OMRON

Portable Multi Logger

ZR-RX45

User's Manual

Cat. No. Z304-E1-01

Introduction

This manual provides information regarding functions, performance and operating methods that are required for using the ZR-RX45.
When using the ZR-RX45, be sure to observe the following:
- The ZR-RX45 must be operated by personnel knowledgeable in electrical engineering.
- To ensure correct use, please read this manual thoroughly to deepen your understanding of the product.
- Please keep this manual in a safe place so that it can be referred to whenever necessary.

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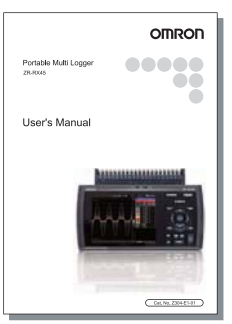
Type of Manuals

The manuals of the ZR-RX45 series consist of the following.
Select the manual suitable for your purpose and read it before starting operation.

Manual packaged in the product (brochure)



User's Manual (this manual)

- Information for safe and correct use
- Before use: connection and wiring in details, language change of display, etc.
- Procedure in details for setting and measurement
- Specifications of the ZR-RX45 series and accessories
- Other information which is required for the use of the ZR-RX45 series

Manuals contained in the utility CD-ROM (pdf data)

Software Manual

Information for installing PC software, basic operation, explanation of screen and setting methods is described.
Two PC software manuals are contained:
- Special PC software "Wave Inspire RX"
- Basic PC software "Smart Viewer RXW"

User's Manual (this manual)

- Same contents as the above referenced "User's Manual" packaged in the product.

User's Manual

Portable Multi Logger

ZR-RX45

READ AND UNDERSTAND THIS DOCUMENT

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Meanings of Signal Words

The following signal words are used in this manual.

⚠ WARNING	Indicates a potentially hazardous situation which, if not avoided, will result in minor or moderate injury, or may result in serious injury or death. Additionally there may be significant property damage.
⚠ CAUTION	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or in property damage.

Meanings of Alert Symbols

The following alert symbols are used in this manual.

	Indicates the possibility of explosion under specific conditions.
	Indicates the possibility of electric shock under specific conditions.
	Indicates prohibition when there is a risk of minor injury from electrical shock or other source if the product is disassembled.
	Indicates general prohibitions for which there is no specific symbol.

Alert Statements in this Manual

The following alert statements apply to the products in this manual. Each alert statement also appears at the locations needed in this manual to attract your attention.

⚠ WARNING

This product cannot be used for directly or indirectly detecting human bodies to ensure safety.

Do not use this product as a human body protection device.

Serious hazard may occur in rare occasions due to ignition, rupture or combustion of the lithium battery contained in this product.

Never disassemble, deform under pressure, heat or incinerate this product.

Serious hazard may occur in rare occasions due to ignition, rupture or combustion.

Never disassemble, deform under pressure, heat or incinerate the lithium ion battery pack ZR-XRB1 (GRAPHTEC: B-517).

⚠ CAUTION

Injuries from electric shock may occur in rare occasions as the result of disassembly.

Never disassemble, deform under pressure or incinerate the main unit.

Hazard may occur from serious fire or electric shock.

Do not connect voltages exceeding the rated voltage to the signal input terminals.

Fire or hazard may occur in rare occasions from ignition, rupture or combustion.

Do not use battery packs other than ZR-XRB1.

Hazard may occur from electric shock.

Be sure to connect the terminal of this product to the cable first, and connect the measurement object.

Precautions for Safe Use

Be sure to observe the following items as they are very important to ensure safety.

1.Installation environment

- Do not store or use in locations where the temperature exceeds the rated range.
- Do not use in locations where the relative humidity exceeds the 5 to 85 %RH range.
- Do not use in locations subject to steam.
- Do not use in flammable or explodable gas environment.

2.Power supply and wiring

- Do not connect voltages exceeding the rated voltage to signal cables.
- Be sure to check the polarity of the signals when connecting the signal cables.
- When using the battery pack, be sure to read the cautions on the battery pack carefully for correct usage.
- Be sure to use only the specified battery pack.
- Be sure to use only the AC cable and the AC adapter provided as standard accessories.
- Do not connect power supplies exceeding the rated voltage to the AC adapter.
- Be sure to turn off the power supply when connecting to the input terminals.
- Do not touch the input terminals during measurement.

3.Installation category

- The ZR-RX45 conforms to the IEC60664-1 installation category II, and must not be used under the environment of the installation category III and IV.

4.Measurement category

- The ZR-RX45 is classified as measurement category I defined by IEC61010-1, and must not be used within measurement category II, III and IV.

5.Others

- Dispose of this product as industrial waste.
- If there are any troubles, stop usage immediately, turn off the power supply and contact OMRON branch or sales office.

Precautions for Correct Use

Please observe the following precautions to prevent inoperability, misoperation of the product or negative effects on the performance and the device.

1.Installation Location

Do not install this product in the following locations.

- Locations where the temperature exceeds the rated range
- Locations where severe changes in temperature occur (where condensation occurs)
- Locations subject to corrosive or flammable gases
- Locations subject to dust, salt or iron powder
- Locations subject to direct shock or vibration
- Locations subject to direct sunlight or near heating devices
- Locations where water, oil or chemical products may be splashed
- Locations subject to strong magnetic fields or strong electric fields

2.Power supply, connecting and wiring

- The cables should be wired apart from high-tension or power lines.
  Malfunction or damage may occur due to induction.
- After wiring, check the adequacy of power supply voltage, miswiring such as overvoltage/load short-circuiting and adequacy of load current before turning on the power supply.
  Malfunction may occur due to miswiring and such.
- Always turn off the power supply when attaching or removing peripheral devices.
  Attaching or removing of peripheral devices with the power supply on can cause malfunction or data corruption.

3.Installation

- Do not cover the vent hole when using this product.
  Leave at least 30cm of installation space around this product.
  The generated heat may cause malfunction or damage.
- When measuring temperature, install the product so that the input terminals are not subject to severe changes in temperature by wind or sunlight.
  It may cause calculation errors.
- Do not install this product in a slanted or vertical position.
- Connect the GND terminal for safe measurement. This product must also be grounded when sharing a common ground level with other devices.

4.Warm up

- For stable measurement, wait at least 30 minutes after turning on the power supply before using.

5.Handling

- Be sure to take backups of captured data in your PC. The captured content may be altered or lost due to misuse or malfunctions during usage.
- Do not drop or apply strong impact or force to the product.
  It may cause malfunction of the monitor or the main unit.

6.Maintenance

- Do not use thinner, benzine, acetone or kerosene to clean this product.
- Calibration should be performed periodically to maintain measurement accuracy.

Checking the Accessories

Item	Remarks	Quantity
Standard Set ZR-RX45A	Main unit AC adapter/AC cable User's Manual (this manual) Utility disk (CD-ROM) • Specal PC software "Wave Inspire RX" (tryout) • Basic PC software "Smart Viewer RXW" • User's Manual PDF files (this manual) • "Wave Inspire RX" Software Manual PDF files • "Smart Viewer RXW" Software Manual PDF files	1 1 1 1

Editor's Note

■ Meaning of Symbols

Menu items that are displayed on the ZR-RX45's LCD screen, and windows, dialog boxes and other GUI elements displayed on the PC are indicated enclosed by brackets "[ ]".

■ Visual Aids

Important Indicates points that are important to achieve the full product performance, such as operational precautions.

Note Indicates application procedures.

 Indicates pages where related information can be found.

MEMO

CONTENTS

1.General Description

2.Checks and Preparation

3.Settings and Measurement

4.SPECIFICATIONS

5.APPENDIX

General Description

This chapter provides a general description of the ZR-RX45 and its features.

Overview

The ZR-RX45 (with color monitor and internal memory) are compact, lightweight, multi-channel data loggers.

ZR-RX45 are provided with 20 channels as a standard measurement feature, or can be extended up to 200 channels by attaching additional terminal sets.

ZR-RX45 are also equipped with an internal flash memory to store data and enable the direct capture of a large volume of data to USB memory.

Furthermore, the data loggers are equipped with USB and Ethernet interfaces to a PC to enable system configurations according to your application.

The Ethernet feature includes WEB and FTP server functions which allow monitoring from a remote location and data transfer.

Features

Input

- Adoption of a pluggable M3 screw type input terminal facilitates wiring.
- The ZR-RX45 is provided with 20 channels as a standard measurement feature, or can be extended up to 200 channels by attaching additional terminal sets.
- All channels are isolated, enabling measurement of signals of different references.

Display & Operation

- With the ZR-RX45's high-resolution 5.7-inch TFT color liquid crystal display, you can confirm the waveforms of measured data and each channel's settings at a glance.
- Easy operation is achieved through a straightforward menu structure and key allocation which resembles mobile phones.

Data Capture

- Data can be directly captured and maintained in the internal or USB memory.
- The high-capacity internal memory enables measurement for a long term without the use of USB memory.
- Internal memory used for the built-in memory maintains captured data even after the power is turned off.
- The Internal memory can be used with disk images thus multiple data items can be maintained.
- The new ring memory capture function maintains latest data even after capturing for a long term. (You need to set how long you want to keep data.)
- For voltage and humidity measurements, data can be captured at sampling rates of up to 10 msec per channel by using fewer measuring channels. (Temperature measurement can be done at sampling rates of 100 msec and higher.)

Data Control & Processing

- The application software provided lets you set conditions and monitor data on a PC.
- The USB drive mode function enables the ZR-RX45's internal memory to be recognized as an external drive by your PC. (Connect the ZR-RX45 to your PC and turn on the power supply to the ZR-RX45 while holding down the [START] key.)
- Captured data can be read from the application software to files and displayed for processing.
- Data can be transferred off-line to a computer using USB memory.
- The WEB server function enables control and monitoring from a remote location without using dedicated software.
- The FTP server function enables handling internal memory and USB memory data from a PC.
- The FTP client function enables backup of measurement data to the FTP server.
- The NTP client function enables synchronization of the time with the NTP server.

Operating Environment

This section explains the operating environment for the ZR-RX45.

Ambient Operating Conditions

(1) Ambient temperature and humidity (the ZR-RX45 must be operated within the following ranges.)
- Temperature range: 0 to 45°C (0 to 40°C when a battery pack is mounted.)
- Humidity range: 5 to 85% RH

(2) Environment (do not use in the following locations.)
- A Location such as being exposed to direct sunlight
- Locations exposed to salty air, corrosive gases, or organic solvents
- Dusty locations
- Locations subject to vibration or impact
- Locations subject to voltage surge or electromagnetic interference such as lightning or electric furnaces

(3) Installation category (over-voltage category)
- The ZR-RX45 belongs to Installation Category II defined in IEC60664-1.
- Never use the ZR-RX45 for Installation Category III or IV.

(4) Measurement category
- The ZR-RX45 belongs to Measurement Category I defined in IEC61010.
- The ZR-RX45 cannot be used for Measurement Category II, III, or IV.

Note

If condensation occurs...
Condensation occurs in the form of water droplets on the device surfaces and interior when the ZR-RX45 is moved from a cold to a warm location. Using the ZR-RX45 with condensation will cause malfunctioning.
Wait until the condensation has disappeared before turning on the power.

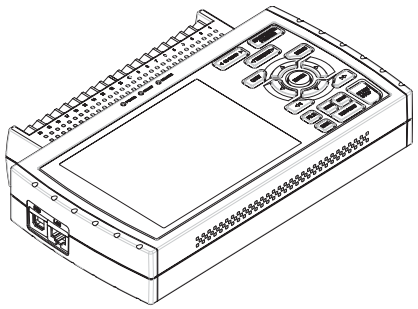
Warming-up Before Use

The ZR-RX45 should be allowed to warm up with the power turned on for approximately 30 minutes to ensure that it operates according to the specified performance.

Configuration When in Use

Do not use the ZR-RX45 standing upright or at an angle. It must always be laid flat.

Usage Configuration



Laid flat

Important

Do not block the air vent on the ZR-RX45, as this will cause malfunctioning.

Measurement accuracy may not be satisfactory if the system is used in a condition other than described above.

Notes on Temperature Measurement

Please observe the following precautions when performing temperature measurement.

- Do not block the air vents. Always provide a space of at least 30 cm on all sides of the ZR-RX45.
- For stabilized temperature measurement, allow the ZR-RX45 to warm up for at least 30 minutes after turning it on.
- Exposure of the input terminals to direct drafts, direct sunlight, or abrupt changes in temperature may impair the equilibrium of the input parts and result in measurement errors. To measure temperature in such an environment, take appropriate countermeasures such as changing the installation site of the ZR-RX45.
- To conduct measurement in noisy environments, connect the ZR-RX45's GND terminal to ground (refer to page 46).
- If measured values fluctuate due to noise, set to a slower sampling speed (refer to page 75).

Notes on Using the Monitor

The monitor is an LCD display unit, and so the display will vary depending on the operating environment.

Note

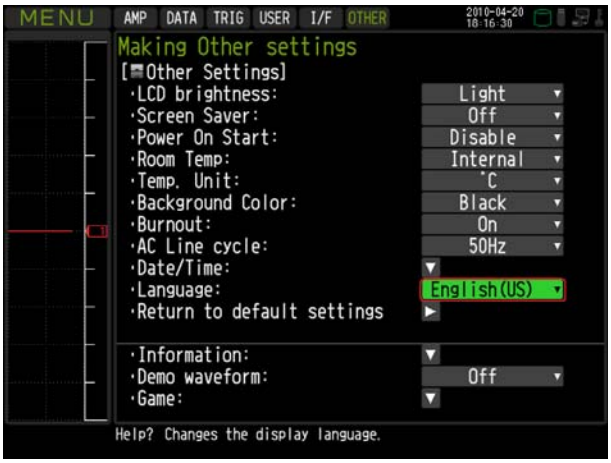
If the screen saver function is used, it will operate and clear the screen if no operations are performed during the preset time. If the screen saver operates, press any key to restore the display.

Important

- Condensation may form on the LCD screen if the ZR-RX45 is moved from a cold to a warm location. If this occurs, wait until the LCD screen warms up to room temperature.
- The LCD screen is manufactured to extremely high precision. Black dots may appear, or red, blue, and green dots may not disappear. Likewise, streaks may appear when viewed from certain angles. These phenomena are due to the LCD screen construction, and are not signs of a fault.

Changing the Display Language

You can choose the language displayed on the screen. The default display language is set to English when the ZR-RX45 is shipped overseas. To change the display language, see the instructions in "OTHER:Language".

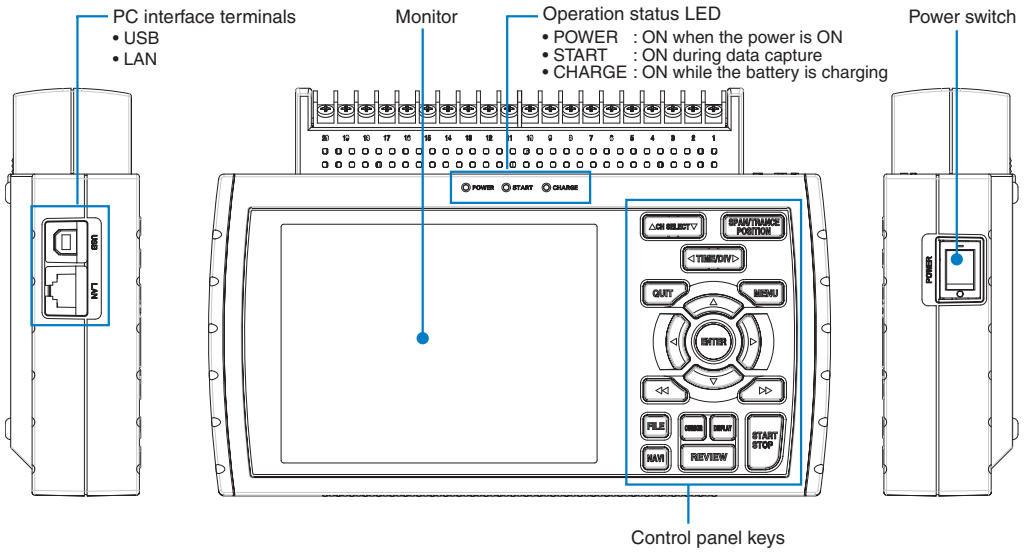


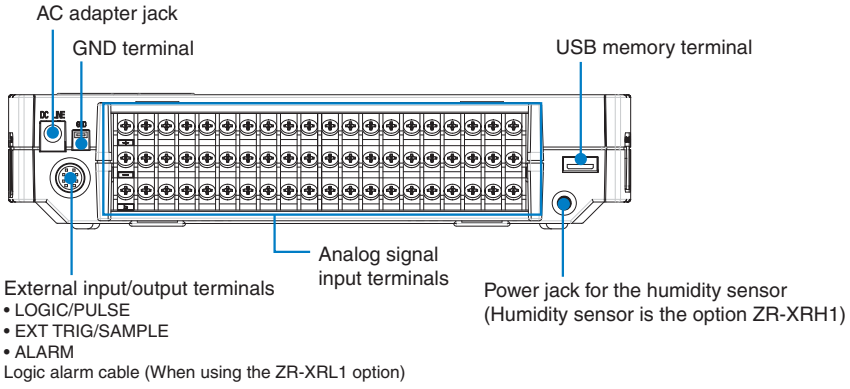
Checks and Preparation

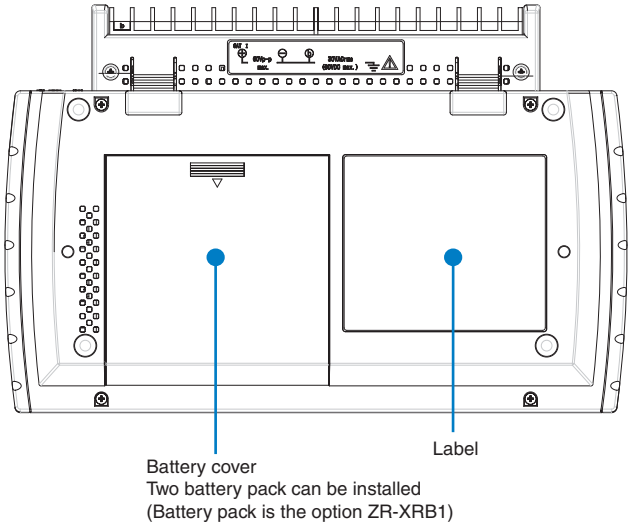
This chapter explains how to check the ZR-RX45's external casing andaccessories, and how to prepare the ZR-RX45 for operation.

Part Names and Functions

This section describes the names and function of parts of the ZR-RX45.







Connecting the Power Cable and Turning on the Power

This section describes how to connect the power cable and turn on the power. The connection method will vary depending on the type of power supply used.

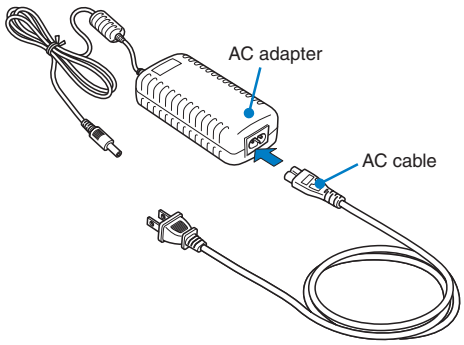
Connecting to an AC Power Supply

Use the AC cable and AC adapter that are provided as accessories.

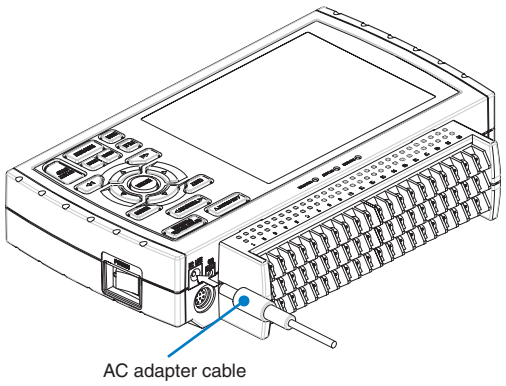
Important

Be sure to use the AC adapter that is supplied as a standard accessory.

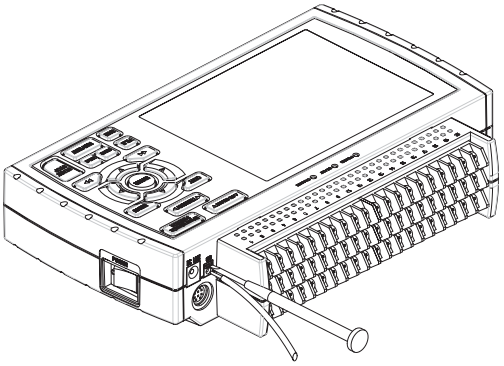
1 **Plug the AC cable into the AC adapter.**



2 **Connect the output side of the AC adapter to the connector on the ZR-RX45.**



3 **Using the flat-blade screwdriver, press against the minus (-) button above the GND terminal, while connecting the grounding cable to the ZR-RX45. Connect the other end of the cable to ground.**



4 **Plug the AC cable into the mains power outlet.**

5 **Press the power switch on the ZR-RX45 to the ON side to turn on the power.**

Important

Always connect the GND terminal and refer to the safety precautions. The ZR-RX45 must be grounded even when connected to other devices and sharing a common ground level.

Connecting to a DC Power Supply

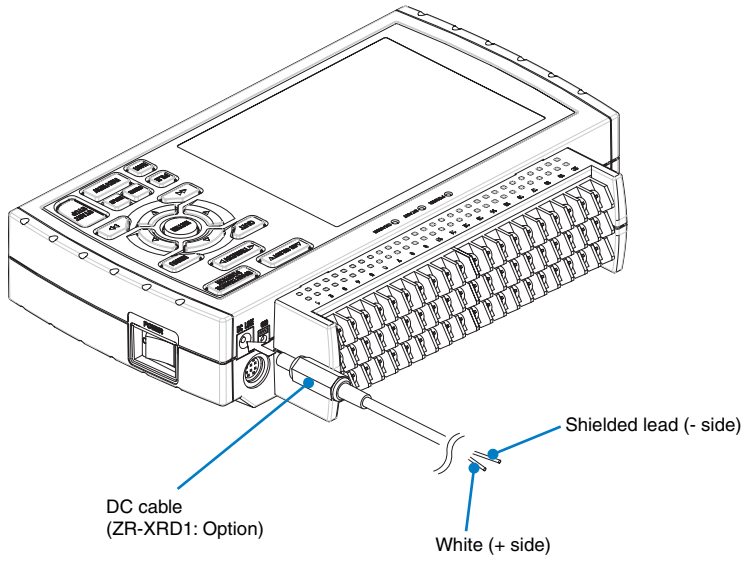
Use the optional DC cable (ZR-XRD1).

Important

Use a power supply within the 8.5 to 26.4 VDC range.

1 **Configure the tip of the DC cable (ZR-XRD1) to enable it to be connected to the DC power supply.**

2 **Connect the DC output side to the power supply connector on the ZR-RX45.**



3 **Connect the DC input side to the DC power supply.**

Important

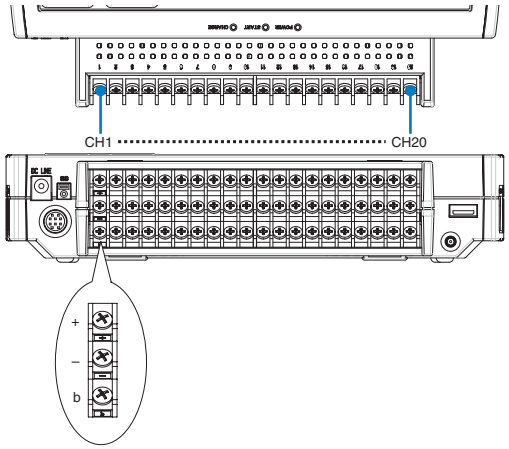
Be sure to check the polarity of the wire tips when performing wiring.

4 **Press the power switch on the ZR-RX45 to the ON side to turn on the power.**

Connecting the Signal Input Cables

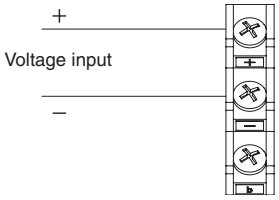
This section describes how to connect the signal input cables.

Terminal Configuration and Signal Types

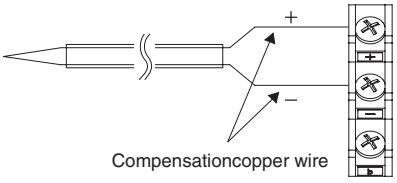


Connection diagram

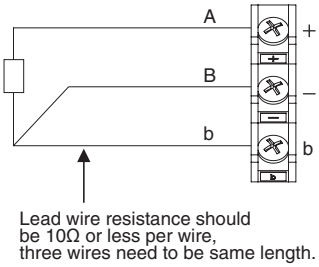
DC voltage input



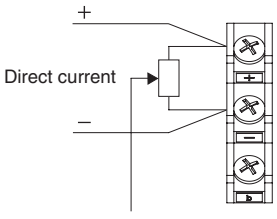
Thermocouple input



Resistance temperature detector input



Current input



Shunt resister
Ex: The current is converted to the voltage in the shunt register.
For 4 to 20mA current input, installing 250 ohms (0.1%) resister for converting 1 to 5V.

+ ..... High-voltage terminal (terminal for high-voltage input signals)

– ..... Low-voltage terminal (terminal for low-voltage input signals)

b ..... Dedicated terminal when connecting resistance temperature detector

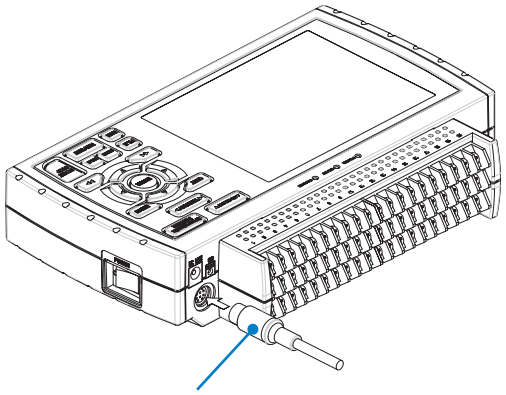
* Resistance temperature detector input terminals A (+) and B (-) are isolated within each channel. Terminal b is shorted within all channels.

Item	Description
Input configuration	Isolated input, scanning
Analog voltage	20, 50, 100, 200, 500 mV/F.S.; 1, 2, 5, 10, 20, 50 V/F.S.; 1-5V
Thermocouples	K, J, E, T, R, S, B, N, W (WRe 5-26)
Resistance temperature detector	PT100, JPT100, PT1000 (IEC751)
A/D resolution	16-bit (Effective resolution: About 1/40,000 of the +/- range)
Filter	Off, 2, 5, 10, 20, 40 Filter operation is on a moving average basis. The average value of the set sampling count is used. If the sample interval exceeds 30 seconds, the average value of data obtained in a sub-sample (30 seconds) is used.

Logic Alarm Cable Connection and Functions

The logic alarm cable (ZR-XRL1: Option) enables logic/pulse input, external trigger input, external sampling input, and alarm signal output.

Connect the logic alarm cable (ZR-XRL1: Option) to the external input/output terminal as shown below.



Logic alarm cable (ZR-XRL1: Option)

Logic/Pulse Specifications

Item	Description
Number of input channels	4
Input voltage range	0 to +24V max. (single-ended ground input)
Threshold level	Approx. +2.5V
Hysteresis	Approx. 0.5 V (+2.5 to +3 V)

* Switch between logic and pulse input.

