

MEMORY HICORDER MR8875

High-Speed Data Logger



1000 V Direct Input Multi-channel Logger

As a Multichannel Logger

The MR8875 delivers multichannel measurement capability in a compact, A4-size footprint that ensures easy 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 μ sec. Sample up to 2 channels in 2 μ sec or up to 60 channels in 50 μ sec while writing data continuously to an SD memory card in real time. * Operation is guaranteed only with a genuine Hioki SD memory card.

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 card.

Introducing a new input module that accepts up to 1000 V input and measures in RMS 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.



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Industrial Robots	
Voltage Temperature Control Signals Strain Temperature variations on movable parts	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.
Strain Motor current	Example of module combinations
Control signal (logic probe)	Analog Unit MR8901 × 2 Voltage/Temp Unit MR8902 × 1 Strain Unit MR8903 × 1
R&D or Science Experiments Voltage Temperature	With its multichannel, long-term recording capabilities, the MR8875 is ideally suited for use in development applications such as per- formance and durability testing. - Record sensor output. - Evaluate sensors and other devices. - Use as an X-Y recorder (flatbed).
C. Commercial and the	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 vibra- tion resistance enable the MR8875 to withstand harsh measurement environments.
	Example of module combinations
	Analog Unit MR8901× 1Voltage/Temp Unit MR8902× 1Strain Unit MR8903× 1CAN Unit MR8904× 1

C CALRIGHT INSTRUMENTS

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Applications

High-speed Data Recorder MR8875





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



Testing of power equipment

600 V AC (CAT III)





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.

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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 even subtle changes in the sensor signals are not missed.

Internal memory 8MW/unit

Ultra-high speed SD data recorder 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 μ s intervals (operation is guaranteed only with a genuine HIOKI SD memory card). When the recording period (sampling rate) is 50 μ s or less, data for all 60 channels can be recorded continuously over a long period.

Sð Memory card

Maximum recordable time to an 2GB SD memory card

* Since the header information is included, actually recordable measurement data is approximately 90% of the times 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 measurement ON channels.

* Built-in logic, pulses P1 and P2 each use the capacity equivalent to one analog channel.



Write to internal memory

Maximum time to record to the internal storage memory (Abridged)

* The maximum number of channels to be used is 16 because memory for recording to the internal memory is allocated to each input module.

* Built-in logic, and pulses P1 and P2 each use the capacity equivalent to one analog channel.

No. of channels to be used * No. of channels for input module with most enabled- measurement channels		1 ch	3 to 4 ch	9 to 16 ch
Time axis (Abridged)	Sampling	80,000div	20,000div	5000div
200 µs/div	2 µs	16 s	4s	1s
1 ms/div	10 µs	1 min 20 s	20s	5s
10 ms/div	100 µs	13 min 20 s	3min 20s	50s
100 ms/div	1 ms	2 h 13 min 20 s	33min 20s	8min 20s
1 s/div	10 ms	22 h 13 min 20 s	5h 33min 20s	1h 23min 20s
10 s/div	100 ms	9 d 06 h 13 min 20 s	2d 07h 33min 20s	13h 53min 20s
100 s/div	1.0 s	92 d 14 h 13 min 20 s	23d 03h 33min 20s	5d 18h 53min 20s
5 min/div	3.0 s	277d 18h 40min	69d 10h 40min	17d 08h 40min



Sampling period as short as 2 µsec (Sampling rate 500 kS/sec)

Write to SD memory card in real-time

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	Not applicable				
500 μs/div	5 μs	1 h 29 min 28 s	44 min 44 s	22 min 22 s	11 min 11 s	Not applicable	Not applicable	Not applicable
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	Not applicable	Not applicable
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	Not applicable
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 16min 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 39min 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 51min 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	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	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	621 d 09 h 04 min 51 s					



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Multichannel **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 which 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 μ V). Measurement of minuscule sensor output is also supported.



