MEMORY HiLOGGER
LR8400-20, LR8401-20, LR8402-20

Portable Data Logger with 30 Standard Channels
Expandible to 60 Channels

Only the size of an A4 sheet of paper, the HIOKI LR8400-20 Series is the realization of our goal to build a logger that provides the existing functionality of a multi-channel data logger in a portable format. The new model comes with 30 channel capability as standard, to which another 30 channels can be added. All input channels for measuring temperature, humidity, voltage and impedance are isolated for safety, culminating in a powerful multi-measurement system that also offers pulse and logic inputs. Long-term logging is coupled with the capability to protect data against unexpected power outages and other problems for stable recordings over an entire year (see note).

Note: Continuous recordings lasting longer than 1 year are also possible.
In fuel cell, electric automobile and other development

- Environmental measurements to prevent global warming
- Development of fuel cell materials, energy field
- Development of automobiles, testing of automobile parts
- Maintenance and inspection of equipment
- Monitoring plants
- Testing of electrical products
- Impedance testing of electronic parts

### Multi-channel measurements

In the development of fuel cells, multiple power-generating cells are connected to form a stack. Independent measurements of each cell require multi-channel measurements of DC voltage, DC current, temperature and other parameters. The LR8400-20 Series comes with 30 channels as standard, which can be expanded to 60 channels.

### High withstand voltage

The HiLOGGER measures not only fuel cells, but also batteries for UPS (uninterruptible power supplies) devices used in buildings as well as batteries consisting of cells and packaging connected in stacks that require multi-point measurements. In such measurements, high voltage for the whole stack is applied between channel-to-channel and channel-to-ground. Only a measuring instrument with isolated inputs and high-capacity withstand voltage characteristics can endure this.

### High-speed sampling

In the development of automobiles such as electric vehicles (EV) and plug-in hybrid vehicles (PHV) that use motors for propulsion, abrupt changes in load need to be measured. This makes the multi-channel, high-speed 10 ms sampling capability of the LR8400-20 Series an indispensable feature.
Measure and record:
- Temperature & humidity
- A variety of transducer outputs (DC voltage)
- Resistance values

Also comes with high withstand voltage; isolated inputs required when measuring and recording battery cell voltages

**Voltage measurement (DC only)**
- 30 input channels
  - Note: The LR8400-20, LR8401-20 and LR8402-20 models differ in the combination of input functions and terminals.
- All input channels are isolated
  - Note: Maximum rated voltage above ground between the HILOGGER and analog inputs is 300 V AC/DC.

**Temperature & humidity measurement**
- Temperature measurements of thermocouples on 30 channels
- M3 screw terminal inputs enable secure connection of even thin thermocouples
- Special sensor permits humidity measurements on 30 channels (optional 22000)
  - Note: The sensor power supply is the M3 mm dia. screw terminal block on the left side.
  - Note: Both universal input terminals and M3 mm dia. input terminals enable humidity measurements.

**Temperature & resistance measurement**
- Universal inputs support temperature measurements using Platinum resistance temperature sensor (Pt100/ JPt100), or resistance measurements (four wires)
  - Note: These cannot be measured using the M3 screw input terminals units.
  - Note: Supports resistance recording to enable assessment of changes in resistance in the device under test. 4-terminal method, measurement resolution 0.5 mΩ, testing current 1 mA

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**Highlights**

**Multi-measurements**

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**Pulse totalization measurement**
- 8 channel inputs (pulse and digital input selectable for each channel)
- For measuring energy consumption and cumulative flow
  - The input signal shares common ground with the HILOGGER
  - Note: M3 screw input terminals provide direct connection

**Pulse rotations measurement**
- 8 channel inputs (pulse and digital input selectable for each channel)
- For measuring rotational irregularities of motors and drills
  - The input signal shares common ground with the HILOGGER
  - Note: M3 screw input terminals provide simple connection

**Logical 1-0 measurement**
- 8 channel inputs (digital and pulse input selectable for each channel)
- 1 or 0 is recorded for each recording interval
  - The input signal shares common ground with the HILOGGER
  - Note: M3 screw input terminals provide simple connection

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**A compact A4 size enhances mobility**
A compact A4 size footprint makes it ideal for use in virtually any environment.

