding the software accompanying this product except those stated in the WARRANTY that is provided separately.
- Use the software on a single PC.
- You must purchase another copy of the software, if you are to use the software on another PC.
- Copying the software for any purposes other than backup is strictly prohibited.
- Please store the original media containing the software in a safe place.
- Reverse engineering, such as decompiling of the software, is strictly prohibited.
- No portion of the software supplied by YOKOGAWA may be transferred, exchanged, sublet, or leased for use by any third party without prior permission by YOKOGAWA.

Conventions Used in This Manual

⚠ Danger. Refer to corresponding location on the instrument.
This symbol appears on dangerous locations on the instrument which require special instructions for proper handling or use. The same symbol appears in the corresponding place in the manual to identify those instructions.

WARNING Calls attention to actions or conditions that could cause serious injury or death to the user, and precautions that can be taken to prevent such occurrences.

CAUTION Calls attentions to actions or conditions that could cause damage to the instrument or user's data, and precautions that can be taken to prevent such occurrences.

Note Provides important information for the proper operation of the instrument.

Handling Precautions

Handling Precautions for the FX100
- This instrument uses many plastic parts. When cleaning, wipe using a dry soft cloth. Do not use volatile chemicals since this might cause discoloring and deformation.
- Do not bring charged objects near the signal terminals. Doing so can lead to malfunction.
- Do not pour volatile agents on the LCD, panel keys, or other parts of the instrument nor leave them in contact with rubber or PVC products for an extended time. Doing so can lead to malfunction.
- Do not apply shock to the instrument.
- When not in use, make sure to turn OFF the power.
- If there are any symptoms of trouble such as smoke, strange odors, or strange sounds coming from the instrument, immediately turn OFF the power and disconnect power supply. Then, contact your nearest YOKOGAWA dealer or representative.

Handling Precautions for the External Storage Medium
- Use caution in the handling of the external storage medium as it is delicate.
- Write operations to floppy disks may fail in high-temperature or low-temperature environments. If you are using the FX100 in a low-temperature environment (around 10 °C or less), use the FX100 after the warm-up time (at least 30 minutes) has elapsed.
  If you are using the FX100 in a high-temperature environment (around 40 °C or more), it is recommended that the external storage medium be inserted into the drive when saving the data and be removed after the data storage operation is finished.
- For the general handling precautions of the external storage medium, see the instruction manual that came with that medium.

CAUTION

- Do not eject the external storage medium while the access lamp is illuminated. This can damage the data.
- Do not operate the floppy disk drive in a place with vibrations or shock. The disk or drive may malfunction.

How to Open the Electronic Manuals

The CD-ROM that came with the FX100 contains manuals listed on page 3 in the PDF file format.
Opening a manual requires a computer with the following specifications.
- CPU: Pentium 166 MHz or higher
- Free memory: 16 MB or more
- OS: Microsoft Windows 98 SE, Windows Me, Windows NT 4.0, Windows 2000, or Windows XP.
- Display: SVGA mode (800 x 600 dpi), capable of displaying 256 colors
- Acrobat Reader or Adobe Reader must be installed.

Place the CD-ROM in the CD-ROM drive of the PC. The names of the manuals will automatically appear on screen. Click a name to open the corresponding manual.
* If the manual names do not appear, double-click the My Computer icon, double-click FX100_Manual, then select the manual you wish to open.

Introduction to Functions

Measurable Signals

The FX100 enables measurement of DC voltage, DC current, thermocouple and RTD input, and ON/OFF input. The FX100 samples the measurement input at the scan interval. The scan interval is 250 ms for the FX103, and 1 s or 2 s for the FX106 and FX112. Up to 4 alarm conditions can be set for each measurement input.

Data Saving Function

Measured data can be acquired continuously, or acquired only upon activation of alarms or other events. Data from the former method is called display data, and data from the latter method is called event data.

Measured data is written to the internal memory at specified intervals. For models with an installed dirve for external storage medium, data from the internal memory can be automatically, or, if necessary, manually saved to a storage medium. The FTP function allows you have the instrument automatically forward measured data via the Ethernet communication interface (optional).
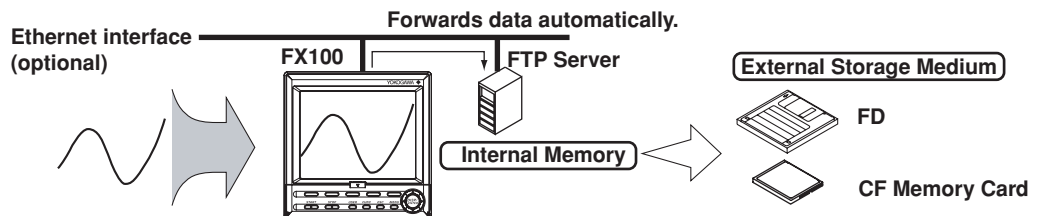
Display Functions

Measured data can be displayed according to previously specified groups as trend waveforms, numerical data, or in bar graphs. There is also a screen in which all channels can be monitored at once.
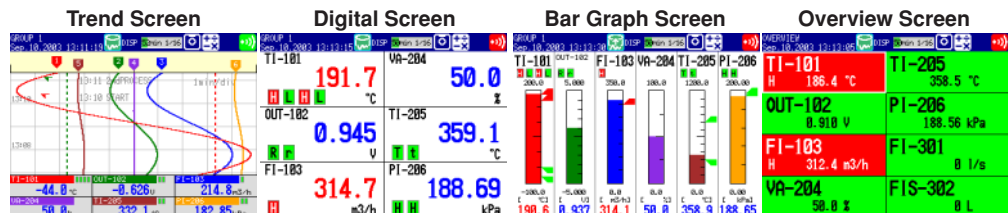
Other Functions

Computation function (optional): equations can be assigned to computation channels allowing various kinds of calculations.

FAIL/memory end function (optional): if the FX100 fails, an alarm is activated. Alarms can also be activated according to the space remaining in the internal memory.

Remote control function (optional): remote input can be sent to a terminal on the rear panel for performing specified operations.

Key login function: a password is required to operate the FX100.

Key lock: specific keys can be made inactive.
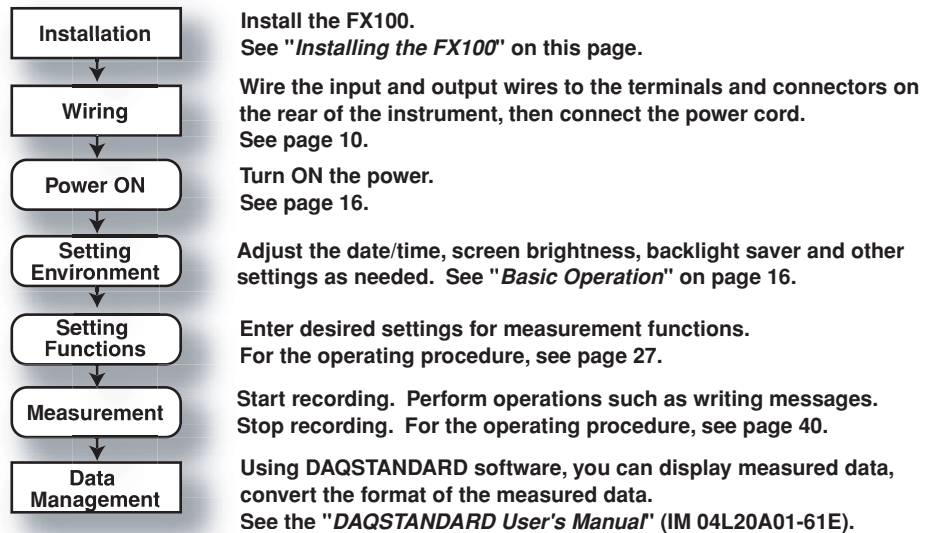
Communication functions (optional): using Ethernet communication functions, you can have the instrument forward data automatically via FTP, send e-mail upon occurrences of alarms and other events, perform monitoring via a Web browser.

DAQSTANDARD

Using DAQSTANDARD software, you can display measured data, convert the format of the measured data, or create FX100 settings.

FX100 Workflow

Follow the steps in the flowchart below when using the FX100 for the first time.

Installation	**Install the FX100.** See "*Installing the FX100*" on this page.
Wiring	**Wire the input and output wires to the terminals and connectors on the rear of the instrument, then connect the power cord.** See page 10.
Power ON	**Turn ON the power.** See page 16.
Setting Environment	**Adjust the date/time, screen brightness, backlight saver and other settings as needed. See "*Basic Operation*" on page 16.**
Setting Functions	**Enter desired settings for measurement functions.** **For the operating procedure, see page 27.**
Measurement	**Start recording. Perform operations such as writing messages.** **Stop recording. For the operating procedure, see page 40.**
Data Management	**Using DAQSTANDARD software, you can display measured data, convert the format of the measured data.** **See the "*DAQSTANDARD User's Manual*" (IM 04L20A01-61E).**

Installing the FX100

Installation Location

Install the instrument in the following locations.

- **Instrumentation Panel**
  The FX100 is designed to be installed in an instrumentation panel (panel mount type).
- **Well-Ventilated Location**
  Install the instrument in a well-ventilated location to prevent the temperature inside the instrument from rising. For the panel cut dimensions when arranging multiple FX100, see the next page. Also, when other instruments are arranged on the panel, allow adequate space between them.
- **Location Where Mechanical Vibration Is Small**
  Select a location with low mechanical vibration for installation.
- **Horizontal Location**
  When installing the FX100, make sure it does not tilt to the left or right (0 to 30 degrees of backward tilt angle is allowed).

Note

- Condensation may occur if the instrument is moved to another place where the ambient temperature is higher, or if the temperature changes rapidly. In addition, measurement errors will occur when using thermocouple input. In this case, let the instrument adjust to the new environment for at least an hour before using it.
- The life of the LCD may shorten (degradation of the image quality) if the FX100 is used in a high-temperature environment. It is recommended that the backlight brightness of the LCD be set low if the FX100 is installed in a hot environment (around 40∞C or higher). For a description on the LCD brightness setting, see section 3.4, "*Setting the Brightness of the LCD and the Backlight Saver Function*" in the "*FX100 User's Manual*" (IM 04L20A01-01E).

Do not install the FX100 in the following places.

- **In Direct Sunlight or Near Heat Appliances**
  Select a location with the smallest temperature fluctuation as possible near room temperature (23 °C). Placing the FX100 in direct sunlight or near heat appliances can cause adverse effects.
- **Where an Excessive Amount of Soot, Steam, Dust, or Corrosive Gases Are Present**
  Soot, steam, humidity, dust, and corrosive gas can cause adverse effects on the FX100. Avoid installing the FX100 in an environment with a high level of such elements.
- **Near Magnetic Field Sources**
  Avoid bringing magnets or instruments that produce magnetic fields near the FX100. Using the FX100 near a strong magnetic field source can cause measurement errors.
- **Where the View of the Display Is Poor**
  The FX100 uses a LCD for the display. Therefore, viewing of the display from an extreme angle is difficult. Install the FX100 so that the user can easily view the display.
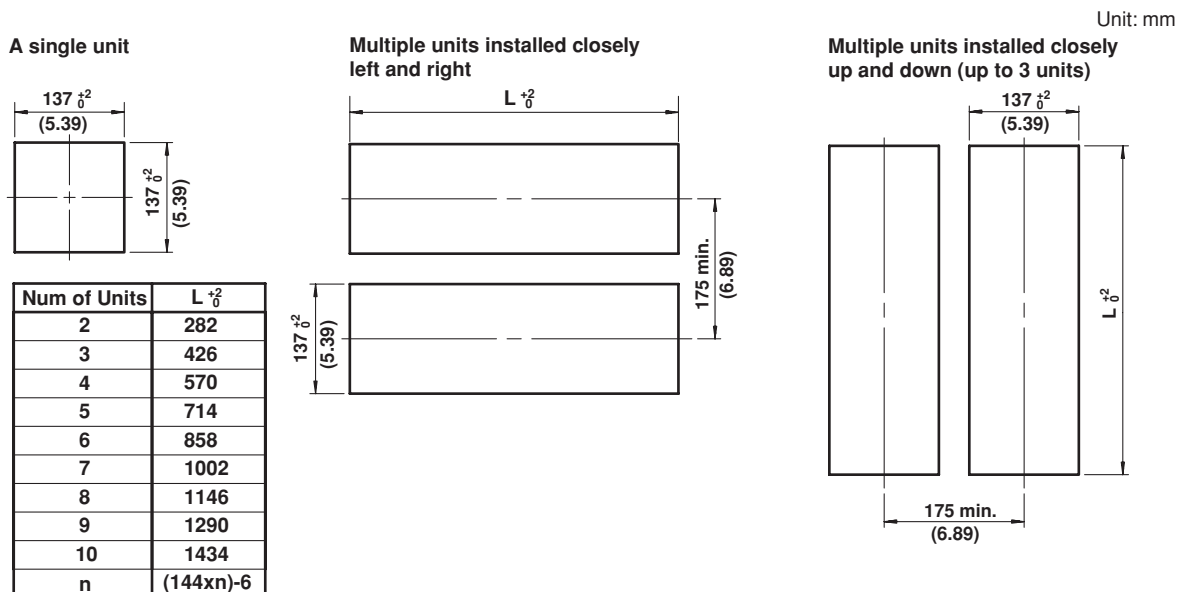
Installation Procedure

Use a 2 mm to 26 mm thick steel plate for the panel on which the FX100 is to be mounted.
1. Insert FX100 from the front of the panel.
2. Using the mounting brackets that came with the package, secure the FX100 to the panel as shown in the following figure.
   - Two mounting brackets are used at the top and bottom or left and right of the case (remove the seal covering the holes of the mounting brackets on the case beforehand).
   - The adequate tightening torque of the screws for the panel mounting brackets is 0.8 to 1.2 N-m.
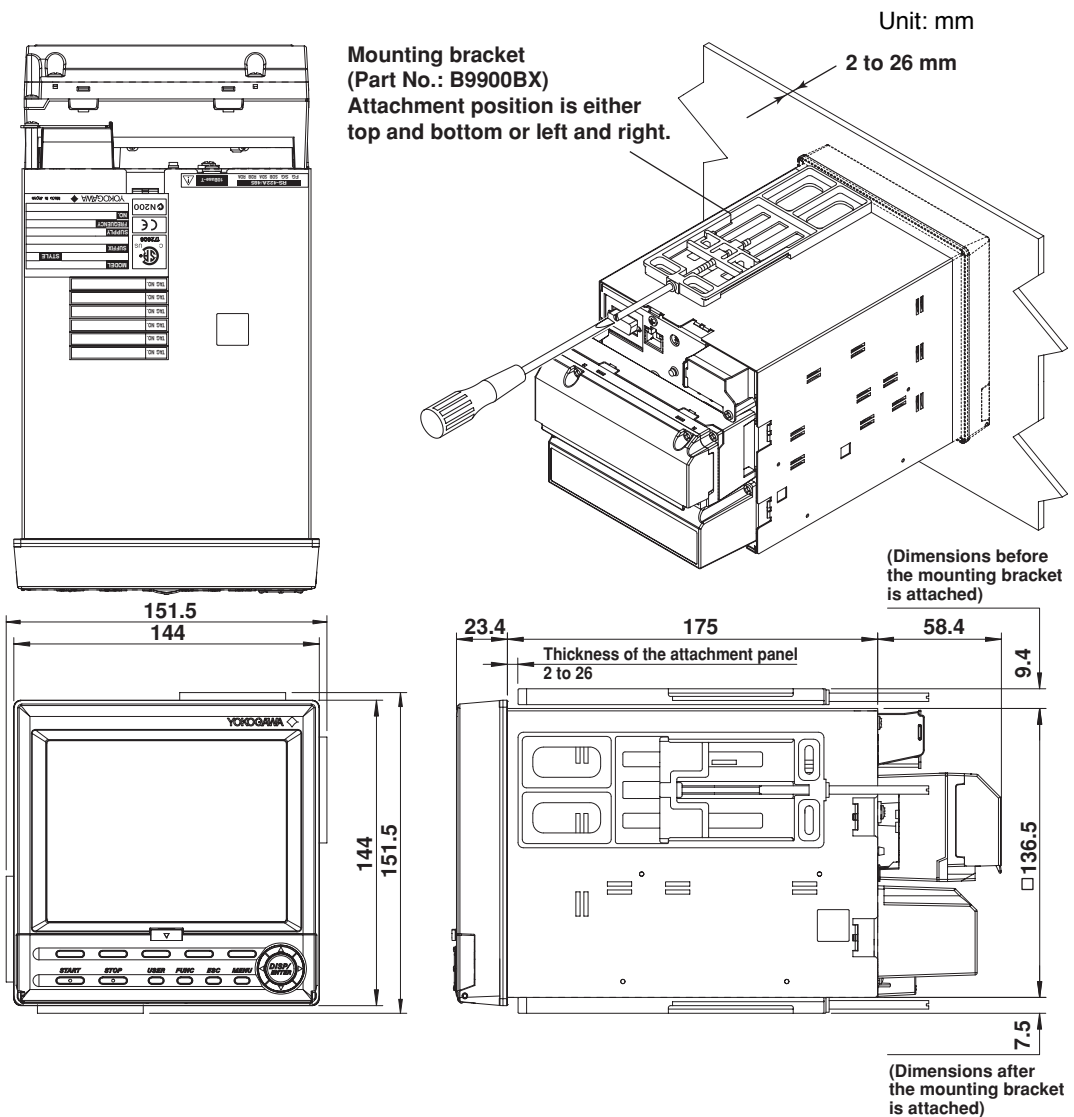

CAUTION

Tightening the screws with a torque greater than the adequate tightening torque can cause deformation of the case or damage to the bracket.

