High-voltage 1000 V direct input measurement

Max. 1 MS/s high-speed sampling, 16-bit resolution measurement

Generate and record in a single unit

Reproduce and output problematic waveform measurements
No amp needed; max. 15 V output

For on-site work and R&D testing
Global Standard Recorder
A high-spec, high-quality versatile measuring device

20 MS/sec sampling speed

Perform multi-channel, high-speed sampling at 20 M samples/sec (time axis resolution: 50 nsec) for all channels at the same time.

Isolated input for all channels

Connections between analog input channels, and between the input channel and the main unit, are isolated by isolation elements. So potential differences can be measured without any concerns, just like with an oscilloscope.

A4 size built-in printer

Print large, high-definition hard copies for easy on-site checking. Paper is easy to replace by inserting a new roll, rolling out the paper slightly, and then closing the cover.
Abundant modules
Hioki has added new high-performance modules in response to overwhelming demand. The Memory HiCorder now supports a wide variety of measurements.

64 logic input channels +10 analog channels
The MR8847A has 16 built-in logic input channels. Add 3 logic input units to record a total of 64 channels at once. You can also display the waveforms for all channels on a single screen—ideal for timing measurements. Up to 10 channels of analog waveforms can be recorded at the same time for efficiency.

Large 512 MW capacity (MR8847-53 only)
Hioki has developed an internal storage FPGA for super-high-speed access. Used in combination with large capacity high-speed memory, this enables many hours of high-speed sampling to be recorded.

SSD 128 GB storage media
The new internal SSD unit (available as an additional option) has 128 GB of capacity, allowing large amounts of data to be stored.

Durable design, with resistance to dropping up to 50 cm
The MR8847A is resistant to strong mechanical shock and vibration, such as short drops. The durable design has been tested to withstand vertical drops of up to 50 cm.

* Tested based on in-house conditions. A dropped unit is not guaranteed to be free of damage or trouble.
Since you can directly input up to 1000 V DC and 700 V AC, a differential probe is no longer necessary. Maximum rated voltage to ground is 1000 V for CAT III and 600 V for CAT IV environments.

Global power supply line measurement

Ideal for primary and secondary measurements of UPS power supplies and commercial power supply transformers, and for recording the primary and secondary waveforms of inverters. It can also be used to measure high-voltage power supply lines, such as 380 V and 480 V systems used in many countries.

Applicable to a variety of characteristics tests

Maximum 1 MS/s high-speed sampling and 16-bit resolution allow the MR8847A to be used for interruption and switch testing. The voltage of each battery cell can be input separately. This uses 1000 V DC input, which can withstand even if high voltage is applied when a cell shorts. The digital voltmeter unit, which allows input up to 500 V DC, is suitable for the testing of individual battery cells.

Transformer Dump Tests

Interchannel isolation allows for safe circuit connections. Simultaneous high-speed sampling can record waveforms before and after the dump. Input large numbers of control and circuit signals.

Recommended units

- HIGH VOLTAGE UNIT U8974
- CURRENT UNIT 8971
- LOGIC UNIT 8973

Applicability:

- Maximum 1 MS/s high-speed sampling and 16-bit resolution in the high-voltage unit allow the MR8847A to be used for interruption and switch testing.
Output and record results seamlessly

Just one MEMORY HiCORDER gives you a function generator mode, arbitrary waveform generator mode, and waveform measurement mode. This makes it easy to observe waveforms while varying test conditions, such as changing the signal’s amplitude and frequency and programming various waveforms to output in order.

Output recorded waveforms without modification

For example, you could output actual waveforms recorded from a car without modification, and then use them for standalone testing. You can also generate isolated output of up to 15 V without a generator or amplifier, which is traditionally necessary in order to generate output while varying the signal’s amplitude and frequency.

Process actual waveforms for reproducibility testing

Process and calculate signals recorded with the MEMORY HiCORDER and output the arbitrary waveforms that you create.

Waveform Maker Software included

After you install the included SF8000 Waveform Maker software on your computer, you can create waveforms easily by either entering them directly or by entering the functions behind them. You can also quickly add noise and multiply waveforms.

Anomaly Simulation

Reproduce and output the observed waveforms without modification. When resolving problems observed during research or development, you can reproduce such problems for efficient testing.

- Recommended units
  - ARBITRARY WAVEFORM GENERATOR UNIT U8793
  - ANALOG UNIT 8966
  - HIGH RESOLUTION UNIT 8968

- Create power supply waveforms such as power supply dips, instantaneous interruptions, and voltage fluctuations for immunity tests to regulate malfunctions in equipment caused by power supply harmonics to perform evaluation testing.
The right unit for your measurement needs

Inverter / UPS Test

- Operation testing and evaluation during load fluctuation
- Confirmation of UPS switching

Recommended units:
- ANALOG UNIT 8966
- LOGIC UNIT 8973
- CURRENT UNIT 8971

Perfect for inverter and UPS evaluation / start-ups. Record using both logic (control signals) and analog (primary/secondary voltage or current for a UPS or inverter).

Power Monitor and Logger

- Identify power fluctuations when power supply is turned ON/OFF and during load fluctuations
- Long-term fluctuations in power

Recommended units:
- ANALOG UNIT 8966
- HIGH RESOLUTION UNIT 8968
- FREQ UNIT 8970

Load the analog output for the rms (instant power / voltage / current, etc.) calculated by the power analyzer, or import the waveform output from the power analyzer to observe data for long-term tests or irregular waveforms.

Control Simulation

- Generate simulated output of each type of sensor signal
- Fluctuating simulated output for 12 V DC car batteries

Recommended units:
- ARBITRARY WAVEFORM GENERATOR UNIT U8793
- WAVEFORM GENERATOR UNIT MR8490
- PULSE GENERATOR UNIT MR8791

Use actual waveforms to perform testing on control boards, such as for engine control, airbags, brake systems, power steering, and active suspension. This allows efficient simulation of actual waveforms obtained from cars.
Vibration / Endurance Tests

- Analyze the relationship between engine control and vibration
- Confirm equipment durability

Replace multiple DMMs with a single unit

Save space by replacing multiple desktop DMM units with a single MEMORY HiCORDER. This eliminates the need to control multiple units and simplifies your system.

DIGITAL VOLTMETER UNIT MR8990

Fine precision and resolution

Proprietary specifications for DC voltage measurements

Measure minute fluctuations in sensor output for automobiles or voltage fluctuations in batteries with high precision and at high resolution. The maximum voltage that you can input is 500 V DC. Another feature is high input resistance.

**Recommended units**

- DIGITAL VOLTMETER UNIT MR8990

512 MW of high-capacity memory makes it easy to observe vibration waveforms for many hours while performing high-speed sampling. This feature is perfect for detecting waveform peaks.

6.5-digit display (Resolution: 0.1 μV), 24-bit high resolution

<table>
<thead>
<tr>
<th>Measurement range</th>
<th>Effective input range (Guaranteed measurement accuracy range)</th>
<th>Max. resolution</th>
<th>Input resistance</th>
<th>Measurement accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 mV/div (f.s. = 100 mV)</td>
<td>-120 mV to 120 mV</td>
<td>0.1 μV</td>
<td>100 MΩ or more</td>
<td>±0.01% rdg. ±0.01% f.s.</td>
</tr>
<tr>
<td>50 mV/div (f.s. = 1000 mV)</td>
<td>-1200 mV to 1200 mV</td>
<td>1 μV</td>
<td>10 MΩ</td>
<td>±0.0025% rdg. ±0.0025% f.s.</td>
</tr>
<tr>
<td>5 V/div (f.s. = 10 V)</td>
<td>-12 V to 12 V</td>
<td>10 μV</td>
<td>500 MΩ</td>
<td>±0.01% rdg. ±0.01% f.s.</td>
</tr>
<tr>
<td>50 V/div (f.s. = 100 V)</td>
<td>-500 V to 500 V</td>
<td>100 μV</td>
<td>10 MΩ</td>
<td>±0.01% rdg. ±0.01% f.s.</td>
</tr>
</tbody>
</table>

512 MW of high-capacity memory makes it easy to observe vibration waveforms for many hours while performing high-speed sampling. This feature is perfect for detecting waveform peaks.

