HIOKI

New

MEMORY HiCORDER MR8880-20

Recorders

Capture high- to low-voltage signals in a single device

Rugged, Professional and Ready for the Field

CE

ISO 9001 JMI-0216

ISO14001 JQA-E-90091

www.hioki.com

HIOKI company overview, new products, environmental considerations and other information are available on our website.

CAT III 600 V insulation performance

- Maximum 600V AC/DC input - no need for a differential probe
- 4 completely isolated channels let you simultaneously record data on a 3-phase power line plus have one extra channel

Tough against harsh environments

- Operating temperature range: **-10°C to 50°C**
- Built to withstand mechanical shocks and vibrations (ships standard with side protectors)

Make settings easily with PRESETS

Simply select what you'd like to measure and follow the on-screen instructions to select the appropriate settings. The recorder can be easily configured to measure voltage drops and power outages.

Safe & Reliable Measurement

The MR8880-20 offers safe, reliable operation featuring CAT III 600 V isolated inputs in a compact yet durable design that excels at taking measurements in harsh environments.

Direct input and measurement of 3-phase power lines

CAT III 600 V isolated inputs (4 channels)

- 4 analog + 8 logic channels
- Directly input 600 V AC/DC (CAT III) and 300 V AC/DC (CAT IV) input. Measure up to 2000V DC/1000V AC (CAT II) with the DIFFERENTIAL PROBE 9322 (separate power supply required.)

Don't let extreme temperatures keep you from taking measurements!

Built to withstand harsh environments

- Extensive operating temperature range [-10°C(14°F) to 50°C(122°F)] Even when operating on battery power, the MR8880-20 can take measurements from 0°C(32°F) to 40°C(104°F).
- Rugged, damage-resistant design features standard side protectors that guard the instrument's case.

Shown with optional printer unit.

Tough & Professional

MR8880-20

Settings are as Easy as 1-2-3 with PRESETS*

*Patent pending

To configure the MR8880-20, you need only select what you'd like to measure—"Measure a commercial power supply," "Monitor a power source for a voltage drop," etc.—and follow the on-screen instructions to select the appropriate settings.

Example: Configuring the MR8880-20 to monitor a power source for a voltage drop:

Press the "PRESETS" key.

Select what you'd like to measure with the cursor keys.

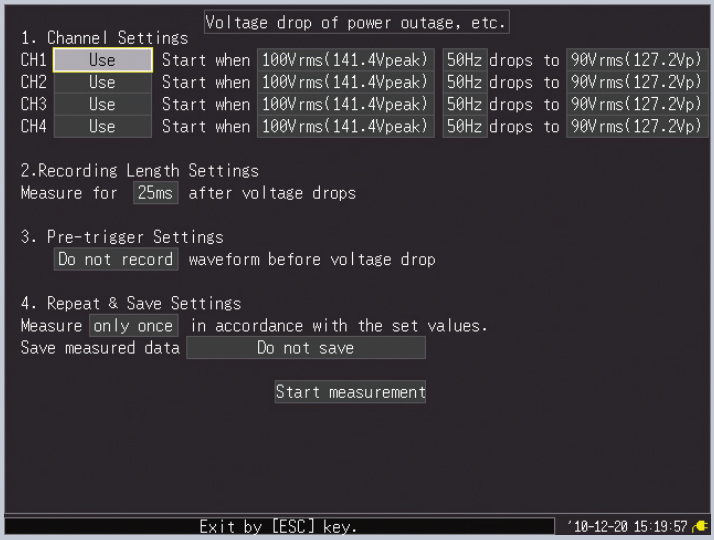
Select "Measurement Guide"

- Basic Guide
- Measurement Guide
- Load Set.

Select "Voltage drop of power outage, etc."

- Measure Power Supply on INSTNT
- Measure Power Supply on RMS
- Voltage drop of power outage, etc.
- Save data to media

"Voltage drop of power outage, etc" settings screen



1. Select the channel you wish to use. — Use • Not Use
   Select the power line voltage. — 100V • 200V
   Select the frequency. — 50Hz • 60Hz
   Select the threshold. — 90/85/80/75/70/65/60 V
2. Select the recording length. — 25ms/50ms/100ms/200ms
3. Save pre-triggered waveforms. — Record • Do not record
4. Select whether to repeat measurement. — only once • Repeatedly

Select the desired save settings.

- Do not save
- Save to CF card in Binary Format
- Save to CF card in Text Format
- Save to USB memory in Binary Format
- Save to USB memory in Text Format

Start mesurement

Press the START key

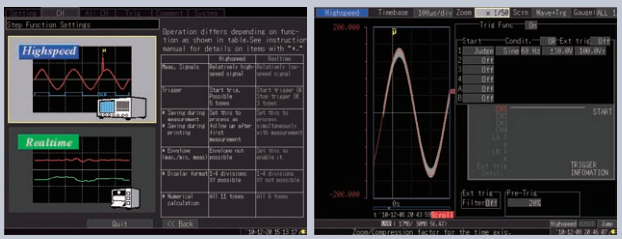
START

Press START to begin measuring.

