REC&MEM Function
New Recording Logger and Oscilloscope

These models feature personal computer-like operability with mouse and keyboard support, accelerated by internal high-speed hardware that provides simpler, faster operation. The Memory function monitors fast waveforms as easily as an oscilloscope while the Logger function records trend graphs in real time. Convenience is improved by enhanced control via LAN and USB capabilities. A broad selection of plug-in front-end modules supports a wide variety of measurement objects. Abnormal phenomena are accurately captured with 20 MS/s sampling and 16-bit resolution on isolated inputs.

NEW 80GB hard disk installed!
By installing a large-capacity hard disk as standard, the recording capacity has increased significantly compared to the storage of PC card media of the conventional models 8860-50, 8861-50.
As an Oscilloscope
As a Data Logger
Record Waveforms in Any Situation
Capabilities and Features

- 80GB hard disk standard configuration
- 20 MS/s high-speed sampling
- Up to 32 isolated input channels (high-speed signals)
- Real-time saving to hard disk
- Dual-timebase sampling for simultaneous fast and slow monitoring.
  - Multi-channel logging on up to 128 channels (low-speed signals)
- Three USB 2.0 ports support a USB storage device along with mouse and keyboard
- REC&MEM (Recorder and Memory) function
  - Capture waveforms of high-speed transients while simultaneously recording at slow speed
- LCD with wider viewing angle for easier waveform observation
- Uses the same input modules as previous models.
- Total 12 type modules can be used
Reliably capture waveform anomalies buried within normal signals

- Memory (Digital Oscilloscope) Function -

Memory Function for High-Speed Waveform Monitoring

Using the same operating principle as a digital oscilloscope, data is recorded to the expanded internal memory at high speed. Sampling rate is up to 20 MS/s (50-ns period) for all channels simultaneously. Capture unpredictable operating anomalies and transient waveforms.

Records to Solid-State Memory

Because instruments that rely on disk access such as hard disk drives are susceptible to vibration, they are often unsuitable for on-board measurements. MEMORY HiCORDERs are preferable for on-board testing because they write data to solid-state memory with no moving parts. You can back up data to a USB storage device when finished measuring. When the optional memory backup unit is installed, the instrument’s internal memory data is preserved when power is turned off.

All Channels Isolated, 20 MS/s Sampling

Except when using the Scanner Module, every input channel has its own A/D converter. Because all channels are sampled simultaneously, transient waveforms can be easily observed along with signals. The Scanner Module switches all inputs through a single A/D converter, but even in that case, all channels are isolated.

Large Capacity Internal Memory

Both high-speed write capability and a large memory capacity are provided to support high-speed sampling. Total memory capacity ranges from 32 megawords to 1 gigaword, enabling capture of waveform peaks by high-speed sampling, as well as long-term recording and long-period waveform capture. (Model 8861-51 provides twice the memory capacity, but with the same recording time limits.)

External Sampling Input Capability

The sampling rate for memory recording can be synchronized to an external clock signal (up to 10 MS/s). So, for example, sampling can be synchronized to the rotation cycle of an engine.

Internal Memory Division (Segmentation) Function

Internal memory can be segmented for use into 4,096 blocks. By using “sequential save” to write data to the segmented memory, the waveform in any block can be overlaid with that in a reference block for comparison.

An Actual Waveform Measurement Example

For operational analysis of an inverter, the waveforms of the high frequency switched carrier and the low frequency fundamental both need to be observed. High-speed sampling, long-term memory recording and input isolation make these observations possible. Various HIOKI non-contact clamp-on sensors capable of measuring up to HF ranges can be used to observe current waveforms.

CLAMP ON PROBE 3270 Series provides flat electrical characteristics for observing current waveforms over a remarkably broad range of amplitudes from mA order to 500 A at frequencies from DC to HF.

High-Voltage Measurement

Measuring in situations where high voltage exists between channels, such as three-phase inverters, requires a measurement instrument that has all input channels isolated. In addition, when measuring signals such as those of switching circuits that include common-mode voltage with a high-frequency component, the isolated circuit’s common-mode frequency rejection characteristics can greatly affect measurements. To measure these kinds of voltages, you can use the HIGH VOLTAGE UNIT 8961 or the optional DIFFERENTIAL PROBE 9322 for CAT III 600-volt AC and DC maximum rated voltage to earth.
Capture High-Speed Signals by Triggering During Slow Recording -

- New REC&MEM Function and Real-Time Saving -

Simultaneous Long-Term Monitoring and Transient Recording (REC&MEM)

Transient waveform recording that is impossible with a pen recorder

The new REC&MEM function can record high-speed waveforms such as intermittent noise by applying a trigger while recording long-term fluctuations just like a pen recorder. This type of measurement previously required choosing between the Recorder function (for slow trend graph recording), or the Memory function (for high-speed oscilloscope-style recording). Now both types of waveforms can be recorded simultaneously using the REC&MEM function.

- Maximum recording time for REC&MEM function (Recorder waveform)

- The setting range depends on installed memory capacity, and whether Memory Division is enabled, and whether 16-Ch Scanner Unit (BU958) is installed.
- Recording length "Continuous" is not available with 100 to 200 ms/div timebase setting, and with the printer enabled.
- Timebase settings in 10 ms/div to 1 sec/div are not available when using BU958 printer, and numerical value printing.
- When the sampling period for Recording and Memory recording is set at the same time.
- Operation cannot be guaranteed when the time axis is longer than one year.

- Maximum recording time for REC&MEM function (Memory waveform)

- The setting range depends on installed memory capacity, and whether Memory Division is enabled.
- Maximum recording length is available when Memory Division is disabled.
- Presence of 16-Ch Scanner Unit (BU958) has no effect (scanner module signals are not written to internal memory for Memory waveform).
- Operation cannot be guaranteed when the time axis is longer than one year.