Trigger Input/External Sampling Input Specifications

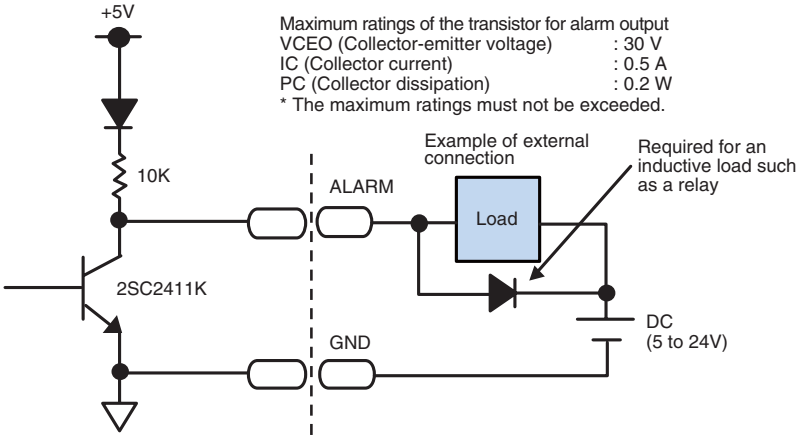
Item	Description
Number of input channels	1
Input voltage range	0 to +24V max. (single-ended ground input)
Threshold level	Approx. +2.5V
Hysteresis	Approx. 0.5 V (+2.5 to +3 V)

Alarm Output Specifications

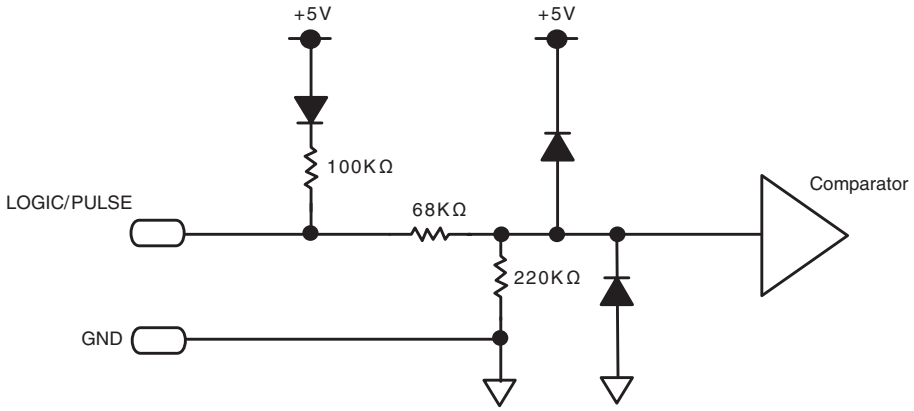
Item	Description
Number of Output channels	4
Output format	Open collector output +5 V, 10 KΩ pull-up resistance * See the next page for details on alarm output.

Internal equivalent circuit of I/O circuit

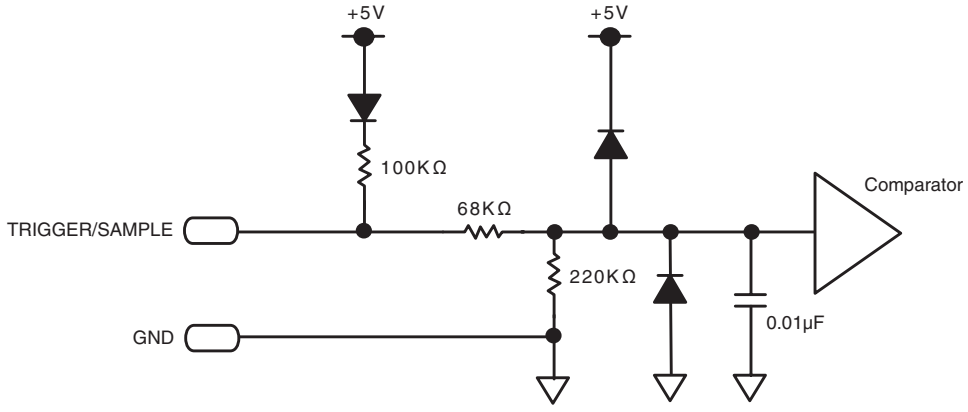
Alarm output



Logic/pulse input



Trigger input/external sampling input

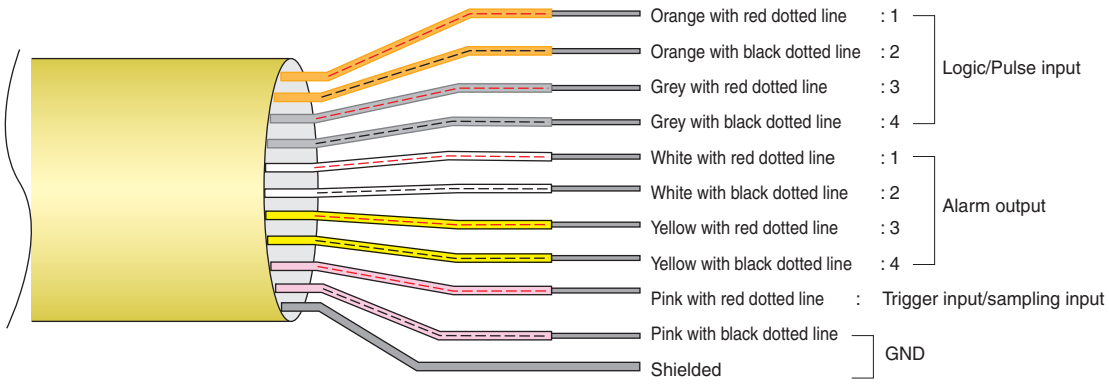


Wiring

Cable tips are bare tips. Perform wiring for the necessary functions.

Signal Name	Channel Number	Wire Color
Logic/Pulse output	1	Orange with red dotted line
	2	Orange with black dotted line
	3	Grey with red dotted line
	4	Grey with black dotted line
Alarm output	1	White with red dotted line
	2	White with black dotted line
	3	Yellow with red dotted line
	4	Yellow with black dotted
Trigger input/sampling input		Pink with red dotted line
GND		Pink with black dotted line
		Shielded

* Switch between logic and pulse.



Attaching USB Memory

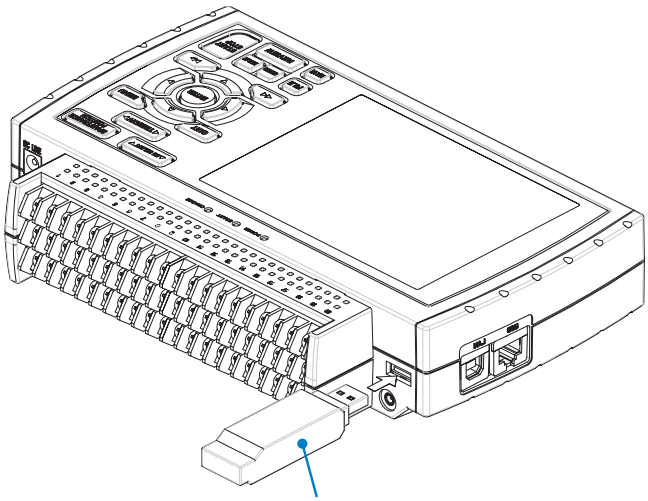
Attaching USB memory to the ZR-RX45 allows you store measured data directly.

Important

Adequate precautions against static electricity must be taken when handling USB memory.

Inserting a USB Memory

Attach the USB memory to the USB memory terminal.



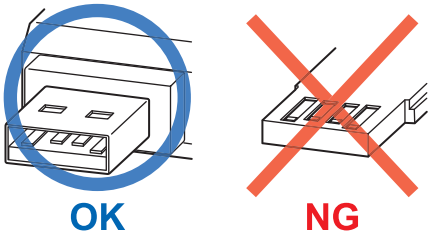
Important

When you attach the USB memory to ZR-RX45, be careful during handling so as not to bump or drop the unit.

<Specifications of supported USB memory>

- Power source : +5 V
- Power consumption : 250 mA or below
- Capacity : No limit (except each file must be within 2 GB)

* USB memory with security functions such as fingerprint authentication or having a connector without a shell (metallic part) cannot be used.

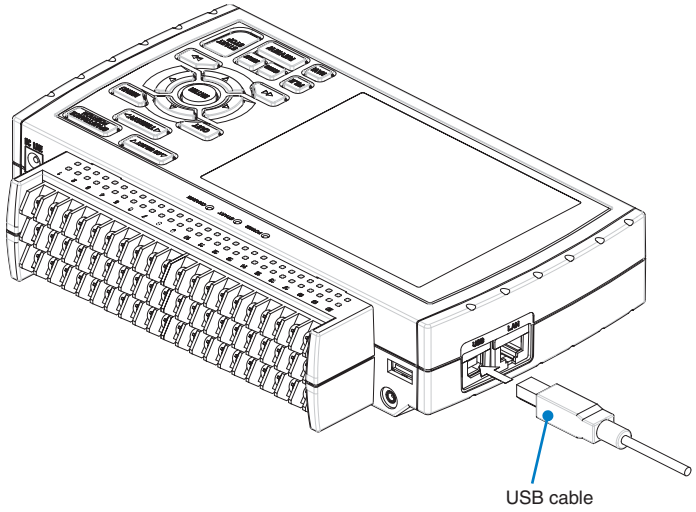


Connecting to a PC

Use the USB, LAN Interface to connect the ZR-RX45 to a PC

Connection Using a USB Cable

Use the USB cable to connect the ZR-RX45 to a PC.



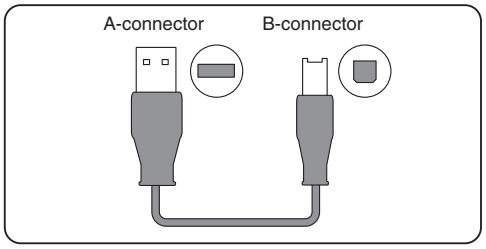
Note

If the USB cable is used, the USB driver must be installed in your PC. Please refer to "Installing the USB Driver" in the "PC Software Manual".

Important

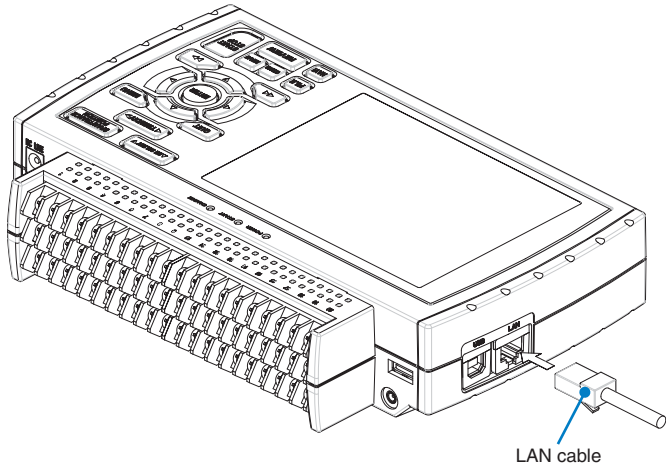
The USB connector is adjacent to the LAN connector. Make sure the cable is inserted into the correct connector.

Use the A-B USB cable to connect the ZR-RX45 to a PC.



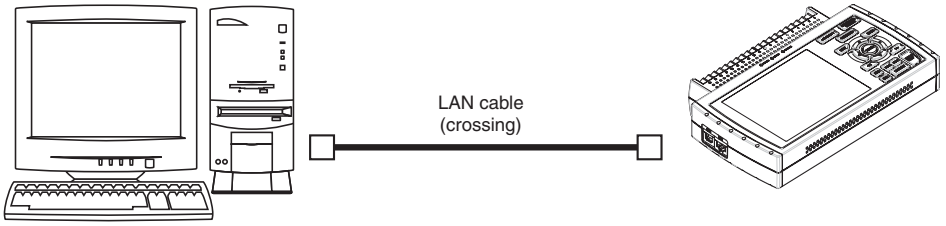
LAN Connection

Use a LAN cable to connect the ZR-RX45 to a PC.

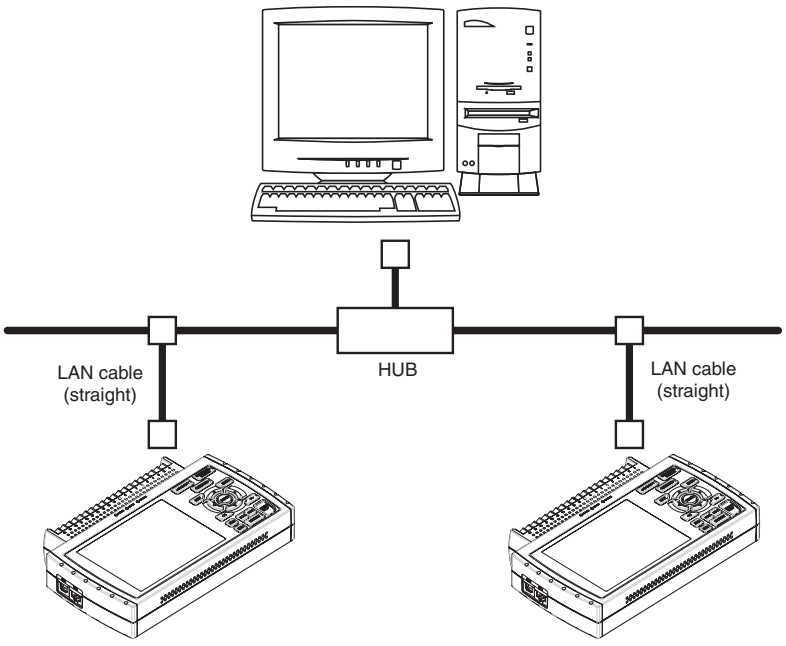


Cable Types

• Use a crossing cable when connecting directly to a PC, without using a hub.



• Use a straight cable when using a hub.



Using the Battery Pack (ZR-XRB1: Option)

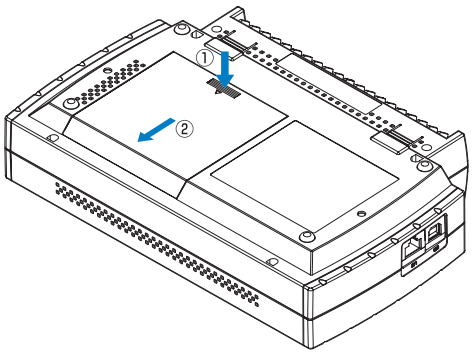
- The ZR-XRB1 (option) is the only battery type that can be used with the ZR-RX45.
- Refer to the specifications (P.133) for information on the battery run time.
- The operating temperature range of the ZR-RX45 with a battery pack mounted is as follows:

  Running on battery : 0 to 40°C

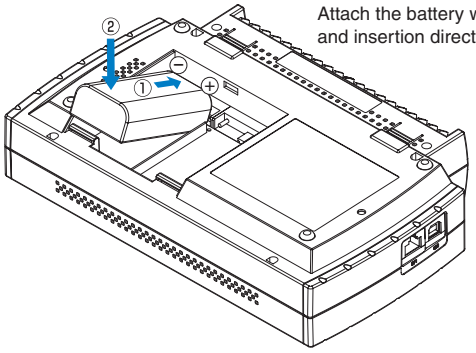
  Battery being charged : 15 to 35°C

Mounting the Battery Pack

1 **While lightly pushing the grip of the battery cover, slid the cover in the direction indicated by the arrow.**



2 **Attach the battery pack (ZR-XRB1).**



Attach the battery with care of polarity and insertion direction.

Note

Either one or two battery packs can be attached.
To connect one pack, connect to either one of the connectors.
Attaching two battery packs allows longer operational time.

Important

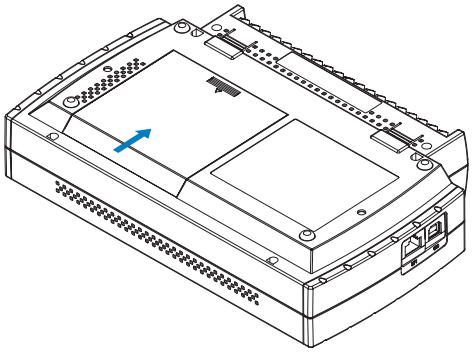
When attaching two battery packs, make sure the battery levels are equivalent.

Do not use a new battery with an old battery at the same time.

When attaching two battery packs, make sure the remaining amount are same.

If you are not sure about the amount, charge each battery and then attach full-charged two battery packs.

3 **Attach the battery cover.**



Charging the Battery

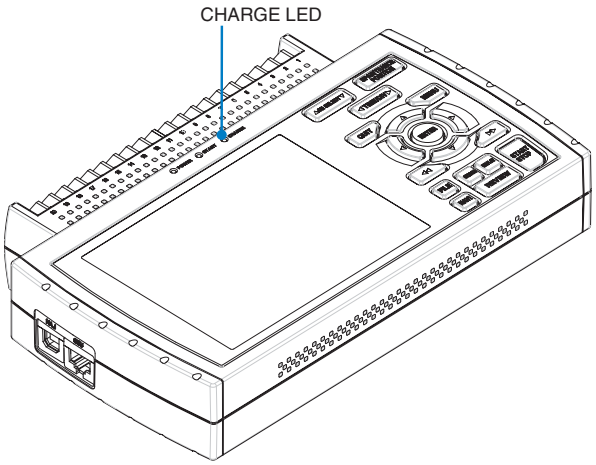
Expected time required for charging: • battery pack × 1: approx. 4 hours
• battery pack × 2: approx. 8 hours

The battery pack is charged by mounting it in the ZR-RX45, attaching AC adapter to the ZR-RX45.

1 **Mount the battery pack in the ZR-RX45 (see the previous section for the mounting procedure).**

2 **Turn on the power to the ZR-RX45. (Please see Section "Connecting the Power Cable andTurning on the Power").**

3 **The CHARGE LED lights.**

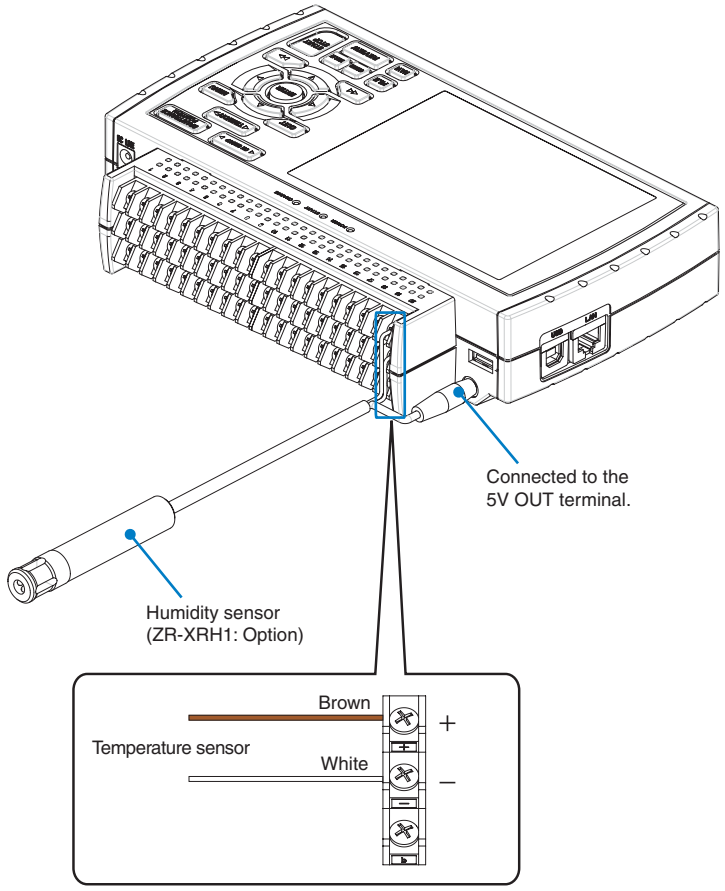


Note

- ZR-RX45 is equipped with a temperature monitor function which starts automatic charging as soon as it is cooled down. Therefore, depending on the internal temperature, charging may not be performed immediately.
- When charging is attempted while the power is ON, charging may not be performed immediately even if the temperature environment conforms to the specification. In such a case, set the Screen Saver settings to ON or perform charging while the power is OFF.
- If input is being made directly from the DC power supply instead of the AC adapter, charging will not be performed when the DC voltage is about 16 V or less.
- The operating temperature range during charge is from 15 to 35°C.

Connecting the Humidity Sensor (Option)

Connect the + and - lead wires of the humidity sensor (the ZR-XRH1 option) to the desired terminals, and then insert the round connector into the 5V OUT connector on the ZR-RX45.



Important

Do not use the sensor in a strong electrolyte envronment. Measured results may not satisfy to the stated.

Mounting and Removing the Terminal Unit

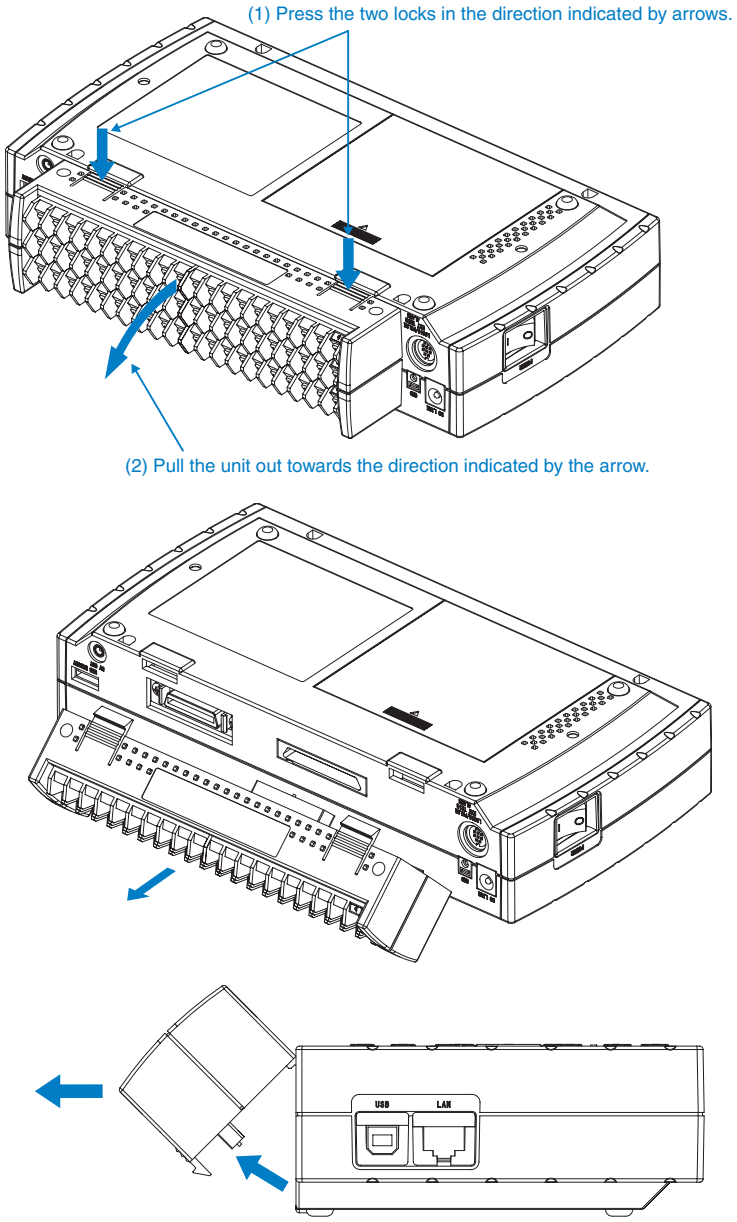
Remove and mount terminal units as shown below.

Important

Make sure the ZR-RX45's power is OFF when removing or mounting terminal units.

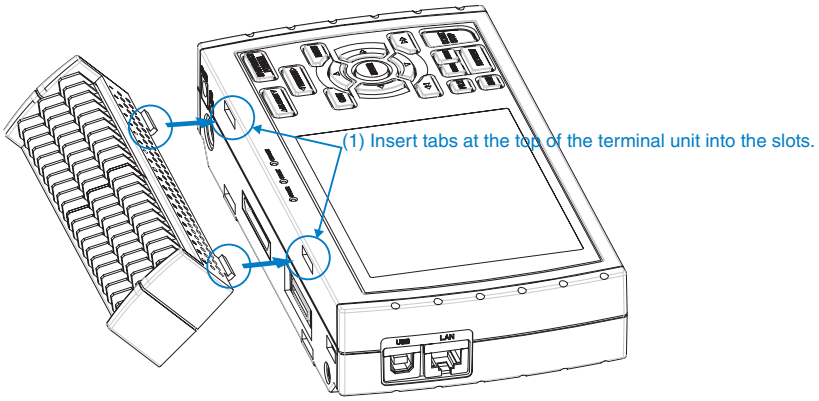
To Remove

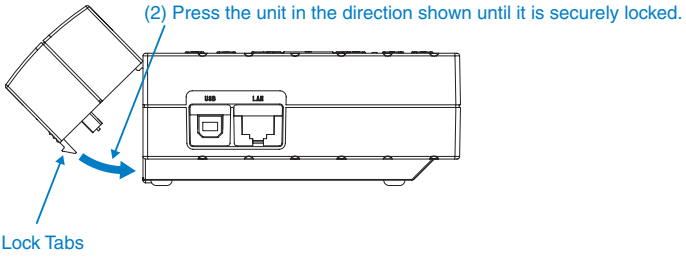
Pull the terminal unit out towards the direction indicated by the arrow while pressing the two locks at the bottom of the unit.



To Mount

Insert the tabs at the top of the terminal unit into the slots of the ZR-RX45, and push in the unit until the lock tabs at the bottom of the unit are securely locked.





Important

- If the terminal unit that comes with the standard ZR-RX40 is mounted on the ZR-RX45, the temperature measurement accuracy may not meet the specifications.
- If the terminal unit that comes with the standard ZR-RX45 is mounted on the ZR-RX40, the temperature measurement accuracy may not meet the specifications.

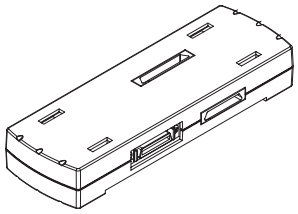
Mounting the Extension Terminal Base Set (ZR-XRE1)

Mount the extension terminal base set as shown below.

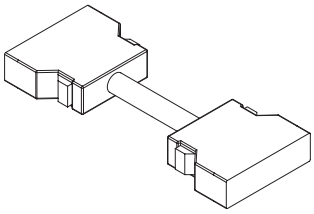
Important

Make sure the ZR-RX45's power is OFF when mounting the extension terminals.

Set Contents



Extension Terminal Base Unit : 1



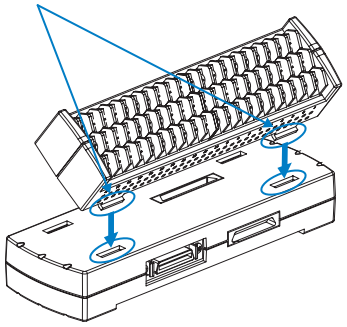
Extension Terminal Cable : 1

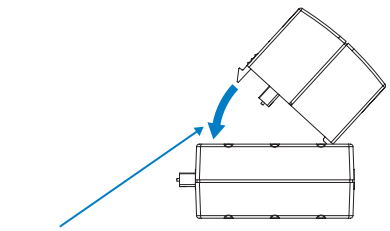
To Mount

1 **Remove the terminal unit mounted to the ZR-RX45 (refer to 39).**

2 **Insert the tabs at the top of the terminal unit into the slots of the extension terminal base unit, and push in the unit until the lock tabs at the bottom of the unit are securely locked.**

(1) Insert tabs at the top of the terminal unit into the slots of the extension terminal base unit.

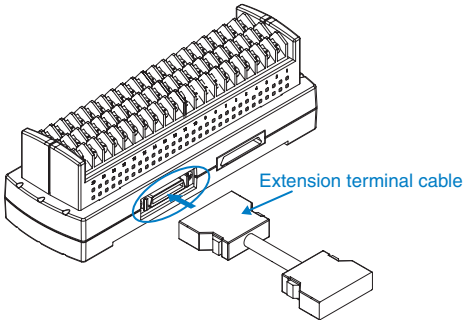




(2) Press the unit in the direction shown until it is securely locked.

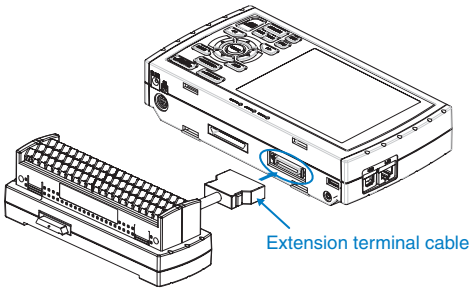
3 **Connect the extension terminal cable to the extension terminal base unit.**

* Press in the cable until it is securely locked.



4 **Connect the other end of the extension terminal cable to ZR-RX45.**

* Press in the cable until it is securely locked.



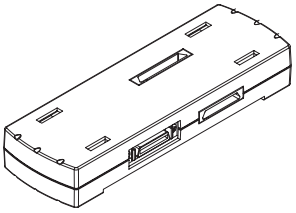
Mounting the 20 Channel Extension Terminal Set (ZR-XRT1)

Mount the 20 channel extension terminal set as shown below.

