HIOKI

2001

8807-01
8808-01 MEMORY HiCORDER

Recorders

Detachable

** Photo shows the 8808-01 with optional printer unit installed.*

New Concept with Detachable Printer

Compact Size Recorder with Color Display

The 8807-01, 8808-01 MEMORY HiCORDERs, housed in a B5 book-sized, compact, and thin body weighing in at under 1.2 kg, are handy high-speed recorders equipped with features such as analog 4-channel (8807-01: 2-channel) isolated inputs, PC card slot, fax/modem communication, 3-way power supply, and powerful trigger functions. One unit is capable of covering a variety of usages, ranging from low-speed/long-term continuous recording to recording of high-speed transients.

ISO 9001
JMI-0216

ISO14001
JQA-E-90091

INTERNET HIOKI Website

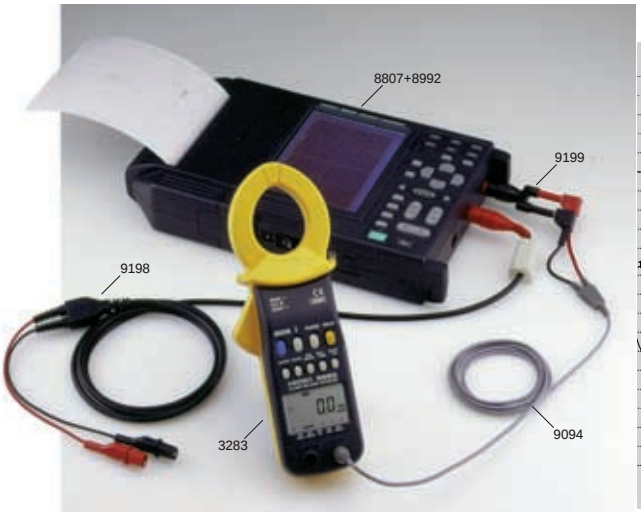
http://www.hioki.co.jp/

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

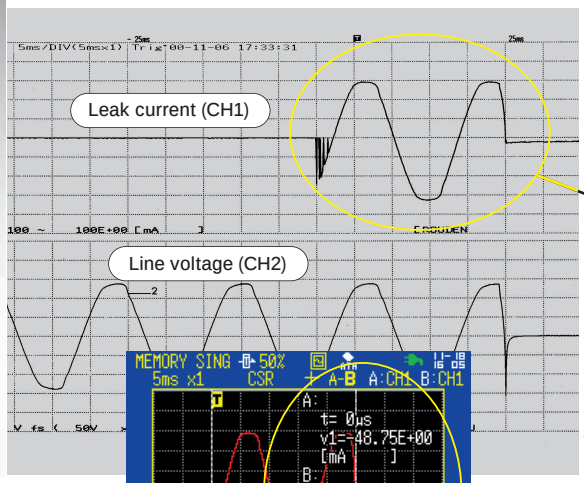
Recording Intermittent Leakage, Engine Performance and Relay Timing

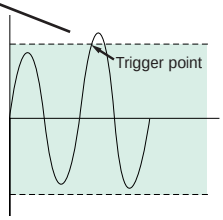
-Application Examples-

Unpredictable intermittent leakage is monitored unattended by recording instantaneous waveforms of the leakage current and line voltage

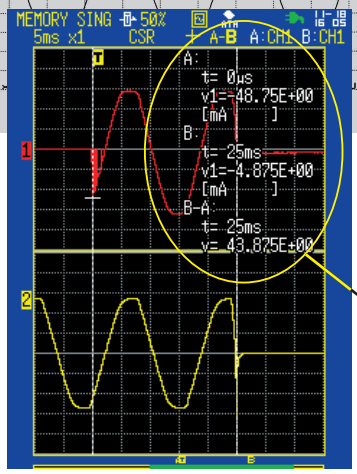


For long-term monitoring, use the Model 9418-10 AC ADAPTER for the 8807-01 MEMORY HiCORDER and the Model 9445-02/-03 AC ADAPTER for the 3283 CLAMP ON LEAK HiTESTER



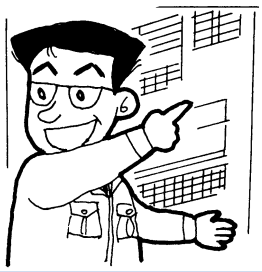


Recording of leakage is triggered when the input exceeds preset upper or lower limits.



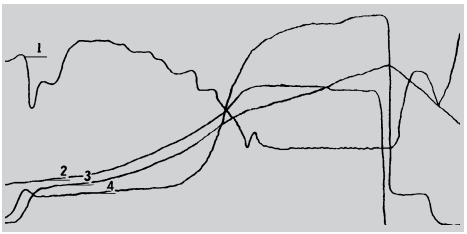
Every time a leakage phenomenon occurs, the waveforms can be printed out or the data saved on an ATA card.

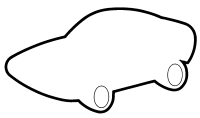
Data saved on a flash ATA card can be read back by the 8807-01 for analysis of peak current values at breaker trip time using the cursor function.



Monitor power line anomalities !

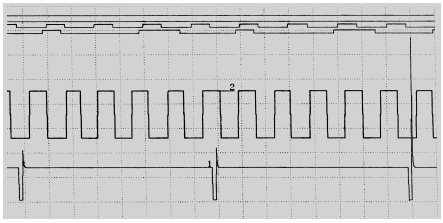
Analysis of engine characteristics





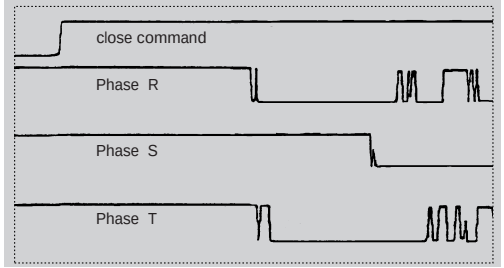
Allows the balance between boost, oil pressure, air fuel ratio, ignition timing, engine speed, injector aperture, etc., to be observed and recorded as waveforms.

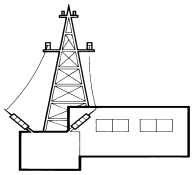
Analysis of Sequence Control Device Faults



Abnormal halts and warnings issued by sequence control devices in manufacturing production and testing lines can be caused by AC power hits or low voltage. Such anomalous behavior can best be analyzed by setting the sequence relay signal as a trigger to record the abnormal AC power waveforms and DC voltage systems.

