

HIOKI

MR8848

Startup Guide

MEMORY HiCORDER



Check for the latest edition and other language versions.



June 2025 Edition 1
MR8848A971-00

EN



Introduction

Thank you for choosing the Hioki MR8848 Memory HiCorder. To ensure you get the most out of this instrument over the long term, please read this manual carefully and keep it available for future reference.

Information on download site

For details on the product application, the update file for the instrument, and the instruction manual, please check Hioki's website:

<https://cloud.gennect.net/dl>



Request for product user registration

This product may be upgraded for improvements or specification changes. We kindly request that you visit the following link to register your product to receive critical updates and information about the product:

<https://www.hioki.com/global/support/myhioki/registration/>



The optional clamps collectively mean “clamp sensors”.

The following instruction manuals are available for this instrument. Refer to the relevant manual as usage. Please review the separate Operating Precautions before using this instrument.

Name of instruction manual	Explanation	Supply form
Startup Guide	Information regarding the safe use of this instrument and specifications (excerpts)	Print
Instruction Manual	Contains details and specifications regarding the functions and operations of this instrument.	PDF (Download)
Communication Command Instruction Manual	Contains a list of the communication commands and their explanations to control the instrument with a computer.	HTML (Download)
U8793, MR8790, MR8791 Instruction Manual	Contains specifications and explanations of functions/operations of the U8793 Arbitrary Waveform Generator Unit, MR8790 Waveform Generator Unit, MR8791 Pulse Generator Unit, and SF8000 Waveform Maker.	PDF (Download)
Operation Precautions	Information to safely use this instrument	Print

Target audience

This manual has been written for use by individuals who use the product or provide information about how to use the product.

In explaining how to use the product, it assumes electrical knowledge (equivalent of the knowledge possessed by a graduate of an electrical program at a technical high school).

Trademarks

Excel, Microsoft Edge, and Windows are trademarks of the Microsoft group of companies.

Inspecting Package Contents

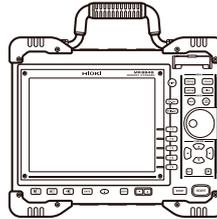
Upon receiving the product, inspect it for any damage or anomalies. If you discover any damage or find that the product does not perform as indicated in the specifications, please contact your authorized Hioki distributor or reseller.

Instrument and accessories

Confirm that you received the following items:

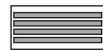
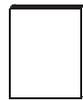
Instrument

- MR8848 Memory HiCorder



Accessories

- Startup Guide
- Operating Precautions(0990A903)
- Input cord label
- Power cord
- 9231 Recording Paper
(When the U8351 Printer Unit is installed.)
- Paper Roll Axle
1 pair (When the U8351 Printer Unit is installed.)
- Other options as specified in your order
Refer to "Options" (p. 59)



When the 8967 Temp Unit is installed in the instrument

- Ferrite clamp-on choke (small)
(2 pieces per unit)



Notation

Safety notations

This manual classifies the seriousness of risks and hazard levels as described below.

 DANGER	Indicates an imminently hazardous situation that, if not avoided, will result in death or serious injury.
 WARNING	Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury.
 CAUTION	Indicates a potentially hazardous situation that, if not avoided, could result in minor or moderate injury or potential risks of damage to the supported product (or to other property).
IMPORTANT	Indicates information related to the operation of the instrument or maintenance tasks with which the operators must be fully familiar.
	Indicates a high voltage hazard. Failure to verify safety or improper handling of the product will result in an electric shock, a burn, or injury, potentially leading to death.
	Indicates prohibited actions.
	Indicates mandatory actions.

Symbols affixed to the instrument

	Indicates the presence of a potential hazard. Refer to "Operation Precautions" (p. 5) and warning messages listed at the beginning of each operating instruction in the instruction manual, as well as the accompanying document entitled Operating Precautions.
	Indicates the ON side of the power switch.
	Indicates the OFF side of the power switch.
	Indicates a fuse.
	Indicates a grounding terminal.
	Indicates DC (Direct Current).
	Indicates AC (Alternating Current).
	Indicates a burn hazard if touched directly.

Standards symbols

	Indicates that the product is covered by the Directive on Waste Electrical and Electronic Equipment (WEEE) in EU member nations. Dispose of the product by local regulations.
	Indicates that the product conforms to regulations set out by the EU Directive.
	Indicates that the product conforms to Korean regulations. Declarer: HIOKI KOREA CO., LTD. http://www.rra.go.kr/selform/HKO-MR8848

Safety Information

The instrument and unit have been designed in accordance with the IEC 61010 safety standard and has undergone rigorous safety testing prior to shipment. However, using the instrument in a way not specified in this manual may compromise its safety features.

Before using the instrument, be certain to carefully read the following safety notes:

DANGER



Mishandling during use could result in injury or death, as well as damage to the instrument. Be certain that you understand the instructions and precautions in the manual before use.

WARNING



With regard to the electricity supply, there are risks of electric shock, heat generation, fire, and arc discharge due to short circuits. Individuals using an electrical measuring instrument for the first time should be supervised by a technician who has experience in electrical measurement.

Measurement categories

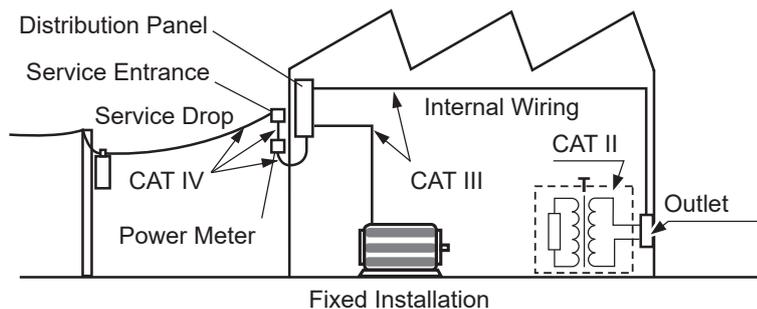
To ensure safe operation of measuring instruments, IEC 61010 establishes safety standards for various electrical environments, categorized as CAT II to CAT IV, and called measurement categories.

DANGER



- Using a measuring instrument in an environment designated with a higher-numbered category than that for which the instrument is rated could result in a severe accident, and must be carefully avoided.
- Never use a measuring instrument that lacks category labeling in a CAT II to CAT IV measurement environment. Doing so could result in a serious accident.

- CAT II: When directly measuring the electrical outlet receptacles of the primary electrical circuits in equipment connected to an AC electrical outlet with a power cord (portable tools, household appliances, etc.)
- CAT III: When measuring the primary electrical circuits of heavy equipment (fixed installations) connected directly to the distribution panel, and feeders from the distribution panel to outlets
- CAT IV: When measuring the circuit from the service drop to the service entrance, and to the power meter and primary overcurrent protection device (distribution panel)



The applicable measurement category is determined based on the unit being used. Refer to “18.6 Specifications of Units” in the Instruction Manual.

Operation Precautions

Before use

Follow these precautions to ensure safe operation and to obtain the full benefits of the various functions. Ensure that the use of the instrument conforms not only to its specifications but also to the specifications of all products to be used, including accessories and optional equipment.

DANGER

If the connection cords or the instrument are damaged, there is a risk of an electric shock. Perform the following inspection before using the instrument:



- Before using the instrument, check that the coatings of the connection cords are neither ripped nor torn and that no metal parts are exposed. Replace the connection cords with those specified by our company.
- Verify that it operates normally to ensure that no damage occurred during storage or shipping. If you find any damage, contact your authorized Hioki distributor or reseller.

Installing the instrument and units

WARNING

Installing the instrument and units in inappropriate locations may cause a malfunction of the instrument or may give rise to an accident. Avoid the following locations:



- Exposed to direct sunlight or high temperatures
- Exposed to corrosive or combustible gases
- Exposed to a strong electromagnetic field or electrostatic charge
- Near induction heating systems (such as high-frequency induction heating systems and IH cooking equipment)
- Susceptible to vibration
- Exposed to water, oil, chemicals, or solvents
- Exposed to high humidity or condensation
- Exposed to high quantities of dust particles
- Where it would be unstable or inclined

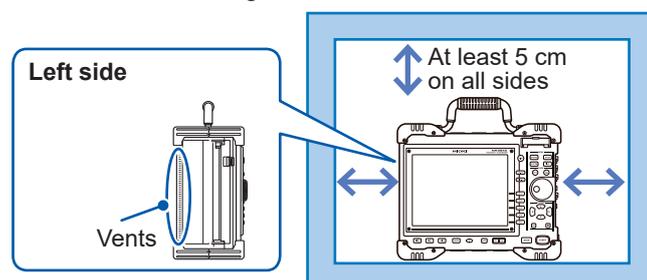


Ensure enough space for operation around the instrument so that the power supply can be immediately cut off by pulling out the plug of the power cord in case of emergency.

Installing the instrument

To prevent overheating, be sure to leave the specified clearances around the instrument.

- The instrument should be operated only with the bottom or rear side downwards.
- Do not block any vents.
- Do not install the instrument at an angle



Handling the instrument and units

DANGER

- Do not use the units or the cords with circuits that exceed those ratings or specifications. Doing so may damage the instrument or cause it to become hot, resulting in bodily injury.
 - Even including any devices, such as an attenuator, in the input terminal will never increase the maximum rated line-to-ground voltage. Take care of the connection not to allow any input voltage to exceed the maximum rated line-to-ground voltage.
 - To avoid an electric shock, do not remove the instrument's cover and the units' cases. The internal components of the instrument carry high voltages and may become very hot during operation.
-
- It is recommended to measure the secondary side of a distribution panel with the U8974 High Voltage Unit. Do not connect the connection cords on the primary side of the distribution panel because an unrestricted current flow can damage the connection cords and facilities if a short-circuit occurs.

WARNING

- Each channel of the U8979 Charge Unit has the BNC terminal and miniature connector terminal with the common ground. Do not connect cords with each of the terminals simultaneously to avoid a short-circuit.
-
- To avoid an electric shock, before removing or replacing an input unit, confirm that the instrument is turned off and that the connection cords are disconnected.
 - To avoid the danger of an electric shock, never operate the instrument with an input unit removed. To use the instrument with a unit removed, install a blank panel over the opening of the removed unit.
 - To prevent the instrument damage or an electric shock, use only the screws that are originally installed for securing the unit in place. If you have lost any screws or find that any screws are damaged, please contact your Hioki distributor for a replacement.
 - Setting the measurement mode to **[PreAmp]** allows the U8979 Charge Unit to constantly provide power (3.0 mA, 22 V) to sensors. Set any measurement mode other than **[PreAmp]** or turn off the instrument before connecting a sensor or probe with a BNC terminal to avoid an electric shock or damage to the measurement target.

CAUTION

- To avoid damaging units, do not touch the connectors, installed in the instrument, to which the units are connected.

⚠ CAUTION

- The U8979 Charge Unit has miniature connectors with the maximum input charge of ± 500 pC (for six higher-sensitivity range) or $\pm 50,000$ pC (for six lower-sensitivity range). Inputting a charge that exceeds these value causes damage to the instrument.
- Use an acceleration sensor with a built-in pre-amplifier that conforms to the specification of the U8979 (3.0 mA, 22 V). Using an inapplicable sensor may cause damaging itself.
- To avoid damage to the instrument, protect it from physical shock when transporting and handling it. Be especially careful to avoid physical shock due to dropping it.
- The mounting screws must be firmly tightened or the unit may not perform to specifications, or may even fail.

Handling the printer and the recording paper**⚠ WARNING**

The print head and surrounding metal parts can become hot. Be careful to avoid touching these parts.

⚠ CAUTION

Be careful not to cut yourself with the paper cutter.

Handling storage devices**⚠ CAUTION**

- Do not remove the storage device while it is being accessed by the instrument (while the SAVE key is lit in blue). Data saved on the device could be lost.
- Do not turn off the instrument while it is accessing the storage device (while the SAVE key is lit up in blue). Data saved on the device could be lost.
- Do not carry the instrument with a USB flash drive left connected. Damage could result.
- Exercise care when using such products because static electricity could damage the storage device or cause a malfunction of the instrument.
- Do not subject the SSD to extreme shock or vibration. Shock can cause it to be damaged.

IMPORTANT

- No compensation is available for loss of data stored on the built-in drive (SSD) or a removable storage device, regardless of the content or cause of damage or loss. Be sure to back up any important data saved on the built-in drive (SSD) or the removable storage device.
- Use only the SD cards or USB flash drive sold by Hioki.

Compatibility and performance are not guaranteed for SD cards or USB flash drive made by other manufacturers. You may be unable to read from or save data to such cards.

Hioki optional SD cards and USB flash drive

Z4003 SD Memory Card 8 GB, Z4001 SD Memory Card 2 GB

Z4006 USB Drive 16 GB

Before connecting cords

DANGER

When measuring power line voltage

-  Do not short-circuit two wires to be measured by bringing the connection cords into contact with them. Arcs or such grave accidents are likely to occur.
 -  To avoid a short-circuit or an electric shock, do not touch the metal parts of the connecting cord clips.
 -  To avoid electrical shock, be careful to avoid shorting live lines with the connection cord chips.
-
-  Connect the connecting cords to only the secondary side of a breaker. Even if a short-circuit occurs on the secondary side of the breaker, the breaker will interrupt a short-circuit current. Do not connect them to the primary side of the breaker because an unrestricted current flow could damage the instrument and facilities if a short circuit occurs.
 -  To prevent an electrical shock and a bodily injury, do not touch any input terminals on the VT (PT), CT or the instrument when they are in operation.
 -  Do not leave the measurement cables connected to the instrument in an environment where voltage surges exceeding the maximum input voltage may occur. Subjecting the instrument to such a voltage may result in damage to the instrument or a serious accident.

WARNING

-  To prevent an electric shock, confirm that the white or red portion (insulation layer) inside the cable is not exposed. If a color inside the cable is exposed, do not use the cable.
-
-  To avoid an electric shock and a short-circuit accident, use only the specified test leads to connect the instrument input terminals to the circuit to be tested.
 -  To avoid an electric shock, do not exceed the lower of the ratings shown on the instrument and connection cords.

CAUTION

-  To prevent cord damage, do not step on cords or pinch them between other objects. Do not bend or pull on cords at their base.
-
-  The cable is hardened in the freezing temperatures. Do not bend or pull it to avoid tearing its shield or cutting cable.
 -  Connecting cables to the BNC terminals on units
Do not use any cable terminated with a metal BNC connector. If you connect a metal BNC cable to an insulated BNC connector, the insulated BNC connector and the instrument may be damaged.

IMPORTANT

- Use only the specified connection cords. Use of any cord not specified by our company does not allow safe measurements due to poor connection or other reasons.
- For detailed precautions and instructions regarding connections, refer to the instruction manuals for your units, connection cords, etc.

Before connecting a logic probe to the measurement object

DANGER

To avoid an electric shock, a short-circuit, and damage to the instrument, observe the following precautions:

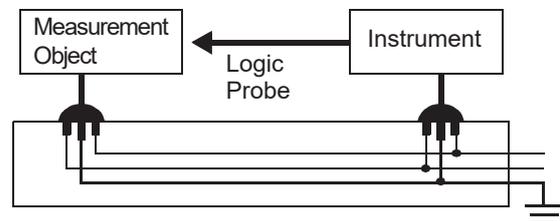
- The ground pin in the logic connector (plug) of the 9320-01 Logic Probe and the 9327 Logic Probe are not isolated from the instrument's ground (common ground). Supply power to the instrument with the provided power cord and measurement objects from a single mains circuit.