Panel Cut Diagram

Unit: mm

A single unit

137^{+2}_{0}
(5.39)

137^{+2}_{0}
(5.39)

Num of Units	L^{+2}_{0}
2	282
3	426
4	570
5	714
6	858
7	1002
8	1146
9	1290
10	1434
n	(144xn)-6

Multiple units installed closely left and right

L^{+2}_{0}

137^{+2}_{0}
(5.39)

175 min.
(6.89)

Multiple units installed closely up and down (up to 3 units)

137^{+2}_{0}
(5.39)

L^{+2}_{0}

175 min.
(6.89)

Panel Mounting Diagram

Unit: mm

**Mounting bracket
(Part No.: B9900BX)
Attachment position is either
top and bottom or left and right.**

2 to 26 mm

(Dimensions before
the mounting bracket
is attached)

9.4

151.5
144

144
151.5

23.4   175   58.4

**Thickness of the attachment panel
2 to 26**

□136.5

7.5

(Dimensions after
the mounting bracket
is attached)

Wiring

General Precautions When Wiring the Input/Output Signal Wires

WARNING

· To prevent the possibility of electric shock when wiring, confirm that the power supply source is turned OFF.
· If a voltage greater than or equal to 30 VAC/60 VDC is going to be applied to the output terminals, use round crimp-on lugs with insulation covers (to prevent the wires from coming loose) for connecting the signal wires on all output terminals. In addition, use double insulated wires (withstand voltage of 2300 VAC or more) for signal wires to which a voltage greater than or equal to 30 VAC/60 VDC is to be applied and basic insulation wires (withstand voltage of 1350 VAC or more) for all other signal wires. To prevent the possibility of electric shock, attach the terminal cover after connecting the wires and keep your hands away from the terminals.

⚠

CAUTION

- If a large pulling force is applied to the input/output signal wires connected to the FX100, the terminal or signal wire may become damaged. To prevent this from happening, fix all the wiring cords to the rear of the installation panel.
- Do not apply a voltage exceeding the following value to the input terminals. Otherwise, damage to the unit may result.
  - Maximum input voltage
    Voltage range less than or equal to 200 mVDC, TC, RTD, and DI: ±10 VDC
    Other DC voltage ranges: ±60 VDC
  - Maximum common mode voltage
    ±60 VDC (under the measurement category II)
- The FX100 is an installation category II product.

Ensure that noise does not enter the measurement circuit.
- Keep the measurement circuit away from the power supply cable (power supply circuit) and ground circuit.
- It is desirable that the object under measurement is not a noise source. However, if this is not avoidable, insulate the object under measurement and the measurement circuit. In addition, ground the object under measurement.
- Shielded wires are effective against noise caused by electrostatic induction. As necessary, connect the shield to the ground terminal of the FX100 (make sure this does not lead to grounding at two points).
- Twisting the measurement circuit wires at short intervals is relatively effective against noise caused by electromagnetic induction.
- Make sure to ground the protective ground terminal through a small grounding resistance (less than or equal to 100 Ω).

When using the reference junction compensation of the FX100 through thermocouple input, take measures to stabilize the temperature at the terminal section.
- Always attach the terminal cover.
- Do not use thick wires with high heat radiations effects (cross-sectional area of 0.5 mm^2 or smaller recommended).
- Keep the ambient temperature consistent. Large temperature fluctuations can occur as a result of such things as turning ON/OFF a nearby fan.

Connecting the input wires in parallel with other instruments may mutually affect the measured values. If you need to make a parallel connection:
- Turn OFF burnout.
- Ground each instrument at a single common point.
- Do not turn ON/OFF the instrument during operation. It may cause adverse affects on other instruments.
- Resistance temperature detectors cannot be connected in parallel.

It is recommended that crimp-on lugs (designed for 4 mm screws) with insulation sleeves be used on the lead wire ends for the optional terminals and power terminals.
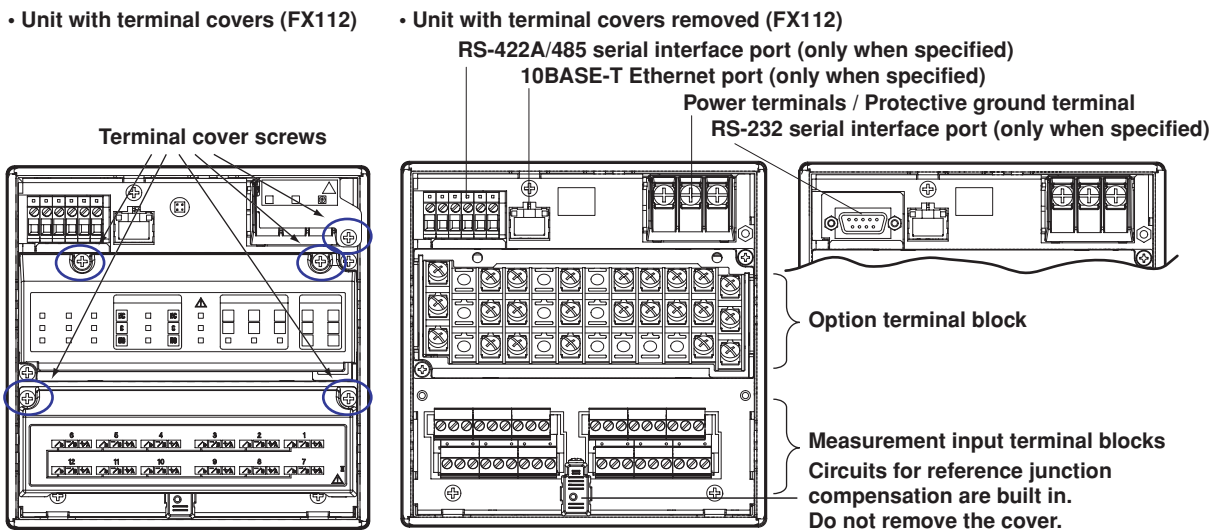
Crimp-on lug with isolation sleeve (for 4-mm screw)
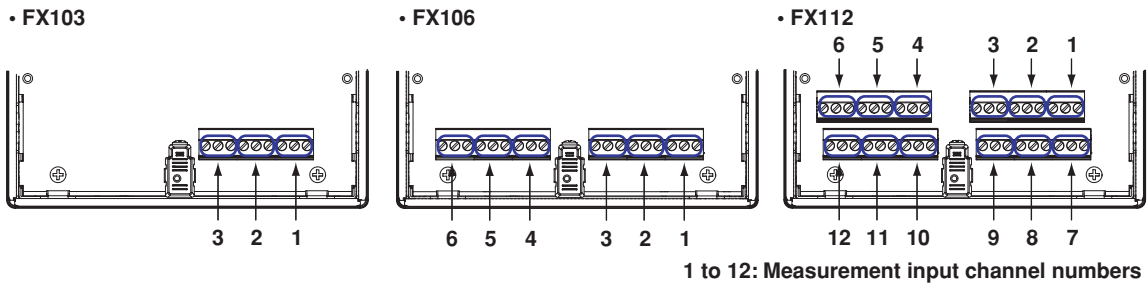
I/O Terminal Arrangement (Rear Panel)

A special terminal cover is screwed onto the measurement input terminal block, and an adhesive label is affixed to the cover showing the arrangement of the terminals on the blocks.

The option terminal block only contains options necessary for I/O such as alarm output relay (option codes: /A1, /A2, and /A3), FAIL/memory end output (option code: /F1), remote control (option code: /R1), and pulse measurement input (option code: /PM1). A special terminal cover is screwed onto the option terminal block, and an adhesive label is affixed to the cover showing the arrangement of the terminals on the block.
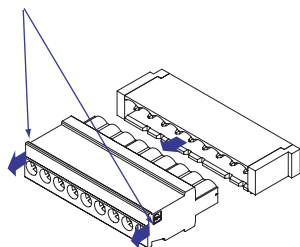
• **Unit with terminal covers (FX112)**

• **Unit with terminal covers removed (FX112)**

RS-422A/485 serial interface port (only when specified)
10BASE-T Ethernet port (only when specified)
Power terminals / Protective ground terminal
RS-232 serial interface port (only when specified)

Terminal cover screws

Option terminal block

Measurement input terminal blocks
Circuits for reference junction compensation are built in.
Do not remove the cover.

Measurement Input Terminal Arrangement

One measurement input to the measurement input terminal block uses three terminals.

• **FX103**

• **FX106**

• **FX112**

6 5 4   3 2 1

12 11 10   9 8 7

3 2 1

6 5 4   3 2 1
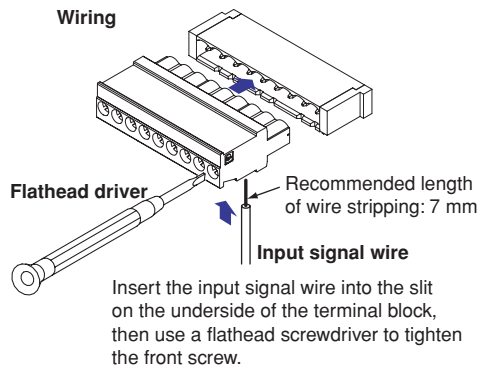
1 to 12: Measurement input channel numbers

Wiring the Measurement Input Terminals

1. Turn OFF the power to the FX100, then remove the terminal cover.
2. Wire the signal wires to the terminals.
   Remove the measurement input terminal block to perform the wiring.
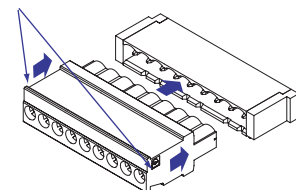   Wire gauge: 0.2-2.5 mm^2 (AWG24-AWG17).

Removing the terminal block
Hold both sides of the terminal block, then pull straight out.

Wiring

Flathead driver

Recommended length of wire stripping: 7 mm

Input signal wire

Insert the input signal wire into the slit on the underside of the terminal block, then use a flathead screwdriver to tighten the front screw.
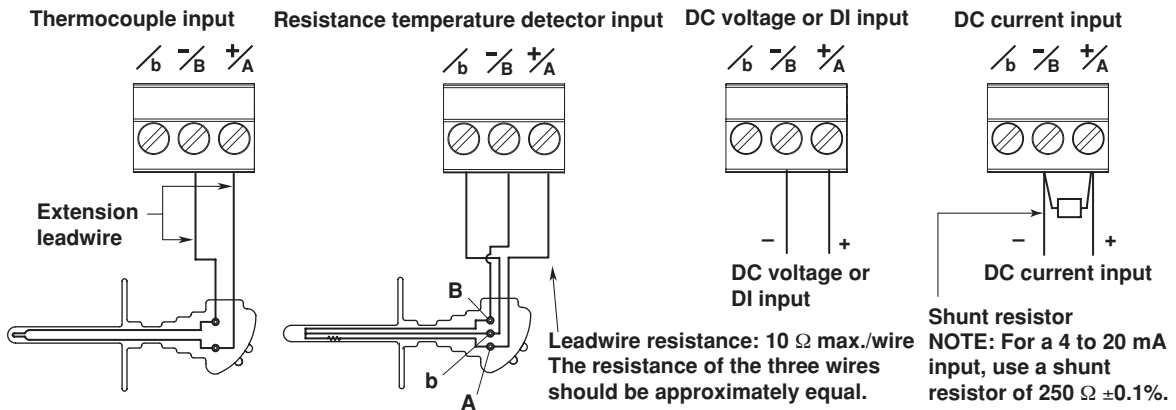
Connecting the terminal block
Align the terminal block with the connectors on the main unit, then push in. Push completely in until it stops.

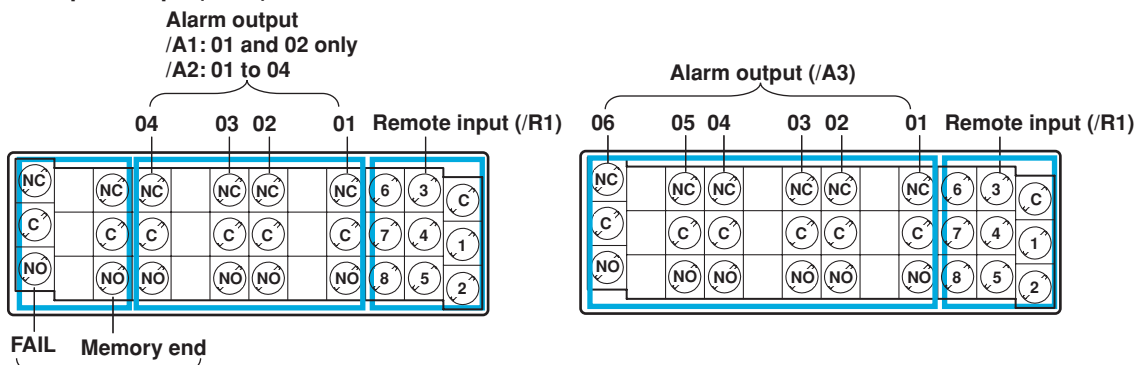3. Attach the terminal cover, then fasten with screws.

Terminal Assignments

Thermocouple input

Resistance temperature detector input

DC voltage or DI input

DC current input

Extension leadwire

B

b

A

− **+**

DC voltage or DI input

Leadwire resistance: 10 Ω max./wire
The resistance of the three wires should be approximately equal.

− **+**

DC current input

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

Note

On the standard measurement input block, RTD input terminals A and B are isolated on each channel. Terminal b is shorted internally across all channels. If you specified the three-terminal isolated RTD (/N2) option, b terminals are isolated with each other.

Option Terminal Arrangement

Terminals are arranged according to the options installed. You can use only the terminals that correspond to the options you purchased.

Without pulse inpit (/PM1)

Alarm output
/A1: 01 and 02 only
/A2: 01 to 04

04 **03 02** **01** **Remote input (/R1)**

Alarm output (/A3)

06 **05 04** **03 02** **01** **Remote input (/R1)**

FAIL **Memory end**

FAIL/Memory end output (/F1)

With pulse input (/PM1)

Alarm output (/A1) Pulse input (/PM1)

02 **01** **8 7 6** **Remote input (/PM1)**

Alarm output (/A2) **Pulse input (/PM1)**

04 **03 02** **01** **8 7 6** **Remote input (/PM1)**

FAIL **Memory end**
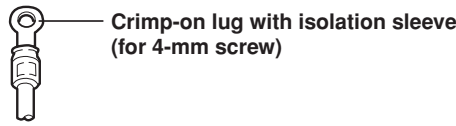
FAIL/Memory end output (/F1)
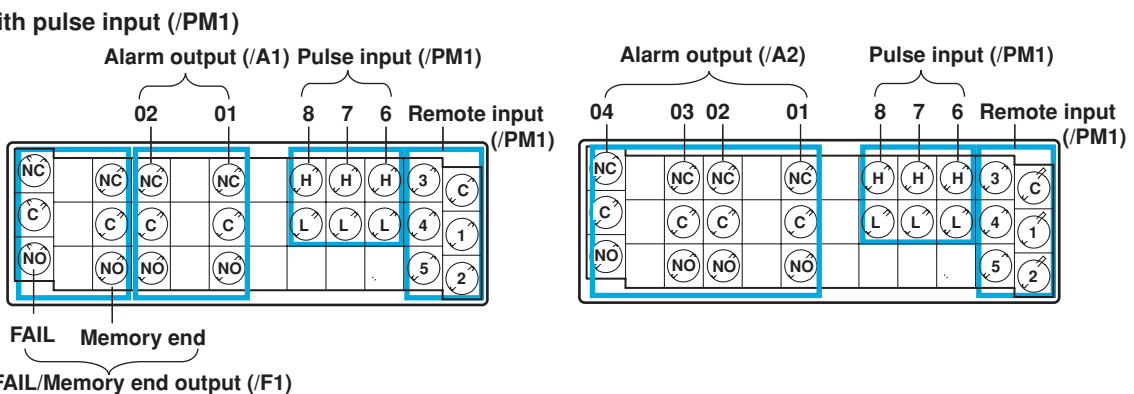
NC (normally closed), C (common), NO (normally opened): Relay contact output terminal
1 to 8, C (common): Remote input terminal
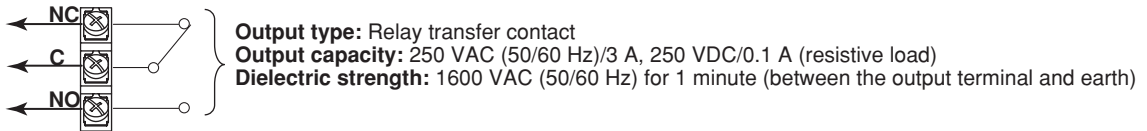H, L: Pulse input terminals

The alarm output terminals 01 to 06 are indicated using [I01] to [I06] in the alarm output settings. The remote input terminals 1 to 8 are indicated using numbers 1 to 8 in the remote input settings. The pulse input terminals 6 to 8 are indicated using numbers 6 to 8 in the pulse input settings.