Recorder accepts direct pulse input or standard logic probe terminals

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



Support for a wide variety of measurement items

	(model mixes) simps standard with purse input capacity. Edgic input requires optional logic protect						
М	leasurement target	Input unit	Input unit Measurement range		Sampling	Frequency characteristics	
	Rotation	Standard l y equipped with pulse input	5000 (r/s) f.s.	1 (r/s)	10 msec (100 S/s)	N/A	
t	Pulse otalization	Standardly equipped with pulse input	65,535 to 3,276,750,000 counts f.s.	1 count	N/A	N/A	
Re	elay contacts, bitage on/off	Logic Probe 9320-01	Depends on logic probe in use * Max. input 50 V, threshold +1.4/ +2.5/+4.0 V * Non-voltage contact, short/open	N/A	2 μsec (500 kS/s)	500 nsec or lower response	
AC	C/DC voltage on/off	Logic Probe MR9321-01	Depends on logic probe in use * Detect presence of AC/DC voltages of up to 250 V.	N/A	2 μsec (500 kS/s)	3 msec or lower response	



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Separate purchase of the optional Connection Cable Set L4940 (x 2) and Alligator Clip Set L4935 (x 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 instrument recording the instantaneous waveform and RMS level waveform during a momentary outage of an AC power supply (using the MR8905)



• Multi-channel timing measurement using logic waveform measurement

Pulse input terminal

(Common GND)

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 number.



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 correspondingly. 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: Potential and time from the trigger
- E and F: Potential
- A-B and C-D cursors: Time difference and potential difference
- E-F cursors: 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.



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Computer Analysis via LAN, SD, and USB memory interfaces

LAN-compatible Web/FTP server function and waveform/ CSV conversion using supplied standard software Wv Take advantage of the built-in 100BASE-TX LAN interface to network with the 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. View waveforms for binary 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 the WaveViewer from the HIOKI website at www.hioki.com.

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.

from the internal memory during measurement.

Transfer data using FTP

matically to the FTP server that is running on the PC. Data

can also be transferred manually.

Excel spreadsheet sample

Download data using FTP

Measurement data in files on recording media and in

LAN

100 BASE-TX

USB 2.0

mini B

the internal memory can be acquired from a PC.

FTP client Note: Waveform data cannot be acquired from the WEB FTP internal memory during measurement. server server FTP E-mail FTP server client send LAN network Note: Waveform data cannot be acquired Web browser SMTP Mail Server Attach data to E-mail After measurement is finished, data is transferred auto-INTERNET After measurement is finished, you can automatically send the captured data as an e-mail attachment. Data can also be transferred manually.

Wv screen sample

Save data to the USB memory or SD card

Convenient USB memory*1 or SD memory cards 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 Data can be saved to USB memory. However, it is recommended to use a genuine Hioki SD card for which operation is guaranteed to ensure data protection.

*2 Direct download from USB memory to a PC via a USB cable is not supported - please use a LAN connection and the FTP server.





FFT Analysis Function

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.

Additionally, you can simultaneously view the linear spectrum, RMS spectrum, power spectrum, and phase spectrum for a signal input to channel 1, for example.

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 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 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.



MR8875 Ver. 2.01 or later









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 singlescreen display.



Illustration of continuous calculation

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

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.







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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 modes 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 the four arithmetic operations as well as differential-integral and other waveform-dimension calculations.

Digital filter calculations

The MR8875 offers new digital filter calculations* as part of its selection of waveform processing calculations, allowing the nec-

essary 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. LPF (passing only the low-frequency component), HPF (passing only the high-frequency component), BPF, and BEF (passing or rejecting only a frequency bandwidth of a certain width) variants of each can be configured.
- * 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 use-specified.



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.





