

HIOKI

1999

8835 MEMORY HiCORDER

Recorders



A Four-Channel A4-Size Recorder Equipped with Color TFT Liquid Crystal Display

A next-generation fast-wave recorder!

Enabling fast-wave recording in field work, the MEMORY HiCORDER models have been highly acclaimed by users. The next-generation MEMORY HiCORDER 8835 is the newest addition to the widely used and long-trusted 8830 line. Incorporating state-of-the-art technology, it offers an enhanced basic "wave recording" function.



ISO9001
CERTIFICATE No. JM-0216

This product has been manufactured in conformity with the ISO9001 international standard on Quality Control and Quality Assurance.



ISO14001
CERTIFICATE No. JQA-E-00091

HIOKI is certified under the international standard ISO 14001 for environmental management systems.

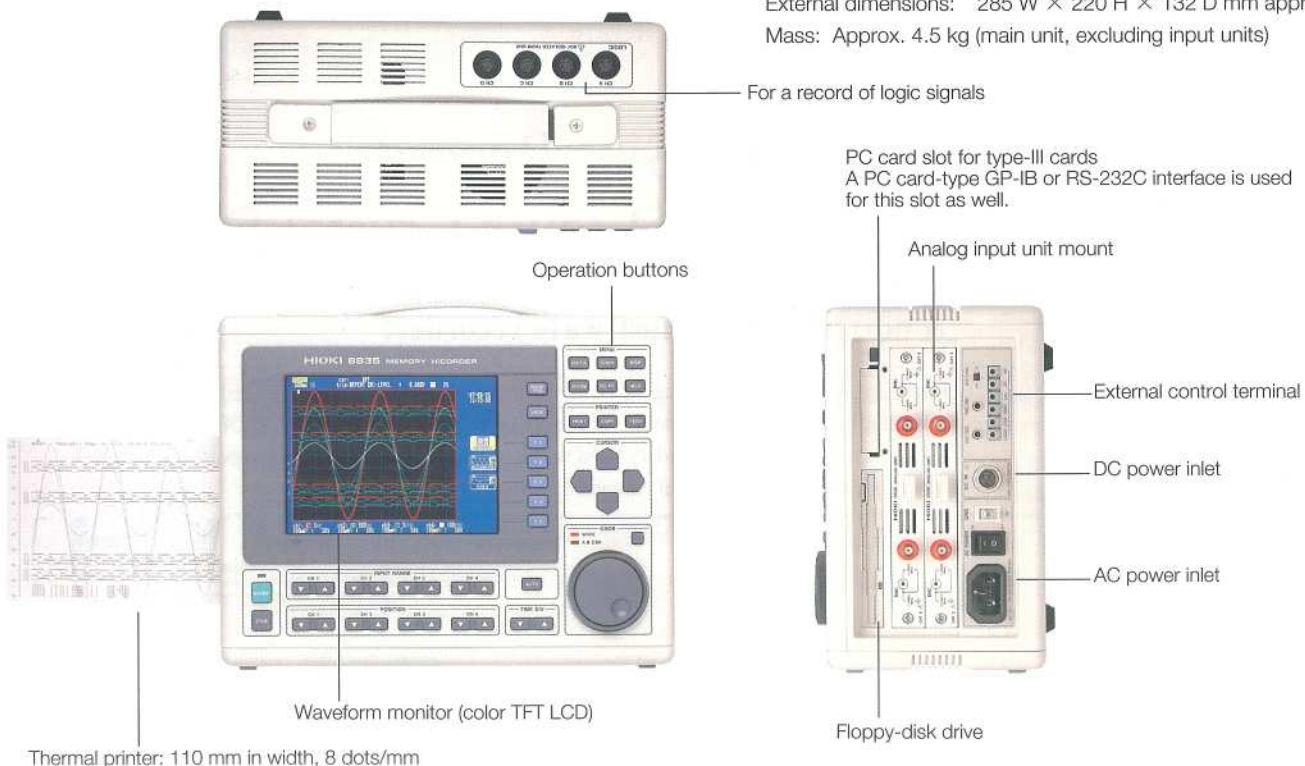
The space-saving MEMORY



1 MEMORY HiCORDER 8835 features and specifications

- High-visibility waveforms displayed on a 6.4-inch color TFT liquid crystal display**
 The color display makes it easier to identify waveforms and install the device. It enhances visibility and facilitates operations.
- Capability for PC data processing using a PC card or an FD**
 PC card slot supports for a type-III card. The 8835 also supports SRAM cards with capacities of up to 32 MB, flash ATA, and hard-disk cards of up to 528 MB.
- Compact and thin, occupying a space equivalent to 60% of an A4-size sheet of paper**
 Occupying desktop space equivalent to 60 % of an A4-size sheet of paper, the MEMORY HiCORDER 8835 is functionally designed so as to permit operation on a flat bed.
- Advanced basic functions with 1 MS/s and 12-bit A/D**
 The 8835 employs a sampling rate of 1 MS/s (1 μ s cycle) and 12-bit voltage-axis resolution for the A/D converter unit, which digitizes measurement signals, enabling accurate detection of signal waveforms.
- Color printout**
 Connection to a standard color printer is also possible, making it easy to produce A4 color prints.
* 9559 PRINTER CARD option required.
- CE Mark compliant**
 Complies with the EC directive determining safety standards in Europe (within the EU).
- Plug-in unit system capable of changing measurement channels**
 The recorder employs a plug-in unit system that enables the user to change measurement channels for a variety of uses. We expect to release a variety of conversion amplifiers in the near future, mountable for the direct input of various physical signals.
- Function upgrade system to meet varied needs**
 The basic model provides several standard functions for users who don't require functional complexity. Users requiring a wider range of measurement functions can add functions through the use of a function upgrade disk.
- On-screen help**
 To help the user get started or clarify operating steps, the 8835 can display tips on-screen for many basic operations, including key-button operations.
- Function upgrade system to meet varied needs**
 The basic model provides several standard functions for users who don't require functional complexity. Users requiring a wider range of measurement functions can add functions through the use of a function upgrade disk.

External dimensions: 285 W \times 220 H \times 132 D mm approx.
 Mass: Approx. 4.5 kg (main unit, excluding input units)



