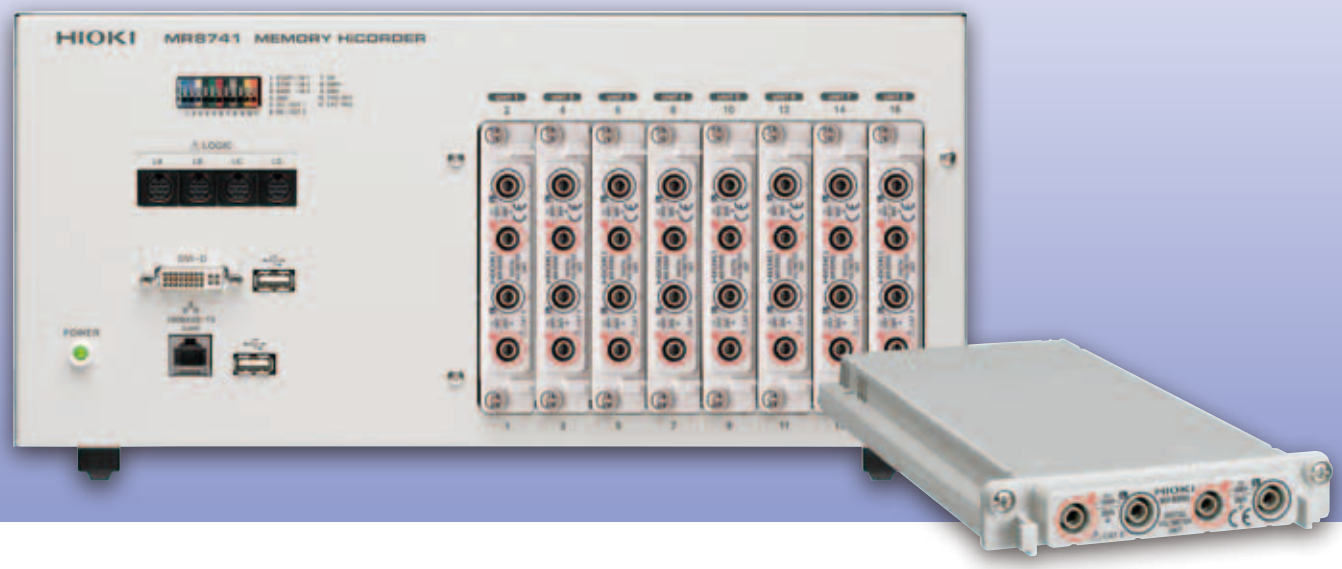
HIOKI

instrumentos de medida

Digital Multi-Module (DMM) Station
MR8990+MR8741/MR8740

Measuret from 16 digital multimeters in a single device

16ch isolated, full simultaneous sampling



Multi-channel measurements, no scanner required

Simultaneous sampling across all channels
High-speed/high-precision measurement without a scanner

Uniform data management

The MR8741/MR8740 can save data from 16 digital multimeters at once
Useful as a powerful high-speed/high-precision data logger

Observe changes using waveforms and area judgment

Monitor voltage waveforms and set thresholds for pass/fail evaluations

High-resolution 6 1/2-digit display

Max resolution of 0.1 µV, covering micro-voltage changes in sensors and other devices

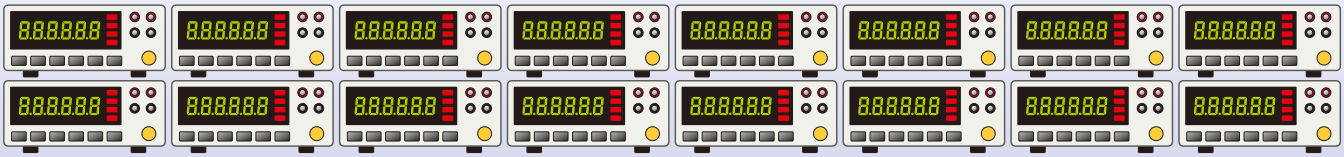
Extended applications

Eight interchangeable modules available
Simultaneously record temperature, distortion, logic, etc.

Save space and power

Modular design uses smaller overall footprint and wiring is simple - all you need is one power cord and one LAN cable for PC control. Maximum power consumption is 120 VA, even at 16ch.