Principle FFT calculation functions

Principle FFT calculation functions

	1,000	<i>v</i>		Storage waveform	N/A
Oplaulation	2,000	V		Frequency distribution	N/A
Calculation	5,000	<i>v</i>		Linear spectrum	~
points	10,000	V		RMS spectrum	V
	20,000	N/A		Power spectrum	~
	Rectangular window	<i>v</i>		Power spectrum density	N/A
	Hanning	V		LPC analysis	N/A
Window functions	Hamming	v.	Analysis func-	Transfer function	~
	Blackman	v	tions	Cross power spectrum	~
	Blackman-Harris	~		Impulse response	N/A
	Elat top	~		Coherence function	~
	Exponential	~		Phase spectrum	 ✓
				Auto-correlation function	N/A
	Amplitude	<i>v</i>		Cross-correlation function	N/A
	Real part	<i>v</i>		1/1-octave analysis	N/A
	Imaginary part	V		1/3-octave analysis	N/A
	Nyquist	N/A		Frequency range	1.33 mHz to 400 kHz
Display	Peak value display	Local maximum Maximum		Max. number of simultaneous functions	✓
Display	Running spectrum	./		Calculations targeting thinned data	N/A
	(spectrogram)	(200 lines)		Recalculation after changing number of calculation points	N/A
	Phase highlighting	N/A		Total harmonic distortion (THD) analysis	~
	Screen seamenting	1-/2-/4-screen	Other	Overall value	~
		waveform display		Anti-aliasing filter (AAF)	N/A
	Time (simple)	N/A		Window function energy correction	~
	Time (exponential)	N/A		dB scaling	~
Averaging	Frequency (simple)	V		Continuous calculation	~
- 0	Frequency (exponential) Frequency (peak hold)	V V		Calculation precision	32-bit floating point (IEEE single-precision)



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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.





Vector's CAN database can be loaded using supplied software

Industry standard CANdb® database files can be loaded into the supplied setting software and associated to 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, users can concentrate on their measurement tasks without needing to define signals.

CAN editor (bundled software)

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

In road tests, extreme environmental conditions associated with the temperature and vibration are harsh for measuring instruments. The MR8875 has the wide operating temperature range of -10 $^\circ\text{C}$ to 50 $^\circ\text{C}$ and is compliant with the JIS DI1601 standard for vibration resistance performance. It is designed to withstand the harsh conditions for 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





	Up to 4 slots, user installable in any combination by plugging into
No. of input modules that can be installed	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 termi- nals, all channels have common GND.
Max. sampling rate	MR8901/MR8905: 500 kS/s (2 μs period, all channels simultaneously) MR8902: 10 msec (channel scanning) MR8903: 200 kS/s (5 μs period, all channels simultaneously) External sampling: 200 kS/s (5 μs period)
Storage memory capacity	Total 32 M-words (memory expansion: none, 8 MW/module) * 1 word = 2 bytes, therefore 32 Mega-words = 64 Mega-bytes. * Memory can be allocated depending on the number of channels used at 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°E)	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 eard 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	Three lines, +5V, 2A total output
Operating temperature and	Temperature: -10° C to 40° C (14° F to 104° F), 80 % th or less 45° C to 50° C (145° F to 132° F), 60 % th or less 45° C to 50° C (113° F to 122° F), 50 % th or less When powered by the battery pack: 0° C to 40° C (32° F to 104° F), 80 % th or less When powered by the battery pack: 0° C to 40° C (32° F to 104° F), 80 % th or less
humidity (No condensation)	Storage 20°C to 40°C (-4°F to 104°F), 80 % th or less 40°C to 45°C (104°F to 113°F), 60 % th or less 45°C to 50°C (113°F to 122°F), 50 % th or less 45°C to 50°C (113°F to 122°F), 50 % th or less
Applicable standards	Safety: EN61010-1, EMC: EN61326, EN61000-3-2, EN61000-3-3
Compliance standards	Anti-vibration: JIS D1601: 1995 5.3 (1) Corresponds to Class 1: a passenger car, Condition: class A
Power supp l y	AC adapter 21002: 100 to 240 V AC (50/60 Hz) Battery Pack Z1003: 7.2 V DC Continuous operation times: 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
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
Dimensions and mass	When using the battery pack: 36 VA Approx. 298W × 224H × 84D mm (11.73W × 8.82H × 3.31D in), 2.4 kg (84.7 oz), (excluding input modules and battery pack) Reference data: 2.75 kg (97.0 oz, excluding input modules and including hattery pack) 347 kg (1224 oz, including MB8001 x4 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	
Disp l ay type	8.4 inch SVGA-TFT color LCD (800 \times 600 dots, with touch screen), (time axis 25 div \times voltage axis 20 div, X-Y waveform 20 div \times 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	(Instantaneous value, average value, P-P value, Max. value, Min. value) •Waveform scroll (scroll backwarde through the display trend area to
Disp l ay functions (Ver. 1.00 or later)	View pas 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)
Disp l ay functions	Waveform zoom (splits the screen vertically; supports waveform magnification and overall display) Waveform overlay (select from off, overlay for each measurement,

