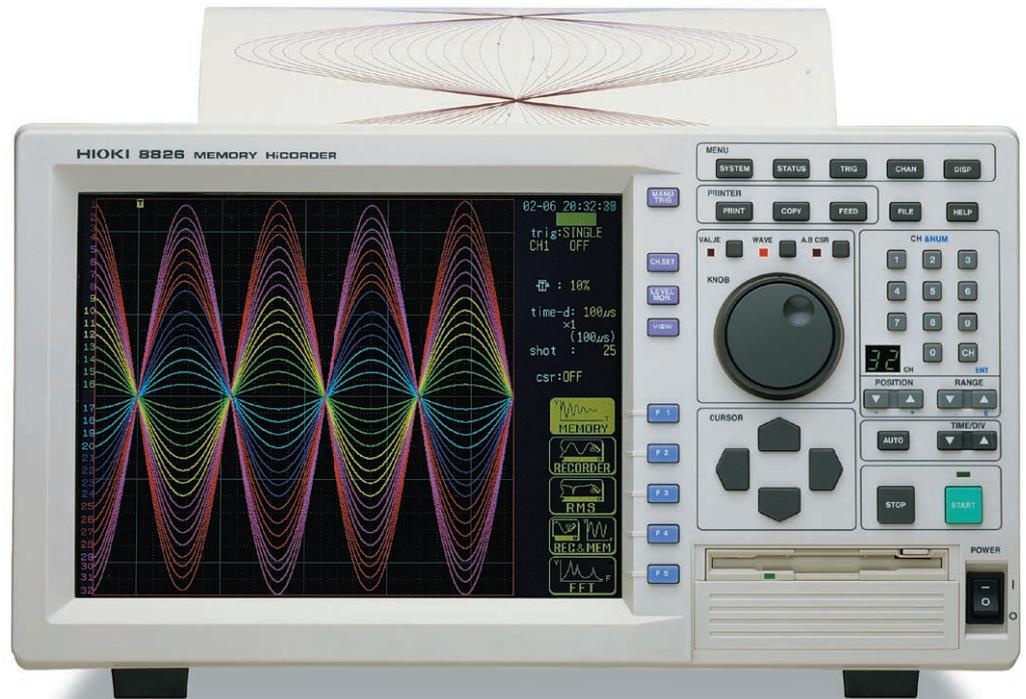


# HIOKI MEMORY HiCORDER 8826

Recorders 

CE



Insulated 32-Channel Recording, paper width 10.4 inch

## Network Recording Instrument for LAN

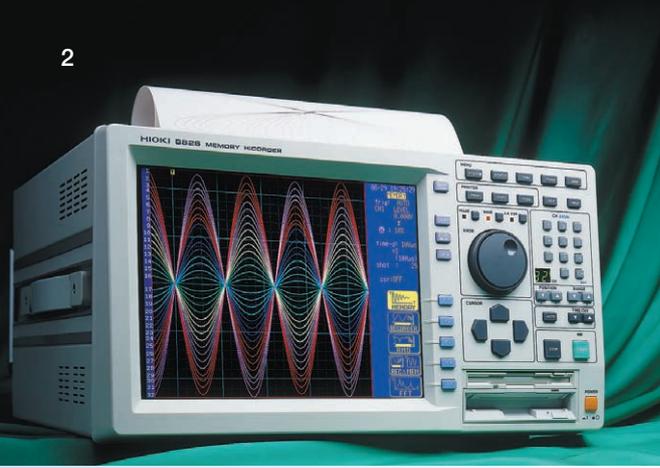
The **MEMORY HiCORDER 8826** can now be connected to a LAN, and when used with a PC makes the ideal recorder for today's Internet-based environment. For use with the **8826**, **HIOKI** provides a wide assortment of input units suitable for all types of signal measurement. The **8826** has a high waveform sampling rate of 1M sample/s which is carried out for all 32 channels simultaneously. In addition, the **8826** supports multichannel recording with wide 10.4-inch recording paper, a memory capacity of 64 megawords for all 32 channels (when expansion memory is installed), and a color LCD.



ISO 9001  
JMI-0216



ISO 14001  
JQA-E-90091



# Level Recorders Play a Vital Role in Many Areas of Modern Industry.

## - Features -

### ● 10.4 inch color TFT display

The large, bright display shows waveforms for all channels (32 analog + 32 logic channels) in 12 colors, allowing easy visual identification. The display also greatly facilitates operation of the unit.

### ● Simultaneous measurement in up to 32 analog channels

Featuring the highest number of input channels in this class, the **8826** lets you simultaneously record in 32 analog + 32 logic channels. All analog inputs are isolated.

### ● Built-in PC card slot

A floppy disk drive and type III PC card slot are provided as standard equipment. This makes it easy to archive measurement data. Besides its internal binary file format, the **8826** can also store data as ASCII files and display screen shots as BMP files.

### ● Large-capacity memory

In the standard memory configuration, the **8826** can store a total of 16 mega-words. With expansion memory installed, capacity is a full 64 mega-words. This provides for up to 2 mega-words per channel when 32 channels are used. Even with high-speed sampling, long-term recording is possible.

### ● CE Mark compliant

Complies with the EC directive determining safety standards in Europe (within the EU).

### ● Internal sampling rate of 1 MS/s, 500 kS/s external sampling rate

The A/D converter that digitizes measurement signals operates at the high sampling rate of 1 M sample/s (1  $\mu$ sec cycle). Resolution for the voltage axis is 12 bits. Sampling is carried out for all channels simultaneously.

### ● Converts to text file used with a Wave viewer

(supplied accessories, PC application software)

To open measurement data in PC applications such as Excel, the data must be converted to text data in the CSV format. The PC application software which comes standard in the package enables easy operation.

### ● Connects to PCs and printers on a LAN network

Its use with PCs can be selected according to the usage. It allows remote operation and data transfer via LAN connection, GP-IB connection, or RS-232C connection.

### ● On-screen help

Explanation of button operations and many basic operations can be displayed on the screen with the provided online help function.

### ● Plug-in slots enhance versatility

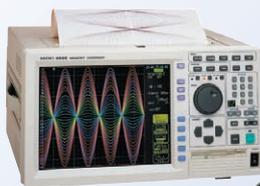
The number of measurement channels can be matched to the application requirements by using plug-in modules. New types of converter amplifiers and other accessories to be introduced in the future will allow direct measurement of various physical quantities.

## A LAN-Connectable Recorder! Digitally Process Test Data

With a conventional pen recorder, even if all test data is written on the paper, usually only a small portion of the data is needed. However, to look for just a small important part requires very extensive search of the recording paper.

**MEMORY HiCORDER 8826** stores and manages all waveform measurement data electronically. Furthermore, use of a LAN card and **LAN COMMUNICATOR 9333**

enables high-speed data file transfer to PCs on a network.



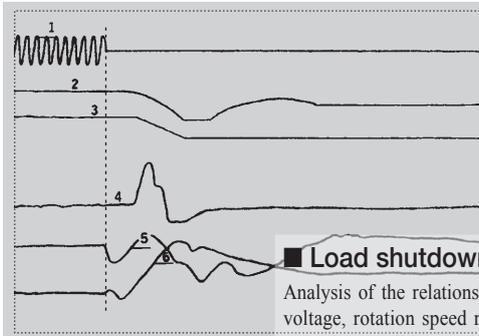
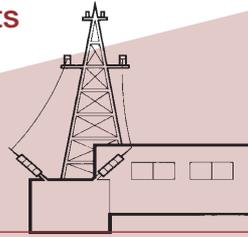
	A	B	C	D	E	F	G	H
1	COMMENT	8826 DATA						
2	DATE	07-28-2000						
3	TIME	15:05:31						
4	NUM SIGS	65						
5	INTERVAL	1.00E-06						
6	HORZ UNITS	S						
7	VERT UNITS	S	V	V	V	V	V	V
8	SIGNAL	TIME	ACH 1	ACH 2	ACH 3	ACH 4	ACH 5	ACH 6
9	DATA							
10		0.00E+00	1.25E-04	1.25E-04	1.25E-04	1.25E-04	1.25E-04	1.25E-04
11		1.00E-06	5.00E-04	5.00E-04	5.00E-04	5.00E-04	5.00E-04	5.00E-04
			03	1.00E-03				
			03	1.44E-03				
			03	1.75E-03				
			03	2.44E-03				
			03	2.81E-03				
			03	3.31E-03				
			03	3.63E-03				
			03	4.13E-03				
			03	4.50E-03				
			03	4.88E-03				
			03	5.38E-03				
			03	5.81E-03				

Example of using measurement data in Excel

# - Application -

## Load shutdown tests in power generation plants

For load shutdown tests in power generation plants, the pre-trigger function can be used to measure and record waveforms before and after the test, enabling accurate analysis. The vernier function, which can be used to perform fine adjustment of amplitudes, is also a useful tool.

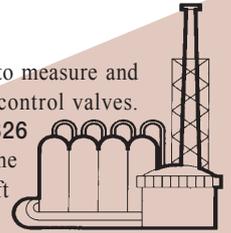


### Load shutdown test

Analysis of the relationship between the generator voltage, rotation speed regulation, governor servo operation condition, and the open and close timing of the pressure regulator before and after load shutdown can be performed.

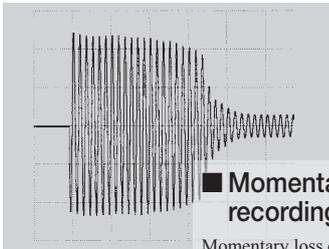
## Plant maintenance

In plants, memory recorders are used to measure and record the operation of solenoid and control valves. Since the **MEMORY HiCORDER 8826** can simultaneously create X-Y plots, the relationship between flow and valve lift can also be observed.



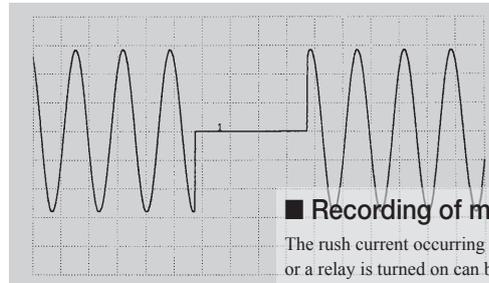
### Ground fault line detection

To identify the ground fault line of transmission lines, measurement can be conducted using the trigger that combines a leak current meter and the recorder. This allows observation and recording of the waveform before and after ground faulting to identify the line.