Other Convenient Functions

PRESETS ▶ Basic Guide

Press the "PRESETS" key and select "Basic Guide"



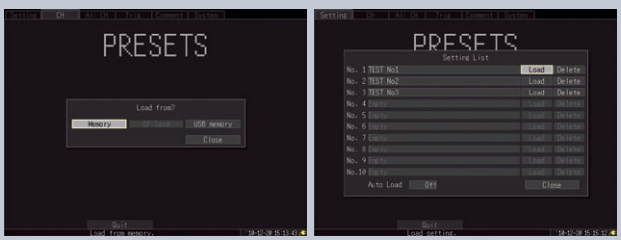
Select the high-speed or real-time function.
(The auto-range settings can be enabled when using the high-speed function.)

Make the necessary settings in accordance with information provided by the guide.
(Settings can be configured while checking the measurement waveform.)

Start measurement

PRESETS ▶ Loading settings

Press the "PRESETS" key and select "Loading settings"



Select the source from which to load settings.
(Memory / CF card / USB memory)

Select the settings file to load from a list of settings stored on the selected source and press the "Load" key.

Start measurement

Applications

The MR8880-20 provides a turnkey solution for both high-speed measurement at 1 MS/s and long-term measurement. Its ability to measure everything from high- to low-voltage signals allows it to play an important role in a variety of measurement scenarios.

1 Measure the instantaneous waveform at startup or a suddenly generated abnormal waveform.

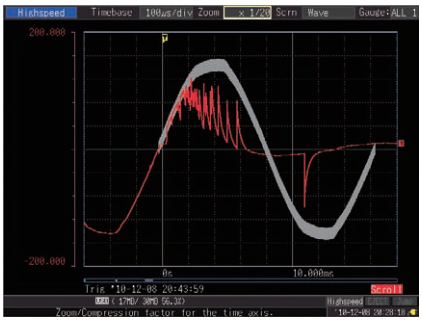
High-speed measurement using the high-speed function

- Fastest sampling period of 1 µs (measuring all channels simultaneously)
- Measurement data is recorded in the instrument's internal memory (1 MW).

■ Recording Time (Internal memory)

All channels (4 analog + 8 logic channels)			
Time Axis Range	Sampling Speed	Recording Interval	Max. Recording Time
100µs/DIV	1 MS/s	1 µs	1 s
200µs/DIV	500 kS/s	2 µs	2 s
500µs/DIV	200 kS/s	5 µs	5 s
1ms/DIV	100 kS/s	10 µs	10 s
2ms/DIV	50 kS/s	20 µs	20 s
5ms/DIV	20 kS/s	50 µs	50 s
10ms/DIV	10 kS/s	100 µs	1m 40 s
20ms/DIV	5 kS/s	200 µs	3m 20 s
50ms/DIV	2 kS/s	500 µs	8m 20 s
100ms/DIV	1 kS/s	1 ms	16m 40 s

The maximum recording length is fixed regardless of the number of channels in use.



Example record of an abnormal waveform

A waveform recorded using a waveform judgment trigger. The judgment area can be displayed simultaneously.

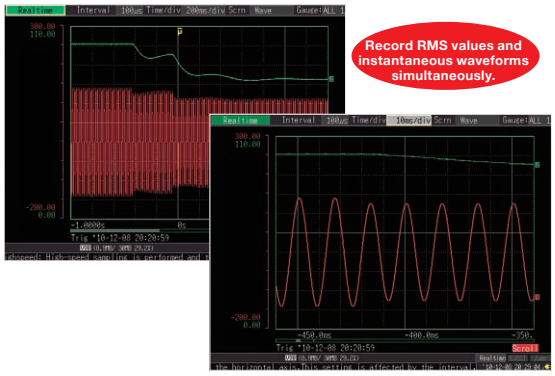
2 Measure RMS value fluctuations for a power line over an extended period of time

Long-term measurement and recording using the real-time function

- Recording interval of 100 µs to 1 min
- Waveform data is saved directly in a binary format to a CF card or USB memory.

■ Recording Capacity Note: Use only HIOKI CF cards that are guaranteed to operate with the HiCORDER for continuous long-term recording.