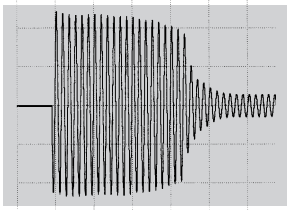
Circuit breaker timing measurement





Circuit breaker cut-off in a power circuit can be investigated by analyzing the relationship of multi-point logic signals to the analog waveform. Up to eight channels are provided for recording relay operation using logic probes.
Use the Model 9320-01 for non-voltage contact signals, and the 9321-01 LOGIC PROBE with isolated inputs for powered AC relay signals.

Recording of motor rush current



Motor power-on inrush current waveforms can be precisely recorded. The Model 9018-10 and 9132-10 CLAMP ON PROBEs are available for current measurement, as is the Model 3283 Leakage Current Meter.
In addition, to measure direct current waveforms, a variety of sensors such as the Model 9277, 9278 and 9279 UNIVERSAL CLAMP ON CTs are available upon request.

High-Speed Response for Capturing Transient Events

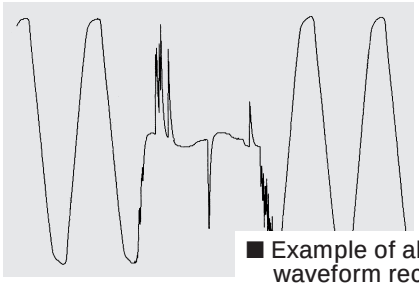
- Memory recorder function -

Operation of the memory recorder functions

The input signal is converted*1 to digital data that are stored in the internal memory. The data can then be displayed on the screen or printed out on paper*2. Once recorded, data are backed up for five years by the internal battery, provided that the start button is not pressed a second time (trigger mode: one-shot). The necessary parts can be searched out on the screen so that only the required waveforms are printed out*2.

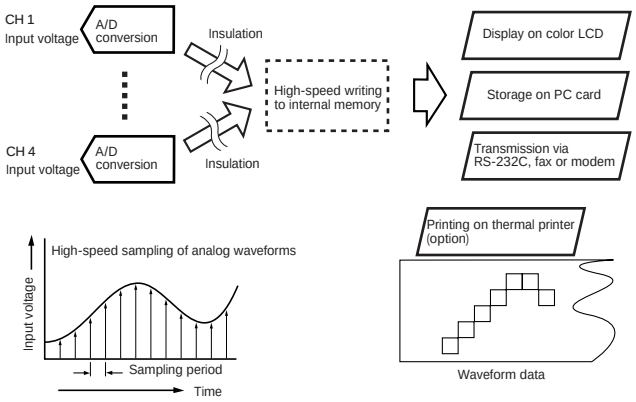
*1 The data sampling speed (sampling rate) is automatically set at 1/80 of the time axis range. E.g., at 200 µs/division the sampling rate is 2.5 µs, at 5 minutes/division, the sampling rate becomes 3.75 sec.

*2 The optional 8992 PRINTER UNIT is required.



■ Example of abnormal waveform recording

Waveform captured using the voltage-drop detection trigger. This allows recording of the waveforms of momentary voltage drops in power lines.



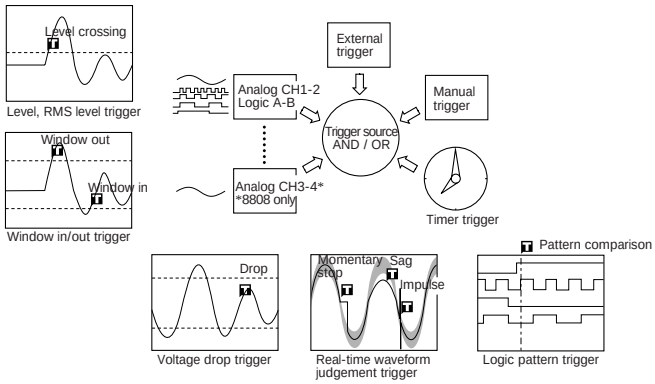
Time axis	Sampling rate	1-channel setting 256 kW/ch 3200 divisions	4-channel setting 64 kW/ch 800 divisions
200 µs /DIV	2.5 µs	640 ms	160 ms
400	5 µs	1.28 s	320 ms
1 ms /DIV	12.5 µs	3.2 s	800 ms
2	25 µs	6.4 s	1.6 s
5	62.5 µs	16 s	4 s
10	125 µs	32 s	8 s
20	250 µs	1 m 4 s	16 s
50	625 µs	2 m 40 s	40 s
100	1.25 ms	5 m 20 s	1 m 20 s
200	2.5 ms	10 m 40 s	2 m 40 s
500	6.25 ms	26 m 40 s	6 m 40 s
1 s /DIV	12.5 ms	53 m 20 s	13 m 20 s
2	25 ms	1 h 46 m 40 s	26 m 40 s
5	62.5 ms	4 h 26 m 40 s	1 h 6 m 40 s
10	125 ms	8 h 53 m 20 s	2 h 13 m 20 s
30	375 ms	1 day 2 h 40 m	6 h 40 m
1 minutes /DIV	750 ms	2 days 5 h 20 m	13 h 20 m
2	1.5 s	4 days 10 h 40 m	1 day 2 h 40 m
5	3.75 s	11 days 2 h 40 m	2 days 18 h 40 m

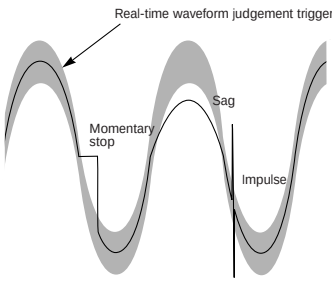
Trigger functions capable of monitoring all 4 channels*3

For all of the measurement functions, including recorder and memory recorder, triggers can be set on all 4 analog input channels and the 8 logic input channels. In addition to a simple level trigger based on comparison with a single voltage value, the following trigger conditions are also available:

- Window in/out trigger based on comparison of 2 voltage values
- Voltage drop trigger for AC power lines*4
- RMS level trigger based on rms values*5
- Waveform judgment trigger*4 monitoring the waveforms of AC power lines in real-time
- Pattern trigger monitoring the ON/OFF condition of a logic signal

*3 8808-01 MEMORY HiCORDER. 2 channels in the case of the 8807-01 MEMORY HiCORDER.
*4 Memory recorder function only. For 50/60 Hz only.
*5 RMS recorder function only. For 50/60 Hz only.





