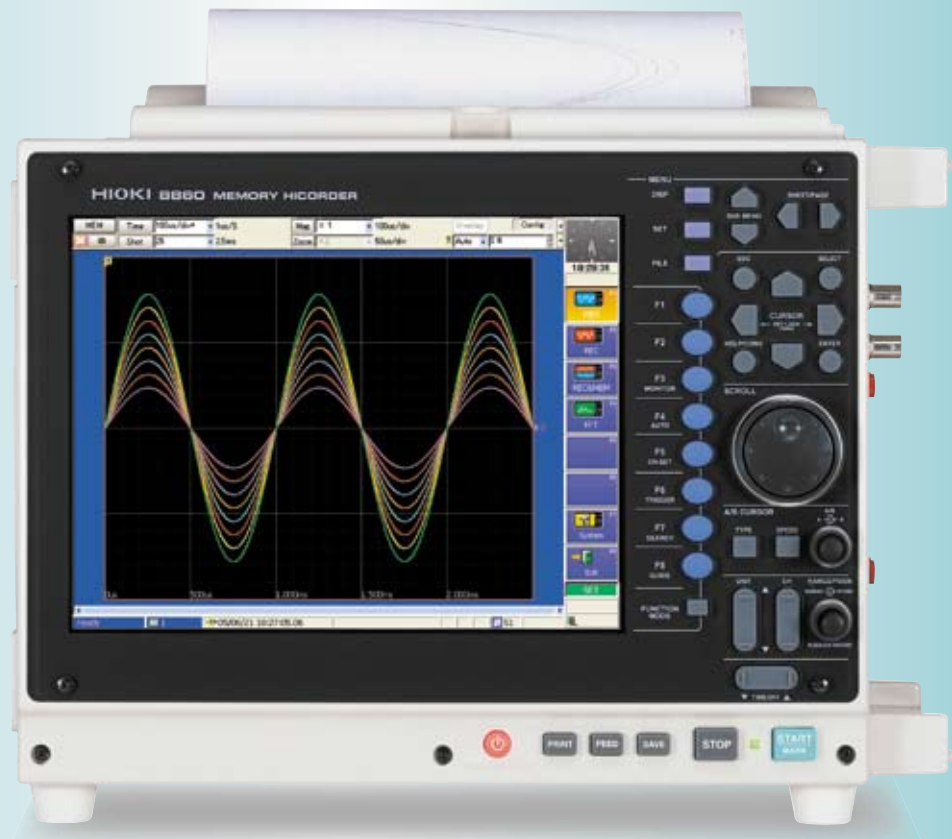


Two New Models for up to 64 or 128 channels

MEMORY HiCORDER 8860, 8861

Recorders 



FFT functions available

High Speed Oscilloscope and Multi-channel Logger - All in One Powerful Instrument

Presenting two new MEMORY HiCORDERs from HIOKI that offer a whole new level of performance and functionality - use the memory function as you would on an oscilloscope for quick and easy waveform observations, and the multi-channel logger function to capture trend graphs in real time. Take advantage of the intuitive graphic user interface by setting and controlling the MEMORY HiCORDER with the click of a mouse, and upload and share files through a LAN for ultimate network compatibility. Independent sampling measurement and 16-bit high-resolution detail help to positively identify even complex target phenomena. The plug-in slot design caters to a wide selection of interchangeable input modules, including those for other members of the HIOKI MEMORY HiCORDER series (Models 8826/8835/8841/8842), to meet all kinds of application needs. With the new MEMORY HiCORDER Models 8860 and 8861, you now have the perfect means to conduct precise signal observations including voltage/current, temperature, pulse, distortion monitoring and much, much more.



ISO 9001
JMI-0216

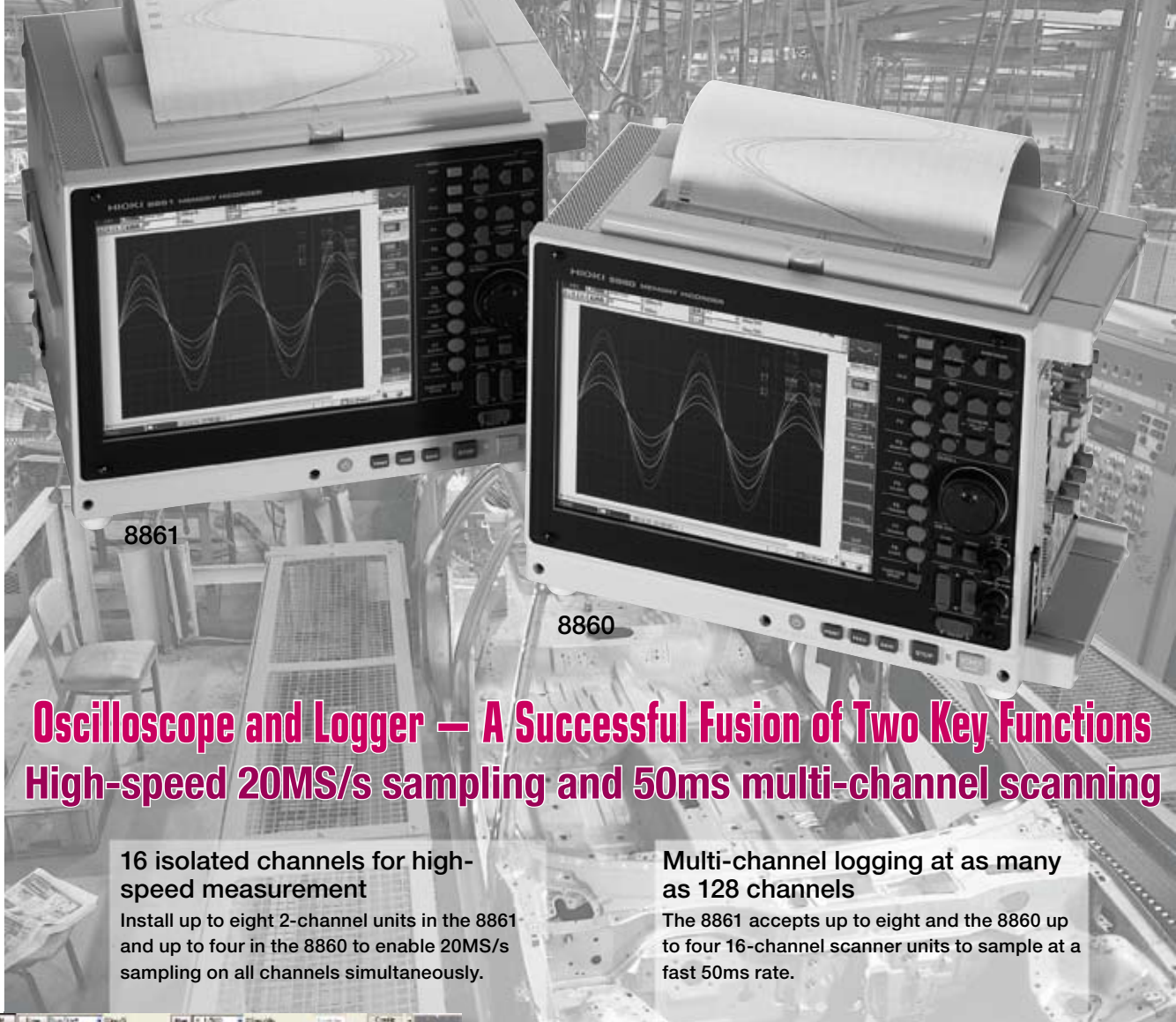


ISO 14001
JQA-E-90091



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

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



Oscilloscope and Logger — A Successful Fusion of Two Key Functions

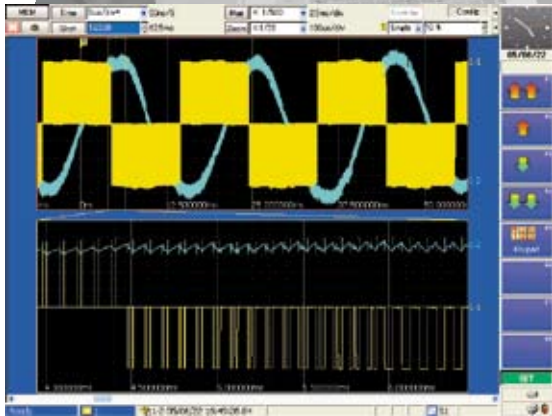
High-speed 20MS/s sampling and 50ms multi-channel scanning

16 isolated channels for high-speed measurement

Install up to eight 2-channel units in the 8861 and up to four in the 8860 to enable 20MS/s sampling on all channels simultaneously.

Multi-channel logging at as many as 128 channels

The 8861 accepts up to eight and the 8860 up to four 16-channel scanner units to sample at a fast 50ms rate.



Analyze inverters and other power control devices

High-speed sampling and a large memory capacity are essential requirements for simultaneously observing switching carrier waveforms and basic waveforms. Using 20 MS/s high-speed sampling, the **8860** and **8861** are digital isolated oscilloscopes that offer a maximum total memory of 1 and 2 gigawords, respectively.

*Various factory-installed memory configurations can be selected, ranging from 32 megawords to 1 gigaword (see options for details).

● High capacity memory

Compared to the previous Model **8841**, the **8860** can be fitted with at least four times more direct access internal memory (32MW), and expanded up to 1GW, for an increase by a factor of 128. The **8861** can be customized to offer as much as 2GW (4GB) of memory, increasing the available recording time drastically.

● Dual Sampling

Two independent sampling speeds can be set up on one single **MEMORY HiCORDER** - allowing you to log at low sampling speeds with the scanner unit while simultaneously capturing high speed waveforms with others. Installing the scanner unit automatically programs the instrument to log at the lower sampling rate; otherwise, exclusively conduct analog measurements at both high and low sampling rates.

● Multi-channel logging

A new analog scanner unit developed exclusively for the **8860** series offers 16 isolated input channels, enabling up to 128 channels of simultaneous recording on the **8861** when 8 scanner units are installed. The delta-sigma based A/D converter provides an oversampling digital filter to greatly reduce noise and 50/60Hz hum interference that used to be a problem when measuring inverter type devices.

● Optional internal printer

The large recording width of the A4 size printer is useful for observing data in detail at the testing site. The printer was made an optional feature to enable product customization based on the user's unique application needs.

● Make complex settings and control with the click of a mouse

Simply by connecting a mouse, the Windows-style graphic user interface offers a quick and intuitive means to adjust the **MEMORY HiCORDER** to the correct settings for your application.

● Real-time save function saves data to internal hard disk (available from version 1.10)

For long-term recording, a 60 GB hard disk option (or an MO drive option) is available for real-time data storage.

● Control the instrument and collect data via LAN on a PC

Automatically transfer data via LAN to a shared folder on a PC. Ftp and web server functions are included for acquiring data and monitoring from PCs.

Now Saves Data to Hard Disk in Real Time

Capture transient phenomena and record whole waveform anomalies

As a data logger, the real-time save function records directly to storage media

Use the real-time save function to write data directly to internal hard disk, MO disk or PC Card while measuring waveforms. Compressed waveforms are displayed in real time (simultaneous printing is not possible). Maximum recording time on storage media depends on available space and the amount of memory installed in the instrument. Typical recording limits are listed in the table at the right.

Criteria: Maximum recording space on a hard disk or PC Card is available immediately after formatting, and recording length can be maximized by an optional recording setting. The timebase for the whole waveform (compressed waveform) is set automatically, with maximum recording time limited to one year. Because recording time depends on the storage media capacity after formatting or the available space, the above times are only meant as typical examples.

