HIOKI

MEMORY HiLOGGER 8430-20

Data Loggers

Records ten times* faster, yet small and light enough for the palm of your hand! *compared to the HIOKI 8420-51 series

Personal Data Logger with Ten Isolated Channels

- **Provides ten** electrically isolated analog input channels for measuring voltage and temperature, plus four pulse-counting input channels. The isolated inputs alleviate constraints when measuring temperatures in live electrical circuits while minimizing interchannel interference.
- **10 ms scanning** of all channels provides rapid sampling capabilities
  To meet the demand for measuring sudden changes in load, this model tracks waveforms that earlier 100 ms models could not.
- **CompactFlash card** makes direct recording a snap
  For long-term data recording, transfer data to a PC via USB connection.
- **Widescreen, bright LCD** gives excellent viewability
  The beautiful, wide QVGA-TFT display is ideal for waveform monitoring.

ISO 9001 JMI-0216

ISO14001 JQA-E-90091

INTERNET HIOKI Website www.hioki.com

HIOKI company overview, new products, environmental considerations and other information are available on our website.

Excellent portability, lightest weight in its class

Easy to operate by practically anyone, anywhere and at any time

Highlights

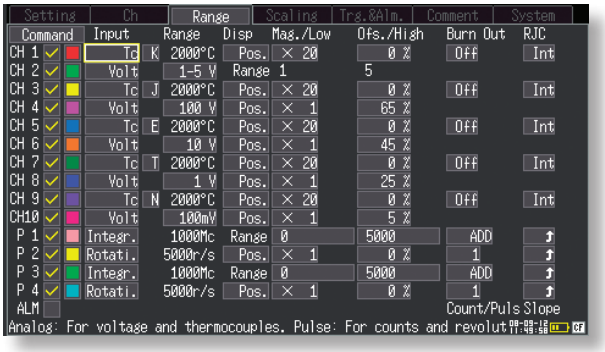
- Ultra-compact for convenient portability -
- Bright, easy-to-view wide LCD display -

■ Most compact dimensions in its class

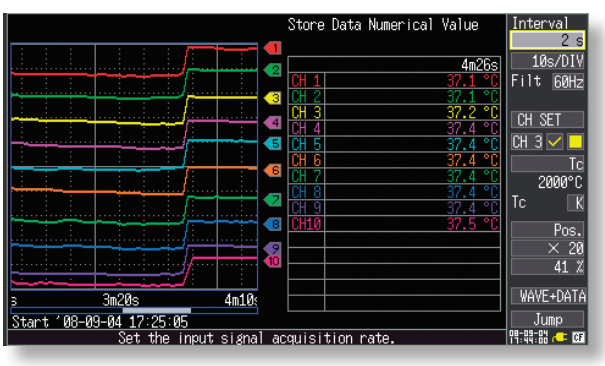
The handy size is easy to carry, and very lightweight.
Just stuff it in the corner of your luggage, and you're ready to go. Sized at 176 × 101 × 41 mm (WHD), and weighing in at only 550 g.

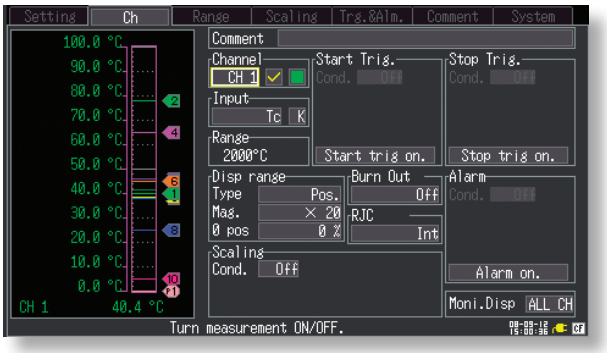
■ Most viewable display in its class

The easy-to-see, high-definition wide-screen QVGA-TFT LCD clearly displays trend graphs as well as numerical values. Waveforms and settings can be confirmed over a broad range, with up to 20 display divisions on the horizontal axis.



All-channel setting screen
Settings for all channels can be set and confirmed from one screen.





Individual channel setting screen
Easily select ranges and set display position while monitoring the waveform.

Monitor screen
View data in various layout combinations such as trend graphs, numerical values and vertical axis gauges.

