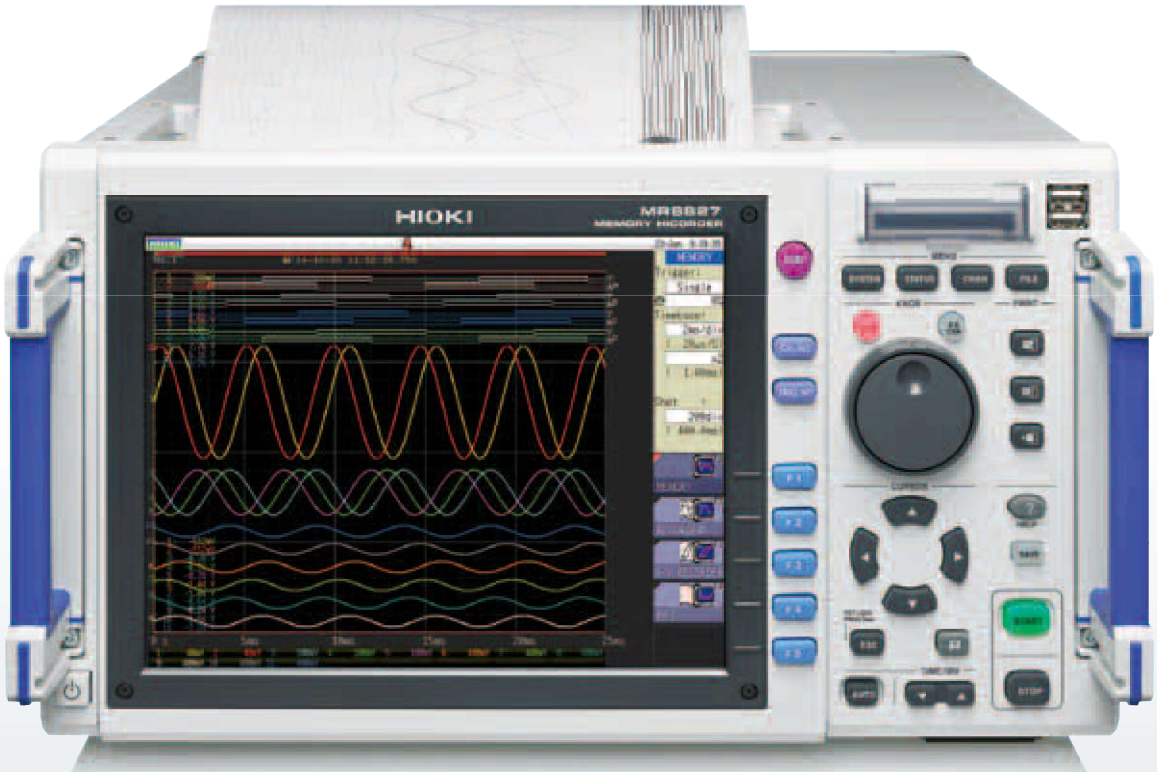
HIOKI

distrame
instruments de mesures électroniques

MEMORY HiCORDER MR8827



64 ch
High-speed
Isolated testing

32 analog channels + 32 logic channels

The Memory HiCorder MR8827 achieves isolated input between the main unit and channel or between channels, at a maximum sampling speed of 20 MS/s on all channels.
It provides mixed recording that combines 32 analog channels and 32 logic channels, and logic input can be expanded up to 64 channels.
Welcome to the next generation of Hioki Memory HiCorders that deliver multi-channel waveform recording of a diverse array of signals to meet complex and demanding applications.

CE 3year Guarantee

*When using 64 logic channels, 28 analog channels are available.

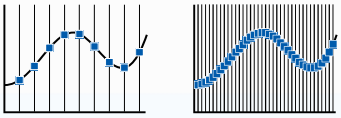
MR8827 - Evolving to the Next Stage of High-Speed Waveform Recording

The high-performance 8826 delivered the most analog channels out of all portable-type Memory HiCorders. The new MEMORY HiCORDER MR8827 inherits that concept and evolves even further.

20x Sampling Speed

A/D converter integrated in the input amp

1MS/s ▶ 20MS/s



The sampling speed (for all channels simultaneously) increased by 20 times, while maintaining isolated input.

2x Logic Input Channels

Logic Unit 8973

32ch ▶ 64ch

A maximum of 8 logic probes can be inserted in the main unit. Use of 2 Logic Unit 8973 will add 8 more connections, supporting 64 channel logic signal input. (This reduces the number of available analog channels to 28.)

8x Internal Memory Capacity

64MW ▶ 512MW

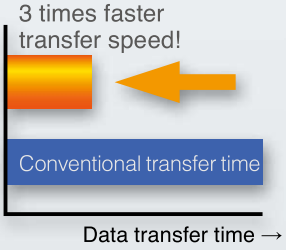
With 8 times more internal memory capacity from 64 MW to 512 MW, you can now record signals of fast events easily and for extended periods of time.

Storage Devices and Media

USB Memory/CF Card
SSD (Solid State Drive)

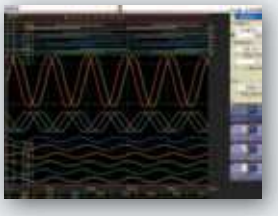
Use various storage devices and media with more capacity and faster writing speeds than conventional drives or PC cards. The optional internal SSD has 128 GB of capacity so you can store large amounts of data.

3x PC Transfer Speed



Transferring speed of stored data from internal memory or SSD to the PC has greatly increased.

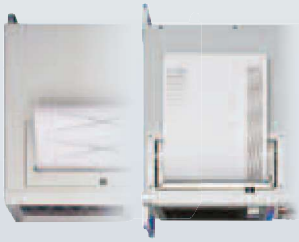
LCD Resolution



10.4 inch TFT 10.4 inch SVGA
640×480 ▶ 800×600

Overlapping waveforms are easier to identify now with a new high resolution LCD.

2x Paper Feeding Speed



25mm/sec ▶ 50mm/sec

Use of a high-speed thermal printer gives you 2 times the printing speed.

Easy Setup of Recording Paper

No more hassles of feeding recording paper between the rubber roller and the thermal head. Just drop it in to set it up.

A4 Size Printer

Print in fine detail, with 2 times the paper feeding speed. Get a printout of enlarged waveforms on A4 size paper so you can check them easily on-site.

Scalable Input Channels

A maximum of 16 modules can be connected on the rear side. The main unit also has connectors for connecting 8 logic probes.

Isolated Input for Security

Isolation element

The MR8827 differentiates itself from typical oscilloscopes by providing complete isolation for the input of each channel, and between each channel and the main frame, enabling you to handle electrical potential differences among multiple signals without any concern.

Sampling Speed and Recording Time

Memory functions

Time axis range/div	Sampling-speed	Maximum recording length: 32 channels: 160,000 div
5 µs	50 ns	0.8 s
10 µs	100 ns	1.6 s
20 µs	200 ns	3.2 s
50 µs	500 ns	8 s
100 µs	1 µs	16 s
200 µs	2 µs	32 s
500 µs	5 µs	1 min 20 s
1 ms	10 µs	2 min 40 s
2 ms	20 µs	5 min 20 s
5 ms	50 µs	13 min 20 s
10 ms	100 µs	26 min 40 s
20 ms	200 µs	53 min 20 s
50 ms	500 µs	2 h 13 min 20 s
100 ms	1 ms	4 h 26 min 40 s
200 ms	2 ms	8 h 53 min 20 s
500 ms	5 ms	22 h 13 min 20 s
1 s	10 ms	1 d 20 h 26 min 40 s
2 s	20 ms	3 d 16 h 53 min 20 s
5 s	50 ms	9 d 6 h 13 min 20 s
10 s	100 ms	18 d 12 h 26 min 40 s
30 s	300 ms	55 d 13 h 20 min 0 s
50 s	500 ms	92 d 14 h 13 min 20 s
1 min	600 ms	111 d 2 h 40 min 0 s
100 s	1 s	185 d 4 h 26 min 40 s
2 min	1.2 s	222 d 5 h 20 min 0 s
5 min	3 s	- abbreviated -

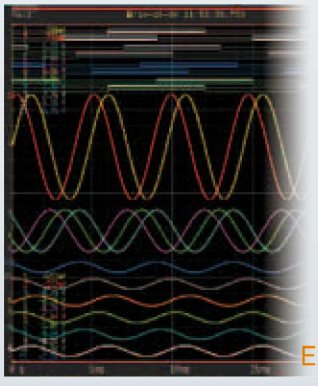
Recorder functions

Time axis range/div	Maximum recording length 80,000 div
10 ms	13 min 20 s
20 ms	26 min 40 s
50 ms	1 h 6 min 40 s
100 ms	2 h 13 min 20 s
200 ms	4 h 26 min 40 s
500 ms	11 h 6 min 40 s
1 s	22 h 13 min 20 s
2 s	1 d 20 h 26 min 40 s
5 s	4 d 15 h 6 min 40 s
10 s	9 d 6 h 13 min 20 s
30 s	27 d 18 h 40 min 0 s
50 s	46 d 7 h 6 min 40 s
1 min	55 d 13 h 20 min 0 s
100 s	92 d 14 h 13 min 20 s
2 min	111 d 2 h 40 min 0 s
5 min	277 d 18 h 40 min 0 s
10 min	- abbreviated -
30 min	- abbreviated -
1 h	- abbreviated -

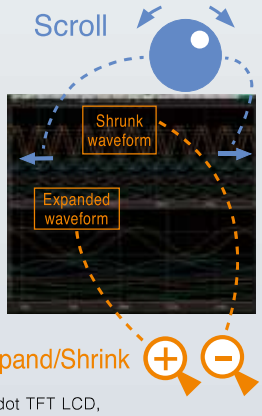
Sampling period:
1 µs, 10 µs, 1 ms, 10 ms, 100 ms

*Select within 1/100 of the time axis. Also limited by combination with the time axis setting for memory recording.

