For the field Professional

HIOKI

New

MEMORY HiCORDER 8847

Recorders

HIOKI 8847 MEMORY HiCORDER

Fully Isolated High Speed Recording, Tough Enough for the Field

■ **Isolated** inputs for all channels enhance measurement safety by letting you record differing electric potential objects simultaneously

■ **Sturdy** construction designed for use in the field
Tough body and strong enclosure provide superior resistance to shocks, falls, and vibrations. Clears a 50 cm drop test. *Note: Using in-house testing conditions. Absence of impairment or damage in all cases is not assured.*

■ **High-speed** printing for checking data right on the spot
Printer features newly designed roll paper drop-in loading and one-touch setup, along with high 50 mm/s printing speed.

■ **Ergonomic** controls for superior user convenience
Large key tops are easy to operate and feature surface coating so you can simply wipe off grease stains and other residue.
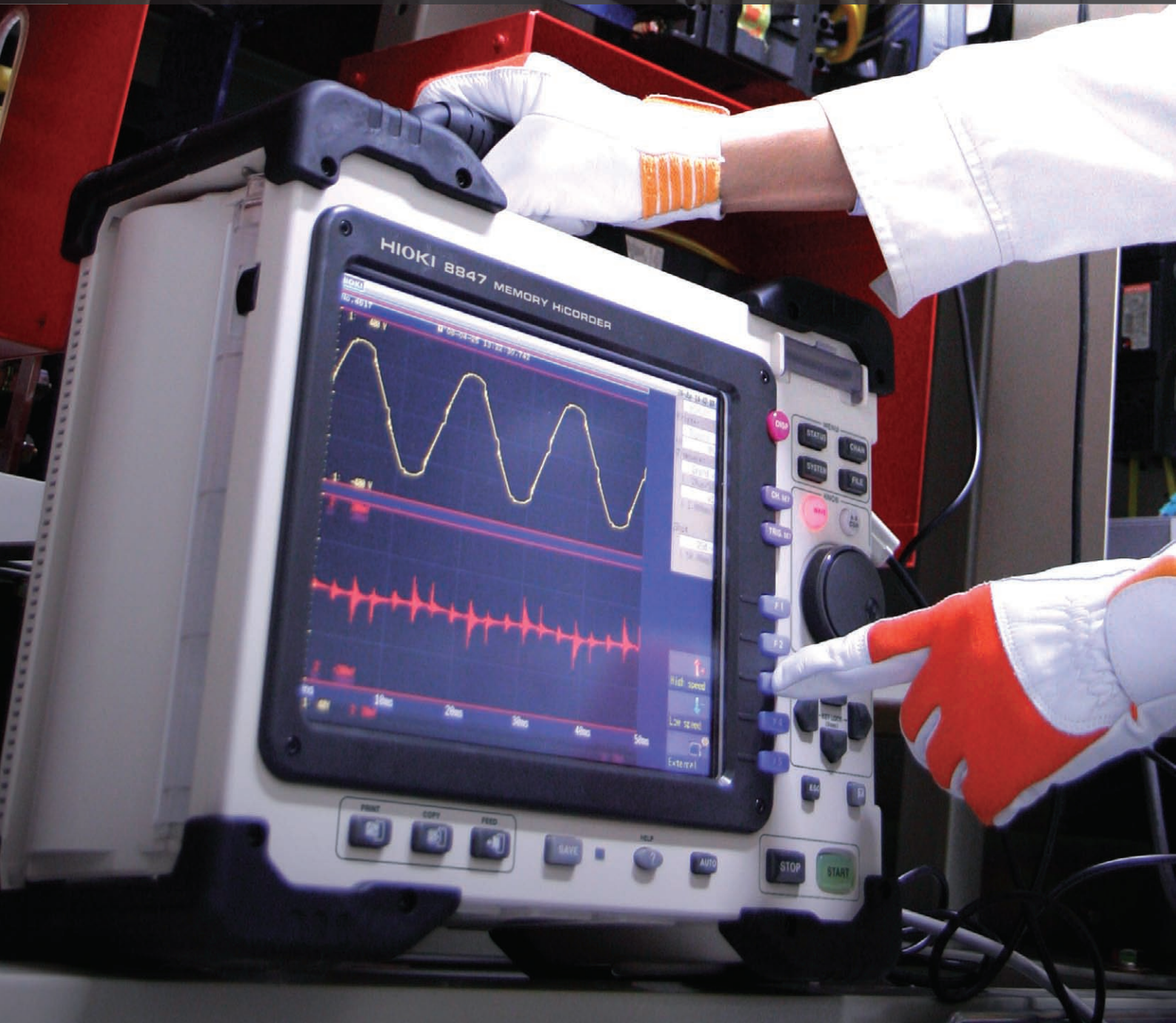
CE

www.hioki.com

ISO 9001 **ISO14001**
JMI-0216 JQA-E-90091

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

The Ideal Recorder for Field Use
Features Easy Portability and Sturdy Construction

Tough & Professional
8847

No Delay

■ **A problem occurs, requiring immediate attention on site**

Grab the sturdy handle and go. The tough construction can take a few knocks.

■ **Start measurement without reading through the manual**

The Help Wizard assists you to do exactly what you want.

■ **Print out results on the spot**

Load printer paper with a simple one-touch operation.

High printing speed gives you a hard copy in a snap.

High Speed

■ **High-speed sampling up to 20 MS/s**

Full isolation for all channels and simultaneous sampling

■ **Store data on media three times faster**

To 30 MB CF Card: Max. 40 seconds (8841: approx. 110 seconds)

Data save speed may vary, depending on conditions.

X-Y Operation

■ **Multi-channel X-Y recorder with electronic data log**

■ **Simultaneous recording over 16 analog + 16 logic channels**

■ **Simultaneous recording over 64 logic + 10 analog channels**

Plug-in modules provide the flexibility to match most channel and signal configuration requirements.

Computer Integration

■ **Easy storage of recorded data**

USB memory stick / CF card / internal hard disk

■ **HTTP/FTP server function and remote operation capability provide easy access to data**

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What Users Want

Start a measurement without delay

"Changing paper is a hassle, and printing speed should be faster!"

☞ **No Problem!** **One-touch design takes the hassle out of the process. 50mm/sec print speed**

No more need for cumbersome and time-consuming steps such as threading the paper between rubber rollers and the thermal print head. Simply drop the paper roll in place, pull the tip out slightly, and close the door. As easy as one, two, three.
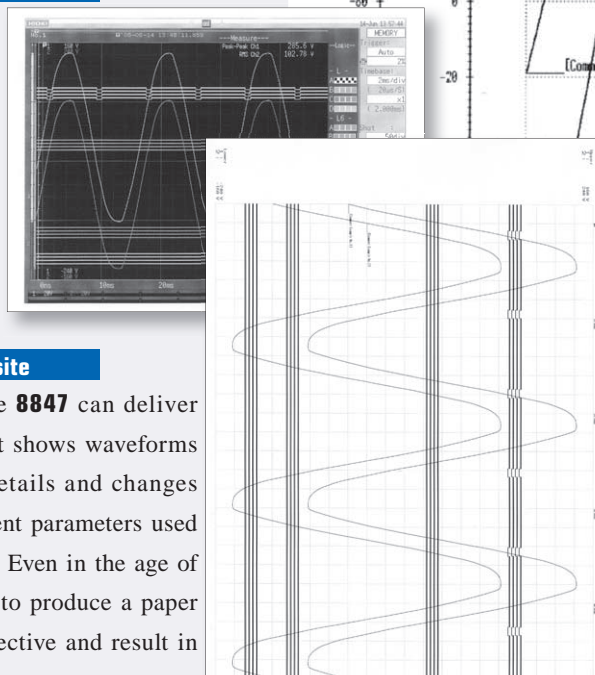
① **②** **③**

"The customer needs measurement results in hand right away!"

☞ **No Problem!** **50 mm/s printing speed produces results in a flash**

Printing is twice as fast compared to the performance of previous HIOKI products. No more waiting when printing out data on site to give to the customer.

