HIOKI

MEMORY HiCORDER MR6000

Exceed All Limits

Fast and powerful - the best specs in the history of Memory HiCorders

Best-in-Class
Flagship
Model

Measurement	**Blazing fast, never-fail sampling** High-speed isolation measurement at 200 MS/s
Storage	**Superior processing capacity lets you save data while measuring** Save data in real time, 32 times faster than conventional models
Usability	**User-friendly design for accurate and smooth operation** Intuitive operation via large 12.1-inch touch screen

CE 3year Warranty

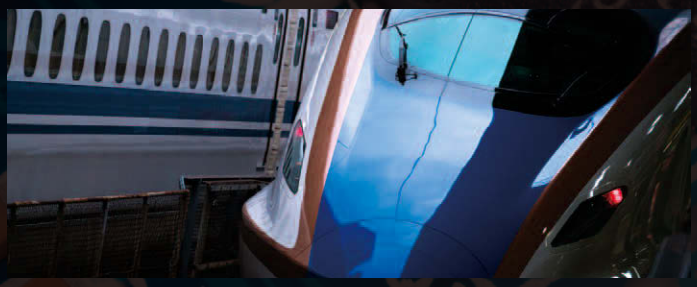
Overwhelming high speed technology
A revolutionary approach to measurement, recording and analysis

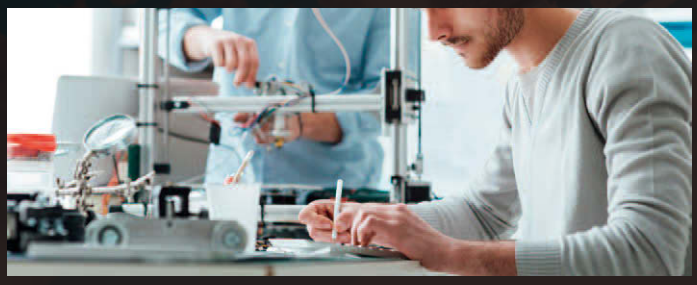
MEMORY HiCORDER MR6000

The MR6000 overcomes all barriers to reach new ground and meet challenges that are yet to be seen.
World class specifications, operability and design - Hioki's newest memory recorder has been re-engineered from top to bottom, delivering unprecedented performance that will change how you look at waveform recording.
Redefining the world standard for recorders - that is the Hioki MR6000.

200MS/s *High-speed optical isolated measurement*	***Instant saving*** *Real-time save*
	Intuitive operation *Touch screen*





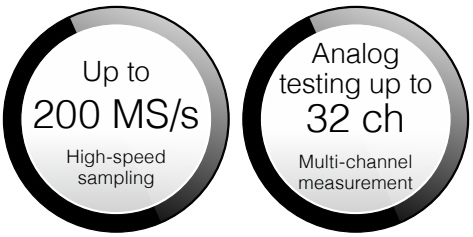
Increased efficiency of inverters and improved performance of energy-saving technologies have been achieved in the power electronics, renewable energy, and automotive industries.
We have drastically improved the technology used in our Memory HiCorders, developing the MR6000 Memory HiCorder to meet the advanced demands of all industries.

Series-Leading Measurement Performance

High-speed isolated measurement at 200 MS/s
Up to 32 ch in the analog unit and up to 128 ch in the logic unit

The Hioki Memory HiCorder lineup now includes a powerful input unit that unlocks the full measuring potential of the MR6000. The High Speed Analog Unit U8976 boasts the highest sampling rate in its entire series, an order of magnitude faster than conventional models, enabling the unit to perform isolated measurement at 200 MS/s*. Combine multiple modules of the 4ch Analog Unit U8975, which provides 4 channels of input with a speed of 5 MS/s at 16 bits, to perform multi-channel measurements up to 32 channels. Make the most of the Memory HiCorder's capabilities as we continue its development to meet your advanced measurement needs.

* 200 MS/s measurements can be achieved even if a unit other than the U8976 is connected at the same time. However, the data update rate will not exceed the maximum sampling rate of the unit.



Blazing fast, never-fail sampling
Record high-precision waveforms

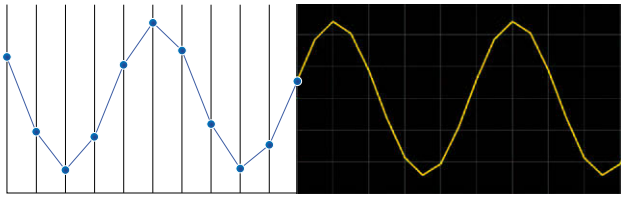
HIGH SPEED ANALOG UNIT U8976

You need accurate detection of switching waveforms in inverter evaluation tests, which requires a high level of efficiency. We developed the High Speed Analog Unit U8976 to meet those needs. In addition to high-speed sampling at 200 MS/s, the unit supports frequency bands up to 30 MHz. Adapted to the Memory HiCorder's direct input feature, it supports inputs up to 400 V DC.

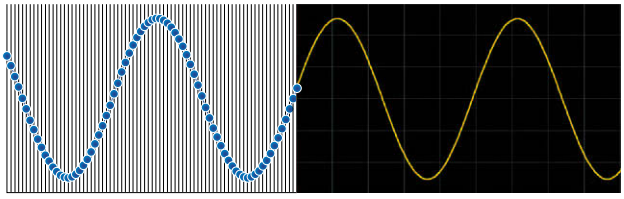
Available recording duration — *5-second continuous recording at 200 MS/s*

Sampling rate	1 ch	2 ch	3 to 4 ch	5 to 8 ch	9 to 16 ch
200 MS/s	5 s	2.5 s	1 s	0.5 s	0.25 s
100 MS/s	10 s	5 s	2 s	1 s	0.5 s
50 MS/s	20 s	10 s	4 s	2 s	1 s
20 MS/s	50 s	25 s	10 s	5 s	2.5 s
⋮	⋮	⋮	⋮	⋮	⋮

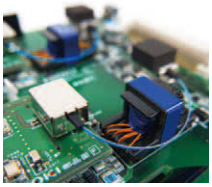
* Internal memory used * U8976 installed in 8 slots



Conventional sampling (20 MS/s)



200 MS/s High-speed sampling



Isolated input with optical isolation devices

Connections between analog input channels, and between the input channel and the main unit, are fully isolated. This means that, unlike an oscilloscope, measurements can be made without concern with negative effects from potential differences.

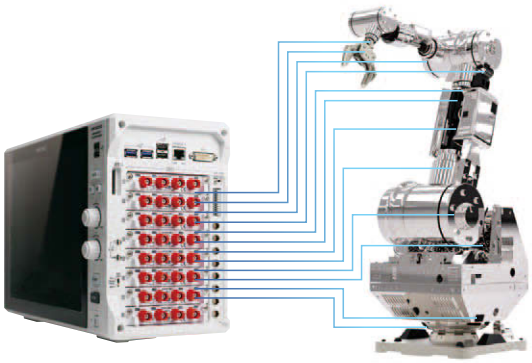
Install up to 8 units with 4 channels each
Measure multiple points simultaneously

NEW

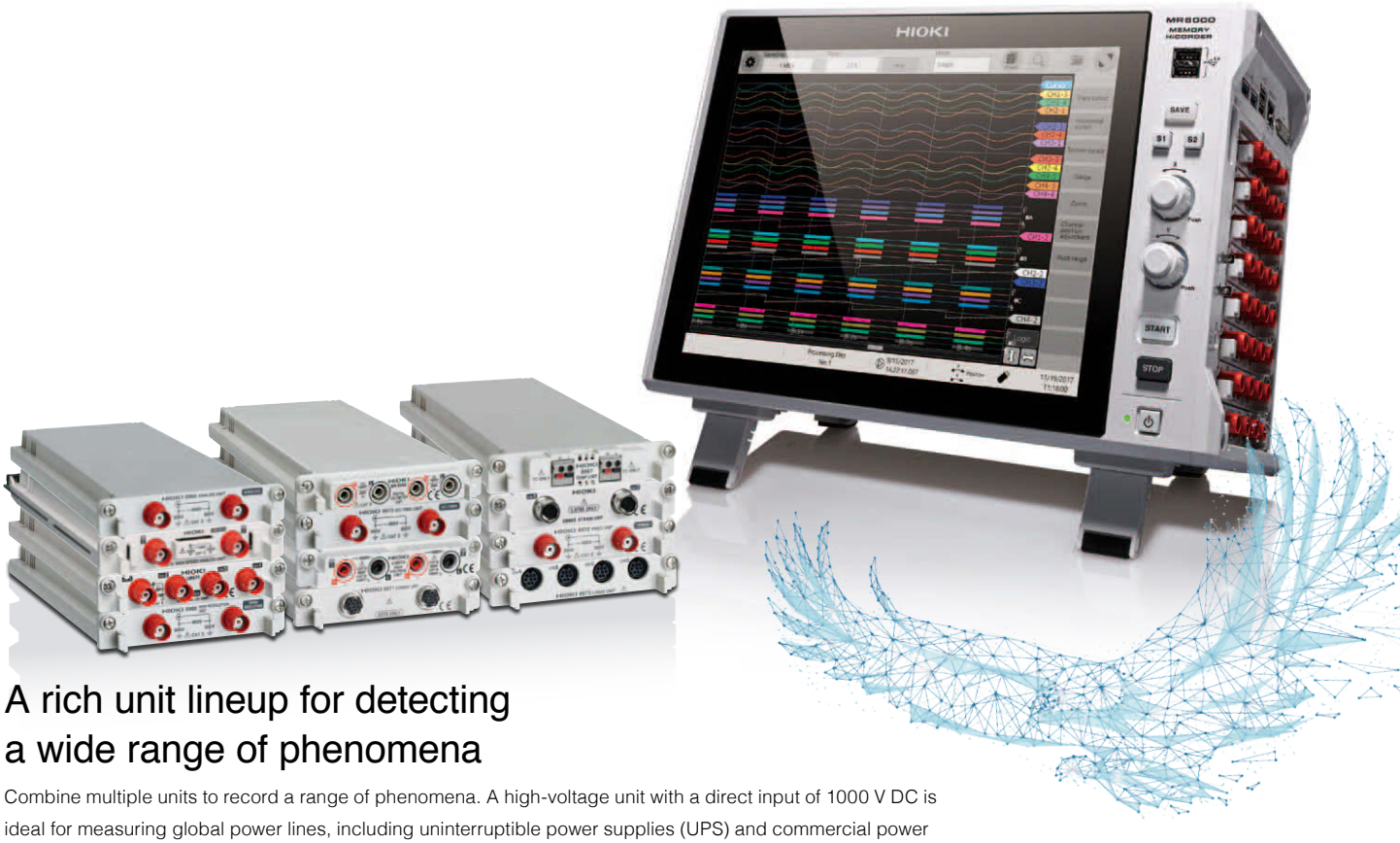
4CH ANALOG UNIT U8975

4CH ANALOG UNIT U8978

Our lineup now includes two types of analog units with 4-channel input in a single device. The U8975 supports direct inputs up to 200 V DC, and the U8978 is effective for accurately capturing sensor output using its 100 mV f.s. high sensitivity range. Both units provide a sampling rate of 5 MHz and 16-bit resolution.



Simultaneous measurement of multiple locations across 32 channels at 5 MS/s



A rich unit lineup for detecting a wide range of phenomena

Combine multiple units to record a range of phenomena. A high-voltage unit with a direct input of 1000 V DC is ideal for measuring global power lines, including uninterruptible power supplies (UPS) and commercial power supplies. Use multiple logic units to measure relay ON/OFF signals or PLC (programmable logic controller) signals across up to 128 channels simultaneously.

Unit interchangeability

The unit types compatible with the MR6000 are identical to the ones compatible with the MEMORY HiCORDER MR8827, MR8847A, MR8740, MR8741, and MR8740-50. Use any of the 15 types listed in the unit selection guide below. However, the U8977, U8978, and U8979 can only be used with the MR6000.

Unit selection guide (15 types)

available for Ver 2.10 or later

Measured signal	Model	Description	No. of channels	Fastest sampling	Bandwidth	A/D resolution	DC accuracy	Max. input voltage	Sensitivity (#1)	Max. sensitivity range	Isolation	Supplement
Voltage (high speed)	U8976	High-Speed Analog Unit	2 ch	200 MS/s	DC to 30 MHz	12 bits	±0.5% f.s.	400 V DC 1000 V DC (#2)	0.0625 mV	100 mV f.s.	Yes	n/a
Voltage	8966	Analog Unit	2 ch	20 MS/s	DC to 5 MHz	12 bits	±0.5% f.s.	400 V DC	0.05 mV	100 mV f.s.	Yes	n/a
Voltage (4ch)	U8975	4ch Analog Unit	4 ch	5 MS/s	DC to 2 MHz	16 bits	±0.1% f.s.	200 V DC	0.125 mV	4 V f.s.	Yes	n/a
Voltage (4ch, high resolution)	U8978	4ch Analog Unit	4 ch	5 MS/s	DC to 2 MHz	16 bits	±0.3% f.s.	40 V DC	3.125 uV	100 mV f.s.	Yes	n/a
Voltage (high resolution)	8968	High Resolution Unit	2 ch	1 MS/s	DC to 100 kHz	16 bits	±0.3% f.s.	400 V DC	3.125 uV	100 mV f.s.	Yes	with AAF
Voltage (DC, RMS)	8972	DC/RMS Unit	2 ch	1 MS/s	DC to 400 kHz	12 bits	±0.5% f.s.	400 V DC	0.05 mV	100 mV f.s.	Yes	with RMS
Voltage (high voltage)	U8974	High Voltage Unit	2 ch	1 MS/s	DC to 100 kHz	16 bits	±0.25% f.s.	1000 V DC 700 V AC	0.125 mV	4 V f.s.	Yes	CAT IV 600 V AC/DC
Voltage (high resolution)	MR8990	Digital Voltmeter Unit	2 ch	2 ms	n/a	24 bits	±0.01% rdg. ±0.0025% f.s.	500 V DC	0.1 uV	100 mV f.s.	Yes	CAT II 300 V AC/DC
Current	U8977	Current Unit	3ch	5 MS/s	DC to 2 MHz	16 bits	±0.3% f.s.	Current sensor only	Depends on current sensor		n/a	Max. 3 Units
Current	8971	Current Unit	2 ch	1 MS/s	DC to 100 kHz	12 bits	±0.65% f.s.	Current sensor only	Depends on current sensor		n/a	with RMS Max. 4 Units
Temperature	8967	Temperature Unit	2 ch	1.2 ms	DC	16 bits	Detailed reference	Thermocouples only	0.01°C	200°C (392°F)f.s.	Yes	n/a
Strain	U8969	Strain Unit	2 ch	200 kS/s	DC to 20 kHz	16 bits	±0.5% f.s. ±4 με	Strain only	0.016 με	400 μεf.s.	Yes	n/a
Frequency	8970	Frequency Unit	2 ch	200 kS/s	DC to 100 kHz (#3)	16 bits	n/a	400 V DC	0.002 Hz	Depends on mode	Yes	n/a
Acceleration	U8979	Charge Unit	2 ch	200 kS/s	DC to 50 kHz (DC) 1 Hz to 50 kHz (AC)	16 bits	±0.5% f.s. (Voltage) ±2.0% f.s. (Acceleration)	40 V DC	Depends on acceleration sensor		Yes	Supports TEDS
Logic	8973	Logic Unit	4 probes (16 ch)	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	Requires 9320-01, 9327 or MR9321-01

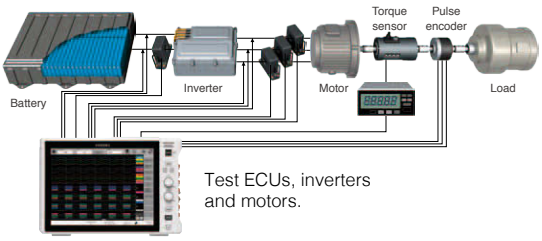
(#1) Minimum resolution shows the highest sensitivity resolution. (#2) When using the 9665 (#3) Minimum pulse width 2 μs

Concentration of sensing technologies with superior accuracy: A rich set of functions suitable for all measuring purposes

Sensing technology that serves as the key to reliable measurement data is essential for detecting various phenomena across multiple channels.
The MR6000 is a high-spec model that fully leverages the performance of Hioki's high-precision sensors.

