HIOKI

MEMORY HiLOGGER LR8450

Wireless data logging at 1 ms

330-channel portable logger available with your choice of plug-in units and wireless units

- **Voltage** 1 ms sampling
- **Strain** 1 ms sampling
- **Temperature** 10 ms sampling
- **Humidity** 10 ms sampling
- **Resistance** 10 ms sampling

CE 3 year Warranty

Two models:
Standard Model and Wireless LAN Model

Standard model (designed for use with plug-in units only)
LR8450

You can add up to 4 plug-in units and provide 120 channels of measurement

Configuration example: 120 channels

Plug-in units

VOLTAGE/TEMP UNIT U8552×4

Each VOLTAGE/TEMP UNIT U8552 accepts 30 channels of input. Add four units for 120 channels of measurement.

Wireless LAN model

Add channels freely via either plug-in or wireless units

Can also be used exclusively with wireless units.

Wireless LAN model
LR8450-01

Add up to 7 wireless units in total for a maximum of 330 channels

Configuration example: 330 channels

Plug-in units

VOLTAGE/TEMP UNIT U8552×4

+

Wireless units

WIRELESS VOLTAGE/TEMP UNIT LR8532×7

With four U8552 VOLTAGE/TEMP Units and seven LR8532 WIRELESS VOLTAGE/TEMP Units, you can measure a total of 330 channels.

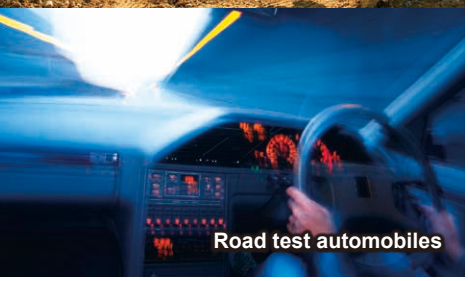
Mix plug-in and wireless units

Plug-in unit and Wireless unit in mix will allow you to build a measurement system that suits your needs.
If wireless units are used with other units (wireless or plug-in), the sampling-timing shift between the units is periodically corrected.*
In addition, at times the wireless communication is cut off, the correction function works after the communication is restored and the sampling-timing shift between the units is corrected.

* Even in good wireless communication conditions (low interference) the sampling-timing between devices may shift about 20 ms. In bad wireless conditions, the sampling-timing shift will be much worse than this.

Voltage measurement


Test hydraulic equipment


Road test automobiles

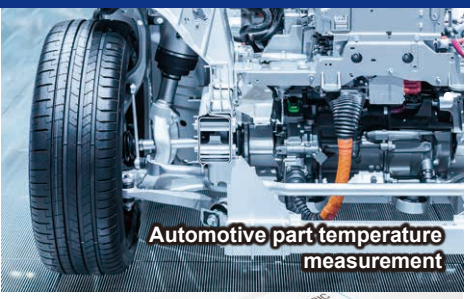
Measure outputs from a pressure sensor and other sensors at 1 ms max. sampling rate.

1 ms sampling is very suitable to record outputs of several tens of Hertz from pressure sensors and vibration sensors.


HIGH SPEED VOLTAGE UNIT U8553


WIRELESS HIGH SPEED VOLTAGE UNIT LR8533

Temperature measurement


Automotive part temperature measurement

Battery temperature rise

Measure temperature near inverters and batteries at a sampling rate of up to 10 ms


VOLTAGE/TEMP UNIT U8550
UNIVERSAL UNIT U8551
VOLTAGE/TEMP UNIT U8552(*)

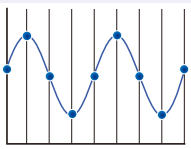

WIRELESS VOLTAGE/TEMP UNIT LR8530
WIRELESS UNIVERSAL UNIT LR8531
WIRELESS VOLTAGE/TEMP UNIT LR8532(*)

*Sampling rate of 10 ms is available when using 15 or fewer channels.

Sample input at up to 1 ms

Consistent even when units are added

Each unit incorporates its own A/D converter. This design keeps the maximum sampling rate high even when units are added.



Example 1: Use four U8553 High Speed Voltage Units (with 5 channels each) to measure 20 channels at a sampling rate of 1 ms.

Example 2: Use four U8550 Voltage/Temp Units (with 15 channels each) to sample 60 channels at a sampling rate of 10 ms.

Noise resistance

Consistent even when units are added

Since increasing the number of units has no effect on the cutoff frequency, which changes with the sampling rate, power supply noise can be reduced without sacrificing noise resistance.

(ex.) Sampling rate: 1 s

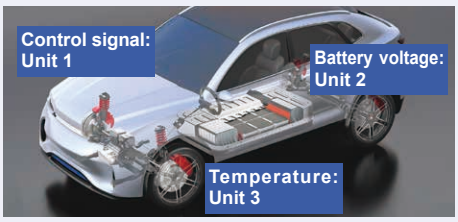
Number of channels	Cutoff frequency
1ch to 15ch	60 Hz
16ch to 30ch	60 Hz
31ch to 45ch	60 Hz
46ch to 60ch	60 Hz

*When using a power supply frequency of 60 Hz.

Same cutoff frequency

Set filters

Set filters for each unit



The cutoff frequency, which varies with the data refresh interval, can be set separately for each unit. You can use long data refresh intervals, which boost filter effectiveness, and short data refresh intervals for different units at the same time.

- Measure control signals at maximum speed: Unit 1 (data refresh interval: 1 ms)
- Measure battery voltage fluctuations: Unit 2 (data refresh interval: 1 ms)
- Measure temperature using thermocouples: Unit 3 (data refresh interval: 1 s) with **strong filter**

Strain measurement

Measure strain with a 1 ms sampling rate

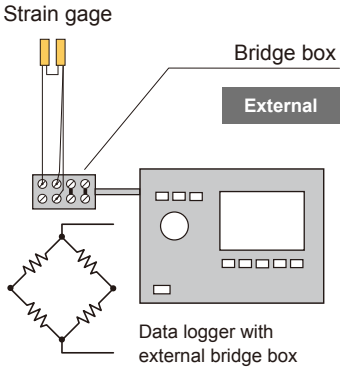
Connect strain gages directly and measure at a sampling rate of up to 1 ms. Strain gages tend to have long, thin wires that are easily broken, but that potential pitfall can be avoided by using wireless units so that wire length is minimized.

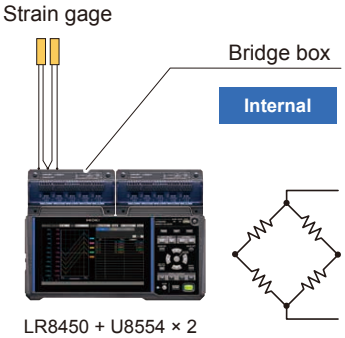
STRAIN UNIT U8554

WIRELESS STRAIN UNIT LR8534

Connect strain gages directly

The Strain Unit has a built-in bridge box, allowing you to connect strain gages directly to its input terminals.





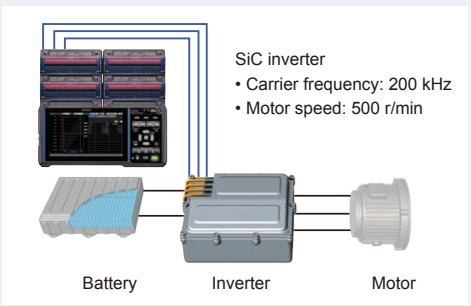
Strain-gage-type converters such as load sensors and pressure sensors can be connected directly and you can make measurement.

Reduced influence of noise

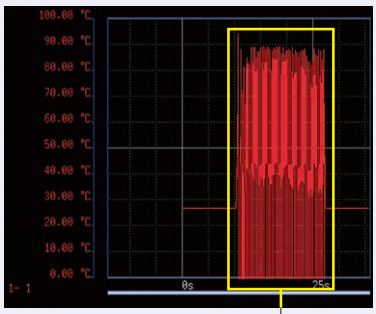
Stable measurement, even at high voltages and high frequencies

Previous models were incapable of measuring temperature accurately in noisy environments due to the influence of high frequencies, which caused values to shift or fluctuate significantly. The LR8450 uses a revamped design to dramatically reduce the influence of high-frequency noise.

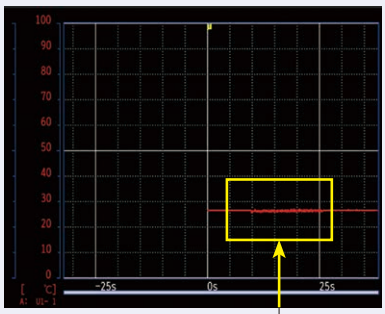
Example: Measure temperature by connecting the tip of a K thermocouple to the screw on an inverter's PWM output terminal (W-phase) when using the Voltage/Temp Unit U8550 (settings: 100 ms sampling in the 100°C f.s. range).



Previous data logger



LR8450



Previous models exhibit significant fluctuations when the inverter is operating, but the LR8450 does not.

Wireless for ease of use

Collect data from dispersed locations all at the same time

The LR8450-01 can simultaneously collect measurement data from wireless units installed on various test equipment.

- Collect measurement data from multiple locations with a single logger
- Manage data as a single time sequence
- Units can be placed in confined locations
- Check the display during measurement

Up to 30 m*
(line-of-sight)

* If the LR8450-01 or the wireless unit is placed on the floor or ground, the communication distance may be shortened.