- Operating Principle of the Recorder Function

With the Recorder function, only maximum and minimum values of the data sampled within the specified timebase are written to memory, so each recorded data point consists of a pair of values, with 100 such points recorded for each waveform timebase division.

- Maximum recording time for REC&MEM function (Memory waveform)

- The setting range depends on installed memory capacity, and whether Memory Division is enabled.
- Maximum recording length is available when Memory Division is disabled.
- Presence of 16-Ch Scanner Unit (BU958) has no effect (scanner module signals are not written to internal memory for Memory waveform).
- Operation cannot be guaranteed when the time axis is longer than one year.

- Recording Directly to Hard Disk Media (Real-Time Save)

- Recording an Entire Waveform Anomaly

The Real-Time Save function writes measurement data to the specified destination during measurement, enabling long-term measurements independent of the instrument’s installed memory capacity. The destination storage media may be the internal hard disk, a shared network folder.

Simultaneously, overall measurement data (the whole waveform) is recorded in the instrument’s internal memory, which is then saved to the storage media when measurement is finished. For analysis, specify the range to be analyzed from the overall waveform data, and reload it. The reloaded data is used with the Memory function for waveform and numerical calculations, or with the FFT function for FFT analysis.

Because of this, the volume of recorded data is compressed while following steep fluctuations of the measured input voltage.

Note: When data recorded with the Recorder function is viewed on a PC, both minimum and maximum values appear as a time series of data points.

- Maximum recording length is available when Memory Division is set to 1,024 blocks.

- Recording time depends on the formatted capacity of the recording media and its available capacity, with the above being just one example.
- Recording time for storage media depends on the instrument’s installed memory capacity, and available capacity of the hard disk.

Note: Scanner Unit BU958 is not used.
The Next Generation Hybrid Recorder

- A single instrument provides both oscilloscope and data logger functions -

Installing a Scanner Module Creates a Multi-Channel Data Logger

Recording slowly changing physical values such as temperature has been performed by plotting recorders and hybrid recorders (combined numerical value and analog graph recording), and is currently performed by data loggers. On the other hand, for high-speed waveform observation, only an oscilloscope (or MEMORY HiCORDER) can be used. However, because the demands of measurement sites can vary, having both of these functions in a single instrument can be advantageous.

MEMORY HiCORDER Models 8860-51 and 8861-51 and Scanner Unit 8958 are the answer to customers’ needs.

- Economical Cost per Channel
  The Scanner Module switches 16 input channels through one A/D converter. Of course, all channels are isolated. Cost per channel is thereby remarkably reduced when compared to systems that include a D/A converter for every input channel. Installing four Scanner Modules in the 8860-51 provides 64 measurement channels, and installing eight Scanner Modules in the 8861-51 provides 128 measurement channels.

- Dual-Timebase Sampling at High and Low Speeds
  Depending on customers’ applications, there are cases in which high-speed signals need to be captured as waveforms while measuring multiple channels with a Scanner Module. Both types of signals can be measured by using a scanner module together with a common high-speed analog module, and recording with two different timebases. Two waveforms are displayed and can be monitored on the same time axis.

Sheet Display Function

The Sheet function has been introduced to support multi-channel measurements (each sheet shows 32 channels). Different display formats can be selected for each sheet, so that each sheet can be assigned and analyzed for a particular application.

Waveform Observation While Recording

- Changing Compression and Zooming While Measuring
  Models 8860-51 and 8861-51 support changing the compression ratio, turning the zoom function on and off, and scroll-back display while measuring, so you can view and analyze existing measurement data without having to wait for the measurement process to finish.

- Scroll-Back Display
  An earlier portion of the waveform can be viewed without interrupt recording. This function automatically displays earlier parts of the waveform just by turning the Scroll knob counterclockwise. Click the Scroll Trace button on the screen, to return the display to the current waveform position.
Accurately capture waveforms with diverse parameters
- Advanced trigger function -

**Trigger during capturing and search after capturing**

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 glitch trigger, level trigger, window-out trigger, voltage drop trigger, window-in trigger, and on the same input waveform to monitor it. (8 parameters in the 8860-51 and 16 parameters in the 8861-51 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 Models 8860-51 and 8861-51 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**

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.
Convert the time domain to the frequency domain for analysis

- FFT analysis function -

FFT analysis function

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 to 20,000 points). The calculation speed for the same condition (when performing the most time-consuming analysis) is about ten times faster than with the conventional Model 8855.

- Simultaneously perform up to 16 calculations

Unlike with the conventional HIOKI 8855 and 8841 models that allow for the simultaneous performing of up to two calculations, the 8860-51 and 8861-51 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.

- 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 8860-51 and 8861-51 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.

- Phase Highlight Display

Phase Highlight emphasizes on the display only those parts of a waveform that exceed a certain level, in order to acquire a power spectrum in the midst of phase calculation. The figure shows power and phase spectra at the same time when the highlighted display is enabled, so you can easily see important parts of the waveform that are normally difficult to see because they appear like noise.

- 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.

- Rich Analysis Capabilities

Power Spectrum Density and LPC Analysis have been added to the calculation selections, for measuring power spectrum per Hz and spectral envelopes. As for calculation settings, former concepts such as “Channel Modes” have been eliminated, and channel settings are now automatically set according to the selected calculation type, eliminating otherwise complex settings.

- 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 20,000 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 20,000 points.

- 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 8860-51 and 8861-51 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.
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 8860-51 or the 8861-51 file screen.

- USB 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.

- USB Ports and External Monitor Output
  Three USB 2.0 ports are now provided to support commonly available PC peripherals. A VGA D-sub output connector is also included to support viewing the measurement screen on an external monitor.

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

- 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.

- 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. Models 8860-51 and 8861-51 can display sixteen X-Y plots simultaneously.

To access the shared folder:
Enter the host name of the computer on the file screen of the 8860-51, enter the user name and password in the account field, and then select the folder you want to share.

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 USB 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.