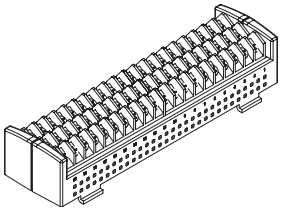
Important

Make sure the ZR-RX45's power is OFF when mounting the extension terminals.

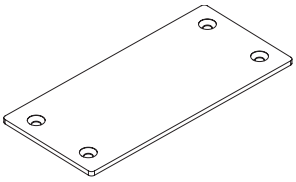
Set Contents



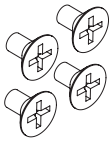
Extension Terminal Base Unit : 1



20 Channel Terminals : 1



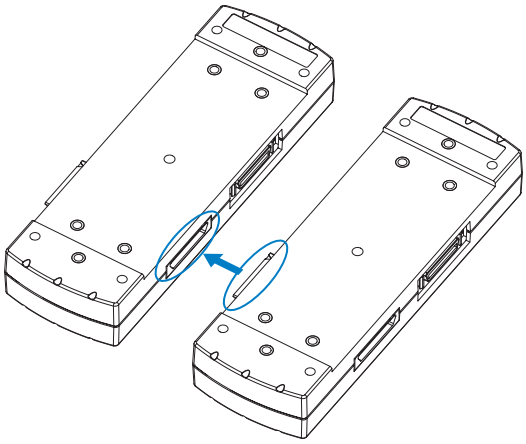
Connection Plate : 1



M4 × 6 Flat Head Screw : 4

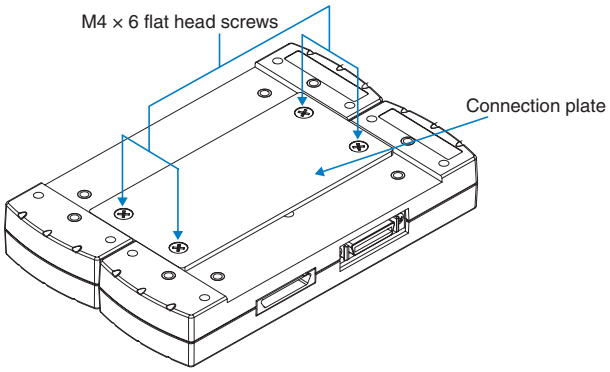
To Mount

1 **Connect the extension terminal base unit connectors.**



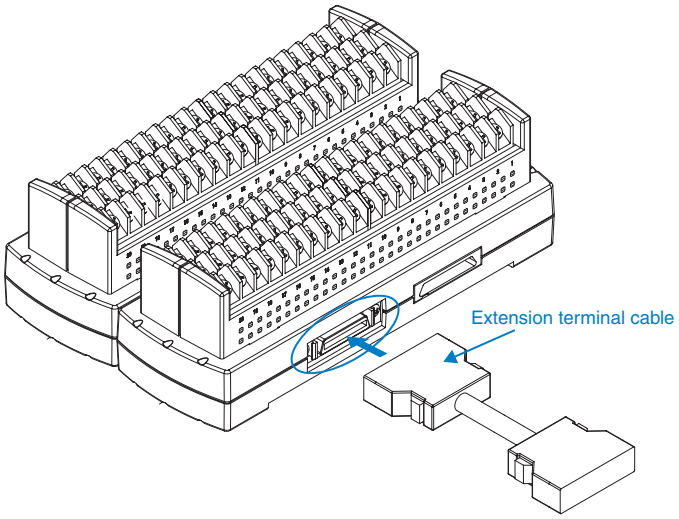
2 Screw on the connection plate using attached screws.

* Recommended screw torque: 14 kgf/cm



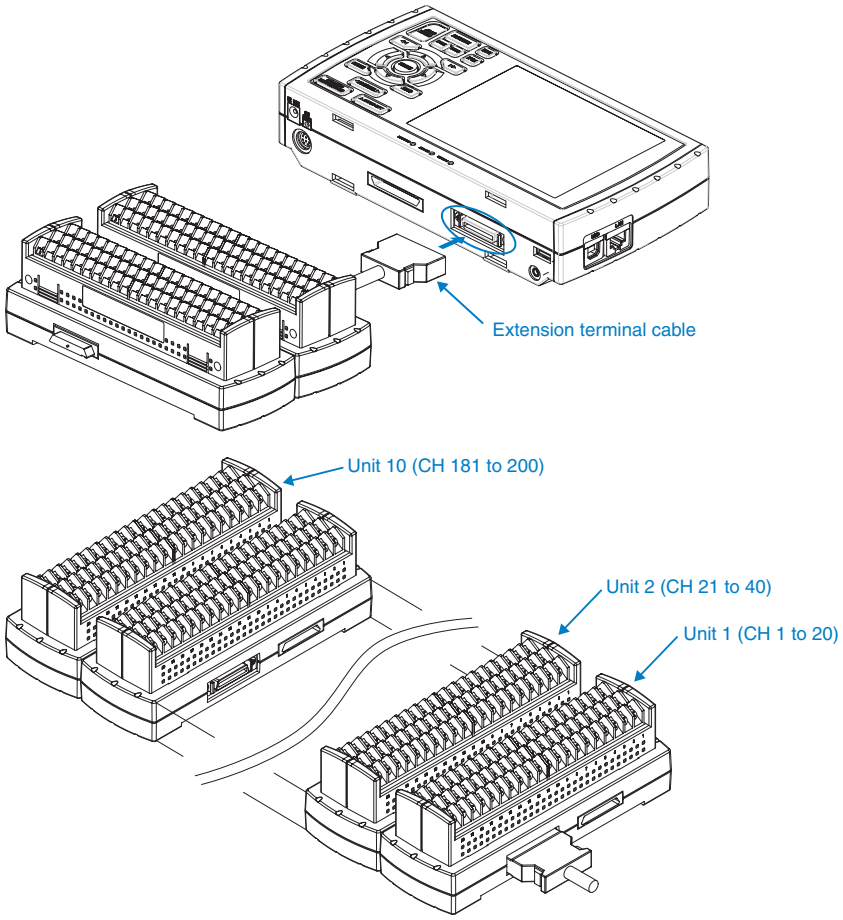
3 Connect the extension terminal cable to the extension terminal base unit.

* Press in the cable until it is securely locked.



4 **Connect the other end of the extension terminal cable to ZR-RX45.**

* Press in the cable until it is securely locked.



Important

When connecting additional terminals, make sure they are added in a continuous manner.

Any terminals omitted will prevent subsequent terminals from being recognized.

Precautions to Observe When Performing Measurement

Please be sure to read the following carefully in order to prevent electric shocks or shorts.

Danger

- Do not apply voltage of 60Vp-p or above between the analog input section and main unit (GND terminal), or between analog input channels.
- Do not apply radio-frequency signals with high voltage (50 KHz or above).
- Be sure to use only the AC adapter provided as a standard accessory. The rated power supply range for the adapter is 100 to 240 VAC, and the rated frequency is 50/60 Hz. Do not use any other voltages.

Maximum input voltage

If a voltage exceeding the specified value is input, the semiconductor relay in the input section will be damaged. Never input a voltage exceeding the specified value even for a moment.

* This applies to all the channels even if channel extension is used.

<Between +/– terminals (A) >

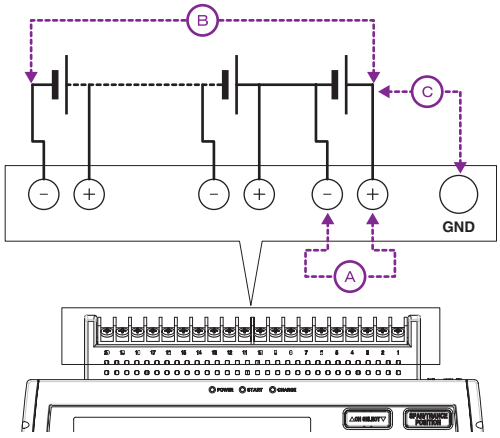
- Maximum input voltage : 60Vp-p

<Between input terminal/input terminal (B) >

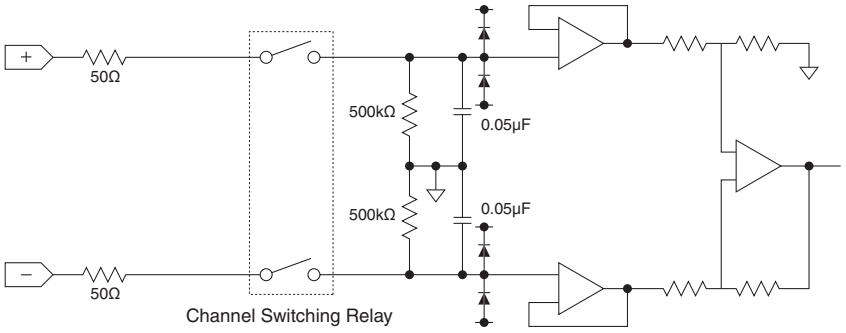
- Maximum input voltage : 60Vp-p
- Withstand voltage : 350 Vp-p at 1 minute

<Between input terminal/GND (C) >

- Maximum input voltage : 60Vp-p
- Withstand voltage : 350 Vp-p at 1 minute



Input Circuit Diagram for Analog Input (Voltage, Thermocouples)



Important

Capacitors have been incorporated into the input circuit to increase the noise elimination capability.

After voltage measurement, when the inputs have been disconnected, there will still be some electric charge remaining.

Before starting another measurement operation, short-circuit the + and - terminals to enable self-discharge. The ZR-RX45 has a scan system.

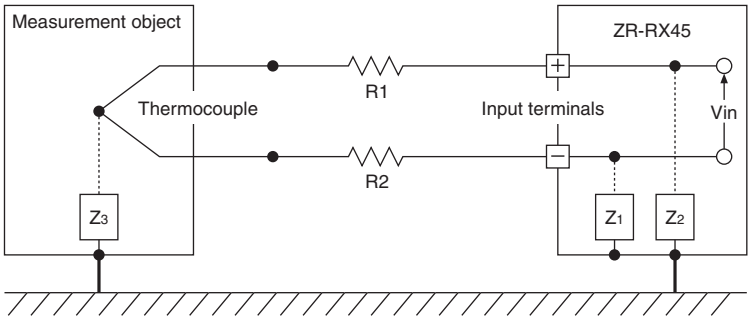
While in the status (open) in which signals are not input to the input terminal, measured results may be influenced by signals from other channels. In such a case, turn OFF the input setting or short circuit +/-.

If signals are input correctly, measured results are not influenced by other channels.

Noise Countermeasures

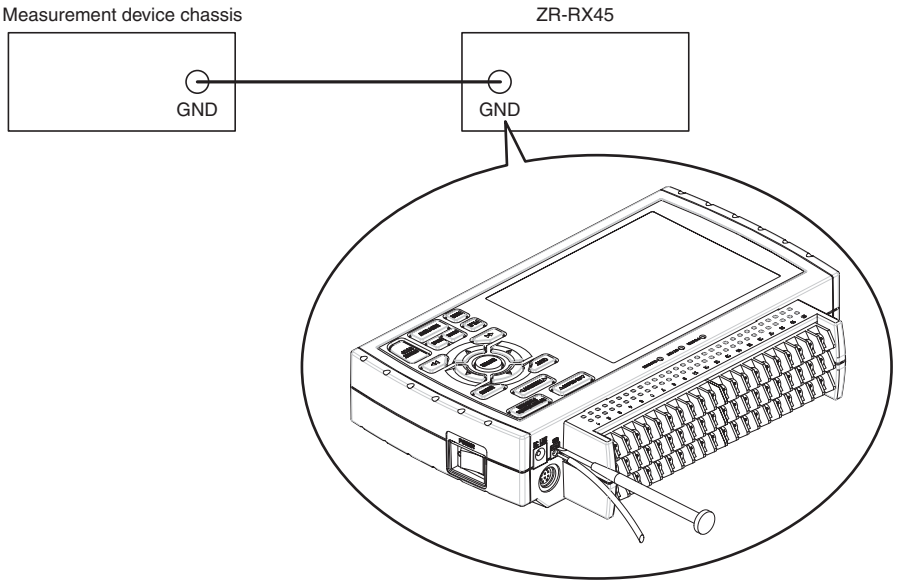
Be sure to connect the chassis GND of the object to be measured.

It may become effective by ensuring that the chassis GND wire of the measurement object is connected to a good ground.



Connect the signal chassis GND and the measurement device chassis ground.

Use a short, thick lead to connect the chassis GND of the measurement object to the ZR-RX45' chassis GND. It will become even more effective if the ground potentials are the same.



Noise countermeasures

If measured values fluctuate due to extraneous noise, conduct the following countermeasures.

(Results may differ according to noise type.)

Ex 1 : Connect the ZR-RX45's GND to ground.

Ex 2 : Connect ZR-RX45's GND to measurement object's GND.

Ex 3 : In the AMP settings menu, set filter to any setting other than "OFF".

Ex 4 : Operate ZR-RX45 with batteries (Option: ZR-XRB1).

Ex 5 : Set the sampling interval which enables ZR-RX45's digital filter.

Use the "OTHER" menu to set the commercial power frequency you use.

Refer to page 101 for details

Setting the Date and Time

If you are using the ZR-RX45 for the first time, charge the internal rechargeable battery and then make the date and time settings.

Important

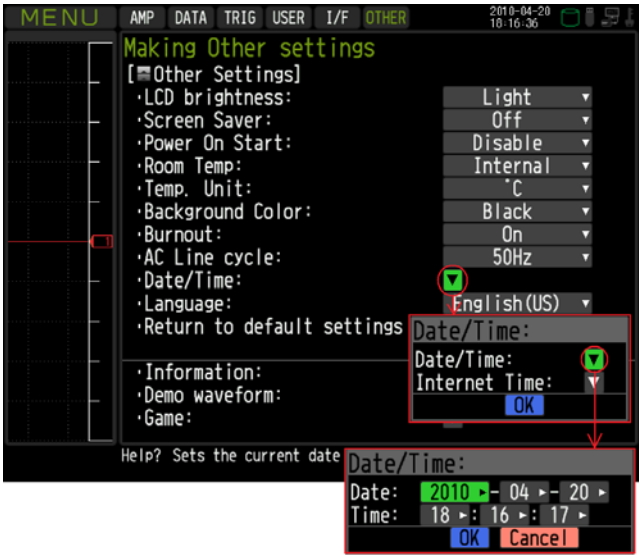
If the ZR-RX45 is not used for a period of approximately six months, the internal rechargeable battery may be discharged and the date and time may revert to the initial settings. If this happens, recharge the battery before using the ZR-RX45.

How to Recharge the Rechargeable Battery

Using the AC adapter provided, connect the ZR-RX45 to a mains power outlet, turn on the power switch, and then leave the ZR-RX45 connected for at least 24 hours.

How to Set the Date and Time

Press the [MENU] key, display the "OTHER" screen, and then set the date and time at the Date/Time Settings sub-menu. For details, see "Date/Time" on page 101.

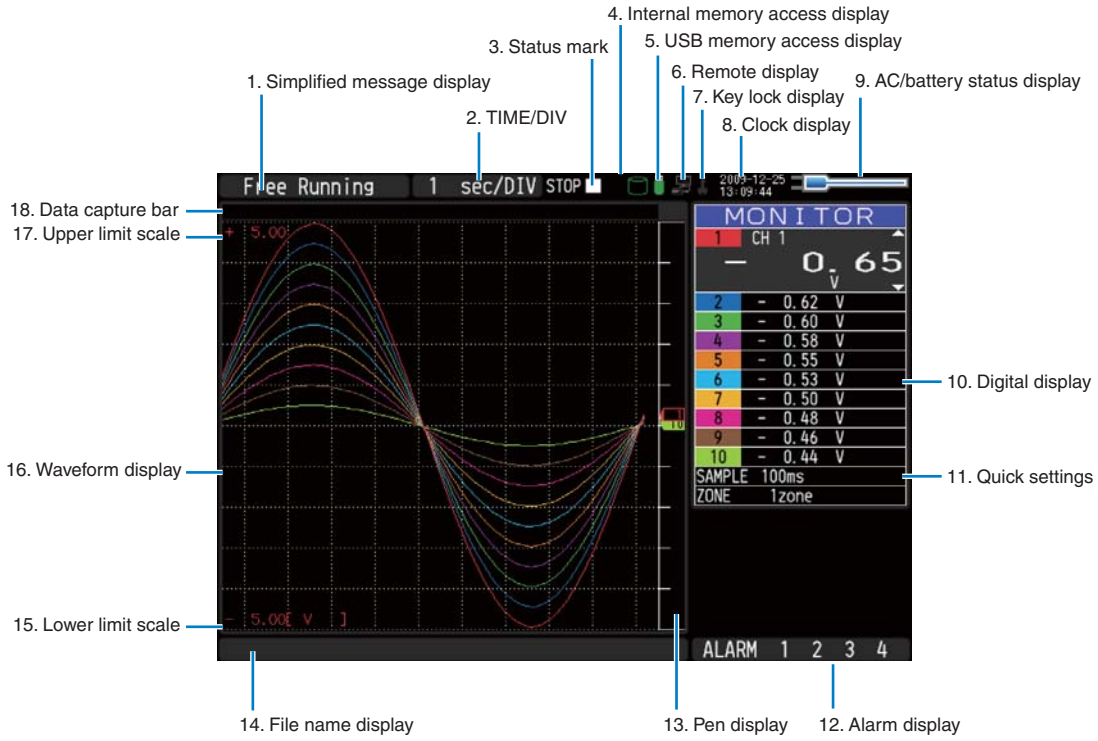


MEMO

Settings and Measurement

This chapter describes the setting and measurement procedures for the ZR-RX45.

Window names and functions



1. Simplified message display

Displays the operation status of the ZR-RX45.

Free Running	: Appears in the start up status or when data is not being captured.
Armed	: Appears while waiting for trigger generation after measurement is started.
Memory Recording	*: Appears when data is being captured in the internal memory.
Recording USB mem	*: Appears when data is being captured in the USB memory.
Writing Disk	*: Capture stop processing or other cases when data is being written to the built-in internal memory or USB memory
Finished	: Appears when the ZR-RX45 waits for you to press the Start/Stop key to stop it after data capture.
Memory Review	: Appears while the data in the internal memory is being replayed.
Replaying USB mem	: Appears while the data in the USB memory is being replayed.
Backup Failed	: Appears when backup fails (e.g. when the USB memory specified as the backup destination has been removed).
Demo Wave Mode	: Appears when a demo waveform is being displayed, not measurement data.

* Refer to page 88 for details on the data capture such as a trigger and repeat.
* Refer to page 82 for details on the memory used for capture.

Important

Do not turn off the power while the simplified message is "Memory Recording" "Recording USB mem" or "Writing Disk" (those with an asterisk (*) above). Data will become corrupt and will not be captured.

Operate the ZR-RX45 after checking that the status mark is "STOP."

2. Time/DIV display

Displays the current time scale.

3. Status mark

: Appears when neither capture nor replay is in progress.

*: Appears when data is being captured in the internal memory or USB memory.

*: Appears when waiting for a trigger during capturing and the stop key after capturing.

*: Appears when data in the internal memory or USB memory is being replayed.

*: Appears when data in the internal memory or USB memory is being replayed on double screens (refer to page 67 "Operation Modes").

Important

Do not turn off the power or remove the USB memory while the status mark is other than STOP (those with an asterisk (*) in the above). Data may become corrupt and inaccessible.

Operate the ZR-RX45 after checking that the display is "STOP."

4. Internal memory access display


: The internal memory is not accessed.


: The internal memory is being accessed.

Important

Do not turn off the power of the ZR-RX45 while the internal memory is being accessed.

Data may become corrupt and inaccessible.

5. USB memory access display


: No USB memory is inserted.

: USB memory is inserted but is not accessed.

: USB memory is being accessed. Do not remove the USB memory.

Important

Do not remove the USB memory or turn off the power of the ZR-RX45 while the USB memory is being accessed.

Data may become corrupt and inaccessible.

6. Remote display

: Indicates local mode. Operations can be conducted on the ZR-RX45.

: Indicates remote mode. With some exceptions, operations must be conducted on a PC.

When you cancel the connection on the application, the ZR-RX45 is automatically sent back to local mode.

If local mode is not entered, press the "QUIT" key.

7. Key lock display

: Not in key lock status. Normal operations are enabled.

: Key lock status. All the keys are locked.

Refer to page 117 for details on the key lock.

8. Clock display

Displays the current date and time.

Refer to page 101 for details on setting the date and time.

9. AC/battery display

: Running on AC or DC power supply.

: Running on the battery. The remaining battery power is 100 to 91%.

: Running on the battery. The remaining battery power is 90 to 61%.

: Running on the battery. The remaining battery power is 60 to 31%.

: Running on the battery. The remaining battery power is 30 to 11%.

: Running on the battery. The remaining battery power is 10% or below.

Important

- Data capture automatically stops when the remaining battery power drops to 10% or below during data capture.
- The power is automatically turned off when the remaining battery power is 0%.
- If the power has been turned off due to battery shortage, inputting AC power will not turn on the power. Turn off the power switch once and then turn it on again.
- Use the remaining battery power as a guideline because it is not accurate. This indicator does not guarantee the operating time with battery.

10. Digital display

Displays the input value of each channel. Use the SPAN/TRACE/POSITION keys to switch the display. Use the ▽△ key to select the channel you want to activate (enlarged display).

The waveform of the active channel is displayed at the top.

MONITOR : Displays the input value.

SPAN : The span of the active channel can be changed using the ◁▷ keys.

POSITION : The position of the active channel can be changed using the ◁▷ keys.

TRACE : The ON or OFF of the active channel display can be changed using the ◁▷ keys.

Refer to page 59 for details.

For a channel with a calculation mark as shown below, calculation between channels is ON.

11. Quick settings

Displays items available for easy operation. Use the ▽△ keys to activate the Quick setting and the left/right keys to change values.

* The "SAMPLE" item cannot be changed during data capture.

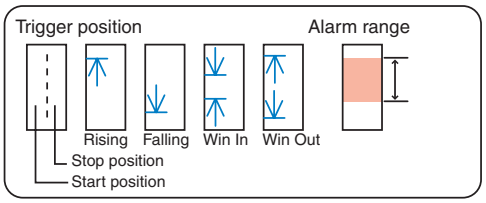
12. Alarm display

Displays the alarm output terminal status.

The number with which an alarm has occurred is displayed in red. The channel with the alarm cause has a red input value in the digital display area.

13. Pen display

Displays the position of each channel signal, trigger and alarm range.



14. File name display

(1) During data capture

A capture file name is displayed during capture.

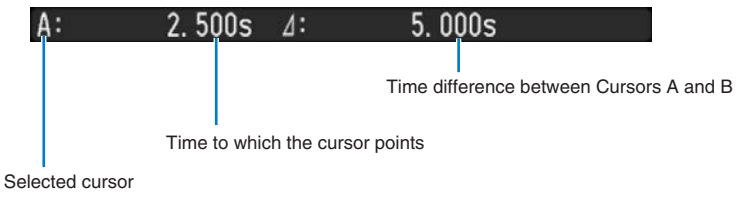
* If the ring capture setting is ON, a file name displayed during capture ends with "_RINGx" (x represents a number) but the actual file name does not include "_RINGx".

  In the above figure, if the ring capture is set to ON, the file name during capture will be displayed, for example, as "<MEM>091225\091225-130620_UG_RING4.GBD" but the actually created file will be "<MEM>091225\091225-130620_UG.GBD".

* Refer to page 84 for details on the ring capture setting.

(2) During data replay

Information on the time axis of the cursor is displayed during replay.



15. Lower limit scale

Displays the lower limit scale of the currently active channel.

16. Waveform display

Displays the waveform of the input signal.

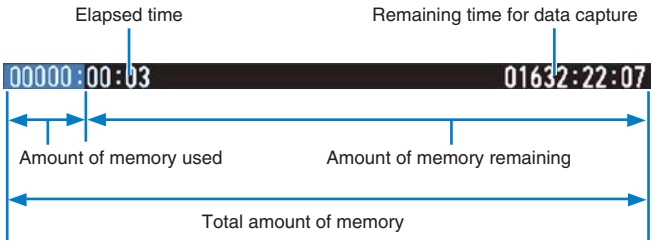
17. Upper limit scale

Displays the upper limit scale of the currently active channel.

18. Data capture bar

(1) During data capture

Displays the elapsed time and the memory usage status.



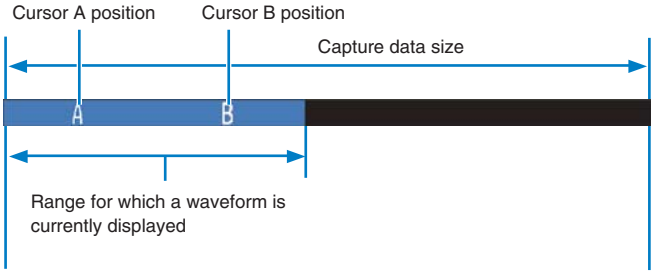
If, for example, 256 MB USB memory is inserted and about 96 MB is used before data capture, the total amount of memory is 256 MB, the amount of memory used is about 96 MB, and the amount of memory remaining is about 160 MB. As time elapses during data capture, the amount of used memory increases and the amount of remaining memory decreases.

The remaining time for data capture shows a length of time during which data capture is available with the amount of remaining memory. If the amount of remaining memory is more than 2 GB, however, this part shows remaining time during which data capture is available with one 2 GB file.

* Remaining time more than 99999 hours is displayed as "++++:++:++".

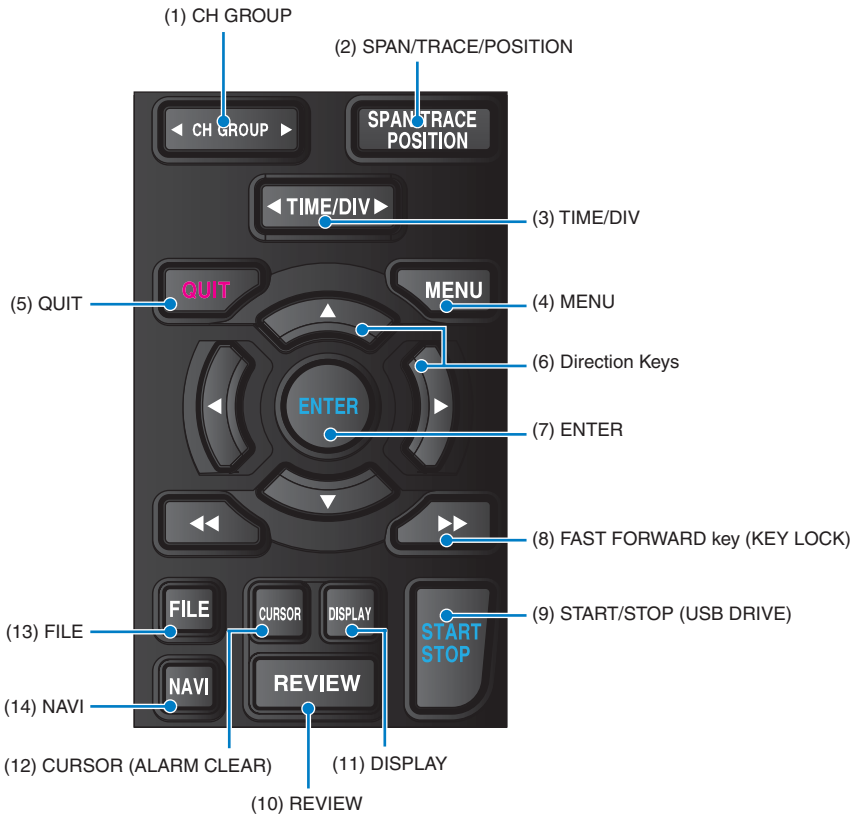
(2) During data replay

Displays the display position, cursor position, and trigger position graphically.



Key Operation

This section describes key operation.



(1) CH GROUP

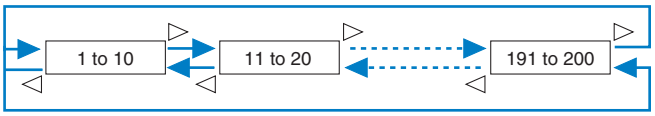
Press this key to switch to the next group consisting of 10 channels.

Press the ◁ side to switch to the group consisting of the next 10 channels with a smaller number.

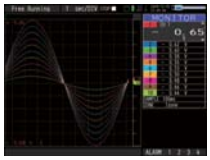
Press the ▷ side to switch to the group consisting of the next 10 channels with a larger number.