Install wireless units in testing equipment

Peace of mind in the event of an interruption in power or wireless connectivity

Peace of mind if communications are temporarily interrupted

Buffer memory holds up to 5 min.*1 of measurement data

Each wireless unit has a built-in buffer memory that can hold up to 5 min.*1 of measurement data. Data are resent along with more recent measurement data once communications resume, after the data are restored inside the LR8450-01*2.
The system can be configured to output an alarm if communications are interrupted or if a unit encounters a low-battery state.

*1 The duration for which measurement data can be maintained does not vary with the recording interval (up to a maximum of 5 min.)
*2 Data collected using the Logger Utility software measurement cannot be restored in this manner.

Battery operation

Use units in locations where there's no AC power

Example:
The wireless Voltage/Temp unit LR8530 can operate for about 9 hours on battery power. If the unit is charged at night, it can operate on the battery pack alone during the day.

Using the Battery Pack Z1007

Wireless unit model	Continuous operating time
LR8530	Approx. 9 hr.
LR8531	Approx. 7 hr.
LR8532	Approx. 9 hr.
LR8533	Approx. 9 hr.
LR8534	Approx. 5 hr.

Peace of mind in the event of a power outage during measurement

Install a battery pack for peace of mind

If you've installed a battery pack in a unit that's being powered by an AC adapter, the unit will automatically switch to battery power in the event of an outage so that the LR8450-01 can continue making measurements.

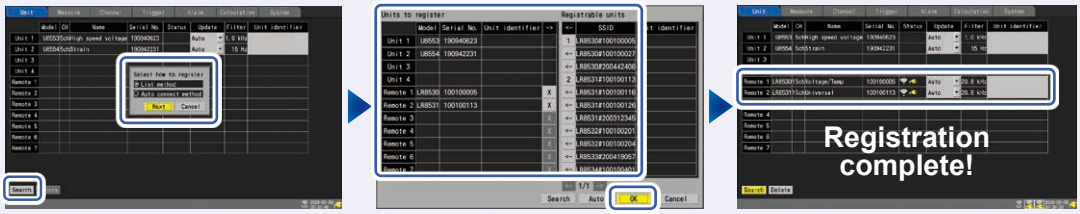
Make measurements in locations where it would be difficult to route wires

Work time can be reduced using the LR8450-01 and wireless units, since only minimal wiring is required. If the measurement target is located in a lab, this approach eliminates the need for wiring and avoids having to drill holes in the walls of the monitoring room where data is being checked.

Inside a room, or outside, you can make measurements with the door closed.

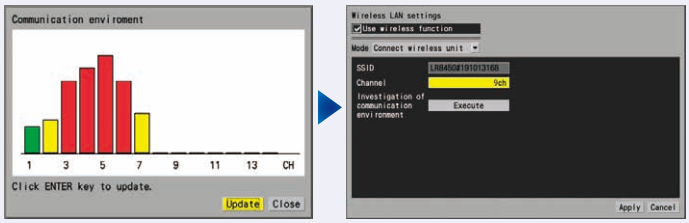
Simple registration of wireless units

Wireless units, located within the range, that are not connected to another LR8450-01, can be automatically detected. Simply choose the unit you wish to register from the list.



Check the unused wireless LAN channels and select the wireless channel to use

You can reduce interference with other wireless devices by using an open channel. Check for open channels on the instrument's screen.



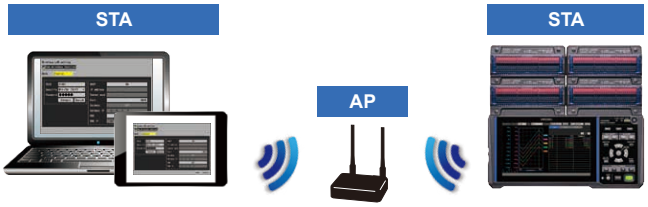
Observe data from a remote location using a PC or a tablet

By connecting the LR8450-01 to a PC or a tablet via wireless LAN, you can control the instrument remotely using the built-in HTTP server or obtain download data files using the built-in FTP server.

(You cannot use Logger Utility when using Station Mode or Access Point Mode.)

Station mode

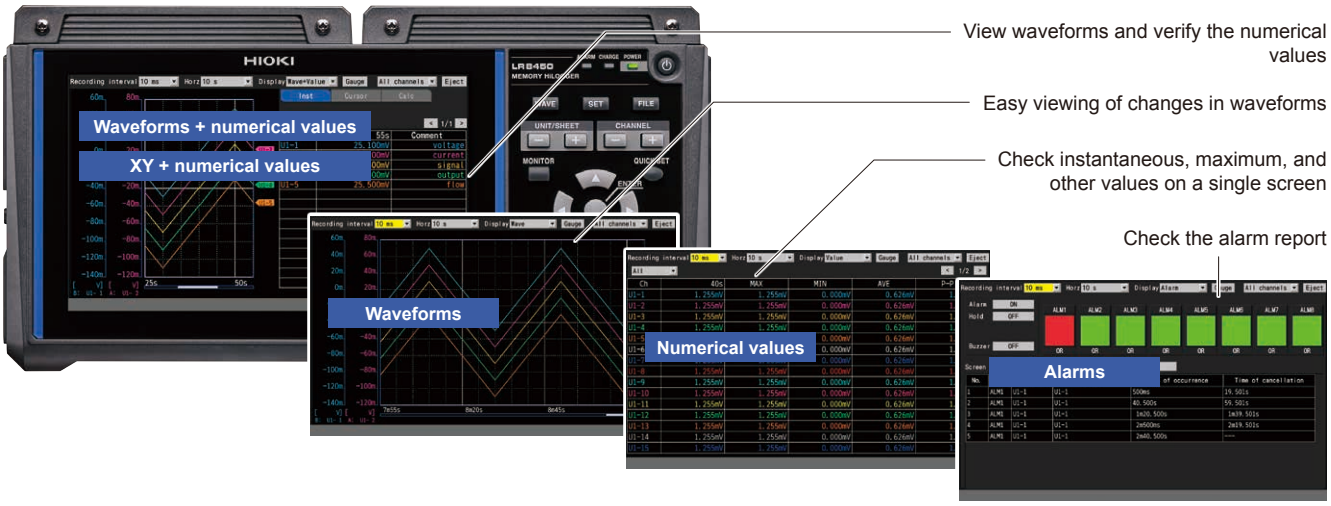
Connect wirelessly to a third-party access point (AP).



Access point mode

The LR8450 can be directly connected to a PC via wireless LAN.

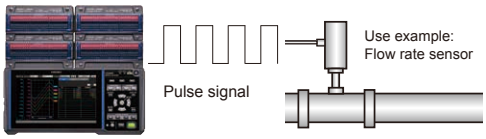
Easy-to-read display of measured values



External control terminals and interfaces to accommodate a broad range of use cases

Motor speed, flow rate integration, etc.

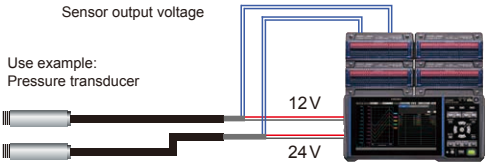
8 channels pulse measurement



In "Revolve" mode, monitor production equipment by measuring the variations in revolution speed of motors or drills. In "Count" mode, identify operation status by acquiring integrated power or flow rate.

Two terminals for voltage outputs (5, 12, or 24 V)

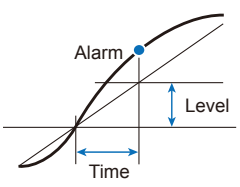
Supplying power to the sensors



The LR8450/LR8450-01 provides two output terminals for voltages, each of which can supply 100 mA current, eliminating the need for a separate sensor power supply. You can select 5 V, 12 V, or 24 V from the VOUTPUT1 terminal and 5 V or 12 V from the VOUTPUT2 terminal.

Useful in preventive maintenance

8 channels alarm outputs



Slope
Set the level and time.
It generates an alarm if the reading exceeds the preset rate of change (level/time)

You can set alarm output for eight channels. You can set a level, a window, a slope, and a logic pattern on channels you wish to monitor.

Replace media during real-time saving

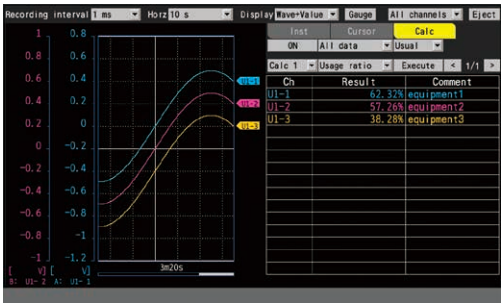
No need to stop recording

When you remove the storage media while recording data, and reinsert it, data remaining in the internal buffer memory will continue to be stored in a different file.

Extensive calculation functions installed

Numerical calculation function

In addition to the maximum and minimum value calculation functions provided by previous models, the LR8450/LR8450-01 offers an extensive range of calculations, including on/off time, count, and usage ratio.

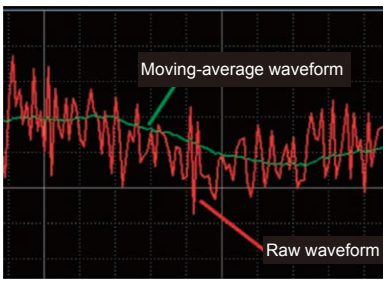


Types of calculations

- Average value
- Peak-to-peak value
- Maximum value
- Minimum value
- Time at which maximum value occurred
- Time at which minimum value occurred
- Integration
- Aggregation
- Usage ratio
- On time
- Off time
- On count
- Off count

Waveform calculation function

Calculate data while measurement continues and display calculated waveforms in real time. Calculation results are saved on a separate dedicated calculation channel.

