



# HIOKI

2003

## 8420/8421/8422-01 MEMORY HiLOGGER

Data Loggers



A Complete Line-up of 8 to 32 Channel Models

## LAN Compatibility plus Simultaneous Display of Graphics and Data

As demand for multiple-channel temperature recording for environmental protection, energy saving and HACCP activities increase steadily, portability to enable measurements everywhere and at all times, and LAN support for connecting to IT (information technology) networks are becoming indispensable capabilities for measurement devices. The **8420-01**, **8421-01**, and **8422-01 MEMORY HiLOGGERS** have been developed to satisfy these important needs. Data collection capabilities include excellent portable stand-alone operation and real-time data collection via LAN connection to a PC.



ISO14001  
JQA-E-90091



<http://www.hioki.co.jp/>

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# 32-Channel Model Now Available! MEMORY HiLOGGER Series

The newest model in the MEMORY HiLOGGER series doubles the number of input channels of existing models, to 32. In addition to the TCP/IP LAN communication functions, PPP connectivity is now supported to connect through a modem to a cellphone or other telephone circuit, for optimum convenience.

## Features

- Record, monitor, print and observe with a single device.
- All input channels are isolated, so there is no need to be concerned with measurement objects at different potentials.
- Measurement data is stored to PC Card at near real-time. To acquire long-term data, just install a high-capacity Flash card.
- TCP/IP communication with the supplied LAN connection supports the following functions:
  - Real-time PC measurement with the optional 9334 Logger Communicator
  - FTP server/client functions
  - SMTP (E-mail) sending function
  - HTTP server
- The above functions are also supported through a cellular phone or other telephone circuit by PPP connection via RS-232C and an externally connected modem.
- Advanced functionality (trigger functions, alarm output functions, etc.)
- Measurement results can be printed on site using the optional 8992 printer.

## Applications

- **Power & Gas**
  - Power facilities diagnosis (cubicle temperature fluctuation, power consumption status monitoring)
  - Gas diagnosis (flow, pressure and temperature fluctuation monitoring)
- **Electronic Devices and Components**
  - Product testing (temperature and voltage data for switching power supplies)
  - Product development (internal temperature distribution and voltage data)
  - Quality assurance (abnormal temperature and voltage reappearance testing)
- **Automobiles, Trains and Transport**
  - Engine development
  - Motor development
  - Air conditioner testing
  - Temperature management in refrigerated cars/containers
- **Building Maintenance, Factory Facilities**
  - Energy Saving Diagnostics (room temperature distribution, lighting and power management)
  - Temperature control recording of freezers and refrigerated warehouses
  - Temperature data collection for HACCP conformance of food factories



### External Docking Printer



Get measurement result printouts on site by docking with the 8992 Printer Unit. Record long-period trend graphs and print hard copies of screens.

### External Docking Input-Output Unit



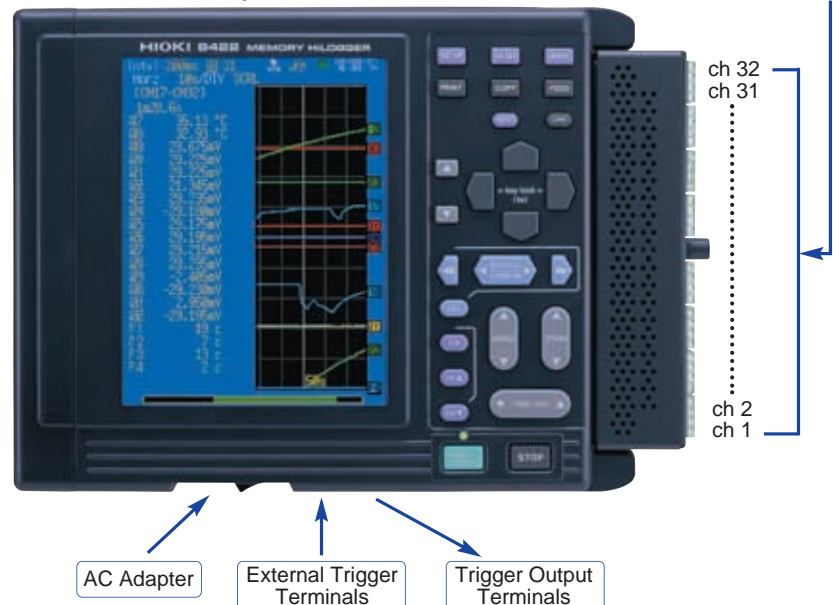
Send control signals to an external device by docking with the 8993 Digital I/O Unit (available with up to 16 channels). Sixteen logic input channels are also provided. In addition to analog and pulse inputs such as for temperature, 16 points of simultaneous logic signal input are supported.

### Pulse totalization / rotation count inputs

- Up to four input channels
- All channels isolated
- For totalization of power and flow values

### Temperature / voltage inputs

- Up to 32 input channels (8420-01: 8 channels / 8421-01: 16 channels)
- All channels isolated



# Temperature/Analog, all inputs are isolated

## -Measurement Functions-

### Universal isolated temperature, voltage and pulse inputs

Universal isolated temperature, voltage and pulse inputs, Universal measurement inputs, voltage, temperature (thermocouple and Pt inputs<sup>\*1</sup>) and humidity<sup>\*1,2</sup> can be selected for each channel. In addition, four input channels are provided for measuring pulse inputs (totalization/rotation count) simultaneously with voltage, temperature and humidity. In addition to channel-to-channel input isolation, the PC connection interface is completely isolated from the measurement terminals. Shock hazard is minimized even when thermocouples and voltage inputs are measured at the same time.

