



Modello	MR8875	MR8880/20	MR8870/20	MR8847 MR8847A	MR8827	MR8740 MR8741
<b>Modalità di funzionamento</b>						
MEM – HIGHSPEED	SI	SI	SI	SI	SI	SI
REC – REALTIME	SI	SI	-	SI	SI	SI
Calcolo RMS	-	SI	SI	SI*	SI	SI
Diagramma X-Y	-	-	-	SI	SI	solo MR8741
Analisi FFT	SI	-	-	SI	SI	SI
Segnali CAN	SI	-	-	SI*	-	-
Comparazione della forma d'onda	-	-	-	SI	SI	solo MR8741
<b>Prestazioni di misura</b>						
Velocità di campionamento	500KS/s	1MS/s	1MS/s	20MS/s	20MS/s	20MS/s
Elaborazione del dato	16 bit*	14 bit	12 bit	16 bit*	24 bit*	24 bit*
Tensione max tra canali	1000 Vcc*	600 Vcc/ca	400 Vcc/ca	1000 Vcc/ca*	1000 Vcc/ca*	1000 Vcc/ca*
Tensione max verso terra	1000 Vcc/ca*	600 Vcc/ca	300 Vcc/ca	1000 Vcc/ca*	1000 Vcc/ca*	1000 Vcc/ca*
<b>Ingressi di misura</b>						
Ingressi isolati tra loro	SI	SI	SI	SI	SI	SI
Max ingressi analogici	16	4	2	16	32	MR8740: 52 MR8741: 16
Max ingressi digitali	8	8	4	64*	32	16
Moduli di ingresso a slot	SI	-	-	SI	SI	SI
<b>Memoria dati</b>						
Memoria interna	64MB	8MB	4MB	/01 - /51= 128MB /52 = 512MB /53 = 1024MB	1024MB	MR8740: 1728MB MR8741: 512MB
Card**	2GB	fino a 2GB	fino a 2GB	fino a 2GB	fino a 2GB	-
SSD (Solid State Drive)	-	-	-	128GB***	128GB***	-
<b>Display e stampante carta</b>						
Dimensioni display grafico	8.4 pollici	5.7 pollici	4.3 pollici	10.4 pollici	10.4 pollici	10.4 pollici
Stampante su carta	-	opzionale	-	SI	opzionale***	-
<b>Interfacce</b>						
USB	SI	SI	SI	SI	SI	SI
Slot per chiavi USB	SI	SI	SI	SI	SI	SI
LAN	SI	-	-	SI	SI	SI
GP-IB	-	-	-	-	-	-
RS232	-	-	-	-	-	-
SD Card	SI	-	-	-	-	-
CF Card	-	SI	SI	SI	SI	-
<b>Alimentazione</b>						
Diretta in CA	-	-	-	SI	SI	SI
Tramite adattatore in CA	SI	SI	SI	-	-	-
Tramite batterie ricaricabili**	SI	SI	SI	-	-	-
Diretta in CC	SI	SI	SI	MR8847A***	-	-

(\*) Le caratteristiche indicate con asterisco (\*) sono da valutare in funzione dei moduli di ingresso intercambiabili (opzionali) installati sull'unità principale  
 (\*\*) non fornite in dotazione  
 (\*\*\*) installazione in fabbrica

# MR8880/20



**Robusto e professionale,  
nato per misure "in campo"!!!**

**Sicuro ed affidabile, 4 canali per qualsiasi  
tensione fino a 600Vcc/ca**

## CAT III 600V

### 4 canali di misura con ingressi isolati

4 canali analogici ed 8 canali digitali, totalmente isolati tra loro. Misura diretta fino a 600Vcc/ca (CAT III) e 300Vcc/ca (CAT IV). MR8880/20 può essere connesso ad una linea di alimentazione trifase senza la necessità di utilizzare attenuatori o equivalenti. Misura fino a 2000Vcc/1000Vca (CAT II) tramite sonda differenziale mod. 9322 opzionale.

