

HIOKI

Measurement Guide

LR8431-20

MEMORY HiLOGGER

HIOKI E. E. CORPORATION

April 2013 Revised edition 2 LR8431B981-02 13-04H

Procedure

Operation and Screen Types (p.12)	Describes the screen types and an overview of the operating keys.
Measurement Procedure (p.16)	Describes procedures from measurement preparation to analysis.
Monitoring Voltage Fluctuations (p.19)	This section describes voltage measurement using an AC transducer* to acquire voltage fluctuation data for one week, with the data automatically saved on a CF card. * The example transducer provides 0 - 10 V DC output proportional to 0 - 150 Vrms AC input.
Monitoring Temperature Changes (p.21)	This section describes temperature measurement using a type K thermocouple to acquire temperature data once per second, for monitoring temperature changes. The post-measurement saving method is also described.
Monitoring Energy Consumption (p.24)	This section describes pulse measurement using a watt-hour meter* to acquire integrated power consumption data for one month. * The example watt-hour meter provides an output of 50,000 pulses/kWh.
Analysis (p.26)	View and calculate waveform measurement values using the A/B cursors.

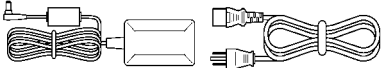
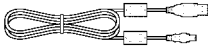
Introduction

Thank you for purchasing the HIOKI "Model LR8431-20 Memory HiLogger."
This Measurement Guide consists of some basic application examples. Before using the instrument, be sure to read the Instruction Manual carefully.

Confirming Package Contents

When you receive the instrument, inspect it carefully to ensure that no damage occurred during shipping. In particular, check the accessories, panel switches, and connectors. If damage is evident, or if it fails to operate according to the specifications, contact your dealer or Hioki representative.

Confirm that these contents are provided.

- | | |
|---|---|
| ☐ Model LR8431-20 1
Memory HiLogger
 | ☐ Measurement Guide
(This document) 1
 |
| ☐ Model Z1005 AC Adapter 1
with supplied power cord
 | ☐ USB Cable 1

☐ CD 1
<ul style="list-style-type: none"> • Instruction Manual (PDF) • Logger Utility Instruction Manual (PDF) • Logger Utility (Data acquisition application program)  The latest version can be downloaded from our web site. |

About options: Contact your dealer or Hioki representative for details.

- | | |
|--|--|
| ☐ Model 9780 Battery Pack
☐ Model Z1005 AC Adapter
☐ Model 9641 Connection Cable (for pulse inputs)
☐ Model 9782 Carrying Case
☐ Model 9812 Soft Case | ☐ Model 9727 PC Card (256MB)
☐ Model 9728 PC Card (512MB)
☐ Model 9729 PC Card (1GB)
☐ Model 9830 PC Card (2GB)
☐ Model 9809 Protection Sheet |
|--|--|

Safety Information



This instrument is designed to comply with IEC 61010 Safety Standards, and has been thoroughly tested for safety prior to shipment. However, mishandling during use could result in injury or death, as well as damage to the instrument. However, using the instrument in a way not described in this manual may negate the provided safety features. Be certain that you understand the instructions and precautions in the manual before use. We disclaim any responsibility for accidents or injuries not resulting directly from instrument defects.

This manual contains information and warnings essential for safe operation of the instrument and for maintaining it in safe operating condition. Before using it, be sure to carefully read the following safety precautions.

Safety Symbols

	In the manual, the symbol indicates particularly important information that the user should read before using the instrument.
	The symbol printed on the instrument indicates that the user should refer to a corresponding topic in the manual (marked with the symbol) before using the relevant function.
	Indicates DC (Direct Current).
	Indicates AC (Alternating Current).
	Indicates the ON side of the power switch.
	Indicates the OFF side of the power switch.

The following symbols in this manual indicate the relative importance of cautions and warnings.

	Indicates that incorrect operation presents an extreme hazard that could result in serious injury or death to the user.
	Indicates that incorrect operation presents a significant hazard that could result in serious injury or death to the user.
	Indicates that incorrect operation presents a possibility of injury to the user or damage to the instrument.
	Indicates advisory items related to performance or correct operation of the instrument.

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Safety Information

Symbols for Various Standards

	This symbol indicates that the product conforms to safety regulations set out by the EC Directive.
	This is a recycle mark established under the Resource Recycling Promotion Law (only for Japan).
	WEEE marking: This symbol indicates that the electrical and electronic appliance is put on the EU market after August 13, 2005, and producers of the Member States are required to display it on the appliance under Article 11.2 of Directive 2002/96/EC (WEEE).

Other Symbols

	Indicates the prohibited action.
(p. #)	Indicates the location of reference information.
*	Indicates that descriptive information is provided below.
[]	The names of setting objects and buttons on the screen are indicated by square brackets [].
SET (Bold characters)	Bold characters within the text indicate operating key labels.
Unless otherwise specified, "Windows" represents Windows 2000, Windows XP, Windows Vista, Windows 7 or Windows 8.	
Click: Press and quickly release the left button of the mouse. Double click: Quickly click the left button of the mouse twice.	

Accuracy

We define measurement tolerances in terms of f.s. (full scale), rdg. (reading) and dgt. (digit) values, with the following meanings:

f.s. (maximum display value or scale length)

The maximum displayable value or scale length. This is usually the name of the currently selected range.

Example: For the 1 V range, f.s. = 1 V

rdg. (reading or displayed value)

The value currently being measured and indicated on the measuring instrument.

dgt. (resolution)

The smallest displayable unit on a digital measuring instrument, i.e., the input value that causes the digital display to show a "1" as the least-significant digit.

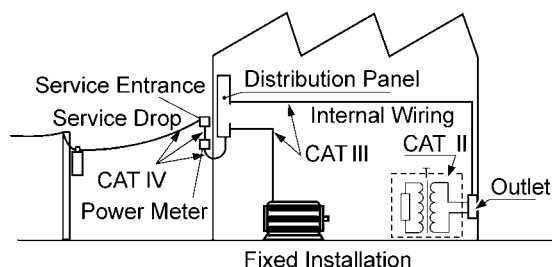
Measurement categories

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

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

Using a measurement 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.

Use of a measurement instrument that is not CAT-rated in CAT II to CAT IV measurement applications could result in a severe accident, and must be carefully avoided.

**Difference between "Measurement" and "Recording"**

The measurement and recording processes are distinguished as follows for the purposes of these instructions.

Measurement:	The acquisition of input values into internal HiLogger memory or to a PC via communications.
Recording:	Storing measurement data on a CF card, USB flash drive or on a PC via data communication.

Measured data (data acquired in internal memory) is erased whenever a new measurement starts. To retain data, always record (save) it.

Operating Precautions



Follow these precautions to ensure safe operation and to obtain the full benefits of the various functions.