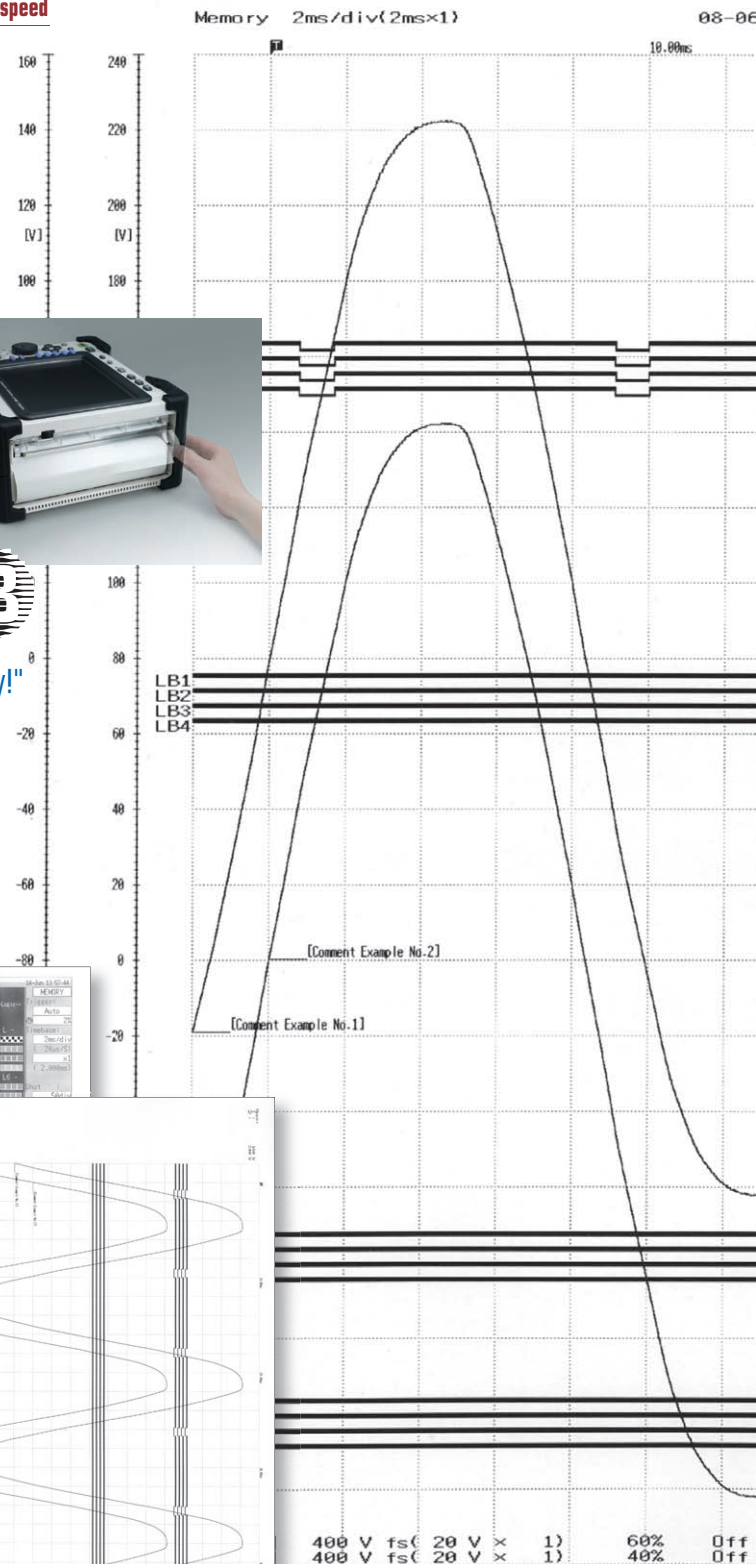### ■ Hard copy of the display screen, then and there

Observed waveforms, setup parameters, processing values, AB cursor readouts and more--a simple push of a button and the high-speed thermal printer gives you a hard copy of the entire screen contents. Saving as a BMP file on a CF card or USB memory is also possible.

■ Print a complete A4 format report on site

If the customer requires a report, the **8847** can deliver without delay. The A4 format printout shows waveforms with high resolution. Even minute details and changes can be detected easily, and measurement parameters used for obtaining the data are also printed. Even in the age of electronic communication, being able to produce a paper document on the spot can be very effective and result in enhanced credibility.

Actual size of printout example

Memory 2ms/div(2ms×1)   08-06

160   240
140   220
120   200
[V]   [V]
100   180

LB1
LB2
LB3
LB4

[Comment Example No.2]

[Comment Example No.1]

400 V fs(20 V ×   1)   60%   Off
400 V fs(20 V ×   1)   40%   Off

What Users Want

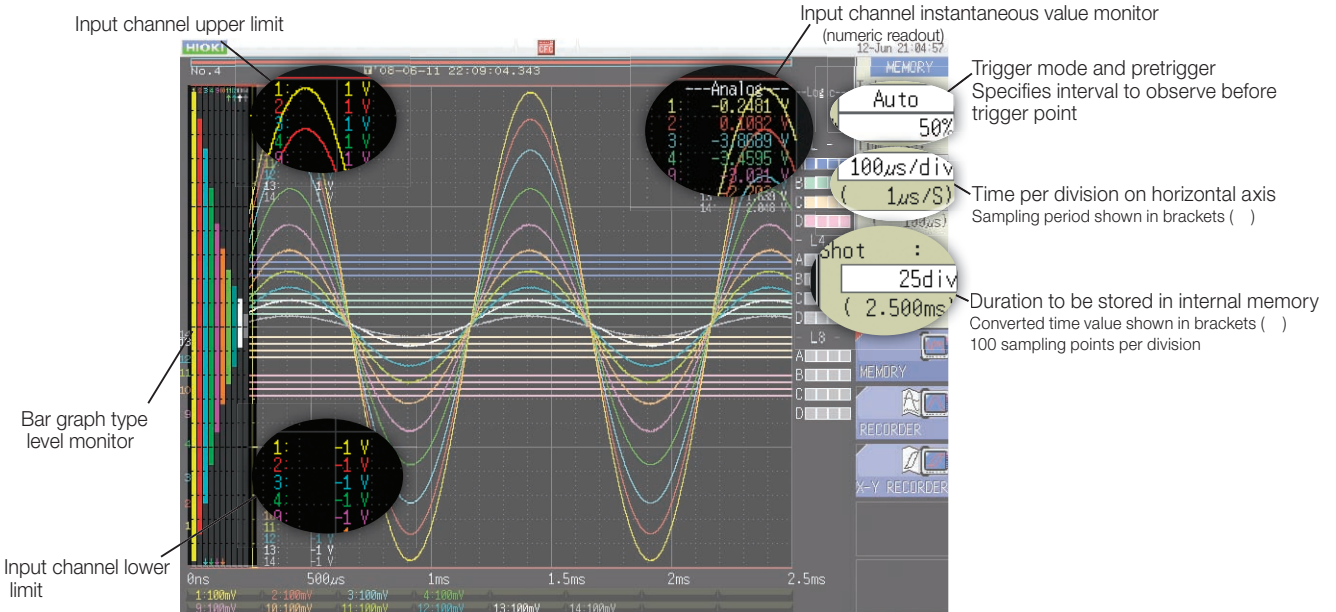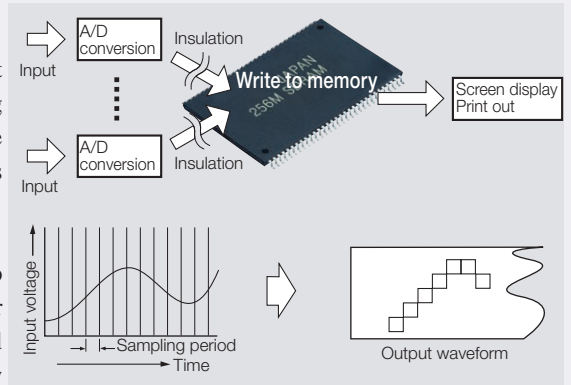# Monitor high-speed signals

"1 MS/s is too slow for observing fast pulse edges"

No Problem! **High-speed 20 MS/s sampling provides ample margin**

The operation principle is the same as for a digital oscilloscope: data are stored at high speed in the high-capacity internal memory. Even with all channels operating simultaneously, sampling rates up to 20 megasamples per second (50 ns cycle) are possible. This ensures that sudden event spikes and instantaneous waveform changes are captured reliably.
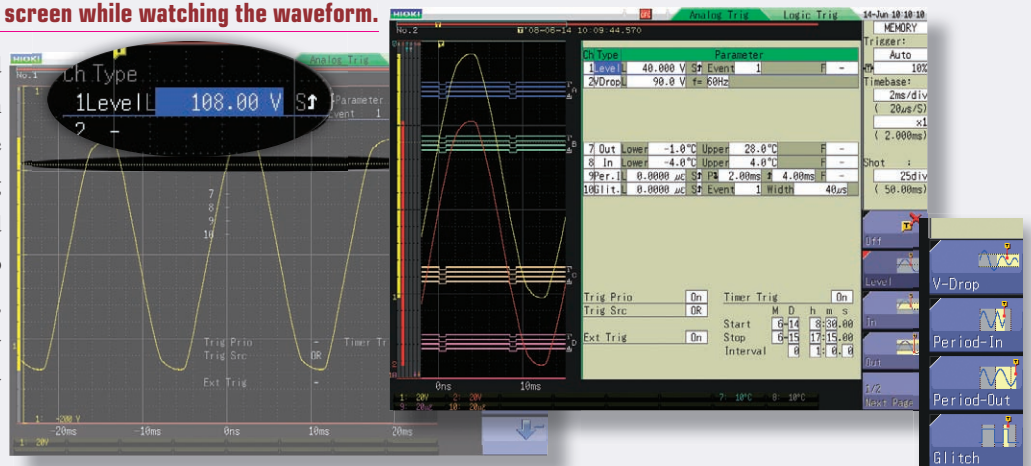
■ **Semiconductor memory storage**

Units using hard disks or other mechanical media for storage are vulnerable to vibrations and therefore are not ideal for automotive measurement and similar applications. By saving data in semiconductor based memory without any mechanical drive parts, the Memory HiCorder is much more suited to such applications. Simply back up the data later to CF card or USB memory, and you're done.