Pressing this key can switch among the following items.

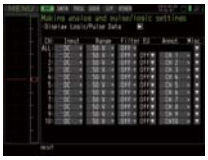
- Switch channels of the digital display area
- Switch channels of the AMP settings
- Switch channels of the trigger/alarm level settings
- Switch channels of the calculation display



MONITOR

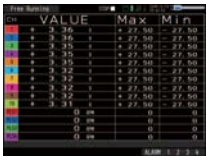


AMP settings



Level settings

Digital + Calculation Display screen



Statistical calculation between cursors

(2) SPAN/TRACE/POSION

Switches the display in the digital display.

Used to change the settings related to waveform display during Free Running (when stopped), data capture and data replay.

Pressing this key will switch displays as shown below.

Displays digital values (default status)

Allows changing of the span value (waveform amplitude)
- Channel change : ▽△ keys
- Amplitude change : ◁▷ keys
- Change available
  : Voltage 8 steps/Temperature 6 steps

Allows changing of the position (waveform up/down position)
- Range can be changed in units of 10%
- Channel change : ▽△ keys
- Position change : ◁▷ keys
- Change available
  : 10% steps of range

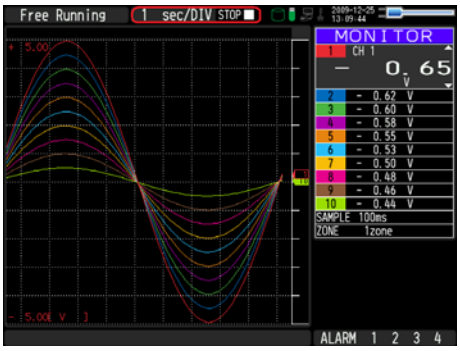
Allows turning ON/OFF of the waveform display
- Channel change : ▽△ keys
- Position change : ◁▷ keys
- Change available : ON/OFF
- * Data is captured even if OFF is set.

* When ALL is set, setting values for CH1 is reflected on other channels.

When CH1 is OFF, ALL Cannot be set.

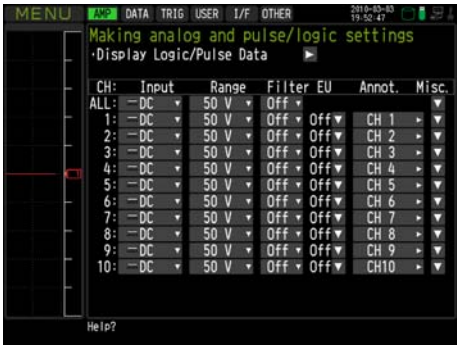
(3) TIME/DIV

Press the left/right key of the TIME/DIV key to change the time axis display width.



(4) MENU

Open the settings window to capture data. For details on settings, see "Setting Menus" on page 71.



(5) QUIT (LOCAL)

This key is primarily used for the following operations.

- To cancel a setting during menu configuration.
- To return to the MONITOR window when the SPAN/TRACE/POSITION window is displayed.
- To cancel remote status (in which keys are disabled) through interface control.
- To close the menu screen.
- To quit data replay.

(6) Direction keys

This key is primarily used for the following operations.

- To move a menu or setting item during menu configuration.
- To move the cursor during replay.
- To move the active channel in the Waveform + Digital and Digital + Calculation Display screens (▽△ keys).
- To change the setting of SPAN/TRACE/POSITION (◁▷ keys).
- To change the Quick setting (◁▷ keys).
- To change the channel to be displayed in the Digital + Calculation Display screen (◁▷ keys).

(7) ENTER

This key is primarily used for the following operations.

- To finalize setting items during menu configuration or open submenus.

(8) FAST FORWARD key (KEY LOCK)

This key is primarily used for the following operations.

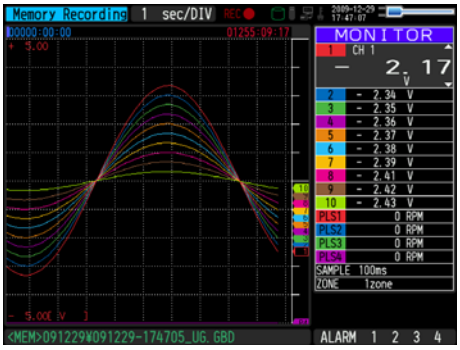
- To move the cursor at high speed during replay.
- To change the operation mode in the file box.
- To set key lock (Hold down the left/right FAST FORWARD key for at least two seconds. press again to unlock)
  A password for canceling the key lock can be specified. See page 117 for details.
- To change the display mode in the Digital + Calculation Display screen

(9) START/STOP (USB Drive Mode)

This key performs the following two operations:

<Starts/stops capture>

- During Free Running, starts capture.
- During capture, stops capture.



USB Drive Mode Operation Procedure

In USB Drive Mode, the internal memory is recognized by the PC as an external storage media.

Since the internal memory is recognized as a removal disk, this mode facilitates file manipulation such as transfer and deletion.

1 **Use a USB cable to connect the ZR-RX45 and a PC.**

2 **While pressing the ZR-RX45 START/STOP key, turn the power ON.**

3 **The external storage media is recognized by the PC and data exchange becomes possible.**

* In USB Drive Mode, the display on the ZR-RX45 becomes as follows:

Important

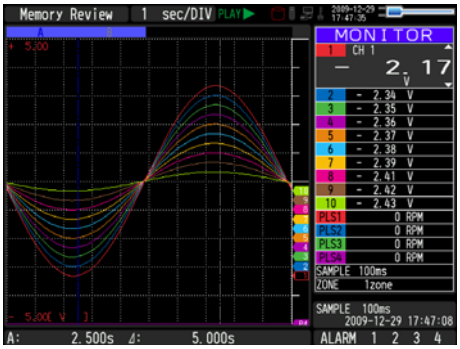
- To exit USB Drive Mode, turn off and on the power again.
- In USB Drive Mode, no operation including data capture and data replay is available.
- To use USB Drive Mode, a USB driver must be installed in your PC.
  Please refer to "Installing the USB Driver" in the "PC Software Manual".

(10) REVIEW

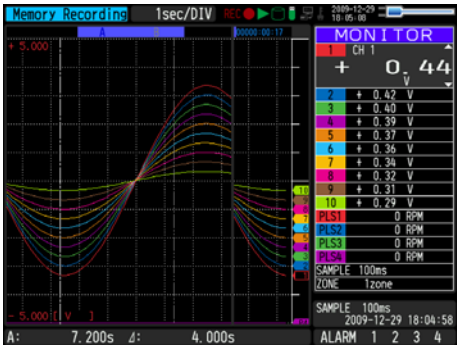
This key is used to replay captured data.

• During Free Running, replays captured data.

The screen used to specify the data replay source file appears; specify the file you want to replay.



• While capturing data, recently captured data is replayed in two windows.

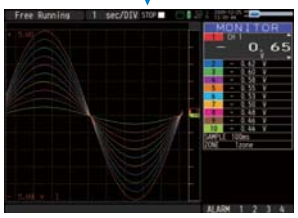


(11) DISPLAY

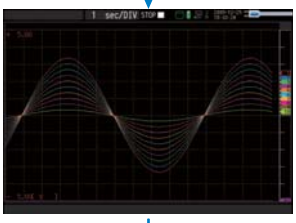
This key is used to switch the window mode.

You can switch the window mode during Free Running (when capturing is stopped) and Capturing.

Pressing this key switches the window display as follows:



<Waveform + Digital Screen>
Displays the waveform and the digital values.
The setting can be changed using the SPAN/TRACE/POSITION keys.



<Expanded Waveform screen>
Displays only the waveform expanded in full screen mode.

<Digital + Calculation Display screen>
Displays digital values and two calculation results in large letters. The calculation settings can be made using the Data menu.

* Refer to page 81 for details.

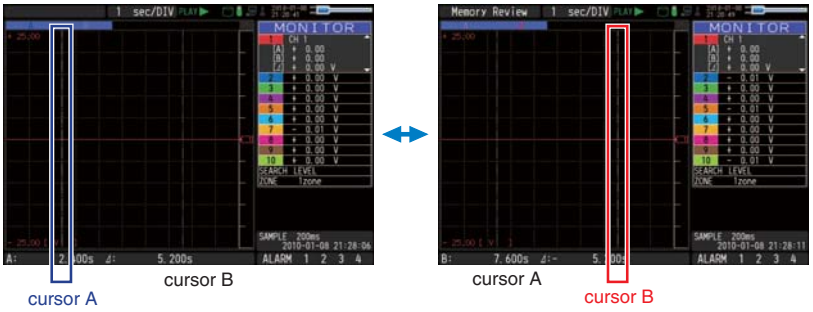
- Use the ◁◁▷▷ FAST FORWARD keys to change the display mode.

The calculation results are displayed only in All Mode.

* Refer to page 61 for details on All Mode.

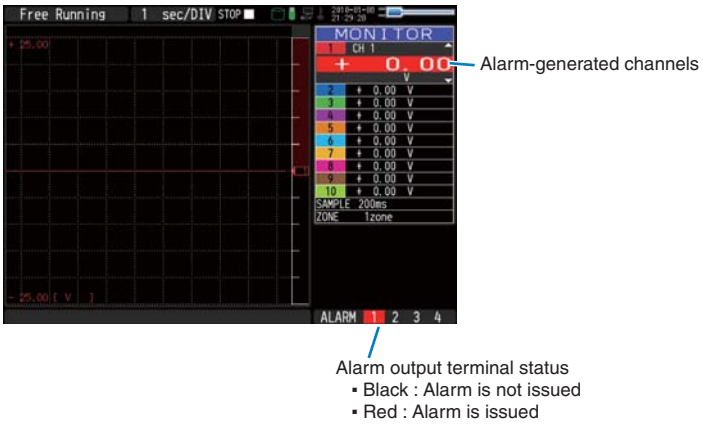
(12) CURSOR (ALARM CLEAR)

- This key is used to toggle between cursors A and B during replay.



The selected cursor turns white, and the other one turns gray.

- When the alarm setting is "Hold generated Alarm", the maintained alarm is cleared.



(13) FILE

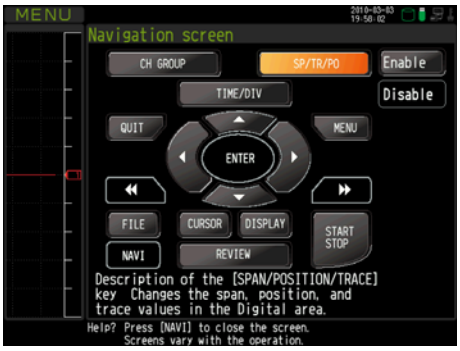
Performs file-related operations.

- This key is use for operations related to the Internal memory and USB device (copy and delete).
- Copies the window.
- Saves all data or data between cursor A and cursor B during replay (can be set during replay only)
- Saves or reads the currently set condition into the USB device. (can be set during Free Running only).
- Exchanges USB memory during data capture (can be set only while data is captured to USB memory).

(14) NAVI

This key is used to display the key operation content during Free Running, capture or replay.

During display of the NAVI screen, an explanation of how the key is used is displayed in the window.



Basic Procedures Used in Settings

The following are basic operation procedures for settings.

1 **Press the MENU key to open each menu.**

2 **Use the ▽△◁▷ key to move the cursor to the items you want to set.**

3 **Press the ENTER key to display a list of setting values.**

4 **Use the ▽△◁▷ key to select a setting value.**

5 **Press the ENTER key to confirm the value.**

The above explanation shows the basic procedure that may be used for each setting.

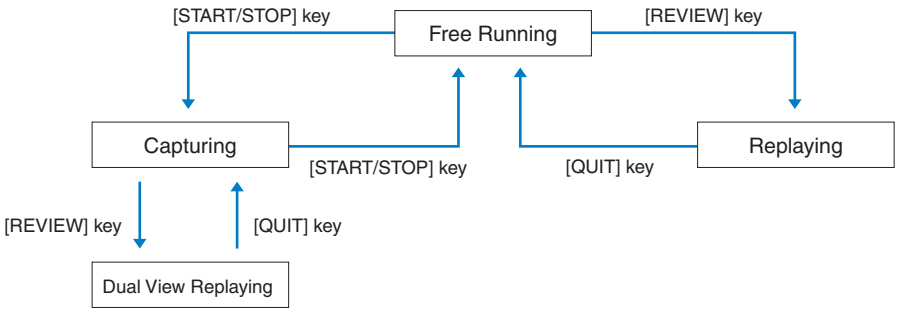
Please follow the procedure indicated by each menu.

Operation Modes

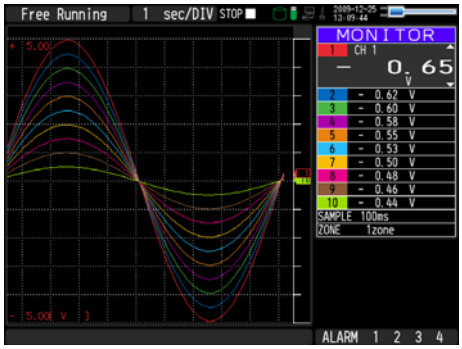
You can check the system operation status in the simplified message display.

operation	operation	simplified message display
Free Running	Start up status or data is not being captured	Free Running
Capturing	Data is being captured in the main memory or USB memory.	Memory Recording USB Memory Recording
Dual View Replaying	The current waveform display and data on capturing is being replayed	Memory Recording USB Memory Recording
Replaying	Captured data is being replayed	Memory Review USB Memory Review

Operation status transition



(1) Free Running



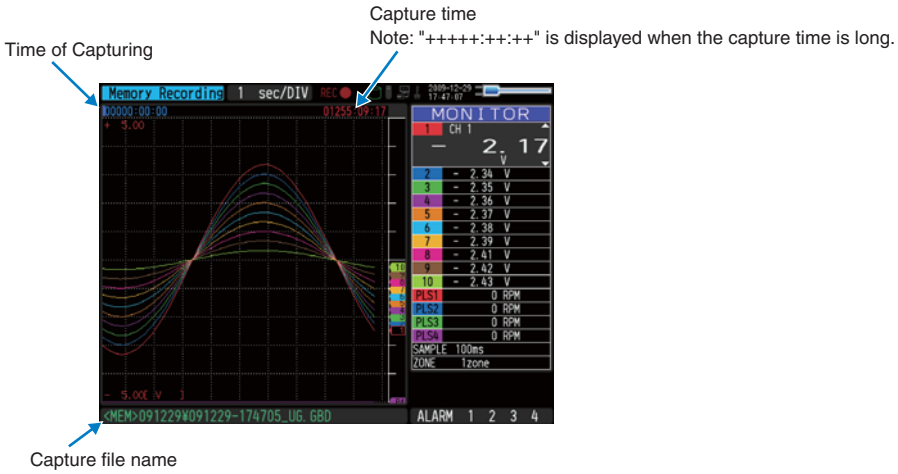
When in Free Running status, you primarily set up the system to capture data.

You can check the current input signal as a waveform or digital values.

Operations available during Free Running

Measuement parameters settings	The MENU key is used to change various setting items in configuration menus.
SPAN/TRACE/POSITION	The SPAN/TRACE/POSITION key is used to change settings.
Display mode	The DISPLAY key is used to change the display mode.
File operations	The FILE key is used to perform file-related operations.
Data replay	The REVIEW key is used to replay captured data.
Time axis change	The TIME/DIV key is used to change the time axis.

(2) Capturing



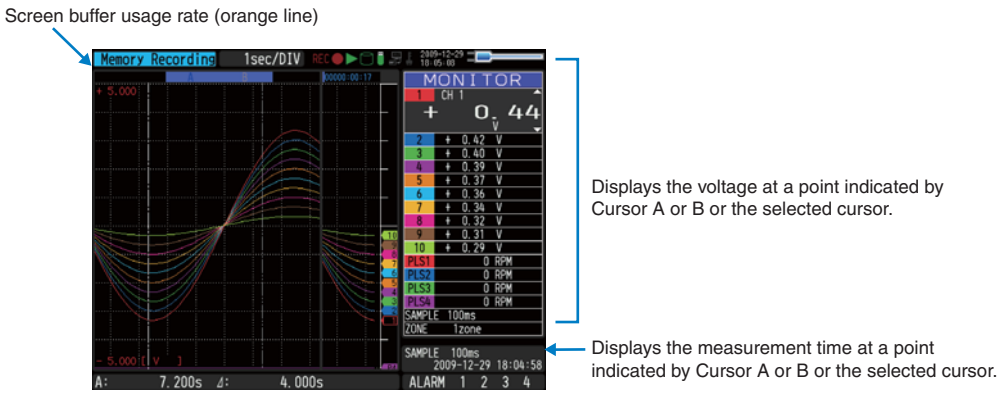
During data capture, data is captured into the Internal memory or USB device.

You cannot use the MENU key to change the setting.

Operations available during capture

SPAN/TRACE/POSITION	The SPAN/TRACE/POSITION key is used to change settings.
Display mode	The DISPLAY key is used to change the display mode.
Dual View replay	The REVIEW key is used to replay captured data in two windows at the same time.
Save to device	While data is replayed in two windows, the FILE key is used to save data to a device.
Setting check	The MENU key is used to change the settings.
Time axis change	The TIME/DIV key is used to change the time axis.

(3) Dual View Replaying



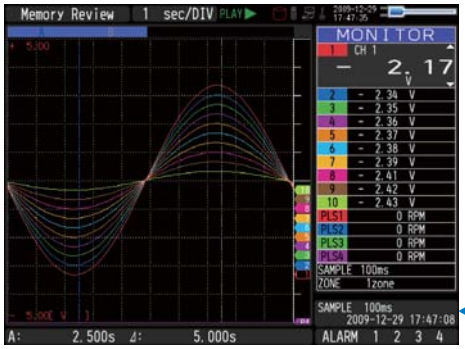
You can replay data during capture.

Waveform on the right side is the current captured data and the left side is previously captureddata. You can use the Direction keys (◁▷) to move the cursor to captured data to check digital values.

Operations available during dual view replaying

Moving cursor	The CURSOR key is used to switch between cursors A and B. The ◁▷ or ◁◁▷▷ keys are used to move the cursors.
Save to device	The FILE menu is used to save data to a device. (During capture, data up to the present or data between cursors can be saved to a separate file. While capture to the internal memory is in progress, use this feature to save data to USB memory without stopping capture.)
Screen copy	The FILE menu is used to copy the screen.

(4) Replaying



Displays the voltage at a point indicated by Cursor A or B or the selected cursor.

Displays the measurement time at a point indicated by Cursor A or B or the selected cursor.

Displays the captured data.

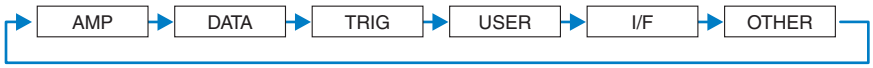
Operations available during replaying

SPAN/TRACE/POSITION	The SPAN/TRACE/POSITION key is used to change settings.
Menu operations during data replay	The MENU key is used to move the cursor, search data and set calculation.
Moving cursors	The CURSOR key is used to switch between cursors A and B. The ◁▷ or ◁◁▷▷ keys are used to move the cursors
File operations	The FILE key is used to save the data between the cursors.
Time axis change	The TIME/DIV key is used to change the time axis.

Setting Menus

When you press the MENU key during Free Running, the following menu screens appear.

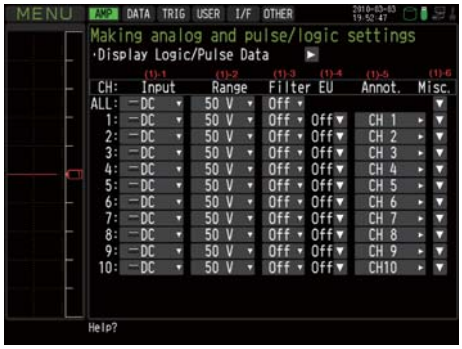
The menu screens are classified by the tab for each setting item.



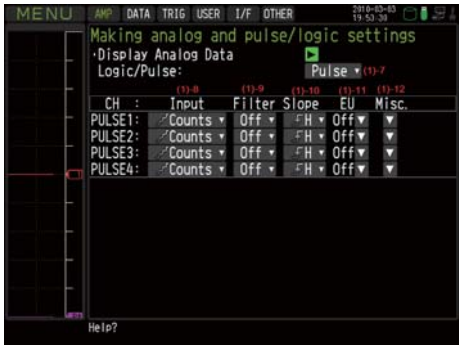
(1) AMP settings

This menu is used to specify input signal-related settings.

<Analog settings>



<Logic Pulse settings>

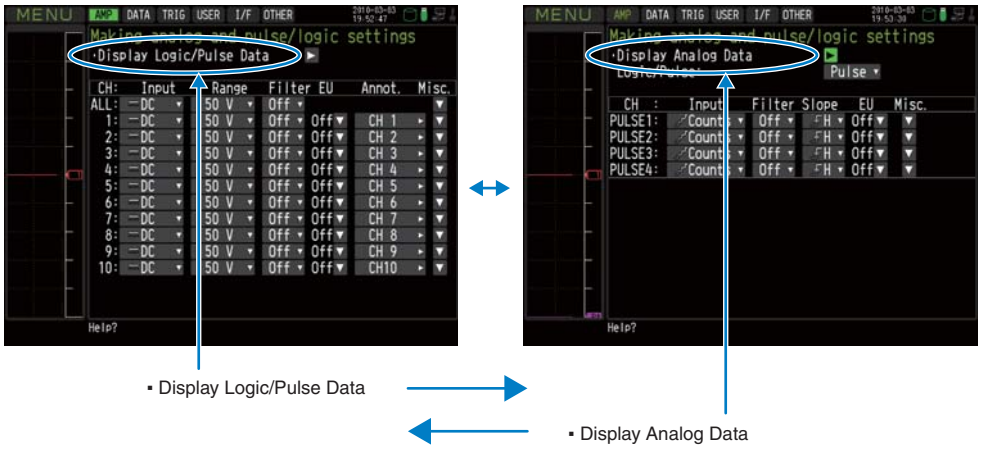


Setting			Selections available
Input			Off, Voltage, Temperature, Humidity
Range	[Voltage]		20, 50, 100, 200, 500 mV; 1, 2, 5, 10, 20, 50, 1-5 V
	[Temperature]		TC-K, TC-J, TC-T, TC-R, TC-E, TC-B, TC-S, TC-N, TC-W, Pt100, JPt100, Pt1000
Filter			Off, 2, 5, 10, 20, 40
EU (Scaling settings)	Function		Off, On
	Meas. Value	Upper limit	Set numeric value
		Lower limit	Set numeric value
	EU output value	Upper limit	Set numeric value
		Lower limit	Set numeric value
	Dec pt		EU output upper limit × 1, × 10, × 100, × 1000
	Select		Current, length, area, volume, speed, acceleration, frequency, weight, work, pressure, flow rate, temperature
	Choose		(The selections vary depending on the unit selected in the above.)
	Arbitrary unit		Text input
Annotation string			Text input (Max. 31 characters)

Setting				Selections available
Misc.	Inter-CH Op Settings	Function		Off, On
		Operation		CH-X (+, -, ×, /) CH-Y
		Scaling		/1000000, /1000, ×1, ×1000, ×1000000
		Upper/Lower limit		Set numeric value
		Dec pt		×1, ×10, ×100, ×1000, ×10000
		Select		Current, length, area, volume, speed, acceleration, frequency, weight, work, pressure, flow rate, temperature
		Choose		(The selections vary depending on the unit selected in the above.)
		Arbitrary unit		Text input
	Span settings	Upper limit		Set numeric value
		Lower limit		Set numeric value
	Waveform color setting			0 to 31 for each of red, green, blue (RGB)
	Amplitude Setting			1 to 8 dots
	Perform Auto Zero ADJ.			▷ Press right key to execute.
	Reset Auto Zero ADJ.			▷ Press right key to execute.
Logic/Pulse				Off, Logic, Pulse
	[Logic]	Filter		Off, On
		Misc.	Waveform color setting	0 to 31 for each of red, green, blue (RGB)
	[Pulse]	Input		Off, Revolution counts, Counts, Inst.
		Filter		Off, On
		Slope		↑ H, ↓ L
		EU	Function	Off, On
			Meas. Value	Set numeric value
			EU output value	Set numeric value
			Select	Current, length, area, volume, speed, acceleration, frequency, weight, work, pressure, flow rate, temperature
			Choose	(The selections vary depending on the unit selected in the above.)
			Arbitrary unit	Text input
		Misc	Waveform color setting	0 to 31 for each of red, green, blue (RGB)
			Amplitude Setting	1 to 8 dots

Switching displays

Analog and logic/pulse can be switched as shown below.



Analog settings

Specify the conditions for analog signals.

Note

When you use CH ALL to set an input, range and filter, all channels are set to the same values if the input is the same. Range is set only for the same input channels. However, the range of a channel is not changed if its EU (scaling) is set to On.
Span All Settings is set only for the same range channels.
* If the first channel in a channel group (CH1 if CHs 1 to 10 are displayed) has an input that is set to Off, the input of CH ALL is set to Off.

(1)-1 Input

Selects input condition

Selection item	Description
Off	Input signal measurement is disabled. No waveform or digital value is displayed.
Voltage	Used for measuring direct-current voltage.
Temperature	Used for measuring temperature.
Humidity	Used for measuring humidity with the humidity sensor ZR-XRH1. In this case, the voltage range will become 1 V, and the EU settings will not be available.

(1)-2 Range

Selects the range of measurement.

Input item	Description
Voltage	20, 50, 100, 200, 500 mV; 1, 2, 5, 10, 20, 50, 1-5 V
Temperature	TC-K, TC-J, TC-T, TC-R, TC-E, TC-B, TC-S, TC-N, TC-W, Pt100, JPt100, Pt1000
Humidity	No selection available

Available SPAN Settings

<Voltage Ranges>

Range	Maximum SPAN	Minimum SPAN	Minimum Resolution
20mV	-22.000 to +22.000mV	0.200mV	0.001mV
50mV	-55.00 to +55.00mV	0.50mV	0.01mV
100mV	-110.00 to +110.00mV	1.00mV	0.01mV
200mV	-220.00 to +220.00mV	2.00mV	0.01mV
500mV	-550.0 to +550.0mV	5.0mV	0.1mV
1V	-1.1000 to +1.1000V	0.0100V	0.0001V
2V	-2.2000 to +2.2000V	0.0200V	0.0001V
5V	-5.500 to +5.500V	0.050V	0.001V
10V	-11.000 to +11.000V	0.100V	0.001V
20V	-22.000 to +22.000V	0.200V	0.001V
50V	-55.00 to +55.00V	0.50V	0.01V
1-5V	-5.500 to +5.500V	0.050V	0.001V

<Temperature Ranges>

Range	Maximum SPAN	Minimum SPAN (p-p)	Measurement Range	Minimum Resolution
K	-270 to +2000°C	50°C	-200 to +1370°C	0.1°C
J	-270 to +2000°C	50°C	-200 to +1100°C	
T	-270 to +2000°C	50°C	-200 to +400°C	
R	-270 to +2000°C	50°C	0 to +1600°C	
E	-270 to +2000°C	50°C	-200 to +800°C	
B	-270 to +2000°C	50°C	+600 to +1820°C	
S	-270 to +2000°C	50°C	0 to +1760°C	
N	-270 to +2000°C	50°C	0 to +1300°C	
W	-270 to +2000°C	50°C	0 to +2000°C	
PT100	-270 to +2000°C	50°C	-200 to +850°C	
JPt100	-270 to +2000°C	50°C	-200 to +500°C	
Pt1000	-270 to +2000°C	50°C	-200 to +500°C	

<Humidity Range>

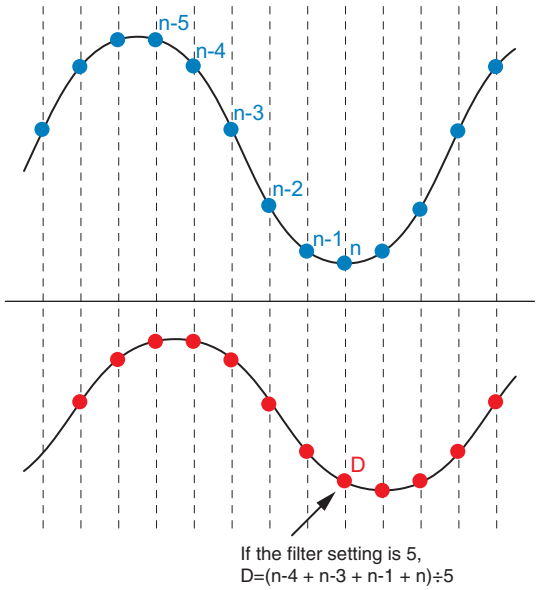
Range	Maximum SPAN	Minimum SPAN (p-p)	Minimum Resolution
	0 to +110%	1.0%	0.1%

(1)-3 Filter

Selection item	Description
Off	No moving average is calculated.
2	A moving average is calculated twice per sampling interval.
5	A moving average is calculated 5 times per sampling interval.
10	A moving average is calculated 10 times per sampling interval.
20	A moving average is calculated 20 times per sampling interval.
40	A moving average is calculated 40 times per sampling interval.