(Maximum rated voltage above ground is 30 V rms or 60 V DC.)

<sup>\*1</sup> Pt and humidity measurement inputs are supported only by the 8420 and 8421.

<sup>\*2</sup> Requires the 9681 or 9653 humidity sensor (both optional).

Measurement objects	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
	100 V f.s.	-60 V to +60 V	5 mV
Temperature Thermocouples: K, E, J, T, N, W (WRe5-26), R, S, B	100 °C f.s.	-100 °C to 100 °C	0.01 °C
	500 °C f.s.	-200 °C to 500 °C	0.1 °C
	2000 °C f.s.	-200 °C to 2000 °C	0.5 °C
Pulse Accumulation	50,000 c f.s.	0 to 50,000 counts	1 counts
	500,000 c f.s.	0 to 500,000 counts	10 counts
	5 Mc f.s.	0 to 5M counts	100 counts
	100 Mc f.s.	0 to 100M counts	2,000 counts
	2,500 Mc f.s.	0 to 2,500M counts	50,000 counts
Rotation	5,000/n (r/s) f.s. <sup>*1</sup>	0 to 5,000/n (r/s) <sup>*1</sup>	1/n (r/s) <sup>*1</sup>
Humidity (with 9653 humidity sensor)	100 %rh f.s.	20.0 to 95.0 %rh	0.1 %rh

<sup>\*1</sup> n = pulses per rotation (1 to 1,000)

### Sample multiple channels at high speeds

All input channels are quickly scanned, measured and stored (within 100 ms, or within about 200 ms when measuring 17 or more channels with the 8422-01, or within about 200 ms for mixed Pt measurements, and within about five seconds for mixed humidity measurements). As stand-alone instruments, each model provides four pulse input channels, plus 8, 16 or 32 temperature/voltage channels on the 8420-01, 8421-01 and 8422-01, respectively. 8 MB of internal memory records 4,194,304 data points.

### Real-Time Save to High-Capacity Memory Card

Measurement data can be automatically saved to a PC Card. Binary (real-time) and text (post-measurement) formats can be selected. High-capacity Flash ATA cards up to 528 MB can be used for continuous long-term recording. Choose binary in normal use. This recording method is linked to writing measurements in real time. The supplied Wv Waveform Viewer software can convert the data into text format on a PC.

Recording intervals	64MB (using 1 channel)	64MB (using 4 channels)	64MB (using 8 channels)	64MB (using 16 channels)	64MB (using 32 channels)
100 ms	36 days	9 days	4 days, 12 hours	2 days, 6 hours	- NA -
200 ms	72 days	18 days	9 days	4 days, 12 hours	2 days, 6 hours
500 ms	180 days	45 days	22 days, 12 hours	11 days, 6 hours	5 days, 15 hours
1 s	360 days	90 days	45 days	22 days, 12 hours	11 days, 6 hours
2 s	1 years, 355 days	180 days	90 days	45 days	22 days, 12 hours
5 s	4 years, 340 days	1 years, 85 days	225 days	112 days, 12 hours	56 days, 6 hours
10 s	9 years, 315 days	2 years, 170 days	1 years, 85 days	225 days	112 days, 12 hours
20 s	- omitted -	4 years, 340 days	2 years, 170 days	1 years, 85 days	225 days
30 s	- omitted -	7 years, 145 days	3 years, 255 days	1 years, 310 days	1 years, 85 days
1 min	- omitted -	- omitted -	7 years, 145 days	3 years, 255 days	1 years, 310 days
2 min	- omitted -	- omitted -	- omitted -	7 years, 145 days	3 years, 255 days
5 min to 1 hour	- omitted -	- omitted -	- omitted -	- omitted -	- omitted -

Real-Time Storage Recording Times with 64 MB Card (approx.)

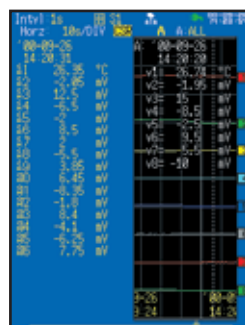
\* Recording times are calculated values, and cannot be guaranteed. For calculations, one year = 365 days. Calculated values resulting in extremely long periods are omitted.

**What happens if a power failure occurs while measuring?**  
We recommend using the real-time saving function of the 8420-01, 8421-01 and 8422-01 MEMORY HiLOGGERS with a PC Card. This exclusive technology has been developed to preserve data as reliably as possible even in the event of a power failure by incorporating PC card technology with the know-how built into the MEMORY HiCORDER series recording instruments. When recording only to internal memory without using a card, stored data is retained for about an hour in the event of a power failure.

