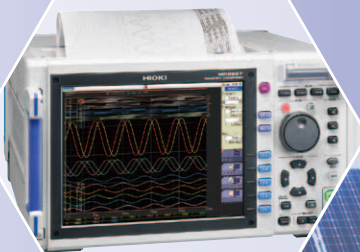
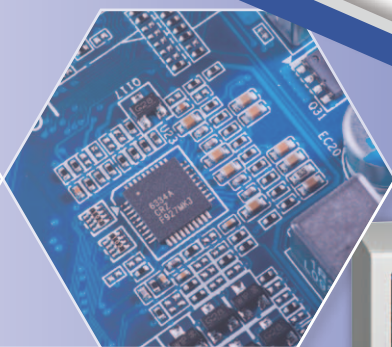


## *Measuring Instrument Catalog for Educational and Research Institutions*



*LCR Meters / Impedance Analyzers*

*Power Meters / Power Analyzers*

*Data Acquisition / Oscilloscopes*

*Data Loggers*

*Resistance Meters / Battery Testers*

*Electrometers / Picoammeters*

*Digital Multimeters*

*Current Probes / Current Sensors*

# LCR Meters / Impedance Analyzers

## Ideal for measuring these component characteristics:

- The ion conductivity of solid electrolytes (zirconia, electrolyte membranes)
- The frequency characteristics of materials such as magnetic materials and piezoelectric ceramics
- The resonance frequency of contactless IC tags
- The capacitance (C-V characteristics) of MOS FETs
- The impedance of fuel cells
- The dielectric constant of foods such as bread dough and chocolate
- The impedance of the electrolyte in batteries and capacitors
- Biological impedance (measuring body fat and visceral fat)
- Corrosion of steel rebar in reinforced concrete
- Capacitance between the ground and plants (to forecast the length of plant roots)
- The dielectric constant (C) of LCD cells

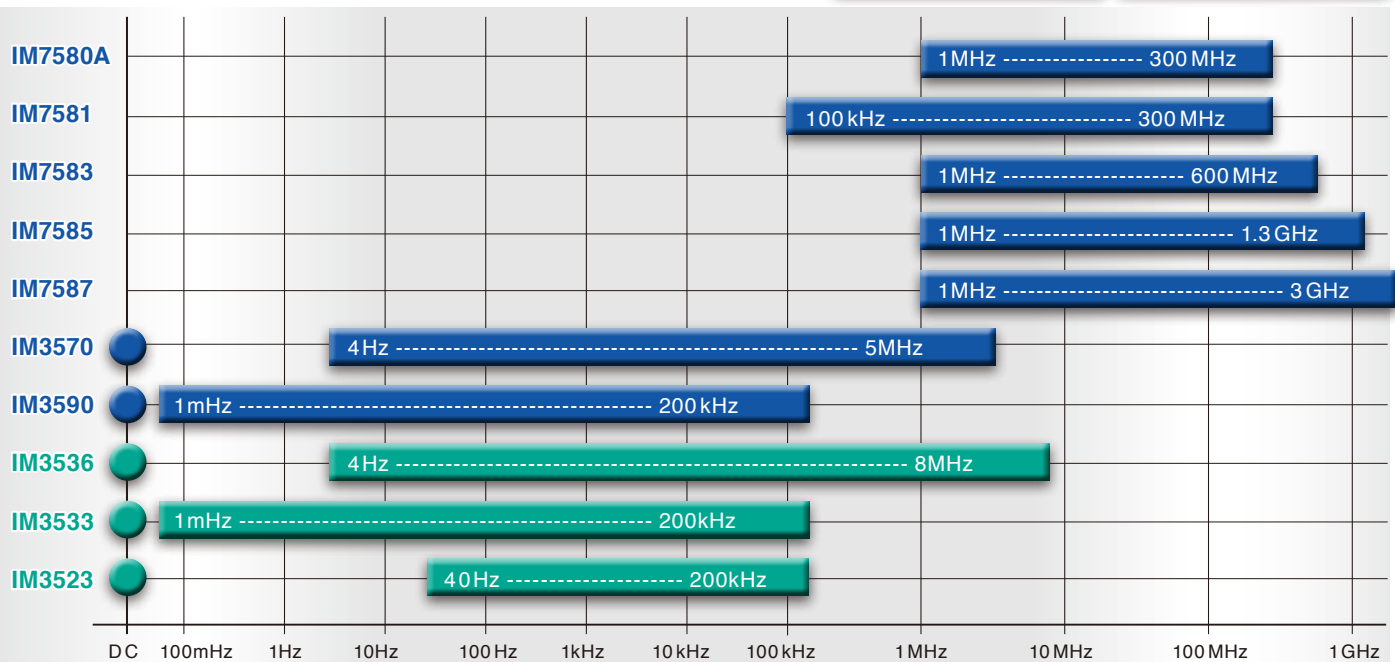


## Measurement frequency

A rich lineup covering a wide range of measurement frequencies

## Impedance Analyzers

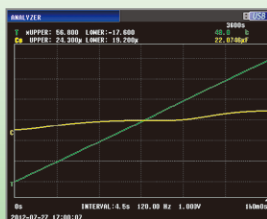
## LCR Meters



## Example application IM3590

## Temperature measurement and time interval measurement

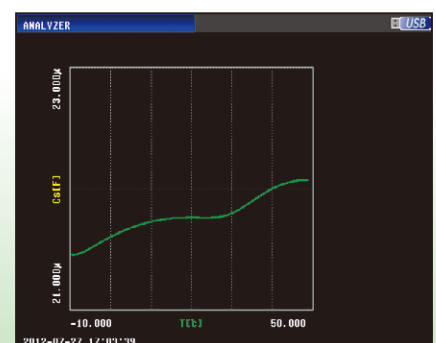
When used with an optional temperature probe, the Impedance Analyzer IM3590 can display graphs that include the temperature at which each measurement was made. You can display a temperature characteristics graph by selecting temperature as one axis on the X-Y display. In addition, the instrument can perform time interval measurement with up to 801 points, making it possible to display graphs of variations over time that include temperature characteristics.



◀ Data describing variations over time obtained by means of interval measurement  
(Change in the capacitance of a laminated ceramic capacitor)

The temperature sensor (Sheath Type Temperature Probe 9478) has a waterproof sheath, allowing it to be directly inserted into liquids.

Sheath material: SUS316  
Waterproofness: EN60529:1991, IP67



▲ X-Y display screen  
(Temperature characteristics for the capacitance of a laminated ceramic capacitor)

## Example application IM3590

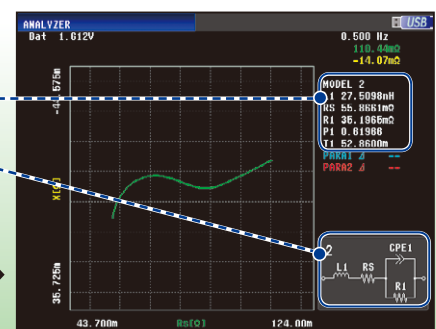
## Equivalent circuit analysis of electrochemical components

Evaluating electrochemical components and materials by estimating an equivalent circuit during measurement provides a way to deepen your understanding of the characteristics of reactions, electrodes, and electrolytes. The Impedance Analyzer IM3590 provides equivalent circuit models for electrochemical components and materials, allowing it to evaluate liquid resistance, charge transfer resistivity, and electric double-layer capacitors.

Equivalent circuit analysis results

Equivalent circuit model

Equivalent circuit analysis screen  
(Alkaline battery)

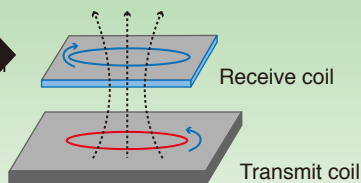


# LCR Meters / Impedance Analyzers

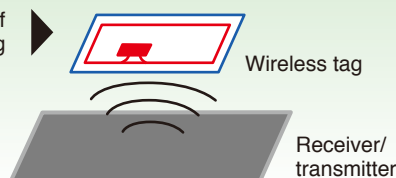
## Example application

## Evaluation and analysis of transmit/receive coil characteristics

Overview of  
contactless power  
transfer



Overview of  
wireless tag

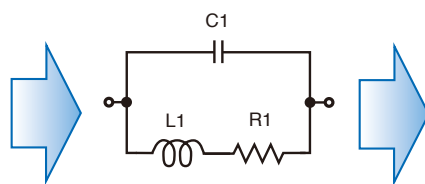
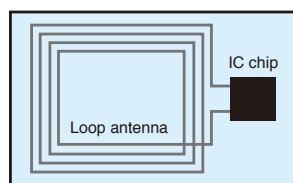


Contactless power transfer technology, which lets you charge mobile phones and consumer electronics like phones, electric toothbrushes, and electric shavers simply by placing them on a stand, is becoming increasingly common. Research into the commercialization of high-capacity contactless power transfer as a technology for charging electric vehicles and plug-in hybrid vehicles is progressing at a rapid pace.

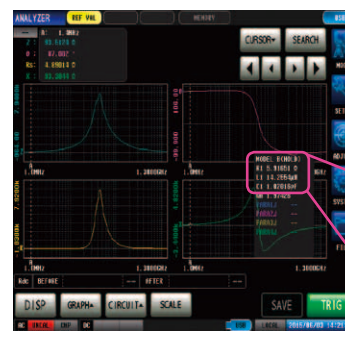
In addition, research into the commercialization of wireless tag technologies such as RF-ID is also continuing as we move into the "Internet of Things" (IoT) era.

Evaluation and analysis of transmit/receive coil characteristics plays an essential role in the development of contactless power transfer and wireless tag technologies. Impedance analyzers such as the IM7585 can analyze not only coil frequency characteristics, but also values for elements in equivalent circuit models. Use these instruments to optimize coil design.

## Equivalent circuit analysis of a loop antenna



Equivalent circuit

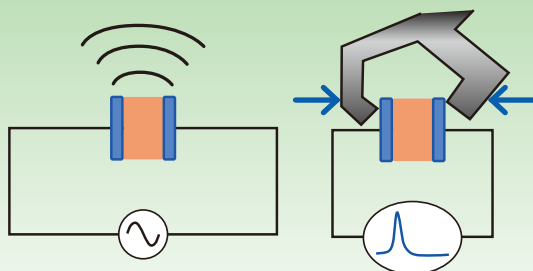


Equivalent circuit analysis results

MODEL B(HOLD)  
R1 5.91651  $\Omega$   
L1 14.2554  $\mu$ H  
C1 1.02016 pF

## Example application

## Evaluation and analysis of the characteristics of piezoelectric elements

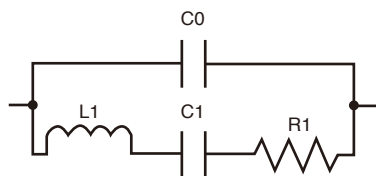


Overview of piezoelectric element characteristics

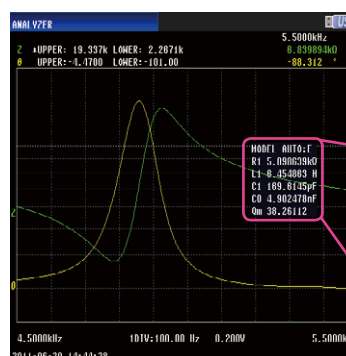
Piezoelectric elements convert electric signals to mechanical movement and vice versa. When an electrical signal is applied externally, the element's shape changes, allowing it to be used in buzzers and other sound-producing components. Another example is its application in pressure and inclination sensors, whereby an electrical signal in response to changes in the element's shape is output.

The impedance/frequency characteristics of piezoelectric elements include resonance points and anti-resonance points. Frequency sweep measurement using an impedance analyzer is an ideal way to ascertain the frequency of each of those points. Impedance analyzers such as the IM7585 can analyze not only frequency characteristics, but also values for elements in equivalent circuit models. Use these instruments to analyze the characteristics of piezoelectric elements.

## Equivalent circuit analysis of a piezo-electric element



Equivalent circuit



Equivalent circuit analysis results

MODEL AUTO:E  
R1 5.098639 k $\Omega$   
L1 6.454863 H  
C1 169.6145 pF  
C0 4.902478 nF  
Qm 38.26112



# LCR Meters / Impedance Analyzers

Instruments do not ship with a test fixture or probe. A test fixture designed specifically for use with the specific Impedance Analyzer is required.

## IMPEDANCE ANALYZER IM7580 series

**NEW**

**High-speed, highly stable measurement**  
**Choose from five models to meet your measurement frequency.**



- Compact, half-rack footprint with space-saving test head
- Comprehensive contact check (via DCR testing, Hi-Z reject or waveform judgment)
- Make frequency sweeps, level sweeps and time interval measurements in Analyzer Mode

Model No. (Order Code)

**IM7587-01, IM7585-01, IM7583-01, IM7581-01, IM7580A-1** (Connection cable 1m is bundled)

**IM7587-02, IM7585-02, IM7583-02, IM7581-02, IM7580A-2** (Connection cable 2m is bundled)

Basic specifications	IM7587	IM7585	IM7583	IM7581	IM7580A
Appearance					
Measurement frequency	<b>1 MHz to 3 GHz</b>	<b>1 MHz to 1.3 GHz</b>	<b>1 MHz to 600 MHz</b>	<b>100 kHz to 300 MHz</b>	<b>1 MHz to 300 MHz</b>
Measurement range (depending on measurement frequency)	L: 0.0053 nH to 0.795 mH C: 0.011 pF to 1.59 $\mu$ F	L: 0.0123 nH to 0.795 mH C: 0.0245 pF to 1.59 $\mu$ F	L: 0.0265 nH to 0.795 mH C: 0.0531 pF to 1.59 $\mu$ F	L: 0.0531 nH to 7.95 mH C: 0.1061 pF to 15.9 $\mu$ F	L: 0.0531 nH to 0.795 mH C: 0.1061 pF to 1.59 $\mu$ F
Measurement signal level	Power	-40.0 dBm to +1.0 dBm			-40.0 dBm to +7.0 dBm
	Voltage	4 mV to 502 mVrms			4 mV to 1001 mVrms
	Current	0.09 mA to 10.04 mArms			0.09 mA to 20.02 mArms
Basic accuracy	Z : 0.65% rdg. $\theta$ : 0.38°			Z : 0.72% rdg. $\theta$ : 0.41°	
Dimensions and mass	Main unit	215 mm (8.46 in) W $\times$ 200 mm (7.87 in) H $\times$ 348 mm (13.70 in) D, 8.0 kg (282.2 oz)			215 mm (8.46 in) W $\times$ 200 mm (7.87 in) H $\times$ 268 mm (10.55 in) D, 6.5 kg (229.3 oz)
	Test head	90 mm (3.54 in) W $\times$ 64 mm (2.52 in) H $\times$ 24 mm (0.94 in) D, 300 g (10.58 oz)			61 mm (2.40 in) W $\times$ 55 mm (2.17 in) H $\times$ 24 mm (0.94 in) D, 175 g (6.2 oz)

### Shared specifications

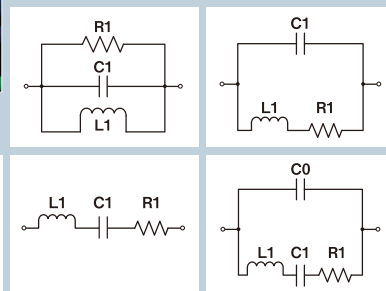
Measurement modes	LCR mode, Analyzer mode (sweeps with measurement frequency and measurement level), Continuous measurement mode
Measurement parameters	Z, Y, $\theta$ , Rs (ESR), Rp, X, G, B, Cs, Cp, Ls, Lp, D (tan $\delta$ ), Q
Measurable range	100 m $\Omega$ to 5 k $\Omega$
Display range	Z: 0.00 m to 9.99999 G $\Omega$ / Rs, Rp, X: $\pm$ (0.00 m to 9.99999 G $\Omega$ ) Ls, Lp: $\pm$ (0.00000 n to 9.99999 GH) / Q: $\pm$ (0.00 to 9999.99) $\theta$ : $\pm$ (0.000° to 180.000°), Cs, Cp: $\pm$ (0.00000 p to 9.99999 GF) D: $\pm$ (0.00000 to 9.99999), Y: (0.000 n to 9.99999 GS) G, B: $\pm$ (0.000 n to 9.99999 GS), $\Delta\%$ : $\pm$ (0.000 % to 999.999 %)
Output impedance	50 $\Omega$
Measurement speeds	FAST: 0.5 ms (Analog measurement time, typical value)
Functions	Contact check, Comparator, BIN measurement (classification), Panel loading/saving, Memory function, Equivalent circuit analysis, Correlation compensation
Interfaces	EXT I/O (Handler), USB communication, USB memory, LAN, RS-232C (optional), GP-IB (optional)
Power supply	100 to 240 V AC, 50/60 Hz, 70 VA max.