Before Use

- Before using the instrument for the first time, verify that it operates normally to ensure that no damage occurred during storage or shipping. If you find any damage, contact your dealer or Hioki representative.
- Before using the instrument, make sure that the insulation on the cables is undamaged and that no bare conductors are improperly exposed. Using the instrument in such conditions could cause an electric shock, so contact your dealer or Hioki representative for replacements.

Instrument Installation

- Operating temperature and humidity: 0 to 40°C at 80% RH or less (non-condensing)
- Temperature and humidity range for guaranteed accuracy: 23±5°C, 80%RH or less

Avoid the following locations that could cause an accident or damage to the instrument.



Exposed to direct sunlight
Exposed to high temperature



In the presence of corrosive or explosive gases



Exposed to water, oil, other chemicals, or solvents
Exposed to high humidity or condensation



Exposed to strong electromagnetic fields
Near electromagnetic radiators



Exposed to high levels of particulate dust



Near induction heating systems (e.g., high-frequency induction heating systems and IH cooking utensils)



Subject to vibration



CAUTION

The maximum operating (ambient) temperature for the LR8431-20 is 40°C. Do not attempt to use in higher temperature environments.

NOTE

- Correct measurement may be impossible in the presence of strong magnetic fields, such as near transformers and high-current conductors, or in the presence of strong electromagnetic fields such as near radio transmitters.
- If liquid enters the enclosure through an air vent or other opening, it may damage the instrument's internal circuitry. Exercise caution concerning the surrounding environment when installing the instrument.

Installation Precautions

- If the instrument is used in any state other than the following, the measurement accuracy may not satisfy the device specifications.

Horizontal placement



Upright placement



- Leave sufficient space around the ventilation holes and install the instrument with the holes unobstructed.
- Avoid temperature changes around the terminal block. Especially avoid directed airflow such as from an electric fan or air conditioner vent. Thermocouple inputs are prone to measurement errors.
- When the HiLogger is moved to a location with significantly different ambient temperature, allow at least 30 minutes for thermal equalization before measuring.

Handling the Instrument**! WARNING**

- Do not allow the instrument to get wet, and do not take measurements with wet hands. This may cause an electric shock.
- Do not attempt to modify, disassemble or repair the instrument; as fire, electric shock and injury could result.

! CAUTION

To avoid damage to the instrument, protect it from physical shock when transporting and handling. Be especially careful to avoid physical shock from dropping.

NOTE

This instrument may cause interference if used in residential areas. Such use must be avoided unless the user takes special measures to reduce electromagnetic emissions to prevent interference to the reception of radio and television broadcasts.

Handling the Cords and Cables

- Avoid stepping on or pinching cables, which could damage the cable insulation.
- To avoid breaking the cables and probes, do not bend or pull them.
- To avoid damaging the power cord, grasp the plug, not the cord, when unplugging it from the power outlet.

Before Turning Power On**Using the Battery Pack**

- For battery operation, use only the HIOKI Model 9780 Battery Pack. We do not take any responsibility for accidents or damage related to the use of any other batteries.

See: For more information about the battery pack, see the instruction manual (on the included CD).

Using the AC Adapter

- Use only the supplied Model Z1005 AC Adapter. AC adapter input voltage range is 100 to 240 VAC (with $\pm 10\%$ stability) at 50/60 Hz. To avoid electrical hazards and damage to the instrument, do not apply voltage outside of this range.
- Turn the instrument off before connecting the AC adapter to the instrument and to AC power.
- To avoid electrical accidents and to maintain the safety specifications of this instrument, connect the power cord provided only to a 3-contact (two-conductor + ground) outlet.
- Use only the designated power cord with this instrument. Use of other power cords may cause fire.
- 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.



When the power is turned off, do not apply voltage or current to the connectors. Doing so may damage the instrument.



- After use, always turn OFF the power.
- Brief power interruptions of 40 ms or less will not cause this instrument to malfunction. However, Longer interruptions may cause the Memory HiLogger to shut itself off, so consider local power conditions before installing, as appropriate.
- To ensure that recording is not interrupted by power outages, you can use the Z1005 AC Adapter and 9780 Battery Pack together.

About Inputs and Measurement

⚠ DANGER

- The maximum input voltage (and the maximum rated voltage to earth) for the analog input terminals is 30 Vrms (or 60 V DC). If these limits are exceeded, the instrument may be damaged and personal injury or death could occur, so do not attempt measurement.
- Do not leave the Memory HiLogger connected to test objects in environments where a voltage surge might exceed the dielectric withstand voltage. Doing so could result in damage to the Memory HiLogger, bodily injury or fatal accident.
- Channels are insulated by semiconductor relays. When a voltage beyond the specification is applied between the channels, the semiconductor relay may short circuit. Please ensure that a voltage beyond specification, especially a surge such as a lightning, is never applied. When an abnormal measurement value is observed, please contact your dealer or Hioki representative for inspection.

NOTE

The waveform for an open channel may sometimes appear to be influenced by the signals of the other channels being measured. If you do not like this, please set the waveform display of the open channel to OFF or short-circuit the input terminals of the open channel by connecting the positive and negative terminal.

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Operating Precautions

CD Handling



- Always hold the disc by the edges, so as not to make fingerprints on the disc or scratch the printing.
- Never touch the recorded side of the disc. Do not place the disc directly on anything hard.
- Do not wet the disc with volatile alcohol or water, as there is a possibility of the label printing disappearing.
- To write on the disc label surface, use a spirit-based felt pen. Do not use a ball-point pen or hard-tipped pen, because there is a danger of scratching the surface and corrupting the data. Do not use adhesive labels.
- Do not expose the disc directly to the sun's rays, or keep it in conditions of high temperature or humidity, as there is a danger of warping, with consequent loss of data.
- To remove dirt, dust, or fingerprints from the disc, wipe with a dry cloth, or use a CD cleaner. Always wipe from the inside to the outside, and do no wipe with circular movements. Never use abrasives or solvent cleaners.
- Hioki shall not be held liable for any problems with a computer system that arises from the use of this CD, or for any problem related to the purchase of a Hioki product.