**Helps also in collecting automotive data**
Ideal for testing and collecting data on the vibration characteristics of automotive parts
Accurately capture any phenomena you want to measure

**Enhanced noise suppression**
A digital oversampling filter function reduces inverter switching noise and 50/60 Hz hum noise, a concern in earlier models, during recording.

*Note: The noise reduction effect improves with longer recording intervals (i.e., at slower sampling speeds).*

**10 ms high-speed sampling**
The development of hybrid and electric automobiles requires instruments that can measure abrupt load changes. Channels 1 to 15 provide 10-ms sampling and channels 16 to 30 provide 20-ms sampling. This channels allow you to track waveforms not possible with earlier models.

*Note: Measurements on channels 31 to 60 provide 50-ms sampling.*

**5.7 inch TFT LCD display is easy to view even at an angle**
The LCD has a wider visual angle and is larger (5.7 inches, 640 × 480 dots) than the STN LCD in our previous model (8420-51s) to facilitate observation of waveforms on multiple channels.
Store data securely for more than 1 year

■ Compatibility with USB memory devices

For even greater convenience, the HiLOGGER now provides support for USB memory devices. Measurements can now immediately be written to a USB memory device in real-time. USB memory devices are also a handy means to transfer data to a PC.

Note: Although USB memory devices enable real-time saving of data, for more reliable data protection we recommend use of HIOKI CF cards, which are guaranteed to work with the instrument, for real-time saving of data.

■ Saving data to CompactFlash (CF) card

Use only HIOKI CF cards, which are manufactured to strict industrial standards, for long-term storage of important data.

Note: Operation of non-HIOKI CF cards is not guaranteed.

■ Recording Capacity

Note: Use only HIOKI CF cards that are guaranteed to operate with the HiLOGGER for continuous long-term recording.