### Equivalent circuit analysis function

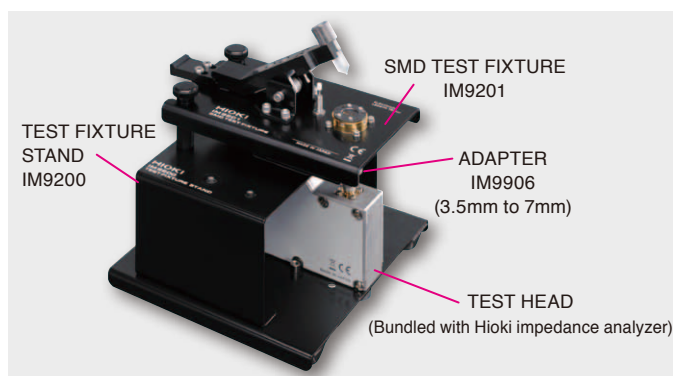


A: Analysis results

Analyze individual component values (L/C/R) for elements in the following five circuits based on measurement results.



### SMD TEST FIXTURE (option)



Frequency range	DC to 3 GHz
Compatible package sizes (EIA)	0201, 0402, 0603, 0805, 1206, 1210
Compatible electrode structure	Bottom electrodes
Maximum voltage	$\pm 42$ Vpeak (AC+DC)
Additional uncertainty	Impedance : $\pm Z_e$ [%] Phase : $\pm 0.58 \times Z_e$ [°] $Z_e = Ae + (Zse / Zx + Yoe \times Zx) \times 100$ $Zx$ : Measured impedance value [ $\Omega$ ] $Ae$ : $4 \times f^2$ [%] $Zse$ : $(100 + 500 \times f) / 1000$ [ $\Omega$ ] $Yoe$ : $(10 + 100 \times f) / 1000000$ [S] $f$ [GHz]

SMD TEST FIXTURE IM9201  
TEST FIXTURE STAND IM9200  
ADAPTER(3.5 mm to 7 mm) IM9906  
CALIBRATION KIT IM9905

# LCR Meters / Impedance Analyzers

Instruments do not supplied with measurement probes or test fixtures. Please select and purchase the measurement probe or test fixture options appropriate for your application separately.

## IMPEDANCE ANALYZER IM3570

Model No. (Order Code) **IM3570**

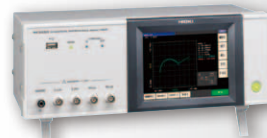


### Single Device Solution for High Speed Testing and Frequency Sweeping

- LCR measurement, DCR measurement, sweep measurement, continuous measurement and high-speed testing achieved with one instrument
- High-speed testing, achieving maximum speeds of 1.5ms (1 kHz) and 0.5ms (100kHz) in LCR mode
- Perfect impedance analyzer for testing the resonance characteristics of piezoelectric elements, C-D and low ESR measurement of functional polymer capacitors, DCR and L-Q measurement of inductors (coils and transformers)
- Perform frequency sweeps, level sweeps, and time interval measurements in analyzer mode

## CHEMICAL IMPEDANCE ANALYZER IM3590

Model No. (Order Code) **IM3590**



### Measure Electrochemical Components and Materials, Batteries, and EDLCs

- Broad 1 mHz to 200 kHz signal source range supports measurements of ion behavior and solution resistance
- Continuous measuring and high-speed testing of LCR and sweep measurements with a single instrument
- Measure internal impedance of batteries with no load
- Perform high-speed sweep measurements in as little as 2 ms
- Basic accuracy of  $\pm 0.05\%$  is ideal for applications from component testing to R&D
- Measure LCR impedance for Cole-Cole plots and equivalent-circuit analyses of electro-chemical components and materials

Basic specifications	IM3570	IM3590
Measurement modes	LCR mode, Analyzer mode (Sweeps with measurement frequency and measurement level), Continuous measurement mode	LCR mode, Continuous measurement mode (LCR mode / Analyzer mode), Analyzer mode (Sweeps with measurement frequency and measurement level, temperature characteristics, equivalent circuit analysis)
Measurement parameters	Z, Y, $\theta$ , Rs (ESR), Rp, Rdc (DC resistance), X, G, B, Cs, Cp, Ls, Lp, D (tan $\delta$ ), Q	Z, Y, $\theta$ , Rs (ESR), Rp, Rdc (DC resistance), X, G, B, Cs, Cp, Ls, Lp, D (tan $\delta$ ), Q, T, $\sigma$ (conductivity), $\epsilon$ (dielectric constant)
Basic accuracy	Z: $\pm 0.08\%$ rdg. $\theta$ : $\pm 0.05^\circ$	Z: $\pm 0.05\%$ rdg. $\theta$ : $\pm 0.03^\circ$
Measurement frequency	4 Hz to 5 MHz (5 digits setting resolution, minimum resolution 10 mHz)	1 mHz to 200 kHz (5 digits setting resolution, minimum resolution 1 mHz)
Measurement signal level (Normal mode)	V mode/CV mode: 5 mV to 5 Vrms (up to 1 MHz) 10 mV to 1 Vrms (1.0001 MHz to 5 MHz), 1 mVrms steps CC mode: 10 $\mu$ A to 50 mArms (up to 1 MHz) 10 $\mu$ A to 10 mArms (1.0001 MHz to 5 MHz), 10 $\mu$ Arms steps	V mode/CV mode: 5 mV to 5 Vrms, 1 mVrms steps CC mode: 10 $\mu$ A to 50 mArms, 10 $\mu$ Arms steps
Measurement signal level (Low impedance high accuracy mode)	V/CV: 5 mV to 1 Vrms (up to 100 kHz), 1 mVrms steps CC: 10 $\mu$ A to 100 mArms (100 m $\Omega$ and 1 $\Omega$ ranges of up to 100 kHz), 10 $\mu$ Arms steps	V mode/CV mode: 5 mV to 2.5 Vrms, 1 mVrms steps CC mode: 10 $\mu$ A to 100 mArms, 10 $\mu$ Arms steps
Output impedance	Normal mode: 100 $\Omega$ , Low impedance high accuracy mode: 10 $\Omega$	Normal mode: 100 $\Omega$ , Low impedance high accuracy mode: 25 $\Omega$
Measurement speeds	0.5 ms (100 kHz, FAST, display OFF, representative value)	2 ms (1 kHz, FAST, display OFF, representative value)
Interfaces	EXT I/O (handler), RS-232C, GP-IB, USB communication, USB memory, LAN	EXT I/O (Handler), USB communication (high-speed), USB memory Optional: Choose 1 from RS-232C, GP-IB, or LAN
Power supply	90 to 264 V AC, 50/60 Hz, 150 VA max.	100 to 240 V AC, 50/60 Hz, 50 VA max.
Dimensions and mass	330 mm (12.99 in) W $\times$ 119 mm (4.69 in) H $\times$ 307 mm (12.09 in) D, 5.8 kg (204.6 oz)	330 mm (12.99 in) W $\times$ 119 mm (4.69 in) H $\times$ 168 mm (6.61 in) D, 3.1 kg (109.3 oz)

## LCR METER IM3536



### Measurement frequency DC, 4 Hz to 8 MHz

- High-speed measurement of 1ms (fastest time)
- Basic accuracy:  $\pm 0.05\%$  rdg
- Guaranteed accuracy range from 1 m $\Omega$
- DC bias function: Measure under conditions simulating actual use or in accordance with industry standards

## LCR METER IM3533



### Measurement frequency DC, 1mHz to 200kHz

- Basic accuracy:  $\pm 0.05\%$  rdg
- Built-in low impedance high precision mode effective for testing low inductance or the ESR of aluminum electrolysis capacitance
- Frequency sweep testing (IM3533-01 only)

## LCR METER IM3523



### Measurement frequency DC, 40Hz to 200kHz

- Basic accuracy:  $\pm 0.05\%$  rdg
- Built-in comparator and BIN functions
- Rapid 2msec test time

Basic specifications	IM3536	IM3533 IM3533-01 (Advanced function model)	IM3523
Measurement modes	LCR, Continuous testing	LCR, Transformer testing (N, M, $\Delta$ L), Continuous testing (LCR mode) -01 only: Analyzer, Continuous Testing (Analyzer mode)	LCR, Continuous testing
Measurement parameters	Z, Y, $\theta$ , X, G, B, Q, Rdc (DC resistance), Rs (ESR), Rp, Ls, Lp, Cs, Cp, D (tan $\delta$ ), $\sigma$ , $\epsilon$	Z, Y, $\theta$ , Rs (ESR), Rp, Rdc (DC resistance), X, G, B, Cs, Cp, Ls, Lp, D (tan $\delta$ ), Q, N, M, $\Delta$ L, T	Z, Y, $\theta$ , Rs (ESR), Rp, Rdc (DC resistance), X, G, B, Cs, Cp, Ls, Lp, D (tan $\delta$ ), Q
Basic accuracy	Z: $\pm 0.05\%$ rdg. $\theta$ : $\pm 0.03^\circ$	Z: $\pm 0.05\%$ rdg. $\theta$ : $\pm 0.03^\circ$	Z: $\pm 0.05\%$ rdg. $\theta$ : $\pm 0.03^\circ$
Measurement signal level (Normal mode)	V/CV: 4 Hz to 1.0000 MHz: 10 mV to 5 V (Max. 50 mA) 1.0001 MHz to 8 MHz: 10 mV to 1 V (Max. 10mA) CC: 4 Hz to 1.0000 MHz: 10 $\mu$ A to 50 mA (Max. 5 V) 1.0001 MHz to 8 MHz: 10 $\mu$ A to 10 mA (Max. 1 V)	V/CV mode: 5 mV to 5 Vrms, 1 mVrms steps CC mode: 10 $\mu$ A to 50 mArms, 10 $\mu$ Arms steps	V/CV mode: 5 mV to 5 Vrms, 1 mVrms steps CC mode: 10 $\mu$ A to 50 mArms, 10 $\mu$ Arms steps
Measurement signal level (Low impedance high accuracy mode)	V/CV: 4 Hz to 1.0000 MHz: 10 mV to 1 V (Max. 100 mA) CC: 4 Hz to 1.0000 MHz: 10 $\mu$ A to 100 mA (Max. 1 V)	V/CV mode: 5 mV to 2.5 Vrms, 1 mVrms steps CC mode: 10 $\mu$ A to 100 mArms, 10 $\mu$ Arms steps	---
Output impedance	Normal mode: 100 $\Omega$ Low impedance high accuracy mode: 10 $\Omega$	Normal mode: 100 $\Omega$ Low impedance high accuracy mode: 25 $\Omega$	100 $\Omega$
Measurement speeds	1 ms (1 MHz, FAST, display OFF, representative value)	2 ms (1 kHz, FAST, display OFF, representative value)	2 ms (1 kHz, FAST, representative value)
Power supply	100 to 240 V AC, 50/60 Hz, 50 VA Max.	100 to 240 V AC, 50/60 Hz, 50 VA Max.	100 to 240 V AC, 50/60 Hz, 50 VA Max.
Dimensions and mass	330 mm (12.99 in) W $\times$ 119 mm (4.69 in) H $\times$ 230 mm (9.06 in) D, 4.2 kg (148.1 oz)	330 mm (12.99 in) W $\times$ 119 mm (4.69 in) H $\times$ 168 mm (6.61 in) D, 3.1 kg (109.3 oz)	260 mm (10.24 in) W $\times$ 88 mm (3.46 in) H $\times$ 203 mm (7.99 in) D, 2.4 kg (84.7 oz)



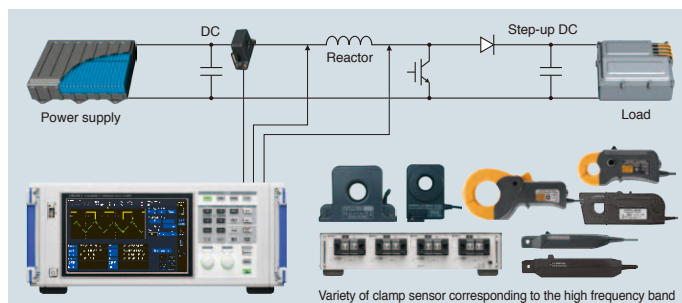
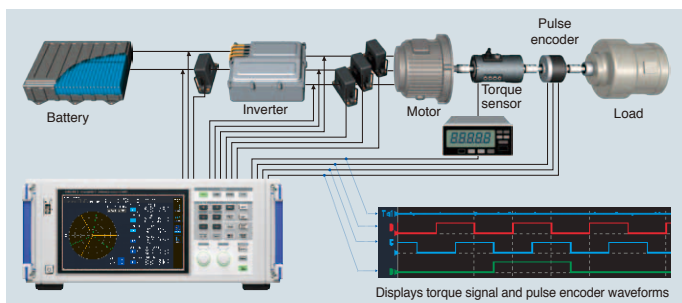
# Power Meters / Power Analyzers

Depending on the model, please purchase separately-sold voltage cords and current sensors appropriate for the application.

## Use for measurement applications like these...

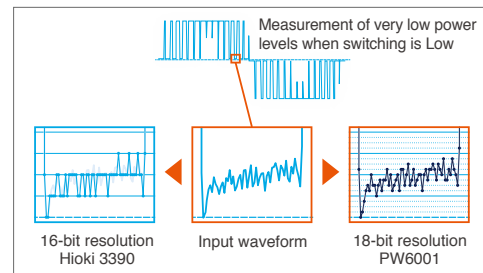
- Evaluating the conversion efficiency of inverters with SiCs
- Measuring reactor loss in chopper circuits
- Measuring loss in high-frequency transformers
- Evaluating the efficiency of high-efficiency motors
- Measuring the energy efficiency of electric vehicles

- Measuring and managing power use as part of energy-saving activities
- Analyzing vector control of high-efficiency synchronous motors
- Measuring the efficiency of power conditioners used in solar power systems
- Evaluating the transmission efficiency of wireless power systems
- Measuring the power consumption, standby power, and harmonics of household electronics



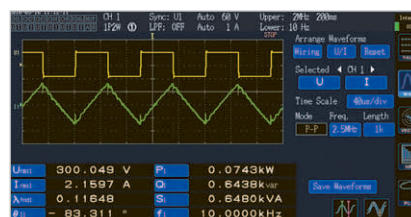
## 5 MS/s speed and high 18-bit resolution make SiC measurements a reality

High resolution is required for the high precision measurement of PWM waveforms for SiC semiconductors with low ON resistance. TrueHD 18-bit is achieved at a level of precision that has never been seen before.



