



## MEMORY HiCORDER 8870-20

Recorders 



*Palm-size but Powerful*

# Easy recording anytime, anywhere!

Hioki's traditional MEMORY HiCORDER functions are now condensed into a low-profile, turn-key device. The compact design includes a beautiful wide-screen QVGA-TFT LCD. Easy to use, with great functionality and performance, you will want to keep this extraordinarily compact MEMORY HiCORDER close at hand.

- Compact and easy to carry
- Easy, intuitive operation
- Simple PC connection
- Fast, 1MS/second performance despite the compact size
- Built-in, compact-yet-sharp QVGA-TFT wide LCD



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# High performance instrument that fits in your hand

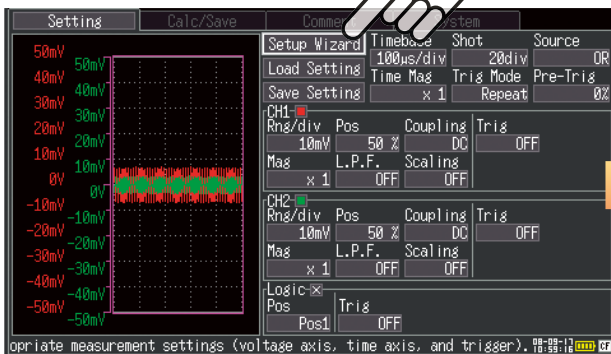
Ultra compact, yet easy to use



Actual Size

The "Setup Wizard" function guides operations

## Activate the Setup Wizard



When powered on, the Settings screen appears along with the waveform monitor, and the new Setup Wizard blinks.

By activating the Setup Wizard, you can easily navigate by

## Real-Time waveform monitoring



The help text crawls along the bottom of the screen, describing the function of the setting at the blinking cursor.

The enhanced "Waveform Monitor" window with level meter

# Take a snapshot of the screen as you would with a digital camera and play back all of your images instantly.

Select the image

Press FILE to display the stored images

Move to the previous image

Move to the next image

File-1

File-2

File-3

Move to the next image

Move to the previous image

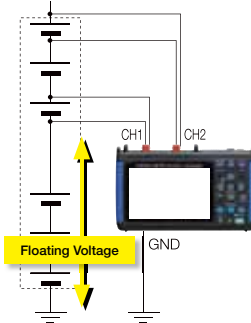
## See the saved bitmap images on the display!

Save important waveform images instantly with the press of a button. Review images by flipping through each file on the widescreen display.

## Isolated inputs for safe measurements

Isolated analog channel inputs provide CAT II overvoltage protection safety for measurements of up to 300 V AC and DC (maximum terminal-to-ground rating). This capability enables safe simultaneous voltage measurements of inverter primary and secondary and stacked battery cells without damaging the instrument.

- 300 V isolation between measurement terminals and HiCORDER chassis
- 300 V isolation between measurement terminals



## Compact, easy-to-carry design

Volume and weight have both been reduced by 60% from HIOKI's previously most compact MEMORY HiCORDER, the 8807-01, to just 40% the volume and 55% the weight. Easily pack it in your briefcase to accompany you wherever you go.

- Only 176 mm wide, 101 mm high and 41 mm thick
- Weighs only 600 g even with the battery pack installed



## Easy connection to a PC

To copy data saved on the CF card to a PC, take it directly to the PC or connect the HiCORDER to the PC using the supplied USB cable. Using the latter method, the 8807-20 will be recognized as a "Removable Disk" on the PC, at which time the contents of the CF card can be copied over. Use the bundled freeware to display waveforms on the PC and make printouts.



Data is efficiently saved to a CF card. When the HiCORDER is connected to a PC via USB cable, the data is quickly copied from the installed card to the PC: 20,000 waveform screen divisions transfer in about 20 seconds.



# Portable size for on-site jobs

## Catering to a multitude of applications

### Sequential control fault analysis

Momentary supply dropouts and low AC voltage are often found to be the causes of abnormal interruptions and warnings from sequentially controlled devices in factory production and testing lines. For optimal operational analysis, specify an abnormal power event as a trigger and simultaneously record waveforms of associated sequential relay signals, AC power and DC voltage systems.



### When facility troubles require analysis right away!

Battery operation is especially convenient in those situations where no power outlet is available. Just plug in the supplied AC adapter to recharge the battery, regardless of whether the HiCORDER is on or off. The battery pack is automatically quick charged (auto-recharging function) whenever its capacity is depleted. A full charge provides about two hours of operation.

