Product Datasheet - Technical Specifications

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HIOKI

MEMORY HiCORDER MR8875

High-Speed Data Logger

1000 V Direct Input Multi-channel Logger

As a Multi-channel Logger

The MR8875 delivers multi-channel measurement capability in a compact, A4-size footprint that ensures portability. Depending on which input modules are installed, measurement capabilities range from 16 analog channels to 60 thermocouple temperature measurement channels.

As a Super-High-Speed Logger

The MR8875 can simultaneously sample all channels in as little as 2 μsec.
Sample up to 2 channels every 2 μsec or up to 60 channels every 50 μsec while writing data continuously to an SD memory card in real time. * Operation is guaranteed only with a genuine Hioki SD memory cards.

As a Long-Term Continuous Recording Logger

Real-time saving to SD card
At an interval of 100 msec, the MR8875 can record 8 channels of data for 155 days or 60 channels of data for 20 days. * Operation is guaranteed only with a genuine Hioki SD memory cards.

New 1000 V RMS Measurement Module

Select and install four input modules from a large selection. The MR8875 lets you mix and match modules to measure voltage, temperature, strain, and CAN signals or measure sensor output signals at a high, 16-bit resolution.

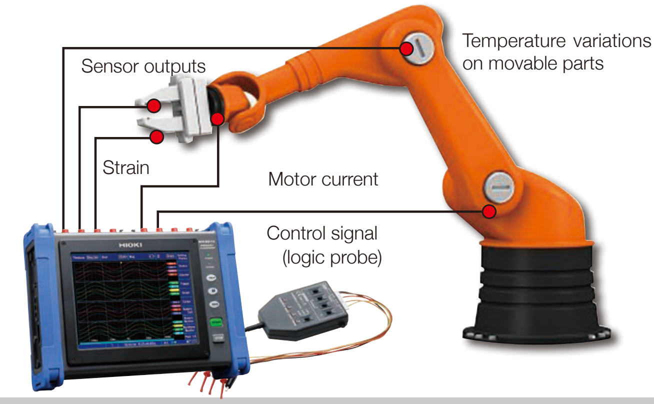
CE

3 year Warranty

User-selectable Input Modules for More Applications!
Compact Solution for Multi-channel Measurement

Industrial Robots

Voltage | Temperature | Control Signals | Strain



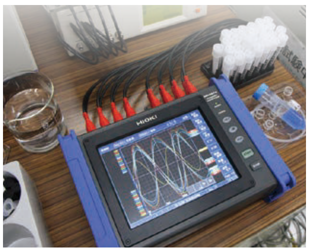
The plug-in module-based architecture means you can mix and record a variety of signals across multiple channels - ideal for verifying the operation of multi-axis robots.

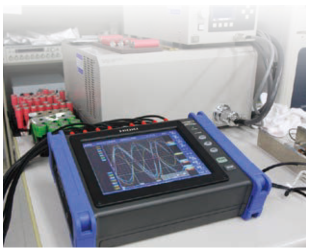
Example of module combinations

Analog Unit MR8901	× 2
Voltage/Temp Unit MR8902	× 1
Strain Unit MR8903	× 1

R&D or Science Experiments

Voltage | Temperature





With its multi-channel, long-term recording capabilities, the **MR8875** is ideally suited for use in development applications such as performance and durability testing.

- Record sensor output.
- Evaluate sensors and other devices.
- Use as an X-Y recorder (flatbed).

Example of module combinations

Analog Unit MR8901	× 2
Voltage/Temp Unit MR8902	× 2

Development of Construction Machinery, Agricultural Machinery, and Automobiles

Voltage | Temperature | Strain

Enhanced environmental temperature and vibration resistance enable the **MR8875** to withstand harsh measurement environments.

Example of module combinations

Analog Unit MR8901	× 1
Voltage/Temp Unit MR8902	× 1
Strain Unit MR8903	× 1
CAN Unit MR8904	× 1

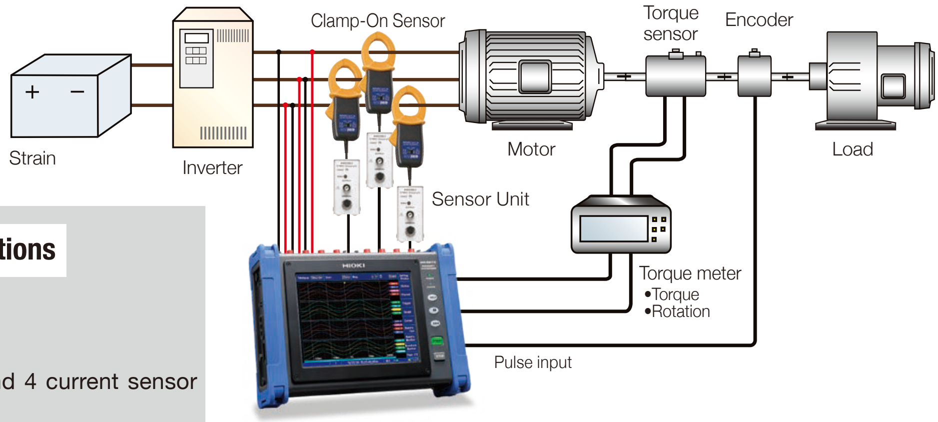
Applications

High-Speed Data Recorder MR8875

Inverter and Motor Testing

High-voltage input (MR8905)

Primary- and secondary-side measurement of UPS power supply and commercial power supply transformers
Record inverter primary- and secondary-side waveforms



Example of module combinations

Analog Unit MR8905 × 2
(up to 4 high-voltage channels)

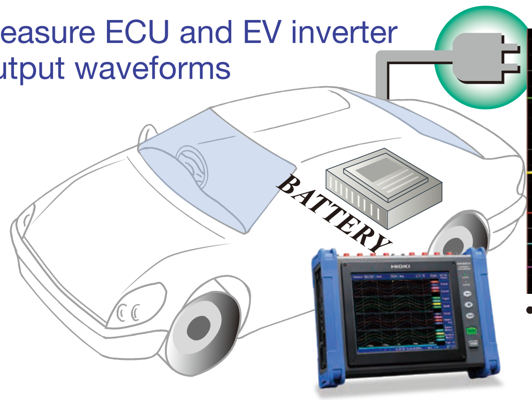
Analog Unit MR8901 × 2
(up to 4 low-voltage channels and 4 current sensor output channels)

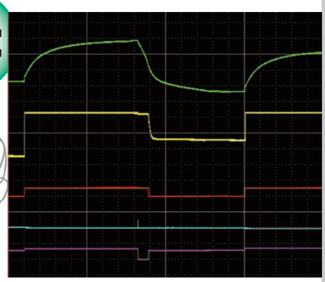
Testing of EV batteries

1000 V DC (CAT II)

Measure ECU and EV inverter output waveforms

With the MR8905 Analog Unit, the MR8875 can measure the voltage of individual battery cells—a process that requires high precision and high resolution—at 16-bit resolution (1/1250 of the range). The instrument can measure signals of up to 1000 V DC directly.



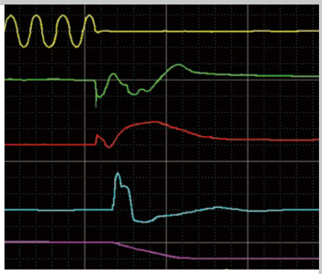


• Battery evaluation
Example of control signals and charge/discharge time measurement

Testing of Power Equipment

600 V AC (CAT III)

Characteristics testing of power equipment
(load rejection and circuit breaker testing)



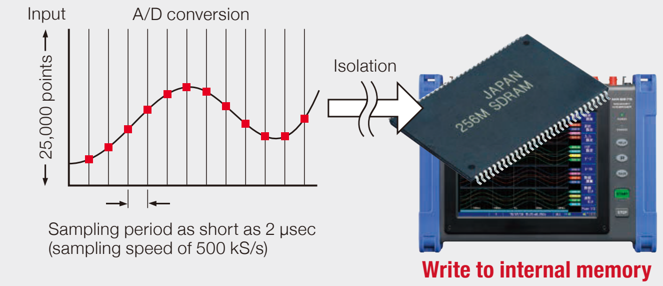
• Load rejection testing
Analyze the correlations among factors such as the generator voltage before and after circuit-breaker operation, degree of variability in RPM, governor servo operating status, and pressure regulator operation timing.

1 Real-Time Saving to an SD Card in High Resolution

Collect physical signals at a 500 kS/s sampling rate with a high resolution of 25,000 points f.s.

The same working principle as that of a digital oscilloscope is used to record data to the large-capacity internal memory at high speed. The sampling rate is 500 kS/s (2 μs period) on all channels simultaneously. Sensor signal waveforms are recorded and represented faithfully. Furthermore, a 16-bit A/D resolution ensures thas even subtle changes in the sensor signals are not missed.

Internal Memory 8MW/unit



■ Maximum time to record to the internal storage memory (non-exhaustive)

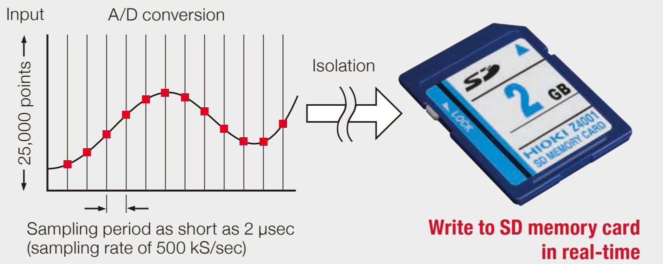
* Since memory is stored in each module, this chart is a comparison of storing on one unit.
* Built-in logic, and pulses P1 and P2 input each use the storage capacity equivalent to one analog channel.

No. of channels to be used		1 ch	3 ch to 4 ch	9 ch to 16 ch
Time axis (non-exhaustive)	Period	80,000 div	20,000 div	5,000 div
200 μs/div	2 μs	16 s	4 s	1 s
1 ms/div	10 μs	1 min 20 s	20 s	5 s
10 ms/div	100 μs	13 min 20 s	3 min 20 s	50 s
100 ms/div	1 ms	2 h 13 min 20 s	33 min 20 s	8 min 20 s
1 s/div	10 ms	22 h 13 min 20 s	5 h 33 min 20 s	1 h 23 min 20 s
10 s/div	100 ms	9 d 06 h 13 min 20 s	2 d 07 h 33 min 20 s	13 h 53 min 20 s
100 s/div	1.0 s	92 d 14 h 13 min 20 s	23 d 03 h 33 min 20 s	5 d 18 h 53 min 20 s
5 min/div	3.0 s	277 d 18 h 40 min	69 d 10 h 40 min	17 d 08 h 40 min

Ultra-high-speed SD data recording is a vast improvement over legacy products

The **MR8875** takes advantage of revolutionary SD card technologies to offer faster real-time saving to a memory card from as fast as 2 μs intervals (operation is guaranteed only with a genuine HIOKI SD memory card). When the recording period (sampling rate) is 50 μs or less, data for all 60 channels can be recorded continuously over a long period.