Maximum recording times for real-time saving

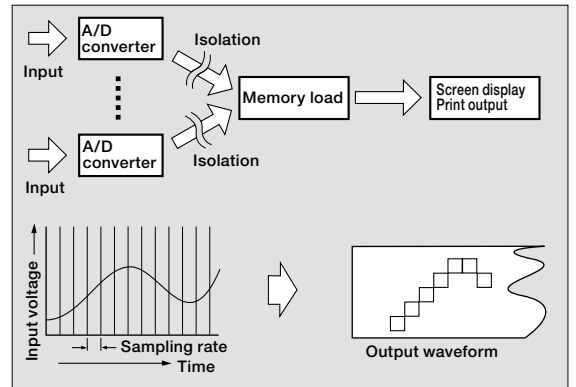
Time axis	Sampling period	No. of recording channels		Max recording time (typical)	
		HDD	PC card, MO	HDD	PC card (512MB)
5µs/DIV to 50µs/DIV	-Abbreviated-	not applicable	not applicable	not applicable	not applicable
100µs/DIV	1µs	not applicable	not applicable	8h 19m 17s	not applicable
200µs/DIV	2µs	1ch	not applicable	16h 38m 34s	not applicable
500µs/DIV	5µs	2ch	1ch	20h 48m 10s	20m 55s
1ms/DIV	10µs	4ch	2ch	20h 48m 10s	20m 40s
2ms/DIV	20µs	10ch	4ch	16h 38m 20s	20m 20s
5ms/DIV	50µs	24ch	8ch	17h 17m 30s	24m 20s
10ms/DIV	100µs	33ch	20ch	1day 1h 8m 20s	16m 40s
20ms/DIV	200µs	33ch	33ch	2days 2h 16m 40s	16m 40s
50ms to 5min/DIV	-omitted-	-omitted-	-omitted-	-omitted-	-omitted-

High-speed data storage in ample internal memory

The 8860/8861 offers high-speed sampling of the input signal and storing of data in memory that is electrically isolated from the input. With the new dual sampling (2-axis sampling) feature, data logged with the SCANNER UNIT 8958 can be carried out at relatively low sampling rates while high-speed sampling using the 20MS/s analog units is simultaneously conducted. Display both measurement results on the same time axis.

Clock input for external sampling *with MEMORY function

The sampling rate for the memory recorder can be controlled by the timing of an external clock signal (10 MS/s). This is useful for example to collect data synchronized to the running cycle of an engine.



How long can I record to the internal direct access memory?

The MEMORY BOARD 9715 offers 32MW of internal memory. Select larger size boards to achieve up to 32 times the memory size for a maximum of 1GW of storage space in Model 8860. Model 8861 provides 2 memory board slots for double the storage capacity.

Note: Memory boards are not built in as a standard feature. Choose from the following memory boards for factory pre-installation - one board for Model 8860, and two of the same capacity for the 8861.

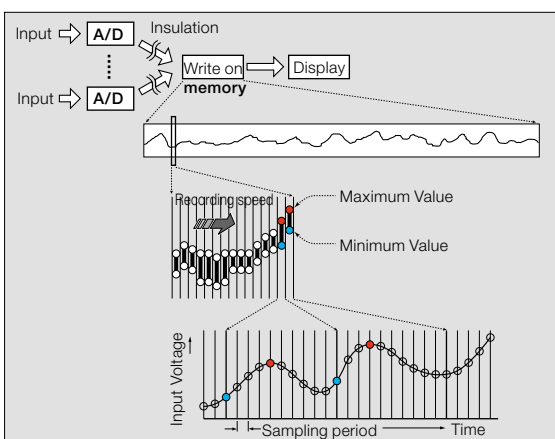
- MEMORY BOARD (32 Megawords) 9715
- MEMORY BOARD (128 Megawords) 9715-01
- MEMORY BOARD (512 Megawords) 9715-02
- MEMORY BOARD (1 Gigaword) 9715-03

The following table shows the maximum recording time when measuring 1 channel on Model 8860 using the built-in preset recording lengths and the respective MEMORY BOARDS. Recording lengths can be increased manually in 1DIV steps to extend the recording time, e.g., up to 320,000 DIV with the 32MW MEMORY BOARD.

Time axis	Sampling period	1-channel setting, 32 megawords memory capacity	1-channel setting, 128 megawords memory capacity	1-channel setting, 512 megawords memory capacity	1-channel setting, 1 gigawords memory capacity
		Recording length of 200k divisions	Recording length of 1000k divisions	Recording length of 5000k divisions	Recording length of 10,000k divisions
5µs/DIV	50ns	1 s	5 s	25 s	50 s
10µs/DIV	100ns	2 s	10 s	50 s	1 m 40 s
20µs/DIV	200ns	4 s	20 s	1 m 40 s	3 m 20 s
50µs/DIV	500ns	10 s	50 s	4 m 10 s	8 m 20 s
100µs/DIV	1µs	20 s	1 m 40 s	8 m 20 s	16 m 40 s
200µs/DIV	2µs	40 s	3 m 20 s	16 m 40 s	33 m 20 s
500µs/DIV	5µs	1 m 40 s	8 m 20 s	41 m 40 s	1 h 23 m 20 s
1ms/DIV	10µs	3 m 20 s	16 m 40 s	1 h 23 m 20 s	2 h 46 m 40 s
2ms/DIV	20µs	6 m 40 s	33 m 20 s	2 h 46 m 40 s	5 h 33 m 20 s
5ms/DIV	50µs	16 m 40 s	1 h 23 m 20 s	6 h 56 m 40 s	13 h 53 m 20 s
10ms/DIV	100µs	33 m 20 s	2 h 46 m 40 s	13 h 53 m 20 s	1 day 3 h 46 m 40 s
20ms/DIV	200µs	1 h 6 m 40 s	5 h 33 m 20 s	1 day 3 h 46 m 40 s	2 days 7 h 33 m 20 s
50ms/DIV	500µs	2 h 46 m 40 s	13 h 53 m 20 s	2 days 21 h 26 m 40 s	5 days 18 h 53 m 20 s
100ms/DIV	1ms	5 h 33 m 20 s	1 day 3 h 46 m 40 s	5 days 18 h 53 m 20 s	11 days 13 h 46 m 40 s
200ms/DIV	2ms	11 h 6 m 40 s	2 days 7 h 33 m 20 s	11 days 13 h 46 m 40 s	23 days 3 h 33 m 20 s
500ms/DIV	5ms	1 day 3 h 46 m 40 s	5 days 18 h 53 m 20 s	28 days 22 h 26 m 40 s	57 days 20 h 53 m 20 s
1s/DIV	10ms	2 days 7 h 33 m 20 s	11 days 13 h 46 m 40 s	57 days 20 h 53 m 20 s	115 days 17 h 46 m 40 s
2s/DIV	20ms	4 days 15 h 6 m 40 s	23 days 3 h 33 m 20 s	115 days 17 h 46 m 40 s	231 days 11 h 33 m 20 s
5s/DIV	50ms	11 days 13 h 46 m 40 s	57 days 20 h 53 m 20 s	289 days 8 h 26 m 40 s	-Abbreviated-
10s/DIV	100ms	23 days 3 h 33 m 20 s	115 days 17 h 46 m 40 s	-Abbreviated-	-Abbreviated-
30s/DIV	300ms	69 days 10 h 40 m	347 days 5 h 20 m	-Abbreviated-	-Abbreviated-
1min/DIV	600ms	138 days 21 h 20 m	-Abbreviated-	-Abbreviated-	-Abbreviated-
100s/DIV	1.0s	231 days 11 h 33 m 20 s	-Abbreviated-	-Abbreviated-	-Abbreviated-
2min/DIV	1.2s	277 days 18 h 40 m	-Abbreviated-	-Abbreviated-	-Abbreviated-
5min/DIV	3.0s	-Abbreviated-	-Abbreviated-	-Abbreviated-	-Abbreviated-

Memory segmentation function

When using the MEM function, the data memory can be divided into a maximum of 4,096 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.



Data recording principles

At REC function, the minimum and maximum values of the many data samples taken within the selected recording interval are recorded in memory. One data-recording element consists of a minimum / maximum pair of values, and 100 of such pairs constitute the waveform across one division of the time axis (for linear measurement). Therefore, even after a rapid change in input voltage, the data quantities are compressed.

Sample and log temperature and other parameters over long periods

- High-speed 50msec scanning across a maximum of 128 channels -

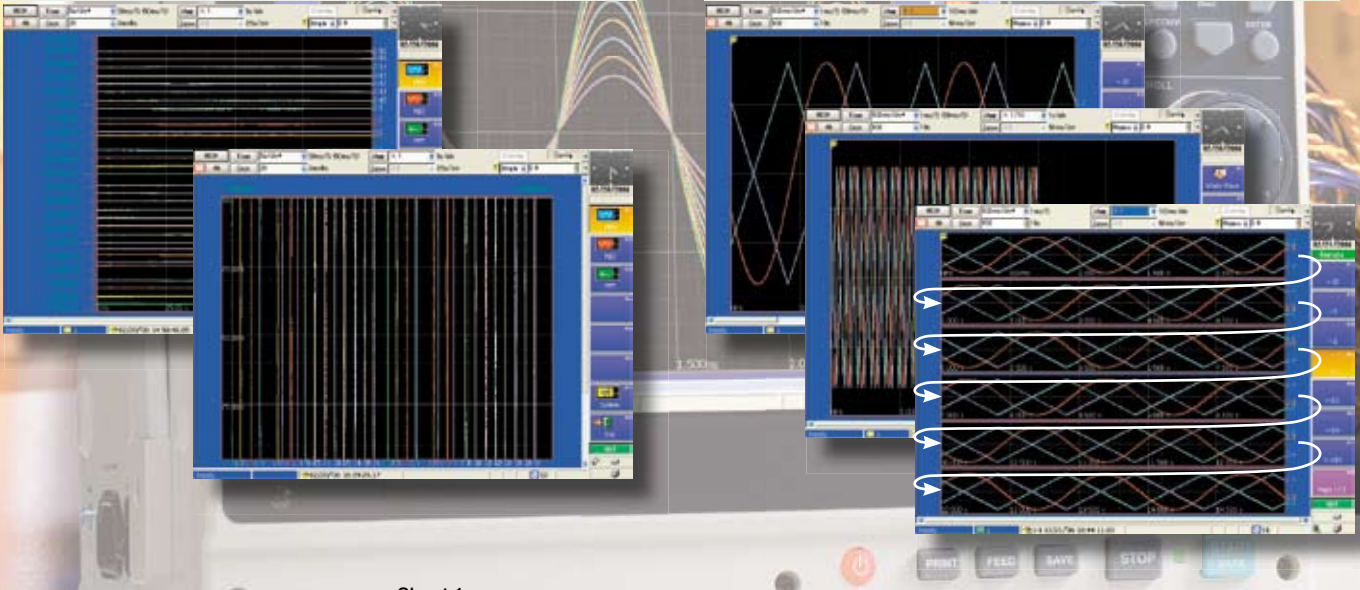


Turn the MEMORY HiCORDER into a multi-channel logger

Load all 4 input slots in Model 8860 with the 16-CH SCANNER UNIT 8958 to achieve 64 channels of logging capabilities, and up to 128 channels by fitting the scanner unit on all 8 slots of the 8861. Display the logged waveforms of up to 32 channels of data on one display.

■ The scroll direction of waveforms can be changed to vertical. This allows you to extend the distance between waveforms, giving you the feeling of reading data on a pen recorder.

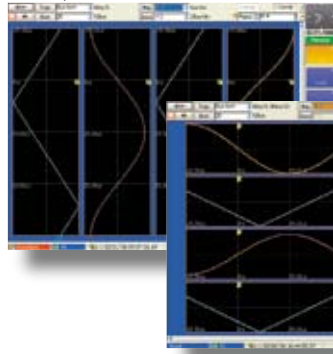
■ Use the split screen and set the scroll direction to "Continuous" to read the entire waveform over an extended period of time, without compressing it along the time axis.



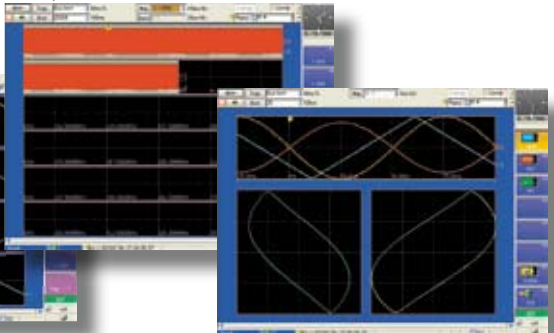
Sheet function

The 8860 series provides a sheet function to optimize the multi-channel approach. You can select your desired display format independently for each sheet depending on your analysis needs.