### Synchronize two HiCORDERs together for four-channel recording!

For those times when two channels are just not enough, synchronize two 8870-20's using the external trigger I/O terminals (apply the trigger output from one to the external trigger input of the other). Then use synchronous start to automatically record four channels of



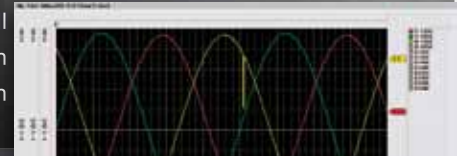
### CB timing measurements

Analyze the relationships of multi-point logic signals and analog waveforms to detect timing issues that can affect power supply circuit breakers. Use logic probes to record relay operations on up to four channels, or use Differential Probe 9322 for 440-volt power measurements and for support of CAT III and CAT IV overvoltage measurement categories.



### New Performance

- Use the bundled software to composite waveform files. For example, to monitor the waveforms of a 3P 200 V line, you can use 2 HiCORDERs at the same time and view the waveforms of all 4 channels on the same screen on the PC.



# Have you ever had an experience like these?

“There's a problem with the facility, so you need to see waveforms without full measurement instrumentation...”

“You often have to visit worksites to set up plants and facilities, but typical measurement instruments are too bulky...”

Fast, 1MS/second performance despite its compact size.

Isolated inputs ensure safe commercial power measurements. Waveform details can be easily observed.

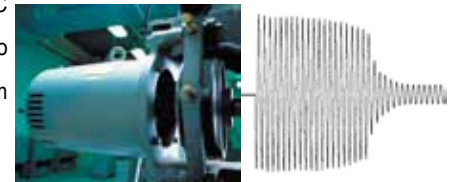
## Unattended monitoring for unpredictably intermittent leakage phenomena

Record instantaneous waveforms of leakage current and line voltage. Use “Out-of-Window” triggering to detect leakage events only when the input is outside of specified upper and lower limits. Measurement data is saved to CF card whenever leakage phenomena occur. Later, reload the data into the 8870-20 and use the cursor functions to analyze peak current values or breaker tripping events.



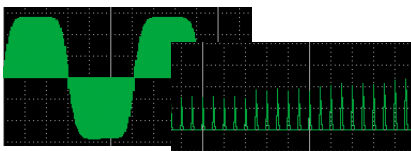
## Record motor inrush current waveforms

Reliably record waveforms of motor startup current. Measure current signals preferably using the 9018-10 Clamp-On Probe, or with the 3283 CLAMP ON LEAK HiTESTER. Models 3284 and 3285 CLAMP ON AC/DC HiTESTERS are also ideal for DC waveform measurements.



## Confirm inverter output waveforms

Inverter performance analysis requires simultaneous observation of the high frequency carrier signal and the low frequency fundamental waveform being switched. The combination of high-speed sampling capability and high-capacity memory make these observations possible. For current waveform observations, use HIOKI clamp sensors capable of high-frequency measurements without direct electrical contact.



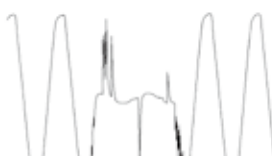
## In the automobile servicing industry

Analyze phenomena in ways that are just not possible with dedicated fault diagnostic instruments. The high-speed sampling capability of the 8870-20 as a compact hand-held oscilloscope provides mobility in situations that call for delicate testing, such as when performing high-level analysis or measuring specifiable phenomena.



## Capture momentary commercial power outages

Easily monitor the instantaneous waveform of 50/60 Hz commercial power. Use triggering to record unexpected waveform anomalies. Capture momentary commercial power outages and voltage dips.



## Long-period recording like a pen recorder

Record dual-level DC voltage systems as you would with a pen recorder. Use the 10 ms sampling rate to record momentary voltage fluctuations. The internal two-Megaword memory offers about five hours of recording with a 10 ms sampling interval.