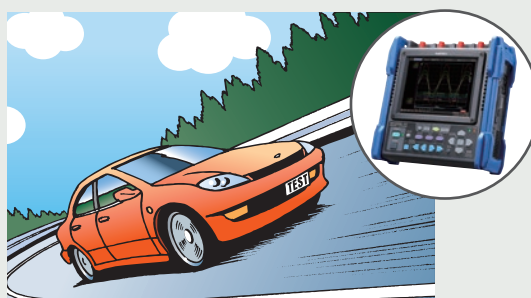


## Idoneo per condizioni estreme

Ampia gamma di temperature di funzionamento da -10°C a +50°C. Con alimentazione tramite batterie ricaricabili il campo di funzionamento è compreso tra 0°C e +40°C.

Design robusto e resistente contro gli urti anche violenti, MR8880/20 dispone di protettori laterali in gomma a protezione del corpo centrale dello strumento.

Conforme a JIS D1601 per la resistenza alle vibrazioni.



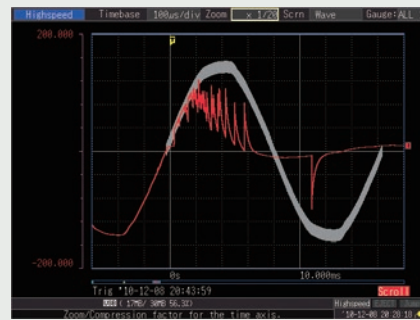
## Configurazione facilitata tramite programmazione con PRESET

Il menù di configurazione PRESET semplifica la programmazione dei passi di setup; è sufficiente selezionare la tipologia di misura da compiere e seguire le istruzioni che vengono presentate a display in sequenza.

MR8880/20 può misurare, visualizzare e registrare l'andamento nel tempo della tensione di alimentazione come valore RMS, come forme d'onda, come variazioni anomale quali buchi e picchi, ecc...

## Misura della forma d'onda istantanea in avvio o per improvvisi segnali anomali

Funzione di misura ad elevata velocità di campionamento (1 microsecondo per tutti i canali di misura in simultanea). La forma d'onda può essere registrata unicamente quando esce al di fuori di una finestra di tolleranza. L'area di valutazione è visualizzata in sovrapposizione alla forma d'onda registrata.



## Misura e registrazione a lungo termine tramite la funzione real-time

La funzione real-time consente di registrare, direttamente su CF card o chiave USB, tutte le forme d'onda misurate e visualizzare con una cadenza di registrazione a partire da 100 microsecondi.

Tramite la registrazione real-time è possibile monitorare continuamente per lungo tempo le fluttuazioni di tensione RMS di una linea di alimentazione.



### ■ 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.

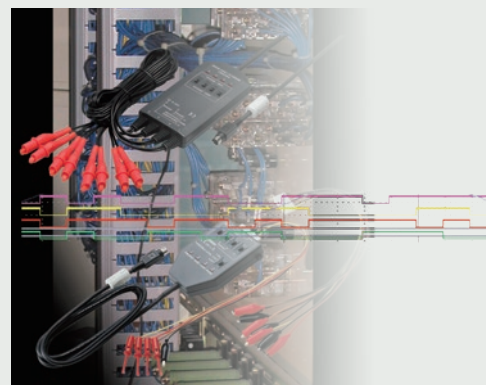
### ■ Recording Capacity Note: Use only HIOKI CF cards that are guaranteed to operate with the HiCORDER for continuous long-term recording.

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.

## Sonde logiche per segnali impulsivi

MR8880/20 dispone di 2 connettori multicanale per segnali impulsivi di tipo a potenziale zero (no tensione), a collettore aperto, o di tensione. I segnali di tipo a treno di impulsi, quali quelli di rotazione e velocità, possono essere misurati o conteggiati. Sono disponibili 2 tipologie di sonde logiche in funzione del segnale da analizzare: 9320/01 (contatti e tensione fino a 50V) oppure MR9321/01 (tensione cc e ca fino a 250V, stati logici di controllo, contatti) (vedi tabella accessori).