Observe minor vibrations with high precision

Vibration testing equipment

Install up to 8 DVM Units to expand up to 16 channels

2 channels, banana input terminal
High precision, high resolution

Digital units:

- DIGITAL VOLTMETER UNIT MR8990
- HIGH RESOLUTION UNIT 8968
- STRAIN UNIT U8969
- ARBITRARY WAVEFORM GENERATOR UNIT U8793
- TEMPERATURE UNIT 8967
- CURRENT UNIT 8971
- VOLTAGE UNIT 8972
- LOGIC UNIT 8973
- HIGH RESOLUTION UNIT 8968
- DISTORTION UNIT 8970
- FREQUENCY UNIT 8971
- VOLTAGE UNIT 8972
- CONTACT UNIT 8973
- CURRENT UNIT 8971
- VOLTAGE UNIT 8972
- CONTACT UNIT 8973

Temperature

- Thermocouple

Voltage

- Supply voltage
  - Primary / secondary inverter voltage
- Motor voltage, etc.

Distortion

- Strain gauge converter
- Dynamic strain
- Vibration
- Pressure
- Acceleration
- Weight, etc.

Frequency, RPM

- Encoder
- Rotating pulse

Current

- Supply current
- Inverter current
- Motor current, etc.

Voltage

- Supply voltage
- Primary / secondary inverter voltage
- Motor voltage, etc.

Contact

- Voltage / non-voltage contacts
- Relay signals
- AC / DC signals

No. of channels: 16
Observation of control signal
Full range of supporting functions

On-site assistance

Help function
Understand operation methods without even reading the instruction manual using the built-in Help function. Place the cursor on a field in the settings and press the HELP button to view a detailed description of that setting.

Master triggers

Set triggers while viewing waveforms
Set input triggers while checking waveforms. You can also display the settings screen separately as a floating screen.

Trigger functions for monitoring all measurement channels
- Level trigger for comparing a single voltage value
- Window trigger for comparing 2 voltage values
- Voltage drop trigger for detecting voltage drops in commercial power lines
- Period trigger for monitoring periods
- Glitch trigger for detecting anomalies in pulses
- Pattern trigger for comparisons when the logic signal is ON/OFF

Acquiring data with triggers, and post-acquisition searching
The MR8847A includes a search function for finding abnormal waveforms within all of the acquired data. You can use this function to search for anomalies after data has been acquired, when it is too difficult to set triggers because it is not possible to predict what types of anomalies might be observed.

Set the number of events for each source
* Only for level and glitch triggers
Set trigger conditions in a variety of combinations.

Label each channel

Comment entry function
Set comments for each channel and display them on the screen, even when observing multiple channels, making identification easy.
When printing, you can also print the channel comments.
Input comments directly on the unit or by using a USB keyboard.
Enlarge waveforms

Zoom function
Display time axis reduced waveforms at the top of the screen, and time axis enlarged waveforms at the bottom of the screen. You can use the scroll function to display the entire waveform while also observing specific parts.

Collapse waveform
Check the entire waveform.

Expand waveform
Enlarge/shrink along the time/vertical axes.

Scan and clip

AB cursor function
Apply the Zoom function to set point A and point B for the area you want to clip.

Scan
Scan data at the cursor and the waveform’s cross point.

Extract
Specify the segment to save as binary or CSV data.

PC operations

Connect to LAN for HTTP/FTP server functions
Use the HTTP function to operate the MEMORY HiCORDER with a browser on a PC connected via LAN. You can also use the FTP function to acquire data from the internal memory or from storage media inserted in the MEMORY HiCORDER. You can even acquire data from the internal memory or from storage media connected to the MEMORY HiCORDER via USB.
Record the data you need

Simultaneous recording on storage media

Memory functions

- Sampling is done at the set period, and all data is recorded.
- Automatic data saving on SSD / CF card or USB memory stick
- During high-speed sampling, data is written to internal memory first and later saved on other media
- During low-speed sampling, data is written to internal memory while also saved on other media
- Highly effective for long-term recording

Maximum Recording Time to internal memory (excerpt)

- Caution: Available recording duration is determined by internal RAM capacity, not by external media.
- Caution: Although USB memory sticks enable automatic data saving, for more reliable data protection, we recommend use of HIOKI CF cards, which are guaranteed to work with the instrument.
- Note: Table shows maximum values at arbitrary recording length settings.
- Note: Saving to media in near real-time is possible at sampling speeds of 100 ms/div (1 msec sampling) or slower.

Analysis software

/// WAVE PROCESSOR 9335
(Software sold separately)

- Waveform display, calculations
- Print function

### 9335 Brief Specifications

- Operating environment: Windows 10/8/7 (32/64-bit)
- Functions:
  - Display functions: Waveform display, X-Y display, Cursor function, etc.
  - File loading: Readable data formats (.MEM, .REC, .RMS, .POW)
  - Maximum loadable file size: Maximum file size that can be saved is a given device (file size may be limited depending on the computer configuration)
  - Data conversion: Conversion to CSV format, Batch conversion of multiple files, etc.
- Printing:
  - Print function: Printing image file output (expanded META type, *.EMF)
  - Print formatting: 1 up, 2-to-16 up, 2-to-16 rows, X-Y 1-to-4 up, preview, hard copy

/// LAN COMMUNICATOR 9333
(Software sold separately)

- Auto-save waveform data to PC
- Remote control via LAN connection
- Save in CSV format and transfer to spreadsheet programs

### 9333 Brief Specifications

- Operating environment: Windows 10/8/7 (32/64-bit), Vista (32-bit), XP (9333 ver.1.09 or later)
- Functions:
  - Auto-saves waveform data to PC, Remote control of Memory HiCorder (by sending key codes and receiving images on screen), print report, print images from the screen, receive waveform data in same format as waveform files from the Memory HiCorder (binary only)
  - Waveform data acquisition: Accept auto-saves from the Memory HiCorder, same format as auto-save files of Memory HiCorder (binary only), print automatically with a Memory HiCorder from a PC. The Memory HiCorder's print key launches printouts on the PC
  - Waveform viewer: Simple display of waveform files, conversion to CSV format, etc.
Chart recording without missing transient events

Recorder functions

- High-speed sampling ensures that transient events are captured also with slow recording
- Data compression achieved by recording maximum/minimum value pairs
- Max. 833-day (1 hr/div) long-term recording even for 64 MW model
- Continuous recording until paper runs out for chart output