Using a CF Card/USB flash drive

CAUTION

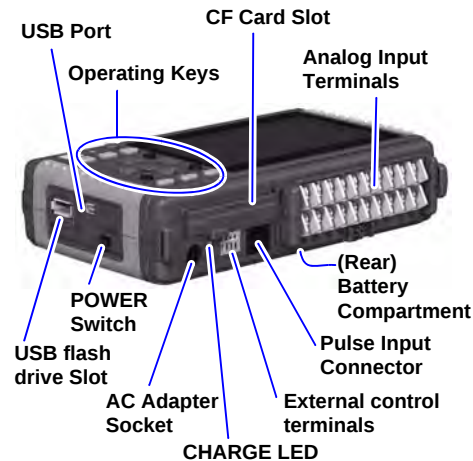
- Inserting a CF card/USB flash drive upside down, backwards or in the wrong direction may damage the CF card, USB flash drive, or HiLogger.
- Never eject a CF card /USB flash drive while measuring or when the HiLogger is or accessing the card. Data on the CF card/USB flash drive may be destroyed. (The CF icon/USB flash drive icon at the lower right is red while the card is being accessed.)
- Do not transport the HiLogger while a USB flash drive is connected. Damage could result.
- As the CF card/USB flash drive is sensitive to static electricity, damage to the CF card/USB flash drive or wrong operations by the HiLogger may occur due to static electricity. Please be careful when handling it.
- With some USB flash drives, the HiLogger may not start up if power is turned on while the USB flash drive is inserted. In such a case, turn power on first, and then insert the USB flash drive. It is recommended to try out operation with a USB flash drive before starting to use it for actual measurements.

NOTE

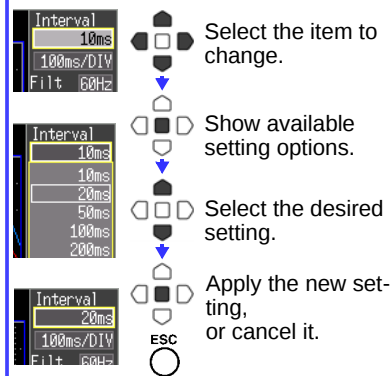
- The Flash memory in a CF card/USB flash drive has a limited operating life. After long-term usage, data storage and retrieval become difficult. In this case, replace the CF card/USB flash drive with a new one.
- We cannot provide compensation for data loss in a CF card/USB flash drive, regardless of content or cause of the damage. Data is also cleared from memory if a long time passes after measuring. Always maintain a backup of important data stored on a CF card/USB flash drive.
- Although real-time saving to USB flash drive is supported, a CF card is recommended for data preservation. Performance cannot be guaranteed when using storage media other than a Hioki-specified CF card option.
- Use a USB flash drive whose continuous current consumption does not exceed 300 mA (peak 500 mA). (The peak value is displayed as "Max Power" under the USB flash drive self-test on the [System] screen.)
- Depending on how USB is used, the USB connector and instrument settings may vary as shown in the chart below.
- The three USB methods of use described in the chart below involve exclusive settings and cannot be used simultaneously.

USB method of use	Connector used	[System] screen USB mode setting
Use a USB flash drive.	Type A	USB Memory (Default)
Communicate with the LR8431-20 and initiate measurement using the Logger Utility software from a computer (using a USB cable).	Type B	USB Communication
Read files on a CF card that is connected to the LR8431-20 from a computer (using a USB cable).	Type B	USB Drive

Operation and Screen Types



Changing screen contents



Operating Keys

Choose a screen

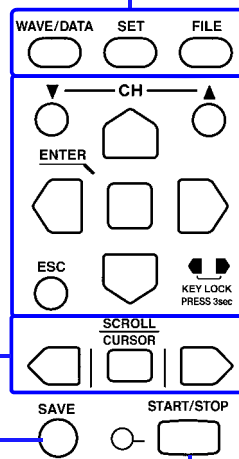
- **WAVE/DATA**
Selects among waveform screen displays (p. 13).
- **SET**
Displays the Settings screens, and switches among the screen tabs with each press (p. 14).
- **FILE**
Displays file information (p. 15).

Scroll waveforms and read cursor values

Press the center key to select waveform scrolling or A/B cursor movement, then press the left and right cursor keys to scroll or move (p. 26).

Saving operations

Press to save data manually (p. 23).



Start and stop measurement

Start and stop measurement. The LED at the left lights green while measuring.

Setup and display

- **CH▼/▲**
Select channels.
- **ESC**
Cancels changes to settings.
- **Cursor Keys**
Moves the position of the cursor (blinking selection) on the screen.
- **ENTER**
Accepts displayed settings.
- **KEY LOCK**
Disables keypad operations. Press and hold the left and right cursor keys simultaneously for three seconds to lock and unlock the keys.
- **(Zero Adjust)**
Performs zero adjustment. Press the up and down keys simultaneously to execute.

Waveform/Numerical Screens

WAVE/DATA SET FILE

Selects between seven display types.

The screen switches each time you press the key.

Operational information is displayed along the bottom of the screen.

Selection is also available from the name of the current screen displayed near the bottom right

[Gauge+Wave] Screen
Measurement data is displayed as waveforms with gauges.

[Wave] Screen
Measurement data is displayed as waveforms.

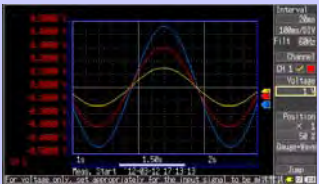
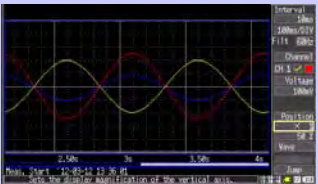
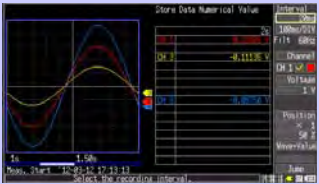
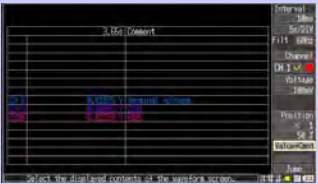
[Wave+Value] Screen
Measurement data is displayed as waveforms and numerical values.

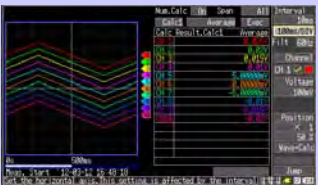
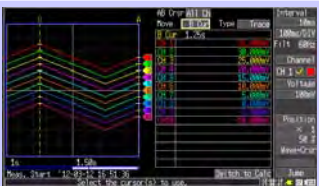
[Value+Cmnt] Screen
Measurement data is displayed as numerical values with comments.

[Value] Screen
Measurement data is displayed as numerical values.

[Wave+Calc] Screen
Measurement data is displayed as waveforms with calculation results.

[Wave+Crsr] Screen
Measurement data is displayed as waveforms with cursor values.

Settings Screens

WAVE/DATA SET FILE

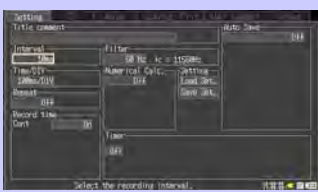
Selects between seven display types.

The screen switches each time you press the key.

Operational information is displayed along the bottom of the screen.

SCROLL CURSOR

Press the left/right cursor keys to select between the Settings screens.



Setting Screen

Make settings for recording. Set numerical calculation, auto-saving and timers.