Functionality

■ A variety of transducer outputs (DC voltage), or thermocouple measuring 10 ch
■ 4 Pulse (count) Input Channels
■ Alarm Output 1 Channel
■ Real-time Save & Long-term recording to CF Card
.....All in a Single Compact Device

Terminal 2: Trigger Output
- Outputs a signal when triggering occurs
- Use for synchronous parallel triggering of multiple HiLOGGERs

Terminal 3: External Trigger Input
- Causes triggering when signaled by an external trigger source
- Use for synchronous parallel triggering of multiple HiLOGGERs

Terminal 4: Alarm Output
- Outputs a signal when alarm criteria are satisfied
- The output signal shares common ground with the HiLOGGER
- Use for simultaneous control of an external alarm device

Note: Open-collector output (active low, with voltage output)

Alarm

Terminal 1: GND

Pulse Inputs (measure integration/revolution count variations)
- Four input channels
- Pulse inputs share common ground with the HiLOGGER
- For measuring energy consumption and cumulative flow

Note: Uses special HIOKI Input Cable 9641

Pulse totalization revolution

Integration count	0 to 1000M (count)
Rotation count	0 to 5000/n (r/s)

Voltage/Temperature Measurement (using thermocouples)
- Ten input channels
- Insulation walls around all input channel terminals (M3 dia. screws)
- Voltage or temperature measurement settings can be independently set up for each channel

Note: Thermocouple types K, J, E, T, N, R, S, B

DC V

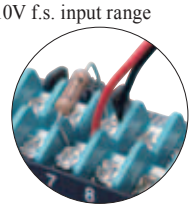
Voltage	±100 mV to ±60 V
Voltage	1 to 5 V

°C Thermocouple

Thermocouple	K, J, E, T, N, R, S, B
	-200 °C to 2000 °C

4-20mA

To record 4 - 20mA instrumentation signals, attach a commercially available 250Ω shunt resistance to the input terminals (between + and -) to convert the signals to 1 - 5 V. Then use the 1-5V or the 10V f.s. input range in the HiLOGGER.



CF Card (for real-time data saving)

- Supports HIOKI's 2GB Card

Note: Non-Hioki CF cards are not supported

Save every measurement to CF card in real time. For continuous long-term recording, just insert a CF card with up to a 2 GB capacity. View data on your computer screen using the supplied Logger Utility program.

■ Recording Time (Save to the CF card in real-time at binary data)

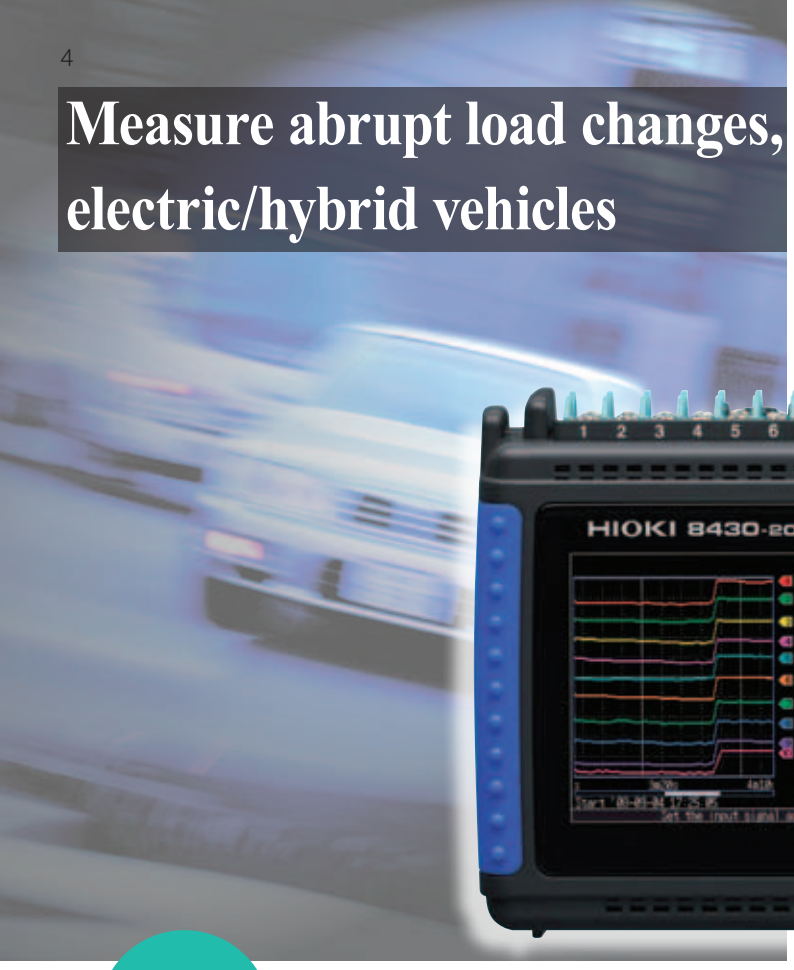
Note: When saving in CSV data format, Total recording time is 1/10 or shorter of the following below.