Recording Interval	All channels (4 analog + 8 logic channels), recording waveform (binary) data only				
	Internal memory (8MB)	256MB (9727)	512MB (9728)	1GB (9729)	2GB (9830)
100µs	1m 40s	42m 40s	1h 25m 20s	2h 46m 40s	5h 33m 20s
200µs	3m 20s	1h 25m 20s	2h 50m 40s	5h 33m 20s	11h 6m 40s
500µs	8m 20s	3h 33m 19s	7h 6m 39s	13h 53m 19s	1d 3h 46m 39s
1ms	16m 40s	7h 6m 39s	14h 13m 19s	1d 3h 46m 39s	2d 7h 33m 19s
2ms	33m 20s	14h 13m 18s	1d 4h 26m 38s	2d 7h 33m 18s	4d 15h 6m 38s
5ms	1h 23m 20s	1d 11h 33m 14s	2d 23h 6m 34s	5d 18h 53m 14s	11d 13h 46m 34s
10ms	2h 46m 40s	2d 23h 6m 28s	5d 22h 13m 8s	11d 13h 46m 28s	23d 3h 33m 8s
20ms	5h 33m 20s	5d 22h 12m 55s	11d 20h 26m 15s	23d 3h 32m 55s	46d 7h 6m 15s
50ms	13h 53m 20s	14d 19h 32m 19s	29d 15h 5m 39s	57d 20h 52m 19s	115d 17h 45m 39s
100ms	1d 3h 46m 40s	29d 15h 4m 37s	59d 6h 11m 17s	115d 17h 44m 37s	231d 11h 31m 17s
200ms	2d 7h 33m 20s	59d 6h 9m 14s	118d 12h 22m 34s	231d 11h 29m 14s	-★-
500ms	5d 18h 53m 20s	148d 3h 23m 6s	296d 6h 56m 26s	-★-	⋮
1s	11d 13h 46m 40s	296d 6h 46m 11s	-★-	⋮	⋮
2s	23d 3h 33m 20s	-★-	⋮	⋮	⋮
⋮	⋮	⋮	⋮	⋮	⋮
1 min	694d 10h 40m	-★-	-★-	-★-	-★-



- Maximum recording time is inversely proportional to number of recording analog channels.
- Because the actual capacity of a CF card is less than that indicated, , expect actual maximum times to be about 90% of those in the table.
- "★" exceeds 1 year.
- Proper operation is not guaranteed for extended recording periods (one year or longer). This type of operation impacts the product's warranty period and service life.

3 Measure the phase voltages for all three phases of a three-phase motor simultaneously.

Four channels of isolated Cat III 600 V input

The MR8880-20 can measure the voltages at different contacts without the need for a differential probe.

4 Check for fluctuations in low-voltage signals such as instrumentation or sensor output.

Thanks to its 14-bit, high-resolution A/D converter and the combination of a high-sensitivity 10 mV/div range and a 5 Hz filter (for noise rejection), the MR8880-20 can deliver stable measurement of sensor output.

5 Investigate why your office's power supply occasionally exhibits instability.

The MR8880-20 is capable of mixed recording of RMS values, DC voltage, and logic signals, allowing it to simultaneously record data describing the interrelationships between equipment power supplies and UPS output and control signals.

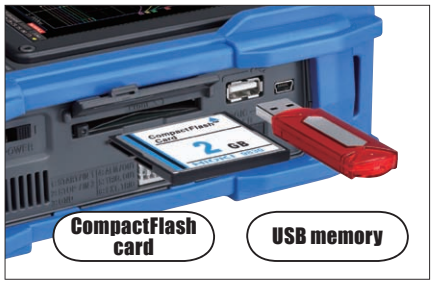
Functionality and Performance

The MR8880-20 delivers convenient functionality designed to maximize ease of use along with exceptional performance. See how this instrument can transform your concern and discontent to peace of mind and satisfaction.

1 Take home data for later viewing on a computer

Data can be saved directly to external media.

- In addition to CF cards, the MR8880-20 can store data on handy USB memory sticks.
- Data can be saved in real time to external media (at up to 10 kS/s).
- External media can be switched while measurement continues.
  If the recording interval is set to 100 µs, media must be swapped outwithin 20 seconds.
- External media is protected in the event of an unexpected power outage during measurement.
  By backing up the internal power supply until processing to save data to the external media completes, the instrument enables highly reliable data collection.

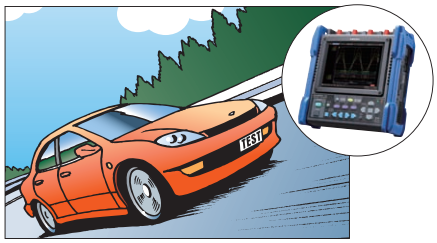


Use only HIOKI CF cards, which are manufactured to strict industrial standards, for long-term storage of important data.
Note: Operation of non-HIOKI CF cards is not guaranteed

2 Can the MR8880-20 withstand the vibrations in a moving vehicle?

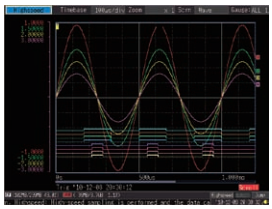
The instrument complies with JIS automotive vibration standards.

Thanks to its ability to withstand a high level of vibration, the MR8880-20 can be used to collect data in moving vehicles. Included side protectors further increase the device's durability.



3 Will the screen be hard to read while taking measurements outdoors?

The MR8880-20 features a 5.7-inch TFT color LCD that offers excellent visibility, even while taking measurements in an outdoor setting. The display is even engineered for easy viewing in the presence of reflections.



4 What if there's no power available in the vehicle being tested?

A high-capacity battery is available.

The MR8880-20 can be used continuously for 4 hours on battery power.