Wiring the Option Terminals

Use crimp-on lugs with isolation sleeves (for 4-mm screws) when connecting the input/output signal wires to the terminals.
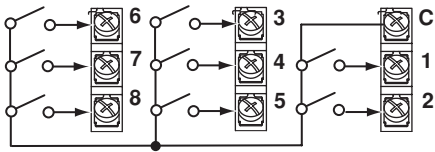
Crimp-on lug with isolation sleeve (for 4-mm screw)

Alarm output, FAIL/memory end output wiring

NC
C
NO

Output type: Relay transfer contact
Output capacity: 250 VAC (50/60 Hz)/3 A, 250 VDC/0.1 A (resistive load)
Dielectric strength: 1600 VAC (50/60 Hz) for 1 minute (between the output terminal and earth)

Remote input wiring
• **Relay contact input (non-voltage contact)**

6 7 8   3 4 5   C 1 2

• **Transistor input (open collector)**

6 7 8   3 4 5   C 1 2

Pulse input wiring
• **Relay contact input (non-voltage contact)**

8 H L   7 H L   6 H L

• **Transistor input (open collector)**

8 H L   7 H L   6 H L
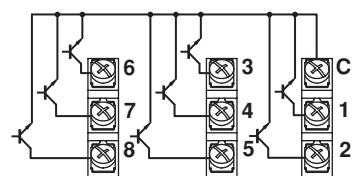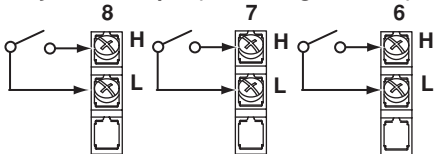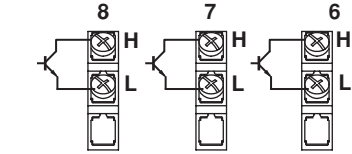
Input Specifications:
• Non-voltage contact
  Open: less than or equal to 200 Ω
  Close: more than or equal to 100 kΩ
• Open collector
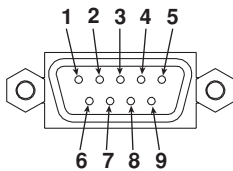 0.5 V or less (30 mADC) when turned ON, leakage current of 0.25 mA or less when turned OFF
Input format: Photocoupler isolation (shared common)
Dielectric strength: 1000 VDC for 1 minute (between the input terminal and earth)

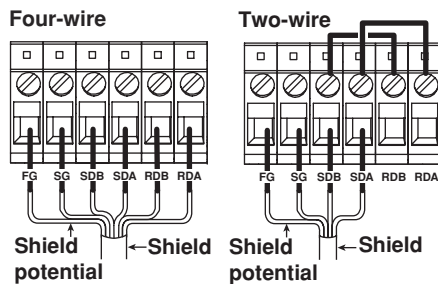## RS-232 Connection

1 2 3 4 5
6 7 8 9

Pin No.	Signal Name	Signal Meaning
2	RD (Received Data)	Received data from the PC. Input signal.
3	SD (Send Data)	Send data to the PC. Output signal.
5	SG (Signal Ground)	Signal ground.
7	RS (Request to Send)	Handshaking signal used when receiving data from the PC. Output signal.
8	CS (Clear to Send)	Handshaking signal used when sending data to the PC. Input signal.

* Pins 1, 4, 6, and 9 are not used.

Wiring the RS-422A/458 Terminals

Four-wire

FG SG SDB SDA RDB RDA

Shield potential   Shield

Two-wire

FG SG SDB SDA RDB RDA

Shield potential   Shield

Signal Name	Signal Meaning
FG (Frame Ground)	Case ground of the FX100.
SG (Signal Ground)	Signal ground.
SDB (Send Data B)	Send data B (+).
SDA (Send Data A)	Send data A (-).
RDB (Received Data B)	Received data B (+).
RDA (Received Data A)	Received data A (-).

Cable
There are two types of cables available, the four-wire cable and the two-wire cable (used only for the Modbus protocol). The cable should meet the following specifications.
• **Cable type:** Twisted-pair cable, 3 pairs 24 AWG or more (four-wire), 2 pair 24AWG or more (two-wire)
• **Characteristic impedance:** 100 Ω
• **Capacitance:** 50 pF/m
• **Cable length:** Up to 1.2 km

Connecting the Power Supply

Make sure to follow the warnings below when wiring the power supply. Otherwise, electric shock or damage to the FX100 may result.

⚠

WARNING

- To prevent the possibility of electric shock when wiring, confirm that the power supply source is turned OFF.
- To prevent the possibility of fire, use a power line or cord that is equivalent to 600 V PVC insulated wire (AWG 18) or better.
- Make sure to ground the protective ground terminal through a grounding resistance of less than or equal to 100 W before turning ON the power.
- Use crimp-on lugs with isolation sleeves (for 4-mm screws) for power supply wires and protective grounding wires.
- To prevent the possibility of electric shock, make sure to close the cover (transparent) for the power supply wires.
- Furnish a switch (double-pole type) to separate the FX100 from the main power supply in the power supply line. In addition, make sure to indicate that the switch is a power control for the FX100 on the switch and the ON/OFF positions of the switch.
  Switch Specifications
  Steady-state current rating: 1 A or more, inrush current rating: 60 A or more
  Use a switch complied with IEC60947-1 and 3.
- Connect a fuse between 2 A and 15 A in the power supply line. Use a fuse approved by CSA (for the use in North America) or VDE (for the use in Europe).
- Do not add a switch or fuse to the ground line.

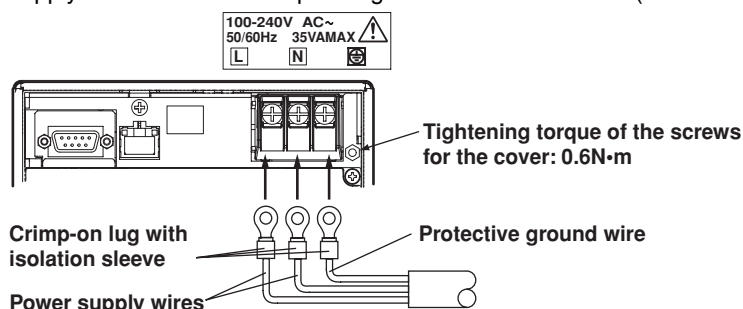Use a power supply that meets the following conditions:

Item	Specification
Rated supply voltage:	100 to 240 VAC
Supply voltage range used:	90 to 132, 180 to 264 VAC
Rated supply voltage frequency:	50/60 Hz
Permitted supply voltage frequency range:	50/60 Hz ± 2%
Maximum power consumption:	25 VA (100 V), 35 VA (240 V)

Note

Do not use a supply voltage in the range 132 to 180 VAC, as this may have adverse effects on the measurement accuracy.

Wiring Procedure

1. Turn OFF the power to the FX100, then open the cover (transparent) for the power supply wires.
2. Connect the power supply wires and the protective ground wire to the power supply terminals. Use crimp-on lugs with isolation sleeves (for 4-mm screws).
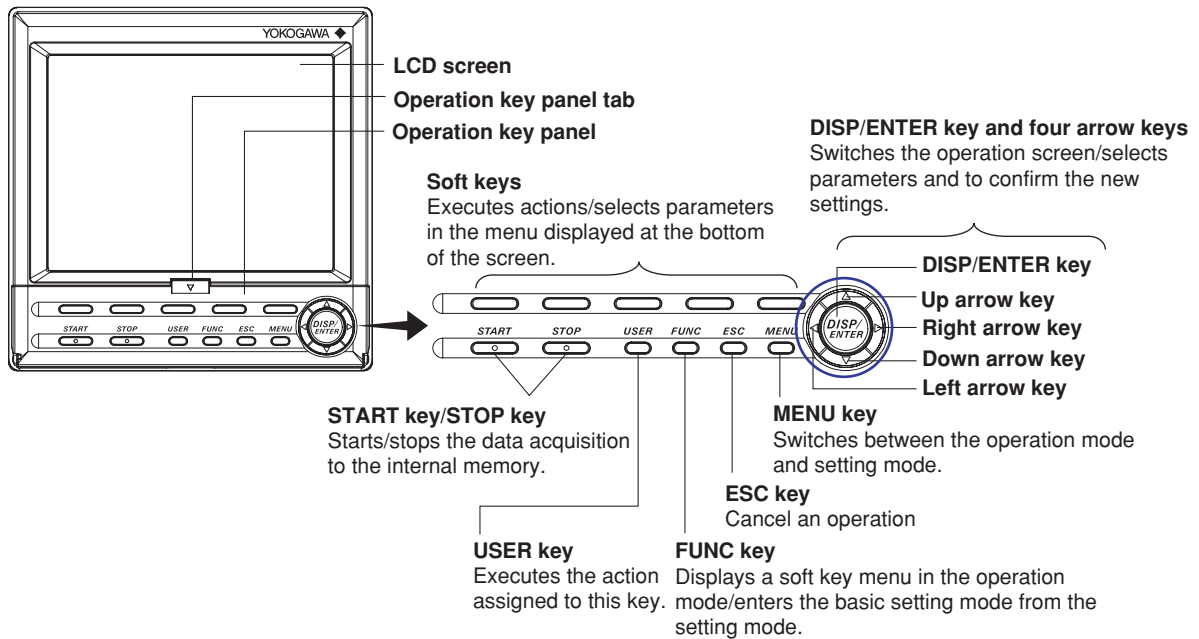

100-240V AC~
50/60Hz 35VAMAX ⚠
L   N   ⏚

Tightening torque of the screws
for the cover: 0.6N•m

Crimp-on lug with
isolation sleeve

Protective ground wire

Power supply wires

3. Close the cover (transparent) for the power supply wires and secure it in place with screws.

Turning the Power ON/OFF

The FX100 has no power switch. Use an external switch to turn the power ON and OFF. When the power is turned ON, the operation screen is displayed.

Basic Operation

Keys

LCD screen

Operation key panel tab

Operation key panel

Soft keys
Executes actions/selects parameters in the menu displayed at the bottom of the screen.

DISP/ENTER key and four arrow keys
Switches the operation screen/selects parameters and to confirm the new settings.

DISP/ENTER key

Up arrow key

Right arrow key

Down arrow key

Left arrow key

START key/STOP key
Starts/stops the data acquisition to the internal memory.

MENU key
Switches between the operation mode and setting mode.

ESC key
Cancel an operation

USER key
Executes the action assigned to this key.

FUNC key
Displays a soft key menu in the operation mode/enters the basic setting mode from the setting mode.

Modes

The FX100 operates in three different modes.

Operation mode: used for performing measurement.

Setting mode: used for changing parameters during measurement.

Basic setting mode: used when the instrument is not performing measurement to enter basic settings such as the input type and method for saving measured data.

Experiment with the procedures followed to familiarize yourself with the operation of the FX100.

## Key Operation Example 1: Date/Time Setting

In this example, we change the date setting in the FX100's internal clock to the 24th.
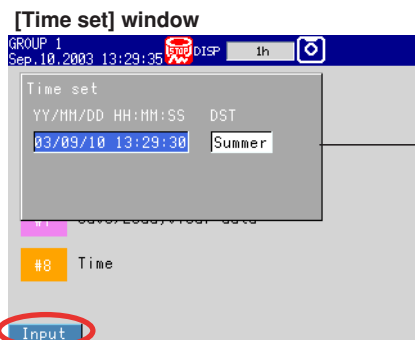Remember to restore the correct date setting after completing this exercise.
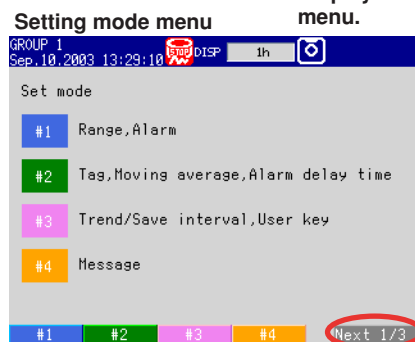
Operation mode

1. Press the **MENU key.**
Displays setting mode menu.

Setting mode menu

2. Press the **[Next 1/3] soft key.**
Displays the next page.

Setting mode menu (page 2/3)

3. Press the **[#8] soft key.**
Selects [Time].
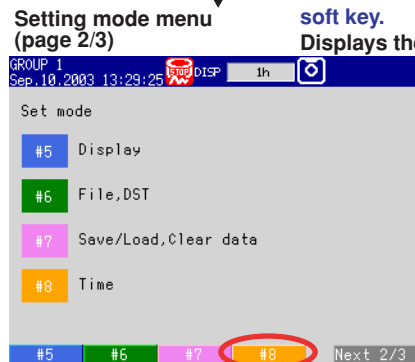
[Time set] window

[Time set] window

4. Press the **[Input] soft key.**
Dispalys the number input keypad.

[Time set] window
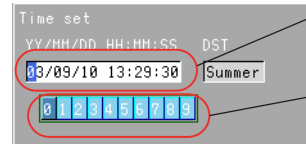
Select the input position using **the left/right arrow keys.**

Number keypad
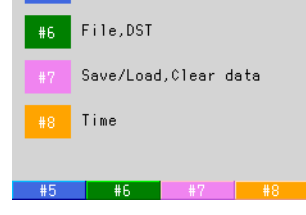Selects a number using the **up/down arrow keys.**
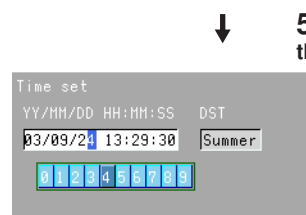
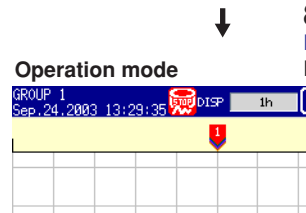**5.** Set "24" as the date using the **arrow keys.**
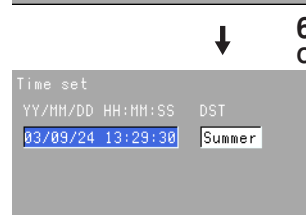
6. Press the **DISP/ENTER key.**
Confirms the new settings.
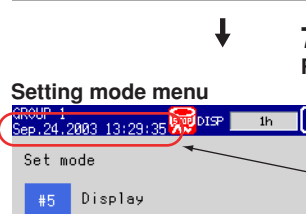
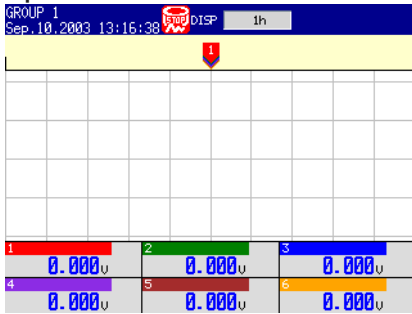**7.** Press the **DISP/ENTER key.**
Returns to setting mode menu.

Setting mode menu

The new date is displayed.

8. Press the **MENU key** or **ESC key.**
Returns to operation mode.

Operation mode

Key Operation Example 2: Changing to Setting Mode from the Operation Screen and Back Again.

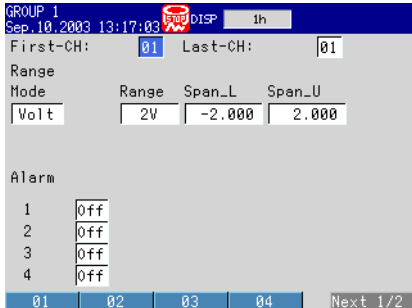Set the measuring range for a type-R thermocouple on channel 1.

Operation mode

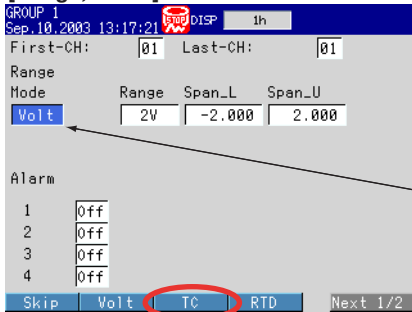**1.** Press the **MENU key.** Displays setting mode menu.

Setting mode menu

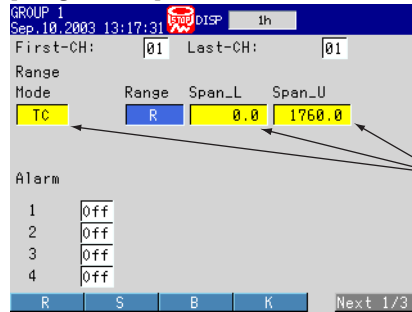**2.** Press the **[#1] soft key.** Selects [Range, Alarm].

[Range, Alarm]

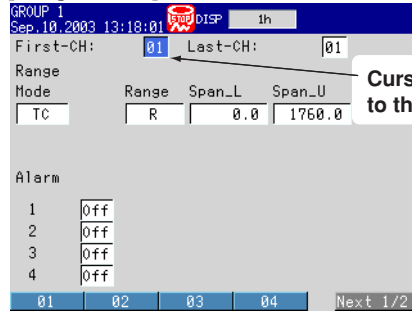**3.** **Twice** press **right arrow key.** Moves cursor (blue) to [Mode].

[Range, Alarm]

Cursor (blue)

4. Press the **[TC] soft key** Selects [TC].

[Range, Alarm]

Yellow

5. Press the **DISP/ENTER key.** Confirms settings.

[Range, Alarm]
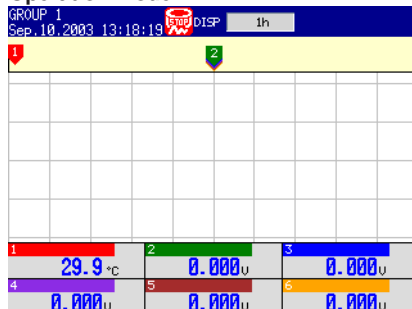
Cursor (blue) returns to the first item box.

6. Press the **ESC key.** Returns to the menu .

Setting mode menu

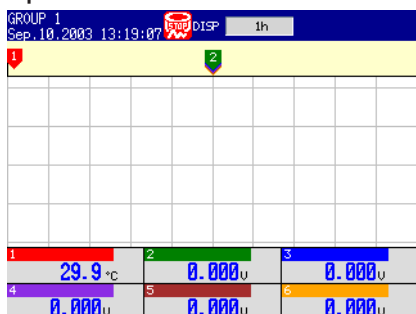**7.** Press the **MENU key** or **ESC key.** Returns to operation mode.

Operation mode

Key Operation Example 3: Changing to Basic Setting Mode from the Operation Screen and Back Again

Set the alarm output relay action (optional) to [Hold].