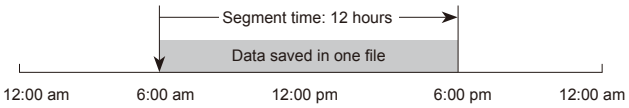


Types of calculations

- Basic arithmetic operations
- Aggregation
- Simple average
- Moving average
- Integration

Recording over extended periods of time without interruption

Collect data on a storage device (SD memory card or USB drive) while measuring continues. The ability to segment files by hour or day without stopping measurement is convenient when you need to review data later.



Maximum recording time (estimate)

Example: Recording 30 analog channel with 2 units (no alarm output or waveform processing)

Because the header portion of waveform files is not included in capacity calculations, expected actual maximum time is about 90% of those in the tables. The maximum recording time varies with the number of measurement channels. Recording times are doubled if the number of measurement channels shown in the table is halved.

When recording 30 analog channels with two U8550/U8551 units or one U8552 unit (no alarm output, no waveform processing)
When recording 30 analog channels with two LR8530/LR8531 units or one LR8532 unit (no alarm output, no waveform processing)

Recording intervals	Internal buffer memory (512 MB)	SD MEMORY CARD Z4001 (2 GB)	SD MEMORY CARD Z4003 (8 GB)	USB DRIVE Z4006 (16 GB)
10 ms	1 d	3 d 20 h	15 d 8 h	30 d 12 h
100 ms	10 d 8 h	38 d 18 h	153 d 9 h	305 d 5 h
1 s	103 d 13 h	387 d 12 h	1533 d 21 h	3052 d 9 h
10 s	500 d	3875 d 6 h	15339 d 3 h	30523 d 19 h

When recording 20 channels with four U8553 units or U8554 units (no alarm output, no waveform processing)
When recording 20 channels with four U8553 units or LR8534 units (no alarm output, no waveform processing)

Recording intervals	Internal buffer memory (512 MB)	SD MEMORY CARD Z4001 (2 GB)	SD MEMORY CARD Z4003 (8 GB)	USB DRIVE Z4006 (16 GB)
1 ms	3 h 43 m	13 h 56 m	2 d 7 h	4 d 13 h
10 ms	1 d 13 h	5 d 19 h	23 d	45 d 18 h
100 ms	15 d 12 h	58 d 3 h	230 d 2 h	457 d 20 h
1 s	155 d 8 h	581 d 7 h	2300 d 21 h	4578 d 13 h
10 s	500 d	5813 d 1 h	23008 d 20 h	45785 d 20 h

When recording 330 channels with four U8552 units and seven LR8532 units (no alarm output, no waveform processing)

Recording intervals	Internal buffer memory (512 MB)	SD MEMORY CARD Z4001 (2 GB)	SD MEMORY CARD Z4003 (8 GB)	USB DRIVE Z4006 (16 GB)
20 ms	4 h 8 m	15 h 28 m	2 d 13 h	5 d 2 h
100 ms	20 h 42 m	3 d 5 h	12 d 18 h	25 d 10 h
1 s	8 d 15 h	32 d 6 h	127 d 19 h	254 d 8 h
10 s	86 d	322 d 16 h	1277 d 23 h	2543 d 9 h

Control the instrument remotely and capture data on a PC

HTTP server function

Control the instrument remotely from a PC

Use a standard Web browser to control the LR8450/LR8450-01, start and stop measurement, and enter comments.

FTP server function

Download data files onto a PC

Your PC can get the files in the SD memory card or USB drive inserted to the LR8450/LR8450-01.

FTP client

Automatically transfer data files to an FTP server

Can automatically transmit to an FTP server the files in the SD memory card or in the USB drive inserted to the LR8450/LR8450-01.

NTP client function

Set the logger's clock

Can set the clock in the LR8450/LR8450-01 and synchronize it to an NTP server on the network.

E-mail transmission function

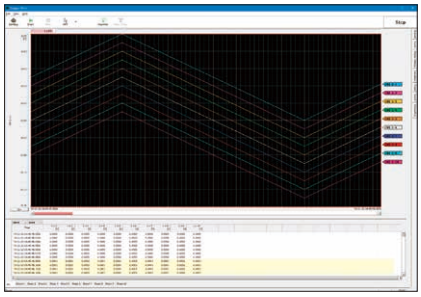
Inform error and other information by e-mail

Can send emails to your PC or mobile phone when there is a communication loss and when an error occurs during measurement and wireless module communications.
Can also send instantaneous values by e-mail periodically.

PC can acquire data in real time

Acquire data using Logger Utility

Record data on a PC in real time using the Logger Utility application software, a standard accessory. You can even scroll waveforms backwards to view older data while recording is in progress. A real-time measurement is supported for recording intervals of 10 ms or greater.

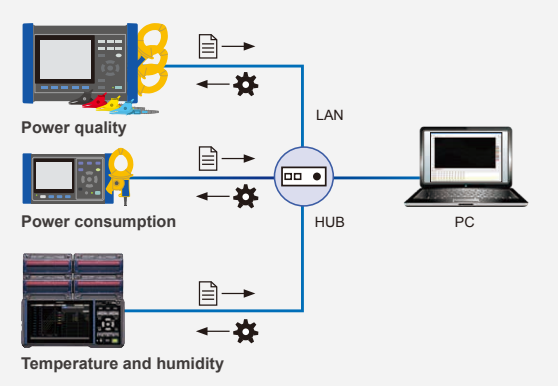


Logger Utility

Collect data using GENNECT

GENNECT One

For an up-to-date list of products supported by GENNECT One, see Hioki's website.



1 Download the GENNECT One SF4000 software from the Hioki website to your PC

2 Connect each measuring instrument to PC with LAN cable

Remote control (HTTP)

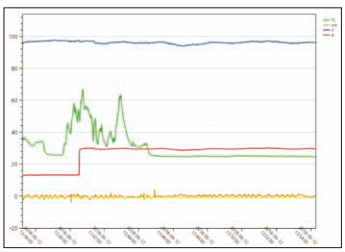
Control instruments remotely and change settings from a LAN-connected PC.

Automatic file transfer (FTP)

This function lets you acquire the measurement file, which is produced in the measurement instrument once per day, into a PC in real time. You can obtain daily data, like power consumptions measured by a measurement instrument installed on site, in to your PC automatically.

Real-time measurement (logging)

- Regularly (as quickly as once every second) collect measurement data from up to 15 LAN-connected measuring instruments and display them on a PC.
- You can acquire power data from a power meter and temperature or flow rate data from a data logger.



Specifications

LR8450, LR8450-01 Memory HiLogger General specifications, Basic specifications	
Product warranty period	3 years
Accuracy guarantee period	1 year (accuracy guarantee duration after adjustment made by Hioki: 1 year)
Maximum number of connectable modules	4 plug-in modules + 7 wireless modules* * LR8450-01 only
Connectable modules (Plug-in modules)	U8550 Voltage/Temp Unit U8551 Universal Unit U8552 Voltage/Temp Unit U8553 High Speed Voltage Unit U8554 Strain Unit
Connectable modules (Wireless modules) (LR8450-01 only)	LR8530 Wireless Voltage/Temp Unit LR8531 Wireless Universal Unit LR8532 Wireless Voltage/Temp Unit LR8533 Wireless High Speed Voltage Unit LR8534 Wireless Strain Unit
Internal buffer memory	Volatile memory, 256 Mwords
Clock functionality	Auto-calendar, automatic leap year recognition, 24-hour clock
Clock precision (Precision of clock displayed by instrument as well as start/stop times)	±1.0 s/day (at 23°C) Time can be synchronized with an NTP server to which instrument is connected.
Time axis accuracy	±0.2 s/day (at 23°C)
Backup battery service life	At least 10 years for clock (reference value at 23°C)
Operating environment	Indoors, Pollution Degree 2, altitude up to 2000 m
Operating temperature and humidity range	−10°C to 50°C (14°F to 122°F), 80% RH or less (non-condensing) (Charging temperature range: 5°C to 35°C)
Storage temperature and humidity range	−20°C to 60°C (−4°F to 140°F), 80% RH or less (non-condensing)
Dimensions	Without any modules: 272W × 145H × 43D mm (10.72″W × 5.71″H × 1.69″D) (excluding protrusions) With 2 modules:272W × 198H × 63D mm (10.71″W × 7.8″H × 2.78″D) (excluding protrusions) With 4 modules:272W × 252H × 63D mm (10.71″W × 9.92″H × 2.48″D) (excluding protruding parts)
Mass	Approx. 1108 g (39.08 oz.) (excluding battery pack)
Standards	Safety: EN61010 EMC: EN61326 Class A
Vibration resistance	JIS D 1601:1995:1995 5.3 (1) Class 1: Passenger vehicles; conditions: Class A equivalent
Accessories	Quick Start Manual, LOGGER Application Disc (Quick Start Manual, Instruction Manual, Logger Utility, Logger Utility Instruction Manual, Communication Instruction Manual), USB Cable, AC Adapter Z1014, Precautions Concerning Use of Equipment that Emits Radio Waves (LR8450-01 only)