HiCORDER 8835 is thin and compact

Specifications for the 8835 MEMORY HiCORDER

Basic Specifications	
Measurement function	(1) Memory recorder (2) Recorder (3) Effective value (RMS-value) recorder
Input type	Plug-in input unit * Each input is isolated from each output.
Maximum number of channels	Four analog channels + 16 logic channels* * The 16 logic channels are provided as a standard feature.
Memory capacity	12 bits × 500 k words per channel (using one channel) to 12 bits × 100 k words per channel (using four channels) * The memory is expandable up to four fold through the use of an SRAM PC card.
File storage	Floppy disk drive × 1 (1.44 M/1.2 M/720 KB, MS-DOS format) Type III PC card slot × 1 (for SRAM* cards up to 32 MB, flash ATA*, hard disk* cards up to 528 MB) * I/O Data products or the equivalent File formats: BMP, binary, text
Battery backup	Clock, waveform data, and setting conditions; battery life of at least 10 years (at 25°C)
External control terminals	Mini-jack 3.5 mm in dia.: Trigger input/output Terminal board: External stop, stop, print input, wave decision output
Interface (optional, sold separately)	GP-IB or RS-232C *Replacement with a 9557 RS-232C CARD or 9558 GP-IB CARD
Power supply	100 to 120 VAC or 200 to 240 VAC (50/60 Hz) * A range of 10 to 28 VDC is applicable during use of the 9439 DC POWER ADAPTOR.
Power consumption (when using two units of 8936)	130 VA, max. for 100 VAC (approx. 60 VA with the printer off) 80 VA, max. for 12 VDC (approx. 38 VA with the printer off)
Ambient conditions	Operation: +5°C to +40°C, 35% to 80% relative humidity Storage: -10°C to +50°C, 20% to 90% relative humidity
Approx. dimensions and mass	285 (W) × 220 (H) × 132 (D)mm, 4.5 kg (main unit only)
Supplied accessories	Power cord (1), power plug (1), recording paper (1), dust cover (1), roll paper attachment (2), PC card protector (1)
Display and Data Output	
Recording paper	110 mm × 30 m, rolled thermosensitive paper
Recording width	10 divisions, full scale, one division = 10 mm (80 dots)
Paper transfer density	10 rows/mm (20 rows/mm in memory-recorder smooth printing)
Recording speed	25 mm/s, max.
Display screen	6.4-inch color TFT liquid crystal display with Japanese/English selector 640 × 480 pixels
Trigger Function	
Trigger source	Channels 1 to 4 (analog), channels A to D (logic), external, timer, manual; ON/OFF for each source; AND/OR between sources
Type of trigger (analog)	Level: Digital setting of the voltage made when the set value exceeded through specification of the ↑ or ↓ direction Window: When entering or exiting the upper-limit or lower-limit range Voltage drop: Exclusively for commercial power lines. When the peak voltage falls below the set value. RMS value level: Exclusively for commercial power lines. When the RMS value exceeds the set value through specification of the ↑ or ↓ direction. Cycle: When the cycle measured in the event of an increase or decrease in the set voltage does not fall within the cycle range
Trigger-level resolution	Equivalent to 0.25 %, f.s. (f.s. = 10 divisions)
Type of trigger (logic)	Pattern trigger: 1, 0, or X (disregard) pattern setting; each group of four channels is subject to logical products (AND) or logical sums (OR)

Memory Recorder Function	
Time axis	100 μs to 5 min / division, 20 ranges; one division = 100 samples; time-axis expansion of three settings, from × 2 to × 10; time-axis compression of 10 settings, from 1/2 to 1/2000
Sampling period	1/100 of the time-axis range (min. of 1 μs)
Recording length	20 to 5000* divisions; arbitrary setting by one-division steps * The value varies according to the number of channels used and the expanded memory capacity.
Pre-trigger	Can record data from before the trigger; 0 to 100% or -95% of the recording duration, 15 settings
Others	Waveform parameter calculations, logging (numerical-value printing), X-Y waveform synthesis, three settings of voltage-axis expansion, from ×2 to ×10, one setting of voltage-axis compression of ×1/2, waveform zoom function
Recorder Function	
Time axis	10 ms to 1 hour per division, 17 ranges; one division = 100 samples; five settings of time-axis compression, from ×1/2 to ×1/50 * The data appears on the display for 10 to 200 ms/division. The data is printed at 20 mm/s.
Sampling period	Six settings, from 1 μs to 100 ms (selected from a time-
Recording length	Arbitrary setting by one-division steps; 20 to 500* divisions, continuous * The value varies according to the number of channels used and the expanded memory capacity.
X-Y No. of channels	Three syntheses, max.; arbitrary for the X and Y axis
X-Y sampling period	300 μs, fixed (for dot); 300 μs to 25 ms (for line)
X-Y recording time	Unlimited superimposition
X-Y printing format	Overall width: 100 mm × 100 mm (10 × 10 divisions)
X- and Y-axis resolution	40 pixels/division (screen) 80 horizontal pixels × 80 vertical pixels (printer)
Others	Reprinting of stored data (last 500 divisions), logging (numerical-value printing), virtual recording function (data is written to internal memory without the use of recording paper), additional recording function (recording is resumed without overwriting previous data)
Effective value Recorder Function (for 50/60 Hz and DC)	
Time axis	5 s to 1 hour per division, nine ranges; five settings of the time-axis compression, from ×1/2 to ×1/50
Sampling period	200 μs, fixed (20 pieces of RMS value data per second)
Recording length	Arbitrary setting by one division steps; 20 to 500* divisions, continuous * The value varies according to the number of channels used and the expanded memory capacity.
Others	Reprinting of stored data (last 500 divisions), logging (numerical-value printing), additional recording function (recording is resumed without overwriting previous data)
Auxiliary Functions	
General	Printing of conditions including input range or trigger time, cursor measurement, scaling, free comment input, display copying, registration of setting conditions (eight conditions), maintenance of starting conditions, automatic setup, automatic saving, remote control, viewing function, online help, key lock, list printing, etc.
Scaling	Scaling: Translation of the amplitude gradation only Variable: Arbitrary setting of the upper and lower limits of the wave waveform display range
Vernier function	Fine adjustment of input voltage
Waveform parameter calculation	Maximum value, minimum value, P-P value, average, RMS value, area value, period, frequency, time required to reach the maximum value, time required to reach the minimum value, rising time, falling time, x-y area, standard deviation

The input unit is freely inter

Options (sold separately)

9540 FUNCTION UP DISK	
Additional measurement function	(1) Recorder & memory, (2) FFT
Recorder & memory function	
Time axis (real-time recorder)	500 ms to 1 hour per division, 17 ranges; one division = 100 samples; five settings of time-axis compression, from 1/2 to 1/50 * Sampling period: six setting, from 1 μ s to 100 ms (selected from a time-axis period of 1/100 or shorter)
Time axis (memory recorder)	100 μ s to 5 min per division, 20 ranges; one division = 100 samples; three settings of time-axis expansion, from $\times 2$ to $\times 10$; 10 settings of time-axis compression, from 1/2 to 1/2000 * Sampling period: 1/100 of the time-axis range (min. of 1 μ s)
Recording length	Recorder: 20 to 200* divisions, continuous Memory recorder: 20 to 500* divisions * The value varies according to the number of channels used and the expanded memory capacity.
Trigger source	Recorder: Timer trigger, or off Memory recorder: Channels 1 to 4 (analog) Channels A to D (logic), external
Others	The printer outputs recorder waveforms only at startup; reprinting of stored data (last 200* divisions); virtual recording function, additional recording function * The value varies according to the expanded memory capacity.