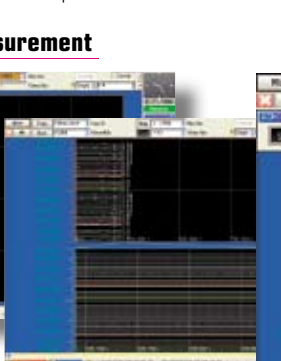
Sheet 1
Four-split screen vertical scroll



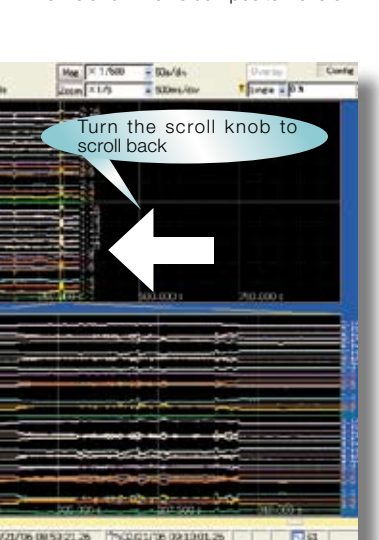
Sheet 3
Six-split screen continuous scroll



Sheet 2
Four-split screen horizontal scroll

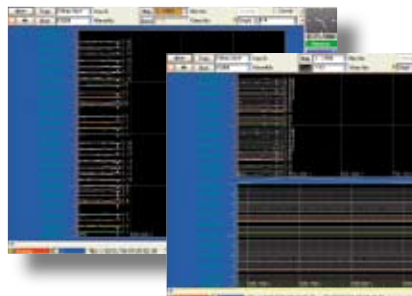


Sheet 4
Timeline and XY-axis composite waveform



Switch the compression ratio and zoom during measurement

The 8860 series allows you to change the compression ratio, turn the zoom function on and off, and scroll back during measurement. This allows you to monitor and analyze the waveform without waiting for measurement to end.



Zoom during measurement!

Display back scroll

You can display the recorded waveform without stopping recording. Turn the scroll knob left to display the recorded waveform. Click the scroll button to return to the current waveform.

Accurately capture waveforms with diverse parameters

- Advanced trigger function -

Trigger during capturing and search after capturing (supported from Version 2.00 and onwards)

The trigger function allows you to set diverse parameters to detect a particular waveform anomaly during capturing. Setting the pre-trigger mode allows you to monitor the pre-trigger waveform. This is useful for analyzing the cause of the anomaly.

On the other hand, the search function allows you to detect an anomaly after all data is captured. This allows you to search for and display an anomaly in the same manner as with the trigger function.

When a waveform is unpredictable and setting a parameter during measurement is difficult, it is recommended to use the search function to locate an anomaly after capturing.

Set multiple triggers on a single channel

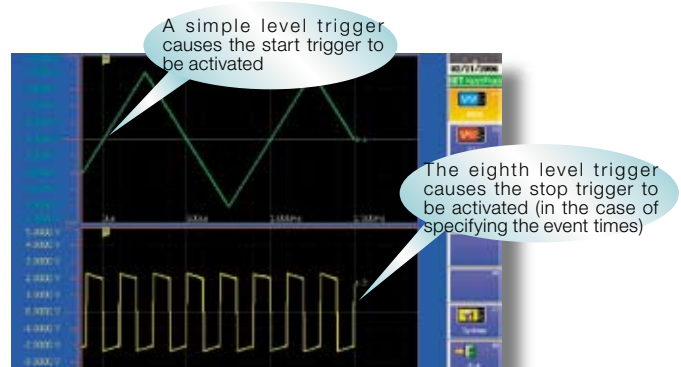
Unlike with conventional MEMORY HiCORDERs, the 8860 series allows you to set multiple trigger parameters on a particular single channel.

This allows you to set, for example, the slope trigger, level trigger, period trigger, and window-in trigger on the same input waveform to monitor it. (Eight parameters in the 8860 and 16 in the 8861 can be set.)



Stop trigger for the MEM function

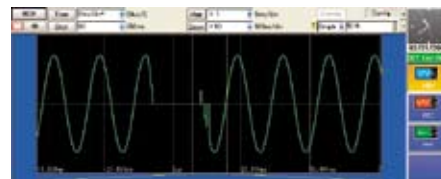
Unlike with conventional MEMORY HiCORDERs, a stop trigger is supported. This enables the timing of measurement to be controlled for both the MEM and REC functions. This also allows you to set Start or Stop independently for each trigger source, thus enabling the timing of measurement to be controlled in a variety of combinations. (Start or Stop trigger can also be set to the logical source.)



Capture a sudden power loss with the drop trigger

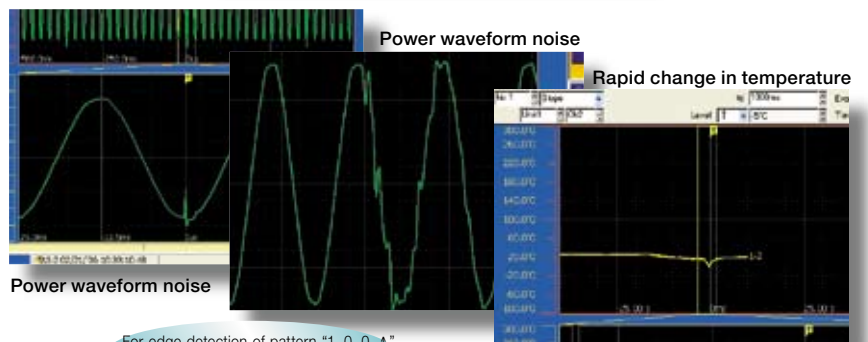
Set the voltage drop trigger to capture a sudden power loss resulting from a blackout caused by lighting or a circuit breaker tripping.

Set the window out trigger to capture an impulse noise or surge noise (voltage swell) caused by, for example, the solenoid opening and closing.



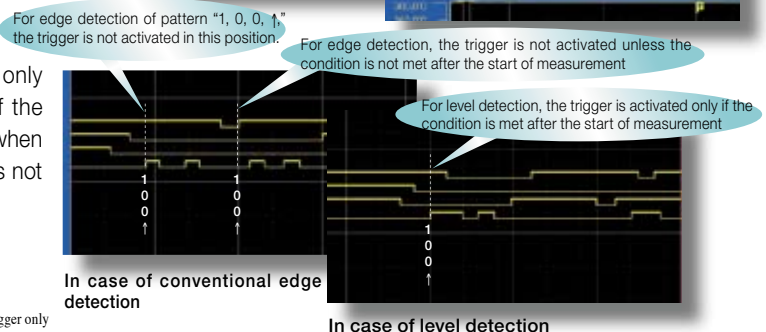
Slope trigger

Unlike with conventional MEMORY HiCORDERs, a slope trigger is supported. This allows you to monitor a noise superimposed on periodic waveforms such as a power waveform. This also allows you to monitor a rapid change in temperature with the amount of change in slope instead of level.



Edge detection and level detection of the logic trigger

Unlike with conventional MEMORY HiCORDERs supporting only edge detection, the 8860 series supports level detection of the logic trigger. This function causes the trigger to be activated when a specified pattern occurs, even if the logic pattern condition is not met after the start of measurement.



Set the event times independently for each trigger source * For the analog trigger only

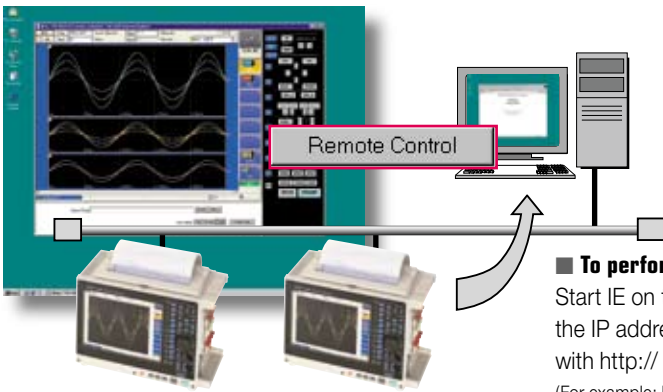
Unlike with conventional MEMORY HiCORDERs, this allows you to set the event times independently for each trigger source, thus enabling the setting of trigger conditions in a variety of combinations.

No.	Type	Ch	Level	Slope	Filter	Parameters	Parameters
T1	Level	1-2		OV	1	OFF	Event: 1 Timing: Start
T2	Win-In	1-2				OFF	Upper: 200mV Event: 2 Timing: Start
T3	Win-Out	2-1				OFF	Upper: 4mV Event: 3 Timing: Start
T4	Per-In	1-1		OV	1	OFF	Upper: 20mV Event: 4 Timing: Start
T5	Rec-Out	1-1		OV	1	OFF	Upper: 20mV Event: 5 Timing: Start

The trigger event times for the trigger source is set to 5.

Remote control with the Internet browser

- LAN/USB, calculation function -



Remote control and automatic saving to a shared folder

The 8860 series allows for remote control using the Internet browser on the computer. When you register access to a shared folder on a computer on the network, you can store and load data to and from the shared folder on the 8860 file screen.

■ To perform remote control:

Start IE on the computer and enter the IP address of the 8860 starting with http:// in the address box.

(For example: http://192.168.0.1)

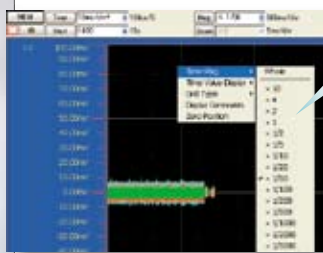
■ To access the shared folder:

Enter the host name of the computer on the file screen of the 8860, enter the user name and password in the account field, and then select the folder you want to share.



Mouse and keyboard connectivity

With the Windows-style interface, you can easily make settings and adjustments with the click of a mouse, and enter text and other comments with a keyboard as you would on a common PC.



Access a variety of popup menus with a right-click of the mouse.

USB and external monitor interfaces

Connect the MEMORY HiCORDER with other USB-compatible PC peripherals. Connect the instrument to your own large color display to see the waveforms in even more detail.



Automatic saving during measurement

Unlike with conventional MEMORY HiCORDERs, the 8860 series allows automatic saving during measurement.



Automatic saving during measurement shortens the waiting time for saving after measurement ends

■ Restrictions

Automatic saving during measurement is restricted to 1ms/division or more of the time axis. Also, restrictions to the time axis settings differ depending on the scanner module, number of channels, storage media, and setting conditions for real-time printing.

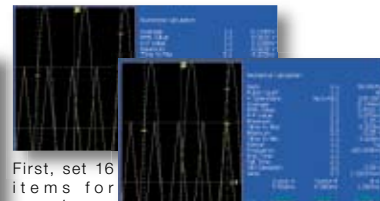
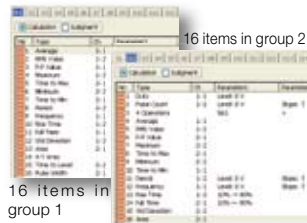
Redundancy against errors in the storage destination

The 8860 series allows you to set up to two storage destinations. Even if, for example, an overflow error occurs on a PC card during automatic saving, switching to the second backup storage destination takes place automatically to ensure saving continues.



Set 16 groups of numerical calculations

Unlike with conventional MEMORY HiCORDERs, the 8860 series allows you to set 16 groups of numerical calculations. Furthermore, each group allows you to select 16 calculation items from a total of 19. The SUB MENU screen of the waveform screen also allows you to view and change the numerical calculation settings and perform recalculation. This enables the settings of calculations in each group on the waveform screen to be changed and monitored, thus enhancing operability.

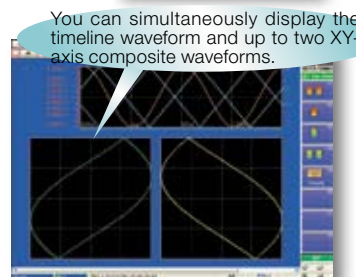


First, set 16 items for group 1

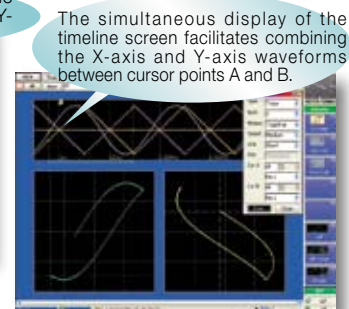
Set the calculation group to G2 and perform the calculation

Simultaneously display timeline and XY-axis composite waveforms

The 8860 series uses a split screen to support the simultaneous display of "timeline waveform" and "XY-axis composite waveform." Any channel can be set to the X-axis and Y-axis. The MEM function supports XY-axis waveforms.



You can simultaneously display the timeline waveform and up to two XY-axis composite waveforms.



