■ Main unit Specifications

Basic specifications (Accuracy guaranteed for 1 year, Post-adjustment accuracy guaranteed for 1 year)	
Measurement functions	MEMORY (high-speed recording) RECORDER (real-time recording) X-Y RECORDER (X-Y real-time recording) FFT (frequency analysis)
Number of input units	[8 analog input modules]: 16 analog channels + 16 logic channels (standard) [5 analog input modules + 3 logic input modules]: 10 analog channels + 64 logic channels (standard 16 channels + 48 channels in logic input modules) ** For analog units, channels are isolated form each other and from frame GND.* *For logic units and internal standard logic terminals, all channels has common GND.*
Maximum sampling rate	20 MS/second (50 ns period, all channels simultaneously) External sampling (10 MS/second, 100 ns period)
Internal memory	**MR8847-01**: Total 64 M-words (Memory expansion: none) 32 MW/ch (using 2 Analog channels), to 4 MW/ch (using 16 Analog channels) **MR8847-02**: Total 256 M-words (Memory expansion: none) 128 MW/ch (using 2 Analog channels), to 16 MW/ch (using 16 Analog channels) **MR8847-03**: Total 512 M-words (Memory expansion: none) 256 MW/ch (using 2 Analog channels), to 32 MW/ch (using 16 Analog channels) *Note: 1 word = 2 bytes (12-bits or 16-bits), therefore 64 Mega-word = 128 Mega-bytes.* *Note: Internal memory is allocated depending on the number of channels used.*
Data storage media *2 Factory installation only	CF card slot (standard) ×1 (up to 2GB, FAT, or FAT-32 format) Hard disk drive ×1 (80 GB, optional Model 9664 *2) USB memory stick (USB 2.0)
Backup functions (At 25°C/ 77°F)	Clock and parameter setting backup: at least 10 years Waveform backup function: none
External control connectors	Terminal block: External trigger input, Trigger output, External sampling input, Two external outputs (GO/NG output), Three external inputs (start, stop, print input)
External interfaces	LAN: 100BASE-TX (DHCP, DNS supported, FTP server, HTTP server) USB: USB2.0 compliant, series A receptacle ×1, series B receptacle ×1, (File transfer HDD/ CF card to PC, or remort control from PC)
Environmental conditions (No condensation)	Operation: -10°C (14°F) to 40°C (104°F), 20 % to 80 % rh Printer use: 0°C (32°F) to 40°C (104°F), 20 % to 80 % rh HD use: 5°C (41°F) to 40°C (104°F), 20 % to 80 % rh Storage: -20°C (-4°F) to 50°C (122°F), 90 % rh or less
Compliance standard	Safety: EN61010, EMC: EN61326, EN61000-3-2, EN61000-3-3
Power supply	100 to 240 V AC, 50/60 Hz 10 to 28 V DC (use the DC POWER UNIT 9784 : Factory installation only)
Power consumption	130 VA max. (Printer not used), 220 VA max. (Printer used)
Dimensions and mass	Approx. 351 mm (13.82 in) W × 261 mm (10.28 in) H × 140 mm (5.51 in) D, 7.6 kg (268.1 oz) (main unit only)
Supplied accessories	Instruction Manual ×1, Measurement Guide ×1, Application Disk (Wave Viewer Wv, Communication Commands table) ×1, Power cord ×1, Input cord label ×1, USB cable ×1, Printer paper ×1, Roll paper attachment ×2
Internal Printer	
Features	Printer paper one-touch loading, high-speed thermal printing
Recording paper	216 mm (8.50 in) × 30 m (98.43 ft), thermal paper roll (use 9231 paper) Recording witdh: 200 mm (7.87 in) 20 division full scale, 1 div = 10 mm (0.39 in) 80 dots
Recording speed	Max. 50 mm (1.97 in)/sec
Paper feed density	10 lines/mm
Display	
Display	10.4 inch SVGA-TFT color LCD (800 × 600 dots) (Time axis 25 div × Voltage axis 20 div, X-Y 20 div × 20 div)
Languages	English, Japanese, Korean, Chinese
Waveform display zoom/compression	Time axis: ×10 to ×2 (zoom at MEMORY function only), ×1, ×1/2 to ×1/20,000, Voltage axis: ×100 to ×2, ×1, ×1/2 to ×1/10
Variable display	Upper/Lower limit set, display/div set
Scaling	10:1 to 1000:1, automatic scaling for various probes Manual scaling (conversion ratio setting, 2-point setting, unit setting)
Comment input	Alphanumeric input (title, analog and logic channels) Simple input, history input, phrase input
Logic waveform	Display point move 1 % step, Line width 3 types
Display partition	Max. Eight divisions
Monitor function	Input level monitor Numerical value (Sampling 10kS/s fixed, refresh rate 0.5s)
Other display functions	• Waveform inversion (positive/negative) • Cursor measurement (A, B, 2-cursor, for all channels) • Vernier function (amplitude fine adjustment) • Zoom function (horizontal screen division, zoomed waveform shown in lower section) • 16 selectable colors for waveform display • Zero position shift in 1% steps for analog waveform • Global zero adjust for all channels and all ranges