Display	
Display	7-inch TFT color LCD (WVGA 800 × 480 dots)
Display resolution (with waveform display selected)	Max. 20 divisions (horizontal axis) × 10 divisions (vertical axis) (1 division = 36 dots [horizontal axis] × 36 dots [vertical axis])
Display language	Japanese, English, Chinese, Korean
Backlight service life	Approx. 100,000 h (Reference value at 23°C)
Backlight saver	Turns off backlight when no key is operated for a set amount of time.
Backlight brightness	5 levels (user-selectable)
Waveform background color	Dark/light (user-selectable)

Power supply		
Power supply	AC adapter	Z1014 AC Adapter (12 V DC ±10%) AC Adapter rated supply voltage: 100 V to 240 V AC (assuming voltage fluctuation of ±10%) AC Adapter rated power supply frequency: 50 Hz/60 Hz
	Battery	LR8450 accommodates 2 batteries Z1007 Battery Pack (When used with AC Adapter, AC Adapter has priority) Li-ion, 7.2 V, 2170 mAh
	External power supply	10 V to 30 V DC
Power consumption	Normal power consumption	Using Z1014 AC Adapter or 12 V DC external power supply, without Battery Pack With LCD at maximum brightness: 8.5 VA (instrument only) With LCD backlight off: 7 VA (instrument only)
	Maximum rated power	When using the Z1014 AC Adapter 95 VA (including AC Adapter) When using a 30 V DC external power supply 28 VA (while charging battery with LCD at maximum brightness) When using the Z1007 Battery Pack 20 VA (with LCD at maximum brightness)
Continuous operating time	Battery	With one Z1007 Battery Pack:Approx. 2 h (reference value at 23°C) With two Z1007 Battery Packs:Approx. 4 h (reference value at 23°C) Conditions: With one U8551 Universal Unit connected, backlight on, voltage output off, and Z4006 connected
Charging functionality	Charging is available when the Z1007 Battery Pack is attached and the AC Adapter is connected. Charging time: Approx. 7 h (reference value at 23°C)	

Interface specifications The LAN interface and USB interface (function) cannot be used at the same time.		
LAN interface	IEEE 802.3 Ethernet, automatic 100Base-TX/1000Base-T detection Auto MDI-X, DHCP, DNS support Connector: RJ-45 Maximum cable length: 100 m	
	LAN functionality:	Acquiring data and setting recording conditions with the Logger Utility
LAN interface	LAN functionality:	Configuring settings and controlling recording using communications commands
		Manually acquiring data using the FTP server Acquiring files from a connected SD Memory Card or USB Drive
		Automatically sending data via FTP (FTP client) Transferring files saved on a connected SD Memory Card or USB Drive While measurement is in progress: Waveform files (binary, text) After measurement has finished: Waveform files (binary, text), numerical calculation result files
		HTTP server function Control mode (one instrument) Displaying screen and remotely controlling instrument and modules, starting/stopping measurement, acquiring data via FTP, configuring comment, updating instrument and modules Browsing mode (up to four instruments) Displaying screen, measurement status, and comments
		Email transmission Start trigger, stop trigger, alarm, power outage recovery, internal buffer, memory full, media full, wireless unit communication interruption, battery low, and periodic mail transmission. Instantaneous values can be attached for start trigger, stop trigger, alarm, and periodic transmission. Emails can be sent regularly at the following intervals: 30 min., 1 h, 12 h, 1 day.
		NTP client function Time synchronization with an NTP server Regular synchronization intervals: 1 h, 1 day Pre-measurement synchronization function
Wireless LAN interface (LR8450-01 only)	IEEE 802.11b/g/n Communications range: 30 m, line of sight Encryption function: WPA-PSK/WPA2-PSK, TKIP/AES Usable channels: 1 to 11 Auto-connect function: Wireless LAN function can be toggled on and off. Supported modes: Access point, station, wireless unit connectivity Devices that can be connected in wireless unit connectivity mode: Wireless units or PC/tablet Wireless unit and PC/tablet connectivity are exclusive.	
	Wireless LAN functionality:	Configuring settings and controlling recording using communications commands
		Manually acquiring data using the FTP server Acquiring files from a connected SD Memory Card or USB Drive
		Automatically sending data via FTP (FTP client) Transferring files saved on a connected SD Memory Card or USB Drive
		HTTP server function Control mode (one instrument) Displaying screen and remotely controlling instrument and modules, starting/stopping measurement, acquiring data via FTP, configuring comment, updating instrument and modules Browsing mode (up to four instruments) Displaying screen, measurement status, and comments
		Email transmission Start trigger, stop trigger, alarm, power outage recovery, internal buffer, memory full, media full, wireless unit communication interruption, battery low, and periodic mail transmission. Instantaneous values can be attached for start trigger, stop trigger, alarm, and periodic transmission. Emails can be sent regularly at the following intervals: 30 min., 1 h, 12 h, 1 day.
		NTP client function Time synchronization with an NTP server Regular synchronization intervals: 1 h, 1 day Pre-measurement synchronization function
USB interface (host)	Standard compliance: USB 2.0 compliant Connectors: Series A receptacle × 2 Guaranteed-operation options: Z4006 USB drive (16 GB) File system: FAT16, FAT32 Connectable devices: keyboard, mouse, hub (1 layer), USB drive (1 port only)	
USB interface (function)	USB standard: USB 2.0 compliant Connector: Series mini-B receptacle USB functionality: Data acquisition, condition settings used with the Logger Utility software (bundled) Configuring settings and controlling recording using communications commands USB drive mode: Transferring data from a connected SD memory card to a computer	
SD card slot	Standard compliance: SD standard-compliant slot × 1 (with SD memory card/SDHC memory card support) Guaranteed-operation options: Z4001 (2 GB), Z4003 (8 GB) File system: FAT16, FAT32	

External control terminals			
Terminal block		Push-button type terminal block	
External I/O	Number of terminals	4, Non-isolated (same GND as instrument)	
	Input	Input voltage	0 V to 10 V DC
		Slope	Rising/falling (user-selectable)
		Functionality	Choose from off, start, stop, start/stop, trigger input, event input.
	Output	Output format	Open-drain output (with 5 V voltage output)
		Maximum switching capacity	5 V to 10 V DC, 200 mA
		Functionality	Trigger output
Alarm output		Output format	Open-drain output (with 5 V voltage output)
		Maximum switching capacity	5 V to 30 V DC, 200 mA
		Number of terminals	8, Non-isolated (same GND as instrument)
Voltage output		Output voltage	Off, 5 V, 12 V, 24 V* (user-selectable) Supply current: Max. 100 mA each *: 24 V output can be selected for the VOUTPUT1 terminal only.
		Number of terminals	2, Non-isolated (same GND as instrument)
GND terminal		Number of terminals	10 (common GND)

Recording

Recording mode	Normal
Recording intervals	1 ms*, 2 ms*, 5 ms*, 10 ms, 20 ms, 50 ms, 100 ms, 200 ms, 500 ms, 1 s, 2 s, 5 s, 10 s, 20 s, 30 s, 1 min., 2 min., 5 min., 10 min., 20 min., 30 min., 1 h * Setting available only when using a module with data refresh intervals that include 1 ms
Data refresh interval	Automatically- or user-selected value per module
Repeat recording	On/off (user-selectable)
Specified time/continuous	Specified time: recording time is set in days, hours, minutes, and seconds. Time can be set up to maximum capacity of internal buffer memory. (total 256 M) Continuous: recording is performed once until it is stopped. If maximum capacity of internal buffer memory is exceeded, memory will be overwritten.
Waveform recording	Last 256 M data points are saved in internal buffer memory. Scroll through and view data stored in internal buffer memory. Alarm source data recording can be toggled on and off.
Backup of recorded data	None

Display

Sheet function	Display sheets can be switched between all channels and individual modules. All-channel display sheet: maximum 120 analog channels, 30 waveform calculation channels, 8 pulse/logic channels, 8 alarm channels	
Waveform display screen	Time-axis waveform display: simultaneous display of gages and settings (channel representative settings and display settings) Simultaneous display of time-axis waveforms and values: instantaneous values, cursor values, or numerical calculation values (user-switchable) Numerical display: simultaneous display of instantaneous values and statistical values Alarm display: display of alarm status and alarm history	
Display format	Time-axis waveform display: 1 screen X-Y waveform display: 1 screen	
X-Y composite	Composite up to 8 waveforms.	
Numerical display format	SI units, decimal, or exponent (user-selectable) When decimal is selected, number of decimal places to display can be set (values will then be rounded to set number of places).	
Waveform colors	24 colors	
Zooming in and out on the waveform display	Horizontal axis	2 ms to 1 day/division
	Vertical axis	Number of divisions per screen: 10 Setting method Select position or upper and lower limits for each channel. (Waveform calculation channels: upper and lower limits only) When setting by position: Set zoom factor and zero position. Zoom factor: 1/2×, 1×, 2×, 5×, 10×, 20×, 50×, 100× Zero position: −50% to 150% (with a zoom factor of 1×) When setting by upper/lower limit: set upper and lower limit.
Waveform scrolling	Display can be scrolled left and right both during recording and while recording is stopped (during waveform rendering only).	
Monitor display	Check instantaneous values and waveforms without recording data to memory (values and waveforms can be displayed while waiting for a trigger).	
Wireless unit status display (LR8450-01 only)	Indicates the battery remaining and the radio-wave strength, in the four levels, of the wirelessly connected modules.	