Compatible with high-precision sensors for measuring large currents

Combine the Current Unit (8971 or U8977) and a current probe or current sensor designed and manufactured by Hioki to use the system over a wide temperature range or measure large currents with a high level of precision at solar power plants or development sites for EVs/HEVs. The convenient, built-in sensor identification function lets you simply connect the sensor to easily configure the scaling settings through automatic recognition. Combine the High Speed Analog Unit U8976 and a Hioki current probe or clamp-on probe for high-precision wideband observation of current waveforms. Furthermore, install the optional Probe Power Unit Z5021 to drive these probes from the MR6000 main unit.

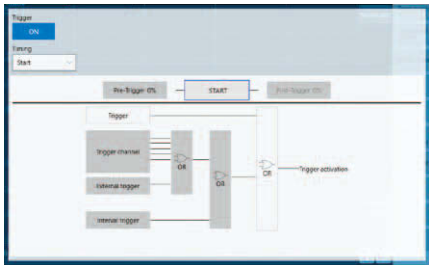


Test ECUs, inverters and motors.

Triggers that detect targeted events

Set triggers on any channel to record data whenever an event occurs.

Level trigger	Compares to one voltage value.
Window trigger	Compares to two voltage values.
Voltage drop trigger	Detects voltage drops in commercial power lines.
Period trigger	Monitors periods.
Glitch trigger	Detects anomalies in pulses.
Pattern trigger	Compares when the logic signal is ON/OFF.

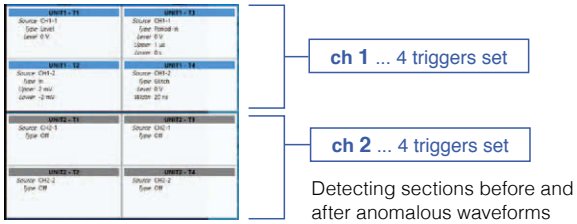


Clear trigger system diagram

Setting multiple triggers for a single channel

Set up to 4 triggers for a single channel. If, for instance, you set the glitch, level, window-in, and window-out triggers for the same input waveform, that waveform is monitored according to the set trigger conditions.

Various triggers × Up to 4 Settable for any channel



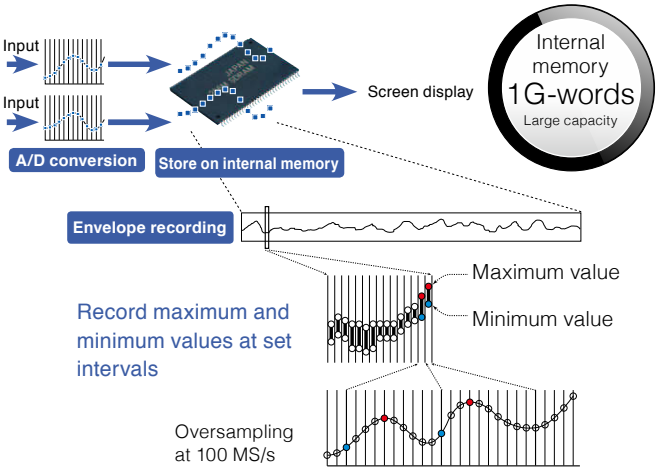
Detecting sections before and after anomalous waveforms

Observe fluctuations over the long-term with high-speed sampling

The system uses the envelope measurement method to record maximum and minimum values at set intervals while performing oversampling at 100 MS/s. The internal memory has a capacity of 1 G-words, which ensures that the measuring process continues for a long time without any data losses. Save data in real time while measuring.

Oversampling speed	Recording intervals	1 ch	…	9 to 16 ch
100 MS/s	10 MS/s	50 s	…	2 s
	1 MS/s	8 m 20 s	…	20 s
	100 kS/s	1 h 23 m 20 s	…	3 m 20 s
	10 kS/s	13 h 53 m 20 s	…	33 m 20 s
	1 kS/s	5 d 18 h 53 m 20 s	…	5 h 33 m 20 s
	⋮	⋮	…	⋮
	20 S/s	289 d 8 h 26 m 40 s	…	11 d 13 h 46 m 40 s
	⋮	⋮	…	⋮

* Limitations apply to measurable time when the U8975, U8977, U8978, or MR8990 is in use, and when performing real-time waveform processing.



Equipped with a powerful data analysis function

FFT calculation function (Equipped from Ver. 2.10)

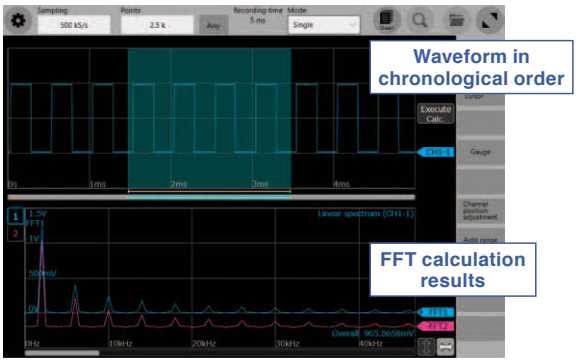
Installed in MR6000, MR6000-01

Analyze 8 phenomena at the same time with a single measurement. Multiple FFT analyses of signals input from different channels let you investigate the frequency components that appeared for each channel at a single point in time. Similarly, conduct a variety of analyses for a single signal simultaneously.

FFT calculation 4-split screen

FFT analysis directly from the memory waveform

Perform FFT analysis from measured data. Simply touch the screen to specify the starting point for analysis, while simultaneously viewing the calculation results.

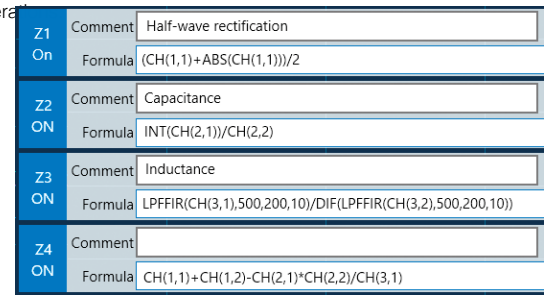


Chronological order + FFT calculation screen

Waveform processing function (Equipped from Ver. 2.10)

Installed in MR6000, MR6000-01

Perform complex calculations using previously loaded waveforms. Make up to 16 calculations, including logarithmic conversions, various filters, and trigonometric functions, simultaneously. You can also compute the average value, maximum value, or minimum value of the loaded data and reuse the results in further waveform processing operations.



Supports complex calculations

Numerical calculation function

ALL Installed in MR6000, MR6000-01

Analyze measured waveforms with numerical parameters. The MR6000 features several new numerical calculation functions including those for identifying overshoot and undershoot. In addition to analog and logic channels, the MR6000 can also perform calculations on real-time waveform processing channels, and features a numerical comparator function.

Average value	Rise time	Duty ratio	Amplitude
RMS value	Fall time	Pulse count	Overshoot
Peak to peak value	Standard deviation	Four arithmetic operations	Undershoot
Maximum value	Area value	Time difference	+Width
Time to maximum value	X-Y area value	Phase difference	-Width
Minimum value	Specified level time	High-level	Burst width
Time to minimum value	Specified time level	Low-level	Integration values
Period	Pulse width	Median value	XY waveform angle
Frequency			

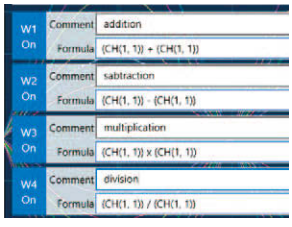
Simultaneous calculations of up to 16 out of a total of 33 computations

Real-time waveform processing

ONLY Installed in MR6000-01

Calculate measurement data during measurement

The MR6000-01 further features a powerful technology designed for robust real-time waveform processing. This function performs the four arithmetic operations (addition, subtraction, multiplication, and division), differentiation calculations, or integration calculations during the measuring process, letting you use check the calculated results via waveforms while measuring. Results can be further processed after measurement and saved.



Simple setting method

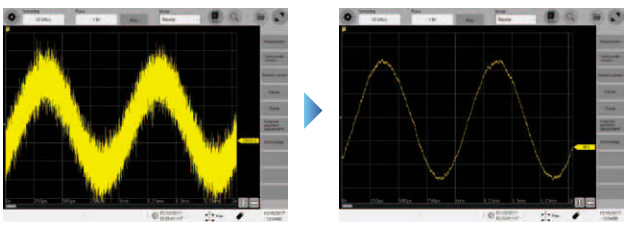
Dedicated equipment installed only in the MR6000-01 for real-time waveform processing

Digital filter calculation

ONLY Installed in MR6000-01

Observe clear waveforms without noise

Remove harmonic noise or specific frequency noise from measurement data. Use it to eliminate the noise that cannot be resolved with the standard filter installed in the unit.

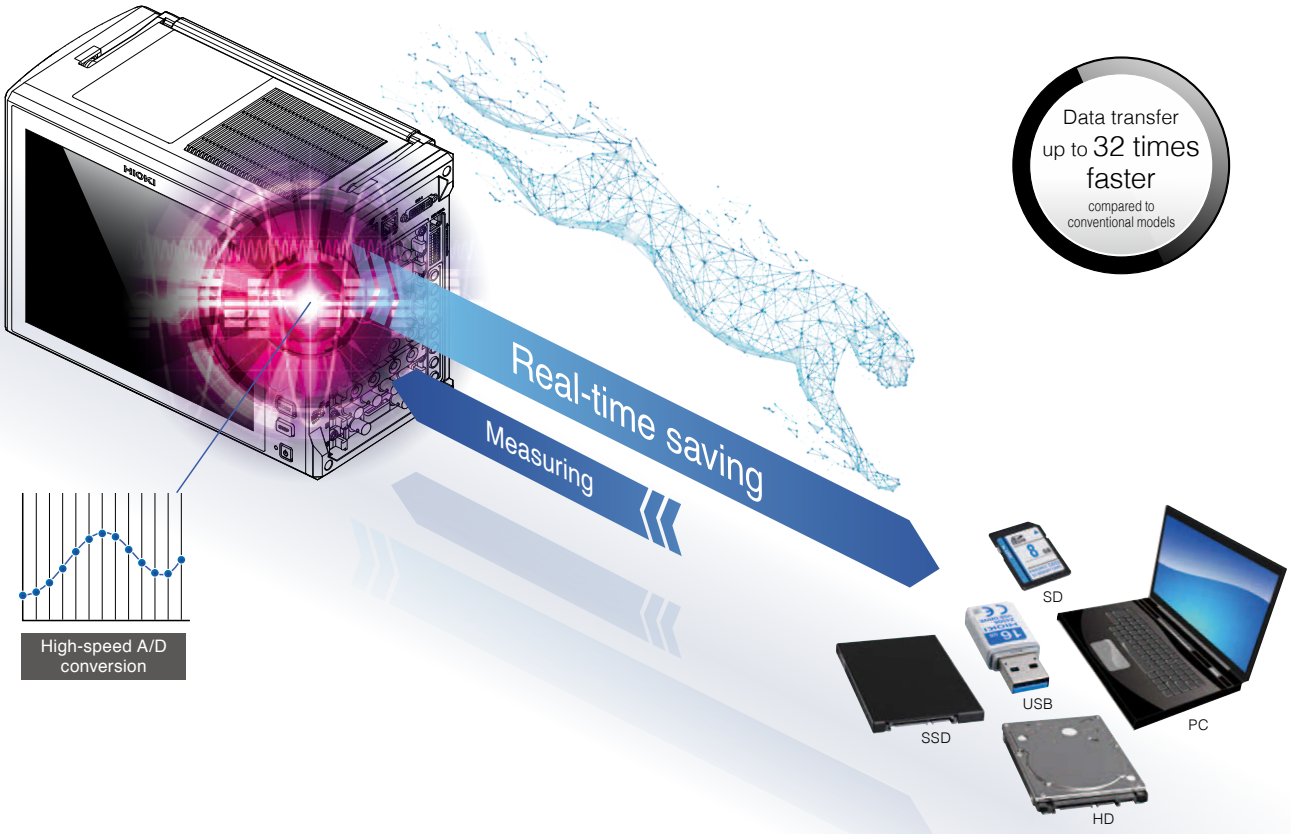


Digital filter disabled　　Digital filter enabled

Highest Transfer Speed in the Entire Series

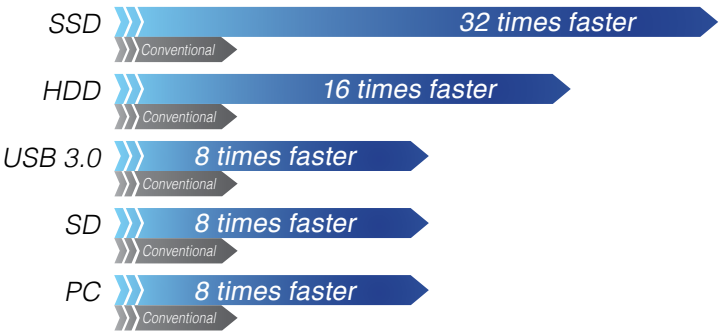
Data transfer up to 32 times faster compared to conventional models
Outstanding real-time save function that saves data during measurement

The MR6000 features a brand new interface that makes data transfer up to 32 times faster.
In addition, faster internal processing allows data to be saved to external media in real time during measurement.



Drastically increased data transfer speed

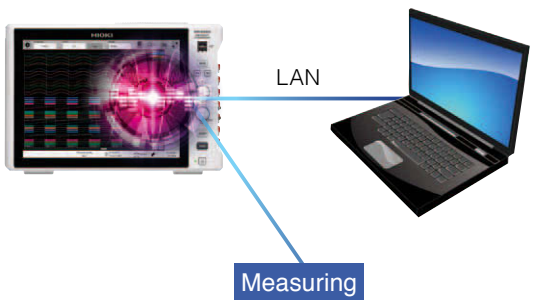
Data transfer to storage devices is now up to 32 times faster. While conventional models transferred data at 1 MS/s in a single channel, the MR6000 transfers data for 32 channels.



*Compared to other recorders in the Hioki Memory HiCorder series.
*Results vary according to measurement conditions.

Saving data directly to your PC

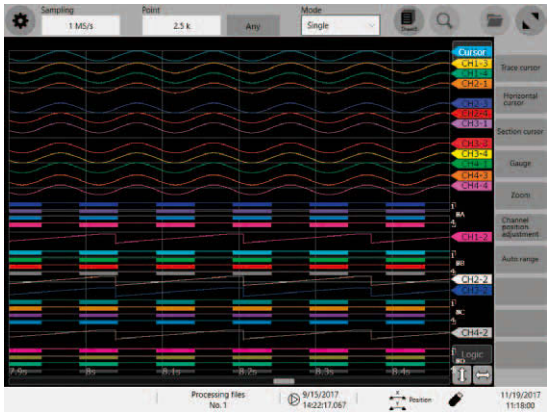
Transfer measurement data directly to your PC by using the FTP sending function together with the real-time save function. This makes it easier to observe data after the measuring process.