MEMORY (High-speed recording)	
Time axis	5 µs to 5 min/div (100 samples/div) 26 ranges, External sampling (100 samples/div, or free setting), Time axis zoom: ×2 to ×10 in 3 stages, compression: 1/2 to 1/20,000 in 13 stages
Sampling period	1/100 of time axis range (minimum 50 ns period)
Recording length	**MR8847-01**: 16 ch mode: 25 - 20,000 div, 2 ch mode: 25 - 200,000 div (built-in presets) or arbitrary setting in 1-div steps (max. 320,000 div) **MR8847-02**: 16 ch mode: 25 - 100,000 div, 2 ch mode: 25 - 1,000,000 div (built-in presets) or arbitrary setting in 1-div steps (max. 1,280,000 div) **MR8847-03**: 16 ch mode: 25 - 200,000 div, 2 ch mode: 25 - 2,000,000 div (built-in presets) or arbitrary setting in 1-div steps (max. 2,560,000 div)
Pre-trigger	Record data from before the trigger point at 0 to +100% or -95% of the recording length in 15 stages, or in 1 div step settings
Numerical calculation	• Simultaneous calculation for up to 16 selected channels Average value, effective (rms) value, peak to peak value, maximum value, time to maximum value, minimum value, time to minimum value, period, frequency, rise time, fall time, standard deviation, area value, X-Y area value, specified level time, specified time level, pulse width, duty ratio, pulse count, four arithmetic operations, Time difference, phase difference, high-level and low-level • Calculation result evaluation output: GO/NG (with open-collector 5 V output) • Automatic storing of calculation results
Waveform processing	For up to 16 freely selectable channels, the following functions can be performed (results are automatically stored): Four arithmetic operations, absolute value, exponentiation, common logarithm, square root, moving average, differentiation (primary, secondary), integration (primary, secondary), parallel displacement along time axis, trigonometric functions, reverse trigonometric functions
Memory segmentation	• Max. 1024 blocks, sequential storage, multi-block storage
Other functions	• No logging • X-Y waveform synthesis (1-screen, 4-screens) • Overlay (always overlay when started/overlay only required waveforms) • Automatic/ Manual/ A-B cursor range printing/ Report printing
RECORDER (Real-time recording)	
Time axis	10 ms to 1 hour/div, 19 ranges, time axis resolution 100 points/div *Note: Out of data acquired at selected sampling rate, only maximum and minimum value data determined using 100 points/div units are stored* Time axis compression selectable in 13 steps, from × 1/2 to × 1/20,000
Sampling rate	1/10/100 µs 1/10/100 ms (selectable from 1/100 or less of time axis)
Real-time printing	Supported ** Real-time printing is possible at time axis settings slower than 500 ms/div* ** Delayed print is performed when recording length is not set to "Continuous" and time axis setting is 10 ms - 200 ms/div* ** When recording length is set to "Continuous" and time axis setting is 10 ms - 200 ms/div, manual printing can be performed after measurement stop*
Recording length	**MR8847-01**: Built-in presets of 25 - 20,000 div, or "Continuous" or arbitrary setting in 1-div steps (max. 20,000 div) **MR8847-02**: Built-in presets of 25 - 50,000 div, or "Continuous" or arbitrary setting in 1-div steps (max. 80,000 div) **MR8847-03**: Built-in presets of 25 - 100,000 div, or "Continuous" or arbitrary setting in 1-div steps (max. 160,000 div)
Additional recording	Supported (recording is resumed without overwriting previous data)
Waveform memory	**MR8847-01**: Store data for most recent 20,000 div in memory **MR8847-02**: Store data for most recent 80,000 div in memory **MR8847-03**: Store data for most recent 160,000 div in memory *Note: Backward scrolling and re-printing available*
Auto save	Data are automatically saved on CF card, USB memory stick or internal HDD after measurement stops
Other functions	• No logging • Manual/ A-B cursor range printing/ Report printing
X-Y RECORDER (X-Y real-time recording)	
Sampling period	1/10/100 ms (dot), 10/100 ms (line)
Recording length	Continuous
Screen, Printing	Split screen (1 or 4), Manual printing only
Number of X-Y	1 to 8 phenomenon
X-Y channel setting	Any 8 channels out of 16 can be selected for X axis and Y axis respectively
X-Y axis resolution	25 dots/div (screen), horizontal 80 dots/div × vertical 80 dots/div (printer)
Waveform memory	Sampling data for last 4,000,000 points are stored in memory
Pen up/down	Simultaneous for all phenomena
External pen control	Possible via external input connector (simultaneous up/down for all phenomena)