## Campionamento a 1MS/s con risoluzione 100 punti/divisione

Il principio di funzionamento di un oscilloscopio digitale tradizionale, con la funzionalità aggiuntiva di registrazione dati in memoria ad alta velocità e per elevati volumi di dati. Frequenza di campionamento 1MS/s (1 microsecondo) contemporanea su tutti i canali. Le forme d'onda del segnale in esame sono rilevate e rappresentate con estrema fedeltà. Risoluzione A/D a 14 bit.

## Registrazione su SD Card o su chiave USB

In aggiunta a CF Card (compact flash), MR8880/20 può registrare i dati su chiave USB con una velocità massima in tempo reale fino a 10KS/s.

Per registrazioni molto veloci, ad esempio 100us, i dati sono salvati sul supporto esterno in modo raggruppato ogni 20 secondi.

Il rischio di perdere dati è ridotto al minimo in quanto la registrazione su supporto esterno è protetta contro improvvise mancanze di alimentazione; MR8880/20 rimane acceso finché i dati non vengono completamente scritti nella SD card o chiave USB.



CompactFlash card

USB memory

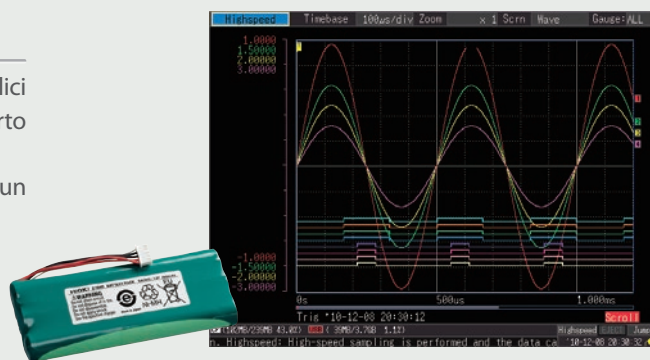
## Visualizzazione ad indagine multipla

MR8880/20 è in grado di compiere registrazioni multiple e miste di valori RMS, tensioni continue in c.c., e segnali logici, permettendo di salvare dati storici che descrivono interrelazioni quali quelle esistenti tra tensione di alimentazione, tensione di uscita da gruppi di continuità UPS e segnali ausiliari di controllo del funzionamento.

## Display & Batteria

MR8880/20 dispone di un display LCD TFT a colori da 5,7 pollici che offre una visibilità eccellente, anche in ambiente aperto naturale con presenza di riflessi.

La batteria interna ricaricabile mod. 1000Z garantisce un utilizzo continuativo di almeno 4 ore.



## Stampante opzionale ad innesto laterale

MR8880/20 può essere equipaggiato lateralmente di una stampante termica ad innesto rapido mod. 9000MR.

La carta termica mod. 9234 di altezza 112mm e lunghezza 18 metri si inserisce con semplice un click.

La funzione di stampa su carta in tempo reale è selezionabile a partire dalla base tempi 1sec/div.



## Configurazione in 3 passi tramite funzione PRESET

L'esempio sottostante mostra la semplicità di configurazione, selezionando cosa misurare tra "tensione di alimentazione", "cadute di tensione", altro ... e la sequenza di istruzioni da osservare.

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

"Voltage drop of power outage, etc." settings screen

1. Channel Settings  
Voltage drop of power outage, etc.

CH1	Use	Start when	100Vrms(141.4Vpeak)	50Hz drops to	90Vrms(127.2Vp)
CH2	Use	Start when	100Vrms(141.4Vpeak)	50Hz drops to	90Vrms(127.2Vp)
CH3	Use	Start when	100Vrms(141.4Vpeak)	50Hz drops to	90Vrms(127.2Vp)
CH4	Use	Start when	100Vrms(141.4Vpeak)	50Hz drops to	90Vrms(127.2Vp)

2. Recording Length Settings  
Measure for 25ms after voltage drops

3. Pre-trigger Settings  
Do not record waveform before voltage drop

4. Repeat & Save Settings  
Measure only once in accordance with the set values.  
Save measured data Do not save

Start measurement

Exit by [ESC] key. 10-12-20 15:19:57

- 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
- Select the recording length. 25ms/50ms/100ms/200ms
- Save pre-triggered waveforms. Record • Do not record
- 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 measurement

Press the START key

Press START to begin measuring.