Maximum Recording Time with the Recorder function

<table>
<thead>
<tr>
<th>REC time axis</th>
<th>Sampling period</th>
<th>To internal memory 20000 divisions</th>
<th>Continuous (approx. recording time with 30 m paper roll)</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 ms/div</td>
<td>33 min 20 s</td>
<td>Display only</td>
<td></td>
</tr>
<tr>
<td>200 ms/div</td>
<td>1 h 6 min 40 s</td>
<td>Display only</td>
<td></td>
</tr>
<tr>
<td>500 ms/div</td>
<td>2 h 46 min 40 s</td>
<td>24 min 46 s</td>
<td></td>
</tr>
<tr>
<td>1 s/div</td>
<td>5 h 33 min 20 s</td>
<td>49 min 30 s</td>
<td></td>
</tr>
<tr>
<td>5 s/div</td>
<td>1 h 39 min 00 s</td>
<td>1 h 39 min 00 s</td>
<td></td>
</tr>
<tr>
<td>10 s/div</td>
<td>4 h 7 min 30 s</td>
<td>4 h 7 min 30 s</td>
<td></td>
</tr>
<tr>
<td>30 s/div</td>
<td>8 h 15 min 00 s</td>
<td>8 h 15 min 00 s</td>
<td></td>
</tr>
<tr>
<td>50 s/div</td>
<td>1 d 17 h 15 min 00 s</td>
<td>1 d 17 h 15 min 00 s</td>
<td></td>
</tr>
<tr>
<td>100 s/div</td>
<td>2 d 1 h 30 min 00 s</td>
<td>2 d 1 h 30 min 00 s</td>
<td></td>
</tr>
<tr>
<td>1 min/div</td>
<td>3 d 10 h 30 min 00 s</td>
<td>3 d 10 h 30 min 00 s</td>
<td></td>
</tr>
<tr>
<td>2 min/div</td>
<td>4 d 3 h 00 min 00 s</td>
<td>4 d 3 h 00 min 00 s</td>
<td></td>
</tr>
<tr>
<td>5 min/div</td>
<td>10 d 7 h 30 min 00 s</td>
<td>10 d 7 h 30 min 00 s</td>
<td></td>
</tr>
<tr>
<td>15 min/div</td>
<td>20 d 15 h 00 min 00 s</td>
<td>20 d 15 h 00 min 00 s</td>
<td></td>
</tr>
<tr>
<td>30 min/div</td>
<td>61 d 21 h 00 min 00 s</td>
<td>61 d 21 h 00 min 00 s</td>
<td></td>
</tr>
<tr>
<td>1 h/div</td>
<td>123 d 18 h 00 min 00 s</td>
<td>123 d 18 h 00 min 00 s</td>
<td></td>
</tr>
</tbody>
</table>

Notes
- When opening data created with the Recorder function on a computer, the maximum and minimum data pairs are lined up in a time series.
- Length of printer paper roll is 30 meters. Paper can be changed during operation without stopping the recording process.
- With settings between 100 ms and 200 ms/div on the time axis, continuous recording is not possible if printer is ON.
- The table shows values for the MR8847-51 (64 M-words memory capacity).
- Model MR8847-52 (256 MW) can record four times and Model MR8847-53 (512 MW) eight times as much. At "Continuous" setting in recording length, total recording time cannot be increased.

iPad App for Memory HiCorder HMR Terminal

- Freely control waveforms using iPad’s gesture controls
- Fingertip operation of Max. 32 channels of waveform data
- Operate the Memory HiCorder via network
  You can change settings, and monitor waveforms during measurement.

Wave Viewer Wv
(Bundled software)

- Check waveforms with binary data on a PC
- Save data in CSV format and transfer to spreadsheet programs

Wave Viewer (Wv) Brief Specifications

<table>
<thead>
<tr>
<th>Operating environment</th>
<th>Functions</th>
</tr>
</thead>
</table>
| Windows 10/8/7 (32/64-bit) | - Simple display of waveform files  
- Convert binary data files to text format, CSV, etc.  
- Scroll function, enlarge/reduce display, jump to cursor/finger position, etc. |

HMR Terminal Brief specifications (free software)

<table>
<thead>
<tr>
<th>Operating environment</th>
<th>Functions</th>
</tr>
</thead>
</table>
| OS on the iPad (Apple Inc.) | - Data acquisition: Send to iPad via FTP using a WiFi router, or load to iPad via iTunes (PC app)  
- Intuitively operate waveform level searches, maximum/minimum/average values, zero position adjustment, and more at your fingertips  
- Waveform monitoring  
- Meter setting  
- Logic waveforms and computational waveforms are not supported. |

*New function on Ver 2.0

*Data can view by the iPad using HiiK’s dedicated apps available from the App Store. Search for “HiDAT” and download the “HiDAT Terminal” app.

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*“HiDAT” and “HiDAT Terminal” are registered trademarks of HiiK Corporation in the United States and/or other countries.

*“HiDAT” and “HiDAT Terminal” are service marks of HiiK Corporation in the United States and/or other countries.
Definitive analysis of important data

Calculate parameter values from measured waveforms

The MR8847A can perform 24 calculations, including RMS, peak value, and maximum value, from measured waveforms. It can also perform time difference measurements, phase difference measurements, histogram measurements for HIGH level and LOW level, and statistical processing. Calculation results are displayed together on the waveform observation screen.

Process waveforms with formulas

If you know the required formulas, you can also perform complicated calculations. By entering formulas, you can perform a variety of calculations even after measurements are complete. For example, you can make the settings shown on the right to find the RMS value from a measured waveform.

FFT analysis function

The MR8847A can perform one-signal FFT for analyzing frequency components, two-signal FFT for analyzing transfer functions, and octave analysis for acoustics.

FFT calculations from memory waveforms

When performing FFT analysis of data measured with the memory function, you can use the jog shuttle to specify analysis points while also viewing the calculation results at the same time. You can also display both the raw data measured with the memory function and the calculation results for storage waveforms at the same time, which improves operability during analysis by displaying spectrum waveforms while checking the results of window functions.

Running spectrum display

Display the spectrum as it changes over time in 3D

Change the number of calculation points after measurement

Scaling by ’dB’

Before scaling  
After scaling

Display the calculation source (memory waveform) and FFT calculation results at the same time
X-Y RECORDER

Now even easier to use with independent pen up/down control. Saving data in chronological order allows records to be saved as digital data, rather than paper hardcopies that need to be stored.

Pen up/down control

Pen up/down during X-Y recording is controlled independently. Press the function button or use an external control terminal (EXT. IN 1, 2, 3) for external control.

Replaces mechanical pen recorders

Use pen up/down control to record only the required data. This allows you to reduce the amount of unnecessary data that is recorded, and lower the running cost for paper.

Determine waveform quality

Use the waveform judgment function, which monitors whether a waveform extends beyond the given area, to easily determine the quality of signal waveforms that are normally difficult to judge. For time axis ranges that are slower than 100 msec/div, you can even make judgments while loading waveforms. This allows you to take the appropriate action the moment a poor waveform is detected on the production line. You can stop the line as soon as an abnormality is detected.

Judge FFT analysis waveforms

Judge FFT analysis waveforms in the same way.

Judge X-Y waveforms

In addition to time axis signals, the MR8847A also has a waveform judgment function for X-Y waveforms built in. Use this to detect:
- Displacement and pressure of presses
- Pressure and flow rate of pumps
The X-Y waveforms of the above and other data can be tested automatically based on area judgment.
### Product Specifications