### Momentary loss of power recording

Momentary loss of power in power-supply circuits can be recorded by using the voltage drop detection trigger, thus enabling accurate waveform recording of unexpected events.

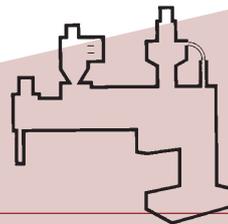


### Recording of motor rush current

The rush current occurring when the power to a motor or a relay is turned on can be accurately measured as a waveform.

## Vibration analysis

When installing rotating machinery, such as agitators, that create many vibrations, damping precautions are normally taken to ensure that the vibrations are not propagated directly to the floor surface. Analysis of the vibration damping measures and effects can be conducted by measuring the natural frequency and the transfer function.

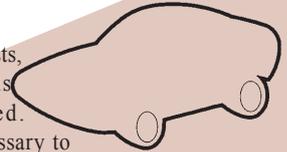


### FFT analysis function

FFT capability includes single-signal FFT for analyzing frequency components, two-signal FFT for transfer function analysis, and octave analysis for acoustic analysis. The source signal can be selected from waveform data captured by the memory recorder, and isolating required sections is also possible. (Number of data points: 1000 - 10000)

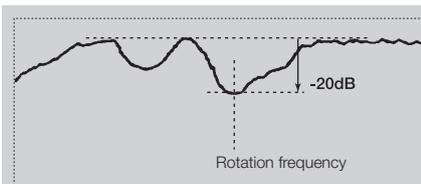
## Research and development of automobiles

In vehicle and engine running tests, the relationship among various parameters must be examined. Multi-channel recorders are necessary to accomplish this.



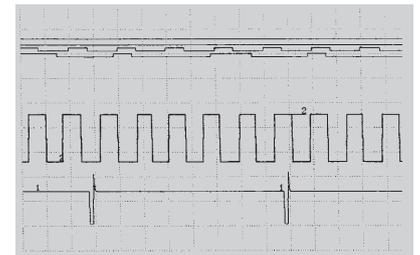
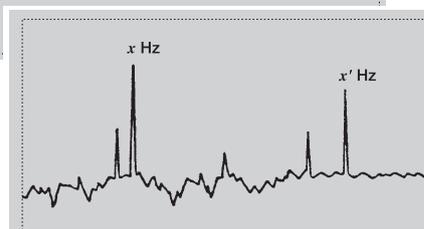
### Measurement of the damping of vibrations reaching the solid base from the rotating machinery

By striking the agitator with an impulse hammer, the vibrations propagated to the solid base can be measured by the acceleration speed pick up. Finding the transfer function can show to what extent specific frequencies are being dampened.



### Measurement of the natural frequency of objects

Resonance phenomena can be avoided by ensuring that the natural frequency of an object is different from the vibration frequency of the surroundings. By striking the object with an impulse hammer and finding the transfer function, the natural frequency of the object can be found.



### Analysis of engine characteristics

The pressure waveforms of injection pipes and fuel-injection pumps, etc., can be recorded and stored in the internal memory and then superimposed on a reference waveform for analysis.

# High-Speed Response for Capturing Transient Events

## - Function Details -

### Large memory capacity allows long-term recording of high-speed data

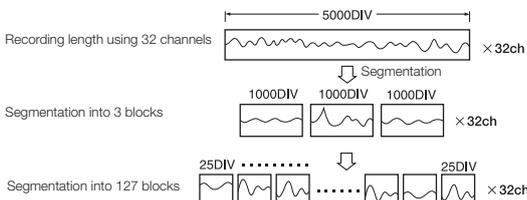
In the standard configuration, the 8826 can store a total of 16 mega-words, and with memory expansion 64 mega-words, using internal solid-state memory. This provides ample capacity to store data for all 32 channels. The table at right shows possible recording times, according to the time axis setting and the number of channels in use. A reduction in the number of channels prolongs the recording time.

\* The table applies to the standard memory configuration. When the optional MEMORY BOARD 9599 is installed, recording times are extended by a factor of 4 (from 16 mega-words/channel, 160,000 divisions for 4 channels to 2 mega-words/channel, 20,000 divisions for 32 channels).

### Memory segmentation function

When using the memory recorder function, the data memory can be divided into a maximum of 255 blocks. Data can be written sequentially to the memory blocks, and the waveform in a reference block and any other block can be superimposed and compared.

\* In the standard memory configuration (16 mega-words), the maximum number of blocks using the 32 channel setting is 127. When the memory expansion is installed, or when the channel setting is 4 to 16, the maximum number of blocks is 255.

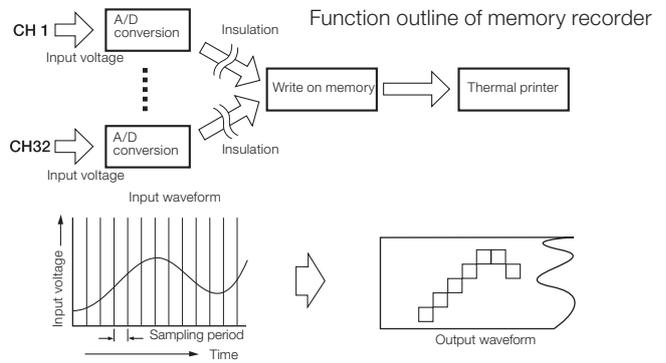
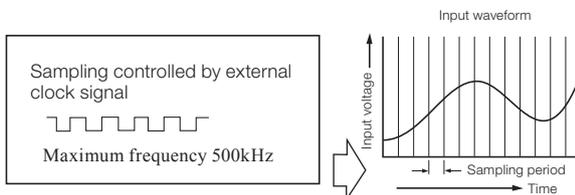


### Zoom function \*In memory recorder function

To make the most of the large-capacity memory, it is possible to display a compressed waveform simultaneously with a magnified waveform. Since the 8826 is capable of storing a large amount of data, high-speed sampling is also possible for waveforms with a long duration. Accordingly, while observing the compressed image of the entire waveform, it is also possible to observe the magnified details of desired parts. Compressed display of a part of the entire waveform is also possible.

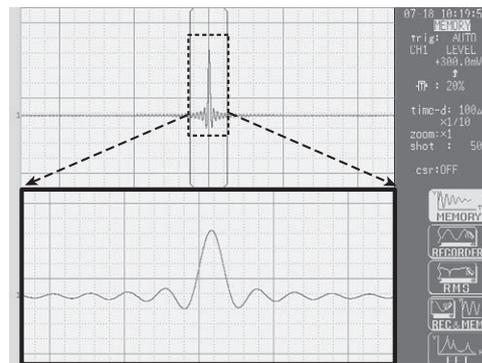
### Clock input for external sampling \*In memory recorder function

The sampling rate for the memory recorder can be controlled by the timing of an external clock signal. This is useful for example to collect data synchronized to the running cycle of an engine.



### Recording Time on internal memory

Time axis	Sampling period	4-channel setting 4 MW/channel 40,000 DIV	32-channel setting 500 kW/channel 5,000 DIV
100µs/DIV	1µs	4 s	0.5 s
200µs/DIV	2µs	8 s	1 s
500µs/DIV	5µs	20 s	2.5 s
1ms/DIV	10µs	40 s	5 s
2ms/DIV	20µs	1 m 20 s	10 s
5ms/DIV	50µs	3 m 20 s	25 s
10ms/DIV	100µs	6 m 40 s	50 s
20ms/DIV	200µs	13 m 20 s	1 m 40 s
50ms/DIV	500µs	33 m 20 s	4 m 10 s
100ms/DIV	1ms	1 h 6 m 40 s	8 m 20 s
200ms/DIV	2ms	2 h 13 m 20 s	16 m 40 s
500ms/DIV	5ms	5 h 33 m 20 s	41 m 40 s
1s/DIV	10ms	11 h 6 m 40 s	1 h 23 m 20 s
2s/DIV	20ms	22 h 13 m 20 s	2 h 46 m 40 s
5s/DIV	50ms	2 days 7 h 33 m 20 s	6 h 56 m 40 s
10s/DIV	100ms	4 days 15 h 6 m 40 s	13 h 53 m 20 s
30s/DIV	300ms	13 days 21 h 20 m	1 day 17 h 40 m
1min/DIV	0.6s	27 days 18 h 40 m	3 days 11 h 20 m
2min/DIV	1.2s	55 days 13 h 20 m	6 days 22 h 40 m
5min/DIV	3.0s	138 days 21 h 20 m	17 days 8 h 40 m



### Manipulation using the cursor

Use of the two cursors on the screen enables the user to read the time difference and potential difference.



## - Function Details -

### Real time save function \*supported in version 2.50 or later

The real time save function enables data to be saved to the PC card while waveform is being measured. The compressed waveform is displayed on the screen at real time. This function is valid at the recorder and memory function. Write to the PC card can be up to 1kS/s (=100ms/DIV) for 16 channels, or up to 500S/s (200ms/DIV) for 32 channels. With the real time save function, data measured at the pre-determined sampling below the maximum sampling can be saved to the PC card at any time.

In addition, since the same data is compressed along the time axis and displayed on the screen, you can check how recording is going. Compressed data is saved to the PC card for later retrieval.

### Maximum continuous recording time using 256MB/1GB PC card (with MEMORY BOARD 9599 expansion)

Time axis	Sampling period	256MB PC card	1GB PC card
100ms/DIV	1ms	2 h 13 m 12 s	8 h 53 m 03 s
200ms/DIV	2ms	2 h 13 m 10 s	8 h 53 m 00 s
500ms/DIV	5ms	5 h 32 m 55 s	22 h 12 m 20 s
1s/DIV	10ms	11h 5 m 30 s	1 day 20 h 23 m 50 s
2s/DIV	20ms	22 h 10 m 20 s	3 days 16 h 44 m 40 s
5s/DIV	50ms	2 days 7 h 20 m	9 days 5 h 30 m 00 s
10s/DIV	100ms	4 days 14 h 20 m	18 days 9 h 46 m 40 s
30s/DIV	300ms	13 days 15 h 10 m	54 days 14 h 50 m
1min/DIV	0.6s	26 days 19 h 10 m	107 days 11 h 20 m
2min/DIV	1.2s	51 days 19 h 40 m	208 days 5 h 40 m
5min/DIV	3.0s	117 days 21 h 10 m	208 days 8 h 00 m

*Note:* Saved at 16 channels for 100 ms/DIV, or at 32 channels otherwise.