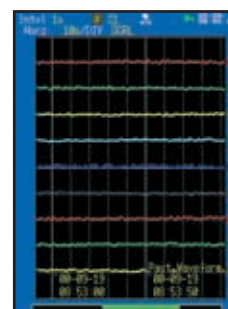


### Color LCD displays waveforms and numerical values simultaneously, and allows viewing earlier data while measuring

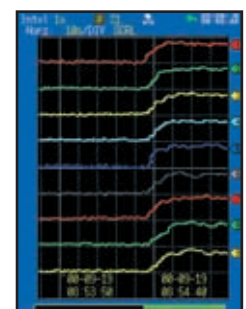
Scroll through the displayed graph while saving measurements in real time to PC Card to verify earlier measurements. You can also read the values at the movable cursors.



Standard Measurement Screen (Measured values appear numerically at the left, and plotted as a graph at the right together with the measured values at the cursors.)



Display of Earlier Waveforms (The green bar at the bottom indicates the relative location of the current display in internal memory.)



Display of Current Measurements (The green bar at the bottom indicates the relative location of the current display in internal memory.)



# LAN Connectivity Supported by PPP Connection to a Telephone Circuit

## - Communication Functions -

The following PC measurements and various web server functions can be employed with a LAN or PPP connection (by connecting the RS-232C connector through a modem to a telephone circuit or cellular phone).

■ Operation from a PC

- Real-time PC measurement with the optional 9334 Logger Communicator
- Download acquired data from a PC Card or internal memory using the FTP server function
- Remote control from a web browser using the HTTP server function

■ Automatic sending from the instrument

- E-mail sending function
- Send data automatically using the FTP client function, or connect directly to a PC via the RS-232C interface (upgrade to version 2.0 or later with Models 8420-01 and 8421-01 is required).

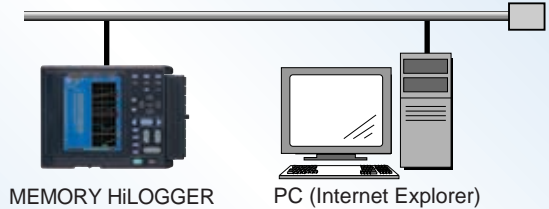
- When communicating with a PC using FTP, acquired data is transferred only in file units.
- The 9334 software with a LAN connection supports quick response times as short as 100 ms.
- The user must create their own software in order to use a direct RS-232C connection. A direct RS-232C connection allows near real-time measurement data to be obtained with response times of as little as about a second.

[Even on a PC equipped only with a USB port, PC calculations can be performed using a commercially available USB-LAN adapter.]

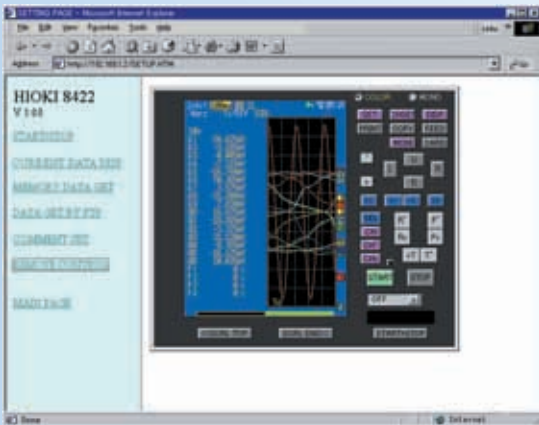
## Remote measurements by HTTP server operation

The HTTP server function can be used to make instrument settings, control data acquisition and monitor the instrument screen using a common web browser such as Internet Explorer, without requiring any special software application to be installed on the PC.

[Example of HTTP communications via 10Base-T LAN connection]

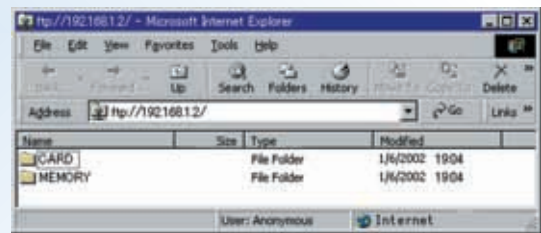


## Function Details



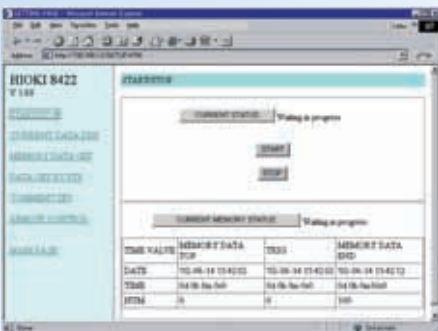
### [Remote Control Screen]

- The instrument screen is duplicated in the web browser.
- Key inputs can be made using the same panel configuration as on the actual instrument.
- Monochrome/color display and screen refresh rate are selectable.
- The lit/unlit state of the Start LED is refreshed whenever the screen is refreshed.
- By clicking inside the window, the lighting cursor can be moved without having to use the up, down, left and right arrow keys.



### [Data Acquisition by FTP]

- Acquired data in files on a PC Card in the instrument, and measurement data in internal memory can be transferred by the web browser using FTP.
- Data being acquired into internal memory cannot be transferred while measuring. Transfer data after measurement has finished.
- While measuring, data previously transferred from internal memory can be viewed on the Data Acquisition Screen.