High Resolution LCD



Conventional devices used a 640×480 dot TFT LCD, but the next-generation MR8827 uses an 800×600 dot SVGA high resolution LCD to make it even easier to identify overlapping measured waveforms.

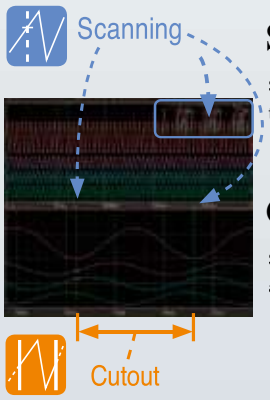


Scroll

Scroll through the waveform to check all or just part of it.

Expand / shrink

Not only can you expand or shrink the time axis or vertical axis, you can also split the screen to check the expanded waveform of the shrunk waveform.



Scanning

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

Cutout

Specify the segment to save as binary or CSV data.

Signal Input and Output

The right module 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).

UPS

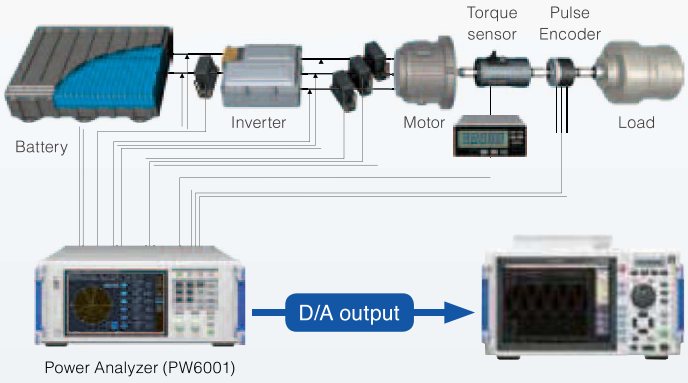
Inverter

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.



Power Analyzer (PW6001)

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.

Perfect for control testing of automobiles, high speed trains, and traditional trains

13 units to choose from

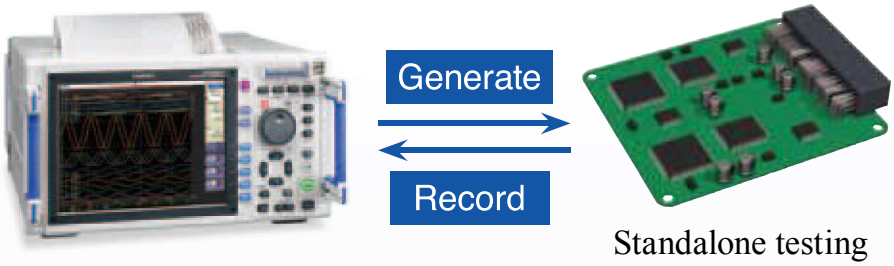
Generation	Voltage	DC voltage	Generation	Pulse	Voltage
ARBITRARY WAVEFORM GENERATOR UNIT U8793	HIGH VOLTAGE UNIT U8974	DIGITAL VOLTMETER UNIT MR8990	WAVEFORM GENERATOR UNIT MR8790	PULSE GENERATOR UNIT MR8791	ANALOG UNIT 8966
No. of channels: 2 Arbitrary waveform output	Measurement resolution: 16-bit 1/1600 of measurement range	Measurement resolution: 24-bit 1/50 000 of measurement range	No. of channels: 4 Waveform output	No. of channels: 8 Pulse output	Measurement resolution: 12-bit 20 MS/s high-speed sampling
• Output frequency range 10m Hz to 100 kHz • Max. output: 15 V	• High voltage • Commercial power supply (primary/secondary) • Power equipment characteristics testing	• Multi-channel • Minute sensor voltage • EV battery voltage	• DC output: -10 V to 10 V • Sine wave output 10 mHz to 20 kHz	• Pulse output 0.1 Hz to 20 kHz • Pattern output	• Various amps • Transducers • Sensors • Industrial meters

Abundant modules

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

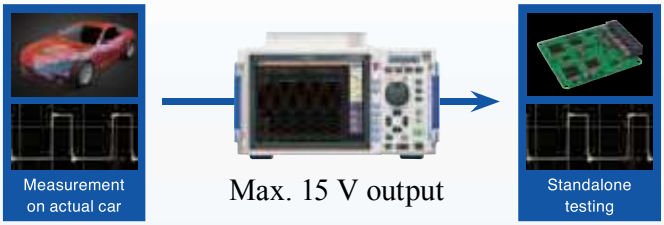
Output and record results seamlessly

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.



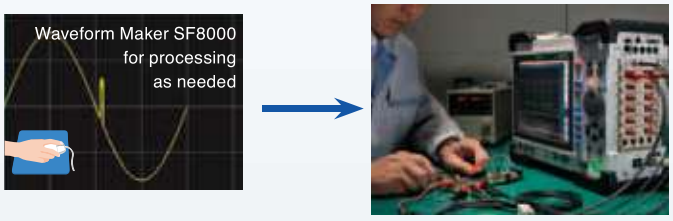
Output recorded waveforms without modification

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

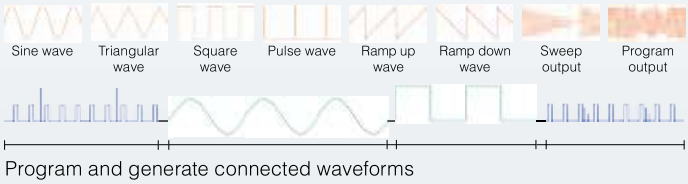
Process and calculate signals recorded with the MEMORY HiCORDER and output the arbitrary waveforms that you create.



Waveform Maker Software included

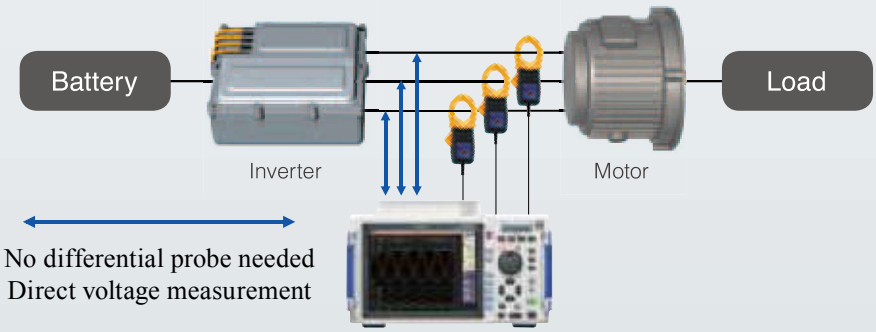
After you install the included SF8000 Waveform Maker software on your computer, you can create waveforms easily by either entering them directly or by entering the functions behind them. You can also quickly add noise and multiply waveforms.

Output waveform example



1000 V DC, 700 V AC high-voltage direct input

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.

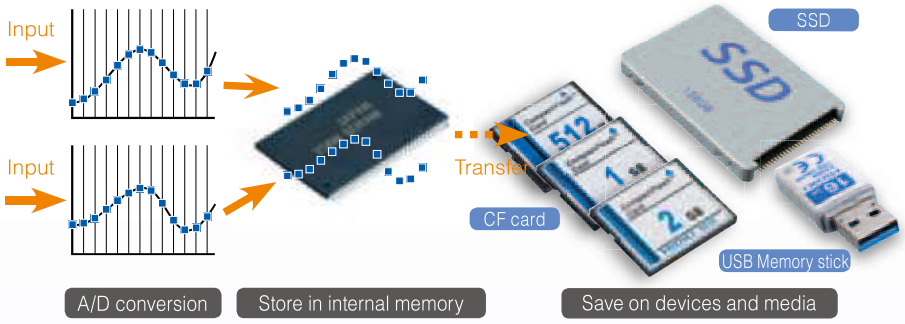


Temperature	Voltage	Distortion	Frequency, RPM	Current	Voltage	Contact
TEMP UNIT 8967	HIGH RESOLUTION UNIT 8968	STRAIN UNIT U8969	FREQ UNIT 8970	CURRENT UNIT 8971	DC/RMS UNIT 8972	LOGIC UNIT 8973
Measurement resolution: 16-bit 1/1000 of measurement range	Measurement resolution: 16-bit 1/1600 of measurement range	Measurement resolution: 16-bit 1/1250 of measurement range	Measurement resolution: 16-bit 1/2000 of measurement range	Measurement resolution: 12-bit Clamp sensor direct connection	Measurement resolution: 12-bit RMS measurement	No. of channels: 16 Observation of control signal
• 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

Data Storage

Save on devices and media

Input signals after A/D conversion stored in internal memory can be saved on the optional internal SDD, USB memory, or CF card.

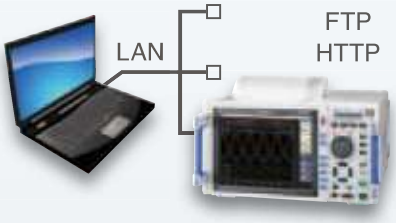


Transfer to PC

Check and analyze data saved in the internal SSD, USB memory, or CF card, by transferring it to a PC, via LAN or USB.

LAN Connection

Use the HTTP function to operate MR8827 with a browser on a PC connected via LAN. You can also use the FTP function to retrieve data from internal memory, devices or media connected to the main unit.