CE



Measure from 16 digital multimeters in a single device

Dimensions/weight (with 8 modules installed)
Approx. 350W×160H×320D mm (13.78W×6.30H×12.60in),
7.8 kg (275.1 oz)

DIGITAL VOLTAGE METER

DVM UNIT MR8990: the heart of the system

±0.01% precision and 0.1 µV resolution

New module for DMM STATION MR8741/8740

The DVM UNIT MR8990 is a 2-channel V DC measurement module for the MR8741/8740. It can measure minute fluctuations in output from sensors in automobiles and other equipment, as well as voltage fluctuations in devices such as batteries, at high levels of precision and resolution.

DVM UNIT MR8990

● High precision: ±0.01% rdg. ±0.0025% f.s.

High precision measurement is delivered even at 500 samples/sec

● High resolution: 6 ½-digit display (0.1 µV resolution), 24-bit

Even minute fluctuations in the output voltage of sensors and other equipment can be measured. Max 1200000 counts

● Max. allowable input: DC 500 V

All input channels are individually isolated

● High input resistance

100 mV range to 10 V range: **More than 100 MΩ**
100 V range to 1000 V range: **10 MΩ±5%**

* Specifications (Product quality and accuracy guaranteed for one year)

● Measurement range

Measurement range:	Effective input range(*)	Input resistance
100 mV (5 mV/div)	-120.0000 mV to 120.0000 mV	More than 100 MΩ
1000 mV (50 mV/div)	-1200.000 mV to 1200.000 mV	
10 V (500 mV/div)	-12.00000 V to 12.00000 V	
100 V (5 V/div)	-120.0000 V to 120.0000 V	10 MΩ ±5%
1000 V (50 V/div)	-500.000 V to 500.000 V	

(*) Guaranteed measurement accuracy range

● Measurement accuracy

Measurement range:	NPLC: Less than 1	NPLC: More than 1
100 mV (5 mV/div)	±0.01% rdg. ±0.015 %f.s.	±0.01% rdg. ±0.01% f.s.
1000 mV (50 mV/div)	±0.01% rdg. ±0.0025% f.s.	
10 V (500 mV/div)		
100 V (5 V/div)	±0.025% rdg. ±0.0025% f.s.	
1000 V (50 V/div)		

(f.s. = measurement range)

● Integration time

Power supply frequency	Integration time
50 Hz	20 ms × NPLC
60 Hz	16.67 ms × NPLC

NPLC:
Can be set to 0.1 to 0.9 (step 0.1) /
1 to 9 (step 1) /10 to 100 (step 10)

The number of power line cycles (NPLC), which indicates the number of cycles in the power supply's period (50 Hz or 60 Hz), determines the integration time. Larger NPLC values result in more effective rejection of noise caused by the power supply at the expense of lower sampling speeds.

- Temperature characteristics: ±(0.002% rdg. ±0.00025% f.s.)/°C
- A/D conversion measurement method : ΔΣ modulation method 24-bit
- Measurement functions : VDC
- Number of channels : 2ch
- Maximum sampling rate : 2 ms (500 samples/sec)
- Max. allowable input : 500 V DC
- Max. rated voltage to earth : 300 V AC/DC

Options for MR8990

TEST LEAD L2200

One set (Red × 1, Black × 1) , 70 cm (2.30 ft) length
Unit jack: Banana terminal
Pin leads and alligator clips
Replaceable clips
Max. allowable input: CAT Ⅳ 600 V, CAT Ⅲ 1000 V

The MR8990 cannot measure AC voltage, current, or resistance. Select from other modules for a variety of measurement options.

Functions/Features Superior functions and features you won't find in general-purpose digital multimeters.

Fully isolated 16ch simultaneous sampling

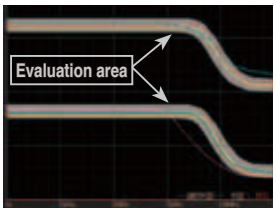
All 16 channels can be sampled at the same time. There's none of the time lag that appears when using a scanner to switch between multiple measurement devices, providing you **full simultaneous sampling**. Make completely accurate measurements without misalignment in start times or between channels. Inputs are also isolated for all channels.