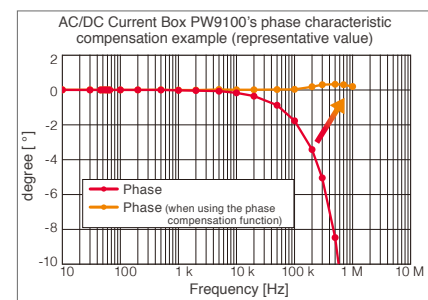
## High-frequency and low power factor device evaluation

Reactors are used for high harmonic current suppression as well as the voltage step up/down of chopper circuits. The PW6001's outstanding high frequency characteristics, highspeed sampling, and noise-suppressing performance are extremely effective in evaluating high-frequency, low power factor devices.



## Current Sensor Phase Shift Function

In addition to the PW6001's flat, broad frequency characteristics, sensor phase error compensation allows highly accurate high-frequency and low power factor device analysis.



## POWER ANALYZER PW6001

**NEW**



**Improve Power Conversion Efficiency**  
**Industry-Leading Accuracy and Max. 12 Channels**  
(When synchronizing two 6-channel models connected via optical link)

- Basic accuracy of  $\pm 0.02\%$ \*1 for power measurement (\*1 PW6001 accuracy only. Instrument delivers accuracy of  $\pm 0.04\%$  even after the current sensor accuracy has been added.)
- High noise resistance and stability  
(80 dB/100 kHz CMRR,  $\pm 0.01\%/^{\circ}\text{C}$  temperature characteristics)
- 10 ms data refresh while maintaining maximum accuracy
- DC basic accuracy of  $\pm 0.02\%$ \*2, which is key for stable, accurate efficiency measurement (\*2 PW6001 accuracy only)
- Accurate measurement even when the load is characterized by large fluctuations; TrueHD 18-bit resolution, 5MS/s sampling
- Wide frequency bandwidth of DC, or 0.1 Hz to 2 MHz

Model No. (Order Code)

<b>PW6001-01</b> (1 ch)	<b>PW6001-04</b> (4 ch)	<b>PW6001-11</b> (1 ch)	<b>PW6001-14</b> (4 ch)
<b>PW6001-02</b> (2 ch)	<b>PW6001-05</b> (5 ch)	<b>PW6001-12</b> (2 ch)	<b>PW6001-15</b> (5 ch)
<b>PW6001-03</b> (3 ch)	<b>PW6001-06</b> (6 ch)	<b>PW6001-13</b> (3 ch)	<b>PW6001-16</b> (6 ch)

Motor analysis, D/A output

### Basic specifications

Measurement line type	Single-phase 2-wire, single-phase 3-wire, three-phase 3-wire, three-phase 4-wire
Number of input channels	Max. 6 channels; each input unit provides 1 channel for simultaneous voltage and current input (Voltage measurement unit: Photoisolated input, resistance voltage divider, Current measurement unit: Isolated input from current sensor)
Measurement range	Voltage range: 6 to 1500 V, 8 ranges Current range (Probe 1): 400 mA to 1 kA (depends on current sensor) Current range (Probe 2): 100 mA to 50 kA (depends on current sensor)
Frequency band	DC, 0.1 Hz to 2 MHz
Basic accuracy	Voltage: $\pm 0.02\%$ rdg, $\pm 0.02\%$ f.s. Current: $\pm 0.02\%$ rdg, $\pm 0.02\%$ f.s. + current sensor accuracy Active power: $\pm 0.02\%$ rdg, $\pm 0.03\%$ f.s. + current sensor accuracy
Measurement items	Voltage (U), current (I), active power (P), apparent power (S), reactive power (Q), power factor (λ), phase angle (φ), frequency (f), efficiency (η), loss (Loss), voltage ripple factor (Urf), current ripple factor (Irf), current integration (Ih), power integration (WP), voltage peak (Upk), current peak (Ipk)
Harmonic measurement	Harmonic active power, select calculation order from 2nd order to 100th order
Waveform recording	Always 50 kS/s, 16 bits, Recording capacity: 1 Mword × ((voltage + current) × number of channels + motor waveforms)
Power supply	100 to 240 V AC, 50/60 Hz, 200 VA max.
Dimensions and mass	430 mm (16.93 in)W × 177 mm (6.97 in)H × 450 mm (17.72 in)D, 14 kg (49.4 oz) (PW6001-16)

Note: Optional voltage cords and current sensor are required for taking measurements. Specify the number of built-in channels and inclusion of Motor Analysis & D/A Output upon order for factory installation. These options cannot be changed or added at a later date.

### High-Precision Sensors

PW9100-03	(Direct Current Input: 50 A AC/DC input, 3 ch)
PW9100-04	(Direct Current Input: 50 A AC/DC input, 4 ch)
CT6862-05	(Pull-through type: 50 A AC/DC input)
CT6863-0	(Pull-through type: 200 A AC/DC input)
9709-05	(Pull-through type: 500 A AC/DC input)
CT6865-05	(Pull-through type: 1000 A AC/DC input)
CT6843-05	(Clamp type: 200 A AC/DC input)
CT6841-05	(Clamp type: 20 A AC/DC input)
CT6844-05	(Clamp type: 500 A AC/DC input)
CT6845-05	(Clamp type: 500 A AC/DC input)
CT6846-05	(Clamp type: 1000 A AC/DC input)

### Wide-Band Current Probes

CT6701	(DC to 120 MHz bandwidth, 1 mA to 5 A rms)
CT6700	(DC to 50 MHz bandwidth, 1 mA to 5 A rms)
3276	(Wide DC to 100 MHz bandwidth, 10 mA-class to 30 Arms)
3275	(Wide DC to 2 MHz bandwidth, up to 500 A rms)
3274	(Wide DC to 10 MHz bandwidth, up to 150 A rms)
3273-50	(Wide DC to 50 MHz bandwidth, 10 mA-class to 30 Arms)

### Voltage measurement

L9438-50	(Black/ Red, Alligator clip ×2)
L1000	(Red/ Yellow/ Blue/ Gray each 1, Black 4, Alligator clip ×8)

# Power Meters / Power Analyzers

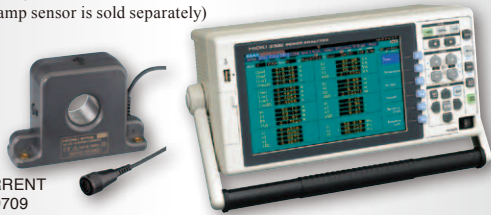
Depending on the model, please purchase separately-sold voltage cords and current sensors appropriate for the application.

## POWER ANALYZER 3390

Model No. (Order Code)

**3390** (main unit, clamp sensor is sold separately)

AC/DC CURRENT  
SENSOR 9709



**Maximum accuracy of  $\pm 0.16\%$  achieved with current sensors (when combined with the 9709)**

- Measure the primary and secondary sides of inverters
- Advanced motor analysis functions
- Wide band measurement: DC, 0.5 Hz to 150 kHz
- Display and save Waveforms at 500 kS/s sampling
- Portable design can be transported away from the workbench
- Supports inverter noise measurement - Perform harmonic analysis and noise analysis while simultaneously viewing the inverter waveform

### Basic specifications

Measurement line type	Single-phase 2-wire, single-phase 3-wire, three-phase 3-wire, three-phase 4-wire, Voltage 4 channels, Current 4 channels, Isolated between each channel
Number of input channels	Voltage: 4 ch (Isolated input) Current: 4 ch (Isolated input)
Measurement range	Voltage range: 15 to 1500 V, 7 ranges, Current range: 400 mA to 500 A (depends on current sensor, 20A/ 50A/ 200A/ or 500A rated)
Frequency band	DC, 0.5 Hz to 150 kHz (Synchronization frequency range: 0.5 Hz to 5 kHz)
Basic accuracy	Voltage: $\pm 0.05\%$ rdg. $\pm 0.05\%$ f.s. Current: $\pm 0.05\%$ rdg. $\pm 0.05\%$ f.s. + current sensor accuracy Active power: $\pm 0.05\%$ rdg. $\pm 0.05\%$ f.s. + current sensor accuracy
Measurement items	Voltage, Current, Voltage/current waveform peak, Active power, Reactive power, Apparent power, Power factor, Phase angle, Frequency, Current integration, Power integration, Efficiency, Loss, Voltage/current ripple factor
Harmonic measurement	RMS value, Content factor, Phase angle, Phase difference, Total distortion, Disequilibrium factor (Number of harmonic orders: Max. 100th order)
Noise measurement	Maximum analysis frequency: 100 kHz
Functions	Rectification switching, Scaling, Averaging, Efficiency/loss calculation, $\Delta - Y$ calculation
Power supply	100 to 240 V AC, 50/60 Hz, 140 VA max.
Dimensions and mass	340 mm (13.39 in)W $\times$ 170 mm (6.69 in)H $\times$ 157 mm (6.18 in)D, 4.8 kg (169.3 oz)
<b>Optional Functions</b>	
Motor testing	Voltage, torque, rotation, frequency, slip, motor output
D/A Output	16 channels, Waveform output (8ch Max., $\pm 2V$ )/Analog output (DC $\pm 5V$ )

## CLAMP ON POWER LOGGER PW3360

Model No. (Order Code)

**PW3360-20** (English model, main unit only)

**PW3360-21** (English model, with harmonic analysis function)



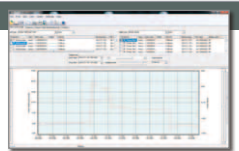
**Portable Power Loggers for Energy Audits and Energy Conservation**

- Supports single to three-phase, 4-wire circuits
- Measure between 90V to 780V
- Measure leakage current from a range setting as low as 50.000 mA (using an optional sensor)
- The QUICK SET function guides you in making the right connections
- Choose PW3360-21 for harmonic measurements up to the 40th order

### POWER LOGGER VIEWER SF1001

Data can be loaded into a PC for expanded display, aggregation and analysis

- Trend graph display function
- Summary display function
- Waveform display
- Harmonic display
- Copy function
- Print function
- Report printing



### Basic specifications

Measurement line type	50/60 Hz, Single phase 2 wires (1/2/3 circuits), Single phase 3 wires (1 circuit), Three phases 3 wires (1 circuit), Three phases 4 wires (1 circuit), Current only: 1 to 3 channels
Measurement items	Voltage, current, frequency, active power, reactive power (with lag/lead display), apparent power, power factor (with lag/lead display) or displacement power factor (with lag/lead display), active energy (consumption, regeneration), reactive energy (lag, lead), active power demand quantity (consumption, regeneration), reactive power demand quantity (lag, lead), active power demand value (consumption, regeneration), reactive power demand value (lag, lead), and other. [PW3360-21 only]: Harmonic voltage level, harmonic current level, harmonic power level, content percentage, phase angle, total harmonic distortion (THD-F or THD-R), up to 40th order
Harmonic measurement (PW3360-21 only)	Harmonic voltage level, harmonic current level, harmonic power level, content percentage, phase angle, total harmonic distortion (THD-F or THD-R), up to 40th order
Power supply	AC adapter Z1006 or Battery pack 9459
Dimensions and mass	180 mm (7.09 in)W $\times$ 100 mm (3.94 in)H $\times$ 48 mm (1.89 in)D, 550 g (19.4 oz)

### For load current measurement

(1 sensor necessary for single-phase measurements, and 2 or 3 sensors required for 3-phase measurements)

9694 (5A AC rated current)  
9660 (100A AC rated current)  
9661 (500A AC rated current)  
9669 (1000A AC rated current)  
CT9667-01/-02/-03 (5000/500 A AC rated current)

9695-02\* (50A AC rated current, Not CE marked)

9695-03\* (100A AC rated current, Not CE marked)

### For leak current measurement

9675 (10 A AC rated current)  
9657-10 (100 A AC rated current)

\*Requires the Connection cord 9219

## POWER HiTESTER 3333, 3334 / POWER METER PW3335, PW3336, PW3337

Basic specifications	3333 (AC)	3334 (AC/DC)	PW3335 (AC/DC)	PW3336, PW3337 (AC/DC)
Appearance				
Measurement line type	Single-phase/ two-wires			Single-phase 2-wires, single-phase 3-wires, 3-phase 3-wires, 3-phase 4-wires (PW3337 only)
Voltage ranges	200 V AC (300 V Max.)	AC/DC 15 V to 300 V, 4 ranges	AC/DC 6 V to 1000 V, 8 ranges	AC/DC 15 V to 1000 V, 7 ranges
Current ranges	50 mA to 20 A AC, 6 ranges (30 A Max.)	AC/DC 100 mA to 30.00 A, 6 ranges	AC/DC 1 mA to 20 A, 14 ranges (30A max.)	AC/DC 200 mA to 50 A, 8 ranges (65A max.)
Frequency band	45 Hz to 5 kHz	DC, 45 Hz to 5 kHz	DC, 0.1 Hz to 100 kHz	
Basic accuracy (W)	$\pm 0.1\%$ rdg. $\pm 0.1\%$ f.s. (45 Hz to 66 Hz)			$\pm 0.1\%$ rdg. $\pm 0.05\%$ f.s. (45 Hz to 66 Hz, at Input < 50% f.s.)
Measurement items	Voltage, Current, Active power, Apparent power, Power factor	Voltage, Current, Active power, Apparent power, Power factor, Frequency, Integration (current, active power), Waveform peak (voltage and current)	Voltage, Current, Active power, Apparent power, Reactive power, Power factor, Phase angle, Frequency, Efficiency, Current integration, Active power integration, Integrated time, Voltage waveform peak value, Current waveform peak value, Voltage crest factor, Current crest factor, Time average current, Time average active power, Voltage ripple factor, Current ripple factor, harmonic (according to IEC61000-4-7), and other	
Key Features/functions	Accuracy guaranteed for 1 year/3 years, Analog output			High-current measurement up to 65 A of direct input Automatically changes the range for each wiring mode, and other
Dimensions and mass	160 mm (6.30 in)W $\times$ 100 mm (3.94 in)H $\times$ 227 mm (8.94 in)D, 1.9 kg (67.0 oz)	210 mm (8.27 in)W $\times$ 100 mm (3.94 in)H $\times$ 245 mm (9.65 in)D, 2.5 kg (88.2 oz)	210 mm (8.27 in)W $\times$ 100 mm (3.94 in)H $\times$ 245 mm (9.65 in)D, 3 kg (105.8 oz)	305 mm (12.01 in)W $\times$ 132 mm (5.20 in)H $\times$ 256 mm (10.08 in)D, 5.6 kg (197.5 oz)
Model No. (Order code)	<b>3333</b> (basic model) <b>3333-01</b> (with GP-IB interface)	<b>3334</b> (basic model) <b>3334-01</b> (with GP-IB interface)	<b>PW3335</b> (with LAN, RS-232C) <b>PW3335-01</b> (with LAN, GP-IB) <b>PW3335-02</b> (with LAN, RS-232C, D/A output) <b>PW3335-03</b> (with LAN, RS-232C, external current sensor terminal) <b>PW3335-04</b> (with LAN, RS-232C, GP-IB, D/A output, external current sensor terminal)	<b>PW3336</b> (2ch model) <b>PW3337-01</b> (3ch, GP-IB installed model) <b>PW3337-02</b> (2ch, D/A output installed model) <b>PW3336-03</b> (2ch, GP-IB, D/A output installed model)
				<b>PW3337</b> (3ch model) <b>PW3337-01</b> (3ch, GP-IB installed model) <b>PW3337-02</b> (3ch, D/A output installed model) <b>PW3337-03</b> (3ch, GP-IB, D/A output installed model)



# Data Acquisition / Oscilloscopes

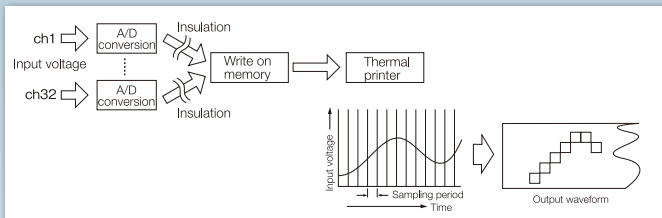
## Use for measurement applications like these...