USB Connection

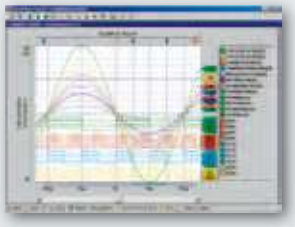
Use a PC to retrieve data saved on devices and media such as internal memory, SSD, or CF card connected to the main unit, via USB.

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 by 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

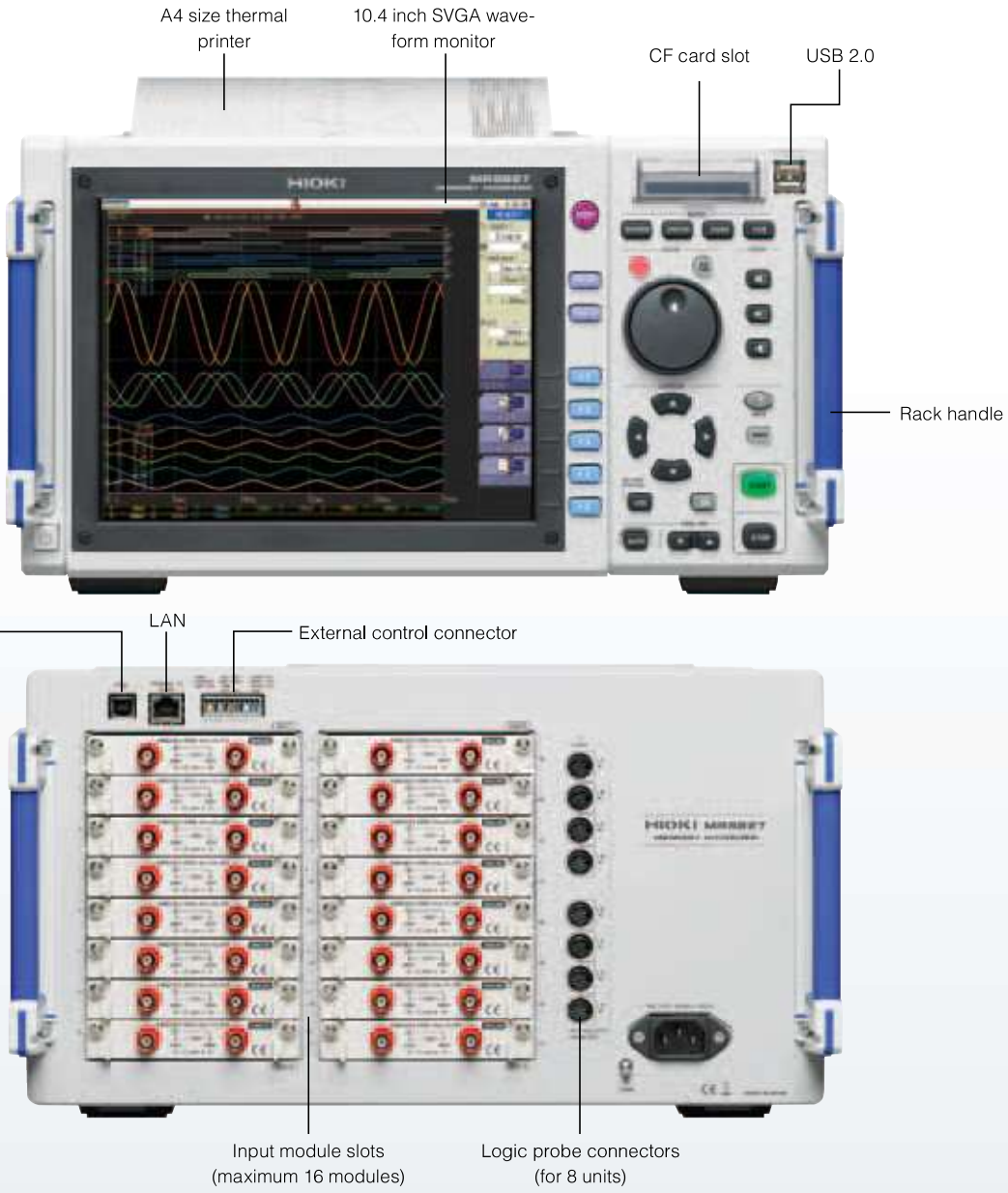
LAN COMMUNICATOR 9333

(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.



iPad App for Memory HiCorder HMR Terminal

Free app (exclusively for iPad) downloadable from the App Store

- 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.
  *New function on Ver 2.0

■ Data can view by the iPad using Hioki's dedicated apps available from the App Store. Search for "HIOKI" and download the "HMR Terminal" app.

Download on the App Store

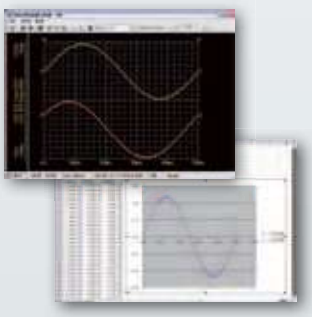
■ HMR Terminal Brief specifications (free software)

Operating environment	iOS on the iPad (Apple Inc.)
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 monitoring - Meter setting * Logic waveforms and computational waveforms are not supported.

Wave Viewer Wv

(Bundled software)

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



■ Wave Viewer (Wv) Brief Specifications

Operating environment	Windows 10/8/7 (32/64-bit)
Functions	- Simple display of waveform files - Convert binary data files to text format, CSV, etc. - Scroll function, enlarge/reduce display, jump to cursor/trig-ger position, etc.

Application

Perfect for recording a combination of analog and logic signals that require multiple channels.

Electric power

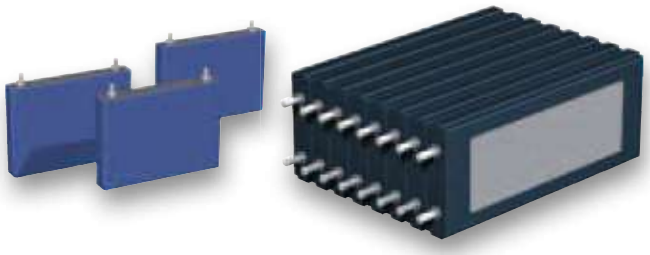
Power electronics

Transformer Interruption Tests

Interchannel isolation allows for safe circuit connections. Simultaneous high-speed sampling can record waveforms before and after the interruption, and allows you to input many control and circuit signals.

Battery Charge/Discharge Tests

Input and test the voltage of each battery cell. The MR8827 is built for up to 400 V DC input, protecting it even if high voltage is applied when there is a short-circuit.

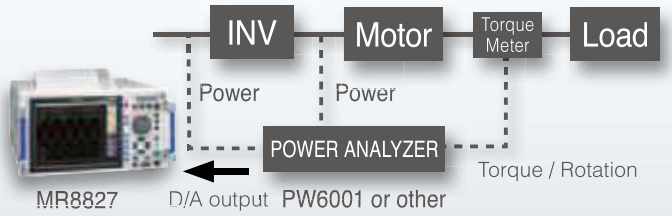


Inverter / UPS Test

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

Power Monitor and Logger

By loading the analog output for the effective value (instant power / voltage / current, etc.) calculated by the power analyzer, or by importing the waveform output from the power analyzer to MR8827, you can observe data for long-term tests or irregular waveforms.



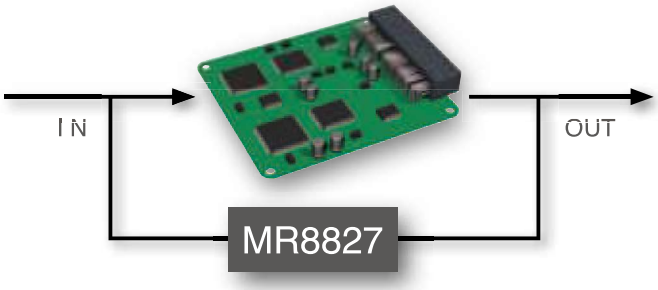
Record a diverse array of signals simultaneously

Mechatronics

Automotive

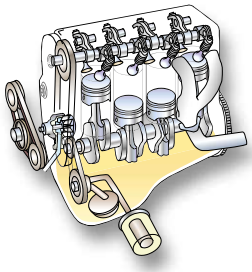
ECU Evaluation

The 32 analog channels and 32 logic channels work great for observing input and output signals of an Engine Control Unit. Over 4 hours of recording can be achieved with 1 ms sampling.



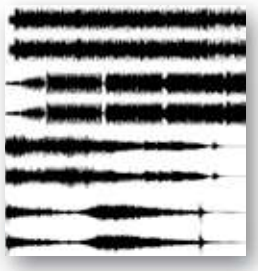
Engine Strain Measurements

Use the Strain Unit U8969 to perform strain measurements of up to 32 channels. You can use the numerical value calculation function to automatically calculate the maximum value, minimum value, and P-P value of strain waveforms.



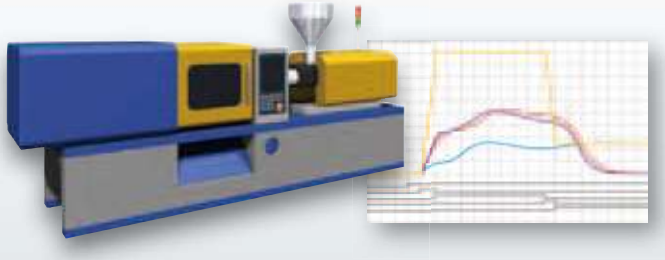
Vibration / Endurance Tests

Use the long 512MW memory to observe vibration waveforms easily (Memory function). Also, with the recorder function, you can perform long-term observation by capturing the waveform peaks while sampling at high speeds.