FFT Function	
Single Signal analysis	Linear spectrum, RMS-value spectrum, power spectrum, auto-correlation function, histogram, octave analysis
Two Signal analysis	Transfer function, cross-power spectrum, cross-correlation function, impulse response, coherence function
Channels analyzed	Any one or two channel of all analog channels
Frequency range	133 mHz to 400 kHz; resolution: 1/400 Sampling : 1000 points
Window types	Rectangular, hanning, exponential

Other Additional Functions	
Waveform processing calculations (memory recorder)	Maximum of 200* divisions waveform; the precision is within the accuracy of the input unit; four operands * The value varies according to the expanded memory capacity. Addition/subtraction/multiplication/division, absolute value, exponent, common logarithm, square root, moving average, differentiation once and twice, integration once and twice, parallel displacement along the time axis.
Waveform judgment function (memory recorder)	Type: Area decision on the standard waveform and parameter decision on the calculated waveform parameter using the time axial waveform and displayed waveform of X-Y and FFT Decision output: GO/NG decision, with open-collector 5-V voltage output
Others	Waveform averaging; memory segmentation (up to 64 segments)

8936 ANALOG UNIT <small>(accuracy at 23 \pm5°C after 30 min of warm-up time; accuracy guaranteed for 12 months)</small>	
Input	Number of channels: Two*, Terminal: Insulated BNC * Input isolated from output, isolated each channels
Measurement range	10 mV to 50 V/division, 12 ranges; full-scale = 10 divisions, 400 VDC max. Low-pass filter, 5 Hz, 500 Hz, 5 kHz, or 100 kHz; the measurement resolution is 1/160 of range * Use in 8835
Maximum sampling rate	1 MS/s (simultaneous sampling of two channels)
DC amplitude accuracy	$\pm 0.4\%$ f.s.
Origin setting (zero position)	-50% to 150 %, 1 % step * With zero-adjustment function
Zero-position accuracy	± 0.1 %, f.s.
Frequency characteristics	DC to 400 kHz ± 3 dB * 7Hz to 400 kHz ± 3 dB * With AC coupling
Input resistance and capacitance	1 M Ω $\pm 1\%$; 30 pF approx. (at 100 kHz)
Input coupling	DC, GND, AC
Maximum grounding voltage	400 VAC or VDC * Between the input unit and frame, and between input channels.
Dimensions and mass	Approx. 170 (W) \times 20(H) \times 148 (D)mm, Approx. 290 g
Accessories	None * Input cable available as option

8937 VOLTAGE/TEMPERATURE UNIT <small>(accuracy at 23 \pm5°C, 60 minutes after power-on; accuracy guaranteed for 12 months)</small>	
Inputs	Number of channels: 2 each for voltage and temperature selectable * Isolated input/output, inter-channel isolation Voltage input: isolated BNC, Thermocouple input: plug-in terminal
Voltage measurement range	1mV - 5 V/division; 12 settings, full-scale = 10 divisions, max. 30 Vrms or 60 V DC, low-pass filter: 5 Hz, 500 Hz, 5 kHz, 100 kHz, measurement resolution: 1/160 of range * Using 8835
Temperature measurement range	20°C to 200°C/division; 4 settings, full-scale = 10 divisions, max. 30 Vrms or 60 V DC, low-pass filter: 5 Hz, 500 Hz, measurement resolution: 1/160 of range * Using 8835
Thermocouple range	K: -200 to 1350°C, E: -200 to 800°C, J: -200 to 1100°C, T: -200 to 400°C, N: -200 to 1300°C, R: 0 to 1700°C, S: 0 to 1700°C, B: 300 to 1800°C Reference junction compensation: internal/external (switchable)
Maximum sampling rate (2-channel simultaneous sampling)	Voltage input: 1 MS/s Temperature measurement: 4 kS/s
Accuracy	Voltage input: DC amplitude $\pm 0.4\%$ f.s. Temperature input (K, E, J, T, N): $\pm 0.1\%$ f.s. $\pm 1^\circ$ C, $\pm 0.1\%$ f.s. $\pm 2^\circ$ C (-200°C to 0°C), (R, S): $\pm 0.1\%$ f.s. $\pm 3^\circ$ C, (B): $\pm 0.1\%$ f.s. $\pm 4^\circ$ C (400°C to 1800°C) Reference junction compensation accuracy: $\pm 0.1\%$ f.s. $\pm 1.5^\circ$ C (internal compensation)
Zero position	Voltage input: -50% to 150%; in 1-percent steps * With zero-adjust function Temperature input: -100% to 100%; in 1-percent steps
Zero position accuracy	$\pm 0.15\%$ of f.s. (voltage input)
Frequency response	Voltage input: DC - 400 kHz +1/-3 dB Temperature input: DC - 1 kHz +1/-3 dB
Input resistance and capacitance	Voltage input: 1 M Ω , approx. 50 pF (at C, 100 kHz) Temperature input: 5.1 M Ω
Input coupling	DC, GND, AC
Maximum grounding voltage	30 Vrms or 60 V DC * Between input channel and frame, and between input channels
Dimensions and mass	Approx. 170 (W) \times 20 (H) \times 148 (D)mm, approx. 300 g
Supplied accessories	None * Input cable available as option

8938 FFT ANALOG UNIT <small>(accuracy at 23 \pm5°C, 30 minutes after power-on; accuracy guaranteed for 12 months)</small>	
Anti-aliasing filter	Cutoff frequency 20, 40, 80, 200, 400, 800, 2k, 4k, 8k, 20k, 40 kHz auto-select (linked to frequency range)
Other functions	Same as 8936 ANALOG UNIT
Supplied accessories	None * Input cable available as option

8939 STRAIN UNIT <small>(accuracy at 23 \pm5°C, 60 minutes after power-on; accuracy guaranteed for 12 months)</small>	
Inputs	Number of channels: 2* Connector: adapter cable connector * Isolated input/output, inter-channel isolation
Converter connector	Via adapter cable, TAJIMI PRC03-32A10-7F10.5
Suitable converter	Strain gage converter, bridge impedance: 120 Ω - 1 k Ω , gage factor 2.00, bridge voltage 2 ± 0.05 V
Measurement range	20 to 1000 μ e/division; 6 settings, full-scale = 10 divisions, low-pass filter: 10 Hz, 30 Hz, 300 Hz, 3 kHz, off, Measurement resolution: 1/160 of range * Using 8835
Maximum sampling rate	1 MS/s (simultaneous sampling for 2 channels)
DC amplitude accuracy	$\pm (0.5\%$ of full scale + 2 μ e) (after auto-balancing)
Balancing	Electronic auto-balancing, max. adjustment range ± 10000 μ e
Zero position	-50% to 150%; in 1-percent steps * With auto-balancing
Zero position accuracy	$\pm 0.5\%$ of full scale
Frequency response	DC - 20 kHz +1/-3 dB
Maximum grounding voltage	40 V DC max.
Dimensions and mass	Approx. 170 (W) \times 20 (H) \times 148 (D)mm, approx. 250 g
Supplied accessories	Adapter cable (2)

-changeable to meet signal measurement.

■ Optional products specification (sold separately)

9320 LOGIC PROBE

Detector for high/low recording of 0/5 V signals or relay contacts.

Inputs: 4 channels (common ground), digital / contact signal detection.

Can detect open-collector signal at contact input.