SD Memory card



■ Maximum recordable time to a 2 GB SD memory card

* Since the header information is included, actually recordable measurement data is approximately 90% of the time shown in the table below. The upper limit is 1,000 days but operation is guaranteed for 1 year.
* The recording interval is limited depending on the number of measuring channels.
* Built-in logic, pulses P1 and P2 input each use the storage capacity equivalent to one analog channel.

Time axis	Recording intervals	1 ch	2 ch	4 ch	8 ch	16 ch	30 ch	60 ch
200 μs/div	2 μs	35 min 47 s	17 min 53 s	N/A	N/A	N/A	N/A	N/A
500 μs/div	5 μs	1 h 29 min 28 s	44 min 44 s	22 min 22 s	11 min 11 s	N/A	N/A	N/A
1 ms/div	10 μs	2 h 58 min 57 s	1 h 29 min 28 s	44 min 44 s	22 min 22 s	11 min 11 s	N/A	N/A
2 ms/div	20 μs	5 h 57 min 54 s	2 h 58 min 57 s	1 h 29 min 28 s	44 min 44 s	22 min 22 s	11 min 55 s	N/A
5 ms/div	50 μs	14 h 54 min 47 s	7 h 27 min 23 s	3 h 43 min 41 s	1 h 51 min 50 s	55 min 55 s	29 min 49 s	14 min 54 s
10 ms/div	100 μs	1 d 05 h 49 min 34 s	14 h 54 min 47 s	7 h 27 min 23 s	3 h 43 min 41 s	1 h 51 min 50 s	59 min 39 s	29 min 49 s
20 ms/div	200 μs	2 d 11 h 39 min 08 s	1 d 05 h 49 min 34 s	14 h 54 min 47 s	7 h 27 min 23 s	3 h 43 min 41 s	1 h 59 min 18 s	59 min 39 s
50 ms/div	500 μs	6 d 05 h 07 min 50 s	3 d 02 h 33 min 55 s	1 d 13 h 16 min 57 s	18 h 38 min 28 s	9 h 19 min 14 s	4 h 58 min 15 s	2 h 29 min 07 s
100 ms/div	1 ms	12 d 10 h 15 min 41 s	6 d 05 h 07 min 50 s	3 d 02 h 33 min 55 s	1 d 13 h 16 min 57 s	18 h 38 min 28 s	9 h 56 min 31 s	4 h 58 min 15 s
200 ms/div	2 ms	24 d 20 h 31 min 23 s	12 d 10 h 15 min 41 s	6 d 05 h 07 min 50 s	3 d 02 h 33 min 55 s	1 d 13 h 16 min 57 s	19 h 53 min 2 s	9 h 56 min 31 s
500 ms/div	5 ms	62 d 03 h 18 min 29 s	31 d 01 h 39 min 14 s	15 d 12 h 39 min 14 s	7 d 18 h 24 min 48 s	3 d 21 h 12 min 24 s	2 d 01 h 42 min 36 s	1 d 00 h 51 min 18 s
1 s/div	10 ms	124 d 06 h 36 min 58 s	62 d 03 h 18 min 29 s	31 d 01 h 39 min 14 s	15 d 12 h 49 min 37 s	7 d 18 h 24 min 48 s	4 d 03 h 25 min 13 s	2 d 01 h 42 min 36 s
2 s/div	20 ms	248 d 13 h 13 min 56 s	124 d 06 h 36 min 58 s	62 d 03 h 18 min 29 s	31 d 01 h 39 min 14 s	15 d 12 h 49 min 37 s	8 d 06 h 50 min 27 s	4 d 03 h 42 min 36 s
5 s/div	50 ms	621 d 09 h 04 min 51 s	310 d 16 h 32 min 25 s	155 d 08 h 16 min 12 s	77 d 16 h 08 min 06 s	38 d 20 h 04 min 03 s	20 d 17 h 06 min 09 s	10 d 08 h 33 min 04 s
10 s/div	100 ms	Upper limit 1000 days	621 d 09 h 04 min 51 s	310 d 16 h 32 min 25 s	155 d 08 h 16 min 12 s	77 d 16 h 08 min 06 s	41 d 10 h 12 min 19 s	20 d 17 h 06 min 09 s
30 s/div	300 ms	Upper limit 1000 days	Upper limit 1000 days	932 d 01 h 37 min 16 s	466 d 00 h 48 min 38 s	233 d 00 h 24 min 19 s	124 d 06 h 36 min 58 s	62 d 03 h 18 min 29 s
50 s/div	500 ms	Upper limit 1000 days	Upper limit 1000 days	Upper limit 1000 days	776 d 17 h 21 min 04 s	388 d 08 h 40 min 32 s	207 d 03 h 01 min 37 s	103 d 13 h 30 min 48 s
60 s/div	600 ms	Upper limit 1000 days	Upper limit 1000 days	Upper limit 1000 days	932 d 01 h 37 min 17 s	466 d 00 h 48 min 38 s	248 d 13 h 13 min 56 s	124 d 06 h 36 min 48 s
100 s/div	1.0 s	Upper limit 1000 days	Upper limit 1000 days	Upper limit 1000 days	Upper limit 1000 days	776 d 17 h 21 min 04 s	414 d 06 h 03 min 14 s	207 d 03 h 01 min 37 s
2 min/div	1.2 s	Upper limit 1000 days	Upper limit 1000 days	Upper limit 1000 days	Upper limit 1000 days	932 d 01 h 07 min 17 s	497 d 02 h 27 min 53 s	248 d 13 h 13 min 56 s
5 min/div	3.0 s	Upper limit 1000 days	Upper limit 1000 days	Upper limit 1000 days	Upper limit 1000 days	Upper limit 1000 days	Upper limit 1000 days	621 d 09 h 04 min 51 s

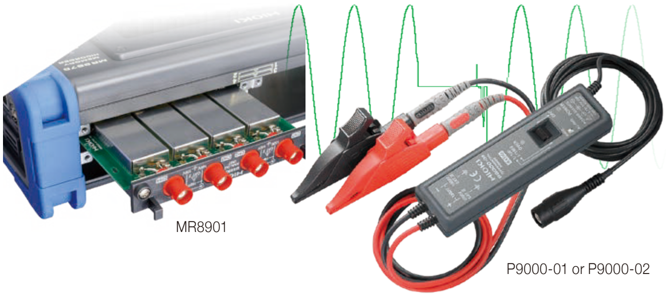
2 Multi-channel
Mixed Measurement of Various Signals

Install input modules according to your specific needs

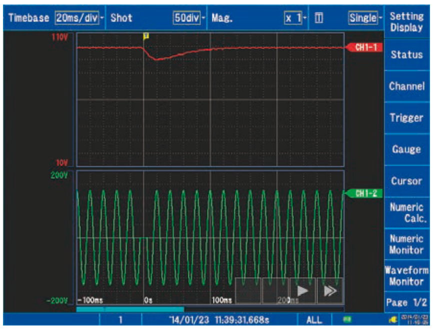
- The **MR8875** uses a plugin unit-type input amp setup that allows users to select the input unit that's appropriate for their measurement objective. In addition, it's easy to change input units after purchase.
- The Analog Unit **MR8905**, which can accommodate high voltages and allows direct input of up to 1,000 V (CAT II) or 600 V (CAT III), is available for high-voltage applications. In addition to instantaneous waveforms, measurement of RMS level waveforms is also supported (starting with Ver. 2.14/3.14 of the **MR8875**).
- Even the standard input unit supports 1,000 V (CAT III) measurement if used with the newly developed Differential Probe P9000 series of small probes.
- For high-sensitivity measurement, use the Strain Unit **MR8903**, which features 1 mV f.s. operation (for a maximum resolution of 0.04 μV). Measurement of minuscule sensor output is also supported.

DC/AC V　DC/AC A　°C Thermocouple　με　CAN

The Analog Unit MR8905 does not include input cables. Separate purchase of the optional Connection Cable Set L4940 (× 2) and Alligator Clip Set L4935 (× 2), which consists of clips that fit onto the ends of the cables, is required.



The Differential Probe P9000 can be used with the standard Analog Unit MR8901 to enable high-voltage, 1,000 V (CAT III) measurement. The P9000-02 further enables RMS level measurement of AC power lines.

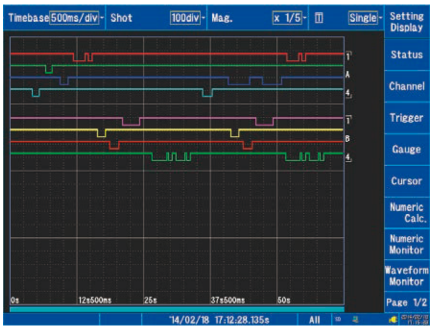


• Example of recording the instantaneous waveform and RMS level waveform during a momentary outage of an AC power supply (using the MR8905)

Accepts direct pulse input and standard logic probe terminals

The **MR8875** offers two standard equipped pulse input channels that allow for inputting no-voltage a- and b-contacts, open collectors, or voltage. Signals transmitted as pulses, such as those of rotation speed and flow rate, can be measured (counted). Use a logic probe for the on/off (logic) signal waveforms such as relay and PLC waveforms. Two types of logic probes are available depending on the signal types (see p. 15).

0 1 0 Digital



• Multi-channel timing measurement using logic waveform measurement

■ Support for a wide variety of measurement items

(Model MR8875 standard equipped with pulse input capability. Logic input requires an optional logic probe.)

Measurement target	Input unit	Measurement range	Resolution	Sampling	Frequency characteristics
Rotation speed	Standard equipped with pulse input	5000 (r/s) f.s.	1 (r/s)	10 msec (100 S/s)	N/A
Pulse totalization	Standard equipped with pulse input	65,535 to 3,276,750,000 counts f.s.	1 count	N/A	N/A
Relay contacts, voltage on/off	Logic Probe 9320-01	Depends on logic probe in use Max. input 50 V Threshold +1.4 V, +2.5 V, +4.0 V, or non-voltage contact (short/open)	N/A	2 μsec (500 kS/s)	500 nsec or lower response
AC/DC voltage on/off	Logic Probe MR9321-01	Depends on logic probe in use detects presence of AC/DC voltages of up to 250 V.	N/A	2 μsec (500 kS/s)	3 msec or lower response

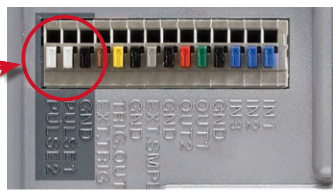
Note: Power line frequency, duty ratio and pulse width measurements are not supported.

■ Pulse input terminal

Take advantage of the frequency dividing function, settable from 1 to 50,000 counts, to take direct readings from an encoder that outputs multi-point pulses according to the rotation speed.

