MEMORY HiCORDER MR8847A

5 new modules
Support for a total of 13 units

- ARBITRARY WAVEFORM GENERATOR UNIT
- HIGH VOLTAGE UNIT
- DIGITAL VOLTMETER UNIT
- WAVEFORM GENERATOR UNIT
- PULSE GENERATOR UNIT

Max. 20 MS/s high-speed sampling
All analog channels isolated
Logic channels Max. 64 ch
16 channels standard

For on-site work and R&D testing
Global Standard Recorder

High-voltage 1000 V direct input measurement

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

Generate and record in a single unit

ARBITRARY WAVEFORM GENERATOR UNIT Reproduce and output problematic waveform measurements
No amp needed; max. 15 V output
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.

Observe the rising edge of pulses
Input amp with integrated A/D converter
Simply open the cover, insert the new paper, and then close the cover.
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.

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.

5 new modules added

Hioki has added new high-performance modules in response to overwhelming demand. The Memory HiCorder now supports a wide variety of measurements with a total of 13 plug-in modules.

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.

NEW 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.

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.

Maximum 1 MS/s high-speed sampling and 16-bit resolution allow the MR8847A to be used for interruption testing 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.

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.

Application of each unit allows analysis of the correlation between voltage before and after the interruption of a generator, RPM fluctuation rate, governor servo motor operation conditions, and suppression machine switching.

- 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.
NEW ARBITRARY WAVEFORM GENERATOR UNIT U8793

Generate and record in a single unit

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 6966 | HIGH RESOLUTION UNIT 6968 |

- 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-up tests. 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.

<table>
<thead>
<tr>
<th>Generation</th>
<th>Voltage</th>
<th>DC voltage</th>
<th>Generation</th>
<th>Pulse</th>
<th>Voltage</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARBITRARY WAVEFORM GENERATOR UNIT U8793</td>
<td>HIGH VOLTAGE UNIT U8974</td>
<td>DIGITAL VOLTMETER UNIT MR8990</td>
<td>WAVEFORM GENERATOR UNIT MR8791</td>
<td>PULSE GENERATOR UNIT MR8791</td>
<td>ANALOG UNIT 8966</td>
</tr>
<tr>
<td>NEW</td>
<td>NEW</td>
<td>NEW</td>
<td>NEW</td>
<td>NEW</td>
<td>20 MS/s high-speed sampling</td>
</tr>
<tr>
<td>No. of channels: 2</td>
<td>Measurement resolution: 16-bit</td>
<td>Measurement resolution: 24-bit</td>
<td>16-bit</td>
<td>Pulse output: 0.1 Hz to 20 kHz</td>
<td>13-bit</td>
</tr>
<tr>
<td>Arbitrary waveform output</td>
<td>1/16000 of measurement range</td>
<td>1/15000 of measurement range</td>
<td>Waveform output</td>
<td>Pattern output</td>
<td>Various amplifiers</td>
</tr>
<tr>
<td>Output frequency range</td>
<td>High voltage</td>
<td>Multi-channel</td>
<td>DC output: -10 V to 10 V</td>
<td>Pulse output</td>
<td>Transducers</td>
</tr>
<tr>
<td>10 kHz to 100 kHz</td>
<td>* Commercial power supply (primary/secondary)</td>
<td>* Minute sensor voltage</td>
<td>* Sine wave output 10 mHz to 20 kHz</td>
<td>0.1 Hz to 20 kHz</td>
<td>* Sensors</td>
</tr>
<tr>
<td>Max. output: 16 V</td>
<td>* Power equipment characteristics testing</td>
<td>* EV battery voltage</td>
<td>* Pattern output</td>
<td>0.1 Hz to 20 kHz</td>
<td>Industrial meters</td>
</tr>
</tbody>
</table>

Perfect for control testing of automobiles, high speed trains, and traditional trains.
Vibration / Endurance Tests

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

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.

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.

Recommended units

- ARBITRARY WAVEFORM GENERATOR UNIT U8793
- HIGH RESOLUTION UNIT 8968
- STRAIN UNIT 8969

New 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.

<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 Ω or more</td>
<td>±0.01% rdg. ±0.01% f.s. ±0.0025% f.s.</td>
</tr>
<tr>
<td>50 mV/div (f.s. = 500 mV)</td>
<td>-1200 mV to 1200 mV</td>
<td>1 μV</td>
<td>100 Ω or more</td>
<td>±0.01% rdg. ±0.01% f.s. ±0.0025% f.s.</td>
</tr>
<tr>
<td>500 mV/div (f.s. = 5 mV)</td>
<td>-12 V to 12 V</td>
<td>10 μV</td>
<td>10 Ω or more</td>
<td>±0.01% rdg. ±0.01% f.s. ±0.01% f.s.</td>
</tr>
<tr>
<td>5 V/div (f.s. = 100 V)</td>
<td>-50 V to 50 V</td>
<td>100 μV</td>
<td>500 MΩ or more</td>
<td>±0.01% rdg. ±0.01% f.s. ±0.01% f.s.</td>
</tr>
<tr>
<td>50 V/div (f.s. = 10 V)</td>
<td>-500 V to 500 V</td>
<td>1 mV</td>
<td>10 MΩ or more</td>
<td>±0.01% rdg. ±0.01% f.s. ±0.0025% f.s.</td>
</tr>
</tbody>
</table>