Files

Save destinations	SD memory card/USB drive (user-selectable) (Only storage media sold by HIOKI are guaranteed for operation)	
File names	Up to 8 single-byte characters Automatic numbering/dating (user-selectable)	
Auto saving	Waveform data (real-time saving): off, binary format, or text format (user-selectable) Numerical calculation results (saved after recording): off or text format (user-selectable) When text format is selected, choose whether to save all calculations in one file or to save each calculation in its own file.	
	Delete and save	On/off (user-selectable) Off: system will stop saving data when SD memory card or USB drive starts to run out of available space. On:When SD memory card or USB drive starts to run out of available space, system will delete oldest waveform file (binary or text) and then continue saving data.
	Folder Splitting	No segmentation, 1 day, 1 week, or 1 month (user-selectable)
	File splitting	Disabled, enabled, or timed (user-selectable) Disabled: data for each recording session is saved in its own file. Enabled: data for each set period of time is saved in its own file, starting with the start of measurement. Segmentation time: day, hour, or minute (user-selectable) Timed: data will be segmented at intervals of the segment time based on the previously set reference time and saved in separate files. Reference time: set in hours and minutes. Split time: 1 min, 2 min, 5 min, 10 min, 15 min, 20 min, 30 min, 1 h, 2 h, 3 h, 4 h, 6 h, 8 h, 12 h, 1 d
	External media eject (SD memory card/USB drive)	External media can be ejected during real-time saving by activating a button on the screen and confirming a message.
	Data protection	Yes (valid only when Z1007 Battery Pack is installed) If remaining battery life declines during real-time saving, system will close file and stop saving data (although measurement operation will continue).
Manual saving	Data is saved when SAVE key is pressed. Choose either selective save or immediate save as operation to perform when SAVE key is pressed.	
Decimation (text format only)	Decimate and save	Off or a value from 1/2 to 1/100,000 (user-selectable)
	Saved data	Select from instantaneous values and statistical values. When statistical values are selected: Instantaneous values, maximum values, minimum values, and average values will be saved for the thinning interval.

Loading data

Loading saved data	Specify a position and then load up to 256 M data points of previously saved text-format data.

Calculations

Numerical calculations	Number of calculations	Up to 10 calculations simultaneously
	Calculation content	Average value, peak-to-peak value, maximum value, maximum value time, minimum value, minimum value time, integration*1, aggregation*1, usage ratio*2, on time*2, off time*2, on count*2, off count*2 *1: total, positive, negative, or absolute value (user-selectable) *2: threshold values can be set for individual channels.
	Calculation range	During recording: calculations performed for all data during recording After recording has stopped: calculations performed for all data in the internal buffer memory, or for data in a calculation range specified by the A/B cursors (on the vertical axis)
	Time split calculation	Disabled, enabled, or timed (user-selectable) Disabled: calculations performed for all data during recording Enabled: data for each segment of time, starting with the start of measurement Segmentation time: set DD HH:MM format Timed: calculations will be made at intervals of the segment time based on the previously set reference time. Reference time: set in hours and minutes. Split time: 1 min, 2 min, 5 min, 10 min, 15 min, 20 min, 30 min, 1 h, 2 h, 3 h, 4 h, 6 h, 8 h, 12 h, 1 d
Waveform calculations	Calculation content	Four arithmetic operations among channels Moving average, simple average, aggregation, and integration of any channel Calculated values are recorded as data for calculation channels (W1 through W30). (Calculations are performed at same time as measurement. Values cannot be recalculated after measurement.)

Triggers

Trigger method	Digital comparison method	
Trigger timing	Start, stop, or start & stop	
Trigger conditions	AND/OR operation performed on trigger source, interval trigger, or external trigger When triggers are disabled, free run	
Trigger sources	Analog, pulse, logic, waveform calculations	
Trigger types	Analog, pulse Waveform calculations	Level triggers: trigger activated by rising or falling edge at set level Window triggers: set by trigger level upper limit and lower limit. Trigger activated when value leaves Area or when value enters area
	Logic	Trigger activated when patterns of 1/0/X match (where "X" indicates either)
Interval triggers	Trigger activated for set recording interval after setting days/hours/minutes/seconds	
External triggers	Trigger activated by rising or falling edge at set level in external input signal. Rising/falling (user-selectable)	
Trigger response time	When using plug-in units: (Recording interval or data refresh interval, whichever is longer) × 2 + 1 ms + analog response time*1 When using wireless units (LR8450-01 only): (Recording interval or data refresh time, whichever is longer) × 2 + wireless response time*2 + analog response time*1 *1: Depending on filter settings (U8554 with a data refresh interval of 5 ms and low-pass filter of 120 Hz). *2: When the radio-wave state is in good condition, 1s.	
Trigger level resolution	Analog	0.1% f.s. (f.s. = 10 divisions)
	Pulse	Count 1c, rotational speed 1/*n* (where *n* = pulse count per rotation setting)
Pre-triggers	Set day/hours/minutes/seconds. Can be set during real-time saving.	

Alarms

Alarm conditions	Set separately for ALM1 to ALM8 System will output an alarm when any of the following conditions are satisfied: • AND/OR operation performed on alarm sources • Low battery • Thermocouple burnout • Wireless error (LR8450-01 only)	
Alarm sources	Analog, pulse, logic, waveform calculations	
Wireless error (LR8450-01 only)	Alarm output when a wireless communication error with a wireless module is detected Off/now/3 min. (user-selectable) Now: outputs an alarm upon a communications disruption 3 min.: outputs an alarm if a communication disruption continues for 3 minutes.	
Low remaining battery life	Alarm output when low remaining battery life is detected for the instrument or a wireless unit.	
Thermocouple burnout	Alarm output when a thermocouple burnout occurs (when Tc burnout detection setting is enabled)	
Types of alarms	Analog, pulse, waveform calculations	Level: system will output an alarm following a rising or falling edge at set level
		Window: set upper limit and lower limit System will output an alarm when value leaves area or when value enters area
		Slope: set level and time. The system will output an alarm when the rate of change (level per unit time) continues to exceed the specified change rate during the set time interval.
	Logic	System will output an alarm when patterns of 1/0/X match (where "X" indicates either)
Alarm filter	Apply a filter to results of AND/OR operations performed on alarm sources. Set based on sample count (off, 2 to 1000). System will output an alarm if alarm state continues for set number of samples	

Alarm retention	On/Off (user-selectable) Clear alarms: When alarm retention is On, alarms will be cleared without stopping recording.
Alarm tone	On/Off (user-selectable)
Alarm output response time	When using plug-in units: (Recording interval or data refresh interval, whichever is longer) × 2 + 1 ms + analog response time*1 When using wireless units (LR8450-01 only): (Recording interval or data refresh interval, whichever is longer) × 2 + wireless response time*2 + analog response time*1 *1: Depending on filter settings (U8554 with a data refresh interval of 5 ms and low-pass filter of 120 Hz). *2: When the radio-wave state is in good condition, 1s.

Other functionality		
Even mark function	Number of inputs	Up to 1000 inputs per measurement
Waveform search function	Search waveforms and display target location in center of waveform screen.	
	Search conditions	Search by choosing level, window, maximum value, minimum value, local maximum value, or local minimum value.
	Search range	All data in internal buffer memory or data between A/B cursors (on vertical axis)
	Search targets	Analog, pulse, logic, waveform calculations
Jump function	Specify event mark, A/B cursor position, trigger point, or waveform display position to display in center of waveform screen.	
Cursor measurement function	Cursor display	All channels or specified channels (user-selectable)
	Cursor movement	A, B, or simultaneous (user-selectable)
	Types of cursors	Vertical or horizontal (user-selectable)
Scaling function	Scaling settings can be configured separately for each channel.	
Comment entry function	Enter titles and channel-specific comments	
Start state retention function	On/Off (user-selectable)	
Auto-start function	On/Off (user-selectable)	
Functionality for saving setting conditions	Up to five groups of setting conditions can be saved in the instrument's internal backup memory.	
Auto setup function	Setting conditions saved in the instrument's memory or on an SD Memory Card or a USB Drive can be automatically loaded when the instrument is powered on. If there are setting conditions stored in the instrument's memory as well as on an SD Memory Card and a USB Drive, setting conditions have the following precedence: instrument's memory, SD Memory Card, and USB Drive.	
Prevention of inadvertent START/STOP key operation	When START or STOP key is pressed, system will display a message asking if user wishes to start or stop measurement. Confirmation message: Enable/disable (user-selectable)	
Key lock function	Disables operation keys	
Beep tone	On/Off (user-selectable)	
Self-check function	Can check keys, LCD, ROM/RAM, LAN, media, and modules.	
Display of horizontal axis (time values)	Horizontal axis (time value) display can be set to time, date, or data point count. Setting is applied when text data is saved.	
Configuration navigation (Quick Set) function	Wireless unit registration guide (LR8450-01 only), wireless connectivity troubleshooting guide (LR8450-01 only), Connection diagram display (Strain gage, external terminals), loading setting conditions	
Power supply frequency filter function	50 Hz/60 Hz selection	

Input		
Pulse/logic input		
Number of channels	8 channels (common GND, non-isolated) Exclusive setting for pulse/logic input for individual channels	
Terminal block	Push-button type terminal block	
Adaptive input format	Non-voltage contact, open collector (PNP open collector requires external resistor), or voltage input	
Maximum input voltage	0 V to 42 V DC	
Input resistance	1.1 MΩ ±5%	
Detection level	2 levels (user-selectable) High: 1.0 V or greater; low: 0 to 0.5 V High: 4.0 V or greater; low: 0 to 1.5 V	
Pulse input		
Measurement range, resolution		

Measurement target	Range	Maximum resolution	Measurable range
Count	1000 M pulse f.s.	1 pulse	0 to 1000 M pulse
Rotational speed	5000/*n* (r/s) f.s.	1/*n* (r/s)	0 to 5000/*n* (r/s)
	300,000/*n* (r/min.) f.s.	1/*n* (r/min.)	0 to 300,000/*n* (r/min.)
	n: Number of pulses per rotation (1 to 1000)		

Pulse input period	With filter off: 200 µs or greater (100 µs or greater during high and low interval) With filter on: 100 ms or greater (50 ms or greater during high and low interval)
Slope	Set rising/falling for each channel.
Measurement mode	Integration (addition, instantaneous), rotational speed
Integration	Addition: Counts number of pulses input from start of measurement. Instantaneous: Counts number of pulses input within each recording interval (integrated value is reset for each rotational interval).
Rotational speed	r/s: Counts number of input pulses during 1 s and calculates rotational speed. r/min.: Counts number of input pulses during 1 min. and calculates rotational speed.
Smoothing function	Select value from 1 s to 60 s (valid only when set to rotational speed and r/min.).
Chatter prevention filter	Set to On/Off for each channel.
Logic input	
Measurement mode	Records 1 or 0 for each recording interval.