Operation mode

GROUP 1
Sep.10.2003 13:19:07 DISP 1h

1   29.9 °C   2   0.000 V   3   0.000 V
4   0.000 V   5   0.000 V   6   0.000 V

1. Press the **MENU key.**
Displays setting mode menu.

Setting menu

GROUP 1
Sep.10.2003 13:19:16 DISP 1h

Set mode

#1   Range,Alarm
#2   Tag,Moving average,Alarm delay time
#3   Trend/Save interval,User key
#4   Message

#1   #2   #3   #4   Next 1/3

2. Hold down the FUNC key for 3 seconds.
Displays basic setting menu.

Basic setting menu

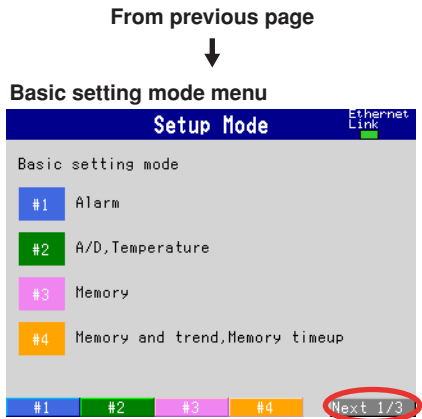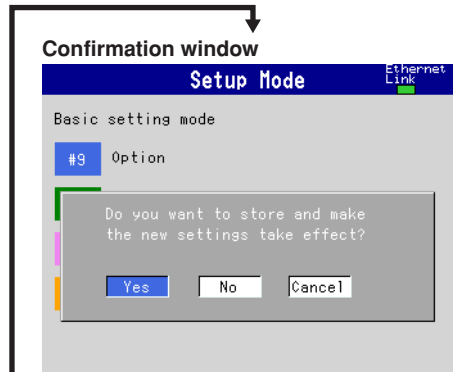Setup Mode   Ethernet Link

Basic setting mode

#1   Alarm
#2   A/D,Temperature
#3   Memory
#4   Memory and trend,Memory timeup

#1   #2   #3   #4   Next 1/3

3. Press the **[#1] soft key.**
Selects [Alarm].

[Alarm]

Setup Mode   Ethernet Link

Alarm
Reflash   Off
Relay   AND   None
         Action Energize
         Behavior Nonhold
Indicator   Nonhold

Rate of change
         Increase 1
         Decrease 1
Hysteresis   On

On   Off
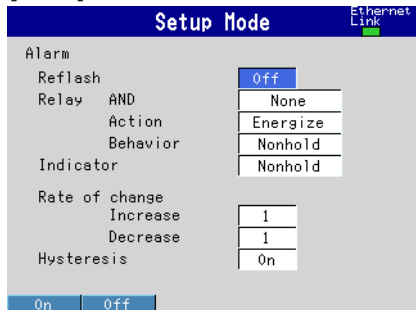
4. **Three times** press the **down arrow key.**
Moves cursor (blue) to [Relay Behavior].

[Alarm]

Setup Mode   Ethernet Link

Alarm
Reflash   Off
Relay   AND   None
         Action Energize
         Behavior Nonhold
Indicator   Nonhold

Rate of change
         Increase 1
         Decrease 1
Hysteresis   On

Hold   Nonhold
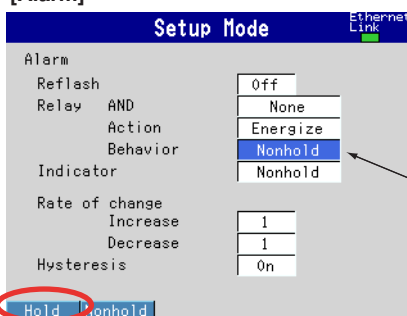
Cursor (blue)

5. Press the **[Hold] soft key.**
Selects [Hold].

[[Alarm]

Setup Mode   Ethernet Link

Alarm
Reflash   Off
Relay   AND   None
         Action Energize
         Behavior Hold
Indicator   Nonhold

Rate of change
         Increase 1
         Decrease 1
Hysteresis   On

Hold   Nonhold
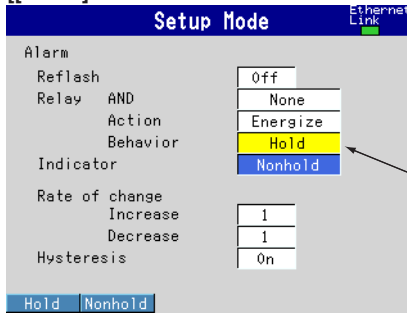
Yellow

6. Press the **DISP/ENTER key.**
Confirms settings.

[Alarm]
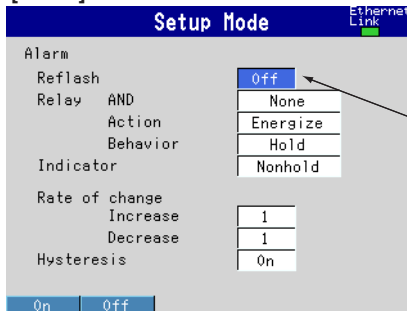
Setup Mode   Ethernet Link

Alarm
Reflash   Off
Relay   AND   None
         Action Energize
         Behavior Hold
Indicator   Nonhold

Rate of change
         Increase 1
         Decrease 1
Hysteresis   On

On   Off

Cursor (blue) returns to the first item box.

To next page

7. Press the **ESC key.**
Returns to the menu.

From previous page

Basic setting mode menu

```
Setup Mode                    Ethernet
                              Link
Basic setting mode

#1   Alarm

#2   A/D,Temperature

#3   Memory

#4   Memory and trend,Memory timeup

#1   #2   #3   #4        Next 1/3
```

8. **Twice** press the **[Next] soft key**
Displays **[End] soft key.**

Basic setting mode menu

```
Setup Mode                    Ethernet
                              Link
Basic setting mode

#9   Option

#10  Communication

#11  Web,E-Mail

End  End

#9   #10  #11   End     Next 3/3
```
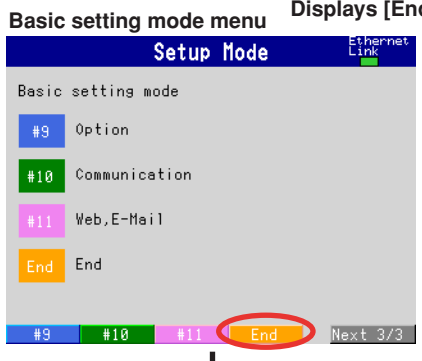
9. Press the **[End] soft key**
Displays confirmation window.

Confirmation window

```
Setup Mode                    Ethernet
                              Link
Basic setting mode

#9   Option

    Do you want to store and make
    the new settings take effect?

    Yes      No      Cancel
```

10. Press the **DISP/ENTER key**
with **[Yes]** is selected.
The settings are saved and the
FX100 returns to operation mode.

Operation mode

```
GROUP 1
Sep.10,2003 13:19:07  STOP DISP   1h
1                        2

1        29.9 °C    2     0.000 v   3    0.000 v
4        0.000 v    5     0.000 v   6    0.000 v
```
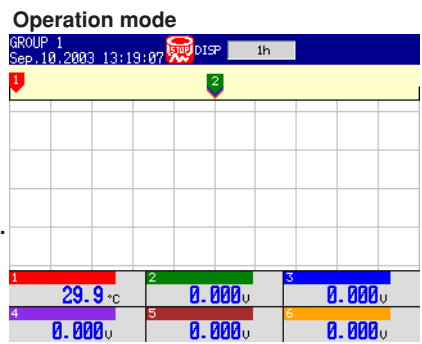
Key Operation Example 4: Saving Settings (Requires External Storage Media Drive)

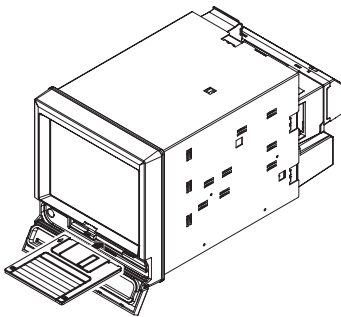Save the setup data to a file name "DF2" on the external storage medium.

Inserting the Storage Medium
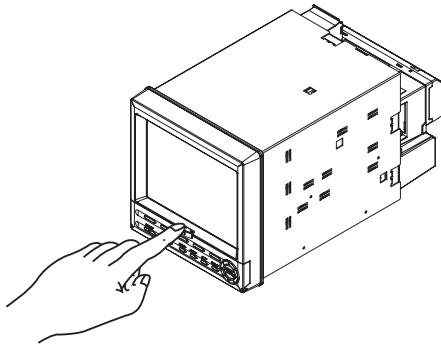
1. Pull open the key panel while pushing down on the tab in the upper middle part of the panel.
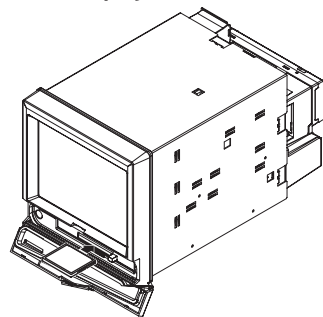
• **Floppy Disks (FD)**

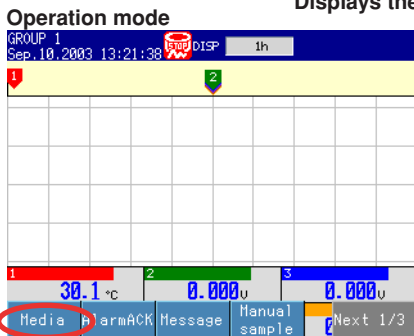**2.** Insert the floppy disk into the drive, then close the operation key panel.
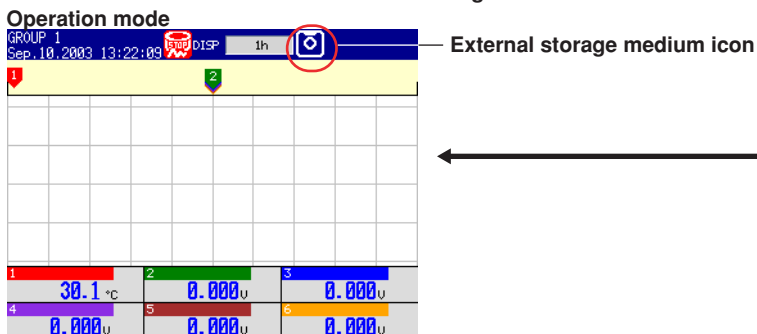
• **Compact Flash Memory Card (CF Memory Card)**

2. Insert the CF memory card into the drive, then close the operation key panel.
The external storage medium icon appears in the status display section of the screen.
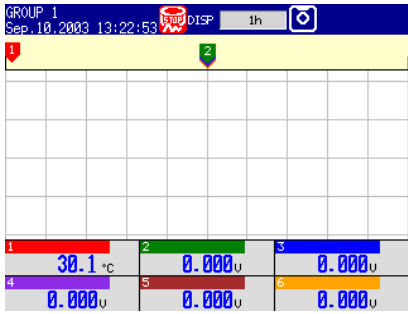
3. Press the **FUNC key.**
Displays the soft key menu.

Operation mode

GROUP 1
Sep.10.2003 13:21:38 DISP 1h

1 30.1 °C   2 0.000 v   3 0.000 v

Media AlarmACK Message Manual sample Next 1/3

4. Press the **[Media] soft key.**
Detects the FD and displays the external storage medium icon.

Operation mode

GROUP 1
Sep.10.2003 13:22:09 DISP 1h   — External storage medium icon

1 30.1 °C   2 0.000 v   3 0.000 v
4 0.000 v   5 0.000 v   6 0.000 v

Saving the Setup Date

Operation mode

GROUP 1
Sep.10.2003 13:22:53 DISP 1h

1   30.1 °C   2   0.000 v   3   0.000 v
4   0.000 v   5   0.000 v   6   0.000 v

1. Press the **MENU key.**
Displays setting mode menu.

Setting mode menu

GROUP 1
Sep.10.2003 13:23:03 DISP 1h

Set mode

#1 Range,Alarm

#2 Tag,Moving average,Alarm delay time

#3 Trend/Save interval,User key

#4 Message

#1   #2   #3   #4   Next 1/3

2. Press the **[Next 1/3] soft key.**
Displays the next age.

Setting mode menu (page 2/3)

GROUP 1
Sep.10.2003 13:23:17 DISP 1h

Set mode

#5 Display

#6 File,DST

#7 Save/Load,Clear data

#8 Time

#5   #6   #7   #8   Next 2/3
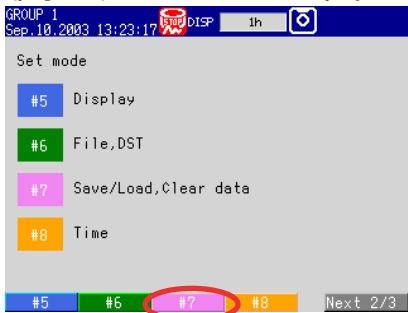
3. Press the **[#7] soft key.**
Selects [Save/Load, Clear data].

[Save/Load, Clear data]

GROUP 1
Sep.10.2003 13:23:23 DISP 1h

Save/Load,Clear data
    #1   Save settings
    #2   Load settings
    #3   Save data
    #4   Load display data
    #5   Load event data
    #6   File list
    #7   Delete
    #8   Format
    #9   Clear data

#1   #2   #3   #4   Next 1/3
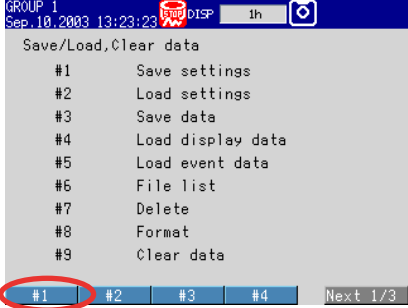
4. Press the **[#1] soft key.**
Selects [Save settings].

[Save settings]

GROUP 1
Sep.10.2003 13:23:33 DISP 1h

Save settings
  File name

  File name   Time
  A1   PNL   2003/08/22 07:50
  B-1   PNL   2003/08/21 17:09
  A102   PNL   2003/08/12 07:31
  A3   PNL   2003/09/08 12:14
  AE   PNL   2003/09/09 07:35
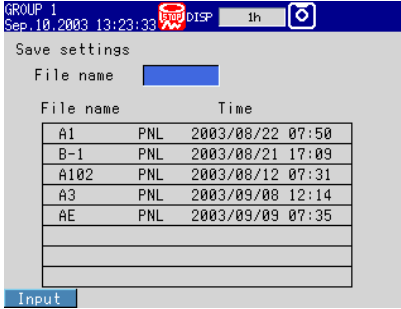
Input

5. Press the **[Input] soft key.**
Displays a pop-up window.

Pop-up window

GROUP 1
Sep.10.2003 15:32:55 DISP 1h

A B C D E F G H I J
K L M N O P Q R S T
U V W X Y Z
+ / * _ < >

A Over

A/1   Del   Bs   Ins
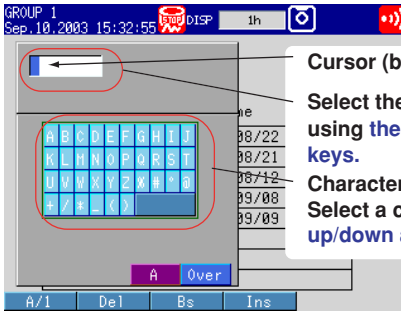
Cursor (blue)

Select the input position using **the left/right arrow keys.**

Character keypad
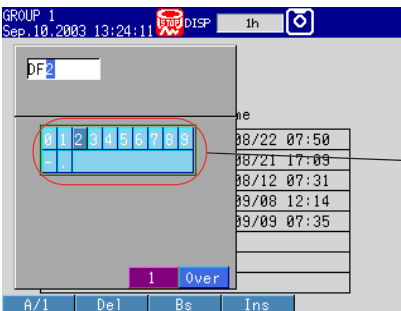Select a character using the **up/down arrow keys.**

Selects insert or overwrite

Deletes the character to the left of the cursor position.

Deletes the character at the cursor position.

Selects the character type.

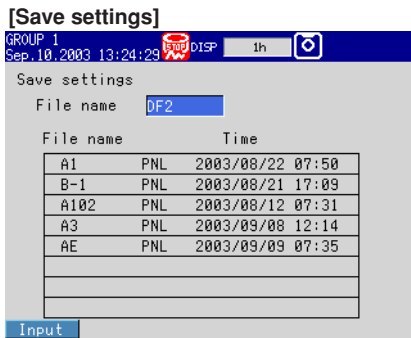**6.** Enter "DF2" as a file name using the **arrow keys.**

GROUP 1
Sep.10.2003 13:24:11 DISP 1h

DF2

0 1 2 3 4 5 6 7 8 9
-

1 Over

A/1   Del   Bs   Ins

Number keypad
Select a number using the **up/down arrow keys.**

7. Press the **DISP/ENTER key.**
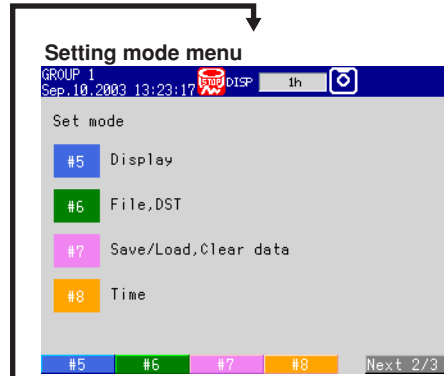Confirms the file name and clears the pop-up window.
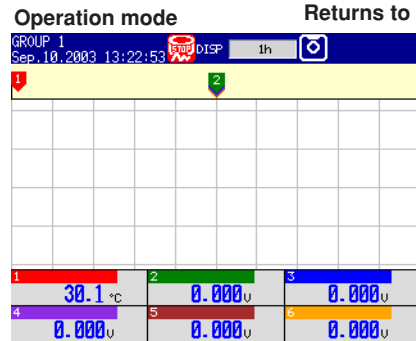
To next page

From previous page

[Save settings]

```
GROUP 1
Sep.10.2003 13:24:29  STOP DISP  1h  ◎
Save settings
  File name  DF2
  File name        Time
    A1      PNL   2003/08/22 07:50
    B-1     PNL   2003/08/21 17:09
    A102    PNL   2003/08/12 07:31
    A3      PNL   2003/09/08 12:14
    AE      PNL   2003/09/09 07:35

Input
```

8. Press the **DISP/ENTER key.**
Saves the setup data.

Setting mode menu

```
GROUP 1
Sep.10.2003 13:23:17  STOP DISP  1h  ◎
Set mode
  #5  Display
  #6  File,DST
  #7  Save/Load,Clear data
  #8  Time

  #5    #6    #7    #8    Next 2/3
```

[Save settings]

```
GROUP 1
Sep.10.2003 13:24:44  STOP DISP  1h  ◎
Save settings
  File name  DF2
  File name        Time
    A1      PNL   2003/08/22 07:50
    DF2     PNL   2003/09/10 13:24
    B-1     PNL   2003/08/21 17:09
    A102    PNL   2003/08/12 07:31
    A3      PNL   2003/09/08 12:14
    AE      PNL   2003/09/09 07:35

Input
```

The file name is displayed.