## ■ Main unit Specifications (Accuracy at 23 ±5°C/73 ±9°F, 80 % rh or less, after 30 minutes of warm-up time; accuracy guaranteed for 1 year)

Basic specifications	
No. of channels	2 analog and 4 logic channels (standard configuration, logic grounds are common with instrument ground)
Measurement functions	MEM (high-speed recording)
Fastest sampling rate	1 MS/s (1 ms, all channels simultaneously)
Memory capacity	12 bits × 2 MWords/ch
Removable storage	CF card Type I slot (standard equipment) × 1: Up to 2 GB (Flash ATA), supports FAT16 and FAT32 formats
Backup function	<b>Clock and settings:</b> 5 years or more (@25°C 77°F) <b>Waveform backup function:</b> available when BATTERY PACK 9780 is installed with charge remaining or AC adapter is connected (up to 100 hours with fully charged battery pack).
External interface	<b>USB:</b> 1 port USB 2.0 High Speed mini-B receptacle, transfers files from the installed CF card to a PC when connected (mass storage class device) <i>Note: The CF card installed in the HiCORDER appears as a removable disk on the PC, but communication functions such as the capability to change HiCORDER settings from the PC are not provided.</i>
Control terminals	Terminal block: External trigger input, trigger output
Display type	4.3-inch WQVGA-TFT color LCD (480 × 272 dots)
Displayable languages	English, Japanese <i>Note: Korean (special order only, please contact HIOKI)</i>
Display resolution	Waveform section: 20 × 10 divisions (time axis × voltage axis), each division is 20 × 20 dots
Environmental conditions (no condensation)	<b>Temperature and humidity range for use:</b> 0°C (32°F) to 40°C (104°F), 80% rh or less <b>Temperature and humidity range for storage:</b> -10°C (14°F) to 50°C (122°F), 80% rh or less
Compliance standard	<b>Safety:</b> EN61010, <b>EMC:</b> EN61326, EN61000-3-2, EN61000-3-3
Power requirements	<b>AC ADAPTER Z1005:</b> 100 to 240 V AC (50/60 Hz) <b>BATTERY PACK 9780:</b> About 2h continuous operation (AC adapter has priority when both are used) 12 V DC supply: 10 to 16 V (cable available by special order)
Charging functions	The installed battery pack charges when the AC adapter is connected. Charging time is about 200 minutes at 25°C (77°F). <i>Notes: Charging time depends on battery condition. Charging is disabled to protect the battery at ambient temperatures out of 5°C (41°F) to 30°C (86°F).</i>
Power consumption	30 VA max. (charging with the AC adapter) 10 VA max. (charging with a 12 V supply)
Dimensions and mass	Approx. 176 mm (6.93 in) W × 101 mm (3.98 in) H × 41 mm (1.61 in) D, 600 g (21.2 oz) (with the BATTERY PACK 9780 installed)
Supplied accessories	Instruction Manual × 1, Measurement Guide × 1, AC ADAPTER Z1005 × 1, Strap × 1, USB cable × 1, Application Disk (dedicated program for the 8870-20) × 1, PROTECTION SHEET 9809 × 1

### Trigger functions

Trigger modes	Single or continuous
Trigger sources	Two analog and four logic channels, external trigger (falls below 2.5 V, or shorted terminals), ON/OFF switching of each source, AND/OR between sources, manual triggering
Trigger types (analog)	<b>Level trigger:</b> Triggering occurs when the signal rises or falls through a specified voltage level. <b>Window trigger:</b> Triggering occurs when the signal level rises above or falls below specified upper and lower limits. <b>Voltage drop trigger:</b> Intended particularly for 50/60 Hz commercial power, triggering occurs when the peak voltage is below the specified value.
Level setting	Resolution : 0.5% of full scale (full scale = 10 divisions)
Logic Trigger	1, 0, ×, or specified pattern
Trigger filter	Set by the number of samples, from 0 to 100, in five steps
Other functions	Pre-trigger recording to capture waveforms before and after triggering, trigger output (terminal block, 5-volt open-collector active low with at least 1 ms pulse width)

Analog Input <small>(Accuracy at 23 ±5°C/73 ±9°F, 80 % rh or less, after 30 minutes of warm-up time; accuracy guaranteed for 1 year)</small>	
Measurement functions	Number of channels: 2, for voltage measurement
Input connectors	Isolated BNC connector (input impedance 1 MΩ, input capacitance 7 pF) <b>Max. rated voltage to earth:</b> 300 V AC, DC, CAT II (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 50 V/div, 12 ranges, full scale: 10 div, AC voltage for possible measurement/display using voltage axis × 1/2: 280 Vrms, Low-pass filter: 5 Hz/50 Hz/500 Hz/5 kHz
Measurement resolution	1/100 of measurement range (using 12-bit A/D conversion, measurement range is ±10 times per-division range value)
Highest sampling rate	1 MS/s (simultaneous sampling in 2 channels)
Accuracy	<b>DC amplitude:</b> ±0.5 % of full scale (after zero-adjust, f.s. = 10 div of per-division measurement range)
Frequency characteristics	DC to 50kHz -3dB
Input coupling	DC/GND