Measurement	function (High-speed recording)
Time axis	200 μ s, 500 μ s/div, 1 ms to 500 ms/div, 1 s to 5 min/div, 21 ranges, external sampling (max. 200 kS/s), Recording interval time at real-time save ON: 2 μ s/S (channels up to 2), 5 μ s/S (channels up to 8), 10 μ s/S (channels up to 16), 20 μ s/S (channels up to 30), 50 μ s/S (channels up to 64), 100 μ s/S (with no limit on number of channels in use)
Accuracy of time axis	± 0.0005 %
Recording length (with MR8901 × 4, logic and pulse inputs OFF)	100 points /dtv 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, ×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 inter- val set in steps ranging from 0 to 40 % of the recording length
Real-time data save	ON /OFF selectable (exclusive real-time save or automatic save) Function: Waveforms are saved as binary data to the SD memory card at each interval (Note: Cannot save in real-time to a USB memory, use only SD memory cards sold by Hioki) Endless loop saving: New file overwrites the oldest file when the SD memory card capacity runs short (Note: Delete files only at 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 calcula- tion results, and image data (compressed BMP or PNG). Function: Data are saved to either SD memory card or USB memory stick at once after the specified recording length is acquired. Endless loop saving: 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. <i>Note: This function is enabled 15 minutes after the power is turned on.</i>
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.
Trigger function	IN/A
Mode	Single, Repeat
Timing	Start / Stop / 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: WI-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 Logical 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 rise or fall to set voltage value. Window: Set 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 selectable (max. allowable input voltage 10 V DC) Rising: A trigger is applied when rise from "Low" (0 to 0.8 V) to "High" (2.5 to 10 V) Falling: A trigger is applied when fall from "High" (2.5 to 10 V) to "Low" (0 to 0.8 V) or terminal short. External trigger filter and response pulse width: When external filter Off: H period 1 ms or greater, L period 2 μs or greater When external filter On: H period 2.5 ms or greater, L period 2.5 ms or greater
Trigger level resolution	 Analog: 0.1 % f.s. (fs.=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 (Off, 10 to 1000 points)
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 since trigger -1) or longer (2 µs or longer)
	Pulse: $2 \text{ ms} \pm 10\%$