10. Press the **MENU key or ESC key.**
Returns to operation mode.

Operation mode

```
GROUP 1
Sep.10.2003 13:22:53  STOP DISP  1h  ◎

1            2
                  ┃


1              2              3
    30.1 °C      0.000 v       0.000 v
4              5              6
    0.000 v      0.000 v       0.000 v
```

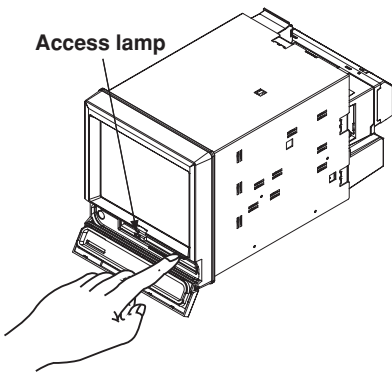**9.** **Twice** press the **ESC key.**
Returns to the menu.

Ejecting the External Storage Medium
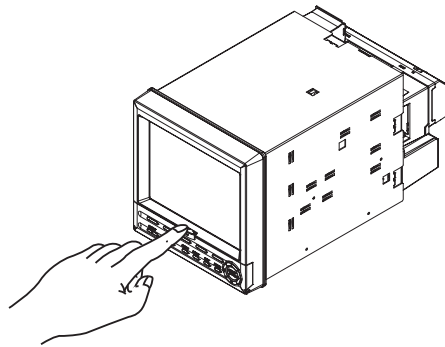
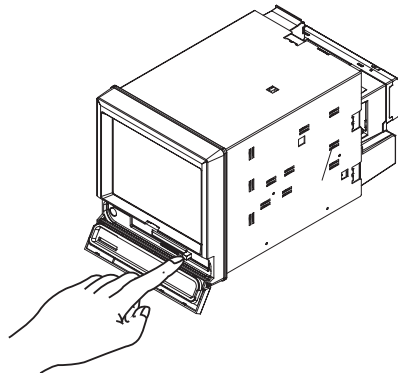**1.** Pull open the key panel while pushing down on the tab in the upper middle part of the panel.

• **Floppy Disks**

2. Make sure that the floppy disk is not being accessed.
Press the Eject button and remove the FD.
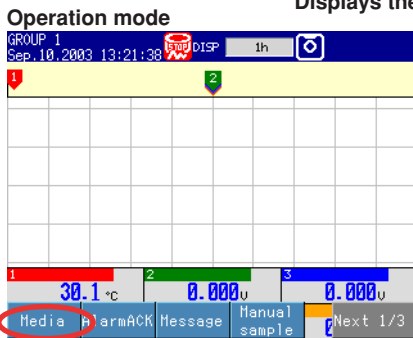
Access lamp

• **Compact Flash Memory Card (CF Memory Card)**

2. Make sure that the CF memory card is not being accessed. Press the Eject button and remove the CF memory card.
The external storage medium icon disappears from the status display section.

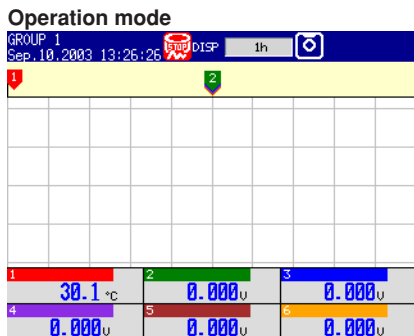**3.** Press the **FUNC key.**
Displays the soft key menu.

Operation mode

GROUP 1
Sep.10.2003 13:21:38 DISP 1h

1   2

1   30.1 °C   2   0.000 v   3   0.000 v

Media AlarmACK Message Manual sample   Next 1/3

4. Press the **[Media] soft key.**
Detects the absence of the FD and clears the external storage medium icon.

Operation mode

GROUP 1
Sep.10.2003 13:22:09 DISP 1h

1   2
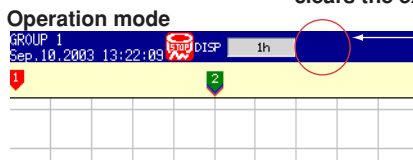
The external storage medium icon disappears.

## Key Operation Example 5: Initializing Settings and Deleting Data from the Internal Memory

Performing this operation deletes all measured data from the FX100 and restores the factory default settings. Date and time settings are not initialized.
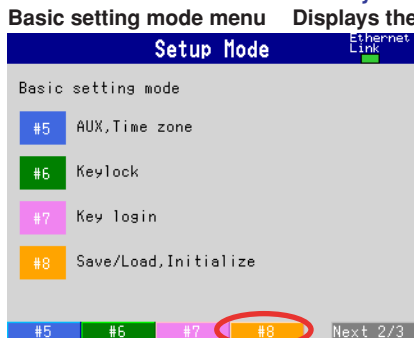
Operation mode

1. Press the **MENU key.** Displays setting mode menu.

Setting mode menu

2. **Hold down the FUNC key for 3 seconds.** Displays basic setting mode menu.

Basic setting mode menu
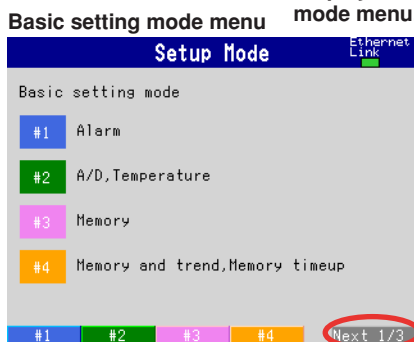
3. Press the **[Next 1/3] soft key.** Displays the next page.

Basic setting mode menu

4. Press the **[#8] soft key.** Selects [Save/Load, Initialize].

[Save/Load, Initialize]

The [#1 Initialize] only is displayed on the model with no external storage drive.
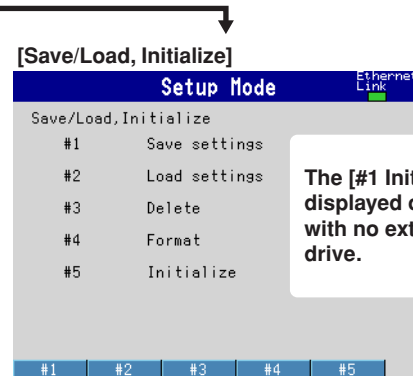
5. Press the **[#5] soft key.** Selects [Initialize].

[Initialize]
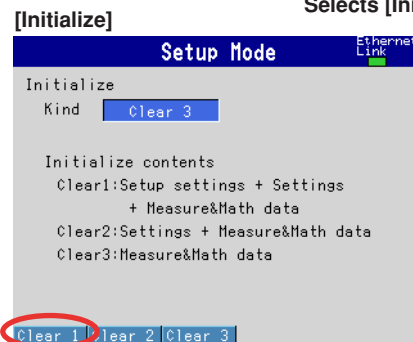
6. Press the **[Clear1] soft key.** Selects [Clear1].

[Initialize]

To next page
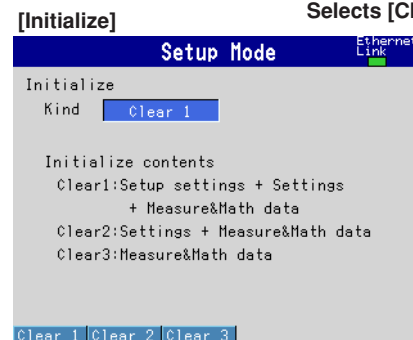
7. Press the **DISP/ENTER key.** Displays the confirmation window.

Basic Operation

From previous page

↓

Confirmation screen

```
            Setup Mode        Ethernet
                              Link
Initialize
  Kind    Clear 1

  Initialize contents

  ⚠  Are you sure you want to execute
     'Clear1'?

     Yes      No
```
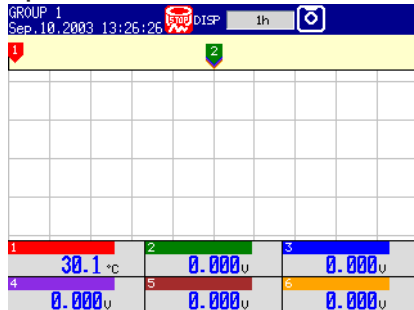
↓   **8**. Press the DISP/ENTER key
with [Yes] is selected.
The settings are saved and the
FX100 returns to operation mode.

Operation mode

```
GROUP 1
Sep.10.2003 13:26:26  STOP DISP   1h   ⟨⟩
1                        2

1    30.1 °C      2   0.000 v    3   0.000 v
4    0.000 v      5   0.000 v    6   0.000 v
```

Measurement Function Setting Examples

Specifications of the FX100

The example given in this section assumes an FX100 with the following specifications.

Item	Description
Model/Specification	FX106-2-1/A2/C7/M1
	• Scan interval: 1 or 2 s
	• No. of measurement input points: 6
	• Floppy disk drive installed
	• Alarm relay outputs: 4
	• Ethernet communication interface installed
	• Computation/report function included

Setting Example 1: Temperature Measurement Channel

FX100

Type-T thermocouple   **Channel 1**
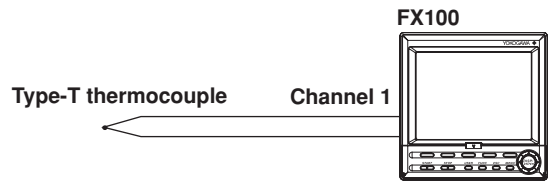
Setting Items in Basic Setting Mode (Common Items)

Item	Description	Item Number in Figure
Burnout detection	When a thermocouple burnout is detected, the indicator is maxed out on the 100% side.	1
Reference junction compensation	Use (initial value) the FX100's reference junction compensation function	2
Tag display	Display tag name in place of channel no.	3

Settings in Basic Setting Mode

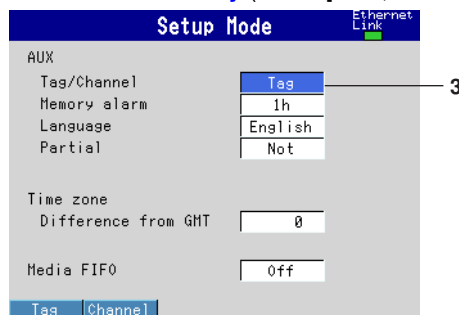- **Displaying the Basic Setting Menu from Operation Mode**
  Press the **MENU key** (change to setting mode), then **hold down the FUNC key for 3 seconds** (change to basic setting mode).

- **Burnout, Reference Junction Compensation**
  Press the **#2 soft key** (select [A/D]).

  ```
  Setup Mode                    Ethernet Link
  ┌ A/D ──────────────────────────────┐
  │  Integrate          Auto          │
  │  Scan interval      1s            │
  │                                   │
  │  First-CH  01   Last-CH   01      │────  Specify the channel 1.
  │                                   │
  │    Burnout set      Up            │────  1
  │    RJC              Internal      │────  2
  │                                   │
  │  Temperature        C             │
  └───────────────────────────────────┘
   Auto   50Hz   60Hz   100ms
  ```
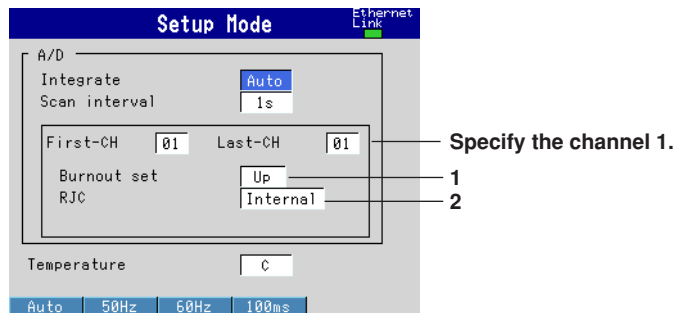
- **Display Tag in Place of Channel Number**
  Press the **#5 soft key** (select [AUX, Time zone]).

  ```
  Setup Mode                    Ethernet Link
  AUX
    Tag/Channel        Tag           ────  3
    Memory alarm       1h
    Language           English
    Partial            Not

  Time zone
    Difference from GMT    0

  Media FIFO             Off
   Tag   Channel
  ```

- **Saving Settings**
  1. Press the **ESC key** to return to the basic setting menu.
  2. Press the **[End] soft key**.
     The save settings confirmation window appears.
  3. With [Yes] selected, press the **DISP/ENTER key**.
     You are returned to operation mode.

Setting Items in Setting Mode (Channel-Specific Items)

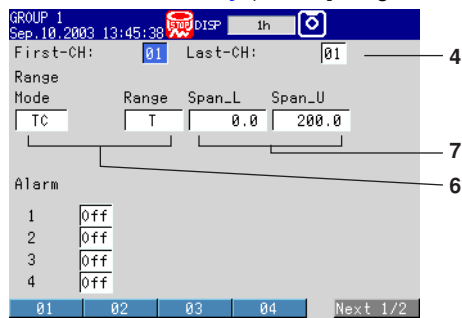| Item	Description	Item Number in Figure
Channel	Use channel 1.	4
Tag name	TI-001	5
Sensor	Type-T thermocouple	6
Measuring range	0.0 to 200.0 °C	7

Settings in Setting Mode

- **Displaying the Setting Menu from Operation Mode**
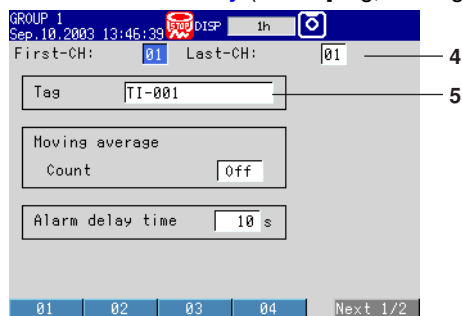 Press the **MENU key** (change to setting mode).

- **Range**
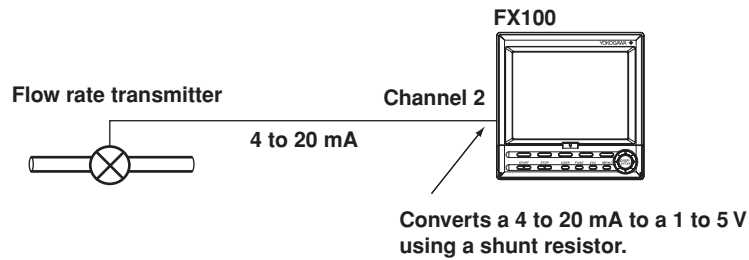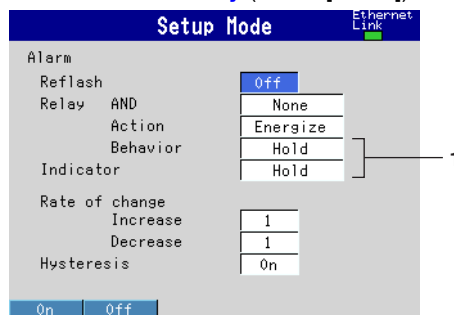 Press the **#1 soft key** (select [Range, Alarm]).

- **Tag Name**
  Press the **#2 soft key** (select [Tag, Moving average, Alarm Delay Time]).

- **Returning to Operation Mode**
  ESC key (return to setting menu) > **ESC key** or **MENU key** (return to operation mode).

Setting Example 2: Flow Rate Measurement Channel with an Alarm Output

FX100

Flow rate transmitter   **Channel 2**

4 to 20 mA

Converts a 4 to 20 mA to a 1 to 5 V using a shunt resistor.

Setting Items in Basic Setting Mode (Common Items)

Item	Description	Item Number in Figure
Alarm output release operation	The operator releases the alarm display and/or relay contact output.	1

Settings in Basic Setting Mode

- **Displaying the Basic Setting Menu from Operation Mode**
  Press the **MENU key** (change to setting mode), then **hold down the FUNC key for 3 seconds** (change to basic setting mode).

- **Alarm Display/Relay Output Action**
  Press the **#1 soft key** (select [Alarm]).

- **Saving Settings**
  1. Press the **ESC key** to return to the basic setting menu.
  2. Press the **[End] soft key**.
     The save settings confirmation window appears.
  3. With [Yes] selected, press the **DISP/ENTER key**.
     You are returned to operation mode.