Connecting the instrument and a measurement object to different mains circuits from one another or using a non-grounding power cord may cause damage to the measurement object or the instrument because of current flowing through the logic probes resulting from the potential difference between the grounds of the different wiring systems.

To avoid that, we recommend the following connection procedure:

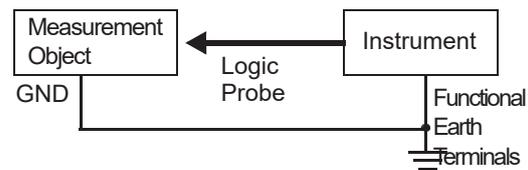


Connect the provided power cord to the instrument and supply power from the same outlet as the measurement object.



Connect the measurement object's ground to the GND terminal (functional earth terminal) of the instrument.

(Always supply power from the single mains circuit.)
Refer to "Connecting an earthing wire to the GND terminal (functional earth terminal)" in the Instruction Manual.



Before turning on the instrument

WARNING



- To avoid electrical accidents and to maintain the safety specifications of this instrument, connect the power cord provided only to an outlet.
- Before turning the instrument on, make sure the supply voltage matches that indicated on its power connector. Connection to an improper supply voltage may damage the instrument and present an electrical hazard.

CAUTION



Avoid using an uninterruptible power supply (UPS), DC/AC inverter with rectangular wave or pseudo-sine-wave output to power the instrument. Doing so may damage the instrument.

Before connecting the instrument to an external device

DANGER

To avoid electrical hazards and damage to the instrument, do not apply voltage exceeding the rated maximum to the external control terminals.



	I/O terminals	Maximum input voltage
Instrument	START/IN1	-0.5 V to 7 V DC
	STOP/IN2	-0.5 V to 7 V DC
	PRINT/IN3	-0.5 V to 7 V DC
	GO/OUT1	50 V DC 50 mA 200 mW
	NG/OUT2	50 V DC 50 mA 200 mW
	EXT.SMPL	-0.5 V to 7 V DC
	TRIG OUT	50 V DC 50 mA 200 mW
	EXT.TRIG	-0.5 V to 7 V DC
U8793 Arbitrary Waveform Generator Unit	IN	-0.5 V to 7 V DC
	OUT	30 V DC 50 mA

WARNING

To avoid an electric shock or damage to the equipment, always observe the following precautions when connecting the cables to external control terminals.



- Always turn off the instrument and any devices to be connected before making connections.
- Be careful to avoid exceeding the ratings of the external control terminals and the external connectors.
- The external control terminals use the same GND as the instrument. Ensure that devices and systems to be connected to the external control terminals are isolated from one another as required.

CAUTION



To avoid equipment failure, do not disconnect the USB cable while communications are in progress.



- Use a common ground for both the instrument and the connection equipment. Using different ground circuits will result in a potential difference between the instrument's ground and the connected equipment's ground. If the cable is connected while such a potential difference exists, it may result in equipment malfunction or failure.
- Before connecting or disconnecting any cable, always turn off the instrument and the device to be connected. Failure to do so may result in equipment malfunction or damage.
- After connecting the communications cable, tighten the screws on the connector securely. Failure to secure the connector could result in equipment malfunction or damage.

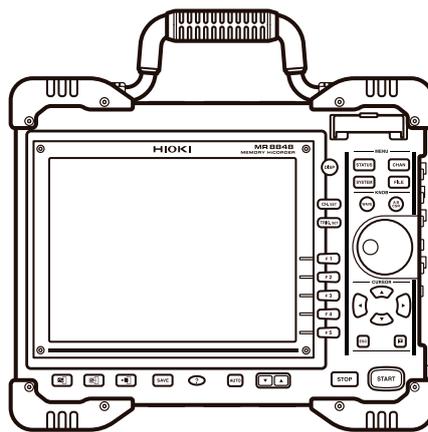
1

Overview

1.1 Product Overview

This instrument enables you to measure and analyze various waveforms promptly with simple methods.

You can use this instrument mainly for facility diagnosis, preventive maintenance, and troubleshooting.



**Sturdy body with
easy-to-grasp handle
installed**

You can install this portable instrument anywhere.

**Logic units can measure
signals input on
64 channels**

You can take multiple measurements simultaneously.

**Easy loading of recording paper
High-speed printing**

(When the U8351 Printer Unit is installed.)
You can load the recording paper through onetouch operation.

**High-speed sampling
20 MS/s**

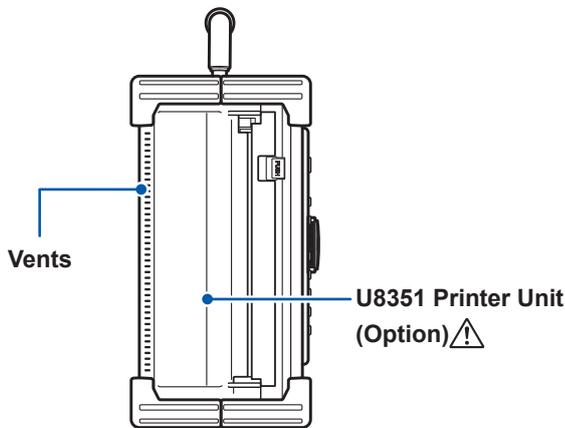
You can conduct reliable response evaluation.

**Arbitrary Waveform
Generator Unit can output
waveforms simulating
measured signals**

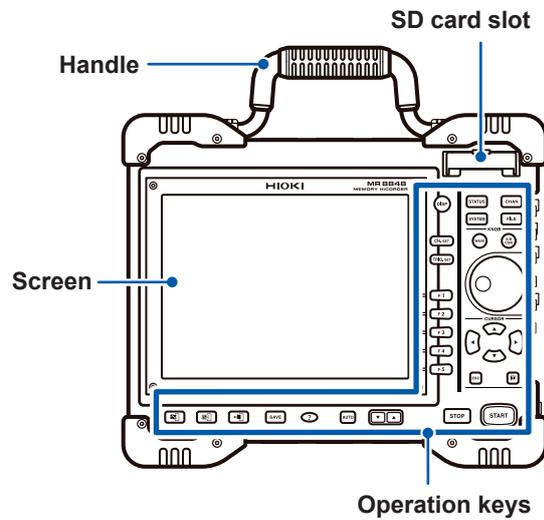
You can have the instrument output realistically simulated waveforms.

1.2 Part Names and Functions

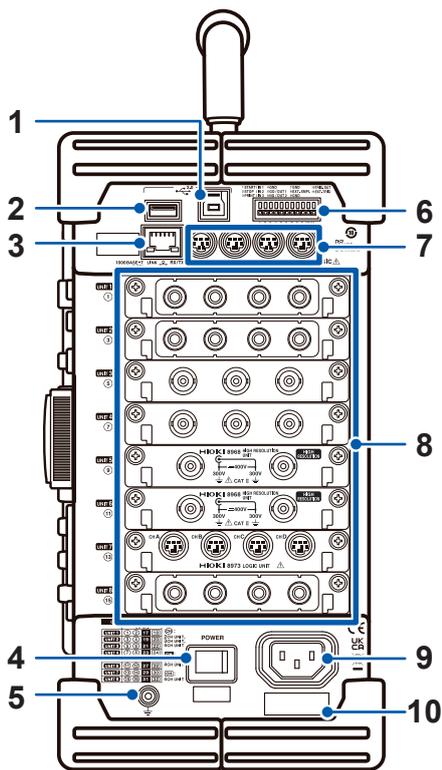
Left side



Front side

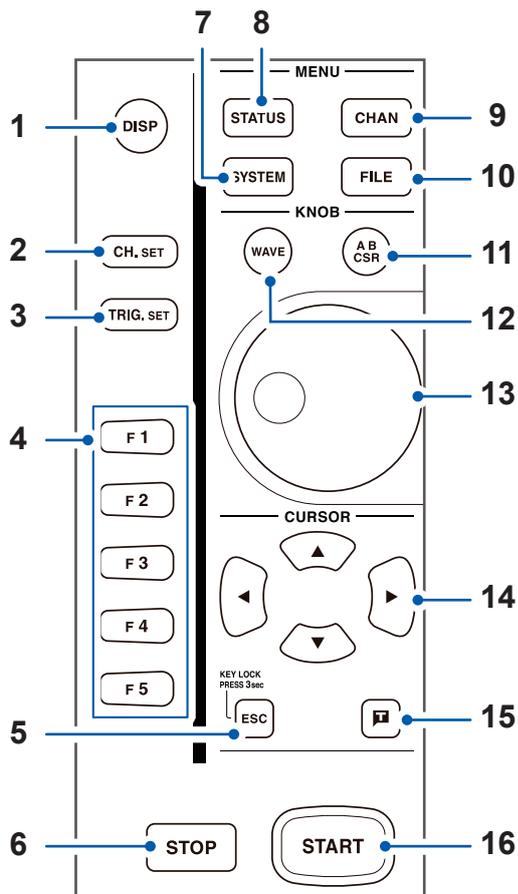


Right side

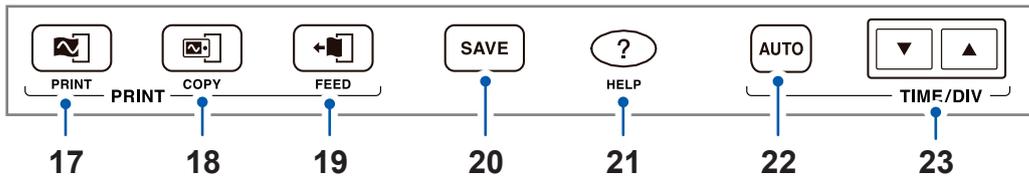


<p>1 USB connector (Type B) Used to connect the PC.</p>	<p>6 External control terminals Input an external sampling signal. Connect signal cables to operate the instrument externally.</p>
<p>2 USB connector (Type A) Connect a USB flash drive or a mouse.</p>	<p>7 Standard LOGIC terminals ⚠ Connect optional Hioki logic probes.</p>
<p>3 1000BASE-T connector Connect a LAN cable.</p>	<p>8 Various units ⚠ For more details, see “8.10 Setting Details of Units” or “18.6 Specifications of Units” in the Instruction Manual.</p>
<p>4 Power switch Flip the switch to turn on and off the instrument. ⬆ : Power-on ⬇ : Power-off</p>	<p>9 Power inlet ⚠ Connect the provided power cord.</p>
<p>5 GND terminal (Functional earth terminal) Connect a grounded conductor.</p>	<p>10 Serial number For the latest information, check Hioki’s website. Do not remove this sticker because the number is required for product tracking.</p>

Operation keys



1	DISP key Displays the waveform screen.	8	STATUS key Displays the status screen.
2	CH.SET key Displays the channel settings window on the waveform screen.	9	CHAN key Displays the channel screen.
3	TRIG.SET key Displays the trigger settings window on the waveform screen.	10	FILE key Displays the File screen.
4	F key Selects setting items.	11	AB CSR key (Lights up in red when selected.) Sets Cursors A and B.
5	ESC key Cancels the last action. Closes the displayed dialog and window. KEY LOCK: Press and hold the ESC key for 3 seconds to engage the key lock function, which prevents accidental operation. Press and hold this key for 3 seconds to disengage the key lock function.	12	WAVE key (Lights up in red when selected.) Assigns waveform scrolling to the jog dial and shuttle ring.
6	STOP key Completing the measurement. Press the key once Stops the measurement in progress after the instrument records the specified recording length of waveforms. Press the key twice: Immediately stops the measurement in progress.	13	Inner: Jog dial Outer: Shuttle ring Scrolls waveforms display. Increases and decreases a setting value.
7	SYSTEM key Displays the system screen.	14	CURSOR key Moves the cursor up, down, left, and right on the screen.
		15	Manual trigger key Manually trigger the instrument.
		16	START key Starts measurement. (Lights up in green during measurement.)



<p>17 PRINT key Prints waveforms, file tables, and lists.</p>	<p>21 HELP key Displays help information.</p>
<p>18 COPY key Prints a screenshot.</p>	<p>22 AUTO key Starts measurement in the auto-range setting.</p>
<p>19 FEED key Feeds paper.</p>	<p>23 TIME/DIV key Sets the timebase.</p>
<p>20 SAVE key (Lights up in blue while the instrument is accessing a storage device.) Saves data to a storage device. The dialog box can be switched between visible and invisible during auto-saving.</p>	

1.3 Screens Configuration

The screens are configured as listed below. Pressing each of the keys listed below displays a corresponding screen or window.

The waveform screen can display the trigger settings window, and the channel settings window.

Waveform screen	
	The display used to observe waveforms. Configure measurement conditions using the settings window on the right.
Trigger settings window, channel settings window	
	The display used to configure the trigger settings.
	The display used to configure the settings of analog channels and logic channels.
Status screen	
	The window used to configure the measurement methods and numerical calculation settings. The sheet changes every time the STATUS key is pressed. [Status] sheet, [Num Calc] sheet, [Memory Div] sheet, and [Wave Calc] sheet.
Channel screen	
	The screen used to configure the channel, the scaling, and the comment settings. Pressing the CHAN key switches the sheet between the following modes: [Unit List] sheet, [Each Ch] sheet, [Scaling] sheet, and [Comment] sheet.
System screen	
	The screen used to configure the environment, the file saving, the file printing, and the interface settings, and to initialize data. Pressing the SYSTEM key switches the sheets to be displayed in the following order: [Environment] sheet, [File Save] sheet, [Printer] sheet, [Interface] sheet, and [Init] sheet.
File screen	
	The screen used to view saved data files in storage devices (an SD card, the built-in drive, a USB flash drive, the internal memory).

Display

Waveform screen

Title comment
Shows a previously entered title comment.

Trigger time
Shows the date and time when the instrument triggered.

Storage device icon
Displays the status of storage devices.

Current date and time
Shows the current date and time in the manner previously configured.

Storage counter
Shows the number of times the instrument triggered.

Logic waveform

Analog waveform

Trigger marker
Indicates the point when the instrument triggered.

Limit Value
The upper and lower limit values for each channel.

Vertical axis display
Shows a value per division for each channel linked to the range settings of the vertical axis (voltage axis).

Settings cursor
The present cursor position flashes.

Settings window
The window used to configure measurement conditions.

Repeat

Scroll bar
The red bar indicates the waveform range written in the memory. The blue frame indicates the displayed waveform range.

Items common to the status, channel, system, and file screens

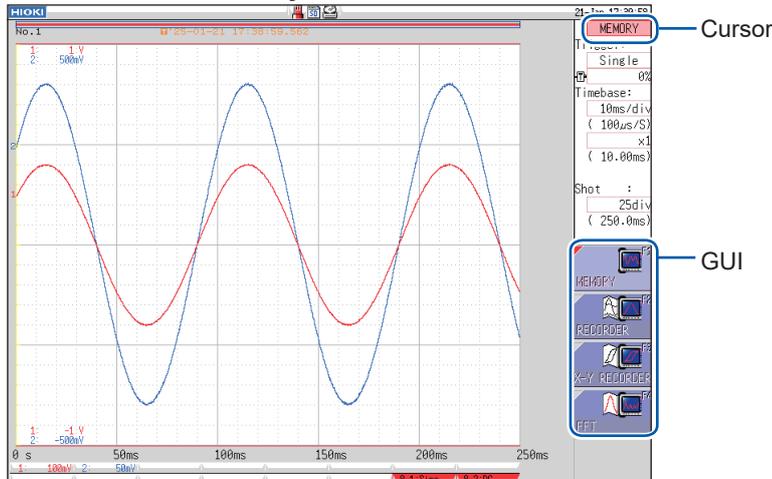
Sheet tabs
Shows names of sheets that can be selected. Pressing each of the **MENU** keys switches a sheet to another.