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. Models 8860-51 and 8861-51 can display sixteen X-Y plots simultaneously.
### Basic specifications

<table>
<thead>
<tr>
<th>8860-51 (max. 4 input modules)</th>
<th>8861-51 (max. 8 input modules)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Input type/number of channels</strong></td>
<td>Plug-in input modules 16 analog channels (max. 64 channels with scanner unit) + 16 logic channels (standard configuration)</td>
</tr>
</tbody>
</table>

### Measurement functions

- **MEM (high-speed recording)**
- **REC (real-time recording)**
- **REC & MEM (real-time recording + high-speed recording)**

### Maximum sampling rate

- **Time axis**
  - Sampling 20MS/second (50 ms, all channels simultaneously, using the ANALOG UNIT 8956)
  - External sampling (10 MS/second, 100 μs)

### Types of measurement signals

- **Sampling rate**
  - 500ms/DIV 5ms 2h 46min 40s 5h 33min 20s 11h 06min 40s 22h 13min 20s 1d 20h 26min 40s
  - 200ms/DIV 2ms 1h 06min 40s 2h 13min 20s 4h 26min 40s 8h 53min 20s 17h 46min 40s
  - 100ms/DIV 10ms 1h 23min 20s 2h 46min 40s 6h 56min 40s 13h 53min 20s 34d 17h 20min 00s 69d 10h 40min 00s

### Data storage media

- **Hard disk drive**: 10GB, FAT-32 format

### Maximum Recording Time for the Memory Function (single base time)

- **One Memory Board Model 8975-50** is installed in the 8860-51, and two in the 8861-51, recording length variable, with 32 MW div.
- **Operation cannot be guaranteed when the time axis is longer than one year.**
- **For memory capacity, 32 MW div is standard as shown in the table below. Optional memory up to 1 GW (div) can be specified when ordering.**

<table>
<thead>
<tr>
<th>Time axis</th>
<th>Memory capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>32MW 20,000 div</td>
<td>300 MW 40,000 div</td>
</tr>
<tr>
<td>5μs</td>
<td>50μs</td>
</tr>
<tr>
<td>20μs</td>
<td>200μs</td>
</tr>
<tr>
<td>100μs</td>
<td>1μs</td>
</tr>
</tbody>
</table>

### Maximum Recording Time for the Memory Function (dual base time)

- **One Memory Board Model 8975-50** is installed in the 8860-51, and two in the 8861-51, recording length variable, with 32 MW div.
- **Operation cannot be guaranteed when the time axis is longer than one year.**
- **For memory capacity, 32 MW div is standard as shown in the table below. Optional memory up to 1 GW (div) can be specified when ordering.**

<table>
<thead>
<tr>
<th>Time axis</th>
<th>Memory capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>32MW 1,000 div</td>
<td>32MW 2,000 div</td>
</tr>
<tr>
<td>5μs</td>
<td>50μs</td>
</tr>
<tr>
<td>20μs</td>
<td>200μs</td>
</tr>
</tbody>
</table>

### Data storage media

- **Hard disk drive**: 10GB, FAT-32 format

### External control connectors

- **BNC connectors**: external sampling input, sampling sync output
- **Terminal block**: external trigger input, trigger output, GO/NO-GO, external start, external stop, print input

### Standard external interfaces

- **USB**: USB2.0 compliant, series A receptacle 3 ports (keyboard, mouse, HDD, USB-memory), Note: Compatible External USB printer is discontinued, so USB printer is NA
- **LAN**: RJ45 connector, Ethernet 100BASE-TX, 100BASE-T Functions: HTTP server, FTP server, File sharing, DHCP compatible, Send mail

### Power requirements

- **100 to 240 V AC (8956) 12 V DC** (use for DC POWER UNIT 8904, option, factory installation only)
- **Power consumption**: 220 VA max. (max. 4 printer used)

### Dimensions and mass

- **8860-51**: 16 x 8ch
- **8861-51**: 4 ch
- **8860-51**:
  - 32 ch
  - 1,000 div
  - 2,000 div
  - 5,000 div
  - 10,000 div
  - 20,000 div
- **8861-51**:
  - 16 x 8ch
  - 500 div
  - 1,000 div
  - 2,000 div
  - 5,000 div

### Compliance standard

- **Safety**: EN61010, EMC: EN61326

### Environmental conditions

- **Temperature and humidity range for use**: 0°C to 40%, 20% to 90% RH
- **Temperature and humidity range for storage**: -10°C to 50%, 20% to 90% RH

### Suppliers of accessories

- **Quick Start Manual x 1, Instruction Manual x 1, Input Module Guide x 1, Analysis Supplement Manual x 1, Power cord x 1, Input cord label x 1, Application Disk (Wave Viewer Wv, Communication Commands table) x 1**
**Main unit Specifications**

**Print/display section**
- **Trigger types**
  - Averaging
  - Waveform calculation
- **Trigger filter**
- **Level setting resolution**
- **Trigger sources**
  - OFF, setting range 0.1 to 10.0 divisions in 0.1 division steps (MEM, REC 1, 0, 0...)
- **Trigger types (analog)**
- **Level setting resolution**
  - 0.1% of full scale (full scale = 20 divisions)
- **Trigger types (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**
- **Memory functions**
  - Time axis: 5 to 5 min/division, 26 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
- **Recording length**
  - 32 MW memory: fixed setting in 1-step divisions (max. 320,000 divisions) or built-in limits of 25 to 200,000 divisions
  - 128 MW memory: fixed setting in 1-step divisions (max. 1,280,000 divisions) or built-in limits of 25 to 200,000 divisions
  - 512 MW memory: fixed setting in 1-step divisions (max. 5,120,000 divisions) or built-in limits of 25 to 5,000,000 divisions
  - 1 GW memory: fixed setting in 1-step divisions (max. 10,240,000 divisions) or built-in limits of 25 to 10,000,000 divisions
- **Pre-trigger**
  - Record data from the before trigger point, -100 to +100% of recording length (free setting in 1% steps)
- **Screen and printing**
  - Split screen (1 to 8) with display (max. 32 channels per sheet), logging (print/display measurement data as digital values), voltage axis zoom (±2 to ±100), compression (+2 to +100), variable display
- **Waveform splitting**
  - Divided use of memory space (up to 1024 divisions), sequential save, block search