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

<table>
<thead>
<tr>
<th>Measurement functions</th>
<th>MEMORY (high-speed recording), RECORDER (real-time recording)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NUMBER OF INPUT UNITS</td>
<td>[8 analog input modules]: 16 analog channels + 16 logic channels (built-in)</td>
</tr>
<tr>
<td></td>
<td>[5 analog input modules + 3 logic input modules]: 10 analog channels + 64 logic channels (16 built-in channels + 48 channels in logic input modules)</td>
</tr>
<tr>
<td></td>
<td>* For analog units, channels are isolated from each other and from frame GND. Logic units are not isolated from each other and from frame GND. All channels must have a common ground.</td>
</tr>
<tr>
<td>Max. sampling speed</td>
<td>20 MS/second (50 ns per step, all channels simultaneously)</td>
</tr>
<tr>
<td>External sampling</td>
<td>10 MS/second (100 ns per step)</td>
</tr>
<tr>
<td>Memory capacity</td>
<td>MR8847-51: Total 64 M-words (Memory expansion: none) 52 MW/ch (using 2 Analog channels), to 4 MW/ch (using 16 Analog channels)</td>
</tr>
<tr>
<td></td>
<td>MR8847-52: Total 256 M-words (Memory expansion: none) 26 MW/ch (using 2 Analog channels), to 16 MW/ch (using 16 Analog channels)</td>
</tr>
<tr>
<td></td>
<td>MR8847-53: Total 512 M-words (Memory expansion: none) 26 MW/ch (using 2 Analog channels), to 52 MW/ch (using 16 Analog channels)</td>
</tr>
<tr>
<td>REMOVABLE STORAGE</td>
<td>CF card slot (standard) + 1 (up to 2GB, FAT, or FAT-32 format), SSD</td>
</tr>
<tr>
<td>BACKUP FUNCTION</td>
<td>Clock and parameter setting backup: at least 10 years, waveform backup function: none</td>
</tr>
<tr>
<td>Control terminals</td>
<td>External trigger input, Trigger output, External sampling input, Two external outputs (GO, NG), Three external inputs (START, STOP, PRINT)</td>
</tr>
<tr>
<td>External interface</td>
<td>LAN: 100BASE-TX (FTP server, HTTP server) USB: USB2.0 compliant, series A receptacle +1, series B receptacle -1, IEEE transfer internal device/CF card to PC, or remote control from PC</td>
</tr>
<tr>
<td>Environmental conditions</td>
<td>Operation: -40°C to 40°C (14°F to 104°F), 20% to 80% RH</td>
</tr>
<tr>
<td></td>
<td>With printer and/or SSD in use: 0°C to 40°C (32°F to 104°F), 20% to 80% RH</td>
</tr>
<tr>
<td></td>
<td>Storage: 20°C to 50°C (68°F to 122°F), 90% RH or less</td>
</tr>
<tr>
<td>Compliance standard</td>
<td>Safety: EN60100</td>
</tr>
<tr>
<td></td>
<td>EMC: EN61326, EN61000-3-2, EN61000-3-3</td>
</tr>
<tr>
<td>Power supply</td>
<td>100 to 240 V AC, 50/60 Hz 10 to 28 V DC (use the DC POWER UNIT 9784; Factory installation only)</td>
</tr>
<tr>
<td>Power consumption</td>
<td>130 VA max. (Printer not used), 220 VA max. (Printer used)</td>
</tr>
<tr>
<td>Dimensions and mass</td>
<td>Approx. 351 mm (13.82 in) W × 261 mm (10.28 in) H × 140 mm (5.51 in) D, 76 kg (168 lb) (main unit only)</td>
</tr>
<tr>
<td>Accessories</td>
<td>Instruction Manual +1, Measurement Guide +1, Application Disc (Waveform Maker Software SF8000, Wave Viewer Wv, Communication Commands table) +1, Power cord +1, Roll paper attachment +2, Printer paper +1, Printer manual +1, Printer used</td>
</tr>
<tr>
<td>Internal printer</td>
<td>Printer paper one-touch loading, high-speed thermal printing</td>
</tr>
<tr>
<td>Recording Paper</td>
<td>216 mm (8.5 in) × 30 (84.3 in), thermal paper roll (use KS2871) Waveform section recording width: 200 mm (7.87 in) 20 division full scale, 1 div = 10 mm (0.39 in) 80 dots Recording speed</td>
</tr>
<tr>
<td>Display section</td>
<td>84.4 inch SXGA-TFT color LCD (800 × 600 dots) (Time axis 25 div × Voltage axis 20 div, X-Y waveform 20 div × 20 div)</td>
</tr>
<tr>
<td>Display languages</td>
<td>English, Japanese, Korean, Chinese</td>
</tr>
<tr>
<td>Waveform display</td>
<td>Time axis: 8 div to 2 div at memory function only), x1, x1/2 to x1/2000 Voltage axis: x100 to 2 div, x2, x2/2 to x1/10 Variable display</td>
</tr>
<tr>
<td>Scaling</td>
<td>50 to 10000 L, automatic scaling for various probes Manual scaling (conversion ratio setting, 2-point setting, unit setting)</td>
</tr>
<tr>
<td>Comment entry</td>
<td>Alphanumeric input (title, analog and logic channels), Simple input, history input, phrase input Logical waveform</td>
</tr>
<tr>
<td>Display partition</td>
<td>Max. 16 graphs</td>
</tr>
<tr>
<td>Monitor functions</td>
<td>Level monitor Numerical value (sampling 10 kS/s fixed, refresh rate 0.5 s) 1/4 div to 1/20000 div Vertex monitor, for all channels) Workstation monitor (horizontal screen division, zoom waveform shown in lower section) 16 selectable colors for waveform display Zero position shift in 1% steps for analog waveform Global zero adjust for all channels and all ranges</td>
</tr>
</tbody>
</table>

**MEMORY (High-speed recording)**

| Time axis | 3 μs to 5 μs/div (100 samples/div) 26 ranges, External sampling (100 samples/div, or free setting), Time axis zoom: x2 to x10 in 3 stages, compression: 1/2 to 1/2000 in 16 stages |
| Sampling period | 1/100 of time axis range (minimum 50 ms period) |
| Recording length | MR8847-51: 16 ch mode: 25 to 20 000 div, 2 ch mode: 25 to 200 000 div (built-in preset) or arbitrary setting in 1-div steps (max. 320 kdiv) |
|                        | MR8847-52: 16 ch mode: 25 to 100 000 div, 2 ch mode: 25 to 1 000 000 div (built-in preset) or arbitrary setting in 1-div steps (max. 1 280 000 div) |
|                        | MR8847-53: 16 ch mode: 25 to 20 000 div, 2 ch mode: 25 to 2 000 000 div (built-in preset) or arbitrary setting in 1-div steps (max. 2 560 000 div) |
| Pre-trigger | Record data from before the trigger point at 0 ±100% or -95% of the recording length in 15 stages, or in 1 div step settings |

**Numerical calculations**

- Simultaneous calculation for up to 16 selected channels
  - Average value, effective (rms) value, peak to peak value, maximum value, minimum value, value to minimum value, period, frequency, rise time, fall time, standard deviation, area value, X-Y area value, specified level time, specified time level, pulse width, duty ratio, pulse count, four arithmetic operations, time difference, phase difference, high-level and low-level
  - Calculation result evaluation output: GO/NG (with open-collector 5 V output)

- Automatic saving of calculation results

**Waveform processing**

- For up to 16 freely selectable channels, the following functions can be performed (results are automatically stored):
  - Automatic saving of four arithmetic operations, absolute value, expectation, common logarithm, square root, moving average, differentiation (primary, secondary), integration (primary, secondary), parallel displacement among waveform functions, reverse trigonometric functions, calculation results

**Memory segmentation**

- Max. 1024 blocks, sequential storage, multi-block storage

**Other**

- No logging
- X-Y waveform synthesis (1-screen, 4-screens)
- Overlay (always overlay when started/or overlay only required waveform)
- Automatic/Manual: A-B cursor range printing/ Report printing

**RECORDER (Real-time recording)**

| Time axis | 10 ms to 1 hour/div. 19 ranges, time axis resolution 100 points/div. * Out of data acquired at selected sampling rate, only maximum and minimum value data determined using 100 points/div units are stored. |
| Sampling period | 1/1000 ps, 1/10000 ms (selectable from 1/100 or less of time axis) |
| Real-time printing | Supported |
|                        | * Real-time printing is possible at time axis settings slower than 500 ms/div |
|                        | * Delayed print is performed when recording length is not set to "Continuous" and time axis setting is 10 ms to 200 ms/div. |
|                        | * When recording length is set to "Continuous" and time axis setting is 10 ms to 200 ms/div, manual printing can be performed after measurement stop |
| Recording length | MR8847-51: Built-in presets of 25 to 20 000 div, or "Continuous" or arbitrary setting in 1-div steps (max. 160 kdiv) |
|                        | MR8847-52: Built-in presets of 25 to 5 000 div, or "Continuous" or arbitrary setting in 1-div steps (max. 80 000 div) |
|                        | MR8847-53: Built-in presets of 25 to 100 000 div, or "Continuous" or arbitrary setting in 1-div steps (max. 320 000 div) |
| Additional recording | Supported (recording is resumed without overwriting previous data) |
| Waveform memory | Supported |
|                        | * Waveform memory: for data most recent 200 000 div in memory |
|                        | * Waveform memory: for data most recent 80 000 div in memory |
|                        | * Waveform memory: for data most recent 160 000 div in memory |
|                        | * Backward scrolling and re-printing available |
| Auto saving | Data are automatically saved on CF card, USB memory stick or internal drive after measurement stops. |
| Other | No logging |
|                        | Manual: A-B cursor range printing/ Report printing |