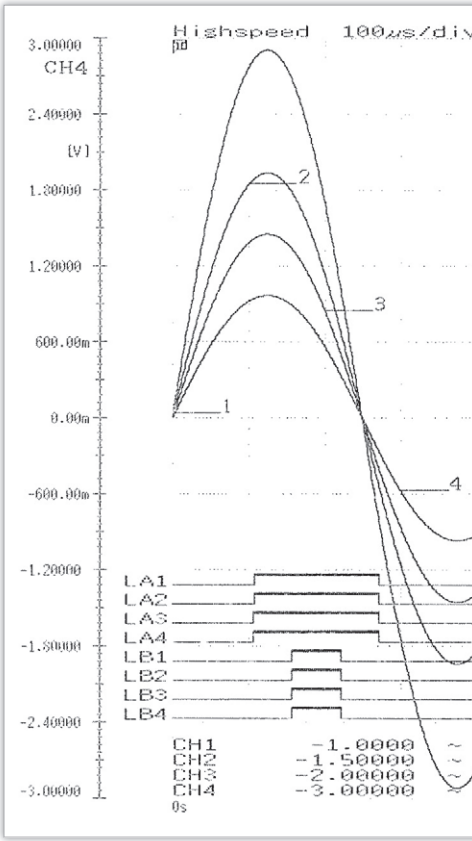
5 Is the printer easy to use?

Shown with optional printer unit.

Loading recording paper is a snap thanks to the MR8880-20's one-touch loading mechanism.

Quickly print data on-site.
(Real-time print function: 1s/div ~)

Example printout (actual size)



Simply load the recording paper roll and close the cover.

■ Specifications

Basic specifications (accuracy guaranteed for 1 year)

Measurement functions	High-speed function (high speed recording) Real-time function (actual time recording)
Number of channels	4 analog + 8 logic Isolated analog channels, isolated input and outputs, logic has common GND.
Maximum sampling rate	1Msamples/s (1 µs cycle, all channels simultaneously)
Memory capacity	14bit × 1 M words/ch (1 word = 2 bytes, not expandible)
External memory	CF card slot × 1 (Up to 2 GB, supports FAT16 and FAT32 formats) USB memoly × 1 (USB 2.0 -A receptacle)
Time accuracy (at 23°C)	Sampling time accuracy: ±0.0005 %, Clock precision: ±3s/day
Backup function (reference value at 23°C)	Clock and settings: 10 years or more (at 25°C / 77°F) Waveform backup function: Approx. 40 minutes • When instrument is powered off at least 3 minutes after being turned on
External control	External trigger input, Trigger output, external start input, external stop input, status output, ground pin
Interface	USB: 1 port USB 2.0 High Speed mini-B receptacle Functions: Configure settings/perform measurement using communications commands; transfer file stored in CF/USB memory to computer (USB drive mode)
Environmental conditions for use (no condensation)	Temperature range: -10°C (14°F) to 50°C (122°F) Humidity range: -10°C (14°F) to 40°C (104°F), 80% rh or less 40°C (104°F) to 45°C (113°F), 60% rh or less 45°C (113°F) to 50°C (122°F), 50% rh or less When powered by BATTERY PACK Z1000: 0°C (32°F) to 40°C (104°F), 80% rh or less When recharging the Z1000: 10°C (50°F) to 40°C (104°F), 80% rh or less
Environmental conditions for storage (no condensation)	Temperature range: -20°C (-4°F) to 60°C (140°F) Humidity range: 80% rh or less (-20°C (-4°F) to 40°C (104°F)), 60% rh or less (40°C (104°F) to 45°C (113°F)), 50% rh or less (45°C (113°F) to 60°C (140°F)) BATTERY PACK Z1000: -20°C (-4°F) to 40°C (104°F) , 80% rh or less
Compliance standard	Safety: EN61010 EMC: EN61326, EN61000-3-2, EN61000-3-3 Vibration resistance: JIS D 1601, Type 1: passenger vehicle, Conditions: equivalent to Type A
Power requirements Note: LR6/AA alkaline batteries are not sufficient to power the unit when it is connected with the PRINTER UNIT MR9000. Use of other power supplies is required. (Continuous operating time is given as a reference value at 23°C.)	1) AC ADAPTER Z1002: 100 to 240V AC (50/60 Hz) 2) BATTERY PACK Z1000: 7.2V DC Continuous operating time: Approx. 3 hours with backlight on, approx. 3.5 hours with backlight off (AC adapter has priority when both are used) 3) LR6 (AA)×8 Approx. 40 minutes with backlight on. Approx. 50minutes with backlight off. (when used with AC adapter, AC adapter takes precedence) 4) 10 to 28V DC (using special order cable)
Charging functions (reference value at 23°C)	Charging time is about 3 hours (can be charged by connecting the AC adapter while the Z1000 battery pack is attached)
Max. rated power	1) When instrument is powered with the Z1002 AC adapter or an external DC power supply: 11 VA*1, 10 VA*2, 40 VA*3 2) When instrument is powered with the Z1000 battery pack; 9 VA*1, 8 VA*2, 22 VA*3 *1 Real-time data storage, backlight on *2 Real-time data storage, backlight off *3 Real-time data storage, backlight on, with printer used
Dimensions, mass (including battery pack)	205 mm (8.07 in)W × 199 mm (7.83 in)H × 67 mm (2.64 in)D, 1.66 kg (58.6 oz) (printer detached) 303 mm (11.93 in)W × 199 mm (7.83 in)H × 67 mm (2.64 in)D, 2.16 kg (76.2 oz) (printer attached)
Accessories	AC adapter Z1002 (1), Alkaline battery box (1), Strap (1) USB cable (1), Application disk (1), Instruction manual (1)