Plug-in module design

Inputs are user-exchangeable plug-in modules. By combining different modules, it is possible to measure temperature, logic signals and other data types along with DC voltage. Current can also be measured by using a clamp-on AC/DC sensor (Hioki CT9690 series).

Area-based evaluation

Define a detection area to evaluate the shape of measured waveforms. This is useful for battery-discharge and power supply durability testing. The instrument's real-time* evaluation capability also allows it to be used for constant monitoring. Evaluation results can also be output to external device.



(*) In slow ranges (time axis range: 100 ms/div or less)

Waveform calculation functions

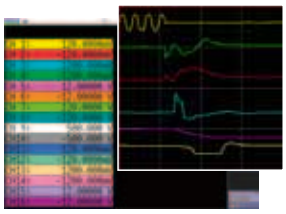
Wave calculations can be applied to measured waveforms. This is useful for checking changes in potential differences between battery cells (cell 1 - cell 2) or DC power (voltage × current). Up to 16 calculations can be defined simultaneously for any given channel. 10 function types are available, in addition to arithmetic operations.

Numerical calculation functions

Numerical calculations can be performed on all measurement data or on a subset of the measurement data. A total of 24 calculations, including interval-specific maximum, minimum, and average values, can be performed using data measured at high precision with the DVM unit on user-specified channels, and up to 16 calculations can be performed simultaneously. Upper/lower limit can also be defined for calculation results, allowing for value-based evaluation.

All channels displayed as waveforms

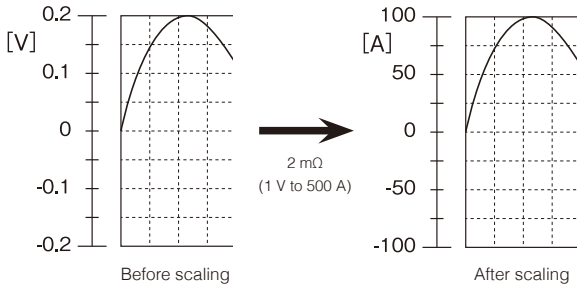
The MR8741 can generate time plots depicting all channels on the same time axis, and it can measure waveform levels over extended periods of time. Values are displayed on the connected display or PC screen. You can also switch between waveform and value display during measurement.



Scaling functions

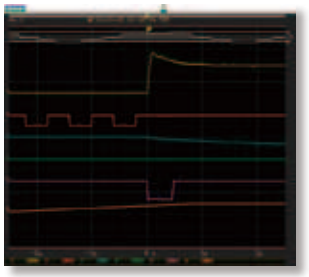
Voltage output from sensors and other equipment can be converted into actual physical quantities for measurement and display.

Ex.: Convert shunt resistance voltage to current



Triggers

Triggers can be applied based on signals input from an external source, logic, or other means, and the voltage value at the point of trigger application can be measured at a high degree of precision with the MR8990. The pre-trigger function can be used to observe data leading up to the trigger. In addition, modules other than the MR8990 provide a variety of triggers, including level triggers.



Applications

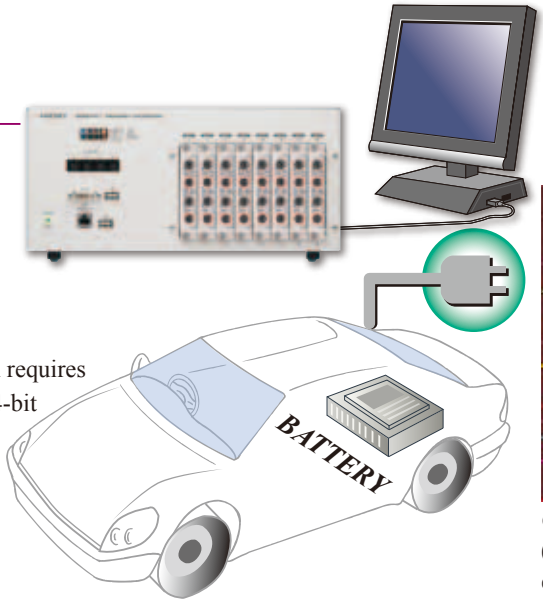
EV battery evaluation

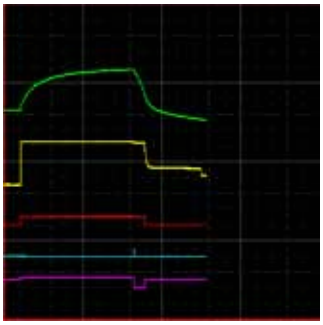
Support for high precision,
high resolution voltage measurement

* Hardware setup example

MEMORY HiCORDER MR8741	×1
DVM UNIT MR8990	×as needed
TEMP UNIT 8967	×1

Voltage measurements for battery cells, which requires high precision and resolution, is possible at 24-bit resolution ±0.01% rdg. ±0.0025% f.s.
The module boasts high input resistance, reducing impact on the measurement target.
Modules can be combined to simultaneously record temperature and other data.