**X-Y RECORDER (X-Y real-time recording)**

| Sampling period | 1/100 ms (div), 1/1000 ms (line) |
| Recording length | Continuous |
| Screen, Printing | Split screen (1 or 4), Manual printing only |
| Number of X-Y | 1 to 8 phenomena |
| X-Y channel setting | Any 8 channels out of 16 can be selected for X axis and Y axis respectively |
| X-Y axis resolution | 25 dots/div (screen), horizontal 80 dots/div × vertical 80 dots/div |
| Waveform memory | Sampling data for last 4 000 000 points are stored in memory |
| Pen up/down | Simultaneous for all phenomena |
| External pen control | Possible via external input connector (simultaneous up/down for all phenomena) |
**Trigger functions**

**Trigger mode**
- MEMORY (high-speed recording), FFT: Single, Repeat, Auto
- Recorder (real-time recording): Single, Repeat

**Trigger source**
- CH1 to CH6 (analog), Standard Logic 16ch + Logic Unit (Max. 3 units 48 channels), External (a rise of 2.5V or terminal short circuit), Timer, Manual (either ON or OFF for each source), Logical AND/or of sources

**Trigger types**
- **Level**: Triggering occurs when preset voltage level is crossed (upwards or downwards)
- **Voltage drop**: Triggering occurs when voltage drops below peak voltage setting (for 50/60 Hz commercial power supply only)
- **Window**: Triggering occurs when window defined by upper and lower limit is entered or exited

**Trigger output**
- Open collector (5 voltage output, active Low)
  - At Level setting: pulse width (Sampling period + data number after trigger)
  - At Pulse setting: pulse width (2 ms)

**Other functions**
- Trigger priority (OFF/ON), Pre-trigger function for capturing data from before / after trigger event (at MEMORY function), Level display during trigger standby, Start and stop trigger (at RECORDER function), Trigger search function

**Level setting resolution**
- 0.1% of full scale (full scale = 20 divisions)

**Trigger filter**
- Selectable 0.1 div to 10.0 div, or OFF (high-speed recording)
  - ON (10 ms fixed) or OFF (at RECORDER function)

**Trigger output**
- Open collector (5 voltage output, active Low)
  - At Level setting: pulse width (Sampling period + data number after trigger)
  - At Pulse setting: pulse width (2 ms)

**Other functions**
- Trigger priority (OFF/ON), Pre-trigger function for capturing data from before / after trigger event (at MEMORY function), Level display during trigger standby, Start and stop trigger (at RECORDER function), Trigger search function

**Notes**
- The above table shows maximum values at arbitrary recording length settings.
- Saving to media in near real-time is possible at sampling speeds of 100 ms/div (1 msec sampling) or slower.
- Operation cannot be guaranteed for extended recording periods one year or longer. The above table represents theoretical values.

**FFT function**

**Analysis mode**

**Analysis channels**
- Selectable from all analog input channels

**Frequency range**
- 133 mHz to 8 MHz, External resolution (1/400, 1/800, 1/2000, 1/4000)

**Number of sampling points**
- 1000, 2000, 5000, 10,000 points

**Window functions**
- Rectangular, Hanning, Hamming, Blackman, Blackman-Harris, Flat-top, Exponential

**Display format**
- Single, Dual, Nyquist, Running spectrum

**Averaging function**
- Time axis / frequency axis simple averaging, Exponential averaging, Peak hold (frequency axis), Averaging times: 2 times to 10000 times

**Print functions**
- Same as the MEMORY function (partial print not available)

**Measurement Indices**

<table>
<thead>
<tr>
<th>Measurement targets</th>
<th>With use input unit</th>
<th>Display range</th>
<th>Max. resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Voltage</strong></td>
<td>ANALOG UNIT 8966</td>
<td>100 mV f.s. to 400 V f.s.</td>
<td>50 µV</td>
</tr>
<tr>
<td><strong>Current</strong></td>
<td>DCRMS UNIT 8972</td>
<td>100 mV f.s. to 400 V f.s.</td>
<td>3.125 µV</td>
</tr>
<tr>
<td><strong>Temperature (Thermocouple)</strong></td>
<td>TEMP UNIT 8967</td>
<td>100 mV f.s. to 4000 V f.s.</td>
<td>50 µV</td>
</tr>
<tr>
<td><strong>Frequency / RPM</strong></td>
<td>FREQ UNIT 8970</td>
<td>10 Hz to 1000 Hz / (kr/min) (to 2000 Hz)</td>
<td>0.01°C / 0.02°F</td>
</tr>
<tr>
<td><strong>Power frequency / Power</strong></td>
<td>FREQ UNIT 8970</td>
<td>40 Hz to 60 Hz, 50 to 70 Hz, 330 to 410 Hz</td>
<td>0.1 Hz</td>
</tr>
<tr>
<td><strong>Vibration</strong></td>
<td>STRAIN UNIT 8971</td>
<td>40 A f.s. or larger</td>
<td>1 mA or larger</td>
</tr>
<tr>
<td><strong>Logic</strong></td>
<td>DCRMS UNIT 8972</td>
<td>100 mV f.s. to 4000 V f.s.</td>
<td>0.01%</td>
</tr>
</tbody>
</table>

**Notes**
- Each unit has two input channels, except Logic Unit.
- Besides logic units (16 channels), the MR8847A series comes standard with 16 logic inputs integrated in the device.
## Optional Specifications (sold separately)

### Dimensions and mass: approx. 106 mm (4.17 in) W × 19.8 mm (0.78 in) H × 204.5 mm (8.05 in) D, approx. 240 g (8.5 oz)

<table>
<thead>
<tr>
<th>Accessories: Ferrite clamp × 2</th>
</tr>
</thead>
</table>

### Dimensions and mass: approx. 106 mm (4.17 in) W × 19.8 mm (0.78 in) H × 196.5 mm (7.74 in) D, approx. 250 g (8.8 oz)

| Accessories: None |

### ANALOG UNIT 8966

**Measurement functions**
- Number of channels: 2, for voltage measurement
- Input terminals: Isolated BNC connector (input impedance 1 MΩ, input capacitance 10 pF), Max. rated voltage to ground: 300 V AC or DC (with input isolated from the main unit, the maximum voltage that can be applied between input channel and chassis, and between input channels without damage)

**Measurement range**
- mV: ±20 V/div, full scale: 30 V, AC voltage for possible measurement/display using the memory function: 280 V max, Low-pass filter: 50/500 Hz, ±50/±50 kHz

**Measurement resolution**
- 100% of range (when using 12-bit A/D conversion)

**Maximum sampling rate**
- 20 Ms/s (continuous sampling in 2 channels)

**Maximum accuracy**
- ±0.1% of full scale (with filter 3 Hz, zero position accuracy included)

**Frequency characteristics**
- DC to 1 MHz (with filter CO), 40 kHz ±3 dB, 8 bandwidths

**Input coupling**
- 500 V DC (maximum voltage that can be applied between input connectors without damage)

### Dimensions and mass: approx. 106 mm (4.17 in) W × 19.8 mm (0.78 in) H × 196.5 mm (7.74 in) D, approx. 250 g (8.8 oz)

| Accessories: None |

### FREQ UNIT 8970

**Measurement functions**
- Number of channels: 2, for voltage input based frequency measurement, rotation, power frequency, integration, pulse duty ratio, pulse width measurement
- Input terminals: Isolated BNC connector (input impedance 1 MΩ, input capacitance 10 pF), Max. rated voltage to ground: 300 V AC or DC (with input isolated from the main unit, the maximum voltage that can be applied between input channel and chassis, and between input channels without damage)