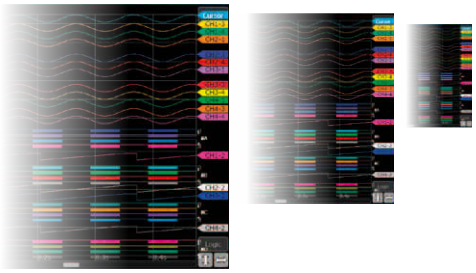


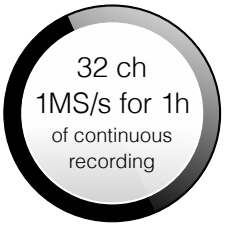
Longest Continuous Recording in the Entire Series

Long-term recording and high-speed sampling in multiple channels All in a single measurement

The real-time save function controls the available measurement duration without relying on the capacity of the internal storage memory.
For long-term recording, we recommend a high-capacity SSD or HD unit. You can also use a more convenient USB memory stick or SD memory card.
All phenomena can be recorded at a high sampling rate over a long period of time. This feature is ideal for situations where it is hard to predict the nature of a phenomenon or for measurements that can only be performed once. When saved in real time, data is split into several 512 MB files.







1 hour of continuous recording across as many as 32 channels at 1 MS/s

Available real-time save duration for various media

Save destination	Sampling speed	Number of channels	Available measurement duration	Maximum sampling rate for real-time save *1
SSD UNIT U8332 (256 GB)	1 MS/s	32 ch	Approx. 1 h	20 MS/s
HD UNIT U8333 (320 GB)	1 MS/s	16 ch	Approx. 2 h 40 min	10 MS/s
USB DRIVE Z4006 (16 GB)	1 MS/s	8 ch	Approx. 16 min	5 MS/s *2
SD MEMORY CARD Z4003 (8 GB)	1 MS/s	8 ch	Approx. 8 min	5 MS/s
PC	1 MS/s	8 ch	Depends on PC capacity	5 MS/s

*1: For 2 channels (no settings for 1 channel) *2: When using the USB 3.0 connector

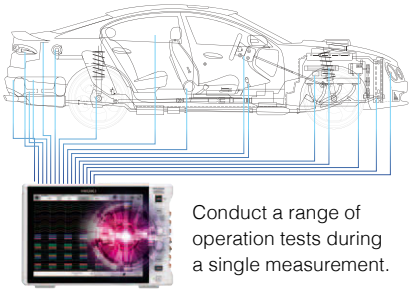
Maximum recording duration for real-time save with an SSD UNIT U8332/Reference values

d: days h: hours min: minutes s: seconds

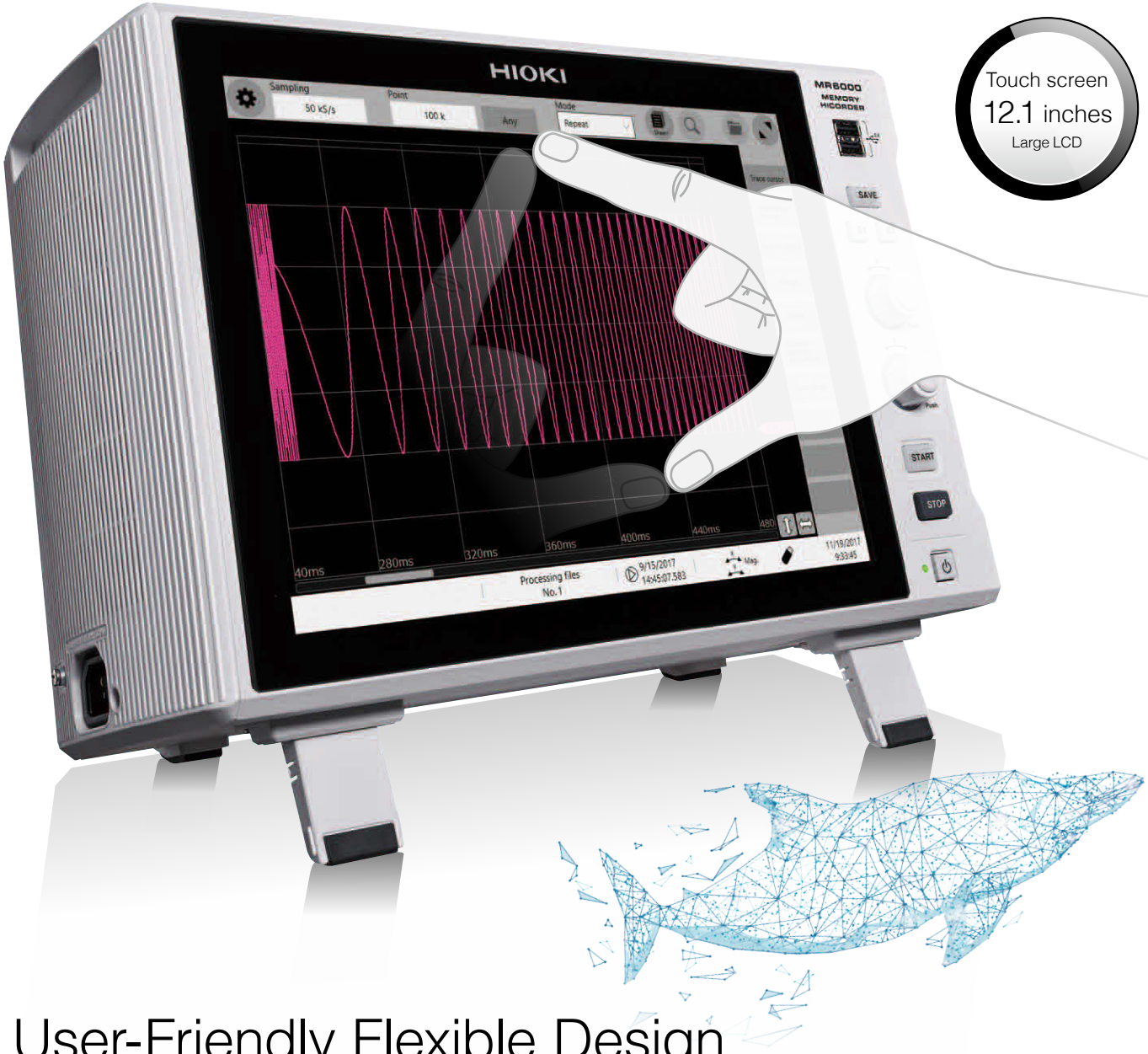
Sampling rate	Number of channels used				
	2	4	8	16	32
20 MS/s	53 min 20 s	–	–	–	–
10 MS/s	1 h 46 min 40 s	53 min 20 s	–	–	–
5 MS/s	3 h 33 min 20 s	1 h 46 min 40 s	53 min 20 s	–	–
2 MS/s	8 h 53 min 20 s	4 h 26 min 40 s	2 h 13 min 20 s	1 h 6 min 40 s	–
1 MS/s	17 h 46 min 40 s	8 h 53 min 20 s	4 h 26 min 40 s	2 h 13 min 20 s	1 h 6 min 40 s
500 kS/s	1 d 11 h 33 min 20 s	17 h 46 min 40 s	8 h 53 min 20 s	4 h 26 min 40 s	2 h 13 min 20 s
200 kS/s	3 d 16 h 53 min 20 s	1 d 20 h 26 min 40 s	22 h 13 min 20 s	11 h 6 min 40 s	5 h 33 min 20 s
100 kS/s	7 d 9 h 46 min 40 s	3 d 16 h 53 min 20 s	1 d 20 h 26 min 40 s	22 h 13 min 20 s	11 h 6 min 40 s
50 kS/s	14 d 19 h 33 min 20 s	7 d 9 h 46 min 40 s	3 d 16 h 53 min 20 s	1 d 20 h 26 min 40 s	22 h 13 min 20 s
20 kS/s	37 d 0 h 53 min 20 s	18 d 12 h 26 min 40 s	9 d 6 h 13 min 20 s	4 d 15 h 6 min 40 s	2 d 7 h 33 min 20 s
10 kS/s	74 d 1 h 46 min 40 s	37 d 0 h 53 min 20 s	18 d 12 h 26 min 40 s	9 d 6 h 13 min 20 s	4 d 15 h 6 min 40 s
5 kS/s	148 d 3 h 33 min 20 s	74 d 1 h 46 min 40 s	37 d 0 h 53 min 20 s	18 d 12 h 26 min 40 s	9 d 6 h 13 min 20 s
2 kS/s	⋮	185 d 4 h 26 min 40 s	92 d 14 h 13 min 20 s	46 d 7 h 6 min 40 s	23 d 3 h 33 min 20 s
1 kS/s		⋮	185 d 4 h 26 min 40 s	92 d 14 h 13 min 20 s	46 d 7 h 6 min 40 s
500 S/s			⋮	185 d 4 h 26 min 40 s	92 d 14 h 13 min 20 s
200 S/s				⋮	231 d 11 h 33 min 20 s
100 S/s					⋮

Long-term measurements for more efficient testing

The real-time save function boasts high-speed sampling and multi-channel measurements. Perform an approximately 1-hour measurement at 20 MS/s in 2 channels or 1 MS/s in 32 channels.



Conduct a range of operation tests during a single measurement.

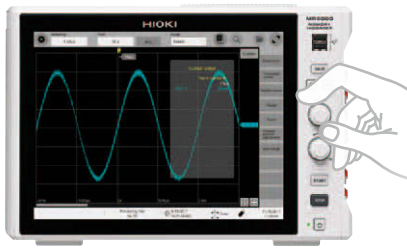


Touch screen
12.1 inches
Large LCD

User-Friendly Flexible Design

Fast and convenient touch screen
Operation as smooth as silk

The capacitive touch screen delivers intuitive operability.
Select a setting item directly by tapping the screen, and use your fingers to enlarge the part you want to see.
The new user interface makes setting measurement items for multiple channels easier compared to the more complicated conventional models where you had to press the keys several times to configure a setting.



▲ Use the rotary knobs to move the tracing cursor.

▲ Simply tap the screen to switch between the items you want to set.

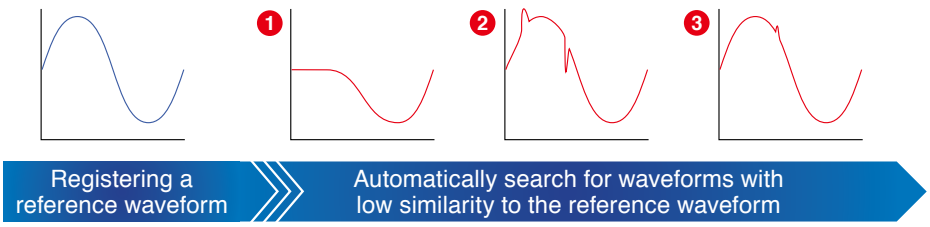
Easy method for pinpointing a specific waveform within large amounts of measurement data

Set the peak values or trigger conditions you want to search for to have the relevant data retrieved and displayed automatically.
Our new Memory HiCorder Concierge function automatically calculates the characteristics of the reference waveform you have set and searches all of the measured data to detect and array any waveforms with low similarity as anomalous waveforms.
This drastically reduces the amount of time required to search for anomalies by eliminating the need to scroll through measured waveforms and check them visually.

Memory HiCorder Concierge

Use the Concierge to look for anomalous waveforms.

A new waveform search function finds anomalous waveforms in all of the measured data. This function is ideal for situations where it is difficult to set the right triggers before measuring because the nature of potential anomalies cannot be predicted.



Rich set of search functions

Peak search

Search for the maximum value, minimum value, local maxima, or local minima in all of the measured data, and mark the search point in the waveform.

Trigger search

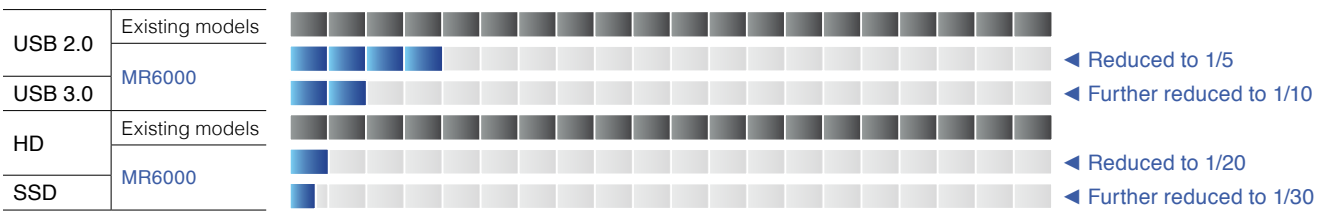
Set trigger conditions for all of the measured data again to search for points where the conditions are fulfilled, even if no triggers were set during the measuring process.

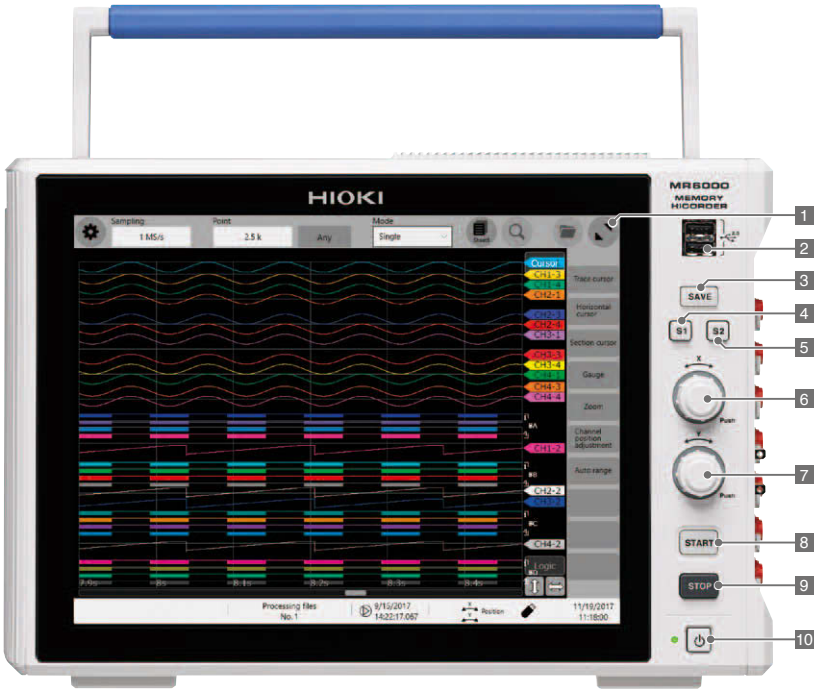
Jump

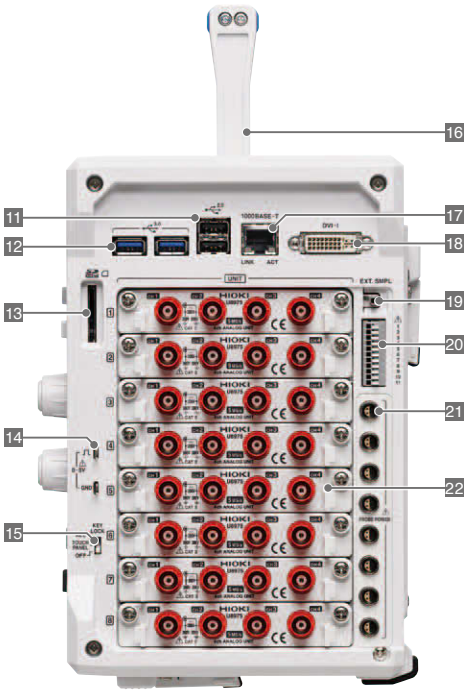
Jump to an event mark you made while measuring, to the cursor position on the display, or to the location measured at a specified time.

Radically improved data saving time

Transferring very large amounts of data measured over a long period of time used to be very time-consuming.
The MR6000 features a brand new interface and faster internal processing, reducing the time required to save measurement data to media.
This saves you the trouble of waiting for data to be saved and improves work efficiency.