Setting Items in Setting Mode (Channel-Specific Items)

| Item	Description	Item Number in Figure
Channel	Use channel 2.	2
Tag name	FI-002	3
Measurement input	1- 5 V. Linear relative to the flow rate. Attach a shunt resistor to the FX100 input terminal and convert 4 to 20 mA to 1 to 5 V.	4
Measuring range	0 to 500 L/H	5
Alarm condition	Alarm output at 120 L/H or less. Output to relay contact (I03).	6

Settings in Setting Mode

- **Displaying the Setting Menu from Operation Mode**
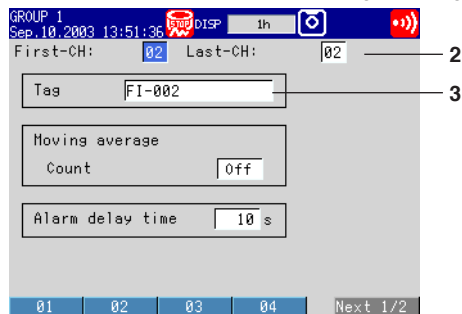 Press the **MENU key** (change to setting mode).

- **Range**
  Press the **#1 soft key** (select [Range, Alarm]).
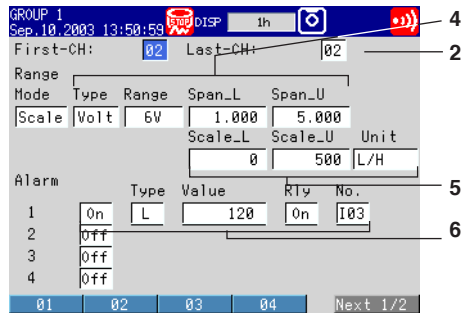
- **Tag Name**
  Press the **#2 soft key** (select [Tag, Moving average, Alarm Delay Time]).

- **Returning to the Operation Mode**
  Press the **ESC key** (return to setting menu) > **ESC key** or **MENU key** (return to operation mode).

Setting Example 3: Computation Channel (Sum Value) (Optional)

Calculate the sum value of flow measured on channel 2.

Setting Items in Basic Setting Mode (Common Items)

Item	Description	Item Number in Figure
Timer action	Counts 12 hours using Timer 1.	1
Reset	Resets the sum value automatically every time the timer expires.	2

Settings in Basic Setting Mode

- **Displaying the Basic Setting Menu from Operation Mode**

  Press the **MENU key** (change to setting mode), then **hold down the FUNC key for 3 seconds** (change to basic setting mode).

- **Timer**

  Press the **#9 soft key** (select [Option]) > **#3 soft key** (select [Timer (TLOG)]).
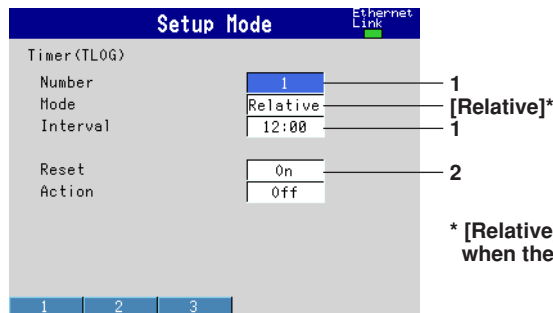
* [Relative]: The timer starts
  when the computation is started.

- **Saving Settings**
  1. Press the **ESC key** to return to the basic setting menu.
  2. Press the **[End] soft key**.

     The save settings confirmation window appears.
  3. With [Yes] selected, press the **DISP/ENTER key**.

     You are returned to operation mode.

Setting Items in Setting Mode (Channel-Specific Items)

| Item	Description	Item Number in Figure
Channel	Use computation channel 31 on the FX100	3
Tag name	FA-003	4
Computed item	Sum value of amount of flow measured on channel 2.	5
Range	0 to 12000 L	6

Settings in Setting Mode

· **Displaying the Setting Menu from Operation Mode**

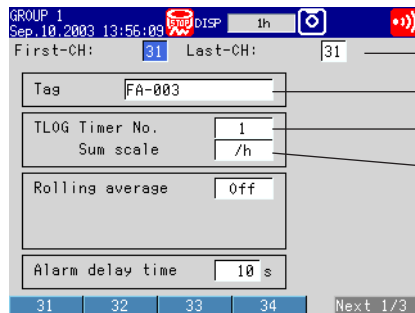Press the **MENU key** (change to setting mode).

· **Equation**

Press the **#9 soft key** (select [Math set1 (Expression, Alarm)])

3

5

5
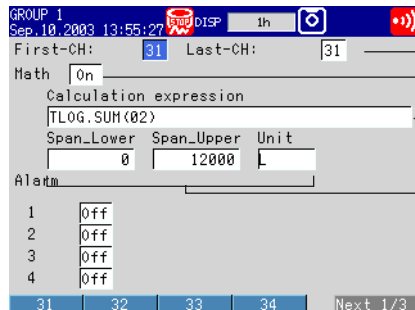
[TLOG.SUM(02)]:
Sums the measured value of channel 2.

6

· **Tag Name, Timer Used, Sum Scale**

Press the **#11 soft key** (select [Math set3 (Tag, TLOG, Rolling average, Alarm Delay Time)])

3

4

Timer number of the timer used

[/h]: Measured flow rate is
multiplied by 1/3600 and summed.

· **Returning to Operation Mode**

Press the **ESC key** (return to setting menu) > **ESC key** or **MENU key** (return to operation mode).

Setting Example 4: Data Acquisition 1

Acquire measurement data continuously.

Setting Items in Basic Setting Mode

| Item	Description	Item Number in Figure
Source channels	Channel 1, channel 2, channel 31	1
Data to be acquired	Acquires measurement data continuously (acquires the display data).	2
Saving	Saves data automatically.	3
Data save time	Saves data at 15:00 everyday.	4

Settings in Basic Setting Mode

- **Displaying the Basic Setting Menu from Operation Mode**

  Press the **MENU key** (change to setting mode), then **hold down the FUNC key for 3 seconds** (change to basic setting mode).
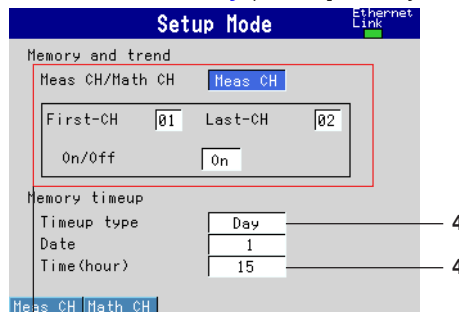
- **Data Acquisition Method**

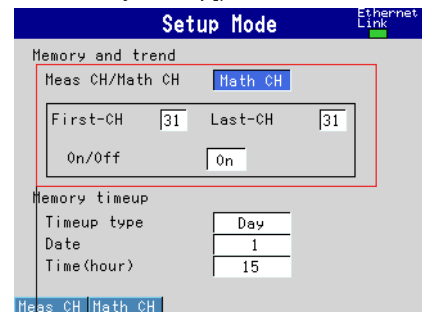 Press the **#3 soft key** (select [Memory]).
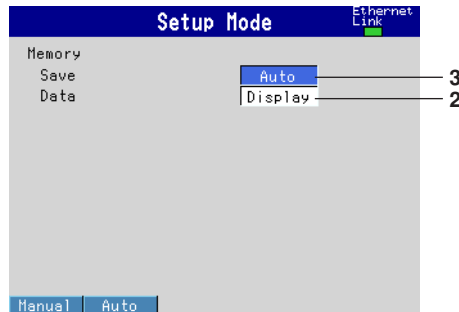
- **Source Channels, Data Save Time**

  Press the **#4 soft key** (select [Memory and trend, Memory timeup]).
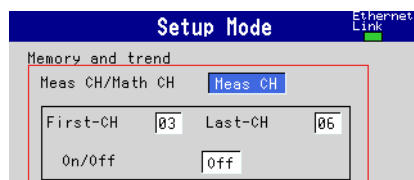

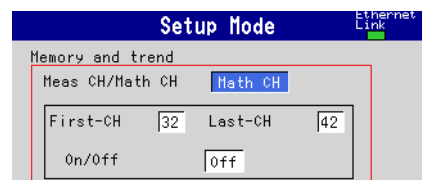
1: Specifies the measurement channels 1 and 2.

1: Specifies the computation channel 31.

All channels turned OFF except for channels 1, 2, and 31. All channels are ON by default.

1: Turns [Off] measurement channels other than channels 1 and 2.

1: Turns [Off] computation channels other than channel 31.

- **Saving Settings**
  1. Press the **ESC key** to return to the basic setting menu.
  2. Press the **[End] soft key**.
     The save settings confirmation window appears.
  3. With [Yes] selected, press the **DISP/ENTER key**.
     You are returned to operation mode.

Setting Items in Setting Mode

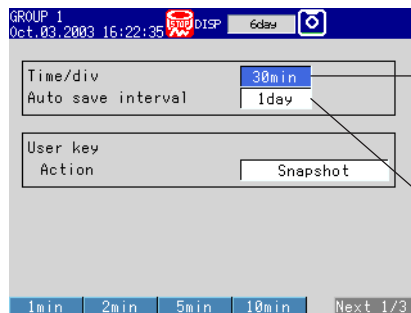| Item	Description	Item Number in Figure
Sampling interval	1 minute	5
Save destination	DATA-101	6

Settings in Setting Mode

- **Displaying the Setting Menu from Operation Mode**
  Press the **MENU key** (change to setting mode).
- **Sampling Interval** (**Display Update Interval**)
  Press the **#3 soft key** (select [Trend display/save interval, User key]).

5
The sampling interval of the display data is "1 min" when the display update rate (Time/div) is set to [30min].

Select [1day] or longer for Auto save interval.

- **Name of Directory Where File Will Be Saved**
  Press the **#6 soft key** (select [File, DST]).
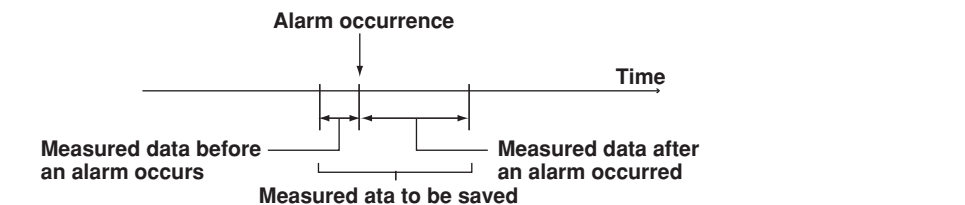

6

- **Returning to the Operation Mode**
  Press the **ESC key** (return to setting menu) > **ESC key** or **MENU key** (return to operation mode).

Setting Example 5: Data Acquisition 2

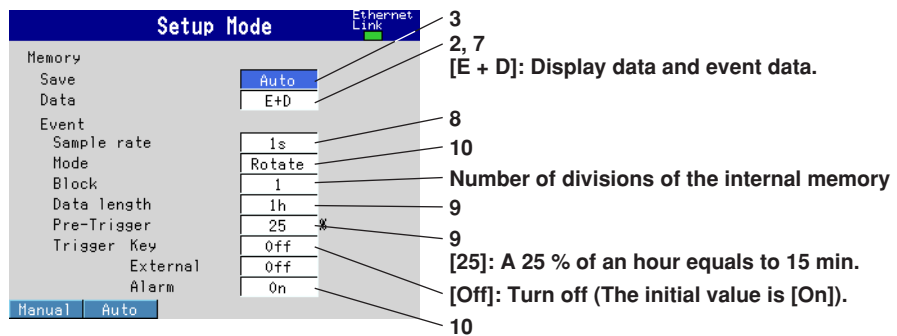The items in setting example 4, plus the condition to acquire detailed data when alarms occur.

Setting Items in Basic Setting Mode

Item	Description	Item Number in Figure
Source channels	Channel 1, channel 2, channel 31	1
Data to be acquired	Acquires measurement data continuously (acquires the display data).	2
Saving	Saves data automatically.	3
Data save time	Saves data at 15:00 everyday.	4
Data to be acquired upon alarm occurrence (Event data)		7
	Sampling interval: 1 second	8
	Acquisition interval: 1 hour, however this includes the 15 minutes of data prior to the alarm occurrence.	9
	Action: perform this action every time an alarm activates.	10

Alarm occurrence

Time

Measured data before an alarm occurs

Measured data after an alarm occurred

Measured ata to be saved

Settings in Basic Setting Mode

- **Displaying the Basic Setting Menu from Operation Mode**

  Press the **MENU key** (change to setting mode), then **hold down the FUNC key for 3 seconds** (change to basic setting mode).

- **Data Acquisition Method**

  Press the **#3 soft key** (select [Memory]).

  ```
  Setup Mode                Ethernet Link
  Memory
    Save              Auto
    Data              E+D
  Event
    Sample rate       1s
    Mode              Rotate
    Block             1
    Data length       1h
    Pre-Trigger       25    *
    Trigger  Key      Off
             External Off
             Alarm    On
  Manual   Auto
  ```

  3
  2, 7
  [E + D]: Display data and event data.
  8
  10
  Number of divisions of the internal memory
  9
  9
  [25]: A 25 % of an hour equals to 15 min.
  [Off]: Turn off (The initial value is [On]).
  10

- **Source Channels, Data Save Time**

  Press the **#4 soft key** (select [Memory and trend, Memory timeup]).

  Same as "Setting Example 4: Data Acquisition 1."

- **Saving Settings**

  1. Press the **ESC key** to return to the basic setting menu.
  2. Press the **[End] soft key**.

     The save settings confirmation window appears.
  3. With [Yes] selected, press the **DISP/ENTER key**.

     You are returned to operation mode.

Setting Items in Setting Mode

For the setting procedure of the following conditions, see the description in "Setting Example 4."

Item	Description	Item Number in Figure
Sampling interval	1 minute	5
Save destination	DATA-101	6

Setting Example 6: Creating Reports (Optional)

Create a daily report of measurement channels 1 and 2.

Setting Items in Basic Setting Mode

| Item	Description	Item Number in Figure
Report types	A daily report is created each day at 17:00.	1
Source channels	Measurement channels 1 and 2	2
Required output data	Average, max, min, and sum value for each channel.	3

Settings in Basic Setting Mode

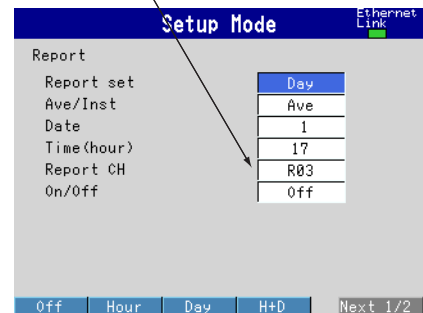- **Displaying the Basic Setting Menu from Operation Mode**

  Press the **MENU key** (change to setting mode), then **hold down the FUNC key for 3 seconds** (change to basic setting mode).

- **Report**

  Press the **#3 soft key** (selects [Option]) > **#2 soft key** (selects [Report]).
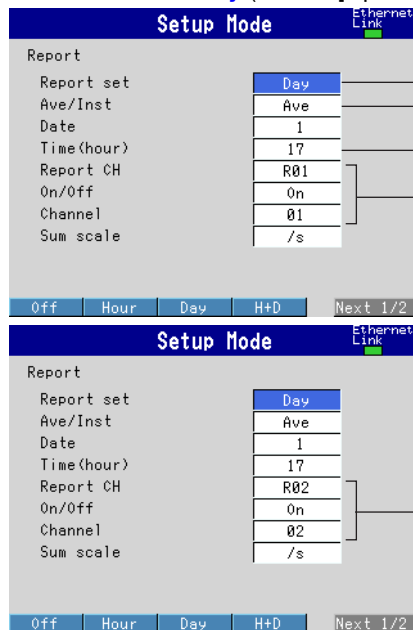
Assigne channels 1 and 2 to report chanels 1 and 2.
Turn [Off] other report channels (R03 to R12).

- **Saving Settings**
  1. Press the **ESC key** to return to the basic setting menu.
  2. Press the **[End] soft key**.
     The save settings confirmation window appears.
  3. With [Yes] selected, press the **DISP/ENTER key**.
     You are returned to operation mode.

Setting Example 7: Display Settings

Set conditions for the trend display.

Setting Items in Setting Mode

Item	Description	Item Number in Figure
Group	Set channels 1, 2, and 31 to group 1.	1
Trend display update rate	Set the update interval for trend waveforms to 1 minute which is identical to the sampling interval in "Setting Example" 4 and 5.	2
Scale for channel 1	Displays a scale of 0.0 to 200.0 °C. The scale is divided by 4 main scale marks.	3

Settings in Setting Mode

- **Displaying the Setting Menu from Operation Mode**
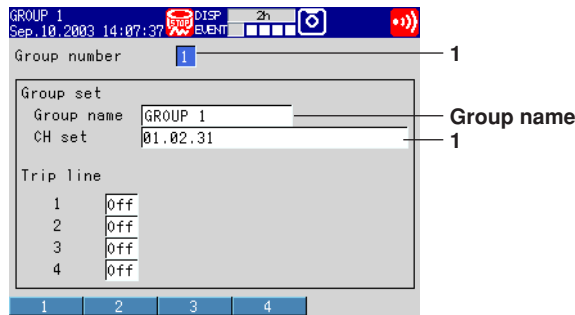 Press the **MENU key** (change to setting mode).
- **Display Update Rate of the Trend Waveform**
  Press the **#3 soft key** (select [Trend display/save interval, USER key]).
  Same as "Setting Example 4: Data Acquisition 1." The display update interval is linked to the sampling interval of the display data.
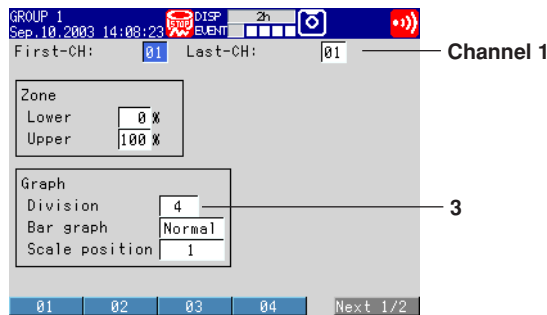- **Group**
  Press the **#5 soft key** (select [Display]) > **#1 soft key** (select [Group set, Trip line]).
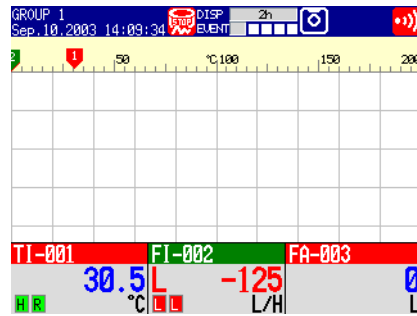

- **Scale**
  Press the **#5 soft key** (select [Display]) > **#3 soft key** (select [Zone, Graph]).