Hint
Shows details about the item at the present settings cursor position. Messages and error messages also appear here.

Next Page
Appears when more than five setting items are available. Pressing this button switches other groups of items to be displayed.

1.4 Basic Key Operation

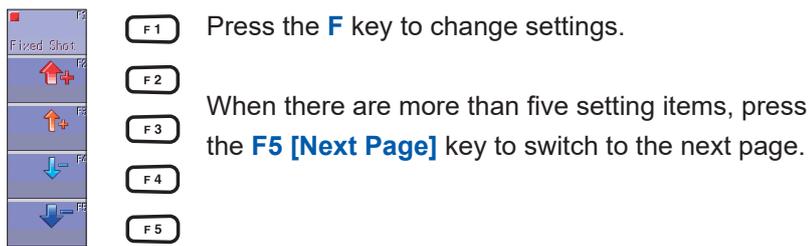
- 1** Press the **CURSOR** key and move the cursor to an item to be changed.



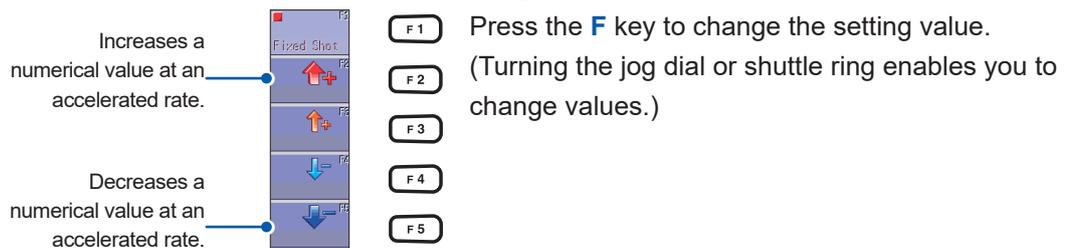
- 2** Check the illustrations on the GUI and press the function key (**F** key) to change the settings.

The function assigned to the **F** key varies depending on the setting items.

To select an item to be set



To increase and decrease a setting value



- 3** For some settings, press the **CH.SET** key to select [**Exec**], and press the **TRIG.SET** key to select [**Cancel**].

To enter characters and numbers

Refer to "Entering alphanumeric characters" in the Instruction Manual.

2

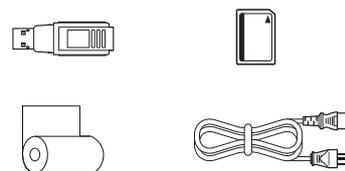
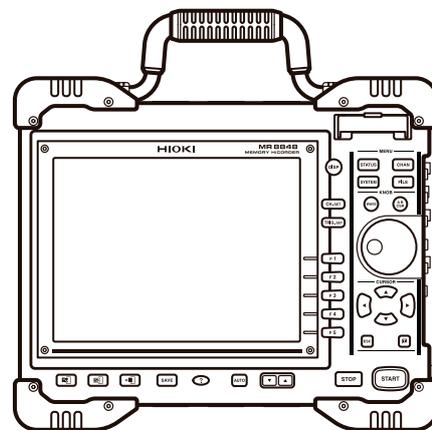
Preparing for Measurement

Procedure

- 1** Install the instrument. (p. 9)
- 2** Install or remove units. (p. 24)
(When adding or replacing units)
- 3** Connect connection cords to the units. (p. 25)
(When measuring analog signals)
Probes and cords differ depending on the type of measurement to be performed.
- 4** Insert a storage device (SD card, USB flash drive). (p. 25)
- 5** Load a roll of recording paper. (p. 26)
- 6** Connect the power cord. (p. 27)
- 7** Turn on the instrument. (p. 27)
- 8** Set the clock. (p. 28)
- 9** Perform zero-adjustment. (p. 29)



After preparation terminates, start measurement. (p. 31)



To operate the instrument with a computer

Refer to “16 Connecting the Instrument to a PC” in the Instruction Manual.

To control the instrument externally

Refer to “17 Controlling the Instrument Externally” in the Instruction Manual.

2.1 Installing and Removing Units

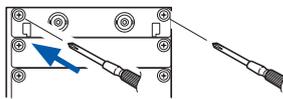
Read “Handling the instrument and units” (p. 10) carefully.

Units ordered with the instrument has already been installed in the instrument. Follow the procedures below to add, replace, or remove units from the instrument.

- Up to three logic units can be installed. The instrument ignores the fourth logic unit and later units that are installed in the instrument.
- For information on the analog channel resolution when logic channels are used, refer to “8.10 Setting Details of Units” in the Instruction Manual.

Installing a unit

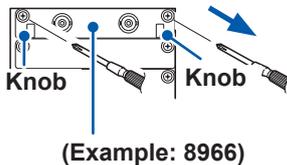
Right side



Required items: Phillips-head screwdriver (No. 2)

- 1** Turn off the instrument.
- 2** Orient the unit and insert it all the way into the instrument. Make certain that the unit is installed in such a way that the characters printed on the unit’s panel are right side up about those printed on the instrument.
- 3** Tighten the two unit mounting screws with a Phillips-head screwdriver.

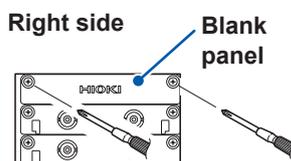
Removing a unit



Required items: Phillips-head screwdriver (No. 2)

- 1** Turn off the instrument.
- 2** Remove all connection cords and thermocouples connected to the unit.
- 3** Remove the power cord.
- 4** Loosen the two unit mounting screws with a Phillips-head screwdriver.
- 5** Pinch the knobs and pull out the unit.

When not installing another unit after removal



- 1** Place a blank panel.
- 2** Tighten the two unit mounting screws with a Phillips-head screwdriver.

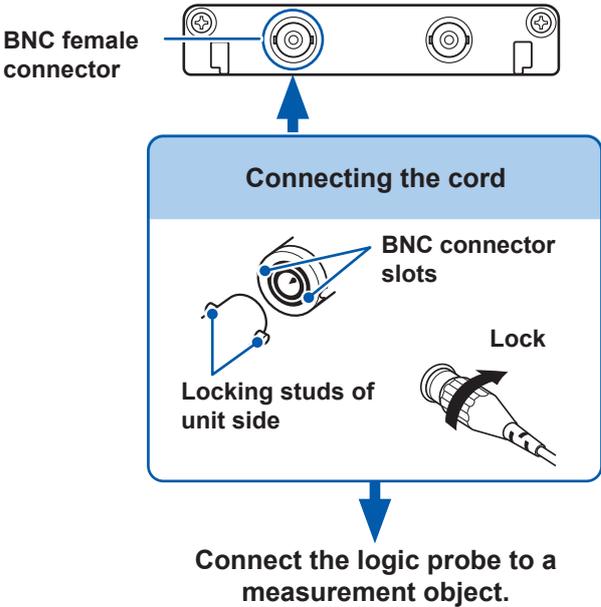
If measurement is performed with the instrument without a blank panel installed, the instrument may fail to meet specifications because of temperature instability within units.

2.2 Attaching Connection Cords

Read “Before connecting cords” (p. 12) carefully.
 For detailed precautions and instructions regarding connections, refer to the instruction manuals for your units, connection cords, etc.

Connecting cables to the BNC female terminals on units

Example: 8966 Analog Unit



Required item: Connection cord

- 1** Connect the BNC male connector of the cord to a BNC female connector on the unit.
- 2** Align the slots in the BNC male connector with the bayonet lugs on the BNC female connector on the unit, then attach the male connector while turning it clockwise until it locks.
- 3** Connect the cord clips to a measurement object.

To disconnect the connection cable from the BNC female connector

Turn the BNC male connector counterclockwise, then pull it out.

2.3 Preparing Storage Devices

Read “Handling storage devices” (p. 11) carefully.

Available storage devices (inserting an SD card and a USB flash drive)

Storage device icon



USB flash drive SD card Built-in drive

The icons indicating the status of storage devices always appear at the top of the screen.

	Storage devices are inserted.
	Storage devices are inserted and selected as the save destination. (Shown in red)
	Storage devices are not inserted, however, they are selected as the save destination. (Shown in black)

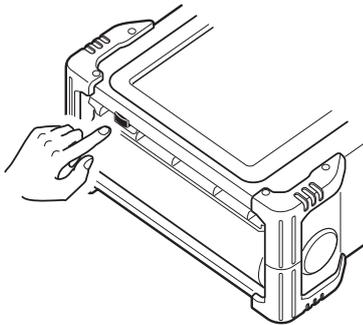
2.4 Loading Recording Paper (When U8351 Printer Unit is Installed)

Read "Handling the printer and the recording paper" (p. 11) carefully.

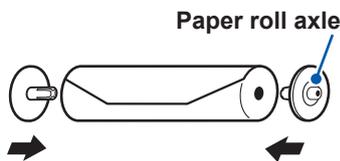
Procedure

Required items: 9231 Recording Paper, Paper roll axles (accessory)

1 Press the button to open the printer cover.



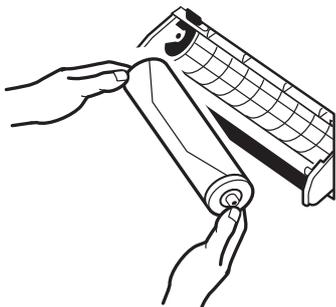
2 Insert the paper roll axles into the core of the 9231 Recording Paper.



3 Put the paper into the holder.

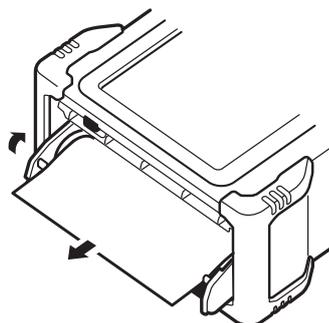
Insert the left side of the paper into the holder, and then, until the holder clicks, put the paper into the holder while pressing the paper leftward.

Face the print side of the paper upward. Printing is not possible if the front and back of the recording paper are reversed.
If the recording paper is put in the holder without the paper roll axle installed, the printer cover cannot be open, resulting in damage to the printer.



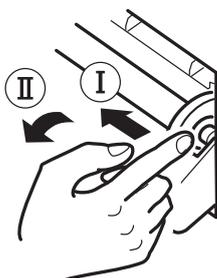
4 Pull out the edge of the paper toward yourself, and close the printer cover while applying the face of the paper to the cover's side surface.

The surface of the paper may become sticky due to the residue left behind by the adhesive tape, with the result that the printing on that area becomes unprintable. Unroll approximately the first 200 mm of paper before inserting it into the printer.



How to withdraw the recording paper

As shown in the left figure, withdraw the paper while pressing the paper roll axle leftward.



2.5 Supplying Power

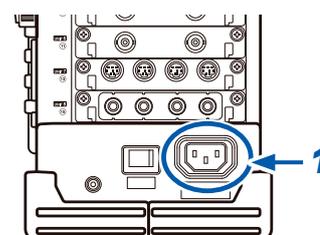
Read “Before turning on the instrument” (p. 13) carefully.

Connecting the power cord

Procedure

- 1** Connect the power cord to the power inlet on the instrument.
- 2** Plug the power cord into the mains outlet.

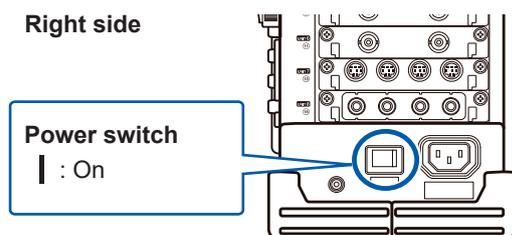
Right side



Turning on and off the instrument

Turning on the Instrument

Right side



Set the power switch in the on position (|).

The splash screen is displayed first, and then the waveform screen is displayed.

Before starting measurement

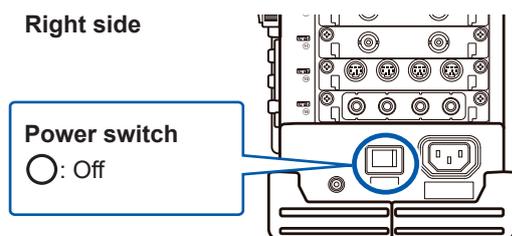
To perform precise measurement, warm up the instrument about 30 minutes after turning on the instrument to stabilize the internal temperature of the units. After warm-up, perform zero adjustment before performing measurement.

Turning off the instrument

Before turning off the instrument

When the instrument is turned off, data recorded in the internal memory is deleted. When you do not want to lose recorded data, save it first to an SD card or an external storage device.

Right side



Set the power switch in the off position (○).

The instrument is turned off.

After the instrument is turned on again, the display is displayed with the same settings as when the instrument was turned off last time.

When the auto-setup function is enabled, settings are read and configured automatically.

2.6 Setting the Clock

Set date and time for the built-in clock as follows.

The clock has an automatic calendar with leap year correction and 24-hour format.

The functions listed below make use of the clock. Ensure that the clock is set correctly before using these functions.

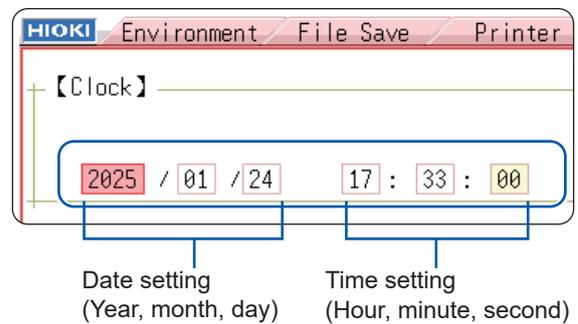
- Performing measurement with timer-based trigger enabled
- Printing data including times of trigger events
- Saving measured data

Procedure

To display the screen: Press the **SYSTEM** key several times to display the **[Init]** sheet on the system screen.

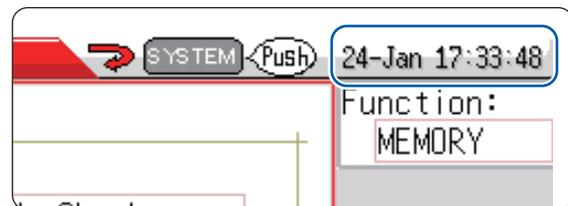
1 Move the cursor to the **[Clock]** box.

2 Select the digits to change and set the numeric values.



3 While the cursor is placed on one of the **[Clock]** settings, select **[SET]**.

The date and time settings are accepted. The date and time are displayed at the top right of the screen.



2.7 Adjusting the Zero Position (Zero-Adjustment)

This operation compensates potential deflection of units and sets the reference potential of the instrument to 0 V.

The compensation operation is performed for all channels and ranges.