**Frequency range**
- Range: Between DC to 100 kHz (minimum pulse width 2 µs), 1 Hz to 5 kHz (full scale = 20 divisions), 7 settings

**Accuracy**
- ±0.1% f.s. (including 10 kHz/div), ±0.2% at all kHz/div

**Rotation range**
- Range: Between 0 to 2 million rotations/minute (maximum pulse width 2 µs), 100 rotations/min to 100 k rotations/min (full scale = 20 divisions), 7 settings

**Accuracy**
- ±0.1% f.s. (including 10 kHz/div), ±0.2% at all kHz/div

**Power frequency range**
- Range: 50 Hz to 60 Hz, 400 Hz to 500 Hz (full scale = 10 divisions), 3 settings

**Integration mode**
- Range: ±2 counts to 1 M counts, 6 settings

**Pulse width range and threshold level**
- ±0 to ±10 V, 6 settings, selectable threshold level at each range

### Dimensions and mass: approx. 106 mm (4.17 in) W × 19.8 mm (0.78 in) H × 196.5 mm (7.74 in) D, approx. 250 g (8.8 oz)

| Accessories: CONVERSION CABLE 9318 x 2 (To connect the current sensor to the 8970) |

### TEMP UNIT 8967

**Measurement functions**
- Number of channels: 2, for temperature measurement with thermocouples (voltage measurement not available)
- Input terminals: Thermocouple input plug-in connector. Recommended wire-size: single wire: 0.14 to 0.32 mm², braided wire: 0.14 to 1.0 mm², AWG 26 to 16. No input impedance min. 5 MΩ (with line fault detection OFF/ON), Max. rated voltage to ground: 300 V AC or DC (with input isolated from the main unit, the maximum voltage that can be applied between input channel and chassis, and between input channels without damage)

**Temperature measurement range**
- Note: upper and lower limit values depend on the thermocouple

- K: -200°C to 1350°C (242°F to 2532°F), E: -100°C to 1022°C (140°F to 1900°F), DC: 0 to 140°C (32°F to 284°F)

**Accuracy**
- ±0.5% f.s. ±4 µε (5 Hz filter ON)

<table>
<thead>
<tr>
<th>Data refresh rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methods: Fast: 12.5 ms digital filter OFF, Normal: 100 ms digital filter 50 Hz, Slow: 600 ms digital filter 10 Hz</td>
</tr>
</tbody>
</table>

**Measurement accuracy**
- Thermocouple K, J, E, T, N: ±1.5°C (±2.7°F) (at 0°C (32°F))
- JIS C 1602-1995

**Input coupling**
- Integrated filter for suppressing aliasing distortion caused by FFT processing (automatic adjustment; Accuracy guaranteed for 1 year, Post-adjustment accuracy guaranteed for 1 year)

**Reference junction compensation**
- Accuracy guaranteed for 1 year, Post-adjustment accuracy guaranteed for 1 year

### Dimensions and mass: approx. 106 mm (4.17 in) W × 19.8 mm (0.78 in) H × 196.5 mm (7.74 in) D, approx. 250 g (8.8 oz)

| Accessories: None |

### HIGH RESOLUTION UNIT 8988

**Measurement functions**
- Number of channels: 2, for voltage measurement
- Input terminals: Isolated BNC connector (input impedance 1 MΩ, input capacitance 10 pF), Max. rated voltage to ground: 300 V AC or DC (with input isolated from the main unit, the maximum voltage that can be applied between input channel and chassis, and between input channels without damage)

**Measurement range**
- mV: ±20 V/div, 12 ranges, full scale: 20 div, AC voltage for possible measurement/display using the memory function: 280 V max, Low-pass filter: 50/500 Hz, ±50/±50 kHz

**Anti-aliasing filter**
- Integrated filter for suppressing aliasing distortion caused by FFT processing (automatic adjustment; Accuracy guaranteed for 1 year, Post-adjustment accuracy guaranteed for 1 year)

**Measurement resolution**
- ±0.5% of measurement range (using 12-bit A/D conversion)

**Maximum sampling rate**
- 300 Ms/s (continuous sampling in 2 channels)

**Measurement accuracy**
- ±0.2% of full scale (with filter 3 Hz, zero position accuracy included)

**Frequency characteristics**
- DC to 100 kHz (with AC coupling: 7 Hz to 100 kHz ±3 dB)

**Input coupling**
- AC/DC/GND

**Maximum input voltage**
- 500 V DC (maximum voltage that can be applied between input connectors without damage)

### Dimensions and mass: approx. 106 mm (4.17 in) W × 19.8 mm (0.78 in) H × 196.5 mm (7.74 in) D, approx. 250 g (8.8 oz)

| Accessories: None |

### DC/RMS UNIT 8972

**Measurement functions**
- Number of channels: 2, for voltage measurement, DC RMS selectable
- Input terminals: Isolated BNC connector (input impedance 1 MΩ, input capacitance 10 pF), Max. rated voltage to ground: 300 V AC or DC (with input isolated from the main unit, the maximum voltage that can be applied between input channel and chassis, and between input channels without damage)

**Measurement range**
- mV: ±20 V/div, 12 ranges, full scale: 20 div, AC voltage for possible measurement/display using the memory function: 280 V max, Low-pass filter: 50/500 Hz, ±50/±50 kHz

**Measurement resolution**
- ±0.5% of range (using 20-bit A/D conversion)

**Maximum sampling rate**
- 300 Ms/s (continuous sampling in 2 channels)

**Measurement accuracy**
- ±0.2% of full scale (with filter 3 Hz, zero position accuracy included)

**RMS measurement**
- RMS amplitude accuracy: ±1.5% f.s. (DC, 30 Hz to 1 kHz), ±3.0% f.s. (1 kHz to 10 kHz)
- RMS response time: 30 ms (time from 5% to 95% of full scale), Crest factor: 2

**Frequency characteristics**
- DC to 40 kHz ±3 dB (with AC coupling; 7 Hz to 100 kHz ±3 dB)

**Input coupling**
- AC/DC/GND

**Maximum input voltage**
- 500 V DC (maximum voltage that can be applied between input connectors without damage)

### Dimensions and mass: approx. 106 mm (4.17 in) W × 19.8 mm (0.78 in) H × 196.5 mm (7.74 in) D, approx. 250 g (8.8 oz)

| Accessories: None |

### LOGIC UNIT 8973

**Measurement functions**
- Number of channels: 16 (8 channels x 2 probe connectors + 4 connectors)
- Input terminals: Mini DIN connector (for HIOKI logic probes only)
- Compatible logic probes: 9320-01, 9327, MR9321-01

### Dimensions and mass: approx. 106 mm (4.17 in) W × 19.8 mm (0.78 in) H × 196.5 mm (7.74 in) D, approx. 190 g (6.7 oz)

| Accessories: None |
### Measurement functions
- Number of channels: 2, for DC voltage measurement
- Banana input connectors
- Input impedance: 100 MD or higher with 100 mV to 10 V input resistance
- Max. rated voltage to ground: 300 V AC or DC (with input isolated from the main unit, the maximum voltage that can be applied between input channel and chassis, and between input unit without damage)