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

High precision, high resolution

<table>
<thead>
<tr>
<th>Temperature</th>
<th>Voltage</th>
<th>Distortion</th>
<th>Frequency, RPM</th>
<th>Current</th>
<th>Voltage</th>
<th>Contact</th>
</tr>
</thead>
<tbody>
<tr>
<td>TEMP UNIT 8967</td>
<td>HIGH RESOLUTION UNIT 8968</td>
<td>STRAIN UNIT 8969</td>
<td>FREQ UNIT 8970</td>
<td>CURRENT UNIT 8971</td>
<td>DC/RMS UNIT 8972</td>
<td>LOGIC UNIT 8973</td>
</tr>
</tbody>
</table>

- Thermocouple K, J, E, T, N, R, S, B, W
- Supply voltage
- Primary / secondary inverter voltage
- Motor voltage, etc.
- Strain gauge converter
- Dynamic strain
- Vibration
- Pressure
- Acceleration
- Weight, etc.
- Encoder
- Rotating pulse
- Supply current
- Inverter current
- Motor current, etc.
- Supply voltage
- Primary / secondary inverter voltage
- Motor voltage, etc.
- Voltage / non-voltage contacts
- Relay signals
- AC / DC signals
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.

Press the HELP button. A detailed description of the setting is displayed.

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.

Adjust levels while displaying waveforms

Detect instantaneous outages
Setting screen for number of events
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

- 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)

<table>
<thead>
<tr>
<th>MR8847-51 (64 MW)</th>
<th>MR8847-52 (256 MW)</th>
<th>MR8847-53 (512 MW)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sampling period</td>
<td>40 000 divisions</td>
<td>160 000 divisions</td>
</tr>
<tr>
<td>5 μs/div</td>
<td>0.2 s</td>
<td>0.8 s</td>
</tr>
<tr>
<td>10 μs/div</td>
<td>0.4 s</td>
<td>1.6 s</td>
</tr>
<tr>
<td>100 μs/div</td>
<td>4 s</td>
<td>16 s</td>
</tr>
<tr>
<td>1 ms/div</td>
<td>10 μs</td>
<td>40 s</td>
</tr>
<tr>
<td>100 ms/div</td>
<td>1 ms</td>
<td>1 h 06 min 40 s</td>
</tr>
<tr>
<td>1 s/div</td>
<td>10 s</td>
<td>11 h 06 min 40 s</td>
</tr>
<tr>
<td>1 min/div</td>
<td>600 s</td>
<td>27 d 18 h 40 min 00 s</td>
</tr>
<tr>
<td>5 min/div</td>
<td>3.0 s</td>
<td>138 d 21 h 20 min 00 s</td>
</tr>
<tr>
<td>1 h/div</td>
<td>600 s</td>
<td>555 d 13 h 20 min 00 s</td>
</tr>
<tr>
<td>5 h/div</td>
<td>3.0 s</td>
<td>1111 d 02 h 40 min 00 s</td>
</tr>
</tbody>
</table>

- 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.

Recording and analysis software

WAVE PROCESSOR 9335

(Software sold separately)

- Waveform display, calculations
- Print function

LAN COMMUNICATOR 9333

(Software sold separately)

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

9335 Brief Specifications

<table>
<thead>
<tr>
<th>Functions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display functions: Waveform display, X-Y display, Cursor function, etc.</td>
</tr>
<tr>
<td>File loading: Readable data formats (.MEM, .REC, .RMS, .POW) / Maximum loadable file size: Maximum file size that can be saved by a given device (file size may be limited depending on the computer configuration)</td>
</tr>
<tr>
<td>Data conversion: Conversion to CSV format, Batch conversion of multiple files, etc.</td>
</tr>
<tr>
<td>Printing: Print function: Printing image file output (expanded META type, &quot;EMF&quot;)</td>
</tr>
<tr>
<td>Print formatting: 1 up, 2-to-16 up, 2-to-16 rows, X-Y 1-to-4 up, preview, hard copy</td>
</tr>
</tbody>
</table>