**START**

### Other Convenient Functions

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

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

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

Basic specifications	
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 $\mu$ s cycle, all channels simultaneously)
Memory capacity	14bit $\times$ 1 M words/ch (1 word = 2 bytes, not expandible)
External memory	CF card slot $\times$ 1 (Up to 2 GB, supports FAT16 and FAT32 formats) USB memory $\times$ 1 (USB 2.0 -A receptacle)
Time accuracy (at 23°C)	Sampling time accuracy: $\pm$ 0.0005 %, Clock precision: $\pm$ 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	1) AC ADAPTER Z1002: 100 to 240V AC (50/60 Hz) 2) BATTERY PACK Z1000: 7.2V DC 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) 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) $\times$ 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 <sup>*1</sup> , 10 VA <sup>*2</sup> , 40 VA <sup>*3</sup> 2) When instrument is powered with the Z1000 battery pack; 9 VA <sup>*1</sup> , 8 VA <sup>*2</sup> , 22 VA <sup>*3</sup> <sup>*1</sup> Real-time data storage, backlight on <sup>*2</sup> Real-time data storage, backlight off <sup>*3</sup> Real-time data storage, backlight on, with printer used
Dimensions, mass (including battery pack)	205 mm (8.07 in)W $\times$ 199 mm (7.83 in)H $\times$ 67 mm (2.64 in)D, 1.66 kg (58.6 oz) (printer detached) 303 mm (11.93 in)W $\times$ 199 mm (7.83 in)H $\times$ 67 mm (2.64 in)D, 2.16 kg (76.2 oz) (printer attached)
Accessories	Instruction manual $\times$ 1, AC adapter Z1002 $\times$ 1, Alkaline battery box $\times$ 1, Strap $\times$ 1, USB cable $\times$ 1, Application disk (Wave viewer Wv, Communication commands table) $\times$ 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) $\times$ 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	100 $\mu$ s to 100ms/div, 10 range, resolution: 100 points/div
Sampling period	1/100 of time axis ranges (minimum sampling period 1 $\mu$ s, 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	100 $\mu$ s to 500 $\mu$ s, 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 M words (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/fixd 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 $\times$ 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 <small>(Accuracy defined at 23<math>\pm</math>5°C, 80% rh or less, for measurements taken following zero adjustment 30 minutes after instrument is turned on)</small>	
Measurement functions	4-channel voltage measurement; switchable between instantaneous value (waveform) and RMS value
Input connectors	Isolated BNC connector (input impedance 1 M $\Omega$ , 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 $\times$ 1)
Highest sampling rate	1 MS/s (simultaneous sampling in 4 channels)
Instantaneous value measurement accuracy	$\pm$ 0.5% f.s. (after zero-adjust)
RMS measurement	RMS accuracy: $\pm$ 1.5% f.s. (30Hz to 1kHz) $\pm$ 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 $\pm$ 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	<ul style="list-style-type: none"> <li>Cursor measurement (two cursors [A/B], support for all channels)</li> <li>Upper and lower limits can be set (to align waveform amplitude with upper and lower limits).</li> <li>The zero position of the analog waveform can be moved in 1% steps.</li> <li>The waveform display can be set to any of 24 colors.</li> <li>Zero adjustment can be performed for all channels and ranges at once.</li> </ul>

### PC Software Specifications Bundled with the MR8880 in the CD-R

Wave Viewer (Wv) Software	
Functions	<ul style="list-style-type: none"> <li>Simple display of waveform file</li> <li>Text conversion: convert binary data file to text format, with selectable space or tab separators in addition to CSV, and specifiable section, thinning available</li> <li>Display format settings: scroll functions, enlarge/reduce display, display channel settings</li> <li>Others: voltage value trace function, jump to cursor/trigger position function</li> </ul>
Operating environment	Windows 8/7 (32/64-bit), Vista (32-bit), XP, 2000