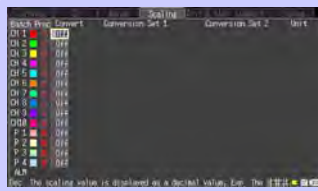
CH Screen

Make input channel settings while viewing the monitor display.



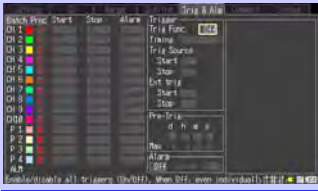
Range Screen

Make settings while viewing all channel settings.



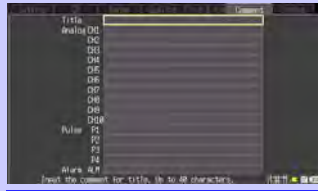
Scaling Screen

Make these settings to convert measured values to arbitrary units for display.



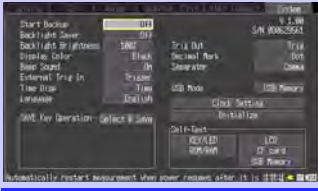
Trig&Alm Screen

Recording criteria (triggering) and warning sounds can be set for each channel.



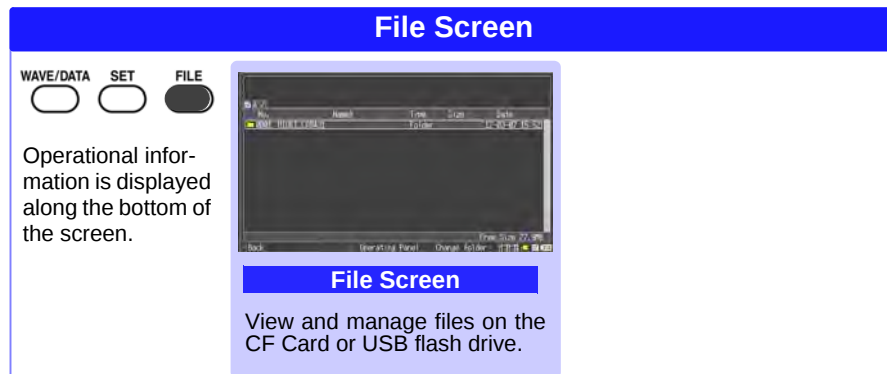
Comment Screen

Enter channel comments.



System Screen

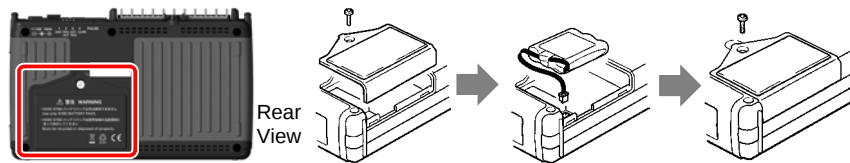
Configure the system environment.



Measurement Procedure

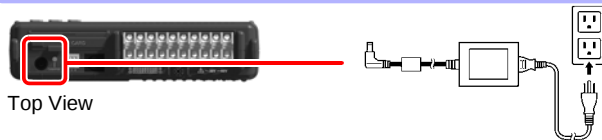
Before measuring, be sure to read the "Usage Notes" in the Instruction Manual.

Install the battery pack (option)

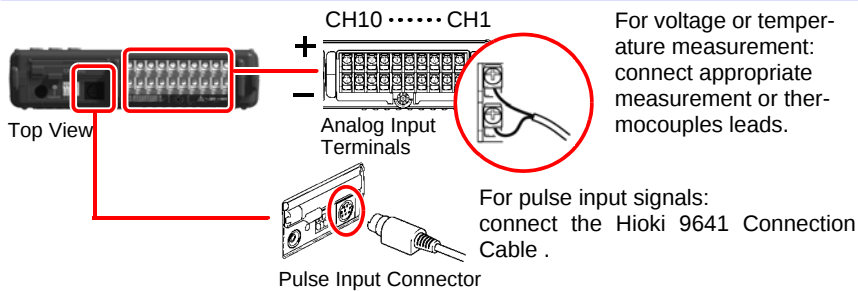


We recommend using the battery pack to provide backup during power outages, and to preserve measurement data.

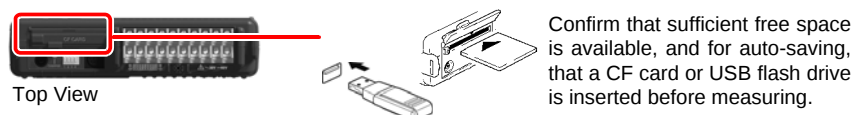
Connect the power cord



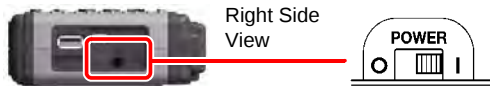
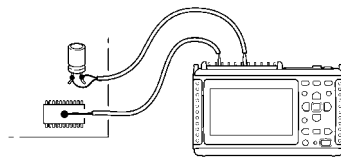
Connect the measurement cable



Insert a CF Card or USB flash drive (option)



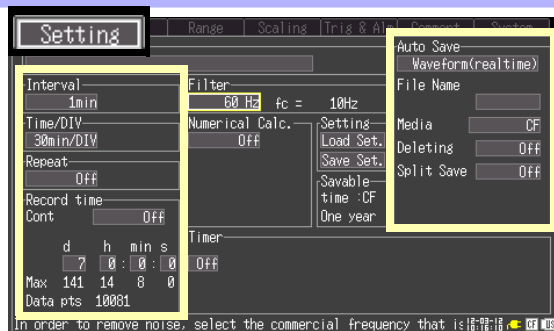
Confirm that sufficient free space is available, and for auto-saving, that a CF card or USB flash drive is inserted before measuring.

Turn the power on**Connect to the measurement object****Configure settings for measurement**

Configure recording settings on the Setting screen.

- Recording interval
- Recording length
- Auto-saving (if used)

Make other settings as necessary.



Configure input channel settings on the CH screen.

- Channel selection
- Input type
- Measurement range

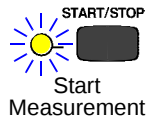
Make other settings as necessary.



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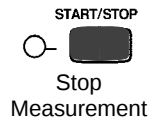
Measurement Procedure

Start and finish measuring

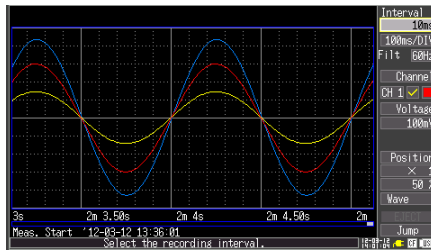


Press to start and stop recording with the selected measurement conditions.