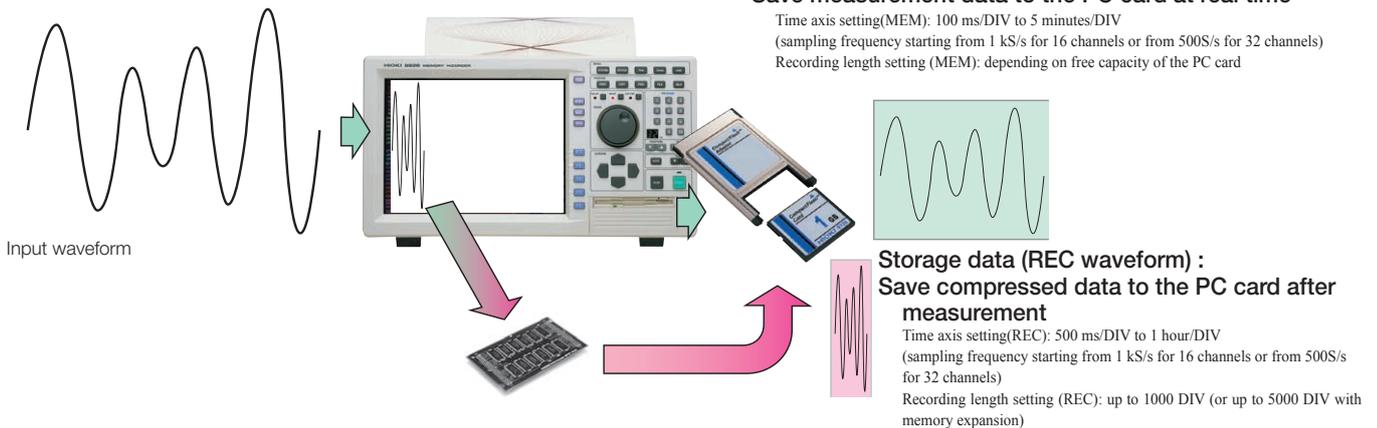
*Note:* Maximum continuous recording time at MEM function, with time axis is 1 hour/DIV in REC function.

*Note:* Limit of maximum continuous recording time at MEM function is 208 days and 8 hours.

### Storage data (MEM waveform) :

#### Save measurement data to the PC card at real time

Time axis setting(MEM): 100 ms/DIV to 5 minutes/DIV  
(sampling frequency starting from 1 kS/s for 16 channels or from 500S/s for 32 channels)  
Recording length setting (MEM): depending on free capacity of the PC card



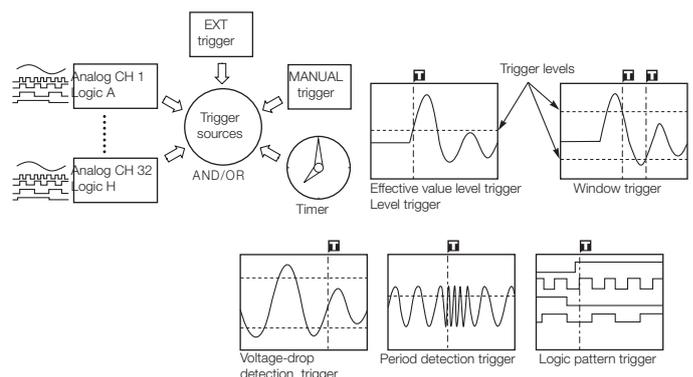
### Display data (REC waveform): compressed waveform is displayed on screen Compressed data is saved temporarily in the internal memory.

However, display time axis of REC data is 2 steps later than that of MEM data. The maximum recording time that can be set is determined by the free capacity of the PC card, and the time axis and recording length of MEM/REC. Nevertheless, since the maximum recording length of REC is fixed at 1000 DIV, or 5000 DIV if there is memory expansion, even if there is plenty of free capacity on the PC card, the recording time cannot exceed the value determined by REC time axis multiplied by 1000 DIV.

## Trigger functions capable of monitoring all 32 channels

For all of the measurement functions, including record and memory recorder, triggers can be set on all 32 channels. In addition to a simple level trigger based on comparison with a single voltage value, the following trigger functions are also available:

- Window trigger based on 2 voltage values
- Voltage drop trigger for AC power lines
- Level trigger based on rms values
- Cycle trigger monitoring the rising edge of a voltage
- Pattern trigger monitoring the Hi/Low condition of a logic signal



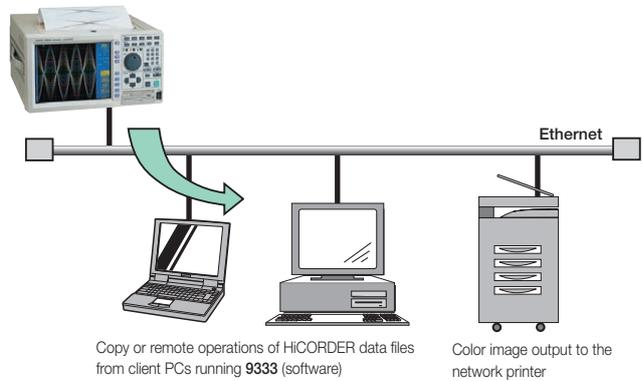
## - Function Details -

### Support for connection to PCs via Ethernet

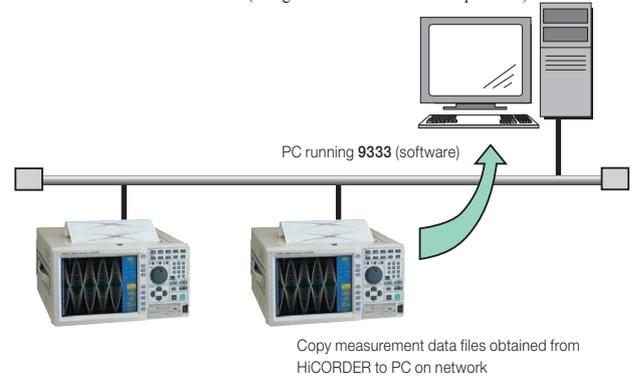
The **8826** can be connected to Ethernet, a standard network protocol in the Internet age (using the optional **LAN CARD** and **LAN COMMUNICATOR 9333**). For those who frequently analyse measurement data on PCs, this function offers a good match. Also, connection to PCs using RS-232C connection or GP-IB connection is possible (using the optional **RS-232C CARD 9557** and **GP-IB CARD 9558**). **8826** data can be sent to PCs or be remotely controlled from PCs.

\* Because LAN card, GP-IB card, and RS-232C card all use the same PC card slot of **8826**, when one of them is inserted into the PC card slot, then any memory card cannot be used at the same time.

#### ■ Connect HiCORDER to departmental LAN (using TCP/IP communication protocol)



#### ■ Save data to network server (using TCP/IP communication protocol)

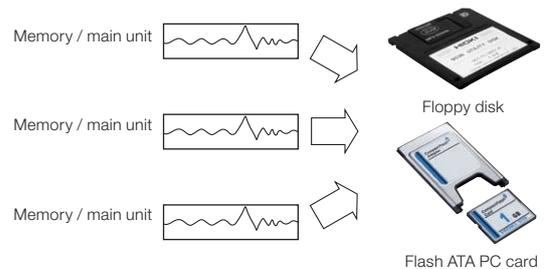


### Offline data exchange with PCs

The supplied waveform viewer (PC application) can convert saved waveform data to text files (CSV format). For data storage, the FD/PC card (supplied as standard) can be used. This allows easy offline data exchange with PCs.

*Note: The optional MO drive is discontinued.*

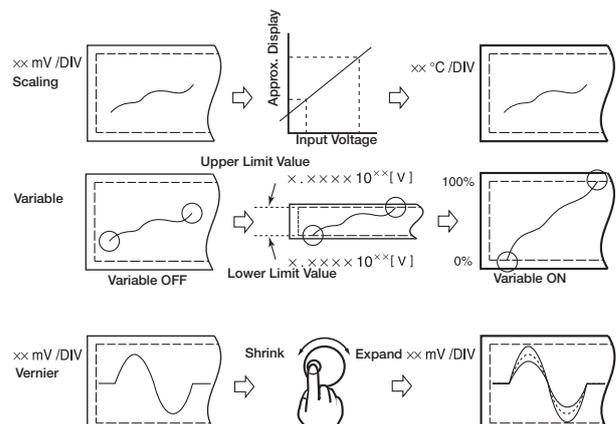
\* In addition to HiCORDER's read/write native file (binary format), data can also be saved to text files (CSV format) which can be opened by PC spreadsheet applications, or waveform bitmap files (BMP format). However, because data saved in text files cannot be read by HiCORDER, it is recommended that text data conversion be performed on PCs.



### Scaling Functions

Actual measurements usually involve parameters other than voltage. Various physical parameters such as speed, vibration and temperature commonly need to be recorded, and this signal data should be directly readable, without having to be manually converted. In such measurement conditions, the scaling function can be used to automatically convert to the desired parameter value. Additionally, waveform amplitude can be adjusted using the Variable Gain function.

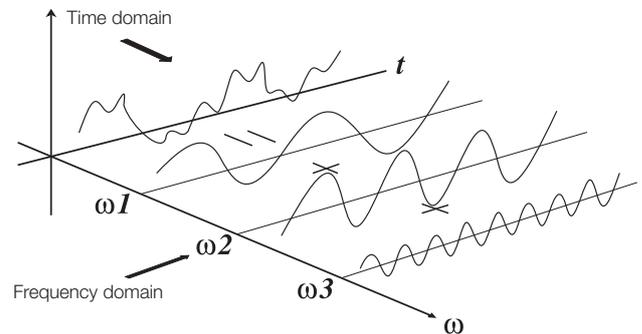
In addition, if accurate input voltage amplitude measurement is not required, the amplitude can be intentionally modified with the Vernier Adjustment function.