Function

Presets	Select from basic measurement guide, example measurement guide, and commands for loading internally stored settings.
Scaling function	Select decimal or scientific notation for each channel. 1) Scaling ratio: Select scaling ratio, offset value, and units. 2) Two-point configuration: Set input values, post-scaling values, and units. 3) HIOKI sensor: Set HIOKI clamp-on probe and range value. 4) Output rate setting: Select scaled value per 1 V from a list.
Data protection	Open files are closed before the instrument turns itself off when a power outage occurs while saving data to recording media. When powering the instrument with a battery, open files are closed and access to the media is stopped when remaining battery power falls below a certain level. *Valid when at least 3 minutes has elapsed since the instrument was turned on.
Reservation function	Up to 10 measurement start and measurement stop conditions can be set.
Other	Settings can be automatically loaded from internal memory or media when the instrument is turned on. Up to 10 settings can be saved in the instrument's internal memory.

Printer (Printer Unit MR9000 docks onto the main device)

Features	Printer paper one-touch loading, high-speed thermal printing
Printer paper	112 mm (4.4 in) × 18 m (59.06 ft), thermal paper roll (using 9234) Recording width: 100 mm, 10 div f.s., 1 div=10 mm (80 dot/div)
Recording speed	Max. 10 mm/s (0.39 inch/s) (Printing is not supported when using alkaline batteries.)

High-speed function (high speed recording)

Time axis	100µs to 100ms/div, 10 range, resolution: 100 points/div
Sampling period	1/100 of time axis ranges (minimum sampling period 1 µs, all channels simultaneously)
Recording length	5 to 10000 divisions fixed (5division steps)
Automatic save function	Binary data, text data, calculation results, binary + calculation results, text + calculation results, or NONE
Other save functions	Save and delete function: ON/OFF
Screen settings	Split screen (1, 2, or 4 segments), X-Y waveform compositing (1 screen)
Pre-trigger	Can record data from before the trigger point, 0 to 100 % of recording length; 13 settings, or user-configured
Waveform scrolling	Backwards scrolling through past waveform data both during and after measurement
Calculation functions	Up to four arithmetic operations simultaneously Average value, effective (RMS) value, peak to peak value, maximum value, time to maximum value, minimum value, time to minimum value, period, and frequency, area, X-Y area.

Real-time function (actual time recording)

Recording interval	100µs to 500µs, 1ms to 500ms, 1s to 1min, 19 settings Display time axis: 10ms to 1day/div, 22 ranges
Real-time printing (with optional MR9000)	ON/OFF *Simultaneous printing: Supported when using a time axis slower than 1 s/div.
Recording Time	Continuous save to CF card or USB memory can be set ON/OFF
Envelope mode	ON/OFF
Waveform recording	The last 1 Mwords (before measurement was stopped) are saved in the instrument's internal memory (when envelope mode is on, 500 kwords).
Real-time save function	Binary data, text data, calculation results, binary + calculation results, text + calculation results, or NONE
Other save functions	Split save: ON/OFF/fixed time Save and delete: ON/OFF Eject media: Media can be ejected while saving data in real time.
Event marks	1) Event marks can be input during measurement (up to 100 marks). 2) Can move to waveform before or after an event mark based on specified event number input.

Trigger function

Repeat recording	Single/Repeat
Trigger timing	High-speed function: Start Real-time function: Start, Stop, Start & Stop
Trigger conditions	AND/OR supported for all trigger sources
Trigger source	Trigger sources can be selected for each channel. Instrument enters free-run mode when all trigger sources are off. 1) Analog input CH1 - CH4 2) Logic input LA1 - LA4, LB1 - LB4 (4ch × 2 probes) 3) External trigger 4) Interval trigger: Fixed-time recording for specified measurement interval (month/day/hours/minutes/seconds)
Trigger types	1) Level 2) In 3) Out 4) Voltage drop (High-speed function) : For AC 50/60 Hz power lines 5) Waveform judgment (High-speed function): For AC 50/60 Hz power lines 6) Logic 7) External: Rising edge/falling edge
Level setting resolution	0.1 % f.s. (f.s.=10 div)
Trigger filter	High-speed function: 7 settings from 10 to 1000 samples or OFF Real-time function: ON/OFF
Trigger output	Open collector (5 V output, active Low)

Analog input

(Accuracy defined at 23° ±5°C, 80% rh or less, for measurements taken following zero adjustment 30 minutes after instrument is turned on; accuracy guarantee of 1 year; product guarantee of 1 year)