<table>
<thead>
<tr>
<th>Recording intervals</th>
<th>Recording of 30 analog channels only (no pulse measurement, alarm output or waveform processing data)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 ms</td>
<td>Internal memory (16 MB) 46m  20 ms  1h 33m  50ms  7h 46m  100ms  13h 32m  500ms  1d 4h 50m  1s  3d 0h 40m  2s  6d 11h 20m  5s  16d 0h 21m  10s  32d 0h 43m  20s  64d 17h 26m  30s  97d 0h 10m  1min  194d 0h 20m  2min  388d 0h 40m  5min to 1hour</td>
</tr>
<tr>
<td>For 15 or fewer analog channels</td>
<td>1d 00h 51m  2d 01h 42m  5d 04h 16m  10d 08h 33m  20d 17h 06m  1d 00h 51m  2d 01h 42m  5d 04h 16m  10d 08h 33m  20d 17h 06m  1d 00h 51m  2d 01h 42m  5d 04h 16m  10d 08h 33m  20d 17h 06m  1d 00h 51m  2d 01h 42m  5d 04h 16m  10d 08h 33m  20d 17h 06m  1d 00h 51m  2d 01h 42m  5d 04h 16m  10d 08h 33m  20d 17h 06m</td>
</tr>
<tr>
<td>20 ms</td>
<td>1d 00h 51m  4d 03h 25m  8d 06h 50m  1h 33m  1d 00h 51m  2d 01h 42m  5d 04h 16m  10d 08h 33m  20d 17h 06m</td>
</tr>
<tr>
<td>50ms</td>
<td>3h 53m  2d 01h 42m  4d 03h 25m  8d 06h 50m  7h 46m  1d 00h 51m  2d 01h 42m  4d 03h 25m  8d 06h 50m</td>
</tr>
<tr>
<td>100ms</td>
<td>7h 46m  5d 04h 16m  10d 08h 33m  20d 17h 06m  13h 32m  10d 08h 33m  20d 17h 06m  41d 10h 12m  82d 20h 24m</td>
</tr>
<tr>
<td>200ms</td>
<td>15h 32m  20d 17h 06m  41d 10h 12m  82d 20h 24m  100ms  10d 08h 33m  20d 17h 06m  41d 10h 12m  82d 20h 24m</td>
</tr>
<tr>
<td>500ms</td>
<td>7d 18h 45m  20d 17h 06m  41d 10h 12m  82d 20h 24m  15h 32m  10d 08h 33m  20d 17h 06m  82d 20h 24m  100ms</td>
</tr>
<tr>
<td>1s</td>
<td>1d 14h 50m  2d 01h 42m  4d 03h 25m  8d 06h 50m  500ms  10d 08h 33m  20d 17h 06m  82d 20h 24m  13h 32m</td>
</tr>
<tr>
<td>2s</td>
<td>5d 18h 45m  10d 13h 30m  20d 03h 01m  41d 06h 03m  1s  3d 0h 40m  5d 18h 45m  10d 13h 30m  20d 03h 01m</td>
</tr>
<tr>
<td>5s</td>
<td>10d 13h 30m  20d 03h 01m  41d 06h 03m  2s  6d 11h 20m  10d 13h 30m  20d 03h 01m  41d 06h 03m  1s</td>
</tr>
<tr>
<td>10s</td>
<td>20d 03h 01m  41d 06h 03m  2s  6d 11h 20m  10d 13h 30m  20d 03h 01m  41d 06h 03m  1s</td>
</tr>
<tr>
<td>20s</td>
<td>51d 19h 34m  102d 03h 01m  207d 03h 01m  414d 06h 03m  5s  16d 0h 21m  51d 19h 34m  102d 03h 01m  207d 03h 01m</td>
</tr>
<tr>
<td>30s</td>
<td>103d 13h 30m  207d 03h 01m  414d 06h 03m  5s  16d 0h 21m  51d 19h 34m  102d 03h 01m  207d 03h 01m  5s</td>
</tr>
<tr>
<td>1min</td>
<td>207d 03h 01m  414d 06h 03m  5s  16d 0h 21m  51d 19h 34m  102d 03h 01m  207d 03h 01m  5s</td>
</tr>
<tr>
<td>2min</td>
<td>414d 06h 03m  5s  16d 0h 21m  51d 19h 34m  102d 03h 01m  207d 03h 01m  5s</td>
</tr>
<tr>
<td>5min to 1hour</td>
<td>5s  16d 0h 21m  51d 19h 34m  102d 03h 01m  207d 03h 01m</td>
</tr>
</tbody>
</table>

• 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 1 year.

■ Cards can be replaced during real-time recording

This function has been provided to enable removal of cards during recording to allow the user to analyze the data recorded so far. This makes it possible to replace USB memory devices and CF cards during real-time recording without having to stop measurements.

Note: During high-speed recording, be sure to insert the new storage media within 2 minutes of removing a card.
The need for more measurement channels can be met even after purchasing the instrument. The instrument comes with 30 channels as standard, but another two 15 channel input units can be added to expand the total number of channels to 60.

Note: The units provided with the unit as standard cannot be removed.

A host of useful functions and features

Input setting screens with waveform monitoring
The HiLOGGER adopts the setting screens that earned its sister model (8430-20) a reputation for user-friendliness. Range settings, warnings, triggers, waveform processing and other measurement input settings can be taken in at a glance.
USB and LAN connection for easy setup
The supplied Logger Utility software allows you to set up the logger from a PC. Setup could not be easier. Just follow the numbered procedures to set up the instrument.

Note: Data on an inserted CF card can be copied to a PC via USB connection.
Note: The Logger Utility will enable LAN access with software Ver. 1.20 or later.

■ Alarm output
The HiLOGGER outputs a signal when alarm criteria are satisfied and also sounds a buzzer. Four systems are provided as standard and separate criteria can be set for each input source enabling OR and AND criteria between channels.