<Filter processing>

Filter processing performed on the ZR-RX45 is the moving average shown in the following figure.



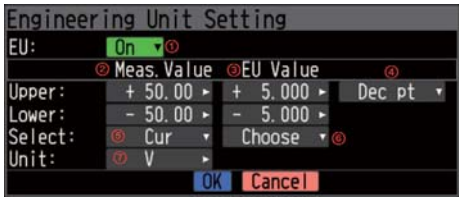
Note

If the sample interval exceeds 30 seconds, the average value of data obtained in a sub-sample (30 seconds) is used.

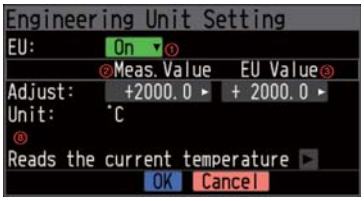
(1)-4 EU (Scaling settings)

Converts the measured signals to other units.

<For voltage input>



<For temperature input>



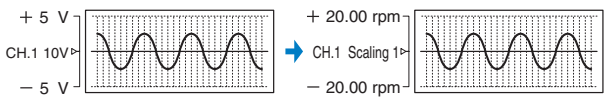
Setting	Description
(1) EU Function	Sets the scaling function to ON or OFF.
(2) Meas. Value (Upper/Lower)	Sets the upper and lower limits of values to be converted. * For temperature input, there is no distinction between upper and lower limits. * See the setting examples shown below for details.
(3) EU Output Value (Upper/Lower)	Sets the upper/lower limit output values after conversion. * For temperature input, there is no distinction between upper and lower limits. * See the setting examples shown below for details.
(4) Dec pt	Sets the decimal point position for an EU output value.
(5) Select	Selects a specific engineering unit classification. (The following are available.) Current, length, area, volume, speed, acceleration, frequency, weight, work, pressure, flow rate, temperature
(6) Choose	Selects a unit to be used after conversion. A unit displayed in this field belongs to the classification selected in "Select." To set a unit not displayed in this field, set arbitrary text in "Arbitrary unit." The setting selected in this field is displayed in "Arbitrary unit."
(7) Arbitrary Unit	Sets a unit to be used after conversion. Arbitrary text consisting of alphabetical characters and numerical values can be set as a unit. (Refer to page 111 for details on the text input.) When "Select" or "Choose" is used, the setting is reflected in this field.
(8) Reads the current temperature measurement value	Substitutes the current measurement value into (2) Measurement value and (3) EU output value. * The value is not substituted when burnout occurs or the scale is exceeded.

Note

- If a message window opens, follow the instruction in the message to change the setting value.
- The Scaling function performs calculation using a ratio of the Meas. Value and EU Output Value settings. The digital display shows "++++/----" when the converted value cannot be processed by the ZR-RX45.
- The span may be changed depending on the Scaling settings.
- For temperature input, the offset setting for an input value is used.

Setting example: For voltage input

	Meas. Value	EU Output Value	Dec pt	Choose
Upper limit	+5.000	+20.00	+xx.xx	rpm
Lower limit	-5.000	-20.00		



Setting example: For temperature input

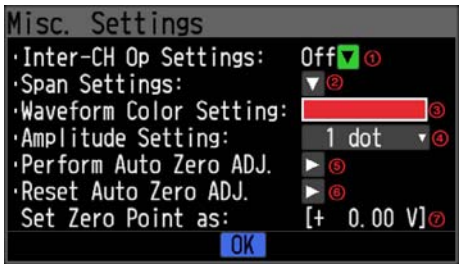
Meas. Value	EU Output Value
22.0°C	25.0°C

3°C is always added to the measurement value.

(1)-5 Annotation

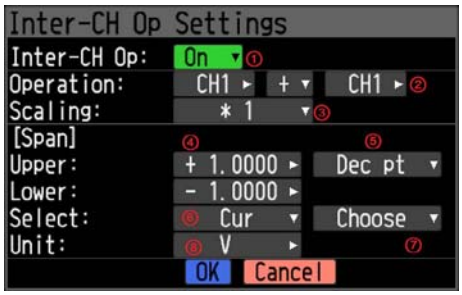
Setting	Description
Annotation String	Sets an annotation (comment) to be displayed for a channel. The maximum number of characters is 31.Alphanumeric characters, kana, and symbols can be input. (Refer to page 111 for details on the text input.)

(1)-6 Misc.



Setting	Description
(1) Inter-CH Op Settings	Sets what to do in calculation between channels. Four arithmetic operations (+, -, ×, ÷) can be set as calculation between channels. * Refer to the next page for details.
(2) Span	Sets the upper and lower limits of values of a span in which a waveform should be displayed.
(3) Waveform Color Setting	0 to 31 for each of red, green, blue (RGB)
(4) Amplitude Setting	1 to 8 dots
(5) Perform Auto Zero ADJ.	Performs calculation using the current input voltage as the zero position voltage value. The range of voltages that can be automatically adjusted is ±10% of the setting range. <Example> For 1 range, the input voltage can be adjusted between -0.1 V and +1.0 V. * For temperature input, this function is not available.
(6) Reset Auto Zero ADJ.	Cancels the zero position voltage value and displays the input voltage.
(7) [Zero position voltage value]	Displays the zero position voltage value (Display only).

<Inter-CH Op Settings (1)>



Setting	Description	
(1) Inter-CH Op Settings Function	Off, On If this setting is ON, the channel has a calculation mark in the digital display, etc. 	
(2) Operation	CH-X (Function) CH-Y	
	CH-X	CH1 to CH200
	Function	Four arithmetic operation functions (x, -, ×, /)
	CH-Y	CH1 to CH200
(3) Scaling	/1000000, /1000, ×1, ×1000, ×1000000	
	Sets the scaling factor for a calculation result. <Example> Result = 0.001 Result = 1000 × 1: 0.001 × 1: 1000 × 1000: 1 /1000: 1 × 1000000: 1000 /1000000: 0.001	
(4) Upper/Lower limits	Sets the upper and lower limits of values of a span in which a waveform should be displayed. The setting value is in reference to a calculation result.	
(5) Dec pt	Sets the decimal point position for a span setting.	
(6) Select	Selects a unit in which a calculation result should be displayed. Current, length, area, volume, speed, acceleration, frequency, weight, work, pressure, flow rate, temperature	
(7) Choose	Selects a unit to be used after conversion. A unit displayed in this field belongs to the classification selected in "Select." To set a unit not displayed in this field, set arbitrary text in "Arbitrary unit." The setting selected in this field is displayed in "Arbitrary unit."	
(8) Arbitrary Unit	Sets a unit to be used after conversion. Arbitrary text consisting of alphabetical characters and numerical values can be set as a unit. (Refer to page 111 for details on the text input.) When "Select" or "Choose" is used, the setting is reflected in this field.	

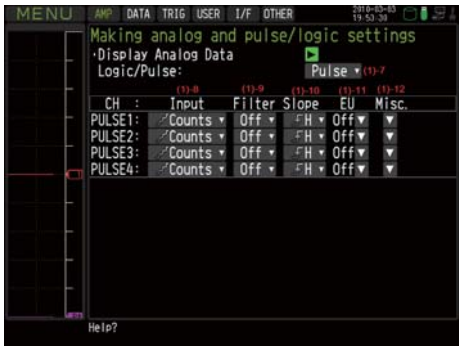
Note

- Calculation results are displayed in volts.
  The calculation result for 100 mV + 100 mV is 0.2.
  Use Scaling to display this result as 200 mV.

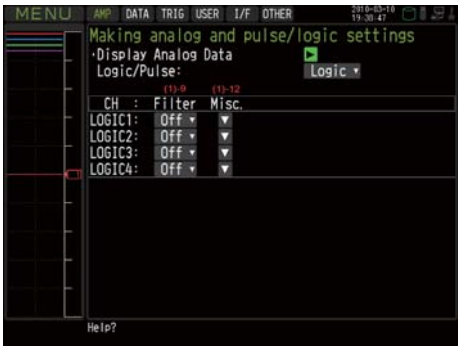
Logic and Pulse settings

Makes settings related to digital input.

<For Pulse>



<For Logic>



(1)-7 Logic/Pulse

Selects the processing method for digital input.

Selection item	Description
Off	Digital input measurement is disabled.
Logic	Digital input is processed as logic signals.
Pulse	Digital input is processed as pulse signals.

(1)-8 Input

Sets the pulse measurement mode.

This setting is available only if Pulse is selected in (1)-7.

Selection item	Description
Off	Pulse input measurement is disabled.
Revol.	Counts the number of pulses per second and captures the value multiplied by 60 as rpm value.
Counts	Captures the cumulative number of pulses for each sampling interval from the start of measurement.
Inst.	Captures the number of pulses for each sampling interval.

(1)-9 Filter

Sets the filter for input.

Selection item	Description
Off	Disables hardware filter.
On	Enables hardware filter. It is effective in a noisy environment. The filter is approximately 30 Hz (-3 dB).

(1)-10 Pulse Slope

Sets the slope (direction) to count the number of pulses.

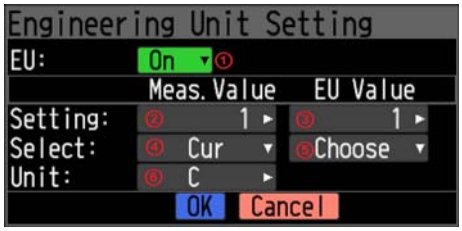
This setting is available only if Pulse is selected in (1)-7.

Selection item	Description
↑H	Counts the rising edges of pulses.
↓L	Counts the falling edges of pulses.

(1)-11 EU (Scaling settings)

Converts the measured signals to other units.

This setting is available only if Pulse is selected in (1)-7.



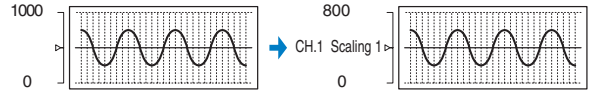
Setting	Description
(1) EU Function	Sets the scaling function to ON or OFF.
(2) Meas. Value	Sets a value to be converted.
(3) EU Output Value	Sets an output value after conversion.
(4) Select	Selects a specific engineering unit classification. (The following are available.) Current, length, area, volume, speed, acceleration, frequency, weight, work, pressure, flow rate, temperature
(5) Choose	Selects a unit to be used after conversion. A unit displayed in this field belongs to the classification selected in "Select." To set a unit not displayed in this field, set arbitrary text in "Arbitrary unit." The setting selected in this field is displayed in "Arbitrary unit."
(6) Arbitrary Unit	Sets a unit to be used after conversion. Arbitrary text consisting of alphabetical characters and numerical values can be set as a unit. (Refer to page 111 for details on the text input.) When "Select" or "Choose" is used, the setting is reflected in this field.

Note

- If a message window opens, follow the instruction in the message to change the setting value.
- The Scaling function performs calculation using a ratio of the Meas. Value and EU Output Value settings.
  The digital display shows "++++/----" when the converted value cannot be processed by the ZR-RX45.

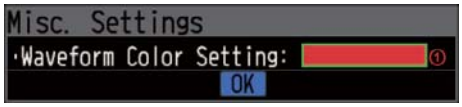
Setting example

Meas. Value	EU Output Value	Dec pt	Choose
1000	800	+xx.xx	rpm
0	200		



(1)-12 Misc.

<For Logic>

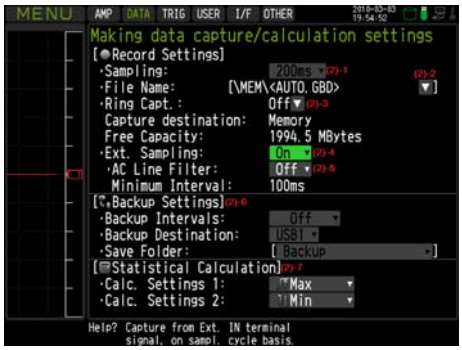


<For Pulse>

Setting	Description
(1) Waveform Color Setting	0 to 31 for each of red, green, blue (RGB)
(2) Amplitude Setting	1 to 8 dots

(2) DATA settings

This menu is used to specify capture-related items and calculations.



Setting			Selections available
Sampling			10, 20, 50, 100, 125, 200, 250, 500 ms; 1, 2, 5, 10, 20, 30s; 1, 2, 5, 10, 20, 30 min; 1h * Available sampling intervals vary depending on the input settings and the number of channels to be used. * Refer to "(2)-1 Sampling Interval" for details.
Capture destination			Internal memory, USB memory
	File Name		* See the description of a captured data file name given below.
Ring Capture			Off, On
	[ON]	Number of Ring Capture Points	1000 to 2000000 (A warning message will appear if you set a value larger than the remaining disk space.)
External Sampling			Off, On
AC Line Filter			Off, On
Backup	Backup interval		Off, 1, 2, 6, 12, 24 hours
	Backup destination		USB1, FTP
	Save folder		Folder name
Calc. Settings 1			Off, Average, Max, Min, Peak, RMS
Calc. Settings 2			Off, Average, Max, Min, Peak, RMS

Captured data file name

Setting	Selections available
Folder (File)	Capture destination : MEM, USB1 Folder : Text input (if the naming method is Auto) File : Text input (if the naming method is Arbitrary or Sequential number)
Name Type	Auto, Arbitrary, Sequential number
File Type	Binary (GBD), Text (CSV)

(2)-1 Sampling interval

Sets the sampling interval for data capture.

The table below shows the number of measuring channels and sampling interval values that can be set.

If data fluctuate due to noise, set the sampling interval to a value which enables the digital filter function.

Number of Measuring Channels*1	Allowed Sampling Interval	Sampling Interval which enables Digital Filter
1 CH	10 ms or slower *2	50 ms or slower
2 CH	20 ms or slower *2	125 ms or slower
3 CH to 5 CH	50 ms or slower *2	250 ms or slower
6 CH to 10 CH	100 ms or slower	500 ms or slower
11CH to 20CH	200ms or slower	1s or slower
21CH to 50CH	500ms or slower	2s or slower
51CH to 100CH	1s or slower	5s or slower
101CH to 200CH	2s or slower	10s or slower

*1 "Number of Measuring Channels" is the number of channels in which input settings are NOT set to "OFF".
*2 The temperature setting is not available for sampling intervals of 10, 20, and 50 ms

Note

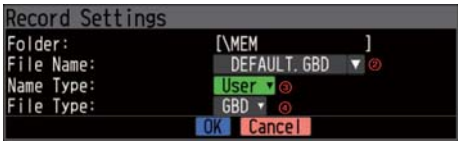
To use the digital filter function, you must set the AC power supply frequency accurately. Follow the instructions on page 87 to ensure that the settings are accurate.

(2)-2 Captured data file name

Select the name of a file or folder to which you want to save capture data.

<If the naming method is Auto>

<If the naming method is Arbitrary>



Setting	Description
(1) Folder	Specify a folder to which you want to capture (or save) data. Refer to page 109, "File box" for details.
(2) File	Specify a file to which you want to capture (or save) data. Refer to page 109, "File box" for details.

Setting	Description
(3) Name Type	Set how a data file should be named. Auto : Automatically supplies the file name. Example: 20050101-123456_UG.GBD Number part : File creation date * The file is created on January 1, 2005, 12:34:56 in this example. UG : User number of the user capturing data UG: Guest U1: User 1 U2: User 2 GBD : Data format GBD (Binary data) CSV (Text format) Arbitrary : Data is captured to a file with an entered file name. Sequential number : A file is created with an arbitrary file name that has been entered, followed by a sequential number. Example: If the file name is "TEST" First time : TEST_SER1.GBD Second time : TEST_SER2.GBD Third time : TEST_SER3.GBD * If the same file name already exists, _CP* is added to the end of a file name to prevent overwriting. The asterisk (*) represents a number. Example: TEST_CP1.GBD
(4) File Type	Sets the file format used to save data. GBD : Creating a data file in OMRON's proprietary binary format * Data tampering can be prevented. CSV : Creating a data file in text format * Replaying on the ZR-RX45 is not available.

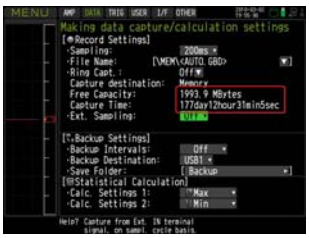
Important

When you save files, create a folder and then save the files in the root directory, you may not be able to save files due to file system restrictions.

Note

Changing the sampling interval, capture destination, number of measuring channels (number of channels for which the input is not Off), etc. will change the Capture Space and Capture Time on the screen.
If you find that the measurement time exceeds the Capture Time, take one of the following measures:

- Change the sampling interval.
- Copy the files on the internal memory to your PC and delete them.
- Change the capture destination to USB memory with larger free space.



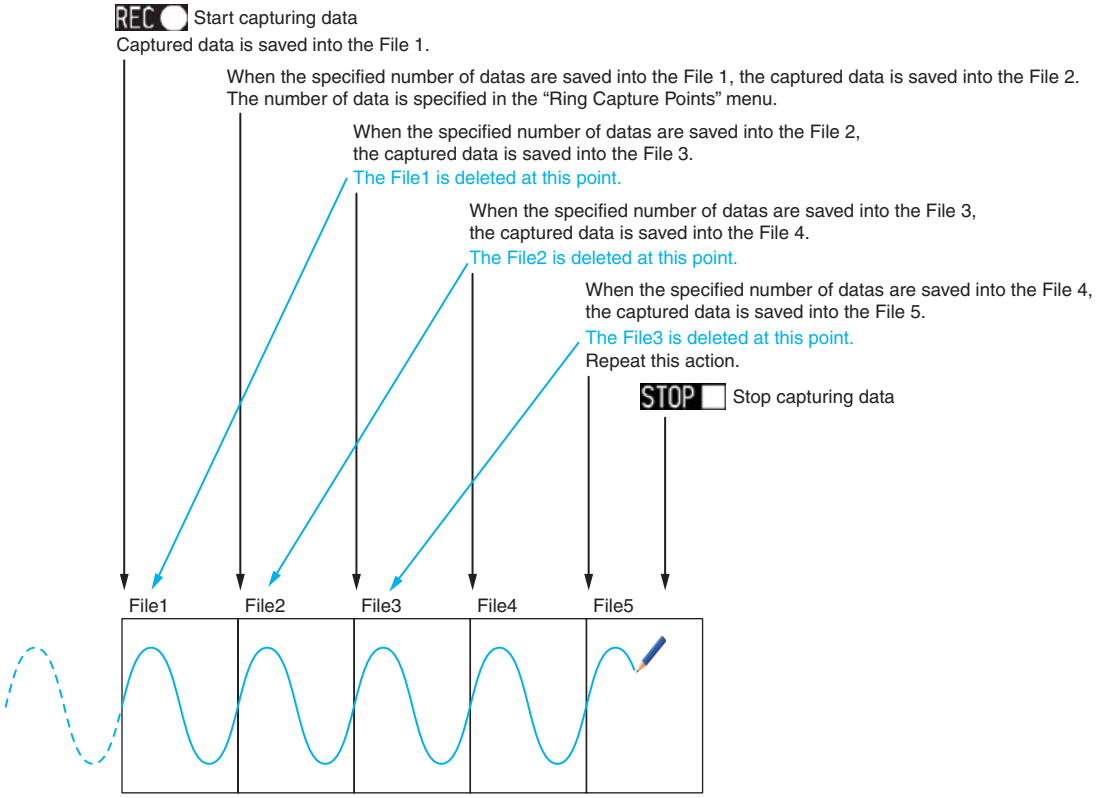
Capture Space : Displays the amount of memory space available for capture at the capture destination.
Capture Time : Displays time available for capture.
* The Capture Time is calculated for 2 GB at the maximum.
The Capture Time more than 366 days is displayed as More Than 366 days.

(2)-3 Ring capture setting

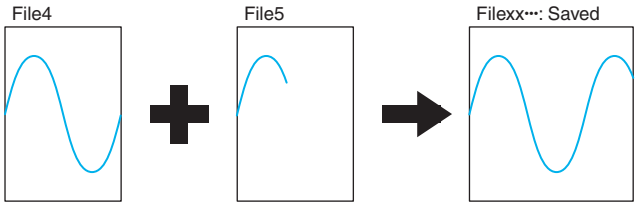
Setting	Description
(1) Ring Capture	Sets the ring capture function to On or Off.
(2) Number of Ring Capture Points	Specifies the number of data points in one file when the ring capture function is On (See the following figure for details).
(3) Ring Capture Time	Displays the possible measurement time with one file when the ring capture function is On.

• Ring Capture Function

Ring-captur has been operating in this instrument is as follows.



When capturing is stopped at the STOP poinf in the above, the File4 and the File 5 are remained.
These files are consolidated into one file and it is saved. Then the ring catpuer is completed.



Note

Twice as many files as the Number of Ring Capture Points will be created at the maximum.

(2)-4 External sampling

Enables or disables external sampling.

When the external sampling function is enabled, data is captured at the shortest intervals and retained temporarily.

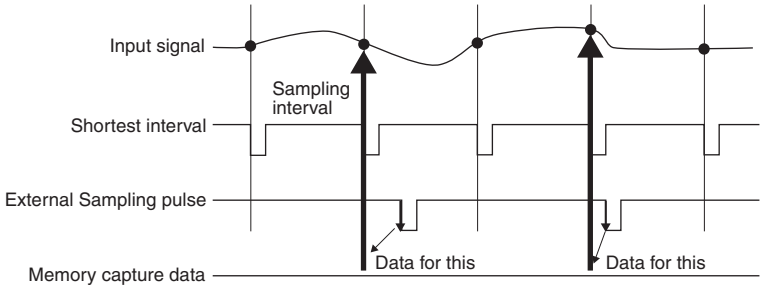
This retained data is updated at the shortest intervals.

When an external sampling pulse is received, the retained data is written to the memory.

(See the following figure.)

Therefore, the maximum error in time between the actually captured data and the external sampling pulse is the same as the shortest interval.

* Refer to the next section, "(2)-5 AC line filter" for details on the shortest interval.



Note

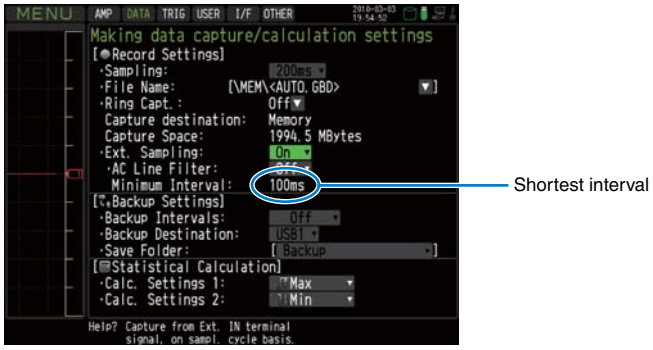
- If the external sampling function is ON, the external input cannot be selected for the trigger setting. If the external input has already been set, the trigger will be set to Off.
- When you measure signals with high noise levels, set the AC line filter described in the next section to ON.

(2)-5 AC line filter

Enables or disables the AC line filter while external sampling is enabled.

Enable this setting to enable the digital filter. - When you use external sampling and measure signals with high noise levels, set the AC line filter to ON.

The shortest interval is displayed under the settings.



The shortest interval is as shown in the following table:

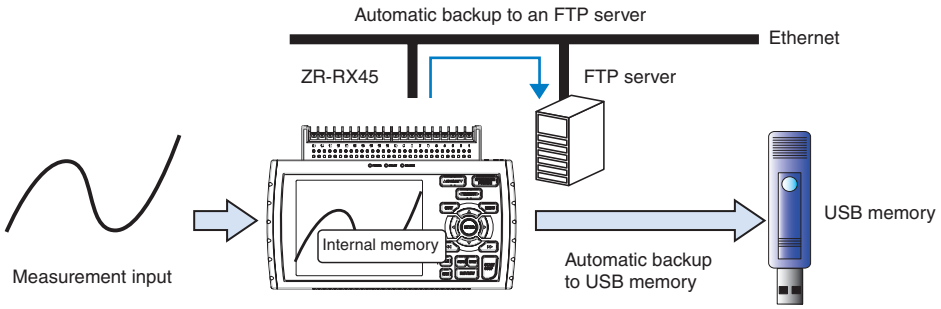
Number of Measuring Channels *1	Shortest interval	
	Digital filter OFF	Digital filter ON
1 CH	10ms	200ms
2 CH	20ms	500ms
3 to 5 CH	50ms	1s
6 to 10 CH	100ms	1s
11 to 20 CH	200ms	2s
21 to 50 CH	500ms	5s
51 to 100 CH	1 s	10 s
101 to 200 CH	2 s	20 s

*1 The Number of Measuring Channels is the number of channels for which the input setting is not OFF.

(2)-6 Backup setting

The ZR-RX45 has a function that periodically backs up captured data (See the figure below).

This section explains how to set the data backup conditions.



Setting	Description	
Backup interval	Sets the backup interval for captured data. Off, 1, 2, 6, 12, 24 hours	
Backup destination	Sets the backup destination for captured data.	
	USB1	Backs up data to USB memory. This setting is available only when data is being captured to the internal memory.
	FTP	Backs up data to an FTP server on the network. * The FTP server settings must be made using the FILE menu. (Refer to page 98 for details.)
Save folder	Sets the folder for saving a backup file. * This must be a folder on USB memory or an FTP server. Example: \OMRON\20091205	

Note

* If ring capture is On, the backup function is not available.

(2)-7 Statistical calculation setting

Two types of operation can be performed on all channels.

This section explains setting what to do in statistical calculation.

Setting	Description
Off	Calculation is not performed.
Average	Displays the simple average value of the data during data capture.
Max	Displays the maximum value of the data during data capture.
Min	Displays the minimum value of the data during data capture.
Peak	Displays the peak value of the data during data capture.
RMS	Displays the RMS value of the data during data capture. The calculation formula is as follows: $R.M.S = \sqrt{\Sigma D^2/n}$ D: data n: number of data

Note

- Calculation results are displayed in the Digital + Statistical Calculation Display screen. Use the ◁◁▷▷ keys to set All Mode. Refer to page 61 for details on All Mode.
- At power-on, calculation is started; The result is cleared when you press the QUIT key or the Start key to start measurement.

(3) TRIG settings

This menu is used to specify trigger conditions and alarms.

Setting			Selections available
Start Side Source Setting			Off, Level, Alarm, External Input, Time, Day, Duration
	[Level]	Mode	Analog: Off, ↑H, ↓L, Window In, Window Out Logic: Off, ↑H, ↓L Pulse: Off, ↑H, ↓L, Window In, Window Out
		Combination	Level OR, Level AND, Edge OR, Edge AND
		Level	Set numeric value
	[Alarm]	Alarm port number	1•2•3•4
	[Date]	Date	From 2005.1.1 to 2035.12.31
		Time	From 0:0:0 to 23:59:59
	[Weekly]	Day of week	Off or On setting for each of Sunday through Saturday
		Time	From 0:0:0 to 23:59:59
	[Time]		From 0:0:1 to 9999:59:59
Stop Side Source Setting			Off, Level, Alarm, External Input, Time, Day, Duration
	[Level]	Mode	Analog: Off, ↑H, ↓L, Window In, Window Out Logic: Off, ↑H, ↓L Pulse: Off, ↑H, ↓L, Window In, Window Out
		Combination	Level OR, Level AND, Edge OR, Edge AND
		Level	Set numeric value
	[Alarm]	Alarm port number	1•2•3•4
	[Date]	Date	From 2005.1.1 to 2035.12.31
		Time	From 0:0:0 to 23:59:59
	[Weekly]	Day of week	Off or On setting for each of Sunday through Saturday
		Time	From 0:0:0 to 23:59:59
	[Time]		From 0:0:1 to 9999:59:59
Repeated Capturing			Off, On

Setting		Selections available
Alarm Level Settings	Mode	Analog: Off, ↑H, ↓L, Window In, Window Out Logic: Off, ↑H, ↓L Pulse: Off, ↑H, ↓L, Window In, Window Out
	Level	Set numeric value
	Output	1•2•3•4
	Detection Method	Level, Edge
	Alarm Hold	On, Off
	Send Burnout Alarm	On, Off

(3)-1 Start side source setting

Specifies trigger conditions to start data capture.