Trigger functions

Trigger mode	MEMORY (high-speed recording), FFT: Single, Repeat, Auto RECORDER (real-time recording): Single, Repeat
Trigger sources	CH1 to CH16 (analog), Standard Logic 16ch + Logic Unit (Max. 3 units 48 channels), External (a rise of 2.5V or terminal short circuit), Timer, Manual (either ON or OFF for each source), Logical AND/OR of sources
Trigger types	• Level: Triggering occurs when preset voltage level is crossed (upwards or downwards) • Voltage drop: Triggering occurs when voltage drops below peak voltage setting (for 50/60 Hz AC power lines only) • Window: Triggering occurs when window defined by upper and lower limit is entered or exited • Period: Rising edge or falling edge cycle of preset voltage value is monitored and triggering occurs when defined cycle range is exceeded • Glitch: Triggering occurs when pulse width from rising or falling edge of preset voltage value is under run • Event setting: Event count is performed for each source, and triggering occurs when a preset count is exceeded • Logic: 1, 0, or ×, Pattern setting
Level setting resolution	0.1% of full scale (full scale = 20 divisions)
Trigger filter	Selectable 0.1div to 10.0div, or OFF (at MEMORY function) ON (10ms fixed) or OFF (at RECORDER function)
Trigger output	Open collector (5 voltage output, active Low) At Level setting: pulse width (Sampling period × data number after trigger) At Pulse setting: pulse width (2ms)
Other functions	Trigger priority (OFF/ON), Pre-trigger function for capturing data from before / after trigger event (at MEMORY function), Level display during trigger standby, Start and stop trigger (At RECORDER function), Trigger search function

Other functions

Waveform judgment function (In MEMORY or FFT function)	• Area comparison with reference waveform area for time domain waveform, X-Y waveform, or FFT analysis waveform • Parameter calculated value comparison with reference value • Output: GO/NG decision, Open-collector 5V, *Note: Judge waveforms in near real-time at samplings speeds of 100msec/div (1ms sampling) or slower.*

FFT function

Analysis mode	Storage waveform, Linear spectrum, RMS spectrum, Power spectrum, Density of power spectrum, Cross power spectrum, Auto-correlation function, Histogram, Transfer function, Cross-correlation function, Impulse response, Coherence function, 1/1 Octave analysis, 1/3 Octave analysis, LPC analysis, Phase spectrum
Analysis channels	Selectable from all analog input channels
Frequency range	133 mHz to 8 MHz, External, (resolution 1/400, 1/800, 1/2000, 1/4000)
Number of sampling points	1000, 2000, 5000, 10000 points
Window functions	Rectangular, Hanning, Hamming, Blackman, Blackman-Harris, Flat-top, Exponential
Display format	Single, Dual, Nyquist, Running spectrum
Averaging function	Time axis / frequency axis simple averaging, Exponential averaging, Peak hold (frequency axis), Averaging times: 2 times to 10,000 times
Print functions	Same as the MEMORY function (partial print not available)

■ Maximum Recording Time for the internal memory (At MEMORY Function)

		MR8847-01 (64MW)		MR8847-02 (256MW)		MR8847-03 (512MW)	
5µs/div	50ns	0.2s	1.6s	0.8s	6.4s	1.6s	12.8s
10µs/div	100ns	0.4s	3.2s	1.6s	12.8s	3.2s	25.6s
20µs/div	200ns	0.8s	6.4s	3.2s	25.6s	6.4s	51.2s
50µs/div	500ns	2s	16s	8s	1min 04s	16s	2min 08s
100µs/div	1µs	4s	32s	16s	2min 08s	32s	4min 16s
200µs/div	2µs	8s	1min 04s	32s	4min 16s	1min 04s	8min 32s
500µs/div	5µs	20s	2min 40s	1min 20s	10min 40s	2min 40s	21min 20s
1ms/div	10µs	40s	5min 20s	2min 40s	21min 20s	5min 20s	42min 40s
2ms/div	20µs	1min 20s	10min 40s	5min 20s	42min 40s	10min 40s	1h 25min 20s
5ms/div	50µs	3min 20s	26min 40s	13min 20s	1h 46min 40s	26min 40s	3h 33min 20s
10ms/div	100µs	6min 40s	53min 20s	26min 40s	3h 33min 20s	53min 20s	7h 06min 40s
20ms/div	200µs	13min 20s	1h 46min 40s	53min 20s	7h 06min 40s	1h 46min 40s	14h 13min 20s
50ms/div	500µs	33min 20s	4h 26min 40s	2h 13min 20s	17h 46min 40s	4h 26min 40s	35h 33min 20s
100ms/div	1ms	1h 06min 40s	8h 53min 20s	4h 26min 40s	1d 11h 33min 20s	8h 53min 20s	2d 23h 06min 40s
200ms/div	2ms	2h 13min 20s	17h 46min 40s	8h 53min 20s	2d 23h 06min 40s	17h 46min 40s	5d 22h 13min 20s
500ms/div	5ms	5h 33min 20s	1d 20h 26min 40s	22h 13min 20s	7d 09h 46min 40s	44h 26min 40s	14d 19h 33min 20s
1s/div	10ms	11h 06min 40s	3d 16h 53min 20s	1d 20h 26min 40s	14d 19h 33min 20s	3d 16h 53min 20s	29d 15h 06min 40s
2s/div	20ms	22h 13min 20s	7d 09h 46min 40s	3d 16h 53min 20s	29d 15h 06min 40s	7d 09h 46min 40s	59d 06h 13min 20s
5s/div	50ms	2d 07h 33min 20s	18d 12h 26min 40s	9d 06h 13min 20s	74d 01h 46min 40s	18d 12h 26min 40s	148d 03h 33min 20s
10s/div	100ms	4d 15h 06min 40s	37d 00h 53min 20s	18d 12h 06min 40s	148d 03h 33min 20s	37d 00h 53min 20s	296d 07h 06min 40s
30s/div	300ms	13d 21h 20min 00s	111d 02h 40min 00s	55d 13h 20min 00s	444d 10h 40min 00s	111d 02h 40min 00s	888d 21h 20min 00s
50s/div	500ms	23d 03h 33min 20s	185d 04h 26min 40s	92d 14h 13min 20s	740d 17h 46min 40s	185d 04h 26min 40s	1481d 11h 33min 20s
1min/div	600ms	27d 18h 40min 00s	222d 05h 20min 00s	111d 02h 40min 00s	888d 21h 20min 00s	222d 05h 20min 00s	1777d 18h 40min 00s
100s/div	1.0s	46d 07h 06min 40s	370d 08h 53min 20s	185d 04h 26min 40s	1481d 11h 33min 20s	370d 08h 53min 20s	2962d 23h 06min 40s
2min/div	1.2s	55d 13h 20min 00s	444d 10h 40min 00s	222d 05h 20min 00s	1777d 18h 40min 00s	444d 10h 40min 00s	3555d 13h 20min 00s
5min/div	3.0s	138d 21h 20min 00s	1111d 02h 40min 00s	555d 13h 20min 00s	4444d 10h 40min 00s	1111d 02h 40min 00s	8888d 21h 20min 00s