## - Function Details -

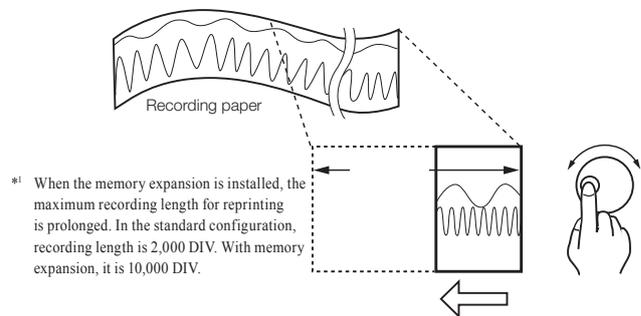
### FFT analysis functions

FFT capability includes single-signal FFT for analyzing frequency components, two-signal FFT for transfer function analysis, and octave analysis for acoustic analysis. The source signal can be selected from waveform data captured by the memory recorder, and isolating required sections is also possible. (Number of data points: 1,000 to 10,000)



### Function outline of recorder (REC)

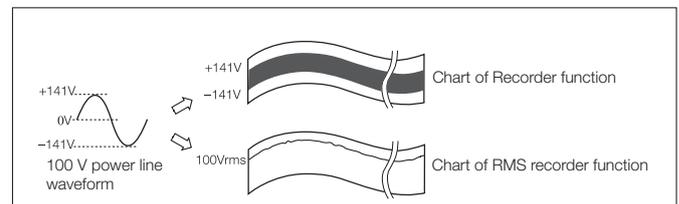
The input signal is converted to digital form and displayed and printed in real time. The maximum chart speed is 20 mm/s (in the 500 ms/DIV range). After the end of measurement, measurement data for the last 2,000 DIV \*<sup>1</sup> are still in memory and can be viewed with the back-scroll function or printed out again.



### Effective value (RMS) recorder function

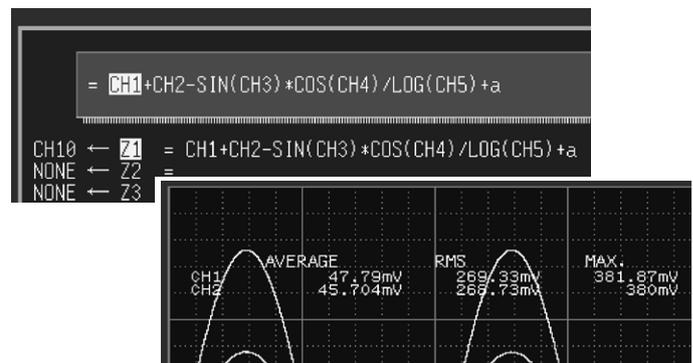
This function is designed exclusively for use on 50/60 Hz power supply lines and DC. High-speed sampling is applied to calculate the rms value from the waveform data \*<sup>2</sup>, and the result is recorded as a graph.

\*<sup>2</sup> Using fixed 200  $\mu$ 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).



### Simultaneous execution of up to 16 mathematical functions \* In MEM function

Available waveform processing functions include all arithmetic operations as well as differentiation, integration, and other functions whose results can be displayed as waveforms. Up to 16 functions can be set.



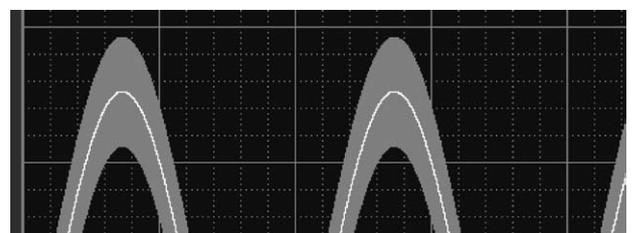
### Waveform parameter processing \* In MEM function

13 types of parameters such as maximum value and minimum value can be selected for processing. For simultaneous operation in all 32 analog channels, up to 4 parameters are possible.

### Waveform evaluation \* For MEM function and FFT analysis functions

After defining a reference waveform bounding area, it is possible to check whether waveforms go outside this reference area. As opposed to simple level-based triggering, even complex waveforms can be evaluated quickly and reliably, because both the level direction and the time axis direction are taken into consideration.

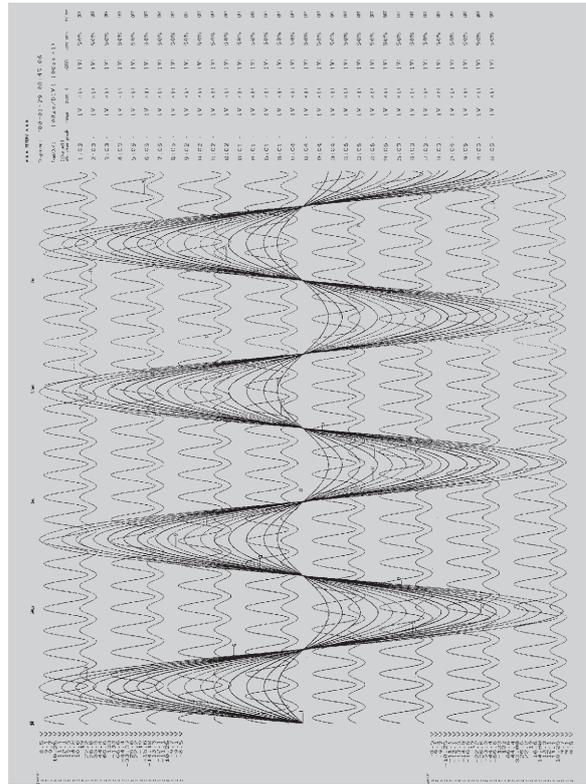
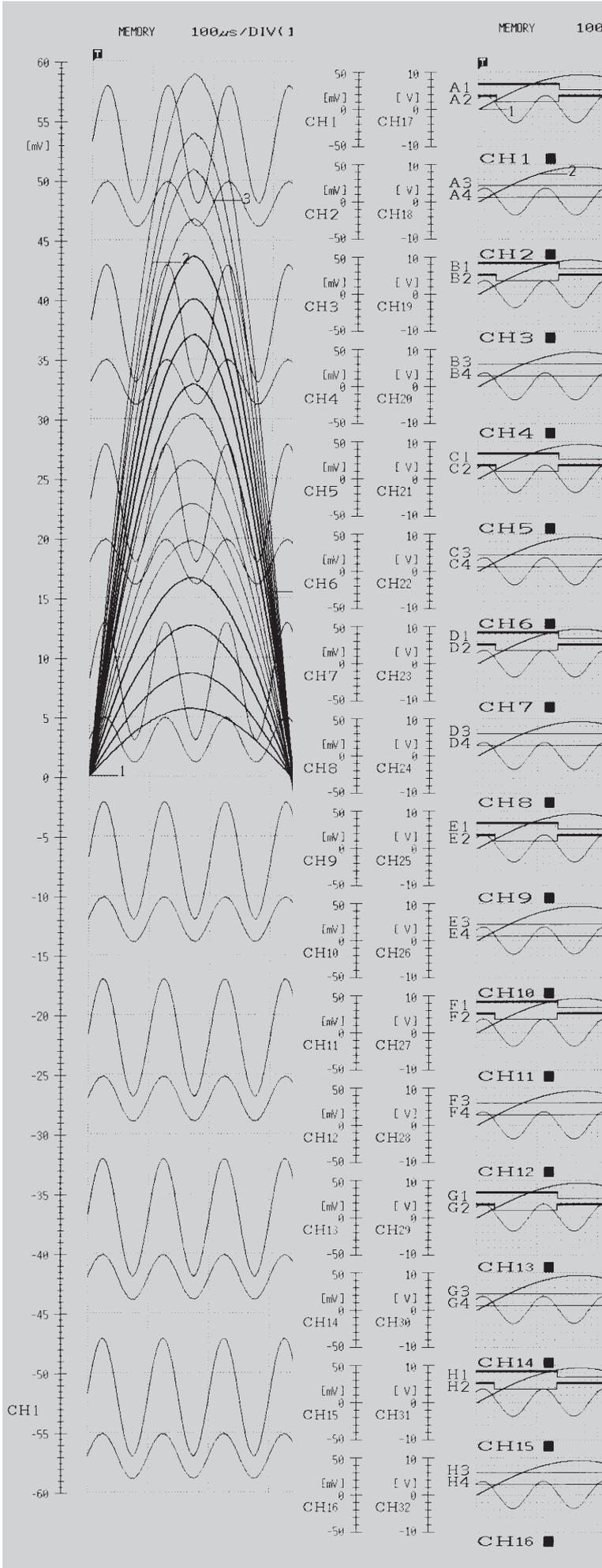
\* Registered patent No. 2028013 in Japan



# 8 Example Printouts & Screen

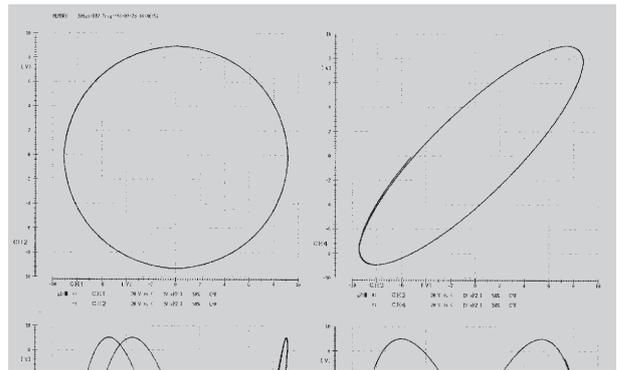
(WIDE mode, actual size)

B4 size paper (264 mm width) allows full-size mixed printing or division into up to 16 sections



Example of B4 report output

Screen image output at high resolution, B4 size.



Example of X-Y plotting

Time-axis waveforms of each input channel can be defined on vertical and horizontal axes to create X-Y plots.

(time)	CH1 CH17	CH2 CH18	CH3 CH19	CH4 CH20	CH5 CH21	CH6 CH22
0 s	125μA 2.9625 V	125μA 2.95 V	187.5μA 2.95 V	62.5μA 2.9625 V	125μA 2.9625 V	
1μs	500μA 3.1 V	500μA 3.0875 V	562.5μA 3.0875 V	437.5μA 3.1 V	500μA 3.1 V	
2μs	1mV 3.225 V	1mV 3.2125 V	1.0625mV 3.2125 V	937.5μA 3.225 V	1mV 3.225 V	
3μs	1.4375mV	1.4375mV	1.5mV	1.375mV	1.4375mV	1

Example of Logging output

This prints the instantaneous numerical value for each sample.

