Portable Data Logger with 30 Standard Channels
Expandible to 60 Channels

Only the size of an A4 sheet of paper, the HIOKI LR8400 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 (with thermocouples), or voltage 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.

Note: Isolation between channels is possible through the use of semi-conductor relays. Voltage exceeding the product specifications, such as that originating from lightning surges or other sources, should never be applied between each channel; otherwise the relays will short and the recorder will be damaged.

**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 Z2000)
  Note: The sensor power supply is the M3 mm dia. screw terminal block on the left side.
  Note: 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

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

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

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

**Multi-measurements**
- Multi-measurements
  • 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

**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

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.
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.

Accurately capture any phenomena you want to measure
Sampling at 100 ms intervals cannot capture abrupt load changes.
Sampling the same waveform at ten times the speed, at 10 ms intervals, accurately captures the changes.

Easy-to-view LCD
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

- Compatible 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

<table>
<thead>
<tr>
<th>Recording intervals</th>
<th>Recording of 15 analog channels only (no pulse measurement, alarm output or waveform processing data)</th>
<th>Recording of 30 analog channels only (no pulse measurement, alarm output or waveform processing data)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Internal memory (16 MB)</td>
<td>Model 9728 (512 MB)</td>
</tr>
<tr>
<td>10 ms *</td>
<td>1h 33m</td>
<td>2d 01h 42m</td>
</tr>
<tr>
<td>20 ms *</td>
<td>1h 33m</td>
<td>2d 01h 42m</td>
</tr>
<tr>
<td>50 ms</td>
<td>3h 33m</td>
<td>5d 04h 16m</td>
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<tr>
<td>100 ms</td>
<td>7h 46m</td>
<td>16d 08h 33m</td>
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<tr>
<td>200 ms</td>
<td>15h 32m</td>
<td>26d 17h 06m</td>
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<tr>
<td>500 ms</td>
<td>1d 14h 50m</td>
<td>51d 13h 30m</td>
</tr>
<tr>
<td>1s</td>
<td>3d 05h 40m</td>
<td>10d 13h 30m</td>
</tr>
<tr>
<td>2s</td>
<td>6d 11h 20m</td>
<td>207d 03h 01m</td>
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<tr>
<td>5s</td>
<td>16d 04h 21m</td>
<td>51d 19h 34m</td>
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<tr>
<td>10s</td>
<td>32d 08h 43m</td>
<td><em>(</em>)</td>
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<tr>
<td>20s</td>
<td>64d 17h 26m</td>
<td><em>(</em>)</td>
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<tr>
<td>30s</td>
<td>97d 02h 10m</td>
<td><em>(</em>)</td>
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<tr>
<td>1min</td>
<td>194d 04h 20m</td>
<td><em>(</em>)</td>
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<tr>
<td>2min</td>
<td>388d 08h 40m</td>
<td><em>(</em>)</td>
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<tr>
<td>5min to 1 hour</td>
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</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.
A host of useful functions and features

Up to two additional 15 channel input units can be added

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.

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.
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 of 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.

### 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.
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.

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.

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

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
- **Accuracy of timebase:** ±0.5μs/ div (at 23 °C ±3 °F)

### Internal clock
- **Accuracy of timebase:** ±0.5μs/ div (at 23 °C ±3 °F)

### Backup battery
- For clock and setting condition: battery life 5 years (at 23 °C ±3 °F)

### Operating temp. & humidity
- 0°C (32 °F) to 40°C (104 °F), 80% rh or less (non-condensating)

### Storage temp. & humidity
- -10 °C (14 °F) to 60 °C (140 °F), 80% rh or less, (non-condensating)

### Conformance standards
- Safety : EN61010, EMC : EN61326, EN61000-3-2, EN61000-3-3

### Interface
- USB communication (ver. 1.20 or later)

### Number of channels
- 30 channels or up to 60 channels

### Trigger mode, timing
- **Modes:** Single / Repeat, Timing : Start / Stop, Start & Stop & Start, Logical sum (OR) and product (AND) of each trigger source, Selectable for each channel

### Analog signal source
- Configurable for each individual channel for 30 channels or up to 60 channels depending on number of additional terminal modules installed.