Input resistance: 1M Ω (digital input, at 0 to +5V), at least 500k Ω (digital input, at +5V to +50V)

Pull up resistance: 2k Ω (contact input)

Threshold level (digital input): +1.4 V, +2.5V, +4.0V

Detect resistance (contact input): open at least 1.5k Ω /close at 500 Ω or smaller, open at least 3.5k Ω /close at 1.5k Ω or smaller, open at least 25k Ω /close at 8k Ω or smaller

Response time: 500 ns maximum

Dimensions and mass: Approx. 62 (W) \times 94 (H) \times 20 (D)mm, 150 g

Max. allowable input: 0 to +50VDC



9321 LOGIC PROBE

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

Inputs: 4 channels (isolate), HIGH/LOW range switching type

Input resistance: at least 100 k Ω (HIGH range), 30 k Ω (LOW range)

High detection levels: 170 to 250VAC, \pm 70 to 250VDC (HIGH range)

60 to 150VAC, \pm 20 to 150VDC (LOW range)

Low detection levels: 0 to 30VAC, 0 to \pm 43VDC (HIGH range)

0 to 10 VAC, 0 to \pm 15VDC (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: 250Vrms (HIGH range), 150Vrms (LOW range)

Dimensions and mass: Approx. 62(W) \times 127 (H) \times 20 (D)mm, 320 g

9303 PT

This voltage transformer converts 400 or 200 V AC to 10 V AC. (Input is insulated from output.)

Transformer ratio: 1/40 or 1/20 \pm 1 %

Maximum permitted input: 440/220 VAC

Frequency characteristics: 40 Hz to 3 kHz, \pm 1 %

Dimensions and mass:

Approx. 56 (W) \times 113 (H) \times 93 (D)mm, 730 g



9305 TRIGGER CODE

This code connects the trigger inputs and outputs of multiple MEMORY HiCORDERS.

Type: 3.5-mm-dia. mini-plug

Length: Approx. 1.5 m



9439 DC POWER ADAPTER

Input voltage: 10 VDC to 28 VDC

Output: 24 VDC \pm 1 V, 2.2 A

Function: The AC power supply takes precedence when both AC and DC power supplies are connected. If the AC power fails, DC operation is automatically selected.

Dimensions and mass:

152 W \times 54 H \times 92 D mm

Approx. 770 g



220H PAPER WINDER

Paper width: 70 to 220 mm

Power supply: 100 VAC

(using a special-purpose AC adapter)

Dimensions and mass:

240 W \times 190 H \times 160 D mm

Approx. 2.6 kg



9330-01 WAVE PROCESSOR

Compatible Recorder: 8835MEMORY HiCORDER (using 8936 ANALOG UNIT)

Provided media: 3.5-inch 2HD floppy disks (3)

Operating environment: IBM PC/AT or compatible running under Windows 95 (English version)

Functions: (1)Data conversion •Converts waveform data on disk into voltages values in ASCII format. Converts logic data for all functions of memory recorder, recorders, and RMS recorders to 1 or 0. •Capable of conversion of all saved waveform data. •Headers exists. •Waveform display possible. •Either all channels or an arbitrary channel can be selected for conversion. •Data storage possible. •Display screens, area selection with A and B cursors, data thinning (interval from 2 to 100 points). •Two storage formats (csv and DADiSP) (2)Report work support functions •Provided for batch display, group display, and display by individual channel. •In addition to waveforms, maximum and minimum points can be printed for all channels. •Zoom function, cursor measurement function. •Preview, screen display data preview, and comment preview are provided with specified output formats. •Comments can be saved, and previously saved comments can be reloaded. •Print paper size, A4, portrait or landscape. •Provided in online help format.

Software supported: Excel, Lotus 1-2-3, DADiSP

* With DADiSP, some manipulation of converted data headers may be required.

* Product names appearing herein are trademarks or registered trademarks of various companies.

9018, 9132 CLAMP ON PROBES

Simply clamp onto the power line to convert current waveforms to voltage waveforms.

Phase characteristics of the 9018 are superior to those of the 9132.

Input ranges: 10 A to 500 A f.s.(9018); 20 A to 1000 A f.s. (9132)

Output voltage: 0.2V AC for full-range value

Accuracy: 45 Hz to 66 Hz (9018), \pm 1.5% rdg., \pm 0.1% f.s.

55 Hz (9132), \pm 3% rdg., \pm 0.5mV

Frequency characteristics: 40 Hz to 3 kHz (9018), better than \pm 1%,

\pm 2.5° (accuracy deviation)

40 Hz to 1 kHz (9132), within \pm 1% (accuracy deviation)

Clamp aperture: 46 mm dia. or 50 \times 20 mm bus bar (9018)

55 mm dia. or 80 mm width bus bar (9132)

Conductor voltage rating: AC 600 V (insulated) *Note



9270 - 9272 CLAMP ON SENSORS and 9555 SENSOR UNIT

These current sensors are capable of reliable measurement of distorted AC-current waveforms. Each clamp-on sensor operates together with the 9555 unit.

Input range: 20 A (9270), 200 A (9271), 20/200 A (9272)

Output voltage: 2 VAC for full-range values

Frequency characteristics:

5 Hz to 50 kHz \pm 2.5%, f.s. (9270 and 9271)

5 Hz to 10 kHz \pm 2.5%, f.s. (9272)

Clamp aperture: 20 mm dia. (9270 and 9271)

46 mm dia. or 50 mm \times 20 mm bus bar (9272)

Conductor voltage rating: 600 VAC (insulated) *Note

9277 - 9279 UNIVERSAL CLAMP ON CTs and 9555

These current sensors are capable of reliable measurement from DC to distorted current waveforms. Each clamp-on sensor operates together with the 9555 SENSOR UNIT.

Input range: 20 A (9277), 200 A (9278), 500 A (9279)

Output voltage: 2 VAC for full-range values

Frequency characteristics:

DC to 100 kHz \pm 5%, f.s. (9277 and 9278)

DC to 20 kHz \pm 5%, f.s. (9279)

Clamp aperture: 20 mm dia. (9277 and 9278)

40 mm dia. (9279)

Conductor voltage rating: 600 VAC, 850 V peak (insulated) *Note



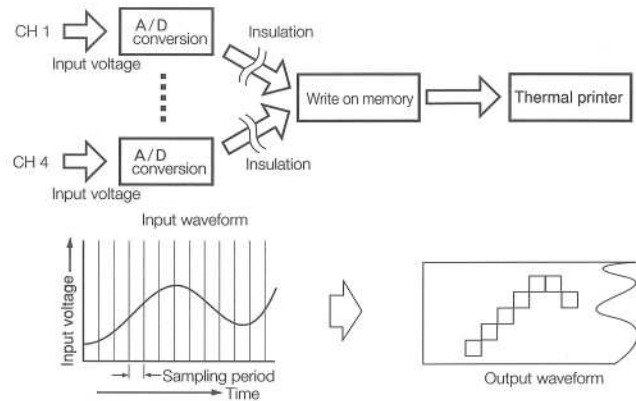
* Note : The core and shield casing are not insulated. To avoid the possibility of accidents, do not use on bare conductors.

High-speed response and Effective value recorder variations

2 Memory recorder functions

Outline of functions

The input signal is converted to digital form by the A/D converter and stored in the internal memory. Since the recordable waveform speed is determined by the sampling rate and the memory saving rate, brief transient events can be reliably captured. It is also possible to make x-y plots for any pair of channels.



Memory-recorder-function recording time

The table of the right shows the possible recording times determined according to the set time axis, as well as the number of channels to be used when the memory record or function is used. A reduction in the number of channels prolongs the recording time.