**Recorder functions**
- **Time axis**
  - 10 to 200 ms division, 500 ms to 1 hour/division with 19 ranges, time axis resolution 100 points/division, time axis zoom: ±2 to ±4 in 2 stages, compression: 1:2 to 1:120,000 in 13 stages
- **Sampling rate**
  - 100 ns to 1 sec in 8 stages (selectable in 1/20 of time axis range)
- **Recording length**
  - 32 MW memory: fixed setting in 1-step divisions (max. 5,000 divisions), continuous, up to 1,000 divisions with the scanner module 8956
  - 128 MW memory: fixed setting in 1-step divisions (max. 20,000 divisions), continuous, up to 5,000 divisions with the scanner module 8956
  - 512 MW memory: fixed setting in 1-step divisions (max. 80,000 divisions), continuous, up to 20,000 divisions with the scanner module 8956
  - 1 GW memory: fixed setting in 1-step divisions (max. 100,000 divisions), continuous, up to 40,000 divisions with the scanner module 8956
- **Waveform memory**
  - Store data for most recent 5,000 divisions, or up to 160,000 div in memory. Backward scrolling and re-printing available.
- **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 (+2 to +100), variable display

**REC & MEM function**
- **Time axis (MEM)**
  - 10 ms to 5 min/division, 25 ranges, time axis resolution 100 points/ division, sampling rate: same as sampling rate for MEM function. Recording data of the scanner module 8956 in REC side.
- **Recording length**
  - REC: 2.5 to 2,000 divisions, or up to 80,000 divisions, continuous, MEM: 25 to 5,000 divisions, or up to 160,000 div
- **Waveform Memory (MEM)**
  - The last 2,500 divisions, or up to 80,000 divisions are saved to memory for scroll-back and re-print.
- **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**
- **Analysis mode**
  - Storage waveform, linear spectrum, RMS spectrum, power spectrum, power spectrum density, cross power spectrum, power spectrum density (LPC), auto-correlation function, histogram, transfer function, cross-correlation function, phase spectrum, impulse response, coherence function, octave analysis
- **Analysis channels**
  - 1-channel FFT, 2-channel FFT in selected channels (up to 16 analysis functions)
- **Frequency range**
  - 135 mHz to 8 MHz, resolution 1/4000, 1/8000, 1/2000, 1/4000, 1/8000
- **No. of sampling points**
  - 1000, 2000, 5000, 10000, 20000 points
- **Analysis data**
  - Selected from: Newly loaded data / MEM function waveform data, MEM waveform of REC & MEM function data, MEM waveform of REC & MEM function data
- **Waveform functions**
  - Rectangular, Hann, 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, (free setting 2 times to 10,000 times)

**Real-time save function**
- **Time axis (Whole waveform data)**
  - 10 ms to 1 hour/division, 19 ranges, time axis resolution 100 points/division, sampling speed: same as sampling rate for “Measurement Waveform”
- **Time axis (Whole waveform data)**
  - 100 to 5 min/division, 22 ranges (limited depending on data format and number of channels), time axis resolution 100 points/division, sampling rate: 1/100 of time axis

**Save to**
- HDD, PC via LAN

**Waveform data**
- Depending on available space on storage media / file system / number of channels / REC time axis. Selectable in division steps up to maximum recording length

**Measurement waveform**
- Whole measurement waveform simulation, simultaneous display of Whole/Measurement waveform with split screen, split screen (1 to 8), 16 split (AA-size printer only), sheet display (max. 32 channels per sheet), logging (print/display measurement data as digital values), frequency axis zoom and left/right scrolling

**Memory transfer**
- Data can be analyzed in MEM function or FFT function

**Screening/wave function**
- Detection of trigger criteria, time, event markers and peak value
- Up to 1,000 event markers can be input during and after measurement
## Additional features

**General**
- Measurement parameter printing, cursor measurement, scaling, current clamp setting, comment input, screen hard copy, list/gauge, start condition, hold auto, save, reverse control (start/stop, pro controls, auto range), over-range indication, VIEW function, key lock, level monitor, vernier function, offset cancel, event marker input, waveform search function, report printing

**Dimensions and mass**
- Approx. 170 W × 200.7 H × 145.5 (6.69 in) D mm, approx. 290 g (10.2 oz)

**ANALOG UNIT 8956**
- 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 200DIV, 12 ranges, full scale: 200DIV, AC voltage for possible measurement/display using the memory function: 280V rms, low-pass filter: 5Hz/50Hz/5kHz/1MHz
- Measurement resolution: 1/10000 of measurement range (using 12-bit A/D conversion, installed in 8860 series)
- Accuracy: DC amplitude: ±0.15% of full scale (with filter 5Hz, after zero adjustment)
- RMS measurement: RMS amplitude accuracy: ±1% of full scale (DC, 20Hz to 20kHz, ±0.1% of full scale (DC to 5kHz), response time: 60μs, 90% time from 90% to 90%, 10μs, 90% time from 90% to 90%, crest factor: 2, 10μs, 90% time from 90% to 90%
- Frequency characteristics: DC to 400kHz x3, (with AC coupling: 7Hz to 400kHz x3)
- Input coupling: D, GND, AC
- Max. allowable input: 400V DC (the maximum voltage that can be applied across input pins without damage)