Injection Molder Evaluation

Along with a pneumatic pressure or valve closure, you can record the logic input from control signals. Select from a rich lineup of Hioki input units that support a wide range of sensors and converters.



Main unit Specifications

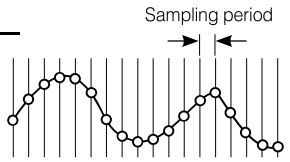
Basic specifications (Accuracy guaranteed for 1 year, Post-adjustment accuracy guaranteed for 1 year)	
Measurement functions	MEMORY (high-speed recording) RECORDER (real-time recording) X-Y RECORDER (X-Y real-time recording) FFT (frequency analysis)
Main unit OS	µ ITRON (Non-Windows OS)
Number of channels (Max.)	[16 analog input modules]: 32 analog channels + 32 logic channels (logic probe terminals standard, logic has common GND) [14 analog input modules + 2 logic input modules]: 28 analog channels + 64 logic channels (standard 32 channels + 32 channels in Logic unit 8973 ×2) * Max. up to two modules of the Logic Unit 8973, the Current Unit 8971 up to four modules
Maximum sampling rate	20 MS/second (all channels simultaneously)
Internal memory	16MW/ch (total capacity 512MW memory), 16MW/ch (using 32 analog channels), 32MW/ch (using 16 analog channels), 64MW/ch (using 8 analog channels), 128MW/ch (using 4 analog channels)
Data storage media	CF card slot (standard) ×1 (up to 2GB, FAT, or FAT-32 format), USB port ×2 (USB 2.0)
Backup battery life	Clock and parameter setting backup: at least 10 years (reference value at 25°C)
External control connectors	External trigger input, Trigger output, External sampling input, GND, Two external outputs (GO/NG output), Three external inputs (start/IN1, stop/IN2, save/IN3)
External interfaces	LAN: 100BASE-TX (DHCP, DNS supported, FTP server, HTTP server) USB: USB 2.0 compliant, series A receptacle ×1, series B receptacle ×1, (File transfer SSD/ CF card to PC, or remote control from PC)
Environmental conditions (No condensation)	Operation: 0°C to 40°C (32°F to 104°F), 20% to 80% rh Storage: -10°C to 50°C (14°F to 122°F), 90% rh or less
Standards	Safety: EN61010 EMC: EN61326, EN61000-3-2, EN61000-3-3
Power supply	AC 100 to 240 V, 50/60 Hz
Power consumption	220 VA max. (when not using the printer), 350 VA max. (when using the printer)
Dimensions and mass	401 mm (15.79 in)W × 233 mm (9.17 in)H × 388 mm (15.28 in)D, 12.6 kg (444.4 oz) (main unit only)
Supplied accessories	Instruction manual ×1, Application disk (Wave Viewer Wv, Communication commands table) ×1, Power cord ×1, Input cord label ×1, USB cable ×1, Printer paper ×1 (when equipped with a printer unit), Roll paper attachment ×2 (when equipped with a printer unit)

PRINTER UNIT U8350 (Factory-installed option)	
Features	Printer paper one-touch loading, high-speed thermal printing
Recording paper	216 mm (8.50 in) × 30 m (98.43 ft), thermal paper roll (use the 9231 paper) Recording witdh: 200 mm (7.87 in) 20 division full scale, 1 div = 10 mm (0.39 in) 80 dots
Recording speed	Max. 50 mm (1.97 in)/sec
Paper feed density	10 lines/mm
Display	
Display	10.4 inch SVGA-TFT color LCD (800 × 600 dots) (Time axis 25 div × Voltage axis 20 div, X-Y 20 div × 20 div)
Languages	English, Japanese, Korean, Chinese
Waveform display zoom/compression	Time axis: ×10 to ×2 (zoom at MEMORY function only), ×1, ×1/2 to ×1/20000, Voltage axis: ×100 to ×2, ×1, ×1/2 to ×1/10
Variable display	Upper/Lower limit set, display/div set
Scaling	10:1 to 1000:1, automatic scaling for various probes Manual scaling (conversion ratio setting, 2-point setting, unit setting)
Comment input	Alphanumeric input (title, analog and logic channels) Simple input, history input, phrase input
Logic waveform	Display point move 1 % step, Line width 3 types
Display partition	Max. eight divisions
Monitor function	• Input level monitor • Numerical value (Sampling 10kS/s fixed, refresh rate 0.5s)
Other display functions	• Waveform inversion (positive/negative) • Cursor measurement (A, B, 2-cursor, for all channels) • Vernier function (amplitude fine adjustment) • Zoom function (horizontal screen division, zoomed 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

MEMORY (high-speed recording)	
Time axis	5 µs to 5 min/div (100 samples/div) 26 ranges, External sampling (100 samples/div, or free setting), Time axis zoom: ×2 to ×10 in 3 stages, compression: 1/2 to 1/20000 in 13 stages
Sampling period	1/100 of time axis range (minimum 50 ns period)
Recording length	**Built-in presets**: (at 4, 8, 16ch mode) 25 to 20000 div, (at 4, 8 ch mode) 25 to 500000 div (at 4 ch mode) 25 to 1000000 div **Arbitrary presets**: setting in 1 div steps, Max. 1280000 div (at 4ch mode), 640000 div (at 8ch mode), 320000 div (at 16ch mode), 160000 div (at 32ch mode)
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 calculation	• 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 storing of calculation results
Waveform processing	• For up to 16 freely selectable channels, the following functions can be performed Four arithmetic operations, absolute value, exponentiation, common logarithm, square root, moving average, differentiation (primary, secondary), integration (primary, secondary), parallel displacement along time axis, trigonometric functions, reverse trigonometric functions, integration time correction for each NPLC setting, auto-saves of calculation results
Memory segmentation	• Max. 1024 blocks, sequential storage, multi-block storage
Other functions	• X-Y waveform synthesis (1 screen, 4 screens) • Overlay (always overlay when started/overlay only required waveforms) • Automatic/ Manual/ A-B cursor range printing/ Report printing • Logging is not available

Memory recording method

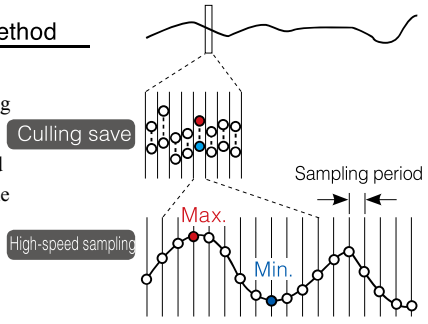
Sampling is done at the set sampling period.



RECORDER (Real-time recording)	
Time axis	10 ms to 1 hour/div, 19 ranges, time axis resolution 100 points/div Note: Out of data acquired at selected sampling rate, only maximum and minimum value data determined using 100 points/div units are stored Time axis compression selectable in 13 steps, from × 1/2 to × 1/20000
Sampling rate	1/10/100 µs 1/10/100 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 - 200 ms/div * When recording length is set to "Continuous" and time axis setting is 10 ms - 200 ms/div, manual printing can be performed after measurement stop
Recording length	Built-in presets of 25 - 50000 div, or "Continuous" or arbitrary setting in 1 div steps (max. 80000 div)
Waveform memory	Store data for most recent 80000 div in memory
Auto save	Data is automatically saved on CF card, USB memory stick or internal SSD after measurement stops
Other functions	• Manual/ A-B cursor range printing/ Report printing • Logging is not available

Recorder recording method

High-speed sampling is performed at the set sampling frequency, culling data other than the maximum and minimum values to create the recording data of a certain time.



X-Y RECORDER (X-Y real-time recording)	
Sampling period	1/10/100 ms (dot), 10/100 ms (line)
Recording length	Continuous
Screen, Printing	Split screen (1 or 4), Manual printing only
Number of X-Y	1 to 8 phenomenon
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 (printer)
Waveform memory	Sampling data for last 16000000 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)

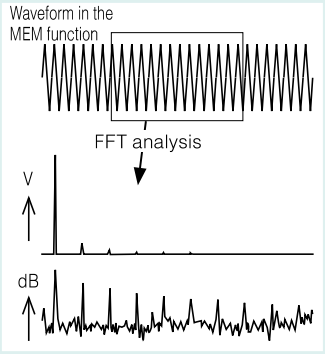
FFT	
Analysis mode	Storage waveform, Linear spectrum, RMS spectrum, Power spectrum, Density of power spectrum, Cross power spectrum, Auto-correlation function, Histogram, Transfer function, Cross-correlation function, Impulse response, Coherence function, 1/1 Octave analysis, 1/3 Octave analysis, LPC analysis, Phase spectrum
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, 10000 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 to 10000 times)
Print functions	Same as the MEMORY function (partial print not available)

Trigger functions	
Trigger mode	MEMORY (high-speed recording), FFT: Single, Repeat, Auto RECORDER (real-time recording): Single, Repeat
Trigger sources	CH1 to CH32 (analog), Standard Logic 32ch + Logic Unit (Max. 2 units 32 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 AC power lines only) • Window: Triggering occurs when window defined by upper and lower limit is entered or exited • Period: Rising edge or falling edge cycle of preset voltage value is monitored and triggering occurs when defined cycle range is exceeded • Glitch: Triggering occurs when pulse width from rising or falling edge of preset voltage value is under run • Event setting: Event count is performed for each source, and triggering occurs when a preset count is exceeded • Logic: 1, 0, or ×, Pattern setting
Level setting resolution	0.1% of full scale (full scale = 20 divisions)
Trigger filter	Selectable 0.1 div to 10.0 div 9 steps, or OFF (at MEMORY function) 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

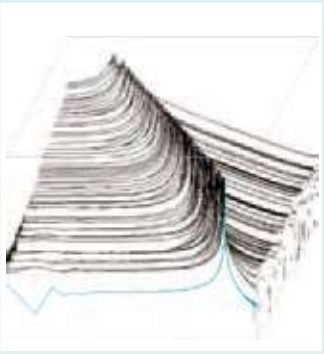
Other functions	
Waveform judgment function (In MEMORY or FFT function)	• Area comparison with reference waveform area for time domain waveform, X-Y waveform, or FFT analysis waveform • Parameter calculated value comparison with reference value • Output: GO/NG decision, Open-collector 5V, *100 msec/div (1 msec sampling) and thereafter allows for evaluation in almost real-time.