*The standard memory of the recorder stores 500 k of words.

Memory segmentation function (an optional 9540 FUNCTION UP DISK is needed)

In the memory recorder function, the data memory can be further divided into up to 256 blocks (the number of divisions depends on the conditions). The waveforms in the reference block and any other block can be superimposed and compared, and dead time during printing, in which signals cannot be captured, can be reduced.

Time axis	Sampling period	1-channel setting 500 kW/channel, 5000 divisions	4-channel setting 100 kW/channel, 1000 divisions
100 μ s/DIV	1 μ s	0.5 s	0.1 s
200	2	1 s	0.2 s
500	5	2.5 s	0.5 s
1ms/DIV	10	5 s	1 s
2	20	10 s	2 s
5	50	25 s	5 s
10	100	50 s	10 s
20	200	1 m 40 s	20 s
50	500	4 m 10 s	50 s
100	1ms	8 m 20 s	1 m 40 s
200	2	16 m 40 s	3 m 20 s
500	5	41 m 40 s	8 m 20 s
1s/DIV	10	1 h 23 m 20 s	16 m 40 s
2	20	2 h 46 m 40 s	33 m 20 s
5	50	6 h 56 m 40 s	1 h 23 m 20 s
10	100	13 h 53 m 20 s	2 h 46 m 40 s
30	300	1 days 17 h 40 m	8 h 20 m
1min/DIV	600	3 days 11 h 20 m	16 h 40 m
2	1.2s	6 days 22 h 40 m	1 days 9 h 20 m
5	3s	17 days 8 h 40 m	3 days 11 h 20 m

Easy expansion of memory capacity

The memory capacity of the 8835 can be expanded through the use of an SRAM PC card (a PCMCIA-compliant product featuring an access rate of no more than 200 ns), even in the field.

- If a 1-MB PC card is mounted, the memory capacity is increased by 1M words.
- If a 4-MB PC card is mounted, the memory capacity is increased by 2M words.

* Remove the bottom plate of the 8835 and mount the additional PC card. Do not use the PC card slot for external memory.

Waveform data backup function

Since the measured waveforms are backed up by the built-in battery, the data will not be erased even after the power is turned off.

Time axis	Sampling period	Addition of 1M words 1-channel setting 10,000 divisions	Addition of 2M words 1-channel setting 20,000 divisions
100 μ s/DIV	1 μ s	1 s	2 s
200	2	2 s	4 s
500	5	5 s	10 s
1ms/DIV	10	10 s	20 s
2	20	20 s	40 s
5	50	50 s	1 m 40 s
10	100	1 m 40 s	3 m 20 s
20	200	3 m 20 s	6 m 40 s
50	500	8 m 20 s	16 m 40 s
100	1ms	16 m 40 s	33 m 20 s
200	2	33 m 20 s	1 h 6 m 40 s
500	5	1 h 23 m 20 s	2 h 46 m 40 s
1s/DIV	10	2 h 46 m 40 s	5 h 33 m 20 s
2	20	5 h 33 m 20 s	11 h 6 m 40 s
5	50	13 h 53 m 20 s	1 day 3 h 46 m 40 s
10	100	1 day 3 h 46 m 40 s	2 day 7 h 33 m 20 s
30	300	3 days 11 h 20 m	6 day 22 h 40 m
1min/DIV	600	6 days 22 h 40 m	13 day 21 h 20 m
2	1.2s	13 days 21 h 20 m	27 day 18 h 40 m
5	3s	34 days 17 h 20 m	69 day 10 h 40 m

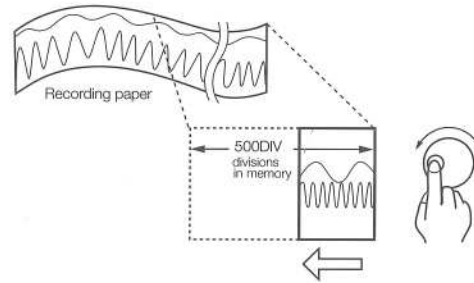
functions are useful in following signal

3) Recorder function and Effective value recorder function

Outline of function

The input signal is converted to digital form and displayed and printed in real time. The chart speed is a maximum of 20 mm/ms (in the 500 ms/division range). Even with the real-time recording, the last 500* divisions of the waveform can be observed (by scrolling both horizontally and vertically) and reprinted following measurement.

* If the memory capacity is expanded, the reprintable recording length is prolonged. While the standard recording length is 500 divisions, it is increased to 1000 divisions for 1-M word expansion or 2000 divisions for 2-M word expansion.



Virtual recording

The 8835 supports a high-speed recording function in the memory with no need for recording paper. Although real-time recording on the recording paper is not possible in the high-speed range of the recorder function (10 ms to 200 ms/division), the waveforms are stored in the memory and can therefore be monitored on the screen. The last 500* divisions of the waveform are retained in the memory before the measurement is completed. If the recording length is not set to "continuous", the printer can also be operated, allowing waveforms to be printed out later.

* If the memory capacity is expanded, the maximum recording length is prolonged. While the standard recording length is 500 divisions, it is increased to 1000 divisions for 1-M word expansion or 2000 divisions for 2-M word expansion.

Recording Time

Time axis	Chart speed	Sampling period	Expected recording time for one roll of recording paper (30 m)
10*ms/DIV	20 mm/sec	1 μ s 10 μ s 100 μ s	Standard memory: 5 s 1-M word expanded memory: 10 s 2-M word expanded memory: 20 s
20*	20	1 μ s 10 μ s 100 μ s	Standard memory: 10 s 1-M word expanded memory: 20 s 2-M word expanded memory: 40 s
50*	20	1 μ s 10 μ s 100 μ s	Standard memory: 25 s 1-M word expanded memory: 50 s 2-M word expanded memory: 1 m 40 s
100*	20	1 μ s 10 μ s 100 μ s 1ms	Standard memory: 50 s 1-M word expanded memory: 1 m 40 s 2-M word expanded memory: 3 m 20 s
200*	20		Standard memory: 1 m 40 s 1-M word expanded memory: 3 m 20 s 2-M word expanded memory: 6 m 40 s
500ms/DIV	20 mm/sec		24 m 45 s
1s/DIV	10	1 μ s, 10 μ s, 100 μ s 1ms, 10ms	49 m 30 s
2	5		1 h 39 m
5	2		4 h 7 m 30 s
10	1		8 h 15 m
30	20mm/min		24 h 45 m
1min/DIV	10	1 μ s 10 μ s 100 μ s	2 days 1 h 30 m
2	5	1ms	4 days 3 h
5	2	10ms	10 days 7 h 30 m
10	1	100ms	20 days 15 h
30	20mm/hour		61 days 21 h
1h/DIV	10mm/hour		123 days 18 h

The figure of 2970 divisions assumes that about 30 cm of the paper length will not be used.

Continuous X-Y recorder function

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, and up to three x-y plots can be combined. The x-y plot can be viewed on the screen in real time, and the recording time is unlimited. The x-y plot can also be reprinted.