■ Real-time waveform judgement trigger with constant monitoring of the voltage waveforms of AC power lines

(Memory recorder function only)*6

The waveform judgement trigger constantly monitors the AC power line for irregular waveforms. There are two ways to use this trigger. One cycle of measured waveforms is observed with the judgement area automatically created from the immediately preceding cycle waveform, or the judgement area can be automatically created from the ideal sine wave. In both cases, the trigger activates when the signal is detected to move outside the reference area. This allows real-time monitoring of phenomena in AC power lines that existing level triggers have not been able to capture, such as momentary stops, sags, and impulses.
The level trigger can be set separately for each analog channel.
Also, when the printer is connected, the judgment area automatically generated from the ideal sine wave can be printed as an overlay with the measurement waveform.

*6 The time axis can be used for all ranges above 10 ms/DIV (version 2.20 or later).

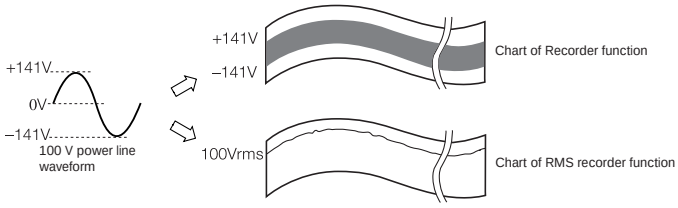
Waveforms are Saved During Real-Time Recording

-Real-Time Recording-

RMS recorder function

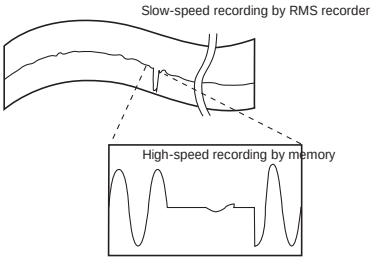
This function is exclusively for use on 50/60 Hz power-supply lines and DC. High-speed sampling is applied to calculate the rms value from the waveform data*1, and the result is recorded as a graph.

*1 Using 250 µs high-speed sampling, data for three waveforms are captured for calculating the rms value. This process is repeated 800 times per second using the moving average method, resulting in high-speed response.



■ RMS recorder & memory function

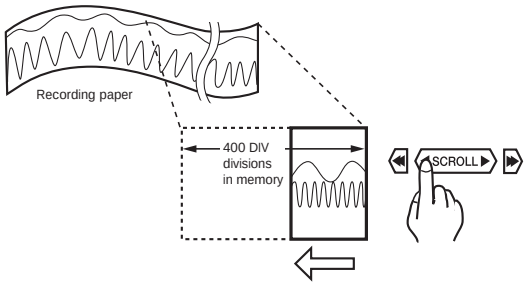
If an abnormal event is detected by triggers during real-time recording of signals using the RMS recorder, it is stored in memory by the high-speed sampling memory recorder. The RMS recorder function works independently and never stops. This function is highly convenient when it is desirable to record both abnormal phenomena and normal level fluctuations.



Recorder function operation

The input signal is converted to digital form and displayed or printed*2 in real-time. The chart speed is maximum 10 mm/s (in the 1s/division range)*3. Even with the real-time recording, the last 400 divisions of the waveform can be observed by scrolling or reprinting the data*2.

*2 The optional 8992 PRINTER UNIT is required.
*3 Only when using the AC Adapter. When using batteries, the maximum speed is 5 mm/s (2 s/division range).



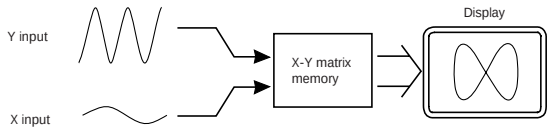
Recorder recording time

Actual operation conditions are assumed, and it is assumed that 30 cm of the length of the recording paper is not used, for a total of 1770 divisions

Time axis	Chart speed	Sampling period	Approximate recording time with one roll of recording paper (18 m)
100 ms/DIV	Printer not required	2.5µs	Stored in memory only: 40 s
200			Stored in memory only: 1 m 20 s
500			Stored in memory only: 3 m 20 s
1 s/DIV	AC Adapter used 10 mm/s	2.5µs	AC Adapter used 29 m 30 s
2 s/DIV	5 mm/s	2.5µs	59 m
5	2	2.5µs	2 h 27 m 30 s
10	1	2.5µs	4 h 55 m
30	20 mm/s	2.5µs	14 h 45 m
1 minutes/DIV	10	2.5µs	1 day 5 h 30 m
2	5	2.5µs	2 days 11 h
5	2	2.5µs	6 days 3 h 30 m
10	1	2.5µs	12 days 7 h
30	20 mm/h	2.5µs	36 days 21 h
1 h/DIV	10 mm/h	2.5µs	73 days 18 h

■ X-Y Recorder format

This function allows two signals converted to digital form to be combined in an x-y plot and stored in memory. Any of the four analog channels can be used for an x-y plot, but only one plot can be combined. The X-Y plot can be viewed in real-time on the display, and there is no limit on the recording time. The waveforms can also be printed out as many times as desired.

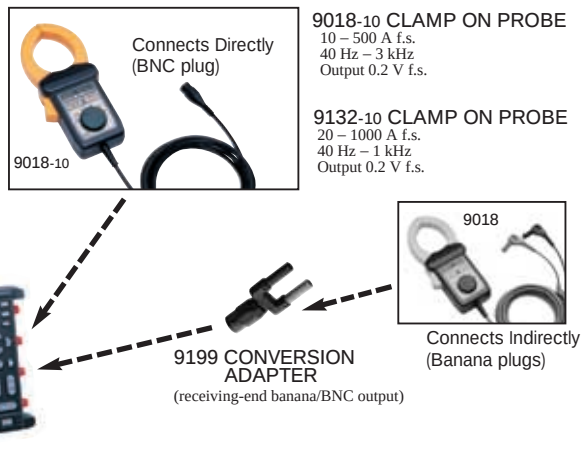


X-Y recorder diagram

Special range for clamp probe enables easy current measurement *4

Using the 9018-10 CLAMP ON PROBE, current waveforms can be captured on live lines. Voltage range settings and scale settings are performed with a one-touch operation thanks to the special clamp probe range provided.