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Calculation fur	ICTIONS	Other function
Real-time inter-	Up to 2 calculations per module can be performed simultane- ously. Calculation target: Analog Unit MR8901, Voltage/Temp Unit MR8902, Strain Unit MR8903 * hter-channel calculations are limited to single module	External sampling
channel calculations (Ver.2.01 or later)	 * Scaling and probe settings for calculation channels targeted for calculations are disabled. * Calculation results can be scaled. * Calculations between different modes on the MR8902 and MR8903 are not supported. • Calculations: Addition, subtraction, multiplication 	Other
	Up to 8 calculations can be performed simultaneously Calculation target: Internal memory Calculations: Average, effective (rms), peak to peak, maximum value, time to maximum value, minimum value, time to mini- mum value, period, frequency, rise time, fall time, area value,	
Numerical calculation	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, four arithmetic operations,	Pulse input
	Calculation results can be saved to SD memory card or USB memory stick.	No. of channels
	•Calculation range: Select from all measurement data or between	Mode
	• Automatic storing of calculation results in CSV format to the SD card or the USB memory stick.	
Waveform	 Up to 8 calculations can be performed simultaneously. Calculation target: Internal memory Calculations: Basic arithmetic, absolute value, exponents, common logarithms, square roots, differentials (1st and 2nd order), integrals (1st and 2nd order), moving averages, time-axis moving 	Measurement functions
calculations (Ver.2.01 or later)	averages, trigonometric operations (SIN, COS, IAN), inverse trigonometric operations (ASIN, ACOS, ATAN), FIR filter operations, IIR filter operations, average value, maximum value, minimum value level at time	Input form
	Calculation range: All measurement data; areas between the A/B and C/D cursors can be selected	Max. allowable inp
	Up to 4 calculations can be performed simultaneously. Coloulation target. Internal memory.	Max. rated voltage between channels
	Calculation modes: Single, repeat Number of points: 1000 to 10000	Max. rated voltage earth
	Number of skips: Automatic, 100 to 10000 * Can be set only when the calculation mode is "Repeat".	Detect level
FFT calculations (Ver.2.01 or later)	Window functions: Rectangular window, Hanning, Hamming, Blackman, Blackman-Harris, flat top, exponential Avaraging: Off. cimple avarage, indexed avarage, peak held	Pulse input period
	Compensation: None, power, average	Slope
	• Peak value display: Off, local maximum value, maximum value	Filter
	spectrum, transmission function, cross-power spectrum, coher-	Setting range
	ence function, phase spectrum	2,500 c /c
Evaluation	Calculation regult evaluation output: CO/NC (with one dayle 5 V extend)	25k c /c
	Calculation result evaluation output. OO/ NO (will open-drain 5 V output)	5M.c./c

Other function	S
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 H or L 2.5 μ s 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 load 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 se	ction
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 overflow: 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 M Ω
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)

Maximum time to record to the internal storage memory

* The maximum number of channels to be used is 16 because memory for recording to the internal memory is allocated to each input module.

* Built-in logic, and pulses P1 and P2 each use the capacity equivalent to one analog channel.