● Battery evaluation
(Example control signal and charge/discharge time measurement)

* Available modules

	24-bit, 6½-digit display High precision	AC waveform measurement 12-bit, 20 MS/s	AC/DC waveform measurement 16-bit, 1 MS/s	AC voltage measurement RMS measurement
	DVM UNIT MR8990	ANALOG UNIT 8966	HIGH RESOLUTION UNIT 8968	DC/RMS UNIT 8972
				
Measurement functions	Voltage measurement (DC)	Voltage measurement	Voltage measurement	Voltage measurement (DC/RMS selectable)
Number of channels	2ch	2ch	2ch	2ch
Input connectors:	Banana input jack Max. rated voltage to earth (*): 300 V AC/DC	Isolated BNC connector Max. rated voltage to earth (*): 300 V AC/DC	Isolated BNC connector Max. rated voltage to earth(*): 300 V AC/DC	Isolated BNC connector Max. rated voltage to earth (*): 300 V AC/DC
Measurement range:	5 mV to 50 V/div, 5 ranges	5 mV to 20 V/div, 12 ranges	5 mV to 20 V/div, 12 ranges	5 mV to 20 V/div, 12 ranges
Measurement resolution	24-bit, 1/50000 of measurement range	12-bit, 1/100 of measurement range	16-bit, 1/1600 of measurement range	12-bit, 1/100 of measurement range
Maximum sampling rate	500 S/s	20 MS/s	1 MS/s	1 MS/s
Accuracy	±0.01% rdg. ±25 dgt.	±0.5% f.s.	±0.3% f.s.	±0.5% f.s. RMS accuracy: ±1% f.s. (DC, 30 Hz to 1 kHz)
Frequency characteristics	-	DC to 5 MHz (-3 dB) AC connection: 7 Hz to 100 kHz (-3 dB)	DC to 100 kHz (-3 dB) AC connection: 7 Hz to 100 kHz (-3 dB)	DC to 400 kHz (-3 dB) AC connection: 7 Hz to 400 kHz (-3 dB)
Max. allowable input	500 V DC	400 V DC	400 V DC	400 V DC

(Detailed MR8890 specifications on P.2) (*) Input and instrument are isolated from each other, the max. voltage that can be applied between input channel and chassis and between input channels without damage

	Temperature	Distortion	Frequency/rotation	Control signals
	TEMP UNIT 8967	STRAIN UNIT 8969	FREQ UNIT 8970	LOGIC UNIT 8973
				