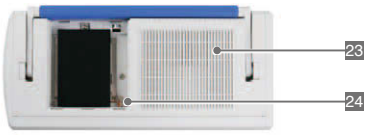




Multifunctional Interface

Only 6 keys in total
New recorder design

Use the touch screen to configure all the basic settings.



Open or close the top panel of the main unit.
Z4006 USB DRIVE installable.

1 Display
12.1-inch capacitive touch screen TFT color LCD display

2 USB 2.0 connector x2
For connecting a USB memory stick, USB mouse, or USB keyboard

3 SAVE button
For displaying the manual save dialog box

4 Shortcut button 1
For registering frequently used settings

5 Shortcut button 2
For registering frequently used settings

6 Rotary knob X
For moving the tracing cursor and scrolling or zooming the waveform in and out

7 Rotary knob Y
For changing the position and zooming the waveform in and out

8 START button
To begin the measuring process

9 STOP button
For importing the set recording length and stopping the measuring process

10 Power button
For turning the power on or off

11 USB 2.0 connector x2
For connecting a USB memory stick, USB mouse, or USB keyboard

12 USB 3.0 connector x2
For connecting a USB memory stick, USB mouse, or USB keyboard

13 SD MEMORY CARD slot
For inserting SD memory cards

14 Output terminal for probe compensation signals
For outputting 10:1 or 100:1 PROBE compensation signals

15 KEY LOCK
For disabling the touch screen and buttons

16 Handle
For carrying the device

17 1000 BASE-T connector
For connecting to the network via LAN cable

18 DVI terminal
For outputting the screen display

19 External sampling terminal
For inputting various external sampling signals

20 External control terminal
For inputting various external signals to control the device

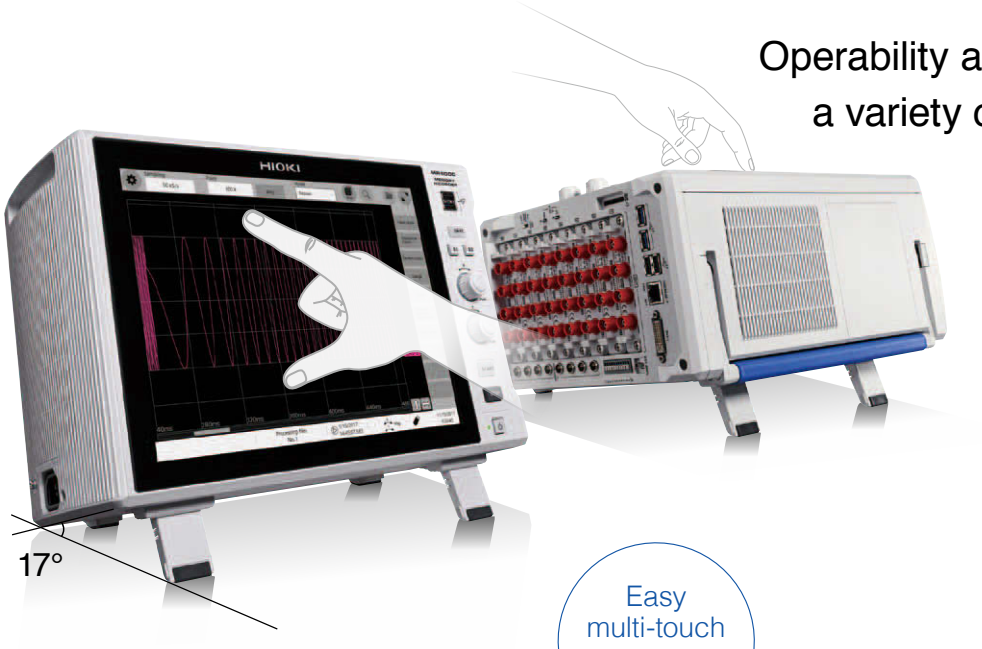
21 Dedicated power supply terminal for current clamp
For supplying power to the current sensor (Option)

22 Various units
Install input units appropriate for the measurement target

23 Air inlet
For reducing the internal temperature

24 Media box
For USB 3.0 connectors (USB memory sticks only)

Operability and visibility suited for a variety of work environments

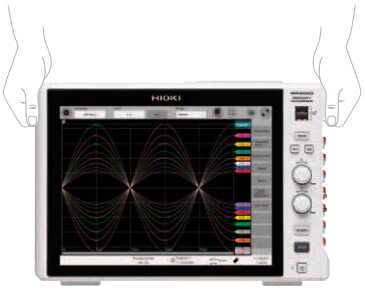


Easy multi-touch

Horizontal and vertical

Ergonomical operating angle

Our search for a touch screen with the best operability and visibility angle led us to develop retractable feet that maximize those two important attributes. Tilting the MR6000 with the feet reduces the strain on your wrists when you use the device on a desk, and keeps your line of sight at a natural level. The rear side also features the same retractable feet, making is easy to use the device on the floor.



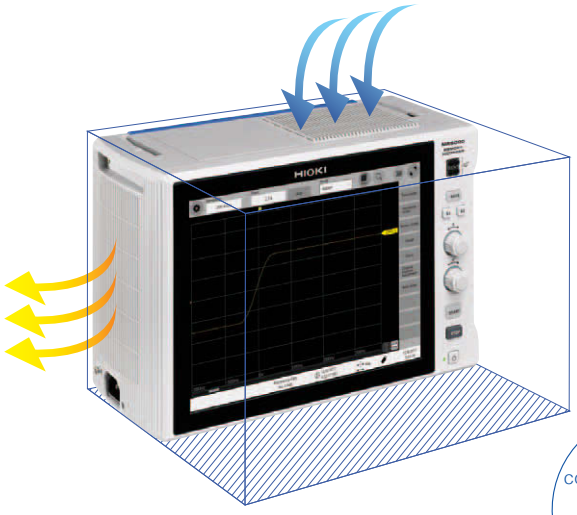
Convenient long handle

Robust design

Easy handling

The rubber handle boasts excellent grip and makes it easy to carry the device with either one or both hands. The grips on either side of the device can also be used to lift it with both hands.

Simple protectors on the top and bottom right side of the device protect the interface and unit input terminals from sudden physical shocks.



Compared to conventional models

1/2 size

When compared to 8861-50

Space-saving size

We have achieved a design that is compact while still delivering blazing fast processing speeds by using thermal liquid analysis to optimally position the air inlets, heating components, and cooling fans. The smaller form factor requires less space for installation, making the device just right for tight workspaces.

Refined attractive shape

Simple design

Sleek details

The bevelled chassis edges give the device a compact and sleek look. The left side is slightly curved with slits to match the mesh of the air outlet. The air outlet is therefore in harmony with the design of the flat and solid-looking chassis. The simple and refined appearance achieved by these efforts well suits a device used for R&D purposes.

Product Specifications

Basic Specifications (Accuracy guaranteed for 1 year, Post-adjustment accuracy guaranteed for 1 year)	
Recording method	Normal: Regular waveform recording Envelope: Periodically recording maximum and minimum values *Envelope setting not available with external sampling
No. of channels	Analog with up to 32 channels (with 4ch ANALOG UNIT U8975/U8978) Logic with up to 128 channels (LOGIC UNIT 8973) *Common GND for the logic probe input connector and main unit
Maximum sampling rate	200 MS/s (all channels at the same time) (with HIGH SPEED ANALOG UNIT U8976) External sampling (10 MS/s)
Memory capacity	1 G-words
Operating environment	Indoors, pollution degree 2, altitude up to 2000 m (6562.20 ft)
Operating temperature and humidity range	0°C to 40°C (32°F to 104°F), 80% RH or less (no condensation)
Storage temperature and humidity range	-10°C to 50°C (14°F to 122°F), 80% RH or less (no condensation)
Compliance standards	Safety: EN61010, EMC EN61326
Power supply	Rated supply voltage: AC 100 V to 240 V (consider ±10% voltage fluctuations for rated supply voltage) Rated power supply frequency: 50 Hz / 60 Hz Anticipated transient overvoltage: 2500 V
Max. power consumption	300 VA
Clock	Auto-calendar, leap-year correcting 24-hour clock
Backup battery life	Approx. 10 years (at 23°C (73°F)) for clock and settings
PC interface (overview)	LAN, USB, SD, SATA, monitor
External dimensions	353 mm (13.90 in) W x 235 mm (9.25 in) H x 154.8 mm (6.09 in) D (excluding protrusions)
Mass	6.5 kg (229.3 oz) (main unit only) 6.7 kg (236.3 oz) (with Z5021, U8332, or U8333 installed) 8.9 kg (313.9 oz) (with HIGH SPEED ANALOG UNIT U8976 installed)
Accessories	Power cord, Quick Start Manual (booklet, CD-R), operating precautions (booklet), application disk (CD-R), Instruction Manual (detailed edition) (CD-R), Instruction Manual (MR6000-01 exclusive functions edition) (CD-R), blank panel (blank slot only)
Accuracy	
Accuracy guarantee conditions	Temperature and humidity range: 23°C ±5°C (73°F ±9°F), 80% RH or less
Time axis accuracy	±0.0005%
Display	
Display type	12.1 inch XGA TFT color LCD (1024 x 768 dots) with capacitive touch screen
LAN Interface	
Compatibility specifications	IEEE 802.3 Ethernet 1000BASE-T, 100BASE-TX, 10BASE-T
Functions	DHCP, DNS, FTP, HTTP, e-mail sending function
Connector	RJ-45
Maximum cable length	100 m (328.11 ft)
USB interface	
Compatibility specifications	USB 3.0 compliant x 3, USB 2.0 compliant x 4
Host	Connector: Series A receptacle Connected devices: Keyboard, mouse, USB memory stick
Available options	Z4006 USB MEMORY STICK (16 GB)
SD card slot	
Compatibility specifications	Compliant with SD standards x 1 (compatible with SD, SDHC, SDXC memory cards)
Available options	Z4001 SD MEMORY CARD (2 GB), Z4003 SD MEMORY CARD (8 GB)
SATA interface	
Compatibility specifications	Serial ATA Revision 3.0 compliant x 1
Available options	U8332 SSD UNIT (256 GB), U8333 HD UNIT (320 GB)
Monitor output	
Connector	DVI-I
Output type	Digital output for external displays 1024 x 768 (XGA) *Not compatible with dual link
External sampling terminal	
Connector	SMB
Maximum input voltage	10 V DC
Input voltage	2.5 V to 10 V for high level, 0 V to 0.8 V for low level
Response pulse width	50 ns or more during high periods, 50 ns or more during low periods
Maximum input frequency	10 MHz
Functions	External sampling clock input, rising/falling selection possible
External control terminals	
Terminal block	Push-button type
External input	Maximum input voltage: 10 V DC Input voltage: 2.5 V to 10 V for high level, 0 V to 0.8 V for low level Response pulse width: 50 ms or more during high periods, 50 ms or more during low periods Pulse interval: 200 ms or greater Number of terminals: 2 Functions: START, STOP, START/STOP, SAVE, ABORT, event
External output	Output type: Open drain output (active low, with 5 V voltage output) Output voltage: 4.0 V to 5.0 V for high level, 0 V to 0.5 V for low level Maximum input voltage: 50 V DC, 50 mA, 200 mW Number of terminals: 2 Functions: Judgment (PASS), judgment (FAIL), occurrence of errors, busy, trigger standby
External trigger	Maximum input voltage: 10 V DC External trigger filter: ON / OFF Response pulse width: External trigger filter OFF: 1 ms or more during high periods, 2 us or more during low periods External trigger filter ON: 2.5 ms or more during high periods, 2.5 ms or more during low periods Functions: Rising/falling selection possible Rising: Triggering occurs when the voltage rises from low (0 V to 0.8 V) to high (2.5 V to 10 V). Falling: Triggering occurs when the voltage falls from high (2.5 V to 10 V) to low (0 V to 0.8 V) or when a terminal short circuit occurs. *Trigger timing: With the START&STOP option, rising/falling can be selected for either START or STOP.
Trigger output	Output type: Open drain output (active low, with 5 V voltage output) Output voltage: 4.0 V to 5.0 V for high level, 0 V to 0.5 V for low level Maximum input voltage: 50 V DC, 50 mA, 200 mW Output pulse width: Level or pulse selection possible Level: Sampling period x data number after trigger Pulse: 2 ms ±1 ms
Output terminal for probe correction signals	
Output signals	0 V to 5 V ±10%, 1 kHz ±1% square waves
Functions	9665 10:1 PROBE, 9666 100:1 PROBE correction
Dedicated power supply terminal for current sensor *Option to be specified upon order placement (with Z5021 PROBE POWER UNIT installed)	
Number of terminals	8
Output voltage	± 12 V ± 0.5 V DC
Trigger *Not available when the real-time save function is used	
Trigger type	Digital comparison type
Trigger conditions	AND or OR condition for trigger sources and interval trigger
Trigger source	Analog, logic, real-time waveform processing When START or STOP is selected: Up to 32 channels *Up to 4 analog triggers can be set for each analog channel. *Up to 4 logic triggers can be set for each logic probe. *Up to 2 analog triggers can be set for each real-time waveform processing channel. When START&STOP is selected: Up to 16 channels / group Analog: Up to 16 channels / group (Up to 2 channels per unit can be selected.) Logic: Up to 16 probes / group (Up to 2 probes per unit can be selected.) Real-time waveform processing: Up to 16 calculations / group *Up to 2 trigger types from each group can be set for each analog channel. *Up to 2 logic triggers from each group can be set for each logic probe. External trigger The free run function is activated if all trigger sources are turned off.
Analog triggers	Level trigger: Triggering occurs when the set level rises (falls). Voltage drop trigger: Triggering occurs when peak voltage drops below the set level. (For a 50 Hz / 60 Hz commercial power supply only) *1, *2, *3 Window trigger: Sets the upper and lower limit for trigger level. Triggering occurs when leaving (OUT) or entering (IN) the area. *1 Period trigger: Sets the period reference value and cycle range. Triggering occurs when the rising (falling) reference value period is measured and determined to be outside or within the cycle range. *1, *2, *3 Glitch trigger: Sets the reference value and pulse width (glitch width). Triggering occurs if the value is below the set pulse width from rising or falling of the reference value. *1, *Not available with MR8990, *3 Specifying events: Specifying events (1 to 4000) Counts the number of times conditions were fulfilled for each trigger source. Triggering occurs when the set number of times is reached. *Not available when the trigger conditions are set to AND *1: Disabled when sampling rate is set to 200 MS/s. *2: Not available with MR8990 or 8970 *3: Not available with envelope setting
Logic trigger	Pattern trigger using 1, 0, or x
Forcible trigger	Included (Forcible triggering can be prioritized over all trigger sources.)
Interval trigger	Recording possible at specified measuring intervals (hours, minutes, or seconds) The trigger conditions are fulfilled when the measuring process starts. Afterwards, the trigger conditions are met at the set measuring intervals.
Trigger filter	Normal: OFF, 10, 20, 50, 100, 150, 200, 250, 500, 1000, 2000, 5000, 10,000 samples Envelope: OFF, 1 ms, 10 ms
Level setting resolution	1 LSB
Pre-trigger	0% to 100% (any value set in 1% steps available), displaying the recording time for pre-trigger
Post-trigger	0% to 40%, displaying the recording time for post-trigger
Trigger priority	ON / OFF
Trigger mark	Displays trigger marks for the positions where triggers are set.
Trigger timing	START, STOP, START&STOP
Waveform monitoring display	Displays the waveform monitor in the trigger standby state. (The display can be turned off.)
Waveform screen	
Numerical display format	Waveform display in chronological order: 1 screen, 2 screens, 4 screens, 8 screens, 16 screens *Displays up to 64 channels per sheet. *Multiple sheets can be set for the same channel. FFT display: 1 screen, 2 screens, 4 screens Waveform in chronological order + FFT display (1 screen, 2 screens, 4 screens)
Sheet function	Up to 16 sheets *The display format can be selected for each sheet.
Zoom display	ON / OFF (Waveforms are displayed in chronological order in the top part of the waveform screen, whereas the zoomed waveforms are displayed in the bottom part.)
Full screen display	Displays waveforms over the entire waveform screen.
Waveform display	Waveform color: Fixed colors (32 colors) Interpolation: Linear Variable display: Always ON Vernier: Adjustable input waveform (Adjustment range: 50% to 250% of the input) Grid: OFF / ON Logic display width: Wide / Standard / Narrow Waveform inversion: Displays waveforms upside down. *Not available with 8967, 8970, and 8973
Enlarge / Reduce	Allows you to adjust the zoom ratio as necessary by pinching in or out.
Waveform scrolling	Scroll left or right by swiping the screen and scroll back while measuring.
Roll display mode	Always displays the latest data by following the measuring process. The drawing start position (left or right edge) can be selected. *The roll cannot be displayed when the overlay function is turned on.
Waveform monitoring function	ON / OFF (The monitor can also be displayed in the trigger standby state.)
Overlay	The OFF, automatic, or manual option can be selected. *The roll cannot be displayed when the overlay function is turned on.
Cursor	Tracing cursor: Up to 8 cursors can be displayed. *Displays potential, time from trigger, time difference between cursors, and potential difference. Horizontal cursor: Up to 8 cursors can be displayed. *Displays potential and potential difference. Gauge: Up to 8 gauges can be displayed. Specifying segments: Segment cursor 1 / Segment cursor 2 *Specifies the calculation range, saving range, and search range. Jump: Tap the screen to jump to the specified location.
Event mark	Input available during the measuring process (up to 1000 marks) Use the start button or external input terminal for input.
Setting screen	
Sampling rate	Normal: 200 M, 100 M, 50 M, 20 M, 10 M, 5 M, 2 M, 1 M 500 k, 200 k, 100 k, 50 k, 20 k, 10 k, 5 k, 2 k, 1 k 500, 200, 100, 50, 20, 10, 5, 2, 1 [S/s] *The speed for real-time waveform processing can be set from 100 MS/s. External sampling: Depending on the input signal of the external sampling terminal Up to 10 MHz Envelope: 10 M, 5 M, 2 M, 1 M 500 k, 200 k, 100 k, 50 k, 20 k, 10 k, 5 k, 2 k, 1 k 500, 200, 100, 50, 20, 10, 5, 2, 1 [S/s] 30, 12, 6, 2, 1 [S/min] *Calculation speed for maximum and minimum values *Oversampling rate: 100 MS/s For real-time saving (*The values in ( ) indicate the number of channels used.): Maximum available sampling rate [Save destination: SSD] 20 MS/s (2 channels), 10 MS/s (4 channels), 5 MS/s (8 channels), 2 MS/s (16 channels), 1 MS/s (32 channels), 500 kS/s (64 channels) [Save destination: HDD] 10 MS/s (2 channels), 5 MS/s (4 channels), 2 MS/s (8 channels), 1 MS/s (16 channels), 500 kS/s (32 channels), 200 kS/s (64 channels) [Save destination: SD memory card, USB memory stick, sending via FTP] 5 MS/s (2 channels), 2 MS/s (4 channels), 1 MS/s (8 channels), 500 kS/s (16 channels), 200 kS/s (32 channels), 100 kS/s (64 channels) *Guaranteed only when the available option is specified for the save destination. *USB memory data guaranteed only when using the USB 3.0 connector.