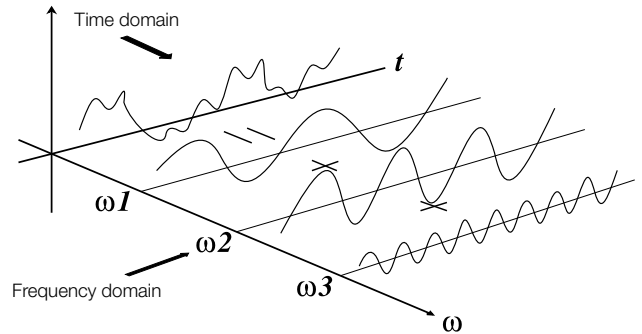
The simultaneous display of the timeline screen facilitates combining the X-axis and Y-axis waveforms between cursor points A and B.

Convert the time domain to the frequency domain for analysis

- FFT analysis function -

FFT analysis function (Supported from Version 1.07 or later)

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 MEM function (the required number of pieces of data for FFT analysis are 1000, 2000, 5000 and 10000). The calculation speed for the same condition (when performing the most time-consuming analysis) is about ten times faster than with the conventional 8855 model.



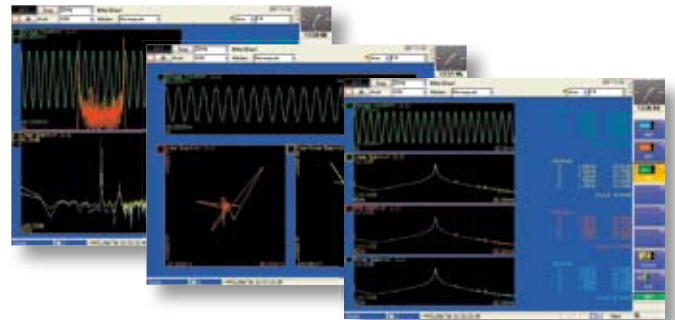
Simultaneously perform up to eight calculations

Unlike with the conventional HIOKI 8855 and 8841 models that allow for the simultaneous performing of up to two calculations, the 8860 and 8861 models allow for the simultaneous performing of up to eight (four times more) FFT calculations for analysis. Furthermore, the analysis channel can be selected independently.

No.	Analyze	Col.	Parameter	Ch1	Ch2	Yaxis	Xaxis
F1	Storage Waveform	A		1-1		Lin-Mag	Linear
F2	Linear Spectrum	A	Normal	1-1		Lin-Mag	Linear
F3	RMS Spectrum	A		1-1		Lin-Mag	Linear
F4	Power Spectrum	A		1-1		Lin-Mag	Linear
F5	Power Spectrum	A		1-1		Lin-Mag	Linear
F6	Auto Correlation	A		1-1		Lin-Mag	Linear
F7	Histogram	A		1-1		Lin-Mag	Linear
F8	1/1 Octave	A	Filter: Normal	1-1		Lin-Mag	Log

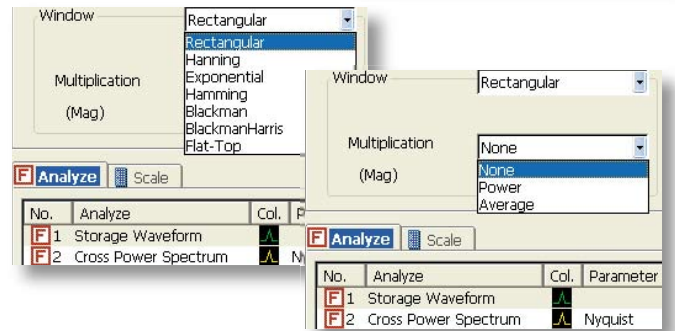
Split screen (a total of 14 patterns)

You can select a split screen format according to your needs. For example, the MEM and REC functions allow you to select a different split screen format independently for each sheet. Unlike with, for example, the conventional 8855 and 8841 models, a function to display superimposed graphs is also supported (however, the function depends on the analysis mode).



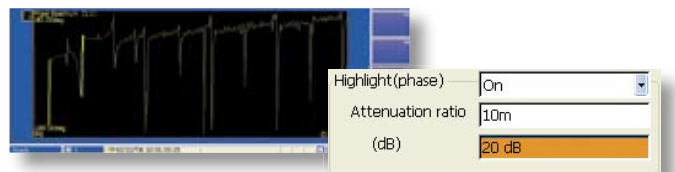
A variety of window functions

Unlike with the conventional 8855 and 8841 models that support only the three window function options "Rectangular," "Hanning," and "Exponential," the 8860 and 8861 models include four additional options, thus enabling you to select a window function from a total of seven options. Furthermore, a difference in calculation results of line spectrum between other companies' FFT analyzers and HIOKI's analyzer can be compensated by selecting the energy attenuation compensation method when using a window function.



Highlight the phase spectrum

While displaying the phase spectrum, you can highlight a desired section. The example on the right shows a section of an attenuation amount of 20dB or more being highlighted.



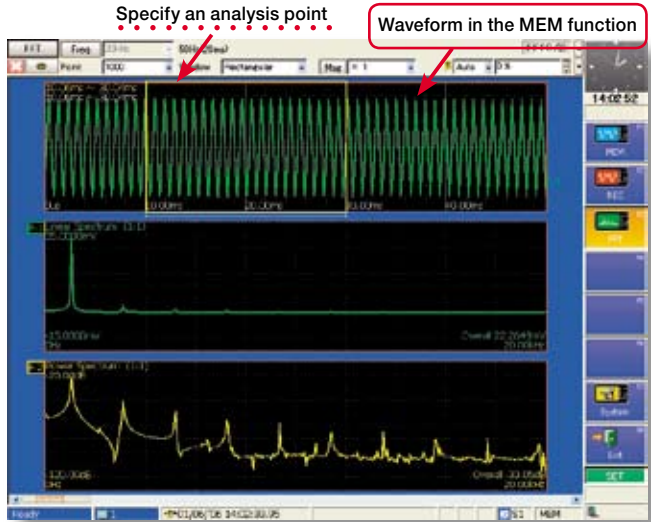
Change the settings on the DISP screen

The dialog bar on the top of the DISP screen (waveform monitoring screen) allows you to change the settings. The frequency resolution and capture time are also displayed.



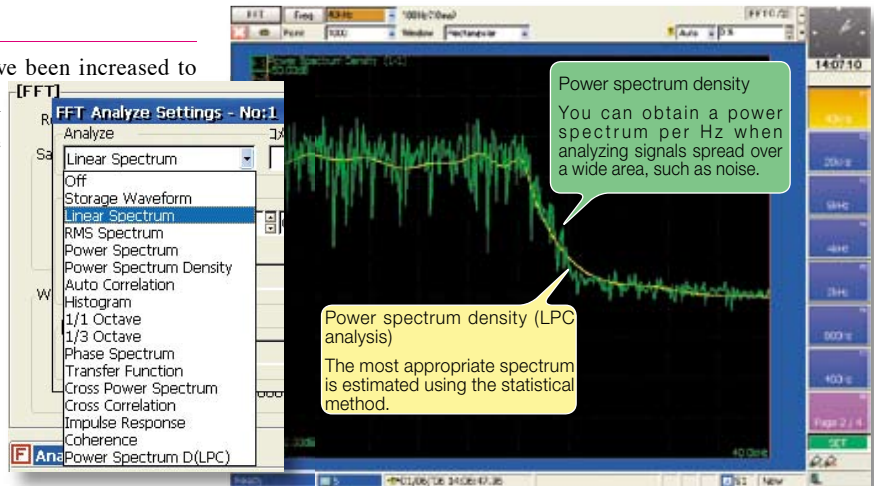
Perform FFT calculation on the waveform from the MEM function

When performing FFT analysis on the data obtained by measurement with the MEM function, you can use the jog shuttle to specify an analysis point and view the calculation results on the same screen. Unlike with the conventional 8855 and 8841 models, you do not need to switch between the MEM function and FFT function screens to set the starting point of calculation. Furthermore, the display of “Raw Data” obtained by measurement with the MEM function and the calculation results of “Storage Waveform” on the same screen allows you to view the effect of the window function and the spectrum waveform on the same window, thus greatly enhancing operability for analysis.



A variety of analysis modes

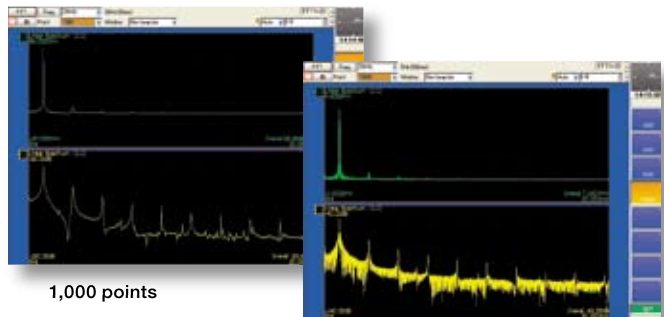
The calculation options in the FFT function have been increased to a total of 16. The long desired Power Spectrum Density option and a LPC Analysis option were added to enable more advanced analysis.



Change the count of calculation points and perform re-calculation after measurement ends

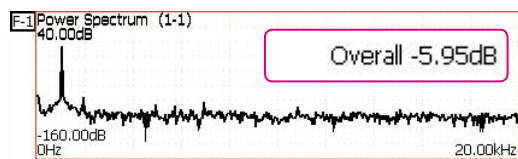
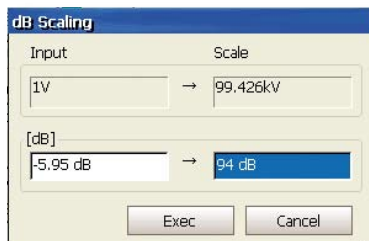
After measurement is performed using less calculation points, you can change the point count and perform re-analysis. For example, if you perform measurement using 1,000 calculation points, you can then convert point count to 10,000 to perform re-analysis on the data. In this case, the frequency resolution increases 10 times. Needless to say, you can convert the point count to 1,000 to perform re-analysis on the data obtained by performing measurement using 10,000 points.

* Re-calculation by changing the point count cannot be performed when Mean Frequency is set to ON.

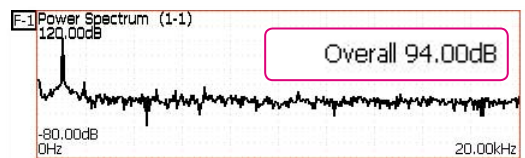


Scaling in “dB”

The long desired capability to scale in dB is supported. You no longer need to perform logarithmic calculation holding a calculator in one hand. The 8860 and 8861 models allow you to enter the overall value (sum of power spectrum values) in dB, thus making scaling easier. This enables signals to be easily read directly from, for example, a noise meter.