Software Logger Utility specifications

Operating Environment	Windows7(32bit/64bit) Windows8(32bit/64bit) Windows10(32bit/64bit)
Overview	Control PC-connected logger to receive, display and save measured waveform data sequentially. (Total recording samples: maximum 10 million data. Data exceeding this number will be segmented into separate measurement files while recording continues.) * Real-time measurement on the LR8450, LR8450-01 is possible with a recording interval of 10 ms or more.
Function	Controllable loggers: 5 Data Collection System: 1 system Display Format: • Waveforms (split time-axis display is possible) • Numerical values (logging) Numerical display can be enlarged • Alarms Above items can be displayed simultaneously Numerical Value Monitor Display: Display in a separate window is possible. Scroll: Waveforms can be scrolled during measurement.
Data Collection	Settings: Data collection settings of logger unit can be configured Monitor function can be checked before measurement. Save: Save settings from multiple devices supporting real-time measurement (LUS format) and measurement data (LUW format) as one file. Data Save Destination: Real-time data collection file (LUW format), transfer data in real-time or non-real-time to Microsoft Excel®, Excel® template can be specified Event Mark: Recording during measurement is possible
Waveform Display	Supported Files: Waveform data file (LUW format, MEM format) Display Format: Waveforms (split time-axis display available), Simultaneous display of numerical values (logging) available Maximum Number of Channels: 2035 channels (measured) + 60 channels (waveform calculation) Waveform Display Sheets: Waveform of each channel can be displayed on any of the ten sheets Scroll: Available Event Mark Recording: Available Cursors: Cursors A and B can be used to display voltage values at cursor positions. Hard Copy: Hard copy of waveform display available
Data Conversion	Applicable Files: Waveform data file (LUW format, MEM format) Conversion Section: All data, specified section Conversion Format: CSV format (comma delimited, space delimited, tab delimited), transfer to Excel® sheet, LR5000 format (hrp2,hrp) Data Thinning: Simple thinning with any thinning number
Waveform Calculation	Calculation items: Four arithmetic operations Number of calculation channel: 60 channels
Numerical Calculations	Applicable Data: Waveform data file (LUW format, MEM format), real-time measurement data, Waveform calculation Calculation Items: Average value, peak value, maximum value, time to maximum value, minimum value, time to minimum value, On time, Off time, On count, Off count, standard deviation, aggregation, area value, and integration Save calculation: Perform numerical calculation and save to file
Search	Applicable Data: Real-time data collection file (LUW format), Main unit measurement file (MEM format), Waveform calculation data Search Mode: Event mark, date and time, maximum position, minimum position, local maximum position, local minimum position, alarm position, level, window, and variation
Print	Applicable printer: Printer compatible to the OS in use Applicable data: Waveform data file (LUW format, MEM format) Print format: Waveform image, Report print, List print (Channel settings, Event, Cursor value) Print area: All area, Specified area by A-B cursor Print preview: Available

Option specifications (sold separately)

Plug-in units: U8550, U8551, U8552, U8553, U8554
Shared specifications

Host model	LR8450/LR8450-01 MEMORY HiLOGGER
Operating temperature and humidity range	-10°C to 50°C, 80% RH or less (non-condensing)
Storage temperature and humidity range	-20°C to 60°C, 80% RH or less (non-condensing)
Vibration resistance	JIS D 1601:1995 5.3(1), Class 1A (passenger vehicle) equivalent
Accessories	User manual, mounting screw × 2, wiring confirmation label (U8554 only)

Wireless units: LR85530, LR8531, LR8532, LR8533, LR8534
Shared specifications

Host model	LR8450-01 MEMORY HiLOGGER
Control communications method	Connect wirelessly via Z3230 Wireless LAN Adapter (included).
Communications buffer memory	4 Mword (volatile memory) Saves data in the event of a communications error. Data is re-sent when communications are restored.
Operating temperature and humidity range	-20°C to 55°C, 80% RH (non-condensing) (Charging temperature range: 5°C to 35°C)
Storage temperature and humidity range	-20°C to 60°C, 80% RH (non-condensing)
Vibration resistance	JIS D 1601:1995 5.3(1), Class 1A (passenger vehicle) equivalent
LED display	Wireless connection and measurement status, error status, AC adapter/external power, battery power, charge status

Auto-connect function	Available
Accessories	Z3230 Wireless LAN Adapter, user manual, Z1008 AC Adapter, mounting plate, M3×4 screw × 2 (for use with mounting plate), wiring confirmation label (LR8534 only)
Z3230 wireless specifications	Wireless LAN (IEEE 802.11b/g/n) Range: 30 m (line of sight) Encryption: WPA-PSK/WPA2-PSK, TKIP/AES Channels: Channel 1 to 11

Power supply specifications

AC adapter	Z1008 AC Adapter (12 V DC, standard accessory) Rated supply voltage: 100 to 240 V AC Rated power supply frequency: 50/60 Hz Maximum rated power: 25 VA (including AC adapter) Normal power consumption (instrument only, without battery pack) LR8530, LR8532, LR8533: 2.5 VA LR8531: 3.0 VA LR8534: 4.0 VA
Battery	Z1007 Battery Pack (When using AC adapter, AC adapter takes precedence.) Rated supply voltage: 7.2 V DC (Li-ion 2170 mAh) Maximum rated power LR8530, LR8532: 1.5 VA LR8531, LR8533: 2.0 VA LR8534: 3.5 VA
External power supply	Rated supply voltage: 10 to 30 V DC Maximum rated power: 8 VA (30 V DC external power supply, while charging battery) Normal power consumption (12 V DC external power supply, without battery pack) LR8530, LR8532, LR8533: 2.5 VA LR8531: 3.0 VA LR8534: 4.0 VA
Continuous operating time	When using Z1007 Battery Pack (all data refresh rates, good communications state, 23°C reference values) LR8530, LR8532, LR8533: Approx. 9 hr. LR8531: Approx. 7 hr. LR8534: Approx. 5 hr.
Charging function	When Z1007 Battery Pack installed while connected to AC adapter or 10 to 30 V DC external power supply Charging time: Approx. 7 hr. (23°C reference value)

VOLTAGE/TEMP UNIT U8550 UNIVERSAL UNIT U8551 VOLTAGE/TEMP UNIT U8552	WIRELESS VOLTAGE/TEMP UNIT LR8530 WIRELESS UNIVERSAL UNIT LR8531 WIRELESS VOLTAGE/TEMP UNIT LR8532

(Accuracy guaranteed for 1 year, post-adjustment accuracy guaranteed for 1 year)

General specifications

Number of input channels	U8550: 15 (set voltage, thermocouple, or humidity for each channel) LR8530: 15 (set voltage or thermocouple for each channel) U8551, LR8531: 15 (set voltage, thermocouple, humidity, RTD, or resistor for each channel) U8552: 30 (set voltage, thermocouple, or humidity for each channel) LR8532: 30 (set voltage or thermocouple for each channel)
Input terminals	U8550, LR8530: M3 screw-type terminal block (2 terminals per channel) U8551, LR8531: Push-button type terminal block (4 terminals per channel) U8552, LR8532: Push-button type terminal block (2 terminals per channel)
Output terminals	M3 screw-type terminal block (1 output, 2 terminals, Z2000 Humidity Sensor power supply [can power up to 15 Z2000 Humidity Sensors]) (LR8531 only)
Measurement target	U8550, U8552: voltage, temperature (thermocouples), humidity LR8530, LR8532: voltage, temperature (thermocouples) U8551, LR8531: voltage, temperature (thermocouples), humidity, temperature (RTD), resistor
Input type	Scanning by semiconductor relays All channels isolated (Not isolated when measuring with RTD, resistance or humidity)
A/D resolution	16 bits
Maximum input voltage	±100 V DC (maximum voltage between input terminals without causing damage)
Maximum channel-to-channel voltage	300 V DC (maximum voltage that can be applied between each input channel without causing damage; not isolated when measuring with RTD, resistance or humidity) *Channels are isolated from each other with semiconductor relays. Never allow a voltage exceeding the product specifications, for example a lightning surge, to be applied across channels as doing so may cause the semiconductor relays to short.
Maximum rated terminal-to-ground voltage	300 V AC, DC (maximum voltage that can be applied between input channels and the instrument or its chassis, or between units without causing damage; humidity measurement not isolated)
Input resistance	10 MΩ or greater (10 mV f.s. to 2 V f.s. voltage ranges, thermocouple ranges, RTD and resistor ranges) 1 MΩ ±5% (10 V f.s. to 100 V f.s. voltage range, 1-5 V f.s. voltage range, humidity measurement)
Allowable signal source resistance	1 kΩ or less
Data refresh interval	10 ms to 10 s (10 selectable levels)
Digital filters	Digital filter cutoff frequency is automatically set to data refresh interval, burnout setting, and power supply frequency filter setting
Dimensions	U8550, U8551, U8552: Approx. 134W × 70H × 63D mm (5.28″W × 2.76″H × 2.48″D) LR8530, LR8531, LR8532: Approx. 154W × 106H × 57D mm (6.06″W × 4.17″H × 2.24″D)
Mass	U8550: Approx. 345 g (12.2 oz.), U8551: Approx. 318 g (11.2 oz.), U8552: Approx. 319 g (11.3 oz.), LR8530: Approx. 423 g (14.9 oz.), LR8531: Approx. 386 g (13.6 oz.), LR8532: Approx. 388 g (13.7 oz.), (including Z3230 Wireless LAN Adapter)
Accessories	Instruction Manual, Installation screws × 2