Maximum recording length	Normal	[Built-in presets] 20 M (32 channels), 50 M (16 channels), 100 M (8 channels), 200 M (4 channels), 500 M (2 channels), 1 G (1 channel) [Point] [Arbitrary recording length] 33554400 (32 channels), 67108800 (16 channels), 134217700 (8 channels), 268435400 (4 channels), 536870900 (2 channels), 1073741800 (1 channel) [Point] *Setting is possible in units of 100 points.
	Envelope	[Built-in presets] 10 M (32 channels), 20 M (16 channels), 50 M (8 channels), 100 M (4 channels), 200 M (2 channels), 500 M (1 channel) [Point] [Arbitrary recording length] 16777200 (32 channels), 33554400 (16 channels), 67108800 (8 channels), 134217700 (4 channels), 268435400 (2 channels), 536870900 (1 channel) [Point] *Setting is possible in units of 100 points.
	For real-time saving	Determined according to the amount of free space in the save destination, file system, and number of measurement channels
	*The values in ( ) indicate the number of channels used. How channels are defined: 1. 2-channel input units: Each channel counts as 1 channel 2. 3- or 4-channel units: (U8975/U8977/U8978): When either or both CH1/CH2 are used, counts as 1 channel When either or both CH3/CH4 are used, counts as 1 channel Any combination of the above, counts as 2 channels 3. Real-time waveform processing: each operation counts as 1 channel *When using any of Model U8975, U8977, U8978, or MR8990, or conducting real-time waveform processing, the maximum recording length at a sampling rate of 10 MS/s or less does not exceed half the length of the values listed above.	
Repeated measurements	Single, repeated, specified number of times *Repeated measurements cannot be set and the number of times cannot be specified for real-time saving.	
Waveform monitoring function	Displayed on the channel setting screen	
Scaling	Conversion ratio and offset / 2-point input / Model / Output rate / dB / Rating *Model: Select a model to configure the scaling settings automatically. *Automatic detection and automatic scaling are available when a current unit is used.	
Comments	Title comments, channel comments Channel numbers and channel comments are added on the setting screen and waveform screen.	
Digital filter *MR6000-01 only (Option to be specified upon order)	Calculation formulas	32 formulas
	Calculation targets	Measurement channels in 8966, 8967, 8968, U8969, 8970, 8971, 8972, U8974, U8975, U8976, U8977, U8978, U8979 *The 8973 and MR8990 measurement channels are not applicable.
	Calculation update rate	10 M / 1 M / 100 k / 10 k / 1 k / 100 / 10 / 1 [S/s] *Up to 8 calculations can be set for 10 MS/s. *Up to 16 calculations can be set for 1 MS/s.
	Calculation delay	Calculation update rate: 10 MS/s | 1 MS/s | 100 kS/s | 10 kS/s or less Calculation delay: 6.2 or 6.3 us | 5 us | 20 us | Calculation update rate period
	Filter types	FIR (LPF / HPF / BPF / BSF), IIR (LPF / HPF / BPF / BSF), moving average, delay device

Saving

Save destination	SD MEMORY CARD	Z4001 (2 GB), Z4003 (8 GB)
	USB MEMORY STICK	Z4006 (16 GB)
	SSD	U8332 SSD UNIT (256 GB)
	HDD	U8333 HD UNIT (320 GB)
	Sending to FTP	PC with a LAN connection
	Sending e-mails	Send files via e-mail to specified address
File format	FAT, FAT32, NTFS, exFAT	
Filename	Alphanumeric and Japanese input	
Processing identical filenames	Adding a serial number at the beginning before saving	
Auto saving	ON / OFF *Automatically saves the data obtained for the recording length at the end of a measuring process. *Settings files are not supported. *This function is not available when real-time saving is selected. *When using memory segmentation, measurement of the next block can start during saving. (Limitations on sampling rate and recording length apply.)	
Real-time saving	ON / OFF *Saves the waveform data (binary) obtained during the measuring process directly to the save destination. *The auto saving function is not available.	
	File division	Files are divided for approx. every 512 MB of data.
Deleting and saving	Deletes the files with the oldest creation dates and saves data when there is no free space left on the specified media at the save destination. *Enabled for auto saving and real-time saving.	
Types of saved data	Settings data	.SET
	Waveform data	Binary format (.MEM, .REC, .FLT), text format (.TXT, .CSV)
	Index	Divided saving (.IDX), memory segmentation (.SEQ)
	Displayed images	.BMP, .PNG, .JPG
	Numerical calculation results	.CSV, .TXT
Saving channels	Select a channel from all the channels available or from the displayed channels when saving waveform data.	
Culled data saving	Waveform data (text format) is culled according to the specified culling value (from 2 to 1000) before saving.	
File division *Real-time saving and memory segmentation excluded	Types of saved data	Division method
	Binary format	OFF / Every 16 MB of data / Every 32 MB of data / Every 64 MB of data
	Text format	OFF / Every 60,000 points of data / Every 1,000,000 points of data
	Numerical calculation results	OFF / By the calculation number
Specifying files	New files / Existing files *Enabled when numerical calculation results are saved. *Select whether to create a new file or add data to an existing file when starting to measure.	
SAVE button operation	Instant saving	Press the SAVE button to save data to a save destination, under a filename, and with saving settings that have been pre-set.
	Saving range	Select the full range or a specific segment. *Enabled only when data is saved with the SAVE key.

Loading data

Loading source	SD MEMORY CARD	Z4001 (2 GB), Z4003 (8 GB)
	USB MEMORY STICK	Z4006 (16 GB)
	SSD	U8332 SSD UNIT (256 GB)
	HDD	U8333 HD UNIT (320 GB)
Types of loaded data	Settings data (.SET) Waveform data Binary format (.MEM, .REC) Index Divided saving (.IDX), memory segmentation (.SEQ)	

Numerical calculations *Not available with envelope setting

Maximum number of calculations	16 items x Measurement channels	
Calculation range	Full range / Specified segments	
Calculation items	Normal	Peak to peak value, maximum value, minimum value, high-level, low-level, average value, effective (RMS) value, standard deviation, rise time (*), fall time (*), frequency (*), period (*), duty ratio (*), pulse count, area value, X-Y area value, time difference (*), phase difference (*), time to maximum value, time to minimum value, specified level time, specified time level, pulse width (*), four arithmetic operations, median value, amplitude, integration value, burst width (*), X-Y waveform angle, overshoot, undershoot, +width (*), -width *Statistical function available for: Beginning, average, maximum, minimum, waveform processing results
Numerical judgment	Targeted waveforms	Analog channels, logic channels, real-time waveform processing channels, waveform processing results
	Judgment settings	ON / OFF
	Stop conditions	PASS, FAIL, PASS&FAIL

Waveform processing *Not available with envelope setting, not available simultaneously with real-time saving

Maximum number of calculations	16 formulas
Calculation range	Full range / Specified segments
Maximum recording length	2,000,000 points
Standard operator	+, −, ×, ÷
Calculation items	Absolute value, exponentiation, common logarithm, moving average, derivative, integral, secondary derivative, secondary integral, square root, cube root, parallel move, PLC shift, SIN, COS, TAN, ASIN, ACOS, ATAN, ATAN2, FIR (LPF, HPF, BPF, BSF), IIR (LPF, HPF, BPF, BSF), average value (*), maximum value (*), minimum value (*), level at specified time (*) *The calculation results can be used as the constant in the equation.
Averaging function	Simple averaging, exponential averaging (arbitrary setting for rotations from 2 to 10,000 times) *Roll display not available when the averaging function is turned on. *One simple averaging equation uses three calculation spots. (The two calculations spots directly following the calculation number for simple averaging will be unavailable.)

Real-time waveform processing *Option to be specified upon order (Order code: MR6000-01)

Maximum number of calculations	16 formulas
Calculation targets	Measurement channels in 8966, 8967, 8968, U8969, 8970, 8971, 8972, 8973, U8974, MR8990 (*), U8975, U8976, U8977, U8978, U8979 *The MR8990 DVM UNIT performs calculations only for the top 16 bits of the 24-bit AD resolution.
Calculation update rate	10 M, 1 M, 100 k, 10 k, 1 k, 100, 10, 1 [S/s] *Up to 8 calculations can be set for 10 MS/s. *Some types of calculations cannot be set with certain calculation update rates.
Calculation delay	Calculation update rate: 10 MS/s | 1 MS/s | 100 kS/s | 10 kS/s or less Calculation delay: 6.2 or 6.3 us | 5 us | 20 us | Calculation update rate period Add the delay times listed below when real-time waveform processing channels are selected for calculation. Calculation update rate: 10 MS/s | 1 MS/s | 100 kS/s | 10 kS/s or less Added calculation delay: 1.6 us | 2 us | 10 us | Calculation update rate period
Calculation type	Addition, subtraction, multiplication, division, four arithmetic operations with coefficients, quartic equations, monomials, polynomial addition and subtraction, differentiation, integrals, integration, FIR (LPF / HPF / BPF / BSF), IIR (LPF / HPF / BPF / BSF), moving average, delay device

FFT calculation *Not available with envelope setting, not available simultaneously with real-time saving

Maximum number of calculations	8
Frequency range	500 mHz to 100 MHz (sampling rate x0.5), external sampling
Number of sampling points	1 k, 2 k, 5 k, 10 k, 20 k, 50 k, 100 k
Frequency resolution	1/500, 1/1000, 1/2500, 1/5000, 1/10,000, 1/25,000, 1/50,000
Anti-aliasing filter	AAF (8968, U8979), waveform processing LPF filter (FIR, IIR), real-time waveform processing LPF filter (FIR, IIR)
Calculation targets	Analog waveform, waveform processing results, real-time waveform processing results
Analyzed data	Newly loaded Data newly measured by pressing START key Memory Data measured most recently or data loaded from media
FFT analysis mode setting	Linear spectrum, RMS spectrum, power spectrum, 1CH phase spectrum, cross power spectrum, transfer function, coherence function, 2CH phase spectrum
Windows	Rectangular, Hanning, Hamming, Blackman, Blackman-Harris, Flat-top, Exponential
Display scale	Linear scale, log scale
Peak value display	OFF, local maxima, maximum value
Averaging function	Simple averaging, exponential averaging, peak hold (arbitrary setting from 2 to 10,000 times)
Calculation execution button	Execution button displayed in screen

Memory division

Max. divisions	1024 blocks
Block search	Search from the data that is saved in divided memory block.
Bulk save	Saves entire range of data in all blocks last measured

Waveform search

Search mode	Trigger	Level, window-in, window-out Logic trigger search is available when a logic channel is selected as the targeted channel. *Logic trigger search is not available with envelope setting.
	Peak	Maximum value, minimum value, local maxima, local minima
	CONCIERGE	Histogram, standard deviation *Select whether to compare each value to the reference waveform or to the directly preceding waveform. *Disabled with envelope setting
	Jump	Event mark, cursor, time (absolute time, relative time, or time specified by the number of points), trigger point, search mark
Search range	Full range	All of the data stored in the internal memory
	Specifying segments	Select either the range specified for segment 1 or the one specified for segment 2.
Number of searches	Specifiable (Up to 1000 data points)	
Continuous search	After a search is executed, if there are more search hits in the search range beyond the specified number, the waveform data following the last search point is continued for searching.	
Display method	Specify a search location to display the data.	