Pulse Totalization/ Rotation Speed

Two line pulse inputs (common GND)

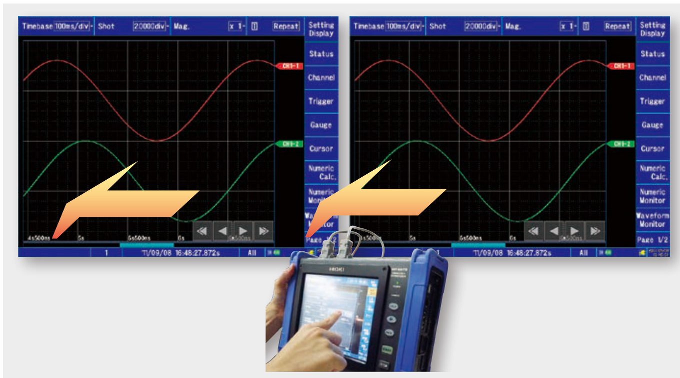


3 Touch Screen for Intuitive Operation

Touch screen interface improves operating efficiency

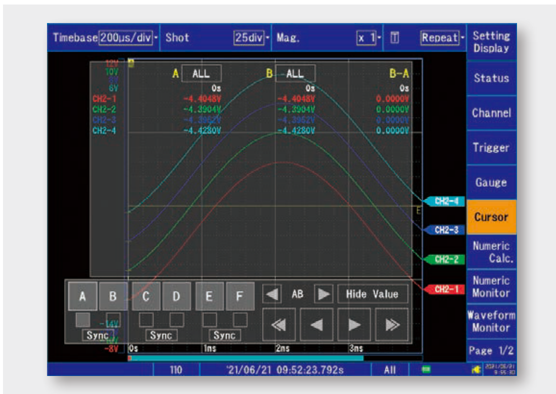
Buttons on the MR8875 are kept to a minimum by utilizing touch screen technology. The high-definition 8.4-inch high-brightness TFT color LCD is the interface of choice for improving productivity by offering a more intuitive experience than traditional input methods. While the connection terminals are located at the top panel of the MR8875, when cables need to be connected from the bottom, simply swipe the screen from top to bottom at either edge and the screen will rotate. In this way, the MR8875 can be set in a position that is easier to use according to the installation location.

Touch to scroll back or scale the waveform



Display earlier waveforms during recording without stopping measurement by simply touching the scroll icons on the screen. You can also scale the waveform amplitude by just swiping through the waveform up (to zoom in) or down (to zoom out).

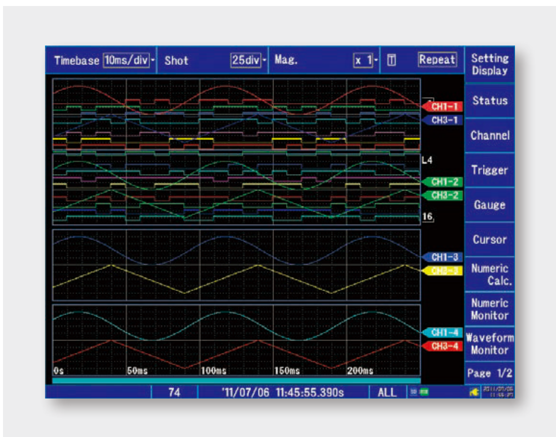
Advanced cursor read function for multichannel analysis



Six cursors A, B, C, D, E, and F are available, compared with the conventional A- and B-cursors. Use the cursors to measure and display the following:

- A, B, C, and D: Electric potential and time from the trigger
- E and F: Electric potential
- A-B and C-D cursors: Time difference and potential difference
- E-F cursors: Electric potential

Split screen, sheet display, event mark input, and jump functions–indispensable for efficient analysis



Split screen and sheet display functions are provided to support multiple channels. Individual display formats can be selected and an application can be assigned to each sheet for analysis, increasing productivity.

★ For long-term recordings, tag important points with event markers. Up to 1000 markers can be placed so that you can quickly jump to them later for detailed analysis.

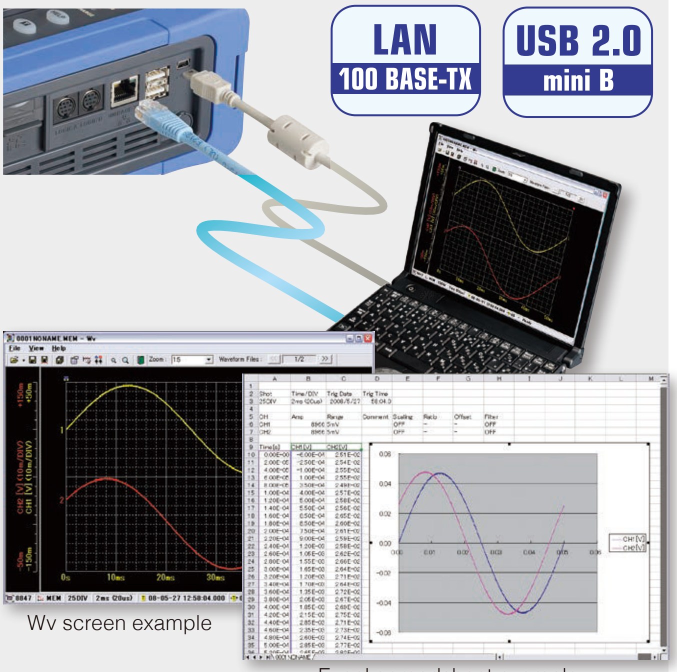
4 Computer Analysis
via LAN, SD, and USB memory interfaces

LAN-compatible Web/FTP server function and waveform/CSV conversion using the included software "Wv"

Take advantage of the built-in 100BASE-TX LAN interface to network with a PC:

WEB server: Use the Web Server function to view waveforms and remotely control the **MR8875** with your PC's web browser

FTP server: Use the FTP server function to copy the data stored in memory (SD card, USB memory, or internal storage memory) to the PC. You can then view binary waveform data acquired with the **MR8875** on a PC, or convert data to CSV using the free WaveViewer (Wv) application for further analysis in Excel. Download the latest version of WaveViewer from the HIOKI website at www.hioki.com.



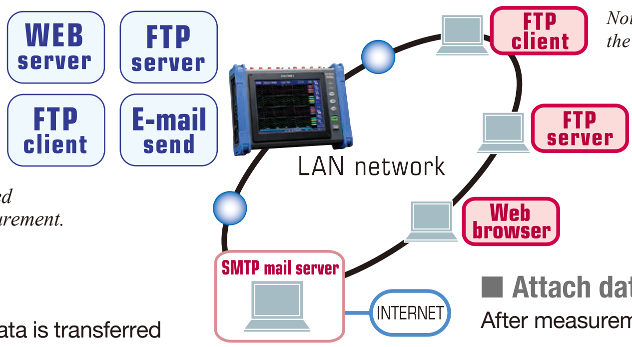
Wv screen example

Excel spreadsheet example

■ Remotely control the MR8875 using the Web server function

Use a typical web browser to see the screen of the **MR8875** on your PC with no other special software required. Make settings, acquire data, and monitor the screen with ease.

Note: Waveform data cannot be acquired from the internal memory during measurement.



■ Download data using FTP

Measurement data in files on recording media and in the internal memory can be acquired from a PC.

Note: Waveform data cannot be acquired from the internal memory during measurement.

■ Transfer data using FTP

After measurement is finished, data is transferred automatically to the FTP server that is running on the PC. Data can also be transferred at you desired timing.

■ Attach data to E-mail

After measurement is finished, you can automatically send the captured data as an e-mail attachment. Data can also be transferred at you desired timing.

Save data to the USB memory or SD card

Convenient USB memory*1 or SD memory cards*1 can be used to copy data stored in the internal storage memory to the PC. Data stored in the **MR8875**'s SD card can also be downloaded to the PC using a USB cable.*2

*1 *Use only HIOKI SD memory cards and USB memory stick, which are manufactured to strict industrial standards, for long-term storage of important data. Data cannot be saved in real-time to a USB memory.*

*2 *Only data stored onto the HIOKI SD memory card can be downloaded onto a PC via a USB cable.*

5 Powerful Data Analysis Capabilities

FFT Analysis Function

MR8875 Ver. 2.01 or later

Simultaneously measure four phenomena

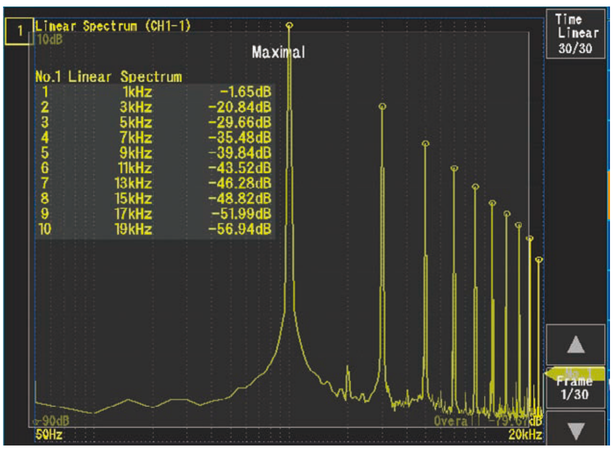
The MR8875's FFT analysis function can simultaneously analyze four phenomena with a single measurement.
By performing FFT analysis of different signal inputs from channels 1 through 4, it is possible to analyze the frequency components of each channel occurring at the same time.
For example, you can simultaneously view the linear spectrum, RMS spectrum, power spectrum, and phase spectrum for a signal input to channel 1.

Analysis functionality for a variety of measurement scenarios

The MR8875 features calculation functions that are often used during field measurements. The linear spectrum is used in analysis that focuses on waveform amplitude values, while the power spectrum is used in analysis that focuses on energy, for example noise and vibration measurement. You can select the calculation function that best suits your application—for example, use a transfer function for measurement that identifies internal systems based on I/O characteristics.

Peak value display function (marker display)

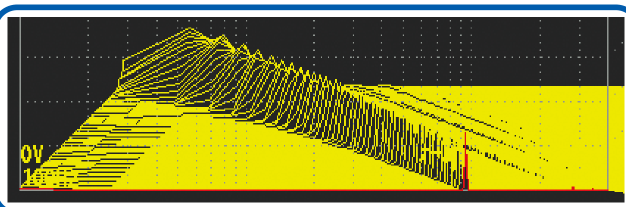
The peak value display function can be used to search for maximum and local maximum values and then display them. Characteristic values can be easily displayed even without using a cursor. Since the MR8875 stores up to 200 frames (200 calculation results) of data, it will automatically search for the peak value again if a different frame is selected.



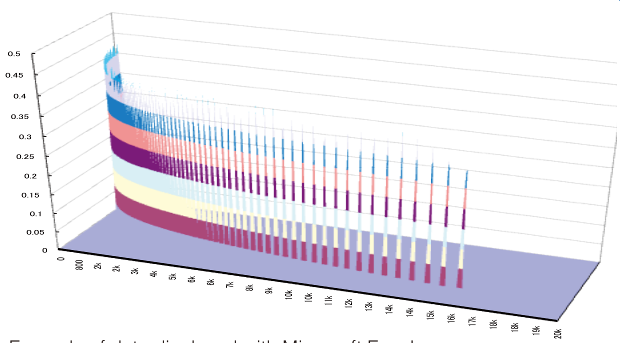
Running the spectrum display function

The MR8875's running spectrum display function can be used to continuously display spectra that change over time. Up to 200 frames* of the most recent calculation results can be stored. Although Hioki's MR8847 Series only supports running the spectrum display for certain types of calculations, the MR8875 can generate this display with all FFT calculation functions. Additionally, if the selected frame is changed, the cursor value can also be loaded.