### Pulse source
- 8 channels of pulse totalizer inputs

### Digital signal source
- 8 channels of digital signal inputs

### Timer trigger
- Set up for year/month/day/hour/minute/second

### Alarm output
- Open collector (active low, with 5V output, M3 mm screw terminal, Output refreshed at each recording interval

### Measurement Settings
- **Recording Intervals**
  - (sampling period) 10 ms/ div, 20 ms/ div, 50 ms/ div, 100 ms to 1 hr (19 selections)
  - All channels are scanned within each recording interval
  - Thermocouple burn-out detection OFF, and using up to 15 channels
  - Thermocouple burn-out detection OFF, and using up to 15 channels, or Thermocouple burn-out detection ON, and using up to 15 channels
  - Thermocouple burn-out detection ON, and using up to 30 channels, or Thermocouple burn-out detection ON, and using up to 30 channels

### Data Saving
- **Storage media**
  - Select a CF card or USB memory (Use only PC Cards sold by HIOKI)

### Data entry
- USB memory

### Display device
- 5.7 inch TFT color liquid crystal display (640 x 480 pixels), horizontal 15.9, vertical 10.5, 4 times magnification, selectable between English and Japanese displays, Back light, battery save

### LCD Brightness
- Selectable from 100, 70, 40, or 25%

### Power supplies
- **AC Power**
  - Using the AC ADAPTER 9418-41 (supplied as standard, 190 to 240 VAC, 50/60 Hz)
- **DC Power**
  - Using the BATTERY PACK Z0000 (optional accessory, 12 V, AC adapter has priority when used in combination with battery pack)

### External
- 10 to 28 VDC (Rechargeable voltage 12 to 16 VDC, Please contact your HIOKI adapter has priority when used in combination with battery pack)

### Display section
- **Display device**
  - 5.7 inch TFT color liquid crystal display (640 x 480 pixels), horizontal 15.9, vertical 10.5, 4 times magnification, selectable between English and Japanese displays, Back light, battery save

### Waveforms
- 4 arithmetic calculations between each channel

### Other functions
- Event marking
  - **Search:** Move to the event number entered and display the waveform appearing before and after event
  - **Number of events:** Maximum 100 per measurement

### Pulse, Digital input
- **Number of channels**
  - 8 channels, (digital / pulse selectable for each channel, M3 screw terminal + 8ch, 2 terminals per channel, not isolated, common ground)

### Input condition
- **Max. allowable input**
  - 5 V to 50 VDC (maximum voltage between input terminals that does not cause damage)

### Digital input
- **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
- **Contact for band reject (OFF) and 10 kHz for each channel**

### Measurement parameters
- **Ranges**
  - 1,000 mV (pulse) / 50 mV (pulses)
  - 1 pulse
  - 0 to 1,000 mV (pulses)

### Pulse totalization
- 10 mV, 20 mV, 50 mV, 100 mV to 1 hr (19 selections)

### Pulse rotations
- 0 V to 5.000 VDC (wa)
  - wa = the number of sensor output pulses per rotation, 1 to 1,000

### Digital input
- **Logic levels**
  - "1" or "0" at each sampling
**Product Specifications**

**Dimensions & Mass**
Approx. 128 mm (5.04 in) W × 52.8 mm (2.08 in) H × 64.5 mm (2.54 in) D, 300 g (10.6 oz)

**Measurement accuracy**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Setting Ranges</th>
<th>Resolution</th>
<th>Measurement range</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Temperature</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thermocouple</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>K</td>
<td>0.01°C</td>
<td>0 to 100°C</td>
<td>±0.6°C</td>
<td>±0.8°C</td>
</tr>
<tr>
<td>J</td>
<td>0.01°C</td>
<td>0 to 100°C</td>
<td>±0.6°C</td>
<td>±0.8°C</td>
</tr>
<tr>
<td>E</td>
<td>0.01°C</td>
<td>0 to 100°C</td>
<td>±0.6°C</td>
<td>±0.8°C</td>
</tr>
<tr>
<td>N</td>
<td>0.01°C</td>
<td>0 to 100°C</td>
<td>±0.6°C</td>
<td>±0.8°C</td>
</tr>
<tr>
<td><strong>Voltage</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pt 100</td>
<td>0.01°C</td>
<td>-100 to 100°C</td>
<td>±0.6°C</td>
<td>±0.8°C</td>
</tr>
<tr>
<td>JPt 100</td>
<td>0.01°C</td>
<td>-100 to 100°C</td>
<td>±0.6°C</td>
<td>±0.8°C</td>
</tr>
<tr>
<td><strong>Humidity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Z2000</td>
<td>0.1%rh</td>
<td>5.0 to 95.0%rh</td>
<td>±2.5%rh</td>
<td>±3.0%rh</td>
</tr>
</tbody>
</table>