Before scaling



After scaling

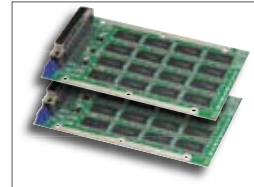
Product Specifications

Basic specifications	8860 (max. 4 input modules)	8861 (max. 8 input modules)
Input type/number of channels	Plug-in input modules Max. 16 analog channels (max. 64 channels with scanner unit) + 16 logic channels (standard configuration)	Plug-in input modules Max. 32 analog channels (max. 128 channels with scanner unit) + 16 logic channels (standard configuration)
Measurement functions	MEM (high-speed recording) REC (real-time recording) REC & MEM (real-time recording + high-speed recording, from version 2.00 onward) FFT (frequency analysis, version 1.07 or later) Real-time data save (version 1.10 or later)	
Maximum sampling rate	20 MS/second (50 ns, all channels simultaneously, using the ANALOG UNIT 8956) External sampling (10 MS/second, 100 ns)	
Types of measurement signals	1 unit: Voltage 2ch, 20 MS/s, 12-bit resolution (8956) 1 unit: Voltage 2ch, 2 MS/s, 16-bit resolution (8957) 1 unit: Voltage / Thermocouple scan 16ch, max. 50 ms refresh rate, 1/1000 of range resolution for temperature axis - (8958) 1 unit: Voltage / RMS, 1 MS/s, 12-bit resolution (8959) 1 unit: Voltage 2ch, 1 MS/s, 12-bit resolution (8936/8938) 1 unit: Voltage / Thermocouple 2ch, 4 kS/s, 12-bit resolution (8937) 1 unit: Strain gauge 2ch, 1 MS/s, 12-bit resolution (8939) 1 unit: Strain gauge 2ch, 200 kS/s, 16-bit resolution (8960) 1 unit: Frequency / Integration / Current / Voltage 2ch, 1 MS/s, 12-bit resolution (8940) 1 unit: Accelerometer 2ch, 1 MS/s, 12-bit resolution (8947) 1 unit: Voltage 4ch, 1 MS/s, 12-bit resolution (8946)	
Highest sampling rate and resolution (Model number of input module shown in parentheses)	1 unit: Voltage 2ch, 20 MS/s, 12-bit resolution (8956) 1 unit: Voltage 2ch, 2 MS/s, 16-bit resolution (8957) 1 unit: Voltage / Thermocouple scan 16ch, max. 50 ms refresh rate, 1/1000 of range resolution for temperature axis - (8958) 1 unit: Voltage / RMS, 1 MS/s, 12-bit resolution (8959) 1 unit: Voltage 2ch, 1 MS/s, 12-bit resolution (8936/8938) 1 unit: Voltage / Thermocouple 2ch, 4 kS/s, 12-bit resolution (8937) 1 unit: Strain gauge 2ch, 1 MS/s, 12-bit resolution (8939) 1 unit: Strain gauge 2ch, 200 kS/s, 16-bit resolution (8960) 1 unit: Frequency / Integration / Current / Voltage 2ch, 1 MS/s, 12-bit resolution (8940) 1 unit: Accelerometer 2ch, 1 MS/s, 12-bit resolution (8947) 1 unit: Voltage 4ch, 1 MS/s, 12-bit resolution (8946)	
Direct access internal memory	32 Mega-words (MEMORY BOARD 9715 × 1) (analog 12-bit + logic 4-bit) × 32 Mega-words/ch (using 1 channel) to (analog 12-bit + logic 4-bit) × 2 Mega-words/ch (using 16 channels)	64 Mega-words (MEMORY BOARD 9715 × 2) (analog 12-bit + logic 4-bit) × 32 Mega-words/ch (using 2 channels) to (analog 12-bit + logic 4-bit) × 2 Mega-words/ch (using 32 channels)
*1 Factory installation only: select 1 board for the 8860, and 2 of the same capacity for the 8861 when ordering.	1 Giga-word (MEMORY BOARD 9715-03 × 1) (analog 12-bit + logic 4-bit) × 1 Giga-word/ch (using 1 channel) to (analog 12-bit + logic 4-bit) × 64 Mega-words/ch (using 16 channels)	2 Giga-words (MEMORY BOARD 9715-03 × 2) (analog 12-bit + logic 4-bit) × 1 Giga-word/ch (using 2 channels) to (analog 12-bit + logic 4-bit) × 64 Mega-words/ch (using 32 channels)
9715: 32 Megawords 9715-01: 128 Megawords 9715-02: 512 Megawords 9715-03: 1 Gigawords	<i>Note: 1 word = 2 bytes (12-bits or 16-bits), therefore 1 giga-word = 2 giga-bytes. Note: Internal memory is allocated depending on the number of channels used.</i>	
Data storage media	PC Card Type II slot (standard) × 2: up to 4GB (Flash ATA), FAT, or FAT-32 format supported 3.5" Floppy disk drive (optional external drive): 1.44MB (2HD), 720KB (2DD), FAT format, via USB connection (external) 3.5" Magneto-optical drive (optional internal drive *2) × 1: Max. 2.3GB (128MB, 230MB, 540MB, 640MB, 1.3GB), FAT format 2.5" Hard disk drive (optional internal drive *2) × 1: 60GB, FAT-32 format	
*2 Only one slot is available in the main unit for either a built-in MO drive or built-in hard disk drive.	The following items are preserved on the memory board(s) even after power off: Clock and parameter setting backup (standard): at least 10 years; at reference temperature (25°C) Waveform backup function (using optional Model 9719 *3): 10 hours (8860) or 5 hours (8861), after full charge, at reference temperature (25°C)	
Backup functions	BNC connectors: external sampling input, sampling sync output Terminal block: external trigger input, trigger output, GO/NG output, external start, external stop, print input	
External control connectors	GP-IB (from version 1.10 *4): with GP-IB CARD 9558, for unit control (including input modules) and data transfer, IEEE 488.2-1987 compliant	
Standard external interfaces	USB: USB1.1 compliant (for 9716, keyboard/mouse/memory) LAN: RJ-45 connector, Ethernet 100BASE-TX, 10BASE-T Functions: HTTP server, FTP server, File sharing, DHCP compatible Monitor output: 15-pin D-sub connector, SVGA output PS/2 socket: for mouse and keyboard	
*4 Using PC Card slot and optional GP-IB card	Environmental conditions (no condensation) Temperature and humidity range for use: 0°C to 40°C, 20% to 80% rh Temperature and humidity range for storage: -10°C to 50°C, 20% to 90% rh	
Environmental conditions	Compliance standard Safety: EN61010, EMC: EN61326, EN61000-3-2, EN61000-3-3	
Power requirements	100 to 240 V AC (50/60 Hz) 12 V DC (use the DC POWER UNIT 9684 : option, factory installation only)	
Power consumption	140 VA max. (printer not used) 300 VA max. (A4 printer used)	190 VA max. (printer not used) 350 VA max. (A4 printer used)
Dimensions and mass	Approx. 330 mm (12.99 in) W × 250 mm (9.84 in) H × 184.5 mm (7.26 in) D, 8 kg (282.2 oz) (printer not installed) Approx. 330 mm (12.99 in) W × 272.5 mm (10.73 in) H × 184.5 mm (7.26 in) D, 9.5 kg (335.1 oz) (A4 printer installed) Approx. 330 mm (12.99 in) W × 255.5 mm (10.06 in) H × 184.5 mm (7.26 in) D, 9.0 kg (317.5 oz) (A6 printer installed)	Approx. 330 mm (12.99 in) W × 250 mm (9.84 in) H × 284.5 mm (11.20 in) D, 10.5 kg (370.4 oz) (printer not installed) Approx. 330 mm (12.99 in) W × 272.5 mm (10.73 in) H × 284.5 mm (11.20 in) D, 12 kg (423.3 oz) (A4 printer installed) Approx. 330 mm (12.99 in) W × 255.5 mm (10.06 in) H × 284.5 mm (11.20 in) D, 11.5 kg (405.6 oz) (A6 printer installed)
Supplied accessories	Instruction Manual × 1, Quick Start Manual × 1, Input Module Guide × 1, Analysis Supplement Manual × 1, Power cord × 1, Input cord label × 1, Application Disk (Wave Viewer Wv, Communication Commands table) × 1	



Interchangeable input modules

The slot design using plug-in type modules offers superior flexibility for measuring all types of signals including voltage, current, frequency, temperature, acceleration and more.



Customized direct access memory capacity

Determine the amount of direct access memory you will need based on your application and budget requirements and build your own unique measurement system. Install either one 32MW, 128MW, 512MW, or 1GW board in the 8860, and two of the same capacity board in the 8861.



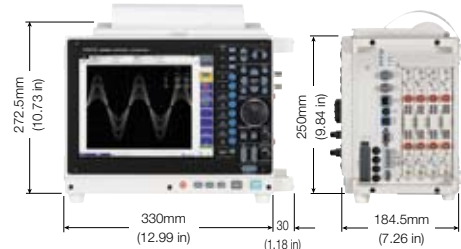
Data can be saved to a variety of storage media

- 60GB Hard Disk (either the hard disk or MO drive can be selected as a factory-installed option)
- 2.3GB MO Drive (either the hard disk or MO drive can be selected as a factory-installed option)
- Two PC Card slots (equipped as standard)
128, 256, 512MB or 1GB Memory Card (option)
- USB floppy diskette drive (option)
- Commonly available USB storage devices
- Shared folders on LAN-connected PCs



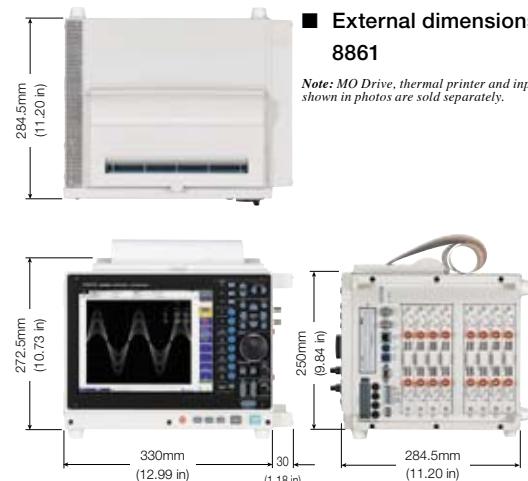
External dimensions 8860

Note: Thermal printer and input units shown in photos are sold separately.



External dimensions 8861

Note: MO Drive, thermal printer and input units shown in photos are sold separately.



Product Specifications

Print/display section ^{*6} Printer functions are available when optional printer unit is installed	
Display	10.4 inch TFT color LCD (SVGA, 800 × 600 dots)
^{*6} Recording paper	RECORDING PAPER 9231: 216 mm (8.50 in) × 30 m (98.43 ft), thermal paper roll (when using A4-size the printer unit 8995) RECORDING PAPER 9234: 112 mm (4.41 in) × 18 m (59.06 ft), thermal paper roll (when using A6-size the printer unit 8995-01)
^{*6} Recording width	RECORDING PAPER 9231: 200 mm (7.87 in), full scale 20 divisions, 1 division = 10 mm (0.39 in) (when using A4-size the printer unit 8995) RECORDING PAPER 9234: 100 mm (3.94 in), full scale 10 divisions, 1 division = 10 mm (0.39 in) (when using A6-size the printer unit 8995-01)
^{*6} Paper feed density	10 lines/mm (when using A4-size the printer unit 8995), 8 lines/mm (when using A6-size the printer unit 8995-01) [*] 20 lines/mm with "smoothed printing" memory function (when using A4-size the printer unit 8995)
^{*6} Recording speed	Max. 20 mm (0.79 in)/sec
Trigger functions	
Trigger sources	Turn on/off independently for each trigger source of analog/logic A – D, external trigger (a rise of 2.5V or terminal short circuit); timer trigger, inter-source AND/OR, forced trigger, standard mode (trigger source to all analog channels settable), extend mode (multiple analog sources to a single analog channel settable, up to 8 for 8860 , and up to 8 on channels/units 1 – 4, and up to 8 on channels/units 5 – 8 for 8861 settable)
Trigger types (analog)	Level: Triggering occurs when preset voltage level is crossed (upwards or downwards). Window: Triggering occurs when window defined by upper and lower limit is entered or exited. Period: Rising edge or falling edge cycle of preset voltage value is monitored and triggering occurs when defined cycle range is exceeded. Glitch: Triggering occurs when pulse width from rising or falling edge of preset voltage value is underrun. Slope: Triggering occurs when preset change degree (slope) is exceeded or underrun. Voltage drop: Triggering occurs when voltage drops below peak voltage setting (for 50/60 Hz AC power lines only). Event setting: Event count is performed for each source, and triggering occurs when a preset count is exceeded.
Level setting resolution	0.1% of full scale (full scale = 20 divisions)
Trigger types (logic)	1, 0, 0 1, x, pattern setting, AND/OR setting for groups of 4 channels, level or edge detect selectable (0 1: changing to any value activates trigger)
Trigger filter (analog/logic)	OFF, setting range 0.1 to 10.0 divisions in 0.1 division steps (MEM, REC & MEM function), ON (10 ms)/OFF (REC function)
Other functions	Pre-trigger function to capture pre- and post-trigger waveform, trigger output (active Low with BNC terminal and open collector 5 voltage output). Level display while waiting for trigger, Start/stop trigger conditions independently selectable
Memory functions	
Time axis	5 μs to 5 min/division, 25 ranges or external sampling, time axis resolution 100 points/division, time axis zoom: ×2 to ×10 in 3 stages, compression: 1/2 to 1/500,000 in 17 stages
Sampling rate	Fixed: 1/100 of time axis range, Variable: external sampling Sampling period can be used to set time axis Two different sampling rate settings are possible
Recording length	32 MW memory: manual setting in 1-division steps (max. 320,000 divisions ^{*7}) Or built-in presets of 25 to 200,000 divisions ^{*7} 128 MW memory: manual setting in 1-division steps (max. 1,280,000 divisions ^{*7}) Or built-in presets of 25 to 1,000,000 divisions ^{*7} 512 MW memory: manual setting in 1-division steps (max. 5,120,000 divisions ^{*7}) Or built-in presets of 25 to 5,000,000 divisions ^{*7} 1 GW memory: manual setting in 1-division steps (max. 10,240,000 divisions ^{*7}) Or built-in presets of 25 to 10,000,000 divisions ^{*7} ^{*7} Maximum recording length or built-in preset length when using 1 channel (8860) or 2 channels (8861). Memory of 8861 is twice that of 8860 , but recording length is the same.
Pre-trigger	Record data from before the trigger point, -100 to +100% of recording length (free setting in 1% steps)
Screen and printing	Split screen (1 to 8), X-Y screen (1, 2, 4 screens, max. 8 combined), sheet display (max. 32 channels per sheet), logging (print/display measurement data as digital values), voltage axis zoom (×2 to ×100), compression (×1/2 to ×1/10), overlay, zoom, variable display, vernier display
Memory splitting	Divided use of memory space (up to 4096 divisions), sequential save
Waveform calculation	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 (sin, cos, tan, arc-sin, arc-cos, arc-tan)
Numerical calculation	(Numerical calculation by specifying calculation area with cursors A and B, numerical calculation judgment, automatic saving of numerical calculation results, saving of any existing numerical calculation results) Average value, effective (rms) value, peak to peak value, maximum value, time to maximum value, minimum value, time to minimum value, period, frequency rise time, fall time, standard deviation, area value, X-Y area value, time to level, pulse width, duty ratio, pulse count, four arithmetic operations for results of numerical calculation