**HIGH-RESOLUTION UNIT 8957**
- 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 200DIV, 12 ranges, full scale: 200DIV, AC voltage for possible measurement/display using the memory function: 280V rms, low-pass filter: 5Hz/50Hz/5kHz/1MHz
- Accuracy: DC amplitude: ±0.2% of full scale (with filter 5Hz)
- Zero position: ±0.5% of full scale (with filter 5Hz, after zero adjustment)
- RMS measurement: RMS amplitude accuracy: ±1% of full scale (DC, 20Hz to 20kHz, ±0.1% of full scale (DC to 5kHz), response time: 60μs, 90% time from 90% to 90%, 10μs, 90% time from 90% to 90%, crest factor: 2, 10μs, 90% time from 90% to 90%
- Frequency characteristics: DC to 20kHz x3, (with AC coupling: 7Hz to 20kHz x3)
- Input coupling: D, GND, AC
- Max. allowable input: 400V DC (the maximum voltage that can be applied across input pins without damage)

**16th SCANNER UNIT 8958**
- Measurement functions: Number of channels: 16, for voltage measurement: temperature measurement: temperature measuring
- Input connectors: Voltage input/Thermocouple input: screw-terminal type strip, recommended wire diameter: 0.25mm pitch, detachable terminal block (with cover), 12 recommended cable, single wire: 0.14 to 1.5mm, twisted wire: 0.14 to 1.5mm, color: white or blue, conduit minim. outer size: 0.80mm, 100m Ω in 3 σ
- Input impedance: 1MΩ, 850kΩ with fine fault detection ON, Max. rated voltage to earth: 200V 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: 5m, 50m, 500m, 2DIV, 4 ranges, full scale: 200V, measurement range: ±0.15% of full scale, digital range: 1000VDC/500VDC, measurement resolution: 1/10000 of measurement range (using 12-bit A/D conversion, installed in 8860 series)
- Accuracy: DC amplitude: ±0.25% of full scale (with filter 5Hz)
- Zero position: ±0.15% of full scale (with filter 5Hz, after zero adjustment)
- RMS measurement: RMS amplitude accuracy: ±30% of full scale (DC, 40Hz to 5kHz sine wave, ±30% of full scale (40Hz to 1kHz sinewave, crest factor: 2
- Frequency characteristics: DC to 10kHz x4
- Input coupling: D, GND
- Max. allowable input: 1000V DC (the maximum voltage that can be applied across input pins without damage)

**HIGH VOLTAGE UNIT 8961**
- Measurement functions: Number of channels: 2, for voltage measurement, DC/RMS selectable
- 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 200DIV, 12 ranges, full scale: 200DIV, AC voltage for possible measurement/display using the memory function: 280V rms, low-pass filter: 5Hz/50Hz/5kHz/1MHz
- Measurement resolution: 1/8000 of measurement range (using 12-bit A/D conversion, installed in 8860 series)
- Accuracy: DC amplitude: ±0.5% of full scale (with filter 5Hz)
- RMS measurement: RMS amplitude accuracy: ±4% of full scale (DC, 20Hz to 20kHz, ±0.1% of full scale (DC to 5kHz), response time: 60μs, 90% time from 90% to 90%, 10μs, 90% time from 90% to 90%, crest factor: 2, 10μs, 90% time from 90% to 90%
- Frequency characteristics: DC to 10kHz x4
- Input coupling: D, GND
- Max. allowable input: 1000V DC (the maximum voltage that can be applied across input pins without damage)

## Options specifications (sold separately)
- For the 8860 series only

**Dimensions and mass**
- Approx. 170 W × 200.7 H × 145.5 (6.69 in) D mm, approx. 310 g (10.9 oz)

**STRAIN UNIT 8960**
- Measurement functions: Number of channels: 2, for strain measurement
- Input connectors: Via conversion cable, TAJIMI PKJ/312A-1400-48, Max. rated voltage to earth: 315Vrms, 300V 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: 20μt to 1000μt/DC, 6 ranges, full scale: 200μt, low-pass filter: 5Hz/10Hz/50Hz/1kHz/10kHz
- Anti-alising filter: Integrated filter for suppressing aliasing distortion caused by FTT processing (automatic cutoff frequency setting OFF)
- Measurement resolution: 1/8000 of measurement range (using 16-bit A/D conversion, installed in 8860 series)
- Accuracy: ±0.4% of full scale (±0.2μt), zero position: ±0.1% of full scale (±2μt) (at 1Hz filter ON)
- Frequency characteristics: DC to 20kHz x3
- Max. allowable input: 10V DC (the maximum voltage that can be applied across input pins without damage)
ANALOG UNIT 8936

Measurement functions
Number of channels: 2; for voltage measurement
Input connectors
Isolated BNC connector (input impedance 1MΩ, input capacitance 3pF). Max. rated voltage to earth: 700V AC, DC (4A 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: 200V RMS, low-pass filter: 5kHz/0.1kHz/5kHz/10kHz

Measurement resolution
1/50 of measurement range (2.5μA-A/D conversion, installed in 8860 series)

Highest sampling rate
IMS (5μs time window sampling in 2 channels)

Accuracy
DC amplitude: ±0.1% of full scale, zero position: ±0.15% of full scale (after auto-zero adjustment)
Frequency characteristics
DC to 40kHz ±3dB, (with AC coupling: 7Hz to 40kHz ±3dB)

Input coupling
DC, GND, AC
Max. allowable input
40V DC, the maximum voltage that can be applied across input pins (with serial number earlier than 04095234 on Models 8861-51/8860-51/8861-50/8860-8861/8860, residual noise will be 80μp-p)

Note: When using Model 8936 with serial number earlier than 04095234 on Models 8861-51/8860-51/8861-50/8860-8861/8860, residual noise will be 80μp-p.