Note: Open-collector output (5 V voltage output and relay drive capacity 5 to 30 V, 200 mA)

■ Protection of files being stored on external storage media
An internal high-capacity capacitor will provide enough power to store any data at risk on a CF card or USB memory device should a sudden power outage occur during long-term storage. This reduces the risk of data loss and corruption of the file system. Measurements will resume as soon as the power returns.

■ Real-time processing functions
The HiLOGGER comes with [four arithmetic operation] functions for processing between channels. Data processed in real-time can be displayed in graph form. In addition, processing results for 30 channels are stored in internal memory and can be handled as data for independent input channels.

■ Records average values every 30 minutes
The HiLOGGER contains a [time-span processing] function. The instrument will save processing data as text data for a preset time period in real-time.

■ Simultaneous recording to storage media and PC
Measurement data can be simultaneously saved to external storage media and a hard disk on a PC connected to a network to reduce the risk data loss.

■ Trickle charging the internal battery
An internal battery (optional accessory) is charged when the AC adapter is connected. Since the internal battery will automatically take over in the event of a sudden power outage, it permits uninterruptible operation.

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Bundled user-friendly software for PC analysis

- The supplied Logger Utility software enables processing of measurement data on a PC
- View past data during recording
- Output PC data to a printer

Control of measurements from a PC screen
Connect the PC to the HiLOGGER using USB or via LAN* (see note). Use the supplied Logger Utility software to record data on a PC in real-time. Scroll backwards through the displayed trend graph window to view past waveforms even while recording. Up to five HiLOGGERs can be connected to one PC.

Analyze after measuring
Our new “dual-knob function” greatly simplifies data analysis. Two separate waveform windows are provided, with the displayed waveforms showing different time-axis scales (time bases). This capability substantially simplifies long-term data analysis. (Patent pending)

Remote control through HTTP server function*
Without the need to install additional software, you can use an ordinary web browser on your PC to set up the HiLOGGER, acquire data and monitor data on the screen.
Note: Waveform data cannot be downloaded from internal memory while measuring.

Data acquisition via FTP*
FTP allows the PC to acquire files stored on HiLOGGER storage devices or measurement data in internal memory.
Note: Waveform data cannot be downloaded from internal memory while measuring.

Data transfer via FTP*
Data saved in real-time to storage media can be automatically transferred to an FTP server started from the PC either at regular intervals during measurements or when measurements end.

Be informed via E-mail*
Your PC or mobile device is notified of storage media full, internal memory full, stop trigger invoked, alarm occurrence and other events via E-mail.

*Note: LAN communication functions support planned from software Ver. 1.20.
**Product Specifications**

**General specifications (product and accuracy guaranteed for one year)**

- **Internal memory**: 16 Mega-bytes (6M data points)
- **Internal clock**: Auto calendar, Precision ±3 s/day (at 23 °C / 73 °F)
- **Accuracy of timebase**: ±0.26 s/day on measurement (at 23 °C / 73 °F)
- **Backup battery**: For clock and setting conditions: battery life 5 years (at 23 °C / 73 °F)
- **Operating temp. & humidity**: 0 °C (32 °F) to 40 °C (104 °F), 80 % rh or less (non-condensating, when charging: 10 °C / 50 °F to 40 °C / 104 °F)
- **Storage temp. & humidity**: -20 °C (4 °F) to 60 °C (140 °F), 80 % rh or less (non-condensating)
- **Conformance standards**: Safety: EN61010-1, EMC: EN61326-1, EN61000-3-2, EN61000-3-3
- **Anti-vibration**: JIS D6101: 1995 5.3 (1) Corresponds to Class 1: a passenger car, Condition: class A
- **External digital I/O**: External trigger input, Trigger output, 4-channel alarm outputs, *12 V*: 100 mA max. output, GND