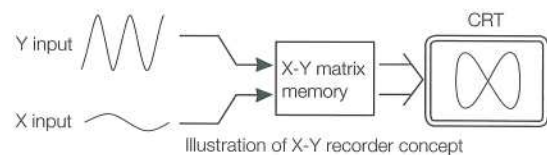
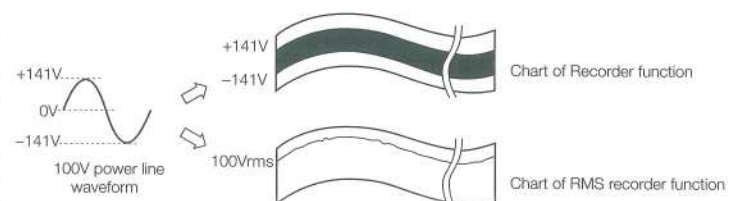


Illustration of X-Y recorder concept

Effective value (RMS-value) recorder function

This function is designed 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 *, and the result is recorded as a graph.

* Using fixed 200 μ s sampling, data for two waveforms are captured for calculating the rms value. This process is repeated 20 times per second, resulting in high-speed response that is 10 times faster than that of a digital tester or similar (using a 2-second update rate).

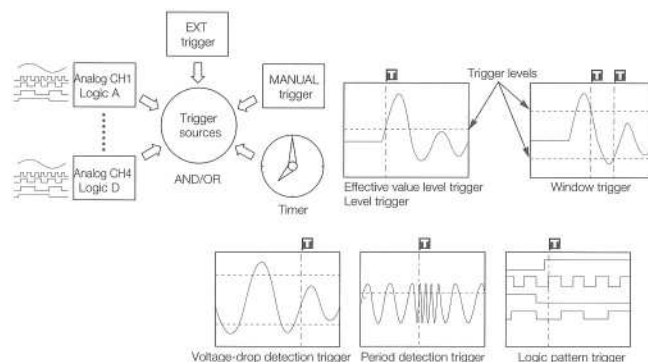


Tricky waveforms are accurately captured

Trigger functions for monitoring of all four channels

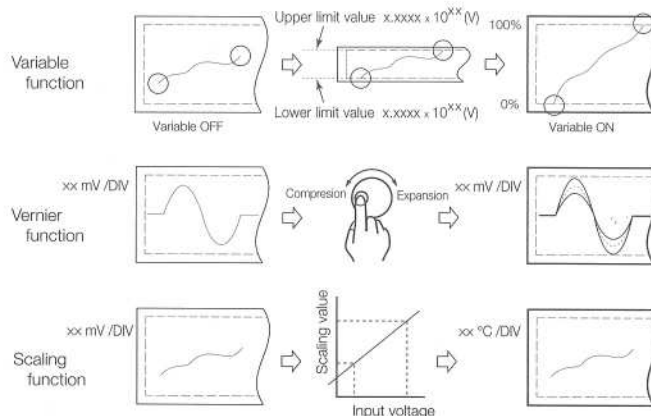
In all of the functions, including the memory recorder and recorder, all four analog input channels and sixteen logic input channels can be used for trigger input. In addition to a level trigger, which compares voltages based on a reference value, the 8835 supports the following triggers:

- Window trigger that compare voltages based on two reference values
- Voltage-drop detection trigger that detects voltage drops in commercial power lines
- RMS-value level trigger that compares signals based on the RMS-value level
- Period detection trigger that measures periods and detects all deviating periods
- Pattern trigger that compares signals based on the logic signal ON/OFF pattern



Variable (span adjustment), vernier (fine adjustment)

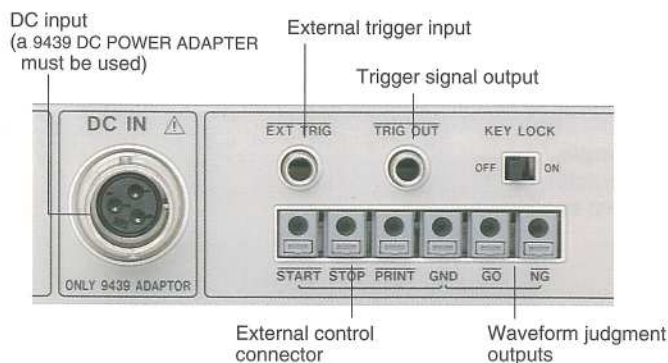
When sensors are used to measure and record noise, temperature, acceleration or other physical quantities, precise calibration is important. This is facilitated by the vernier function that allows fine adjustment of amplitude. The variable function lets the user numerically specify the measurement span, such as 1 - 5 V or 4 - 20 mA. This is useful for matching the range of instrumentation to the full span of the recording paper. A scaling function for converting measurement results is also available.



Signal outputs, control inputs, DC input

The results of waveform decisions, parameter decisions, and triggers are output as open collector signals. The 8835 is also provided with signal inputs for remote control of the start, stop, and print buttons.

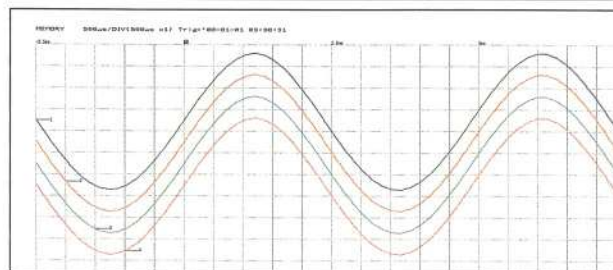
The 8835 has a dual AC/DC power-supply specification, and an external battery can be used by means of a 9439 DC POWER ADAPTOR, in addition to normal AC power supply. This allows vehicle-mounted applications, where an AC power supply is not available. If both supplies are connected, the AC power supply takes precedence, but if the AC power fails, the unit automatically switches to DC operation.