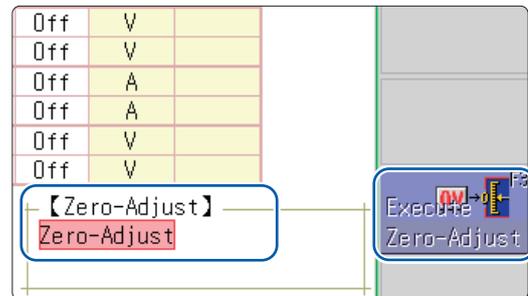
Before performing zero-adjustment

- Warm up the instrument for about 30 minutes after the power-on to stabilize the internal temperature of the units, and then perform zero-adjustment.
- Note that zero-adjustment cannot be performed during measurement.
- Key operation is not accepted during zero-adjustment.
- The time required for zero-adjustment varies depending on types and the number of units installed in the instrument. (The operation may take several seconds.)

Procedure

To display the screen: Press the **CHAN** key several times to display the **[Unit List]** sheet on the channel screen.

- 1** Move the cursor to the **[Zero-Adjust]** box.
- 2** Select **[Execute Zero-Adjust]**.
The zero-adjustment is executed.



3 Measurement

3.1 Measurement Procedure

1 Inspecting the instrument before measurement

Refer to
“3.2 Inspecting the Instrument Before Measurement” (p. 32)

2 Configuring the basic measurement settings

Select a suitable recording method for an object to be measured

Select a function depending on a type of measurement.

Set the sampling rate

The timebase refers to a speed for sampling the input signal waveform. The timebase setting defines a time length per division of the horizontal axis (time/div).

Set the recording length

Set the recording length (number of divisions) of each data acquisition.

Set the waveform display format and printing format

You can lay out waveform displays of input signals on the waveform screen.

Refer to the following pages:

“Measurement functions” in the Instruction Manual

“Timebase and sampling rate” in the Instruction Manual

“Recording length (number of divisions)” in the Instruction Manual

“Screen layout” in the Instruction Manual

3 Configuring Input Channels Settings

Configure the analog channel settings

Configure the logic channel settings

Refer to the following pages:

“Analog channel settings” in the Instruction Manual

“Logic channel settings” in the Instruction Manual

4 Configuring the trigger settings

Refer to “9 Setting the Trigger” in the Instruction Manual:

5 Starting measurement

Press the **START** key to start measurement.

Refer to the following pages:

“3.5 Starting and Stopping Measurement” in the Instruction Manual

6 Completing the measurement

Press the **STOP** key once to stop the measurement in progress after the specified recording length expires.
Press the **STOP** key once again to stop the measurement in progress immediately.

Refer to the following pages:

“3.5 Starting and Stopping Measurement” in the Instruction Manual

3.2 Inspecting the Instrument Before Measurement

Verify that it operates normally to ensure that no damage occurred during storage or shipping. If you find any damage, contact your authorized Hioki distributor or reseller.

(1) Inspecting products used with the instrument

When using probes and connection cords

Insulation of a probe or connection cord to be used is damaged, or bare metal is not exposed.

→
Metal exposed

Do not use them if damage is present, as you could receive an electric shock. Request repairs.

↓ No metal exposed Go to Step (2)

When using clamp sensors

Any clamp is not cracked or damaged.

→
There is an abnormality.

Do not use them if damage is present, as you could receive an electric shock. Request repairs.

↓ No Go to Step (2)

(2) Inspecting the instrument and units

There is no visible damage to the instrument or units.

→
There is an abnormality.

If damage is evident, request repairs.

↓ No

When turning on the instrument

The Hioki logo appears on the screen.

→
No

The power cord may be damaged, or the instrument may be damaged. Request repairs.

↓ Yes

The waveform screen appears.

→
Nothing appears, or the display is abnormal.

The instrument may be damaged. Request repairs.

↓ Yes

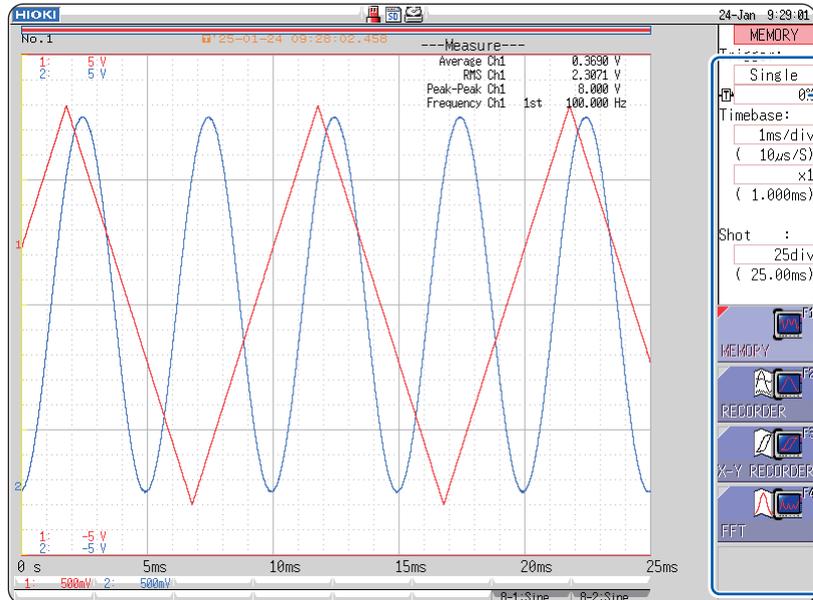
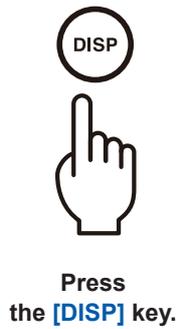
Inspection terminates.

3.3 Setting Measurement Conditions

This section describes how to set measurement conditions.

The settings window displayed on the Waveform display enables you to configure basic settings conveniently while you are observing waveforms. The basic settings can also be configured on the **[Status]** sheet of the status screen.

How to open the settings window



Settings window

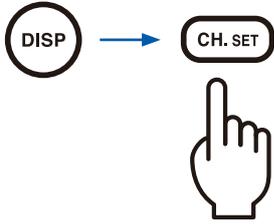
Timebase (Sampling rate)

Recording length (Number of divisions)

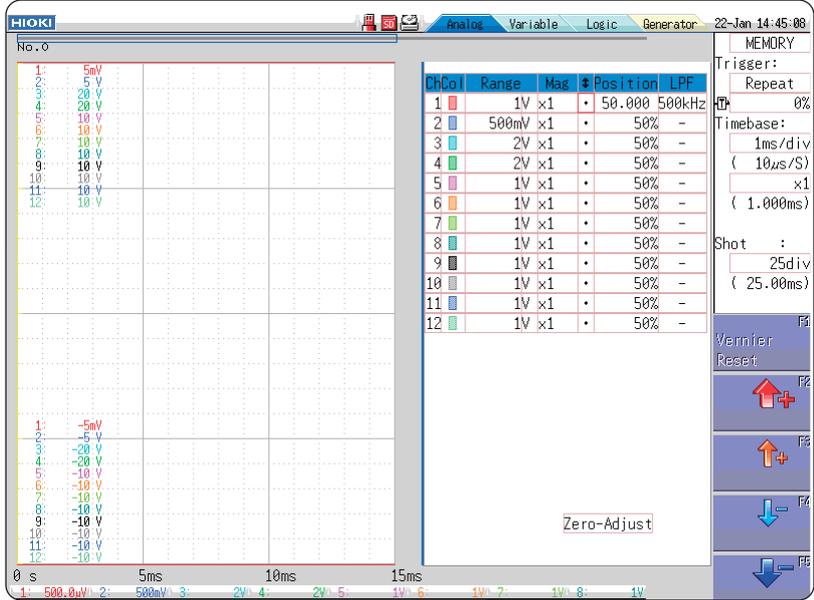
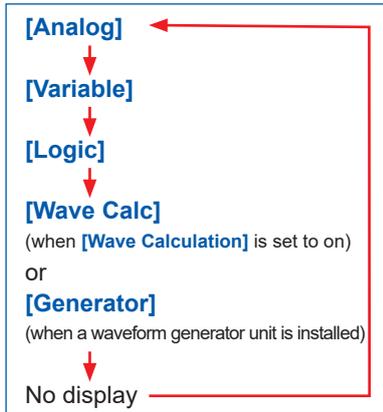
3.4 Configuring Input Channels Settings

Configuring analog and logic channels settings.

To open the channel settings window



The sheet changes every time the **CH.SET** key is pressed.



Channel setting procedure

The procedure below shows how to configure the analog channels (CH1 through CH16) settings.

1 Configuring the settings of input and screen display

Configuring the input coupling setting

Selecting an appropriate range for the input signal

Scaling the input value (As needed)

Configuring the filter setting (If performed in noisy environment)

Finely adjust the waveform amplitude (As needed)

Magnify/demagnify the waveform vertically (in the voltage-axis direction) (As needed)

2 Configuring the trigger settings (as needed)

3 Configuring the settings of waveform display colors and positions

Setting the waveform display color

Setting the display position and magnification ratio (As needed)

4 Configuring the graph display settings

This section describes the setting procedure for logic channels (standard logic terminals: LA through LD, expansion logic terminals: L1A through L8D).

1 Configuring the display settings

Configuring the logic recording width settings

2 Configuring the settings of waveform display colors and positions

Setting the waveform display positions

Setting the waveform display color

4 Specifications

For details on the specifications, see the Instruction Manual.

4.1 General Specifications of the Instrument

Basic specifications

Operating environment	Indoor use, pollution degree 2, altitude up to 2000 m (6562 ft.)	
Operating temperature and humidity range	Temperature: -10°C to 40°C (14°F to 104°F) Humidity: 20% RH to 80% RH (no condensation) When the printer is used Temperature: 0°C to 40°C (32°F to 104°F) Humidity: 20% RH to 80% RH (no condensation)	
Storage temperature and humidity range	-20°C to 50°C (-4°F to 122°F), 90% RH or less (no condensation)	
Standards	Safety	EN 61010
	EMC	EN 61326 Class A
Power supply	Rated power supply voltage:	100 V to 240 V AC (continuous input) (Voltage fluctuations of $\pm 10\%$ from the rated supply voltage are taken into account.)
	Rated power supply frequency:	50 Hz/60 Hz
	Anticipated transient overvoltage:	2500 V
	DC power supply input	
	Rated power supply voltage:	10 V to 28 V DC (9784 DC Power Unit) (Voltage fluctuations of $\pm 10\%$ from the rated supply voltage are taken into account.)
Maximum rated power	220 VA (When U8351 Printer Unit is used) 130 VA (When U8351 Printer Unit is not used)	
Dimensions	Approx. 351W \times 261H \times 140D mm (13.8W \times 10.3H \times 5.5D in.) (excluding protrusions) Approx. 365W \times 307H \times 160D mm (14.4W \times 12.1H \times 6.3D in.) (including protrusions)	
Weight	Approx. 6.9 kg (15.2 lb.) (When no units are installed) Approx. 7.4 kg (16.3 lb.) (When U8351 Printer Unit is installed) Approx. 9.3 kg (20.5 lb.) (When 8966 Analog Unit is installed)	
Option	Refer to "Options" (p. 59).	

External control terminals

External input (Remote terminal) (START/IN1, STOP/IN2, SAVE/IN3)	Maximum input voltage	10 V DC
	VRange (Input voltage)	High level: 2.5 V to 10 V; Low level: 0 V to 0.8 V
External output (GO/OUT1, NG/OUT2)	Output type	Open-drain output (with 5 V voltage output, active low)
	Output voltage	High level: 4.0 V to 5.0 V; Low level: 0 V to 0.5 V
	Maximum input voltage	50 V DC, 1.0 A DC, 500 mW
External trigger	Maximum input voltage	7 V DC
Trigger output	Output type	Open-drain output (with 5 V voltage output, active Low)
	Output voltage	High level: 4.0 V to 5.0 V; Low level: 0 V to 0.5 V
	Maximum input voltage	50 V DC, 1.0 A DC, 500 mW
External sampling	Maximum input voltage	7 V DC
	VRange (Input voltage)	High level: 2.5 V to 7 V; Low level: 0 V to 0.8 V

4.2 Specifications of Units

8966 Analog Unit

The accuracy has been specified under the following conditions: installed in a Memory HiCorder and operated at $23^{\circ}\text{C} \pm 5^{\circ}\text{C}$ ($73^{\circ}\text{F} \pm 9^{\circ}\text{F}$) in the range of 20% to 80% RH after a warm-up period of at least 30 minutes and execution of zero adjustment.

Maximum input voltage	400 V DC
Maximum rated line-to-ground voltage	300 V AC, DC (between each input channel and enclosure, between any two of input channels) Measurement category II (anticipated transient overvoltage: 2500 V)
Operating temperature and humidity range	In accordance with the specification of the Memory HiCorder in which 8966 is installed
Operating environment	In accordance with the specification of the Memory HiCorder in which 8966 is installed
Storage temperature and humidity range	-10°C to 50°C (14°F to 122°F), 80% RH or less (no condensation)
Dimensions	Approx. 106W × 19.8H × 196.5D mm (4.2W × 0.8H × 7.7D in.)
Weight	Approx. 250 g (8.8 oz.)
Standards	Safety EN 61010 EMC EN 61326 Class A
Options	L9197 Connection Cord (CAT IV 300 V, CAT III 600 V, 1 A) L9198 Connection Cord (CAT III 300 V, CAT II 600 V, 0.2 A) L9217 Connection Cord (CAT III 300 V, CAT II 600 V, 0.2 A) L9790 Connection Cord (with the L9790-01 or 9790-03: CAT III 300 V, CAT II 600 V, 1 A) (with the 9790-02: CAT III 150 V, CAT II 300 V, 1 A) 9322 Differential Probe (with grabber clips attached: CAT II 1000 V) (with alligator clip set attached: CAT III 600 V, CAT II 1000 V) P9000-01 Differential Probe (CAT III 1000 V) P9000-02 Differential Probe (CAT III 1000 V) 9665 10:1 Probe (CAT II 300 V) 9666 100:1 Probe (CAT II 300 V)

8967 Temp Unit

The accuracy has been specified under the following conditions: installed in a Memory HiCorder and operated at $23^{\circ}\text{C} \pm 5^{\circ}\text{C}$ ($73^{\circ}\text{F} \pm 9^{\circ}\text{F}$) in the range of 20% to 80% RH after a warm-up period of at least 30 minutes and execution of zero adjustment.

Maximum rated line-to-ground voltage	300 V AC, DC (between each input channel and enclosure, between any two of input channels) Measurement category II (anticipated transient over-voltage: 2500 V)
Operating temperature and humidity range	In accordance with the specification of the Memory HiCorder in which 8967 is installed
Storage temperature and humidity range	-20°C to 50°C (-4°F to 122°F), 90% RH or less (no condensation)
Operating environment	In accordance with the specification of the Memory HiCorder in which 8967 is installed
Dimensions	Approx. 106W × 19.8H × 204.5D mm (4.2W × 0.8H × 8.1D in.)

Weight	Approx. 240 g (8.5 oz.)	
Standards	Safety	EN 61010
	EMC	EN 61326 Class A
Accessories	Ferrite clamp-on choke (2 pieces)	

8968 High Resolution Unit

The accuracy has been specified under the following conditions: installed in a Memory HiCorder and operated at 23°C ±5°C (73°F ±9°F) in the range of 20% to 80% RH after a warm-up period of at least 30 minutes and execution of zero-adjustment.