### Measurement range
- 1000 V AC, 200 V AC or DC

### Integration time
- 2 μs: 2nd integration time or less (i.e., f < 1 kHz, full scale)

### Basic measurement accuracy
- ±0.05% rdg. ±0.025% f.s. (at range of 1000 mV f.s.)

### Maximum input voltage
- ShV DC (maximum voltage that can be applied between input connectors without damage)

### Accessories
- None

---

### ARBITRARY WAVEFORM GENERATOR UNIT U8793

#### Output terminal
- Number of channels: 2, SMB terminal
- Output impedance: 1 MΩ or less
- Max. rated voltage to ground: 100 V AC or DC (CAT III), 600 V AC or DC (CAT IV)

#### Output voltage range
- ±2 V to ±5 V differential output range setting: ±3 dB to ±10 dB/μV, Setting resolution: 1 mV

#### Max. output current
- 10 mA (Allowable load resistance: 1.5 kΩ or less)

#### FG generator
- DC, sine wave, square wave, Pulse wave, triangular wave, ramp wave, output frequency: 0 Hz to 100 kHz

#### Arbitrary waveform generator mode
- Waveform measured by Hioki, etc., generated by signal generator 8725, 8750, HPE waveforms 10, 15, 20, 20 kHz

#### Sweep input
- Frequency, Amplitude, Offset, Duty, Pulse only

#### Program function
- Max. 128 steps (Number of loops for each step, Number of total loops)

#### Other
- Soft function (Voltage), External input/output control

Note: Cannot use with legacy models of the U8747 or U8847

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### WAVEFORM GENERATOR UNIT MR8970

#### Output terminal
- Number of channels: 4, SMB terminal
- Output impedance: 1 MΩ or less
- Max. rated voltage to ground: 33 V AC or DC

#### Output voltage range
- ±2 V to ±10 V (Amplitude setting range: 0 V to 20 V, Setting resolution: 1 mV)

#### Max. output current
- 5 mA

#### Output function
- DC, sine wave, square wave, output range setting: 0 Hz to 10 kHz

#### Accuracy
- ±0.2% of setting ±1 mV (1 Hz to 10 kHz)

#### Other
- Soft function (Voltage, Current)

Note: Cannot use with legacy models of the MR8970 or MR8747

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### PULSE GENERATOR UNIT MR8971

#### Output terminal
- Number of channels: 3, Connector: D-sub, half-pitch, 50-pin
- Max. rated voltage to ground: 33 V AC or DC (between unit and output channels)

#### Output mode 1
- Pattern output: Real frequency: 0 Hz to 128 kHz, 2048 logic patterns

#### Output mode 2
- Logic output: Output voltage levels: 0 V or 5 V

#### Other
- Soft function (Voltage, Current)

Note: Cannot use with legacy models of the MR8970 or MR8747

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### DIFFERENTIAL PROBE P9000

#### Measurement modes
- DC to 100 kHz: ±3 dB

#### Division ratio
- Switch between 1000:1, 100:1

#### Effective value measurement accuracy
- ±2% f.s. (1 kHz to less than 1 kHz, sine wave), ±3% f.s. (1 kHz to 15 kHz, sine wave)

#### Maximum input capacitance
- 10 μF, 100 MΩ, 5 pF or less (at 100 kHz)

#### Accessories
- Instruction manual #1, Alligator clip #2, Carrying case #1

---

### DIFFERENTIAL PROBE P9322

#### Functions
- High-voltage measurement, power line surge noise measurement, RMS output measurement

#### DC mode
- For waveform monitor output, Frequency characteristics: DC to 10 MHz (±3 dB), Amplitude accuracy: ±1% of full scale (at 1000 V DC), ±3% of full scale (at 10000 V DC, full scale: 2000 V)

#### AC mode
- For detection of power line surge noise, Frequency characteristics: 1 kHz to 10 MHz, ±3 dB

#### RMS mode
- DC/AC RMS output, Frequency characteristics: DC to 100 kHz, Response speed: 200 ms of less (400 V AC), Accuracy: ±1% of full scale (DC, 40 Hz to 1 kHz), ±3% of full scale (1 kHz to 100 kHz, full scale: 2000 V AC)

#### Input
- Input type: Balanced differential input, Input impedance/capacitance: ±2 MΩ, ±0.3 pF

#### Maximum input voltage
- 2000 V DC, 1000 V AC, CAT IV (CAT IV)

#### Power supply
- Voltage divider for 1100 V or more, Input connectors/output switchable for 4 models, DC, AC, RMS

---

### LOGIC PROBE 9320-01/9327-01

#### Functions
- Detection of voltage signal or relay contact signal for High/Low state recording

#### Input
- 4 channels (common ground between unit and channels), digital contact input, switchable (contact input can detect open-collector signals)

#### Maximum input voltage
- ±500 V or more (with digital input, +5 to +5 V)

#### Digital input threshold
- ±5 V or less

#### Contact input resistance
- 1.5 kΩ or higher (open) and 500 Ω or less (short)

#### Detectable pulse width
- 0 to 100 ns

#### Maximum input voltage
- 0 to ±50 V DC (the maximum voltage that can be applied across input pins without damage)

---

### LOGIC PROBE MR9321-01

#### Functions
- Detection of AC or DC relay drive signal for High/Low state recording

#### Input
- 4 channels (isolated signals) input pin, BURST LOW range switching

#### Maximum input voltage
- 1000 V AC, ±100 V or higher (Burst range), 1000 V or higher (LOW range)

#### Output (H) detection
- 100 to 250 V AC, ±100 V or higher (Hi range), 100 V AC, ±100 V or lower (Low range)

#### Output (L) detection
- 100 to 250 V AC, ±100 V or higher (Hi range), 100 V AC, ±100 V or lower (Low range)

#### Response time
- Rising edge 1 μs max., falling edge 3 μs max. (with Burst range at 200 V DC, LOW range at 30 V DC)

#### Maximum input voltage
- ±50 V DC (Hi range), ±100 V DC (Low range)
System Chart of Options

**Model : MEMORY HiCORDER MR8847A**

<table>
<thead>
<tr>
<th>Model</th>
<th>No.</th>
<th>(Order Code)</th>
<th>(Note)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MR8847-51</td>
<td>(MR8847A, 64MW memory, main unit only)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MR8847-52</td>
<td>(MR8847A, 256MW memory, main unit only)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MR8847-53</td>
<td>(MR8847A, 512MW memory, main unit only)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Cannot operate alone. You must install other options.*

**Input modules**

* *Input cords not included. Please purchase them separately.*

- **ANALOG UNIT** 8966
  - 2 ch, Voltage input, DC to 5 MHz bandwidth

- **TEMP UNIT** 8967
  - 2 ch, thermocouple temperature input

- **HIGH RESOLUTION UNIT** 8968
  - 2 ch, voltage input, DC to 100 kHz bandwidth

- **STRAIN UNIT** U8969
  - 2 ch, strain gauge type converter amp
  - Conversion Cable L9769
    (for STRAIN UNIT U8969 only, included)

- **FREQ UNIT** 8970
  - 2 ch, for measurement of frequency, RPM, pulse, etc.

- **DCMRS UNIT** 8972
  - 2 ch, voltage/DC to 400 kHz. RMS rectifier, DC and 30 to 100 kHz bandwidth

- **LOGIC UNIT** 8973
  - 4 terminals, 16 ch
  - Note: Max. up to 3 modules can be installed in the MR8847A

- **DIGITAL VOLTMETER UNIT** MR8990
  - 2 ch, high-precision DC V, 0.1 μV resolution, maximum sampling rate 500 times/s

- **HIGH-VOLTAGE UNIT** U8974
  - 2 ch, voltage input, max. 1000 V DC and 700 V AC

**Output modules**

* *Input cords not included. Please purchase separately.*

- **WAVEFORM GENERATOR UNIT** MR8790
  - 4 ch, DC Output: ±10 V
  - Sine wave output: 10 mHz to 20 kHz

- **PULSE GENERATOR UNIT** MR8791
  - 8 ch, Pulse output: 0.1 Hz to 20 kHz, Pattern output

- **ARBITRARY WAVEFORM GENERATOR UNIT** U8793
  - 2 ch, 10 mHz to 100 kHz function generator, arbitrary waveform generator with 2 MHz D/A refresh rate, -10 V to 15 V output

**Storage media**

* The CF card includes a PC Card adapter.