Example of color printout

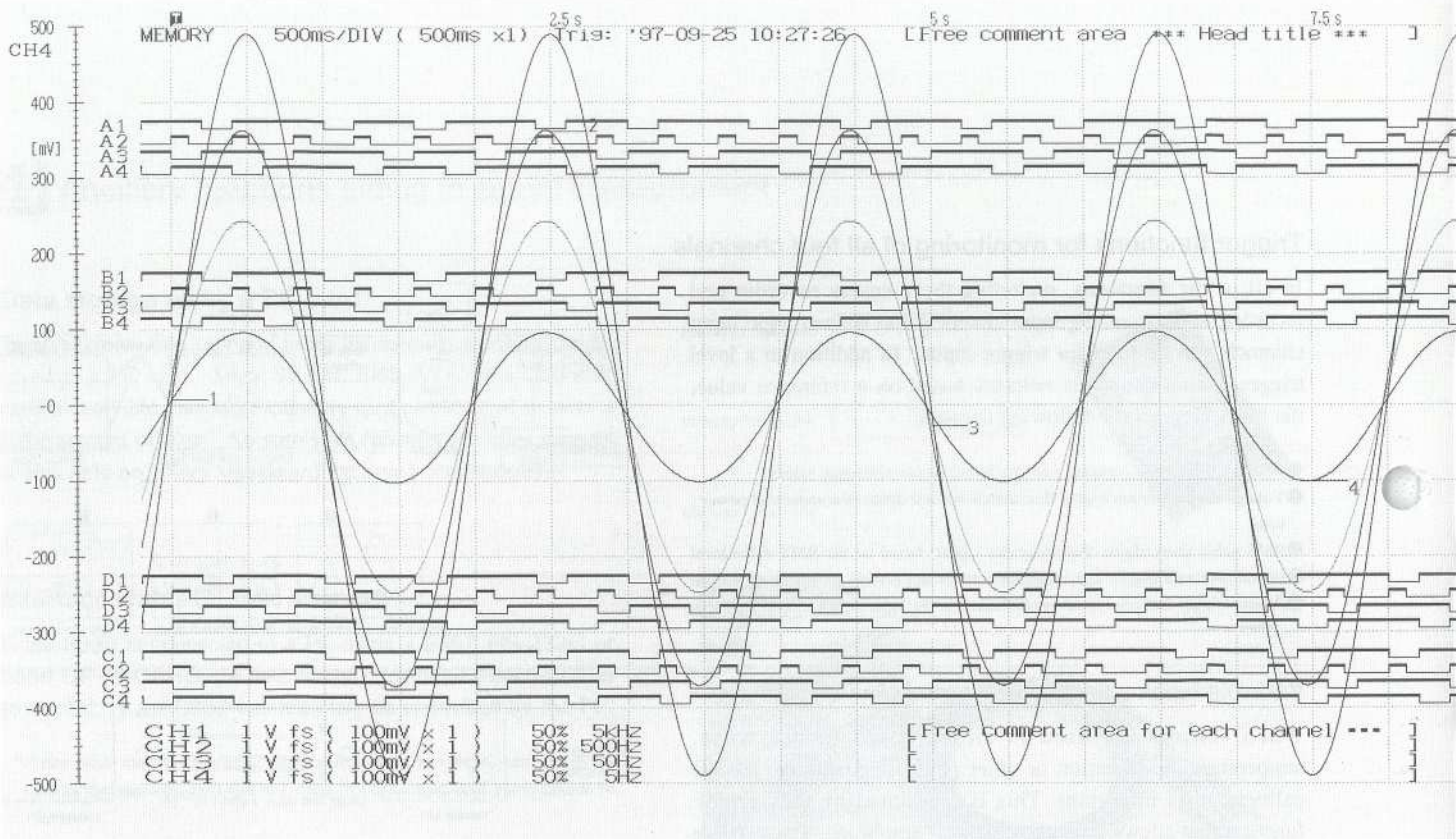
Connected to a standard color printer, the 8835 can produce color or monochrome A4 size printouts.

(using separately available 9559 PRINTER CARD, corresponding to ESC/P and ESC/P raster standard)



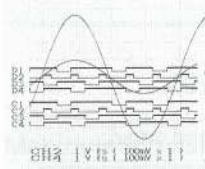
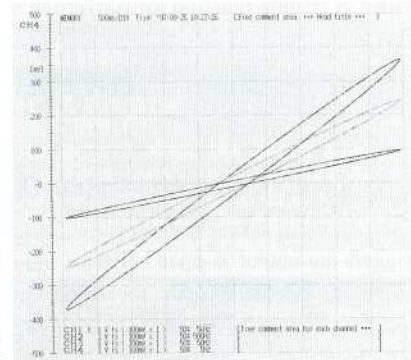
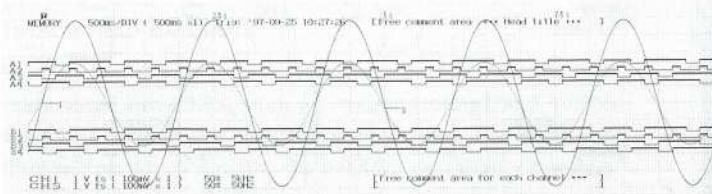
Example Printouts

(Actual size)

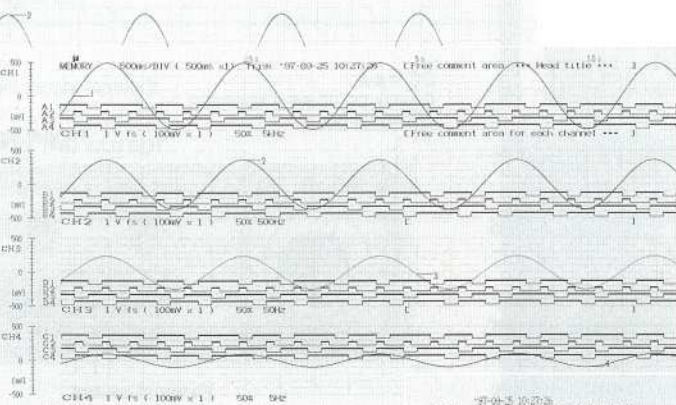


Sample recording in memory recorder function (full width)

The recording width can also be divided into two or four parts, and X-Y plots are possible.



Sample recording (two sections)



Sample recording (four sections)

Full-width recordings and recordings divided into two or four parts are also possible.

Sample recording in X-Y format

Synthesized X-Y waveforms can be output where amplitude data for each input channel is plotted on the vertical and horizontal axes, based on the waveform data obtained using the memory recorder. The recording size is 100 mm x 100 mm.

97-09-25 10:27:26
Title: [Free comment area: *** head title ***]
Channel: [Free comment area for each channel: ***]

(time)	CH1	CH2	CH3	CH4	A	B	C	D
	124	124	124	124				
-200ms	-211.86V	-187.56V	-123.76V	-51.87V				
-150ms	-275.06V	-182.56V	-121.36V	-50.00V	***	***	***	***
-100ms	-338.26V	-177.56V	-117.56V	-48.75V	***	***	***	***
-150ms	-335.16V	-172.56V	-113.76V	-48.12V	***	***	***	***
-100ms	-255.26V	-167.56V	-110.66V	-46.88V	***	***	***	***
-170ms	-243.46V	-162.56V	-107.56V	-45.00V	***	***	***	***
-170ms	-243.16V	-156.56V	-103.76V	-43.75V	***	***	***	***

Logging output

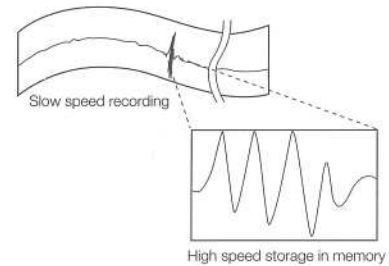
Instantaneous voltage values are printed for each sampling.

Upgrading provides sophisticated functions

5) Additional functions provided by the 9540 FUNCTION UP DISK

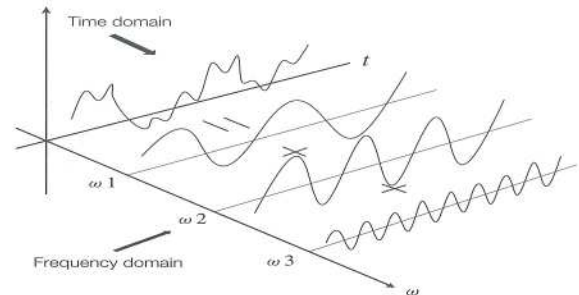
Recorder and memory functions

If an abnormal event is detected by triggers during the real-time recording of signals using the recorder function, it is stored in memory by the high-speed sampling memory recorder. The recorder function works independently and is therefore continuous. These functions are useful when the user wants to record normal waveforms as well as abnormal waveforms.