When [Repeat] is [Off] (default setting), one recording length is acquired, and recording stops automatically.
When [Repeat] is [On], recording proceeds continuously.



Analyze



Monitoring Voltage Fluctuations

This section describes voltage measurement using an AC transducer* to acquire voltage fluctuation data for one week.

* The example transducer provides 0 - 10 V DC output proportional to 0 - 150 Vrms AC input.

1 Prepare the Following Before Measuring

Items to prepare

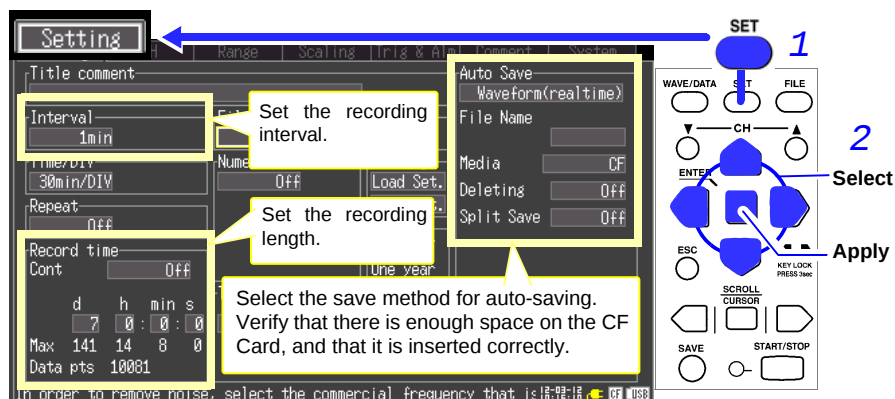
- ☐ Model LR8431-20 Memory HiLogger
- ☐ AC Adapter (supplied)
- ☐ Measurement (input) leads
- ☐ Transducer
- ☐ CF Card (Hioki option)

"Measurement Procedure" (p. 16) Connect to the measurement points



2 Configure Measurement Settings

Make recording timing settings on the Setting screen.



Setting Example

(Record at one-minute intervals for seven days automatically on the CF card)

Interval: 1min

Record time: Cont Off, 7 days

Auto Save: Waveform(realtime)

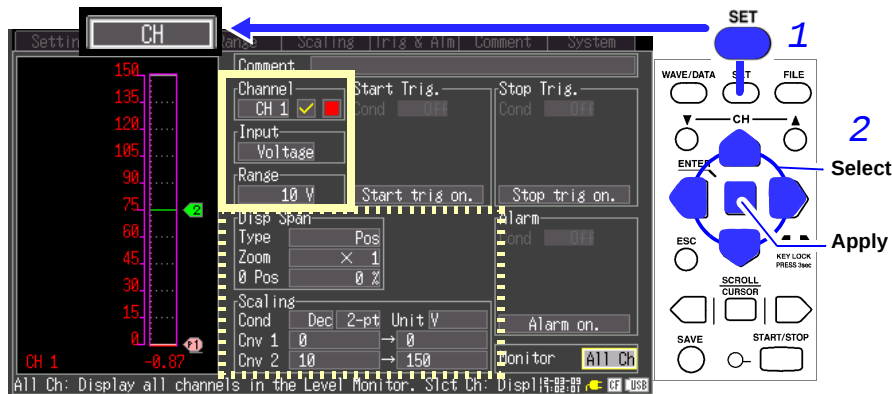
The default settings for the non-framed items can be left as-is. Change as needed.

Enable **[Deleting]** (set to **[On]**) to delete old files when the CF card or USB flash drive becomes full. Otherwise, when disabled (set to **[Off]**), saving stops when the card becomes full. Also, when you want measurements saved in multiple files at specific intervals, set **[Split Save]** to **[On]** or to **[Ref Time]** and set the interval as needed.

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Monitoring Voltage Fluctuations

Make input channel settings on the CH screen.



Setting Example

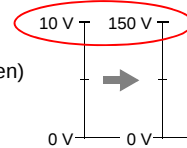
Channel: CH1, Input: Voltage, Range: 10V

Make other settings as necessary.

Disp Span: Position, 0 pos: 0% (displays zero volts at the bottom of the screen)

Scaling: Dec, 2-pt

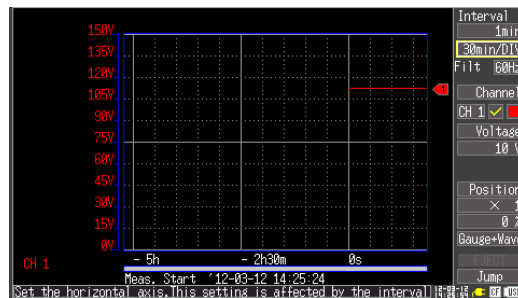
Cnv 1: 0 V to 0 V, Cnv 2: 10 V to 150 V for display



3 Start and Stop Measurement



Press the **START/STOP** key.
The specified data length is recorded on the CF card.
Recording stops seven days after starting.



To interrupt recording, press the **START/STOP** key again.

Refer to "Analysis" (p. 26) for analysis methods.

Monitoring Temperature Changes

This section describes temperature measurement using a type K thermocouple to acquire temperature data once per second, for monitoring temperature changes. The procedure for saving measurement data to a CF card after measuring is also described.

1 Prepare the Following Before Measuring

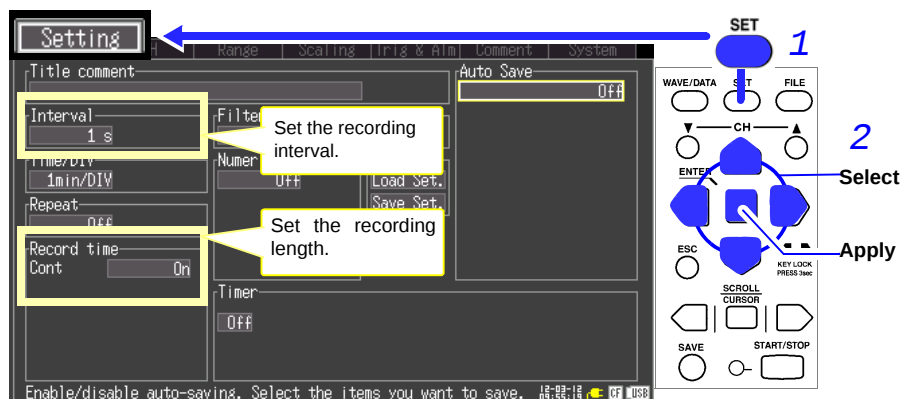
Items to prepare

- ☐ Model LR8431-20 Memory HiLogger
 - ☐ AC Adapter (supplied)
 - ☐ ThermoCouples (K)
 - ☐ CF Card (Hioki option)
- "Measurement Procedure" (p. 16)



2 Configure Measurement Settings

Make recording timing settings on the Setting screen.