How is FFT Analysis Performed?

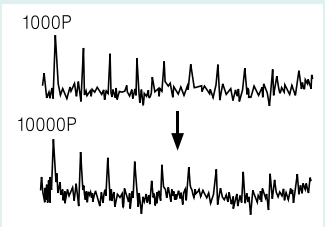
Designate a range of the waveform stored in the memory function to perform FFT analysis. It is rendered simultaneously on the screen.



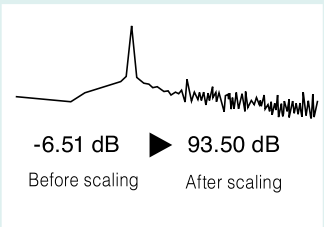
Display the spectrum as it changes over time in 3-D.



Convert data measured with few calculation points into data with many points for re-analysis.
*Not possible with frequency averaging ON



Scale by dB. Input the overall value (sum of the power spectrum) directly as a dB value.



Optional Specifications (sold separately)

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

(Accuracy at 23 ±5°C/73 ±9°F, 20 to 80% rh after 30 minutes of warm-up time and zero adjustment; Accuracy guaranteed for 1 year, Post-adjustment accuracy guaranteed for 1 year)

Measurement functions	Number of channels: 2, for voltage measurement
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)
Measurement range	5 mV to 20 V/div, 12 ranges, full scale: 20 div, AC voltage for possible measurement/display using the memory function: 280 V rms, Low-pass filter: 5/50/500 Hz, 5 k/50 k/500 kHz
Measurement resolution	1/100 of range (using 12-bit A/D conversion)
Maximum sampling rate	20 MS/s (simultaneous sampling in 2 channels)
Measurement accuracy	±0.5% of full scale (with filter 5 Hz, zero position accuracy included)
Frequency characteristics	DC to 5 MHz -3 dB, (with AC coupling: 7 Hz to 5 MHz -3 dB)
Input coupling	AC/DC/GND
Maximum input voltage	400 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 × 204.5 mm (8.05 in) D, approx. 240 g (8.5 oz)
Accessories: Ferrite clamp × 2

TEMP UNIT 8967

(Accuracy at 23 ±5°C/73 ±9°F, 20 to 80% rh after 30 minutes of warm-up time and zero adjustment; Accuracy guaranteed for 1 year, Post-adjustment accuracy guaranteed for 1 year)

Measurement functions	Number of channels: 2, for temperature measurement with thermocouple (voltage measurement not available)
Input terminals	Thermocouple input: plug-in connector, Recommended wire diameter: single-wire, 0.14 to 1.5 mm², braided wire 0.14 to 1.0 mm² (conductor wire diameter min. 0.18 mm), AWG 26 to 16 Input impedance: min. 5 MΩ (with line fault detection ON/OFF), 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	10°C (50°F)/div (-100°C to 200°C (-148°F to 392°F)), 50°C (122°F)/div (-200°C to 1000°C (-328°F to 1832°F)), 100°C (212°F)/div (-200°C to 2000°C (-328°F to 3632°F)), 3 ranges, full scale: 20 div, Measurement resolution: 1/1000 of measurement range (using 16-bit A/D conversion)
Thermocouple range (JIS C 1602-1995) (ASTM E-988-96)	K: -200°C to 1350°C (-328°F to 2462°F), J: -200°C to 1100°C (-328°F to 2012°F), E: -200°C to 800°C (-328°F to 1472°F), T: -200°C to 400°C (-328°F to 752°F), N: -200°C to 1300°C (-328°F to 2372°F), R: 0°C to 1700°C (32°F to 3092°F), S: 0°C to 1700°C (32°F to 3092°F), B: 400°C to 1800°C (752°F to 3272°F), W (WRe5-26): 0°C to 2000°C (32°F to 3632°F), Reference junction compensation: internal/ external (switchable), Line fault detection ON/OFF possible
Data refresh rate	3 methods, Fast: 1.2 ms (digital filter OFF), Normal: 100 ms (digital filter 50/60 Hz), Slow: 500 ms (digital filter 10 Hz)
Measurement accuracy	Thermocouple K, J, E, T, N: ±0.1% of full scale ±1°C (±1.8°F) (±0.1% of full scale ±2°C (±3.6°F) at -200°C to 0°C (-328°F to 32°F)), Thermocouple R, S, B, W: ±0.1% of full scale ±3.5°C (±6.3°F) (at 0°C (32°F) to less than 400°C (752°F); However, no accuracy guarantee of less than 400°C (752°F) for B), ±0.1% f.s. ±3°C (±5.4°F) (at 400°C (752°F) or more) Reference junction compensation accuracy: ±1.5°C (±2.7°F) (added to measurement accuracy with internal reference junction compensation)

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 8968

(Accuracy at 23 ±5°C/73 ±9°F, 20 to 80% rh after 30 minutes of warm-up time and zero adjustment; Accuracy guaranteed for 1 year, Post-adjustment accuracy guaranteed for 1 year)

Measurement functions	Number of channels: 2, for voltage measurement
Input terminals	Isolated BNC connector (input impedance 1 MΩ, input capacitance 30 pF), Max. rated voltage to ground: 300 V AC, DC (with input isolated from the unit, the maximum voltage that can be applied between input channel and chassis and between input channels without damage)
Measurement range	5 mV to 20 V/div, 12 ranges, full scale: 20 div, AC voltage for possible measurement/display using the memory function: 280 V rms, Low-pass filter: 5/50/500 Hz, 5k/50k Hz
Anti-aliasing filter	Integrated filter for suppressing aliasing distortion caused by FFT processing (automatic cutoff frequency setting/OFF)
Measurement resolution	1/1600 of measurement range (using 16-bit A/D conversion)
Maximum sampling rate	1 MS/s (simultaneous sampling in 2 channels)
Measurement accuracy	±0.3% of full scale (with filter 5 Hz, zero position accuracy included)
Frequency characteristics	DC to 100 kHz -3 dB (with AC coupling: 7 Hz to 100 kHz -3 dB)
Input coupling	AC/DC/GND
Maximum input voltage	400 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. 245 g (8.6 oz)
Accessories: Conversion cable L9769 × 2 (cable length 60 cm/1.97 ft)

STRAIN UNIT U8969

(Accuracy at 23 ±5°C/73 ±9°F, 80% rh or less, after 30 minutes of warm-up time and auto-balance; Accuracy guaranteed for 1 year, Post-adjustment accuracy guaranteed for 1 year)

Measurement functions	Number of channels: 2, for distortion measurement (electronic auto-balancing, balance adjustment range within ±10 000 με or less)
Input terminals	NDIS connector EPRC07-R9FNDIS (via Conversion Cable L9769, NDIS connector PRC03-12A10-7M10.5) Max. rated voltage to ground: 30 V rms or 60 V DC (with input isolated from the unit, the maximum voltage that can be applied between input channel and chassis and between input channels without damage)
Suitable transducer	Strain gauge converter, Bridge impedance: 120 Ω to 1 kΩ, Bridge voltage: 2 V ±0.05 V, Gauge rate: 2.0
Measurement range	20 με to 1000 με/div, 6 ranges, full scale: 20 div, Low-pass filter: 5/10/100 Hz, 1 kHz
Measurement resolution	1/1250 of measurement range (using 16-bit A/D conversion)
Maximum sampling rate	200 kS/s (simultaneous sampling across 2 channels)
Measurement accuracy After auto-balancing	±0.5% f.s. ±4 με (5 Hz filter ON)
Frequency characteristics	DC to 20 kHz +1/-3 dB

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 at 23 ±5°C/73 ±9°F, 20 to 80% rh after 30 minutes of warm-up time; Accuracy guaranteed for 1 year, Post-adjustment accuracy guaranteed for 1 year)

Measurement functions	Number of channels: 2, for voltage input based frequency measurement, rotation, power frequency, integration, pulse duty ratio, pulse width
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 mode	Range: Between DC to 100 kHz (minimum pulse width 2 μs), 1 Hz/div to 5 kHz/div (full scale = 20 div), 8 settings Accuracy: ±0.1% f.s. (exclude 5 kHz/div), ±0.7% f.s. (at 5 kHz/div)
Rotation mode	Range: Between 0 to 2 million rotations/minute (minimum pulse width 2 μs), 100 (r/min)/div to 100 k (r/min)/div (full scale = 20 div), 7 settings Accuracy: ±0.1% f.s. (excluding 100 k (r/min)/div), ±0.7% f.s. (at 100 k (r/min)/div)
Power frequency mode	Range: 50 Hz (40 to 60 Hz), 60 Hz (50 to 70 Hz), 400 Hz (390 to 410 Hz) (full scale = 20 div), 3 settings Accuracy: ±0.03 Hz (50, 60 Hz), ±0.1 Hz (400 Hz range)
Integration mode	Range: 2 k counts/div to 1 M counts/div, 6 settings Accuracy: ±range/2000
Duty ratio mode	Range: Between 10 Hz to 100 kHz (minimum pulse width 2 μs), 5%/div (full scale = 20 div) Accuracy: ±1% (10 Hz to 10 kHz), ±4% (10 kHz to 100 kHz)
Pulse width mode	Range: Between 2 μs to 2 sec, 500 μs/div to 100 ms/div (full scale = 20 div), Accuracy: ±0.1% f.s.
Measurement resolution	1/2000 of range (Integration mode), 1/500 of range (exclude integration, power frequency mode), 1/100 of range (power frequency mode)
Input voltage range and threshold level	±10 V to ±400 V, 6 settings, selectable threshold level at each range
Other functions	Slope, Level, Hold, Smoothing, Low-pass filter, Switchable DC/AC input coupling, Frequency dividing, Integration over-range keep/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 × 2
(To connect the current sensor to the 8971)