1 ch	2 ch	3 to 4 ch	5 to 8 ch	9 to 16 ch	f channels used r of chan- put module t enabled- mt channels	Number o to be * Numbe nels for in, with mos measureme
80,000 div	40,000 div	20,000 div	10,000 div	5000 div	Sampling	Time axis
16	8 s	4 s	2 s	1 s	2 µs	200 µs/div
40	20 s	10 s	5 s	2.5 s	5 µs	500 μs/div
1 min 20	40 s	20 s	10 s	5 s	10 µs	l ms/div
2 min 40	1 min 20 s	40 s	20 s	10 s	20 µs	2 ms/div
6 min 40	3 min 20 s	1 min 40 s	50 s	25 s	50 µs	5 ms/div
13 min 20	6 min 40 s	3 min 20 s	1 min 40 s	50 s	100 µs	10 ms/div
26 min 40	13 min 20 s	6 min 40 s	3 min 20 s	1 min 40 s	200 µs	20 ms/div
1 h 06 min 40	33 min 20 s	16 min 40 s	8 min 20 s	4 min 10 s	500 μs	50 ms/div
2 h 13 min 20	1 h 06 min 40 s	33 min 20 s	16 min 40 s	8 min 20 s	1 ms	100 ms/div
4 h 26 min 40	2 h 13 min 20 s	1 h 06 min 40 s	33 min 20 s	16 min 40 s	2 ms	200 ms/div
11 h 06 min 40 s	5 h 33 min 20 s	2 h 46 min 40 s	1 h 23 min 20 s	41 min 40 s	5 ms	500 ms/div
22 h 13 min 20 s	11 h 06 min 40 s	5 h 33 min 20 s	2 h 46 min 40 s	1 h 23 min 20 s	10 ms	l s/div
1 d 20 h 26 min 40 s	22 h 13 min 20 s	11 h 06 min 40 s	5 h 33 min 20 s	2 h 46 min 40 s	20 ms	2 s/div
4 d 15 h 06 min 40 s	2 d 07 h 33 min 20 s	1 d 03 h 46 min 40 s	13 h 53 min 20 s	6 h 56 min 40 s	50 ms	5 s/div
9 d 06 h 13 min 20 s	4 d 15 h 06 min 40 s	2 d 07 h 33 min 20 s	1 d 03 h 46 min 40 s	13 h 53 min 20 s	100 ms	10 s/div
27 d 18 h 40 mir	13 d 21 h 20 min	6 d 22 h 40 min	3 d 11 h 20 min	1 d 17 h 40 min	300 ms	30 s/div
46 d 07 h 06 min 40 s	23 d 03 h 33 min 20 s	11 d 13 h 46 min 40 s	5 d 18 h 53 min 20 s	2 d 21 h 26 min 40 s	500 ms	50 s/div
55 d 13 h 20 mir	27 d 18 h 40 min	13 d 21 h 20 min	6 d 22 h 40 min	3 d 11 h 20 min	600 ms	60 s/div
92 d 14 h 13 min 20 s	46 d 07 h 06 min 40 s	23 d 03 h 33 min 20 s	11 d 13 h 46 min 40 s	5 d 18 h 53 min 20 s	1.0 s	100 s/div
111 d 02 h 40 mir	55 d 13 h 20 min	27 d 18 h 40 min	13 d 21 h 20 min	6 d 22 h 40 min	1.2 s	2 min/div
277 d 18 h 40 mir	138 d 21 h 20 min	69 d 10 h 40 min	34 d 17 h 20 min	17 d 08 h 40 min	3.0 s	5 min/div
715 Mesa I oll Free: 1.8	87 To	NT⊆		ALR		G

External appearance and dimensions

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)

Resolution 1 c/LSB

10 c/LSB

100 c/LSB

2k c/LSB

50k c/LSB

1 [r/s] /LSB

Setting range

Rotation: 250 [r/s] /div

2,500 c /div 25k c/div

250k c /div

125M c /div

5M c/div

Count at rising edge, or count at falling edge

Chatter prevention filter (On/Off switchable)

With filter Off: 200 μ s or more (both H and L periods must be at least 100 μ s) With filter On: 100 ms or more (both H and L periods must be at least 50 ms)

Measurement range

0 to 65,535 c

0 to 655,350 c 0 to 6,553,500 c

0 to 131,070,000 c

0 to 3,276,750,000 c

0 to 5,000 [r/s]



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Options specifications (sold separately)

Plug-in slot for the input modules



Measurement target	Input module	Measurement range	Resolution
	Analog Unit MR8901	100 mV f.s. to 200 V f.s.	4 μV
Voltago	Analog Unit MR8905	10 V f.s. to 1000 V f.s.	400 µV
voltage	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 + optional current sensor	Depends on current sensor(s) in use * Certain current sensors require a separate power supply	1/1250 div
DMSAC	Analog Unit MR8905	10 V rms f.s. to 700 V rms f.s.	400 µV
voltage	Analog Unit MR8901 + optional 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 250V AC/DC, detect live or not live	N/A