Dimensions and mass
(approx. 170.6 x 98.9 x 20 (0.7 x 3.9 x 0.8) inches) Max. weight: 148.5 (5.95) kg)
Dimensions and mass
(approx. 290 x 102 x 2.2 (11.4 x 4 x 0.9) inches) Max. weight: 148.5 (5.95) kg)

Accessories: None

VOLTAGE/TEMP UNIT 8937

Measurement functions
Number of channels: 2, for voltage measurement/temperature measurement with thermocouple
Input connectors
Voltage input: metallic BNC connector (input impedance: 100kΩ, input capacitance 2pF)
thermocouple input: plug-in connector (input impedance: 50kΩ)

Input coupling
DC, GND, AC
Max. allowable input
50Vrms or 60V DC (the maximum voltage that can be applied across input pins without damage)

Note: When using Model 8937 with serial number earlier than 04113577 or Models 8861-51/8860-51/8861-50/8860-8861/8860-8861/8860, residual noise will be 150μp-p.

Voltmeter: ±200mV, ±0.5% of full scale
Ammeter: ±200μA, ±0.5% of full scale

Dimensions and mass
(approx. 170.6 x 98.9 x 20 (0.7 x 3.9 x 0.8) inches) Max. weight: 148.5 (5.95) kg)
Dimensions and mass
(approx. 300 x 108 x 8.5 (11.8 x 4.3 x 0.3) inches) Max. weight: 148.5 (5.95) kg)

Accessories: None

F/V UNIT 8940

Measurement functions
Number of channels: 4; for voltage measurement
Input connectors
Metallic BNC connector (input impedance 1MΩ, input capacitance 3pF), sensor connector (dedicated connector for clamp-on sensor via connection cable, common ground possible), Max. rated voltage to earth: 500Vrms 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
Voltage: DC to 10kHz, with 0.05Hz to 5kHz/10kHz, 11 ranges, 5°C to 73°F, 5% to 100% RH after 1 hour of warm-up time and zero-adjust; Accuracy guaranteed for 1 year, Post-adjustment accuracy guaranteed for 1 year

Measurement resolution
1/50 of measurement range (installed in 8860 series, excluding current range when using 8940)

Highest sampling rate
IMS (4-channel simultaneous sampling), (frequency/duty ratio measurement: 0.25s cycle)

Other functions
Voltage input plug-in: ON/OFF, input coupling: DC, GND, AC, voltage/current, DC (others), low-pass filter: 5Hz-500Hz-5kHz-10kHz

Dimensions and mass
(approx. 170.6 x 98.9 x 20 (0.7 x 3.9 x 0.8) inches) Max. weight: 148.5 (5.95) kg)
Dimensions and mass
(approx. 310 x 139 x 8.5 (12.2 x 5.5 x 0.3) inches) Max. weight: 148.5 (5.95) kg)

Accessories: None

4TH ANALOG UNIT 8946

Measurement functions
Number of channels: 4, for voltage measurement
Input connectors
Metalic BNC connector (input impedance 1MΩ, input capacitance 4pF), Max. rated voltage to earth: 500Vrms 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
Voltage: DC to 20kHz, with 0.05Hz to 1kHz/5kHz/10kHz/50kHz, 11 ranges, 5°C to 73°F, 5% to 100% RH after 30 minutes of warm-up time and zero-adjust; Accuracy guaranteed for 1 year, Post-adjustment accuracy guaranteed for 1 year

Measurement resolution
1/50 of measurement range (installed in 8860 series, excluding current range when using 8779)

Highest sampling rate
IMS (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 10kHz ±3dB

Max. allowable input
30Vrms or 60V DC (the maximum voltage that can be applied across input pins without damage)

Note: When using Model 8946 with serial number earlier than 04095369 on Models 8861-51/8860-51/8861-50/8860-8861/8860, residual noise will be 200μp-p.

Dimensions and mass
(approx. 170.6 x 98.9 x 20 (0.7 x 3.9 x 0.8) inches) Max. weight: 148.5 (5.95) kg)
Dimensions and mass
(approx. 310 x 139 x 8.5 (12.2 x 5.5 x 0.3) inches) Max. weight: 148.5 (5.95) kg)

Accessories: None

CHARGE UNIT 8947

Measurement functions
Number of channels: 2; for acceleration measurement
Input connectors
Voltage input/integrated preamplifier input: metallic BNC connector (input impedance 1MΩ, input capacitance 20pF or less)
Charge input: miniature connector (10-32 UNF)

Input coupling
DC, GND, AC
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
Suitable transducer: Charge input: Output type piezoelectric accelerometer pick-up sensor Internal preamplifier input: Acceleration pick-up sensor with an internal preamplifier

Suitable transducer
Suitable transducer: Charge input: Charge input: Output type piezoelectric accelerometer pick-up sensor Internal preamplifier input: Acceleration pick-up sensor with an internal preamplifier

Measurement range
Voltage input/integrated preamplifier input: ±10V/±20V (full scale: 5000g/3000g), 10 ranges, using current sensor (powered from the 8840, max. 4 sensors total)
Charge input: ±10V/±20V

Measurement resolution
1/50 of measurement range (installed in 8860 series, excluding current range when using 8779)

Highest sampling rate
IMS (2-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 10kHz ±3dB

Max. allowable input
30Vrms or 60V DC (the maximum voltage that can be applied across input pins without damage)

Note: When using Model 8947 with serial number earlier than 04095397 on Models 8861-51/8860-51/8861-50/8860-8861/8860, residual noise will be 200μp-p.

Dimensions and mass
(approx. 170.6 x 98.9 x 20 (0.7 x 3.9 x 0.8) inches) Max. weight: 148.5 (5.95) kg)
Dimensions and mass
(approx. 310 x 139 x 8.5 (12.2 x 5.5 x 0.3) inches) Max. weight: 148.5 (5.95) kg)

Accessories: None
Options specifications (sold separately)

Cable length and mass: Main unit cable 1.5 m (4.92 ft), input section cable 30 cm (1.0 ft), approx. 150 g (5.3 oz).
Note: The unit-side plug of the 9320-01 is different from the 9320.