- Measuring control waveforms for inverter-controlled robots
- Evaluating inverters used in solar power systems
- Testing the on-off characteristics of circuit breakers and switches
- Diagnosing engine deterioration
- Measuring ultrasonic welding waveforms
- Measuring concrete stress and load
- Recording gear eccentricity (X-Y)
- Recording pulse rate and electrocardiogram data

- Measuring the voltage waveforms of fuel cell injection systems used in automobiles
- Testing the charge and discharge characteristics of lithium-ion batteries
- Testing the characteristics (strain, torque, etc.) of machinery (bearings, etc.)
- Measuring the inductive voltage (lightning surge) during lightning strikes
- Testing for fatigue in metal materials (load, displacement, etc.)
- Diagnosing and measuring deterioration and failure in combination with an AE sensor
- Measuring current control signals used by electric-discharge machining equipment (recording output from laser Doppler vibrometers)

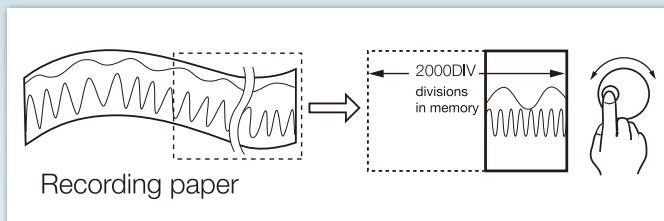


## Advanced Functions



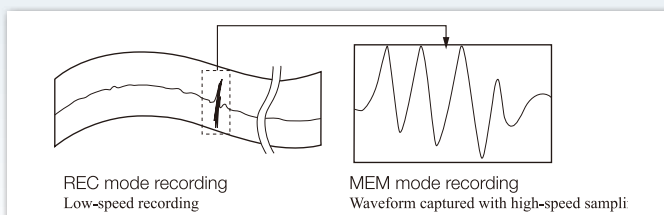
## Memory Recorder Mode

Instruments feature large capacity semiconductor memory, allowing them to record data for up to 32 channels (number of channels varies with model) with room to spare.



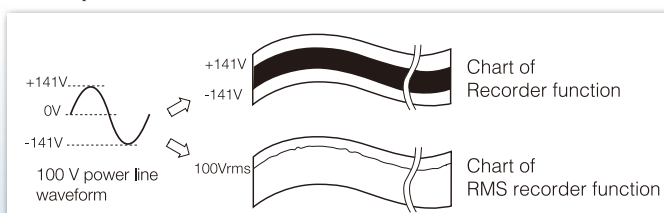
## Recorder Mode

The input signal is converted to digital form and displayed and printed in real time. The maximum chart speed is 20 mm/s (in the 500 ms/DIV range). After the end of measurement, measurement data for the last 2000 DIV \*1 are still in memory and can be viewed with the back-scroll function or printed out again.



## REC & MEM Mode

During the real-time recording of a signal in Recorder mode, when an anomaly is detected by triggers, that portion is stored in memory using the highspeed sampling of Memory Recorder mode. In the meantime, the Recorder function works independently and never stops. This function is highly convenient when it is desirable to record both abnormal phenomena and normal level fluctuations.

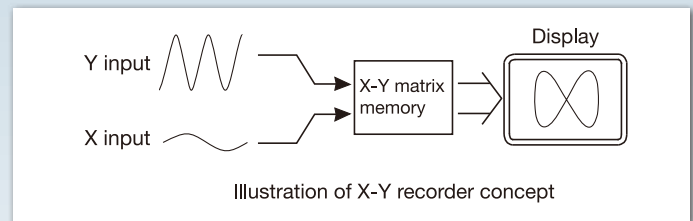


## RMS Recorder Mode

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

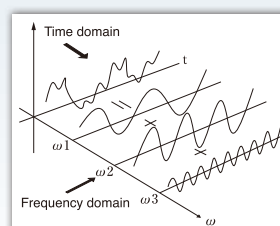
## Logic Input

By using logic probe (sold separately), you can record on/off data for relay contact signals, digital signals such as 5 to 24 V signals, and AC relay drive voltages.



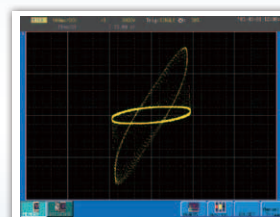
## X-Y Input

Hioki Memory Recorders provide memory for storing X-Y composite waveforms consisting of two digitally converted signals. Waveforms can be observed on the screen in real time, and there are no limitations on recording time. Waveforms can also be reprinted.



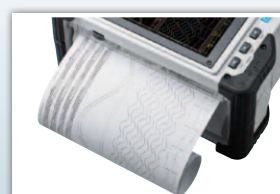
## FFT Analysis

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



## X-Y Waveform Display

Hioki memory recorders let you observe X-Y composite waveforms (Lissajous waveforms) that occur between two signals. Any channel can be set as the X or Y axis. In addition to its composition capacity in Memory mode, the instruments can also display real-time images of unlimited recording time in Recorder mode.



## On-site Printouts

A dedicated thermal printer unit allows the instrument to print observed waveforms in the field (the printer unit is optional for the 8860-50, 8861-50, MR8880, and MR8827.)



# Data Acquisition / Oscilloscopes

Memory HiCorders can not operate alone. You must purchase optional input modules and input cords separately.

## MEMORY HiCORDER MR8847A

**NEW**



### Generate and record in a single unit

- Supports a wide variety of measurements with a total of 13 plug-in modules (5 new modules added)
- Generate and record with a single unit
- Direct 1000 V high voltage input testing
- High-speed sampling up to 20MS/s with fully isolated inputs
- 16 analog + 16 logic channels to 64 logic + 10 analog channels
- High-speed sampling with waveform judgement function
- Soil-resistant construction strong against adverse working environments
- Big buttons coated to withstand industrial oil and residue
- Drop-in paper loading and one-touch setup, along with high-speed 50mm/s printing

Model No. (Order Code)

**MR8847-51** (MR8847A, 64MW memory, main unit only)

**MR8847-52** (MR8847A, 256MW memory, main unit only)

**MR8847-53** (MR8847A, 512MW memory, main unit only)

### Basic specifications

Number of channels	[8 analog input modules]: 16 analog channels + 16 logic channels (standard) [5 analog input modules + 3 logic input modules]: 10 analog channels + 64 logic channels
Measurement ranges (20 div full-scale)	5 mV to 20 V/div, 12 ranges, resolution : 1/100 of range (using the 8966) 5 mV to 50 V/div, 5 ranges, resolution : 1/1 000 000 of range (using the MR8990) 200 mV to 50 V/div, 8 ranges, resolution : 1/1600 of range (using the U8794)
Max. allowable input	400 V DC (using the 8966/8968), 500 V DC (using the MR8990), 1000 V DC (using the U8974)
Frequency characteristics (-3dB)	DC to 5 MHz (using the 8966), DC (using the MR8990), DC to 100 kHz (using the U8794)
Time axis (Memory function)	5 $\mu$ s to 5 min/div (100 samples/div) 26 ranges, External sampling (100 samples/div, or free setting)
Memory capacity	MR8847-51: Total 64 MW, 32 MW/ch (using 2 Analog channels), to 4 MW/ch (using 16 Analog channels) MR8847-52: Total 256 MW, 128 MW/ch (using 2 Analog channels), to 16 MW/ch (using 16 Analog channels) MR8847-53: Total 512 MW, 256 MW/ch (using 2 Analog channels), to 32 MW/ch (using 16 Analog channels)
Measurement functions	MEMORY (high-speed recording), RECORDER (real-time recording), X-Y RECORDER (X-Y real-time recording), FFT
Other functions	Waveform judgment (at Memory or FFT function)
Removable storage	CF card slot (standard) $\times$ 1 (up to 2GB, FAT, or FAT-32 format), SSD (128 GB, optional), USB memory stick (USB 2.0)
Printing	216 mm (8.50 in) $\times$ 30 mm (98.43 ft), thermal paper roll, Recording speed : Max. 50 mm (1.97 in)/s
External interfaces	[LAN] 100BASE-TX (FTP server, HTTP server), [USB] USB2.0 compliant, series A receptacle $\times$ 1, series B receptacle $\times$ 1, (File transfer internal drive/CF card to PC, or remote control from PC)
Dimensions and mass	351 mm (13.82 in) W $\times$ 261 mm (10.28 in) H $\times$ 140 mm (5.51 in) D, 7.6 kg (268.1 oz) (main unit only)

### Input modules

Main unit MR8847-51/-52/-53 cannot operate alone.  
You must install one or more optional input modules in the unit.

ANALOG UNIT 8966 (2 ch, Voltage input)  
TEMP UNIT 8967 (2 ch, thermocouple temperature input)  
HIGH RESOLUTION UNIT 8968 (2 ch, voltage input)  
STRAIN UNIT 8969 (2 ch, strain gauge type converter amp)  
FREQ UNIT 8970 (2 ch, for frequency)  
CURRENT UNIT 8971 (2 ch, for measuring current)  
DC/RMS UNIT 8972 (2 ch, Voltage/RMS rectifier)  
LOGIC UNIT 8973 (4 terminals, 16 ch)  
DIGITAL VOLTMEETER UNIT MR8990 (2 ch, DC Voltage input)  
HIGH VOLTAGE UNIT U8974 (2ch, voltage input)

### Generator modules

ARBITRARY WAVEFORM GENERATOR UNIT U8793 (2 ch)  
WAVEFORM GENERATOR UNIT MR8790 (4 ch)  
PULSE GENERATOR UNIT MR8791 (8 ch)

## MEMORY HiCORDER MR8875

Model No. (Order Code)

**MR8875** (Max. 16-60ch, 32MW memory, main unit only)



### 1000 V Direct Input Multi-channel Logger

- 1000V input and instantaneous DC or RMS waveform measurement with new Analog Unit MR8905
- Tough against vibrations and extreme temperatures, with strengthened body ideal for in-vehicle testing and road tests
- 3 different power supplies
- Mixed Measurement of Various Signals, Install input modules according to your specific needs
- Save directly to the SD Card in real time for uninterrupted long-term logging

### Basic specifications

Number of input units	Up to 4 units
Number of channels	Max. 16 analog channels (Max. 60 channels when using the MR8902) + standard 8 logic channels + 2 pulse channels
Measurement ranges (20 div full-scale)	5 mV to 10 V/div, 11 ranges (when using the MR8901), 500 mV to 50 V/div, 7 ranges (when using the MR8905), resolution : 1/1250 of range
Max. rated voltage	[Between terminals] 150 V DC, [Between terminal to earth] 100 V AC, DC (when using the MR8901)
Frequency characteristics	DC to 100 kHz (-3 dB, when using the MR8901)
Time axis	200 $\mu$ s to 5 min/div, 21 ranges, sampling period: 1/100 of range, External sampling possible
Max. sampling rate	[Using MR8901] 500 kS/s (2 $\mu$ s period, all channels simultaneously) [Using MR8902] 10 ms (all input channels are scanned at high speed during every recording interval) [Using MR8903] 200 kS/s (5 $\mu$ s period, all channels simultaneously) External sampling: 200 kS/s (5 $\mu$ s period)
Measurement functions	High-speed function (high speed recording), Real-time calculation between channels, FFT calculation, or other functions
Removable storage	SD card slot $\times$ 1, USB 2.0 memory
Communication interfaces	LAN: 100BASE-TX (DHCP, DNS supported, FTP server/client, WEB server, send E-mail, command control) USB: USB 2.0 compliant, series mini-B receptacle $\times$ 1 (setting / measure with communication command, or file transfer SD card to PC), series A receptacle $\times$ 2 (USB memory, USB mouse/ key-board)
Power supply	1) AC adapter Z1002: 100 to 240 V AC (50/60 Hz), 56 VA 2) Battery pack Z1003: 7.2 V DC, 36 VA, continuous operation time: 1 hour with back light ON (AC adapter has priority when used in combination with battery pack), Charges while installed in the MR8875, recharging time: 3 hours 3) External DC Power: 10 to 28 V DC, 56 VA, (please contact your HIOKI distributor for connection cord)
Dimensions and mass	298 mm (11.73 in)W $\times$ 224 mm (8.82 in)H $\times$ 84 mm (3.31 in)D, 2.4 kg (84.7 oz), (excluding input units and the Battery pack Z1003)

### Input modules

Main unit cannot operate alone.  
You must install one or more optional input modules in the unit.

(4ch, Voltage measurement) (15ch, Voltage / Thermocouple measurement)  
(4ch, Voltage measurement, Strain gauge converter input)(Up to 15 analog channels each equivalent to a 16-bit analog signal, and up to 16 logic channels each equivalent to a 1-bit logic signal)  
(2ch, High-voltage DC/RMS measurement)

# Data Acquisition / Oscilloscopes

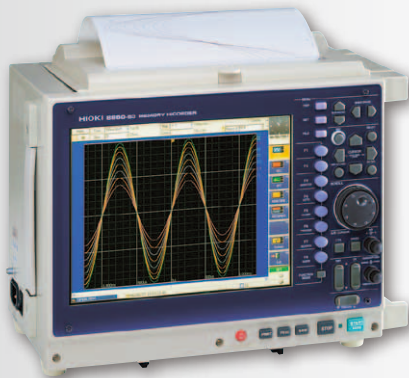
Memory HiCorders can not operate alone. You must purchase optional input modules and input cords separately.