9333 Brief Specifications

<table>
<thead>
<tr>
<th>Functions</th>
</tr>
</thead>
<tbody>
<tr>
<td>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).</td>
</tr>
<tr>
<td>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.</td>
</tr>
<tr>
<td>Waveform display: Simple display of waveform files, conversion to CSV format, etc.</td>
</tr>
</tbody>
</table>
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>50 ms/div</td>
<td>1 h 6 min 40 s</td>
<td>Display only</td>
<td></td>
</tr>
<tr>
<td>1 s/div</td>
<td>2 h 46 min 40 s</td>
<td>24 min 46 s</td>
<td></td>
</tr>
<tr>
<td>2 s/div</td>
<td>5 h 33 min 20 s</td>
<td>49 min 30 s</td>
<td></td>
</tr>
<tr>
<td>10 s/div</td>
<td>11 h 6 min 40 s</td>
<td>1 h 39 min 00 s</td>
<td></td>
</tr>
<tr>
<td>30 s/div</td>
<td>1 d 3 h 46 min 40 s</td>
<td>4 h 7 min 30 s</td>
<td></td>
</tr>
<tr>
<td>50 s/div</td>
<td>2 d 7 h 33 min 20 s</td>
<td>8 h 15 min 00 s</td>
<td></td>
</tr>
<tr>
<td>100 s/div</td>
<td>6 d 22 h 40 min 00 s</td>
<td>24 h 45 min 00 s</td>
<td></td>
</tr>
<tr>
<td>1 min/div</td>
<td>11 d 13 h 46 min 40 s</td>
<td>1 d 17 h 15 min 00 s</td>
<td></td>
</tr>
<tr>
<td>2 min/div</td>
<td>23 d 3 h 33 min 20 s</td>
<td>3 d 10 h 30 min 00 s</td>
<td></td>
</tr>
<tr>
<td>5 min/div</td>
<td>13 d 21 h 20 min 00 s</td>
<td>2 d 1 h 30 min 00 s</td>
<td></td>
</tr>
<tr>
<td>10 min/div</td>
<td>27 d 18 h 40 min 00 s</td>
<td>4 d 3 h 00 min 00 s</td>
<td></td>
</tr>
<tr>
<td>30 min/div</td>
<td>69 d 10 h 40 min 00 s</td>
<td>10 d 7 h 30 min 00 s</td>
<td></td>
</tr>
<tr>
<td>1 h/div</td>
<td>416 d 16 h 00 min 00 s</td>
<td>61 d 21 h 00 min 00 s</td>
<td></td>
</tr>
<tr>
<td></td>
<td>833 d 8 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.

HMR Terminal (iPad App for MEMORY HiCORDER)

Free app (exclusively for iPad) downloadable from the App Store
- Easy waveform operation on iPad
- Fingertip operation of Max. 32 channels of waveform data
- Operate MEMORY HiCORDER via network, change settings, and monitor waveforms during measurement
  * New function in Ver 2.0

HMR Terminal Brief Specifications

- Operating environment: OS on the iPad (Apple Inc.)
- Supported OS:
  - iOS
  - Android

- Functions:
  - 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 monitor
  - Meter setting
  * Logic waveforms and computational waveforms are not supported.

Waveform Viewer Wv (Bundled software)

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

Waveform Viewer (Wv) Brief Specifications

- Supported OS: Windows 8/7 (32/64-bit), Vista (32-bit), XP, 2000

- Functions:
  - Simple display of waveform files
  - Convert binary data files to text format, CSV, etc.
  - Scroll function, enlarge/reduce display, jump to cursor/trigger position, etc.
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’
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

**Memory Specifications (High-speed recording)**

**Time axis**
- 3 ps to 5 min/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 1/200 000 in 16 stages

**Sampling period**
- 1/100 of time axis range (minimum 50 ns period)

**Recording length**
- MR8847-51: 16 ch: mode: 25 to 2 000 000 div, 2 ch mode: 25 to 2 000 000 div (built-in presets) or arbitrary setting in 1-div steps (max. 520 000 div)
- MR8847-52: 16 ch: mode: 25 to 100 000 div, 2 ch mode: 25 to 1 000 000 div (built-in presets) or arbitrary setting in 1-div steps (max. 1 200 000 div)

**Pre-trigger**
- Record data from before the trigger point at 0 to +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, time to maximum value, minimum value, time 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, exponentiation, common logarithm, square root, moving average, differentiation (primary, secondary), integration (primary, secondary), parallel displacement alignment, how waveform functions, reverse trigonometric functions, calculation results

### RECORDE (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**
- 1/100 000 ps, 1/10 000 ps (selectable from 1/100 or less of time axis)

**Real-time processing**
- 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. 20 000 div)
- MR8847-52: Built-in presets of 25 to 5 000 div, or "Continuous" or arbitrary setting in 1-div steps (max. 5 000 div)
- MR8847-53: Built-in presets of 25 to 100 000 div, or "Continuous" or arbitrary setting in 1-div steps (max. 100 000 div)

**Additional recording**
- Supported (recording is resumed without overwriting previous data)

**Wavespace memory**
- MR8847-51: Store data for most recent 20 000 div in memory
- MR8847-52: Store data for most recent 80 000 div in memory
- MR8847-53: Store data for most recent 160 000 div in memory
- * Backward scolling 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