**Number of input channels**
15 channels (input type selectable from voltage, thermocouple, humidity, for each channel), M3 screw terminals (2 terminals per channel)

**Measurement parameters**

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**Other specifications about thermocouple measurement**
Reference junction compensation: Internal: External, at INT KJC, total accuracy + add ± 0.5°C

**Temperature resistance temperature sensor**
(Compliance standard)

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<tr>
<td><strong>Potentiometer</strong></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>X</td>
<td>2000°C</td>
<td>0.1°C</td>
<td>0 to less than 100°C</td>
<td>±0.1°C</td>
</tr>
<tr>
<td>Y</td>
<td>2000°C</td>
<td>0.1°C</td>
<td>0 to less than 100°C</td>
<td>±0.1°C</td>
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<td>Z</td>
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<td>0.1°C</td>
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**Filler function**
(Thermocouple/Resistance/Thermometer/Voltage/Resistance/Humidity)

**Universal unit LR9501** (Accuracy guaranteed for 1 year, Post-adjustment accuracy guaranteed for 1 year)
Number of input channels: 15 channels (input type selectable from voltage, thermocouple, Pt 100, JPt 100, humidity, resistance, for each channel), Push-button type terminals (4 terminals per channel)

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**Input conditions**
Note: Isolated from each channel to chassis

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| **Input conditions**              |                |            |                   |           |
|                                  |                |            |                   |           |

**Measurement parameters**
Voltage: Temperature with thermocouples (K, J, E, T, N, R, S, B, W)

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**Input conditions**
Note: Isolated between channels and from each channel to chassis

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**Measurement parameters**
Input resistance: 1 MΩ (at voltage/thermocouple measurement), 2 MΩ (at platinum resistance temperature sensor, or resistance measurement)

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**Input conditions**
Max. rated voltage from isolated input terminals to chassis ground

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**Measurement parameters**
Input resistance: 1 MΩ (at voltage/thermocouple measurement), 2 MΩ (at platinum resistance temperature sensor, or resistance measurement)

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**Input conditions**
Max. rated voltage from isolated input terminals to chassis ground

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**Input conditions**
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</tr>
</tbody>
</table>
### Model Line-up