Maximum input voltage	400 V DC	
Maximum line-to-ground voltage	300 V AC, DC (between each input channel and enclosure, between any two of input channels) Measurement category II (anticipated transient overvoltage: 2500 V)	
Operating temperature and humidity range	In accordance with the specification of the Memory HiCorder in which 8968 is installed	
Operating environment	In accordance with the specification of the Memory HiCorder in which 8968 is installed	
Storage temperature and humidity range	-10°C to 50°C (14°F to 122°F), 80% RH or less (no condensation)	
Dimensions	Approx. 106W × 19.8H × 196.5D mm (4.2W × 0.8H × 7.7D in.)	
Weight	Approx. 250 g (8.8 oz.)	
Standards	Safety	EN 61010
	EMC	EN 61326 Class A
Options	L9197 Connection Cord (CAT IV 300 V, CAT III 600 V, 1 A) L9198 Connection Cord (CAT III 300 V, CAT II 600 V, 0.2 A) L9217 Connection Cord (CAT III 300 V, CAT II 600 V, 0.2 A) L9790 Connection Cord (with the L9790-01 or 9790-03: CAT III 300 V, CAT II 600 V, 1 A) (with the 9790-02: CAT III 150 V, CAT II 300 V, 1 A) 9322 Differential Probe (with grabber clips attached: CAT II 1000 V) (with alligator clip set attached: CAT III 600 V, CAT II 1000 V) P9000-01 Differential Probe (CAT III 1000 V) P9000-02 Differential Probe (CAT III 1000 V) 9665 10:1 Probe (CAT II 300 V) 9666 100:1 Probe (CAT II 300 V)	

8969 Strain Unit, U8969 Strain Unit

	8969	U8969
Maximum rated line-to-ground voltage	33 V rms AC or 70 V DC (between each input channel and enclosure, between any two of input channels) Anticipated transient overvoltage: 330 V (Based on EN61010-2-030:2010)	30 V rms AC or 60 V DC (between each input channel and enclosure, between any two of input channels) Anticipated transient overvoltage: 330 V
Operating temperature and humidity range	In accordance with the specification of the Memory HiCorder in which 8969 is installed	Temperature: -10°C to 40°C (14°F to 104°F) Humidity: 80% RH or less (no condensation)

Storage temperature and humidity range	In accordance with the specification of the Memory HiCorder in which 8969 is installed	Temperature: -20°C to 50°C (-4°F to 122°F) Humidity: 90% RH or less (no condensation)
Operating environment	In accordance with the specification of the Memory HiCorder in which 8969 is installed	Indoor use, pollution degree 2, altitude up to 2000 m (6562 ft.)
Dimensions	Approx. 106W × 19.8H × 196.5D mm (4.2W × 0.8H × 7.7D in.)	
Weight	Approx. 220 g (7.8 oz.)	Approx. 245 g (8.6 oz.)
Standards	Safety EMC	EN 61010 EN 61326 Class A

8970 Freq Unit

The accuracy has been specified under the following conditions: installed in a Memory HiCorder and operated at 23°C ±5°C (73°F ±9°F) in the range of 20% to 80% RH after a warm-up period of at least 30 minutes.

Maximum input voltage	400 V DC	
Maximum rated line-to-ground voltage	300 V AC, DC (Measurement category II) Anticipated transient overvoltage: 2500 V (between each input channel and enclosure, between any two of input channels)	
Operating temperature and humidity range	In accordance with the specification of the Memory HiCorder in which 8970 is installed	
Operating environment	In accordance with the specification of the Memory HiCorder in which 8970 is installed	
Storage temperature and humidity range	In accordance with the specification of the Memory HiCorder in which 8970 is installed	
Standards	Safety EMC	EN 61010 EN 61326 Class A
Dimensions	Approx. 106W × 19.8H × 196.5D mm (4.2W × 0.8H × 7.7D in.)	
Weight	Approx. 250 g (8.8 oz.)	
Options	L9197 Connection Cord (CAT IV 300 V, CAT III 600 V, 1 A) L9198 Connection Cord (CAT III 300 V, CAT II 600 V, 0.2 A) L9217 Connection Cord (CAT III 300 V, CAT II 600 V, 0.2 A) L9790 Connection Cord (with the L9790-01 or 9790-03: CAT III 300 V, CAT II 600 V, 1 A) (with the 9790-02: CAT III 150 V, CAT II 300 V, 1 A) 9322 Differential Probe (with grabber clips attached: CAT II 1000 V) (with alligator clip set attached: CAT III 600 V, CAT II 1000 V) P9000-01 Differential Probe (CAT III 1000 V) P9000-02 Differential Probe (CAT III 1000 V) 9665 10:1 Probe (CAT II 300 V) 9666 100:1 Probe (CAT II 300 V)	

8971 Current Unit

The accuracy has been specified under the following conditions: installed in a Memory HiCorder and operated at 23°C ±5°C (73°F ±9°F) in the range of 20% to 80% RH after a warm-up period of at least 30 minutes and execution of zero-adjustment.

Operating temperature and humidity range	In accordance with the specification of the Memory HiCorder in which 8971 is installed	
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Operating environment	In accordance with the specification of the Memory HiCorder in which 8971 is installed
Storage temperature and humidity range	-10°C to 50°C (14°F to 122°F), 80% RH or less (no condensation)
Dimensions	Approx. 106W × 19.8H × 196.5D mm (4.2W × 0.8H × 7.7D in.)
Weight	Approx. 250 g (8.8 oz.)
Standards	Safety EN61010 EMC EN61326 Class A
Options	9318 Conversion Cable, CT9901 Conversion Cable

8972 DC/RMS Unit

The accuracy has been specified under the following conditions: installed in a Memory HiCorder and operated at 23°C ±5°C (73°F ±9°F) in the range of 20% to 80% RH after a warm-up period of at least 30 minutes and execution of zero-adjustment.

Maximum input voltage	400 V DC
Maximum rated line-to-ground voltage	300 V AC, DC (between each input channel and enclosure, between any two of input channels) Measurement category II (anticipated transient overvoltage: 2500 V)
Operating temperature and humidity range	In accordance with the specification of the Memory HiCorder in which 8972 is installed
Operating environment	In accordance with the specification of the Memory HiCorder in which 8972 is installed
Storage temperature and humidity range	-10°C to 50°C (14°F to 122°F), 80% RH or less (no condensation)
Dimensions	Approx. 106W × 19.8H × 196.5D mm (4.2W × 0.8H × 7.7D in.)
Weight	Approx. 250 g (8.8 oz.)
Standards	Safety EN 61010 EMC EN 61326 Class A
Options	L9197 Connection Cord (CAT IV 300 V, CAT III 600 V, 1 A) L9198 Connection Cord (CAT III 300 V, CAT II 600 V, 0.2 A) L9217 Connection Cord (CAT III 300 V, CAT II 600 V, 0.2 A) L9790 Connection Cord (with the L9790-01 or 9790-03: CAT III 300 V, CAT II 600 V, 1 A) (with the 9790-02: CAT III 150 V, CAT II 300 V, 1 A) 9322 Differential Probe (with grabber clips attached: CAT II 1000 V) (with alligator clip set attached: CAT III 600 V, CAT II 1000 V) P9000-01 Differential Probe (CAT III 1000 V) P9000-02 Differential Probe (CAT III 1000 V) 9665 10:1 Probe (CAT II 300 V) 9666 100:1 Probe (CAT II 300 V)

8973 Logic Unit

Operating temperature and humidity range	In accordance with the specification of the Memory HiCorder in which 8973 is installed
Operating environment	In accordance with the specification of the Memory HiCorder in which 8973 is installed

Storage temperature and humidity range	-20°C to 50°C (-4°F to 122°F), 80% RH or less (no condensation)	
Dimensions	Approx. 106W × 19.8H × 196.5D mm (4.2W × 0.8H × 7.7D in.)	
Weight	Approx. 190 g (6.7 oz.)	
Standards	Safety	EN 61010
	EMC	EN 61326 Class A

MR8990 Digital Voltmeter Unit

The accuracy has been specified under the following conditions: installed in a Memory HiCorder and operated at 23°C ±5°C (73°F ±9°F) in the range of 20% to 80% RH after a warm-up period of at least 30 minutes and the execution of calibration.

Maximum input voltage	500 V DC	
Maximum rated line-to-ground voltage	300 V AC, DC (between each input channel and enclosure, between any two of input channels) Measurement category II (anticipated transient overvoltage: 2500 V)	
Operating temperature and humidity range	In accordance with the specifications of Memory HiCorder in which the MR8990 is installed	
Operating environment	In accordance with the specifications of Memory HiCorder in which the MR8990 is installed	
Storage temperature and humidity range	-10°C to 50°C (14°F to 122°F), 80% RH or less (no condensation)	
Dimensions	Approx. 106W × 19.8H × 196.5D mm (4.2W × 0.8H × 7.7D in.)	
Weight	Approx. 260 g (9.2 oz.)	
Standards	Safety	EN 61010
	EMC	EN 61326 Class A
Option	L2200 Test Lead (CAT IV 600 V, CAT III 1000 V, 10 A)	

U8974 High Voltage Unit

The accuracy has been specified under the following conditions: installed in a Memory HiCorder and operated at 23°C ±5°C (73°F ±9°F) in the range of 20% to 80% RH after a warm-up period of at least 30 minutes and execution of zero-adjustment.

Maximum input voltage	1000 V DC, 700 V AC	
Maximum rated line-to-ground voltage	1000 V AC, DC measurement category III, 600 V AC, DC measurement category IV (between each input channel and enclosure, between any two of input channels) Anticipated transient overvoltage: 8000 V	
Operating temperature and humidity range	In accordance with the specifications of Memory HiCorder in which the U8974 is installed	
Operating environment	In accordance with the specifications of Memory HiCorder in which the U8974 is installed	

Storage temperature and humidity range	Temperature	-20°C to 50°C (-4°F to 122°F)	
	Humidity	For -20°C or higher but lower than 40°C (-4°F or higher but lower than 104°F), 80% RH or less (no condensation) For 40°C or higher but lower than 45°C (-104°F or higher but lower than 113°F), 60% RH or less (no condensation) For 45°C to 50°C (113°F to 122°F), 50% RH or less (no condensation)	
Dimensions	Approx. 106W × 19.8H × 196.5D mm (4.2W × 0.8H × 7.7D in.)		
Weight	Approx. 230 g (8.1 oz.)		
Standards	Safety	EN 61010	
	EMC	EN 61326 Class A	
Options	L4940 Connection Cable Set (1.5 m) L4935 Alligator Clip Set (attachable on the tips of L4940, CAT IV 600 V, CAT III 1000 V, 10 A) L9243 Grabber Clip (attachable on the tips of L4940, CAT II 1000 V, 1 A) L4936 Bus Bar Clip Set (attachable on the tips of L4940, CAT III 600 V, 5 A) L4937 Magnetic Adapter Set (attachable on the tips of L4940, CAT III 1000 V, 2 A) L4931 Extension Cable (for L4940, 1.5 m, CAT IV 600 V, CAT III 1000 V, 10 A) L4932 Test Pin Set (attachable on the tips of L4940, CAT IV 600 V, CAT III 1000 V, 10 A) L4934* Small Alligator Clip Set (CAT III 300 V, CAT II 600 V, 3 A) * The L4932 is required to use the L4934.		

U8979 Charge Unit

1. General specifications

Operating environment	Indoor use, pollution degree 2, altitude up to 2000 m (6562 ft.)	
Operating temperature and humidity range	0°C to 40°C (32°F to 104°F), 80% RH or less (no condensation)	
Storage temperature and humidity range	-10°C to 50°C (14°F to 122°F) For -10°C or higher but lower than 40°C (14°F or higher but lower than 104°F), 80% RH or less (no condensation) For 40°C or higher but lower than 45°C (104°F or higher but lower than 113°F), 60% RH or less (no condensation) For 45°C to 50°C (113°F to 122°F), 50% RH or less (no condensation)	
Standards	Safety	EN 61010
	EMC	EN 61326 Class A
Dimensions	Approx. 106W × 19.8H × 196.5D mm (4.2W × 0.8H × 7.7D in.)	
Weight	Approx. 250 g (8.8 oz.)	
Option	9166 Connection Cord (for voltage measurement)	

2. Specifications of input, output, and measurement

-1. Common specifications	Maximum rated line-to-ground voltage	30 V AC, 60 V DC (between each input channel and enclosure, between any two of input channels) Anticipated transient overvoltage: 330 V
-2. Voltage input	Maximum input voltage	40 V DC
-3. Charge input	Maximum input charge	±500 pC (when one of the higher six ranges is chosen) ±50,000 pC (when one of the lower six ranges is chosen)

U8793 Arbitrary Waveform Generator Unit

General specifications

Operating environment	In accordance with the specifications of Memory HiCorder in which the U8793 is installed	
Operating temperature and humidity range	In accordance with the specifications of Memory HiCorder in which the U8793 is installed	
Storage temperature and humidity range	-20°C to 50°C (-4°F to 122°F), 80% RH or less (no condensation)	
Standards	Safety	EN 61010
	EMC	EN 61326 Class A
Dimensions	Approx. 106W × 19.8H × 196.5D mm (4.2W × 0.8H × 7.7D in.) (excluding protrusions)	
Weight	Approx. 250 g (8.8 oz.)	
Options	L9795-01 Connection Cable (terminal type: SMB terminal/mini-alligator clip) L9795-02 Connection Cable (terminal type: SMB terminal/BNC terminal)	

Specifications of output

Basic specifications (common to both FG function and user-defined waveform generation function)

Maximum rated line-to-ground voltage	30 V rms AC or 60 V DC (between individual output channels and enclosure/external I/O terminals as well as between individual output channels) Anticipated transient overvoltage: 330 V
Maximum output voltage	-10 V to 15 V

MR8790 Waveform Generator Unit

The accuracy has been specified under the following conditions: installed in a Memory HiCorder and operated at 23°C ±5°C (73°F ±9°F) and 80% RH or less after a warm-up period of at least 30 minutes.

General specifications

Maximum rated line-to-ground voltage	30 V rms AC or 60 V DC (between each output channel and enclosure, between any two of output channels) Anticipated transient overvoltage: 330 V	
Operating temperature and humidity range	In accordance with the specifications of Memory HiCorder in which the MR8790 is installed	
Operating environment	In accordance with the specifications of Memory HiCorder in which the MR8790 is installed	
Storage temperature and humidity range	-20°C to 50°C (-4°F to 122°F), 90% RH or less (no condensation)	
Dimensions	Approx. 106W × 19.8H × 196.5D mm (4.2W × 0.8H × 7.7D in.) (excluding protrusions)	
Weight	Approx. 230 g (8.1 oz.)	
Standards	Safety	EN 61010
	EMC	EN 61326 Class A
Options	L9795-01 Connection Cable (terminal type: SMB terminal/mini-alligator clip) L9795-02 Connection Cable (terminal type: SMB terminal/BNC terminal)	

Specification of voltage output

Maximum output voltage	±10 V
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MR8791 Pulse Generator Unit

General specifications

Operating temperature and humidity range	In accordance with the specifications of Memory HiCorder in which the MR8791 is installed	
Operating environment	In accordance with the specifications of Memory HiCorder in which the MR8791 is installed	
Storage temperature and humidity range	-20°C to 50°C (-4°F to 122°F), 90% RH or less (no condensation)	
Maximum rated line-to-ground voltage	30 V rms AC or 60 V DC (between output channels and enclosure) Anticipated transient overvoltage: 330 V	
Dimensions	Approx. 106W × 19.8H × 196.5D mm (4.2W × 0.8H × 7.7D in.) (excluding protrusions)	
Weight	Approx. 230 g (8.1 oz.)	
Standards	Safety	EN 61010
	EMC	EN 61326 Class A

U8975 4CH Analog Unit

The accuracy has been specified under the following conditions: installed in a Memory HiCorder and operated at 23°C ±5°C (73°F ±9°F) in the range of 20% to 80% RH after a warm-up period of at least 30 minutes and execution of zero-adjustment.