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

**Sampling period**
- 1/100 000 ms (dot), 1/10 000 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

**Wavespace 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

<table>
<thead>
<tr>
<th>Trigger mode</th>
<th>Trigger source</th>
<th>Trigger types</th>
<th>Level setting resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation cannot be guaranteed for extended recording periods one year or longer. The above table represents theoretical values.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CHI 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</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level: Triggering occurs when preset voltage level is crossed (upwards or downwards)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Voltage drop: Triggering occurs when voltage drops below peak voltage setting (for 50/60 Hz commercial power supply only)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Window</strong>: Triggering occurs when window defined by upper and lower limit is entered or exited</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Period: Rising edge or falling edge cycle of preset voltage value is measured and triggering occurs when defined cycle range is exceeded</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glitch: Triggering occurs when pulse width from rising or falling edge of preset voltage edge is under run</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Event setting: Event count is performed for each source, and triggering occurs when a preset count is exceeded</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Logic: 1, 0, or ×, Pattern setting</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Trigger filter</th>
<th>Trigger output</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selectable 0.1 div to 10.0 div, or OFF (high-speed recording) ON (10 ms off) or OFF (at Recorder function)</td>
<td></td>
</tr>
<tr>
<td>Trigger priority (OFF/ON), Pre-trigger function for capturing data from before or after trigger event (at MEMORY function), Level display during trigger standby, Start and stop trigger (at Recorder function), Trigger search function</td>
<td></td>
</tr>
</tbody>
</table>

### Other

#### Waveform judgment function

- (In MEMORY or FFT function)
- Storage waveform, Linear spectrum, RMS spectrum, Power spectrum, Density of power spectrum, Cross spectrum, Auto-correlation function, Histogram, Transfer function, Cross-correlation function, Impulse response, Coherence function, 1/1 Octave analysis, 1/3 Octave analysis, LPC analysis, Phase spectrum

<table>
<thead>
<tr>
<th>Analysis mode</th>
<th>Analysis channels</th>
<th>Frequency range</th>
<th>Number of sampling points</th>
<th>Window functions</th>
<th>Display format</th>
<th>Averaging function</th>
<th>Print functions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selectable from all analog input channels</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>133 mHz to 8 MHz, External (resolution 1/400, 1/800, 1/2000, 1/4000)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1000, 2000, 5000, 10 000 points</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rectangular, Hanning, Hamming, Blackman, Blackman-Harris, Flat-top, Exponential</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single, Dual, Nyquist, Running spectrum</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time axis / frequency axis simple averaging, Exponential averaging, Peak hold (frequency axis), Averaging times: 2 times to 10000 times</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Same as the MEMORY function (partial print not available)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### FFT function

#### Measurement Indices

**Input units sold separately**

<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>Voltage</td>
<td>ANALOG UNIT 8966</td>
<td>100 mV to 400 V</td>
<td>50 μV</td>
</tr>
<tr>
<td>High RESOLUTION UNIT 8967</td>
<td>100 mV to 400 V</td>
<td>3.125 μV</td>
<td></td>
</tr>
<tr>
<td>DCRM UNIT 8972</td>
<td>100 mV to 400 V</td>
<td>50 μV</td>
<td></td>
</tr>
<tr>
<td>High-Voltage UNIT 8974</td>
<td>4 V to 1000 V</td>
<td>4 mV</td>
<td></td>
</tr>
<tr>
<td>Current</td>
<td>CURRENT UNIT 8971 + optional current sensor</td>
<td>20 A.f.s. or larger When driving current sensors with separate power supply measurement can be conducted with voltage input unit.</td>
<td>1 mA or larger</td>
</tr>
<tr>
<td>RMS-AC voltage</td>
<td>DC/AC UNIT 8972</td>
<td>400 mV to 400 V</td>
<td>50 μV</td>
</tr>
<tr>
<td>Temperature (thermocouple)</td>
<td>TEMP UNIT 8967</td>
<td>200°C to 390°C</td>
<td>0.01°C</td>
</tr>
<tr>
<td>Frequency, Hz</td>
<td>FREQUENCY UNIT 8970</td>
<td>30 Hz to 1000 Hz (f.s.)</td>
<td>0.01 Hz</td>
</tr>
<tr>
<td>Power frequency</td>
<td>FREQUENCY UNIT 8970</td>
<td>400 Hz to 60 Hz, 50 Hz to 70 Hz, 330 Hz to 410 Hz</td>
<td>0.01 Hz</td>
</tr>
<tr>
<td>Power measurement</td>
<td>FREQUENCY UNIT 8970</td>
<td>4000 counts to 20 M counts</td>
<td>1 count</td>
</tr>
<tr>
<td>Pulse duty cycle</td>
<td>Pulse duty cycle</td>
<td>100% to 99%</td>
<td>0.01%</td>
</tr>
<tr>
<td>Pulse width</td>
<td>Pulse width</td>
<td>0.01 s to 2 s</td>
<td>1 μs</td>
</tr>
<tr>
<td>Vibration</td>
<td>VIBRATION UNIT 8969</td>
<td>400 μe to 20000 μe</td>
<td>0.016 μe</td>
</tr>
<tr>
<td>Acoustic level</td>
<td>LOGIC UNIT 8973</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

**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.

### Maximum Internal Memory Recording Time (MEMORY Function)

<table>
<thead>
<tr>
<th>Model</th>
<th>Time axis Sampling</th>
<th>Analog 16 ch (vascular input ranges)</th>
<th>Analog 2 ch (vascular input ranges)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MR8847-51 (64 MW)</td>
<td>400 divisions</td>
<td>3200 divisions</td>
<td>3200 divisions</td>
</tr>
<tr>
<td>MR8847-52 (256 MW)</td>
<td>2000 divisions</td>
<td>16000 divisions</td>
<td>4000 divisions</td>
</tr>
<tr>
<td>MR8847-53 (512 MW)</td>
<td>1000 divisions</td>
<td>8000 divisions</td>
<td>2000 divisions</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.
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**