<table>
<thead>
<tr>
<th>Items</th>
<th>Specifications</th>
<th>Model LR8400-20 (built-in the Voltage/hemp unit LR8500 x2, 30 ch)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Analog input</strong></td>
<td>Built-in 30 channels Note: Isolated from each channel to chassis [UNIT-1, UNIT-2] Push-button type terminals x 30 channels (4 terminals per channel)</td>
<td><strong>Caution:</strong> Built-in M3 screw terminal units cannot be removed or replaced</td>
</tr>
<tr>
<td>Expandable by adding 30 more channels for a total of 60 input channels (optional input unit, Model LR8500 or LR8501, up to 2 units)</td>
<td><strong>M3 screw terminals x 15</strong></td>
<td><strong>M3 screw terminals x 15</strong></td>
</tr>
<tr>
<td><strong>Measurement parameters</strong></td>
<td>Voltage, Temperature with thermocouples (K, J, E, T, N, R, S, B, W) Note: Not isolated between channels nor from each channel to chassis</td>
<td><strong>Push-button type terminals x 15</strong></td>
</tr>
<tr>
<td>Humidity with the sensor Z2000</td>
<td>Resistance (4-wired, testing current 1 mA) Note: Not isolated between channels</td>
<td></td>
</tr>
<tr>
<td>Note: Not isolated between channels nor from each channel to chassis</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Input resistance</strong></td>
<td>1 MΩ (at voltage thermocouple measurement)</td>
<td></td>
</tr>
<tr>
<td><strong>Max. allowable input</strong></td>
<td>±100 V DC (max. voltage between input terminals without damage)</td>
<td></td>
</tr>
<tr>
<td><strong>Max. rated voltage between isolated input channels</strong></td>
<td>250 V DC (max. voltage between input terminals)</td>
<td></td>
</tr>
<tr>
<td><strong>Max. rated voltage from isolated terminals to ground</strong></td>
<td>500 V AC, DC (max. voltage from terminals to chassis ground without damage)</td>
<td></td>
</tr>
<tr>
<td><strong>CAUTION:</strong> Built-in push-button terminal units cannot be removed or replaced</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Items</th>
<th>Specifications</th>
<th>Model LR8401-20 (built-in the Universal unit LR8501 x2, 30 ch)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Analog input</strong></td>
<td>Built-in 30 channels Note: Isolated from each channel to chassis [UNIT-1] Push-button type terminals x 15 channels (4 terminals per channel) [UNIT-2] M3 screw terminals x 15 channels (2 terminals per channel)</td>
<td><strong>Caution:</strong> Built-in push-button terminal unit and M3 screw terminal unit cannot be removed or replaced</td>
</tr>
<tr>
<td>Expandable by adding 30 more channels for a total of 60 input channels (optional input unit, Model LR8500 or LR8501, up to 2 units)</td>
<td><strong>Push-button type terminals x 15</strong></td>
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<tr>
<td><strong>Measurement parameters</strong></td>
<td>Voltage, Temperature with thermocouples (K, J, E, T, N, R, S, B, W) Note: Not isolated between channels nor from each channel to chassis</td>
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</tr>
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<td>Humidity with the sensor Z2000</td>
<td>Resistance (4-wired, testing current 1 mA) Note: Not isolated between channels</td>
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<tr>
<td><strong>Input resistance</strong></td>
<td>1 MΩ (at voltage thermocouple measurement)</td>
<td></td>
</tr>
<tr>
<td><strong>Max. allowable input</strong></td>
<td>±100 V DC (max. voltage between input terminals without damage)</td>
<td></td>
</tr>
<tr>
<td><strong>Max. rated voltage between isolated input channels</strong></td>
<td>300 V DC (max. voltage between input channel terminals)</td>
<td></td>
</tr>
<tr>
<td><strong>Max. rated voltage from isolated terminals to ground</strong></td>
<td>300 V AC, DC (max. voltage from terminals to chassis ground without damage)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Items</th>
<th>Specifications</th>
<th>Model LR8402-20 (built-in the Universal unit x1, Voltage/hemp unit x1, 30 ch)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Analog input</strong></td>
<td>Built-in 30 channels Note: Isolated from each channel to chassis [UNIT-1] Push-button type terminals x 15 channels (4 terminals per channel) [UNIT-2] M3 screw terminals x 15 channels (2 terminals per channel)</td>
<td><strong>Caution:</strong> Built-in push-button terminal unit and M3 screw terminal unit cannot be removed or replaced</td>
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<td><strong>Max. allowable input</strong></td>
<td>±100 V DC (max. voltage between input terminals without damage)</td>
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</tr>
<tr>
<td><strong>Max. rated voltage between isolated input channels</strong></td>
<td>250 V DC at M3 screw terminals, 300 V DC at push-button type terminals (max. voltage between input channel terminals)</td>
<td></td>
</tr>
<tr>
<td><strong>Max. rated voltage from isolated terminals to ground</strong></td>
<td>300 V AC, DC (max. voltage from terminals to chassis ground without damage)</td>
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</tr>
</tbody>
</table>

### Logger Utility SF1000 (bundled application software)

<table>
<thead>
<tr>
<th>Supported units</th>
<th>Model 8423, 8430, LR8431, LR8432, LR8400, LR8401, LR8402, and LR8410</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating environement</td>
<td>Windows 10/8/7 (32bit/64bit), Vista (32bit/64bit), XP (with SP2 or later) (32bit)</td>
</tr>
</tbody>
</table>

**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)
- Number of controllable instruments: up to 5 units
- This software is compatible only with the LR8401-20, LR8400-20Series, LR8401-20, LR8423, and LR8420-20
- Display: Waveforms (time-axis divided display possible), numerical values (logging), and alarm status can be displayed at the same time
- Numerical value display: Can be monitored in a separate window
- Scroll: Waveform scroll while measuring
- Data saving destination: Real-time data transfer to Excel, or Real-time data acquisition file (LUW format)
- Event filter: Can be set while measuring