Note: The above table is maximum value at arbitrary recording length settings.
Note: Saving to media in near real-time is possible at sampling speeds of 100ms/div (1msec sampling) or slower.
Note: Operation cannot be guaranteed for extended recording periods one year or longer. The above table represents theoretical values.

■ Measurement Indices (Optional input unit types)

Measurement target	With use input unit	Measurement range	Resolution
Voltage	ANALOG UNIT 8966	100mV f.s. - 400V f.s.	50µV
	HIGH RESOLUTION UNIT 8968	100mV f.s. - 400V f.s.	3.125µV
	DC/RMS UNIT 8972	100mV f.s. - 400V f.s.	50µV
Current	CURRENT UNIT 8971 + optional current sensor	20A f.s. or larger *When driving current sensors with separate power supply, measurement can be conducted with voltage input units.*	1mA or larger
RMS AC voltage	DC/RMS UNIT 8972	100mV f.s. - 400V f.s.	50µV
Temperature (Thermocouple input)	TEMP UNIT 8967	200°C f.s. to 2000°C f.s. *Note: Upper and lower limit values depend on the thermocouple*	0.01°C
Frequency, rotation	FREQ UNIT 8970	20 Hz f.s. - 100 kHz f.s. 2 (kr/min) f.s. - 2000 (kr/min) f.s.	2mHz 0.2(r/min)
Power frequency	FREQ UNIT 8970	40 - 60 Hz, 50 - 70 Hz, 390 - 410 Hz	0.01Hz
Pulse add up	FREQ UNIT 8970	40k-counts f.s. - 20M-counts f.s.	1 count
Pulse duty ratio	FREQ UNIT 8970	100% f.s.	0.01%
Pulse width	FREQ UNIT 8970	0.01s f.s. - 2s f.s.	1µs
Vibration, Stress	STRAIN UNIT 8969	400µε f.s. - 20000µε f.s.	0.016µε
Relay contacts, voltage on/off	LOGIC UNIT 8973	—	—

Note: Each unit has two input channels.
Note: Besides logic units (16 channels), The MR8847 series comes standard with 16 logic inputs integrated in the device.

■ Options specifications (sold separately)

Dimensions and mass: approx. 106 (4.17in) W × 19.8 (0.78in) H × 196.5 (7.74in) D mm, approx. 250 g (8.8 oz) Accessories: None

ANALOG UNIT 8966

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

Measurement functions	Number of channels: 2, for voltage measurement
Input connectors	Isolated BNC connector (input impedance 1 MΩ, input capacitance 30 pF), Max. rated voltage to earth: 300 V AC, DC (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	5 mV to 20 V/div, 12 ranges, full scale: 20 div, AC voltage for possible measurement/display using the memory function: 280 V rms, Low-pass filter: 5/50/500 Hz, 5 k/50 k/500 kHz
Measurement resolution	1/100 of measurement range (using 12-bit A/D conversion and when installed in the 8847)
Highest sampling rate	20 MS/s (simultaneous sampling across 2 channels)
Measurement accuracy	±0.5 % of full scale (with filter 5 Hz, zero position accuracy included)
Frequency characteristics	DC to 5 MHz -3 dB, (with AC coupling: 7 Hz to 5 MHz -3dB)
Input coupling	AC/DC/GND
Max. allowable input	400 V DC (the maximum voltage that can be applied across input pins without damage)

Dimensions and mass: approx. 106 (4.17in) W × 19.8 (0.78in) H × 204.5 (8.05in) D mm, approx. 240 g (8.5 oz) Accessories: Ferrite clamp × 2