Input → A/D conversion → Insulation → Write to memory → Screen display Print out

Input → A/D conversion → Insulation

Input voltage ← → Time
Sampling period

Output waveform

Input channel upper limit
Input channel instantaneous value monitor (numeric readout)
Trigger mode and pretrigger
Specifies interval to observe before trigger point

Auto
50%

100µs/div
(1µs/S)

Time per division on horizontal axis
Sampling period shown in brackets ( )

Shot :
25div
(2.500ms)

Duration to be stored in internal memory
Converted time value shown in brackets ( )
100 sampling points per division

Bar graph type level monitor

Input channel lower limit

"Making settings is too complicated if I can't see the waveform!"

No Problem! **Make settings on screen while watching the waveform.**

Making input amplitude and trigger settings becomes much easier when the effect can be observed immediately. Setting values can be superimposed on the waveform display to maximize the waveform area, or you can separate the display areas to enhance the legibility of setting items.

Ch Type
1Level L 108.00 V S↑

Versatile trigger functions
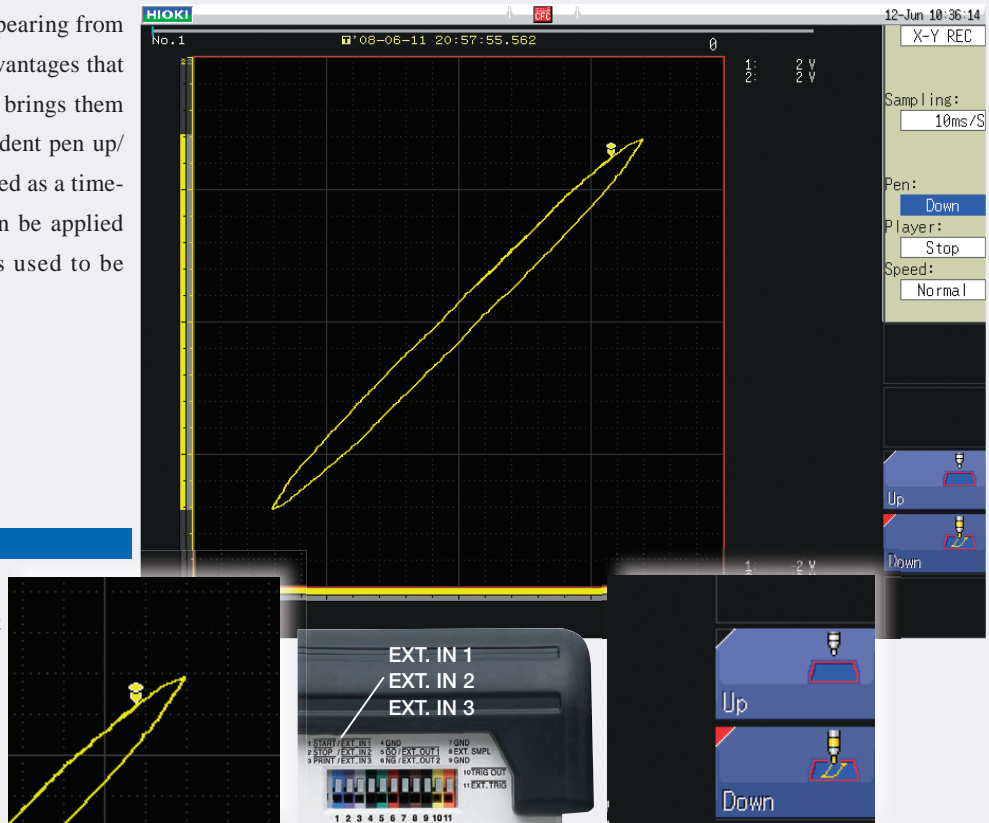
Having an X-Y recorder would be handy!

"An X-Y recorder uses paper, but electronic data would be better!"

☞ No Problem! X-Y recorder with electronic recording

Chart-type X-Y recorders are disappearing from the market, but they had certain advantages that are sometimes desirable. The **8847** brings them back with features such as independent pen up/down control. Because data are stored as a time-based series, electronic storage can be applied to tasks for which paper archives used to be necessary.
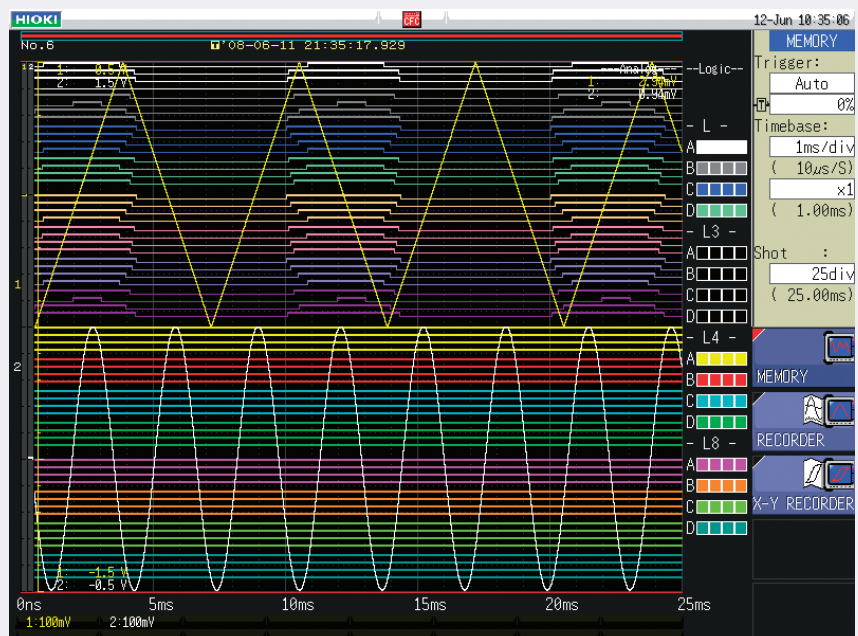
■ Pen up/down control

Individual pen up/down control is possible during X-Y recording, not only by using the Function buttons but also via external signals at the EXT. IN1, 2, 3 connectors.

EXT. IN 1
EXT. IN 2
EXT. IN 3

"There are scores of relays, and I need to measure the timing of them all!"

☞ No Problem! Max. 64 channels Logic input + 10 channels Analog input

The **8847** comes standard with 16 logic input channels. Three more logic input modules with up to 48 logic channels can be installed in place of analog input modules, resulting in simultaneous recording capacity for up to 64 channels in total. All channels can be displayed on a single screen, which is ideal for timing measurements. Furthermore, simultaneous recording of analog waveforms is possible in up to 10 channels.

What Users Want

Analyze data on a computer

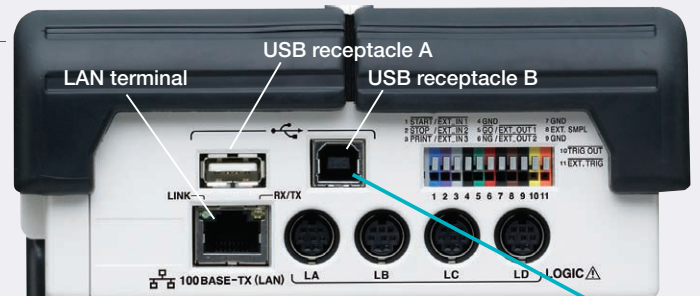## "I want to use a USB memory stick!"

No Problem! **Two types of USB 2.0 ports**

Measurement data can be saved manually on any generic USB memory device. *Automatic data saving as on CF card is not possible.*

The USB interface conforms to version 2.0 specifications. Mass storage devices can be used in the A type connector.

Due to compatibility reasons, some USB memory devices may not work.

The B type connector can be used to connect the **8847** to a computer for remote operation. If no USB memory stick is available, internal data of the **8847** can be sent to the computer via this USB connection for storage.

LAN terminal
USB receptacle A
USB receptacle B

"I want to use a hard disk!"

No Problem! **Optional internal HDD**

Measurement data can be saved automatically on the optional 80GB hard disk. The HDD is a factory option which will be installed internally.

A slot for CompactFlash cards is also provided.

Data can be saved automatically on cards available from HIOKI.