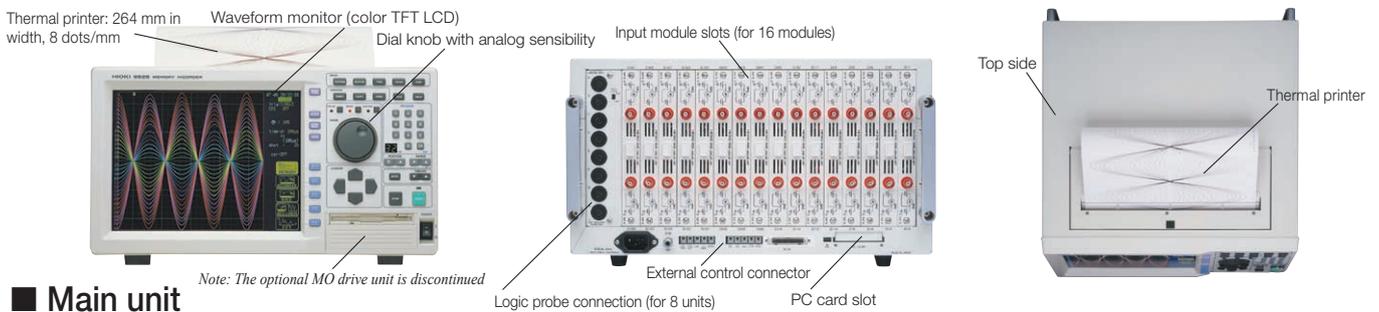
● Function mode setting

- Set the function mode.
- Make the selection with the function keys.

MEMORY : Select the memory recorder function.  
 RECORDER: Select the recorder function.  
 RMS : Select the RMS recorder function.  
 REC&MEM : Select the recorder and memory function.

## Online help and error indication

Simply pressing the help key will bring up relevant information on functions and operation steps. If an error has occurred, the reason for it is also displayed to ease operation.



## Main unit

Basic specifications 8826 (max. 16 input modules)	
<b>Input type/number of channels</b>	Plug-in input modules Max. 32 analog ch's + 32 logic ch's (Isolated analog channels, isolated input and frame, logic has common GND)
<b>Measurement functions</b>	MEM (high-speed recording), REC (real-time recording), RMS (50/60Hz, or DC only), REC & MEM (include the Real-time save function), FFT
<b>Maximum sampling rate</b>	1 MS/second (1 $\mu$ s, all channels simultaneously) External sampling (500kS/second, 2 $\mu$ s)
<b>Memory capacity</b>	<b>16 Mwords total</b> : (12 analog bits + 4 logic bits) $\times$ 4 Mwords/channel (4 channels used) to (12 analog bits + 4 logic bits) $\times$ 500 kwords/channel (32 channels used) * Memory capacity can be expanded 4 times.
<b>Data storage media</b>	<b>PC Card Type III slot <math>\times</math> 1</b> : up to 1GB (Flash ATA) <b>FD drive <math>\times</math> 1</b> : 1.44MB, 1.2MB, 720KB, MS-DOS format <b>File format</b> : Binary, text, BMP Note: The optional MO UNIT 9598 is discontinued
<b>Backup functions (at 25°C/77°F)</b>	<b>Clock and setting conditions</b> : battery life of at least 10 years <b>Waveform data</b> : none
<b>External control connectors</b>	<b>Terminal board</b> : external trigger input, trigger output, waveform judgment output, external start/stop, print input, external sampling input.
<b>Interfaces (option)</b>	GP-IB, RS-232C, LAN Note: Use one of the following: <b>RS-232C CARD 9557</b> , <b>GP-IB CARD 9558</b> , <b>LAN CARD (HIOKI-tested)</b> . Remote control and transfer the data
<b>Environmental conditions (no condensation)</b>	Operation: +5°C (41°F) to +40°C (104°F), 35% to 80% rh Storage: -10°C (14°F) to +50°C (122°F), 20% to 90% rh
<b>Compliance standard</b>	<b>Safety</b> : EN61010 <b>EMC</b> : EN61326, EN61000-3-2, EN61000-3-3
<b>Power requirements</b>	100 to 240V AC (50/60 Hz)
<b>Power consumption (with 8936 full loaded)</b>	300VA, max. for 100V AC (100VA with the printer off)
<b>Dimensions and mass</b>	401mm (15.79in) W $\times$ 235mm (9.25in) H $\times$ 382mm (15.04in) D, 11kg (388.0oz.) (main unit only)
<b>Supplied accessories</b>	Instruction Manual $\times$ 1, Power cord $\times$ 1, Printer paper $\times$ 1, Protective cover $\times$ 1, Roll paper attachment $\times$ 2, PC card protector $\times$ 1, Application Disk (Wave Viewer Wv, Communication Commands table) $\times$ 1

## Print/display section

<b>Display</b>	10.4 inch TFT color LCD, with English/Japanese selector (640 $\times$ 480 dots)
<b>Recording paper</b>	264 mm (10.39 in) $\times$ 30 m (98.4 ft), thermal paper roll
<b>Recording width</b>	20/24 divisions for full scale, 1 DIV = 10 mm (0.39 in) (80 dots)
<b>Paper feed density</b>	10 rows/mm (250 rows/in) * 20 rows/mm (500 rows/in with the memory recorder's smooth print function)
<b>Recording speed</b>	Max. 25 mm/s (0.98 in/s)

## Trigger functions

<b>Trigger sources</b>	CH1 to CH32 (analog), CHA to CHH (logic), external, timer, manual (either ON or OFF for each source), logical AND/OR of sources
<b>Trigger types (analog)</b>	<b>Level</b> : Digital setting of voltage. Triggered when set value is exceeded in UP or DOWN direction. <b>Window</b> : When entering or exiting a level range defined by upper or lower limit <b>Voltage drop</b> : Only for AC power lines. Triggered when the peak voltage falls below setting value <b>Period</b> : When rising or falling edge of set voltage does not fall within cycle range <b>RMS level</b> : Only for DC and AC power lines. Triggered when rms value crosses set value in UP or DOWN direction
<b>Level setting resolution</b>	Equivalent to 0.25% when full scale is set to 20 divisions
<b>Trigger types (logic)</b>	Pattern trigger: 1, 0, or $\times$ (disregard), logical product (AND) or logical sum (OR) set for 4 channels
<b>Trigger filter (analog/logic)</b>	OFF, setting range 0.1 to 10.0 DIV; 9 ranges (MEM, MEM waveform in REC & MEM function, FFT function), ON (10 ms)/OFF (REC function)
<b>Other functions</b>	Pre-trigger function to capture pre- and post-trigger waveform, trigger output (active Low and open collector 5V voltage output), Start & stop trigger in REC function

## Memory functions

<b>Time axis</b>	100 $\mu$ s to 5min/DIV, 20 ranges or external sampling, time axis resolution 100 points/DIV, time axis zoom: $\times$ 2 to $\times$ 10 in 3 stages, compression: 1/2 to 1/10,000 in 12 stages
<b>Sampling rate</b>	1/100 of time axis ranges (minimum sampling period 1 $\mu$ s)
<b>External sampling</b>	Max. 500kS/s (minimum sampling period 2 $\mu$ s)
<b>Recording length</b>	Settable in 1 DIV steps, 20 to 40,000 DIV*1 *1 Depending on the number of channels in use. With memory expansion max. 160,000 DIV.
<b>Pre-trigger</b>	Can record data from before the trigger point, 0 to 100% or -95% of recording length; 15 settings
<b>Other functions</b>	waveform processing, waveform parameter processing, waveform averaging, memory segmentation (up to 255 segments), logging (numerical printout), X-Y waveform plot, voltage axis zoom $\times$ 2 to $\times$ 10, 3 settings, compression 1/2, zoom, variable display, graph superimposition, waveform judgment function

## Recorder functions (time axis waveform and X-Y format)

<b>Time axis</b>	20ms to 1 hr/DIV with 16 ranges, time axis resolution 100 points/DIV, time axis compression: 1/2 to 1/500 in 8 stages At 20ms to 200ms/DIV, printing in real time is not possible, but waveform data are stored in memory and can be monitored on screen. Data are stored for 2,000 divisions before the end of measurement. At recording length settings other than "Continuous", the printer can be used simultaneously, for follow-up printing of waveforms.
<b>Sampling rate</b>	1 $\mu$ s to 100ms; 6 settings (selectable from 1/100 or less of time axis)
<b>Recording length</b>	Settable in 1 DIV steps, 25 to 2,000 DIV*2, or "Continuous"*3 At X-Y format: only continuous for X-Y plotting *2 Measure all channels, 10,000 DIV at expanded memory. *3 When time 20 ms - 200 ms/DIV and printer is ON, continuous is not available.
<b>X-Y sampling period</b>	500 $\mu$ s; fixed (dot), 500 $\mu$ s to 18ms (line)
<b>X-Y axis resolution</b>	20dots/DIV (display), 100dots (horizontal) $\times$ 80 dots (vertical)/DIV (printer)
<b>Waveform memory</b>	Store data for most recent 2,000 DIV (10,000 DIV at expanded memory) in memory. Backward scrolling and re-printing available.
<b>Other functions</b>	logging (numerical printout), additional recording (recording is resumed without overwriting previous data), voltage axis magnification $\times$ 2 to $\times$ 10; 3 settings, compression 1/2; 1 setting, variable display.

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

<b>Time axis</b>	5s to 1 hr/DIV; 9 settings, time axis compression 1/2 to 500; 8 settings
<b>Sampling rate</b>	200 $\mu$ s fixed (20 rms datas/s)
<b>RMS calculation accuracy</b>	$\pm$ 3% f.s.
<b>Recording length</b>	Settable in 1 DIV steps, 25 to 2,000 DIV*4 (10,000 DIV at expanded memory) or "Continuous" *4 Measure all channels.
<b>Waveform memory</b>	Store data for most recent 2,000 DIV (10,000 DIV at expanded memory) in memory. Backward scrolling and re-printing available.
<b>Other functions</b>	logging (numerical printout), additional recording (recording is resumed without overwriting previous data), voltage axis magnification $\times$ 2 to $\times$ 10; 3 settings, compression 1/2; 1 setting, variable display.

## Auxiliary Functions

<b>General</b>	Printing of settings including input range, trigger time, etc, cursor measurement, scaling, free comment input, screen hard copy, start condition retention, auto setup, auto saving, remote control, auto ranging, view function, online help, key lock, list printing, level monitor, etc.
<b>Scaling</b>	<b>Scaling</b> : Translation of amplitude gradation only <b>Variable</b> : Arbitrary setting of the upper and lower limit of the waveform display range
<b>Vernier function</b>	Allows precision adjustment of input voltage.
<b>Waveform judgment function (MEM function) (FFT function)</b>	<b>Type</b> : Area judgment using reference waveform for time axis waveform, X-Y plot, or FFT display. Parameter judgment for waveform parameter processing. <b>Judgment output</b> : pass/fail output, open-collector 5V voltage output
<b>Waveform parameter calculation (MEM function)</b>	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, and X-Y area value.
<b>Waveform processing calculations (MEM function)</b>	(Maximum possible calculation up to 1,000 DIV, or 5,000 DIV at expanded memory; accuracy is within the tolerance of the input module.) Four arithmetic operations, absolute value, exponentiation, common logarithm, square root, moving average, differentiation once and twice, integration once and twice, parallel displacement along the time axis, trigonometric functions, reverse trigonometric functions. 16 arbitrary operational equation.