Analog input specifications

(23 ±5°C [73 ±9°F], 80% rh or less, after 30 minutes of warm-up and zero-adjustment, with the 50/60 Hz cut-off setting selected)

Voltage

Range	Maximum resolution	Measurable range	Measurement accuracy
10 mV f.s.	500 nV	-10 mV to 10 mV	±10 µV
20 mV f.s.	1 µV	-20 mV to 20 mV	±20 µV
100 mV f.s.	5 µV	-100 mV to 100 mV	±50 µV
200 mV f.s.	10 µV	-200 mV to 200 mV	±100 µV
1 V f.s.	50 µV	-1 V to 1 V	±500 µV
2 V f.s.	100 µV	-2 V to 2 V	±1 mV
10 V f.s.	500 µV	-10 V to 10 V	±5 mV
20 V f.s.	1 mV	-20 V to 20 V	±10 mV
100 V f.s.	5 mV	-100 V to 100 V	±50 mV
1-5 V f.s.	500 µV	1 V to 5 V	±5 mV

Temperature

Thermocouple (not including accuracy of reference junction compensation)
Standards: JIS C1602-2015, IEC584

Type	Range	Measurable range	Measurable range	Measurement accuracy
K	100°C f.s.	0.01°C	-100°C to less than 0°C	±0.7°C
			0°C to 100°C	±0.5°C
	500°C f.s.	0.05°C	-200°C to less than -100°C	±1.4°C
			-100°C to less than 0°C	±0.7°C
			0°C to 500°C	±0.5°C
	2000°C f.s.	0.1°C	-200°C to less than -100°C	±1.4°C
			-100°C to less than 0°C	±0.7°C
			0°C to less than 500°C	±0.5°C
			500°C to 1350°C	±0.7°C
J	100°C f.s.	0.01°C	-100°C to less than 0°C	±0.7°C
			0°C to 100°C	±0.5°C
	500°C f.s.	0.05°C	-200°C to less than -100°C	±0.9°C
			-100°C to less than 0°C	±0.7°C
			0°C to 500°C	±0.5°C
	2000°C f.s.	0.1°C	-200°C to less than -100°C	±0.9°C
			-100°C to less than 0°C	±0.7°C
			0°C to 1200°C	±0.5°C
E	100°C f.s.	0.01°C	-100°C to less than 0°C	±0.7°C
			0°C to 100°C	±0.5°C
	500°C f.s.	0.05°C	-200°C to less than -100°C	±0.9°C
			-100°C to less than 0°C	±0.7°C
			0°C to 500°C	±0.5°C
	2000°C f.s.	0.1°C	-200°C to less than -100°C	±0.9°C
			-100°C to less than 0°C	±0.7°C
			0°C to 1000°C	±0.5°C
T	100°C f.s.	0.01°C	-100°C to less than 0°C	±0.7°C
			0°C to 100°C	±0.5°C
	500°C f.s.	0.05°C	-200°C to less than -100°C	±1.4°C
			-100°C to less than 0°C	±0.7°C
			0°C to 400°C	±0.5°C
	2000°C f.s.	0.1°C	-200°C to less than -100°C	±1.4°C
			-100°C to less than 0°C	±0.7°C
			0°C to 400°C	±0.5°C
N	100°C f.s.	0.01°C	-100°C to less than 0°C	±1.1°C
			0°C to 100°C	±0.9°C
	500°C f.s.	0.05°C	-200°C to less than -100°C	±2.1°C
			-100°C to less than 0°C	±1.1°C
			0°C to 500°C	±0.9°C
	2000°C f.s.	0.1°C	-200°C to less than -100°C	±2.1°C
			-100°C to less than 0°C	±1.1°C
			0°C to 1300°C	±0.9°C
R	100°C f.s.	0.01°C	0°C to 100°C	±4.4°C
	500°C f.s.	0.05°C	0°C to less than 100°C	±4.4°C
			100°C to less than 300°C	±2.9°C
			300°C to 500°C	±2.2°C
	2000°C f.s.	0.1°C	0°C to less than 100°C	±4.4°C
			100°C to less than 300°C	±2.9°C
			300°C to 1700°C	±2.2°C
S	100°C f.s.	0.01°C	0°C to 100°C	±4.4°C
	500°C f.s.	0.05°C	0°C to less than 100°C	±4.4°C
			100°C to less than 300°C	±2.9°C
			300°C to 500°C	±2.2°C
	2000°C f.s.	0.1°C	0°C to less than 100°C	±4.4°C
			100°C to less than 300°C	±2.9°C
			300°C to 1700°C	±2.2°C
B	2000°C f.s.	0.1°C	400°C to less than 600°C	±5.4°C
			600°C to less than 1000°C	±3.7°C
			1000°C to 1800°C	±2.4°C
C	100°C f.s.	0.01°C	0°C to 100°C	±1.7°C
	500°C f.s.	0.05°C	0°C to 500°C	±1.7°C
	2000°C f.s.	0.1°C	0°C to 2000°C	±1.7°C

Other specifications about thermocouple measurement

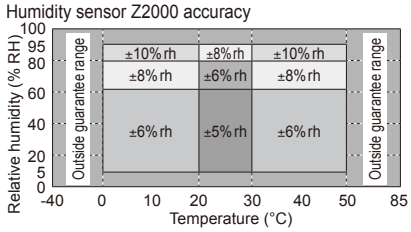
Reference junction compensation: Internal/external	At INT RJC, total accuracy = add ± 0.5˚C
Thermocouple burnout detection: ON/OFF	System will check for burnout at each data refresh interval during thermocouple measurement. (10 ms interval not available)

U8550, U8551, U8552, LR8531 Only Input specifications

Humidity (use Humidity Sensor Z2000)

Range	Maximum resolution	Measurable range
100% rh f.s.	0.1% rh	5.0% rh to 95.0% rh

Humidity sensor Z2000 accuracy



If the humidity value lies on a boundary line, the better of the two regions' measurement accuracy values applies.

U8551, LR8531 Only Input specifications

Temperature
RTD

Connection: 3-wire/4-wire, Measurement current: 1 mA (Pt100, Jpt100), 0.1 mA (Pt1000)
Standards: Pt100,Pt1000:JIS C1604-2013,IEC751 JPt100:JIS C1604-1989

Type	Range	Maximum resolution	Measurable range	Measurement accuracy
Pt100	100°C f.s.	0.01°C	-100°C to 100°C	±0.5°C
	500°C f.s.	0.05°C	-200°C to 500°C	±0.7°C
	2000°C f.s.	0.1°C	-200°C to 800°C	±0.9°C
JPt100	100°C f.s.	0.01°C	-100°C to 100°C	±0.5°C
	500°C f.s.	0.05°C	-200°C to 500°C	±0.7°C
	2000°C f.s.	0.1°C	-200°C to 500°C	±0.9°C
Pt1000	100°C f.s.	0.01°C	-100°C to 100°C	±0.5°C
	500°C f.s.	0.05°C	-200°C to 500°C	±0.7°C
	2000°C f.s.	0.1°C	-200°C to 800°C	±0.9°C

*When using Pt1000, data refresh intervals of 10ms, 20m, and 50ms are not available.