### [Starting and Stopping Measurement]

- Start and stop measurement using the web browser.
- Current measurement status can be displayed.



### [Current Value Display]

- Measurement data can be displayed as numerical values.
- During measurement, data acquired on each channel at every recording interval can be monitored.
- Instantaneous data input to each channel can be monitored even when measurement is stopped.
- Selectable screen refresh rate.



### [Data Acquisition in Internal Memory]

- Data acquired in internal memory can be transferred to the browser during measurement, or the data over an optionally specified range can be transferred after measurement stops. All data in internal memory can be transferred.
- Either binary or text data can be selected.
- Data can be freely transferred to MS Excel for graphing.

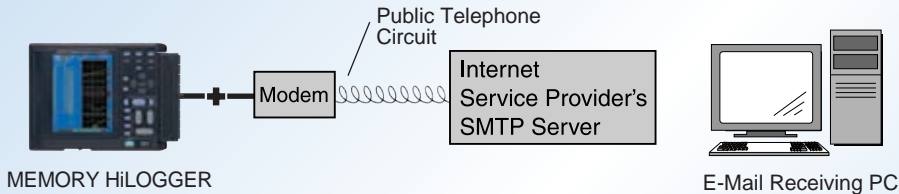
# Communication functions for added convenience

## - Communication Functions -

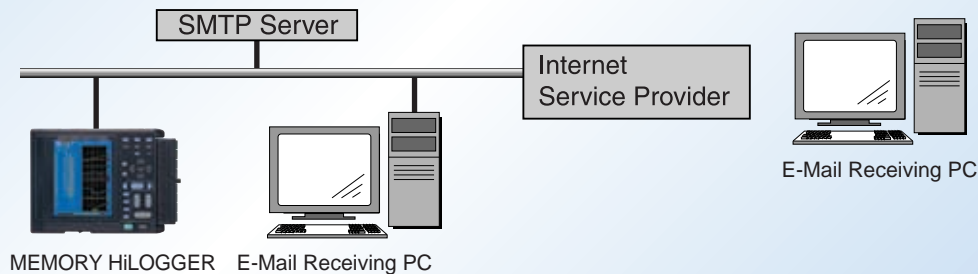
### E-Mail Sending

E-mail can be automatically sent through an SMTP mail server to a local network, remote PC or e-mail compatible cellular phone upon any of the following events: start/stop trigger, alarm, recovery from power failure, memory full or card full. Up to three e-mail destination addresses can be specified. (The 8993 DIGITAL I/O UNIT is required for alarms)

[Example of sending e-mail to an internet service provider through a PPP connection (RS-232C + modem)]



[Example of sending e-mail via 10Base-T LAN connection]



```
mail from:logger@xyz.xx.xx
mail to:abc@xyz.xx.xx
subject:logger_mail
```

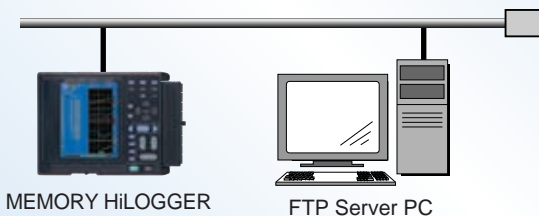
```
message = mail from logger
comment = title comment
time = '02-04-25 13:11:34
start trigger happen
trigger source = CH1
data = -183.785mV
channel comment = channel1
instant data
CH1 = -183.785mV
CH2 = 121.835mV
CH3 = 102.435mV
CH4 = -81.850mV
CH5 = -183.785mV
CH6 = 102.435mV
CH7 = -81.850mV
CH8 = 102.435mV
```

[Example of Sent E-mail]

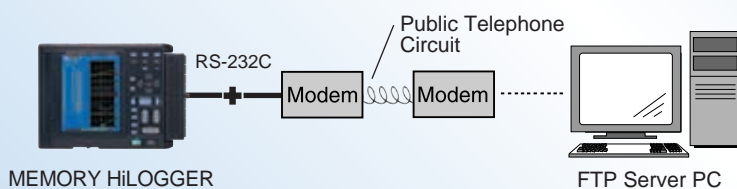
### Automatic Data Sending by FTP Client

Binary data files that are saved automatically to the PC Card during periodic measurement or when finished measuring, are sent automatically by the instrument to the FTP server on a local network or remote PC.

[Example of FTP data transfer via 10Base-T LAN connection]



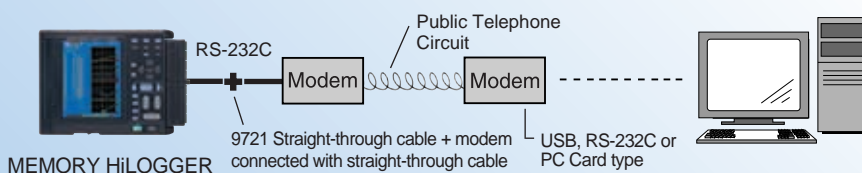
[Example of FTP data transfer via PPP (RS-232C + modem)]



### PPP Communication (RS-232C + modem)

By connecting the instrument to a modem using an RS-232C cable, measurement can be controlled from a remote modem-equipped PC. Connect the instrument to a modem using the 9721 RS-232C Cable (straight-through cable for modems) as illustrated.