CURRENT UNIT 8971

(Accuracy at 23 ±5°C/73 ±9°F, 20 to 80% rh after 30 minutes of warm-up time and zero adjustment; Accuracy guaranteed for 1 year, Post-adjustment accuracy guaranteed for 1 year)

Measurement functions	Number of channels: 2, Current measurement with optional current sensor,
Input terminals	Sensor connector (input impedance 1 MΩ, exclusive connector for current sensor via conversion cable the 9318, common GND with recorder)
Compatible current sensors	CT6863, CT6862, 9709, CT6841, CT6843, CT6844, CT6845, 9272-10 (To connect the 8971 via conversion cable the 9318)
Measurement range	Using 9272-10 (20 A), CT6841: 100 mA to 5 A/div (f.s. = 20 div, 6 settings) Using CT6862: 200 mA to 10 A/div (f.s. = 20 div, 6 settings) Using 9272-10 (200 A), CT6843, CT6863: 1 A to 50 A/div (f.s. = 20 div, 6 settings) Using CT6844, CT6845, 9709: 2 A to 100 A/div (f.s. = 20 div, 6 settings)
Measurement accuracy (with 5 Hz filter ON) Note: Add the accuracy and attributes of the current sensor being used.	±0.65% f.s. RMS amplitude accuracy: ±1% f.s. (DC, 30 Hz to 1 kHz), ±3% f.s. (1 kHz to 10 kHz) RMS response time: 100 ms (rise time from 0 to 90% of full scale), Crest factor: 2 Frequency characteristics: DC to 100 kHz, ±3 dB (with AC coupling: 7 Hz to 100 kHz)
Measurement resolution	1/100 of range (using 12-bit A/D conversion)
Maximum sampling rate	1 MS/s (simultaneous sampling in 2 channels)
Other functions	Input coupling: AC/DC/GND, Low-pass filter: 5, 50, 500, 5 k, 50 kHz

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

(Accuracy at 23 ±5°C/73 ±9°F, 20 to 80% rh after 30 minutes of warm-up time and zero adjustment; Accuracy guaranteed for 1 year, Post-adjustment accuracy guaranteed for 1 year)

Measurement functions	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)
Measurement range	5 mV to 20 V/div, 12 ranges, full scale: 20 div, AC voltage for possible measurement/display using the memory function: 280 V rms, Low-pass filter: 5/50/500 Hz, 5 k/100 kHz
Measurement resolution	1/100 of range (using 12-bit A/D conversion)
Maximum sampling rate	1 MS/s (simultaneous sampling in 2 channels)
Measurement accuracy	±0.5% of full scale (with filter 5 Hz, zero position accuracy included)
RMS measurement	RMS amplitude accuracy: ±1% f.s. (DC, 30 Hz to 1 kHz), ±3% of full scale (1 kHz to 100 kHz) Response time: SLOW 5 s (rise time from 0 to 90% of full scale), MID 800 ms (rise time from 0 to 90% of full scale), FAST 100 ms (rise time from 0 to 90% of full scale), Crest factor: 2
Frequency characteristics	DC to 400 kHz -3 dB, (with AC coupling: 7 Hz to 400 kHz -3 dB)
Input coupling	AC/DC/GND
Maximum input voltage	400 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. 190 g (6.7 oz)
Accessories: None

LOGIC UNIT 8973

Measurement functions	Number of channels: 16 channels (4 ch/1 probe connector × 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. 260 g (9.2 oz)
Accessories: None

DIGITAL VOLTMETER UNIT MR8990

(Accuracy at 23 ±5°C/73 ±9°F, 20 to 80% rh after 30 minutes of warm-up time and calibration, Accuracy guaranteed for 1 year, Post-adjustment accuracy guaranteed for 1 year)

Measurement functions	Number of channels: 2, for DC voltage measurement
Input terminals	Banana input connectors (Input resistance: 100 MΩ or higher with 100 mV f.s. to 10 V f.s. range, otherwise 10 MΩ) 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	100 mV f.s. (5 mV/div) to 1000 V f.s. (50 V/div), 5 ranges, full scale: 20 div
Measurement resolution	1/50 000 of measurement range (using 24 bit ΔΣ modulation A/D)
Integration time	20 ms ×NPLC (during 50 Hz), 16.67 ms ×NPLC (during 60 Hz)
Response time	2 ms +2× integration time or less (rise - f.s. → + f.s., fall + f.s. → - f.s.)
Basic measurement accuracy	±0.01% rdg. ±0.0025% f.s. (at range of 1000 mV f.s.)
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. 230 g (8.1 oz)
Accessories: None

HIGH-VOLTAGE UNIT U8974

(Accuracy at 23 ±5°C/73 ±9°F, 20 to 80% rh after 30 minutes of warm-up time and zero adjustment; Accuracy guaranteed for 1 year, Post-adjustment accuracy guaranteed for 1 year)

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 IV)
Input terminals	Banana input terminal (Input impedance: 4 MΩ, Input capacitance: 5 pF)
Measurement range	200 mV, 500 mV, 1, 2, 5, 10, 20, 50 V/div (DC mode) 500 mV, 1, 2, 5, 10, 20, 50 V/div (RMS mode)
Measurement resolution	1/1600 of measurement range (using 16-bit A/D conversion)
Maximum sampling rate	1 MS/s
Measurement accuracy	±0.25% f.s. (with filter 5 Hz, zero position accuracy included)
RMS measurement	RMS accuracy: ±1.5% f.s. (DC, 30 Hz to 1 kHz), ±3% f.s. (1 kHz to 100 kHz) Response time: High speed 150 ms, Medium speed 500 ms, Low speed 2.5 s
Frequency characteristics	DC to 100 kHz -3 dB
Input coupling	DC / GND
Maximum input voltage	1000 V DC, 700 V AC

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

ARBITRARY WAVEFORM GENERATOR UNIT U8793

(Accuracy at 23 ±5°C/73 ±9°F, 80% rh or less after 30 minutes or more of warm-up time; Power supply frequency range of installed MEMORY HiCORDER at 50 Hz/60 Hz ±2 Hz; Accuracy guaranteed for 1 year, Post-adjustment accuracy guaranteed for 1 year)

Output terminal	Number of channels: 2, SMB terminal (Output impedance: 1 Ω or less) Max. rated voltage to ground: 33 V rms AC or 70 V DC
Output voltage range	-10 V to 15 V (Amplitude setting range: 0 V to 20 V p-p, Setting resolution: 1 mV)
Max. output current	10 mA (Allowable load resistance: 1.5 kΩ or more)
FG function	DC, Sine wave, Square wave, Pulse wave, Triangular wave, Ramp wave, Output frequency: 0 Hz to 100 kHz
Arbitrary waveform generator mode	Waveforms measured by MR8847A, etc., generated by Hioki Model 7075 or SF8000, CSV waveforms D/A refresh rate: 2 MHz (using 16-bit D/A)
Sweep function	Frequency, Amplitude, Offset, Duty (Pulse only)
Program function	Max. 128 steps (Number of loops for each step, Number of total loops)
Other	Self-test function (Voltage), External input/output control

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. 230 g (8.1 oz)
Accessories: None

WAVEFORM GENERATOR UNIT MR8790

(Accuracy at 23 ±5°C/73 ±9°F, 80% rh after 30 minutes of warm-up time; Accuracy guaranteed for 1 year, Post-adjustment accuracy guaranteed for 1 year)

Output terminal	Number of channels: 4, SMB terminal (Output impedance: 1 Ω or less) Max. rated voltage to ground: 33 V rms AC or 70 V DC
Output voltage range	-10 V to 10 V (Amplitude setting range: 0 V to 20 V p-p, Setting resolution: 1 mV)
Max. output current	5 mA
Output function	DC, Sine wave (Output frequency range: 0 Hz to 20 kHz)
Accuracy	Amplitude accuracy: ±0.25% of setting ±2 mV p-p (1 Hz to 10 kHz) Offset accuracy: ±3 mV DC output accuracy: ±0.6 mV
Other	Self-test function (Voltage, Current)

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. 230 g (8.1 oz)
Accessories: None

PULSE GENERATOR UNIT MR8791

(Accuracy at 23 ±5°C/73 ±9°F, 80% rh or less with no condensation; Accuracy guaranteed for 1 year)

Output terminal	Number of channels: 8, Connector: D-sub, half-pitch, 50-pin Max. rated voltage to ground: 33 V rms AC or 70 V DC (between unit and output channels) Logic output/Open collector output
Output mode 1	Pattern output: Read frequency: 0 Hz to 120 kHz, 2048 logic patterns
	Pulse output: Frequency 0 Hz to 20 kHz, Duty 0.1% to 99.9%
Output mode 2	Logic output: Output voltage level: 0 V to 5 V (H level: 3.8 V or more, L level: 0.8 V or less)
	Open collector output: Absolute maximum rated voltage for collector/emitter: 50 V Overcurrent protection: 100 mA
Other	Self-test function