	Recording All Channels (ten analog, four pulse and one alarm)					
Recording intervals	Internal memory (7 MB)	128 MB	256 MB	512 MB	1 GB	2 GB
10 ms	32m	9h 48m	19h 37m	1d 15h 14m	3d 06h 29m	6d 12h 58m
20 ms	1h 04m	19h 37m	1d 15h 14m	3d 06h 29m	6d 12h 58m	13d 01h 57m
50 ms	2h 40m	2d 01h 03m	4d 02h 6m	8d 04h 13m	16d 08h 26m	32d 16h 53m
100 ms	5h 21m	4d 02h 06m	8d 04h 13m	16d 08h 26m	32d 16h 53m	65d 09h 47m
200 ms	10h 43m	8d 04h 13m	16d 08h 26m	32d 16h 53m	65d 09h 47m	130d 19h 35m
500 ms	1d 02h 49m	20d 10h 33m	40d 21h 07m	81d 18h 14m	163d 12h 29m	327d 00h 59m
1 s	2d 05h 39m	40d 21h 07m	81d 18h 14m	163d 12h 29m	327d 00h 59m	"★"
2 s	4d 11h 18m	81d 18h 14m	163d 12h 29m	327d 00h 59m	"★"	"★"
5 s	11d 04h 16m	204d 09h 37m	"★"	"★"	"★"	"★"
10 s	22d 08h 33m	"★"	"★"	"★"	"★"	"★"
20 s	44d 17h 06m	"★"	"★"	"★"	"★"	"★"
30 s	67d 01h 39m	"★"	"★"	"★"	"★"	"★"
1 min	134d 03h 18m	"★"	"★"	"★"	"★"	"★"
2 min	268d 06h 36m	"★"	"★"	"★"	"★"	"★"
5 min to 1 hour	"★"	"★"	"★"	"★"	"★"	"★"

- *Maximum recording time is inversely proportional to number of recording channels.*
- *Because the actual capacity of a CF card is less than that indicated, and because the header portion of waveform files is not included in capacity calculations, expect actual maximum times to be about 90% of those in the table.*
- *"★" Exceeds 365 days.*

Measure abrupt load changes, such as those that occur in electric/hybrid vehicles

Isolated, high-speed-sampling data logger

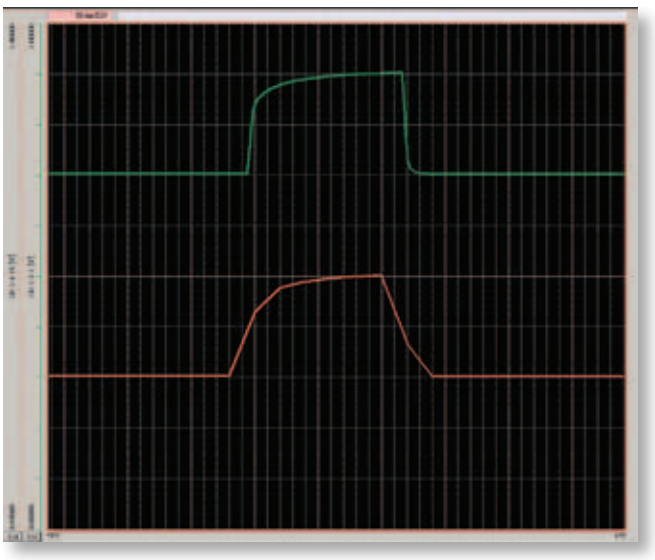


Highlights

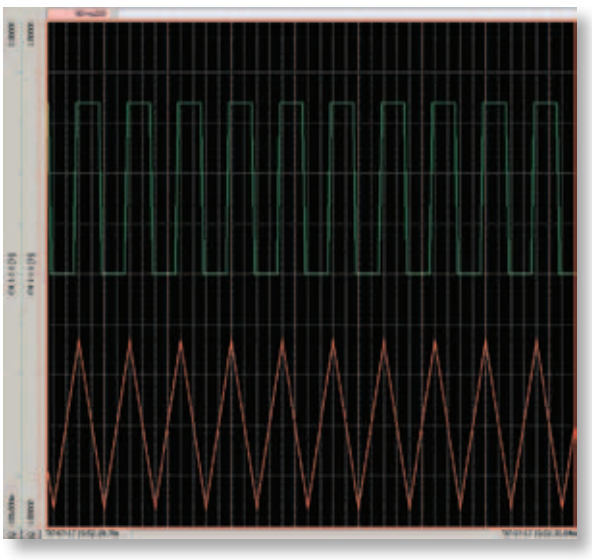
- Fast, 10 ms sampling even while measuring on all channels -
- Measurement circuit includes effective noise suppression -

■ 10 ms Sampling and Recording Across All Channels

Abrupt changes in load need to be measured during development of electrical vehicle systems such as in recent hybrid cars, for which multi-channel, 10 ms sampling is essential. This HiLOGGER can track waveforms that could not be followed with the 100 ms sampling interval previously available.