** Frame data is stored in the instrument's internal memory, regardless of whether the running spectrum display is used.*



The MR8875 can also freeze the spectrum display on its screen during measurement. This function allows data to be observed without the inclusion of unneeded information on the screen or in the data. All calculation results can be output as CSV data, which can be loaded into a spreadsheet application such as Microsoft Excel and used to create a three-dimensional graph.



Example of data displayed with Microsoft Excel

Extensive window functions

The MR8875 provides a total of seven window functions, including rectangular and Hanning variants. The rectangular function is used for analysis that focuses on spectrum amplitude values, while the Hanning function is used for analysis that focuses on the degree of spectral separation of frequency components. Additionally, by using an exponential window in impact measurement utilizing an impulse hammer, the instrument enables more precise analysis by limiting unneeded noise components on the time axis.

Continuous calculation function

When analyzing a signal that changes over time, the number of FFT calculation points becomes a limitation, preventing the waveform from being analyzed in all time domains. Furthermore, using too many FFT points prevents the desired results from being obtained because the spectrum is averaged. The MR8875 resolves these problems with its continuous calculation function. For data covering extended periods of time, calculation points can be shifted by a number of skip points* at a uniform interval. Moreover, calculations for up to 200 frames can be accomplished with a single operation. Calculation results for different time periods can be reviewed by changing the calculation frame, regardless of whether you're using the running spectrum display or a single-screen display.

** The number of skip points can be set from 100 to 10,000.*

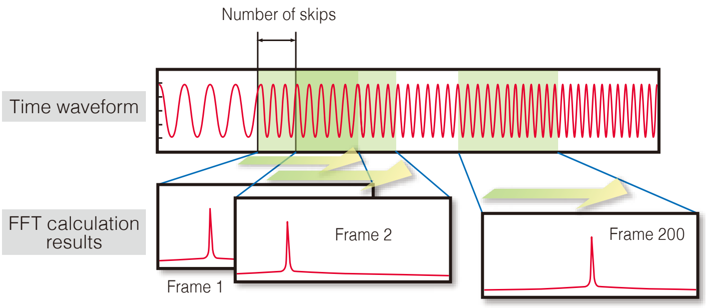
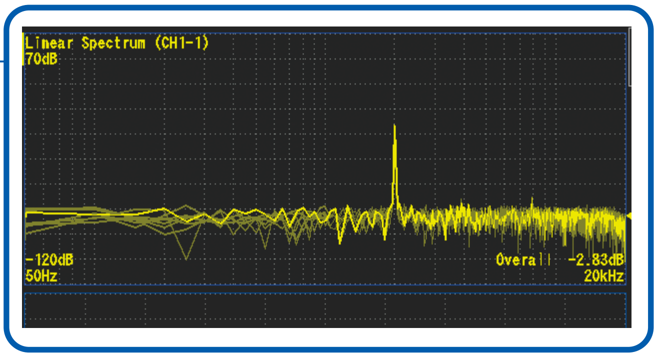


Illustration of continuous calculation

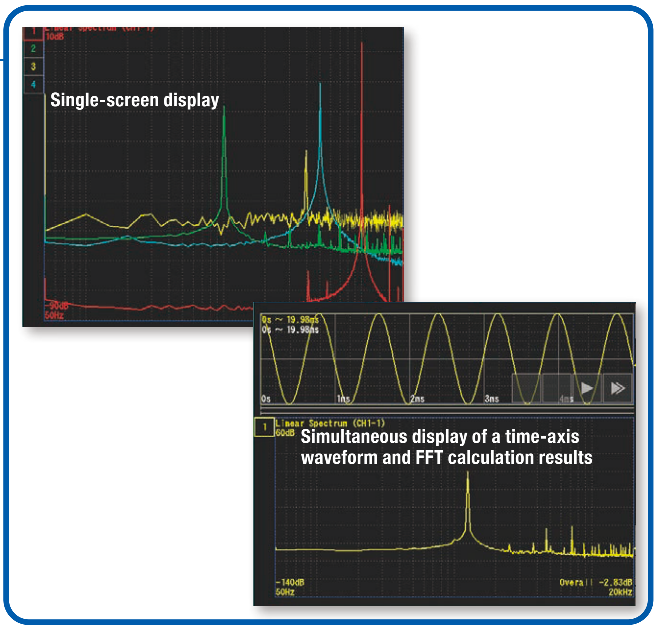
Overlay display function

The MR8875's overlay display function can be used to observe variations in waveforms captured using continuous measurement over time. Although previous Hioki models have not been able to overlay FFT calculations, the MR8875 offers this capability, improving the visibility of analysis.



Visually appealing screen displays

The MR8875's display can be switched according to the application at hand. For example, its single-screen display can be used when focusing on the correlation between channels, while its four-screen display can be used to isolate complex spectra for viewing. Additionally, time and spectrum waveforms can be displayed above and below one another when focusing on correlation with a captured time waveform.



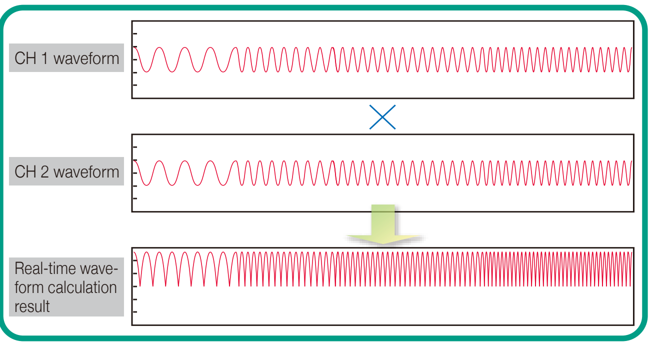
Waveform Calculation Function

MR8875 Ver. 2.01 or later

Real-time inter-channel calculation

The MR8875 features a new real-time inter-channel calculation* function that allows you to observe and record results for up to two calculations on the same input module while measurement continues.

* *Between channels on the same input module only (supported input modules: MR8901/8902/8903)*
* *Calculations between different user-set phenomena on the MR8902/8903 (voltage and temperature, etc.) are not supported.*

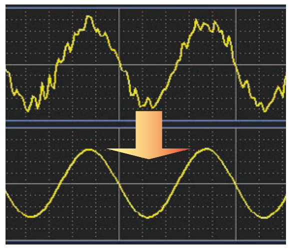


Waveform-dimension calculations

The previous MR8875 firmware version only supported calculations that generated values such as averages and RMS values, but the new version can process for up to eight calculations simultaneously, including arithmetic operations as well as differential-integral and other waveform-dimension calculations.

Results of measuring a distorted waveform containing noise

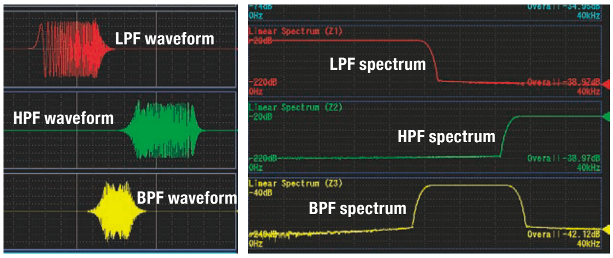
Results of a calculation-based simulation of a waveform from which high-frequency distortion has been rejected by passing it through a low-pass filter.



Digital filter calculations

The MR8875 offers new digital filter calculations* as part of its selection of waveform processing calculations, allowing the necessary bandwidth portion of a waveform containing noise to be calculated and the resulting waveform displayed.

* *Finite impulse response (FIR) and infinite impulse response (IIR) digital filters are offered. Both of the digital filters can be configured with an LPF (passing only the low-frequency component), HPF (passing only the high-frequency component), BPF (passing only a frequency bandwidth of a certain width), or BEF (rejecting only a frequency bandwidth of a certain width).*
* *Although FIR calculation processing is time-consuming, it can yield waveforms with no phase distortion. By contrast, IIR calculation yields results at a relatively faster calculation speed but is prone to phase distortion. Each filter's cutoff frequency is user-specified.*



Principle FFT calculation functions

Calculation points	1,000
	2,000
	5,000
	10,000
Window functions	Rectangular window
	Hanning
	Hamming
	Blackman
	Blackman-Harris
	Flat top
	Exponential
Display	Amplitude
	Real part
	Imaginary part
	Peak value display: local maximum, maximum
	Running spectrum (spectrogram): 200 lines
	Screen segmenting: 1-/2-/4-screen waveform display
Averaging	Frequency (simple)
	Frequency (exponential)
	Frequency (peak-hold)

Principle FFT calculation functions

Analysis functions	Linear spectrum
	RMS spectrum
	Power spectrum
	Transfer function
	Cross power spectrum
	Coherence function
	Phase spectrum
Other	Frequency range: 1.33 mHz to 400 kHz
	Max. number of simultaneous functions: 4
	Total harmonic distortion (THD) analysis
	Overall value
	Window function energy correction
	dB scaling
	Continuous calculation
	Calculation precision: 32-bit floating point, IEEE single-precision

6 CAN Signal Input for Vehicle Testing

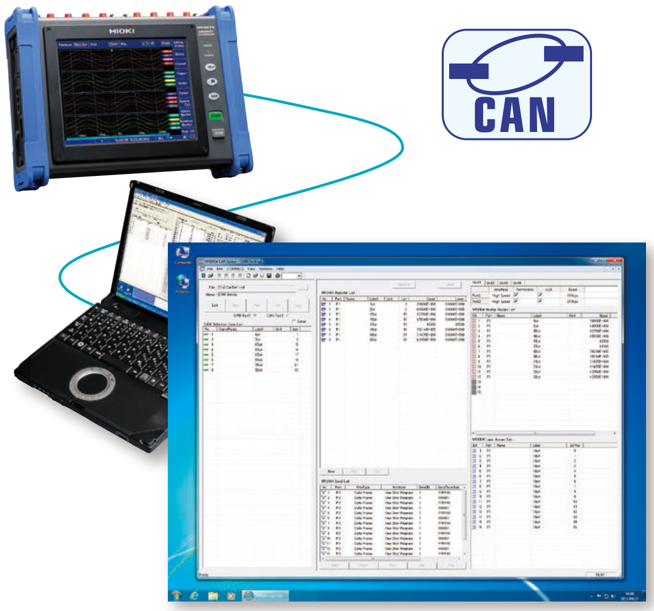
Synchronized mixed recording of CAN data and real data such as voltage, temperature, or distortion signals

CAN bus signals that are used widely, particularly in automotive applications, can be recorded, analyzed, converted to analog waveforms, and viewed. Simultaneous recording and viewing of analog waveforms from sensors, in addition to the CAN data, allows you to check the impact of noise and level changes on the communication data.

DC V · Thermocouple °C · με · CAN

Vector's CAN database can be loaded using supplied software

Industry standard CANdb® database files can be loaded onto the supplied setting software to identify the CAN channel signals. CAN messages can be viewed using the customer-specified message and signal names, as well as scaled engineering units. Since parameters such as signal data type, start bit, length, and byte sequence are all pre-defined in CANdb files, users can concentrate on their measurement tasks without needing to define signals.