**Data acquisition settings**
- Data acquisition settings for the logger or logging station
- Saving: The setting for multiple loggers or logging stations can be saved together in one file (LUW format), Instrument configuration settings can be sent and received
- Processed data file: Real-time data acquisition file (LUW format), Record to internal memory data (MEM format)
- Display format: Simultaneously display waveform and temperature, numerical value, time-axis divided display possible
- Maximum number of channels: 675 channels (measurement data) + 60 channels (waveform processing data)
- Others: Display each channel's waveform on 10 sheets, scroll, record event mark, cursor, screen hard copy, numerical value display

**Data conversion**
- Target data: Real-time data acquisition file (LUW format), Record to internal memory data (MEM format)
- Converted sections: All data, designation section
- Format: CSV format (separate by comma, space, tab), transfer to Excel spreadsheet, arbitrary data thinning

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

**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 value, time to minimum values, ON time, OFF time, count the number of ON time and OFF time, standard deviation, integration, area values, totalization

**Search functions**
- Target data: Real-time data acquisition file (LUW format), Record to internal memory data (MEM format)
- Search mode: Event mark, time and date, maximum position, minimum position, maximum pole, minimum pole, alarm position, level, window, amount of change

**Print functions**
- Supported printer: Printer compatible with the OS
- Target data: Real-time data acquisition file (LUW format), Record to internal memory data (MEM format)
- 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
LR8400-20 Options in Detail

- **VOLTAGE/TEMP UNIT LR6500**
  - 4 terminals, 4-bit dump type, 15 channels, Voltage, Temperature, with Temperature sensor, Humidity measurement, for the LR8400 series

- **UNIVERSAL UNIT LR5051**
  - 4 terminals, 4-bit dump type, 15 channels, Voltage, Temperature, with Temperature sensor, Humidity, or Resistance measurement, for the LR8400 series

- **BATTERY PACK Z1000**
  - NiMH, Charges while installed in the main unit

- **AC ADAPTER 9418-15**
  - 100 to 240 V AC

- **CARRYING CASE C1000**
  - Includes compartment for options

- **FIXED STAND Z5000**
  - For wall hanging and slanted bench mounting

- **LOGGER UTILITY**
  - Control the measurement of loggers and download data in real-time

- **LAN CABLE 9642**
  - Straight Ethernet cable, supplied with straight to cross conversion adapter, 5 m (16.4 ft) length

- **PC CARD 512M 9728**
  - 512 MB capacity

- **PC CARD 1G 9729**
  - 1 GB capacity

- **PC CARD 2G 9830**
  - 2 GB capacity

- **HUMIDITY SENSOR Z2000**
  - Sensor guaranteed for 1 year.

- **GRABBER CLIP 9243**
  - Can also be used with accessories such as L4936/L4937/L4931 as available for other testers.

- **CONVERSION CABLE L0111**
  - 30 cm (0.98 ft) length, covert BNC to-wire

- **CONVERSION CABLE L0111-10**
  - 2 m (6.5 ft) length, covert BNC to-wire

**Note:**
- 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 or save data to such cards.

**Model : MEMORY HILOGGER LR8400**

- Model No. (Order Code) (Note)
  - LR8400-20 : Built-in units are equivalent to the Voltage/Temp unit LR5050 (15 ch) × 2
  - Bundled Accessories: Detailed operating manual × 1, Measurement guide × 1, AC ADAPTER 9418-15 × 1, USB cable × 1, CD-R (data collection software “Logger Utility”) × 1

**Model : MEMORY HILOGGER LR8401**

- Model No. (Order Code) (Note)
  - LR8401-20 : Built-in units are equivalent to the Voltage/Temp unit LR5050 (15 ch) × 2
  - Bundled Accessories: Detailed operating manual × 1, Measurement guide × 1, AC ADAPTER 9418-15 × 1, USB cable × 1, CD-R (data collection software “Logger Utility”) × 1

**Model : MEMORY HILOGGER LR8402**

- Model No. (Order Code) (Note)
  - LR8402-20 : Built-in units are equivalent to the Voltage/Temp unit LR5050 (15 ch) × 2
  - Bundled Accessories: Detailed operating manual × 1, Measurement guide × 1, AC ADAPTER 9418-15 × 1, USB cable × 1, CD-R (data collection software “Logger Utility”) × 1