Setting Example

(to record at one-second intervals from starting measurement until pressing the **START/STOP** key again)

Interval: 1s

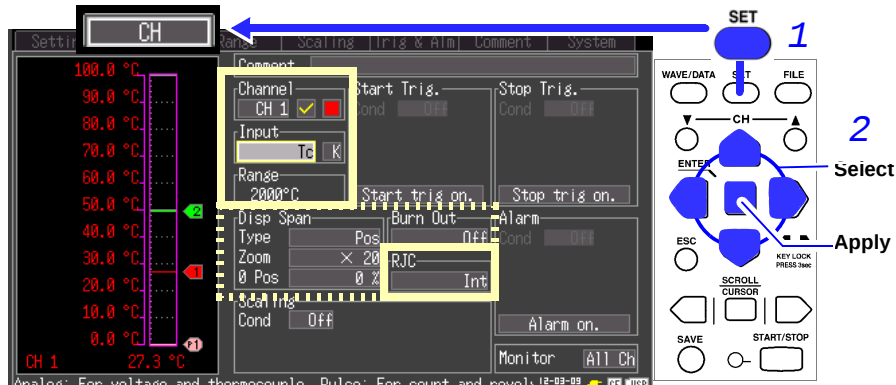
Record time: Cont On

The default settings for the non-framed items can be left as-is. Change as needed.

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Monitoring Temperature Changes

Make input channel settings on the CH screen.

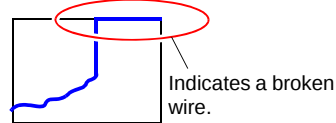


Setting Example

Channel: CH1, Input: Tc, K (Thermocouple)
RJC: Int

The default settings for the non-framed items can be left as-is. Change as needed.

Set the open-circuit detection and display range as necessary. Enable [Burn Out] (set to [On]) to detect a broken thermocouple. When a thermocouple is broken, its waveform appears at the top of the screen as shown at the right.

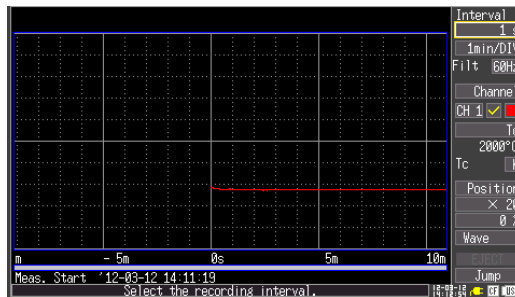


3 Start and Stop Measurement



Press the **START/STOP** key.

In this case, measurement data is recorded until you press the **START/STOP** key again.



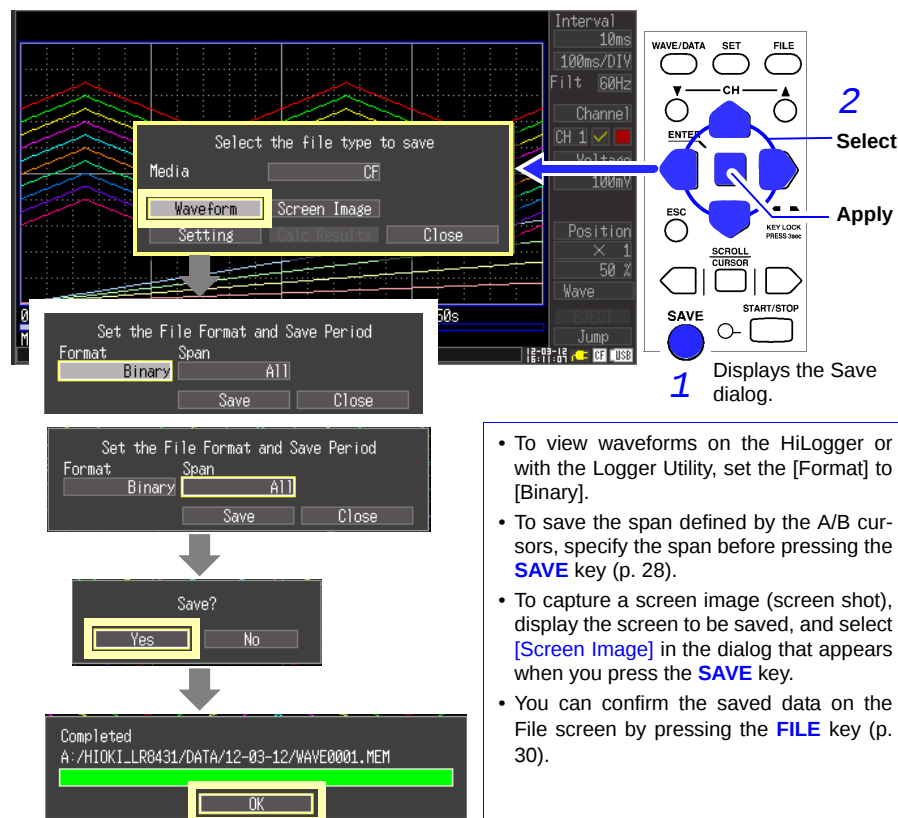
4 Saving Data After Measuring

This section describes how to save data after measuring.

Two methods are available for saving measurement data to a CF card or USB flash drive after recording: [\[Select & Save\]](#) and [\[Quick Save\]](#).

Press the **SAVE** key and select [\[Select & Save\]](#) to set the saving data type and make other settings. [\[Quick Save\]](#) causes data to be saved immediately when the **SAVE** key is pressed, according to the settings made beforehand.

In this case, we use the default [\[Select & Save\]](#) method to save waveform data.



For long-term measurement, set the Auto-Save setting to [\[Waveform\(realtime\)\]](#) (p. 19). When [\[Cont\]](#) is enabled, data recording is limited to the size of the HiLogger's internal memory.

To avoid data loss, we recommend using both the AC adapter and battery pack.

Refer to "Analysis" (p. 26) for analysis methods.

Monitoring Energy Consumption

This section describes pulse measurement using a watt-hour meter* to acquire integrated power consumption data for one month.

* The example watt-hour meter provides an output of 50,000 pulses/kWh.