Automatic data saving occurs in close to real time and is possible while saving data in the internal memory (128MB) of the HiCorder. Automatic data saving on USB memory is not possible. Data must be saved manually on such media.
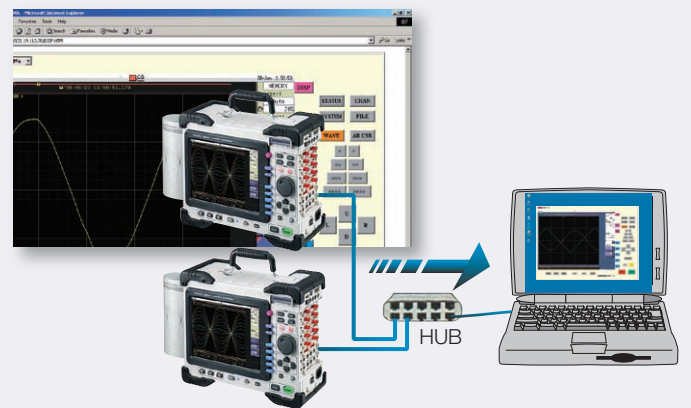
"I want to hook up to a LAN!"

No Problem! **LAN port and HTTP/FTP server function**

A 100BASE-TX LAN port is built in as standard equipment.

<HTTP server capability> Access the unit via a web browser running on a computer, for waveform observation and remote operation. Waveform data of the **8847** can also be downloaded and pasted into Excel.

<FTP server capability> Copy the memory contents of the **8847** (internal RAM, CF card, HDD) to a computer.

HUB

■ Waveform observation/CSV conversion software bundled as standard (Wv)

● Binary data collected with the HiCorder can be observed as waveforms on a computer.

● Data can be converted to CSV format for importing into Excel.

The software is supplied free of charge with the product, and the latest version can also be downloaded from the HIOKI web site.

Wv screen sample

EXCEL sheet sample

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Highlights
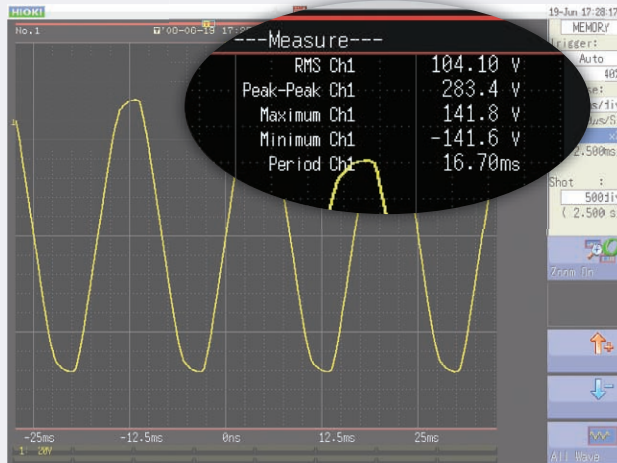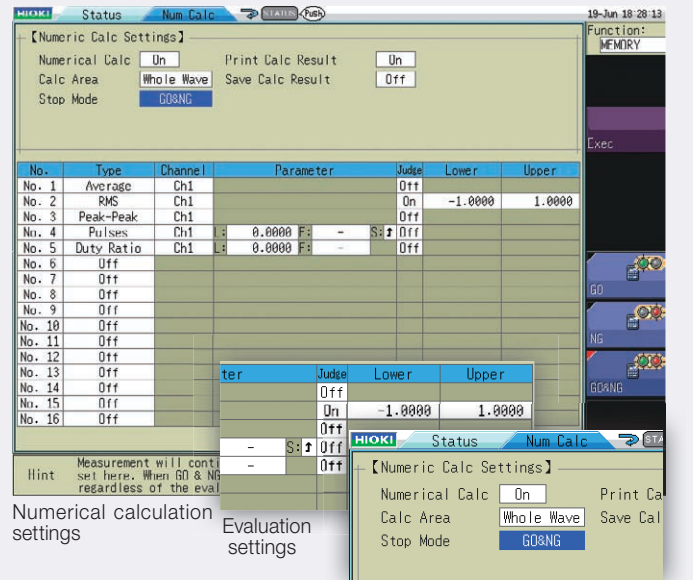
- Numerical calculation function -
- Partial waveform zooming -
- Comment input capability without a keyboard -

■ Calculate parameter values from measured waveform

● 20 different built-in calculation types including effective (rms) value, peak value, and maximum value

Numerical calculation results can be shown on waveform display

Numerical calculation settings

Evaluation settings

Evaluation settings

■ Partial waveform zooming

● Display time axis compressed waveform in upper part of screen
● Display time axis expanded waveform in lower part of screen
● Use Jog & Shuttle knobs to scroll to desired section

While observing the entire waveform, zoom in on portions of interest

■ Enter comments for each measurement signal

● Assign comments to channels and display them on screen
● Print channel comments when printing waveforms
● Make entries without a keyboard

Comments can be input for each channel

Highlights

- Simultaneous recording on recording media 👉 **Memory** function **-**
- Chart recording reliably captures noise events 👉 **Recorder** function **-**

■ Simultaneous recording on recording media (Memory function)

● Automatic data saving on CF card or HDD

● During high-speed sampling, data are written to internal RAM first and later saved on other media

● During low-speed sampling, data are written to internal RAM and sequentially saved on other media

● Highly suitable for long-term recording

* Available recording duration is determined by internal RAM capacity, not by external media.

■ Maximum recording times with Memory function (auto saving)

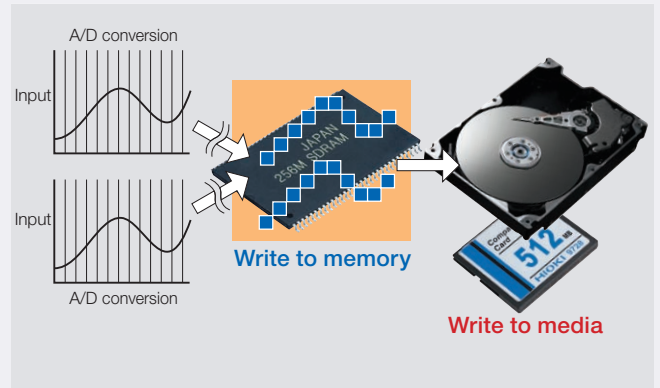• *At sampling speeds of 100 ms/division (1 ms sampling) and lower, real-time saving on media becomes possible.*
• *Setting recording length to an arbitrary value allows increasing the 200,000 division limit up to a maximum of 320,000 divisions in 1 division units.*

Maximum recording time increases depending on number of channels used		Analog 16 ch + internal Logic 16 ch	Analog 8 ch + internal Logic 16 ch	Analog 4 ch + internal Logic 16 ch	Analog 2 ch + internal Logic 16 ch	Logic 48 ch + internal Logic 16 ch
Time axis	Samp. period	20,000 div	50,000 div	100,000 div	200,000 div	100,000 div
5 μs/div to 50 ms/div	50 ns to 500 μs	- omitted -	- omitted -	- omitted -	- omitted -	- omitted -
100 ms/div	1 ms	33 min 20 s	1 h 23 min 20 s	2 h 46 min 40 s	5 h 33 min 20 s	2 h 46 min 40 s
200 ms/div	2 ms	1 h 06 min 40 s	2 h 46 min 40 s	5 h 33 min 20 s	11 h 06 min 40 s	5 h 33 min 20 s
500 ms/div	5 ms	2 h 46 min 40 s	6 h 56 min 40 s	13 h 53 min 20 s	1 d 03 h 46 min 40 s	13 h 53 min 20 s
1 s/div	10 ms	5 h 33 min 20 s	13 h 53 min 20 s	1 d 03 h 46 min 40 s	2 d 07 h 33 min 20 s	1 d 03 h 46 min 40 s
2 s/div	20 ms	11 h 06 min 40 s	1 d 03 h 46 min 40 s	2 d 07 h 33 min 20 s	4 d 15 h 06 min 40 s	2 d 07 h 33 min 20 s
5 s/div	50 ms	1 d 03 h 46 min 40 s	2 d 21 h 26 min 40 s	5 d 18 h 53 min 20 s	11 d 13 h 46 min 40 s	5 d 18 h 53 min 20 s
10 s/div	100 ms	2 d 07 h 33 min 20 s	5 d 18 h 53 min 20 s	11 d 13 h 46 min 40 s	23 d 03 h 33 min 20 s	11 d 13 h 46 min 40 s
30 s/div	300 ms	6 d 22 h 40 min 00 s	17 d 08 h 40 min 00 s	34 d 17 h 20 min 00 s	69 d 10 h 40 min 00 s	34 d 17 h 20 min 00 s
50 s/div	500 ms	11 d 13 h 46 min 40 s	28 d 22 h 26 min 40 s	57 d 20 h 53 min 20 s	115 d 17 h 46 min 40 s	57 d 20 h 53 min 20 s
100 s/div	1.0 s	23 d 03 h 33 min 20 s	57 d 20 h 53 min 20 s	115 d 17 h 46 min 40 s	231 d 11 h 33 min 20 s	115 d 17 h 46 min 40 s
1 min/div	600 ms	13 d 21 h 20 min 00 s	34 d 17 h 20 min 00 s	69 d 10 h 40 min 00 s	138 d 21 h 20 min 00 s	69 d 10 h 40 min 00 s
2 min/div	1.2 s	27 d 18 h 40 min 00 s	69 d 10 h 40 min 00 s	138 d 21 h 20 min 00 s	277 d 18 h 40 min 00 s	138 d 21 h 20 min 00 s
5 min/div	3.0 s	69 d 10 h 40 min 00 s	173 d 14 h 40 min 00 s	347 d 05 h 20 min 00 s	694 d 10 h 40 min 00 s	347 d 05 h 20 min 00 s