## MEMORY HiCORDER 8860-50/8861-50

Model No. (Order Code)

**8860-50** (main unit only, input modules up to 4 units)

**8861-50** (main unit only, input modules up to 8 units)



### Logger & Oscilloscope, in a single unit

- The capacity of the memory up to 2GW (8861-50)
- 20 MS/s high-speed sampling (with 8956 Analog Unit)
- Multi-channel logging on up to 64 or 128 channels (with 8958 Scanner Unit)
- Dual-timebase sampling for simultaneous fast and slow monitoring



Input modules

#### Input modules

*The Memory HiCorder 8860-50 and 8861-50 cannot operate alone. You must install one or more optional input modules in the unit.*

ANALOG UNIT 8956 (2 ch, Voltage input)  
HIGH RESOLUTION UNIT 8957 (2 ch, Voltage input)  
16ch SCANNER UNIT 8958 (16 ch, Voltage or Temperature input with thermocouple)  
DC/RMS UNIT 8959 (2 ch, Voltage or RMS rectifier)  
STRAIN UNIT 8960 (2 ch, Distortion measurement for strain gauge converter)  
HIGH VOLTAGE UNIT 8961 (2 ch, Voltage input)  
ANALOG UNIT 8936 (2 ch, Voltage input)  
VOLTAGE/TEMP UNIT 8937 (2 ch, Voltage or Temperature input with thermocouple)  
STRAIN UNIT 8939 (Distortion measurement for strain gauge converter, not CE Marked)  
F/V UNIT 8940 (2 ch, Frequency, Voltage input, Current input with clamp-on sensor)  
4ch ANALOG UNIT 8946 (4 ch, Low voltage input)  
CHARGE UNIT 8947 (2 ch, Charge-output type piezoelectric acceleration pick-up sensor)

#### Factory-installed options (Must specify when ordering)

*Memory boards are not built in as a standard feature. Choose one board for Model 8860-50, and two of the same capacity for the 8861-50, for factory pre-installation.*

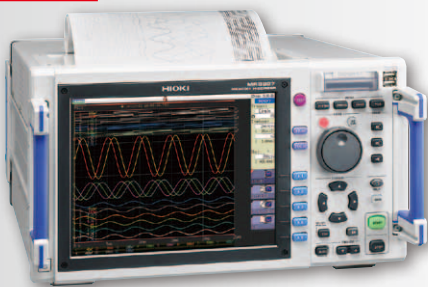
MEMORY BOARD 9715-50 (32 Megaword capacity)  
MEMORY BOARD 9715-51 (128 Megaword capacity)  
MEMORY BOARD 9715-52 (512 Megaword capacity)  
MEMORY BOARD 9715-53 (1 Gigaword capacity)  
HD UNIT 9718-50 (Built in type, 80 GB)  
MEMORY BACKUP UNIT 9719-50  
A4 PRINTER UNIT 8995  
A6 PRINTER UNIT 8995-01  
DC POWER UNIT 9684  
PROBE POWER UNIT 9687

Basic specifications	8860-50	8861-50
Number of channels	Max. 16 analog channels (Max. 64 channels when using the 8958) + standard 16 logic channels	Max. 32 analog channels (Max. 128 channels when using the 8958) + standard 16 logic channels
Measurement ranges	5 mV to 20 V/div, 12 ranges (when using the 8956), Resolution: 1/100 of range, 20 div f.s.	
Max. allowable input	DC 400V (when using the 8956)	
Frequency characteristics	DC to 10 MHz (-3dB, when using the 8956)	
Time axis (MEM)	5 $\mu$ s to 5 min/div, 26 ranges, sampling period: 1/100 of range, external sampling, dual timebase possible	
Memory capacity	12-bits $\times$ 32M-words/ch (1ch at 8860-50, 2ch at 8861-50) to 2M-words/ch (16ch at 8860-50, 32ch at 8861-50) *Memory capacity can be expanded 32 times. (Optional memory board)	
Measurement functions	MEM (high-speed recording) REC (real-time recording) REC & MEM (realtime recording + high-speed recording) FFT (frequency analysis) Real-time Save (records directly to storage media)	
Removable storage	USB 2.0 memory $\times$ 3, PC card Type II slot $\times$ 2, Hard disk drive (option) $\times$ 1	
External interfaces	USB 2.0, LAN, Monitor output (15 pin D-sub output), *GP-IB is Not Available	
Trigger types	Level/Window/Period/Glitch/Slope/Voltage drop/Event setting/Logic pattern	
Dimensions and mass (printer not installed)	330 mm (12.99 in) W $\times$ 250 mm (9.84 in) H $\times$ 184.5 mm (7.26 in) D, 8 kg (282.2 oz)	330 mm (12.99 in) W $\times$ 250 mm (9.84 in) H $\times$ 284.5 mm (11.20 in) D, 10.5 kg (370.4 oz)

## MEMORY HiCORDER MR8827

**NEW**

### The next generation of Memory HiCorders that deliver multi-channel waveform recording of a diverse array of signals



- 32 analog + 32 logic channels to 28 analog + 64 logic channels
- High-speed sampling up to 20MS/s with fully isolated inputs
- Safe measurement with all isolated analog inputs
- Large capacity memory of total 512M-words
- Measure various system signals from high voltage to ultra low voltage simultaneously

Model No. (Order Code)

**MR8827** (Max. 32ch, 512MW memory, main unit only)

Basic specifications	
Number of channels	[16 analog input modules]: 32 analog channels + 32 logic channels [14 analog input modules + 2 logic input modules]: 28 analog channels + 64 logic
Measurement ranges (20 div full-scale)	[Analog unit 8966]: 5 mV/div to 20 V/div, 12 ranges, resolution: 1/100 of range (using 12-bit A/D) [High resolution unit 8968]: 5 mV/div to 20 V/div, 12 ranges, resolution: 1/1600 of range (using 16-bit A/D) [Digital voltmeter unit MR8990]: 100 mV f.s. to 1000 V f.s., 5 ranges, resolution: 1/1000,000 of range (using 24-bit A/D)
Max. allowable input	500 V DC (using the MR8990), 400 V DC (using the 8966/8968)
Frequency characteristics	DC to 5 MHz (-3 dB, using the 8966), DC to 100 kHz (-3 dB, using the 8968), N/A (using the MR8990)
Time axis (MEM)	5 $\mu$ s to 5 min/div, 26 ranges, at 100 points/div resolution
Memory capacity	128M-words/ch (using 4 Analog channels) to 16M-words/ch (using 32 Analog channels), Total capacity 512MW memory
Measurement functions	Memory (high-speed recording), Recorder (real-time recording), X-Y recorder, FFT
Other functions	Numerical calculation, Waveform processing, Waveform judgment (at Memory, or FFT function)
Data storage media	USB memory stick, CF card, Built-in SSD unit (option, 128GB)
Printing	216 mm (8.50 in) $\times$ 30 mm (98.43 ft), thermal paper roll, Recording speed: Max. 50 mm (1.97 in)/s
External interfaces	LAN: 100BASE-TX, USB 2.0 series A receptacle 2 port (for USB memory, mouse) USB 2.0 series B receptacle (for communication to PC, mass storage)
Dimensions and mass (main unit only)	401 mm (15.79 in)W $\times$ 233 mm (9.17 in)H $\times$ 388 mm (15.28 in)D (including protruding parts except handle) 12.6 kg (444.4 oz)

#### Input modules

*MR8827 cannot operate alone. You must install one or more optional input modules in the unit.*

ANALOG UNIT 8966 (2 ch, Voltage input)  
TEMP UNIT 8967 (2 ch, thermocouple temperature input)  
HIGH RESOLUTION UNIT 8968 (2 ch, voltage input)  
STRAIN UNIT 8969 (2 ch, strain gauge type converter amp)  
FREQ UNIT 8970 (2 ch, for frequency)  
CURRENT UNIT 8971 (2 ch, for measuring current)  
DC/RMS UNIT 8972 (2 ch, Voltage/RMS rectifier)  
LOGIC UNIT 8973 (4 terminals, 16 ch)  
DIGITAL VOLTMEETER UNIT MR8990 (2 ch, DC Voltage input)  
HIGH VOLTAGE UNIT U8974 (2ch, voltage input)

#### Generator modules *Must specify when ordering*

ARBITRARY WAVEFORM GENERATOR UNIT U8793 (2 ch)  
WAVEFORM GENERATOR UNIT MR8790 (4 ch)  
PULSE GENERATOR UNIT MR8791 (8 ch)

#### Factory-installed option

SSD UNIT U8330 (Built-in type, 128 GB)  
PRINTER UNIT U8350



# Data Acquisition / Oscilloscopes

Memory HiCorders can not operate alone. You must purchase optional input modules and input cords separately.

## MEMORY HiCORDER MR8870

Model No. (Order Code)  
**MR8870-20** (2ch)



**A Single Memory Recorder that can Observe Waveforms like an Oscilloscope and Record RMS Value Fluctuations**

- Mode for recording instantaneous waveform and RMS fluctuations
- Save values in real time to a CF card
- Record four channels at once by synchronizing two instruments with the bundled PC application
- Fast, 1MS/s performance despite the compact size
- Built-in, compact-yet-sharp QVGA-TFT wide LCD
- Compact and easy to carry
- Easy, intuitive operation

### Basic specifications

Number of channels	2 analog channels + 4 logic channels (standard) Note: Isolated analog channels, isolated input and frame, logic has common GND
Measurement ranges	10 mV to 50 V/div (10 div full-scale), 12 ranges, Resolution: 1/100 of range
Max. allowable input	Between terminals: 400 VDC, Between terminal to earth: 300 VAC, DC CAT II
Frequency characteristics	DC to 50 kHz (-3 dB)
Time axis (MEM)	100 $\mu$ s to 5 min/div, 20 ranges, at 100 points/div resolution
Recording intervals (RMS)	1 ms to 1 min., 16 settings, sampling period: 200 $\mu$ s (fixed)
Measurement functions	Memory recorder (high speed recording), RMS recorder (50/60 Hz, DC only)
Removable storage	CF card TYPE I slot $\times$ 1 (Up to 2 GB)
Power supply	[AC Adapter Z1005] 100 to 240 VAC (50/60 Hz), 30 VA max. (when using the AC adapter and charging the 9780 with the instrument) [Battery Pack 9780] 3 VA, continuous operating time of approx. 2 hr. (25°C reference value; when used with the Z1005, the Z1005 takes priority), charging time of 200 min. using the AC adapter (25°C reference value) (option) [External DC power] 10 to 16 V, 10 VA max. (connection cord of 3 m or less is available by special-order)
Dimensions and mass	176 mm (6.93 in)W $\times$ 101 mm (3.98 in)H $\times$ 41 mm (1.61 in)D, 600 g (21.2 oz) (with the Battery pack 9780 installed)

## MEMORY HiCORDER MR8880

Model No. (Order Code)  
**MR8880-20** (4ch, printer unit option)



**Capture high- to low-voltage signals in a single device**

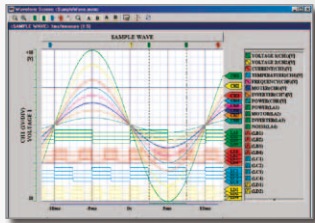
- CAT III 600V isolation performance; directly measure a 480V power line
- 4 completely isolated channels let you simultaneously record data on a 3-phase power line plus have one extra channel
- Tough against harsh environments; -10°C to 50°C operating temperature range
- Built to withstand mechanical shocks and vibrations (ships standard with side protectors)
- Make settings easily with PRESETS function

### Basic specifications

Number of channels	4 analog channels + 8 logic channels (standard) Note: Isolated analog channels, isolated input and frame, logic has common GND
Measurement ranges	10 mV to 100 V/div (10 div full-scale), 13 ranges, resolution: 1/640 of range
Max. allowable input	Between terminals: 600 V AC/DC Between terminal to earth: 600 V AC/DC CAT III; 300 V AC/DC CAT IV
Frequency characteristics	DC to 100 kHz ( $\pm$ 3dB)
Time axis	High-speed: 100 $\mu$ s to 100 ms/div, 10 ranges, Sampling period: 1/100 of range
Recording intervals (Real-time function)	100 $\mu$ s to 1 minute, 19 selections (simultaneous sampling in all channels)
Measurement functions	High-speed function, Real-time function (actual time recording)
Removable storage	CF card slot $\times$ 1 (Up to 2 GB), USB 2.0 memory $\times$ 1
Power supply	[AC adapter Z1002] 100 to 240 V AC (50/60 Hz), 45 VA (include AC adapter, when Real-time recording), 107 VA (include AC adapter, when Real-time recording and printing) [Battery pack Z1000] AC adapter has priority when used in combination with battery pack, recharge with AC adapter 3 hours, Continuous use 3 hours (with back-light ON) [LR6 (AA) alkaline batteries] $\times$ 8, Continuous use 40 minutes, (with back-light ON, cannot be used with the Printer unit) [DC power supply] 10 to 28 V DC (cable available by special order)
Dimensions and mass	205 mm (8.07 in)W $\times$ 199 mm (7.83 in)H $\times$ 67 mm (2.64 in)D, 1.66 kg (58.6 oz) (with the Battery pack installed)

## WAVE PROCESSOR 9335

Model No. (Order Code)  
**9335**



**Display, Convert, Calculate, and Print Waveforms with a PC**

- Display waveform screens, X-Y graphs, and numerical results
- Rich printing and hard copy functions to assist in creating reports
- Save in CSV format and export to spreadsheet application (EXCEL)

### Basic specifications

Operating environment	Computer running under Windows 10/8/7 (32/64-bit), Vista (32-bit), XP
Display functions	Waveform display, X-Y display, Digital value display, Cursor function, Scroll function, Maximum number of channels (32 channels analog, 32 channels logic), Gauge display (time, voltage axes), Graphical display
File loading	Readable data formats (.MEM, .REC, .RMS, .POW), Maximum loadable file size: Maximum file size that can be saved by a given device (file size may be limited depending on the computer configuration)
Data conversion	Conversion to CSV format, Tab delimited, Space delimited, Data culling (simple), Convert for specified channel, Batch conversion of multiple files
Other	Parameter calculation, Search, Clipboard copy, Launching of other applications
Print functions	Printing image file output (expanded META type, ".EMF"), Supported printer: usable on any printer supported by operating system Print formatting: (1 up, 2-to-16 up, 2-to-16 rows, X-Y 1-to-4 up, preview, hard copy)

Depending on the version of 9335, there is a model that can not be used. Please check the specifications of the Memory HiCorder.

## iPad App for Memory HiCorder HMR Terminal



**Analyze Memory HiCorder waveforms right on your iPad**

- Free app (exclusively for iPad) downloadable from the App Store
- iPad-unique gestures let you analyze measurement data any way you like
- Multi-channel support - up to 32 channels of waveform data at your fingertips

### Outline specifications

Supported models	MR8740, MR8741, MR8847-01/-02/-03, MR8847-51/-52/-53, MR8827, 8847 * calculated waveforms and logical waveforms not supported
Operating environment	iOS on the iPad (Apple Inc.)
Functions	<ul style="list-style-type: none"> <li>• Data acquisition: Send to iPad via FTP using a WiFi router, or load to iPad via iTunes (PC app)</li> <li>• Intuitively operate waveform level searches, maximum / minimum / average values, zero position adjustment, and more at your fingertips</li> <li>• Waveform monitoring</li> <li>• Meter setting</li> <li>* Logic waveforms and computational waveforms are not supported.</li> </ul>

Data can be viewed by the iPad using Hioki's dedicated apps available from the App Store. Search for "HIOKI" and download the "HMR Terminal" app.



\*iOS is a registered trademark of Cisco Technology, Inc. and/or its affiliates in the United States and certain other countries.  
\*iPhone, iPad, iPad mini, iPad Pro and iPod touch are trademarks of Apple Inc.  
\*Apple and the Apple logo are trademarks of Apple Inc. App Store is a service mark of Apple Inc.