**Dimensions & Mass**

- **Display section**
  - **Display device**: 5.7 inch TFT color liquid crystal display (640 × 480 pixel), horizontal 15 division, vertical 10 division, selectable between English and Japanese displays, Back light saver available
- **Power supplies**
  - **AC Power**: Using the AC ADAPATER 9418-15 supplied as standard, 100 to 240 VAC, 50/60 Hz
  - **DC Power**: Using the BATTERY PACK Z1000 (optional accessory, AC adapter has priority when used in combination with battery pack)
- **External**
  - **USB communication interface**: USB 2.0 High-speed capable, series mini-B receptacle
- **Trigger functions**
  - **Trigger modes, timing, timing**
    - Medes: Single / Repeat, Timing: Start / Stop / Start & Stop / Start & Stop. Logical sum (OR) and product (AND) of each trigger selectable, Selectable for each channel
  - **Analog input**
    - **Analog source**: Configure each individual channel for 10 channels or up to 60 channels depending on number of additional terminal modules installed. (Level trigger) Triggers when rising or falling through preset level
  - **Pulse source**
    - **Pulse inputs**: 8 channels of pulse totalizer inputs
  - **Digital input**
    - **Digital inputs**: 8 channels of digital signal inputs
  - **Timer**
    - **Timer trigger**: Set up for / day/month/day/hour/minute/second
  - **Trigger output**
    - **Trigger output**: Open collector (active low, with 5 V output, at least 10 ms pulse width), M3 mm screw terminal

**Alarm functions**

- **Number of channels**: 4 channels, non-isolated (common ground with chassis)
- **Alarm source**: 60 channels of analog input, 8 channels of pulse totalizer inputs or digital inputs, Thermocouple burn-out detection
- **Alarm type**: Level, Window, Logic pattern trigger, Output latch: no latch, Cancel alarm while measuring
- **Alarm sound**: Buzzer, ON/OFF possible
- **Alarm output**: Open collector (active low, with 5 V output, M3 mm screw terminal, Output refreshed at every recording interval
- **Output sink current**: 200 mA at 5 V to 30 VDC

**Measurement Settings**

- **Recording Intervals (sampling period)**: 10 ms*, 20 ms*, 50 ms*, 100 ms* to 1 hr (19 selections)
- **Note**: All input channels are scanned at high speed during every recording interval
  - *Thermocouple burn-out detection OFF, and using up to 15 channels
  - *Thermocouple burn-out detection OFF, and using up to 30 channels
  - *Thermocouple burn-out detection OFF, and using up to 60 channels
  - *Thermocouple burn-out detection OFF, and using up to 80 channels
- **Graph time axis**: 100 ms* to 1 day* / day* (25 selections)
- **Graph time axis**: Set: Side is independent from the recording interval
- **Recording Time**: Enable continuous recording ON (records until the Stop key is pressed), or continuous recording OFF (enable a specified time span)
- **Repeating Recording**: ON/OFF: Enable to repeat recording after the specified recording time span has elapsed

**Data Saving**

- **Data storage media**: CF card, CF card slot, USB memory (Use only PC Cards sold by HIOKI)
  - **CF card**: CF card slot *1, HIOKI 9727 (256 MB), 9728 (512 MB), 9729 (1 GB), 9830 (2 GB), Data format: FAT, FAT32
  - **USB memory**: Series A receptacle
- **Communication function**
  - **LAN interface**: IEEE 802.3 Ethernet 100BASE-TX, DIP, DIN capabe
  - **Data acquisition**, **setting conditions** (use with the Logger Utility software supplied as standard)
  - **Use the communication command to set and measure**
  - **Data download via FTP server function** (use in the CF card or the USB memory)
  - **Automatically transmit data via FTP client function**
  - **Remote control via HTTP server function**
  - **Send mail function via E-mail system**
- **USB communication interface**: USB 2.0 High-speed capable, series mini-B receptacle
  - **Data acquisition**, **setting conditions** (use with the Logger Utility software supplied as standard)
  - **Configure the unit and measure using communication commands**
  - **Transfer data from the CF card to a PC via USB drive mode data transfer not possible from USB memory stacks