CAN editor (bundled software)

Withstand extreme environmental temperatures, vibrations, and data loss threats due to power outages

In road tests, extreme environmental conditions associated with temperature and vibration are traditionally hard on measuring instruments. The **MR8875** has the wide operating temperature range of -10˚C to 50˚C (14˚F to 122˚F) and is compliant with the stringent Japanese standard for vibration resistance performance used in automotive testing (JIS DI1601). It is designed to withstand the harsh conditions of in-vehicle measurement.

In the event of a power outage while data is being recorded, the power supply is maintained using a built-in large-capacity capacitor until data is completely written to the SD or USB memory. Risk of data loss or damage to the file system is minimized, and after power is restored, measurement can be restarted automatically.

Basic specifications (Accuracy guaranteed for 1 year)

Measurement function	High-speed recording
Number of input modules that can be installed	Up to 4 slots, user installable in any combination by plugging into the main unit [MR8901 × 4]: 16 analog channels + standard 8 logic and 2 pulse channels [MR8905 × 4]: 8 analog channels + standard 8 logic and 2 pulse channels [MR8902 × 4]: 60 analog channels + standard 8 logic and 2 pulse channels [MR8903 × 4]: 16 analog channels + standard 8 logic and 2 pulse channels [MR8904 × 4]: 8 CAN ports (analyzed 60 analog + analyzed 64 logic ch) + standard 8 logic and 2 pulse channels *For analog units, channels are isolated from each other and from the MR8875's GND. For CAN unit ports or standard logic terminals or standard pulse terminals, all channels have common GND.*
Max. sampling rate	MR8901/MR8905: 500 kS/s (2 µs period, all channels simultaneous) MR8902: 10 msec (channel scanning) MR8903: 200 kS/s (5 µs period, all channels simultaneous) External sampling: 200 kS/s (5 µs period)
Storage memory capacity	Total 32 Mega-words (memory expansion: none, 8 Mega-words/module) * *1 word = 2 bytes, therefore 32 Mega-words = 64 Mega-bytes.* * *Memory can be allocated depending on the number of channels used on each input module*
External storage	SD card slot × 1, USB memory stick (USB 2.0 standard) * *FAT-16 or FAT-32 format on SD or USB*
Backup functions (at 23°C/73°F)	Clock and parameter setting backup: at least 10 years Waveform backup function: none
Interfaces	LAN × 1: 100BASE-TX (DHCP, DNS supported, FTP server/client, web server, send E-mail, command control) USB series mini-B receptacle × 1 (setting and measurement by communications commands, transfer data from SD card to a PC) USB series mini-A receptacle × 2 (USB memory stick, USB mouse, USB keyboard)
External control connectors	External trigger input, trigger output, external sampling input, pulse input × 2, external input × 3, external output × 2
External power supply	Three lines, +5 V, 2 A total output, Common GND with the body GND * *Differential probe 9322 can not be used*
Operating temperature and humidity (no condensation)	Temperature: -10°C to 40°C (14°F to 104°F), 80% rh or less 40°C to 45°C (104°F to 113°F), 60% rh or less 45°C to 50°C (113°F to 122°F), 50% rh or less When powered by the battery pack: 0°C to 40°C (32°F to 104°F), 80% rh or less When charging the battery pack: 10°C to 40°C (50°F to 104°F), 80% rh or less Storage: -20°C to 40°C (-4°F to 104°F), 80% rh or less 40°C to 45°C (104°F to 113°F), 60% rh or less 45°C to 50°C (113°F to 122°F), 50% rh or less Battery pack storage: -20°C to 40°C (-4°F to 104°F), 80% rh or less
Applicable standards	Safety: EN61010-1, EMC: EN61326, EN61000-3-2, EN61000-3-3
Compliat standards	Anti-vibration: JIS D1601: 1995 5.3 (1) (corresponds to Class 1: passenger car, condition: class A)
Power supply	AC adapter Z1002: 100 to 240 V AC (50/60 Hz) Battery Pack Z1003: 7.2 V DC Continuous operation time: one hour with back light on (AC adapter has priority when used in combination with battery pack) DC power supply: 10 to 28 V DC (please contact your Hioki distributor for connection cord)
Charging function (at 23°C/73°F)	Recharging time: approx. 3 hours (using the AC adapter and main unit to recharge the Battery Pack Z1003)
Power consumption	When using the AC adapter Z1002, or external DC power supply: 56 VA When using the battery pack: 36 VA
Dimensions and weight	Approx. 298W × 224H × 84D mm (11.73W × 8.82H × 3.31D in.), 2.4 kg (84.7 oz.), (excluding input modules and battery pack) Example configurations: 2.75 kg (97.0 oz., excluding input modules and including battery pack), 3.47 kg (122.4 oz., including MR8901 × 4 and battery pack)
Supplied accessories	Instruction Manual × 1, Measurement Guide × 1, AC Adapter Z1002 × 1, Protection Sheet × 1, USB Cable × 1, Shoulder Strap × 1, Application Disk (Wave viewer Wv, communication commands table, CAN Editor) × 1

Display

Display type	8.4 inch SVGA-TFT color LCD (800 × 600 dots, touch screen), (time axis 25 div × voltage axis 20 div, X-Y waveform 20 div × 20 div)
Screen settings	Waveform split screen (1, 2, or 4), X-Y 1 & X-Y 2 screens, time axis + X-Y waveform screen, sheet display (sheet "ALL", sheet 1 to 4 selectable)
Screen display types	•Waveform display •Simultaneous waveform and gauge display •Simultaneous waveform, gauge, and settings display •Simultaneous waveform and numerical calculation results display •Waveform and A/B, C/D, E/F cursor values displayed at the same time •Simultaneous waveform and instantaneous value display
Waveform monitor	See waveform without recording (setting screen, waiting for trigger screen)
Real-time value monitor	Values for all channels can be monitored during measurement (instantaneous value, average value, P-P value, max. value, min. value)
Display functions (Ver. 1.00 or later)	•Waveform scroll (scroll backwards through the display trend graph to view past waveforms even while recording) • Event marker input and jump functions (up to 1000 markers) •Waveform inversion (positive/negative) •Cursor readout (use A/B/C/D/E/F/cursors) •Vernier display (fine amplitude adjustment)
Display functions (added with Ver. 2.01)	•Waveform zoom (splits the screen vertically; supports waveform magnification and overall display) •Waveform overlay (select from off, overlay for each measurement, and overlay at user-selected timing) • Waveform history (up to 16 past data sets can be selected and displayed.)

Measurement function (High-speed recording)

Time axis	200 µs/div, 500 µs/div, 1 ms/div to 500 ms/div, 1 s/div to 5 min/div 21 ranges, external sampling (max. 200 kS/s) Recording intervals with real-time save on: 2 µs/S (up to 2 channels), 5 µs/S (up to 8 channels), 10 µs/S (up to 16 channels), 20 µs/S (up to 30 channels), 50 µs/S (up to 64 channels), 100 µs/S (no limit on number of channels in use)
Accuracy of time axis	±0.0005%
Time axis resolution	100 points/div
Recording length (with MR8901 × 4, logic and pulse inputs off)	25 to 20,000 div *1 *2, 50,000 div *3, or user-configurable from 5 to 80,000 div *3 in 1 div increments *1 4 ch/module, *2 2 ch/module, *3 1 ch/module
Waveform expansion/ compression	Time axis: × 10 to × 2 or × 1, × 1/2 to × 1/50,000 Voltage axis: × 100 to × 2 or × 1, × 1/2 to × 1/10 Upper and lower limit settings, or position setting
Pre-trigger	Trigger timing at start: pre-trigger data can be recorded for an interval set in steps ranging from 0% to 100% of the recording length
Post-trigger	Trigger timing at stop: post-trigger data can be recorded for an interval set in steps ranging from 0% to 40% of the recording length
Real-time data save	On/off is selectable (exclusive real-time save or automatic save) Function: waveforms are saved as binary data to the SD memory card at each interval. *(Note: it cannot save in real-time to a USB memory. Use only SD memory cards sold by Hioki.)* Endless loop saving: a new file overwrites the oldest file when the SD memory card capacity runs short. *(Note: delete files only in saved repeat trigger mode.)* Normal saving: saving stops when the SD memory card capacity is full
Auto data save	Select from "off", waveform data (binary or CSV), numerical calculation results, and image data (compressed BMP or PNG) Function: data are saved to either an SD memory card or USB memory stick at once after the specified recording length is acquired. Endless loop saving: a new file overwrites the oldest file when the SD memory card or USB memory capacity runs short Normal saving: saving stops when the SD memory card or USB memory capacity is full
Data protection	In the event of a power outage during saving to storage media, the file is closed and then the power is shut down. *(Note: this function is enabled 15 minutes after the power is turned on.)*
Loading data from media	•Binary data stored in the SD memory card or the USB memory stick can be recalled by the MR8875 internal storage memory •Waveform data saved in real time to the SD memory card can be loaded starting at a specified position up to the maximum storage memory capacity.
Memory segmentation	N/A

Trigger functions

Mode	Single, repeat
Timing	Start, stop, and start & stop (separate trigger conditions can be set to start and stop)
Trigger sources	•Trigger source selectable for each channel. (Free-running when all trigger sources are off) •Analog input: select up to 4 channels for each module •Inter-channel calculation results: W1-1 to W4-2 (Ver.2.01 or later) •Logic input: LA1 to LA4, LB1 to LB2 (4 channels x 2 probes), CAN L1 to 16 (for each MR8904 CAN Unit). Pattern triggers can be configured for each of the above trigger sources. •Pulse input: P1, P2 (2 channels) •External input: input signal to external trigger terminal •Logic AND/OR of all sources •Forced trigger execution: priority over any other trigger source •Interval trigger: trigger is activated at recording start, and again at each set interval
Trigger types (analog, pulse)	• Level: a trigger is applied when the set voltage rises or falls. • Window: sets the upper and lower limits of trigger level
Trigger types (logic)	• Logic pattern: settable to 1, 0, or × for each logic probes • The trigger condition (AND/OR) can be set between logic input channels in each probe.
Trigger types (external input)	•Rise or fall is selectable (max. allowable input voltage 10 V DC) Rising: a trigger is applied when rising from "Low" (0 to 0.8 V) to "High" (2.5 to 10 V) Falling: a trigger is applied when falling from "High" (2.5 to 10 V) to "Low" (0 to 0.8 V) or to a terminal short. •External trigger filter and response pulse width: When external filter is off: high period is 1 ms or greater, and low period 2 µs or less When the external filter is on: high period is 2.5 ms or greater, and low period is 2.5 ms or less
Trigger level resolution	• Analog: 0.1% f.s. (f.s. = 20 div) *(Note: with the CAN Unit MR8904, resolution fluctuates according to the bit length defined by the CAN.)* •Pulse integration: 0.002% f.s., •Pulse rotation count: 0.02% f.s. (f.s. = 20 div)
Trigger filter	Set by number of samples (10 to 1000 points, or off)
Trigger output	•Open drain output (with 5 voltage output, active low) •Output voltage: 4.0 to 5.0 V (high level), 0 to 0.5 V (low level) •Output pulse width: selectable level or pulse Level: sampling period × (number of data after the trigger minus one) or longer (2 µs or longer) Pulse: 2 ms ±10%