TEMP UNIT 8967

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

Measurement functions	Number of channels: 2, for temperature measurement with thermocouple (voltage measurement not available)
Input connectors	Thermocouple input: plug-in connector, Recommended wire diameter: single-wire, 0.14 to 1.5 mm², braided wire 0.14 to 1.0 mm² (conductor wire diameter min. 0.18 mm), AWG 26 to 16 Input impedance: min. 5 MΩ (with line fault detection ON/OFF), Max. rated voltage to earth: 300 V AC, DC (with input isolated from the unit, the maximum voltage that can be applied between input channel and chassis and between input channels without damage)
Temperature measurement range Note: Upper and lower limit values depend on the thermocouple	10 °C/div (-100 °C to 200 °C), 50 °C/div (-200 °C to 1000 °C), 100 °C/div (-200 °C to 2000 °C), 3 ranges, full scale: 20 div, Measurement resolution: 1/1000 of measurement range (using 16-bit A/D conversion and when installed in the 8847)
Thermocouple range (JIS C 1602-1995) (ASTM E-988-96)	K: -200 to 1350 °C, J: -200 to 1100 °C, E: -200 to 800 °C, T: -200 to 400 °C, N: -200 to 1300 °C, R: 0 to 1700 °C, S: 0 to 1700 °C, B: 400 to 1800 °C, W (WRe5-26): 0 to 2000 °C, Reference junction compensation: internal/ external (switchable), Line fault detection ON/OFF possible
Data refresh rate	3 methods, Fast: 1.2 ms (digital filter OFF), Normal: 100 ms (digital filter 50/60 Hz), Slow: 500 ms (digital filter 10Hz)
Measurement accuracy	Thermocouple K, J, E, T, N: ±0.1 % of full scale ±1 °C (±0.1 % of full scale ±2 °C at -200 °C to 0 °C), Thermocouple R, S, W: ±0.1 % of full scale ±3.5 °C (at 0 °C to 400 °C or less), ±0.1 % of full scale ±3 °C (at 400 °C or more) Thermocouple B: ±0.1 % of full scale ±3 °C (at 400 °C or more), Reference junction compensation accuracy: ±1.5 °C (added to measurement accuracy with internal reference junction compensation)

Dimensions and mass: approx. 106 (4.17in) W × 19.8 (0.78in) H × 196.5 (7.74in) D mm, approx. 250 g (8.8 oz) Accessories: None

HIGH RESOLUTION UNIT 8968

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

Measurement functions	Number of channels: 2, for voltage measurement
Input connectors	Isolated BNC connector (input impedance 1 MΩ, input capacitance 30 pF), Max. rated voltage to earth: 300 V AC, DC (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	5 mV to 20 V/div, 12 ranges, full scale: 20 div, AC voltage for possible measurement/display using the memory function: 280 V rms, Low-pass filter: 5/50/500 Hz, 5k/50k Hz
Anti-aliasing filter	Integrated filter for suppressing aliasing distortion caused by FFT processing (automatic cutoff frequency setting/OFF)
Measurement resolution	1/1600 of measurement range (using 16-bit A/D conversion and when installed in the 8847)
Highest sampling rate	1 MS/s (simultaneous sampling across 2 channels)
Measurement accuracy	±0.3 % of full scale (with filter 5 Hz, zero position accuracy included)
Frequency characteristics	DC to 100 kHz -3 dB, (with AC coupling: 7 Hz to 100 kHz -3dB)
Input coupling	AC/DC/GND
Max. allowable input	400 V DC (the maximum voltage that can be applied across input pins without damage)

Dimensions and mass: approx. 106 (4.17in) W × 19.8 (0.78in) H × 196.5 (7.74in) D mm, approx. 220 g (7.8 oz) Accessories: Conversion cable 9769 × 2 (cable length 50 cm/1.64 ft)

STRAIN UNIT 8969

(Accuracy at 23 ±5 °C/73 ±9 °F, 20 to 80 % rh after 30 minutes of warm-up time and auto-balance; Accuracy guaranteed for 1 year, Post-adjustment accuracy guaranteed for 1 year)

Measurement functions	Number of channels: 2, for distortion measurement (electronic auto-balancing, balance adjustment range within ±10000 με)
Input connectors	Weidmuller SL 3.5/7/90G (via Conversion Cable 9769, TAJIMI PRC03-12A10-7M10.5) Max. rated voltage to earth: 33 Vrms or 70 V DC (with input isolated from the unit, the maximum voltage that can be applied between input channel and chassis and between input channels without damage)
Suitable transducer	Strain gauge converter, Bridge impedance: 120 Ω to 1 kΩ, Bridge voltage: 2 V ±0.05 V, Gauge rate: 2.0
Measurement range	20 με to 1000 με/div, 6 ranges, full scale: 20 division, Low-pass filter: 5/10/100 Hz, 1 kHz
Measurement resolution	1/1250 of measurement range (using 16-bit A/D conversion and when installed in the 8847)
Highest sampling rate	200 kS/s (simultaneous sampling across 2 channels)
Measurement accuracy	±(0.5 % of full scale +4 με) (at 5 Hz filter ON, After auto-balancing)
Frequency characteristics	DC to 20 kHz +1/-3dB