Operating environment	Indoor use, pollution degree 2, altitude up to 2000 m (6562 ft.)	
Operating temperature and humidity range	0°C to 40°C (32°F to 104°F), 80% RH or less (no condensation)	
Storage temperature and humidity range	-10°C to 50°C (14°F to 122°F) For -10°C or higher but lower than 40°C (14°F or higher but lower than 104°F), 80% RH or less (no condensation) For 40°C or higher but lower than 45°C (104°F or higher but lower than 113°F), 60% RH or less (no condensation) For 45°C to 50°C (113°F to 122°F), 50% RH or less (no condensation)	
Standards	Safety	EN 61010
	EMC	EN 61326 Class A
Dimensions	Approx. 106W × 19.8H × 196.5D mm (4.2W × 0.8H × 7.7D in.)	
Weight	Approx. 250 g (8.8 oz.)	
Maximum rated line-to-ground voltage	300 V AC, DC, Measurement category II (between each input channel and the enclosure, between any two of input channels) Anticipated transient overvoltage: 2500 V	

Options	L9197 Connection Cord (CAT IV 300 V, CAT III 600 V, 1 A) L9198 Connection Cord (CAT III 300 V, CAT II 600 V, 0.2 A) L9217 Connection Cord (CAT III 300 V, CAT II 600 V, 0.2 A) L9790 Connection Cord (with the L9790-01 or 9790-03: CAT III 300 V, CAT II 600 V, 1 A) (with the 9790-02: CAT III 150 V, CAT II 300 V, 1 A) 9322 Differential Probe (with grabber clips attached: CAT II 1000 V) (with alligator clip set attached: CAT III 600 V, CAT II 1000 V) P9000-01 Differential Probe (CAT III 1000 V) P9000-02 Differential Probe (CAT III 1000 V) 9665 10:1 Probe (CAT II 300 V) 9666 100:1 Probe (CAT II 300 V)
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U8977 3CH Current Unit

The accuracy has been specified under the following conditions: installed in a Memory HiCorder and operated at 23°C ±5°C (73°F ±9°F) in the range of 20% to 80% RH after a warm-up period of at least 30 minutes and execution of zero-adjustment.

Operating environment	Indoor use, pollution degree 2, altitude up to 2000 m (6562 ft.)
Operating temperature and humidity range	0°C to 40°C (32°F to 104°F), 80% RH or less (no condensation)
Storage temperature and humidity range	-10°C to 50°C (14°F to 122°F) For -10°C or higher but lower than 40°C (14°F or higher but lower than 104°F), 80% RH or less (no condensation) For 40°C or higher but lower than 45°C (104°F or higher but lower than 113°F), 60% RH or less (no condensation) For 45°C to 50°C (113°F to 122°F), 50% RH or less (no condensation)
Standards	Safety EN 61010 EMC EN 61326 Class A
Dimensions	Approx. 106W × 19.8H × 196.5D mm (4.2W × 0.8H × 7.7D in.)
Weight	Approx. 250 g (8.8 oz.)
Options	CT9900 Conversion Cable (PL23 receptacle–ME15W plug) CT9920 Conversion Cable (PL14 receptacle–ME15W plug)
Maximum rated line-to-ground voltage	Non-isolated

U8978 4CH Analog Unit

The accuracy has been specified under the following conditions: installed in a Memory HiCorder and operated at 23°C ±5°C (73°F ±9°F) in the range of 20% to 80% RH after a warm-up period of at least 30 minutes and execution of zero-adjustment.

Operating environment	Indoor use, pollution degree 2, altitude up to 2000 m (6562 ft.)
Operating temperature and humidity range	0°C to 40°C (32°F to 104°F), 80% RH or less (no condensation)
Storage temperature and humidity range	-10°C to 50°C (14°F to 122°F) For -10°C or higher but lower than 40°C (14°F or higher but lower than 104°F), 80% RH or less (no condensation) For 40°C or higher but lower than 45°C (104°F or higher but lower than 113°F), 60% RH or less (no condensation) For 45°C to 50°C (113°F to 122°F), 50% RH or less (no condensation)

Standards	Safety EN 61010 EMC EN 61326 Class A
Dimensions	Approx. 106W × 19.8H × 196.5D mm (4.2W × 0.8H × 7.7D in.)
Weight	Approx. 250 g (8.8 oz.)
Maximum input voltage	(Direct input) 40 V DC (In combination with the 9665) 400 V DC
Maximum rated line-to-ground voltage	(Direct input) 30 V AC, 60 V DC (between each input channel and the enclosure, between any two of input channels) (In combination with the 9665) 300 V AC, DC, Measurement category II (between each input channel and the enclosure, between any two of input channels)
Options	L9197 Connection Cord (CAT IV 300 V, CAT III 600 V, 1 A) L9198 Connection Cord (CAT III 300 V, CAT II 600 V, 0.2 A) L9217 Connection Cord (CAT III 300 V, CAT II 600 V, 0.2 A) L9790 Connection Cord (with the L9790-01 or 9790-03: CAT III 300 V, CAT II 600 V, 1 A) (with the 9790-02: CAT III 150 V, CAT II 300 V, 1 A) 9322 Differential Probe (with grabber clips attached: CAT II 1000 V) (with alligator clip set attached: CAT III 600 V, CAT II 1000 V) P9000-01 Differential Probe (CAT III 1000 V) P9000-02 Differential Probe (CAT III 1000 V) 9665 10:1 Probe (CAT II 300 V) 9666 100:1 Probe (CAT II 300 V)

5

Maintenance and Service

WARNING



Do not touch the internal parts of this instrument as high voltage is generated in some parts. Customers are not allowed to modify, disassemble, or repair the instrument. Doing so may cause fire, electric shock, or injury.

Calibration

The frequency of calibration varies depending on the status of the instrument and installation environment. Determine the appropriate calibration interval based on your operating conditions and environment, and have Hioki calibrate the instrument accordingly.

Backing up your data

When repairing or calibrating the instrument, Hioki may reset it to factory settings or update it by installing the latest version of the firmware.

We recommend creating a backup copy (saving and recording) of the settings, measurement data, and other important information before requesting a repair.

Precautions during shipment

Be sure to observe the following precautions:

- To avoid damage to the instrument, remove all accessories and optional equipment from the instrument. Use the original packing materials in which the product was shipped. Damage that occurs during transport is not covered by the warranty.
- When sending the instrument for repair, be sure to include details of the problem.

To avoid straining some parts of the printer, and to prevent dirt adhering to the print head, close the printer cover.

Replaceable parts and service life

Some parts used in the instrument may deteriorate in characteristics after years of use.

It is recommended to replace these parts regularly to ensure long-term functionality.

To order replacements, please contact your authorized Hioki distributor or reseller.

Part service life varies with the operating environment and frequency of use. Recommended replacement intervals do not guarantee continuous operation throughout the specified period.

Part	Recommended replacement cycle	Remarks/conditions
Fan motor	Approx. 4 years	
Print head	After using approx. 1000 rolls of recording paper	When U8351 Printer Unit is installed
LCD backlight (Half-life of brightness)	Approx. 80,000 hours	At an ambient temperature of 25°C (77°F) The service life varies greatly depending on the ambient environment. The service life becomes shorter under high temperature in particular.
U8334 Internal Storage	Approx. 5 years (continuous writing)	In ambient environment of 25°C (77°F) Total bytes written (TBW): Approx. 2900 TB Data retention period: Approx. one year (When power is Off) It is recommended to back up the data at regular intervals.
Electrolytic capacitor	Approx. 4 years	The board on which this part is installed should be replaced.

Part	Recommended replacement cycle	Remarks/conditions
Lithium battery	Approx. 10 years	The instrument contains an built-in lithium battery for memory backup, which offers a service life of about 10 years. If the date and time deviate substantially when the instrument is switched on, the battery should be replaced. Please contact your authorized Hioki distributor or reseller.

The fuse is housed in the power unit of the instrument. If the power does not turn on, the fuse may be blown. If this occurs, replacement or repair cannot be performed by the customer. Please contact your authorized Hioki distributor or reseller.

5.1 Troubleshooting

If damage is suspected, review the “Before requesting repairs” section before contacting your authorized Hioki distributor or reseller.

Before requesting repairs

Power and operating keys malfunction

Condition	Cause	Remedy and reference
Turning on the instrument does not cause the screen to display something.	The power cord is disconnected. The power cord is not connected properly.	Connect the power cord properly. “2.5 Supplying Power” (p. 27)
Keys do not work.	<ul style="list-style-type: none"> One of the keys is pressed and being held down. The key lock is engaged (the key lock message is displayed). 	<ul style="list-style-type: none"> Check if the keys are stuck. Disengage the key lock. (Hold down the ESC key for three seconds.)

Display or operation malfunction

Condition	Cause	Remedy and reference
Blank screen	The backlight saver is engaged.	Press any key, or set the backlight saver to [Off] .
Pressing the START key does not allow any waveforms to appear on the screen.	The pre-trigger is engaged. When the pre-trigger is activated, the instrument will not trigger until the pre-trigger memory is fully filled. Recording starts when the instrument triggers.	“9.8 Setting the Pre-trigger” in the Instruction Manual
The displayed waveforms do not change.	<ul style="list-style-type: none"> The clamp sensor or connection cord is not connected correctly. The vertical axis (voltage axis) range is not set properly. The low-pass filter is not set properly. 	<ul style="list-style-type: none"> Connect the optional items, such as the clamp sensor and connection cord, properly. Set the vertical axis (voltage axis) range properly. Set the low-pass filter properly.
While measuring a signal using the memory function, the displayed frequency is significantly lower than the actual frequency.	Aliasing error may be occurring.	Change the timebase setting to a faster sampling rate. Press the AUTO key to execute the automatic setting. “Recording length and the number of samples” in the Instruction Manual
Changing the input range setting does not cause the displayed waveform size to change.	The variable function is set to [On] .	Set the variable function set to [Off] . “8.6 Setting the Waveform Position (Variable Function)” in the Instruction Manual

No printing or printing malfunction (When U8351 Printer Unit is installed)

Condition	Check for	Remedy and reference
Nothing is printed on the paper.	The recording paper is loaded incorrectly (backside facing forward).	Load the recording paper properly. "2.4 Loading Recording Paper (When U8351 Printer Unit is Installed)" (p. 26)
The printout is too light.	<ul style="list-style-type: none"> The specified recording paper is not being used. The print density setting is incorrect. The print head is dirty. 	<ul style="list-style-type: none"> Use the specified recording paper. Change the print density setting. "6.5 Configuring the Printer Settings" in the Instruction Manual. Clean the print head. "Cleaning the print head (When U8351 Printer Unit is installed)" (p. 57)
The recorded trace is too wide.	The input signal may have a ripple component.	Enable the filter in the unit settings. "Analog channel settings" in the Instruction Manual
The recorded trace is doubled.	<p>The waveform printing density is set to [Light].</p> <p>If the printing density is set to [Light], gaps appear between printed dots in the vertical direction. Thus, a slightly varying signal is printed as the waveform that can seem to be one line or two lines.</p>	<p>Set the waveform printing density to any setting other than [Light]. ([Printer] sheet)</p> <p>"6.5 Configuring the Printer Settings" in the Instruction Manual</p>

Saving data is not possible

Condition	Check for	Remedy and reference
Saving data on the storage device is not possible.	<ul style="list-style-type: none"> The specified SD card is not used. The storage device is not inserted properly. The storage device is not formatted. There is insufficient space on the storage device. The number of files in the folder has reached its maximum limit. 	<ul style="list-style-type: none"> Use the specified SD card. Insert the storage device completely. Format the storage device. Use a storage device with sufficient space available. Relocate some files in the folder. <p>"2.3 Preparing Storage Devices" and "To select a storage device" in the Instruction Manual</p>
The USB flash drive cannot be used.	The configured settings do not allow usage of a USB flash drive.	Change the settings so that a USB flash drive can be used. "USB usage" in the Instruction Manual

Other limitations

Condition	Check for	Remedy and reference
The USB communications cannot be used.	The USB communication settings have not been configured.	Configure the USB communication settings. "Configuring the USB settings with the instrument" in the Instruction Manual
The USB driver cannot be installed.	[Interface] is not set to [USB] .	Set [Interface] to [USB] . "Configuring the USB settings with the instrument" in the Instruction Manual
	A driver for a different product is installed.	In the PC's [Device Manager] , delete [Other Devices] and then install the USB driver for the MR8848.

If the cause is unknown

Reset the system. The settings are reset and initialized.

Refer to "19.2 Resetting the Instrument" in the Instruction Manual.

5.2 Error Messages

When an error is displayed, the instrument needs repair. Please contact your authorized Hioki distributor or reseller.

A message is displayed whenever an error occurs. When an error occurs, take the remedial action indicated below.

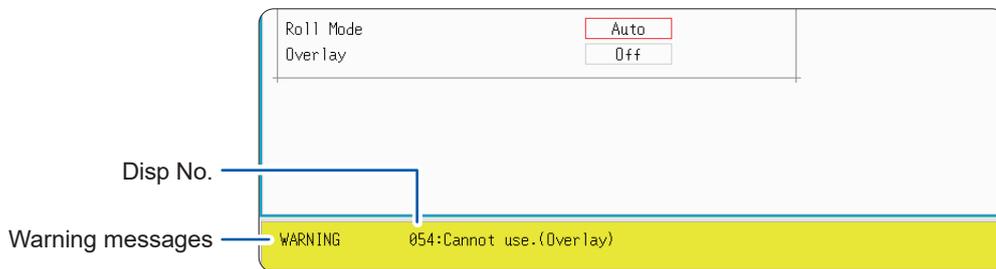
A beep may sound if the beeper setting on the **[Environment]** sheet is set to **[Warning]** or **[Warn + Act]**.

Refer to “15 Setting the System Environment” in the Instruction Manual.

Warning display

Appears just once when an error occurs. Disappears within a few seconds.

Also disappears when any key is pressed.