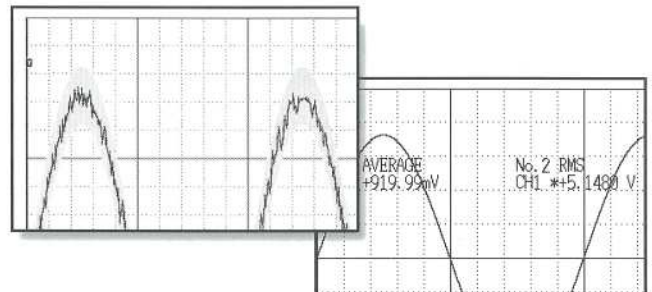
FFT analysis functions

The single-channel FFT function is used in spectrum analysis. The two-channel FFT function analyzes transfer functions. The octave analysis function is used in acoustic analysis. The signal source for FFT analysis is a section obtained from the waveforms captured in the memory recorder (the required number of pieces of data for FFT analysis is 1000).



Waveform and parameter judgment functions

Waveforms captured in memory recorder mode are monitored in a predetermined bounding area. Similarly, it is possible to use a numerical determination that monitors the parameter operation results of the input waveform based on a predetermined reference value.



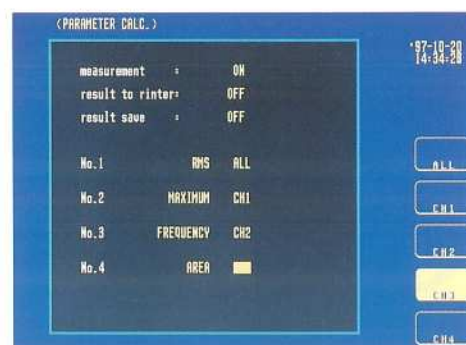
Simultaneous computation on four channels

It is possible to simultaneously compute four different types of waveforms, each of which has been captured on one of the four channels in memory recorder mode. The results of four basic arithmetic computations, differentiation, or integral are displayed in a waveform.

(The waveform computation requires a 9540 FUNCTION UP DISK.)

For parameter calculations that calculate numerical values such as the maximum and minimum values, up to four waveforms can be operated simultaneously on four channels.

(The parameter operations are a standard function.)



Options



8936 ANALOG UNIT
* Without an input cord



8937 VOLTAGE/TEMPERATURE UNIT
* Without an input cord



8938 FFT ANALOG UNIT
* Without an input cord



8939 STRAIN UNIT
* With an adapter cord



9557 RS-232C CARD
(compliance with the PCMCIA Standard)



9558 GP-IB CARD
(compliance with the PCMCIA Standard) * With a GP-IB cable, cord length : 2m



9559 PRINTER CARD
(compliance with the PCMCIA Standard) * With a printer cable



9596 RAM CARD
(compliance with the PCMCIA Standard; 1-MB SRAM)



9597 RAM CARD
(compliance with the PCMCIA Standard; 4-MB SRAM)



9197 CONNECTION CORD
(high-voltage use, up to 500 V)



9198 CONNECTION CORD
(low-voltage use, up to 300 V)



9199 CONVERSION ADAPTER
(receiving-end banana/BNC output)

Holds options only



9084 CARRYIN CASE
Approximate dimensions and mass :
260 (W) × 120 (H) × 300 (D) mm ; 750 g
Material : rigid PVC leather



9388 CARRYING CASE
Approximate dimensions and weight:
380 (W) × 580 (H) × 260 (D) mm; 6.3kg
Material: Rigid plastic

(Recorder unit) + (8936 unit or other × required number) + (other options)

Maximum number of measurements	1ch	2ch	4ch
Number of 8936 units	One	One	Two
Memory capacity per channel	500 k words	200 k words	100 k words

Ordering information

8835 MEMORY HiCORDER (basic unit only)

● Options Factory fitted or user-interchangeable

8936 ANALOG UNIT (2 channel unit)

8937 VOLTAGE/TEMPERATURE UNIT (2 channel unit)

8938 FFT ANALOG UNIT (2 channel unit)

● Options ※ Note : None-CE mark product

9018 CLAMP ON PROBE: 10 - 500 A, 40 Hz - 3 kHz, 9199 required

※ 9132 CLAMP ON PROBE: 20 - 1000 A, 40 Hz - 1 kHz, 9199 required

9197 CONNECTION CORD (high-voltage use, up to 500 V)

9198 CONNECTION CORD (low-voltage use, up to 300 V)

9199 CONVERSION ADAPTER (receiving end banana/BNC output)

9221 RECORDING PAPER (30 m/ 98.43 feet, 10 rolls)

※ 9303 PT (insulation transformer)

9305 TRIGGER CORD: 3.5-mm-dia. mini-plug, 1.5 m approx.

9320 LOGIC PROBE: 4-channel voltage/contact signal on/off detection

9321 LOGIC PROBE: 4 insulated channels AC/DC voltage on/off detection

9330-01 WAVE PROCESSOR; Windows 95/English Version

9388 CARRYING CASE (with casters)

9084 CARRYING CASE (holds options only)

9439 DC POWER ADAPTER (used between 10 VDC to 28 VDC)

9540 FUNCTION UP DISK

* The 8835 MEMORY HiCORDER cannot operate alone. To use the 8835, mount an optional input unit or units on it.

* A measurement input cord is not supplied with the input unit. Order optional 9197 and 9198 CONNECTION CORDS from us.

8939 STRAIN UNIT (2 channel unit)

9557 RS-232C CARD: Compliance with the PCMCIA standard

9558 GB-IB CARD: Compliance with PCMCIA standard, with GB-IB cable (2m)

9559 PRINTER CARD: Compliance with the PCMCIA standard, with printer cable (1.5m)

9596 RAM CARD: Compliance with the PCMCIA standard, SRAM-1 MB

9597 RAM CARD: Compliance with the PCMCIA standard, SRAM-4 MB

※ 220H PAPER WINDER: Paper width 70 (2.75") to 220 (8.66") mm, AC 100 V

※ 9270 CLAMP ON SENSOR: 20 A, 5 Hz - 50 kHz, 9555 required

※ 9271 CLAMP ON SENSOR: 200 A, 5 Hz - 50 kHz, 9555 required

※ 9272 CLAMP ON SENSOR: 20/200 A, 5 Hz - 10 kHz, 9555 required

※ 9277 UNIVERSAL CLAMP ON CT: 20 A, DC - 100 kHz, 9555 required

※ 9278 UNIVERSAL CLAMP ON CT: 200A, DC - 100 kHz, 9555 required

※ 9279 UNIVERSAL CLAMP ON CT: 500 A, DC - 20 kHz, 9555 required

※ 9555 SENSOR UNIT: used together with 9270 to 9272, 9277 - 9279

※ CT-101A LINE SPLITTER: for clamp current measurement up to AC 15 A

* Note : Product names appearing herein are trademarks or registered trademarks of various companies.

HIOKI

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All information correct as of Jan.19, 1999. All specifications are subject to change without notice.

Internet HIOKI web-page <http://www.hioki.co.jp/>

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