Dimensions and mass: approx. 106 (4.17in) W × 19.8 (0.78in) H × 196.5 (7.74in) D mm, approx. 250 g (8.8 oz) Accessories: None

FREQ UNIT 8970

(Accuracy at 23 ±5 °C/73 ±9 °F, 20 to 80 % rh after 30 minutes of warm-up time; Accuracy guaranteed for 1 year, Post-adjustment accuracy guaranteed for 1 year)

Measurement functions	Number of channels: 2, for voltage input based frequency measurement, rotation, power frequency, integration, pulse duty ratio, pulse width
Input connectors	Isolated BNC connector (input impedance 1 MΩ, input capacitance 30 pF), Max. rated voltage to earth: 300 V AC, DC (with input isolated from the unit, the maximum voltage that can be applied between input channel and chassis and between input channels without damage)
Frequency mode	Range: Between DC to 100kHz (minimum pulse width 2μs), 1Hz/div to 5kHz/div (full scale= 20 div), 8 settings Accuracy: ±0.1% f.s. (exclude 5kHz/div), ±0.7% f.s. (at 5kHz/div)
Rotation mode	Range: Between 0 to 2 million rotations/minute (minimum pulse width 2μs), 100 (r/min)/div to 100k (r/min)/div (full scale= 20 div), 7 settings Accuracy: ±0.1% f.s. (excluding 100k (r/min)/div), ±0.7% f.s. (at 100k (r/min)/div)
Power frequency mode	Range: 50Hz (40 - 60Hz), 60Hz (50 - 70Hz), 400Hz (390 - 410Hz) (full scale= 20 div), 3 settings Accuracy: ±0.03Hz (exclude 400Hz range), ±0.1Hz (400Hz range)
Integration mode	Range: 2k counts/div to 1M counts/div, 6 settings Accuracy: ±range/2000
Duty ratio mode	Range: Between 10Hz to 100kHz (minimum pulse width 2μs), 5%/div (full scale=20 div) Accuracy: ±1% (10Hz to 10kHz), ±4% (10kHz to 100kHz)
Pulse width mode	Range: Between 2μs to 2sec, 500μs/div to 100ms/dv (full scale=20 div) Accuracy: ±0.1% f.s.
Measurement resolution	1/2000 of range (Integration mode), 1/500 of range (exclude integration, power frequency mode), 1/100 of range (power frequency mode)
Input voltage range and threshold level	±10V to ±400V, 6 settings, selectable threshold level at each range
Other functions	Slope, Level, Hold, Smoothing, Low-pass filter, Switchable DC/AC input coupling, Frequency dividing, Integration over-range keep/ return

Dimensions and mass: approx. 106 (4.17in) W × 19.8 (0.78in) H × 196.5 (7.74in) D mm, approx. 250 g (8.8 oz) Accessories: CONVERSION CABLE 9318 × 2 (To connect the current sensor to the 8971)

CURRENT UNIT 8971

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

Measurement functions	Number of channels: 2, Current measurement with optional current sensor, Maximum 4 units connectable to the 8847
Input connectors	Sensor connector (input impedance 1 MΩ, exclusive connector for current sensor via conversion cable the 9318, common ground with recorder)
Compatible current sensors	CT6863, CT6862, 9709, 9279, 9278, 9277, 9272-10 (To connect the 8971 via conversion cable the 9318)
Measurement range	Using 9272-10 (20A), 9277: 100mA to 5A/div (f.s.=20div, 6 settings) Using CT6862: 200mA to 10A/div (f.s.=20div, 6 settings) Using 9272-10 (200A), 9278, CT6863: 1A to 50A/div (f.s.=20div, 6 settings) Using 9279, 9709: 2A to 100A/div (f.s.=20div, 6 settings)
Accuracy	Using 9278, 9279: ±0.85% f.s. Using other sensor: ±0.65% f.s. RMS amplitude accuracy: ±1% f.s. (DC, 30Hz to 1kHz), ±3% f.s. (1kHz to 10kHz) RMS response time: 100ms (rise time from 0 to 90% of full scale), Crest factor: 2 Frequency characteristics: DC to 100kHz, ±3dB (with AC coupling: 7Hz to 100kHz)
Measurement resolution	1/100 of range
Highest sampling rate	1 MS/s (simultaneous sampling across 2 channels)
Other functions	Input coupling: AC/DC/GND, Low-pass filter: 5, 50, 500, 5k, 50kHz, or OFF

■ Options specifications (sold separately)

Dimensions and mass: approx. 106 (4.17in) W × 19.8 (0.78in) H × 196.5 (7.74in) D mm, approx. 250 g (8.8 oz) Accessories: None