Measurement comparison of abrupt load change in waveform with 10 ms (upper trace) and 100 ms sampling (using the supplied Logger Utility program)

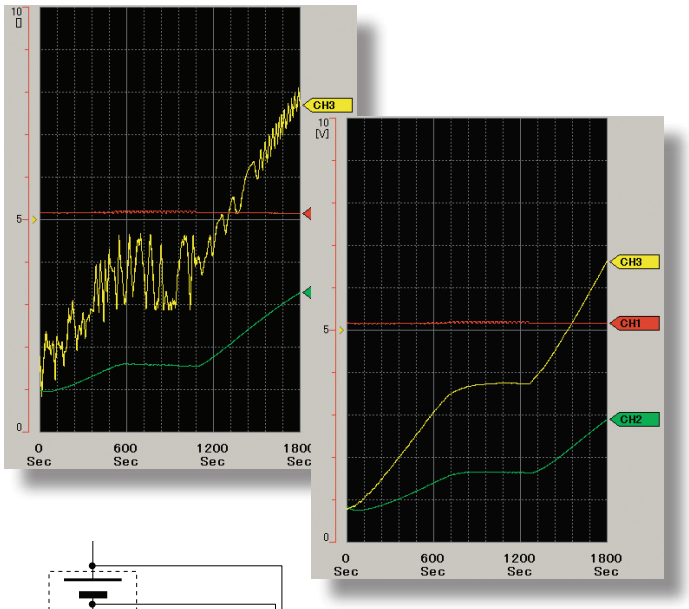


Measurement comparison of 5 Hz square pulse waveform with 10 ms (upper trace) and 100 ms sampling (using the supplied Logger Utility program)

Enhanced Noise Suppression

Measurement involves the deployment of a delta-sigma type A/D converter. Suppress inverter switching noise and line-frequency hum by digital filtering with the HiLOGGER's proprietary oversampling technology.

Note: Optimum noise suppression is obtained for recordings at least two seconds long.

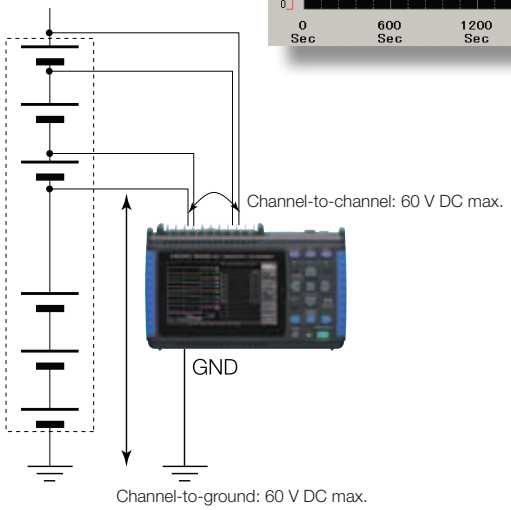


Ten Isolated Analog Input Channels

There's no need to worry about differing potentials of measurement objects when measuring temperature and voltage. All ten analog channels are isolated.

Even when measuring temperature and voltage at the same time, interchannel interference and electric shock hazards are eliminated. The four pulse channels are ideal for counting revolution pulses to measure rotation speed.

Note: Pulse inputs share common ground.



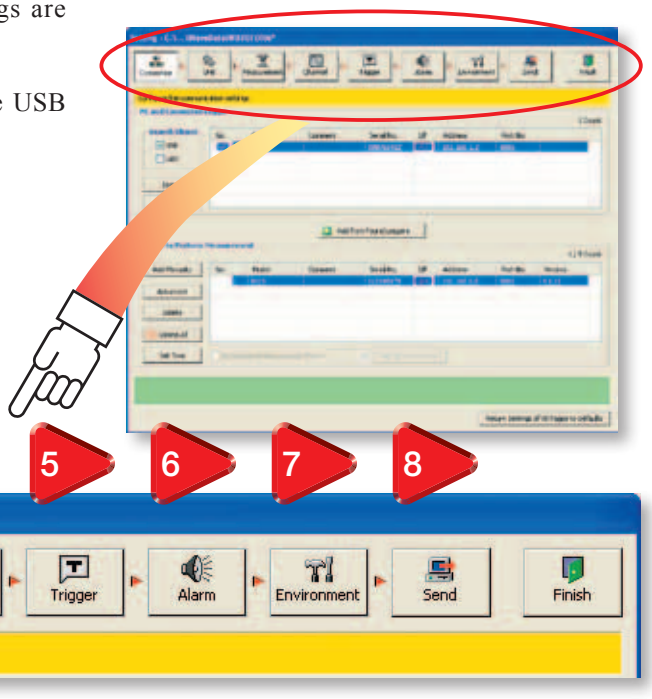
Highlights

- Logger Utility program supports multi-channel measurements via PC -
- Bundled with the HiLogger -