*4 Only compatible with the 9018-10 and 9132-10 CLAMP ON PROBEs. Model 9018 and 9132 CLAMP ON PROBEs can be connected using the Model 9199 CONVERSION ADAPTER



9018-10 CLAMP ON PROBE
10 – 500 A f.s.
40 Hz – 3 kHz
Output 0.2 V f.s.

9132-10 CLAMP ON PROBE
20 – 1000 A f.s.
40 Hz – 1 kHz
Output 0.2 V f.s.

Ideal for Unattended Operation

-Data Communication and Other Functions-

Fax/modem communication function and PC connection

Use of a commercially available fax/modem card*1 allows communication via a telephone line. The RS-232C terminal is standard equipment that allows the 8807-01 and 8808-01 to be connected serially to a personal computer.

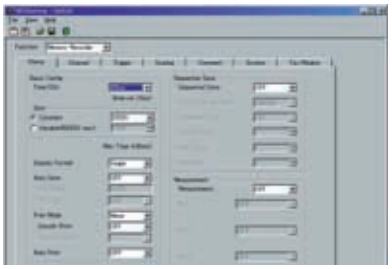
*1 Please contact HIOKI for details on compatible fax/modem cards. The fax/modem card is inserted into the PC card slot on the 8807-01 and 8808-01.

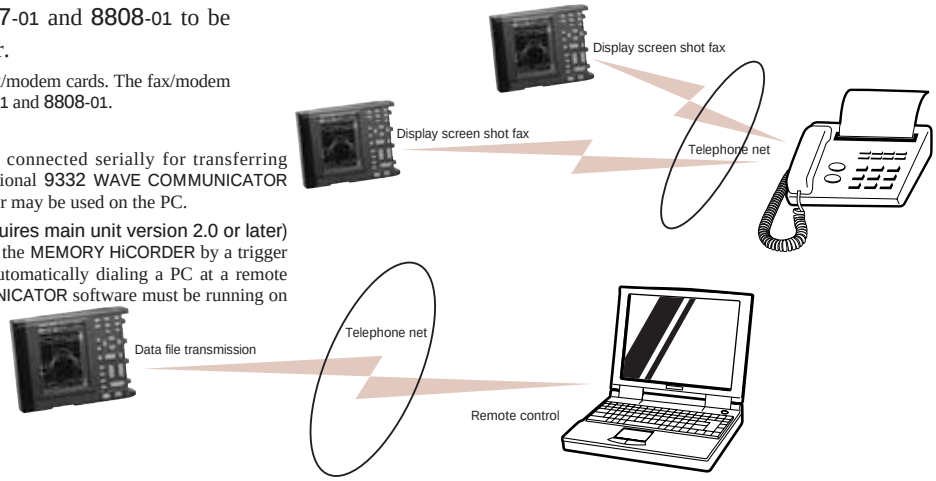
■ RS-232C connection to PC

The PC and HiCORDER can be directly connected serially for transferring recorded data and remote settings. The optional 9332 WAVE COMMUNICATOR software or other software created by the user may be used on the PC.

■ Modem connection to PC (requires main unit version 2.0 or later)

When an abnormal waveform is recorded in the MEMORY HiCORDER by a trigger event, the data file can be transferred by automatically dialing a PC at a remote location (the optional 9332 WAVE COMMUNICATOR software must be running on the PC).





■ Auto-dial function for connection to fax machine (requires main unit version 2.0 or later)

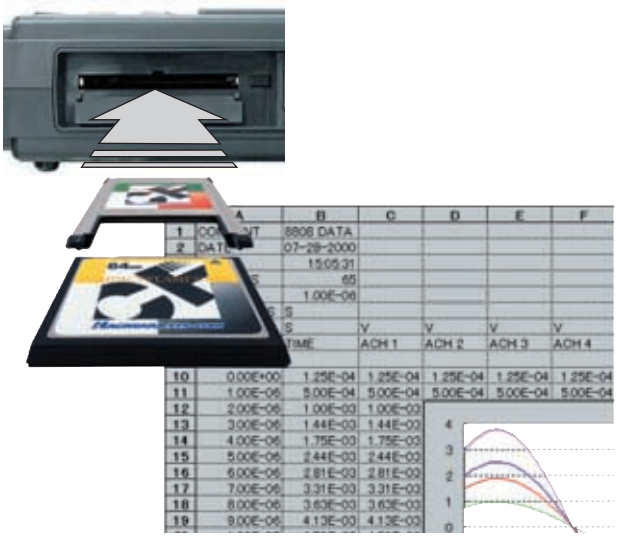
Automatically transmit measurement data (display screen shots) to a specified fax machine. When used in combination with a trigger, this function allows automatic notification in case of abnormalities. It also enables unattended monitoring with waveforms transmitted to the fax machine at specified times.

■ Communication software to connect the 8807-01 and 8808-01 with a PC

The 9332 WAVE COMMUNICATOR (communication software) is available as an option to transfer recorded data and remote settings between a Windows PC and MEMORY HiCORDER.

Off-Line Data Exchange with a PC

Waveforms acquired by the memory recorder can be stored on flash ATA-PC cards. Stored waveform data can be converted to text (CSV) format files by the supplied Wv Waveform Viewer PC application program.



Example showing measurement data imported to Excel.

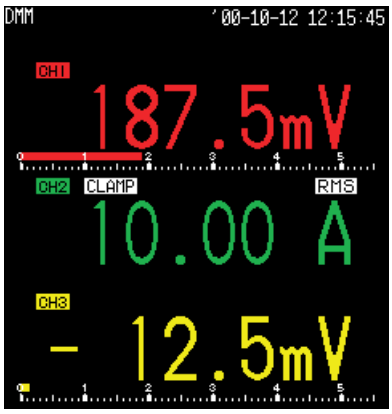
■ Using Data on the PC

Displayed images can be saved in BMP format to easily create and print color reports from the PC's word processor. Also, measurement data can be converted to text format*2 for numerical analysis in a PC spreadsheet program.

*2 Data can be saved in binary or text formats. The binary format is for data to be used in the 8807-01 and 8808-01 MEMORY HiCORDERs. Data saved to the PC in binary format can be converted to text format using the supplied Wv (Waveform Viewer program), for loading into a spreadsheet program such as Excel. Also, images can be saved in BMP format.