- **Accuracy:** as stated in the table below. Adjustment accuracy guaranteed for 1 year. Post-adjustment accuracy guaranteed for 1 year.
- **Input terminals:** isolated BNC connector: input impedance 1 MΩ, input capacitance 30 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 1 kHz (minimum pulse width 2 µs), 1 Hz to 2 kHz (full scale = 20 div), 7 settings Accuracy: ±0.1 % f.s. (including 1 kHz), ±0.5 % f.s. (at 2 kHz)
- **Power frequency mode:** Range: 50 Hz (40 to 60 Hz), 60 Hz (50 to 70 Hz), 400 Hz (400 to 400 Hz) accuracy: ±0.03 Hz (40 Hz, ±0.1 Hz/400 Hz range)
- **Duty ratio mode:** Range: Between 10 Hz to 1 kHz (minimum pulse width 2 µs), 3% (50 Hz to 800 Hz, 1% (10 kHz to 10 kHz) Accuracy: ±0.1 % f.s.
- **Pulse width mode:** Range: Between 2 µs to 2 ms, 500 µs to 100 m (full scale = 20 div), Accuracy: ±0.01 % f.s. (with 5 Hz filter ON)
- **Input voltage range and threshold level:** ±10 to ±800 V, 6 settings, selectable threshold level at each range
- **Other functions:** Sleep, Level, Hold, Smoothing, Low-pass filter, Switchable DC input coupling, Frequency division, Integration-over-range key/return

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 8971)

**CURRENT UNIT 8971**

- **Number of channels:** 2, Current measurement with optional current sensor.
- **Input terminals:** Current sensor (input impedance: 1 MΩ, exclusive connector for current sensor via conversion cable the 9105, common GND with recorder)
- **Compatible current sensors:** CT6841, 4418, 4414, 4384, 5225-02 (To connect the 8971 via conversion cable the 9105)
- **Measurement range:** Using 9272-10 (10 A), CT441: 100 mA to 5 A (div. = 20 A, 6 settings)
- **Accuracy:** ±0.05 % f.s. (with 5 Hz filter ON)
- **RMS measurement:** Accuracy: ±1 % f.s. (DC, 30 Hz to 1 kHz, ±1 % f.s. (1 kHz to 10 kHz) RMS response time: 30 ms (time from 0% to 90% of full scale), Crystal factor: 2
- **Frequency characteristics:** DC to 100 kHz, 1 Hz/div to 10 MHz/div. (with AC coupling: 10 Hz to 10 MHz/div) Accuracy: ±0.1 % f.s.
- **Measurement resolution:** ±100 of range (using 5 Hz filter ON)

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**

- **Number of channels:** 2, for voltage measurement, DC/RMS selectable
- **Input terminals:** Isolated BNC connector: input impedance 1 MΩ, input capacitance 30 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)
- **Range:** Full scale: 20 div, AC voltage for possible measurement/display using the memory function: 280 V rms, Low-pass filter: 5/50/500 Hz, 150 Hz, 400 Hz
- **Accuracy:** ±0.15 % f.s.
- **RMS measurement:** Accuracy: ±1 % f.s. (30 Hz to 1 kHz, ±0.5 % f.s. (1 kHz to 10 kHz) RMS response time: 30 ms (time from 0% to 90% of full scale), Crest factor: 2
- **Frequency characteristics:** DC to 20 kHz, 1 Hz/div to 10 kHz/div. (with AC coupling: 5 Hz to 100 kHz/div) Accuracy: ±0.1 % f.s.
- **Measurement resolution:** ±0.5% of full scale (with filter 5 Hz, zero position accuracy included)

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

**LOGIC UNIT 8973**

- **Number of channels:** 16 channels (4-ch.) probe connector + 4 connectors
- **Input terminals:** Mini DIN connector (for HIOKI logic probes only), Compatiable logic probes: 9320-01, 9321-01, 9322-01

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. 250 g (8.8 oz)

Accessories: None
### DIGITAL VOLTMETER UNIT MR8990

**Measurement functions**
- Number of channels: 2, for DC voltage measurement
- Output terminals: Banana input/output connectors (Input resistance: 100 MΩ or higher with 100 pF max. to 100 V range, otherwise 10 MΩ)
- Max. rated voltage to ground: 500 V AC or DC (with isolated input)
- Max. voltage that can be applied between input channels and chassis, and between input channels without damage