- **PC CARD 2G** 9830 (2 GB)
- **PC CARD 1G** 9729 (1 GB)
- **PC CARD 512M** 9728 (512 MB)
- **USB DRIVE Z4006**
  - 16 GB, Long life, High-reliability SLC Flash Memory

**PC Software**

- **WAVE PROCESSOR** 9335
  - Convert data, print and display waveforms

- **LAN COMMUNICATOR** 9333
  - Waveform data collected function
  - Remote control with the PC

- **iPod App for MEMORY HiCORDER HMR Terminal**
  - Download from the App Store (exclusively for Apple iPad)

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

**Printer options**

- **RECORDING PAPER** 9231
  - A4 width 216 mm (8.50 in) × 30 m (98.43 ft), 6 rolls/set

**Case**

- **CARRYING CASE** 9783
  - Hard trunk type to protect unit during transport

**Output cable**

* Please contact your local HIOKI distributor for connectors that support Model MR8790s.

- **CONNECTION CABLE L9795-01**
  - Maximum rated voltage to ground: 33 V AC rms or 70 V DC, SMB terminal - alligator clip, Cord length: 1.5 m (4.92 ft)

- **CONNECTION CABLE L9795-02**
  - Maximum rated voltage to ground: 33 V AC rms or 70 V DC, SMB terminal - BNC terminal, Cord length: 1.5 m (4.92 ft)

**Logic signal measurement**

- **LOGIC PROBE 9327**
  - 4-channel type, for voltage/contact signal ON/OFF detection (response pulse width 100 ns or more, miniature terminal type)

- **LOGIC PROBE MR9321-01**
  - 4 isolated channels, ON/OFF detection of DC voltage, miniature terminal type

- **LOGIC PROBE 9320-01**
  - 4-channel type, for voltage/contact signal ON/OFF detection (response pulse width 500 ns or more, miniature terminal type)

- **CONVERSION CABLE 9323**
  - Used for connecting the 9330/9350/9109 MR8971 and the 9330 to the Memory HiCorder with small logic terminal models. The cable is not required for the small terminal type models.
**INPUT CORD (A)**
Voltage is limited to the specifications of the input modules in use.

**CONNECTION CORD L9790**
Flexible 4.1 mm (0.16 in) thin dia. cable allowing for up to 600 V input, 1.5 m (5.91 ft) length.* The end clip is sold separately.

**ALLIGATOR CLIP L9790-01**
Red/black set attaches to the ends of the cables L9790

**GRABBER CLIP L9790-02**
Red/black set attaches to the ends of the cables L9790* when this clip is attached to the end of the L9790, input is limited to CAT III 200 V.

**CONTACT PIN 9790-03**
Red/black set attaches to the ends of the cables L9790.

**INPUT CORD (B)**
Voltage is limited to the specifications of the input modules in use.

**CONNECTION CORD L1917**
6.0 mm (0.23 in) dia., cable allowing for up to 300 V input, 1.7 m (5.58 ft) length, small alligator clip.

**INPUT CORD (C)**
This probe does not exceed the maximum rated voltage above ground of an isolated input.

**TO PROBE 9663**
Max. rated voltage to earth is same as for input module, max. input voltage 1 kV rms (up to 500 kHz), 1.5 m (5.91 ft) length.

**10.1 PROBE 8666**
Max. rated voltage to earth is same as for input module, max. input voltage 5 kV peak (up to 500 kHz), 1.5 m (4.92 ft) length.

**INPUT CORD (D)**
Voltage to ground is within this product’s specifications, separate power source is also required.

**DIFFERENTIAL PROBE P9000-01**
(With Only) For Memory HiCorder, 1 kV AC, DC, Frequency band: 100 Hz.

**DIFFERENTIAL PROBE P9000-02**
(Switch between Wave/IMS) For Memory HiCorder, 1 kV AC, DC, Frequency band: 100 Hz.

**AC ADAPTER Z1008**
100 to 240 V AC.

**INPUT CORD (E)**
Voltage to ground is within this product’s specifications, separate power source is also required.

**DIFFERENTIAL PROBE 9322**
1 kV AC, 2 kV DC, Frequency band: 10 MHz.

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

**INPUT CORD (F)**
Voltage input via banana terminals limited by the voltage specifications of the respective input unit.

**CONNECTABLE CABLE L4340**
Banana plug - banana plug, Cont length: 1.5 m (4.92 ft).

**EXTENSION CABLE L4931**
Extend the length of banana plug cables, Cable length: 1.5 m (4.92 ft).

**ALLIGATOR CLIP L4935**
Attach to the tip of banana plug cables, CAT IV 600 V, CAT III 1000 V.

**BUS BAR CLIP L4936**
Attach to the tip of banana plug cables, CAT III 600 V.

**MAGNETIC ADAPTER L4937**
Attach to the tip of banana plug cables, CAT III 1000 V.

**GRABBER CLIP 9243**
Attach to the tip of banana plug cables, red/black set, full length: 96 mm (3.78 in), CAT III 1000 V.

**INPUT CORD (G)**
For the MB8890. Voltage is limited to the specifications of the input modules in use.

**TEST LEAD L2202**
Cable length: 70 cm, tips interchangeable with a pin test lead or alligator clip, maximum input voltage: CAT IV 600 V, CAT III 1000 V.

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**Non-contact Voltage measuring**

**Non-CONTACT AC VOLTAGE PROBE SP3000-01**
3V rms rated, 1 kHz to 1000 V band with non-CONTACT AC VOLTAGE PROBE SP3000
Sold individually
AC VOLTAGE PROBE SP9001
Sold individually

**Other options for Input**

**CONNECTION CORD L917**
Cord has insulated BNC connectors at both ends, 9.0 mm (0.35 in) dia. connectable with the Memory HiCorder, max. input voltage 1 kV rms (up to 500 kHz), 1.5 m (4.92 ft) length.

**CONVERSION ADAPTER 9199**
Connect to terminal block, 1.5 m (4.92 ft) length

**OUTPUT CORD L9096**
Connect to BNC connector, 1.5 m (4.92 ft) length.

**AC ADAPTER L945-02**
Convert to AC, 2.5 mm (0.10 in) dia.

**L4931**
Connect to banana plug, 1.5 m (4.92 ft) length.

**L4935**
Connect to banana plug, 1.5 m (4.92 ft) length.
Anomaly simulation testing
Output measured anomalous waveforms and processed arbitrary waveforms at max. 15 V, and record the results without modification.

Reproduce anomalous waveforms
Record results while testing
Output both measured anomalous waveforms and waveforms that you created yourself for testing. You can also measure the results at the same time.

High-voltage direct input measurement
Direct input is also possible without a differential probe for high voltage of 1000 V DC and 700 V AC.

Simultaneous measurement with high-speed camera recording
Synchronize high-speed video with multi-channel signals for recording.

Example sets

### Set example

<table>
<thead>
<tr>
<th>Component</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>MEMORY RECORDER</td>
<td>1 unit</td>
</tr>
<tr>
<td>ARBITRARY WAVEFORM GENERATOR UNIT</td>
<td>4</td>
</tr>
<tr>
<td>ANALOG UNIT</td>
<td>2</td>
</tr>
<tr>
<td>CONNECTION CABLE</td>
<td>8</td>
</tr>
<tr>
<td>CONNECTION CORD</td>
<td>6</td>
</tr>
</tbody>
</table>

Test ECUs, inverters and motors.

* Please contact your local Hioki distributor for more information about the use of high-speed cameras.

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