LOGIC PROBE 9320-0r/9327

<table>
<thead>
<tr>
<th>Function</th>
<th>Detection of voltage signal or relay contact signal for High/Lo state recording</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input</td>
<td>4-channel common ground with unit and channel, digital/contact input, switchable contact input can detect open-collector signals</td>
</tr>
<tr>
<td>Input resistance</td>
<td>1 kΩ (with digital input, 10 to 5 V) 500 kΩ (with switchable liquid input, 1 to 5 V)</td>
</tr>
<tr>
<td>Pull-up resistance</td>
<td>2 kΩ (contact input, internally pulled up 5 V)</td>
</tr>
<tr>
<td>Contact input</td>
<td>1.4 V ≤ 3.5 kΩ or higher (open) and 500 kΩ or lower (short) 2.5 V ≤ 3.5 kΩ or higher and 1.5 kΩ or lower (open) 4.0 V ≤ 25 kΩ or higher and 8 kΩ or lower (short)</td>
</tr>
<tr>
<td>Response speed</td>
<td>9320-07: 50mV or lower, 9327: detectable pulse width 100ms or higher</td>
</tr>
<tr>
<td>Max. allowable input</td>
<td>0 to ±50V DC (the maximum voltage that can be applied across input pins without damage)</td>
</tr>
</tbody>
</table>

Cable length and mass: Main unit cable 1.5 m (4.92 ft), input section cable 30 cm (1.0 ft), approx. 150 g (5.3 oz).
Note: The unit-side plug of the 9320-01 is different from the 9320.

LOGIC PROBE MR9321-01

<table>
<thead>
<tr>
<th>Function</th>
<th>Detection of AC or DC relay drive signal for High/Lo state recording</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input</td>
<td>4 channels (isolated between unit and channel), HIGH/LOW range switching</td>
</tr>
<tr>
<td>Input resistance</td>
<td>Input resistance: 100 kΩ to higher (HIGH range), 30 kΩ or higher (LOW range)</td>
</tr>
<tr>
<td>Output (H) detection</td>
<td>170 to 250 V AC, ±DC 70 to 250 V (HIGH range) 60 to 150 V AC, ±DC 20 to 150 V (LOW range)</td>
</tr>
<tr>
<td>Output (L) detection</td>
<td>0 to 30 V AC, ±DC 0 to 40 V (HIGH range) 0 to 10 V AC, ±DC 0 to 15 V (LOW range)</td>
</tr>
<tr>
<td>Response speed</td>
<td>Rising edge 1 ms max, falling edge 3 ms max. (with HIGH range at 200 V DC, LOW range at 100 V DC)</td>
</tr>
<tr>
<td>Max. allowable input</td>
<td>250 Vrms (HIGH range), 150 Vrms (LOW range) (the maximum voltage that can be applied across input pins without damage)</td>
</tr>
</tbody>
</table>

Differential Probe 9322

<table>
<thead>
<tr>
<th>Functions</th>
<th>For high-voltage floating measurement, power line surge noise detection, RMS rectified output measurement</th>
</tr>
</thead>
<tbody>
<tr>
<td>DC mode</td>
<td>For waveform monitor output, Frequency characteristics: DC to 10 MHz ±0.5 dB, Amplitude accuracy: ±1 % of full scale (±0.5 % for 1000 VDC), ±0.3 % of full scale (±0.2 % for 2000 VDC)</td>
</tr>
<tr>
<td>AC mode</td>
<td>For detection of power line surge noise, Frequency characteristics: 1 kHz to 10 MHz ±3 dB</td>
</tr>
<tr>
<td>RMS mode</td>
<td>For voltage RMS output detection, Frequency characteristics: DC, 10 Hz to 100 Hz, Response speed: 200 ms or less (40 VAC), accuracy: ±1 % of full scale (±0.5 % for 1000 VDC, ±0.4 % of full scale (±0.2 % for 1000 VAC))</td>
</tr>
<tr>
<td>Input</td>
<td>Input type: balanced differential input</td>
</tr>
<tr>
<td>Impedance/capacitance</td>
<td>Input impedance/capacitance: H-L: 9.2 MΩ, 5 pF or less (at 100 kHz), H/L-units: 4.5 MΩ, 20 pF or less (at 100 kHz), full-scale: 1000 VAC</td>
</tr>
<tr>
<td>Power source</td>
<td>Voltage divider for 1:1000 of input, BNC connectors (output available for 3 masks DC, AC, RMS)</td>
</tr>
<tr>
<td>Output</td>
<td>2000 V DC, 3000 V AC (CAT II), 600 V AC/DC (CAT III)</td>
</tr>
<tr>
<td>Power requirements</td>
<td>200VA (printer used)</td>
</tr>
<tr>
<td>Dimensions and mass</td>
<td>approx. 315.8 (12.31in) W × 29.1 (1.14in) H × 244.3 (9.62in) D mm, approx. 1.23 kg (4.11oz)</td>
</tr>
<tr>
<td>Accessories</td>
<td>None</td>
</tr>
</tbody>
</table>

DC Power Unit 9684

Note: Factory-installed option, built in on the bottom case of the main unit.

<table>
<thead>
<tr>
<th>Rated input voltage</th>
<th>DC (input range: 0 to 16 V DC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power requirements</td>
<td>200VA (printer used)</td>
</tr>
</tbody>
</table>

Dimensions and mass: approx. 315.8 (12.31in) W × 18.2 (0.72in) H × 244.4 (9.62in) D mm, approx. 570 g (20.1 oz)

Accessories: None

Probe Power Unit 9687

Note: Factory-installed option, built in on the bottom case of the main unit.