USB connection ensures easy setup

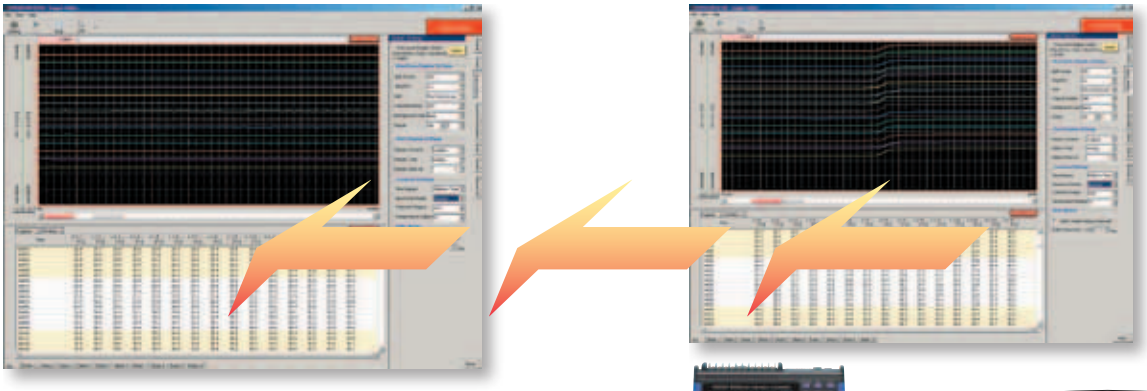
Configure HiLOGGER settings from PC software. Settings are sequentially ordered and guided from a PC window.

Copy the data recorded on the CF card to your PC via the USB interface. (Firmware version 1.10 or later)



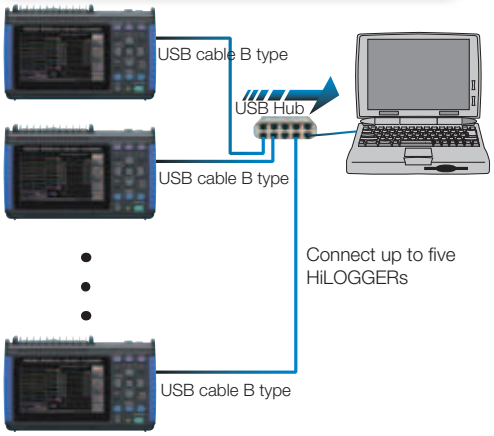
- Logger Utility program supports multi-channel measurements via PC -
- View past measurement data even while measuring -
- Use Windows' printers for hard copy output -

2 Control measurements from the PC screen



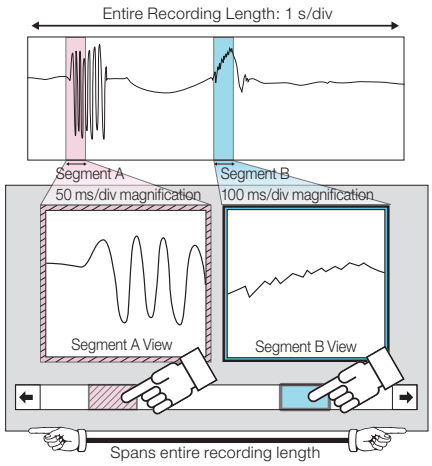
Use the supplied Logger Utility program to control real-time data recording from the PC. Scroll backward through the displayed trend graph window to view past waveforms even while recording.

Up to five **8430-20** HiLOGGERs can be connected to one PC, providing 50 analog and 20 pulse channels that can be graphically displayed together in one window.



3 Analyze after measuring

Our new "dual-knob function" greatly simplifies data analysis. Two different waveform windows are provided, with the displayed waveforms showing different time axis scales (timebases). This capability can greatly simplify long-term data analysis over competitors' offerings.



Logger Utility (bundled application software)	
Operating environment	One CD-R, **CPU:** Pentium 3 (500 MHz or more), at least 512 MB of memory **Interface:** USB (LAN not available with the Model 8430-20/-21) **OS:** Windows 2000 (SP4 or later)/ XP (SP2 or later)/ Vista (32-bit/ 64-bit), (Ver 1.50 or later) Windows 7 (32-bit/ 64-bit) (This software is compatible only to the MEMORY HiLOGGER **LR8400-20, LR8400-21s, 8423, 8430-20/-21**)
Real-time data acquisition	Measurements on multiple loggers connected by USB can be controlled to sequentially acquire, display and save waveform data (for recording up to 10 million samples) **LAN not available with the Model 8430-20/-21* **Number of controllable instruments:** up to 5 units **Display:** Waveforms (multiple time axis can be displayed), Numerical values (logging), Alarm status at the same time, Numerical value monitoring in a separate window, Waveform scroll while measuring **Data saving destination:** Real-time data transfer to EXCEL (new function), or Real-time data acquisition file (LUW format, only for HIOKI) **Event marks:** can be applied while recording
Data acquisition settings	Data acquisition settings for the HiLOGGER **Saving:** The setting for multiple HiLOGGERs can be saved together in one file (LUS format); Instrument configuration settings can be sent and received
Waveform display	**Processed data file:** Real-time data acquisition file (LUW format), Record to internal memory data (MEM format) **Display format:** Simultaneously display waveform and numerical value, (time-axis divided display possible) **Maximum number of channels:** 50 channerls (measurement data, used with the 8430-20/ -21) + 60 channels (waveform processing data) **Others:** Waveform display on sheet for each channel, scroll, record event mark, cursor, hard copy, numerical value display
Data conversion	**Target data:** Real-time data acquisition file (LUW format), Record to internal memory data (MEM format), Waveform processing data **Converted sections:** All data, designation section **Format:** CSV format (separate by comma, space, tab), transfer to EXCEL spreadsheet, arbitrary data thinning
Parameter calculations	**Target data:** Real-time data acquisition file (LUW format), Record to internal memory data (MEM format), Data acquired in real time, Waveform processing data **Calculation items:** average, peak, maximum values, time to maximum values, minimum values, time to minimum values, ON time, OFF time, count the number of ON time and OFF time, standard deviation, integration, area values, totalization
Search function	**Target data:** Real-time data acquisition file (LUW format), Record to internal memory data (MEM format), Waveform processing data, **Search mode:** event mark, time and date, maximum position, minimum position, maximum pole, minimum pole, alarm position, level, window, amount of change
Print function	**Supported printer:** printer compatible with the OS **Target data:** Real-time data acquisition file (LUW format), Record to internal memory data (MEM format), Waveform processing data **Print format:** waveform image, report format, list print (channel settings, event, cursor value) **Print area:** the entire area, area between cursors A and B **Print preview:** supported
Waveform processing	**Processing items:** Four arithmetic operations **Number of processing channels:** 60 channerls (Ver 1.20 or later)