### 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.



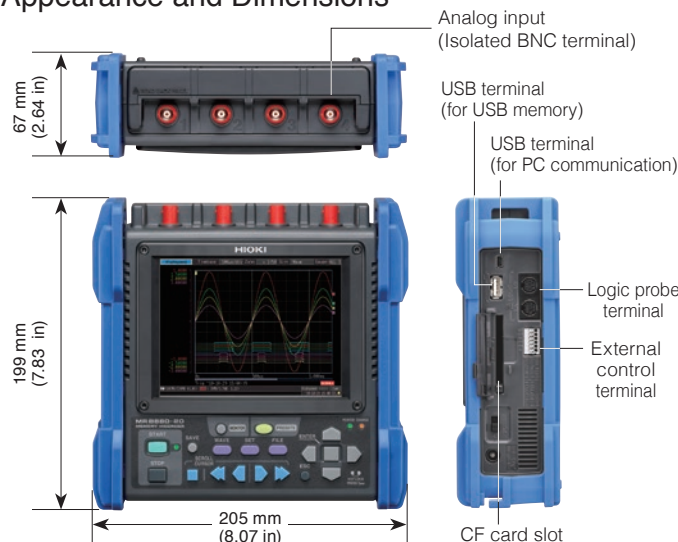
LOGIC PROBE 9320-01	
Function	Detection of voltage signal or relay contact signal for High/Low state recording
Input	4 channels (common ground between unit and channels), digital/contact input, switchable (contact input can detect open-collector signals) Input resistance: 1 MΩ (with digital input, 0 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: 70 cm (2.30 ft), Output side: 1.5 m (4.92 ft), 170g (6.0 oz)

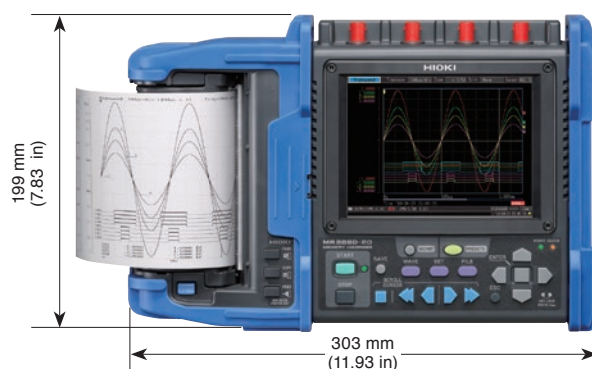


DIFFERENTIAL PROBE P9000 (Accuracy guaranteed for 1 year, Post-adjustment accuracy guaranteed for 1 year)	
Measurement modes	P9000-01: For waveform monitor output, Frequency properties: DC to 100 kHz -3 dB P9000-02: Switches between waveform monitor output/AC effective value output Wave mode frequency 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 measurement accuracy	±1 % f.s. (30 Hz to less than 1 kHz, sine wave), ±3 % f.s. (1 kHz to 10 kHz, sine wave)
Input resistance/capacity	H-L: 10.5 MΩ, 5 pF or less (at 100 kHz)
Maximum input voltage	1000 V AC, DC
Maximum rated voltage to ground	1000 V AC, DC (CAT III)
Operating temperature range	-40°C to 80°C (-40°F to 176°F)
Power supply	(1) AC adapter Z1008 (100 to 240 V AC, 50/60 Hz), 6 VA (including AC adapter), 0.9 VA (main unit only) (2) USB bus power (5 V DC, USB-microB terminal), 0.8 VA (3) External power source 2.7 V to 15 V DC, 1 VA
Accessories	Instruction manual ×1, Alligator clip ×2, Carrying case ×1

### Appearance and Dimensions



with PRINTER UNIT MR9000 attached



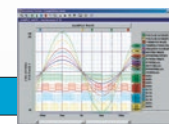
Cable length and mass: Main unit cable 1.5 m (4.92 ft), input section cable 1 m (3.28 ft), approx. 320 g (11.3 oz)  
Note: The unit-side plug of the MR9321-01 is different from the MR9321.