Warning messages

Disp No.	Message	Remedy	Reference
003	Out of paper.	Load another roll of paper.	“2.4 Loading Recording Paper (When U8351 Printer Unit is Installed)” in the Instruction Manual
004	Printer cover is open.	Close the printer cover.	
005	Recording length is set to Continuous.	When the recording length (Shot) is set to [Cont.] or [On] , real-time printing is not available with a fast timebase setting.	“Recording length (number of divisions)” in the Instruction Manual
006	Cannot set. (Time/Div 10 ms to 200 ms)	When the recording length (Shot) is set to [Cont.] or [On] , the printer cannot be used.	
010	Set the recording media.	Set the storage device.	“2.3 Preparing Storage Devices” in the Instruction Manual
011	Wrong recording format.	The storage device was formatted in an unsupported format. Format the storage device.	“Formatting storage devices” in the Instruction Manual
012	Cannot write.	The write protection is engaged of the storage device. Disable it.	–
013	Disk full while accessing the file.	Saving files is not possible because of insufficient space on the storage device. Delete files or change the storage device. If the instrument is performing measurement, stop the measurement, and then change the storage device.	“Deleting files and folders” in the Instruction Manual

Disp No.	Message	Remedy	Reference
014	File is read only.	The file is read-only. Deleting the file is prohibited.	–
015	Access to the file was denied.	An internal fault may have occurred in the instrument. Cycle the instrument. The file is corrupt, or the file contents are not in a readable format. Check the file contents.	–
016	The file name already exists: cannot save.	Change the file name.	"Renaming files and folders" in the Instruction Manual
017	The folder name already exists.	Change the folder name.	
018	Not enough free space in the folder to create file.	Either delete files in the saving destination folder or change the destination to another folder.	–
019	Folder not empty.	The folder contains files. Be careful not to delete the necessary files.	–
020	The maximum length of a file name, including its path, is 255 characters.	Reduce the number of characters of the path name including the filename to 255 or less.	–
021	Internal error.	An internal error occurred. Check the storage device.	–
022	No waveform data to save.	Acquire waveform data.	–
024	There is no calculation result.	There is no calculation result. After performing calculation, print the results.	"10 Numerical Calculation Function" in the Instruction Manual
025	Cannot select this media.	You cannot select this storage device as a destination of auto-saving. Select another device.	–
026	Invalid folder path.	The root folder cannot be specified.	–
027	When executing, select [No] as the save property.	Selective saving cannot be performed because other dialog boxes are displayed. Either the selective saving during execution to [No] or close the dialog box and save data again.	"Saving data selectively (SAVE key)" in the Instruction Manual
028	Pressed key invalid (waveform evaluation).	Unable to perform the operation because the waveform evaluation is enabled. Set the waveform evaluation set to [Off].	"14.3 Configuring the Waveform Evaluation Setting" in the Instruction Manual
029	The recording length was restricted.	–	–
030	Auto-ranging failed.	Check the input signal.	"3.6 Measurement in Automatic Range Setting (Auto-Range Function)" in the Instruction Manual
031	AB cursor positions invalid.	Cursors A and B are at the same position. Check the cursor positions.	"7.2 Specifying the Waveform Range (Cursors A and B)" in the Instruction Manual

Disp No.	Message	Remedy	Reference
032	Zero-adjustment needed.	Perform the zero-adjustment.	"2.7 Adjusting the Zero Position (Zero-Adjustment)" (p. 29)
033	Disabled key.	Close the dialog box.	–
034	Invalid key pressed (Overlay)	The key operation is prohibited because the overlay is enabled. Set the overlay to [Off] .	"8.3 Overlaying New Waveforms with Past Waveforms" in the Instruction Manual
036	No trigger has been set.	Set the trigger conditions.	"9 Setting the Trigger" in the Instruction Manual
038	Use of logic channels has reduced analog waveform resolution from 16 to 12 bits.	Using channels LA to LD reduces the resolution of CH1 to CH4 to 12 bits.	"8.10 Setting Details of Units" in the Instruction Manual
039	Auto-balance failed.	Check if no load is applied to the strain gauge transducer and the strain gauge transducer is correctly connected to a measuring object.	"Setting the 8969 and U8969 Strain Units" in the Instruction Manual
040	Voltage Sag triggering is disabled. (Valid time base range: 20 μ s/div to 50 ms/div)	You can use the voltage sag triggering only when setting the timebase to one between 20 μ s/div and 50 ms/div.	"9.3 Triggering the Instrument Using Analog Signals" in the Instruction Manual
041	Channels that are not measurable will be assigned to X-Y.	The channel not specified in the [Used Ch] box is selected. Change the channel selection.	"8.4 Setting Channels to be Used (Extending the Recording Length)" in the Instruction Manual
042	There is not enough data in the memory.	Measure the necessary amount of data required for the calculation.	"11.1 Waveform Calculation Workflow" in the Instruction Manual
043	Stopped.	–	–
044	Current clamp/sensor was recognized.	–	–
045	Current clamp/sensor was disconnected.	Check the connection of the current clamps and the current sensors.	–
046	Channels may no longer be able to be used by frequency units due to logic channel use.	If LA to LE are used, the frequency units cannot be used at CH1 to CH4.	"Logic channel settings" in the Instruction Manual
047	This module cannot be used because it is not AAF aligned.	Press the SYSTEM key to display the [Init] sheet. Execute [System Information] and check the software items.	–
048	There are module on which AAF cannot be set to On because of lack of adjustment.	If [Not AAF aligned] is displayed, send the unit for repair.	
050	Roll Mode is not available.	Roll mode cannot be used when the overlay is enabled.	"8.2 Displaying Waveforms Simultaneously During Writing to the Memory (Roll Mode)" in the Instruction Manual
051	Cannot use. (Pre-Trigger)	The pre-trigger function is not available when using the external sampling.	"17 Controlling the Instrument Externally" in the Instruction Manual

Disp No.	Message	Remedy	Reference
052	Cannot use. (Roll Mode, Memory Division)	If the waveform calculation function is in use, these functions cannot be used.	"11.1 Waveform Calculation Workflow" in the Instruction Manual
053	Cannot use. (Roll Mode, Memory Division, Wave Calculation)	If one of the functions is in use, the other functions cannot be used.	"8.2 Displaying Waveforms Simultaneously During Writing to the Memory (Roll Mode)" in the Instruction Manual
054	Cannot use. (Overlay)	The overlay function is not available when using the roll mode.	"8.3 Overlaying New Waveforms with Past Waveforms" in the Instruction Manual
055	Cannot use. (Overlay, Memory Division, Wave Calculation)	If roll mode is in use, these functions cannot be used.	"8.2 Displaying Waveforms Simultaneously During Writing to the Memory (Roll Mode)" in the Instruction Manual
056	Real-time printing is not available.	The recording length (Shot) is set to [Cont.] or [On]. Real-time printing is not available when using the recorder function with a faster timebase setting.	"Recording length (number of divisions)" and "6.2 Setting Auto-printing" in the Instruction Manual
057	Cannot set.(External sampling)	Cannot use roll mode when using the external sampling.	"8.2 Displaying Waveforms Simultaneously During Writing to the Memory (Roll Mode)" in the Instruction Manual
058	Rated capacity/rated output error.	The value calculated from the rated capacity and rated output exceed the selected range. Input correct values.	"When using the 8969 or U8969 Strain Unit" in the Instruction Manual
059	Cannot use. (Roll Mode, Wave Calculation)	If the memory division function is in use, these functions cannot be used.	"12.1 Configuring the Recording Settings" in the Instruction Manual
060	No waveform data.	Acquire waveform data.	–
065	Dot interpolation may takes place for sampling speed 1 ms/S.	Set the sampling rate to 1 ms/S or longer.	"4.2 Setting Measurement Conditions" in the Instruction Manual
068	Recording length is too long.	Shorten the measurement recording length. The maximum recording length that can be calculated is 80,000 div.	"Recording length (number of divisions)" in the Instruction Manual
080	In key lock.	The key lock function is engaged. Disengage the key lock function.	"KEY LOCK:" (p. 17)

Disp No.	Message	Remedy	Reference
091	LAN: Bad IP address.	Check the IP address.	"16.1 Setting LAN and Connecting the Instrument to the LAN Network (Before Using FTP/Internet Browser/Command Communications)" in the Instruction Manual
093	LAN: Can not connect to server.	Verify that the LAN cable is securely connected.	
		Verify that 9333 LAN Communicator (data collection application) on the connected computer is in the standby state.	
		Verify that LAN communication setting is enabled.	
		Verify that the connected computer's IP address is set correctly.	"16.9 Operating the Instrument Remotely and Acquiring Data Using 9333 LAN Communicator" in the Instruction Manual
095	LAN: Connection timed out.	Check the transmission settings.	"16.1 Setting LAN and Connecting the Instrument to the LAN Network (Before Using FTP/Internet Browser/Command Communications)" in the Instruction Manual
097	LAN: Network error.	Check the connection between the instrument and connection destination.	
100	Inappropriate setting of time axis for waveform data.	Set the timebase to the setting with which the waveform was measured.	"Timebase and sampling rate" and "9.1 Setting Procedure" in the Instruction Manual
101	Some blocks are different in time axis setting from the others.	Set the same timebase setting for all search target blocks. If they cannot be the same, set the search range to the displayed blocks only.	
102	Some blocks are different in units configuration from the others.	Unify the units configuration of the search target blocks. If they cannot be the same, set the search range to the displayed blocks only.	"9.11 Searching the Measured Data Using the Trigger Settings" in the Instruction Manual
103	No data matching your search condition.	Check the trigger setting.	
104	There is no data in the search target channel.	Select the channels including measured data as the search target.	
105	There is a block including no data in the search target channel.	Select the blocks including measured data as the search target.	"9.11 Searching the Measured Data Using the Trigger Settings" in the Instruction Manual
106	Some blocks are different in measurement mode of units from the others.	Blocks created with different measurement modes cannot be searched.	–
110	No space to store waveform data at copy location.	Create empty space by deleting the waveform data from the copy location.	"8.11 Registering Waveforms in the U8793 Arbitrary Waveform Generator Unit" in the Instruction Manual
111	No space to register arbitrary waveform data.	Create empty space by deleting waveform data from registration location.	"8.11 Registering Waveforms in the U8793 Arbitrary Waveform Generator Unit" in the Instruction Manual

5.3 Cleaning

Cleaning the print head (When U8351 Printer Unit is installed)

⚠ WARNING



The print head and surrounding metal parts can become hot. Perform cleaning only after making sure that the parts have cooled fully. Be careful to avoid touching these parts.

Normally, no maintenance is required. However, depending on usage conditions, dirt and paper dust may accumulate on the thermal head over long periods, which can cause light or smeared printing. In that case, clean the head by following the procedure below.

Checking the print head

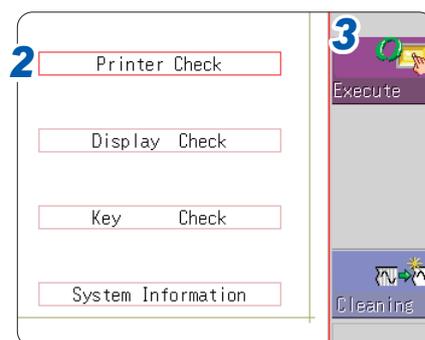
Before cleaning the print head

Check that the recording paper is loaded properly.

- 1** Press the **SYSTEM** key to display the [Init] sheet.
- 2** Move the cursor to the [Printer Check] box.
- 3** Select [Exec].

If the printing is blurred, clean the print head.

Executing [Cleaning] remove the paper dust readily. If sufficient improvement is not obtained even after cleaning the print head several times, cleaning the print head is required.



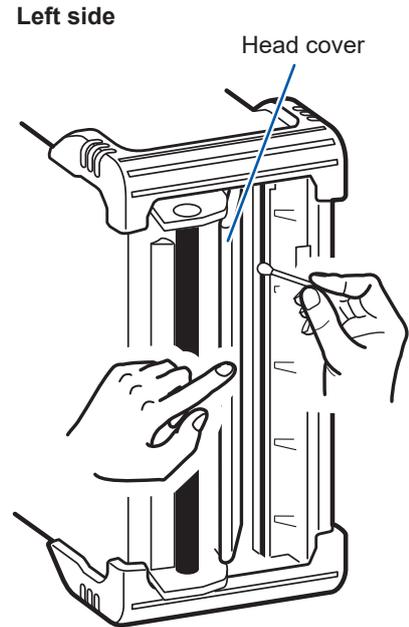
To clean the print head

Required items: Undiluted alcohol, cotton swab

- 1 **Moisten the end of the cotton swab with undiluted alcohol.**

Be careful not to apply too much undiluted alcohol.

- 2 **Open the head cover and wipe the print head with the tip of the cotton swab.**



Print head

Note the following precautions to avoid discoloration or deformation.

- Do not use organic solvents such as thinner or benzene.
- After washing, be certain that the printer is completely dry before use.

Roller surface

- White powder, such as paper dust, may accumulate on the roller surface with prolonged use. A small amount of the dust should have no effect on printing; however, you can remove it with a commercially available camera blower brush if it causes concern.
- Always use the paper cutter to cut the printed paper. Excessive paper dust can accumulate on the roller if the paper is cut with the print head.

To clean the instrument and units

⚠ CAUTION



- To clean the instrument and units, wipe it gently with a soft cloth moistened with water or mild detergent.
- Clean the vents periodically to avoid blockage. If the vents become clogged, the instrument's internal cooling will be impeded, which may result in damage.

IMPORTANT

Never use solvents such as benzene, alcohol, acetone, ether, ketone, thinners or gasoline. Doing so could deform and discolor the instrument.

Wipe the LCD gently with a soft, dry cloth.

Appendix

Options

Options

The following options are available for the instrument. Contact your authorized Hioki distributor or reseller when ordering. The options are subject to change. Visit our website for updated information. For details of cords and clamp sensors for connecting to the units and the instrument, refer to the manuals supplied with them.

The products marked “factory option” are not user-installable. To order these products additionally, contact your authorized Hioki distributor or reseller.

Unit (for generation)

These units can be installed along with a measurement unit.

Application	Model	Number of channels	Maximum output frequency	Output voltage
User-defined waveform generation	U8793 Arbitrary Waveform Generator Unit	2	100 kHz	-10 V to 15 V
Sine wave and DC generation	MR8790 Waveform Generator Unit	4	20 kHz	±10 V
Pulse generation	MR8791 Pulse Generator Unit	8	100 kHz	0 to 5 V

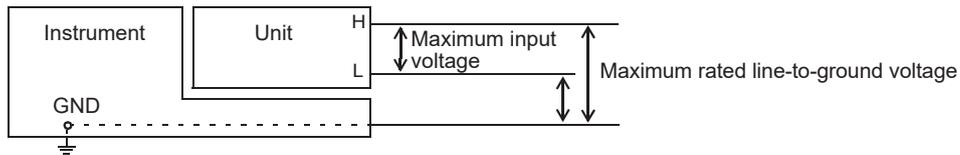
Units (Measurement amplifiers)

The units listed below can be inserted into the right side of the instrument. You can install these units freely.