■ Product Specifications

General specifications (product guaranteed for one year)

Input System/ Channels	**Analog inputs:** 10 (M3 mm dia. screw terminal block), electrically isolated between channels, and from chassis ground. **Input impedance:** 1 MΩ (when voltage input or temperature measuring with thermocouple burn-out detection OFF), 800 kΩ (with thermocouple burn-out detection ON) **Pulse inputs:** 4 channels (requires HIOKI Input Cable 9641) *Note: all pulse inputs share common ground with the HiLOGGER*
Analog Inputs	**Maximum rating:** 60 V DC (max. voltage between input terminals without damage), **Maximum rated voltage from isolated terminals to ground:** 60 V DC (max. voltage between input channel terminals, and from terminals to chassis ground without damage)
Pulse Inputs	**Input limits:** -5 to +10 V DC (max. voltage between input terminals without damage), non-isolated (common ground between pulse input channels, and with chassis) **Pulse signal characteristic:** no-voltage relay contact "a", open collector or voltage input (High: ≥ 2.5 V, Low: ≤ 0.9 V), **Period:** at least 200 µs (both high and low periods at least 100 µs)
Alarm Output	**One channel, non-isolated:** output from external control connector (common ground) **Signal criteria:** configurable high/low threshold levels, enter/exit threshold window, logical sum (OR) and logical product (AND) for every input channel. Output is refreshed each time recording starts. **Signal characteristic:** Open-collector output (active low, with voltage output) **Voltage levels:** 4.0 to 5.0 V (H) and 0 to 0.5 V (L), **Max. sink current:** 5 mA DC, Max. applied voltage: 30 V DC
Data Recording Capacity	**Internal storage:** 3.5 MWords (7 MB of two-byte data points, or four-byte pulse measurements) **External storage:** Up to 2 GB (HIOKI CF cards only)
Backup Function (@25°C)	**Backup battery life for clock and settings:** approx. 5 years **For measurement data:** 100 hours with fully charged battery pack, or for as long as AC adapter is connected
External Control Terminals	External Trigger/Event Mark input (exclusion function), Trigger Output, Alarm Output
Display type	4.3-inch WQVGA-TFT color LCD (480 × 272 dots)
Displayable languages	English, Japanese
External Interface	One USB 2.0 series mini B receptacle Functions: Control from a PC (Ver 1.00 or later), Transfers internal data on the CF card to a PC (Ver 1.10 or later, Windows XP/ Vista/ 7)
Environmental conditions (no condensation)	**Temperature and humidity range for use:** 0°C to 40°C (32°F to 104°F), (or 5°C to 30°C, 41°F to 86°F when battery charging) 80% rh or less **Temperature and humidity range for storage:** -10°C to 50°C (14°F to 122°F), 80% rh or less
Compliance standard	**Safety:** EN61010, **EMC:** EN61326, EN61000
Power Sources	(1) 100 to 240 V AC, 50/60 Hz using AC ADAPTER **Z1005** (2) BATTERY PACK **9780** (when used with the AC Adapter, the AC Adapter has priority) (3) 12 V battery (10 to 16 V DC ±10%, Please contact HIOKI for connection cord)
Power Consumption	10 VA (using 12 V battery, while charging Battery Pack 9780) 30 VA (using AC Adapter, while charging Battery Pack 9780)
Continuous Operating Time	Approx. 2.5 hours (with Battery Pack Model 9780) Charging time: Approx. 200 minutes (@5°C to 30°C ambient)
Dimensions and mass	Approx. 176 mm (6.93 in) W × 101 mm (3.98 in) H × 41 mm (1.61 in) D, 550 g (19.4 oz) (HiLOGGER only)
Supplied Accessories	Instruction Manual × 1, Measurement Guide × 1, Application Disk (Logger Utility program) × 1, USB cable × 1, AC ADAPTER **Z1005** × 1, Shoulder Strap × 1, PROTECTION SHEET **9809** × 1