MR8902 specifications

Thermocouples	Setting ranges (full scale=20 div)	Resolution	Measurement ranges	Accuracy
	10.0011	0.01 °C	-100 to less than 0°C	±0.8 °C
	10 C/div		0 to 200°C	±0.6 °C
V	50.8C	0.0510	-200 to less than -100 °C	±1.5 °C
ĸ	50 C	0.05 C	-100 to 1000 °C	±0.8 °C
	100 °C	0.1.°C	-200 to less than -100 °C	±1.5 °C
	100 C	0.1 C	-100 to 1350 °C	±0.8 °C
	10.001	0.01.0	-100 to less than 0°C	±0.8 °C
	10 C/div	0.01 C	0 to 200°C	±0.6 °C
т	50.00	0.05.20	-200 to less than -100 °C	±1.0 °C
J	50 C	0.05 C	-100 to 1000 °C	±0.8 °C
	100 ° C	0.1 °C	-200 to less than -100 °C	±1.5 °C
			-100 to 1200 °C	±0.8 °C
	10 °C/div	0.01 °C	-100 to less than 0°C	±0.8 °C
			0 to 200°C	±0.6 °C
	50 °C	0.05 °C	-200 to less than -100 °C	±1.5 °C
Б			-100 to less than 0 °C	±0.8 °C
E			0 to 1000 °C	±0.6 °C
		0.1 °C	-200 to less than -100 °C	±1.5 °C
	100 °C		-100 to less than 0 °C	±0.8 °C
			0 to 1000 °C	±0.6 °C
	10 °C/div	0.01.°C	-100 to less than 0°C	±0.8 °C
	10 C/ulv	0.01 C	0 to 200°C	±0.6 °C
			-200 to less than -100 °C	±1.5 °C
т	50 °C	0.05 °C	-100 to less than 0 °C	±0.8 °C
1			0 to 400 °C	±0.6 °C
			-200 to less than -100 °C	±1.5 °C
	100 °C	0.1 °C	-100 to less than 0 °C	±0.8 °C
			0 to 400 °C	±0.6 °C

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

Dimensions, mass: Approx. 119.5W \times 18.8H \times 151.5D mm (4.70W \times 0.74H \times	
5.96D in), Approx. 180 g (6.3 oz) Accessories: None	

Functions



Low-pass filter	Low-pass filter: 5/50/500 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, mass: Approx. 119.5W \times 18.8H \times 184.8D mm (4.70W \times 0.74H \times 7.28D in), Approx. 190 g (6.7 oz) Accessories: Ferrite clamp $\times 2$



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, Post-adjustment accuracy guaranteed for 1 year)
Functions	No. of channels: 15, for voltage/temperature measurement (selectable for each channels)
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 mm ² (conductor wire diameter min. ϕ 0.12 mm), AWG 28 to 22 Input resistance: 1 MΩ Max. rated voltage to earth: 100 V AC, DC (with input isolated from the main unit, the max. voltage that can be applied between input channel and
Voltage measurement ranges	500 µV to 5 V/div, 9 ranges, full scale: 20 division * 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 included)
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)



Signal form	1-bit to 16-bits signal: 1 channel of Analog 17-bits to 32-bits signal: 2 channels of Analog * Cannot handle signals over 32-bits
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 the setting CAN message to the CAN bus by a port

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JMENTS

Dimensions, mass: 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-

	balance; Accuracy guaranteed for 1 year, Post-adjustment 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 $\pm 10000 \ \mu$ V, $\pm 10000 \ \mu$ E)
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 ACrms or 70 V DC (with input 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 k Ω , Bridge voltage: 2 V ±0.05 V, Gauge rate: 2.0
Input resistance	More than 1 MΩ
Voltage measurement ranges	50 μ V to 1000 μ V/div, 5 ranges, full scale: 20 division Accuracy: $\pm 0.5 \%$ f.s. $+ 4 \mu$ V (at 50 μ V/div only), other ranges $\pm 0.5 \%$ f.s. (after auto-balance, with filter 5 Hz, zero position accuracy included)
Strain measurement ranges	20 μ e to 1000 μ e/div, 6 ranges, full scale: 20 division Accuracy: ± 0.5 % f.s. + 4 μ e (at 20, 50 μ e/div), other ranges ± 0.5 % f.s. (after auto-balance, with filter 5 Hz, zero position accuracy included)
Low-pass filter	Low-pass filter: 5/10/100 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)