[Example of connection between the 8420/21/22 and a PC, both on public telephone circuits]



# Control up to 16 Instruments Over LAN Connections

## - PC Application -

### Wave Viewer Software (included as standard accessory)

Measurement data (binary format) from the instrument can be converted to CSV format (file conversion and batch conversion are available).

Also, waveforms can be displayed on the PC screen.

#### ■ Specifications

Wave Viewer (Wv) Software (supplied accessory)	
Functions	<ul style="list-style-type: none"> <li>• Simple display of waveform file</li> <li>• Text conversion: convert binary data file to text format, with selectable space or tab separators in addition to CSV, and specific section, thinning available</li> <li>• Display format settings: scroll functions, enlarge/reduce display, display channel settings</li> <li>• Others: voltage value trace function, jump to cursor/trigger position function</li> </ul>
PC operating systems	Windows 95/98/Me, Windows NT 4.0 (SP3 or later), 2000, XP

### 9334 Logger Communicator (optional software)

#### Collects Data on a PC via Ethernet

Data from a HiLOGGER connected to a LAN can be stored on the hard disk of a PC in real time. Other functions include waveform display, CSV conversion, printing, numerical value calculations and searching.

Acquired data (either all data, or only that between marker cursors) can be converted to CSV format text data. Data in this format can be loaded into a spreadsheet program such as Excel.

A table shows time difference and potential difference between A and B cursors, and the time and potential at each cursor on the waveform screen.

Acquired data can be displayed as numerical values for time series'. Waveform image and numerical values can be displayed simultaneously.

Acquired data can be printed out as a waveform image on a connected printer.

Acquired data can be subjected to parameter calculations such as maximum value, time and average value.

Acquired data can be searched for specific event marks, as well as for conditions such as date, maximum and minimum values.

The waveform image of acquired data is displayed. It can be drawn in real time during data acquisition. Up to 512 analog channels, 256 logic channels and 64 pulse channels are supported.

## ■ Product Specifications

General Specifications		
	8420-01/8421-01	8422-01
Measurement objects	Temperature (thermocouple, Pt), voltage, humidity, totalized pulses, rotation count	Temperature (thermocouple only), voltage, totalized pulses, rotation count
Input System/ Channels	Analog: 8 channels isolated by Photo-MOS relays/16 channels scanning isolated inputs (voltage, temperature and humidity independently selectable for each channel) Pulse Inputs: 4 channels Logic Inputs: 16 channels (using Model 8993 DIGITAL I/O UNIT)	Analog: 32 channels isolated by Photo-MOS relays (voltage and temperature can be independently selected for each channel) Pulse Inputs: 4 channels Logic Inputs: 16 channels (using Model 8993 DIGITAL I/O UNIT)
Recording intervals	100 ms to 1 hour (200 ms or more with resistance temperature sensor, 5 s to 1 hour with humidity measurement) Note: All input channels are scanned at high speed during each recording interval.	100 ms to 1 hour (200 ms to 1 hour with more than 16 channels)
Data recording capacity	Waveforms are saved as binary data to the PC Card in real time, selectable as full files or an endless loop with automatic deletion of oldest data. Stored data can be recalled by the instrument in 8-MB blocks.	
File operations	One Type II PC Card slot: accepts Flash ATA (up to 528 MB) Stores binary data (custom format), text data (Excel format), bmp data (screen images), numerical calculation results and measurement values. A-B cursors can be used select data to be saved (manual operation only).	

General Specifications	
A/D Converter	Equipped with 16-bit A/D converter
Memory capacity	Internal: 8 MB (4,194,304 data points) External (Flash ATA Card): Up to 528 MB
External control connectors	RS-232C, 10Base-T, Trigger In, Trigger Out
Memory backup function (@23°C)	Time and settings: 10 years or more, Measurement data: Retained from at least 2 minutes after power on until about 1 hour after power off
Environmental conditions (non-condensating)	Operating temperature and humidity: 0 to 40°C, 30 to 80% RH Storage temperature and humidity: -10 to 50°C, 30 to 80% RH
Conforming standards	Safety: EN61010-1, EMC: EN61326, EN61000
Power supply	100 to 240 V AC @50/60 Hz (with 9418-10 AC ADAPTER) 9447 BATTERY PACK (NiMH, when used with AC Adapter, the Adapter has priority), 12V car battery (using custom connection cable - please inquire for further details)
Continuous usage time with one Model 9447 Battery Pack, when measuring voltage	Approx. 2.5 hours (with backlight saver off and after only a rapid charge) Approx. 5 hours (with backlight saver on and after 10 hours additional charging after rapid charge)
Battery Pack	Charging: The battery charges when the AC adapter is connected and the instrument is turned off. Rapid charge time: Approx. 2 hours @23°C
Size & Weight	Approx. 234W × 170H × 52D mm, 1.3 kg (instrument only, without battery) Approx. 310W × 170H × 52D mm, 1.6 kg (with printer attached, without battery) Approx. 302W × 170H × 52D mm, 1.6 kg (with Digital I/O Unit, without battery)
Accessories	9418-10 AC Adapter (1), Terminal Cover (1), Flat Screwdriver (1), Wave Viewer Software (Wv) diskette (1), Communication Commands Operating Manual diskette (1)