A/D conversion
Input

Write to memory

Write to media

■ Chart recording reliably captures noise events (Recorder function)

● High-speed sampling ensures that noise events are captured also with slow recording

● Data compression achieved by recording maximum/minimum value pairs

● Up to 416 days of recording time with maximum memory capacity (1 hour/division)
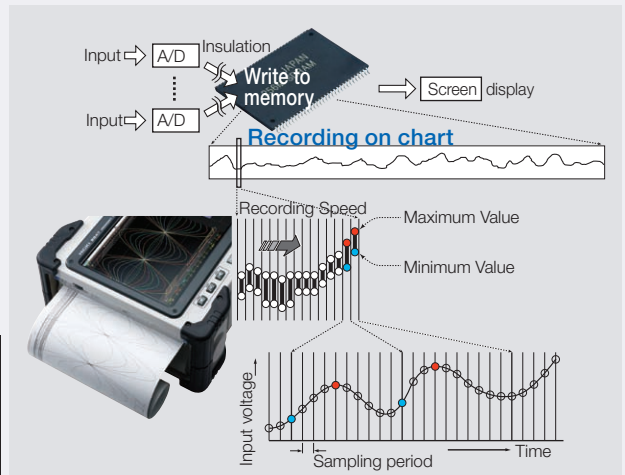
● Chart output enables permanent recording

* When opening data created with the Recorder function on a computer, the maximum and minimum data pairs are lined up in a time series.
* Length of printer paper roll is 30 meters. Paper can be changed during operation without stopping the recording process.

Input ⇒ A/D
Insulation
Write to memory
⇒ Screen display
Recording on chart
Recording Speed
Maximum Value
Minimum Value
Input voltage
Sampling period
Time

■ Maximum recording times with Recorder function

• *With settings between 100 and 200 ms per division on the time axis, continuous recording is not possible if printer is ON.*

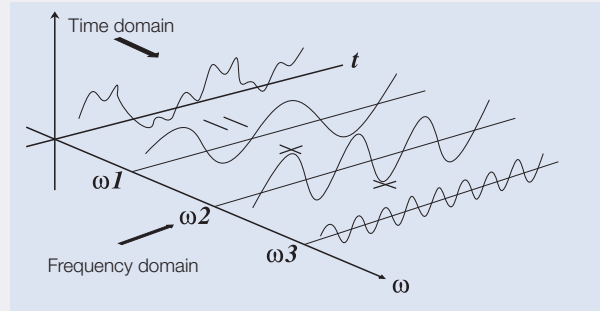| REC time axis	Sampling period	To internal memory 20,000 divisions	Continuous (approx. recording time with one 30m paper roll) Note: Calculated as 30 m = 2,970 divisions Changing paper enables permanent continuation of recording
100 ms/div		33 min 20 s	Display only
200 ms/div		1 h 6 min 40 s	Display only
500 ms/div		2 h 46 min 40 s	24 min 45 s
1 s/div		5 h 33 min 20 s	49 min 30 s
2 s/div		11 h 6 min 40 s	1 h 39 min 00 s
5 s/div	1 ms, 10 ms, 100 ms,	1 d 3 h 46 min 40 s	4 h 7 min 30 s
10 s/div	1 ms, 10 ms, 100 ms	2 d 7 h 33 min 20 s	8 h 15 min 00 s
30 s/div		6 d 22 h 40 min 00 s	24 h 45 min 00 s
50 s/div	Note: Limited by combination	11 d 13 h 46 min 40 s	1 d 17 h 15 min 00 s
100 s/div	of selections under 1/100 on	23 d 3 h 33 min 20 s	3 d 10 h 30 min 00 s
1 min/div	time axis and time axis setting	13 d 21 h 20 min 00 s	2 d 1 h 30 min 00 s
2 min/div	for memory recording	27 d 18 h 40 min 00 s	4 d 3 h 00 min 00 s
5 min/div		69 d 10 h 40 min 00 s	10 d 7 h 30 min 00 s
10 min/div		138 d 21 h 20 min 00 s	20 d 15 h 00 min 00 s
30 min/div		416 d 16 h 00 min 00 s	61 d 21 h 00 min 00 s
1 hr/div		833 d 8 h 00 min 00 s	123 d 18 h 00 min 00 s

Highlights
- Frequency area data analysis (FFT function) -
- Electrical distortion analysis/mechanical vibration analysis -

function available from version 2.00 onward
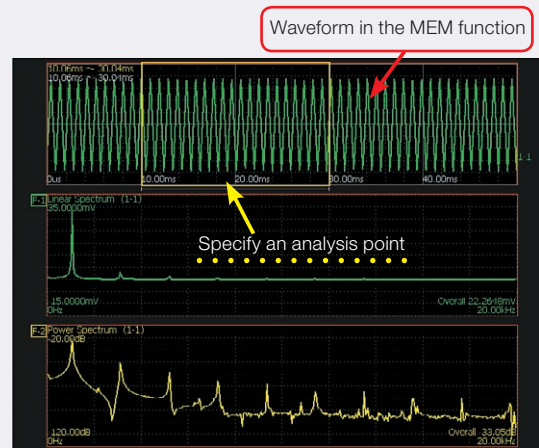
FFT analysis function

This function comprises single-signal FFT for tasks such as frequency component analysis, dual-signal FFT for transfer function analysis, and octave analysis for acoustic measurements. The signal source for analysis are specified sections from waveform data captured using the Memory function. *The selectable range is 1,000 to 10,000 data points.*

Compared to the predecessor model **8841**, processing speed is about 1.6 times faster (internal clock ratio) when performing the most time-intensive analysis calculation under the same conditions.
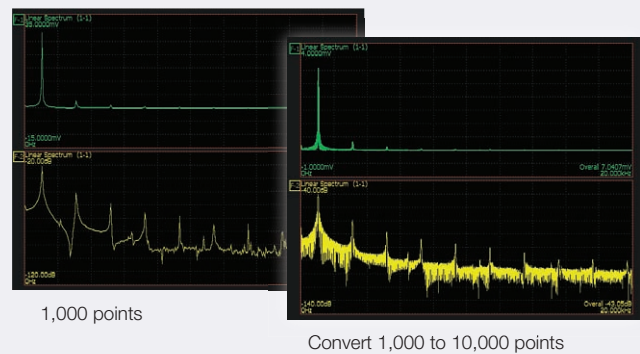
FFT analysis from memory waveform data

To use measurement data captured with the Memory function, the Jog & Shuttle knobs serve to specify analysis points, and processing results can now be displayed at the same time. Compared to earlier models such as the **8855** and **8841**, operation has been significantly streamlined by eliminating the need to go back and forth between the Memory function and the FFT function. It is also possible to view raw data measured with the Memory function and processing results obtained from stored waveforms side by side. This makes it possible to check the effects of window functions while viewing spectrum waveforms, resulting in a dramatic improvement in operation convenience during use of the analysis functions.

Waveform in the MEM function

Specify an analysis point

■ Recalculate by changing the number of calculation points after measurement

Even for measurement data currently based on a lower number of calculation points, it is possible to increase the number later and perform analysis again. For example, data measured at a setting of 1,000 points can be converted and reanalyzed with a 10,000 point setting. This will result in a tenfold increase in frequency analysis resolution. Of course, the opposite is also possible, going for example from 10,000 points to 1,000 points.

* Recalculation with a different number of calculation points is not possible if frequency averaging is set to ON.

1,000 points

Convert 1,000 to 10,000 points

■ Decibel-based scaling

Decibel-based scaling as requested by numerous customers is now possible. There is no more need to make logarithmic conversions on the side with an electronic calculator. The **8847** can accept input of overall values (power spectrum sum) in dB, with the capability for easy scaling. Signals from noise level meters and similar equipment can therefore be read directly.