Calculation functions

Real-time inter-channel calculations (Ver.2.01 or later)	• Up to 2 calculations per module can be performed simultaneously. • Calculation possible modules: Analog Unit MR8901, Voltage/Temp Unit MR8902, Strain Unit MR8903 * *Inter-channel calculations are limited to a single module.* * *Scaling and probe settings will be disabled if their channel has a calculation set to it.* * *Calculation results can be scaled.* * *Calculations between different user-set phenomena on the MR8902 and MR8903 are not supported.* • Calculations: addition, subtraction, multiplication
Numerical calculation	• Up to 8 calculations can be performed simultaneously • Calculation memory location: internal memory • Calculations: average, effective (rms), peak to peak, maximum value, time to maximum value, minimum value, time to minimum value, period, frequency, rise time, fall time, area value, X-Y area value, standard deviation, specified level time, specified time level, pulse width, duty ratio, pulse count, time difference, phase difference, high-level, low-level, arithmetic calculations. Calculation results can be saved to an SD memory card or USB memory stick. •Calculation range: select from all measurement data or between A/B or C/D cursors • Automatic storing of calculation results in CSV format to the SD card or the USB memory stick
Waveform calculations (Ver.2.01 or later)	• Up to 8 calculations can be performed simultaneously. • Calculation memory location: internal memory • Calculations: basic arithmetic, absolute values, exponents, common logarithms, square roots, differentials (1st and 2nd order), integrals (1st and 2nd order), moving averages, time-axis moving averages, trigonometric operations (SIN, COS, TAN), inverse trigonometric operations (ASIN, ACOS, ATAN), FIR filter operations, IIR filter operations, average values, maximum values, minimum values, level at time • Calculation range: all measurement data; areas between the A/B and C/D cursors can be selected.
FFT calculations (Ver.2.01 or later)	• Up to 4 calculations can be performed simultaneously. • Calculation memory location: internal memory • Calculation modes: single, repeat • Number of points: 1,000 to 10,000 • Number of skips: automatic, 100 to 10,000 * *It can be set only when the calculation mode is "Repeat".* • Window functions: rectangular window, Hanning, Hamming, Blackman, Blackman-Harris, flat top, exponential • Averaging: off, simple average, indexed average, peak hold • Compensation: none, power, average • Peak value display: off, local maximum value, maximum value • Analysis mode: off, linear spectrum, RMS spectrum, power spectrum, transmission function, cross-power spectrum, coherence function, phase spectrum • Display scale: linear scale, log scale
Evaluation	Calculation result evaluation output: GO/STOP (with open-drain 5 V output)

Other functions

External sampling	Maximum input: up to 10 V DC Maximum input frequency: 200 kHz Input signal condition: high level 2.5 to 10 V, Low level 0 to 0.8 V, Pulse width high or low 2.5 µs or longer
Other	•Scaling, comment entry, select from time, date, and number of data for the horizontal axis display, key lock •Beep sound on/off •Auto range setting (automatically sets the best suitable sampling rate and amplitude range) •Hold start condition (when the power is interrupted during recording, measurement automatically resumes after power is restored) •Auto set up (automatically loads setting files stored in internal memory or the SD card) •Save the setting condition in internal memory (up to 6 conditions) •Manual data save

Pulse input section

No. of channels	2 channels, push-button type terminal, not isolated (common GND with main unit)
Mode	Rotation, integration
Measurement functions	•Divided rotation: 1 to 50,000 count (rotation number: number of pulses per rotation; integration: number of pulses per count) •Timing: select from "starting the count at the trigger" or "at the start of measurement". •Integration mode: select from "integration from the start of measurement" or "instantaneous value at each sampling period" •Processing of integration overflows: select either "value returns to 0 and counting continues" or "the overflow state persists"
Input form	•No-voltage 'a' contact (normally open contact), no-voltage 'b' contact (normally short contact), open collector or voltage input •Input resistance: 1.1 MΩ
Max. allowable input	0 V to 50 V DC (max. voltage between input terminals that does not cause damage)
Max. rated voltage between channels	Not isolated (common GND with main unit)
Max. rated voltage to earth	Not isolated (common GND with main unit)
Detection level	4 V: (high: over 4.0 V, low: 0 to 1.5 V) 1 V: (high: over 1.0 V, low: 0 to 0.5 V)
Pulse input period	With filter off: 200 µs or more (both high and low periods must be at least 100 µs) With filter on: 100 ms or more (both high and low periods must be at least 50 ms)
Slope	Count at rising edge, or count at falling edge
Filter	Chatter prevention filter (on/off switchable)

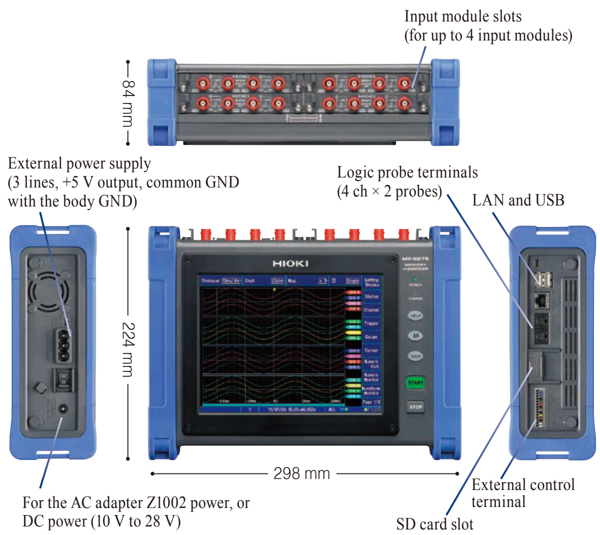
Setting range	Resolution	Measurement range
2,500 c/div	1 c/LSB	0 to 65,535 c
25 kc/div	10 c/LSB	0 to 655,350 c
250 kc/div	100 c/LSB	0 to 6,553,500 c
5 Mc/div	2 kc/LSB	0 to 131,070,000 c
125 Mc/div	50 kc/LSB	0 to 3,276,750,000 c
Rotation: 250 [r/s]/div	1 [r/s]/LSB	0 to 5,000 [r/s]

■ Maximum time to record to the internal storage memory

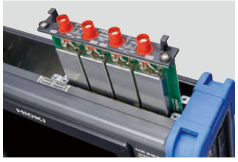
* The MR8875 is able to save up to 16 channels of data per module. The graph below shows 16 channels because it is looking at storage per unit. However all units in use will follow the same maximum recording time.
* Built-in logic, and pulses P1 and P2 each use the capacity equivalent to one analog channel.

Number of channels to be used		9 ch to 16 ch	5 ch to 8 ch	3ch to 4 ch	2 ch	1 ch
Time axis	Sampling period	5,000 div	10,000 div	20,000 div	40,000 div	80,000 div
200 µs/div	2 µs	1 s	2 s	4 s	8 s	16 s
500 µs/div	5 µs	2.5 s	5 s	10 s	20 s	40 s
1 ms/div	10 µs	5 s	10 s	20 s	40 s	1 min 20 s
2 ms/div	20 µs	10 s	20 s	40 s	1 min 20 s	2 min 40 s
5 ms/div	50 µs	25 s	50 s	1 min 40 s	3 min 20 s	6 min 40 s
10 ms/div	100 µs	50 s	1 min 40 s	3 min 20 s	6 min 40 s	13 min 20 s
20 ms/div	200 µs	1 min 40 s	3 min 20 s	6 min 40 s	13 min 20 s	26 min 40 s
50 ms/div	500 µs	4 min 10 s	8 min 20 s	16 min 40 s	33 min 20 s	1 h 06 min 40 s
100 ms/div	1 ms	8 min 20 s	16 min 40 s	33 min 20 s	1 h 06 min 40 s	2 h 13 min 20 s
200 ms/div	2 ms	16 min 40 s	33 min 20 s	1 h 06 min 40 s	2 h 13 min 20 s	4 h 26 min 40 s
500 ms/div	5 ms	41 min 40 s	1 h 23 min 20 s	2 h 46 min 40 s	5 h 33 min 20 s	11 h 06 min 40 s
1 s/div	10 ms	1 h 23 min 20 s	2 h 46 min 40 s	5 h 33 min 20 s	11 h 06 min 40 s	22 h 13 min 20 s
2 s/div	20 ms	2 h 46 min 40 s	5 h 33 min 20 s	11 h 06 min 40 s	22 h 13 min 20 s	1 d 20 h 26 min 40 s
5 s/div	50 ms	6 h 56 min 40 s	13 h 53 min 20 s	1 d 03 h 46 min 40 s	2 d 07 h 33 min 20 s	4 d 15 h 06 min 40 s
10 s/div	100 ms	13 h 53 min 20 s	1 d 03 h 46 min 40 s	2 d 07 h 33 min 20 s	4 d 15 h 06 min 40 s	9 d 06 h 13 min 20 s
30 s/div	300 ms	1 d 17 h 40 min	3 d 11 h 20 min	6 d 22 h 40 min	13 d 21 h 20 min	27 d 18 h 40 min
50 s/div	500 ms	2 d 21 h 26 min 40 s	5 d 18 h 53 min 20 s	11 d 13 h 46 min 40 s	23 d 03 h 33 min 20 s	46 d 07 h 06 min 40 s
60 s/div	600 ms	3 d 11 h 20 min	6 d 22 h 40 min	13 d 21 h 20 min	27 d 18 h 40 min	55 d 13 h 20 min
100 s/div	1.0 s	5 d 18 h 53 min 20 s	11 d 13 h 46 min 40 s	23 d 03 h 33 min 20 s	46 d 07 h 06 min 40 s	92 d 14 h 13 min 20 s
2 min/div	1.2 s	6 d 22 h 40 min	13 d 21 h 20 min	27 d 18 h 40 min	55 d 13 h 20 min	111 d 02 h 40 min
5 min/div	3.0 s	17 d 08 h 40 min	34 d 17 h 20 min	69 d 10 h 40 min	138 d 21 h 20 min	277 d 18 h 40 min

■ External appearance and dimensions



Options specifications (sold separately)