**Calculation function**

- **Numerical value calculations**: No. 1 to 6, maximum 6 calculations can be conducted simultaneously
  - selections: average value, peak value, maximum value, time at maximum value, minimum value, time at minimum value
- **Data range of calculations**: During measurement or after stopping: Store all data or data between A and B cursors into internal memory
  - **Time**: Calculates time at the pre-determined 1 sec to 1 day intervals and display the latest value
- **Calculation save**: Possible: After measuring the last calculated value is automatically saved to the CF card or USB memory as a text file
  - **Timed save**: Save calculated data at pre-determined 1 sec to 1 day intervals as text data to the CF card or USB memory in real time.
- **Waveform calculations**: *4 arithmetic calculations between each channel
  - Separate display of calculation graphs (only during measurement) and input waveforms
  - **Real-time save of calculation graph data**

**Other functions**

- **Event marking**: Search: Move to the event number entered and display the waveforms appearing before and after event
  - **Number of events**: Maximum 100 per measurement
- **A-B cursor**: Measurement: time difference between A and B, electric potential difference of A and B, resistance Type: Trace the data, amplitude axis, time axis
- **Scaling**: Convert and display the measurement value of each channel as a scaled value
  - **Rate adjustment**: Scaling can be set for a channel so that its value is the same as that for UNIT-CH1
- **Other**: Start up, key-lock, beep sound

**Pulse, Digital input**

- **Number of channels**: 4 channels, (digital / pulse selectable for each channel, M3 screw terminal)
  - 8 channels (digital / pulse selectable for each channel, not isolated, common ground)
- **Input condition**
  - **Input voltage**: No-voltage 'a' contact (normally open contact), open collector or voltage input, Input resistance: 1.1 MΩ
- **Max. allowable input voltage**: 1 V to 50 VDC (maximum voltage between input terminals that does not cause damage)
- **Max. rated voltage between channels**: Not isolated (common ground)
- **Max. rated voltage to earth**: Not isolated (common ground)
- **Detect level**: 2 selectable levels (H: over 1.0 V, L: 0 - 0.5 V) (H: over 4.0 V, L: 0 - 1.5 V)
- **Pulse input period**: With filter OFF: 200 ms or more (both H and L periods must be at least 100 ms)
  - With filter ON: 100 ms or more (both H and L periods must be at least 50 ms)
- **Slope**: Rising or falling edge can be set for each channel
- **Pulse measurement mode**: Totalized pulses: Integrated (pulse count integration from start), Instantaneous (pulse count value at each sampling, and integrated value is reset each time)
- **Rotation count**: Count input pulses during one second
- **Filter**: For contact bound resistant (ON/OFF set for each channels)

**Measurement parameters**

- **Ranges**
- **Finest Resolution**
- **Range of Measurements**
  - **Pulse totalization**: 10 M (pulse) / s
  - **Pulse rotations**: 1 (pulse) / s to 1,000 (pulse) / s
  - *minimum count for input pulse (at least 1.0 M pulse)
### Analog input section

<table>
<thead>
<tr>
<th>Voltage Setting Ranges</th>
<th>Resolution</th>
<th>Measurement range</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 mV f.s.</td>
<td>500 mV</td>
<td>-10 mV to 10 mV</td>
<td>±10 μV</td>
</tr>
<tr>
<td>20 mV f.s.</td>
<td>1 μV</td>
<td>-20 mV to 20 mV</td>
<td>±20 μV</td>
</tr>
<tr>
<td>100 mV f.s.</td>
<td>5 μV</td>
<td>-100 mV to 100 mV</td>
<td>±100 μV</td>
</tr>
<tr>
<td>200 mV f.s.</td>
<td>10 μV</td>
<td>-200 mV to 200 mV</td>
<td>±200 μV</td>
</tr>
<tr>
<td>1 V f.s.</td>
<td>50 μV</td>
<td>-1 V to 1 V</td>
<td>±1 μV</td>
</tr>
<tr>
<td>2 V f.s.</td>
<td>100 μV</td>
<td>-2 V to 2 V</td>
<td>±2 mV</td>
</tr>
<tr>
<td>10 V f.s.</td>
<td>500 μV</td>
<td>-10 V to 10 V</td>
<td>±10 mV</td>
</tr>
<tr>
<td>20 V f.s.</td>
<td>1 mV</td>
<td>-20 V to 20 V</td>
<td>±20 mV</td>
</tr>
<tr>
<td>100 V f.s.</td>
<td>5 mV</td>
<td>-100 V to 100 V</td>
<td>±100 mV</td>
</tr>
<tr>
<td>10 - 5 V f.s.</td>
<td>500 μV</td>
<td>1 V to 5 V</td>
<td>±10 mV</td>
</tr>
</tbody>
</table>