Other

Auto setup	Available	*When the power is turned on, the unit loads the settings data previously saved (STARTUP.SET) to start up. *The HDD/SSD, SD memory card, and USB memory are searched, in that order, for the save location.
Rotary knobs	X	In the horizontal direction, the sampling rate, compression rate, or display position can be changed and the cursor can be moved.
	Y	In the vertical direction, the measurement range, compression rate, or display position can be changed and the cursor can be moved.
Shortcut button	S1, S2	A function can be allocated.
Auto range	Available (The optimal sampling rate and measurement range for the input waveform are automatically set.) *Not available for envelope, real-time saving, or external sampling.	
Key lock	Three levels of settings are available: OFF, touch screen only, or touch screen and hard buttons.	
Beep sound	OFF / Alarm only / Alarm and operation	
Sending e-mails	Sending e-mails via SMTP	
	Sending timing	Automatic saving, saving with the SAVE button
	Sent data	Attach data specified in the main text or files specified by a type of saved data.
Initialization	Waveform data initialization, setting initialization, complete initialization	
Self-check	Memory, LCD, buttons, LAN, media, touch screen	
Language	English, Japanese	
Error and warning display	Displays the details of errors and warnings when they occur.	
Touch keyboard	Displays the on-screen keyboard.	
Region specifications	Settings for decimal point and break characters in data saved to waveform (text) files and numerical calculation result files	
	Decimal point	Period, comma
	Break	Comma, space, tab, semicolon
Time value display	Hours, sexagesimal time, date, data values	
Zero position display	ON / OFF	
Waveform screen background color	Black or white	
Restart permission	Permitted / Not permitted *Permitted: If settings are changed during the measuring process, the unit is restarted. *Not permitted: Settings cannot be changed during the measuring process.	
Display settings	Adjust brightness or set the display to turn off automatically.	
Time settings	Set the date and time.	
System protection function	ON / OFF Protects the system against unintentional power shutdowns. (However, we recommend turning off the system protection function and mounting an external UPS when using the unit continuously for long periods of time.)	
Number of current sensor connections	Up to 9 connections altogether on the PROBE POWER UNIT Z5021, CURRENT UNIT 8971, and 3ch CURRENT UNIT U8977	
Unit installation restrictions	CURRENT UNIT 8971: Up to 4 slots 3ch CURRENT UNIT U8977: Up to 3 slots	

Option Specifications (sold separately)

Dimensions/mass: approx. 106 mm (4.17 in) W x 19.8 mm (0.78 in) H x 196.5 mm (7.74 in) D, approx. 280 g (9.9 oz)
Accessories: None

HIGH SPEED ANALOG UNIT U8976	(Accuracy at 23 ±5°C/73 ±9°F, 20 to 80% RH after 30 minutes of warm-up time and zero adjustment; Accuracy guaranteed for 1 year, Post-adjustment accuracy guaranteed for 1 year)
Measurement functions	No. of channels: 2, for voltage measurement
Input terminals	Isolated BNC connector (input impedance 1 MΩ, input capacitance 22 pF) Max. rated voltage to ground:1000 V AC, DC (with input isolated from the unit, the maximum voltage that can be applied between input channel and chassis and between input channels without damage)
Measurement range	100, 200, 400 mV f.s. 1, 2, 4, 10, 20, 40, 100, 200, 400 V f.s., 12 ranges AC voltage for possible measurement/display: 280 V rms Low-pass filter: 5/500/5 k/1 MHz
Measurement resolution	1/1600 of measurement range (using 12-bit A/D conversion)
Maximum sampling rate	200 MS/s (simultaneous sampling in 2 channels)
Measurement accuracy	±0.5% f.s. (with filter 5 Hz, zero position accuracy included)
Frequency characteristics	DC to 30 MHz -3 dB (with AC coupling: 7 Hz to 30 MHz -3 dB)
Input coupling	AC/DC/GND
Maximum input voltage	400 V DC (with direct input), 1000 V DC (with 9665)

Dimensions/mass: approx. 106 mm (4.17 in) W x 19.8 mm (0.78 in) H x 196.5 mm (7.74 in) D, approx. 250 g (8.8 oz)
Accessories: None

ANALOG UNIT 8966	(Accuracy at 23 ±5°C/73 ±9°F, 20 to 80% RH after 30 minutes of warm-up time and zero adjustment; Accuracy guaranteed for 1 year, Post-adjustment accuracy guaranteed for 1 year)
Measurement functions	No. of channels: 2, for voltage measurement
Input terminals	Isolated BNC connector (input impedance 1 MΩ, input capacitance 30 pF), Max. rated voltage to ground: 300 V AC, DC (with input isolated from the unit, the maximum voltage that can be applied between input channel and chassis and between input channels without damage)
Measurement range	100, 200, 400 mV f.s. 1, 2, 4, 10, 20, 40, 100, 200, 400 V f.s., 12 ranges AC voltage for possible measurement/display: 280 V rms Low-pass filter: 5/50/500/5 k/50 k/500 kHz
Measurement resolution	1/2000 of measurement range (using 12-bit A/D conversion)
Maximum sampling rate	20 MS/s (simultaneous sampling across 2 channels)
Measurement accuracy	±0.5% f.s. (with filter 5 Hz, zero position accuracy included)
Frequency characteristics	DC to 5 MHz -3 dB (with AC coupling: 7 Hz to 5 MHz -3 dB)
Input coupling	AC/DC/GND
Maximum input voltage	400 V DC (the maximum voltage that can be applied across input pins without damage)

Dimensions/mass: approx. 106 mm (4.17 in) W x 19.8 mm (0.78 in) H x 196.5 mm (7.74 in) D, approx. 250 g (8.8 oz)
Accessories: None

4CH ANALOG UNIT U8975	(Accuracy at 23 ±5°C/73 ±9°F, 20 to 80% RH after 30 minutes of warm-up time and zero adjustment; Accuracy guaranteed for 1 year, Post-adjustment accuracy guaranteed for 1 year)
Measurement functions	No. of channels: 4, for voltage measurement
Input terminals	Isolated BNC connector (input impedance 1 MΩ, input capacitance 30 pF), Max. rated voltage to ground: 300 V AC, DC (with input isolated from the unit, the maximum voltage that can be applied between input channel and chassis and between input channels without damage)
Measurement range	4, 10, 20, 40, 100, 200 V f.s., 6 ranges AC voltage for possible measurement/display: 140 V rms Low-pass filter: 5/500/5 k/200 kHz
Measurement resolution	1/32,000 of measurement range (using 16-bit A/D conversion)
Maximum sampling rate	5 MS/s (simultaneous sampling in 4 channels)
Measurement accuracy	±0.1% f.s. (with filter 5 Hz, zero position accuracy included)
Frequency characteristics	DC to 2 MHz -3 dB
Input coupling	DC / GND
Maximum input voltage	200 V DC (the maximum voltage that can be applied across input pins without damage)

Dimensions/mass: approx. 106 mm (4.17 in) W x 19.8 mm (0.78 in) H x 196.5 mm (7.74 in) D, approx. 250 g (8.8 oz)
Accessories: None

4CH ANALOG UNIT U8978	(Accuracy at 23 ±5°C/73 ±9°F, 20 to 80% RH after 30 minutes of warm-up time and zero adjustment; Accuracy guaranteed for 1 year, Post-adjustment accuracy guaranteed for 1 year)
Measurement functions	No. of channels: 4, for voltage measurement
Input terminals	Isolated BNC connector (input impedance 1 MΩ, input capacitance 30 pF), Max. rated voltage to ground: 30 V AC or 60V DC for direct input, 300 V AC, DC (CAT II) when combined with the 9665 (Between each input channel and the main unit, and between the input channels)
Measurement range	100, 200, 400 mV f.s. 1, 2, 4, 10, 20, 40 V f.s., 9 ranges Low-pass filter: 5/500/5 k/200 kHz
Measurement resolution	1/32,000 of measurement range (using 16-bit A/D conversion)
Maximum sampling rate	5 MS/s (simultaneous sampling in 4 channels)
Measurement accuracy	±0.3% f.s. (with filter 5 Hz, zero position accuracy included)
Frequency characteristics	DC to 2 MHz -3 dB
Input coupling	DC / GND
Maximum input voltage	40 V DC (with direct input), 400 V DC (with 9665)

Dimensions/mass: approx. 106 mm (4.17 in) W x 19.8 mm (0.78 in) H x 196.5 mm (7.74 in) D, approx. 250 g (8.8 oz)
Accessories: None

HIGH RESOLUTION UNIT 8968	(Accuracy at 23 ±5°C/73 ±9°F, 20 to 80% RH after 30 minutes of warm-up time and zero adjustment; Accuracy guaranteed for 1 year, Post-adjustment accuracy guaranteed for 1 year)
Measurement functions	No. of channels: 2, for voltage measurement
Input terminals	Isolated BNC connector (input impedance 1 MΩ, input capacitance 30 pF), Max. rated voltage to ground: 300 V AC, DC (with input isolated from the unit, the maximum voltage that can be applied between input channel and chassis and between input channels without damage)
Measurement range	100, 200, 400 mV f.s. 1, 2, 4, 10, 20, 40, 100, 200, 400 V f.s., 12 ranges AC voltage for possible measurement/display: 280 V rms Low-pass filter: 5/50/500/5 k/50 kHz
Anti-aliasing filter	Integrated filter for suppressing aliasing distortion caused by FFT processing (automatic cutoff frequency setting/OFF)
Measurement resolution	1/32,000 of measurement range (using 16-bit A/D conversion)
Maximum sampling rate	1 MS/s (simultaneous sampling across 2 channels)
Measurement accuracy	±0.3% f.s. (with filter 5 Hz, zero position accuracy included)
Frequency characteristics	DC to 100 kHz -3 dB (with AC coupling: 7 Hz to 100 kHz -3 dB)
Input coupling	AC/DC/GND
Maximum input voltage	400 V DC (the maximum voltage that can be applied across input pins without damage)

Dimensions/mass: approx. 106 mm (4.17 in) W x 19.8 mm (0.78 in) H x 196.5 mm (7.74 in) D, approx. 250 g (8.8 oz)
Accessories: None

DC/RMS UNIT 8972	(Accuracy at 23 ±5°C/73 ±9°F, 20 to 80% RH after 30 minutes of warm-up time and zero adjustment; Accuracy guaranteed for 1 year, Post-adjustment accuracy guaranteed for 1 year)
Measurement functions	No. of channels: 2, for voltage measurement, DC/RMS selectable
Input terminals	Isolated BNC connector (input impedance 1 MΩ, input capacitance 30 pF), Max. rated voltage to ground: 300 V AC, DC (with input isolated from the unit, the maximum voltage that can be applied between input channel and chassis and between input channels without damage)
Measurement range	100, 200, 400 mV f.s. 1, 2, 4, 10, 20, 40, 100, 200, 400 V f.s., 12 ranges AC voltage for possible measurement/display: 280 V rms Low-pass filter: 5/50/500/5 k/100 kHz
Measurement resolution	1/2000 of measurement range (using 12-bit A/D conversion)
Maximum sampling rate	1 MS/s (simultaneous sampling across 2 channels)
Measurement accuracy	±0.5% f.s. (with filter 5 Hz, zero position accuracy included)
RMS measurement	RMS accuracy: ±1% f.s. (DC, 30 Hz to 1 kHz) ±3% f.s. (1 kHz to 100 kHz) Response time: SLOW 5 s (rise time from 0 to 90% of full scale), MID 800 ms (rise time from 0 to 90% of full scale), FAST 100 ms (rise time from 0 to 90% of full scale) Crest factor: 2
Frequency characteristics	DC to 400 kHz -3 dB (with AC coupling: 7 Hz to 400 kHz -3 dB)
Input coupling	AC/DC/GND
Maximum input voltage	400 V DC (the maximum voltage that can be applied across input pins without damage)

Dimensions/mass: approx. 106 mm (4.17 in) W x 19.8 mm (0.78 in) H x 196.5 mm (7.74 in) D, approx. 230 g (8.1 oz)
Accessories: None

HIGH-VOLTAGE UNIT U8974	(Accuracy at 23 ±5°C/73 ±9°F, 20 to 80% RH after 30 minutes of warm-up time and zero adjustment; Accuracy guaranteed for 1 year, Post-adjustment accuracy guaranteed for 1 year)
Measurement functions	No. of channels: 2, for voltage measurement, DC/RMS selectable Max. rated voltage to ground: 1000 V AC,DC for measurement category III, 600 V AC, DC for measurement category IV
Input terminals	Banana input terminal (Input impedance: 4 MΩ, Input capacitance: 5 pF)
Measurement range	4, 10, 20, 40, 100, 200, 400, 1000 V f.s. (DC mode), 8 ranges 10, 20, 40, 100, 200, 400, 1000 V f.s. (RMS mode), 7 ranges Low-pass filter: 5/50/500/5 k/50 kHz
Measurement resolution	1/32,000 of measurement range (using 16-bit A/D conversion)
Maximum sampling rate	1 MS/s
Measurement accuracy	±0.25% f.s. (with filter 5 Hz, zero position accuracy included)
RMS measurement	RMS accuracy: ±1.5% f.s. (DC, 30 Hz to 1 kHz), ±3% f.s. (1 kHz to 100 kHz) Response time: High speed 150 ms, medium speed 500 ms, low speed 2.5 s
Frequency characteristics	DC to 100 kHz -3 dB
Input coupling	DC / GND
Maximum input voltage	1000 V DC, 700 V AC

Dimensions/mass: approx. 106 mm (4.17 in) W x 19.8 mm (0.78 in) H x 196.5 mm (7.74 in) D, approx. 260 g (9.2 oz)
Accessories: None

DIGITAL VOLTMETER UNIT MR8990	(Accuracy at 23 ±5°C/73 ±9°F, 20 to 80% RH after 30 minutes of warm-up time and calibration, Accuracy guaranteed for 1 year, Post-adjustment accuracy guaranteed for 1 year)
Measurement functions	No. of channels: 2, for DC voltage measurement
Input terminals	Banana input connectors (Input resistance: 100 MΩ or higher with 100 mV f.s. to 10 V f.s. range, otherwise 10 MΩ) Max. rated voltage to ground: 300 V AC, DC (with input isolated from the unit, the maximum voltage that can be applied between input channel and chassis and between input channels without damage)
Measurement range	100, 1000 mV f.s. 10, 100, 1000 V f.s., 5 ranges
Measurement resolution	1/1,000,000 of measurement range (using 24-bit ΔΣ modulation A/D)
Integration Time	20 ms × NPLC (during 50 Hz), 16.67 ms × NPLC (during 60 Hz)
Response time	2 ms +2× integration time or less (rise - f.s. → + f.s., fall + f.s. → - f.s.)
Basic measurement accuracy	±0.01% rdg. ±0.0025% f.s. (at range of 1000 mV f.s.)
Maximum input voltage	500 V DC (the maximum voltage that can be applied across input pins without damage)

Dimensions/mass: approx. 106 mm (4.17 in) W x 19.8 mm (0.78 in) H x 196.5 mm (7.74 in) D, approx. 245 g (8.6 oz)
Accessories: CONVERSION CABLE L9769 x 2 (cable length 60 cm (1.97 ft))

STRAIN UNIT U8969	(Accuracy at 23 ±5°C/73 ±9°F, 80% RH or less after 30 minutes of warm-up time and auto-balance; Accuracy guaranteed for 1 year, Post-adjustment accuracy guaranteed for 1 year)
Measurement functions	No. of channels: 2, for distortion measurement (electronic auto-balancing, balance adjustment range within ±10,000 με or less)
Input terminals	NDIS connector EPRC07-R9FNDIS (via CONVERSION CABLE L9769, NDIS connector PRC03-12A10-7M10.5) Max. rated voltage to ground: 30 V AC rms or 60 V DC (with input isolated from the main unit, the maximum voltage that can be applied between input channel and chassis, and between input channels without damage)
Suitable transducer	Strain gauge converter, Bridge impedance: 120 Ω to 1 kΩ, Bridge voltage: 2 V ±0.05 V, Gauge rate: 2.0
Measurement range	400, 1000, 2000, 4000, 10,000, 20,000 με f.s., 6 ranges Low-pass filter: 5/10/100/1 kHz
Measurement resolution	1/25,000 of measurement range (using 16-bit A/D conversion)
Maximum sampling rate	200 kS/s (simultaneous sampling across 2 channels)
Measurement accuracy After auto-balancing	±0.5% f.s. ±4 με (5 Hz filter ON)
Frequency characteristics	DC to 20 kHz +1/-3 dB