Recorder functions	
Time axis	10 ms to 200 ms ^{**} /division, 500 ms to 1 hour/division with 18 ranges, time axis resolution 100 points/division, time axis zoom: ×2 to ×5 in 2 stages, compression: 1/2 to 1/500 in 8 stages ^{**8:} Virtual record function: At 10 ms - 200 ms/division, printing in real time is not possible, but waveform data are stored in memory and can be monitored on screen. Data are stored for 10,000 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.
Sampling rate	100 ns to 1 sec in 8 stages (selectable in 1/100 of time axis range)
Recording length	32 MW memory: manual setting in 1-division steps (max. 5,000 ^{*9} divisions) or built-in presets of 25 to 5,000 divisions, continuous ^{**} 128 MW memory: manual setting in 1-division steps (max. 20,000 ^{*9} divisions) or built-in presets of 25 to 20,000 divisions, continuous ^{**} 512 MW memory: manual setting in 1-division steps (max. 50,000 ^{*9} divisions) or built-in presets of 25 to 80,000 divisions, continuous ^{**} 1 GW memory: manual setting in 1-division steps (max. 100,000 ^{*9} divisions) or built-in presets of 25 to 160,000 divisions, continuous ^{**} ^{**8:} At time axis 10 ms to 200 ms/division and printer ON, Continuous setting cannot be selected ^{*9:} Memory of 8861 is twice than shown above, but recording length is the same.
Waveform memory	Store data for most recent 5,000 ^{*10} divisions (with 32 MW memory) in memory. Backward scrolling and re-printing available. ^{*10:} 20,000 divisions with 128 MW, 80,000 divisions with 512 MW, 160,000 divisions with 1 GW. Memory of 8861 is twice that of 8860 , but recording length is the same.
Screen and printing	Split screen (1 to 8), sheet display (max. 32 channels per sheet), logging (print/display measurement data as digital values), voltage axis zoom (×2 to ×100), compression (×1/2 to ×1/10), variable display
REC & MEM function (function available from version 2.00 onward)	
Time axis (REC)	100 ms to 200 ms/division, 500 ms to 1 hour/division, 18 ranges, time axis resolution 100 points/division, sampling rate: same as sampling rate for MEM function
Time axis (MEM)	10 μs to 5 min/division, 24 ranges, time axis resolution 100 points/division, sampling rate: 1/100 of time axis
Recording length	REC: 25 to 2,000 ^{*11} divisions, max. 80,000 divisions ^{*11} , continuous MEM: 25 to 5,000 ^{*11} divisions, max. 160,000 divisions ^{*11} ^{*11:} Depends on installed memory 32 MW to 1GW (free setting in 1-division steps also possible)
Screen and printing	Toggle REC/MEM waveform display, simultaneous display of REC/MEM waveform with split screen, split screen (1 to 8), sheet display (max. 32 channels per sheet), logging (print/display measurement data as digital values), zoom (with MEM), variable display
Memory divide	Divided use of memory space (up to 1024 divisions), sequential save, block search
FFT function (version 1.07 or later)	
Analysis mode	Storage waveform, linear spectrum, RMS spectrum, power spectrum, power spectrum density, cross power spectrum, auto-correlation function, histogram, transfer function, cross-correlation function, impulse response, coherence function, octave analysis
Analysis channels	1-channel FFT, 2-channel FFT in selected channels (up to 8 analysis functions)
Frequency range	133 mHz to 8 MHz, resolution 1/400, 1/800, 1/2000, 1/4000
Number of sampling points	1000, 2000, 5000, 10000 points
Analysis data	Selected from: Newly loaded data / MEM function waveform data / MEM waveform of REC & MEM function
Window functions	Rectangular, Hanning, Exponential, Hamming, Blackman, Blackman-Harris, Flat-top
Screen and printing	Split screen (1/2/4), Nyquist, logging (print/display measurement data as digital values), frequency axis zoom and left/right scrolling
Averaging	Time axis / frequency axis simple averaging, exponential averaging, peak hold

■ Product Specifications

Real-time save function (version 1.10 or later)	
Time axis (Whole waveform data)	10 ms to 200 ms *14/division, 500 ms to 1 hour/division, 18 ranges, time axis resolution 100 points/division, sampling speed: same as sampling rate for "Measurement Waveform" *14 Not available for virtual recording at 10 ms to 200 ms/division
Time axis (Measurement waveform data: sampling data)	100 μs to 5 min/division, 20 ranges (limited depending on store target and number of channels), time axis resolution 100 points/division, sampling rate: 1/100 of time axis
Save to	MO disk, HDD, LAN, PC Card
Recording length	Depending on available space on storage media / file system / number of channels / REC time axis Selectable in division steps up to maximum recording length
Screen and printing	During measurement: Whole wave, after measurement: toggle Whole/Measurement waveform display, simultaneous display of Whole/Measurement waveform with split screen, split screen (1 to 8), sheet display (max. 32 channels per sheet), logging (print/display measurement data as digital values), zoom, variable display
Memory transfer	Data can be analyzed in MEM function/FFT function
Waveform detection function	Detection of trigger criteria, time, event markers and peak value*15 Up to 1,000 event markers can be input during and after measurement*16 *15 Trigger criteria and event marker detection for other than level and window triggering are available from version 2.00 *16 Event marker input is available from version 2.00
Additional features (Some functions available from version 2.00 onward)	
General	Measurement parameter printing, cursor measurement, scaling, current clamp setting, comment input, screen hard copy, list/gauge, start condition hold, auto setup, auto save, remote control (start/stop/print control), auto range, over-range indication, VIEW function, key lock, level monitor, vernier function, offset cancel, event marker input, waveform search function, report printing, file save of printing image

■ Options specifications (sold separately) For 8860/8861 only

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

ANALOG UNIT 8956 (Accuracy at 23 ±5°C/73 ±9°F, 30 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 1MΩ, input capacitance 40pF), Max. rated voltage to earth: 300V 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: 20 DIV, AC voltage for possible measurement/display using the memory function: 280V rms, low-pass filter: 5Hz/500Hz/5kHz/1MHz
Measurement resolution	1/100 of measurement range (using 12-bit A/D conversion; installed in 8860/8861)
Highest sampling rate	20MS/s (simultaneous sampling in 2 channels)
Accuracy	DC amplitude: ±0.4% of full scale (with filter 5Hz) Zero position: ±0.1% of full scale (with filter 5Hz, after zero adjustment)
Frequency characteristics	DC to 10MHz ±3dB, with AC coupling: 7Hz to 10MHz ±3dB
Input coupling	DC, GND, AC
Max. allowable input	400V DC (the maximum voltage that can be applied across input pins without damage)

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

HIGH-RESOLUTION UNIT 8957 (Accuracy at 23 ±5°C/73 ±9°F, 30 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 1MΩ, input capacitance 40pF), Max. rated voltage to earth: 300V 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/500Hz/5kHz/50kHz
Anti-aliasing filter	Integrated filter for suppressing aliasing distortion caused by FFT processing (automatic cutoff frequency setting/OFF)
Measurement resolution	1/1600 of measurement range (using 16-bit A/D conversion; installed in 8860/8861)
Highest sampling rate	2MS/s (simultaneous sampling in 2 channels)
Accuracy	DC amplitude: ±0.2% of full scale (with filter 5Hz) Zero position: ±0.1% of full scale (with filter 5Hz, after zero adjustment)
Frequency characteristics	DC to 200kHz ±3dB, with AC coupling: 7Hz to 200kHz ±3dB
Input coupling	DC, GND, AC
Max. allowable input	400V DC (the maximum voltage that can be applied across input pins without damage)

■ Options specifications (sold separately) For 8860/8861 only

Dimensions and mass: approx. 170 (6.69in) W × 20 (0.79in) H × 183 (7.20in) D mm, approx. 385 g (13.6 oz) **Accessories:** Flathead screwdriver × 1, short bar × 2



16ch SCANNER UNIT 8958 (Accuracy at 23 ±5°C/73 ±9°F, 30 to 80 % rh after 1 hour of warm-up time and adjustment; accuracy guaranteed for 1 year)	
Measurement functions	Number of channels: 16, for voltage measurement/temperature measurement with thermocouple
Input connectors	Voltage input/Thermocouple input: screw-type terminal strip, recommended wire diameter *1, detachable terminal block (with cover) *1 Recommended cable, single-wire: 0.14 to 1.5 mm ² , braided wire 0.14 to 1.0 mm ² (conductor wire diameter min. 0.18 mm), AWG 26 to 16 Input impedance: 1MΩ, 850kΩ with line fault detection ON, Max. rated voltage to earth: 33Vrms or 70V 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	5m, 50m, 500m, 2V/DIV, 4 ranges, full scale: 20DIV, measurement range: ±100% of full scale, digital filter: 10Hz/50Hz/60Hz, measurement resolution 1/1600 of measurement range (using 16-bit A/D conversion; installed in 8860/8861)
Temperature measurement range	10°C/DIV (-100°C to +200°C), 50°C/DIV (-200°C to +1000°C), 100°C/DIV (-200°C to +2000°C), 3 ranges, full scale: 20DIV, digital filter: 10Hz/50Hz/60Hz, measurement resolution 1/1000 of measurement range (using 16-bit A/D conversion; installed in 8860/8861)
Thermocouple range	K: -200 to 1350°C, J: -200 to 1200°C, E: -200 to 1000°C, T: -200 to 400°C, N: -200 to 1300°C, R: 0 to 1700°C, S: 0 to 1700°C, B: 400 to 1800°C, W (WRε5-26): 0 to 2000°C, reference junction compensation: internal/ external (switchable), line fault detection ON/OFF switchable
Data refresh rate	50ms/all channels (digital filter OFF), 300ms/all channels (digital filter 50Hz/60Hz), 1.4 s/all channels (digital filter 10Hz)
Accuracy	Voltage: ±0.2% of full scale, thermocouple (K, J, E, T, N): ±0.05% of full scale ±1°C, (R, S, B, W): ±0.05% of full scale ±2°C (400°C or more), ±0.05% of full scale ±3.5°C (less than 400°C), reference junction compensation accuracy: ±1°C (added to measurement accuracy with internal reference junction compensation)
Max. allowable input	40V DC (the maximum voltage that can be applied across input pins without damage)

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



DC/RMS UNIT 8959 (Accuracy at 23 ±5°C/73 ±9°F, 30 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 1MΩ, input capacitance 30pF), Max. rated voltage to earth: 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/5kHz/100kHz
Measurement resolution	1/80 of measurement range (using 12-bit A/D conversion; installed in 8860/8861)
Highest sampling rate	1MS/s (simultaneous sampling in 2 channels)
Accuracy	DC amplitude: ±0.4% of full scale (with filter 5Hz), zero position: ±0.1% of full scale (with filter 5Hz, after zero adjustment)
RMS measurement	RMS amplitude accuracy: ±1% of full scale (DC, 20Hz to 1kHz), ±3% of full scale (1kHz to 100kHz), response time: SLOW 5s (rise time from 0 to 90% of full scale), MID 800ms (rise time from 0 to 90% of full scale), FAST 100ms (rise time from 0 to 90% of full scale), crest factor: 2
Frequency characteristics	DC to 400kHz ±3dB, with AC coupling: 7Hz to 400kHz ±3dB
Input coupling	DC, GND, AC
Max. allowable input	400V DC (the maximum voltage that can be applied across input pins without damage)