## ■ Main unit specifications

REC & MEM functions (version 2.00 or later. Real-time save function: version 2.20 or later)	
Time axis (REC)	20ms to 1hour/DIV; 16 settings, 1 DIV = 100 samples, time axis compression 1/2 to 1/500, 8 settings Note: Sampling period 1/100 of time axis range at memory recorder function
Time axis (MEM)	100 $\mu$ s to 5 minutes/DIV; 20 settings, 1 DIV = 100 samples, time axis zoom $\times 2$ to $\times 10$ ; 3 settings, compression 1/2 to 1/10,000, 12 settings Note: Sampling period 1/100 of time axis range (min. 1 $\mu$ s)
Recording length	<b>REC:</b> Settable in 1-division steps, 25 to 1,000 DIV (5,000 DIV at expanded memory), or continuous <b>MEM:</b> Settable in 1-division steps, 25 to 2,000 DIV (10,000 DIV at expanded memory)
Trigger source	<b>REC:</b> timer trigger, or OFF <b>MEM:</b> CH1 to CH32 (analog), logic A to H, or external trigger
Real-time save functions <i>Note: Used with the PC card, firmware version 2.30 or later</i>	<b>Time axis:</b> 100ms/DIV to 5 minutes/DIV (less than 16 channels), 200ms/DIV to 5 minutes/DIV (more than 17 channels) (1 DIV=100 samples, sampling period 1/100 of time axis range) <b>Save destination:</b> PC card, or MO disk in the optional MO UNIT 9598 <b>Save time:</b> Depending on free capacity of the PC card, or MO disk <b>Trigger:</b> trigger settings are not applicable to the MEM waveform, and the start of MEM waveform recording coincides with the start of the REC waveform. <b>Time axis at REC:</b> 500ms/DIV to 1 hour/DIV (less than 16 channels), 1s/DIV to 1 hour/DIV (more than 17 channels) (1 DIV=100 samples, sampling period 1/100 of time axis range)
Other functions	Only REC waveform is output when printer output is started, reprinting of stored REC waveform data (last 1,000 DIV; or 5,000 DIV at expanded memory). Additional recording function (recording is resumed without overwriting previous data), variable display

FFT functions (version 2.00 or later.)	
Analysis mode	Storage waveform, Linear spectrum, RMS spectrum, Power spectrum, Cross-power spectrum, Auto-correlation function, Histogram, Transfer function, Cross-correlation function, Unit-impulse response, Coherence function, Octave analysis
Analysis channels	1 or 2 selected channels out of all analog channels
Frequency range	133mHz to 400kHz, External, (resolution 1/400, 1/800, 1/2000, 1/4000)
Number of sampling points	1000, 2000, 5000, 10000 points
Windows	Rectangular, Hanning, Exponential
Averaging function	Time axis / frequency axis simple averaging, exponential averaging, peak hold

### ■ PC Software Specifications

Wave Viewer (Wv) Software (Application disk CD-R, bundled accessory)	
Functions	<ul style="list-style-type: none"> <li>• <b>Simple display of waveform file</b></li> <li>• <b>Text conversion:</b> convert binary data file to text format, with selectable space or tab separators in addition to CSV, and specifiable section, thinning available</li> <li>• <b>Display format settings:</b> scroll functions, enlarge/reduce display, display channel settings</li> <li>• <b>Others:</b> voltage value trace function, jump to cursor/trigger position function</li> </ul>
Compatible PC operating systems	Windows 95/98/Me, Windows NT 4.0 (SP3 or later), 2000, XP

## ■ Input unit specifications (sold separately)

Dimensions and mass: approx. 170 (6.69in) W  $\times$  20 (0.79in) H  $\times$  148.5 (5.85in) D mm, approx. 290 g (10.2 oz) **Accessories:** None

ANALOG UNIT 8936 (Accuracy at 23 $\pm$ 5 $^{\circ}$ C/73 $\pm$ 9 $^{\circ}$ F, 35 to 80 % rh after 30 minutes of warm-up time and zero-adjust; accuracy guaranteed for 1 year)	
Measurement functions	Number of channels: 2, for voltage measurement
Input connectors	Isolated BNC connector (input impedance 1M $\Omega$ , input capacitance 30pF), <b>Max. rated voltage to earth:</b> 370V 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	5mV to 20V/DIV, 12 ranges, full scale: 20DIV, AC voltage for possible measurement/display using the memory function: 280V rms, low-pass filter: 5Hz/500Hz/5k Hz/100kHz
Measurement resolution	1/80 of measurement range (using 12-bit A/D conversion; installed in the 8826)
Highest sampling rate	1MS/s (simultaneous sampling in 2 channels)
Accuracy	<b>DC amplitude:</b> $\pm 0.4\%$ of full scale, <b>zero position:</b> $\pm 0.1\%$ of full scale (after zero adjustment)
Frequency characteristics	DC to 400kHz $\pm 3$ dB, with AC coupling: 7Hz to 400kHz $\pm 3$ dB
Input coupling	DC, GND, AC
Max. allowable input	400V DC (the maximum voltage that can be applied across input pins without damage)

FFT ANALOG UNIT 8938 (Accuracy at 23 $\pm$ 5 $^{\circ}$ C/73 $\pm$ 9 $^{\circ}$ F, 35 to 80 % rh after 30 minutes of warm-up time and zero-adjust; accuracy guaranteed for 1 year)	
Measurement functions	Number of channels: 2, for voltage measurement
Anti-aliasing filter	Integrated filter for suppressing aliasing distortion caused by FFT processing (automatic cutoff frequency setting/OFF)
Other functions	Other specifications same as the ANALOG UNIT 8936

Dimensions and mass: approx. 170 (6.69in) W  $\times$  20 (0.79in) H  $\times$  148.5 (5.85in) D mm, approx. 300 g (10.6 oz) **Accessories:** None



VOLTAGE/TEMP UNIT 8937 (Accuracy at 23 $\pm$ 5 $^{\circ}$ C/73 $\pm$ 9 $^{\circ}$ F, 35 to 80 % rh after 1 hour of warm-up time and zero-adjust; accuracy guaranteed for 1 year)	
Measurement functions	Number of channels: 2, for voltage measurement/temperature measurement with thermocouple
Input connectors	<b>Voltage input:</b> metallic BNC connector (input impedance 1M $\Omega$ , input capacitance 50pF), <b>thermocouple input:</b> terminal connector (input impedance min. 51M $\Omega$ ), <b>Max. rated voltage to earth:</b> 30Vrms or 60V 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)
Voltage measurement range	500 $\mu$ V to 2V/DIV, 12 ranges, full scale: 20DIV, low-pass filter: 5Hz/500Hz/5k Hz/100kHz, Measurement resolution: 1/80 of measurement range (using 12-bit A/D conversion; installed in the 8826)
Temperature measurement range	10 $^{\circ}$ C to 100 $^{\circ}$ C/DIV, 4 ranges, full scale: 20DIV, low-pass filter: 5Hz/500Hz, Measurement resolution: 1/80 of measurement range (using 12-bit A/D conversion; installed in the 8826)
Thermocouple range	<b>K:</b> -200 to 1350 $^{\circ}$ C, <b>E:</b> -200 to 800 $^{\circ}$ C, <b>J:</b> -200 to 1100 $^{\circ}$ C, <b>T:</b> -200 to 400 $^{\circ}$ C, <b>N:</b> -200 to 1300 $^{\circ}$ C, <b>R:</b> 0 to 1700 $^{\circ}$ C, <b>S:</b> 0 to 1700 $^{\circ}$ C, <b>B:</b> 300 to 1800 $^{\circ}$ C, <b>Reference junction compensation:</b> internal/ external (switchable)
Highest sampling rate	<b>Voltage input:</b> 1MS/s, <b>Temperature measurement:</b> 4kS/s (simultaneous sampling in 2 channels)
Accuracy	<b>Voltage input:</b> DC amplitude $\pm 0.4\%$ of full scale, zero position $\pm 0.15\%$ of full scale, <b>Temperature measurement (K, E, J, T, N):</b> $\pm 0.1\%$ of full scale $\pm 1^{\circ}$ C, $\pm 0.1\%$ of full scale $\pm 2^{\circ}$ C (-200 to 0 $^{\circ}$ C), <b>(R, S):</b> $\pm 0.1\%$ of full scale $\pm 3^{\circ}$ C, <b>(B):</b> $\pm 0.1\%$ of full scale $\pm 4^{\circ}$ C (400 to 1800 $^{\circ}$ C), <b>Reference junction compensation accuracy:</b> $\pm 0.1\%$ of full scale $\pm 1.5^{\circ}$ C (internal reference junction compensation)
Frequency characteristics	<b>Voltage input:</b> DC to 400 kHz $+1/-3$ dB <b>Temperature measurement:</b> DC to 1kHz $+1/-3$ dB
Input coupling	DC, GND, AC
Max. allowable input	30Vrms or 60V DC (the maximum voltage that can be applied across input pins without damage)

Dimensions and mass: approx. 170 (6.69in) W  $\times$  20 (0.79in) H  $\times$  148.5 (5.85in) D mm, approx. 250 g (8.8 oz) **Accessories:** Conversion cable  $\times$  2