Selection item	Description
Off	Starts capturing data unconditionally when you press the Start/Stop key.
Level	Starts capturing data when a specified level is reached. -> When Level is selected, the condition for each channel must be set. Refer to page 91 for details.
Alarm	Starts capturing data when an alarm is generated in the specified alarm port.
External Input	Starts capturing data when an input signal is received from an external trigger terminal. * A trigger is established at a transition from 5 V (open) to 0 V (shorted to the ground). A falling edge operation occurs.
Date	Starts capturing data when specified date and time arrives.
Weekly	Starts capturing data at the specified time on days of week for which On is set. Example: On is set for Mon, Tue, Wed, Thu, and Fri, Off is set for Sun and Sat, and 9:00 is set as the time. Starts capturing data at 9:00 on weekdays. Does not start capturing data on Sat and Sun.
Time	Starts capturing data when a specified length of time elapses.

(3)-2 Stop side source setting

Specifies trigger conditions to stop data capture.

Selection item	Description
Off	Stops capturing data unconditionally when you press the Start/Stop key.
Level	Stops capturing data when a specified level is reached. -> When Level is selected, the condition for each channel must be set. Refer to page 91 for details.
Alarm	Stops capturing data when an alarm is generated in the specified alarm port.
External Input	Stops capturing data when an input signal is received from an external trigger terminal. * A trigger is established at a transition from 5 V (open) to 0 V (shorted to the ground). A falling edge operation occurs.
Date	Stops capturing data when specified date and time arrives.
Weekly	Stops capturing data at the specified time on days of week for which On is set. Example: On is set for Mon, Tue, Wed, Thu, and Fri, Off is set for Sun and Sat, and 17:00 is set as the time. Starts capturing data at 17:00 on weekdays.
Time	Stops capturing data when a specified length of time elapses.

Note

- When External Input is used as the trigger source, no stop trigger is accepted for 50 ms after capture is started.
- When the start trigger is External Input, data is captured at sampling intervals (fixed to 30 seconds if they are more than 30 seconds) and retained temporarily.
  This retained data is refreshed at sampling intervals (fixed to 30 seconds if they are more than 30 seconds).
  Since the external trigger input operation conducts detection at 10 ms intervals asynchronously from sampling, the retained data becomes the first point when an external trigger is detected. Starting from this point, data is captured at sampling intervals.
- This retained data is refreshed at sampling intervals (fixed to 30 seconds if they are more than 30 seconds).

(3)-3 Repeated capturing

Sets up the repeat function to conduct repeated capturing.

Selection item	Description
Off	The repeat function is disabled.
On	The repeat function is enabled. After one capture is ended, the next capture is started (If the start side source setting is not Off, the ZR-RX45 waits for a trigger).

(3)-4 Alarm level settings

Sets alarm generation conditions, output destination, etc.

When the conditions specified here are met, the alarm output terminal (for which an output destination number must be specified for each channel) outputs an alarm.

Refer to page 91 for details on the condition setting for each channel.

(3)-5 Alarm hold

When "On" is selected here and once the conditions are met, an alarm is not canceled even if the conditions are no longer met later (Press the CURSOR key to cancel it).

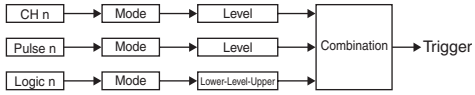
(3)-6 Send burnout alarm

When "On" is selected here, the generation of a burnout (refer to page 100) causes the alarm output terminal to output an alarm.

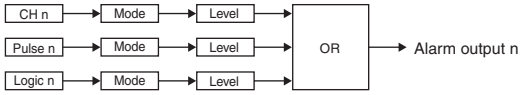
Trigger level settings/Alarm level settings

Specifies detailed conditions for each channel when the start and stop side source settings are Level.

The configuration of the level trigger is as shown in the figure below.

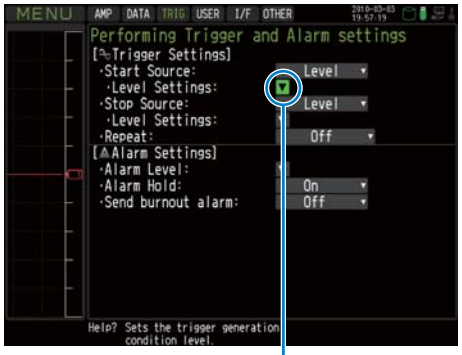


* Pulse and Logic are switchable.

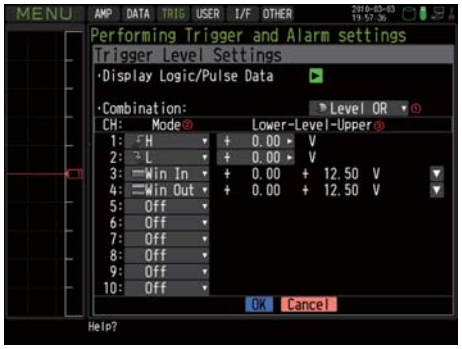


* Pulse and Logic are switchable.
* Specify an alarm output destination for each channel and Pulse/Logic. Each of the alarms is ORed at the output destination.
Example: If you specify 1 as the output destination of 1CH and 2CH and 2 as that of 3CH and 4CH, Alarm Output 1 occurs when one of 1CH and 2CH meets the conditions, and Alarm Output 2 occurs when one of 3Ch and 4CH meets the conditions.

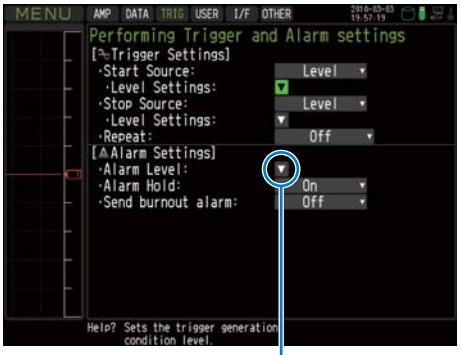
<Trigger level settings>



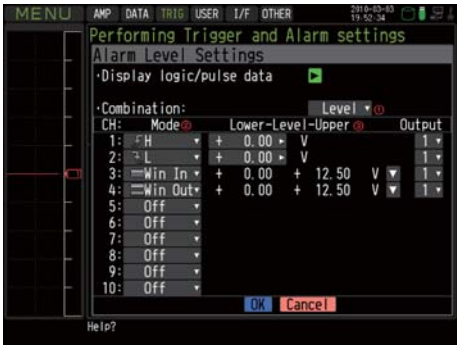
Place the cursor here and press the ENTER key to open the following setting screen.



<Alarm level settings>



Place the cursor here and press the ENTER key to open the following setting screen.



Setting		Description
(1)	Combination <For Trigger>	Sets a combination of trigger conditions set for each channel. Level OR : Starts (stops) capturing data when at least one of the specified trigger conditions is met. Each condition is Level operation. Level AND : Starts (stops) capturing data when all of the specified trigger conditions are met. Each condition is Level operation. Edge OR : Starts (stops) capturing data when at least one of the specified trigger conditions is met. Each condition is Edge operation. Edge AND : Starts (stops) capturing data when all of the specified trigger conditions are met. Each condition is Edge operation.
	Detection method <For Alarm>	Level: Each condition is Level operation. Edge: Each condition is Edge operation.
(2) Mode		Sets a trigger comparison mode for each channel. Off : Disables triggers for the setting channel. ↑H (rising) : A trigger is generated when the input signal exceeds the specified level. ↓L (falling) : A trigger is generated when the input signal falls below the specified level. Win In : Used to specify the upper and lower limits for each channel. When the input signal level is (or comes) between these limits, a trigger is generated. * This setting is not available for Logic CH.Win Out: Used to specify the upper and lower limits for each channel. When the input signal level is (or goes) out of these limits, a trigger is generated. * This setting is not available for Logic CH.
(3) Level		Sets a trigger comparison level. If the mode is ↑H (rising) or ↓L (falling), set one comparison level. If the mode is Win In or Win Out, set two comparison levels.

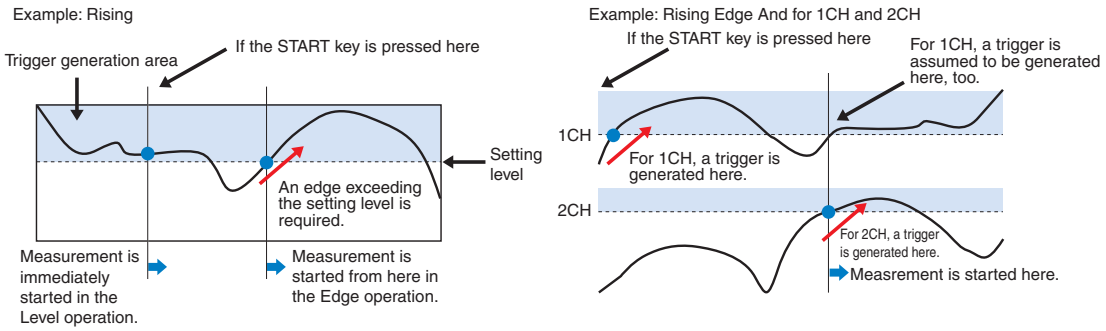
Level and Edge operations

In the Level operation, a trigger is assumed to be generated if the trigger conditions are met when the START key is pressed.

In the Edge operation, a trigger is not assumed to be generated even if the trigger conditions are met when the START key is pressed.

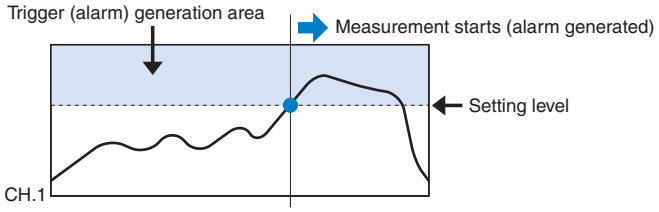
A trigger is assumed to be generated when the trigger conditions, after not being met, are met again.

* A trigger is still assumed to be generated even if the trigger conditions are met once in the Edge operation and then are no longer met.

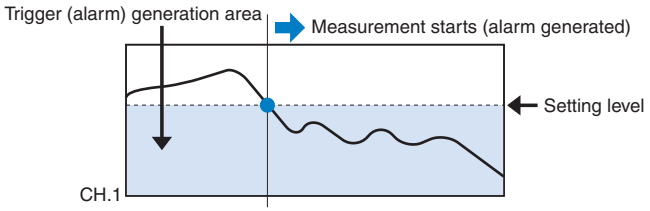


Trigger and Alarm operations

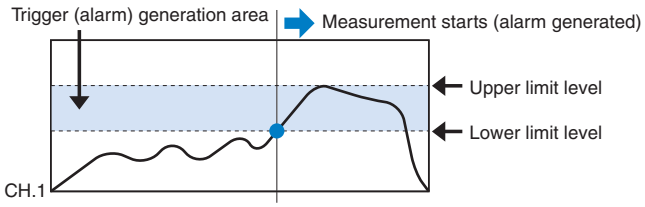
Rising : A trigger/alarm is generated when the input signal is higher than the specified level.



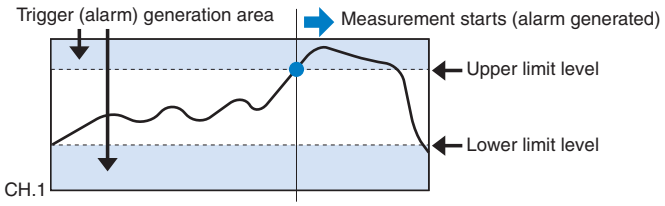
Falling : A trigger/alarm is generated when the input signal is lower than the specified level.



Win In : Used to specify the upper and lower limits for each channel. When the input signal level comes (or is) between these limits, a trigger/alarm is generated.



Win Out : Used to specify the upper and lower limits for each channel. When the input signal level goes (or is) out of these limits, a trigger/alarm is generated.



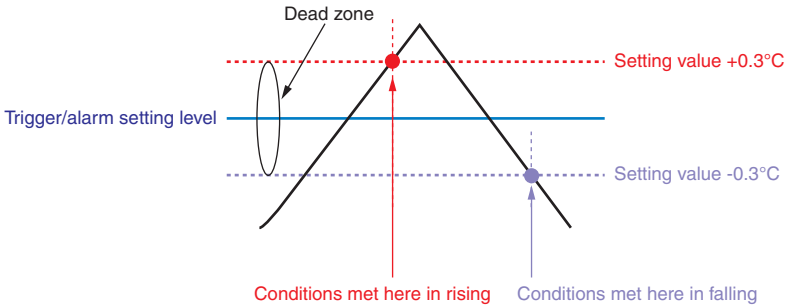
Dead zones of trigger and alarm levels

Trigger and alarm levels are provided with a dead zone in order to prevent false detection due to noise.

Since a dead zone exists as shown in the figure below, the conditions are met at different points between rising and falling signals.

Therefore, errors in relation to the setting levels are generated as shown in the figure below.

<For Temperatures>

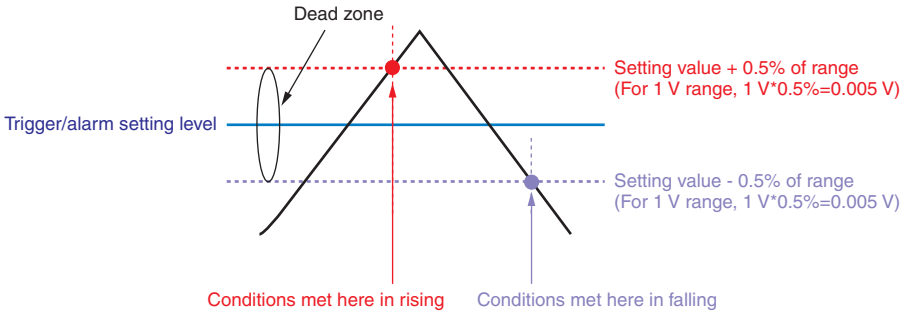


Note

An alarm that has occurred is canceled at the following levels:

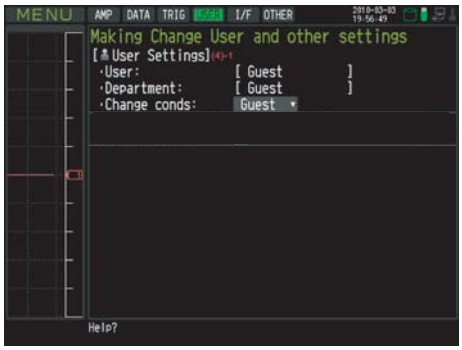
- For rising setting: Setting value -0.4°C
- For falling setting: Setting value +0.4°C

<For Voltages>



(4) USER settings

By switching between users using the USER Setting, you can easily read out different setting conditions that have been stored



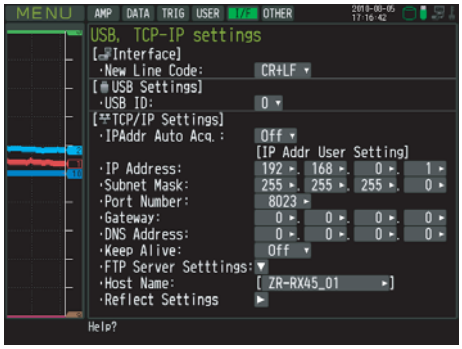
Selection item	Selections available
User	Text input (when User is selected)
Department name	Text input (when User is selected)
Setting conditions switch	Guest, User 1, User 2

(4)-1 USER settings

Setting	Description
User	Specify the user name. You cannot specify it as Guest.
Department name	Specify the department name. You cannot specify it as Guest.
Setting conditions switch	Switches between Guest, User1 and User2. Since setting conditions are stored for each user, they can be called up easily by simply switching the user.

(5) Interface settings

This menu is used to specify conditions for PC connection.



Setting			Selections available
Selections availableNew Line code			CR+LF, LF, CR
USB settings	USB ID		0 to 9
TCP-IP setting	Auto IP Address Acquisition		On, Off
	IP Address		0-255.0-255.0-255.0-255 (only if Auto IP Address Acquisition is Off)
	Subnet Mask		0-255.0-255.0-255.0-255 (only if Auto IP Address Acquisition is Off)
	Port Number		1024~65535
	Gateway		0-255.0-255.0-255.0-255 (only if Auto IP Address Acquisition is Off)
	DNS Address		0-255.0-255.0-255.0-255 (only if Auto IP Address Acquisition is Off)
	Keep Alive		Off; 10, 30 seconds; 1, 10, 30 minutes; 1 hour
	FTP server settings	FTP Server	Text input
		User Name	Text input
		Password	Text input
		Port Number	0~65535
		PASV Mode	Off, On
		FTP Server Connection Test	▷ Press right key to execute.
	Host Name		Text input
	Reflect Settings		▷ Press right key to execute.

(5)-1 New Line code

Specifies the line feed code.

Selection item	Description
CR+LF	Starts a new line with CR+LF code (default value).
LF	Starts a new line with LF code.
CR	Starts a new line with CR code.

(5)-2 USB settings

Sets the USB ID number of ZR-RX45.

Specify a number from 0 to 9 (default value: 0).

To control more than one ZR-RX45 unit with one PC, assign a unique USB ID to each of them.

(5)-3 TCP-IP settings

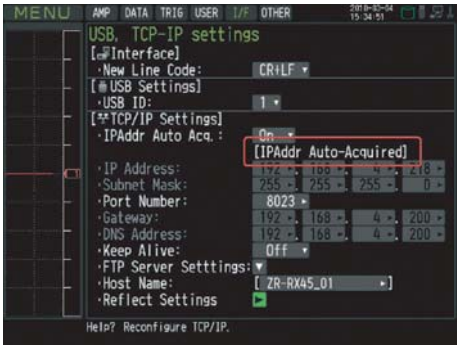
TCP-IP settings are used to connect the ZR-RX45 to Ethernet.

Selection item	Description
Auto IP Address Acquisition	Set whether the IP address should be manually set or automatically acquired. * If auto acquisition is enabled, the auto acquisition operation (performed when the power is turned on or the settings are reflected) may take a few seconds to around one minute.
IP Address	Sets the IP address of the ZR-RX45. (0-255.0-255.0-255.0-255)
Subnet Mask	Sets the subnet mask of the ZR-RX45. (0-255.0-255.0-255.0-255)
Port Number	Sets the IP port number of the ZR-RX45 (1024-65535).
Gateway	Sets the gateway address of the ZR-RX45. (0-255.0-255.0-255.0-255)
DNS Address	Sets the DNS address of the ZR-RX45. (0-255.0-255.0-255.0-255)
Keep Alive	Sets up the function that detects no-communication time and automatically disconnects the socket connection. Refer to "(5)-4 Keep Alive" for details.
FTP server settings	Makes the FTP server settings. * Refer to "(5)-5 FTP server settings" for details.
Host Name	Sets a name that can be identified by the supplied application. * This identifier is NOT a common computer name (NETBIOS name) or a name for DNS.
Reflect Settings	Reflects the TCP-IP settings immediately (without turning off and on the power). * Connections are forcibly disconnected when the settings are reflected. * Reflecting the settings may take a few seconds to around one minute.

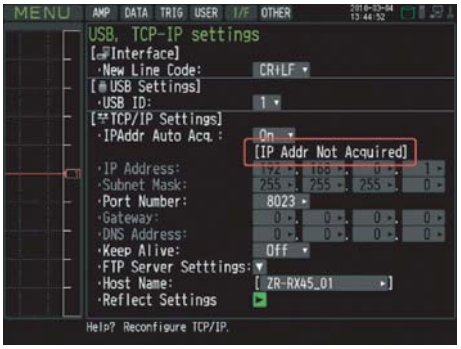
Important

- If the Automatic IP Address Acquisition fails (see the figure below), the manual settings for IP address, etc. are used. In this case, the settings including the IP address may not be consistent with your network. Disable the Auto IP Address Acquisition and make the settings one by one.
- After you have changed the TCP-IP settings, turn off and on the power or execute Reflect Settings (The connection will be forcibly disconnected).

<Auto IP Address Acquisition is successful>



<Auto IP Address Acquisition fails>

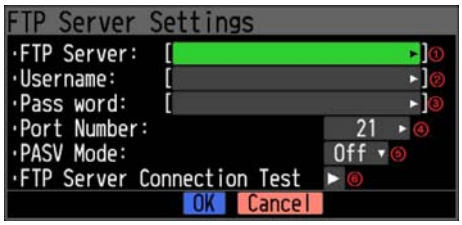


(5)-4 Keep Alive

Detects no-communication time and automatically disconnects the socket connection.

Selection item	Description
OFF	Disconnection is not performed.
10 seconds to 1 hour	Disconnects the socket connection if no-communication status continues longer than the specified time. Generate some kind of communication within the setting time. Note that, while the supplied application software is used, no-communication status continues during the replay of captured data.This function is effective only for the command port. The Web server function or FTP server function is not influenced.)

(5)-5 FTP server settings



Selection item	Description
(1) FTP Server	Enter the domain name or IP address of the FTP server.
(2) User Name	Enter the user name of the FTP account.
(3) Password	Enter the password of the FTP account.
(4) Port Number	Enter the port number of a port to be used for FTP. It is normally 21.
(5) PASV Mode	Make the passive mode setting. ON : Should be set for communication with an external FTP server in a firewall environment. OFF : Should be set for communication with an FTP server in a normal network environment.
(6) FTP Server Connection Test	Performs connection test to the FTP server.When the connection test is performed, a message is displayed.If connection cannot be established, check the settings and perform the connection test again. * If the connection test is passed, the following message is displayed. 

(6) OTHER settings

Other miscellaneous settings are made here.

Setting			Selections available
LCD brightness			Light, Medium, Dark
Screen Saver			Off, 10, 30 (sec.), 1, 2, 5, 10, 30, 60 (min.)
Power On Start			Disable, Enable
Room Temp.			Internal, External
Temp. Unit			°C, °F
Background Color			Black, White
Burn Out			Off, On
AC Line Frequency			50/60Hz (Off, On)
Date/Time	Date/Time	Date	From 2005.1.1 to 2035.12.31
		Time	From 0:0:0 to 23:59:59
	Network Time		Off, On
		Time Server	Text input
		Time Zone	-12:00 to +13:00 (one-hour steps)
		Synchronization Time	From 0:0 to 23:59
		Synchronization Mode	Synchronize at once, Synchronize gradually
		Connection Test	▷ Press right key to execute.
Language			Japanese, English (US), English (UK), French, German, Chinese, Korean
Return to default settings			▷ Press right key to execute.
Information			▽ Down button to display information
Demo Waveform Mode			Off, On

(6)-1 LCD brightness

Sets the brightness of the LCD backlight.

(6)-2 Screen Saver

Automatically turns off the display if the ZR-RX45 is not operated within a specified interval.

Turns off the display if not operated for some time to extend the service life of the LCD screen.

If the ZR-RX45 runs on a battery pack (ZR-XRB1, option), the use of this function prolongs the drive time.

(6)-3 Power On Start

Sets the feature which initiates measurement as soon as the ZR-RX45 isturned on.

Selection item	Description
Disable	Disables the Power On Start function.
Enable	Enables the Power On Start function.

(6)-4 Room Temp. Compensation

Selection item	Description
Internal	The ZR-RX45's room temperature compensation settings are used (usually, you use this parameter).
External	This parameter is set to enable room temperature compensation settings in external devices.

(6)-5 Temp. Unit

Toggles the temperature unit between °C (Centigrade) and °F (Fahrenheit) for temperature settings.

When °F (Fahrenheit) is selected, calculation is performed using the following formula:

°F (Fahrenheit) = °C (Centigrade) × 1.8 + 32

Calculate the accuracy as: Centigrade accuracy × 1.8.

(6)-6 Background Color

Sets the background colors of the waveform display area and the digital display area.

(6)-7 Burn Out

Sets a feature which checks sensor burnout in a thermocouple.

Selection item	Description
Off	Burnout check is disabled.
On	Periodical burnout check is conducted.

Important

During a burnout check, voltage is applied to the ZR-RX45. Therefore, set Burn Out to "Off" when ZR-RX45 is connected in parallel with other devices to avoid any effect from these voltages.

(6)-8 AC Line Frequency

Select the frequency of the AC line used.

Selection item	Description
50Hz	For an area with a power supply frequency of 50 Hz
60Hz	For an area with a power supply frequency of 60Hz

Important

In this setting, select a frequency for noise removal using the digital filter. Note that no noise in the power supply can be removed if this setting is wrong. Refer to "(2)-1 Sampling Interval" for details on sampling rates at which the digital filter is enabled.

(6)-9 Date/Time

Makes settings related to the ZR-RX45 clock.

The internal clock (date and time) of the ZR-RX45 can be set. Alternatively, if the Network Time setting is used, the ZR-RX45 clock can be automatically adjusted via the network.

*  Refer to the next section, "Network Time Setting" for details.

(6)-10 Language

This parameter sets the ZR-RX45's display language.

(6)-11 Return to default settings

Returns all the settings to the factory defaults.

(6)-12 Information

Displays system information.

(6)-13 Demo Waveform Mode

This parameter displays demo waveforms without analog signal input.

Selection item	Description
Off	The demo waveform is not displayed.
On	The demo waveform is displayed.

Network Time setting

The ZR-RX45 has a function that synchronizes the time to that of a time server via Ethernet.

This section describes settings to be made to use this function.

Setting	Selections available
Network Time	Enables or disables this function. Off : This function is disabled. Time adjustment is not performed. On : This function is enabled to perform time adjustment.
Time Server	Sets the domain name of a time server (NTP server) to be used.
Time Zone	Sets the time zone of an area in which the ZR-RX45 is to be used. (Japan: +09:00)
Synchronized Time	Sets the time at which the ZR-RX45 synchronizes to the time server. When the specified time comes, time synchronization operation is performed using a method specified in Synchronization Mode.
Adjust Mode	Synchronize at once, Synchronize gradually Sets the mode in which the ZR-RX45 synchronizes to the time server. Synchronize at once : When the synchronization time comes, the ZR-RX45 synchronizes to the time server at once. Synchronize gradually : Even when the synchronization time comes, the ZR-RX45 does not synchronize at once. It synchronizes to the time of the time server gradually. The rate of adjustment is about 43 seconds per day (equivalent to around 10 ms per 20 seconds).
Connection Test	Performs connection test to the time server. When the connection test is performed, a message is displayed. If connection cannot be established, check the settings and perform the connection test again. * If the connection test is passed, the following message is displayed. 

Important

Synchronization is not performed if the time difference with the time server is 500 ms or less.

(7) FILE menu

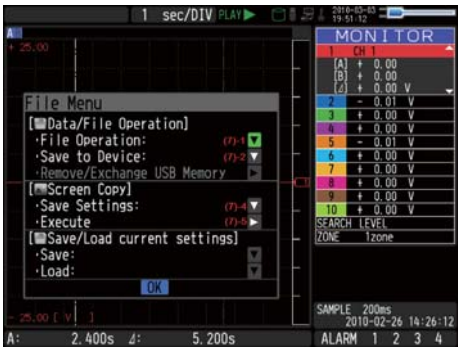
Performs file-related operations.

The items to be displayed vary depending on the operation mode.

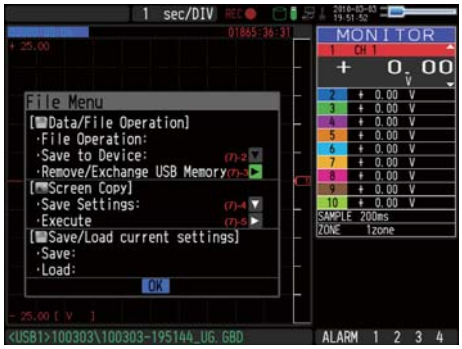
Refer to page 67 for details on the operation modes.

<Free Running Status>

<Replay or Double-Screen Replay Status>



<Capture Status>



(7)-1 File Operation

Operate files in the main memory and USB device. For details on file operation, see on page 109.

(7)-2 Data Save

Saves data being replayed to the internal memory or USB memory.