Convenient features for ease of operation

Convenient features such as the DMM function, special range for a clamp probe, numerical value calculation, scaling, A/B cursor measurement, free comment input, and automatic restart after power outage make the measurement work quick and simple.



■ DMM Function

Digital Multi Meter functions are provided for simple input voltage checking. Selectable modes are Effective value mode (AC+DC), and Instantaneous value mode (DC), each displaying four numeric digits. When the scaling function is enabled, the specified scaling value is incorporated.

Note: Convenient for checking waveform recordings of power lines. RMS display is for 50/60 Hz or DC only.

-Specifications-

8807-01, 8808-01 MEMORY HiCORDER Basic Specifications

Measurement functions	(1) Memory recorder, (2) Recorder, (3) RMS recorder & memory (50/60 Hz/ or DC only)
Input type and number of channels	8807-01: fixed input section, 2 analog + 8 logic, 8808-01: fixed input section 4 analog + 8 logic Isolated analog channels, isolated input and outputs, logic has common GND.
Maximum sampling rate	400 k sample/s (2.5 µs cycle) Simultaneous sampling for 2/4 analog + 8 logic channels
Memory capacity	8807-01: (analog 12 bits + logic 4 bits) × 256 kilo-words/channel (CH1) to (analog 12 bits + logic 4 bits) × 128 kilo-words/channel (CH1, CH2) 8808-01: (analog 12 bits + logic 4 bits) × 256 kilo-words/channel (CH1) to (analog 12 bits + logic 4 bits) × 64 kilo-words/channel (CH1 - CH4)
External memory	PC card TYPE Ⅱ slot × 1: SRAM card (max. 32 MB), flash ATA card (max. 528 MB), MS-DOS format Memory contents: Setting conditions, measurement data (binary, text), image data (BMP), calculation results (figures)
Battery backup	Clock, waveform data, settings, battery life approx. 5 years (at 25 ˚C/ 77 ˚F)
External control	Terminal block: trigger input/output
Interface	RS-232C interface: 9-pin round connector terminal (the optional 9612 RS-232C CABLE is required for connection to PC) PC card interface: Commercially available PC card type fax modem (Please contact HIOKI for information on compatible fax modems) Printer interface: 8992 PRINTER UNIT can be connected (option)
Environment conditions (no condensation)	Operation: +5 ˚C/41 ˚F to +40 ˚C/104 ˚F, 35% to 80% relative humidity. Storage: -10 ˚C/14 ˚F to +50 ˚C/122 ˚F, 35% to 80% relative humidity.
Applicable standards	Safety: EN61010 EMC: EN61326
Power supplies *1 **Note:** *These LR6/AA alkaline batteries cannot be used with the 8992 PRINTER UNIT.*	(1) 9418-10 AC Adapter (DC 12 V ±10 %), *1LR6/AA alkaline batteries × 6 (AC adapter has priority when used in combination w/batteries), (2) 9447 BATTERY PACK (AC adapter has priority when used in combination w/battery pack, fast recharge possible with AC adapter), (3) 12 V Car battery (*Please contact HIOKI for connection cord).*
Power requirements	8807-01, 8808-01: 15 VA max. (when using optional printer)
Continuous operation time (trigger standby at 23 ˚C/ 73 ˚F)	Approx. 3 hours (when using 9447 BATTERY PACK) Approx. 1 hours (when using *1 alkaline batteries)
Charge time	With power switch OFF, approx. 2 hours fast charge (at 23 ˚C/ 73 ˚F)
Dimensions (8807-01, 8808-01)	Approx. 203 (7.99) W × 170 (6.69) H × 52 (2.05) D mm (inch) (printer detached) Approx. 280 (11.02) W × 170 (6.69) H × 52 (2.05) D mm (inch) (printer attached)
Mass (batteries not included)	8807-01: approx. 1.1 kg/ 38.80 oz (printer detached)1.5 kg/ 52.91 oz (printer attached) 8808-01: approx. 1.2 kg/ 42.33 oz (printer detached)1.6 kg/ 56.44 oz (printer attached)
Supplied accessories	LR6/AA alkaline batteries (6), alkaline battery box (1), shoulder belt (1), Wave viewer software (1)

Recording and Display Section *Waveform printing when the optional 8992 PRINTER UNIT is used

Display	5.7-inch STN color LCD, with Japanese/English selector 240 × 320 dots
*Printer paper	112 mm (4.4") × 18 m (59.06 feet), thermal paper roll
*Recording width	10 divisions for full scale, 1 division = 10 mm (0.39") (80 dots)
*Paper feed density	8 rows/mm (203 rows/inch) 16 rows/mm (406 rows/inch) in memory recorder's smooth printing mode.
*Recording speed	Max. 10 mm/s (0.39 inch/s) (when using AC Adapter), max. 5 mm/s (0.2 inch/s) (when using batteries)

Trigger Function

Trigger source	Analog input CH1 - CH4 (8807-01: CH1 - CH2), logic input A - B, external, timer, manual (either ON or OFF for each source), logical AND/OR of sources
Trigger types (Analog)	**Level:** Triggered when set voltage value is exceeded in UP or DOWN direction. **Window in/out:** When entering or exiting a level range defined by upper or lower limit **Voltage drop:** Only for AC 50/60 Hz power lines. Triggered when the peak voltage falls below setting value **RMS level:** Only for DC and AC 50/60 Hz power lines. Triggered when rms value crosses set value in UP or DOWN direction (RMS recorder function only) **Real-time waveform judgment:** Only for AC 50/60 Hz power lines. Trigger function that monitors when a signal exceeds the evaluation area (Memory recorder function only)
Level setting resolution	Equivalent to 0.5 % when full scale is set to 10 divisions
Trigger types (Logic)	Pattern trigger: 1, 0, or × (disregard), logical product (AND) or logical sum (OR) set for 4 channels
Trigger filter (Analog / logic)	9 settings from 0.1 to 10.0 divisions or OFF (memory recorder) ON/OFF (recorder)

Memory Recorder Function

Time axis	200 µs to 5 minutes/division, 19 settings, time axis zoom ×2 to ×10; 3 settings, compression 1/2 to 1/500; 8 settings
Sampling period	1/80 of time axis ranges (minimum sampling period 2.5 µs)
Recording length	20 to 3200* divisions * Depending on the number of channels in use
Pre-trigger	Can record data from before the trigger point, 0 ~ 100 % or -95 % of recording length; 15 settings
Other functions	Numerical calculations, logging (numerical printout), X-Y waveform plot (one plot on 8807-01, up to three plots on 8808-01), voltage axis zoom ×2 ~ ×10; 3 settings, compression 1/2