# Data Loggers

Battery pack is sold separately

Countries where wireless use is supported: Japan, the USA, Canada, the EU, and other licensed countries

For an updated list of supported countries and regions, please visit [www.hioki.com](http://www.hioki.com).

## Use for measurement applications like these...

- Measuring the charging and discharging of batteries
- Measuring the temperature of solar panels
- Capturing a range of data at wind power installations
- Measuring temperature in agricultural greenhouses
- Measuring environmental conditions in living spaces

- Measuring variations in body temperature caused by water pressure (while installed in a wetsuit)
- Measuring temperature distribution in electromagnetic cooking appliances
- Measuring heat island phenomena
- Measuring the temperature distribution in clothing and bedding
- Measuring the temperature distribution in seawater
- Measuring temperature in geothermal power generation
- Measuring the temperature distribution in forests and soil



## WIRELESS LOGGING STATION LR8410

Model No. (Order Code) **LR8410-20**  
(English model, main unit only)



The LR8410-20 alone is not capable of making measurements. One or more input modules are necessary to measure.  
LR8410-20 alone is not capable of making measurements. One or more input modules are necessary to measure.

## Logging Multi-point Data Has Never Been So Easy with a Wireless Logger

- Capture logging data using Bluetooth® wireless technology. Install logging modules in hard-to-reach locations (over line-of-sight distances of up to 30 meters \*1) (\*1) The presence of obstructions may shorten this range
- Choose an input unit based on the parameters you wish to measure (LR8410/LR8415: 15-channel, Wireless mini logger series: 1 or 2-channel)
- Easily add up to 7 input units wirelessly to keep your environment free of tangled wires (for a total of up to 105 channels when using 15-channel units)
- Quick Set guide makes configuration a breeze

### Basic specifications (LR8410)

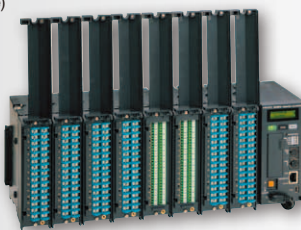
Number of channels	Connect up to seven LR8510 series units wirelessly (using Bluetooth® wireless technology) to measure or collect data from up to 105 channels.
Recording intervals	100 ms(*), 200 ms to 1 hour, 16 selections (All input channels are scanned within each recording interval.) (*) Setting not available when the thermocouple burnout detection setting is on
Data storage	Internal memory: 8 M-words, Data storage media: SD memory card or USB memory stick (Only data recorded to a genuine HIOKI SD memory card is guaranteed)
Functions	Save waveform data in real time to the SD memory card or USB memory stick, Numerical value calculations, Waveform calculations, 4ch alarm output (not isolated, common ground), and others
Interface	LAN: 100BASE-TX, USB 2.0 series mini-B receptacle ×1
Power supply	[AC adapter] Using the AC adapter Z1008 (100 to 240 V AC, 50/60 Hz), 45 VA Max. (including AC adapter), 15 VA Max. (exclusive of AC adapter) [Internal battery] Using the Battery pack Z1007 (optional accessory), 3 hours of continuous use (at 23 °C reference data), 7 VA Max. [External power] 10 to 28 V DC, 15 VA Max. (Please contact your HIOKI distributor for connection cord)
Dimensions and mass	230 mm (9.06 in) W × 125 mm (4.92 in) H × 36 mm (1.42 in) D, 700 g (24.7 oz) (excluding Battery pack)

### Basic specifications (LR8510/LR8511)

WIRELESS UNIVERSAL UNIT LR8511	15 analog channels; isolated scanning method input (4 terminals: push-button type) [Voltage] ±10 mV to ±100 V, 1-5 V f.s., max. 500 nV resolution [Temperature: Thermocouples] -200 °C to 2000 °C (depends on sensor), Thermocouples (K, J, T, or other), max. 0.01 °C resolution [Temperature: Pt 100, JPt 100 sensor] -200 °C to 800 °C, max. 0.01 °C resolution (not isolated between channels) [Resistance] 0 Ω to 200 Ω f.s., max. 0.5 mΩ resolution (not isolated between channels) [Humidity] 5.0 to 95.0 % rh (use with optional sensor), 0.1 % rh resolution (not isolated between channels)
WIRELESS VOLTAGE/TEMP UNIT LR8510	15 analog channels; isolated scanning method input (2 terminals: M3 screw type) [Voltage] ±10 mV to ±100 V, 1-5 V f.s., max. 500 nV resolution [Temperature: Thermocouples] -200 °C to 2000 °C (depends on sensor), Thermocouples (K, J, T, or other), max. 0.01 °C resolution
Max. rated voltage from isolated terminals to ground	300 V AC, DC (max. voltage from terminals to chassis ground without damage)
Power supply	[AC adapter] Using the AC adapter Z1008 (100 to 240 V AC, 50/60 Hz), 23 VA Max. (including AC adapter), 7 VA Max. (exclusive of AC adapter) [Internal battery] Using the Battery Pack Z1007 (optional accessory), 24 hours of continuous use (at 100 ms recording interval, 23 °C reference data), 120 hours of continuous use (at 1 minute recording interval, 23 °C reference data), 0.4 VA Max. [External power] 10 to 28 V DC, 7 VA Max.
Dimensions and mass	150 mm (5.91 in) W × 90 mm (3.54 in) H × 56 mm (2.20 in) D, 340 g (12.0 oz)

## MEMORY HiLOGGER 8423

Model No. (Order Code)  
**LR8423**  
(main unit only)



## 600-channel Data Logger with 10ms Sampling

- Capture data with 15 to a maximum of 600 channels
- Send data to the PC in real time
- Isolated to sustain up to 600 V between modules and earth
- USB 2.0, LAN 100BASE-TX, store to 1GB PC Card
- Simultaneous fast- and low-speed sampling allows for media storage space efficiency

### Basic specifications

No. of connectable units	Max. 8 units (total 120 channels), Bundle 8 modules together to achieve a 120-ch system, Bundle 5 systems together to enable a maximum of 600 channels of simultaneous recording
Measurement parameters Model 8948	[No. of channels] 15 analog channels, isolated scanning method input (2 terminals: M3 screw type) [Voltage measurement range] ±150 mV to ±100 V, 1-5V, Max. resolution 5 μV, Max. allowable input: 100 VDC, between channels: 200 VDC, to earth: 600 VAC/DC [Temperature range] -200 °C to 2000 °C (depend on the sensor), thermocouples (K, J, E, T, N, R, S, B, W), Max. resolution 0.01 °C
Measurement parameters Model 8949	[No. of channels] 15 analog channels, isolated scanning method input (4 terminals: push-button type) (not isolated between channels at resistance temperature sensor & humidity sensor) [Voltage measurement range] ±150 mV to ±60 V, 1-5V, Max. resolution 5 μV, Max. allowable input: 60 VDC, between channels: 120 VDC, to earth: 600 VAC/DC [Temperature range] -200 °C to 2000 °C (depend on the sensor), thermocouples (K, J, E, T, N, R, S, B, W), Max. resolution 0.01 °C [Resistance temperature sensor range] -200 °C to 800 °C, (Pt 100, JPt 100), Max. resolution 0.01 °C [Humidity] 5.0 to 95.0 % rh, (use with optional sensor), resolution 0.1 % rh
Measurement parameters Model 8996	[No. of channels] 15 channels, digital/pulse input (2 terminals: M3 screw type, CH1-5, CH6-10, CH11-15 are common GND, No-voltage 'a' contact, open collector or voltage input) [Totalized pulses] 0 to 1000M pulse, Max. resolution 1 pulse [Rotation count] 0 to 5000/n (r/s), Resolution 1/n (r/s) *n = pulses per rotation (1 to 1,000) [Digital input] Record ON/OFF digital signal per interval [Max. allowable input] 50 VDC, between channels: 33 VACrms or 70 VDC, to earth: 600 VAC/DC, (Upper limit voltage that does not cause damage when applied between CH1-5, CH6-10, CH11-15 each channel and chassis, and between each UNITS)
Recording intervals	10 ms to 1 hr, 19 ranges (5s to 1hr when combined with humidity measurement), Dual sampling: Recording intervals can be specified for every input module (high-speed and low-speed)
Function	Measurement data are saved to the CF Card in real time, Trigger function, Digital filter (Input unit), Alarm output (use with the Alarm unit 8997), Data acquisition is controlled by the PC data acquisition program, FTP server function, HTTP server function
Power supply	Using the AC adapter 9418-15 (100 to 240 V, 50/60 Hz), 55 VA Max. (include AC adapter), 20 VA Max. (main unit only) (when connected with 8 units), External DC Power: 9.6 V to 15.6 VDC, 20 VA Max. (when connected with 8 units) (Please contact HIOKI for connection cord)
Dimensions and mass	67 mm (2.64 in) W × 133 mm (5.24 in) H × 125 mm (4.92 in) D, 600 g (21.2 oz) (main unit 8423 only)

# Data Loggers

Battery pack is sold separately

## MEMORY HiLOGGER LR8400 Series

### Portable Handheld 30- to 60- channel Data Loggers with 10ms Simultaneous Sampling



Built-in units cannot be removed or changed

- Compact size despite 30-channel standard capabilities
- Write data to USB memory stick or CF card in real-time
- Expand up to 30 additional channels
- Protected against unexpected power outages
- Built in with USB 2.0 or 100 BASE-TX LAN interfaces
- 5.7" TFT color display

Model No. (Order Code)

**LR8400-20** (Voltage/temp unit LR8500 ×2, 30 ch, English model)

**LR8401-20** (Universal unit LR8501 ×2, 30 ch, English model)

**LR8402-20** (Universal unit ×1, Voltage/temp unit ×1, 30 ch, English model)

#### Basic specifications

Analog input Universal unit LR8501 Actual functionality will depend on combination of units installed *Note: Isolated from each channel to chassis*

Number of channels	15 analog channels; isolated scanning method input (4 terminals: push-button type)
Voltage	±10 mV to ±100 V, 1-5 V f.s. Max. resolution: 500 nV, (Isolated between channels and from each channel to chassis)
Temperature: Thermocouples	-200 °C to 2000 °C (depends on sensor), Thermocouples (K, J, E, T, N, R, S, B, W), Max. resolution 0.01 °C, (Isolated between channels and from each channel to chassis)
Temperature: Pt 100, JPt 100 sensor	-200 °C to 800 °C, Max. resolution 0.01 °C (Not isolated between channels)
Resistance	0 Ω to 200 Ω f.s. Max. resolution 0.5 mΩ (Not isolated between channels)
Humidity	5.0 to 95.0 % rh (use with optional sensor), resolution 0.1 % rh, (Not isolated between channels nor from each channel to chassis)
Other	[Max. rated voltage between isolated input channels] 300 V DC, [Max. allowable input] ±100 V DC, [Max. rated voltage from isolated terminals to ground] 300 V AC, DC

Analog input Voltage/temp unit LR8500 Actual functionality will depend on combination of units installed *Note: Isolated from each channel to chassis*

Number of channels	15 analog channels; isolated scanning method input (2 terminals: M3 screw type)
Voltage	±10 mV to ±100 V, 1-5 V f.s. Max. resolution: 500 nV, (Isolated between channels and from each channel to chassis)
Temperature: Thermocouples	-200 °C to 2000 °C (depends on sensor), Thermocouples (K, J, E, T, N, R, S, B, W), Max. resolution 0.01 °C, (Isolated between channels and from each channel to chassis)
Humidity	5.0 to 95.0 % rh (use with optional sensor), resolution 0.1 % rh, (Not isolated between channels nor from each channel to chassis)
Other	[Max. rated voltage between isolated input channels] 300 V DC, [Max. allowable input] ±100 V DC, [Max. rated voltage from isolated terminals to ground] 300 V AC, DC

#### Common specifications

Pulse, Digital input	[No. of channels] 8 channels, pulse / digital selectable for each channel, M3 screw terminal, not isolated, common ground [Pulse totalization] 0 to 1000 M pulse, 1 range (No-voltage 'a' contact; normally open, open collector or voltage input), Max. resolution 1 pulse [Rotation count] 0 to 5000 /n (r/s) f.s. 1 range (same as Pulse totalization input signal condition), resolution 1/n (r/s) Note: "n" is the number of sensor output pulses per revolution, 1 to 1000 [Digital input] Record logical "1" or "0" at each sampling, [Max. rated voltage between input channels] Not isolated, [Max. allowable input] 0 to 50 V
Power supply	[AC adapter] 9418-15 (100 to 240 V AC, 50/60 Hz), 7 VA [Battery pack] Z1000 (optional accessory), Continuous use 5 hr [External power] 10 to 28 V DC (Please contact your HIOKI distributor for connection cord)
Dimensions and Mass	272 mm (10.71 in) W × 182.4 mm (7.18 in) H × 66.5 mm (2.62 in) D, 1.8 kg (63.5 oz), (LR8400-20 main unit, excluding the Battery Pack 370 g / 13.1 oz)

## MEMORY HiLOGGER LR8431

Model No. (Order Code) **LR8431-20**  
(10ch, English model)



### Portable Handheld 10-isolated channel Data Logger with 10ms Simultaneous Sampling

- Record measurement data on a USB flash drive for easy transfer to a computer
- Improved thermocouple measurement accuracy and reference junction compensation accuracy
- Replace storage media during real-time recording
- Noise-resistant measurement circuitry for improved readings

#### Basic specifications

Number of channels	[Analog] 10 isolated channels using scanning input method (M3 mm dia. screw terminal block) [Pulse] 4 channels (All pulse inputs share common ground with the main unit)
Measurement range	[Voltage] ±100 mV to ±60 V, 1-5V f.s. 6 ranges, Max. resolution 5μV [Temperature (thermocouples)] -200 °C to 1800 °C (depend on the sensor) 1 range (K, J, E, T, N, R, S, B), Max. resolution 0.1 °C [Totalized pulses] 0 to 1000M pulse, 1 range (No-voltage 'a' contact, open collector or voltage input), Max. resolution 1 pulse [Rotation count] 0 to 5000/n (r/s) f.s. 1 range (No-voltage 'a' contact, open collector or voltage input), Resolution 1/n (r/s) Note: n = pulses per rotation (1 to 1,000)
Recording intervals	10 ms to 1 hour, 19 selections (All input channels are scanned within each recording interval)
Functions	Save data to the CF card or USB memory stick in real time, Numerical Calculations, etc.
External interface	USB 2.0 mini-B receptacle ×1
Power supply	[AC adapter] Z1005, 100 to 240 VAC (50/60 Hz) [Battery pack] 9780, Continuous use 2.5 hours [12 V DC supply] 10 to 16 V (please contact HIOKI distributor for cable)
Dimensions and mass	176 mm (6.93 in) W × 101 mm (3.98 in) H × 41 mm (1.61 in) D, 550 g (19.4 oz) (Battery pack 9780 not installed)

## HEAT FLOW LOGGER LR8432

Model No. (Order Code) **LR8432-20**  
(English model)



### Compact & Lightweight Heat Flow Logger for Analyzing the Causes of Temperature Change

- Use a heat flow sensor to measure the movement and volume of heat energy
- Easily analyze temperature and heat flow
- Replace storage media during real-time recording

#### Basic specifications

Specialized functions for heat flow measurement	[Easy scaling settings] directly enter the sensitivity of the heat flow sensor [Calculations] waveform processing function for the analysis of temperature and heat flow (Simple average, moving average, integration, heat transmission coefficient), Integration with numerical calculations
Voltage measurement range	±10 mV to ±60 V, 1-5V, Max. resolution 500 nV
Other	Basic specifications are the same as the model LR8431

#### Heat flow sensor (option)

##### Measurement of small parts and curved surfaces of piping

Waterproof characteristics : IP06, IP07



Small parts



Curved surfaces

Select from 3 sizes

31.6 mm (1.24 in)

9.1 mm (0.36 in)

54.1 mm (2.13 in)

S size M size L size

Cord length: 1.5 m (4.92 ft)

Model Z2012

Model Z2013

Model Z2014

Cord length: 5 m (16.40 ft)

Model Z2015

Model Z2016

Model Z2017



# Data Loggers

Countries where wireless use is supported: Japan, the USA, Canada, the EU, and other licensed countries  
For an updated list of supported countries and regions, please visit [www.hioki.com](http://www.hioki.com).