#### Temperature

<table>
<thead>
<tr>
<th>Thermocouple Types</th>
<th>Setting Ranges</th>
<th>Resolution</th>
<th>Measurement range</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>K</td>
<td>100 °C f.s.</td>
<td>0.01 °C</td>
<td>-100 to less than 0 °C</td>
<td>±0.8 °C</td>
</tr>
<tr>
<td></td>
<td>500 °C f.s.</td>
<td>0.05 °C</td>
<td>-200 to less than 0 °C</td>
<td>±1.5 °C</td>
</tr>
<tr>
<td></td>
<td>2000 °C f.s.</td>
<td>0.1 °C</td>
<td>-200 to less than 0 °C</td>
<td>±1.5 °C</td>
</tr>
<tr>
<td>J</td>
<td>100 °C f.s.</td>
<td>0.01 °C</td>
<td>-100 to less than 0 °C</td>
<td>±0.8 °C</td>
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<tr>
<td></td>
<td>500 °C f.s.</td>
<td>0.05 °C</td>
<td>-200 to less than 0 °C</td>
<td>±1.0 °C</td>
</tr>
<tr>
<td></td>
<td>2000 °C f.s.</td>
<td>0.1 °C</td>
<td>-200 to less than 0 °C</td>
<td>±1.0 °C</td>
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<td>E</td>
<td>100 °C f.s.</td>
<td>0.01 °C</td>
<td>-100 to less than 0 °C</td>
<td>±0.8 °C</td>
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<td></td>
<td>500 °C f.s.</td>
<td>0.05 °C</td>
<td>-200 to less than 0 °C</td>
<td>±1.0 °C</td>
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<td></td>
<td>2000 °C f.s.</td>
<td>0.1 °C</td>
<td>-200 to less than 0 °C</td>
<td>±1.0 °C</td>
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<tr>
<td>T</td>
<td>100 °C f.s.</td>
<td>0.01 °C</td>
<td>-100 to less than 0 °C</td>
<td>±0.8 °C</td>
</tr>
<tr>
<td></td>
<td>500 °C f.s.</td>
<td>0.05 °C</td>
<td>-200 to less than 0 °C</td>
<td>±1.5 °C</td>
</tr>
<tr>
<td></td>
<td>2000 °C f.s.</td>
<td>0.1 °C</td>
<td>-200 to less than 0 °C</td>
<td>±1.5 °C</td>
</tr>
<tr>
<td>N</td>
<td>100 °C f.s.</td>
<td>0.01 °C</td>
<td>-100 to less than 0 °C</td>
<td>±0.8 °C</td>
</tr>
<tr>
<td></td>
<td>500 °C f.s.</td>
<td>0.05 °C</td>
<td>-200 to less than 0 °C</td>
<td>±1.2 °C</td>
</tr>
<tr>
<td></td>
<td>2000 °C f.s.</td>
<td>0.1 °C</td>
<td>-200 to less than 0 °C</td>
<td>±2.2 °C</td>
</tr>
</tbody>
</table>

### Optional Product Specifications

**Voltage/Temp Unit LR8500**

- **Number of input channels**: 15 channels (input type selectable from voltage, thermocouple, humidity, for each channel)
- **Input terminals**: M3 screw terminals (4 terminals per channel)
- **Isolated from each channel and from chassis**