LOGIC PROBE MR9321-01	
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	Computer running under Windows 8/7 (32/64-bit), Vista (32-bit), XP, 2000
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	Printing image file output (expanded META type, ".EMF"), Supported printer: usable on any printer supported by operating system Print formatting: (1 up, 2-to-16 up, 2-to-16 rows, X-Y 1-to-4 up, preview, hard copy)
Other	Parameter calculation, Search, Clipboard copy, Launching of other applications



Printer options



**PRINTER UNIT MR9000**  
Printing width 100 mm (3.94 in), used together with the MR8880 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

Small terminal type only



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



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



**CONVERSION CABLE 9323**  
Used for connecting the 9320/9321/ MR9321 and the 9324 relay to the Memory HiCorder with small logic terminal models  
\* This cable is not required for the small-terminal types 9327, 9320-01, 9321-01 and MR9321-01.

Input cable (A)

\*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

**CONNECTION CORD L9790**

Flexible  $\phi$  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.

**GRABBER CLIP 9790-02**  
Red/black set attaches to the ends of the cables L9790

\* When this clip is attached to the end of the L9790, input is limited to CAT II 300 V. Red/black set.



Input cable (B)

\*Voltage is limited to the specifications of the input modules in use



**CONNECTION CORD L9198**  
 $\phi$  5.0 mm (0.20 in) dia., cable allowing for up to 300 V input. 1.7 m (5.58 ft) length, small alligator clip



**CONNECTION CORD L9197**  
 $\phi$  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 banana plug cable, CAT III 1000 V, 196 mm (7.72 in) length

Input cable (C)

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

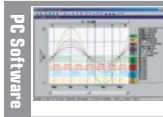


**DIFFERENTIAL PROBE P9000-01**  
(Wave mode only)  
For the Memory HiCorder series, input up to 1kV AC/DC



**DIFFERENTIAL PROBE P9000-02**  
(Select between WAVE/RMS mode)  
For the Memory HiCorder series, input up to 1kV AC/DC

**AC ADAPTER Z1008**  
100 to 240 V AC



PC software

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

Custom cable

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

Storage media

\*The CF card includes a 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)  
**PC CARD 1G 9729**  
(1 GB)  
**PC CARD 512M 9728**  
(512 MB)

Recommended

Power supply



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

**BATTERY PACK Z1000**  
NiMH, Charges while installed in the main unit

Other options



**CARRYING CASE C1003**  
Includes compartment for options, soft case type

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

**500 A to 1000 A** \*For commercial power lines, 50/60Hz (separate power supply not required)

**CLAMP ON PROBE 9018-50**  
Excellent phase characteristics, Input from 10 to 500 A, 40 Hz to 3 kHz for 0.2 V AC output, BNC terminal

**CLAMP ON PROBE 9132-50**  
Input from 20 to 1000 A, 40 Hz to 1 kHz for 0.2 V AC output, BNC terminal



Order Code: MR8880-20  
(4ch, 1MW memory, english model)

Up to 200 A (High precision)

High-Precision pull-through current sensors, observe waveforms from DC to distorted AC.  
**AC/DC CURRENT SENSOR CT6862**, 50A  
**AC/DC CURRENT SENSOR CT6863**, 200A

Observe waveforms from DC to distorted AC.  
**AC/DC CURRENT PROBE CT6841**, 20A  
**AC/DC CURRENT PROBE CT6843**, 200A

**CLAMP ON SENSOR 9272-10**  
Enables observation of AC current waveforms. 1 Hz to 100 kHz response, input selectable 20 and 200A, 2V AC output.

Up to 500 A (High precision)

**AC/DC CURRENT SENSOR 9709**  
High-Precision pull-through current sensors, observe waveforms from DC to distorted AC. DC to 100 kHz response, input 500A, 2V AC output.

**UNIVERSAL CLAMP ON CT 9279-01**  
Enables observation from DC to AC current waveforms. DC to 20 kHz response, input 500A, 2V AC output. (CE marked)