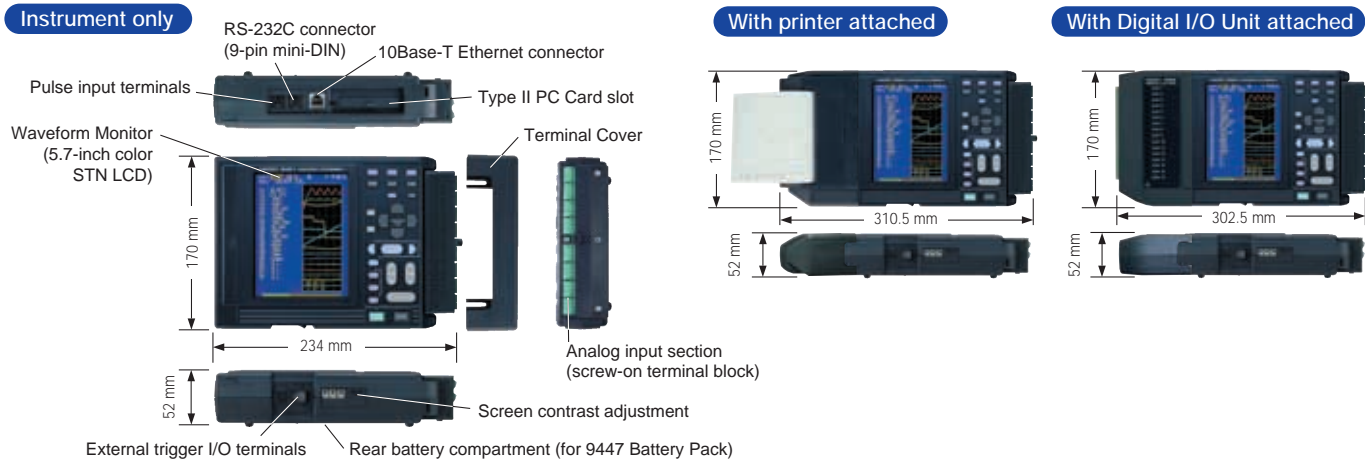


## Product Specifications

Functional Specifications	
Display	5.7-inch STN Color LCD (240 × 320 dots). Displays either waveforms only, waveforms and numerical values simultaneously, numerical values only or calculation results and waveforms simultaneously. Japanese/English language selectable.
Waveform compression and magnification	Time-axis zoom: 18 ranges from 1-s to 1-day/division Voltage-axis zoom: ×1/2, ×1, ×2, ×5, ×10, ×20, ×50, ×100
Search function	Event marks can be searched
Calculation functions	Waveform parameter calculations: Up to four simultaneous calculations are supported: average, peak, maximum, minimum and effective values, timing of maximum and minimum values, and waveform processing calculation: displays sums and differences between channel waveforms
FTP server	Transfers files from internal memory and PC Card (Internal memory data can be transferred only when not measuring.)
FTP client function	Periodically during measurement or when finished measuring, the file automatically saved to the PC Card is automatically sent to an FTP server on the internal network or a remote PC.
Built-In SMTP (E-mail) sending	The SMTP mail server can send an e-mail to a PC on the local network or a remote PC upon the occurrence of a start trigger, stop trigger, alarm condition, recovery from power suspension, memory full or card full.
HTTP server function	With no special software other than a common Web browser like Internet Explorer, make HiLOGGER settings, acquire data and observe the screen.
PPP support	Connect a modem to the RS-232C interface to communicate through a telephone circuit or cellular phone to a modem-equipped PC.
Miscellaneous	Waveform scroll, cursor measurement, scaling, automatic saving (binary/text selectable), start condition retention, settings saving, comment entry, event marking (for search), automatic setup
Trigger Functions	
Trigger source (conditions can be set for each channel)	All analog channel inputs, pulse totalizer inputs P1 to P4, logic inputs LI-1 to LI-16 (with Model 8993 DIGITAL I/O UNIT installed): external trigger input, timed trigger, logical product (AND) or logical sum (OR) of all channels
Trigger timing	Start, stop, start & stop
Trigger type (analog, pulse)	Level: the trigger window when rising (or falling) through a preset value. After setting the upper and lower trigger level limit values, a trigger event occurs when the measurement exits (or enters) the range defined by the upper and low limits.
Trigger level resolution	0.5% f.s. (f.s. = 10 divisions)
Logic trigger	Pattern set by 1, 0 or × (ignore) [with the Model 8993 DIGITAL I/O UNIT installed]
Miscellaneous	Pre-trigger (settable for real-time saving), trigger output (open collector, 5 V output, active low, at least 100 ms pulse width)
Thermocouple Inputs (accuracy specified @23 ±5°C, from 30 minutes after power on and after zero point adjustment, guaranteed for one year)	
Input Terminals/Impedance	Removable screw-type terminal block (2 terminals per channel) supplied with a cover. Each terminal is isolated from other channels and from the instrument chassis. 1 MΩ
Setting range	100°C f.s.: -100 to 100°C <sup>1)</sup> (0.01°C resolution) 500°C f.s.: -200 to 500°C <sup>1)</sup> (0.01°C resolution) 2000°C f.s.: -200 to 2000°C <sup>1)</sup> (0.5°C resolution)
Thermocouples are JIS C 1602-1995 compliant (except type W)	K: ±200 to 1350°C, E: ±200 to 1000°C, J: ±200 to 1200°C, T: ±200 to 400°C, N: ±200 to 1300°C, W (WRε5-26): 400 to 2000°C, R: 400 to 1700°C, S: 400 to 1700°C, S: 400 to 1800°C Note: Types W, R and S can measure from 0°C, but measurements in this range are not guaranteed Standard reference contact: internally and externally switchable
Accuracy	Types K, E, J, T, N: ±0.5% f.s. ±1°C Types R, S, B, W: ±0.05% f.s. ±2°C (applicable at 400°C and above) Standard reference contact accuracy: ±1°C (with internal compensation, add to measurement accuracy)
Max. allowable input	30 V rms or 60 V DC (maximum voltage between input terminals that does not cause damage)
Maximum rated voltage above ground	30 V rms or 60 V DC (Upper limit voltage that does not cause damage when applied between input channel and chassis, and between each input channel)
Platinum resistance temperature sensor inputs (only 8420/8421, accuracy specified @23 ±5°C, from 30 minutes after power on and after zero point adjustment, guaranteed for one year)	
Input terminal/detection current	Common thermocouple application, detection current: 1 mA
Setting range	100°C f.s.: -100 to 100°C <sup>1)</sup> (0.01°C resolution) 500°C f.s.: -200 to 500°C <sup>1)</sup> (0.01°C resolution) 2000°C f.s.: -200 to 2000°C <sup>1)</sup> (0.5°C resolution)
Resistance temperature sensor	Pt100: -200 to 800°C, JPt100: -200 to 1200°C Connection: 3-wire/4-wire (Pt100: JIS C 1604-1997, JPt100: JIS C 1604-1989)
Accuracy	Pt100, JPt100: ±0.05% f.s. ±0.5°C
Max. allowable input	30 V rms or 60 V DC (maximum voltage between input terminals that does not cause damage)
Maximum rated voltage above ground	30 V rms or 60 V DC (Upper limit voltage that does not cause damage when applied between input channel and chassis, and between each input channel)