**Measurement parameters**

- **Voltage**: 200 V DC (max. voltage between input terminals without damage)
- **Platinum resistance temperature sensor**: (Pt 100, JPt 100)
  - Resistance (4-wired, testing current 1 mA)

**Input conditions**

- **Input resistance**: 1 Ω (at voltage/thermocouple measurement)
- **Platinum resistance temperature sensor**: (Pt 100, JPt 100)

**Max. rated voltage between isolated input channels**

- **300 V AC, DC**: (max. voltage from terminals to chassis ground without damage)

**Max. rated voltage from isolated terminals to ground**

- **300 V AC, DC**: (max. voltage between input terminals without damage)

**Measurement accuracy**

- Refer to MEMORY HILOGGER main unit specifications

**Dimensions & Mass**

- **Approx. 128 mm (5.04 in) W × 52.8 mm (2.08 in) H × 64.5 mm (2.54 in) D, 380 g (13.4 oz)**
Bundled software specifications

**Logger Utility** (bundled application software)

- **Operating environment**
  - One CD-R, CPU: Pentium 3 (900 MHz or more), at least 512 MB of memory
  - Interface: USB, LAN
  - OS available with the Model LR8400-20/21
  - 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)

- **Real-time data acquisition**
  - Measurements on multiple loggers connected by LAN* or USB can be controlled to sequentially acquire, display and save waveform data (for recording up to 10 million samples)
  - *LAN available with HILOGGER main unit for 1.5 hours or later

- **Data acquisition settings**
  - Measurements on multiple loggers connected by LAN* or USB can be controlled to sequentially acquire, display and save waveform data (for recording up to 10 million samples)
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  - *LAN available with HILOGGER main unit for 1.5 hours or later

- **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: 300 channels (measurement data, used with the LR8400-20/20, LR8400-21/21 + 60 channels (waveform processing data)

- **Wavesform processing**
  - Processing items: Four arithmetic operations
  - Number of processing channels: 60 channels

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**Data conversion**
- **Target data:** Real-time data acquisition file (LUW format), Record to internal memory data (MEM format), Waveform processing data
- **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, 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
- **Print 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)

**Wavesform processing**
- **Processing items:** Four arithmetic operations
- **Number of processing channels:** 60 channels
Main units and Options in Detail

LR8400-20 (with built-in VOLTAGE/TEMP UNIT × 2)
Built-in units are equivalent to the VOLTAGE/TEMP UNIT LR8500 (15 ch) × 2
Caution: Built-in units cannot be removed or changed

LR8401-20 (with built-in UNIVERSAL UNIT × 2)
Built-in units are equivalent to the UNIVERSAL UNIT LR8501 (15 ch) × 2
Caution: Built-in units cannot be removed or changed

LR8402-20
(with built-in UNIVERSAL UNIT × 1, VOLTAGE/TEMP UNIT × 1)
Built-in units are equivalent to the UNIVERSAL UNIT LR8501 (15 ch) × 1, and VOLTAGE/TEMP UNIT LR8509 (15 ch) × 1
Caution: Built-in units cannot be removed or changed

measurement and input options

VOLTAGE/TEMP UNIT LR8500
Discrete 15 channel type, 15 channels Voltage, Temperature with thermocouple, or Humidity measurement

UNIVERSAL UNIT LR8501
Discrete 15 channel type, 15 channels Voltage, Temperature with thermocouple, Platinum Resistance temperature sensor, Humidity, or Resistance measurement

HUMIDITY SENSOR Z2000
3 m (9.84 ft) length

Power supplies

BATTERY PACK Z1000
NiMH, Charges while installed in the HILOGGER

AC ADAPTER 9418-15
Supplied as standard, 100 to 240 V AC

Caution:
Built-in units cannot be removed or changed

Removable storage (CF card)

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 on such cards.

Cases

CARRYING CASE C1000
Includes compartment for options

FIXED STAND Z5000
For wall hanging or stand alone bench mounting

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