<If the naming method is Auto>

<If the naming method is Arbitrary>

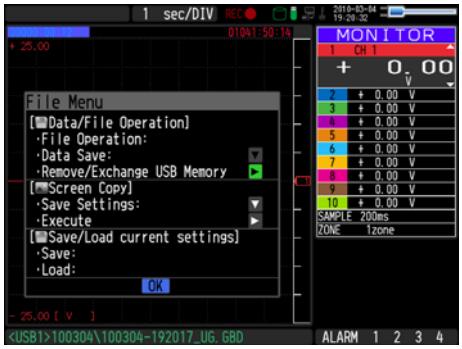
Setting	Description
(1) Folder	Specify a folder to which you want to save data. Refer to page 109, "File box" for details.
(2) File	Specify a file to which you want to save data. Refer to page 109, "File box" for details.
(3) File Type	Sets the file format used to save data. GBD: Creating a data file in OMRON's proprietary binary format * Data tampering can be prevented. CSV: Creating a data file in text format * Replaying on the ZR-RX45 is not available.
(4) Name Type	Set how a data file should be named. Auto : Automatically supplies the file name. Example: 20050101-123456_UG.GBD Number part : File creation date * The file is created on January 1, 2005, 12:34:56 in this example. UG : User number of the user capturing data UG: Guest U1: User 1 U2: User 2 GBD : Data format GBD (Binary data) CSV (Text format) Arbitrary : Data is captured to a file with an entered file name. Sequential number : A file is created with an arbitrary file name that has been entered, followed by a sequential number.
(5) Save Range	Sets the range of data to be saved. All Data : Saves all data regardless of the cursors. Data between Cursors: Saves only a range of data between cursors A and B.

(7)-3 Remove/Exchange USB Memory

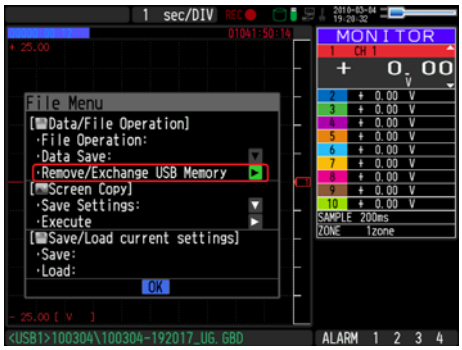
The ZR-RX45 allows you to exchange the USB memory while data is captured to it.

Exchange the USB memory in accordance with the following procedure:

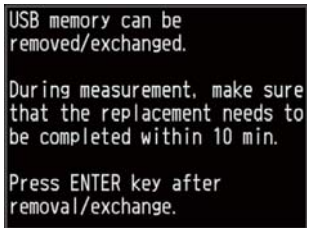
1 **Press the FILE key to open the FILE menu.**

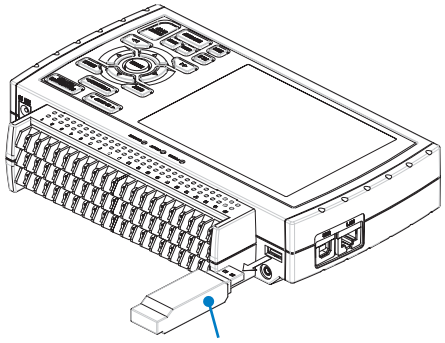


2 **Move the cursor to Remove/Exchange USB Memory and press the ENTER key.**



3 **You can remove the USB memory device when the message is displayed.**

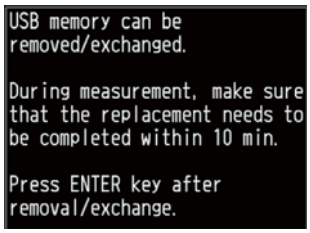


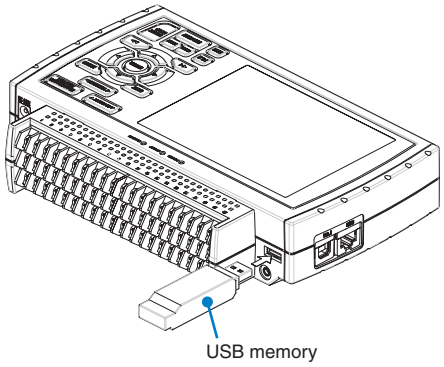


Important

Do not remove the USB memory device before the message is displayed. Data may become corrupt and inaccessible.

4 Insert a new USB memory device.





5 After checking that the USB memory access display turns green, press the ENTER key.

Refer to page 53 for details on USB memory access.

Note

"_CHG" and a number will be appended to the file name each time you exchange a USB memory device.
Example: When data is captured to the file "TEST.GBD":
First USB memory device : TEST.GBD
Second USB memory device : TEST_CHG1.GBD
Third USB memory device : TEST_CHG2.GBD
* While ring capture is On, the USB memory device cannot be exchanged.

Important

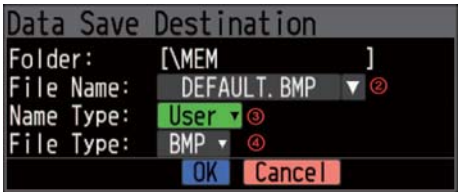
The exchange procedure must be completed within ten minutes. Data will be lost after ten minutes have elapsed.

(7)-4 Specify Save Destination (Screen Copy)

Saves data being replayed as an image file to the internal memory or USB memory.

<If the naming method is Auto>

<If the naming method is Arbitrary>



Setting	Description
(1) Folder	Specify a folder to which you want to save data. Refer to page 109, "File box" for details.
(2) File	Specify a file to which you want to save data. Refer to page 109, "File box" for details.
(3) Name Type	Set how a data file should be named. Auto : Automatically supplies the file name. Example: 20050101-123456_UG.BMP Number part : File creation date * The file is created on January 1, 2005, 12:34:56 in this example. UG : User number of the user capturing data UG: Guest U1: User 1 U2: User 2 BMP : Data format BMP: Bitmap file format PNG: Ping format Arbitrary : Data is captured to a file with an entered file name. Sequential number : A file is created with an arbitrary file name that has been entered, followed by a sequential number.
(4) File Type	Sets the file format used to save data. BMP: Saves data in bitmap file format PNG: Saves data in ping format

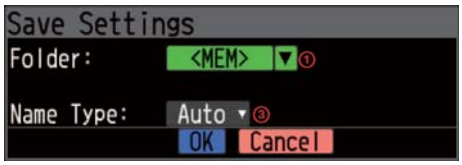
(7)-5 Execute (Screen Copy)

Executes screen copy and saves it to an image file. * Refer to page (7)-4 "Specify Save Destination" for details on specifying the save destination.

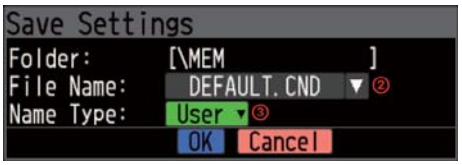
(7)-6 Save

Saves the setting conditions of the ZR-RX45.

<If the naming method is Auto>



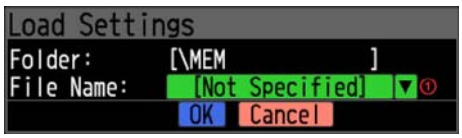
<If the naming method is Arbitrary>



Setting	Description
(1) Folder	Specify a folder to which you want to save data. Refer to page 109, "File box" for details.
(2) File	Specify a file to which you want to save data. Refer to page 109, "File box" for details.
(3) Name Type	Set how a data file should be named. Auto : Automatically supplies the file name. Example: 20050101-123456_UG.CND Number part : File creation date * The file is created on January 1, 2005, 12:34:56 in this example. UG : User number of the user capturing data UG: Guest U1: User 1 U2: User 2 CND : Data format (ZR-RX45 setting file format) Arbitrary : Data is captured to a file with an entered file name. Sequential number : A file is created with an arbitrary file name that has been entered, followed by a sequential number.

(7)-7 Load

Loads and reflects the ZR-RX45 setting conditions from a file.



Setting	Description
(1) File	Specify a file to which you want to save data. Refer to page 109, "File box" for details.

(8) File box

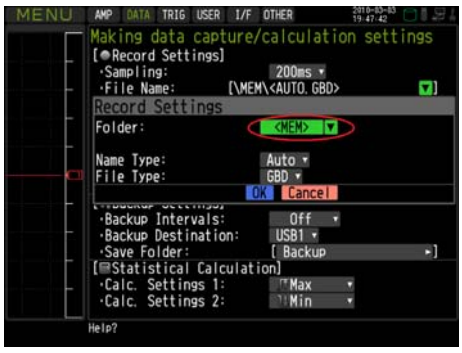
The file box used to set captured data files using the DATA menu or for disk operations accessed using the FILE menu is operated as follows.

<File box by disk operations>

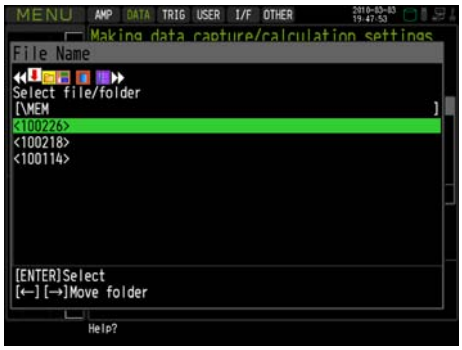
Key	Description
◁◁ ▷▷	Change the operation of the file box. Show properties..... Display details of a file or folder. Select file/folder..... Select files or folders to write data. Create new folder..... Create a new folder. Create new file..... Create a new file. Rename..... Change the file or folder name. Copy file/folder..... Copy files or folders. Select file to copy/delete..... Select the file to copy or delete. Select copy destination and copy.... Select the copy destination and copy. Delete file/folder..... Delete files or folders. Change file sort order..... Change the order in which files are displayed. View setting..... Change displaying information for files. Format disk..... Format the disk. * Details of allowed operation will depend on the operation target.
◁ ▷	Moves between folders. ◁ : Move up one folder. ▷ : Move down one folder.
ENTER	Finalize the operation.
QUIT	Close the file box.

<Setting example>

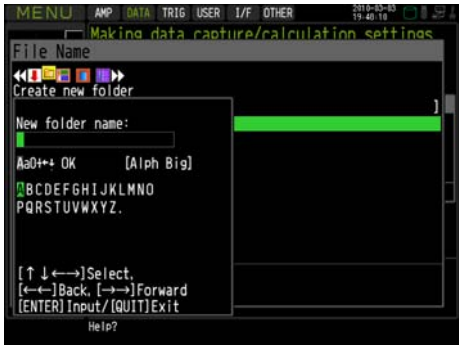
The following shows an operation example where a folder named "TEST" is created for captured data and automatically saved.



In the [Data save Destination], choose [Select folder] and press the ENTER key.



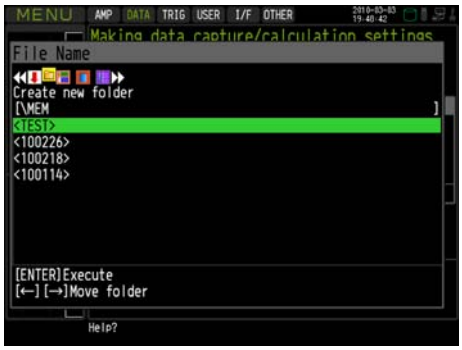
Use the ▷ key to move to the target folder.



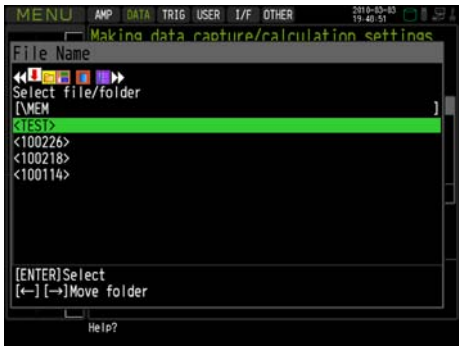
Use the ▷▷ key to select [Create new folder].

Press the ENTER key.

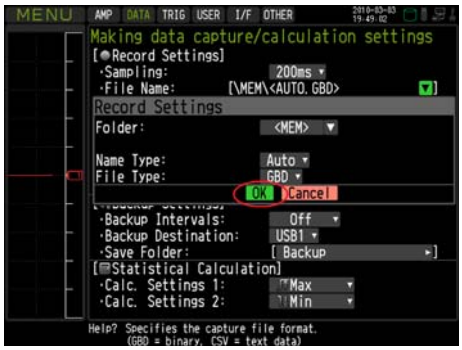
When the input box for a new folder name opens, enter "TEST" and click OK.



Use the ◁◁ key to choose [Select file/folder].



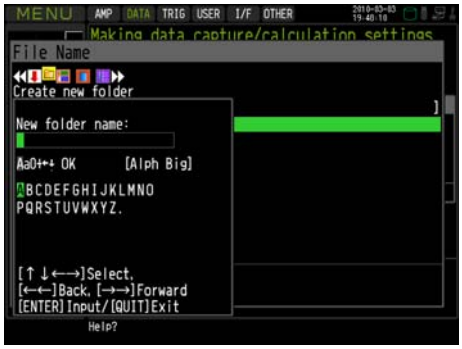
Use the ▽△ key to move the cursor to the created "TEST" folder, and press the ENTER key.



Select [OK] to close the screen.

(9) Text input

Related to text input operations such as annotation, EU (scaling) unit and captured data file name input.



Operation

Operation mode	Description		Operation method
Text input	A	Upper case alphabet mode	When the cursor key is moved to the uppermost part, operation can be selected using the left/right key. After selecting an operation, use the down key to move the cursor to the desired character.
	a	Lower case alphabet mode	
	0	Numeric mode	
	+	Symbol mode	
	←	Delete mode	
	↓	Insert mode	
	OK	Finalize mode	
When selecting operation	Text used for each operation		When you bring the cursor to a character and press ENTER, the character is entered. After you finish entering characters, move the cursor to OK and then press ENTER.

(10) Data replay menu

Data replay menus are displayed by pressing the MENU key during replay.

Setting				Selections available
Cursor Position	Move to First Data			▷ Press right key to execute.
	Move to Last Data			▷ Press right key to execute.
	Move to Center			▷ Press right key to execute.
	Move to Selected Position	Method:		Position, Time
		[Position]	Position	0 to end of data For example, if the sampling interval is 100 ms, capture destination is the built-in RAM, and the number of capture points is 10000, settings up to 9999 ms are available.
		[Time]	Date	Date from the start to end of the data
			Time	Time from the start to end of the data
	Cursor Synch			Off, On
Data search	CH			CH1 to 200, Logic, Pulse, Alarm * Logic and Pulse are displayed only if the Logic Pulse function is On in the AMP settings.
		[CH1 to CH200]		CH1-200
		[Logic]		Logic1-4
		[Pulse]		Pulse1-4
		[Alarm]		Alarm1-4
	Mode	[CH1 to CH200]		↑H, ↓L
		[Logic]		↑H, ↓L
		[Pulse]		↑H, ↓L
		[Alarm]		Both, ↑H, ↓L
	Level	[CH1 to CH200]		Set numeric value
				Set numeric value
	Find Next			▷ Press right key to execute.
	Find Previous			▷ Press right key to execute.
Statistical calculation between cursors	Function			Off, Average, Max, Min, Peak, RMS
	Execute			▷ Press right key to execute.

(10)-1 Move to First Data

Executing this option moves the currently selected cursor (A or B) to the start of the data.

(10)-2 Move to Last Data

Executing this option moves the currently selected cursor (A or B) to the end of the data.

(10)-3 Move to Center

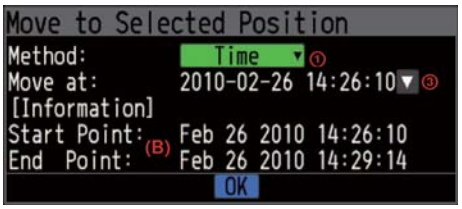
Executing this option moves the currently selected cursor (A or B) to the center of the data.

(10)-4 Move to Selected Position

Sets a position (relative position in time) or time and moves the currently selected cursor (A or B) to this position or time.

<If the Method is Position>

<If the Method is Time>



Setting	Selections available
(1) Method	Sets the method for specifying the position to move the cursor to. Select Position or Time.
(2) Position	Sets the position to move the cursor to. Specify how far down you want to move the cursor from the capture start position assumed as 0.Only positions down to the end of the data can be set. Check the setting range in the (A) part.
(3) Time	Sets the position to move the cursor to using a date and time. Only positions from the start to the end of the data can be set. Check the setting range in the (B) part.

(10)-5 Cursor Sync

Sets up the function that moves two cursors in synchronization.

Selection item	Description
Off	Cursors are not synchronized. Only the specified one cursor moves.
On	Two cursors move in synchronization. Cursor A is always the fulcrum.

* Cursor Synch is turned Off when you move a cursor using Move to Selected Position or perform Data Search.

(10)-6 Data Search

Sets the search conditions to be used in the next sections ((10)-7 "Find Next" and (10)-8 "Find Previous").

The operation is Edge operation.

Selection item	Description
CH	Sets the channel to be used for search. CH1-200 : The specified analog channel is used for search. Logic1-4 : The specified logic channel is used for search. Pulse1-4 : The specified pulse channel is used for search. Alarm1-4 : The specified alarm output is used for search.
Mode	Sets the search mode. Both : Detects an edge at which alarm output changes from generation to cancellation or vice versa when Alarm is selected. ↑H : Detects a rising edge of an analog signal or an edge at which alarm output changes from cancellation to generation ↓L : Detects a falling edge of an analog signal or an edge at which alarm output changes from generation to cancellation.
Level	Sets a voltage level to be searched for when the search channel is an analog or pulse channel.

(10)-7 Find Next

Executing this option moves the cursor to a next position where the search conditions are met, down from the current cursor position. (Specify the search conditions as described in (10)-6 "Data Search.")

(10)-8 Find Previous

Executing this option moves the cursor to a previous position where the search conditions are met, up from the current cursor position. (Specify the search conditions as described in (10)-6 "Data Search.")

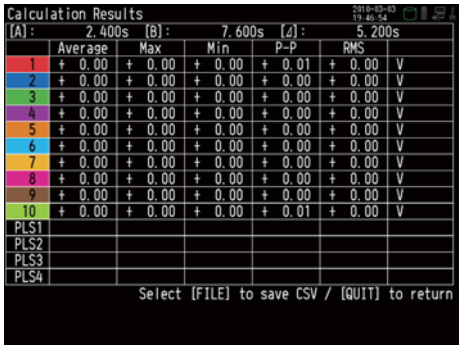
(10)-9 Execute (Calculation)

Executes calculation between cursors. Executing this option opens a window to display calculation results.

For description of the calculation results, see the table below. Pressing the FILE key opens a window for saving statistical calculation results. Specify a save destination and select OK to save statistical calculation results in text (CSV) format.

* A save destination and a file name can be specified in the same way as for specifying a file for captured data. Refer to (8) "File Box" (page 109).

* CH GROUP key is effective. CH11 and later can be checked by pressing the CH GROUP key.



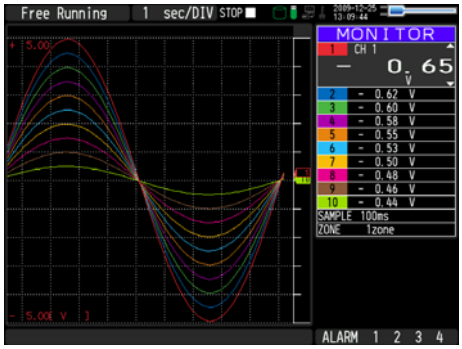
Selection item	Description
Average	Displays the simple average value of the data during data capture.
Max	Displays the maximum value of the data during data capture.
Min	Displays the minimum value of the data during data capture.
Peak	Displays the peak value of the data during data capture.
RMS	Displays the RMS value of the data during data capture. The calculation formula is as follows: $R.M.S = \sqrt{\Sigma D^2/n}$ * D: data n: number of data

(11) NAVI menu

The NAVI menu can be displayed in three modes, Free Running, Recording, and Replay.

Operation	Description
Open	Press the NAVI key to open the NAVI menu.
Close	Press the NAVI key to close the NAVI menu.
Browse explanation	Explanation is displayed when an enabled key is pressed.

(12) Quick settings



Screen	Operation mode	Content	Explanation
Waveform	Free Running	SAMPLE	◁▷ key can be used to change the sampling interval.
		ZONE	◁▷ key can be used to change the zone division.
	Recording	ZONE	◁▷ key can be used to change the zone division.
	Dual View Replaying	ZONE	◁▷ key can be used to change the zone division.
	Replaying	SERCH	◁▷ key can be used to perform search. ◁ : Searches past side ▷ : Searches future side
		ZONE	◁▷ key can be used to change the zone division.

(13) To cancel key lock by password

A password can be set to ZR-RX45 to cancel the key lock.

(No password is set at factory default.)

<Operation flow>

1 Set the password.

Press the ◁, ▷, and ENTER keys at the same time to display the password setting screen shown below. Specify a 4 digit password.

Use the ◁, ▷, △, ▽ keys to select numbers. Press the ENTER key to confirm the password.

Specifying 0000 will disable password operation.

In case you forgot your password, please contact us to acquire the master password.

2 Set the password.

Hold down the ◁◁ and ▷▷ keys together for at least two seconds.

3 Cancel the key lock.

Hold down the ◁◁ and ▷▷ keys together again for at least two seconds.

The password setting screen shown below will be displayed. Set a password.

Entering an incorrect password will not cancel key lock.

Key lock state will be retained when power is turned off.

WEB Server Function

This function allows operating and monitoring ZR-RX45 via a Web browser.

Supported Web browsers

- Microsoft Internet Explorer 6.0 or later

Available functions using a Web browser

- Operating ZR-RX45
- Monitoring ZR-RX45 display screen
- Enlarging ZR-RX45 display screen
- Linking to FTP
- Linking to our Web site

Setting the URL

The URL (Uniform Resource Locator) must be correctly set according to your network environment.

Follow the procedure below to access the ZR-RX45.

http://IP address/Index.html

- http ..... Protocol to access the server.
  HTTP (Hyper Text Transfer Protocol)
- IP address ..... Type in the IP address of the ZR-RX45 to monitor.
- Index.html..... File name. This is fixed to Index.html.

Note

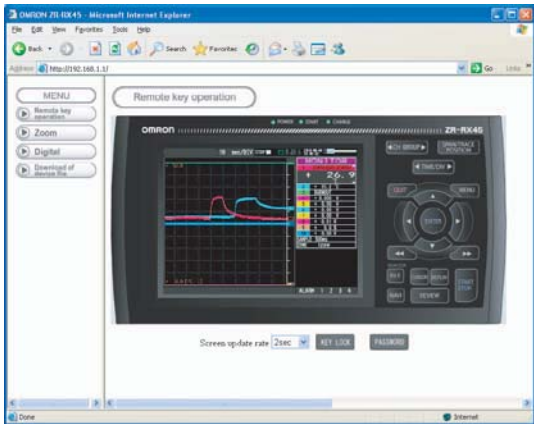
The port number can be omitted. If you enter a port number, specify 80.
http://(IP-address):80/index.html

Procedure

1 **Open the Web browser.**

2 **Type in the URL (http://IP address/Index.html) in the address input field.**

3 **The following pages are displayed.**



Remote key operatio..... Allows ZR-RX45 operation.

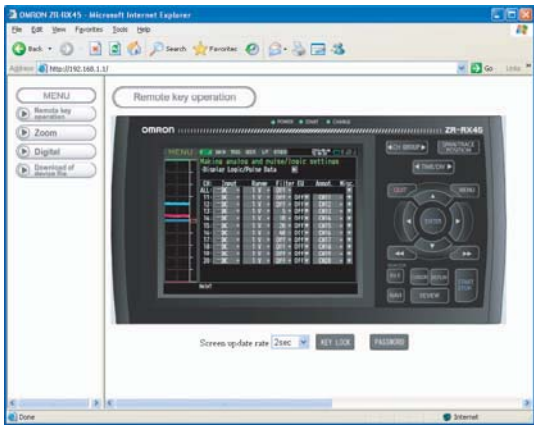
Zoom..... Enlarges only the LCD screen of ZR-RX45.

Digital ..... Displays the ZR-RX45 measured value digitally.

Download of device file .... Allows data captured with ZR-RX45 to be downloaded to your PC via FTP.

Remote key operation

To operate ZR-RX45 from a remote location, click the corresponding ZR-RX45's panel keys on the screen.

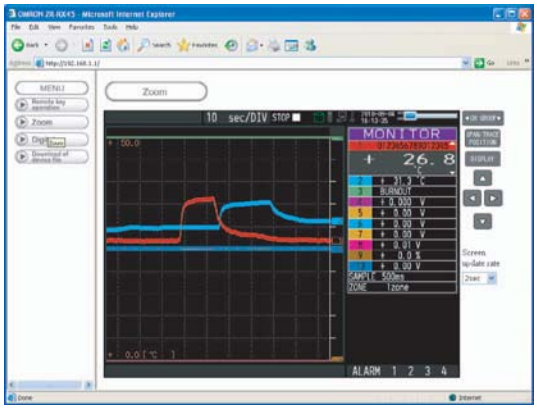


KEY LOCK..... Sets and cancels key lock.

PASSWORD ..... Sets and cancels a password.

Screen update rate .... Sets an update rate of the screen.
The screen update rate can be set either to 2, 5, or 10 seconds.

Zoom



CH GROUP..... Digital values for 10 channels are displayed on a single screen.
Press this key to display the next group consisting of 10 channels.

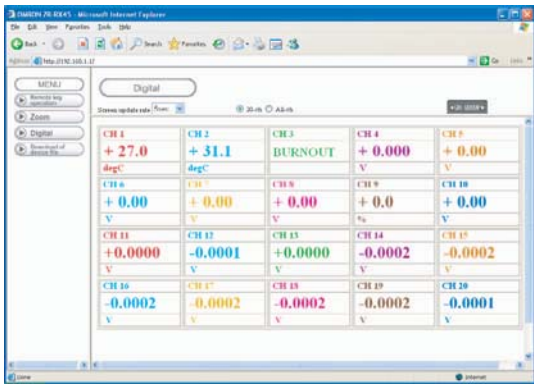
DISPLAY ..... Switches the display mode.
Press this key to switch among Waveform + Digital, Expanded Waveform, and Digital screens.

SPAN/TRACE/POSTION ..... Switches the display in the digital display area.
Press this key to switch among MONITOR, SPAN, POSITION, and TRACE.

◁ ▷ △ ▽ ..... Cursor keys

Screen update speed..... Specifies the speed in which the screen is updated.
Available update speeds are 2, 5, and 10 seconds.

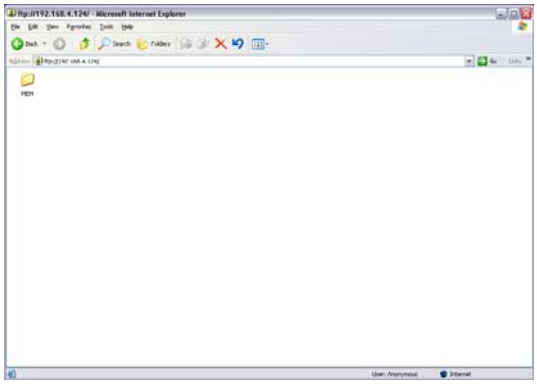
Digital



Screen update speed..... Specifies the speed in which the screen is updated.
Available update speeds are 2, 5, and 10 seconds.

Download of device file

Allows memory data from ZR-RX45 and data in USB memory to be downloaded to your PC.



<About the FTP server function>

When an Internet Explorer FTP connection is used, login is automatically performed using an anonymous account and the files become read-only files.

The following operations cannot be performed for read-pnly files:

- Upload file
- Delete file/folder
- Create file/folder
- Change file name/folder name

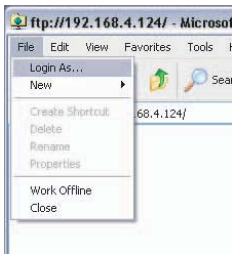
To enable data to be written to the ZR-RX45, the login account name must be changed. please use the following table as a guide.

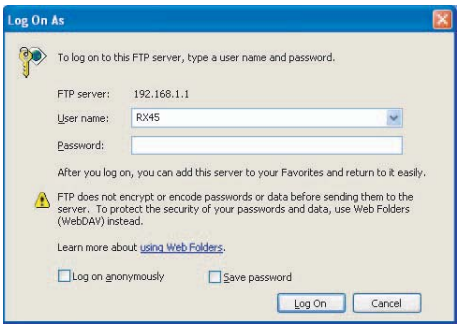
Account name	Password	Restrictions
RX45	None	None
rx45	None	None
Anonymous	Any	Read-only

The following procedure is used to change the Internet Explorer login account.