Measurement functions	4-channel voltage measurement; switchable between instantaneous value (waveform) and RMS value
Input connectors	Isolated BNC connector (input impedance 1 MΩ, input capacitance 7 pF)
Max. rated voltage to earth	600 V AC, DC CAT Ⅲ / 300 V AC, DC CAT IV (with input isolated from the unit, the maximum voltage that can be applied between input channel and chassis and between input channels without damage)
Measurement range	10 mV to 100 V/div, 13 ranges, full scale: 10 div, AC voltage that can be measured and displayed using high-speed function: 600 Vrms Low-pass filter: 5 Hz/50 Hz/500 Hz/5 kHz/50 kHz
Measurement resolution	1/640 of measurement range (using 14-bit A/D conversion, at × 1)
Highest sampling rate	1 MS/s (simultaneous sampling in 4 channels)
Instantaneous value measurement accuracy	±0.5% f.s. (after zero-adjust)
RMS measurement	RMS accuracy: ±1.5% f.s. (DC, 30Hz to 1kHz) ±3% f.s. (1kHz to 10kHz) Response time: 300ms (rising edge 0 to 90% of full scale with filter off) Crest factor: 2
Frequency characteristics	DC to 100 kHz ±3dB
Input coupling	DC/GND
Max. rated voltage between terminals	600 V AC, DC (maximum voltage which when applied to between input terminals does not damage them)

Screen display

Display	5.7-inch VGA-TFT color LCD (640 × 480dot)
Waveform display scale	Time axis: × 10 to × 2 (zoom view supported for high-speed recording only), × 1, × 1/2 to × 1/2,000 Voltage axis: × 20 to × 2, × 1, × 1/2 to × 1/10
Comment input	Titles and comments input for individual channels
Logic waveform display	Select 2 recording widths; display positions can be set separately
Display items	• Waveform display; simultaneous display of waveform and gage; simultaneous display of waveform, gage, and settings; simultaneous display of waveform and calculation results; simultaneous display of waveform and cursor values (A/B cursor values) The following display items are supported when using real-time functionality:
Monitor function	Value (instantaneous value or RMS value) and measured waveform (monitor screen display with refresh rate of 0.5 sec) Display digits: 5
Instantaneous value display	Time: Display of time elapsed since start of measurement or trigger point Date: Display of date and time at which data was captured Number of data points: Display of number of data points captured since start of measurement
Other display functions	• Cursor measurement (two cursors [A/B], support for all channels) • Upper and lower limits can be set (to align waveform amplitude with upper and lower limits). • The zero position of the analog waveform can be moved in 1% steps. • The waveform display can be set to any of 24 colors. • Zero adjustment can be performed for all channels and ranges at once.

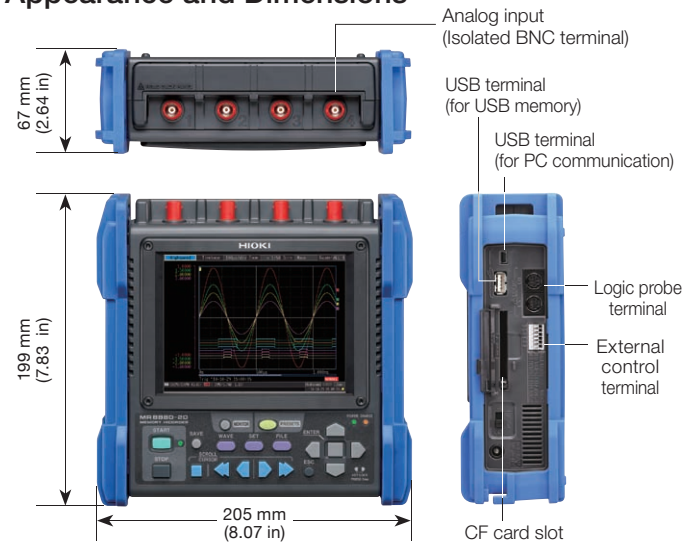
■ PC Software Specifications

Bundled with the MR8880-20 in the CD-R

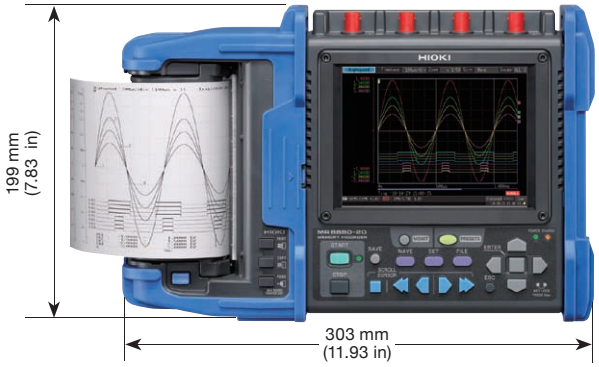
Wave Viewer (Wv) Software

Functions	• Simple display of waveform file • Text conversion: convert binary data file to text format, with selectable space or tab separators in addition to CSV, and specifiable section, thinning available • Display format settings: scroll functions, enlarge/reduce display, display channel settings • Others: voltage value trace function, jump to cursor/trigger position function
Operating environment	Windows 2000/XP/Vista (32-bit), or Windows 7 (32-bit/64-bit)