Dimensions/mass: approx. 106 mm (4.17 in) W x 19.8 mm (0.78 in) H x 196.5 mm (7.74 in) D, approx. 230 g (8.1 oz)
Accessories: None

CHARGE UNIT U8979	(Accuracy at 23 ±5°C/73 ±9°F, 20 to 80% RH after 30 minutes of warm-up time and zero adjustment; Accuracy guaranteed for 1 year, Post-adjustment accuracy guaranteed for 1 year)
Measurement functions	No. of channels: 2, for acceleration measurement
Input terminals	Voltage input / pre-amp embedded input: Metal BNC connector (Under voltage input: input impedance 1 MΩ, input capacitance 200 pF or less) Charge input: Miniature connector (#10-32UNF) Max. rated voltage to ground: 30 V AC or 60 V DC (with input isolated from the main unit, the maximum voltage that can be applied between input channel and chassis, and between input channels without damage) *Voltage input terminal GND and charge input terminal GND for the same channel are shared.
Suitable transducer	Charge output type acceleration detector Pre-amp embedded acceleration detector
Measurement range Charge input (Miniature connector) Pre-amp embedded input (BNC connector)	1 (m/s^2) to 200 k (m/s^2) f.s., 12 ranges x 6 types Charge input sensitivity: 0.1 to 10 pC /(m/s^2) Pre-amp embedded sensor input sensitivity: 0.1 to 10 mV /(m/s^2) Amplitude accuracy: ±2% f.s. Frequency characteristics: 1(1.5) to 50 kHz -3 dB (charge input) Low-pass filter: 500/5 kHz Pre-amp supply power: 3.5 mA ±20%. 22 V ±5% Maximum input charge: ±500 pC (6 ranges on high sensitivity side), 50.000 pC (6 ranges on low sensitivity side)
Measurement range Voltage input (BNC connector)	10 mV to 40 V f.s., 12 ranges, DC amplitude accuracy: ±0.5% f.s. Frequency characteristics: DC to 50 kHz -3 dB (with DC coupling), 1 Hz to 50 kHz -3 dB (with AC coupling) Low-pass filter: 5/500/5 kHz, input coupling: AC/DC/GND Maximum input voltage: 40 V DC
Measurement resolution	1/25,000 of measurement range (using 16-bit A/D conversion)
Maximum sampling rate	200 kS/s
Anti-aliasing filter	Integrated filter for suppressing aliasing distortion caused by FFT processing (automatic cutoff frequency setting/OFF)
TEDS	IEEE 1451.1.4 class 1 support (Support for sensor information reading and automatic sensitivity setting)

Dimensions/mass: approx. 106 mm (4.17 in) W x 19.8 mm (0.78 in) H x 196.5 mm (7.74 in) D, approx. 250 g (8.8 oz)
Accessories: CONVERSION CABLE 9318 × 2 (To connect the current sensor to the 8971)

CURRENT UNIT 8971	(Accuracy at 23 ±5°C/73 ±9°F, 20 to 80% RH after 30 minutes of warm-up time and zero adjustment; Accuracy guaranteed for 1 year, Post-adjustment accuracy guaranteed for 1 year)
Measurement functions	No. of channels: 2, Current measurement with optional current sensor
Input terminals	Sensor connector (input impedance 1 MΩ, exclusive connector for current sensor via conversion cable the 9318, common GND with recorder)
Compatible current sensors	CT6862, CT6863, 9709, CT6865, CT6841, CT6843, CT6844, CT6845, CT6846, 9272-10 (To connect to the 8971 via the CONVERSION CABLE 9318)
Measurement range	Using 9272-10 (20 A), CT6841: 2 A to 100 A f.s., 6 ranges Using CT6862: 4 A to 200 A f.s., 6 ranges Using 9272-10 (200 A), CT6843, CT6863: 20 A to 1000 A f.s., 6 ranges Using CT6844, CT6845, 9709, CT6846*1, CT6865*1: 40 A to 2000 A f.s., 6 ranges *1: The conversion ratio needs to be set to 2 for scaling.
Measurement accuracy (with 5 Hz filter ON) Note: Add the accuracy and attributes of the current sensor being used.	±0.65% f.s. RMS accuracy: ±1% f.s. (DC, 30 Hz to 1 kHz), ±3% f.s. (1 kHz to 10 kHz) RMS response time: 100 ms (rise time from 0 to 90% of full scale) Crest factor: 2 Frequency characteristics: DC to 100 kHz ±3 dB (with AC coupling: 7 Hz to 100 kHz)
Measurement resolution	1/2000 of measurement range (using 12-bit A/D conversion)
Maximum sampling rate	1 MS/s (simultaneous sampling across 2 channels)
Other functions	Input coupling: AC/DC/GND, Low-pass filter: 5/50/500/5 k/50 kHz

Dimensions/mass: approx. 106 mm (4.17 in) W x 19.8 mm (0.78 in) H x 196.5 mm (7.74 in) D, approx. 190 g (6.7 oz)
Accessories: None

LOGIC UNIT 8973	
Measurement functions	No. of channels: 16 channels (4 ch/1 probe connector × 4 connectors)
Input terminals	Mini DIN connector (for HIOKI logic probes only), Compatible logic probes: 9320-01, 9327, MR9321-01

Dimensions/mass: approx. 106 mm (4.17 in) W x 19.8 mm (0.78 in) H x 196.5 mm (7.74 in) D, approx. 250 g (8.8 oz)
Accessories: None

3CH CURRENT UNIT U8977	(Accuracy at 23 ±5°C/73 ±9°F, 20 to 80% RH after 30 minutes of warm-up time and zero adjustment; Accuracy guaranteed for 1 year, Post-adjustment accuracy guaranteed for 1 year)
Measurement functions	No. of channels: 3, Current measurement with optional current sensor
Input terminals	Dedicated connector terminal (ME15W) (input impedance 1 MΩ, common GND with recorder)
Compatible current sensors	9272-05, CT6841-05, CT6843-05, CT6844-05, CT6845-05, CT6846-05, CT6862-05, CT6863-05, 9709-05, CT6904, CT6865-05, CT6875,CT6876 (Direct connection) CT7631, CT7636, CT7642, CT7731, CT7736, CT7742, CT7044, CT7045, CT7046 (Connection using optional CONVERSION CABLE CT9920)
Measurement range	- Directly connected current sensor: Automatically identify rating of compatible current sensors Using 9272-05 (20 A), CT6841-05: 2 A to 100 A f.s., 6 ranges Using CT6862-05: 4 A to 200 A f.s., 6 ranges Using 9272-05 (200 A), CT6843-05, CT6863-05: 20 A to 1000 A f.s., 6 ranges Using CT6844-05, CT6845-05, 9709-05, CT6904, CT6875: 40 A to 2000 A f.s., 6 ranges Using CT6846-05, CT6865-05, CT6876: 80 A to 4000 A f.s., 6 ranges - Current sensors connected using CT9920: Select conversion rate or model Using CT7631, CT7731: 200 A, 1 range Using CT7636, CT7736: 200 A to 1000 A, 3 ranges Using CT7642, CT7742: 2000 A/4000 A, 2 ranges Using CT7044, CT7045, CT7046: 2000 A to 10,000 A, 3 ranges
Measurement accuracy (with 5 Hz filter ON) Note: Add the accuracy and attributes of the current sensor being used.	±0.3% f.s. Frequency characteristics: DC to 2 MHz ±3 dB
Measurement resolution	1/32,000 of measurement range (using 16-bit A/D conversion)
Maximum sampling rate	5 MS/s (simultaneous sampling in 3 channels)
Other functions	Input coupling: DC/GND, Low-pass filter: 5/500/5 k/200 kHz

Dimensions/mass: approx. 106 mm (4.17 in) W x 19.8 mm (0.78 in) H x 204.5 mm (8.05 in) D, approx. 240 g (8.5 oz)
Accessories: Ferrite clamp x 2

TEMP UNIT 8967	(Accuracy at 23 ±5°C/73 ±9°F, 20 to 80% RH after 30 minutes of warm-up time and zero adjustment; Accuracy guaranteed for 1 year, Post-adjustment accuracy guaranteed for 1 year)
Measurement functions	No. of channels: 2, for temperature measurement with thermocouple (voltage measurement not available)
Input terminals	Thermocouple input: Push-button terminal block, Recommended wire diameter: single-wire 0.14 to 1.5 mm^2, braided wire 0.14 to 1.0 mm^2 (conductor wire diameter ϕ0.18 mm (0.01 in) or more), AWG 26 to 16 Input impedance: min. 5 MΩ (with line fault detection ON/OFF) Max. rated voltage to ground: 300 V AC, DC (with input isolated from the unit, the maximum voltage that can be applied between input channel and chassis and between input channels without damage)
Temperature measurement range Note: Upper and lower limit values depend on the thermocouple	200°C (392°F) f.s. (-100°C to 200°C (-148°F to 392°F)), 1000°C (1832°F) f.s. (-200°C to 1000°C (-328°F to 1832°F)), 2000°C (3632°F) f.s. (-200°C to 2000°C (-328°F to 3632°F)), 3 ranges Measurement resolution: 1/20,000 of measurement range (using 16-bit A/D conversion)
Thermocouple range (JIS C 1602-1995) (ASTM E-988-96)	K: -200°C to 1350°C (-328°F to 2462°F), J: -200°C to 1100°C (-328°F to 2012°F), E: -200°C to 800°C (-328°F to 1472°F), T: -200°C to 400°C (-328°F to 752°F), N: -200°C to 1300°C (-328°F to 2372°F), R: 0°C to 1700°C (32°F to 3092°F), S: 0°C to 1700°C (32°F to 3092°F), B: 400°C to 1800°C (752°F to 3272°F), W (WRe5-26): 0 to 2000°C (32°F to 3632°F) Reference junction compensation: internal/ external (switchable), line fault detection ON/OFF possible
Data refresh rate	3 methods, Fast:1.2 ms (digital filter OFF), Normal:100 ms (digital filter 50/60 Hz), Slow: 500 ms (digital filter 10 Hz)
Measurement accuracy	Thermocouple K, J, E, T, N: ±0.1% f.s. ±1°C (±1.8°F), (±0.1% f.s. ±2°C (±3.6°F) at -200°C to 0°C (-328°F to 32°F)) Thermocouple R, S, B, W: ±0.1% f.s. ±3.5°C (±6.3°F)(at 0°C (32°F) to less than 400°C (752°F); However, no accuracy guarantee at less than 400°C (752°F) for B), ±0.1% f.s. ±3°C (±5.4°F) (at 400°C or more) Reference junction compensation [RJC] accuracy: ±1.5°C (±2.7°F) (added to measurement accuracy with internal reference junction compensation)

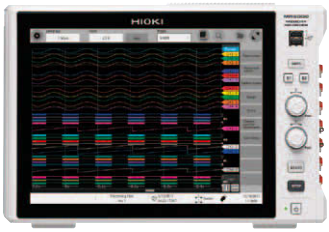
Dimensions/mass: approx. 106 mm (4.17 in) W x 19.8 mm (0.78 in) H x 196.5 mm (7.74 in) D, approx. 250 g (8.8 oz)
Accessories: None

FREQ UNIT 8970	(Accuracy at 23 ±5°C/73 ±9°F, 20 to 80 % RH after 30 minutes of warm-up time; Accuracy guaranteed for 1 year, Post-adjustment accuracy guaranteed for 1 year)
Measurement functions	No. of channels: 2, for voltage input based frequency measurement, rotation, power frequency, integration, pulse duty ratio, pulse width
Input terminals	Isolated BNC connector (input impedance 1 MΩ, input capacitance 30 pF), Max. rated voltage to ground: 300 V AC, DC (with input isolated from the unit, the maximum voltage that can be applied between input channel and chassis and between input channels without damage)
Frequency mode	Measurement range: Between DC to 100 kHz (minimum pulse width 2 μs), 20 Hz to 100 kHz f.s., 8 ranges Accuracy: ±0.1% f.s. (exclude 100 kHz range), ±0.7% f.s. (100 kHz range)
Rotation mode	Measurement range: Between 0 to 2 million rotations/minute (minimum pulse width 2 μs), 2 kr/min to 2 Mr/min f.s, 7 ranges Accuracy: ±0.1% f.s. (exclude 2 Mr/min range), ±0.7% f.s. (2 Mr/min range)
Power frequency mode	Measurement range: 50 Hz (40 to 60 Hz), 60 Hz (50 to 70 Hz), 400 Hz (390 to 410 Hz), 3 ranges Accuracy: ±0.03 Hz (50, 60 Hz), ±0.1 Hz (400 Hz range)
Integration mode	Measurement range: 40 k-counts f.s. to 20 M-counts f.s. 6 ranges Accuracy: ±0.0025% f.s.
Duty ratio mode	Measurement range: Between 10 Hz to 100 kHz (minimum pulse width 2 μs), 100% f.s. Accuracy: ±1% (10 to 10 kHz), ±4% (10 k to 100 kHz)
Pulse width mode	Measurement range: Between 2 μs to 2 s, 10 ms to 2 s f.s. Accuracy: ±0.1% f.s.
Measurement resolution	0.0025% f.s. (Integration mode), 0.01% f.s. (exclude integration, power frequency mode),0.01 Hz (power frequency mode)
Input voltage range and threshold level	±10 V to ±400 V, 6 ranges, selectable threshold level at each range
Other functions	Slope, Level, Hold, Smoothing, Low-pass filter, Switchable DC/AC input coupling, Frequency dividing, Integration over-range keep/return

System Chart of Options

Model: MEMORY HiCORDER MR6000

Model No. (Order code)	(Specifications)
MR6000	(Main unit only, install up to 8 optional input modules)
MR6000-01	(Real-time waveform processing and other functions included)



Note: The main unit cannot operate alone.
You must install one or more optional input modules in the unit.
The Z5021, U8332, and U8333 are factory built-in options and cannot be installed by the user.

Factory-installed option A *Must specify when ordering

*Power can be supplied to up to 9 current sensors, including the current sensors connected to the CURRENT UNIT U8977 and CURRENT UNIT 8971.

PROBE POWER UNIT Z5021
Specified upon order, DC ±12 V, supply for up to 8 probes

Factory-installed option B *Must specify when ordering

SSD UNIT U8332
Specified upon order; built-in type, 256 GB

Factory-installed option C *Must specify when ordering

HD UNIT U8333
Specified upon order; built-in type, 320 GB

Storage media

*Use only the storage media sold by HIOKI. Compatibility and performance are not guaranteed for storage media made by other manufacturers. You may be unable to read from or save data to such media.

SD MEMORY CARD Z4001
2 GB

SD MEMORY CARD Z4003
8 GB

USB DRIVE Z4006
16 GB
Using highly durable and reliable SLC flash memory

Case

CARRYING CASE C1010
For the MR6000, hard trunk type, for storing options

Input modules

*Input cords not included. Please purchase separately. *When using 9709 with CURRENT UNIT 8971, a total of 7 current probes can be used.

HIGH SPEED ANALOG UNIT U8976
2 ch, voltage input, 200 MS/s, (DC to 30 MHz)

ANALOG UNIT 8966
2 ch, voltage input, 20 MS/s, (DC to 5 MHz)

4CH ANALOG UNIT U8975
4 ch, voltage input, 5 MS/s, (DC to 2 MHz),
Input voltage limit: 200 V DC

4CH ANALOG UNIT U8978
4 ch, voltage input, 5 MS/s, (DC to 2 MHz),
highest sensitivity range 100 mV f.s.