DC/RMS UNIT 8972

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

Measurement functions	Number of channels: 2, for voltage measurement, DC/RMS selectable
Input connectors	Isolated BNC connector (input impedance 1 MΩ, input capacitance 30 pF), Max. rated voltage to earth: 300 V AC, DC (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	5 mV to 20 V/div, 12 ranges, full scale: 20 div, AC voltage for possible measurement/display using the memory function: 280 V rms, Low-pass filter: 5/50/500 Hz, 5 k/100 kHz
Measurement resolution	1/100 of measurement range (using 12-bit A/D conversion and when installed in 8847)
Highest sampling rate	1 MS/s (simultaneous sampling across 2 channels)
Measurement accuracy	±0.5 % of full scale (with filter 5 Hz, zero position accuracy included)
RMS measurement	RMS amplitude accuracy: ±1 % of full scale (DC, 30 Hz to 1 kHz), ±3 % of full scale (1 kHz to 100 kHz), Response time: SLOW 5 s (rise time from 0 to 90% of full scale), MID 800 ms (rise time from 0 to 90% of full scale), FAST 100 ms (rise time from 0 to 90% of full scale), Crest factor: 2
Frequency characteristics	DC to 400 kHz -3 dB, (with AC coupling: 7 Hz to 400 kHz -3dB)
Input coupling	AC/DC/GND
Max. allowable input	400 V DC (the maximum voltage that can be applied across input pins without damage)

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 9320-01/9327

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	9320-01: 500ns or lower, 9327: detectable pulse width 100ns or higher
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 1.5 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)

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

Dimensions and mass: approx. 106 (4.17in) W × 19.8 (0.78in) H × 196.5 (7.74in) D mm, approx. 190 g (6.7 oz) Accessories: None

LOGIC UNIT 8973

Measurement functions	Number of channels: 16 channels (4 ch/1 probe connector × 4 connectors)
Input connectors	Mini DIN connector (for HIOKI logic probes only), Compatible logic probes: 9320-01, 9327, 9321-01

Dimensions and mass: approx. 290 (11.42in) W × 29 (1.14in) H × 219.5 (8.64in) D mm, approx. 1.2 kg (42.3 oz) Accessories: None

DC POWER UNIT 9784

Rated input voltage	10 to 28 V DC
Power requirements	200 VA (printer used)

Note: Factory-installed option, build in on the rear of the main unit

DC power supply module integrated on rear panel

■ Analyzing data on a computer

WAVE PROCESSOR 9335 (option)

- Waveform display and calculation
- Print function

LAN COMMUNICATOR 9333 (option)

- Collect waveform data
- Remotely control Memory HiCorders with a PC
- Save data in CSV format and export to spreadsheet applications

iPad App for Memory HiCorder HMR Terminal (option)

Free app (exclusively for iPad) downloadable from App Store

- iPad-unique gestures let you analyze measurement data any way you like
- Supports MR8740/41 and MEM data from MR8847s

Wave Viewer (Wv) Software (bundled software)

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

■ 9335 Outline specifications (option)

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

■ 9333 Outline specifications (option)

Operating environment	Windows 8/7 (32/64-bit), Vista (32-bit), XP, (The 9333 ver.1.09 or later)
Functions	• Auto-saves waveform data to PC, Remote control of Memory HiCorder (by sending key codes and receiving images on screen), print reports, print images from the screen, receive waveform data in same format as waveform files from the Memory HiCorder (binary only) • Waveform data acquisition: Accept auto-saves from the Memory HiCorder, same format as auto-save files of Memory HiCorder (binary only), print automatically with a Memory HiCorder from a PC. The Memory HiCorder's print key launches printouts on the PC • Waveform viewer: Simple display of waveform files, conversion to CSV format, or other

■ HMR Terminal Outline specifications (free software)

Operating environment	Apple iPad
Functions	• Data acquisition: Send to iPad via FTP using a WiFi router, or load to iPad via iTunes (PC app) • Waveform level search, maximum value/minimum value/average value, Intuitive fingertip manipulation of channel zero position, or other • Waveform viewing • Setting configuration for the Memory HiCorder * Not support logic waveform, processing waveform

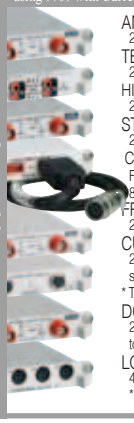
■ Wave Viewer (Wv) Outline specifications (bundled software)

Operating environment	Windows 8/7 (32/64-bit), Vista (32-bit), XP, 2000
Functions	• Simple display of waveform file • Convert binary data file to text format, CSV • Scroll display, enlarge/reduce, jump to cursor/trigger position, etc.

MR8847 series Options in Detail

Input modules

*Input cords are not included. Please purchase them separately. *When using 9709 with Current Unit 8971, a total of 7 current probes can be used.



ANALOG UNIT 8966 — Recommended
2 ch, Voltage input, DC to 5 MHz bandwidth

TEMP UNIT 8967
2 ch, thermocouple temperature input

HIGH RESOLUTION UNIT 8968
2 ch, voltage input, DC to 100 kHz bandwidth

STRAIN UNIT 8969
2 ch, strain gauge type converter amp

Conversion Cable 9769
For the 8969(MR8847/8827 series), bundled with the 8969

FREQ UNIT 8970
2 ch, for measurement of frequency, rpm, pulse, etc.