■ Appearance and Dimensions



with PRINTER UNIT MR9000 attached



■ Specifications of Options (sold separately)

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**.*

LOGIC PROBE 9320-01

(Accuracy at 23 ±5°C/73 ±9°F, 35 to 80% rh, accuracy / product guaranteed for 1 year)

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 to +50V) Pull-up resistance: 2 kΩ (contact input: internally pulled up to +5 V)
Digital input threshold	1.4V/ 2.5V/ 4.0V
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)
Response speed	500ns or lower
Max. allowable input	0 to +50V DC (the maximum voltage that can be applied across input pins without damage)

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

DIFFERENTIAL PROBE 9322

(Accuracy at 23 ±5 °C/73 ±9 °F, 35 to 80 % rh after 30 minutes of warm-up time, accuracy / product guaranteed for 1 year)

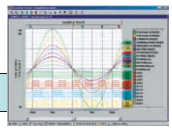
Functions	For high-voltage floating measurement, power line surge noise detection, RMS rectified output measurement
DC mode	For waveform monitor output, Frequency characteristics: DC to 10 MHz (±3 dB), Amplitude accuracy: ±1 % of full scale (at max. 1000 V DC), ±3% of full scale (at max. 2000 V DC) (full scale: 2000 V DC)
AC mode	For detection of power line surge noise, Frequency characteristics: 1 kHz to 10 MHz ±3 dB
RMS mode	DC/AC voltage RMS output detection, Frequency characteristics: DC, 40 Hz to 100 kHz, Response speed: 200 ms or less (400 V AC), accuracy: ±1 % of full scale (DC, 40 Hz to 1 kHz), ±4 % of full scale (1 kHz to 100 kHz) (full scale: 1000 V AC)
Input	Input type: balanced differential input, Input impedance/capacitance: H-L 9 MΩ/10 pF, H/L-unit 4.5 MΩ/20 pF, Max. rated voltage to earth: when using grabber clip 1500V AC/DC (CAT Ⅱ), 600 V AC/DC (CAT Ⅲ), when using alligator clip: 1000 V AC/DC (CAT Ⅱ), 600 V AC/DC (CAT Ⅲ)
Max. allowable input	2000 V DC, 1000 V AC (CAT Ⅱ), 600 V AC/DC (CAT Ⅲ)
Output	Voltage divider for 1/1000 of input, BNC connectors (output switchable for 3 modes DC, AC, RMS)
Power source	Use the AC Adapter 9418-15 *Note: power cannot be supplied from the logic terminals of the MR8880-20*

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

LOGIC PROBE MR9321-01

(Accuracy at 23 ±5°C/73 ±9°F, 35 to 80% rh, accuracy / product guaranteed for 1 year)

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 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)



WAVE PROCESSOR 9335

Distribution media	One CD-R
Operating environment	Running under Windows 2000/XP/Vista (32-bit), or Windows 7 (32-bit/64-bit)
Display functions	Waveform display, X-Y display, Digital value display, Cursor function, Scroll function, Maximum number of channels (32 channels analog, 32 channels logic), Gauge display (time, voltage axes), Graphical display
File loading	Readable data formats (.MEM, .REC, .RMS, .POW) Maximum loadable file size: Maximum file size that can be saved by a given device (file size may be limited depending on the computer configuration)
Data conversion	Conversion to CSV format, Tab delimited/Space delimited Data culling (simple), Convert for specified channel, Batch conversion of multiple files
Print functions	Print formatting (1 up, 2-to-16 up, 2-to-16 rows, X-Y 1-to-4 up), Preview, Hard copy functions usable on any printer supported by operating system
Other	Parameter calculation, Search, Clipboard copy, Launching of other applications

Options

Printer options

PRINTER UNIT MR9000
Printing width 100 mm (3.94 in), used together with the MR8880-20 main body, includes 1 roll of recording paper

RECORDING PAPER 9234
112 mm (4.41 in) × 18 m (59.06 ft), roll type, 10 rolls set

Logic signal measurement

LOGIC PROBE 9320-01
4-channel type, for voltage/contact signal ON/OFF detection (response time 0.5 µsec, miniature terminal type)

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

CONVERSION CABLE 9323
Used for connecting the **9320/ 9321/ MR9321** to the **MR8880-20**, because the terminal shapes are different.
* This cable is not required for the small-terminal types **9327**, **9320-01**, **9321-01** and **MR9321-01**.

Voltage measurement
(Voltage is limited to the specifications of the input modules in use)

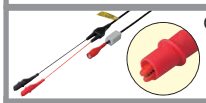
Recommended

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 300 V. Red/black set.*

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.*



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

CONNECTION CORD 9197
φ 5.0 mm (0.20 in) dia., cable allowing for up to 600 V input. 1.8 m (5.91 ft) length, a detachable large alligator clips are bundled

GRABBER CLIP 9243
Attaches to the tip of the Cord 9197, Red/ Black set, 196 mm (7.72 in) length

High-Voltage measurement separate power supply required

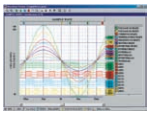
DIFFERENTIAL PROBE 9322
For up to 2 kV DC or 1 kV AC. Use with the AC Adapter 9418-15, for power supply.