Voltage Inputs (accuracy is specified at 23 ±5°C, from 30 minutes after power on and after zero point adjustment, guaranteed for one year)		
Input Terminals/Impedance	Same as for thermocouples, Input impedance: 1 MΩ	
Measurement ranges	100 mV f.s.: -100 to +100 mV (5 μV resolution) 100V f.s.: -1 to +1 V (50 μV resolution) 100V f.s.: -10 to +10 V (500 μV resolution) 100V f.s.: -60 to +60 V (5 mV resolution) 1 to 5 V f.s.: 1 to 5 V (500 μV resolution)	
Accuracy	±0.1% f.s. (in the 1-5 V f.s. range only, f.s. = 10 V)	
Max. allowable input	30 V rms or 60 V DC (maximum voltage between input terminals that does not cause damage)	
Maximum rated voltage above ground	30 V rms or 60 V DC (Upper limit voltage that does not cause damage when applied between input channel and chassis, and between each input channel)	
Humidity measurement (only in 8420/21-01, when using 9653 humidity sensor, accuracy specified @23 ±5°C, from 30 minutes after power on and after zero point adjustment, guaranteed for one year)		
Input terminals	Commonly used with thermocouples	
Measurement ranges	100% RH f.s.: 20.0 to 95.0% RH (0.1% RH resolution)	
Accuracy (includes accuracy of 9653 humidity sensor)	±5% RH f.s. (@25°C, from 30 to 80% RH) (Add ±5% RH for 10 to 40°C and 30 to 90% RH)	
Filter function (common to thermocouple/platinum resistance temperature sensor/voltage/humidity inputs)		
Recording interval average	Average of values at each 100 ms within the recording interval	
Hard filter	Low-pass filter with 1.5-Hz cutoff (for recording intervals slower than 1 minute)	
Pulse inputs (@23 ±5°C, accuracy guaranteed for one year)		
Input terminals	Custom connector (up to 4 channel inputs using 9641 Connection Cable)	
Input signal condition	8420/21-01	8422-01
	No-voltage 'a' contact (normally open contact), open collector or voltage input: 15 V DC; Detection levels: HIGH = at least 4.0 V, LOW = 0 to 0.8 V; Pulse period: at least 200 μs (with filter off, H and L periods should be at least 100 μs), Slope: rising or falling can be set for each channel	No-voltage 'a' contact (normally open contact), open collector or voltage input: 15V DC; Detection levels: HIGH = at least 1.0 V, LOW = 0 to 0.5 V; Pulse period: at least 200 μs (with filter off, H and L periods should be at least 100 μs); Slope: can be set to rising or falling edge for each channel, jitter filter on or off
Totalization ranges	50,000 c f.s.: 0 to 50,000 counts (1-count resolution) 500000 c f.s.: 0 to 500,000 counts (10-count resolution) 5M c f.s.: 0 to 5M counts (100-count resolution) 100M c f.s.: 0 to 100M counts (2,000-count resolution) 2500M c f.s.: 0 to 2,500M counts (50,000-count resolution)	
Rotation range	5,000/n (r/s) f.s.: 0 to 5,000/n (r/s) <sup>2)</sup> ; Resolution: 1/n (r/s) <sup>2)</sup> <sup>2)</sup> n = pulses per rotation (1 to 1,000)	
Maximum rated voltage above ground	30 V rms or 60 V DC (maximum voltage between an input channel and frame ground, and between each channel, that does not cause damage)	
■ Optional Accessories (sold separately)		
8992 PRINTER UNIT Specifications (installs on HiLOGGERS)		
Recording paper	100mm recording width (10 divisions), 18m thermal paper roll	
Functions	Logging (prints numerical measurement values), hybrid (prints numerical values simultaneously with waveforms at selectable intervals). Real-time (automatic printing during measurement: available when the waveform time axis is at least 5s and numeric printing interval is more than 5s). Comments can also be printed.	
8993 DIGITAL I/O UNIT Specifications (installs on HiLOGGERS)		
Input	One 16-bit logic channel; Detection levels: HIGH = at least 2.5 V, LOW = 0 to 1.5 V; Maximum input voltage: 50 V DC (between input and common frame ground)	
Alarm outputs	16 isolated channels (isolation between each channel, output and chassis ground) Alarms 1 to 16 can be assigned to any of the 16 analog input channels, 4 pulse input channels or the (16-bit) logic input channel	
Output signals	Open collector, active low (10 mA sink current) Output latch setting: Latch/No Latch and alarm sound on/off Note: Mechanical contact output is available by modification for users who want to control sequencers using relays or photocouplers that require drive currents in excess of 10 mA. Please contact HIOKI or your distributor for details.	