STRAIN UNIT 8939 (Accuracy at 23 $\pm$ 5 $^{\circ}$ C/73 $\pm$ 9 $^{\circ}$ F, 35 to 80 % rh after 1 hour of warm-up time and auto-balance; accuracy guaranteed for 1 year)	
Measurement functions	Number of channels: 2, for distortion measurement (electronic auto-balancing, balance adjustment range within $\pm 10000\mu$ e)
Input connectors	Via conversion cable, TAJIMI PRC03-12A10-7M10.5, <b>Max. rated voltage to earth:</b> 30Vrms or 60V 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 $\Omega$ to 1k $\Omega$ , bridge voltage 2 $\pm 0.05$ V
Measurement range	20 $\mu$ e to 1000 $\mu$ e/DIV, 6 ranges, full scale: 20DIV, low-pass filter: 10Hz/30Hz/300Hz/3kHz
Measurement resolution	1/80 of measurement range (using 12-bit A/D conversion; installed in the 8826)
Highest sampling rate	1MS/s (simultaneous sampling in 2 channels)
Accuracy After auto-balancing	<b>DC amplitude:</b> $\pm 0.5\%$ of full scale $+2\mu$ e, <b>zero position:</b> $\pm 0.5\%$ of full scale
Frequency characteristics	DC to 20 kHz $+1/-3$ dB
Max. allowable input	10V DC + AC peak (the maximum voltage that can be applied across input pins without damage)

CONVERSION CABLE 9318 (to connect 9270 to 9272, 9277 to 9279 and 8940)  
CONVERSION CABLE 9319 (to connect 3273, 3273-50 and 8940)

Dimensions and mass: approx. 170 (6.69in) W  $\times$  20 (0.79in) H  $\times$  148.5 (5.85in) D mm, approx. 300 g (10.6 oz) **Accessories:** None



F/V UNIT 8940 (Accuracy at 23 $\pm$ 5 $^{\circ}$ C/73 $\pm$ 9 $^{\circ}$ F, 35 to 80 % rh after 30 minutes of warm-up time and zero-adjust; accuracy guaranteed for 1 year)	
Measurement functions	Number of channels: 2, for voltage input based frequency measurement, integration, pulse duty ratio, current (with optional clamp-on sensor), and voltage measurement
Input connectors	Metallic BNC connector (input impedance 1M $\Omega$ , input capacitance 60pF), sensor connector (dedicated connector for clamp-on sensor via conversion cable, common ground with recorder), <b>Max. rated voltage to earth:</b> 30Vrms or 60V 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)
Compatible current sensors	9270, 9271, 9272, 9277, 9278, 9279, 3273, 3273-50
Measurement range	<b>Frequency:</b> DC to 100kHz, with 0.05Hz to 5kHz/DIV, 11 ranges, 5 ( $\tau$ min) to 500 ( $\tau$ min)/DIV, 5 ranges, P50Hz (40 to 60Hz), P60Hz (50 to 70Hz) <b>* Power line frequency measurement requires the DIFFERENTIAL PROBE 9322 or PT 9303, Accuracy:</b> $\pm 0.2\%$ of full scale (except 10kHz/DIV range), $\pm 0.7\%$ of full scale (10kHz/DIV range), $\pm 0.032$ Hz (P50Hz, P60Hz range) <b>Integration:</b> DC to 90kHz, with 5counts to 500kcounts/DIV, 11 ranges <b>Pulse duty ratio:</b> 10Hz to 100kHz, with 100% of full scale, 1 range, <b>Accuracy:</b> $\pm 1\%$ of full scale (10Hz to 10kHz) <b>Threshold:</b> -10 to +10V (settable in 0.2V steps) <b>Full scale:</b> 10DIV, <b>Max. allowable input:</b> 30Vrms or 60V DC (the maximum voltage that can be applied across input pins without damage)
Measurement range	<b>Voltage:</b> 0.5mV to 2V/DIV, 12 ranges <b>Current:</b> 5mA to 100A/DIV, 10 ranges, using current sensor (powered from the 8940, max. 4 sensors total) <b>DC amplitude accuracy:</b> $\pm 0.4\%$ of full scale, zero position $\pm 0.15\%$ of full scale (current measurement accuracy dependent on sensor accuracy/ characteristics) <b>Frequency characteristics:</b> DC to 400kHz $\pm 3$ dB <b>Full scale:</b> 20DIV, <b>Max. allowable input:</b> 30Vrms or 60V DC (the maximum voltage that can be applied across input pins without damage)
Measurement resolution	1/80 of measurement range (installed in the 8826, excluding current range when using 9279)
Highest sampling rate	1MS/s (simultaneous sampling in 2 channels), (frequency/duty ratio measurement: 1.125 $\mu$ s cycle)
Other functions	<b>Voltage input pull-up:</b> ON (10k $\Omega$ )/OFF, <b>input coupling:</b> DC, GND, AC (voltage/current), DC (others), <b>low-pass filter:</b> 5Hz/500Hz/5k Hz/100kHz

Dimensions and mass: approx. 170 (6.69in) W × 20 (0.79in) H × 148.5 (5.85in) D mm, approx. 310 g (10.9 oz) **Accessories:** None



<b>CHARGE UNIT 8947</b> (Accuracy at 23 ±5°C/73 ±9°F, 35 to 80% rh after 1 hour of warm-up time and zero-adjust; accuracy guaranteed for 1 year)	
Measurement functions	Number of channels: 2, for acceleration measurement
Input connectors	<b>Voltage input/integrated preamplifier input:</b> metallic BNC connector (for voltage input: input impedance 1MΩ, input capacitance 200pF or less) <b>Charge input:</b> miniature connector (#10-32 UNF) <b>Max. rated voltage to earth:</b> 30Vrms or 60V 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	<b>Charge input:</b> Charge-output type piezoelectric acceleration pick-up sensor <b>Internal preamp input:</b> Acceleration pick-up sensor with an internal preamp
Measurement range Charge input (miniature connector) Internal pre-amp input (BNC connector)	50m (m/s <sup>2</sup> )/DIV to 10k (m/s <sup>2</sup> )/DIV, 12 ranges × 6 types, <b>charge input sensitivity:</b> 0.1 to 10 pC/(m/s <sup>2</sup> ), <b>integrated pre-amplifier input:</b> 0.1 to 10 mV/(m/s <sup>2</sup> ), <b>amplitude accuracy:</b> ±2% of full scale, <b>frequency characteristics:</b> 1 to 50kHz, +1/-3dB, <b>low-pass filter:</b> 500Hz/5kHz, <b>pre-amplifier drive power source:</b> 2mA ±20%, +5V ±5%, <b>maximum input charge:</b> ±500pC (high-sensitivity setting, 6 ranges), ±50000pC (low-sensitivity setting, 6 ranges)
Measurement range Voltage input (BNC connector)	500μV to 2V/DIV, 12 ranges, <b>DC amplitude accuracy:</b> ±0.4% of full scale, <b>frequency characteristics:</b> DC to 400kHz, +1/-3 dB, <b>low-pass filter:</b> 5Hz/500Hz/5kHz/100kHz, <b>input coupling:</b> DC, GND, AC, <b>Max. allowable input:</b> 30Vrms or 60V DC
Measurement resolution	1/80 to 1/32 of measurement range (depending on measurement sensitivity; installed in the <b>8826</b> )
Highest sampling rate	1MS/s (simultaneous sampling in 2 channels)
Anti-aliasing filter	Integrated filter for suppressing aliasing distortion caused by FFT processing (automatic cutoff frequency setting/OFF)

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)



<b>LOGIC PROBE 9320</b> (Accuracy at 23 ±5°C/73 ±9°F, 35 to 80% rh; accuracy 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), <b>input impedance:</b> 1MΩ (with digital input, 0 to +5V), 500kΩ or more (with digital input, +5 to +50V), <b>pull-up resistance:</b> 2kΩ (contact input: internally pulled up to +5V)
Digital input threshold	1.4V/2.5V/4.0V
Contact input detection resistance	1.5kΩ or higher (open) and 500Ω or lower (short), 3.5kΩ or higher (open) and 1.5kΩ or lower (short), 25kΩ or higher (open) and 8kΩ or lower (short)
Response speed	Detectable pulse width 500ns or lower
Max. allowable input	0 to +50V DC (the maximum voltage that can be applied across input pins without damage)

Cable length and mass: Main unit cable 1.5 m (4.92 ft), input section cable 1 m (3.28 ft), approx. 320 g (11.3 oz)



<b>LOGIC PROBE 9321</b> (Accuracy at 23 ±5°C/73 ±9°F, 35 to 80% rh; accuracy 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 <b>Input impedance:</b> 100kΩ or higher (HIGH range), 30kΩ or higher (LOW range)
Output (H) detection	170 to 250V AC, ±DC (70 to 250V) (HIGH range) 60 to 150V AC, ±DC (20 to 150V) (LOW range)
Output (L) detection	0 to 30V AC, ±DC (0 to 43V) (HIGH range) 0 to 10V AC, ±DC (0 to 15V) (LOW range)
Response time	Rising edge 1ms max., falling edge 3ms max. (with HIGH range at 200V DC, LOW range at 100V DC)
Maximum allowable input voltage	250Vrms (HIGH range), 150Vrms (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)



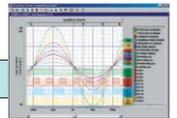
<b>DIFFERENTIAL PROBE 9322</b> (Accuracy at 23 ±5°C/73 ±9°F, 35 to 80% rh, after 30 minutes of warm-up time; accuracy guaranteed for 1 year)	
Function	For high-voltage floating measurement, power line surge noise detection, RMS rectified output measurement
DC mode	For waveform monitor output, frequency characteristics: DC to 10MHz (±3dB), <b>amplitude accuracy:</b> ±1% of full scale (at max. 1000V DC), ±3% of full scale (at max. 2000V DC) (full scale: 2000V DC)
AC mode	For detection of power line surge noise, frequency characteristics: 1kHz to 10MHz ±3dB
RMS mode	DC/AC voltage RMS output detection, frequency characteristics: DC, 40Hz to 100kHz, <b>response speed:</b> 200ms or less (400V AC), <b>accuracy:</b> ±1% of full scale (DC, 40Hz to 1kHz), ±4% of full scale (1kHz to 100kHz) (full scale: 1000V AC)
Input	<b>Input type:</b> balanced differential input, <b>input impedance/capacitance:</b> H-L 9MΩ/10pF, H/L-unit 4.5MΩ/20pF, <b>Max. rated voltage to earth:</b> when using grabber clip 1500V AC/DC (CAT II), 600V AC/DC (CAT III), when using alligator clip: 1000V AC/DC (CAT II), 600V AC/DC (CAT III)
Maximum allowable input voltage	2000V DC, 1000V AC (CAT II) 600V AC/DC (CAT III)
Output	Voltage divider for 1/1000 of input, BNC connectors (output switchable for 3 modes DC, AC, RMS)
Power source	Use of the AC ADAPTER <b>9418-15</b> (12V DC)

**LAN COMMUNICATOR 9333**



Distribution media	One CD-R
Operating environment	Computer equipped with Pentium (133 MHz) or better CPU, running under Windows 95/98/Me or Windows NT 4.0/ 2000/XP operating system, with network adapter installed and configured to use TCP/IP protocol, and at least 64 MB of memory.
HiCORDER side	Standard LAN connector, LAN card
Communications	Ethernet, TCP/IP
Remote control	Remote control of MEMORY HiCORDER (by sending key codes and receiving images on screen), print reports, print images from the screen, receive waveform data in same format as waveform files from the MEMORY HiCORDER (binary only)
Waveform data acquisition	Accept auto-saves from the MEMORY HiCORDER, same format as auto-save files of MEMORY HiCORDER (binary only), print automatically with a MEMORY HiCORDER from a PC. The MEMORY HiCORDER's print key launches printouts on the PC
Waveform viewer	Simple display of waveform files, conversion to CSV format, Scroll function, enlarge/reduce display, display CH settings.