<table>
<thead>
<tr>
<th>No. of power channels</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Channels, Current output</td>
<td>3 A total (Combined total current consumption of connected probes should be no more than 3 A)</td>
</tr>
<tr>
<td>Compatible probes</td>
<td>3273 (0.25 A max. current consumption) exclusive, up to 8 probes</td>
</tr>
<tr>
<td></td>
<td>3272 (0.47 A max. current consumption) exclusive, up to 4 probes</td>
</tr>
<tr>
<td></td>
<td>3274 (0.46 A max. current consumption) exclusive, up to 6 probes</td>
</tr>
<tr>
<td></td>
<td>3275 (0.60 A max. current consumption) exclusive, up to 6 probes</td>
</tr>
<tr>
<td></td>
<td>3276 (0.44 A max. current consumption) exclusive, up to 6 probes</td>
</tr>
<tr>
<td></td>
<td>3277 (0.25 A max. current consumption) exclusive, up to 8 probes</td>
</tr>
<tr>
<td>Compatible probes</td>
<td>3222 (0.5 A max. current consumption) exclusive, up to 8 probes</td>
</tr>
</tbody>
</table>

Note: Only one of either the DC Power Unit 9684 or Probe Power Unit 9687 can be installed at any one time. Please contact your HIOKI representative if concurrent installation is required.

Perform the same functions on the computer

Memory Hiviewer 9725

1) Application software allows you to perform the same data analysis as on a Windows computer as on the MEMORY HICORDERS 8860 series.
2) No confusion, because the screens appearing on the computer are identical to those of the 8860 series.
3) Functions identical to those of the 8860 series, such as waveform processing calculation, run on the computer.

Data on the computer

Waveform Processor 9335

Waves display, data calculation, printing function
Note: The 9335 supports 8860-51/8860-50, 8867-51/50/55, 8865-50, 8864 series MEM, REC and REC&MEM data recorded using single-axis sampling only. Not compatible with dual time-axis data.

Data Analysis and Presentation Software

FlexPro

A powerful data analysis and presentation software for importing and organizing data from the 8860-51/8861-51.
Note: With use of the 8860-51/8861-51, WaveViewer (Wv) Software.

Wave Viewer (Wv) Software

- 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 selectable section, thinning and zoomling
- Display format settings: scroll functions, enlarge/reduce display, display channel settings
- Others: voltage trace function trace, jump to cursor/trigger position function

Operating environment
Windows 10/8.1(64-bit), Vista (32-bit), XP

Differential Probe 9000

Accuracy: guaranteed for 1 year, Pre-shipment accuracy: guaranteed for 1 year.

Measurement modes
- P9000-01: For waveform monitor output, Frequency properties: DC to 100 kHz ±3 dB
- P9000-02: Switches between waveform monitor output/AC effective value output Wave mode frequency properties: DC to 100 kHz ±3 dB, RMS mode frequency properties: 30 Hz to 10 kHz, Response time: Rise 360 ms, Fall 600 ms

Division ratio
Switches between: 1, 1000, 10000

Effective value measurement accuracy
- ±3 % ± Fa (30 Hz to less than 1 kHz, sine wave), ±3 % ±fa (3 kHz to 10 kHz, sine wave)

Input resistance/capacitance
- H-L: 10.5 MΩ, 5 pF or less (1 kHz), H/L-units: 4.5 MΩ, 20 pF or less (1 kHz)

Maximum input voltage
- 1000 V AC, DC

Maximum rated voltage to ground
- 1000 V AC, DC (CAT III)

Operating temperature range
- -40°C to 80°C (-40°F to 176°F)

Power supply
- (1) AC adapter Z1008 (100 to 240 V AC, 70 to 90 Hz, 6 W AC, 3 A main unit), 0.5 VA (main unit only)
- (2) USB bus power (5 V DC, USB-A/microB terminal), 0.8 VA
- (3) External power source 2.7 V to 15 V DC, 1 VA

Accessories
- Instruction manual ×1, Alligator clip ×2, Carrying case ×1

For importing and organizing data from the 8860-51/8861-51.

Note: The 9335 supports 8860-51/8860-50, 8867-51/50/55, 8865-50, 8864 series MEM, REC and REC&MEM data recorded using single-axis sampling only. Not compatible with dual time-axis data.
Note: Company names and Product names appearing in this catalog are trademarks or registered trademarks of various companies.

8860-51 / 8861-51 Options in Detail

<table>
<thead>
<tr>
<th>Model</th>
<th>Option Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>8860-51</td>
<td>(Order Code)</td>
<td>(None)</td>
</tr>
</tbody>
</table>

8860-51
- Main unit only, input modules up to 4 units
- Cannot operate alone, You must install other options

8861-51
- Main unit only, input modules up to 8 units

- **Input Cables**: Input cable (A), Input cable (B), Input cable (C), Input cable (D), Input cable (E), Input cable (F)

- **Input Modules**:
  - Factory options (A)
  - Factory options (B)
  - CUSTOM OPTIONS

- **Voltage**: Voltage is limited to the specifications of the input modules in use.

- **Connections**:
  - CONNECTION CORD L9170
  - CONNECTION CORD L199
  - CONNECTION CORD L197
  - GRABBER CLIP 9243

- **Voltage Limitations**: Voltage is limited to the specifications of the input modules in use.

- **Input Currents**:
  - 10 mA class to 500 A (High speed)
  - DC to 100 MHz wide band response, mA-class current up to 30 A
  - DC to 100 MHz wide band response, mA-class current up to 10 A
  - DC to 100 MHz wide band response, mA-class current up to 5 A

- **Other Features**:
  - **Power Supply**: Necessary for use high-speed current probes
  - **CARRYING CASE**: For the 8860-51, hard trunk type
  - **CARRYING CASE**: For the 8861-51, hard trunk type

- **Other Current Sensors**

- **MARCH 2016**

- **Note**: Company names and Product names appearing in this catalog are trademarks or registered trademarks of various companies.

- **Test Equipment Depot**: 800.517.8431 - 99 Washington Street Melrose, MA 02176

All information correct as of Dec. 6, 2016. All specifications are subject to change without notice.

8860-51E1-A2B Printed in Japan