### Memory recorder functions

Time axis	100 μs to 5 min/div, 20 ranges, time axis resolution 100 points/div, time axis zoom: ×2 to ×10 in 3 stages, compression: 1/2 to 1/1,000 in 9 stages, Auto roll mode display at 50 ms/div or slowly range
Sampling speed	1/100th of time axis range, (1 μs period maximum, simultaneous sampling in all channels)
Recording length	Ten settings from 20 to 20,000 div, or continuous (limited by timebase, only the last 20,000 div are saved)
Pre-trigger	Records waveforms prior to trigger events, from 0 to 100% of the specified recording length
Screen types	Split screen (none, only 1 screen), X-Y screen (none, but possible at use with the supplied PC software), Waveform or numerical logging (switched), Voltage axis zoom (×2 to ×10), compression (×1/2 to ×1/5)
Numerical display	Instantaneous value or RMS value display (only DC and 50/60 Hz) Refresh rate: 0.5 sec, Sampling speed: 10 kS/sec, 4 digits: (the lowest digit displays as 0 for values 0 to 4, and 5 for values 5 to 9) Voltage axis range: 10 mV, 50 mV, 100 mV, 500 mV, 1 V, 5 V, 10 V, 50 V/div, auto ranging, Accuracy : ±2.5 % of reading ±5 digits
Numerical calculation	Up to four simultaneous calculations (common to all channels), calculation results are saved to CF card, Calculation contents: average, peak, maximum and minimum values, RMS, period and frequency Calculation range: specified by A/B cursors or whole recording length
Saving function	Setting configurations, measurement data (binary and text), screen data (compressed bitmap format), numerical calculation results, thinned data saving (text)
Cursor readout	Trace, vertical and horizontal
Scaling function	Selectable by model (clamp or Differential Probe 9322), specified conversion ratio (output ratio, division ratio), 2-point setting method
Comment entry	Title comments can be entered for each channel (including logic)
Screen capture	The displayed screen is saved to CF card as a compressed bitmap
Gauges	Vertical axis gauges can be displayed for two channels on the waveform screen
Preserve starting conditions	If power fails while measuring, measurement can be automatically resumed when power is restored
Auto save	Included
Scroll bar	To jump to a specific waveform location
Waveform monitor	Setting is possible while monitoring waveforms on the Settings screen
Logic signal view	In 4-bit units, four selectable display positions



### ■ Maximum Recording Time for the Memory Function

- Because data is not recorded directly to the CF card, maximum recording time is independent of CF card capacity. Maximum recording time is determined only by internal memory capacity.
- Operation cannot be guaranteed when recording continuously for more than one year (with a slow timebase).
- Maximum recording length is the same whether using one or two channels.

Time axis	Sampling period	2M-Word (=4MB) 20,000 div Max.
100 μs/div	1 μs	2 s
200 μs/div	2 μs	4 s
500 μs/div	5 μs	10 s
1 ms/div	10 μs	20 s
2 ms/div	20 μs	40 s
5 ms/div	50 μs	1 min 40 s
10 ms/div	100 μs	3 min 20 s
20 ms/div	200 μs	6 min 40 s
50 ms/div	500 μs	16 min 40 s
100 ms/div	1 ms	33 min 20 s
200 ms/div	2 ms	1 h 06 min 40 s
500 ms/div	5 ms	2 h 46 min 40 s
1 s/div	10 ms	5 h 33 min 20 s
2 s/div	20 ms	11 h 06 min 40 s
5 s/div	50 ms	1 d 03 h 46 min 40 s
10 s/div	100 ms	2 d 07 h 33 min 20 s

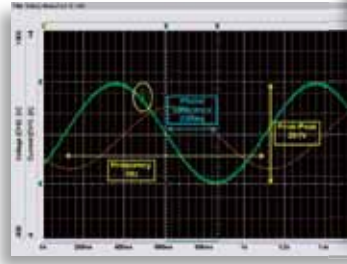
5 min/div      3.0 S      09 d 10 h 40 min 00 s