**Measurement range**
- 100 mV, ±100 mV/div (100 V/div), 50 V/div, 5 ranges, full scale: 20 div

**Integration time**
- 20 μs ±1% (10 Hz), 16 μs ±1% (10 kHz)

**Response time**
- 2 s ±2% (Integration time, 10 Hz), 1 s ±1% (Integration time, 10 kHz)

**Basic measurement accuracy**
- ±0.0% ±2% (of full scale at 100 mV)

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

Note: Cannot use with 8847 or MR8847

### HIGH-VOLTAGE UNIT U8974

**Measurement functions**
- Number of channels: 2, for voltage measurement, DC/ RMS selectable
- Maximum rated voltage to ground: 1000 V AC or DC (CAT III), 600 V AC or DC (CAT II)
- Input terminals: Banana input/output connectors
- Measurement resolution: 1500 of measurement range (using 16-bit A/D conversion)
- Maximum sampling rate: 1 MS/s
- RMS measurement accuracy: ±0.2% +0.2% (with filter 5 Hz, zero position accuracy included)
- Frequency characteristics: DC to 100 kHz -3 dB
- Input coupling: DC - GND
- Maximum input voltage: 1000 V DC, 700 V AC

Note: Cannot use with 8847 or MR8847

### ARBITRARY WAVEFORM GENERATOR UNIT U8793

**Measurement functions**
- Number of channels: 2, SMB terminal (Input impedance: 1 kΩ or less)
- Maximum rated voltage to ground: 33 V AC or DC
- Measurement range:
  - 20 V to ±15 V (Amplitude setting range: 0 V to 20 V p-p, Setting range: 1 mV)
- Max. output current:
  - 10 mA (Allowable load current: 1.5 kΩ or more)
- FG function:
  - DC: Sine wave, square wave, Pulse wave, Ramp wave, Ramp up, Ramp down, Train, Train up, Train down
- Arbitrary waveform generator mode:
  - Waveform measured by MR8847A, etc., generated by Hioki Model 7075 or SF8000, CSV waveform
  - D/A refresh rate: 2 MHz (using 16-bit D/A)
  - Waveforms measured by MR8847, etc., generated by Hioki Model 7075 or SF8000, CSV waveform

**Program function**
- Max. 100 steps (Number of loops for each step, Number of total loops)
- Other: Self-test function (Voltage, Current)

Note: Cannot use with 8847 or MR8847

### WAVEFORM GENERATOR UNIT MR8790

**Measurement functions**
- Number of channels: 4, SMB terminal (Input impedance: 1 kΩ or less)
- Maximum rated voltage to ground: 33 V AC or DC
- Measurement range:
  - 20 V to ±10 V (Amplitude setting range: 0 V to 20 V p-p, Setting range: 1 mV)
- Max. output current:
  - 5 mA
- Output function:
  - DC: Sine wave, square wave, Output frequency range: 0 Hz to 20 kHz
- Accuracy:
  - Amplitude accuracy: ±0.0% ±2% (setting 2 mV, 1 p-p) (1 Hz to 10 kHz)
  - Offset accuracy: ±3 mV
- DC output accuracy: ±5 mV
  - Other: Self-test function (Voltage, Current)

Note: Cannot use with 8847 or MR8847

### PULSE GENERATOR UNIT MR8791

**Measurement functions**
- Number of channels: 8, Connectors: D-sub, half pitch, 50-pin
- Maximum rated voltage to ground: 33 V AC or DC (between unit and output channels)
- Logic output: Open collector output
- Output mode 1:
  - Pattern output: 10-level output: 0 to 120 kHz, 2048 logic patterns
  - Pulse output: Frequency 0 Hz to 20 kHz, Duty: 0% to 99%

**Output mode 2:
- Other: Self-test function**

Note: Cannot use with 8847 or MR8847

---

**DIFFERENTIAL PROBE P9500**

**Measurement modes**
- P9000-01: For waveform monitor output, Frequency characteristics: DC to 100 kHz 3 dB
- P9000-02: Switches between waveform monitor output/AC effective value output and AC peak value characteristics: DC to 10 kHz 5 dB, RMS mode frequency characteristics: 30 Hz to 10 kHz, Response time: Rise 500 ms, Fall 600 ms

**Output (L) detection**
- 10.5% (L = 10 V, Division ratio 100), (L = 3.3 V, Division ratio 100)

**Effective value**
- ±1% (For 10 Hz to less than 1 kHz, sine wave), ±3% (For 1 kHz to 10 kHz, sine wave)

**Input resistance capacity**
- H-L: 10.5 MΩ, 5 pF or less (At 100 kHz)

**Maximum input voltage**
- 1000 V AC, DC

**Maximum rated current to ground**
- 1000 V AC, DC (CAT III)

**Operating temperature range**
- 40°C to 85°C (4°F to 185°F)

**Power supply**
- (1) AC adapter Z200 (100 to 240 V AC, 50/60 Hz), 5 VA (excluding AC adapter), 4.5 V output
  - (2) USB bus power (5 V DC, USB micro-B connector), 0.8 VA
  - (3) External power source 2.7 V to 15 V DC, 1.5A

**Accessories**
- Instruction manual, Adapter clip x2, Carrying case x1

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**DIFFERENTIAL PROBE 9322**

**Measurement modes**
- For high-voltage floating measurement, power line surge noise detection, RMS rectified output measurement