Options specifications (sold separately)

CAN Editor specifications (software bundled with the MR8904)	
Operating environment	Windows 7 / Vista (32-bit/64-bit), Windows XP (32-bit)
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-bits to 1 channel • Assign the definition on the registration list for 17-bits to 32-bits to 2 channels
Logic channel settings	Number of channels: 16 • Assign the definition on the registration list under 16-bits, 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 set- ting, 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, mass: Approx. 119.5W \times 18.8H \times 151.5D mm (4.70W \times 0.74H \times 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 adjust- ment, Accuracy guaranteed for 1 year, Post-adjustment accuracy guaranteed for 1 year)	
Functions	No. of channels: 2, switchable between instantaneous value and AC RMS value
Input connectors	Banana connector (input impedance 4 M Ω , input capacitance less than 1 pF) Max. rated voltage to earth: CAT II 1000 V AC & DC, CAT III 600 V AC & DC (with input 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 to 50 V/div, 7 ranges, full scale: 20 div *The maximum displayable AC voltage is 700 Vrms when using 1/2 compres- sion of the vertical axis.
Low-pass filter	5/50/500/5 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	$\pm 0.5\%$ f.s. (with 5 Hz filter ON)
RMS measurement	RMS accuracy: $\pm 1.5\%$ f.s. (30 Hz up to but not including 1 kHz, sine wave input) or $\pm 3\%$ f.s. (1 kHz up 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 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 plue of the MR9321-01 is different from the MR9321.



Note. The unit-side plug of the Williouz 1-of is different from the Williouz 1.	
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), HIGH/LOW range switching Input resistance: 100 k Ω or higher (HIGH range), 30 k Ω 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

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 is different from the 9320.

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

LOGIC PROBE 9320-01 Function Detection of voltage signal or relay contact signal for High/Low state recording 4 channels (common ground between unit and channels), digital/contact input, $\begin{array}{c} \text{Commercis} (\text{contact input}, \text{can detect open-collector signals}) \\ \text{Input resistance: } 1 \ M\Omega \ (\text{with digital input}, 0 \ \text{to} + 5 \ \text{V}) \\ 500 \ k\Omega \ \text{or more} \ (\text{with digital input}, +5 \ \text{to} + 50 \ \text{V}) \\ \end{array}$ Input Pull-up resistance: 2 k Ω (contact input: internally pulled up to +5 V) Digital input threshold 1.4V/2.5V/4.0V 1.4 V: 1.5 kΩ or higher (open) and 500 Ω or lower (short) Contact input 2.5 V: 3.5 k Ω or higher (open) and 1.5 k Ω or lower (short) detection resistance $4.0~\text{V:}~25~\text{k}\Omega$ or higher (open) and $8~\text{k}\Omega$ or lower (short) Response speed 500 ns or lower 0 to +50 V DC (the maximum voltage that can be applied across input pins without Max. allowable input damage)



DIFFERENTIAL PROBE P9000 (Accuracy guaranteed for 1 year, Post-adjustment accuracy guaranteed for 1 year)	
Measurement modes	P9000-01: For waveform monitor output, Frequency properties: DC to 100 kHz -3 dB P9000-02: Switches between waveform monitor output/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, 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 mea- surement 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 volt- age to ground	1000 V AC, DC (CAT III)
Operating temperature range	-40°C to 80°C (-40°F to 176°F)
Power supply	 AC adapter Z1008 (100 to 240 V AC, 50/60 Hz), 6 VA (including AC adapter), 0.9 VA (main unit only) USB bus power (5 V DC, USB-microB terminal), 0.8 VA External power source 2.7 V to 15 V DC, 1 VA
Accessories	Instruction manual ×1, Alligator clip ×2, Carrying case ×1



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



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