Measurement functions	Temperature measurement with thermocouple	Distortion measurement	Frequency measurement using voltage input	Logic measurement using an optional probes
Number of channels	2ch	2ch	2ch	16 channels (up to 4 logic probes can be connected)
Measurement resolution	16-bit, 1/1000 of measurement range	16-bit, 1/1250 of measurement range	16-bit, 1/2000 of measurement range (Integration mode)	Mini-DIN terminal (HIOKI logic probes only) Compatible logic probes:
Specifications	Input connectors Thermocouple input: Push-button type Max. rated voltage to earth (*): 300 V AC/DC	Input connectors: Weidmuller SL 3.5/7/90G (Connector compatible with included conversion cable 9769: Tajimi PRC03-12A10-7M10.5) Max. rated voltage to earth(*): 33 V AC rms , or 70 V DC	Input connectors: Isolated BNC connector Max. rated voltage to earth(*): 300 V AC/DC	■ LOGIC PROBE 9320-01/9327 Detection of voltage signal or relay contact signal for High/Low state recording Input: 4 channels (common ground between unit and channels), digital/contact input switchable (contact input can detect open-collector signals) Digital input threshold: 1.4 V / 2.5 V / 4.0 V Response speed: 9320-01: 500 ns or lower 9327: Detectable pulse width 100 ns or higher Max. allowable input: 0 to + 50 V DC (max.voltage that can be applied across input pins without damage) ■ LOGIC PROBE MR9321-01 Detection of AC or DC relay drive signal for High/Low state recording. Can also be used for power line interruption detection Input: 4ch (isolated between instruments and between channels), HIGH/LOW range switchable Output (H) detection: 170 to 250 V AC, ±70 to 250 V DC (HIGH) 60 to 150 V AC, ±20 to 150 V DC (LOW) Output (L) detection: 0 to 30 V AC, ±0 to 43 V DC (HIGH) 0 to 10 V AC, ±0 to 15 V DC (HIGH) Response time: Rising edge 1 ms max., falling edge 3 ms max. (with HIGH range at 200 V DC, LOW range at 100 V DC) Max. allowable input: 250 Vrms (HIGH), 150 Vrms (LOW) (max.voltage that can be applied across input pins without damage)
	Temperature measurement range: 10°C/div (-100 to 200°C) 50°C/div (-200 to 1000°C) 100°C/div (-200 to 2000°C)	Suitable converter: Distortion gauge converter, bridge resistance 120 Ω to 1 kΩ, bridge voltage 2 V±0.05 V, gauge ratio 2.0	Frequency measurement range: DC to 100 kHz (minimum pulse width: 2 µs) Accuracy: ±0.1% f.s. (except 5 kHz/div), ±0.7% f.s. (at 5 kHz/div)	
	Thermocouple range: K: -200 to 1350°C J: -200 to 1100°C E: -200 to 800°C T: -200 to 400°C N: -200 to 1300°C R: 0 to 1700°C S: 0 to 1700°C B: 400 to 1800°C W (WRe5-26): 0 to 2000°C Reference junction compensation: internal/external (switchable) Line fault detection ON/OFF possible	Measurement range: 20 µe to 1000 µe/div, 6 ranges, fullscale: 20 div Low-pass filter: 5/10/100/1 kHz	Rotation measurement range: 0 to 2 million rotations/min Accuracy: ±0.1% f.s. (excluding 100 k (r/min)/div), ±0.7% f.s. (at 100 k (r/min)/div) Power supply frequency measurement range: 50 Hz (40 to 60 Hz), 60 Hz (50 to 70 Hz), 400 Hz (390 to 410 Hz) Accuracy: ±0.03 Hz (50, 60 Hz), ±0.1 Hz (400 Hz) Integrated measurement range: 2 k to 1 M counts/div Accuracy: ±range/2000 Duty ratio measurement range: 0 to 100 kHz Accuracy: ±1% (10 to 10 kHz), ±4% (10k to 100 kHz) Pulse width measurement range: 500 µs/div for 2 µs to 2 sec ranges 100 ms/div (f.s. = 20 div) Accuracy: ±0.1% f.s.	
	Accuracy: Thermocouple K, J, E, T, N: ±0.1% f.s. ±1°C (±0.1% f.s. ±2°C at -200°C to 0°C) Thermocouple R, S, B, W: ±0.1% f.s. ±3.5°C (at 0°C to 400°C; B accuracy not guaranteed under 400°C) ±0.1% f.s. ±3°C (400°C and up) Reference junction compensation accuracy: ±1.5°C (added to measurement accuracy with internal reference junction compensation)	Max. sampling rate: 200 kS/s Measurement accuracy (after auto-balance): ±(0.5% f.s. +4 µe) (filter 5 Hz ON) Frequency characteristics: DC to 20 kHz +1/-3 dB		Up to three modules can be installed in a single instrument (or 1 block)

(*) Input and instrument are isolated from each other, the maximum voltage that can be applied between input channel and chassis and between input channels without damage.


MR8740

MR8741

Model : Digital Multi-Module (DMM) Stations

Model No. (Order Code)	(Note)
MR8990	(For the MR8740/MR8741, MR8827, etc.)
MR8740	(Max. 54ch, 864MW memory, main unit only)
MR8741	(Max. 16ch, 256MW memory, main unit only)

Note: Instrument requires input units and other dedicated options. Input cords not included. The MR8990 cannot operate alone.

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