Application	Model	Number of channels	Maximum sampling rate	A/D Resolution	Maximum input voltage	Maximum rated line-to-ground voltage
Voltage measurement	8966 Analog Unit	2	20 MS/s	12 bits	400 V DC	300 V AC, DC (CAT II)
	8968 High Resolution Unit	2	1 MS/s	16 bits	400 V DC	300 V AC, DC (CAT II)
	MR8990 Digital Voltmeter Unit	2	500 S/s	24 bits	500 V DC	300 V AC, DC (CAT II)
	U8975 4CH Analog Unit	4	5 MS/s	16 bits	200 V DC	300 V AC, DC (CAT II)
	U8978 4CH Analog Unit	4	5 MS/s	16 bits	Direct input: 40 V DC With the 9665 10:1 Probe used: 400 V DC	Direct input: 30 V AC, 60 V DC With the 9665 10:1 Probe used: 300 V AC, DC (CAT II)
RMS voltage measurement	8972 DC/RMS Unit	2	1 MS/s	12 bits	400 V DC	300 V AC, DC (CAT II)
	U8974 High Voltage Unit	2	1 MS/s	16 bits	1000 V DC 700 V AC	1000 V AC, DC (CAT III) 600 V AC, DC (CAT IV)

Application	Model	Number of channels	Maximum sampling rate	A/D Resolution	Maximum input voltage	Maximum rated line-to-ground voltage
Temperature (Thermocouple) measurement	8967 Temp Unit	2	–	16 bits	–	300 V AC, DC (CAT II)
Frequency, count, pulse duty, and pulse width measurements	8970 Freq Unit	2	–	16 bits	400 V DC	300 V AC, DC (CAT II)
Current measurement	8971 Current Unit	2	1 MS/s	12 bits	–	Not insulated.
	U8977 3CH Current Unit	3	5 MS/s	16 bits	–	Not insulated.
Strain (Strain-gauge type converter) measurement	U8969 Strain Unit	2	200 kS/s	16 bits	–	30 V rms AC or 60 V DC
Digital signals and contact signal measurement	8973 Logic Unit	16	20 MS/s	–	–	Not insulated.
Acceleration measurement (sensor with built-in pre-amplifier, charge-output sensor)	U8979 Charge Unit	2	200 kS/s	16 bits	40 V DC	30 V AC, 60 V DC

Refer to “18.6 Specifications of Units” in the Instruction Manual.



Measurement probes, cords, and clamp sensors

Application	Model	Description	Maximum input voltage	Maximum rated line-to-ground voltage
Voltage measurement	L9197 Connection Cord	For high voltage	600 V AC, DC	600 V AC, DC (CAT III) 300 V AC, DC (CAT IV)
	L9198 Connection Cord	For low voltage	300 V AC, DC	600 V AC, DC (CAT II) 300 V AC, DC (CAT III)
	L9790 Connection Cord		600 V AC, DC	With L9790-01 Alligator Clip Set or 9790-03 Contact Pin attached: 600 V AC, DC (CAT II) 300 V AC, DC (CAT III) With 9790-02 Grabber Clip attached: 300 V AC, DC (CAT II) 150 V AC, DC (CAT III)
	L9217 Connection Cord		300 V AC, DC	600 V AC, DC (CAT II) 300 V AC, DC (CAT III)
	9322 Differential Probe	For high voltage • The 9418-15 AC Adapter is required when connecting to the unit for voltage measurement.	2000 V DC, 1000 V AC	With grabber clips attached: 1000 V AC, DC (CAT II) With alligator clips attached: 1000 V AC, DC (CAT II) 600 V AC, DC (CAT III)
	P9000-01 Differential Probe P9000-02 Differential Probe	The Z1008 AC Adapter or a commercially available USB cable is required.	1000 V AC, DC	1000 V AC, DC (CAT III)
	9665 10:1 Probe	Maximum rated line-to-ground voltage is that of the unit.	1 kV rms (up to 500 kHz)	–
	9666 100:1 Probe	Maximum rated line-to-ground voltage is that of the unit.	5 kV peak (up to 1 MHz)	–
	9166 Connection Cord	For inputting voltage to the U8979	30 V AC, 60 V DC	–

Application	Model	Description	Maximum input voltage	Maximum rated line-to-ground voltage
Voltage measurement	L4940 Connection Cord	For U8974 High Voltage Unit	1000 V DC	With L4935 Alligator Clip Set or L4932 Contact Test Pin Set attached: 600 V AC, DC (CAT IV) 1000 V AC, DC (CAT III, CAT II)
				With L9243 Grabber Clip attached: 1000 V AC (CAT II)
				With L4936 Bus Bar Clip Set attached: 600 V AC, DC (CAT III)
				With L4937 Magnetic Adapter Set attached: 1000 V AC, DC (CAT III)
				With L4934 Small Alligator Clip Set attached: 300 V AC, DC (CAT III) 600 V AC, DC (CAT II)
Logic signal input	9320-01 Logic Probe	Four channels, for detecting voltage and closed/open contact points	–	–
	MR9321-01 Logic Probe	Four isolated channels, for detecting AC/DC voltage and closed/open contact points (small-terminal types, for lines)	High range 250 V rms Low range 150 V rms	250 V rms (CAT II)
	9327 Logic Probe	Four channels, for detecting voltage and closed/open contact points (high-speed type)	–	–
AC/DC current CT955X or 9318 is required for connection	9709 AC/DC Current Sensor* ¹	500 A, DC to 100 kHz	–	–
	CT6841 AC/DC Current Probe* ¹	20 A, DC to 1 MHz	–	–
	CT6843 AC/DC Current Probe* ¹	200 A, DC to 500 kHz	–	–
	CT6844 AC/DC Current Probe* ¹	500 A, DC to 200 kHz	–	–
	CT6845 AC/DC Current Probe* ¹	500 A, DC to 100 kHz	–	–
	CT6846 AC/DC Current Probe* ¹	1000 A, DC to 20 kHz	–	–
	CT6862 AC/DC Current Sensor* ¹	50 A, DC to 1 MHz	–	–
	CT6863 AC/DC Current Sensor* ¹	200 A, DC to 500 kHz	–	–
CT6865 AC/DC Current Sensor* ¹	1000 A, DC to 20 kHz	–	–	

*1. Discontinued Products

Application	Model	Description	Maximum input voltage	Maximum rated line-to-ground voltage
AC/DC current	CT6875 AC/DC Current Sensor* ¹	500 A, DC to 2 MHz	–	–
	CT6876 AC/DC Current Sensor* ¹	1000 A, DC to 1.5 MHz	–	–
	CT6877 AC/DC Current Sensor* ¹	2000 A, DC to 1 MHz	–	–
	CT6830 AC/DC Current Probe	2 A, DC to 100 kHz	–	–
	CT6831 AC/DC Current Probe	20 A, DC to 100 kHz	–	–
	CT6833, CT6833-01 AC/DC Current Probe	200 A, DC to 50 kHz	–	–
	CT6834, CT6834-01 AC/DC Current Probe	500 A, DC to 50 kHz	–	–
AC/DC current CT9920 is required for connection	CT7631 AC/DC Current Sensor	100 A, DC to 10 kHz	–	–
	CT7636 AC/DC Current Sensor	600 A, DC to 10 kHz	–	–
	CT7642 AC/DC Current Sensor	2000 A, DC to 10 kHz	–	–
	CT7731 AC/DC Auto-Zero Current Sensor	100 A, DC to 5 kHz	–	–
	CT7736 AC/DC Auto-Zero Current Sensor	600 A, DC to 5 kHz	–	–
	CT7742 AC/DC Auto-Zero Current Sensor	2000 A, DC to 5 kHz	–	–
AC current CT955X or 9318 is required for connection.	9272-10 Clamp on Sensor* ¹	20 A/ 200 A, 1 Hz to 100 kHz	–	–
AC current	9018-50 Clamp On Probe	10 A to 500 A, 40 Hz to 3 kHz	–	–
	9132-50 Clamp On Probe	20 A to 1000 A, 40 Hz to 1 kHz	–	–
Leakage current	9657-10 Clamp On Leak Sensor	10 A AC (Leakage current, 50 Hz/60 Hz)	–	–
Voltage generation	L9795-01 Connection Cable	Electrical clips	±30 V	30 V rms AC, 42.4 V peak AC or 60 V DC
	L9795-02 Connection Cable	For measuring output signal from a BNC connector		
Other limitations For connecting to voltage measuring units	CT9555, CT9556, CT9557 Sensor Unit	For 9272-05, 9709-05, CT6841-05, CT6843-05, CT6844-05, CT6845-05, CT6846-05, CT6862-05, CT6863-05	–	–
For connecting to 8971 Current Unit	9318 Conversion Cable	For 9272-10, 9709, CT6841, CT6843, CT6844, CT6845, CT6846, CT6862, CT6863, CT6865	–	–

*1. Discontinued Products

Application	Model	Description	Maximum input voltage	Maximum rated line-to-ground voltage
For connecting to 8971 Current Unit	9318 + CT9901 Conversion Cable	For 9272-05, 9709-05, CT6862-05, CT6863-05, CT6865-05, CT6841-05, CT6843-05, CT6844-05, CT6845-05, CT6846-05, CT6875, CT6876, CT6833, CT6833-01, CT6834, CT6834-01, CT6841A, CT6843A, CT6844A, CT6845A, CT6846A, CT6872, CT6872-01, CT6873, CT6873-01, CT6875A, CT6875A-1, CT6876A, CT6876A-1	–	–
For connecting to U8977 3CH Current Unit	CT9900 Conversion Cable	For 9272-10, 9709, CT6841, CT6843, CT6844, CT6845, CT6846, CT6862, CT6863, CT6865	–	–
	CT9920 Conversion Cable	For CT7631, CT7731, CT7636, CT7736, CT7642, CT7742, CT7044, CT7045, CT7046	–	–

For more information on the output rate of a clamp sensor, see the indication on each clamp sensor or the instruction manual.

Printer

Printer unit	U8351 Printer Unit	(specify when ordering)
Recording paper	9231 Recording Paper	A4-size width × 30 m, one set of 6 rolls For U8351 Printer Unit

Storage device (media)

SSD Unit	U8334 Internal Storage	Built-in SSD drive (specify when ordering)
USB flash drive	Z4006 USB Drive	16 GB
SD card	Z4001 SD Memory Card 2 GB	2 GB
	Z4003 SD Memory Card	8 GB

Software

Application software	9333 LAN Communicator	
	9335 Wave Processor	
License card	MR9001-01 Direct Write to Storage	Activation license for MR9001 Direct Write to Storage

Other limitations

Power supply	9784 DC Power Unit	Device to supply DC power to the instrument (factory option)
Case	9783 Carrying Case	Equipped with casters

9783 Carrying Case

The product warranty period of the 9783 Carrying Case is 1 year.

WARNING

The case may fall and cause injury or get damaged. Take care of the following to avoid any injury or damage.



- Do not stand or sit on the case.
 - Do not use the casters on any unstable or uneven platform, or on soft grounds.
- Take care while mounting/removing casters to prevent any injury.

CAUTION



The case may get damaged. Take care of the following to avoid any damage.

- Do not exceed the load capacity of the case (maximum 15 kg).
- Do not open or close the case in vertical position.



Do not place the case near fire or in places exceeding a temperature of 100°C because the case uses a flammable material. Doing so may cause a fire.

9784 DC Power Unit

The instrument can be operated on a DC power supply such as batteries.

If both of an AC power supply and the 9784 DC Power Unit are connected to the instrument, the AC power supply supplies the power preferentially. Note that when the instrument is operated on AC power supply and the 9784 is turned on, the 9784 will be in standby state but consume electricity. Turn off the 9784 when not in use.

The input voltage of the 9784 ranges between 10 V and 28 V DC.

WARNING



Before making connections, make sure the 9784 DC Power Unit is turned off. The instrument could be damaged by a spark if it is connected to a voltage source while its power supply is on.

CAUTION



Check polarity (positive/negative) and firmly connect the 9784 to a DC power supply. The 9784 may break down if the polarity is reversed.

Specifications of the 9784 DC Power Unit

The accuracy is provided at 23°C ±5°C (73.4F ±9F), 20% to 80% RH, 30 minutes after power on.

Rated input voltage	DC 12 V
Input voltage range	10 V to 28 V DC
Maximum rated power	200 VA
Operating temperature and humidity range	In accordance with the specifications of the Memory HiCorder in which the 9784 is installed
Storage temperature and humidity range	In accordance with the specifications of the Memory HiCorder in which the 9784 is installed
Operating environment	In accordance with the specifications of the Memory HiCorder in which the 9784 is installed
Dielectric strength	700 V DC for 1 minute (between input and output as well as input and enclosure)
Insulation voltage	100 MΩ or more/500 V DC (between input and output as well as between input and enclosure)
Dimensions	Approx. 290W × 220H × 32D mm (11.42W × 8.66H × 1.26D in.)
Weight	Approx. 1.2 kg (42.3 oz.)

Warranty Certificate

HIOKI

Model	Serial number	Warranty period Three (3) years from date of purchase (___ / ___)
-------	---------------	--

Customer name: _____

Customer address: _____

Important

- Please retain this warranty certificate. Duplicates cannot be reissued.
- Complete the certificate with the model number, serial number, and date of purchase, along with your name and address. The personal information you provide on this form will only be used to provide repair service and information about Hioki products and services.

This document certifies that the product has been inspected and verified to conform to Hioki's standards.

Please contact the place of purchase in the event of a malfunction and provide this document, in which case Hioki will repair or replace the product subject to the warranty terms described below.

Warranty terms

1. The product is guaranteed to operate properly during the warranty period (three [3] years from the date of purchase).
If the date of purchase is unknown, the warranty period is defined as three (3) years from the date (month and year) of manufacture (as indicated by the first four digits of the serial number in YYMM format).
2. If the product came with an AC adapter, the adapter is warranted for one (1) year from the date of purchase.
3. The accuracy of measured values and other data generated by the product is guaranteed as described in the product specifications.
4. In the event that the product or AC adapter malfunctions during its respective warranty period due to a defect of workmanship or materials, Hioki will repair or replace the product or AC adapter free of charge.
5. The following malfunctions and issues are not covered by the warranty and as such are not subject to free repair or replacement:
 - 1. Malfunctions or damage of consumables, parts with a defined service life, etc.
 - 2. Malfunctions or damage of connectors, cables, etc.
 - 3. Malfunctions or damage caused by shipment, dropping, relocation, etc., after purchase of the product
 - 4. Malfunctions or damage caused by inappropriate handling that violates information found in the instruction manual or on precautionary labeling on the product itself
 - 5. Malfunctions or damage caused by a failure to perform maintenance or inspections as required by law or recommended in the instruction manual
 - 6. Malfunctions or damage caused by fire, storms or flooding, earthquakes, lightning, power anomalies (involving voltage, frequency, etc.), war or unrest, contamination with radiation, or other acts of God
 - 7. Damage that is limited to the product's appearance (cosmetic blemishes, deformation of enclosure shape, fading of color, etc.)
 - 8. Other malfunctions or damage for which Hioki is not responsible
6. The warranty will be considered invalidated in the following circumstances, in which case Hioki will be unable to perform service such as repair or calibration:
 - 1. If the product has been repaired or modified by a company, entity, or individual other than Hioki
 - 2. If the product has been embedded in another piece of equipment for use in a special application (aerospace, nuclear power, medical use, vehicle control, etc.) without Hioki's having received prior notice
7. If you experience a loss caused by use of the product and Hioki determines that it is responsible for the underlying issue, Hioki will provide compensation in an amount not to exceed the purchase price, with the following exceptions:
 - 1. Secondary damage arising from damage to a measured device or component that was caused by use of the product
 - 2. Damage arising from measurement results provided by the product
 - 3. Damage to a device other than the product that was sustained when connecting the device to the product (including via network connections)
8. Hioki reserves the right to decline to perform repair, calibration, or other service for products for which a certain amount of time has passed since their manufacture, products whose parts have been discontinued, and products that cannot be repaired due to unforeseen circumstances.

HIOKI E.E. CORPORATION

<http://www.hioki.com>

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HIOKI
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