Recorder Function

Time axis	100 ms* to 1 hour/division; 14 settings, 1 division = 80 samples, time axis compression 1/2 to 1/50; 5 settings * 100 ms - 500 ms/division ranges shown only on display when using AC Adapter. 100 ms - 1 s/division ranges shown only on display when using batteries
Sampling period	2.5 µs fixed
Recording length	20 ~ 400 divisions, "continuous" * * only "continuous" for X-Y plotting
X-Y sampling period	250 µs; fixed (dot), 500 µs to 10 ms (line)
X-Y axis resolution	20 dots/division (display), 80 dots/division (w/ optional printer)
Other functions	Back-scroll of memory data (max. last 400 divisions) and reprinting of stored data (w/ optional printer), logging (numerical printout) (w/ optional printer), voltage axis magnification ×2 ~ ×10; 3 settings, compression 1/2; 1 setting. X-Y waveform plot (one plot on 8807-01, up to three plots on 8808-01)

RMS Recorder & memory Function (for 50/60 Hz and DC)

Time axis	RMS recorder: 100 ms to 1 hour/division; 14 settings Memory recorder: 200 µs to 20 ms/division; 7 settings 1 division = 80 samples, time axis compression 1/2 to 1/50; 5 settings
Sampling period	RMS recorder: 250 µs fixed (800 RMS data/second) Memory recorder: 1/80 of time axis range
RMS calculation accuracy	±3% f.s.
Recording length	RMS recorder: 20 ~ 200 divisions, continuous Memory recorder: 20 ~ 400 divisions, OFF (only RMS recorder when OFF)
Other functions	Back-scroll of memory data (max. last 200 divisions) and reprinting of stored data (w/ optional printer), for memory recorder: back-scroll of memory data (max. last 400 divisions) and reprinting of stored data (w/ optional printer), logging (numerical printout) (w/ optional printer), voltage axis magnification ×2 ~ ×10; 3 settings, compression 1/2; 1 setting.

Auxiliary Functions

General	Printing of settings including input range, trigger time, etc., cursor measurement, scaling, comment input, screen hard copy, start condition retention, auto setup, auto saving, remote control, auto-range setting, list printing (w/ optional printer), DMM function (voltage shown as numerals on the display).
Calculation functions (Memory recorder)	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.
DMM function	Display update rate: 1 s, display contents: AC+DC rms (measurement signal is DC, 50/60 Hz only), or DC instantaneous value Display digits: 4 digits (last digit is rounded down in case of 0 to 4, and rounded up in case of 5 to 9) Voltage range: Auto only (10 mV ~ 100 V/division, 5 settings) Accuracy: ±3 % rdg. ±5 dgt.

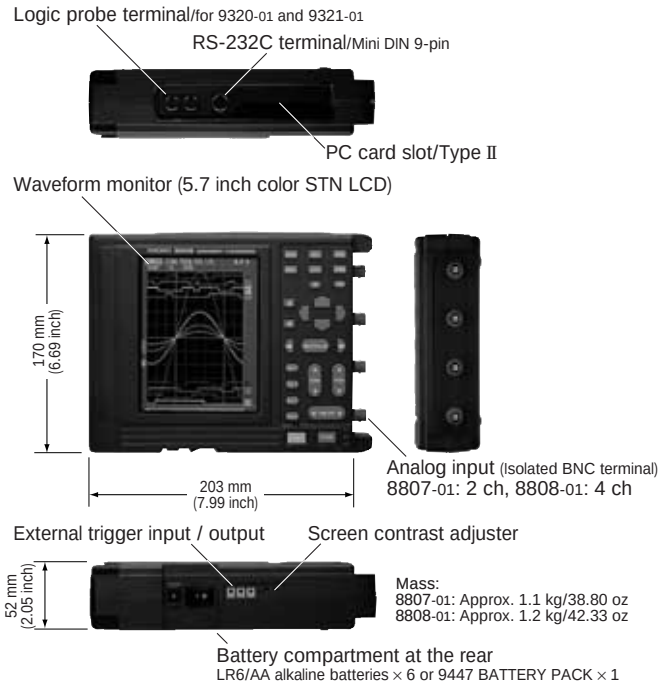
Wave viewer (Wv) software (Supplied accessories, added from Jul. 2000)

Functions	• Simple display of waveform files • Converts to CSV format from binary data files, saved at memory recorder function : a selection can be specified, and thinning can be enabled. • Display format setting : Scroll function, Enlarge/Reduce display, display CH settings.
Operating environment	IBM PC/AT or compatible, PC 98 series Windows 95 (OSR2 or later)/ 98, Windows NT 4.0
Supported recorders	8826, 8835-01, 8841, 8842, 8807-01, 8808-01

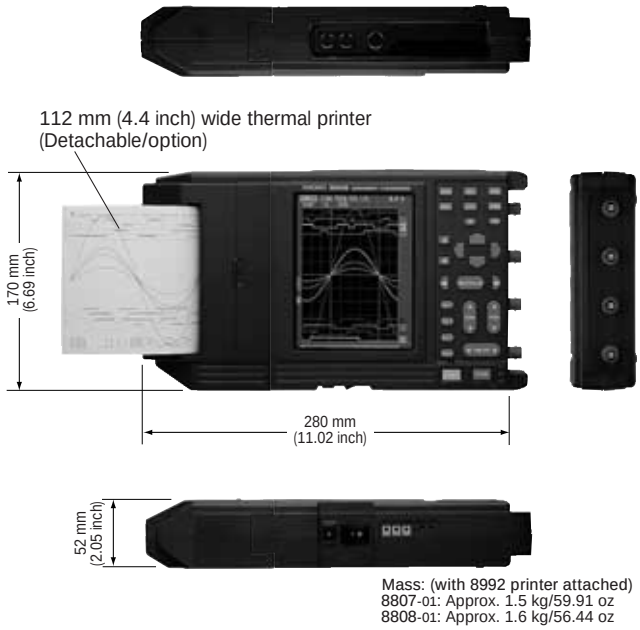
Analog input (accuracy at 23 ±5 ˚C/73 ±9 ˚F after 30 minutes warm-up time; accuracy guaranteed for 1 year)