Cable length and mass: Input side: 70 cm (2.30 ft), Output side: 1.5 m (4.92 ft), Approx. 170 g (6.0 oz)

DIFFERENTIAL PROBE P9000

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

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 Wave mode frequency characteristics: DC to 100 kHz -3 dB, RMS mode frequency characteristics: 30 Hz to 10 kHz, Response time: Rise 300 ms, Fall 600 ms
Division ratio	Switches between 1000:1, 100:1
DC output accuracy	±0.5% f.s. (f.s. = 1.0 V, division ratio 1000:1), (f.s. = 3.5 V, division ratio 100:1)
Effective value measurement accuracy	±1% f.s. (30 Hz to less than 1 kHz, sine wave), ±3% f.s. (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 voltage to ground	1000 V AC, DC (CAT III)
Operating temperature range	-40°C to 80°C (-40°F to 176°F)
Power supply	(1) AC adapter Z1008 (100 to 240 V AC, 50/60 Hz), 6 VA (including AC adapter), 0.9 VA (main unit only) (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 VA
Accessories	Instruction manual ×1, Alligator clip ×2, Carrying case ×1

Cable length and mass: Main unit cable 1.3 m (4.27 ft), input section cable 46 cm (1.51 ft), approx. 350 g (12.3 oz)

DIFFERENTIAL PROBE 9322

(Accuracy guaranteed for 1 year)

Functions	For high-voltage floating measurement, power line surge noise detection, RMS rectified output measurement
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 V DC)
AC mode	For detection of power line surge noise, Frequency characteristics: 1 kHz to 10 MHz ±3 dB
RMS mode	DC/AC voltage RMS output detection, Frequency characteristics: DC, 40 Hz to 100 kHz, Response speed: 200 ms or less (400 V AC), Accuracy: ±1% of full scale (DC, 40 Hz to 1 kHz), ±4% of full scale (1 kHz to 100 kHz) (full scale: 1000 V AC)
Input	Input type: balanced differential input, Input impedance/capacitance: H-L 9 MΩ/10 pF, H/L-unit 4.5 MΩ/20 pF, Max. rated voltage to ground: when using grabber clip 1500 V AC/DC (CAT II), 600 V AC/DC (CAT III), when using alligator clip: 1000 V AC/DC (CAT II), 600 V AC/DC (CAT III)
Maximum input voltage	2000 V DC, 1000 V AC (CAT II), 600 V AC/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: (1) AC Adapte 9418-15, (2) Power Cord 9248 with Probe Power Unit 9687, (3) Power Cord 9324 + Conversion Cable 9323 with HiCORDER logic terminal, (4) Power Cord 9325 with F/V Unit 8940

Cable length and mass: Main unit cable 1.5 m (4.92 ft), input section cable 30 cm (0.98 ft), approx. 150 g (5.3 oz)
Note: The unit-side plug of the 9320-01 and 9327 is different from the 9320.

LOGIC PROBE 9320-01/9327

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) Input resistance: 1 MΩ (with digital input, 0 to +5 V) 500 kΩ or more (with digital input, +5 to +50 V) Pull-up resistance: 2 kΩ (contact input: internally pulled up to +5 V)
Digital input threshold	1.4 V/ 2.5 V/ 4.0 V
Contact input detection resistance	1.4 V: 1.5 kΩ or higher (open) and 500 Ω or lower (short) 2.5 V: 3.5 kΩ or higher (open) and 1.5 kΩ or lower (short) 4.0 V: 25 kΩ or higher (open) and 8 kΩ or lower (short)
Detectable pulse width	9320-01: 500 ns or longer, 9327: 100 ns or longer
Maximum input voltage	0 to +50 V DC (the maximum voltage that can be applied across input pins without damage)

Cable length and mass: Main unit cable 1.5 m (4.92 ft), input section cable 1 m (3.28 ft), approx. 320 g (11.3 oz)
Note: The unit-side plug of the MR9321-01 is different from the MR9321.

LOGIC PROBE MR9321-01

Functions	Detection of AC or DC relay drive signal for High/Low state recording Can also be used for power line interruption detection
Input	4 channels (isolated between unit and channels), HIGH/LOW range switching Input resistance: 100 kΩ or higher (HIGH range), 30 kΩ or higher (LOW range)
Output (H) detection	170 to 250 V AC, ±DC 70 to 250 V (HIGH range) 60 to 150 V AC, ±DC 20 to 150 V (LOW range)
Output (L) detection	0 to 30 V AC, ±DC 0 to 43 V (HIGH range) 0 to 10 V AC, ±DC 0 to 15 V (LOW range)
Response time	Rising edge 1 ms max., falling edge 3 ms max. (with HIGH range at 200 V DC, LOW range at 100 V DC)
Maximum input voltage	250 V rms (HIGH range), 150 V rms (LOW range) (the maximum voltage that can be applied across input pins without damage)

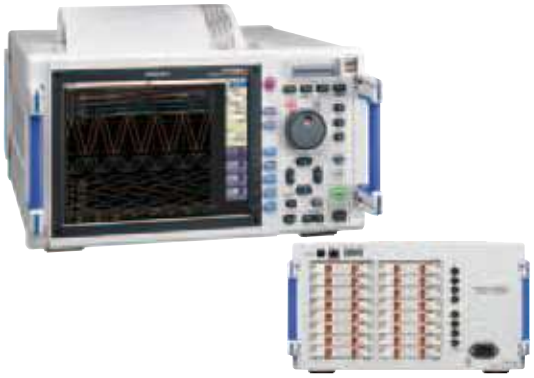
System Chart of Options

Model : MEMORY HiCORDER MR8827

Model No. (Order Code) (Note)

MR8827 (Max. 32ch, 512MW memory, main unit only)

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



Note: Main unit MR8827 cannot operate alone. You must install one or more optional input modules in the unit.

Printer options

*PRINTER UNIT is a built-in option that must be specified upon order.

PRINTER UNIT U8350
Specified upon order. Printing width 200 mm (7.87 inch).
Compatible recording paper: Model 9231

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

Factory-installed option

*Must specify when ordering

SSD UNIT U8330
Specified upon order; built-in type, 128 GB

Storage media

* The CF card includes a PC card adapter.

Use only CF Cards or USB drive sold by HIOKI. Compatibility and performance are not guaranteed for CF cards/USB memory stick made by other manufacturers. You may be unable to read from or save data to such cards.

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 collect 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

Case

CARRYING CASE (special order)
hard trunk type
Inquire with your local Hioki distributor.

Input modules

* Input cords not included. Please purchase them separately.
* When using 9709 with Current Unit 8971, a total of 7 current probes can be used.

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.

CURRENT UNIT 8971
2 ch, for measuring current using dedicated current sensors, bundled two Conversion cable 9318
Note: Max. up to 4 modules can be installed in the MR8847A, MR8827

DC/RMS 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 2 modules can be installed in the MR8827

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

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

Output modules

* Input cords not included. Please purchase separately.

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

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

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

Output cable

* Please contact your local HIOKI distributor for connectors that support Model MR8791.

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

LOGIC PROBE MR9321-01 Recommended
4 isolated channels, ON/OFF detection of AC/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 9320/9321/MR9321 and the 9324 to the Memory HiCorder with small logic terminal models * This cable is not required for the small-terminal types 9327, 9320-01, 9321-01 and MR9321-01.

* You can connect up to 4 Current Unit 8971 to the Memory HiCorder main unit, allowing up to 8 current sensors to be used.
* There is no limit if you connect a current sensor to the voltage input analog unit.

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

Recommended

CONNECTION CORD L9790
Flexible ϕ 4.1 mm (0.16 in) thin 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 9790-02
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 II 300 V. Red/black set.

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 L9198
ϕ 5.0 mm (0.20 in) dia., cable allowing for up to 300 V input, 1.7 m (5.58 ft) length, small alligator clip

CONNECTION CORD L9197
ϕ 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

GRABBER CLIP 9243
Attaches to the tip of the banana plug cable, CAT III 1000 V, 196 mm (7.72 in) length

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

10:1 PROBE 9665
Max. rated voltage to earth is same as for input module, max. input voltage 1 kV rms (up to 500 kHz), 1.5 m (4.92 ft) length

10:1 PROBE 9666
Max. rated voltage to earth is same as for input module, max. input voltage 5 kV peak (up to 1MHz), 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
(Wave Only) For Memory HiCorder, 1 kV AC, DC, Frequency band: 100 kHz

DIFFERENTIAL PROBE P9000-02
(Switch between Wave/RMS) For Memory HiCorder, 1 kV AC, DC, Frequency band: 100 kHz

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.