1 Prepare the Following Before Measuring

Items to prepare

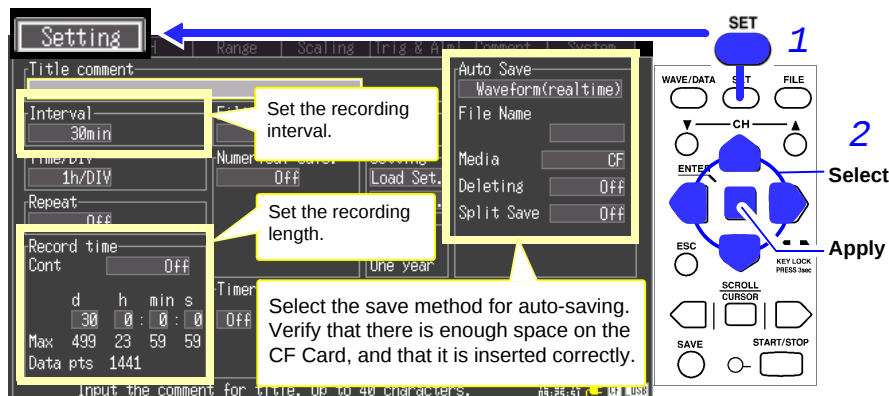
- ☐ Model LR8431-20 Memory HiLogger
- ☐ AC Adapter (supplied)
- ☐ Model 9641 Connection Cable (Hioki option)
- ☐ Watt-Hour Meter
- ☐ CF Card (Hioki option)

"Measurement Procedure" (p. 16)



2 Configure Measurement Settings

Make recording timing settings on the Setting screen.



Setting Example

(Record at 30-minute intervals for 30 days, and automatically store on the CF card)

Interval: 30min

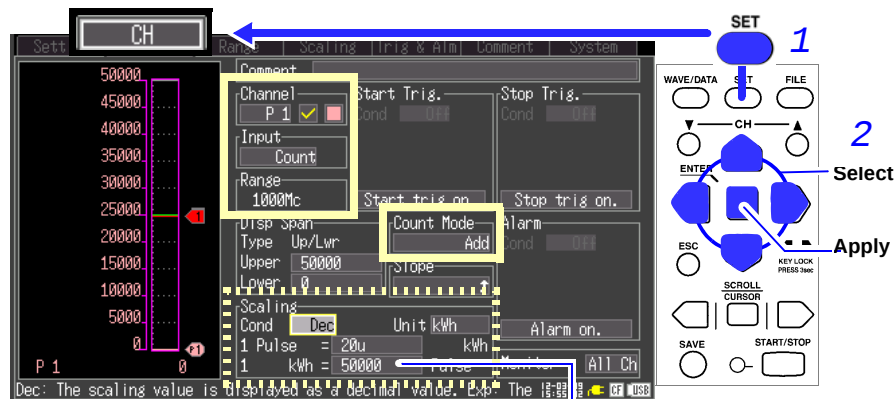
Record time: Cont Off, 30 days

AutoSave: Waveform(realtime)

The default settings for the non-framed items can be left as-is. Change as needed.

Enable **[Deleting]** (set to **[On]**) to delete old files when the CF card or USB flash drive becomes full. Otherwise, when disabled (set to **[Off]**), saving stops when the card becomes full. Also, when you want measurements saved in multiple files at specific intervals, set **[Split Save]** to **[On]** or to **[Ref Time]** and set the interval as needed.

Make input channel settings on the CH screen.



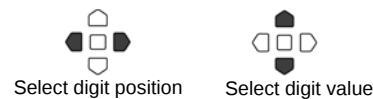
Setting Example

Channel: P1, Input: Count, Count Mode: Add

Use the scaling function to display values in kWh units.
Cond: Dec, Unit: kWh, 1 Pulse = 20u [kWh],
1 kWh=50000 Pulse
The display range changes automatically when scaling is used.



(+/-) (E/P/T/G/M/k/ (blank) /m/ u/n/p/f/a)



Select digit position

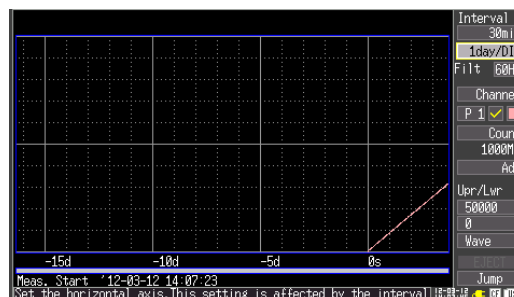
Select digit value

3 Start and Stop Measurement



Press the **START/STOP** key.
The specified length of data is recorded and stored on the CF card.

Recording stops thirty days after starting.



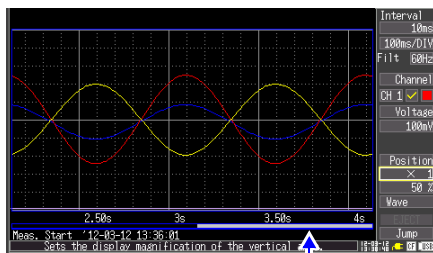
To interrupt recording, press the **START/STOP** key again.

Refer to "Analysis" (p. 26) for analysis methods.

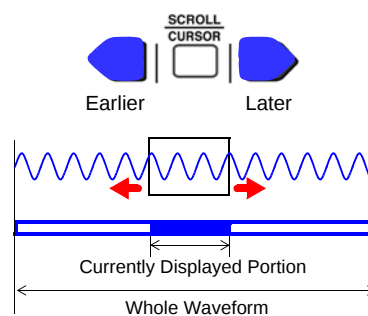
Analysis

Viewing a Measurement Waveform

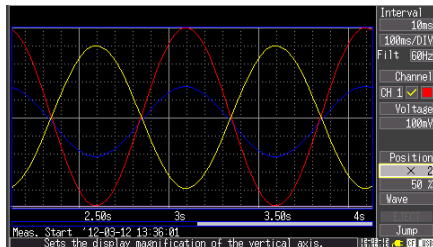
Scrolling the Waveform



The portion of a waveform that is currently displayed can be confirmed by the position of the scroll bar.



Zooming the Waveform View



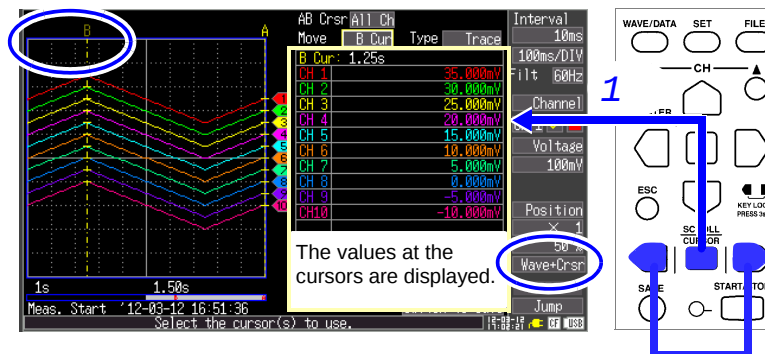
Zooming (Magnifying and Reducing) the Horizontal Axis

Specify the time per division for the horizontal axis.