Input	Terminal: isolated BNC Inter-channel and input-frame isolation
Measurement range	10 mV ~ 100 V*2/division, 13 settings, full-scale (f.s.) = 10 divisions, max. 450 V AC rms or DC, low-pass filter = 5/500 Hz, the measurement resolution is 1/160 of range *2 100 V/division is excluding the rms recorder
Maximum sampling rate	400 kS/s (simultaneous sampling of all channels)
Accuracy, frequency characteristics	±0.5% f.s., DC to 50 kHz ±3 dB
Input resistance and capacitance	1 MΩ, 7 pF approx. (at 100 kHz)
Input coupling	DC, GND
Max. allowable input	450 V AC rms, DC (upper voltage which when applied to between input pins does not damage them)
Max. grounding voltage	450 V AC, DC (upper voltage which when applied to input channel casing or between input channels does not damage them)

■ Appearance and Dimensions (8807-01 and 8808-01 Instrument-only)



■ Appearance and Dimensions (8807-01 and 8808-01 with printer attached)



■ Specifications of Options (sold separately)

9320-01 LOGIC PROBE

Detector for high/low recording of voltage signals or relay contacts.

Inputs: 4 channels (common ground), digital / contact signal detection.
Can detect open-collector signal at contact input.
Input resistance: 1 MΩ (digital input, at 0 to +5 V), at least 500 kΩ (digital input, at +5 to +50 V)
Pull up resistance: 2 kΩ (contact input)
Threshold level (digital input): +1.4 V, +2.5 V, +4.0 V
Detect resistance (contact input): open at least 1.5kΩ / close at 500Ω or smaller, open at least 3.5kΩ / close at 1.5kΩ or smaller, open at least 25kΩ / close at 8kΩ or smaller
Response time: 500 ns maximum
Dimensions and mass:
Approx. 62 (2.44) W × 94 (3.7) H × 20 (0.78) D mm (inch), 150 g (5.3 oz)
Max. allowable input: 0 to +50 V DC


9320*

* The 9320-01 uses a different recorder connector than the 9320.

9321-01 LOGIC PROBE

Detector for high/low recording of relay drive signals. Can be used for detecting outages on a power line.

Inputs: 4 channels (isolated), HIGH/LOW range switching type
Input resistance: at least 100 kΩ (HIGH range), 30 kΩ (LOW range)
High detection levels: 170 to 250 V AC, ±70 to 250 V DC (HIGH range)
60 to 150 V AC, ±20 to 150 V DC (LOW range)
Low detection levels: 0 to 30 V AC, 0 to ±43 V DC (HIGH range)
0 to 10 V AC, 0 to ±15 V DC (LOW range)
Response time: rising edge 1 ms max., falling edge 3 ms max.
(ON/OFF, with HIGH range at 200 V DC, LOW range at 100 V DC)
Max. allowable input: 250 V rms (HIGH range), 150 V rms (LOW range)
Dimensions and mass: Approx. 62 (2.44) W × 127 (5) H × 20 (0.78) D mm (inch), 320 g (1.13 oz)


9321*

* The 9321-01 uses a different recorder connector than the 9321.

9331-01 WAVE PROCESSOR

Supported recorders: 8806, 8806-01, 8807-01, 8808-01
Provided media: 3.5-inch 2HD floppy disks (3)
Operating environment: IBM PC/AT or compatible, PC98 series (800 × 600 or higher resolution), Windows 95 (English version)
Functions: ■ Data conversion - Converts waveform data on disk to voltage values in ASCII format. Converts logic data to 1 or 0 (for all functions of memory recorder, recorders, effective-value recorders). All channels or an arbitrary channel can be selected for conversion.■ Waveform display - Conversion waveforms can be displayed on a PC screen ■ Calculation Function - parameters can be calculated ■ Saving conversion data - Display screens, specified ranges by A and B cursors, and data thinning can be saved in two formats: CSV and DADiSP ■ Reading and Saving Data - Various types of data can be read and saved ■ Calculation Value Saving Function - Parameter calculation results can be saved ■ Report Function - A report can be created from the recorded comment ■ Preview Function ■ Printing and Saving Comments - Channel headers and channel comments can be printed and saved ■ Print Format - Batch display or group display is possible ■ Printing paper size - A4, portrait or landscape
Supported software: Excel, Lotus 1-2-3, DADiSP

* *Note) Product names appearing herein are trademarks or registered trademarks of various companies. With DADiSP, some manipulation of converted data headers may be required.*

9332 WAVE COMMUNICATOR

Supported recorders: 8807-01 and 8808-01
(support for other MEMORY HiCORDERs is planned)
Provided media: 3.5-inch 2HD floppy disks (2)
Operating environment: IBM PC/AT or compatible, PC98 series (800 × 600 or higher resolution), Windows 95, 98, NT4.0 (English version)
Communications method: Standard telephone line (requires a Windows 95/98/NT4.0 compatible modem), RS-232C
Functions:
■ **Waveform data transfer:** waveforms stored in the MEMORY HiCORDER can be transferred to and saved on the PC (for all functions of memory recorder, recorder and RMS recorder).
■ **Store-on-trigger:** waveforms can be transferred and stored in response to a trigger event detected by the MEMORY HiCORDER. (via telephone line only)
■ **Create and send Settings files:** MEMORY HiCORDER setting files can be created and sent to the MEMORY HiCORDER.
■ **Waveform display function:** received waveform data images can be displayed on the PC screen.
■ **Data conversion:** saved waveform data can be converted to CSV format (converted waveforms can then be analyzed by reading into standard application programs such as Excel, Lotus 1-2-3, DADiSP, etc.)
■ **External control interface:** waveforms can be loaded via RS-232C interface.