CONNECTION CABLE L4940
Banana plug - banana plug, Cord 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)

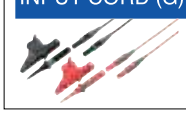
ALLIGATOR CLIP L4935
Attach to the tip of banana plug cables, CAT IV 600 V, CAT III 1000 V

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: 196mm (7.72 in), CAT III 1000 V

INPUT CORD (G)
*For the MR8990 *Voltage is limited to the specifications of the input modules in use



TEST LEAD L2200
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

Up to 200 A (High precision) *ME15W (12-pin) terminal type

High-Precision pull-through current sensors, observe waveforms from DC to distorted AC
AC/DC CURRENT SENSOR CT6862-05, 1 MHz, 50 A
AC/DC CURRENT SENSOR CT6863-05, 500 kHz, 200 A

Observe waveforms from DC to distorted AC
AC/DC CURRENT PROBE CT6841-05, 1 MHz, 20 A
AC/DC CURRENT PROBE CT6843-05, 500 kHz, 200 A

Observe waveforms of distorted AC (cannot for DC)
CLAMP ON SENSOR 9272-05, 100 kHz, 200 A

Up to 1000 A (High precision) *ME15W (12-pin) terminal type

High-Precision pull-through current sensors, observe waveforms from DC to distorted AC
AC/DC CURRENT SENSOR 9709-05, 100 kHz, 500 A

Observe waveforms from DC to distorted AC
AC/DC CURRENT PROBE CT6844-05, 200 kHz, 500 A
AC/DC CURRENT PROBE CT6845-05, 100 kHz, 500 A
AC/DC CURRENT PROBE CT6846-05, 20 kHz, 1000 A

Precautions when connecting a high-precision current sensor to a Memory HiCorder

Connecting to the MR8847A / MR8827 / MR8740

- High-precision current sensor (ME15W) + CT9901 + 9318 → CURRENT UNIT 8971
- High-precision current sensor (ME15W) + CT955x + BNC cable → except CURRENT UNIT 8971
- High-precision current sensor (PL23) + 9318 → CURRENT UNIT 8971
- High-precision current sensor (PL23) + CT9900 + CT955x + BNC cable → except CURRENT UNIT 8971

Other current sensor types

The Memory HiCorder can be used with various types of current sensors and probes. For details, see product information on Hioki's website.

*A separate power supply (CT9555) is required in order to use a high-precision current sensor.
*Only sensors with ME15W (12-pin) terminals (-05 type) can be connected to the CT9555.
*The separately available Conversion Cable CT9900 is required in order to use a sensor with PL23 (10-pin) terminal.

POWER SUPPLY for Current Sensors

SENSOR UNIT CT9555 1ch, with Waveform output
CONNECTION CORD L9217
Cord has insulated BNC connectors at both ends, 1.6 m (5.25 ft) length

PL23 (10-pin) - ME15W (12-pin) conversion

CONVERSION CABLE CT9900
Convert PL23 (10-pin) terminal to ME15W (12-pin) terminal

*The separately available Conversion Cable CT9901 is required in order to use a high-precision current sensor equipped with a ME15W (12-pin) terminal (-05 type) with the Current Measuring Module 8971 (which is designed for use with the MR8847, MR8827, and MR8740).
*While the CT955x is not required in order to use a sensor equipped with a PL23 (10-pin) terminal with the 8971 or 8940, the Conversion Cable 9318 (which comes with the 8971) is required for that setup.

Direct connectable with the Current Sensor

CURRENT UNIT 8971 For the MR8847, MR8827, MR8740
CONVERSION CABLE 9318 For the CT6841/43 or other

ME15W (12-pin) - PL23 (10-pin) conversion

CONVERSION CABLE CT9901
Convert ME15W (12-pin) terminal to PL23 (10-pin) terminal

10 mA class to 500 A (High speed)

CLAMP ON PROBE 3273-50
Wide DC to 50 MHz bandwidth, 10 mA-class to 30 Arms

CLAMP ON PROBE 3276
Wide DC to 100 MHz bandwidth, 10 mA-class to 30 Arms

CLAMP ON PROBE 3274
Wide DC to 10 MHz bandwidth, up to 150 A rms

CLAMP ON PROBE 3275
Wide DC to 2 MHz bandwidth, up to 500 A rms

Power supply * Necessary for use the 3270 seies current probes

POWER SUPPLY 3272
• For Hioki wide bandwidth current probes
• Single sensor connectable

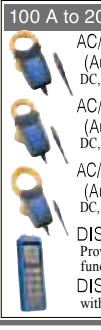
POWER SUPPLY 3269
Connect up to four sensors

Custom cable *For P9000. Inquire with your local Hioki distributor.

(1) Bus powered USB cable
(2) USB(A)- Micro B cable
(3) 3-prong cable

The CM7290 (available separately) is required in order to use these current sensors.

100 A to 2000 A (Medium speed)



AC/DC CURRENT SENSOR CT7631, (Auto zero CT7731)
DC, 1 Hz to 10 kHz (-3dB), 100 A, 1 mV/A output

AC/DC CURRENT SENSOR CT7636, (Auto zero CT7736)
DC, 1 Hz to 10 kHz (-3dB), 600 A, 1 mV/A output

AC/DC CURRENT SENSOR CT7642, (Auto zero CT7742)
DC, 1 Hz to 10 kHz (5 kHz), 2000 A, 1 mV/A output

DISPLAY UNIT CM7290
Provides measurement, display, and output functionality when used with the CT7000s.

DISPLAY UNIT CM7291
with built-in Bluetooth® wireless technology

Non-contact Voltage measuring

NON-CONTACT AC VOLTAGE PROBE SP3000-01
5 Vrms rated, 10 Hz to 100 kHz band width

NON-CONTACT AC VOLTAGE PROBE SP3000
Sold individually

AC VOLTAGE PROBE SP9001
Sold individually

500 A to 5000 A *For commercial power lines, 50/60 Hz

CLAMP ON PROBE 9018-50
Good phase characteristics, Frequency characteristics: 40 Hz to 3 kHz, 10 to 500 A AC range, output 0.2 V AC f.s.

CLAMP ON PROBE 9132-50
Frequency characteristics: 40 Hz to 1 kHz, 20 to 1000 A AC range, output 0.2 V AC f.s.

AC FLEXIBLE CURRENT SENSOR CT9667-01/-02/-03
10 Hz to 20 kHz, 5000 A/ 500 A AC, 500 mV/f.s. output, φ 100 to 254 mm (3.94 to 10.00 in), 3 loop diameters

Other options for Input

CONNECTION CORD L9217
Cord has insulated BNC connectors at both ends, signal output use, 1.6 m (5.25 ft) length

CONVERSION ADAPTER 9199
Receiving side banana terminal, output BNC terminal

CONNECTION CORD 9165
Metallic BNC at both ends, for metallic BNC terminals, 1.5 m (4.92 ft) , not CE marked

CONVERSIONCABLE 9318
For connecting CT6841/43 and similar probes to 8971/40/51.

Leak Current *For commercial power lines, 50/60 Hz

CLAMP ON LEAK HiTESTER 3283
10 mA range/10 µA resolution to 200 A range, with monitor/analog output 1 V f.s.

OUTPUT CORD L9094
3.5 mm (0.14 in) dia. mini plug to banana, 1.5 m (4.92 ft) length

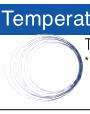
CONVERSION ADAPTER 9199
Receiving side banana, output BNC terminal

OUTPUT CORD L9095
Connect to BNC terminal, 1.5 m (4.92 ft) length

OUTPUT CORD L9096
Connect to terminal block, 1.5 m (4.92 ft) length

AC ADAPTER 9445-02 For USA, 100 to 240 V AC
AC ADAPTER 9445-03 For EU 100 to 240 V AC

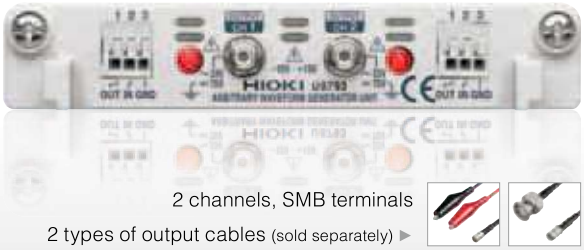
Temperature sensor



THERMOCOUPLE
*For reference only. Please purchase locally.

ARBITRARY WAVEFORM GENERATOR UNIT U8793

Generate and record in a single unit



2 channels, SMB terminals

2 types of output cables (sold separately) ▶

Anomaly Simulation

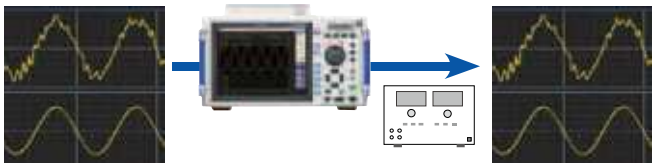
Reproduce and output the observed waveforms without modification. When resolving problems observed during research or development, you can reproduce such problems for efficient testing.

Recommended units

ARBITRARY WAVEFORM GENERATOR UNIT U8793

ANALOG UNIT 8966

HIGH RESOLUTION UNIT 8968



Record anomalous waveforms

Max. 15 V output + amplifier

Reproduce and output anomalous waveforms

- 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.

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: DIGITAL VOLTMETER UNIT MR8990

2 channels, banana input terminal
High precision, high resolution

Install up to 16 DVM Units to expand up to 32 channels

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.

Measurement range		Effective input range (Guaranteed measurement accuracy range)	Max. resolution	Input resistance	Measurement accuracy	
					NPLC: less than 1	NPLC: 1 or more
5 mV/div	(f.s. = 100 mV)	-120 mV to 120 mV	0.1 µV	100 MΩ or more	±0.01% rdg. ±0.015% f.s.	±0.01% rdg. ±0.01% f.s.
50 mV/div	(f.s. = 1000 mV)	-1200 mV to 1200 mV	1 µV		±0.01% rdg. ±0.0025% f.s.	
500 mV/div	(f.s. = 10 V)	-12 V to 12 V	10 µV			
5 V/div	(f.s. = 100 V)	-120 V to 120 V	100 µV	10 MΩ ±5%	±0.025% rdg. ±0.0025% f.s.	
50 V/div	(f.s. = 1000 V)	-500 V to 500 V	1 mV			

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

HIOKI

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MR8827E7-87B Printed in Japan