<Using Internet Explorer 6>

Go to the [File] menu and select [Login As...] to open the [login As] dialog box.



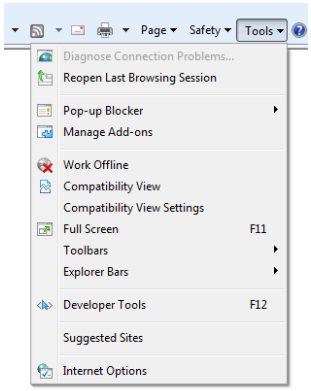


Enter the account name in the User Name box. leave the Password box blank.

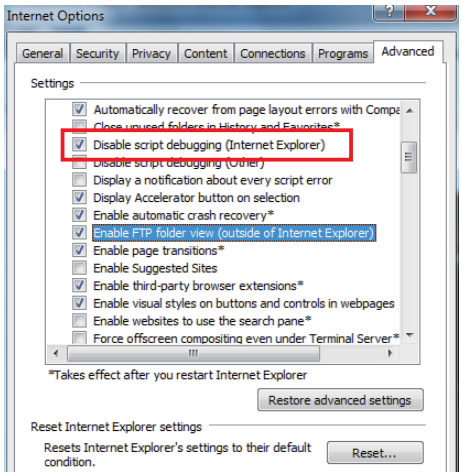
Finally, click the "Login" button.

<Using Internet Explorer 7 or 8>

Select [Tools] - [Internet Options] to open Internet Options.



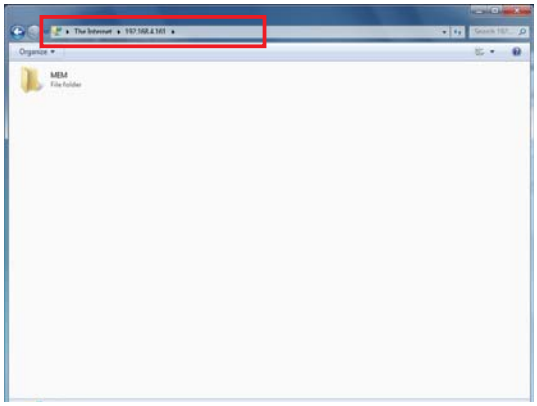
Click the [Advanced] tab and check Enable FTP Folder View (Outside of Internet Explorer).



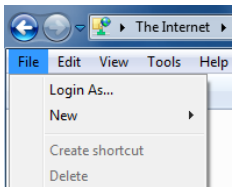
Click the OK button to close the Internet Options dialog.

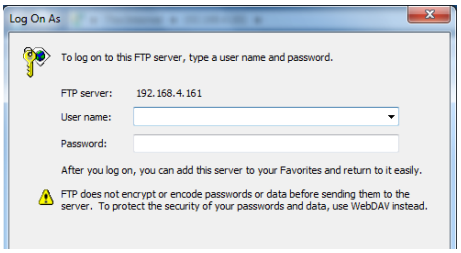
Close Internet Explorer.

Open Explorer and re-enter the URL.



Select [File] - [Login As ...] to open the Login As dialog.





At User Name, enter your account name. At Password, do not type anything but leave it blank.

Finally, click the Logon button.

Note

If Explorer does not display the File menu, enable the display of this menu by selecting [Organize] - [Layout] - [Menu Bar] and checking this option.

MEMO

SPECIFICATIONS

Standard Specifications

Standard Specifications

Item		Description		
Number of analog input channels		Standard: 20 ch Maximum: 200 ch (When the terminal unit is connected)		
External input/output		Trigger input (1 ch) or External sampling input (1 ch) Logic input (4 ch) or Pulse input (4 ch) Alarm output (4 ch)		
PC interface		Ethernet (10BASE-T/100BASE-TX) USB (USB2.0, HIGH-SPEED)		
Internal memory device		Internal memory: approx. 2 GB USB memory slot (USB1.1, FULL-SPEED)		
Display		5.7-inch TFT color LCD (VGA: 640 × 480 dots)		
Data backup functions		Setup conditions: EEPROM Clock: Lithium battery		
Clock accuracy *1		±0.002 % (accurate within about 50 seconds per month)		
Operating environment		0 to 45°C, 5 to 85 % RH (0 to 40°C when operated in batteries/15 to 35°C when battery is charging)		
Withstand voltage		Between each input terminal/Case: 1 minute at 350 Vp-p		
Power supply *2		AC adapter: 100 to 240 VAC, 50/60 Hz DC input: 8.5 to 24 VDC (maximum 26.4 V) Battery pack (option): 7.2 VDC (2200 mAh), 2 packs mountable		
Power consumption (current consumption)	Power supply	Condition	Normal consumption *3	During recharging battery
	When the supplied AC adapter is used	When the LCD is ON	18 VA	32 VA
		When the screensaver is operating	14 VA	30 VA
	When DC 24 V is input	When the LCD is ON	0.3 A	0.7 A
		When the screensaver is operating	0.25 A	0.65 A
	When DC 12 V is input	When the LCD is ON	0.6 A	Recharging battery is not possible
		When the screensaver is operating	0.45 A	Recharging battery is not possible
	When DC 8.5 V is input	When the LCD is ON	0.85 A	Recharging battery is not possible
		When the screensaver is operating	0.65 A	Recharging battery is not possible
Vibration resistance		Equivalent to automobile parts Type 1 Category A classification		
External dimensions		232 × 152 × 50 mm		

Item	Description
Weight	Apporx. 900 g (Excluding the AC adapter and battery. Including one terminal unit.)
Accessories	User's Manual (this document), Utility disk (CD-ROM), AC Adapter/AC cable

*1 ambient temperature 23°C
*2 Be sure to use only the AC cable and AC adapter provided as standard accessories.
*3 LCD brightness is set to maximum.

Analog Input Funstion

Item			Description		
Input method			Photo MOS relay scanning system All channels isolated, balanced input *1		
Input terminal shape			M3 screw type terminal		
Number of input channels			Standard: 20 ch Maximum: 200 ch (When the terminal unit is connected)		
Scan speed			10 ms/1 ch maximum		
Measurement ranges	Voltage		20, 50, 100, 200, 500 mV; 1, 2, 5, 10, 20, 50 V; 1-5 V F.S.		
	Temperature		Thermocouples: K, J, E, T, R, S, B, N, W (WRe5-26) Resistance temperature detector: Pt100, JPt100; Pt1000 (IEC751)		
	Humidity *2		0 to 100 % (Voltage 0 to 1 V scaling conversion)		
Measurement accuracy *3 *4	Voltage		±0.1 % of F.S.		
	Thermocouple	Type	Measurement Temperature Range (°C)	Measurement Accuracy	
		R/S	0 ≤ TS ≤ 100 100 < TS ≤ 300 R: 300 < TS ≤ 1600 S: 300 < TS ≤ 1760	±5.2°C ±3.0°C ±(0.05 % of rdg +2.0°C) ±(0.05 % of rdg +2.0°C)	
		B	400 ≤ TS ≤ 600 600 < TS ≤ 1820	±3.5°C ±(0.05 % of rdg +2.0°C)	
		K	-200 ≤ TS ≤ -100 -100 < TS ≤ 1370	±(0.05 % of rdg +2.0°C) ±(0.05 % of rdg +1.0°C)	
		E	-200 ≤ TS ≤ -100 -100 < TS ≤ 800	±(0.05 % of rdg +2.0°C) ±(0.05 % of rdg +1.0°C)	
		T	-200 ≤ TS ≤ -100 -100 < TS ≤ 400	±(0.1 % of rdg +1.5°C) ±(0.1 % of rdg +0.5°C)	
		J	-200 ≤ TS ≤ -100 -100 < TS ≤ 100 100 < TS ≤ 1100	±2.7°C ±1.7°C ±(0.05 % of rdg +1.0°C)	
		N	0 ≤ TS ≤ 1300	±(0.1 % of rdg +1.0°C)	
		W	0 ≤ TS ≤ 2000	±(0.1 % of rdg +1.5°C)	
		Reference contact compensation accuracy		±0.5°C	
Measurement accuracy *3 *4	Resistance temperature detector	Type	Measurement Temperature Range (°C)	Applied current	Measurement Accuracy
		Pt100	-200 to 850 (FS = 1050°C)	1 mA	±1.0°C
		JPt100	-200 to 500 (FS = 700°C)	1 mA	±0.8°C
		Pt1000	-200 to 500 (FS = 700°C)	0.2 mA	±0.8°C

Item	Description
Reference contact compensation	Internal/External switching
A/D converter	Method: ΔΣ method Resolution: 16-bit (Effective resolution: About 1/40000 of the +/- range)
Temperature coefficient	Gain: 0.01 % of F.S./°C Zero: 0.02 % of F.S./°C *5
Input impedance	1 MΩ ± 5 %
Allowable signal source resistance	300 Ω or less
Maximum input voltage	Between +/- terminals: 60 Vp-p Between input terminal/input terminal: 60 Vp-p Between input terminal/GND: 60 Vp-p
Withstand voltage	Between input terminal/input terminal: 1 minute at 350 Vp-p Between input terminal/GND: 1 minute at 350 Vp-p
Insulation resistance	Between input terminal/GND: At least 50 MΩ (at 500 VDC)
Common mode rejection ratio	At least 90 dB (50/60 Hz; signal source 300 Ω or less)
Noise	At least 48 dB (with +/- terminals shorted)
Filter	Off, 2, 5, 10, 20, 40 Filter operation is on a moving average basis. The average value of the set sampling count is used. If the sampling interval is set to 30 seconds or slower, the average value which are sampled with the sub-sample (30 seconds) is used.

*1 All terminals b for the resistance temperature detector short internally.
*2 When ZR-XRH1 (option) is used.
*3 Features under the following measurement parameters
- Operating environment 23°C ± 5°C
- When 30 minutes or more have elapsed after power was switched on
- Sampling interval 1 s/20 ch
- Filter ON (Average: 10 times)
- GND connected
- Thermocouple used is T: 0.32ϕ, others: 0.65ϕ

*4 Refer to the ZR-XRH1 (option) specifications for humidity measurement accuracy.
*5 Zero occurs at the sampling intervals of 10, 20, and 50 ms.

External Input/Output Functions

Item		Description
Input/output types *1	Input	Trigger input (1 ch) or External sampling input (1 ch) *2 Logic input (4 ch) or Pulse input (4 ch) *3
	Output	Alarm output (4 ch)
Input specifications	Input voltage range	0 to +24 V (single-ended ground input)
	Input signal	No-voltage contact (a-contact, b-contact, NO, NC), Open collector, Voltage input
	Input threshold voltage	Approx. +2.5 V
	Hysteresis range	Approx. 0.5 V (+2.5 to + 3 V)
Alarm output specifications	Output format	Open collector output (5 V, 10 KΩ pull-up resistance) <Maximum ratings of output transistor> • Collector-GND voltage : 30 V • Collector current : 0.5 A • Collector dissipation : 0.2 W
	Output conditions	Level judgment, window judgment, logic pattern judgment, pulse judgment

Item		Description
Pulse input functions	Revolutions mode (engines, etc.)	Function: Counts the number of pulses per second, enables them to be converted to rpms. Span: 50, 500, 5000, 50k, 500k, 5M, 50M, 500M PRM/F.S.
	Counts mode (wattmeters, etc.)	Function: Displays a count of the number of pulses for each sampling interval from the start of measurement. Span: 50, 500, 5000, 50k, 500k, 5M, 50M, 500M C/F.S.
	Inst. Mode	Function: Counts the number of pulses for each sampling interval. Resets the count value after each sampling interval. Span: 50, 500, 5000, 50k, 500k, 5M, 50M, 500M C/F.S.
	Maximum number of pulse inputs	Maximum input frequency: 50 kHz Maximum number of counts: 50 kC/sampling (16-bit counter)

*1 A logic alarm cable ZR-XRL1 (option) is required.
*2 Switch between Trigger input and External sampling input.
*3 Switch between Logic input and Pulse input.

Internal memory devices

Item	Description
Memory capacity	Internal memory: Approx. 2GB Flash Memory USB memory: Unlimited (However, one file must be 2GB at the maximum)
Memory contents	Setup conditions/Captured data/Screen copy

PC Interface

Item	Description
Interface types	Ethernet (10BASE-T/100BASE-TX) USB (USB2.0, HIGH-SPEED)
Ethernet functions (10BASE-T/100BASE-TX)	PC Software connections: Transfers data to the PC (realtime, memory), controls of ZR-RX45. Web server function: Displays ZR-RX45's screen image on Web browser, operates of ZR-RX45. FTP server function: Transfers and deletes files from internal memory and USB memory. FTP client function: Backs up data in internal memory and USB memory. NTP client function: Corrects the time of the ZR-RX45 clock. DHCP client function: Automatically retrieves the IP address.
USB functions	PC Software connections: Transfers data to the PC (realtime, memory), controls of ZR-RX45. USB drive mode: Transfers and deletes files from internal memory.
Realtime data transfer speed *1	10 ms/1 ch maximum

*1 Depends on the number of transferring channels.

Monitor

Item	Description
Display	5.7-inch TFT color LCD (VGA: 640 × 480 dots)
Display languages	Japanese, English, French, German, Chinese, and Korean
Backlight life	50,000 hrs (when brightness is down to 50%) *1

Item	Description
Screensaver function	Off, 10, 30 s; 1, 2, 5, 10, 30, 60 min.
Display screen	Waveform screen + Digital screen, Waveform screen, Digital screen + Calculation Display screen, Expanded digital screen • Swich screens with the dedicated key (toggle operation) • For the Expanded digital screen, the number of channels and the display channel must be specified.

*1 Depends on operation environment.

Function Specifications

Item		Description
Data capture functions	Sampling interval	10 ms/1 ch maximum 10, 20, 50, 100, 125, 200, 250, 500 ms; 1, 2, 5, 10, 20, 30 s; 1, 2, 5, 10, 20, 30 min; 1 h; External *1
	Functions during capture	Double-screen display Exchange of USB memory Saving of data between cursors
	Distination and file format	Internal memory or USB memory Binary or CSV
	Ring capture	Function: ON, OFF Number of captureing points : 1000 to 2000000 When ring capture is ON, the memory space that can be used for capture is one-third of the free space or less.
Trigger and Alarm functions	Repeat trigger	Off, On
	Trigger types	Start: Data capture starts when a trigger is generated. Stop: Data capture stops when a trigger is generated.
	Trigger conditions	Start: Off, Level, Alarm, External, Date, Weekly, Time Stop: Off, Level, Alarm, External, Date, Weekly, Time
	Level trigger judgment modes	Combination: Level OR, Level AND, Edge OR, Edge AND Analog channel judgment mode: H (↑), L (↓), Window In, Window Out Logic channel judgment mode: H (↑), L (↓) Pulse channel judgment mode: H (↑), L (↓), Window In, Window Out
	Alarm judgment modes	Detection method: Level, Edge Analog channel judgment mode: H (↑), L (↓), Window In, Window Out Logic channel judgment mode: H (↑), L (↓) Pulse channel judgment mode: H (↑), L (↓), Window In, Window Out
Calculation function	EU (scaling function)	The voltage and pulse value can be converted to any value and units. The temperature value can be set to offset.
	Statistical calculation	Types of statistical calculation: Average, peak, maximum, minimum, RMS Number of operations: maximum of 2 can be set simultaneously Method: Realtime and between cursors specified (during data replay) Calculation results are displayed in Digital screen + Calculation Display screen.
	Calculation between channels	Calculation type: Addition, subtraction, multiplication, and division Input channels: Analog channels 1 through 200

Item		Description
Other	Waveform expansion and reduction functions	Time axis: 1, 2, 5, 10, 20, 30 sec/Div 1, 2, 5, 10, 20, 30 min/Div 1, 2, 5, 10, 20, 30 hours/Div
	Data save functions	Saving of the setup condition data (Internal memory or USB memory) Saving of screen copy data (Internal memory or USB memory)
	Search functions	Search the captured data for the required number of points Search type : Channel, Pulse, Logic, Level, Alarm
	Annotation input function	A comment can be input for each channel. Inputtable characters : Alphanumerics Number of characters : 31

*1 The settings of 50 ms or below can be used depending on the input settings and the measuring channels.

Accessory/Option Specifications

PC Software

Item	Special PC software	Standard PC software
	Wave Inspire RX (Ver. 2.4)	Smart Viewer RXW (Ver. 2.0)
Compatible logger	ZR-RX70, ZR-RX45, ZR-RX25, ZR-RX40, ZR-RX20	ZR-RX45, ZR-RX25, ZR-RX40, ZR-RX20
Compatible operating system	Windows XP / Vista / 7	
CPU	Intel (x86) compatible processor 1 GHz or faster professor recommended Intel Atom CPU not supported	Pentium 4: 2.0GHz or faster professor recommended Intel Atom CPU not supported
Memory	Windows XP: 512 MB or more (recommended : 1 GB or more) Windows Vista / 7 : 1 GB or more (recommended: 2 GB or more)	512 MB or more (1 GB or more recommended)
Display	1024 × 768 screen resolution, or higher 16-bit color or higher screen display functions (recommended 24-bit color or more)	1024 × 768 screen resolution, or higher 16-bit color or higher screen display functions (recommended 24-bit color or more)
Compatible interface	USB, LAN	
Standard functions	Review saved data, real-time capture of PC data, main unit setup, CSV file conversion	
Waveform operation	Direct operation of waveform by Mouse or icons Batch processing of selected waveform	Operation of waveform by icons
Waveform display	Display waveform of selected channels (available over loggers) Display group waveform in multi-window X-Y View FFT View Handy function of switching waveform Scrolling for all directions (up, down, right, left)	Display waveform of selected channels (by every logger) Display group waveform in single window X-Y View between Cursors (only during replay)
Configuration function	Simple main unit setup Support function in setup group waveform	Main unit setup
Extarnal control of sampling	Not avaliable	Available (can set and display)
Captured data	Binary file (original format) : Captured data and the information of graph window are saved. CSV file : Captured data is saved in Comma separated value format: Binary files can be converted to CSV files all at once	
Others	Cursor function, Comment Input function, Excel transfer function	

*1 When you capture the data by these software, please finish all the other application software and save captured data to the hard disk. Even using the PC which fills enough specification, the capture error occurs at times because the PC is bad condition.(For example, the other application software works, or recording medium has no free area.)

*2 Don't start up the other application software, as these software work. And don't work several operation. (For example, screen saver, virus scan program, copying and moving files, searching files etc.)

Battery Pack ZR-XRB1 (Option)

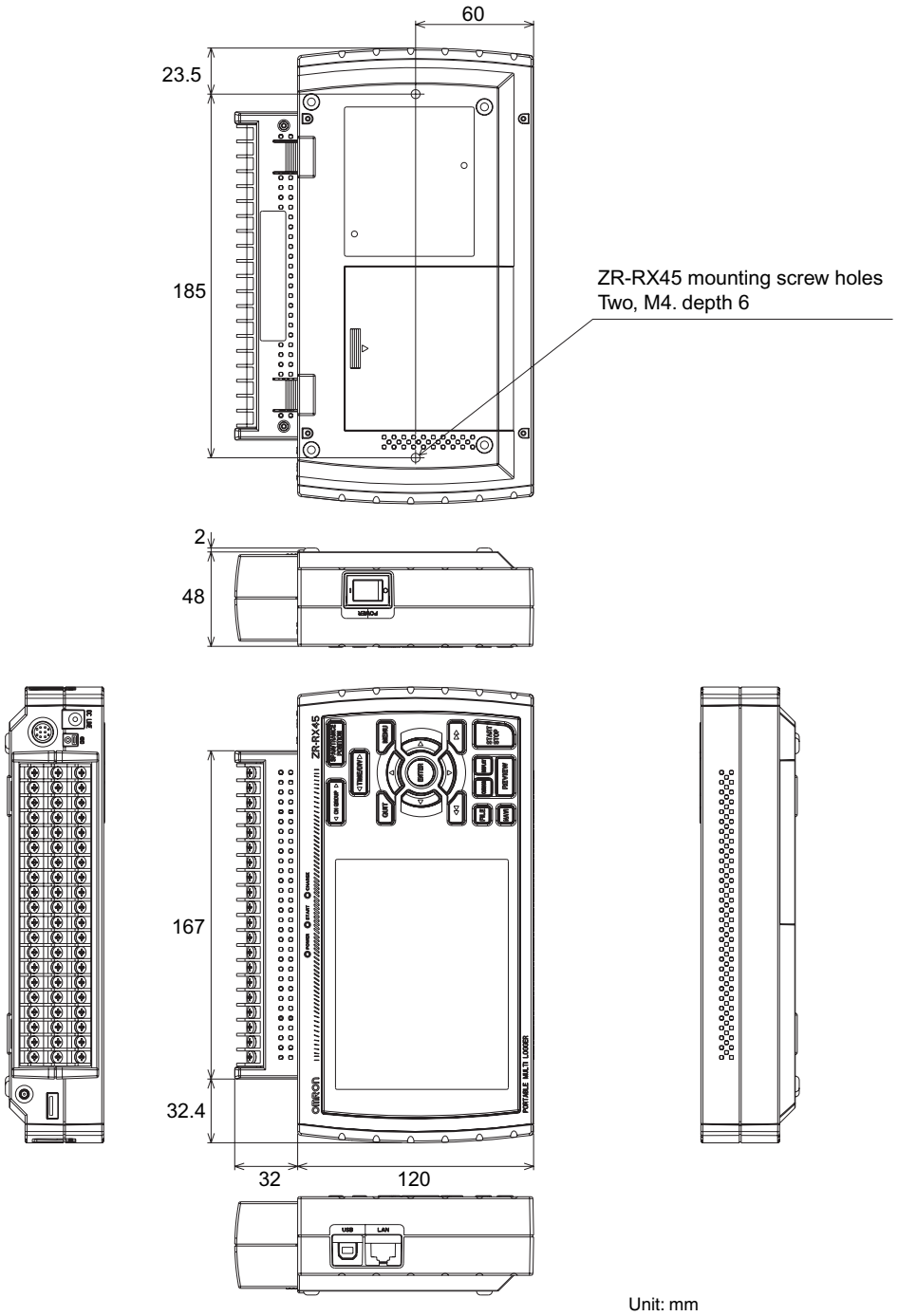
Item	Description
Capacity	7.4 V/2200 mAh 17Wh
Battery type	Lithium secondary battery
Running time	Up to two packs can be mounted <When LCD is ON> Battery pack × 1 (brightness MAX): approx. 2.5 hours Battery pack × 1 (brightness MIN): approx. 3 hours Battery pack × 2 (brightness MAX): approx. 5 hours Battery pack × 2 (brightness MIN): approx. 6 hours <When LCD is OFF> Battery pack × 1: approx. 3.5 hours Battery pack × 2: approx. 7 hours Use conditions: When capturing to internal memory at 1s sampling, 20 channel terminals, using new battery packs at +25°C environment. (The running time depends on the operating environment.)
Charging method	Mount in the main unit (ZR-RX45)
Time required for charging	Battery pack × 1: approx. 4 hours Battery pack × 2: approx. 8 hours
Switchover in the case of a power failure	By using the battery together with the AC adapter, the power supply will be switched automatically to the battery in the event of a power failure. The AC adapter is the primary power source.
Operation environment	Running on battery: 0 to 40°C, Battery being charged: 15 to 35°C
Other functions	When the battery is running low, measured data is saved and the file is closed automatically. (when captured to internal memory or USB memory) The remaining battey power is displayed.

Humidity Sensor ZR-XRH1 (Option)

Item	Description	
Allowable temperature range	-25 to +80°C	
Allowable humidity range	0 to 100 % RH	
Relative humidity measurement accuracy	±3 % RH (5 to 98 % RH at 25°C)	
Method	Capacitance method	
Relative humidity measurement accuracy (5 to 98 %)	Measurement environment	Measurement accuracy
	0 to 10°C	±5 % RH
	10 to 20°C	±4 % RH
	20 to 30°C	±3 % RH
	30 to 40°C	±4 % RH
	40 to 50°C	±5 % RH
	50 to 60°C	±6 % RH
	60 to 70°C	±7 % RH
	70 to 80°C	±8 % RH
Response time	15 sec (90 % response when membrane filter installed)	

Item	Description
Sensor output	0 to 1 VDC
External dimensions	ϕ14 mm × 80 mm (excluding cable)
Cable length	3 m
Sensor power source	5 to 16 VDC
Power consumption	Approx. 4 mA

External Dimensions



Unit: mm

APPENDIX

List of Error Messages

This section outlines the error messages that are displayed and the countermeasures for those messages.

Display	Details Cause	Countermeasure
Can't adjust zero voltage.	When the input voltage is over 0 point adjustable range,it is displayed.	Please adjust the input voltage within 10% of ± of a set range.
Back-up is not available when saving with CSV format. Do you wish to continue without baking up data?	In case of the data file format is CSV,the backup function cannot be used.	Please change the data file format a binary or logging without using the backup function.
Data was not captured.	When the logging file that is not recorded by as much as one point is replayed, it is displayed. The error occurs before detecting the trigger by the file that stops logging.	Please start the data logging.
The replay file name has not been specified.	When the replay is executed without selecting the file, it is displayed.	Please select the logging file.
The replay file name is the same as the save file name.p	When the logging file and the saved file are selected by the same name when it preserves between cursors,it is displayed.	Please change the file name.
EU function had set ON can't change range.	When the range is changed with scaling on, it is displayed.	Please turn off the scaling function, and change the range.
The recovery could not be done.	When the power supply is turned off while data is being written in a built-in memory, the recovery processing is done. However when failing in the recovery processing, it is displayed.	The recording data cannot be replayed. Please do not turn off power while logging data.
Upper < Lower setting	When the upper and the lower are opposite in the span setting, it is displayed.	Please change to upper < lower.
Too narrow span setting	When the span setting width of voltage CH is set by less than 1% of full-scale, it is displayed.	Please change the span setting value to 1% or more of full-scale.
Too narrow span setting	When the span setting width of temperature CH is less than 50°C, it is displayed.	Please change the span setting value to 50°C or more.
The load file name has not been specified.	When the setting file is loaded when it unselects the file, it is displayed.	Please select the setting file.
Out of input range.	When input value is over range,it is displayed.	Please change within the range of can the displayed setting.
Invalid trigger start settings. Press [Enter] key and change the settings.	When logging is started with the trigger setting not normally set,it is displayed.(START)	Please set the start trigger correctly.
Invalid trigger stop settings. Press [Enter] key and change the settings.	When logging is started with the trigger setting not normally set,it is displayed.(STOP)	Please set the stop trigger correctly.

Display	Details Cause	Countermeasure
Unable to establish a connection.	In connected test in the network time setting,when not connected with the network server,it is displayed.	Please check the network setting and the synchronous server setting of ZR-RX.
Unable to establish a connection.	In connected test in FTP server setting,when not connected with the FTP server,it is displayed.	Please check the network setting and the FTP server setting of ZR-RX.

List of File Error Messages

This section outlines the file error messages that are displayed and the countermeasures for those messages.

Display	Details Cause	Countermeasure
Disk I/O Error.(2)	File or directory is not found.	Set a correct file or directory.
Disk I/O Error.(9)	Invalid file format.	Filesystemn is invalid, and format it again, please. If the error is not canceled even if it formats it, might the media failure. Repair ZR-RX when a built-in memory is failure. Please use another USB memory when the USB memory is failure.
Disk I/O Error.(13)	It is displayed by either of following cause. • Not formatted. • Write-protected. • Memory failure.	• Please confirm whether write-protection is turning on. (For the USB memory with the write-protection function.) • Please format it. If the error is not canceled even if it formats it, might the media failure. Repair ZR-RX when a built-in memory is failure. Please use another USB memory when the USB memory is failure.
Disk I/O Error.(28)	It is displayed by either of following cause. • Disk is full. • Neither the file nor the directory are created any further.	"Disk is full" is usually displayed. Please increase the capacity of the disk as it erases an unnecessary file.

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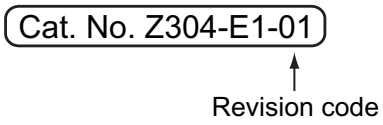
Revision History

A manual revision code appears as a suffix to the catalog number at the bottom of the front and back covers of this manual.



Revision code	Date	Revised contents
01	September 2010	Original production

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