· **Returning to Operation Mode**

Press the **ESC key** (return to setting menu) > **ESC key** or **MENU key** (return to operation mode).

— **To display the scale, select [Scale ON] from the sub menu that is displayed by the following key operations.**
DISP/**ENTERkey** > **right arrow key**

Operation Example

Starting/Stopping Measurement

Start Writing to Internal Memory

Press the **START key**.

The FX100 begins writing to the internal memory. The computation/report (optional) function also starts.

When you begin writing to internal memory, the internal memory icon changes from indicating the stopped status to indicating the writing status as shown in the figure below.

Internal memory icon
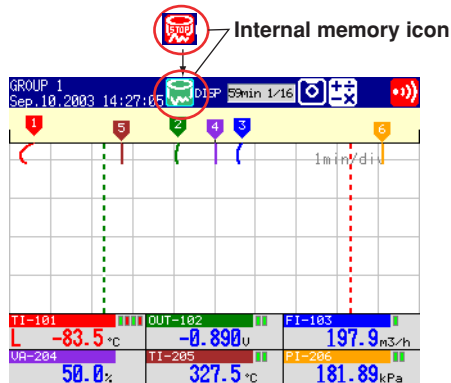
Stop Writing to Internal Memory

1. Press the **STOP key**.
2. A confirmation window appears. Using the **left and right arrow keys**, select [Memory] or [Mem + Math].
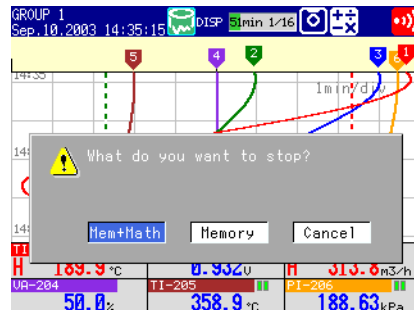

Select [Mem + Math] when you wish to stop not only writing to the internal memory but also the calculations assigned to computation channels.

If a computation function (option /M1 or /PM1) is not installed, a confirmation window appears with the message, "Do you want stop data storage?." Select [Yes].

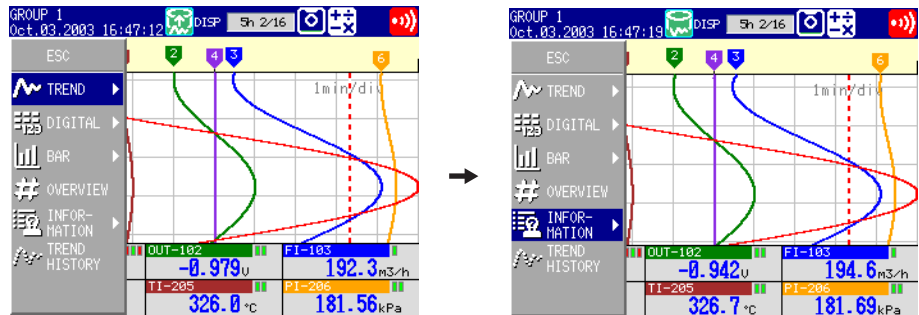3. Press the **DISP/ENTER key**.

The FX100 stops writing to the internal memory.

When you stop writing to the internal memory, the internal memory icon changes from indicating the writing status to indicating the stopped status.

Internal memory icon
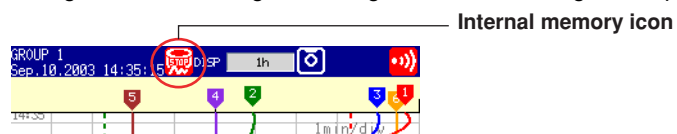
Switching from the Trend Screen to the Memory Summary

1. With trend display active in the operation screen, press the **DISP/ENTER key**.
    The display selection menu is appears. [TREND] is selected.
2. Press the **down arrow key four times** to select [INFORMATION].

3. Press the **right arrow key**.
    A sub menu is displayed. [Alarm summary] is selected.
    To close the sub menu, press the left arrow key.
4. Press the **down arrow key twice** to select [Memory summary].
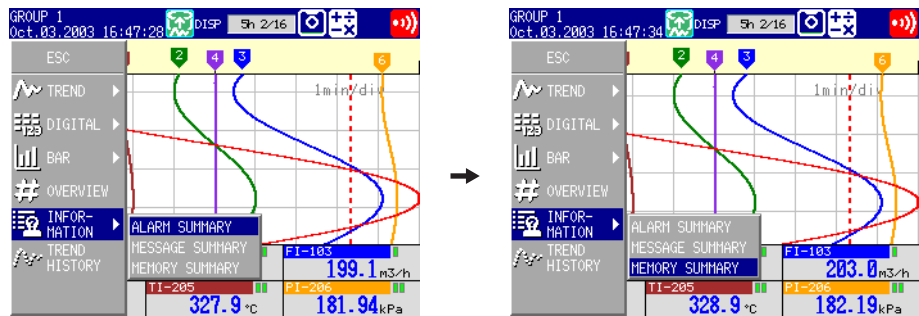
5. Press the **DISP/ENTER key**.
    The memory summary display appears.
    To close without switching the screen, press the ESC key.

Canceling Output When Alarms Occur (Alarm ACK Operation)

The operations below are only valid when [Behavior] is set to [Hold] or [Indicator] is set to [Hold].

1. With the operation screen displayed, press the **FUNC key**.
    The soft key menu is displayed in the lower part of the screen.

2. Press the **[AlarmACK] soft key**. Output from all activated alarms is cancelled.
    The soft key menu disappears.
    To clear the soft key menu without performing the operation, press the ESC key.
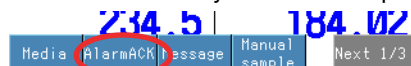
Writing the Message, "START"

Settings in Setting Mode

- **Displaying the Setting Screen from the Operation Screen**
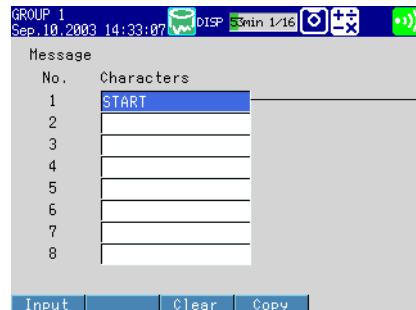 Press the **MENU key** (change to setting mode).
- **Example of Message Text**
  Press the **#4 soft key** (select [Message]).

[START]
The character string is set using the pop-up window that appears by pressing the [Input] soft key.

- **Returning to Operation Mode**
  Press the **ESC key** (return to setting menu) > **ESC key** or **MENU key** (return to operation mode).

Writing Messages in Operation Mode

1. Press the **FUNC Key** to display the soft key menu.
2. Press the **[Message] soft key** to display the message list.
   The soft keys for selecting messages are displayed.

3. Press the **[Message1] soft key**.
   Message mark/time/message is displayed in the trend display, and the corresponding information is written to the internal memory.

Message
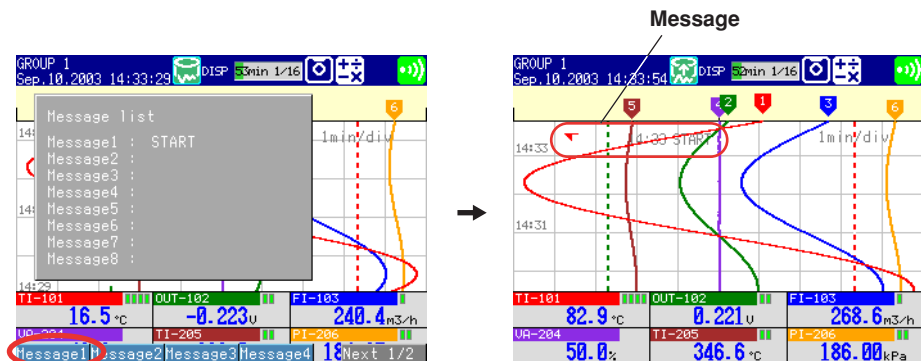
Utilizing Measured Data

You can display measured data using the DAQSTANDARD software and convert the data format.

Overview of Settings for the Ethernet Communication Function (/C7 Option)

The following is an overview of settings related to the Ethernet communication interface (/C7 option). Please confirm these settings with your network administrator.

File Transfers via FTP

These settings allow measured data files, report files, and screen image data files to be transferred automatically to an FTP server. To transfer measured data files and report files, autosaving of measured data must be turned ON (see "*Setting Example 4*" on page 34).

Settings in Basic Setting Mode

- **Displaying the Basic Setting Menu from Operation Mode**

  Press the **MENU key** (change to setting mode), then **hold down the FUNC key for 3 seconds** (change to basic setting mode).

- **IP Address, Subnet Mask, Default Gateway**

  Press the **#10 soft key** (select [Communication]) > **#1 soft key** (select [Ethernet (IP_Address)]).

- IP address of the FX100
- Subnet mask
- IP address of the default gateway

- **DNS**
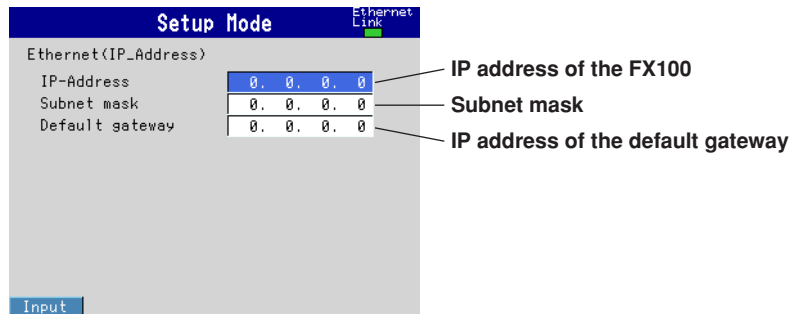
  Press the **#10 soft key** (select [Communication]) > **#2 soft key** (select [Ethernet (DNS)]).

  Use when specifying the FTP server by host name.

- Select [On] to use the DNS.
- IP address of the primary/secondary DNS
- Host name of the FX100
- Domain name the FX100 belongs

- **Transferring Files**

  Press the **#10 soft key** (select [Communication]) > **#3 soft key** (select [Ethernet (FTP transfer file)]).

- Select [On] to transfer files automatically.

- **Transfer Destination**

  Press the **#10 soft key** (select [Communication]) > **#4 soft key** (select [Ethernet (FTP connection)]).
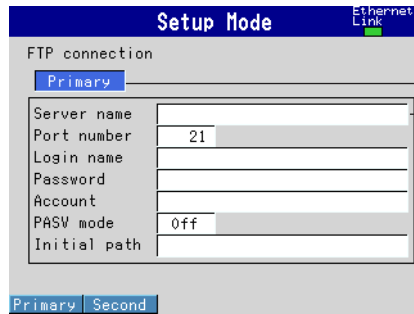
Select [Primary] or [Secondary].

IP address or the host name of the FTP server

Login name and password to access the FTP server

File Transfer Test in Operation Mode

1. Press **the FUNC key** to display the soft key menu.
2. Press the **[FTP test] soft key**.

    A soft key menu for selecting the transfer destination (primary and secondary) is displayed.
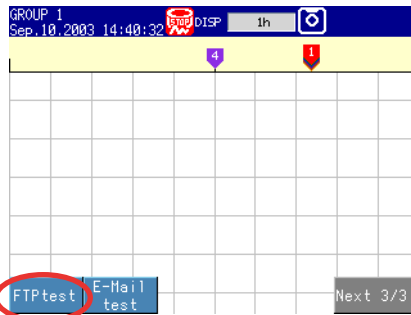
3. Press the transfer destination **soft key**.

    The messages, "FTP test is being executed," and "Execution is complete" are displayed.

    A text file containing the date and time (FX_FTPC.TXT) is transferred.

Sending E-Mail

These settings allow an e-mail to be sent to a specified recipient whenever an alarm occurs or at regular intervals.

Settings in Basic Setting Mode

- **Displaying the Basic Setting Menu from Operation Mode**

  Press the **MENU key** (change to setting mode), then **hold down the FUNC key for 3 seconds** (change to basic setting mode).

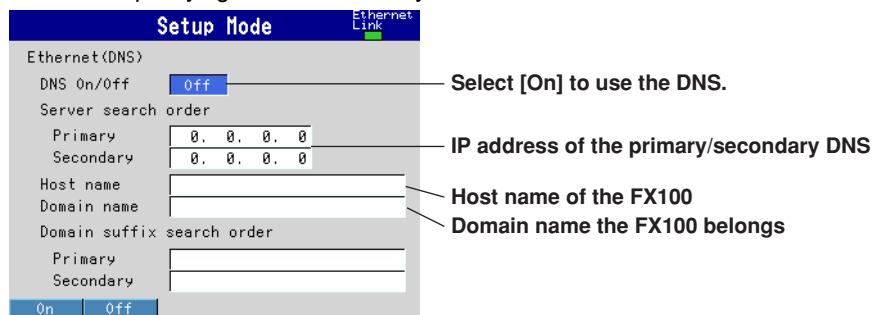- **IP Address, Subnet Mask, Default Gateway**

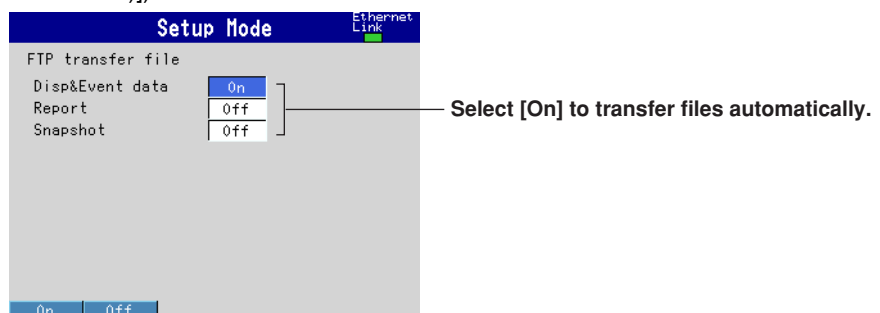 Press the **#10 soft key** (select Communication) > **#1 soft key** (select Ethernet (IP_Address)).

  Same as the settings in "*File Transfers via FTP*" (see page 43).

- **DNS**

  Press the **#10 soft key** (select Communication) > **#2 soft key** (select Ethernet (DNS)).

  Same as the settings in "*File Transfers via FTP*" (see page 43).

  Use when specifying the SMTP server by host name.

· **SMTP Server and Recipient Address**

Press the **#11 soft key** (select [Web, E-mail]) > **#2 soft key** (select [Basic E-mail Setting]).

Setup Mode   Ethernet Link
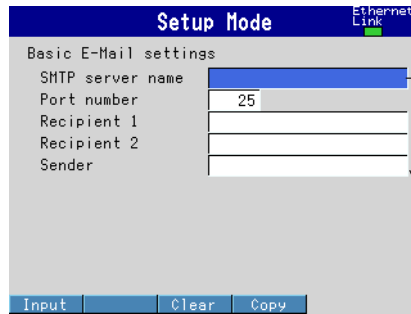
Basic E-Mail settings
SMTP server name _____ ——— **IP address or the host name of the SMTP server**
Port number   25
Recipient 1 _____ ——— **Set the transmission destination of the e-mail message using up to 150 alphanumeric characters. To specify multiple addresses, delimit the addresses using spaces.**
Recipient 2 _____
Sender _____ ——— **This string is displayed as a sender on the recipient PC.**

Input   Clear   Copy

· **Sending E-Mail upon Alarm Occurrences**

Press the **#11 soft key** (select [Web, E-mail]) > **#3 soft key** (select [Alarm E-mail Setting]).

Setup Mode   Ethernet Link

Alarm E-Mail settings
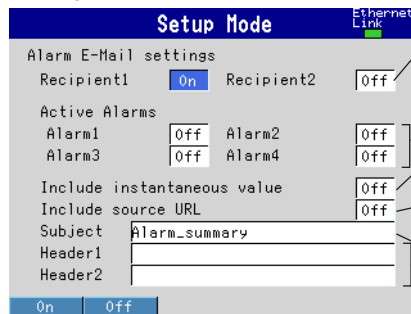Recipient1   On   Recipient2   Off ——— **Select the transmission destination.**

Active Alarms
Alarm1   Off   Alarm2   Off ——— **Set [On] to alarm numbers of which the alarm information is to be transmitted via the e-mail.**
Alarm3   Off   Alarm4   Off

Include instantaneous value   Off ——— **[On]: Attaches the measured value to the e-mail.**
Include source URL   Off ——— **[On]: Attaches the URL of ths FX100 to the e-mail.**
Subject   Alarm_summary ——— **Subject of the e-mail message**
Header1 _____ ——— **String to be attached to the e-mail message**
Header2 _____
On   Off

Sending a Test E-Mail in Operation Mode

1. Press **the FUNC key** to display the soft key menu.
2. Press the **[E-Mail test] soft key**.

   A soft key menu for selecting the recipient (Recipient 1 or Recipient 2) is displayed.