Trigger functions

Trigger Source (selectable for each channel)	All analog and pulse channels P1 to P4, external trigger, logical sum (OR) and product (AND) of each trigger source
External Trigger	**Criteria:** Short-circuit between external trigger input and ground, or voltage input (H-L transition from [3.0 – 5 V] to [0 – 0.8 V]) **Pulse width:** At least 1 ms (H), and 2 µs (L) **Input limits:** -2 to 7 V DC
Trigger Timing	Start, Stop and Start/Stop (different trigger criteria can be set to start and stop)
Trigger Types (Analog, Pulse)	**Level:** Triggers when rising or falling through preset threshold. **Window:** Triggers when entering or exiting range defined by preset upper and lower thresholds.
Level Resolution	**Analog:** 0.025% f.s. (f.s. = 10 display divisions) **Pulse:** Totalization 1 count, Rotations 1/n [r.s] (n: pulses per rotation)
Pre-trigger	Records for a specified period before triggering; can be set for real-time saving
Trigger Output	(1) Output signal at trigger occured, (2) Output signal at start or trigger occured, (1) or (2) mode selectable Open collector (active low, with voltage output, at least 10 ms pulse width, Voltage levels: 4.0 to 5.0 V (H) and 0 to 0.5 V (L), Max. sink current: 5 mA DC, Max. applied voltage: 30 V DC)

Measurement Settings

Recording Intervals (sampling period)	10 ms to 1 hour, 19 selections *Note: All input channels are scanned at high speed during every recording interval*
Graph Timebase Scaling	100 ms to 1 day per division, 21 selections *Note: Setting is independent from the recording interval*
Repeating Recording	(ON/OFF) Enable to repeat recording after the specified recording time span has elapsed
Recording Time	Enable continuous recording ON (records until the Stop key is pressed), or disable to record for a specified time span (days, hours, minutes and seconds)
Timer Recording	(ON/OFF) Enable to record for a specified time span, or between specified start and stop times
Auto Saving	Waveform (Real-time): stores binary data to the CF card during real-time measurement CSV (Real-time): stores CSV data to the CF card during real-time measurement (CSV data in real-time is 50 msec sampling or later, Firmware Ver. 1.10 or later) Calculation (Post meas.): stores calculated values to the CF card when finished measuring Waveform + Calculation: stores binary data during real-time measurement, and stores calculated values when finished measuring CSV + Calculation: stores CSV data during real-time measurement, and stores calculated values when finished measuring
Data Storage Methods	Each times can be saved in a separate file. Overwriting save (endless loop recording): new data overwrites the oldest data when the CF card is full Divided Saving: Enable to save data at a specified interval (days, hours and minutes) Divided Saving: Specified Time (specify a time of day at which to start saving data to files at a specified interval) *Note: Don't shutdown while data saving*
Load Stored Data	Stored data can be recalled by the HiLOGGER in 3.5 MWord (7 MB) quantities (for a single channel; less for multiple channels)
Settable Save/ Reload	Configure saving and reloading to and from CF card or internal memory Ten types for internal memory, no limit for CF card
Numerical Calculations	Calculations 1 to 4, may be simultaneous Selections: average, peak, maximum and minimum values, time-to-maximum and time-to-minimum
Selectable Filters	50Hz, 60 Hz, or OFF (digital filtering of high frequencies on analog channels)

Channel Settings

Channel Settings	Enable/disable measurement (ON/OFF), selectable waveform color **Analog channels (10):** Voltage (DC only), Temperature (thermocouple only). Thermocouple types K, J, E, T, N, R, S, B **Pulse input channels (4):** Count Integration or revolutions **Alarm output (1):** Hold/not-hold, beeper enable/disable (ON/OFF), Show/hide alarm waveform display (ON/OFF)

Measurement parameters	Ranges	Range of Measurements	Finest Resolution
Voltage	100 mV f.s.	-100 mV to +100 mV	5 µV
	1 V f.s.	-1 V to +1 V	50 µV
	10 V f.s.	-10 V to +10 V	500 µV
	20 V f.s.	-20 V to +20 V	1 mV
	100 V f.s.	-60 V to +60 V	5 mV
	1 – 5 V *(Note)*	1 V to 5 V	500 µV
	Accuracy: ±0.1 % f.s. *(Note: 1 - 5V range's f.s. = 10 V)*		