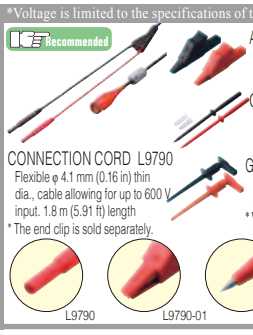
CURRENT UNIT 8971
2 ch, for measuring current using dedicated current sensors, bundled two Conversion cable 9318
* The Current unit 8971 up to four module

DC/RMS UNIT 8972
2 ch, voltage/DC to 400 kHz, RMS rectifier, DC and 30 to 100 kHz bandwidth

LOGIC UNIT 8973
4 terminals, 16 ch
* Max. up to two modules of the Logic unit 8973

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

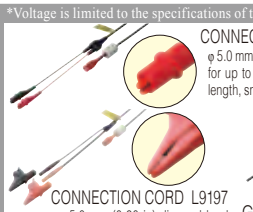
CONNECTION CORD L9790
Flexible φ 4.1 mm (0.16 in) thin dia., cable allowing for up to 600 V input. 1.8 m (5.91 ft) length
* The end clip is sold separately.

GRABBER CLIP 9790-02
Red/black set attaches to the ends of the cables L9790
* When this clip is attached to the end of the L9790, input is limited to CAT II 300 V. Red/black set.

L9790 L9790-01 9790-03 9790-02

Input cable (B)

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



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

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

INPUT CORD (C)

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

10:1 PROBE 9665
Note: This probe does not expand the maximum rated voltage above ground of an isolated input.
Max. rated voltage to earth is same as for input module, max. input voltage 1 kV rms (up to 500 kHz), 1.5 m (4.92 ft) length

100:1 PROBE 9666
Note: This probe does not expand the maximum rated voltage above ground of an isolated input.
Max. rated voltage to earth is same as for input module, max. input voltage 5 kV peak (up to 1MHz), 1.5 m (4.92 ft) length

Input cable (D)

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

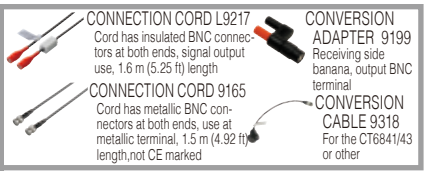
DIFFERENTIAL PROBE P9000-01
(Wave mode only)
For the Memory HiCorder series, input up to 1kV AC/DC

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

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

Other options for Input



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

CONNECTION CORD 9165
Cord has metallic BNC connectors at both ends, use at metallic terminal, 1.5 m (4.92 ft) length,not CE marked

CONVERSION ADAPTER 9199
Receiving side banana, output BNC terminal

CONVERSION CABLE 9318
For the CT6841/43 or other

Logic signal measurement

LOGIC PROBE 9327 — Recommended
4-channel type, for voltage/contact signal ON/OFF detection (response pulse width 100 ns or more, miniature terminal type)

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

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

CONVERSION CABLE 9323
*Used for connecting the 9320/9321/MR9321 and the 9324 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.

Order Code: MR8847-01
. . . . . (Max. 16ch, 64MW memory, main unit only)

Order Code: MR8847-02
. . . . . (Max. 16ch, 256MW memory, main unit only)

Order Code: MR8847-03
. . . . . (Max. 16ch, 512MW memory, main unit only)

Printer options

RECORDING PAPER 9231
A4 width 216 mm (8.50 in) × 30 m (98.43 ft), 6 rolls/set

Factory-installed option

*Must specify when ordering

HD UNIT 9664
Factory-installed option. 80GB

DC POWER UNIT 9784
Factory-installed option - not user installable, built in on the bottom case. 10 to 28 V DC drive.

Storage media

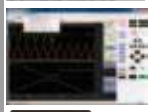
*The CF card includes a PC card adapter.

*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)

PC Software

WAVE PROCESSOR 9335
Convert data, print and display waveforms



LAN COMMUNICATOR 9333
• Waveform data collect function
• Remote control with the PC

iPad App for MEMORY HiCORDER HMR Terminal
Download from the App Store Free (exclusively for Apple Inc. iPad)

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

Case

CARRYING CASE 9783
Includes compartment for options, Hard trunk type, also suitable for transporting the MR8847s

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.

10 mA class to 500 A (High speed)

CLAMP ON PROBE 3273-50
DC to 50 MHz wide band response, 10 mA-class current up to 30 Arms

CLAMP ON PROBE 3276
DC to 100 MHz wide band response, 10 mA-class current up to 30 Arms

CLAMP ON PROBE 3274
DC to 10 MHz wideband response, up to 150 Arms

CLAMP ON PROBE 3275
DC to 2 MHz wideband response, up to 500 Arms

Power supply for sensor
Necessary for use high speed current probes

POWER SUPPLY 3272
For the 3270 series, single sensor connectable (2 units possible depending on conditions)

POWER SUPPLY 3269
For the 3270 series, connect up to four sensors

100 A to 2000 A (Medium speed)

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

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

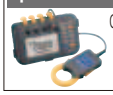
CLAMP ON AC/DC SENSOR CT9693-90
DC to 15kHz (-3dB), 2000A, Output 0.2 V/f.s., bundled the Sensor Unit CT6590

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

Up to 2000 A (Curent meter)
*Clamp sensor sold separately



CLAMP ON AC/DC HiTESTER 3290
With signal output terminals, enables observation of AC/DC current waveforms, input range and frequency range depend on clamp sensor used, 2V AC output

HIOKI

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