Before scaling

After scaling

Measure a variety of signals in one go

Find problem solutions straight away

Power facilities

Generating stations

Transformer stations

Steel and chemical plants

Short-circuit/interruption testing

Facilities diagnosis

Troubleshooting

Application example **Load interruption test at generator**

- Use pretrigger function to record waveform before and after interruption
- Test breaker characteristics
- Use multiple isolated input channels simultaneously
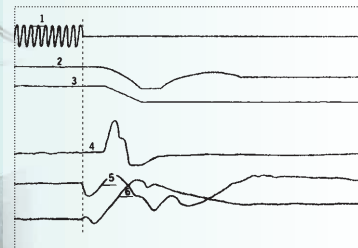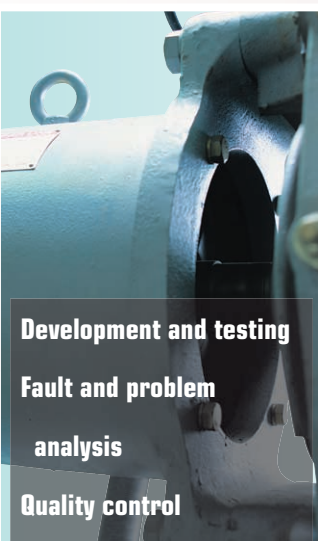- Instantly load paper and print out full-width waveform

Application example **Commercial power supply line measurement**

- Use drop trigger to monitor voltage drops
- Evaluate waveform when switching to UPS or other source
- Use instantaneous waveform recording for 50/60 Hz
- Isolated inputs eliminate short-circuiting risks

Motors

Railways/Transport

Automotive

Development and testing

Fault and problem analysis

Quality control

Application example **Railway carriage problem analysis**

- Use pretrigger function to record instantaneous waveform before and after problem
- Check notch curves and cam progression waveform
- Use logic probe to record cam contact point signal waveform
- Record MG startup current waveform using clamp sensor

Application example **Motor startup current measurement**

- Observe correlation between main motor current waveform and relay signal
- Record up to 3 m 20 s at 1/1000 s (1 ms per division)
- Make simultaneous current and voltage measurements using multiple channels and isolated inputs
- Use trigger wait function to pinpoint and record problem waveforms only

Elevators

Machine tools and hydraulic machinery

Production facilities

Maintenance

Troubleshooting

Performance and characteristics testing

Application example **Measurement of hydraulic machinery operation waveform**

- Perform braking mechanism measurement
- Perform X-Y measurement of valve flow and pressure
- Perform X-Y measurement of load and displacement
- Use pen up/down and playback functions

Application example **Check for bearing wear and deterioration**

- Perform FFT analysis over a frequency range from DC to 8 MHz
- Perform long-term signal recording and analyze only required parts
- Use FFT analysis to diagnose cracks and similar problems

Note: FFT analysis function available from version 2.00 onward

■ Main unit Specifications

Basic specifications (product guaranteed for one year)

Measurement functions	MEMORY (high-speed recording) RECORDER (real-time recording) X-Y RECORDER (X-Y real-time recording) FFT (frequency analysis) Note: function available from version 2.00 onward
Number of input modules	[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 modules, channels are insulated vs. each other and vs. unit ground. For logic modules and integrated standard logic channels, all channels use the unit ground.
Maximum sampling rate	20 MS/second (50 ns period, all channels simultaneously) External sampling (10 MS/second, 100 ns period)
Direct access internal memory	64 Mega-words (Memory expansion: none) 32 Mega-words/ch (using 2 Analog channels), 16 Mega-words/ch (using 4 Analog channels), 8 Mega-words/ch (using 8 Analog channels), 4 Mega-words/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 1GB, FAT, or FAT-32 format Hard disk drive (option, HD UNIT 9664 *2) × 1: 80GB
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: RJ-45 connector, Ethernet 100BASE-TX Functions: DHCP, DNS supported, FTP server, HTTP server USB: USB2.0 compliant, series A receptacle 1 port, series B receptacle 1 port (file transfer to PC, 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 requirements	100 to 240 V AC (50/60 Hz) 10 to 28 V DC (use the DC POWER UNIT 9784 : option, 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 widh: 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)
Displayable languages	English, Japanese, Korean, Chinese Note: Chinese (available end of 2009)
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	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/division (100 points/div) 26 ranges, External sampling (100 points/div, or free setting), Time axis zoom: ×2 to ×10 in 3 stages, compression: 1/2 to 1/20,000 in 13 stages
Sampling rate	1/100 of time axis range (minimum 50 ns period)
Recording length	16 ch mode : built-in presets of 25 to 20,000 divisions 8 ch mode : built-in presets of 25 to 50,000 divisions 4 ch mode : built-in presets of 25 to 100,000 divisions 2 ch mode : built-in presets of 25 to 200,000 divisions or free setting in 1-division steps (max. 320,000 div)
Pre-trigger	Record data from before the trigger point, 0 to +100% or -95% of recording length 15 stages
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 • Calculation result evaluation output: GO/NG (with open-collector 5 V output) • Automatic storing of calculation results
Other functions	• Averaging (cumulative average, exponential average, with unit firmware version 2.00 and later) • No logging • X-Y waveform synthesis (1-screen, 4-screens) • Overlay (always overlay when started/overlay only required waveforms) • Automatic/manual/AB cursor range printing/report printing
Additional functions Note: By installing optional Function Expansion Software 9785 in unit	• Waveform calculation: For up to 8 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 splitting (max. 1024 blocks): sequential storage, multi-block storage

RECORDER (real-time recording)

Time axis	10 ms to 1 hour per division, 19 ranges, time axis resolution 100 points/division * Out of data acquired at selected sampling rate, only maximum and minimum value data determined using 100 points/division 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 per division * Delayed print is performed when recording length is not set to " Continuous" and time axis setting is 10 ms - 200 ms per division * When recording length is set to " Continuous" and time axis setting is 10 ms - 200 ms per division, manual printing can be performed after measurement stop
Recording length	Built-in presets of 25 to 20,000 divisions, or "Continuous" or free setting in 1-division steps (max. 20,000 div)
Additional recording	Supported (recording is resumed without overwriting previous data) * With unit firmware version 2.00 and later
Waveform memory	Store data for most recent 20,000 divisions in memory *Backward scrolling and re-printing available
Auto save	Data are automatically saved on CF card or internal HDD after measurement stop
Other functions	• No logging • Event recording (screen during measurement/marker input for print recording) * With unit firmware version 2.00 and later • Manual/AB cursor range printing/report printing

X-Y RECORDER (X-Y real-time recording)

Sampling rate	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/division (screen), 80 dots (horizontal) × 80 dots (vertical)/division (printer)
Waveform memory	Sampling data for last 2,000,000 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) : Auto, Single, Repeat 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 underrun. • Event setting: Event count is performed for each source, and triggering occurs when a preset count is exceeded. • Logic: 1, 0, ×, pattern setting,
Level setting resolution	0.1% of full scale (full scale = 20 divisions)
Trigger filter	OFF, setting range 0.1 to 10.0 divisions (MEMORY: high-speed recording), ON (10 ms fixed)/OFF (RECORDER: real-time recording)
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 (memory), level display during trigger standby, start and stop trigger for recorder (real-time recording)

FFT function (function available from version 2.00 onward)

Analysis mode	Storage waveform, linear spectrum, RMS spectrum, Power spectrum, Cross power spectrum, Auto-correlation function, Histogram, Transfer function, Cross-correlation function, Impulse response, Coherence function, Octave analysis
Analysis channels	1 or 2 selected channels out of all analog channels
Frequency range	133 mHz to 8 MHz, External, (resolution 1/400, 1/800, 1/2000, 1/4000)
No.of sampling points	1000, 2000, 5000, 10000 points
Window functions	Rectangular, Hanning, Exponential
Averaging function	Time axis / frequency axis simple averaging, Exponential averaging, Peak hold (frequency axis), Averaging times: 2 times to 4,096 times
Other functions	• Display screen: Single, Dual, Nyquist • Auto, Manual, Report printing

■ PC Software Specifications *Note: With use of the 8847 , Wv ver 1.26 or later*

Wave Viewer (Wv) Software (Application disk CD-R, bundled accessory)

Functions	• Simple display of waveform file • Text conversion: convert binary data file to text format, with selectable space or tab separators in addition to CSV, and specifiable section, thinning available • Display format settings: scroll functions, enlarge/reduce display, display channel settings • Others: voltage value trace function, jump to cursor/trigger position function
Compatible PC operating systems	Windows 95/98/Me, Windows NT 4.0 (SP3 or later), 2000, XP

■ Maximum Recording Time for the Memory Function

- Operation cannot be guaranteed when the time axis is longer than one year.
- Setting recording length to an arbitrary value allows increasing the 200,000 division limit up to a maximum of 320,000 divisions in 1 division units.