Resistance
Connection: 4-wire; measurement current: 1 mA

Range	Maximum resolution	Measurable range	Measurement accuracy
10 Ω f.s.	0.5 mΩ	0 Ω to 10 Ω	±10 mΩ
20 Ω f.s.	1 mΩ	0 Ω to 20 Ω	±20 mΩ
100 Ω f.s.	5 mΩ	0 Ω to 100 Ω	±100 mΩ
200 Ω f.s.	10 mΩ	0 Ω to 200 Ω	±200 mΩ

HIGH SPEED VOLTAGE UNIT U8553 | **WIRELESS HIGH SPEED VOLTAGE UNIT LR8531**

(Accuracy guaranteed for 1 year, Post-adjustment accuracy guaranteed for 1 year)

General specifications

Number of input channels	5 (voltage only)
Input terminals	M3 screw-type terminal block (2 terminals per channel), outfitted with terminal block cover
Measurement target	Voltage
Input type	Scanning by semiconductor relays, all channels isolated
A/D resolution	16 bits
Maximum input voltage	±100 V DC (maximum voltage between input terminals without causing damage)
Maximum channel-to-channel voltage	300 V DC (maximum voltage between input channels without causing damage) *Channels are isolated from each other with semiconductor relays. Never allow a voltage exceeding the product specifications, for example a lightning surge, to be applied across channels as doing so may cause the semiconductor relays to short.
Maximum rated terminal-to-ground voltage	300 V AC, DC (maximum voltage between input channel and chassis, or between modules, without causing damage)
Input resistance	1MΩ±5%
Allowable signal source resistance	100Ω or less
Data refresh interval	1 ms to 10 s (13 selectable levels)
Digital filters	Digital filter cutoff frequency is automatically set to data refresh interval, burnout detection setting, and power supply frequency filter setting.
Dimensions	U8553: Approx. 134W × 70H × 63D mm (5.28″W × 2.76″H × 2.48″D) LR8531: Approx. 154W × 106H × 57D mm (6.06″W × 4.17″H × 2.24″D)
Mass	U8553: Approx. 237 g (8.4 oz.) LR8531: Approx. 370 g (13.1 oz.) (including Z3230 Wireless LAN Adapter)

Analog input specifications
(23 ±5˚C/73 ±9˚F, 80% rh or less, after 30 minutes of warm-up and zero-adjustment, with the 50 Hz/60 Hz cut-off setting selected)

Measurement target	Range	Maximum resolution	Measurable range	Measurement accuracy
Voltage	100 mV f.s.	5 µV	-100 mV to 100 mV	±100 µV
	200 mV f.s.	10 µV	-200 mV to 200 mV	±200 µV
	1 V f.s.	50 µV	-1 V to 1 V	±1 mV
	2 V f.s.	100 µV	-2 V to 2 V	±2 mV
	10 V f.s.	500 µV	-10 V to 10 V	±10 mV
	20 V f.s.	1 mV	-20 V to 20 V	±20 mV
	100 V f.s.	5 mV	-100 V to 100 V	±100 mV
	1-5 V f.s.	500 µV	1 V to 5 V	±10 mV

STRAIN UNIT U8554 | **WIRELESS STRAIN UNIT LR8534**

(Accuracy guaranteed for 1 year, Post-adjustment accuracy guaranteed for 1 year)

General specifications

Number of input channels	5 (Set voltage or strain for each channel.)	
Input terminals	Push-button type terminal block (5 terminals per channel), outfitted with terminal block cover, Set DIP switches according to measurement target.	
Measurement target	Voltage	
	Strain	Strain gage-type converter Strain gage 1-gage method (2-wire setup), 1-gage method (3-wire setup), 2-gage method (adjacent sides), 4-gage method
Adaptive gage resistance	1-gage method, 2-gage method: 120 Ω (external bridge box required for 350 Ω) 4-gage method: 120 Ω to 1 kΩ	
Gage ratio	2.0 (fixed)	
Bridge voltage	2 V ±0.05 V DC	
Balance adjustment	Method	Electronic auto-balancing
	Range	Voltage: ±20 mV or less (1 mV f.s. to 20 mV f.s. range), ±200 mV or less (50 mV f.s. to 200 mV f.s. range) Strain: ±20,000 με or less (1000 με f.s. to 20,000 με f.s. range), ±200,000 με or less (50,000 με f.s. to 200,000 με f.s. range)
Input type	Balanced differential input, Simultaneous sampling of all channels (non-isolated channels)	
A/D resolution	16bit	
Maximum input voltage	±0.5 V DC (maximum voltage between input terminals without causing damage)	
Maximum channel-to-channel voltage	Non-isolated (all channels share common GND)	
Maximum rated terminal-to-ground voltage	30 Vrms AC or 60 V DC (maximum voltage between input channel and chassis without causing damage)	
Input resistance	2 MΩ ±5%	
Data refresh interval	1 ms to 10 s (13 selectable levels)	
Low-pass filter	Cutoff frequency: −3 dB ±30% Auto, 120, 60, 30, 15, 8, 4 (Hz) Auto: Cutoff frequency of low-pass filter is automatically set based on set data refresh interval.	
	Attenuation characteristics: 5th-order Butterworth filter, −30 dB/oct	
Dimensions	U8554: Approx. 134W × 70H × 63D mm (5.28″W × 2.76″H × 2.48″D) LR8534: Approx. 154W × 106H × 57D mm (6.06″W × 4.17″H × 2.24″D)	
Mass	U8554: Approx. 236 g (8.3 oz.) LR8534: Approx. 372 g (13.1 oz.) (including Z3230 Wireless LAN Adapter)	

Analog input specifications
(23 ±5˚C/73 ±9˚F, 80% rh or less, auto-balance at least 30 minutes after power on, with LPF set at 4 Hz)

Measurement target	Range	Maximum resolution	Measurable range	Measurement accuracy
Voltage	1 mV f.s.	50 nV	-1 mV to 1 mV	±9 µV
	2 mV f.s.	100 nV	-2 mV to 2 mV	±10 µV
	5 mV f.s.	250 nV	-5 mV to 5 mV	±25 µV
	10 mV f.s.	500 nV	-10 mV to 10 mV	±50 µV
	20 mV f.s.	1 µV	-20 mV to 20 mV	±100 µV
	50 mV f.s.	2.5 µV	-50 mV to 50 mV	±250 µV
	100 mV f.s.	5 µV	-100 mV to 100 mV	±500 µV
	200 mV f.s.	10 µV	-200 mV to 200 mV	±1 mV
Strain	1,000 με f.s.	0.05 με	-1,000 με to 1,000 με	±9 με
	2,000 με f.s.	0.1 με	-2,000 με to 2,000 με	±10 με
	5,000 με f.s.	0.25 με	-5,000 με to 5,000 με	±25 με
	10,000 με f.s.	0.5 με	-10,000 με to 10,000 με	±50 με
	20,000 με f.s.	1 με	-20,000 με to 20,000 με	±100 με
	50,000 με f.s.	2.5 με	-50,000 με to 50,000 με	±250 με
	100,000 με f.s.	5 με	-100,000 με to 100,000 με	±500 με
	200,000 με f.s.	10 με	-200,000 με to 200,000 με	±1000 με

* Internal bridge resistance precision tolerance: ±0.01%; temperature characteristics: ±2 ppm/°C
* Measurement accuracy does not include internal bridge resistance tolerance and temperature characteristics

Model: MEMORY HiLOGGER LR8450

Model No. (Order code)	Specifications
LR8450	Standard model, main unit only
LR8450-01	Wireless LAN equipped model, main unit only

- The LR8450 and LR8450-01 cannot perform measurement on their own. One or more plug-in units or wireless units are required (sold separately).
- The LR8450-01 and each wireless unit emit radio waves. Use of radio waves is subject to licensing requirements in certain countries. Using it in a country or region other than those indicated may violate the law and may result in legal penalties for the operator.
  For the latest information about countries and regions where wireless operation is currently supported, please visit the Hioki website.

Option

Plug-in units

VOLTAGE/TEMP UNIT U8550
Channels: 15; maximum sampling rate: 10 ms

UNIVERSAL UNIT U8551
Channels: 15; maximum sampling rate: 10 ms

VOLTAGE/TEMP UNIT U8552
Channels: 30; maximum sampling rate: 20 ms
(When 15 or fewer channels are used, 10 ms)

HIGH SPEED VOLTAGE UNIT U8553
Channels: 5; maximum sampling rate: 1 ms

STRAIN UNIT U8554
Channels: 5; maximum sampling rate: 1 ms

Wireless units

WIRELESS VOLTAGE/TEMP UNIT LR8530
Channels: 15; maximum sampling rate: 10 ms

WIRELESS UNIVERSAL UNIT LR8531
Channels: 15; maximum sampling rate: 10 ms

WIRELESS VOLTAGE/TEMP UNIT LR8532
Channels: 30; maximum sampling rate: 20 ms
(When 15 or fewer channels are used, 10 ms)

WIRELESS HIGH SPEED VOLTAGE UNIT LR8533
Channels: 5; maximum sampling rate: 1 ms

WIRELESS STRAIN UNIT LR8534
Channels: 5; maximum sampling rate: 1 ms

Power supply

For instrument and wireless units

BATTERY PACK Z1007
Instrument takes two; wireless units take one.

For instrument

AC ADAPTER Z1014
Ships standard with LR8450/LR8540-01.

For wireless units

AC ADAPTER Z1008
Ships standard with wireless units.

Fixed Stand

FIXED STAND Z5040
For installing logger on wall

CASE

CARRYING CASE C1012
Accommodates instrument and four plug-in units or seven wireless units.

Wireless Lan Adapter

For wireless units

WIRELESS LAN ADAPTER Z3230
Ships standard with wireless units.

Cables, sensors, etc.

LAN CABLE 9642
Straight Ethernet cable, supplied with straight to cross conversion adapter, 5 m (16.41 ft) length

HUMIDITY SENSOR Z2000
(Analog output), 3 m (9.84 ft) length

Thermocouple
For reference only. Please purchase locally.

Storage media

*Always use HIOKI optional storage media. Proper operation is not guaranteed when using storage media from other manufacturers, and may prevent the product from saving and loading data properly.

SD memory card Z4001
2 GB capacity

SD memory card Z4003
8 GB capacity

USB drive Z4006
16 GB, Long-life, High-reliability SLC Flash Memory

HIOKI
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