HIGH RESOLUTION UNIT 8968
2 ch, voltage input, 1 MS/s (DC to 100 kHz)

DC/RMS UNIT 8972
2 ch, voltage/1 MS/s, (DC to 400 kHz)
RMS rectifier (DC, 30 to 100 kHz)

HIGH-VOLTAGE UNIT U8974
2 ch, voltage input, max. 1000 V DC and 700 V AC

DIGITAL VOLTMETER UNIT MR8990
2 ch, high-precision DC voltage, 0.1 µV resolution, maximum sampling rate 500 times/s

3CH CURRENT UNIT U8977
3 ch, for measuring current using dedicated current sensors, can be directly connected to ME15W (12-pin) connector-type sensors, for use with up to 3 units

CURRENT UNIT 8971
2 ch, for measuring current using dedicated current sensors, 2 CONVERSION CABLES 9318 included, for use with up to 4 units

TEMP UNIT 8967
2 ch, thermocouple temperature input

STRAIN UNIT U8969
2 ch, strain gauge type converter amp

CONVERSION CABLE L9769
(for STRAIN UNIT U8969 only, included)

FREQ UNIT 8970
2 ch, for measurement of frequency, RPM, pulse, etc.

CHARGE UNIT U8979
2 ch, for acceleration measurement, supports charge output, pre-amp output, and voltage output

LOGIC UNIT 8973
4 terminals, 16 ch, installable in all 8 slots

Logic signal measurement

LOGIC PROBE 9327
4-channel type, for voltage/contact signal ON/OFF detection (response pulse width 100 ns or more, miniature terminal type)

LOGIC PROBE MR9321-01
4 isolated channels, ON/OFF detection of AC/DC voltage (miniature terminal type)

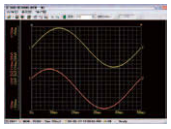
LOGIC PROBE 9320-01
4-channel type, for voltage/contact signal ON/OFF detection (response pulse width 500 ns or more, miniature terminal type)

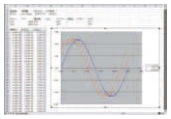
External sampling measurement

CONNECTION CABLE L9795-01
Max. rated voltage to ground:
33 V AC rms or 70 V DC,
SMB terminal to alligator clip, 1.5 m (4.92 ft)

CONNECTION CABLE L9795-02
Max. rated voltage to ground:
33 V AC rms or 70 V DC,
SMB terminal to BNC terminal, 1.5 m (4.92 ft)

PC Software

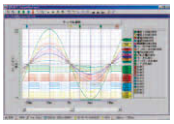




Waveform Viewer Wv
Software for checking waveforms with binary data on a PC, saving data in CSV format, and transferring to spreadsheet programs

- Operating environment: Windows 10/8/7 (32-bit/64-bit)
- Simple display of waveform files
- Convert binary data files to text format, CSV, etc.
- Scroll function, enlarge/reduce display, jump to cursor/trigger position, etc.

..... Standard accessory



WAVE PROCESSOR 9335
PC display for massive amounts of waveform data and more

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

FAMOS
Over 400 types of calculation processing functions, easy report function
Sold by: TOYO Corporation

FlexPro
Quickly search and process massive amounts of data, share analysis templates
Sold by: Weisang GmbH

NI DIAdem
Software that performs data searching and loading to analysis and report creation, in an interactive format
Sold by: Kyowa Electronic Instruments Co., Ltd.

For details, see product information on Hioki's website.

INPUT CORD (A)
*Voltage is limited to the specifications of the input modules in use.

CONNECTION CORD L9790
Flexible ϕ 4.1 mm (0.16 in) thin dia. cable allowing for up to 600 V input, 1.8 m (5.91 ft) length
*The end clip is sold separately.

ALLIGATOR CLIP L9790-01
Red/black set attaches to the ends of the cables L9790

GRABBER CLIP 9790-02
*When this clip is attached to the end of the L9790, input is limited to CAT II 300 V. Red/black set.

CONTACT PIN 9790-03
Red/black set attaches to the ends of the cables L9790

INPUT CORD (B)
*Voltage is limited to the specifications of the input modules in use.

CONNECTION CORD L9198
ϕ 5.0 mm (0.20 in) dia., cable allowing for up to 300 V input, 1.7 m (5.58 ft) length, small alligator clip

CONNECTION CORD L9197
ϕ 5.0 mm (0.20 in) dia., cable allowing for up to 600 V input, 1.8 m (5.91 ft) length, detachable large alligator clips are bundled

GRABBER CLIP 9243
Attaches to the tip of the L9197, red/black set, full length: 196 mm (7.72 in)

INPUT CORD (C)
*Voltage is limited to the specifications of the input modules in use.

10:1 PROBE 9665
Max. rated voltage to ground is same as for input module, max. input voltage 1 kV rms (up to 500 kHz), 1.5 m (4.92 ft) length

100:1 PROBE 9666
Max. rated voltage to ground is same as for input module, max. input voltage 5 kV peak (up to 1 MHz), 1.5 m (4.92 ft) length

INPUT CORD (D)
*Voltage to ground is within this product's specifications.
*Separate power source is also required.

DIFFERENTIAL PROBE P9000-01
(Wave Only) For Memory HiCorder, 1 kV AC, DC, Frequency band: 100 kHz

DIFFERENTIAL PROBE P9000-02
(Switch between Wave/RMS) For Memory HiCorder, 1 kV AC, DC, Frequency band: 100 kHz

AC ADAPTER Z1008
100 to 240 V AC

INPUT CORD (E)
*Voltage to ground is within this product's specifications.
*Separate power source is also required.

DIFFERENTIAL PROBE 9322
1 kV AC, 2 kV DC, Frequency band: 10 MHz

AC ADAPTER 9418-15
100 to 240 V AC

INPUT CORD (F)
*Voltage input via banana terminals limited by the voltage specifications of the respective input unit.

CONNECTION CABLE L4940
Banana plug - banana plug, Cord length: 1.5 m (4.92 ft)

EXTENSION CABLE L4931
Extend the length of banana plug cables, Cable length: 1.5 m (4.92 ft)

ALLIGATOR CLIP L4935
Attach to the tip of banana plug cables, CAT IV 600 V, CAT III 1000 V

BUS BAR CLIP L4936
Attach to the tip of banana plug cables, CAT III 600 V

MAGNETIC ADAPTER L4937
Attach to the tip of banana plug cables, CAT III 1000 V

GRABBER CLIP 9243
Attach to the tip of banana plug cables, red/black set, full length: 196 mm (7.72 in), CAT III 1000 V

INPUT CORD (G)
*For the MR8990 *Voltage is limited to the specifications of the input modules in use.

TEST LEAD L2200
Cable length: 70 cm (2.30 ft), tips interchangeable with a pin test lead or alligator clip, maximum input voltage: CAT IV 600 V, CAT III 1000 V

High-precision current measurement
*ME15W (12-pin) terminal type
*Directly connect to U8977

High-precision pull-through current sensors, observe waveforms from DC to distorted AC
AC/DC CURRENT SENSOR CT6862-05, 1 MHz, 50 A
AC/DC CURRENT SENSOR CT6863-05, 500 kHz, 200 A

Observe waveforms from DC to distorted AC
AC/DC CURRENT PROBE CT6841-05, 1 MHz, 20 A
AC/DC CURRENT PROBE CT6843-05, 500 kHz, 200 A

Observe AC waveforms (cannot observe DC)
CLAMP ON SENSOR 9272-05, 100 kHz, 200 A

High-precision pull-through current sensors, observe waveforms from DC to distorted AC
AC/DC CURRENT SENSOR CT6875, 2 MHz, 500 A
AC/DC CURRENT SENSOR CT6876, 1.5 MHz, 1000 A

Observe waveforms from DC to distorted AC
AC/DC CURRENT PROBE CT6844-05, 200 kHz, 500 A
AC/DC CURRENT PROBE CT6845-05, 100 kHz, 500 A

AC/DC CURRENT PROBE CT6846-05, 20 kHz, 1000 A

Precautions when connecting the CURRENT UNIT 8971 with a high-precision current sensor
- High-precision current sensor (ME15W) + CT9901 + 9318 → CURRENT UNIT 8971
- High-precision current sensor (ME15W) + CT955x + BNC cable → except CURRENT UNIT 8971
- High-precision current sensor (PL23) + 9318 → CURRENT UNIT 8971
- High-precision current sensor (PL23) + CT9900 + CT955x + BNC cable → except CURRENT UNIT 8971

*The 9318 is bundled with the CURRENT UNIT 8971.

*Combine the high-precision current sensor and the power supply (CT9555) to perform current measurements with a voltage input unit.
*Only sensors with ME15W (12-pin) terminals (-05 type) can be connected to the CT9555.
*The separately available CONVERSION CABLE CT9900 is required in order to use a sensor with a PL23 (10-pin) terminal.

POWER SUPPLY for Sensors
SENSOR UNIT CT9555
1 ch, with waveform output
CONNECTION CORD L9217
Both cord ends are isolated BNC, 1.6 m (5.25 ft)

PL23 (10-pin) - ME15W (12-pin) conversion
CONVERSION CABLE CT9900
Convert PL23 (10-pin) terminal to ME15W (12-pin) terminal

*The separately available CONVERSION CABLE CT9901 is required in order to use a high-precision current sensor equipped with a ME15W (12-pin) terminal (-05 type) with the CURRENT UNIT 8971.
*While the CT955x is not required in order to use a sensor equipped with a PL23 (10-pin) terminal with the 8971, the CONVERSION CABLE 9318 (which comes with the 8971) is required for that setup.

ME15W (12-pin) - PL23 (10-pin) conversion
CONVERSION CABLE CT9901
Convert ME15W (12-pin) terminal to PL23 (10-pin) terminal

Other current sensor types
The MEMORY HiCORDER can be used with various types of current sensors and probes.

U8977 only

General-purpose current measurement
*PL14 terminal type

AC/DC AUTO ZERO CURRENT SENSOR CT7731
DC, 1 Hz to 5 kHz, 100 A

AC/DC AUTO ZERO CURRENT SENSOR CT7736
DC, 1 Hz to 5 kHz, 600 A

AC/DC AUTO ZERO CURRENT SENSOR CT7742
DC, 1 Hz to 5 kHz, 2000 A

AC/DC CURRENT SENSOR CT7631
DC, 1 Hz to 10 kHz, 100 A

AC/DC CURRENT SENSOR CT7636
DC, 1 Hz to 10 kHz, 600 A

AC/DC CURRENT SENSOR CT7642
DC, 1 Hz to 10 kHz, 2000 A

AC FLEXIBLE CURRENT SENSOR CT7044
ϕ100 mm (3.94 in), 6000 A

AC FLEXIBLE CURRENT SENSOR CT7045
ϕ180 mm (7.09 in), 6000 A

AC FLEXIBLE CURRENT SENSOR CT7046
ϕ254 mm (10.00 in), 6000 A

*The separately available CONVERSION CABLE CT9920 is required in order to connect a PL14 terminal general-purpose current sensor to the CURRENT UNIT U8977.

PL14 - ME15W (12-pin) conversion
CONVERSION CABLE CT9920
Convert PL14 terminal to ME15W (12-pin) terminal

10 mA class to 500 A (High speed)

CURRENT PROBE CT6700
Frequency characteristics: DC to 50 MHz wideband response, 1 mA-class up to 5 A rms

CURRENT PROBE CT6701
Frequency characteristics: DC to 120 MHz wideband response, 1 mA-class up to 5 A rms

CLAMP ON PROBE 3273-50
Frequency characteristics: DC to 50 MHz wideband response, 10 mA-class up to 30 A rms

CLAMP ON PROBE 3276
Frequency characteristics: DC to 100 MHz wideband response, 10 mA-class up to 30 A rms

CLAMP ON PROBE 3274
Frequency characteristics: DC to 10 MHz wideband response, up to 150 A rms

CLAMP ON PROBE 3275
Frequency characteristics: DC to 2 MHz wideband response, up to 500 A rms

Custom cable
For P9000. Inquire with your local Hioki distributor.
(1) Bus powered USB cable
(2) USB(A)- Micro B cable
(3) 3-prong cable

Leak Current
*For commercial power lines, 50/60 Hz

CLAMP ON LEAK HiTESTER 3283
10 mA range / 10 µA resolution to 200 A range, with monitor / analog output 1 V f.s.

OUTPUT CORD L9095
Connect to BNC terminal, 1.5 m (4.92 ft) length

AC ADAPTER 9445-02
100 to 240 V AC, 9 V/ 1 A

Non-contact voltage measuring

NON-CONTACT AC VOLTAGE PROBE SP3000-01
5 V rms rated, 10 Hz to 100 kHz band width

NON-CONTACT AC VOLTAGE PROBE SP3000
Sold individually

AC VOLTAGE PROBE SP9001
Sold individually

Other options for input

CONNECTION CORD L9217
Cord has insulated BNC connectors at both ends, signal output use, 1.6 m (5.25 ft) length

CONVERSION ADAPTER 9199
Receiving side banana terminal, output BNC terminal

Temperature sensor

THERMOCOUPLE
*For reference only. Please purchase locally.

Precautions for connecting current sensors and current probes

*Depending on the combination of current sensors and current probes, physical and space limitations may prevent simultaneous connection. Hioki can assist with special order conversion cables - please inquire with your local distributor.

*A total of 9 current sensors and current probes can be connected simultaneously to the Memory HiCorder. (Total with the CURRENT UNIT U8977, CURRENT UNIT 8971, and PROBE POWER UNIT Z5021 connected)

*Three U8977 current units and four 8971 current units can be simultaneously connected to the Memory HiCorder.

*If combining a current sensor or current probe with a sensor power source and using the voltage input analog unit for current measurement, there is no limitation on the number of connections.

*Only the U8977 can use the CT9920 to convert a PL14 connector sensor. The 8971 does not support this combination.

R&D Tests and Critical Analyses
Meeting the High Demands of a Broad Range of Industries

Example configurations

High-speed 200 MS/s measurement of inverter waveforms

Perform high-speed isolated recording across 16 channels at 200 MS/s by installing 8 units of U8976.

MEMORY HiCORDER	MR6000	1 unit
HIGH SPEED ANALOG UNIT	U8976	8
10:1 PROBE	9665	16

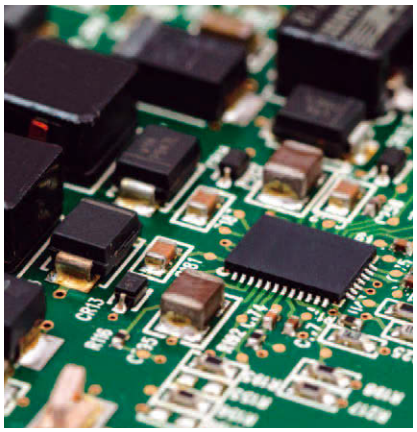
Multi-channel measurement for ECU development

Perform multi-channel recording across 32 channels at 5 MS/s by installing 8 units of U8975.

MEMORY HiCORDER	MR6000	1 unit
4ch ANALOG UNIT	U8975	8
CONNECTION CORD	L9790	32
ALLIGATOR CLIP	L9790-01	32

Perform mixed multi-channel measurements across 16 analog and 64 logic channels by installing 4 units of U8975 and 4 units of 8973.

MEMORY HiCORDER	MR6000	1 unit
4ch ANALOG UNIT	U8975	4
CONNECTION CORD	L9790	16
ALLIGATOR CLIP	L9790-01	16
LOGIC UNIT	8973	4
LOGIC PROBE	9327	16



Remove harmonic noise

The MR6000-01 comes with a digital filter calculation function that removes specific frequency noise from measurement data.

MEMORY HiCORDER	MR6000-01	1 unit
ANALOG UNIT	8966	8
CONNECTION CORD	L9790	16
ALLIGATOR CLIP	L9790-01	16

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All information correct as of Feb. 21, 2019. All specifications are subject to change without notice. MR6000E3-92E Printed in Japan