Maximum recording time increases depending on number of channels used		Analog 16 ch + internal Logic 16 ch	Analog 8 ch + internal Logic 16 ch	Analog 4 ch + internal Logic 16 ch	Analog 2 ch + internal Logic 16 ch	Logic 48 ch + internal Logic 16 ch
Time axis	Samp. period	20,000 div	50,000 div	100,000 div	200,000 div	100,000 div
5μs/div	50ns	100ms	250ms	500ms	1s	500ms
10μs/div	100ns	200ms	500ms	1s	2s	1s
20μs/div	200ns	400ms	1s	2s	4s	2s
50μs/div	500ns	1s	2.5s	5s	10s	5s
100μs/div	1μs	2s	5s	10s	20s	10s
200μs/div	2μs	4s	10s	20s	40s	20s
500μs/div	5μs	10s	25s	50s	1min 40s	50s
1ms/div	10μs	20s	50s	1min 40s	3min 20s	1min 40s
2ms/div	20μs	40s	1min 40s	3min 20s	6min 40s	3min 20s
5ms/div	50μs	1min 40s	4min 10s	8min 20s	16min 40s	8min 20s
10ms/div	100μs	3min 20s	8min 20s	16min 40s	33min 20s	16min 40s
20ms/div	200μs	6min 40s	16min 40s	33min 20s	1h 06min 40s	33min 20s
50ms/div	500μs	16min 40s	41min 40s	1h 23min 20s	2h 46min 40s	1h 23min 20s
100 ms/div	1 ms	33 min 20 s	1 h 23 min 20 s	2 h 46 min 40 s	5 h 33 min 20 s	2 h 46 min 40 s
200 ms/div	2 ms	1 h 06 min 40 s	2 h 46 min 40 s	5 h 33 min 20 s	11 h 06 min 40 s	5 h 33 min 20 s
500 ms/div	5 ms	2 h 46 min 40 s	6 h 56 min 40 s	13 h 53 min 20 s	1 d 03 h 46 min 40 s	13 h 53 min 20 s
1 s/div	10 ms	5 h 33 min 20 s	13 h 53 min 20 s	1 d 03 h 46 min 40 s	2 d 07 h 33 min 20 s	1 d 03 h 46 min 40 s
2 s/div	20 ms	11 h 06 min 40 s	1 d 03 h 46 min 40 s	2 d 07 h 33 min 20 s	4 d 15 h 06 min 40 s	2 d 07 h 33 min 20 s
5 s/div	50 ms	1 d 03 h 46 min 40 s	2 d 21 h 26 min 40 s	5 d 18 h 53 min 20 s	11 d 13 h 46 min 40 s	5 d 18 h 53 min 20 s
10 s/div	100 ms	2 d 07 h 33 min 20 s	5 d 18 h 53 min 20 s	11 d 13 h 46 min 40 s	23 d 03 h 33 min 20 s	11 d 13 h 46 min 40 s
30 s/div	300 ms	6 d 22 h 40 min 00 s	17 d 08 h 40 min 00 s	34 d 17 h 20 min 00 s	69 d 10 h 40 min 00 s	34 d 17 h 20 min 00 s
50 s/div	500 ms	11 d 13 h 46 min 40 s	28 d 22 h 26 min 40 s	57 d 20 h 53 min 20 s	115 d 17 h 46 min 40 s	57 d 20 h 53 min 20 s
100 s/div	1.0 s	23 d 03 h 33 min 20 s	57 d 20 h 53 min 20 s	115 d 17 h 46 min 40 s	231 d 11 h 33 min 20 s	115 d 17 h 46 min 40 s
1 min/div	600 ms	13 d 21 h 20 min 00 s	34 d 17 h 20 min 00 s	69 d 10 h 40 min 00 s	138 d 21 h 20 min 00 s	69 d 10 h 40 min 00 s
2 min/div	1.2 s	27 d 18 h 40 min 00 s	69 d 10 h 40 min 00 s	138 d 21 h 20 min 00 s	277 d 18 h 40 min 00 s	138 d 21 h 20 min 00 s
5 min/div	3.0 s	69 d 10 h 40 min 00 s	173 d 14 h 40 min 00 s	347 d 05 h 20 min 00 s	694 d 10 h 40 min 00 s	347 d 05 h 20 min 00 s

■ Measurement Indices (optional input module types)

- Each module has two input channels.
- Besides logic modules (16 channels), Model 8847 comes standard with 16 logic inputs integrated in the device.

Measurement target	With use input unit	Measurement range	Resolution
Voltage	ANALOG UNIT 8966	100 mV f.s. to 400 V f.s.	50 μV
	HIGH RESOLUTION UNIT 8968	100 mV f.s. to 400 V f.s.	3.125 μV
	DC/RMS UNIT 8972	100 mV f.s. to 400 V f.s.	50 μV
Current * Using separate power supply	Use with the Clamp 9272-10 (20A), 9277, 3273-50, 3276	20 A f.s. Note: 2 V f.s. voltage measurement	10 mA
Current * Using separate power supply	Use with the Clamp 9272-10 (200A), 9278, 3274	200 A f.s. Note: 2 V f.s. voltage measurement	0.1 A
Current * Using separate power supply	Use with the Clamp 9279	500 A f.s. Note: 2 V f.s. voltage measurement	0.25 A
Current * Using separate power supply	Use with the Clamp 3275	500 A f.s. Note: 2 V f.s. voltage measurement	0.25 A
RMS AC voltage	DC/RMS UNIT 8972	100 mV f.s. to 400 V f.s.	50 μV
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, rpm	FREQ UNIT 8970	20 Hz f.s. to 100 kHz f.s. 2 (kr/min) f.s. to 2000 (kr/min) f.s.	0.1 Hz 10 (r/min)
Commercial power supply frequency	FREQ UNIT 8970	40 Hz f.s. to 60 Hz f.s. 50 Hz f.s. to 70 Hz f.s.	0.1 Hz
Pulse count	FREQ UNIT 8970	40 k counts f.s. to 20 M counts f.s.	20 counts
Pulse duty ratio	FREQ UNIT 8970	100 % f.s.	0.5 %
Pulse width	FREQ UNIT 8970	0.01 s f.s. to 2 s f.s.	50 μs
Vibration/stress	STRAIN UNIT 8969	400 με f.s. to 20000 με f.s.	0.016 με
Relay contacts, voltage on/off	LOGIC UNIT 8973	—	—

■ Options specifications (sold separately, for the 8847 only)

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/product 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/product 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/product 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
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 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 × 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/product 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

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/product 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)

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
(Product guaranteed for 1 year)

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**

■ 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 and 9327 is different from the 9320.

LOGIC PROBE 9320-01/9327
(Accuracy at 23 ±5 °C/73 °F, 35 to 80 % rh ; accuracy/product guaranteed for 1 year)

Function	Detection of voltage signal or relay contact signal for High/Low state recording
Input	4 channels (common ground between unit and channels), Digital/contact input switchable (contact input can detect open-collector signals), Input impedance: 1 MΩ (with digital input, 0 to +5 V), 500 kΩ or more (with digital input, +5 to +50 V), pull-up resistance: 2 kΩ (contact input: internally pulled up to +5 V)
Digital input threshold	1.4 V/2.5 V/4.0 V
Contact input detection resistance	1.5 kΩ or higher (open) and 500 Ω or lower (short), 3.5 kΩ or higher (open) and 1.5 kΩ or lower (short), 25 kΩ or higher (open) and 8 kΩ or lower (short)
Response speed	9320-01: 500 ns or lower, 9327: detectable pulse width 100 ns or higher
Max. allowable input	0 to +50 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 1 m (3.28 ft), approx. 320 g (11.3 oz)
Note: The unit-side plug of the 9321-01 is different from the 9321.

LOGIC PROBE 9321-01
(Accuracy at 23 ±5 °C/73 °F ±9 °F, 35 to 80 % rh ; accuracy/product guaranteed for 1 year)

Function	Detection of AC or DC relay drive signal for High/Low state recording Can also be used for power line interruption detection
Input	4 channels (isolated between unit and channels), HIGH/LOW range switching Input impedance: 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 1ms max., falling edge 3ms 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: 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 °F ±9 °F, 35 to 80 % rh after 30 minutes of warm-up time, accuracy/product guaranteed for 1 year)

Function	For high-voltage floating measurement, power line surge noise detection, RMS rectified output measurement
DC mode	For waveform monitor output, Frequency characteristics: DC to 10 MHz (±3 dB), Amplitude accuracy: ±1 % of full scale (at max. 1000 V DC), ±3% of full scale (at max. 2000 V DC) (full scale: 2000 V DC)
AC mode	For detection of power line surge noise, frequency characteristics: 1 kHz to 10 MHz ±3 dB
RMS mode	DC/AC voltage RMS output detection, Frequency characteristics: DC, 40 Hz to 100 kHz, Response speed: 200 ms or less (400 V AC), accuracy: ±1 % of full scale (DC, 40 Hz to 1 kHz), ±4 % of full scale (1 kHz to 100 kHz) (full scale: 1000 V AC)
Input	Input type: balanced differential input, Input impedance/capacitance: H-L 9 MΩ/10 pF, H/L-unit 4.5 MΩ/20 pF, Max. rated voltage to earth: when using grabber clip 1500V AC/DC (CAT II), 600 V AC/DC (CAT III), when using alligator clip: 1000 V AC/DC (CAT II), 600 V AC/DC (CAT III)
Max. allowable input	2000 V DC, 1000 V AC (CAT II), 600 V AC/DC (CAT III)
Output	Voltage divider for 1/1000 of input, BNC connectors (output switchable for 3 modes DC, AC, RMS)
Power source	(1) Connect the AC ADAPTER 9418-15, (2) Connect to HiCORDER logic terminal via the POWER CORD 9324 and CONVERSION CABLE 9323