Plug-in slot for the input modules

Measurement target	Input module	Measurement range	Resolution
Voltage	Analog Unit MR8901	100 mV f.s. to 200 V f.s.	4 µV
	Analog Unit MR8905	10 V f.s. to 1000 V f.s.	400 µV
	Voltage/Temp Unit MR8902	10 mV f.s. to 100 V f.s.	0.5 µV
	Strain Unit MR8903	1 mV f.s. to 20 mV f.s.	0.04 µV
Current	Analog Unit MR8901 + additional current sensor	Depends on current sensor(s) in use * *Certain current sensors require a separate power supply*	1/1250 div
RMS AC voltage	Analog Unit MR8905	10 V rms f.s. to 700 V rms f.s.	400 µV
	Analog Unit MR8901 + additional Differential Probe 9322	100 V rms to 1 kV rms	1/1250 div
Temperature (thermocouple)	Voltage/Temp Unit MR8902	200°C f.s. to 2000°C f.s. * *Upper and lower limit values depend on the thermocouple in use*	0.01°C
Distortion, stress	Strain Unit MR8903	400 με to 20,000 με f.s.	0.016 με
Analyze CAN signals	CAN Unit MR8904	2 ports/unit **Up to 15 analog channels, each equivalent to a 16-bit analog signal* **Up to 16 logic channels, each equivalent to a 1-bit logic signal*	N/A
Relay contacts, voltage on/off	Logic Probe 9320-01	Depends on logic probes in use * *Max. input 50 V, threshold +1.4/+2.5/+4.0 V* * *Contact short/open, non-voltage*	N/A
AC/DC voltage on/off	Logic Probe MR9321-01	Depends on logic probes in use * *Up to 250 V AC/DC, detects live or not live*	N/A

Dimensions, weight: approx. 119.5W × 18.8H × 151.5D mm (4.70W × 0.74H × 5.96D in.), approx. 180 g (6.3 oz.) accessories: None

Analog Unit MR8901 (accuracy at 23 ±5°C [73 ±9 °F], 20 to 80% rh after 30 min. of warm-up time and zero adjustment; accuracy guaranteed for 1 year)

Functions	No. of channels: 4, for voltage measurement
Input connectors	Isolated BNC connector (input resistance 1 MΩ, input capacitance 10 pF) Max. rated voltage to earth: 100 V AC rms or 100 V DC (input is isolated from the main unit, the max. voltage that can be applied between input channels and chassis, and between input channels without damage)
Measurement range	5 mV to 10 V/div, 11 ranges, full scale: 20 div * *AC voltage can be measured/displayed: up to 140 V rms at × 1/2 amplitude compression, but limited to 100 V rms is the max. rated voltage to earth*
Low-pass filter	Low-pass filter: 5 Hz, 50 Hz, 500 Hz, 5 kHz, off
Resolution	1/1250 of measurement range (using 16-bit A/D converter)
Highest sampling rate	500 kS/s (simultaneous sampling across 4 channels)
Accuracy	±0.5% of full scale (with filter 5 Hz, zero position accuracy included)
Frequency characteristics	DC to 100 kHz, -3 dB
Input coupling	DC/GND
Max. allowable input	150 V DC (the max. voltage that can be applied across input pins without damage)

Dimensions, weight: approx. 119.5W × 18.8H × 184.8D mm (4.70W × 0.74H × 7.28D in.), approx. 190 g (6.7 oz.) accessories: ferrite clamp × 2

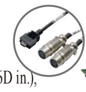
Voltage/Temp Unit MR8902 (accuracy at 23 ±5°C [73 ±9°F], 20 to 80% rh after 30 minutes of warm-up time and zero adjustment; accuracy guaranteed for 1 year)

Functions	No. of channels: 15, for voltage/temperature measurement (selectable for each channel)
Input connectors	Voltage/thermocouple input: push-button terminal Recommended wire diameter: single-wire φ 0.32 mm to φ 0.65 mm, stranded wire 0.08 to 0.32 mm² (conductor wire diameter min. φ 0.12 mm), AWG 28 to 22 Input resistance: 1 MΩ Max. rated voltage to earth: 100 V AC rms or 100 V DC (input is isolated from the main unit, the max. voltage that can be applied between input channels and chassis, and between input channels without damage)
Voltage measurement ranges	500 µV/div to 5 V/div, 9 ranges, full scale: 20 div * *The AC instantaneous voltage waveform cannot be measured due to the slow sampling speed.* Resolution: 1/1000 of measurement range (using 16-bit A/D converter) Accuracy: ±0.1% f.s. (with digital filter on, zero position accuracy)
Temperature measurement range	Reference junction compensation: internal/external (selectable) Thermocouple broken-wire detection: on/off (selection applies to entire unit) Thermocouple type: K, J, E, T, N, R, S, B, WRe5-26 * *For thermocouple measurement ranges, resolution, and accuracy, refer to the specifications table below*
Digital filter	50 Hz, 60 Hz, or off
Data refresh rate	10 ms (with filter off, burn-out detection off) 20 ms (with filter off, burn-out detection on) 500 ms (with filter on, data refresh rate: fast) 2 s (with filter on, data refresh rate: normal)
Max. allowable input	100 V DC (the max. voltage that can be applied across input pins without damage)
Max. allowable input across input channels	100 V DC (the max. voltage that can be applied across input channels without damage.) The channels are insulated by semiconductor relays. If a voltage exceeding the product specifications is applied between input channels, such as a lightning surge, it may cause a short circuit failure of the semiconductor relay. Please make such a voltage is not applied.

MR8902 specifications

Thermocouples	Setting ranges (full scale = 20 div)	Resolution	Measurement ranges	Accuracy
K	10 °C/div	0.01°C	-100°C to less than 0°C	±0.8°C
			0°C to 200°C	±0.6°C
	50°C	0.05°C	-200°C to less than -100°C	±1.5°C
			-100°C to 1000°C	±0.8°C
	100°C	0.1°C	-200°C to less than -100°C	±1.5°C
			-100°C to 1350°C	±0.8°C
J	10 °C/div	0.01°C	-100°C to less than 0°C	±0.8°C
			0°C to 200°C	±0.6°C
	50°C	0.05°C	-200°C to less than -100°C	±1.0°C
			-100°C to 1000°C	±0.8°C
	100°C	0.1°C	-200°C to less than -100°C	±1.5°C
			-100°C to 1200°C	±0.8°C
E	10 °C/div	0.01°C	-100°C to less than 0°C	±0.8°C
			0°C to 200°C	±0.6°C
	50°C	0.05°C	-200°C to less than -100°C	±1.5°C
			-100°C to less than 0°C	±0.8°C
			0°C to 1000°C	±0.6°C
	100°C	0.1°C	-200°C to less than -100°C	±1.5°C
			-100°C to less than 0°C	±0.8°C
			0°C to 1000°C	±0.6°C
T	10 °C/div	0.01°C	-100°C to less than 0°C	±0.8°C
			0°C to 200°C	±0.6°C
	50°C	0.05°C	-200°C to less than -100°C	±1.5°C
			-100°C to less than 0°C	±0.8°C
			0°C to 400°C	±0.6°C
	100 °C	0.1°C	-200°C to less than -100°C	±1.5°C
			-100°C to less than 0°C	±0.8°C
			0°C to 400°C	±0.6°C

Note: the thermocouple accuracy is obtained by adding a reference junction compensation accuracy of ±0.5°C



Dimensions, weight: approx. 119.5W × 18.8H × 151.5D mm (4.70W × 0.74H × 5.96D in.), approx. 173 g (6.1 oz.) accessories: conversion cable × 2 (connector: TAJIMI PRC03-12A10-7M10.5)

Strain Unit MR8903 (accuracy at 23 ±5°C [73 ±9°F], 20 to 80% rh after 30 minutes of warm-up time and auto-balancing; accuracy guaranteed for 1 year)

Functions	No. of channels: 4, for voltage/strain measurements (selectable for each channel, electronic auto-balancing, balance adjustment range within ±10,000 µV, ±10,000 µε)
Input connectors	Unit side: "HDR-EC14LFDTG2-SLE+" made by Honda Tsushin Kogyo Co., Ltd. Japan Via conversion cable, "PRC03-12A10-7M10.5" made by Tajimi Electronics Co., Ltd. Japan Max. rated voltage to earth: 33 V AC rms or 70 V DC (input is isolated from the main unit, the max. voltage that can be applied between input channel and chassis, and between input channels without damage)
Suitable transducer	Strain gauge converter, bridge resistance: 120 Ω to 1 kΩ, bridge voltage: 2 V ±0.05 V, Gauge rate: 2.0
Input resistance	More than 1 MΩ
Voltage measurement ranges	50 µV/div to 1,000 µV/div, 5 ranges, full scale: 20 div Accuracy: ±0.5% f.s. + 4 µV (at 50 µV/div only), other ranges ±0.5% f.s. (after auto-balance, with filter 5 Hz, zero position accuracy included)
Strain measurement ranges	20 µε/div to 1,000 µε/div, 6 ranges, full scale: 20 div Accuracy: ±0.5% f.s. + 4 µε (at 20, 50 µε/div), other ranges ±0.5% f.s. (after auto-balance, with filter 5 Hz, zero position accuracy included)
Low-pass filter	Low-pass filter: 5 Hz, 10 Hz, 100 Hz, 1 kHz, off
Resolution	1/1250 of measurement range (using 16-bit A/D converter)
Highest sampling rate	200 kS/s (simultaneous sampling across 4 channels)
Frequency characteristics	DC to 20 kHz, +1/-3 dB
Max. allowable input	10 V DC (the max. voltage that can be applied across input pins without damage)

Dimensions, weight: approx. 119.5W × 18.8H × 151.5D mm (4.70W × 0.74H × 5.96D in.), approx. 185 g (6.5 oz.), accessories: none

CAN Unit MR8904

Input CAN port	Number of ports: 2, connector: D-sub male 9 pin × 2
Standards	ISO 11898 CAN 2.0b, ISO 11898-1, ISO 11898-2, ISO 11898-3, SAE J2411
Interface	Selectable: high-speed CAN, low-speed CAN, or single-wire CAN by port (with built-in corresponding transceiver)
ACK transmission	On/off for transmitting an ACK for receiving CAN signal with the MR8904
Terminator	On/off via commands, 120 Ω ±10 Ω built-in resistance
Baud rate	50 kbps to 1 Mbps at "High-speed", 10 kbps to 125 kbps at "Low-speed", 10 kbps to 83.3 kbps at "Single-wire"
Analyzed signal output channel	Up to 15 analog channels each equivalent to a 16-bit analog signal Up to 16 logic channels each equivalent to a 1-bit logic signal
Signal form	1-bit signal: 1 channel of logic, or 1 channel of analog 1-bit to 16-bit signal: 1 channel of analog 17-bit to 32-bit signal: 2 channels of analog * *Cannot handle signals over 32-bit*
ID trigger	Output "H" level pulse to designated logic channel when receiving set ID signal * *Output pulse width: 50 µs below 5 ms/div time axis, 1 sampling time at more than 10 ms/div time axis*
Response time	Within 200 µs after completely receiving CAN message
Transmit CAN message	Can transmit a set CAN message to the CAN bus per port

Options specifications (sold separately)

CAN Editor specifications (software bundled with the MR8904)

(The following values are for one MR8904)