Dimensions and mass: approx. 170 (6.69in) W × 20 (0.79in) H × 148.5 (5.85in) D mm, approx. 290 g (10.2 oz) **Accessories:** Conversion cable × 2, cable length 50cm (19.69in)



STRAIN UNIT 8960 (Accuracy at 23 ±5°C/73 ±9°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 ±10000 με)
Input connectors	Via conversion cable, TAJIMI PRC03-12A10-7MI0.5, Max. rated voltage to earth: 33Vrms or 70V 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: 120Ω to 1kΩ (bridge voltage 2V), 350Ω to 1kΩ (bridge voltage 5V, 10V), bridge voltage 2, 5, 10 ±0.05V
Measurement range	20με to 1000με/DIV, 6 ranges, full scale: 20DIV, low-pass filter: 5Hz/10Hz/100Hz/1kHz
Anti-aliasing filter	Integrated filter for suppressing aliasing distortion caused by FFT processing (automatic cutoff frequency setting/OFF)
Measurement resolution	1/1600 of measurement range (using 16-bit A/D conversion; installed in 8860/8861)
Highest sampling rate	200kS/s (2-channel simultaneous sampling)
Accuracy After auto-balancing	DC amplitude: ±(0.4% of full scale +2με), zero position: ±(0.1% of full scale +2με) (at 5Hz filter ON)
Frequency characteristics	DC to 20kHz ±1/-3dB
Max. allowable input	10V DC (the maximum voltage that can be applied across input pins without damage)

* Available from main unit 8860/8861 version 1.06

Options specifications (sold separately) options common to Models 8720/8826/8835/8835-01/8841/8842/8860/8861

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

ANALOG UNIT 8936 <small>(Accuracy at 23 ±5°C/73 ±9°F, 35 to 80 % rh after 30 minutes of warm-up time and zero-adjust; accuracy guaranteed for 1 year)</small>	
Measurement functions	Number of channels: 2, for voltage measurement
Input connectors	Isolated BNC connector (input impedance 1MΩ, input capacitance 30pF), Max. rated voltage to earth: 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/5kHz/100kHz
Measurement resolution	1/80 of measurement range (using 12-bit A/D conversion; installed in 8860/8861)
Highest sampling rate	1MS/s (simultaneous sampling in 2 channels)
Accuracy	DC amplitude: ±0.4% of full scale, zero position: ±0.1% of full scale (after zero adjustment)
Frequency characteristics	DC to 400kHz ±3dB, with AC coupling: 7Hz to 400kHz ±3dB
Input coupling	DC, GND, AC
Max. allowable input	400V DC (the maximum voltage that can be applied across input pins without damage)

* When using Model 8936 with serial number earlier than 041018234 on Models 8860 or 8861, residual noise will be 850 μVp-p.

FFT ANALOG UNIT 8938 <small>(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)</small>	
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

* When using Model 8938 with serial number earlier than 041132532 on Models 8860 or 8861, residual noise will be 1.4 mVp-p.

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

VOLTAGE/TEMP UNIT 8937 <small>(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)</small>	
Measurement functions	Number of channels: 2, for voltage measurement/temperature measurement with thermocouple
Input connectors	Voltage input: metallic BNC connector (input impedance 1MΩ, input capacitance 50pF), thermocouple input: plug-in connector (input impedance min. 5.1MΩ), Max. rated voltage to earth: 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	500μV to 2 V/DIV, 12 ranges, full scale: 20DIV, low-pass filter: 5Hz/500Hz/5kHz/100kHz, Measurement resolution: 1/80 of measurement range (using 12-bit A/D conversion; installed in 8860/8861)
Temperature measurement range	10°C to 100°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 8860/8861)
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)
Highest sampling rate	Voltage input: 1MS/s, Temperature measurement: 4kS/s (2-channel simultaneous sampling)
Accuracy	Voltage input: DC amplitude ±0.4% of full scale, zero position ±0.15% of full scale, Temperature measurement (K, E, J, T, N): ±0.1% of full scale ±1°C, ±0.1% of full scale ±2°C (-200 to 0°C), (R, S): ±0.1% of full scale ±3°C, (B): ±0.1% of full scale ±4°C (400 to 1800°C), Reference junction compensation accuracy: ±0.1% of full scale ±1.5 °C (internal reference junction compensation)
Frequency characteristics	Voltage input: DC to 400 kHz +1/-3dB Temperature measurement: DC to 1kHz +1/-3dB
Input coupling	DC, GND, AC
Max. allowable input	30Vrms or 60V DC (the maximum voltage that can be applied across input pins without damage)

* When using Model 8937 with serial number earlier than 041135257 on Models 8860 or 8861, residual noise will be 150 μVp-p.

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

STRAIN UNIT 8939 <small>(Accuracy at 23 ±5°C/73 ±9°F, 35 to 80 % rh after 1 hour of warm-up time and auto-balancing; accuracy guaranteed for 1 year)</small>	
Measurement functions	Number of channels: 2, for distortion measurement (electronic auto-balancing, balance adjustment range within ±0000μe)
Input connectors	Via conversion cable, TAJIMI PRC03-12A10-7M10.5, Max. rated voltage to earth: 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: 120Ω to 1kΩ, bridge voltage 2 ±0.05V
Measurement range	20μe to 1000μe/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 8860/8861)
Highest sampling rate	1MS/s (2-channel simultaneous sampling)
Accuracy After auto-balancing	DC amplitude: ±(0.5% of full scale +2μe), zero position: ±0.5% of full scale
Frequency characteristics	DC to 20 kHz +1/-3dB
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 x 20 (0.79in) H x 148.5 (5.85in) D mm, approx. 300 g (10.6 oz) **Accessories:** None

F/V UNIT 8940 <small>(Accuracy at 23 ±5°C/73 ±9°F, 35 to 80 % rh after 30 minutes of warm-up time and zero-adjust; accuracy guaranteed for 1 year)</small>	
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 1MΩ, input capacitance 60pF), sensor connector (dedicated connector for clamp-on sensor via conversion cable, common ground with recorder), Max. rated voltage to earth: 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	Frequency: DC to 100kHz, with 0.05Hz to 5kHz/DIV, 11 ranges, 5 (r/min) to 500 (r/min)/DIV, 5 ranges, P50Hz (40 to 60Hz), P60Hz (50 to 70Hz) * Power line frequency measurement requires the DIFFERENTIAL PROBE 9322 or PT 9303, Accuracy: ±0.2% of full scale (except 5kHz/DIV range), ±0.7% of full scale (5kHz/DIV range), ±0.032Hz (P50Hz, P60Hz range) Integration: DC to 90kHz, with 5counts to 500counts/DIV, 11 ranges Pulse duty ratio: 10Hz to 100kHz, with 100% of full scale, 1 range, Accuracy: ±1% of full scale (10Hz to 10kHz) Threshold: -10 to +10V (settable in 0.2V steps) Full scale: 20DIV, Max. allowable input: 30Vrms or 60V DC (the maximum voltage that can be applied across input pins without damage)
Measurement range	Voltage: 0.5mV to 2V/DIV, 12 ranges Current: 5mA to 100A/DIV, 10 ranges, using current sensor (powered from the 8940, max. 4 sensors total) DC amplitude accuracy: ±0.4% of full scale, zero position ±0.15% of full scale (current measurement accuracy dependent on sensor accuracy/ characteristics) Frequency characteristics: DC to 400kHz ±3dB Full scale: 20DIV, Max. allowable input: 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 8860/8861, excluding current range when using 9279)
Highest sampling rate	1MS/s (2-channel simultaneous sampling), (frequency/duty ratio measurement: 1.125μs cycle)
Other functions	Voltage input pull-up: ON (10kΩ)/OFF, input coupling: DC, GND, AC (voltage/current), DC (others), low-pass filter: 5Hz/500Hz/5kHz/100kHz

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

4ch ANALOG UNIT 8946 <small>(Accuracy at 23 ±5°C/73 ±9°F, 35 to 80 % rh after 30 minutes of warm-up time and zero-adjust; accuracy guaranteed for 1 year)</small>	
Measurement functions	Number of channels: 4, for voltage measurement
Input connectors	Metallic BNC connector (input impedance 1MΩ, input capacitance 15pF), Max. rated voltage to earth: 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)
Measurement range	10mV to 2V/DIV, 8 ranges, full scale: 20DIV, low-pass filter, 5Hz/500Hz/5kHz/50kHz, input coupling: DC, GND
Measurement resolution	1/80 of measurement range (using 12-bit A/D conversion; installed in 8860/8861)
Highest sampling rate	1MS/s (4-channel simultaneous sampling)
Accuracy	DC amplitude: ±0.5% of full scale, zero position: ±0.15% of full scale (after zero adjustment)
Frequency characteristics	DC to 100kHz ±3dB
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 x 20 (0.79in) H x 148.5 (5.85in) D mm, approx. 310 g (10.9 oz) **Accessories:** None

CHARGE UNIT 8947 <small>(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)</small>	
Measurement functions	Number of channels: 2, for acceleration measurement
Input connectors	Voltage input/integrated preamplifier input: metallic BNC connector (for voltage input; input impedance 1MΩ, input capacitance 200pF or less) Charge input: miniature connector (#10-32 UNF) Max. rated voltage to earth: 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	Charge input: Charge-output type piezoelectric acceleration pick-up sensor Internal preamp input: Acceleration pick-up sensor with an internal preamp
Measurement range	50m (m/s ²)/DIV to 10k (m/s ²)/DIV, 12 ranges x 6 types, charge input sensitivity: 0.1 to 10 pC/(m/s ²), integrated pre-amplifier input: 0.1 to 10 mV/(m/s ²), amplitude accuracy: ±2% of full scale, frequency characteristics: 1 to 50kHz, +1/-3dB, low-pass filter: 500Hz/5kHz, pre-amplifier drive power source: 2mA ±20%, +15V ±5%, maximum input charge: ±500pC (high-sensitivity setting, 6 ranges), ±50000pC (low-sensitivity setting, 6 ranges)
Measurement range	500μV to 2V/DIV, 12 ranges, DC amplitude accuracy: ±0.4% of full scale, frequency characteristics: DC to 400kHz, +1/-3 dB, low-pass filter: 5Hz/500Hz/5kHz/100kHz, input coupling: DC, GND, AC, Max. allowable input: 30Vrms or 60V DC
Measurement resolution	1/80 to 1/32 of measurement range (depending on measurement sensitivity; installed in 8860/8861)
Highest sampling rate	1MS/s (2-channel simultaneous sampling)
Anti-aliasing filter	Integrated filter for suppressing aliasing distortion caused by FFT processing (automatic cutoff frequency setting/OFF)

* When using Model 8947 with serial number earlier than 040933650 on Models 8860 or 8861, residual noise will be 200 μVp-p.

Options specifications (sold separately)

Cable length and mass: Main unit cable 1.5 m (4.92 ft), input section cable 30 cm (0.98 ft), approx. 150 g (5.3 oz)

Note: The unit-side plug of the 9320-01 and 9327 is different from the 9320.



LOGIC PROBE 9320-01/9327	
<small>(Accuracy at 23 ±5°C/73 ±9°F, 35 to 80% rh; accuracy guaranteed for 1 year)</small>	
Function	Detection of voltage signal or relay contact signal for High/Low state recording
Input	4 channels (common ground between unit and channels), digital/contact input, switchable (contact input can detect open-collector signals), input impedance: 1MΩ (with digital input, 0 to +5V), 500kΩ or more (with digital input, +5 to +50V), pull-up resistance: 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	9320-01: 500ns or lower, 9327: detectable pulse width 100ns or higher
Max. allowable input	0 to +50V DC (the maximum voltage that can be applied across input pins without damage)

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

Note: The unit-side plug of the 9321-01 is different from the 9321.