   Log   FTPtest   E-Mail START   E-Mail test   Next 3/3

3. Press the Recipient **soft key**.

   The messages, "E-mail test is being executed," and "E-mail sent" are displayed. The test mail (Test_mail) is sent.

   Rcpnt1   Rcpnt2
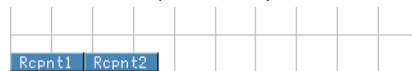
Enabling the E-Mail Transmission

1. Press **the FUNC key** to display the soft key menu.
2. Press the **[E-Mail START] soft key**.

   E-mail transmission is enabled. An e-mail transmission function icon (✉) is displayed in the status display section of the FX100.

   Log   FTPtes   E-Mail START   E-Mail test   Next 3/3

Monitoring on a Web Browser

These settings allow you to view the FX100's display and perform operations remotely using a Web browser on a networked PC.

Settings in Basic Setting Mode

・ **Displaying the Basic Setting Menu from the Operation Screen**

Press the **MENU key** (change to setting mode), then **hold down the FUNC key for 3 seconds** (change to basic setting mode).

・ **IP Address, Subnet Mask, Default Gateway**

Press the **#10 soft key** (select [Communication]) > **#1 soft key** (select [Ethernet (IP address)]).

Same as the settings in "*File Transfers via FTP*" (see page 43).

・ **DNS**

Press the **#10 soft key** (select [Communication]) > **#2 soft key** (select [Ethernet (DNS)]).

Same as the settings in "*File Transfers via FTP*" (see page 43).

Use when specifying the FX100 server by host name.

・ **Operator Page and Monitor Page**

Press the **#11 soft key** (select [Web, E-mail]) > **#1 soft key** (select [Web]).

Select [Use] to use this function.

Select either [Operator] page or [Monitor] page.

Select [On] to use the page.

If you select [On], you can operate the FX100 from the PC on the network using a web browser.

You must enter the user name and password to display the page.

Viewing the FX100's Screen from a PC on the Network

Open a Web browser on a PC on the network. Use Microsoft Internet Explorer 4.0 or later.

Enter the following example URL into the browser.
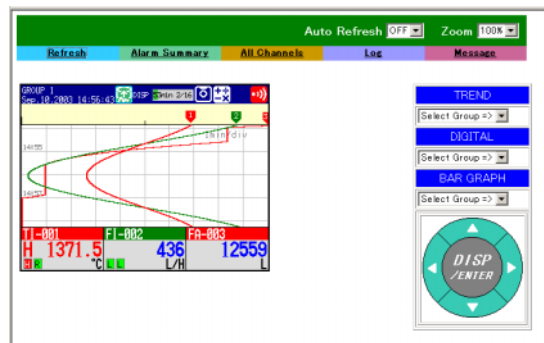
http://hostname.domain name/file name, or

http://IP address/file name

Example   http://FX.aaa.co.jp/operator.htm

http://000.000.000.000/monitor.htm
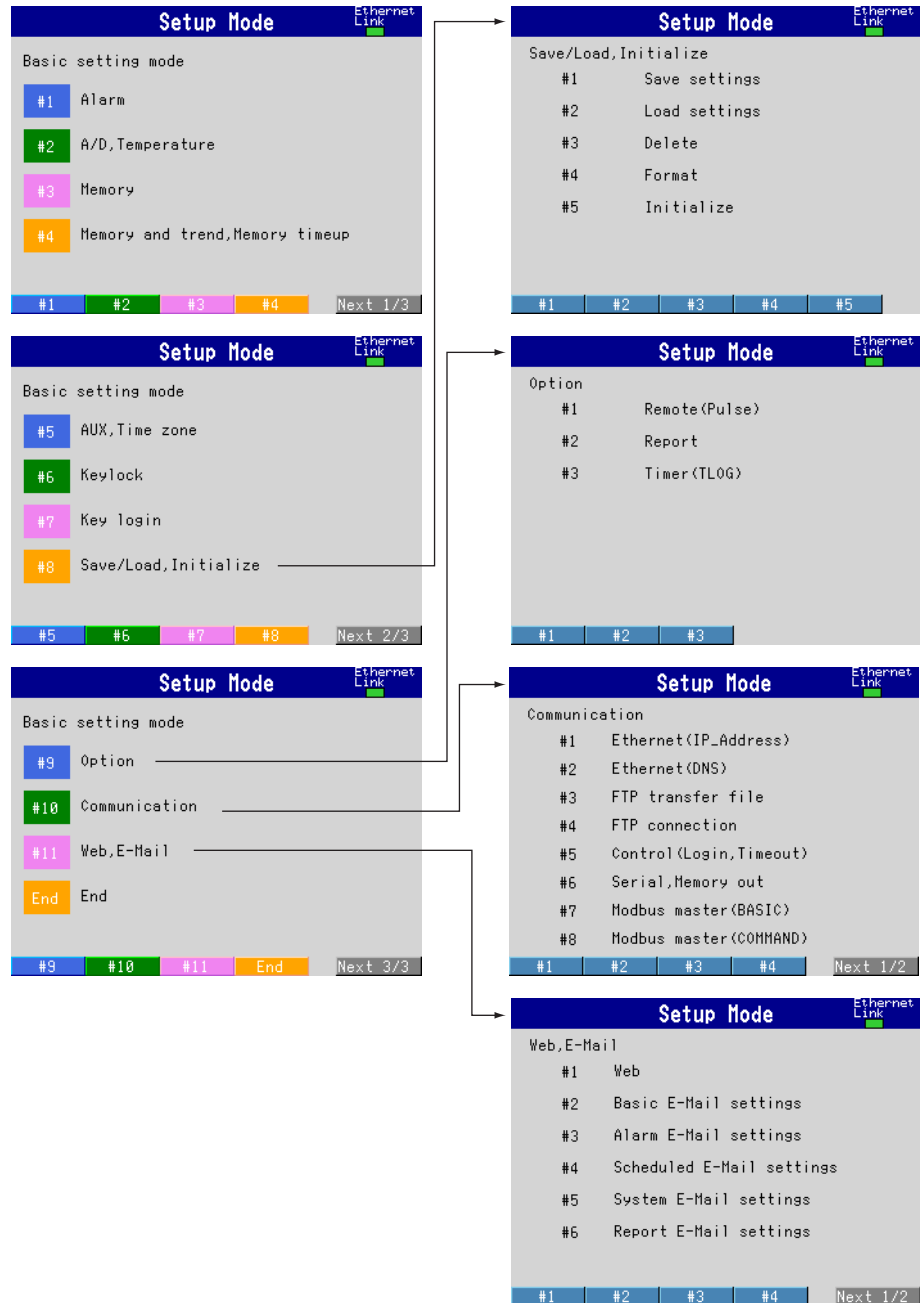
・ **Display example (operator page).**

Settings

Basic Setting Mode

Menu Screen

The following shows the basic setting mode menu screen. The displayed items vary depending on the specifications of your particular model.

Settings

The reference sections indicated in the table can be found in the *"FX100 user's manual"* (IM 04L20A01-01E, included in the CD-ROM).

Soft key	Settings in the basic setting mode		Ref. section
	Title	Item	
#1	Alarm	Reflash alarm	4.2
		AND operation of alarm output relays	
		Energize/de-energize alarm output relays	
		Hold/non-hold alarm output relays	
		Hold/non-hold alarm displays	
		Rate-of-change alarm interval	
		Turn On/Off the alarm hysteresis	
#2	A/D	Integration time of the A/D converter	4.1
		Scan interval	
		Burn out Off/Up/Down	
		Reference junction compensation (internal or external, compensation voltage when using external)	
	Temperature	Temperature unit	4.1
#3	Memory	Save method to the external storage medium	7.1
		Type of data to be acquired	
		Event data	
		Sampling interval	
		Data length (file size)	
#4	Memory & trend	Measurement channels to acquire data/display the waveform	7.1
		Computation channels to acquire data/display the waveform	
	Memory timeup	Date and time to save data	7.1
#5	Aux	Tag display or channel number display	6.2
		Minimum remaining amount of internal memory at which to generate the alarm	9.5
		Displayed language	3.6
		Use/Not use partial expanded display	6.12
	Time zone	Time difference from GMT	3.7
#6	Key lock	Use/Not use key lock, Password, Keys to lock	9.2
#7	Key login	Use/Not use key login, Auto logout On/Off, Use/Not use user ID, User name, User ID, Password, Allow/Prohibit basic setting mode	9.3
#8	Save/Load, Initialize[*1]		
#8 - #1	Save settings	Save setup data to external storage medium	7.9
#8 - #2	Load settings	Load setup data from external storage medium	7.9
#8 - #3	Delete	Delete files on external storage medium	7.7
#8 - #4	Format	Format external storage medium	7.7
#8 - #5	Initialize	Initialize the setup data in the internal memory and clear measured data	3.5
#9	Option[*2]		
#9 - #1	Remote	Action assignment to remote terminals	9.6
#9 - #1	Remote (Pulse)[*3]	Pulse input assignment to terminals	4.3
		Action assignment to remote terminals	9.6
#9 - #2	Report	Report types	8.6
		Date/Time of creation	
		Report channel assignments	
		Sum scale	
#9 - #3	Timer (TLOG)	Timer mode (absolute time/relative time)	8.4
		Interval	
		Reference time for the absolute timer	
		Turn On/Off reset at each interval	
		Turn On/Off TLOG data storage	

*1 The title is [#8 Initialize] and [#1 Initialize] only is contained in the menu on the models with no external storage drive.
*2 The displayed items varies depending on the option codes specified.
*3 For models with pulse input measurement option (/PM1)

Soft key	Settings in the basic setting mode Title	Ref. section
#10	Communications[4]	
#10 - #1	Ethernet (IP_Address)	[5]
#10 - #2	Ethernet (DNS)	[5]
#10 - #3	FTP transfer file	[5]
#10 - #4	FTP connection	[5]
#10 - #5	Control (Login, Timeout)	[5]
#10 - #6	Serial, Memory out	[5]
#10 - #7	Modbus master (BASIC)	[5]
#10 - #8	Modbus master (DOMMAND)	[5]
#11	Web, E-Mail[6]	
#11 - #1	Web	[5]
#11 - #2	Basic E-Mail settings	[5]
#11 - #3	Alarm E-Mail settings	[5]
#11 - #4	Scheduled E-Mail settings	[5]
#11 - #5	System E-Mail settings	[5]
#11 - #6	Report E-Mail settings	[5]

[4] The displayed items vary depending on the communication functions installed.
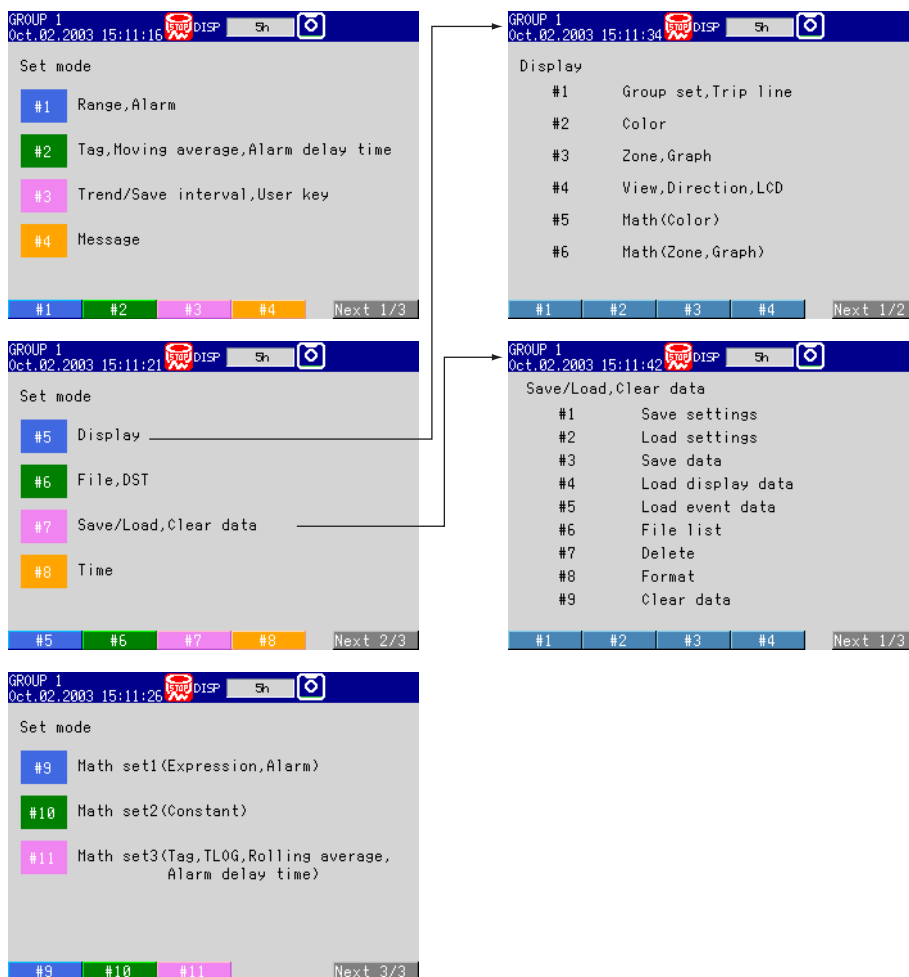[5] See the "*FX100 Communication Interface User's Manual*" (IM 04L20A01-17E).
[6] Displayed when the Ethernet communications interface (/C7) is installed.

Setting Mode

Menu Screen

The following shows the setting mode menu screen. The displayed items vary depending on the specifications of your particular model.

Setting Items

The reference sections indicated in the table can be found in the "*FX100 user's manual*" (IM 04L20A01-01E, included in the CD-ROM).

Soft key	Settings in the setting mode		Ref. section
	Title	Item	
#1	Range	Input type, measurement range, upper and lower limits of span, reference channel for difference computation, upper and lower limits of scale, Unit	4.1
	Alarm	Alarm type, Alarm value, Output relay number	4.2
#2	Tag	Tag name	4.1
	Filter	Filter time constant/Off (FX103)	4.1
	Moving average	Number of samples for the moving average/Off (FX106/FX112)	4.1
	Alarm delay time		4.2
#3	Trend/Save interval	Trend display update rate	6.3
		Auto save interval	7.1
	USER key	Assign an action to the USER key	9.1
#4	Message	Message string	6.4

Soft key	Settings in the setting mode		Ref.
	Title	Item	section
#5	Display		
#5 - #1	Group set	Group name, Assign channels to groups	6.1
	Trip line	Trip line position, display color	6.5
#5 - #2	Color	Measurement channel display color	6.5
#5 - #3	Zone	Zone upper and lower limits	6.7
	Graph	Number of scale divisions	6.8
		Bar graph base position	6.10
		Specifies the scale display position for trends	6.8
	Partial	Turns On/Off partial expanded display	6.12
		Position/boundary for the partial expanded display	
#5 - #4	View	Trend display direction	6.9
		Bar graph display direction	6.10
		Background color, Trend line width, Trip line width, Grid for the trend display	6.9
		Group display switching interval (Scroll time)	6.11
		Scale digit	6.8
	LCD	LCD brightness	3.4
		Turns off/dims the LCD backlight, or disables the saver	
		Transition time for the LCD backlight saver and conditions to restore the backlight	
#5 - #5	Math (Color)[*1]	Computation channel display color	6.6
#5 - #6	Math (Zone)[*1]	Zone upper and lower limits	6.7
	Math (Graph)[*1]	Number of scale divisions	6.8
		Bar graph base positions,	6.10
		Specifies the scale display position for trends	6.8
	Math (Partial)[*1]	Turns On/Off partial expanded display	6.12
		Position/boundary for the partial expanded display	
#6	File	Header string to be written to file	7.1
		A name of directory to which data are to be saved	
	DST	Summer/winter time On/Off (Daylight savings time)	3.3
#7	Save/Load, Clear data[*2]		
#7 - #1	Save settings	Saves setup data to external storage medium	7.9
#7 - #2	Load settings	Loads setup data from external storage medium	7.9
#7 - #3	Save data	Saves measured data to external storage medium	7.3
#7 - #4	Load display data	Loads the display data on external storage medium	7.6
#7 - #5	Load event data	Loads the event data on external storage medium	7.6
#7 - #6	File list	Lists files/directories/free space on external storage medium	7.7
#7 - #7	Delete	Deletes files/directories on external storage medium	7.7
#7 - #8	Format	Formats external storage medium	7.7
#7 - #9	Clear data	Clears the measure data in the internal memory	7.8
#8	Time	Enters the current time	3.3
#9	Math set1 (Expression)[*1]	Computing equations, display span, and unit for computation channels	8.1
	Math set1 (Alarm)[*1]	Alarm type, Alarm value, Output relay number	8.3
#10	Math set2 (Constant)[*1]	Constants (K01 to K30)	8.1
#11	Math set3 (Tag)[*1]	Tag names of the computation channels	8.1
	Math set3 (TLOG)[*1]	Timer number used in TLOG, sum scale	8.4
	Math set3 (Rolling average)[*1]	Turn On/Off the rolling average	8.5
		Sampling interval/number of samples	
	Math set3 (Alarm delay time)[*1]		8.3

*1 Computation-related items are not displayed if the computation functions are not installed.
*2 For models with no storage media drive, the title is "#7 Clear data," and only the "#1 Clear data" menu is displayed.