* *Note) Product names used herein are trademarks or registered trademarks of their owners. With DADiSP, some manipulation of converted data headers may be required.*

Dimensions : Approx. 70 W × 150 H × 25 D mm, (2.76 W × 5.91 H × 0.98 D inch)
Mass : Approx. 350 g (12.3 oz)
Primary cord length : Approx. 460 mm (18.11 inch)
Secondary cord length : Approx. 1.3 m (4.27 feet)

9322 DIFFERENTIAL PROBE

(accuracy at 23 ±5 ˚C/73 ±9 ˚F after 30 minutes warm-up time; accuracy guaranteed for 1 year)

Measurement functions	(1) DC mode, (2) AC mode, (3) RMS mode
Input type	1/1000, Balanced differential input
Input resistance, capacity	H–L: 9 MΩ, approx 10 pF (C at 100 kHz) H, L–case: 4.5 MΩ, approx 20 pF (C at 100 kHz)
Maximum input voltage	2000 V DC, 1000 V AC (CAT II), 600 V AC/DC (CAT III)
Max. grounding voltage	When using grabber clip: 1500 V 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)
Power supply	Use with 9418-10 AC ADAPTER (DC 12 V±10%)
Supplied accessories	Alligator clips (2), Grabber clips (2), 3853 CARRYING CASE (1)

9322 DIFFERENTIAL PROBE (DC mode)

Application	Waveform monitor output
Frequency band width	DC to 10 MHz ±3 dB
DC amplitude accuracy	±1 % f.s. (1000 V DC or less) ±3 % f.s. (2000 V DC or less) f.s.=2000 V DC

9322 DIFFERENTIAL PROBE (AC mode)

Application	Detection of power line surge noise
Frequency band width	1 kHz to 10 MHz ±3 dB

9322 DIFFERENTIAL PROBE (RMS mode)

Application	Effective value output for DC, or AC voltage input
Frequency band width & Output accuracy	DC, 40 Hz to 1 kHz : ±1 % f.s. 1 kHz to 100 kHz : ±4 % f.s. f.s.=1000 V AC
Response speed	200 ms or less (400 V AC)

Composition of options

** designated products are not CE-Mark compliant*

9648 CARRYING CASE
Hard case type, for storing options

9391 CARRYING CASE
Soft case type, for storing options
Holds more options than the 9648 hard case

9320-01 LOGIC PROBE
4-channels, on/off detection of voltage/ contact signal (Exclusive use with 8807-01/ 8808-01, small connector type)

9321-01 LOGIC PROBE
4-channel isolated, on/off detection of AC/DC voltage (Exclusive use with 8807-01/ 8808-01, small connector type)

9323 CONVERSION CABLE
Adapts the 9320 and 9321 LOGIC PROBE connectors for the 8807-01 and 8808-01 terminals

9612 RS-232C CABLE
Mini DIN 9-pin - Dsub 9-pin, Cable length 1.5 m

9331-01 WAVE PROCESSOR
Software required to convert the binary file to CSV text file, print, calculation, operate under Windows 95/ 98, NT 4.0

9332 WAVE COMMUNICATOR
Software required to use PC connection via phone modem/ RS-232C, operate under Windows 95/ 98, NT 4.0

PCMCIA-compatible

PC CARD 64M
Included with PC card adapter, 64 M-bytes compact flash memory card

PC CARD 32M
Included with PC card adapter, 32 M-bytes compact flash memory card

- The latest information about compatible PC Cards is available at our website.

URL: http://www.hioki.co.jp/

4ch (8808-01)

Current Measurement

Voltage

9018-10 CLAMP ON PROBE
Input from 10 to 500 A
40 Hz to 3 kHz for 0.2 V AC output.
BNC terminal

*9132-10 CLAMP ON PROBE
Input from 20 to 1000 A
40 Hz to 1 kHz for 0.2 V AC output.
BNC terminal

*9094 OUTPUT CORD
Required along with the 9199 adapter to connect Model 3283 to the 8807-01 or 8808-01

3283 CLAMP ON LEAK HiTESTER
For leakage current measurement, includes 10 mA to 200 A ranges, with analog output of 1 V f.s. DC, and waveform monitor output of 1 V f.s. AC at 40 Hz to 2 kHz. Requires the 9445-02/-03 AC ADAPTER

9197 CONNECTION CORD
For up to 500 V, 1.5 m length

9322 DIFFERENTIAL PROBE
For inputs up to 2 kHz DC or 1 kV AC, the 9322 requires the 9418-10 AC ADAPTER

9198 CONNECTION CORD
For up to 300 V, 1.5 m length

9217 CONNECTION CORD
Insulation BNC-to-insulation BNC, use to connect to insulation-BNC terminal on Input Module

- An input cord for measurement use is not provided. Please purchase the optional 9197 or 9198 CONNECTION CORD together with the recorder.

8807-01 MEMORY HiCORDER (2ch model)

8808-01 MEMORY HiCORDER (4ch model)

Included accessories: LR6/AA Alkaline batteries (6), Alkaline battery box (1), Shoulder belt (1), Wave viewer software (1)

8992 PRINTER UNIT
Printing width 100 mm, used together with the 8807-01, 8808-01 main body

9234 RECORDING PAPER
18 m/ 59.06 feet length, 10 rolls/ 1 set

*220H PAPER WINDER
Paper width: 70 - 220 mm, using special-purpose AC adapter

*CT101A LINE SPLITTER
For 100 V/ 15 A, convenient for measuring 100 VAC line current with clamp-on probe

9199 CONVERSION ADAPTER
Banana-to-BNC, use to connect to insulation-BNC terminal on Input section

9447 BATTERY PACK
7.2 V, 2400 mAh

9643 CHARGE STAND
Used with the 9418-10 AC ADAPTER to charge one Model 9447 BATTERY PACK

9418-10 AC ADAPTER
Universal 100 to 240 V AC, 12 V DC/ 2.5 A output

- An The units can be operated using the supplied LR6/AA alkaline batteries but use of the optional 9418-10 AC ADAPTER or 9447 BATTERY PACK (the 9418-10 AC ADAPTER is necessary for recharging) is recommended. Manganese batteries cannot be used. Use of commercially available rechargeable batteries instead of the original battery pack may result in damage to the unit.

Examples of optional combinations

8807-01 (2ch) Printer set	8992 PRINTER UNIT	9418-10 AC ADAPTER	9447 BATTERY PACK	9198 CONNECTION CORD	9234 RECORDING PAPER
one	one	one	one	two	1 pack (10 rolls)
8808-01 (4ch) Printer set	**8992 PRINTER UNIT**	**9418-10 AC ADAPTER**	**9447 BATTERY PACK**	**9198 CONNECTION CORD**	**9234 RECORDING PAPER**
one	one	one	one	four	1 pack (10 rolls)

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■ Internet HIOKI website http://www.hioki.co.jp/

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