AC ADAPTER 9418-15
For powering Differential probe 9322, 100 to 240 V AC.

MEMORY HiCORDER MR8880-20
(Printer unit is sold separately)

Supplied accessories:
AC adapter Z1002 (1), Alkaline battery box (1)
Strap (1), USB cable (1), Wave viewer software (1)

PC Software



WAVE PROCESSOR 9335
Convert data, print and display waveforms. Windows 2000/XP/Vista (32-bit), Windows 7 (32-bit/64-bit)

Current measurement *Use in combination with the Sensor Unit 9555-10

UNIVERSAL CLAMP ON CT 9279 *Not CE marked
Observe waveforms from DC to distorted AC. DC to 20kHz response, input 500A / output 2V AC

UNIVERSAL CLAMP ON CT 9277
Observe waveforms from DC to distorted AC. DC to 100kHz response, input 20A / output 2V AC

UNIVERSAL CLAMP ON CT 9278
Observe waveforms from DC to distorted AC. DC to 100kHz response, input 200A / output 2V AC

CLAMP ON SENSOR 9272-10
Enables observation of AC current waveforms. Input: 1 to 100kHz, selectable 20 and 200A rms ranges, 2V AC output

SENSOR UNIT 9555-10
Power supply unit for the **9272-10** to the **9279** clamp sensors, for signal output **L9217** is necessary.

CONNECTION CORD L9217
Cord has insulated BNC connectors at both ends, and connects to the **9555-10** and input module.

Current measurement * For commercial power lines, 50/60Hz (separate power supply not required)

CLAMP ON PROBE 9018-50
Enables observation of AC current waveforms. 40 Hz to 3 kHz response, input 10 A to 500 A range, output 0.2 V AC/range

CLAMP ON PROBE 9132-50
Enables observation of AC current waveforms. 40 Hz to 1 kHz response, input 20 A to 1000 A range, output 0.2 V AC/range

Leak current / Load current measurement

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

CLAMP ON AC/DC HiTESTER 3284
20A, 200A AC/DC ranges, monitor / analog output 1V f.s.

CLAMP ON AC/DC HiTESTER 3285
200A, 2000A AC/DC ranges, monitor / analog output 1V f.s.

Note: With the MR8875 connection requires Output cord 9094 and Conversion adapter 9199.

Current measurement *Other current meters with analog output function also compatible

Clamp sensor sold separately

CLAMP ON AC/DC HiTESTER 3290
Enables observation of AC/DC current waveforms. Input range and frequency range depend on clamp sensor used, 2V AC output

CLAMP ON AC/DC SENSOR 9691
DC to 10kHz (-3dB), 100A, 2m (6.56ft) cord length

CLAMP ON AC/DC SENSOR 9692
DC to 20kHz (-3dB), 200A, 2m (6.56ft) cord length

CLAMP ON AC/DC SENSOR 9693
DC to 15kHz (-3dB), 2000A, 2m (6.56ft) cord length

OUTPUT CORD 9094
φ 3.5mm (0.14in) dia. mini-plug to banana terminal, 1.5m (4.92ft) cord length

CONVERSION ADAPTER 9199
Female banana terminals to BNC plug (output), use to connect to BNC terminal on Input Module

CARRYING CASE 9400
Includes compartment for options

AC ADAPTER 9445-02
For powering the 3283 to 3285, the 3290, For USA, 100 to 240 V AC, 9V/ 1A

AC ADAPTER 9445-03
For EU, 100 to 240 V AC, 9V/ 1A

Removable storage (CF card)

Supplied with PC Card adapter

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

- **PC CARD 2G 9830** (2 GB capacity)
- **PC CARD 1G 9729** (1 GB capacity)
- **PC CARD 512M 9728** (512 MB capacity)
- **PC CARD 256M 9727** (256 MB capacity)

Power supply

AC ADAPTER Z1002
Included as standard, for main unit, 100 to 240 V AC

BATTERY PACK Z1000
NiMH, charges while installed in the HiCORDER, 7.2V DC/ 4500mA

Other options

CARRYING CASE C1003
Includes compartment for options, soft case type

CONNECTION CORD L9217
Insulated BNC connectors at both ends, Connects to insulated BNC connectors on input module. 1.7 m (5.58 ft) length

● Example setup for 4-channel voltage measurement (up to 600 V)

MR8880-20	+ 9197 × 4	+ MR9000	+ Z1000	+ 9727	+ C1003
Main unit	CONNECTION CORD (up to 600 V)	PRINTER UNIT	BATTERY PACK	PC CARD (256MB)	CARRYING CASE

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All information correct as of Sep. 26, 2011. All specifications are subject to change without notice.

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