**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

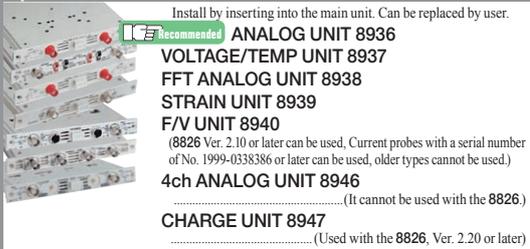
## Configuration of options

Note: Options described as "factory-installed options" must be specified when ordering and cannot be installed by the user. Note: Product names appearing in this catalog are trademarks or registered trademarks of various companies.

### 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 8936  
 VOLTAGE/TEMP UNIT 8937  
 FFT ANALOG UNIT 8938  
 STRAIN UNIT 8939  
 F/V UNIT 8940  
 (8826 Ver. 2.10 or later can be used, Current probes with a serial number of No. 1999-0338386 or later can be used, older types cannot be used.)  
 4ch ANALOG UNIT 8946  
 ..... (It cannot be used with the 8826.)  
 CHARGE UNIT 8947  
 ..... (Used with the 8826, Ver. 2.20 or later)



### Voltage measurement for use with general input modules

**Recommended**

**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)

**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.

**Tip Expanders 9790-01**  
 Attachment clips are sold separately from CONNECTION CORD 9790. Purchase the appropriate attachment clips for your application separately.

**Tip Expanders 9790-02**

**Tip Expanders 9790-03**

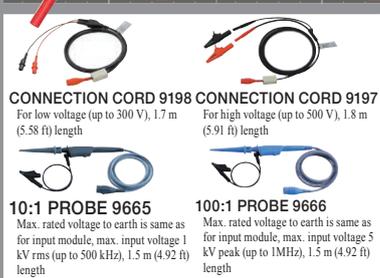


**CONNECTION CORD 9198**  
 For low voltage (up to 300 V), 1.7 m (5.58 ft) length

**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

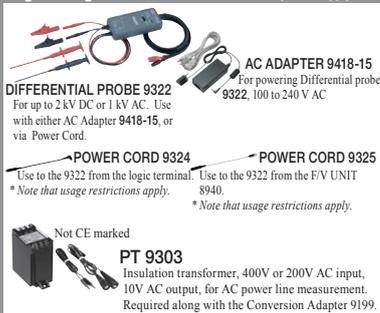
**AC ADAPTER 9418-15**  
 For powering Differential Probe 9322, 100 to 240 V AC

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

**POWER CORD 9324**  
 Use to the 9322 from the logic terminal.  
 \* Note that usage restrictions apply.

**POWER CORD 9325**  
 Use to the 9322 from the F/V UNIT 8940.  
 \* Note that usage restrictions apply.

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

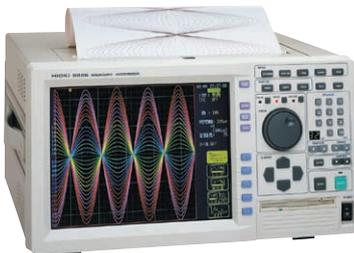


### Printer options

**Recommended**

**RECORDING PAPER 9229**  
 264 mm (10.39 in) × 30 m (98.43 ft), 6 rolls set

**RECORDING PAPER 9229-01**  
 perforated type, 264 mm (10.39 in) × 30 m (98.43 ft), 6 rolls set

### MEMORY HiCORDER 8826

\* The MEMORY HiCORDER 8826 cannot operate alone. You must install one or more optional input modules in the unit.

### Factory-installed option \*Must specify when ordering

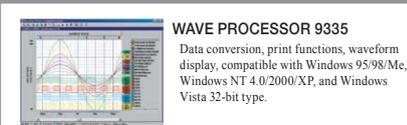
**Note: The MO UNIT 9598 is discontinued**

**MEMORY BOARD 9599**  
 Expands main unit memory by 4x,  
 Note: user installable this board



### 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.



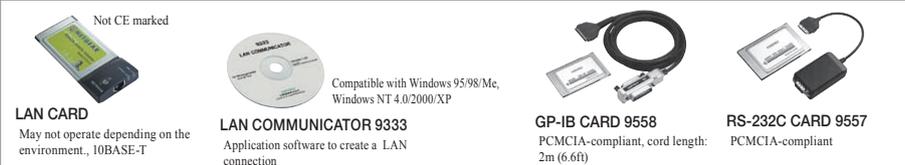
### PC Communication

**LAN CARD**  
 Not CE marked  
 May not operate depending on the environment., 10BASE-T

**LAN COMMUNICATOR 9333**  
 Compatible with Windows 95/98/Me, Windows NT 4.0/2000/XP  
 Application software to create a LAN connection

**GP-IB CARD 9558**  
 Not CE marked  
 PCMCIA-compliant, cord length: 2m (6.6ft)

**RS-232C CARD 9557**  
 PCMCIA-compliant



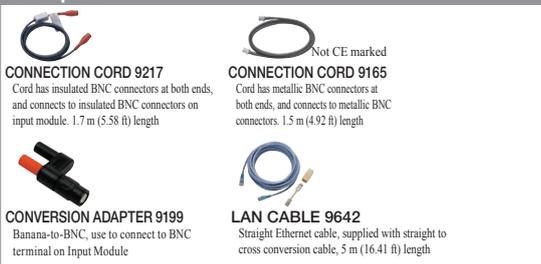
### Other options

**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

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

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

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



### Logic signal measurement

**LOGIC PROBE 9320**  
 4-channel type, for voltage/contact signal ON/OFF detection (response time 0.5 μsec, large terminal type)

**LOGIC PROBE 9321**  
 4 isolated channels, ON/OFF detection of AC/DC voltage (large terminal type)



### Current measurement

\* To connect the clamp-on sensor via the conversion cable, the 3274, 3275, and 3276 cannot be used for the F/V UNIT 8940

**F/V UNIT 8940**  
 CONVERSION CABLE 9318 (To connect the 9272 - 9279 and the 8940)

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

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

**SENSOR UNIT 9555-10**  
 Power supply unit for the 9272 to the 9279 clamp sensors, except for connecting to the F/V unit 8940, for signal output 9217 is necessary.

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

**CONVERSION CABLE 9705**  
 Use with the Conversion Cable 9318 to connect Model 9272-10 to the F/V Unit 8940. (Not necessary for when using the Model 9272 due to different output wiring specifications.)

**CONVERSION CABLE 9318**  
 To connect the 9272 to 9279 and the 8940

**CONVERSION CABLE 9319**  
 To connect the 3273-50 and the 8940  
 Note: To connect with the 3274, 3275, 3276 to connect the 8940 via this cable 9319

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

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

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

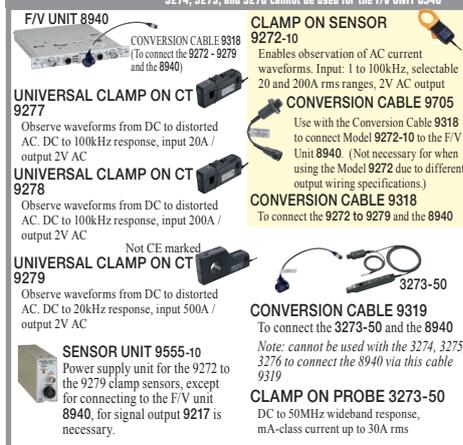
**CLAMP ON PROBE 3276**  
 DC to 100MHz wideband response, mA-class current up to 30A rms

**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

**CLAMP ON PROBE 9018-50**  
 Input from 10 to 500 A, 40 Hz to 3 kHz for 0.2 V AC output. BNC terminal

**CLAMP ON PROBE 9132-50**  
 Input from 20 to 1000 A, 40 Hz to 1 kHz for 0.2 V AC output. BNC terminal



### Current measurement \*Connect directly to the analog input module

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

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

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

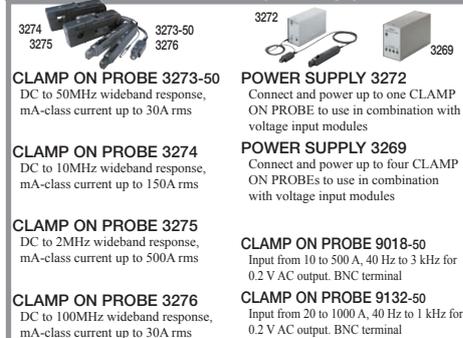
**CLAMP ON PROBE 3276**  
 DC to 100MHz wideband response, mA-class current up to 30A rms

**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

**CLAMP ON PROBE 9018-50**  
 Input from 10 to 500 A, 40 Hz to 3 kHz for 0.2 V AC output. BNC terminal

**CLAMP ON PROBE 9132-50**  
 Input from 20 to 1000 A, 40 Hz to 1 kHz for 0.2 V AC output. BNC terminal



Combination example	Main unit with memory 16 MW	No. of channels	4 ch + logic 32 ch	8 ch + logic 32 ch	12 ch + logic 32 ch	16 ch + logic 32 ch	20 ch + logic 32 ch	24 ch + logic 32 ch	28 ch + logic 32 ch	32 ch + logic 32 ch
(normal choice of the input unit, up to 200V AC direct input.)	8826 × 1	Input module	8936 × 2	8936 × 4	8936 × 6	8936 × 8	8936 × 10	8936 × 12	8936 × 14	8936 × 16
		Input cable	9198 × 4	9198 × 8	9198 × 12	9198 × 16	9198 × 20	9198 × 24	9198 × 28	9198 × 32

### 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.