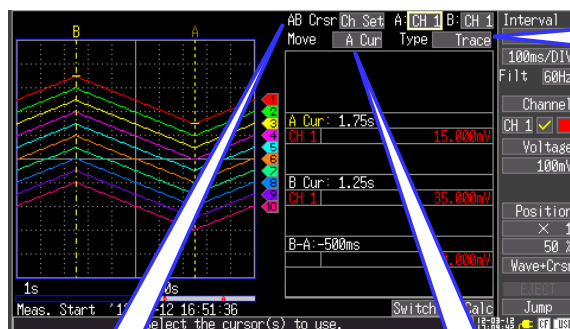
Zooming the Vertical Axis

Specify the magnification factor for the vertical axis.

View Measurement Values



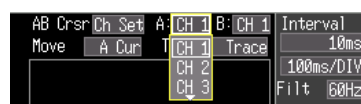
- 2 Press these keys to move the cursor on the displayed waveform.



To change the cursor type, select from the [Type] setting items.

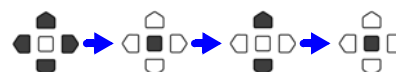
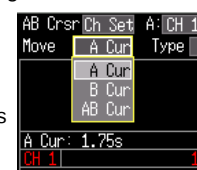
- Trace (time value and measurement value)
- Vert (Vertical, time value)
- Horz (Horizontal, measurement value)

To view only the cursor values for specified channels, Select [Ch set] from the [AB Crsr] settings, and select the channels for which to display cursor values.

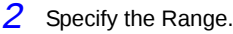


To select which cursor(s) to move, select from the [Move] setting items.

- A Cur
- B Cur
- AB Cur (Move both cursors at the same time)



Specifying a Range

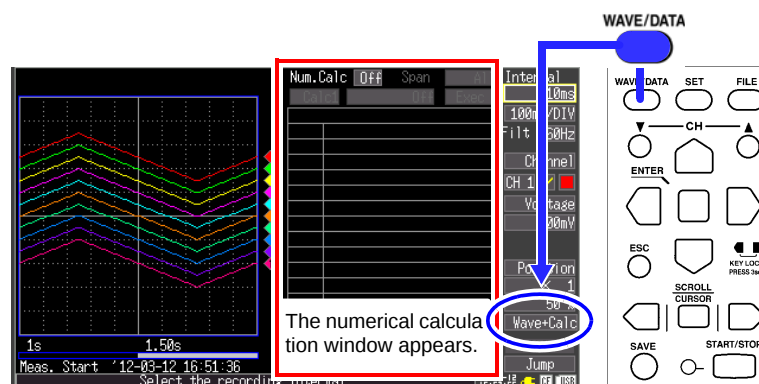


Calculate Measurement Data

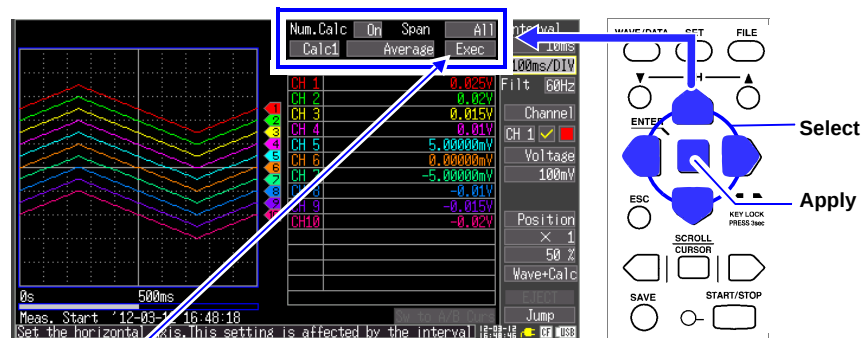
Up to four types of calculations can be applied at the same time.

Calculation types: Average, peak value, maximum, minimum, time to maximum and time to minimum

- 1 Press the **WAVE/DATA** key several times to display **[Wave+Calc]**.



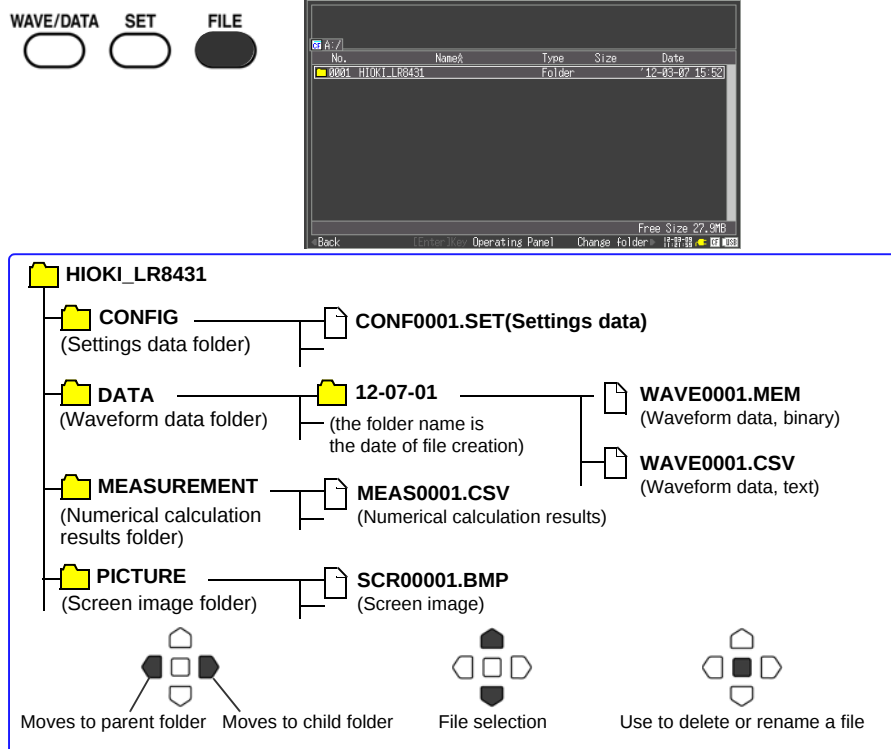
- 2 Enable **[Num.Calc]** (set to On), and set up to four calculation types (1 to 4).



- 3 Select **[Exec]** and press the **ENTER** key to display calculation results.

View CF Card/USB flash drive Contents

Data saved by the LR8431-20 can be confirmed on the File screen. It is stored on the CF Card or USB flash drive as follows. The numbers in the file names are automatically generated sequentially.



Analyzing HiLogger Data on a Computer



To access the HiLogger's CF card from a computer, connect a USB cable after setting the [USB Mode] on the [System] screen to [USB Drive].

Recorded data can be analyzed and HiLogger settings can be changed using a computer running the supplied application program. Not only waveforms, but also numerical values and alarm output states can be monitored in real time. Measurement data from up to five LR8431-20 HiLoggers can be collected by one computer using USB connections. To use the Logger Utility, connect a USB cable after setting the [USB Mode] setting on the [System] screen to [USB Communication].