## WIRELESS MINI LOGGER series

### Easy, wireless collection of a variety of data types

- Connect to a tablet, smartphone, or PC for easy, wireless data collection
- Instrument can store 500,000 data points per channel

■ Data can be downloaded using Hioki's tablet and smartphone app (for Android devices).  
Search for "HIOKI" and download the Wireless Logger Collector!



#### Android Terminal

##### Setting, Measurement, Data collection

- Use your Android terminal to set and send measurement conditions, such as the recording interval, to the logger to begin measurement.
- Collect the data recorded in the logger after or even during measurement. (Collection software acquisition: Download from Google Play)

##### Data analysis

- Connect a USB cable to transfer the data to a PC. Use the bundled software, "Logger Utility," to perform analysis.

#### Windows PC

##### Setting, Measurement, Data collection

Use your Windows PC to set and send measurement conditions, such as the recording interval, to the logger to begin measurement. Collect the data recorded in the logger after or even during measurement.

##### Data analysis

Start "Logger Utility" and perform analysis at the touch of a button.

Basic specifications	WIRELESS PULSE LOGGER	WIRELESS CLAMP LOGGER	WIRELESS HUMIDITY LOGGER	WIRELESS VOLTAGE/ TEMP LOGGER	WIRELESS FUNGAL LOGGER
Model No. (Order Code)	LR8512	LR8513	LR8514	LR8515	LR8520
Physical appearance		 <i>Current and leak current that occur intermittently cannot be measured.</i>			
Number of channels	2 channels (common GND)	2 channels (common GND)	2 ch for temperature + 2 ch for humidity (2 sensors can be attached)	2 channels	1 ch for temperature + 1 ch for humidity (1 sensor can be attached)
Measurement items	Pulse, no. of revolutions, logic	AC load current, DC load current, AC leak current (using current sensor)	Temperature Humidity	Voltage Thermocouple (K, T)	Fungal index, Growth prediction, Temperature, Humidity
Measurement range	Pulse: 0 to 1000M pulse No. of revolutions: 0 to 5000/n [r/s]	AC: 500.0 mA to 2000 A DC: 10.00 A to 2000 A (using current sensor)	Temperature: -40 °C to 80 °C Humidity: 0% rh to 100% rh	Voltage: -50 V to 50 V Thermocouple (K): -200°C to 999.9°C Thermocouple (T): -200°C to 400°C	Temperature: -40 °C to 80 °C Humidity: 0% rh to 100% rh (Calculates fungal index from temperature and humidity.)
Basic accuracy		±0.5% rdg ±5 dgt. (DC, AC 50 Hz/60 Hz)	Temperature: ±0.5 °C Humidity: ±3% rh	Voltage: ±0.05 mV Thermocouple: ±0.6 °C	Temperature: ±0.5 °C Humidity: ±3% rh
Dimensions and mass (Not including the battery)	85W×61H×31D mm (3.35W×2.40H×1.22D in), 95 g (3.4 oz)	85W×75H×38D mm (3.35W×2.95H×1.50D in), 130 g (4.6 oz)	85W×61H×31D mm (3.35W×2.40H×1.22D in), 95 g (3.4 oz)	85W×75H×38D mm (3.35W×2.95H×1.50D in), 126 g (4.4 oz)	85W×61H×31D mm (3.35W×2.40H×1.22D in), 95 g (3.4 oz)
Other	CONNECTION CABLE L1010 is bundled	Clamp sensor is sold separately	Humidity sensor is sold separately	Thermocouples sold separately	Humidity sensor is sold separately Includes output function

## Compact Data Logger LR5000 Series

### Various Compact Data Loggers

- Easily mount the light-weight, pocket-sized loggers in tight spaces
- Measurement data is preserved even after the battery dies
- Record large amounts of data by a simple operation

*Analysis of measurement data on a PC requires the optional Communication Adapter LR5091 or Data Collector LR5092-20.*

Transfer Data from a LR5000 Series Data Logger to a PC  
Communication Adapter LR5091 or Data Collector LR5092-20 is necessary to transfer data from a LR5000 series Logger to a PC.

- Bring the data logger LR5000 series back from the field and transfer data to a PC
- Use the included software to easily graph and print data

COMMUNICATION ADAPTER LR5091  
Model No. (Order Code) LR5091  
USB cable is bundled



DATA COLLECTOR LR5092  
Model No. (Order Code) LR5091-20  
Save data from data loggers in the built-in memory or on an SD card  
USB cable is bundled  
SD memory card sold separately.



Basic specifications	HUMIDITY LOGGER	TEMPERATURE LOGGER	INSTRUMENTATION LOGGER	CLAMP LOGGER	VOLTAGE LOGGER
Model No. (Order Code)	LR5001	LR5011	LR5031	LR5051	LR5041, LR5042, LR5043
Physical appearance				 <i>Current and leak current that occur intermittently cannot be measured.</i>	
Measurement items	Temperature 1ch and humidity 1ch	Temperature 1ch	Instrumentation 1ch	AC current (2 channels)	DC voltage 1ch
Measurement range	Temperature: -40.0°C to 85°C Humidity: 0% to 100%rh	-40.0°C to 180°C *Depends on measurement range of sensor.	-30.00 to 30.00mA DC	0.00 to 1000 A AC	LR5041: -50.00 mV to 50.00 mV LR5042: -5.000 V to 5.000 V LR5043: -50.00 V to 50.00 V
Basic accuracy	Temperature: ±0.5°C (at 0°C to 35°C) Humidity: ±5%rh (at 50%rh or less, 25°C)	±0.5°C (at 0°C to 35°C)	±0.5%rdg. ±5dgt. (at 23°C±5°C)	±2.0%rdg. ±0.13% f.s. (at Main unit+ CT6500, 500.0 A range, 50/60 Hz typical value)	±0.5%rdg. ±5dgt. (at 23°C±5°C)
Other	HUMIDITY SENSOR LR9504 is bundled	Sensor is sold separately	Connection cable is bundled	Clamp sensor is sold separately	Connection cable is bundled



# Resistance Meters / Battery Testers

Depending on the model, please select and purchase the measurement probe options appropriate for your application separately.

## Use for measurement applications like these...

- Performing basic experiments using electric circuits
- Evaluating thermoelectric element materials
- Generating Cole-Cole plots for lithium-ion batteries
- Evaluating circuit board continuity and insulation resistance

- Measuring the resistance of materials such as pure iron and enamel wires
- Measuring the resistance of magnetic heads (using the low-power resistance measurement function)
- Measuring the resistance of coils, transformers, relays, switches, and printed circuit boards
- Evaluating the internal resistance of batteries and electrical double layer capacitors



## BATTERY IMPEDANCE METER BT4560

Model No. (Order Code) **BT4560**

### Variable frequency High-speed measurement

- Bundled with free PC application that can be used for measurement and drawing Cole-Cole plots.
- Extremely reliable measurements for low-impedance batteries
- \*The BT4560 uses a testing current of 1.5 A at the 3mΩ range, which improves the S/N ratio
- Circuit configuration highly tolerant of contact and wire resistance to provide stable measurements
- Simultaneous measurement of impedance and voltage



### Basic specifications

Allowable input voltage	Up to 5 V
Measured signals	Impedance, voltage, temperature
Impedance measurement	[Parameters] R, X, Z, θ, Frequency: 0.1 Hz to 1050 Hz [Measurement ranges] 3.0000 mΩ, 10.0000 mΩ, 100.000 mΩ [Testing current] 3 mΩ range: 1.5 Arms, 10 mΩ range: 500 mArms, 100 mΩ range: 50 mArms
Voltage measurement	Measurement range: 5.00000 V (single range), Measurement time: 0.1 s (Fast) to 1.0 s (Slow)
Temperature measurement	Range: -10.0 °C to 60.0 °C, Measurement time: 2.3 s
Basic accuracy	Z: ±0.4% rdg. θ: ±0.1°, V: ±0.0035% rdg. ±5 dgt., Temperature: ±0.5 °C (at 10.0 to 40.0 °C)
Functions	Comparator, self-calibration, sample delay, average, contact check, measurement current error, and other
Interfaces	RS-232C/USB (virtual COM port) * Cannot be used simultaneously, EXT. I/O (NPN/PNP can be switched)
Power supply	100 to 240 V AC, 50/60 Hz, 80 VA max
Dimensions and mass	330 mm (12.99 in) W × 80 mm (3.15 in) H × 293 mm (11.54 in) D, 3.7 kg (130.5 oz)

This product is not supplied with measurement probes.  
Please select and purchase the measurement probe options appropriate for your application separately.

## RESISTANCE METER RM3545

Model No. (Order Code) **RM3545**  
**RM3545-01** (with GP-IB interface)  
**RM3545-02** (support for the multiplexer unit)

### Featuring super-high accuracy and multi-channel capabilities (20 channels with 4-terminal measurement)

- 0.006% basic accuracy, 0.01 μΩ max. resolution, 1A max. testing current
- Measure from 0.00 μΩ (testing current 1 A) to 1200 MΩ
- Multiplexer Unit Z3003 (option) provides 20-channels of 4-terminal measurements for a complete assessment of multi-point signals (RM3545-02 only)
- Low-power resistance measurement with an open voltage not exceeding 20 mV



### Basic specifications

Resistance range	10 mΩ to 1000 MΩ range, 12 steps, Measurement accuracy: ±0.006 % rdg. ±0.001 % f.s.
Testing current	1 A DC to 1 μA or less [LP ON] 1 mA to 5 μA DC
Open-terminal voltage	20 V DC (10 kΩ range or more), 5.5 V DC max. (1000 Ω range or less) [LP ON] 20 mV DC max.
Temperature measurement	-10.0 to 99.9 °C, accuracy: ±0.50 °C (Temperature Sensor Z2001 and RM3545 combined accuracy), -99.9 to 999.9°C (analog input)
Functions	Temperature correction, temperature conversion, offset voltage compensation (OVC), comparator (ABS/REF%), BIN, key-lock (OFF, menu lock, all lock), display digit count selection function (7-digit/6-digit/5-digit), automatic power supply frequency settings (AUTO/ 50Hz/ 60Hz), scaling, judgment sound setting, auto hold, averaging, statistical calculations, panel store/panel load, D/A output.
Communication interfaces	Select from GP-IB (RM3545-01 only), RS-232C, PRINTER (RS-232C), or USB. Remote function, communications monitor function, data output function, memory (50)
Power supply	100 to 240 V AC, 50/60 Hz, Rated power consumption: 40 VA
Dimensions and mass	215 mm (8.46 in) W × 80 mm (3.15 in) H × 306.5 mm (12.07 in) D [RM3545/RM3545-01] 2.5 kg (88.2 oz), [RM3545-02] 3.2 kg (35.3 oz)

## BATTERY HiTESTER BT3563, BT3562

Model No. (Order Code)  
**BT3562, BT3563** (basic model)  
**BT3562-01, BT3563-01** (with GP-IB interface)

### High-speed evaluation of Large-cell to High-voltage Batteries

- Measure high-voltage battery packs up to 300V (BT3563)
- Evaluate lithium-ion storage batteries, nickel-metal-hydride storage batteries, and lead-acid storage batteries.
- Evaluate fuel cell stacks.



### Basic specifications

Measurement ranges	[Resistance] 3 mΩ to 3000 Ω, 7 ranges [Voltage] 6 VDC to 300 VDC, 3 ranges (300 V range: BT3563 only)
Basic accuracy (SLOW)	[Ω] ±0.5% rdg.±5 dgt., [V] ±0.01% rdg.±3 dgt.
Response time	approx. 10 ms (Response time depends on reference values and the measurement object.)
Interfaces	External I/O, RS-232C, Printer (RS-232C), GP-IB (-01 suffix models only)
Power supply	100 to 240 VAC, 50/60 Hz, 30 VA max.
Dimensions and mass	215 mm (8.46 in) W × 80 mm (3.15 in) H × 295 mm (11.61 in) D, 2.4 kg (84.7 oz)

## DC SIGNAL SOURCE SS7012

Model No. (Order Code) **SS7012**

### Generate and Measure Signals Simultaneously

- Simultaneously sources up to ±25 V and ±25 mA while measuring up to ±28 V and ±28 mA (DC)
- Generate and measure ±25 V, ±25 mA output with a single instrument
- Evaluate circuit characteristics and test the characteristics of semiconductors
- Fully controllable via its USB interface.
- Use in schools as a portable signal source for electronic device testing and evaluation.



Use of the AC Adapter and/or rechargeable batteries and dedicated charger is recommended.

### Basic specifications

Generation functions	
Constant Voltage	2.5 V: 0 to ±2,500 V (±0.03 % of setting ±300 μV, 100 μV resolution) 25 V: 0 to ±25,000 V (±0.03 % of setting ±3 mV, 1 mV resolution)
Constant Current	25 mA: 0 to ±25,000 mA (±0.03 % of setting ±3 μA, 1 μA resolution)
Thermoelectric power generation	K: at TC: 0 °C, -174.0 to 1372.0 °C (±0.05 % of setting ±0.5 °C, 0.1 °C resolution) Other types: E, J, T, R, S, B, N selectable
Thermoelectric power generation	K: at TC: RJ, -174.0 to 1372.0 °C (±0.05 % of setting ±1.0 °C, 0.1 °C resolution) Other types: E, J, T, R, S, B, N selectable
Standard resistance (Rs)	100 Ω (±0.2 Ω)
Measurement functions	
Voltage	2.5 V: 0 to ±2,800 V (±0.03 % rdg. ±300 μV, 100 μV resolution, 1 MΩ input resistance) 25 V: 0 to ±28,000 V (±0.03 % rdg. ±3 mV, 1 mV resolution, 1 MΩ input resistance)
Current	25 mA: 0 to ±28,000 mA (±0.03 % rdg. ±3 μA, 1 μA resolution, 25 Ω input resistance)
Temperature	-25.0 to 80.0 °C (±0.5 °C at 23 ±5 °C, 0.1 °C resolution, use with the RJ sensor 9184)
Power supply	AC adapter 9445-02/03 (100 to 240 V AC 50/60 Hz, 9 VA), Ni-MH battery HR6 × 4, 6 VA, (fully charged 2500 mAh Ni-MH batteries: 170 minutes continuous use), or LR6 (AA) alkaline battery × 4, 6 VA
Dimensions and mass	104 mm (4.09 in)W × 180 mm (7.09 in)H × 58 mm (2.28 in)D, 660 g (23.3 oz) (including LR6 × 4 batteries)

# Electrometers / Picoammeters

Depending on the model, please select and purchase the measurement probe options appropriate for your application separately.