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
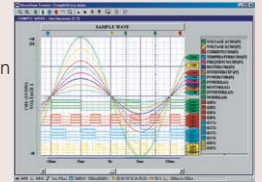

DC power supply module integrated on rear panel
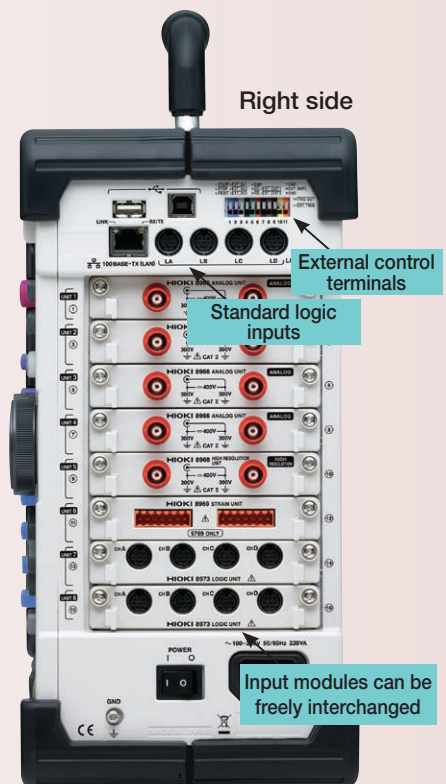
Data analysis on the computer
■ Features
Waveform display, data calculation, printing function

WAVE PROCESSOR 9335

Distribution media	One CD-R
Operating environment	Computer equipped with Pentium (133 MHz) or better CPU and at least 32 MB of memory, and running under Windows 95/98/Me, Windows NT 4.0/2000/XP, or Windows Vista 32-bit type (recommended system: Pentium (200 MHz) or better with at least 64 MB of memory)
Display functions	Waveform display/X-Y display/digital value display/cursor function/ scroll function/maximum number of channels (32 channels analog, 32 channels logic)/gauge display (time, voltage axes)/graphical display
File loading	Readable data formats (.MEM, .REC, .RMS, .POW) Maximum loadable file size: Maximum file size that can be saved by a given device (file size may be limited depending on the computer configuration)
Data conversion	Conversion to CSV format, tab delimited, space delimited/data culling (simple)/convert for specified channel/batch conversion of multiple files
Print functions	Print formatting (1 up, 2-to-16 up, 2-to-16 rows, X-Y 1-to-4 up) /preview/ hard copy functions usable on any printer supported by operating system
Other	Parameter calculation/search/clipboard copy/launching of other applications

Right side

External control terminals

Standard logic inputs

Input modules can be freely interchanged

Input modules
Input cables are not supplied. Please purchase the appropriate cable for the intended application.

Install by inserting into the main unit. Can be replaced by user.

Recommended ANALOG UNIT 8966
TEMP UNIT 8967
HIGH RESOLUTION UNIT 8968
STRAIN UNIT 8969
...CONVERSION CABLE 9769, Two cables included
FREQ UNIT 8970 ....(available middle 2009)
CURRENT UNIT 8971 ....(available middle 2009)
DC/RMS UNIT 8972
LOGIC UNIT 8973

Voltage measurement for use with general input modules

Recommended

CONNECTION CORD 9790
(Thin Type) CAT II 300 V, ultra-flexible 2.8 mm (0.11 in) diameter test lead cable, 1.5 m (4.92 ft) length
Note: Attachment clips sold separately.

ALLIGATOR CLIP 9790-01
Red/black set attaches to the ends of test leads (9790)

GRABBER CLIP 9790-02
Red/black set attaches to the ends of test leads (9790)

CONTACT PIN 9790-03
Red/black set attaches to the ends of test leads (9790)

Tip Expanders 9790-01
Tip Expanders 9790-03
Tip Expanders 9790-02

Tip Expanders
Attachment clips are sold separately from CONNECTION CORD 9790. Purchase the appropriate attachment clips for your application separately

CONNECTION CORD 9198
For low voltage (up to 300 V), 1.7 m (5.58 ft) length

CONNECTION CORD 9197
For high voltage (up to 500 V), 1.8 m (5.91 ft) length

10:1 PROBE 9665
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
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

High-Voltage measurement for use with power supply

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

Not CE marked
PT 9303
Insulation transformer, 400V or 200V AC input, 10V AC output, for AC power line measurement. Required along with the Conversion Adapter 9199.

MEMORY HiCORDER 8847
∗ The MEMORY HiCORDER 8847 cannot operate alone. You must install one or more optional input modules in the unit.

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.

PC Software

WAVE PROCESSOR 9335
Data conversion, print functions, waveform display, compatible with Windows 95/98/Me, Windows NT 4.0/2000/XP, and Windows Vista 32-bit type.

Logic signal measurement

Recommended LOGIC PROBE 9327
4-channel type, for voltage/contact signal ON/OFF detection (response time 0.1 μsec or higher, miniature terminal type)

Recommended LOGIC PROBE 9321-01
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 time 0.5 μsec, miniature terminal type)

CONVERSION CABLE 9323
Used for connecting the 9320/9321 to the 8847 MEMORY HiCORDERs, because the terminal shapes are different.
* This cable is not required for the small-terminal types 9327, 9320-01, and 9321-01.

Current measurement * To connect the clamp-on sensor via the conversion cable, Band width DC to 100 kHz class

CURRENT UNIT 8971

AC/DC CURRENT SENSOR 9709
Pass through & high precision type, Observe waveforms from DC to distorted AC. DC to 100kHz response, input 500A / output 2V AC

CONNECTION CORD 9217
Cord has insulated BNC connectors at both ends, and connects to the 9555-10 and input module.

SENSOR UNIT 9555-10
Power supply unit for the 9272 to the 9279 clamp sensors, except for connecting to the Current unit 8971, for signal output 9217 is necessary.

CONVERSION CABLE 9318
To connect the 9272 to 9279 and the 8971

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

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

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

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

Current measurement *Connect directly to the analog input module

3274 3275 3276 3273-50 3272 3269

CLAMP ON PROBE 3276
DC to 100MHz wideband response, mA-class current up to 30A rms

CLAMP ON PROBE 3275
DC to 2MHz wideband response, mA-class current up to 500A rms

CLAMP ON PROBE 3274
DC to 10MHz wideband response, mA-class current up to 150A rms

CLAMP ON PROBE 3273-50
DC to 50MHz wideband response, mA-class current up to 30A rms

POWER SUPPLY 3272
Connect and power up to one CLAMP ON PROBE to use in combination with voltage input modules

POWER SUPPLY 3269
Connect and power up to four CLAMP ON PROBEs to use in combination with voltage input modules

Current measurement * Use for commercial power line, 50/60 Hz (Useless the power supply)

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

Printer options

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

Not CE marked
PAPER WINDER 220H
Paper width 70 to 220 mm (2.76 to 8.66 inch), 100V AC Only

Other options

CONNECTION CORD 9217
Cord has insulated BNC connectors at both ends, and connects to insulated BNC connectors on input module. 1.7 m (5.58 ft) length

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

Not CE marked
CONNECTION CORD 9165
Cord has metallic BNC connectors at both ends, and connects to metallic BNC connectors. 1.5 m (4.92 ft) length

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

CARRYING CASE 9783
Hard trunk type, also suitable for shipping/transporting the 8847

Removable storage (CF card)

Supplied with PC Card adapter

PC CARD 256M 9727
(256 MB capacity)

PC CARD 512M 9728
(512 MB capacity)

PC CARD 1G 9729
(1 GB capacity)

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.

■ **Combination example: 8847** (with mix of logic modules and standard analog modules) * 16 logic input channels installed as standard in unit, separate logic probes required

8847 × 1	Memory 64 MW	Logic 32 ch	Logic 48 ch	Logic 64 ch	Logic 64 ch	Analog 2 ch	Logic 64 ch	Analog 4 ch	Logic 64 ch	Analog 6 ch	Logic 64 ch	Analog 8 ch	Logic 64 ch	Analog 10 ch
Logic input unit		8973 × 1	8973 × 2	8973 × 3	8973 × 3		8973 × 3		8973 × 3		8973 × 3		8973 × 3	
Analog input unit		—	—	—	8966 × 1		8966 × 2		8966 × 3		8966 × 4		8966 × 5	
Input cable		—	—	—	9198 × 2		9198 × 4		9198 × 6		9198 × 8		9198 × 10	

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