## Waveform display and printing, and CSV conversion with PC

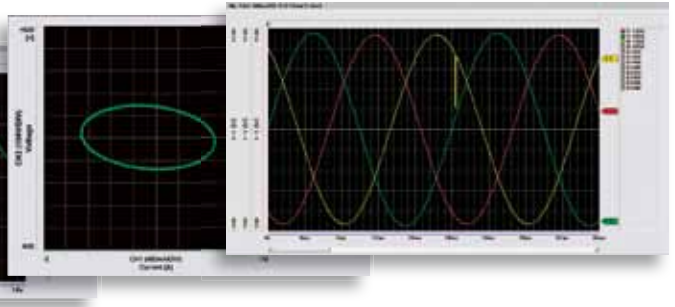
Open a data file with the dedicated Wave Processor (PC application program) for the 8870-20, to import and print waveforms with your own arrow and figure annotations. Of course, screen data can be copied and pasted into common Word and Excel documents to easily create reports.

### ■ Features of the Dedicated Wave Processor Program (supplied accessory)

- Designed especially for MEMORY HiCORDER 8870-20
- Application program displays and prints waveforms, and converts measurement data to CSV text files on a Windows PC.
- Provides X-Y display capability not available on the HiCORDER



- Generate reports using templates, with figure annotations and entered comments
- Multiple files can be batch-converted to CSV data
- New** ● Use 2 HiCORDERs to monitor 3 or 4 channels of waveforms that are measured using the same time axis range on the same PC window.



### Wave Processor Program for the 8870-20

<b>Supported measurement instruments</b>	MEMORY HiCORDER 8870-20 only
<b>Operating environment</b>	Computer running under Windows 7 (32-bit/64bit), Vista/XP (32-bit), or Windows 2000
<b>File loading</b>	Loadable data format: Memory function data (MEM extension) Max. loadable file size: The maximum size that can be stored by the 8870-20 (subject to the capacity of the PC's operating environment) Waveform Composite Function: Composite the waveforms of up to 8 HiCORDERs (16 analog channels)
<b>Overwriting save</b>	Overwrites saved scaling and title/channel comments
<b>Slideshow display</b>	Sequentially displays waveform files in the same folder
<b>Text conversion</b>	Data conversion format: Select from CSV, tab-separated or space-separated Object data range: Whole range, or between cursors Data thinning: Available by specifying interval Conversion methods: Analog waveform data to voltage values, logic data is converted to ones and zeros Conversion channels: selectable Header contents: Title, trigger date, timebase, comments, per-channel setting conditions Batch conversion: specify multiple files for batch conversion

<b>Displaying</b>	Display language: English or Japanese (select during installation) Waveform display: Scroll and magnify/reduce the time axis of the displayed waveform data image, move the zero position of each channel, zoom and set the vertical axis of each channel independently (variable gain) Numerical value display: included Cursor functions: Manipulate A and B cursors independently, and display time and voltage numerically. Max. displayable channels: 16 analog and 32 logic channels Gauge display: Time gauge (absolute or relative time, seconds, data points), voltage gauge (for each channel) Figure annotations: Text boxes, straight lines, arrows, circles and rectangles at any location Screen capture: Extended meta format, bitmap format Search functions: Date, maximum, minimum, level and window search Template function: Save and reload waveform file display configurations
<b>Printing</b>	Printer support: Color and monochrome printing on printers supported by the operating system Printable ranges: All data, screen capture and specifiable areas Print formats: Undivided, 2, 4, 8 divisions, 2, 4, 8 or 16 traces, 1, 2 or 4 XY screen, gauges, channel comments, zero-position comments, and A/B cursor values Print preview and waveform screen hard copy/logging print functions are included

### ■ Options specifications (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)	
<b>Function</b>	Detection of voltage signal or relay contact signal for High/Low state recording
<b>Input</b>	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)
<b>Digital input threshold</b>	1.4V/ 2.5V/ 4.0V
<b>Contact input detection resistance</b>	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)
<b>Response speed</b>	500ns or lower
<b>Max. allowable input</b>	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)	
<b>Functions</b>	For high-voltage floating measurement, power line surge noise detection, RMS rectified output measurement
<b>DC mode</b>	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)
<b>AC mode</b>	For detection of power line surge noise, Frequency characteristics: 1 kHz to 10 MHz ±3 dB
<b>RMS mode</b>	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)
<b>Input</b>	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)
<b>Max. allowable input</b>	2000 V DC, 1000 V AC (CAT II), 600 V AC/DC (CAT III)
<b>Output</b>	Voltage divider for 1/1000 of input, BNC connectors (output switchable for 3 modes DC, AC, RMS)
<b>Power source</b>	Use the AC Adapter 9418-15, (power cannot be supplied from the logic terminals of the 8870-20)