■ Appearance/Dimension Illustration



Options in Detail

Note: Product names in this publication are trademarks or registered trademarks of their respective companies.

**Cases and Stand**



**9648 Carrying Case**  
(includes space for options)




**9649 Protective Case**  
(basic water-resistance, includes space for options)  
Note: This product is manufactured after the order is received. Please inquire separately regarding shipping time.




**9652 Mounting Stand**  
(For standing the instrument at a slant, hanging it on a wall, or strapping it to a pole)  
Note: This product is manufactured only after the order is received. Please inquire separately regarding shipping time.

**9649 Protective Case**  
Rubber grommets are provided for cables on the side to allow measurement while closed.


**Peripherals and PC-Related**




**9612 RS-232C CABLE**  
1.5m crossover cable, 9-pin mini DIN to Dsub for PC




**9642 LAN CABLE**  
(Straight-through cable with crossover adapter) cable length 5m




**9641 CONNECTION CABLE**  
(for pulse inputs) cable length 1.5m




**9721 RS-232C CABLE**  
1.5m straight-through cable, 9-pin mini DIN to Dsub for modem




**9653 HUMIDITY SENSOR**  
(for 8420/8421-01 only)  
Cable length 3 m



**9681 HUMIDITY SENSOR**  
(for 8420/8421-01 only)  
Cable length 3 m  
available soon



**9334 LOGGER COMMUNICATOR**  
Data collection application software required for LAN connection on Windows 9x/MENT 4.0/2000/XP



**9626 PC Card 32 MB**  
**9627 PC Card 64 MB**  
**9726 PC Card 128 MB**  
**9727 PC Card 256 MB**  
**9728 PC Card 512 MB**

**Alarm Output and Logic Input**



**8993 DIGITAL I/O UNIT**  
(16-bit logic input, 16 output channels, mounts on the HILOGGER)  
Note: The DIGITAL I/O UNIT is required to operate the HILOGGER from two batteries.

**Power Supplies**



**Supplied Accessories: 9418-10 AC ADAPTER**  
(100 to 240 V AC, 2.5 A/12 V)



**9447 BATTERY PACK**  
7.2 V, 2400 mAh



**9643 CHARGING STAND**  
Charges one 9447; requires the 9418-10 AC ADAPTER be connected to the HILOGGER

By using the AC adapter provided with the HILOGGER, the 9447 BATTERY PACK can be charged without the 9643 CHARGING STAND. If the charging stand, AC adapter, and battery pack are purchased separately, standalone battery charging is possible.

**Printing**




**8992 PRINTER UNIT**  
(Prints 100 mm wide, attaches to the HILOGGER)



**9234 RECORDING PAPER**  
(Set of ten 18m rolls)



**220H AUTO PAPER WINDER**  
(70 to 220 mm paper width, 100 V AC)



**8420-01 MEMORY HILOGGER (8-Ch Model)**  
**8421-01 MEMORY HILOGGER (16-Ch Model)**  
**8422-01 MEMORY HILOGGER (32-Ch Model)**

This photo shows the optional 9329 TERMINAL UNIT installed. Remove the supplied terminal block to install the optional unit. M3 screw terminal input connections are available.  
**9329 Terminal Stand Unit (coming soon)**

Supplied Accessories: 9418-10 AC Adapter (1), Terminal Cover (1), Flat Screwdriver (1), Wave Viewer Software (Wv) diskette (1), Communication Commands Operating Manual diskette (1)

Note: Thermocouples are not provided by HIOKI, and must be purchased from a separate vendor.



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