**Input**
- DC mode: For waveform monitor output, Frequency characteristics: DC to 10 MHz (±3 dB), Amplitude accuracy: ±1% of full scale (at max. 1000 V DC), ±3% of full scale (at max. 2000 V DC) (full scale: 2000 VDC)
- AC mode: For detection of power line surge noise, Frequency characteristics: 1 kHz to 10 MHz ±1% of full scale

**RSMS mode**
- DC/Voltage RMS measurement output, Frequency characteristics: DC, 40 Hz to 10 kHz, Response speed: 200 ms or less (for 1000 V DC), Accuracy: ±1% of full scale (for DC, 40 Hz to 1 kHz), ±3% of full scale (for 100 Hz to 10 kHz)

**Input**
- Input type: balanced differential input, Input impedance/capacitance: H-L: 9.5 MHz (10 MHz), L-H: 0.5 MHz (10 MHz, 10 kHz)

**Input resistance capacity**
- ±10.5 MΩ, 5 pF or less (At 100 kHz)

**Maximum input voltage**
- 2000 V DC, 1000 V AC (CAT I), 600 V AC or DC (CAT III)

**Output**
- Voltage divider for 1/1000 of input, BNC connectors (output switchable for 3 modes: DC, AC, RMS)

**Power supply**
- Any of the following:

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**LOGIC PROBE 9320-01/9327**

**Measurement modes**
- Detection of voltage signal or relay contact signal for High/Low state recording

**Input**
- 4 channels (common ground between unit and channels), digital input/output, switchable (contact input can detect digital-output signals)

**Contact input**
- 4 channels (digital input/output, switchable)

**Contact input resistance capacity**
- 1 MΩ (with digital input, 0 to +5 V)
- 500 kΩ or more (with digital input, ±5 V)

**Digital input threshold**
- 2.4 V, 4.9 V

**Contact input detection**
- 1.6 V: 1.5 kΩ or higher (input) and 500 kΩ or less (input)
- 2.5 V: 1.5 kΩ or higher (input) and 1.5 kΩ or less (input)
- 6.0 V: 25 kΩ or higher (input) and 8 kΩ or lower (short)

**Response speed**
- 9320-01: 500 ns or less, 9327: detectable pulse width 100 ns or higher

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

**Digital input threshold**
- 3.8 V

**Contact input detection**
- 4 channels (output range: 0 to ±50 V)

**Maximum input voltage**
- 500 V AC (HIGH range), 150 V AC (LOW range) (the maximum voltage that can be applied across input pins without damage)
System Chart of Options

**Model:** MEMORY HiCORDER MR8847A

**Model Name** (Order Code) (Note)
- MR8847-51 (64MW memory, main unit only)
- MR8847-52 (256MW memory, main unit only)
- MR8847-53 (512MW memory, main unit only)

*Cannot operate alone, You must install other options*

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### Power supply unit

- DC POWER UNIT 9764
  - Dimensions: 390 mm (15.35 in) W × 29 mm (1.14 in) H × 219.5 mm (8.64 in) D
  - Mass: 1.2 kg (4.23 oz)
  - Specified upon factory shipping, built-in on back of unit, 10 V to 28 V DC

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### Storage Devices and Media

- SSD UNIT 98331
  - Specified upon order; built-in type, 128 GB

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

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### PC Software

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

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

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

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

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### Printer options

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

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### Case

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

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### Input modules

* Input cords not included. Please purchase them separately.

- ANALOG UNIT 9866
  - 2 ch, Voltage input, DC to 5 MHz bandwidth

- TEMP UNIT 9867
  - 2 ch, thermocouple temperature input

- HIGH RESOLUTION UNIT 9868
  - 2 ch, Voltage input, DC to 100 kHz bandwidth

- STRAIN UNIT 9869
  - 2 ch, strain gauge type converter amp

- Conversion Cable 9769
  - For and bundled with the strain unit

- FREQ UNIT 9870
  - 2 ch, for measurement of frequency, RPM, pulse, etc.

- CURRENT UNIT 9871
  - 2 ch, for measuring current using dedicated current sensors, bundled two Conversion cable 9318
  - Max. up to four modules of the Current unit 9871

- DC/AC UNIT 9872
  - 2 ch, Voltage/DC to 400 kHz, RMS rectifier, DC and 30 to 100 kHz bandwidth

- LOGIC UNIT 9873
  - 4 terminals, 16 ch
  - Max. 3 modules can be installed in the MR8847A

- DIGITAL VOLTMETER UNIT 98990
  - 2 ch, high-precision DC V, 0.1μV resolution, maximum sampling rate 500 times/s

- HIGH-VOLTAGE UNIT 98974
  - 2 ch, voltage input, max. 1000 V DC and 700 V AC

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### Output modules

* Input cords not included. Please purchase separately.

- WAVEFORM GENERATOR UNIT 98790
  - 4 ch, DC Output: ±10 V
  - Sine wave output: 10 mHz to 20 kHz

- PULSE GENERATOR UNIT 98791
  - 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

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### Output cable

* Please contact your local HIOKI distributor for connectors that support Model MR8793.