Operating environment	Windows 8/8.1 (32-bit/64-bit) Windows 10 (32-bit/64-bit): operation confirmed
CAN definition settings	CAN message ID, Start position, data length Data order: U/L (Motorola), L/U (Motorola), L/U (Intel) Code: unsigned, 1-signed, 2-signed
CAN db file	•Load CAN db file •Convert to ".cdf" file •Register to list (editing not available), 33-bit data and above not supported •Convert data order: Motorola (CANdb file) to U/L (Motorola) •Convert coded file (CANdb file) to 2-signed, IEEE float or double (CANdb file) not supported •Convert signal name (CANdb file) to the label •Convert comment (CANdb file) to the signal name
Registration list settings	CAN input port setting: port 1, port 2, item number: 1 to 200 Setting upper/lower limit display on the MR8875 screen
CAN communication settings	•Interface: high-speed, low-speed, single-wire •Terminator: on/off (on is enabled at "High-speed" only) •ACK: on/off •Baud rate: AUTO (enabled at ACK off only) 50 kbps to 1 Mbps at "High-speed", 10 kbps to 125 kbps at "Low-speed", 10 kbps to 83.3 kbps at "single-wire"
Analog channel settings	Number of channels: 15 •Assign the definition on the registration list under 16-bit to 1 channel •Assign the definition on the registration list for 17-bit to 32-bit to 2 channels
Logic channel settings	Number of channels: 16 •Assign the definition on the registration list under 16-bit, with bit position •Assign the definition on the registration list to the ID trigger
Transmission settings	Transmission number, mode, CAN output port, frame type, transmission ID, transmission byte length, transmission data, answer ID, transmission period
Communication with the MR8875	Search MR8875 via USB, registration list, CAN communication setting, analog channels settings, logic channel settings, transmission setting information, etc.
Printing functions	Registration list, all items of CAN communication settings, assigned analog list, assigned logic list, all items of transmission settings
Save functions	CAN definition data: binary form, ".cdf" extension, convertible to software for Hioki Model 8910 Setting date (all contents without CAN definition data): binary form, ".ces" extension

Dimensions, weight: approx. 119.5W × 18.8H × 151.5D mm (4.70W × 0.74H × 5.96D in.), approx. 185 g (6.5 oz.), accessories: none

Analog Unit MR8905

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

Functions	No. of channels: 2, switchable between instantaneous values and AC RMS values
Input connectors	Banana connector (input impedance 4 MΩ, input capacitance less than 1 pF) Max. rated voltage to earth: CAT II 1000 V AC & DC, CAT III 600 V AC & DC (since input is isolated from the main unit, the max. voltage that can be applied between input channel and chassis, and between input channels without damage)
Measurement range	500 mV/div to 50 V/div, 7 ranges, full scale: 20 div *The maximum displayable AC voltage is 700 Vrms when using 1/2 compression of the vertical axis.*
Low-pass filter	5 Hz, 50 Hz, 500 Hz, 5 kHz, off
Resolution	1/1250 of measurement range (using 16-bit A/D converter)
Highest sampling rate	500 kS/s (simultaneous sampling across 2 channels)
Accuracy	±0.5% f.s. (with 5 Hz filter on)
RMS measurement	RMS accuracy: ±1.5% f.s. (from 30 Hz up to but not including 1 kHz, sine wave input) or ±3% f.s. (1 kHz to 10 kHz, sine wave input) Response time: 300 ms (filter off, rising from 0% to 90% f.s.) or 600 ms (filter off, falling from 100% to 10% f.s.) Crest factor 2
Frequency characteristics	DC to 100 kHz, -3 dB
Input coupling	DC/AC-RMS/GND
Max. allowable input	1000 V DC, 700 V AC (the max. voltage that can be applied across input pins without damage)

(Compatible with MR8875 firmware version 2.14/3.14 or later)

Cable length and weight: 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

Function	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), hight/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)
Max. allowable input	250 Vrms (high range), 150 Vrms (low range) (the maximum voltage that can be applied across input pins without damage)

Cable length and weight: 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 is different from the 9320.

LOGIC PROBE 9320-01

Function	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 V 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	500 ns or longer
Max. allowable input	0 to +50 V DC (the maximum voltage that can be applied across input pins without damage)

Cable length and weight: 70 cm (2.30 ft.), output side: 1.5 m (4.92 ft.), 170 g (6.0 oz.)

DIFFERENTIAL PROBE P9000

(accuracy guaranteed for 1 year)

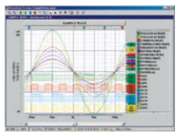
Measurement modes	P9000-01: for waveform monitoring output, frequency properties: DC to 100 kHz, -3 dB P9000-02: switches between waveform monitor output and AC effective value output Wave mode frequency properties: DC to 100 kHz, -3 dB, RMS mode frequency properties: 30 Hz to 10 kHz, response time: rise 300 ms, fall 600 ms
Division ratio	Switches between 1000:1 and 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-microB terminal), 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

Capture Voltage Signals from Outside the Wire Cover: SP3000-01

Measure signals from electric equipment on vehicles, capture LIN and other communications signals.

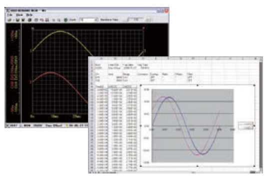
- Measure insulated wires with outside diameters 1 mm to 2.5 mm
- 10 Hz to 100 kHz band width

Analyzing data on a computer



WAVE PROCESSOR 9335 (option)

- Waveform display and calculation
- Print function



Wave Viewer (Wv) Software (bundled software)

- Confirmation of binary data waveforms on a computer
- Saving data in the CSV format for transfer to spreadsheet software

9335 outline specifications (option)

Operating environment	Windows 10/8/7 (32/64-bit)
Functions	• Display: waveform display, X-Y display, cursor function, etc. • File loading: readable data formats (.MEM, .REC, .RMS, .POW) Largest readable file: largest file that can be saved by supported instruments (supported file size may be limited due to the computer's operating environment.) • Data conversion: conversion to CSV format, batch conversion of multiple files
Print	• Print function: saving of print image files (with support for enhanced metafile [EMF] format) • Print format: select from no tiling, 2 to 16 tiles, 2 to 16 rows, X/Y 1 to 4 tiles, preview & hard copy

Wave Viewer (Wv) outline specifications (bundled software)

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

MR8875 Options in Detail

Input modules

*Install by inserting into the main unit. Can be replaced by user. Input cables are not supplied.

ANALOG UNIT MR8901
4ch, voltage measurement, DC to 100 kHz bandwidth

VOLTAGE/TEMP UNIT MR8902
15ch, voltage measurement, thermocouple measurement

STRAIN UNIT MR8903
4ch, voltage measurement, strain gauge converter input, conversion cable included

CAN UNIT MR8904
Up to 15 analog channels each equivalent to a 16-bit analog signal, and up to 16 logic channels each equivalent to a 1-bit logic signal

ANALOG UNIT MR8905
2 channels, high-voltage DC/RMS input, DC to 100 kHz band
(compatible with MR8875 firmware version 2.14/3.14 or later)

Input cable (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

CONTACT PIN 9790-03
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

L9790 L9790-01 9790-03 9790-02

Input cable (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

Input cable (C)

* Voltage input via banana terminals limited by the voltage specifications of the respective input unit.

CONNECTION CABLE SET L4940
Banana plug, 1.5 m (4.92 ft.) length, red/black, 1 each

EXTENSION CABLE L4931
Extends the length of the cable with banana plug, 1.5 m (4.92 ft.) length

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

BUS BAR CLIP L4936
Attaches to the tip of the banana plug cable, CAT III 600 V

MAGNETIC ADAPTER L4937
Attaches to the tip of the banana plug cable, CAT III 1000 V

GRABBER CLIP L9243
Attaches to the tip of the connection cable, 185 mm (7.28 in.) length, CAT II 1000 V

Input cable (D)

*Voltage to ground is within this product's specifications. Separate power source is also required.

DIFFERENTIAL PROBE P9000-01
Waveform only, up to 1 kV AC/DC, band width up to 100 kHz

DIFFERENTIAL PROBE P9000-02
Waveform/RMS value switchable, up to 1 kV AC/DC, band width up to 100 kHz

AC ADAPTER Z1008
100 V AC to 240 V AC

Custom cable

*For P9000: inquire with your Hioki distributor.
(1) Bus powered USB cable
(2) USB(A)- Micro B cable
(3) 3-prong cable

Other options for Input

CAN CABLE 9713-01
For the MR8904 (MR8875), 8910, unprocessed on one end, 1.8 m (5.91 ft.) length

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

CONVERSION ADAPTER 9199
Receiving side banana, output BNC terminal

Temperature sensor

*For reference only. Please purchase locally.

Thermocouple

Model: MEMORY HiCORDER MR8875

Model No. (order code)

MR8875 (Max. 16 to 60ch, 32 MWord memory, main unit only)

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

Logic signal measurement

* Only the small terminal types can be used.

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

LOGIC PROBE MR9321-01
4 isolated channels, on/off detection of AC/DC voltage (miniature terminal type)

Storage media

SD MEMORY CARD 2GB Z4001
2 GB capacity

SD MEMORY CARD Z4003
8 GB capacity

USB DRIVE Z4006
16 GB, long-life, high-reliability SLC flash memory

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

PC software

WAVE PROCESSOR 9335
Convert data, print and display waveforms

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

FlexPro (third party software)
Advanced software for analysis and presentation of Memory HiCorder data
More information: Weisang GmbH (Germany)
http://www.weisang.com/

Input cable (E)

*Voltage to ground is within this product's specifications. Separate power source is also required.

DIFFERENTIAL PROBE 9322
For up to 1 kV AC or 2 kV DC, frequency band width up to 10 MHz

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

Power supply

*Z1002 is a bundled accessory

AC ADAPTER Z1002
For main unit, 100 V AC to 240 V AC

BATTERY PACK Z1003
NiMH, charges while installed in the main unit

Case

CARRYING CASE C1004
Includes compartment for options, hard trunk type, also suitable for transporting the MR8875

*A separate power supply (CT955x) 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 CT955x.
*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) to ME15W (12-pin) conversion

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

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

High-precision pull-through type, monitor the waveforms of DC to distorted AC current
AC/DC CURRENT SENSOR CT6875, 2 MHz band width, 500 A

Monitor the waveforms of DC to distorted AC current
AC/DC CURRENT PROBE CT6844-05, 200 kHz band width, 500 A
AC/DC CURRENT PROBE CT6845-05, 100 kHz band width, 500 A
AC/DC CURRENT PROBE CT6846-05, 20 kHz band width, 1000 A

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

Connecting to the MR8880/MR8875/MR8870
- High-precision current sensor (ME15W) + CT9555 + BNC cable → MR8875
- High-precision current sensor (PL23) + CT9900 + CT9555 + BNC cable → MR8875

Other current sensor types

The MR8875 can be used with various types of current sensors and probes. For details, see product information on Hioki's website.

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 (-3 dB), 100 A, 1 mV/A output

AC/DC CURRENT SENSOR CT7636, (auto zero CT7736)
DC, 1 Hz to 10 kHz (-3 dB), 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

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

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, 5000/500 A AC, 500 mV/f.s. output, φ 100 to 254 mm (3.94 to 10.00 in.), 3 loop diameters

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

AC LEAKAGE CLAMP METER CM4003
6 mA range (1 μA resolution) to 200 A range, with WAVE/RMS output

CONNECTION CABLE L9097
Output terminal: BNC, power terminal: USB-C, 1.5 m (4.92 ft.) length

AC ADAPTER Z1013
100 V AC to 240 V AC

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

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