Measurement parameters	Ranges	Range of Measurements	Finest Resolution
Temperature (Thermocouples)	2000 °C f.s.	-200 °C to 2000 °C	0.1 °C

Temperature input ranges (JIS C 1602-1995)	(K) -200 °C to 1350 °C (J) -200 °C to 1200 °C (E) -200 °C to 1000 °C (T) -200 °C to 400 °C (N) -200 °C to 1300 °C (R) 0 °C to 1700 °C (S) 0 °C to 1700 °C (B) 400 °C to 1800 °C
Measurement Accuracy	K, J, E, T, N: ±2 °C R, S: ±4.5 °C (less than 400 °C) R, S, B: ±3 °C (400 °C or more) Reference junction compensation [RJC] accuracy: ±1 °C Internal [RJC] (internal reference junction compensation at 0 °C): Measurement accuracy = (temp. measurement accuracy) + (RJC accuracy) External [RJC] (using external junction compensation at 0 °C): Measurement accuracy = temp. measurement accuracy only
Temperature Other Functions	Thermocouple burn-out detection: ON or OFF

Measurement parameters	Ranges	Range of Measurements	Finest Resolution
Pulse (Totalization)	1,000 M (count) f.s.	0 to 1,000 M (count)	1 (count)
	Totalization mode: cumulative (counts from start), **Instantaneous value:** instantaneous value during each recording period		
Pulse (Rotations)	5,000/n (r/s) f.s.	0 to 5,000/n (r/s)	1/n (r/s)
	Settable pulses per rotation: 1 to 1,000 ("n" above is the number of sensor output pulses per rotation)		

Slope Setting	↑ (count of L-to-H pulse transitions), ↓ (count of H-to-L pulse transitions)
Displayed Range	Specified by position, or by upper/lower display limit values (Upper/lower limit values only at Totalization mode)

Common Channel Settings

Scaling	Decimal (display decimal values), Exponential (display base-10 exponents), or Off Method: Ratio (set by slope and intercept), or 2-point (set by input/output values at two points)
Other Common Channel Settings	Enter comments for each channel, set start/stop triggers and alarm criteria

Options in Detail

MEMORY HiLOGGER 8430-20

(English model)

Supplied Accessories: Instruction Manual × 1, Measurement Guide × 1, Application Disk (Logger Utility program) × 1, USB cable × 1, AC ADAPTER **Z1005** × 1, Shoulder Strap × 1, PROTECTION SHEET **9809** × 1

Removable storage (CF card)

Supplied with PC Card adapter

- PC CARD 2G 9830 (2 GB capacity)
- PC CARD 1G 9729 (1 GB capacity)
- PC CARD 512M 9728 (512 MB capacity)
- PC CARD 256M 9727 (256 MB capacity)

PC Card Precaution

Use only PC Cards sold by HIOKI. Compatibility and performance are not guaranteed for PC cards made by other manufacturers. You may be unable to read from or save data to such cards.

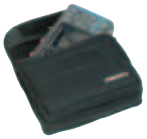
Battery Pack

Charges while installed in the HiLOGGER

BATTERY PACK 9780

NiMH, Charges while installed

Case



SOFT CASE 9812

Includes space for small items, Neoprene rubber

CARRYING CASE 9782

Includes compartment for options, Resin coated

Input cables

CONNECTION CABLE 9641

For pulse inputs, 1.5 m (4.92 ft) length

Supplied Accessories

PROTECTION SHEET 9809

For LCD protection, pairs of additional sheets can be purchased separately.

AC ADAPTER Z1005

100 to 240 V AC

Related Products

MEMORY HiLOGGER LR8400-20

30 isolated analog input channels

With built-in VOLTAGE/TEMP UNIT × 2 model

MEMORY HiLOGGER LR8401-20

30 isolated analog input channels

With built-in UNIVERSAL UNIT × 2 model

MEMORY HiLOGGER LR8402-20

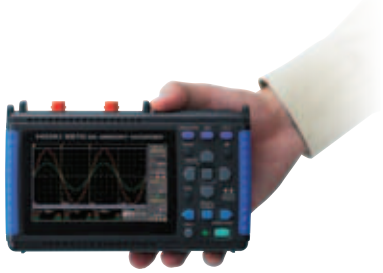
30 isolated analog input channels

With built-in UNIVERSAL UNIT × 1, VOLTAGE/TEMP UNIT × 1 model

MEMORY HiLOGGER 8423

15 to 120 isolated analog channels, with up to 600-channel systems available

Isolated pulse input and alarm output, LAN/USB support, for measuring with a PC



MEMORY HiCORDER 8870-20

Dual-channel (isolated) high-speed oscilloscope

Measures (at 1 MS/s) and displays instantaneous AC waveforms up to 280 V

External dimensions are the same as Model **8430-20**

HIOKI

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All information correct as of Apr. 11, 2011. All specifications are subject to change without notice.

8430-20E10-14M-00KR Printed in Korea