- CONNECTION CABLE 97930-01
  - Maximum rated voltage to ground: 33 V AC/DC, SMB terminal - alligator clip, Cord length: 1.5 m (4.92 ft)

- CONNECTION CABLE 97935-02
  - Maximum rated voltage to ground: 33 V AC/DC, SMB terminal - BNC terminal, Cord length: 1.5 m (4.92 ft)

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### Logic signal measurement

- LOGIC PROBE 9327
  - 4-channel type, for voltage/contact signal

- LOGIC PROBE MR9321-01
  - 4 isolated channels, ON/OFF detection (response pulse width 100 ns or more, miniature terminal type)

- LOGIC PROBE 93230-01
  - 4-channel type, for voltage/contact signal

- CONVERSION CABLE 9323
  - Used for connecting the 93230/9321/MR9321 and the 9304 to the Memory HiCorder with small logic terminal models

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Note: Main unit MR8847A cannot operate alone. You must install one or more optional input modules in the unit.
**INPUT CORD (A)**
- Voltage is limited to the specifications of the input modules in use.
- CONNECION CORD L9790
  - Flexible 4.1 mm (0.16 in) dia. cable allowing for up to 600 V input, 1.8 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 I 300 V. Red/black set.
- CONTACT PIN L9790-03
  - 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.
- CONNECION CORD L9198
  - ø 5.0 mm (0.20 in) dia. cable allowing for up to 600 V input, 1.8 m (5.91 ft) length. Thenlal alligator clips are bundled.
- GRABBER CLIP L9343
  - Attaches to the tip of the banana plug cable, CAT III 196 mm (7.72 in) length

**INPUT CORD (C)**
- Voltage is limited to the specifications of the input modules in use.
- CONNECION CORD L9197
  - ø 5.0 mm (0.20 in) dia. cable allowing for up to 600 V input, 1.8 m (5.91 ft) length. Detachable large alligator clips are bundled.

**INPUT CORD (D)**
- Voltage is limited to the specifications of the input modules in use.
- DIFFERENTIAL PROBE PB900-01
  - (Wave Only) For Memory Hicorder, 1 kV AC, DC, Frequency band: 10 MHz
- DIFFERENTIAL PROBE PB900-02
  - (Switch between Wave/WMS) For Memory Hicorder, 1 kV AC, DC, Frequency band: 100 kHz
- AC ADAPTER Z1008
  - 100 to 240 V AC

**INPUT CORD (E)**
- Voltage is limited to the specifications of the input modules in use.
- 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 product’s specifications, and is not affected by connected voltage above ground of an isolated input. Max. rated voltage 1 kV rms (up to 500 kHz), 1.5 m (4.92 ft) length
- **Connection Cable L4940**
  - Banana plug - banana plug, Cord length: 1.5 m (4.92 ft)
- **Extension Cable L4931**
  - Extends 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 II 600 V
- **Magnetic Adapter L4837**
  - Attach to the tip of banana plug cables, CAT III 1000 V
- **Grabber Clip L9343**
  - Attaches to the tip of banana plug cables, red/black set, full length: 196 mm (7.72 in), CAT II 1000 V

**Other options for Input**
- **Connection Cable L9217**
  - Cord has insulated BNC connectors at both ends, signal output 0.2 VAC f.s.
- **Conversion Cable 9318**
  - For connecting CT6844/43 and similar probes to 9970/50.

**Temperature Sensor**
- **Thermocouple**
  - For reference only. Please purchase locally.
Example sets

Anomaly simulation testing
Output measured anomalous waveforms and processed arbitrary waveforms at max. 15 V, and record the results without modification.

- **Set example**
  - **MEMORY HiCORDER**: MR8847-51 1 unit
  - **ARBITRARY WAVEFORM GENERATOR UNIT**: U8793 4
  - **ANALOG UNIT**: 8971 4
  - **CONNECTON CABLE**: L9195-01 8
  - **CONNECTON CORD**: L9198 8

- **Generate**
  - Reproduce anomalous waveforms
  - Record results while testing

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

- **Allows test ECUs, inverters and motors. **

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.

- **Set example**
  - **MEMORY HiCORDER**: MR8847-51 1 unit
  - **HIGH-VOLTAGE UNIT**: U8974 2
  - **CURRENT UNIT**: 8971 2
  - **CLAMP ON SENSOR**: 9272-10 3
  - **CONNECTION CABLE**: L4940 3
  - **ALLIGATOR CLIP**: L4935 3

- **No DIFFERENTIAL PROBE needed for direct high-voltage measurements**
  - Perform direct measurement of up to 1000 V DC and 700 V AC for high-voltage power equipment as well as 380 V and 480 V systems used globally.

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

- **Set example**
  - **MEMORY HiCORDER**: MR8847-51 1 unit
  - **ANALOG UNIT**: 8966 1
  - **CONNECTION CORD**: L9197 1
  - **High-speed camera**: — 1 unit

- **Simultaneous measurement of all waveforms**
  - Test ECUs, inverters and motors.

- **Visualize prototype evaluations and problem analyses together with measurement data.**
  - Easily visualize the relationship between various factors through the simultaneous measurement of data such as multi-system voltage, current and vibration together with high-speed camera recording.

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