**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)	
<b>Function</b>	Detection of AC or DC relay drive signal for High/Low state recording Can also be used for power line interruption detection
<b>Input</b>	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)
<b>Output (H) detection</b>	170 to 250 V AC, ±DC 70 to 250 V (HIGH range) 60 to 150 V AC, ±DC 20 to 150 V (LOW range)
<b>Output (L) detection</b>	0 to 30 V AC, ±DC 0 to 43 V (HIGH range) 0 to 10 V AC, ±DC 0 to 15 V (LOW range)
<b>Response time</b>	Rising edge 1 ms max., falling edge 3 ms max. (with HIGH range at 200 V DC, LOW range at 100 V DC)
<b>Max. allowable input</b>	250 Vrms (HIGH range), 150 Vrms (LOW range) (the maximum voltage that can

**Voltage measurement**  
(Voltage is limited to the specifications of the MR8870-20 input)





**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  $\phi$  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.*


**Battery Pack**



Charges while installed in the HICORDER





**BATTERY PACK 9780**  
NiMH, Charges while installed

**Voltage measurement**  
(Voltage is limited to the specifications of the MR8870-20 input)

**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

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

**CONNECTION CORD 9197**  
 $\phi$  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


**MEMORY HICORDER 8870-20 (English model)**

*Note: Test leads are not included. Purchase the leads appropriate for your application separately*

**Removable storage (CF card)**

Supplied with PC Card adapter



**PC Card Precaution**


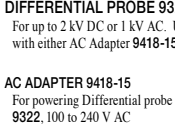
Use only PC Cards sold by HIOKI. Compatibility and performance are not guaranteed for PC cards made by other manufacturers. You may be unable to read from or save data to such cards.

- 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)

**High-Voltage measurement (separate power supply required)**

**DIFFERENTIAL PROBE 9322**  
For up to 2 kV DC or 1 kV AC. Use with either AC Adapter 9418-15

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

**Included Accessories**

**PROTECTION SHEET 9809**  
For LCD protection, pairs of additional sheets can be purchased separately.

**AC ADAPTER Z1005**  
100 to 240 V AC




**Case**

**SOFT CASE 9812**  
Includes space for small items, Neoprene rubber

**CARRYING CASE 9782**  
Includes compartment for options, Resin coated







**LOGIC SIGNAL MEASUREMENT**  
(Only 1 probe can be connected to provide four channels)

**LOGIC PROBE 9320-01**  
4-channel type, for voltage/contact signal ON/OFF detection (response time less than 500 nsec, 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 8870-20, because the terminal shapes are different.  
*\* This cable is not required for the small-terminal types 9327, 9320-01, 9321-01 and MR9321-01.*







**CURRENT MEASUREMENT**

**CLAMP ON AC/DC SENSOR CT9691-90**  
DC to 10kHz (-3dB), 100A, Output 0.1 V/f.s.

**CLAMP ON AC/DC SENSOR CT9692-90**  
DC to 20kHz (-3dB), 200A, Output 0.2 V/f.s.

**CLAMP ON AC/DC SENSOR CT9693-90**  
DC to 15kHz (-3dB), 2000A, Output 0.2 V/f.s.


**CURRENT MEASUREMENT**

**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




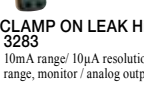
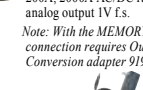

**CLAMP ON AC/DC HITESTER 3284**  
20A, 200A AC/DC ranges, monitor / analog output 1V f.s.

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

**CLAMP ON LEAK HITESTER 3283**  
10mA range/ 10 $\mu$ A resolution to 200A range, monitor / analog output 1V f.s.

**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

**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**

**OUTPUT CORD 9094**  
 $\phi$  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)

*Note: Company names and Product names appearing in this catalog are trademarks or registered trademarks of various companies.*

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