LOGIC PROBE 9321-01	
<small>(Accuracy at 23 ±5°C/73 ±9°F, 35 to 80% rh; accuracy guaranteed for 1 year)</small>	
Function	Detection of AC or DC relay drive signal for High/Low state recording Can also be used for power line interruption detection
Input	4 channels (isolated between unit and channels), HIGH/LOW range switching Input impedance: 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)



DIFFERENTIAL PROBE 9322	
<small>(Accuracy at 23 ±5°C/73 ±9°F, 35 to 80% rh, after 30 minutes of warm-up time; accuracy guaranteed for 1 year)</small>	
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), amplitude accuracy: ±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, response speed: 200ms or less (400V AC), accuracy: ±1% of full scale (DC, 40Hz to 1kHz), ±4% of full scale (1kHz to 100kHz) (full scale: 1000V AC)
Input	Input type: balanced differential input, input impedance/capacitance: H-L 9MΩ/10pF, H/L-unit 4.5MΩ/20pF, Max. rated voltage to earth: 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	(1) Connect the AC ADAPTER 9418-15, (2) Connect to the PROBE POWER UNIT 9687 via the POWER CORD 9248, (3) Connect to HiCORDER logic terminal via the POWER CORD 9324 and CONVERSION CABLE 9323, (4) Connect to the F/V UNIT 8940 via the POWER CORD 9325.

Dimensions and mass: approx. 315.8 (12.43in) W × 29 (1.14in) H × 244.4 (9.62in) D mm, approx. 1.25 kg (44.1oz) **Accessories:** None



DC POWER UNIT 9684	
<small>Note: Factory-installed option, build in on the bottom case of 8860/8861</small>	
Rated input voltage	12V DC (input range : 10 to 16V DC)
Power requirements	200VA (printer used)

Dimensions and mass: approx. 315.8 (12.43in) W × 18.2 (0.72in) H × 244.4 (9.62in) D mm, approx. 570 g (20.1oz) **Accessories:** None



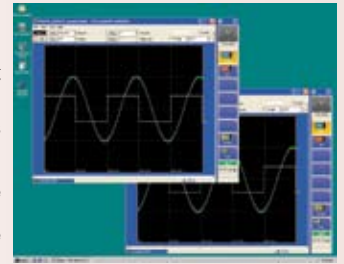
PROBE POWER UNIT 9687	
<small>Note: Factory-installed option, build in on the bottom case of 8860/8861</small>	
No. of power channels	8, rated output voltage : ±12V
Compatible probes	3273 (15A Max.) : less than 8 units 3273-50 (35A Max.) : less than 6 units 3274 (150A Max.) : less than 6 units 3275 (500A Max.) : less than 5 units 3276 (30A Max.) : less than 6 units



Perform the same functions on the computer

Features

- Application software enables you to perform the same data analysis on a Windows computer as on the MEMORY HiCORDERs 8860 and 8861.
- No confusion, because the screens appearing on the computer are identical to those of the 8860/8861.
- Functions identical to those of the 8860/8861, such as waveform processing calculation, run on the computer.



MEMORY HiVIEWER 9725

Compatible devices	MEMORY HiCORDER 8860, 8861
Supplied Media	One CD-R disc
Operating environment	Computer running under Windows 2000/XP
File loading	Readable data formats : OnI for 8860, 8861 data (.MEM, .REC, .FFT, .SEQ, .IDX, .SET) Maximum file size : 2 GW
File saving	Saved contents: measurement data (binary and ASCII), (partial saving of the area between cursors A and B), setting conditions, screen image (BMP, PNG), and calculation results
Display	Waveform display: 1-, 2-, 3-, 4-, 6-, and 8-split screen, horizontal, vertical, consecutive scroll, and zoom in/out along the time axis, move the zero position, zoom in/out, setting of variables independently for each channel X-Y-axis composite display (for the MEM function only): 1-, 2-, and 4-split display, dot/line interpolation, composite area can be specified Numerical display: digital values of waveform data can be displayed Display sheet: 16 sheets Display channel count (per sheet): 32 analog channels, 16 logic channels, 16 calculated waveforms, 8 X-Y-axis composite waveforms Cursor function: vertical cursor, horizontal cursor, trace cursor, two cursors (cursor A and cursor B), time and voltage display Clipboard copy: images on the waveform screen can be transferred to the clipboard
Print	Supported printer: printer compatible with the OS Print format: waveform image (1-, 2-, 3-, 4-, 6-, 8-, and 16-split), numerical print, report format, list print, calculation results, screen image Print area: the entire area, area between cursors A and B Print preview: supported

PC Software Specifications Note: Wv ver 1.20 or later, and 8860/8861 main unit ver 1.03 or later


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

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

Input modules


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

- ANALOG UNIT 8956
- HIGH RESOLUTION UNIT 8957
- 16ch SCANNER UNIT 8958
- DC/RMS UNIT 8959
- STRAIN UNIT 8960
- ANALOG UNIT 8936
- VOLTAGE/TEMP UNIT 8937
- FFT ANALOG UNIT 8938
- STRAIN UNIT 8939
- F/V UNIT 8940
- 4ch ANALOG UNIT 8946
- CHARGE UNIT 8947



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

Logic signal measurement

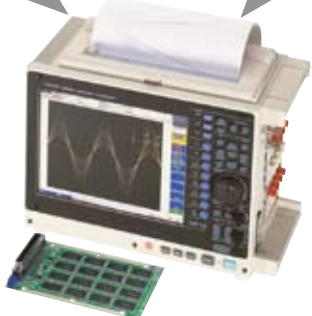


- LOGIC PROBE 9320-01**
4-channel type, for voltage/contact signal ON/OFF detection (miniature terminal for use with the 8861/8860, 8855, 8807-01/8808-01)
- LOGIC PROBE 9321-01**
4 isolated channels, ON/OFF detection of AC/DC voltage (miniature terminal for use with the 8861/8860, 8855, 8807-01/8808-01)
- LOGIC PROBE 9327**
4-channel type, for voltage/contact signal ON/OFF detection (high-speed, miniature terminal type)
- CONVERSION CABLE 9323**
Used for connecting the 9320/9321 and 8860 series MEMORY HiCORDERs, because the terminal shapes are different. * This cable is not required for the small-terminal types 9327, 9320-01, and 9321-01.

Voltage measurement



- CONNECTION CORD 9197**
For high voltage (up to 500V)
- DIFFERENTIAL PROBE 9322**
For up to 2kV DC or 1kV AC, AC adapter 9418-15 required, or Probe power unit 9687 and Power cord 9248 required for operation.
- CONNECTION CORD 9198**
For low voltage (up to 300V)
- POWER CORD 9248**
to connect Differential probe 9322 and Probe power unit 9687
- AC ADAPTER 9418-15**
For powering Differential probe 9322, 100 to 240V AC, 12V/2.5A
- 10:1 PROBE 9665**
Max. rated voltage to earth is same as for input module, max. input voltage 1kV rms (up to 1MHz)
- CONNECTION CORD 9217**
Cord has insulated BNC connectors at both ends, and connects to insulated BNC connectors on input module
- 100:1 PROBE 9666**
Max. rated voltage to earth is same as for input module, max. input voltage 5kV peak (up to 1MHz)
- CONNECTION CORD 9165**
Cord has metallic BNC connectors at both ends, and connects to metallic BNC connectors such as trigger terminals



- MO UNIT 9717**
Factory-installed option. Either MO DRIVE UNIT or HDD UNIT can be selected. (2.3GB to 128MB)
- HD UNIT 9718**
Factory-installed option. Either MO DRIVE UNIT or HDD UNIT can be selected. (60GB)
- MEMORY BACKUP UNIT 9719**
Factory-installed option. Internal type.
- DC POWER UNIT 9684**
Factory-installed option, not user installable, build in on the bottom case. 12V DC drive.
- MEMORY BOARD 9715**
(32 Megaword capacity)
- MEMORY BOARD 9715-01**
(128 Megaword capacity)
- MEMORY BOARD 9715-02**
(512 Megaword capacity)
- MEMORY BOARD 9715-03**
(1 Gigaword capacity)
- MEMORY HiCORDER 8860** (main unit only)
- MEMORY HiCORDER 8861** (main unit only)

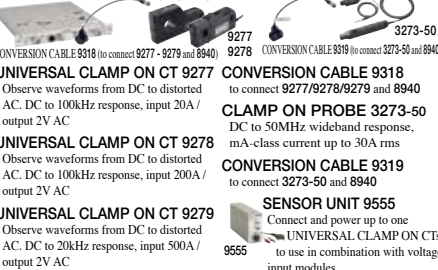
Note: Memory boards are not built in as a standard feature. Choose from the following memory boards for factory pre-installation - one board for Model 8860, and two of the same capacity for the 8861.

** Either the DC power unit 9684 or the probe power unit 9687 may be used. If you want to use both at the same time, consult us.*

** The MEMORY HiCORDER 8860/8861 cannot operate alone. You must install one or more optional input modules in the unit. * When ordering, specify one memory board for the 8860, and two memory boards of the same capacity for the 8861.*

Current measurement

* The 3274, 3275, and 3276 cannot be used for the F/V UNIT 8940



- F/V UNIT 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**
Observe waveforms from DC to distorted AC. DC to 20kHz response, input 500A / output 2V AC
- CONVERSION CABLE 9318**
to connect 9277-9279 and 8940
- CONVERSION CABLE 9319**
to connect 3273-50 and 8940
- CONVERSION CABLE 9318**
to connect 9277/9278/9279 and 8940
- CLAMP ON PROBE 3273-50**
DC to 50MHz wideband response, mA-class current up to 30A rms
- CONVERSION CABLE 9319**
to connect 3273-50 and 8940
- SENSOR UNIT 9555**
Connect and power up to one UNIVERSAL CLAMP ON CTs to use in combination with voltage input modules
- 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
- * Either the DC power unit 9684 or the probe power unit 9687 may be used. If you want to use both at the same time, consult us.*
- PROBE POWER UNIT 9687**
Factory-installed option, not user installable, build in on the bottom case. For up to five or more Clamp on probes 3273-50 to 3276, or Differential probe 9322.

Printer options



- RECORDING PAPER 9231**
(for A4-printer 8995 only)
A4 width 216 mm (8.50 in) x 30 m (98.43 ft), 6 rolls
- A4 PRINTER UNIT 8995**
Factory-installed option. Either 8995 or 8995-01 printer can be installed. Printing width 200 mm (7.87 inch).
- PAPER WINDER 220H**
Paper width 70 to 220 mm (2.76 to 8.66 inch), 100V AC Only
- RECORDING PAPER 9234**
(for A6-printer 8995-01 only)
A6 width 112 mm (4.41 in) x 18 m (59.06 ft), 10 rolls
- A6 PRINTER UNIT 8995-01**
Factory-installed option. Either 8995 or 8995-01 printer can be installed. Printing width 100 mm (3.94 inch).

PC Communication



- MEMORY HiVIEWER 9725**
Functions identical to those of the 8860s run on Windows 2000/XP compatible computers
- GP-IB CARD 9558**
PCMCIA compliant, cable length 2 m (6.56 ft)
Note: Available from main unit version 1.10
- LAN CABLE 9642**
Straight Ethernet cable, supplied with straight to cross conversion cable, cable length: 5 m (16.41 ft)
- FD DRIVE 9716**
External type with USB connection

Other options



- CONVERSION ADAPTER 9199**
Banana-to-BNC, use to connect to BNC terminal on Input Module
- CARRYING CASE 9723**
For only the 8860, hard trunk type
- CARRYING CASE 9724**
For only the 8861, hard trunk type
- PC CARD 128M 9726**
(128MB capacity)
- PC CARD 256M 9727**
(256MB capacity)
- PC CARD 512M 9728**
(512MB capacity)
- PC CARD 1G 9729**
(1GB capacity)

PC Card Precaution
Use only PC Cards sold by HIOKI. Compatibility and performance are not guaranteed for PC cards made by other manufacturers. You may be unable to read from or save data to such cards.

Combination example: 8860 (for high-speed applications)

	Main unit	Memory 32 MW	2ch	4ch	6ch	8ch
Model number x quantity	8860x1	9715x1	8956x1	8956x2	8956x3	8956x4
Input cable			9198x2	9198x4	9198x6	9198x8

8860 (for logging applications)

	16ch	32ch	48ch	64ch
Model number x quantity	8958x1	8958x2	8958x3	8958x4
Input cable	-	-	-	-

Combination example: 8861 (for high-speed applications)

	Main unit	Memory 64 MW	4ch	8ch	12ch	16ch
Model number x quantity	8861x1	9715x2	8956x2	8956x4	8956x6	8956x8
Input cable			9198x4	9198x8	9198x12	9198x16

8861 (for logging applications)

	32ch	64ch	96ch	128ch
Model number x quantity	8958x2	8958x4	8958x6	8958x8
Input cable	-	-	-	-



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