Power supply for sensor Necessary for use high precision current sensors

**SENSOR UNIT 9555-10**  
For signal output L9217 is necessary

**CONNECTION CORD L9217**  
Insulated BNC connectors at both ends, 1.6 m (5.25 ft) length.

100 A to 2000 A (Medium speed)

**CLAMP ON AC/DC SENSOR CT9691-90**  
DC to 10kHz (-3dB), 100A, Output 0.1 V/i.s., bundled the Sensor Unit CT6590

**CLAMP ON AC/DC SENSOR CT9692-90**  
DC to 20kHz (-3dB), 200A, Output 0.2 V/i.s., bundled the Sensor Unit CT6590

**CLAMP ON AC/DC SENSOR CT9693-90**  
DC to 15kHz (-3dB), 2000A, Output 0.2 V/i.s., bundled the Sensor Unit CT6590



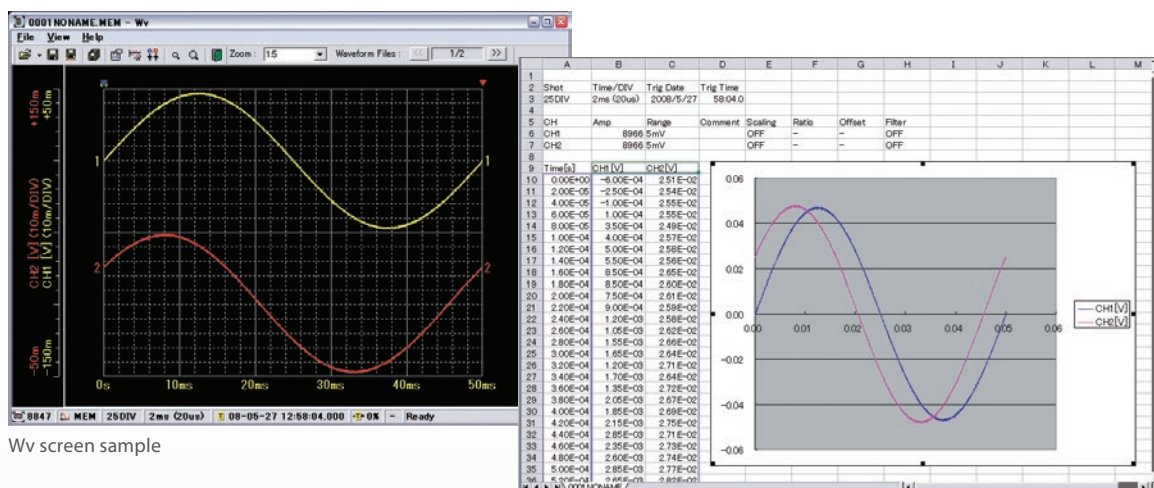
# Wave-Viewer software

## Applicativo software per la visualizzazione dei dati delle forme d'onda

L'applicativo software Wave-Viewer è fornito in dotazione a tutti gli oscilloscopi registratori presentati in questo catalogo, ad esclusione del modello MR8870/20 per il quale il software si chiama "Wave-Processor" sebbene mantenga le medesime funzionalità e prestazioni.

Wave-Viewer consente di aprire i file dati salvati e di svolgere le seguenti funzioni:

- Visualizzazione delle forme d'onda, così come rappresentate a display sullo strumento
- Possibilità di utilizzare i cursori orizzontali e verticali, scorrere con il puntatore all'interno della forma d'onda, la controllare la posizione del trigger, utilizzare la funzione di zoom per ingrandire/ridurre il dettaglio visualizzato
- Conversione dei file di dati binari in formato CSV o equivalente, per elaborazione su foglio di calcolo commerciale quale Excel, OpenOffice, ...



Wv screen sample

Excel spreadsheet sample

Il trasferimento del file può essere realizzato tramite diverse modalità in funzione delle caratteristiche di comunicazione e interfaccia specifiche di ogni modello di oscilloscopio registratore: tramite connessione LAN, USB, chiave USB, CF card, SD card, FTP server.

Wave-Viewer è compatibile con i Sistemi Operativi Windows 10 (32-bit o 64-bit), Windows 8/8.1 (32-bit o 64-bit), Windows 7 (32-bit o 64-bit), Windows Vista (32-bit), Windows XP (32-bit).

Wave-Processor, specifico per oscilloscopio registratore MR8870/20, è compatibile con i Sistemi Operativi Windows 8/8.1 (32-bit o 64-bit), Windows 7 (32-bit o 64-bit), Windows Vista (32-bit), Windows XP (32-bit), Windows 2000.