## Ideal for measuring these component characteristics:

- The resistance of high-resistance components
- The resistance of liquids such as adhesives and alcohol
- The resistance of film materials
- The resistance of materials used in automobile seats
- The leakage current of semiconductor protective diodes
- Components with high insulation resistance such as capacitors



## SUPER MEGOHM METER SM7110, SM7120

**NEW**

Model No. (Order Code)  
**SM7110** (1ch, Max. 1000V output)  
**SM7120** (1ch, Max. 2000V output)



### Flexible, Multipurpose Design, Max. $2 \times 10^{19} \Omega$ Display

- 300x Noise Resistance (Compared to legacy model)
- Rapid 6.4 ms High-Speed Inspection
- Low capacity contact checks for Picoammeter Mode
- Max.  $2 \times 10^{19} \Omega$  Display, Min. 0.1 fA Resolution
- Built-in EXT I/O, LAN, RS-232C, GP-IB and USB
- Flexible, Multipurpose Design (Electrometer, Picoammeter, IR Meter)

### Basic specifications

DC current measurement	20 pA range (0.1 fA resolution) to 2 mA range (1 nA resolution), 9 ranges (2 mA range: Measurement speed FAST only)
Resistance measurement capabilities	50 $\Omega$ to $2 \times 10^{19} \Omega$
Setting voltage range	0.1 to 100.0 V, 100 mV resolution, Accuracy: $\pm 0.1\%$ of setting $\pm 0.05\%$ f.s. 100.1 to 1000 V, 1 V resolution, Accuracy: $\pm 0.1\%$ of setting $\pm 0.05\%$ f.s. [SM7120 only] 1000 to 2000 V, 1 V resolution, Accuracy: $\pm 0.2\%$ of setting $\pm 0.10\%$ f.s.
Current Limiter	0.1 to 250.0 V: 5/ 10/ 50 mA, 251 to 1000 V: 5/ 10 mA, to 2000 V: 1.8 mA
Measurement time setting	Delay: 0 to 9,999 ms
Functions	Comparator measurement, deviation measurement, percentage measurement, surface resistivity, volume resistivity, voltage monitor, contact check
Program function	10 types of discharge, charge, measure and measurement sequence discharge patterns can be programmed.
Interfaces	GP-IB, RS-232C, USB or EXT I/O Interface
Power supply	100 to 240V AC, 50/60 Hz, 45 VA
Dimensions and mass	330 mm (12.99 in)W $\times$ 80 mm (3.15 in)H $\times$ 450 mm (17.72 in)D, 6.7 kg (208.1 oz)

Measurement leads are not included. Purchase the appropriate lead option for your application separately.

## SUPER MEGOHM METER SM-8220

Model No. (Order Code) **SM-8220**

### Super Megohm Measurement in Any Field

- Ultra megohm measurement
- Digital/analog display on LCD
- Compatible for measurement of several sample types with electrodes & other devices

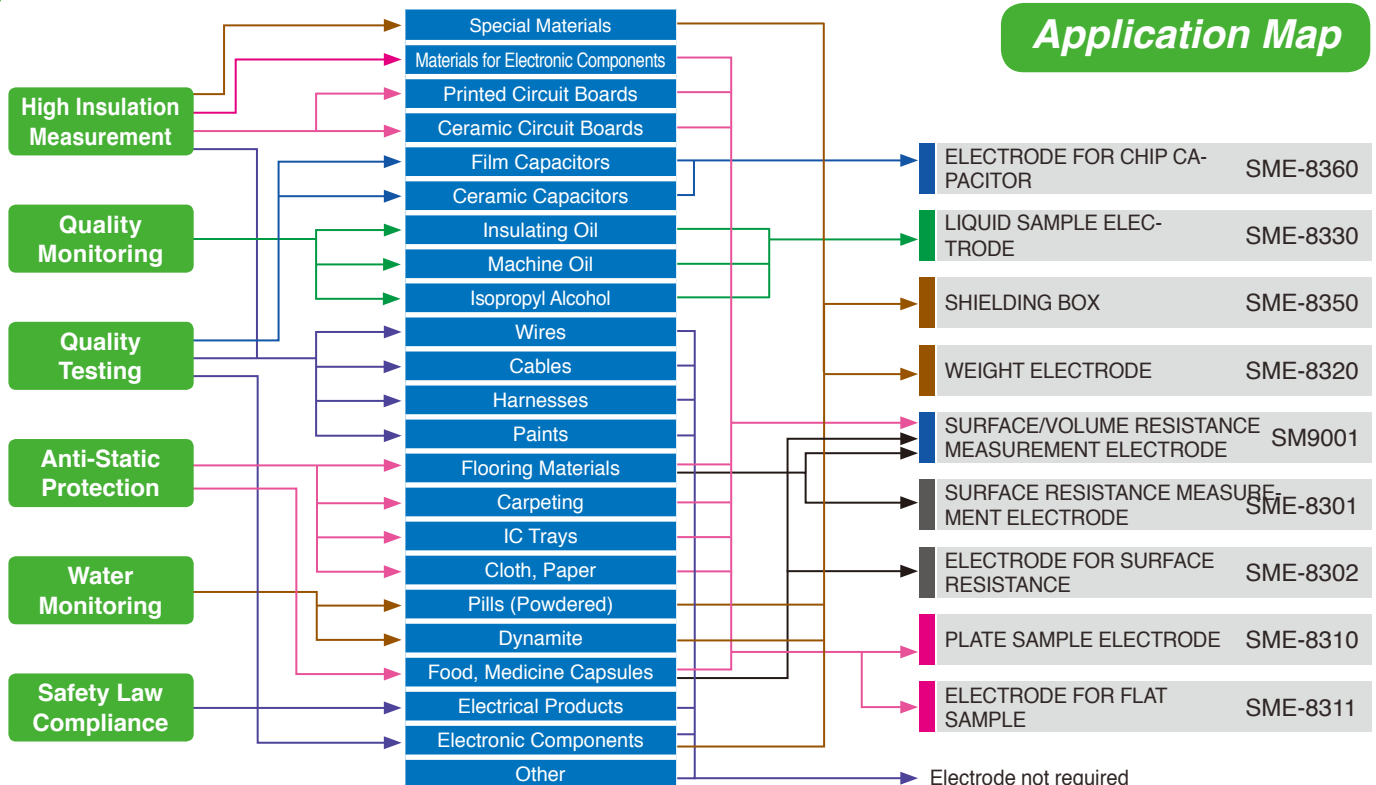


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### Basic specifications

Measuring resistance range	10 V	$5 \times 10^4 - 2 \times 10^{14} \Omega$	250 V	$1.25 \times 10^6 - 5 \times 10^{15} \Omega$
	25 V	$1.25 \times 10^5 - 5 \times 10^{14} \Omega$	500 V	$2.5 \times 10^6 - 1 \times 10^{16} \Omega$
	50 V	$2.5 \times 10^5 - 1 \times 10^{15} \Omega$	1000 V	$5 \times 10^6 - 2 \times 10^{16} \Omega$
	100 V	$5 \times 10^5 - 2 \times 10^{15} \Omega$		
Measuring accuracy	$\pm 10\%$ (within 10 times range of min. value on each range at 20°C), but $\pm 20\%$ at $10^8$ range			
Output current	Max. 2 mA			
Standard function	Timer (1 to 999s), Comparator, Remote start, HV-EN (interlock)			
Interfaces	RS-232C, Comparator output (open-collector)			
Power supply	Selectable 100, 120, 220 or 240 V AC $\pm 10\%$ , 50/60 Hz, 25 VA			
Dimensions and mass	284 mm (11.18 in)W $\times$ 139 mm (5.47 in)H $\times$ 215 mm (8.46 in)D, 4.3 kg (151.7 oz)			

## Application Map



When connecting electrodes and shield boxes to SM7110/SM7120, note that CONVERSION ADAPTER Z5010 or a change of connectors is required.



# Electrodes *Options for Super Megohm Meters*

For surface resistance or volume resistance measurement

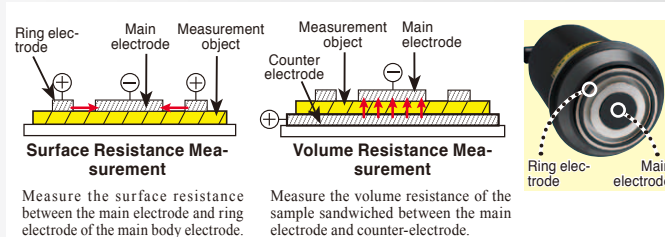
## SURFACE/VOLUME RESISTANCE MEASUREMENT ELECTRODE SM9001

Not CE Marked



- Electrodes compliant with the JIS C 2170 and IEC 61340-2-3 standards
  - Measurement voltage up to 1,000 V, and measurement resistance up to  $10^{13} \Omega$
  - Surface and volume resistance of sheets and films can be measured just as they are without the need to cut samples
  - Measure the surface resistance of antistatic flooring and molded products
- \*When used with the SM-8200 series, measurement can take full advantage of the instrument's voltage and resistance ranges.

Dimensions:  $\phi$  100mm (3.94in)  $\times$  223mm (8.78in), Mass: 2.5 kg (88.2oz), Cable length: 1 m (3.28 ft)  
(With integrated low resistance [500 k $\Omega$ ]/high resistance [1 T $\Omega$ ] test surfaces)



**VERIFICATION FIXTURE FOR SURFACE RESISTANCE MEASUREMENT SM9002**  
The SM9002 Verification Fixture for Surface Resistance Measurement (option) allows you to check the operation of the electrode to increase the reliability of measurement results.  
Not CE Marked

## Electrode for surface resistance SME-8301

Not CE Marked



Surface resistance can be easily measured by simply pushing the electrode against the specimen. It measures surface resistance of anti-static related goods in combination of mainly Model SM-8213. Measure resistance up to  $10^{11} \Omega$ .

Dimensions:  $\phi$  60mm (2.36in)  $\times$  50mm (1.97in)  
Lead length: 1m (3.28ft)

## Electrode for surface resistance SME-8302

Not CE Marked



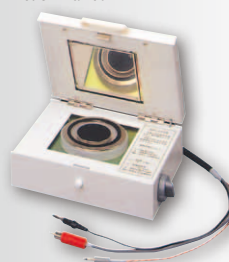
Electrode for surface resistance of curved samples such as resin and rubber processed goods, TV cathode tubes or small samples. Surface resistance can be measured by pressing the rubber tips at the tip onto the sample. Measure electrodes up to  $10^{11} \Omega$  at 10mm intervals or greater.

An electrode distance:  
4mm (0.16in)

Dimensions:  $\phi$  40mm (1.57in)  $\times$  115mm (4.53in)  
Lead length 1m (3.28ft)

## Electrode for plate samples SME-8310

Not CE Marked



Sample of 100mm square by up to 8mm in thickness is measurable. The main electrode dia. is 50mm and inner & outer dia. of ring electrode are 70mm & 80mm respectively. Measurement voltage becomes "OFF" while the lid is open to ensure safety. A selector switch allows selection of voltage or surface resistivity.  
\*A separately purchased interlock cable (DSM8104F) is required in order to use the product with the DSM-8104.

Dimensions: 215mm (8.46in) W  $\times$  78mm (3.07in) H  $\times$  165mm (6.50in) D  
Lead length: 75cm (2.46ft)

## Electrode for plates SME-8311

Not CE Marked



Sample of 40~100mm square by up to 8mm in thickness is measurable. The main electrode dia. is 19.6mm and inner & outer dia. of ring electrode are 24.1mm & 28.8mm respectively. Measurement voltage becomes "OFF" while the lid is open to ensure safety. The fundamental specifications are the same as SME-8310.  
\*A separately purchased interlock cable (DSM8104F) is required in order to use the product with the DSM-8104.

Dimensions: 215mm (8.46in) W  $\times$  78mm (3.07in) H  $\times$  165mm (6.50in) D  
Lead length 75cm (2.46ft)

## Weight electrode SME-8320

Not CE Marked



This is an electrode for plate sample for use together with SME-8350 shield box. This electrode enables extremely easy measurement of surface resistivity and volume of sample with coarse surface such as carpets, etc. The main electrode dia. is 50mm, and the ring electrode inner-dia. and outer-dia. are 70mm and 80mm respectively.

Included: Banana clips  $\times$  2  
Photo is Combination with Shield box SME-8350

## Shield box SME-8350

Not CE Marked



This is used as a sample accommodation box during measurement of a high-insulation resistance samples, or inductive or capacitive samples to perform electromagnetic shielding.

Dimensions: 250mm (9.84in) W  $\times$  100mm (3.94in) H  $\times$  200mm (7.87in) D  
Lead length: 80cm (2.62ft)  
Included: Rubber sheet

## Standard resistor box SR-2

Not CE Marked



This is a resistor box for calibration of the super megohmmeters. Max. voltage is 1,000 V DC and resistor value covers from 10 M $\Omega$  to 10,000 M $\Omega$  in 24 points.  
\*A separately purchased interlock cable (DSM8104F) is required in order to use the product with the DSM-8104.

Dimensions: 270mm (10.63in) W  $\times$  90mm (3.54in) H  $\times$  195mm (7.68in) D  
Included: Inspection data sheet

## Electrode for liquid samples SME-8330

Not CE Marked



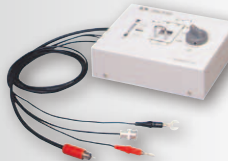
Electrode for liquid samples which is electrically guarded. Total volume is 25ml. Capacitance between main and counter electrode is approx. 45pF. Electrode constant is approx. 500cm. Distance between both electrodes is 1mm. Outer dia. is 36mm, height is approx. 140mm. Measure resistance up to  $10^{19} \Omega$  (at 1000V) when used together with Model SM-8220.

Included: Connection cable  
60cm (1.97ft) length  
(Red) 0GA00029  $\times$  1  
(Black) 0GA00030  $\times$  1

Dimensions:  $\phi$  36mm (1.42in)  $\times$  140mm (5.51in)  
Included: Inspection data sheet

## Electrode for chip capacitor SME-8360

Not CE Marked



For measuring the resistance of tip capacitors, with adjustable jig from 0mm to 11mm. When connected to the meter by an interlock cable, measurement voltage becomes "OFF" while the lid is open to ensure safety.  
The interlock cable must be modified in order to use the product with the SM-8220 series.

Dimensions: 200mm (7.87in) W  $\times$  520mm (2.05in) H  $\times$  150mm (5.91in) D



# Digital Multimeters

## Use for measurement applications like these...

- Monitoring the voltage of battery cells
- Measuring the voltage of vehicle batteries
- Performing natural discharge tests of batteries
- Measuring lead-acid battery cell voltage variability
- Recording biological signal waveforms
- Measuring thermoelectromotive force

- Measuring nanovolt-order voltages in superconductivity applications
- Collecting data from remote locations in applications such as earth-quake research
- Measuring inverter-equipped systems
- Measuring the voltage of solar panels
- Logging high-resolution sensor data
- Verifying ripple voltage in DC power supply systems

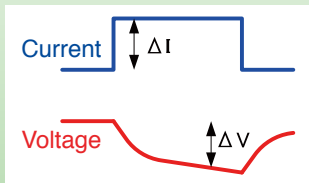


### Example application DM7275/DM7276

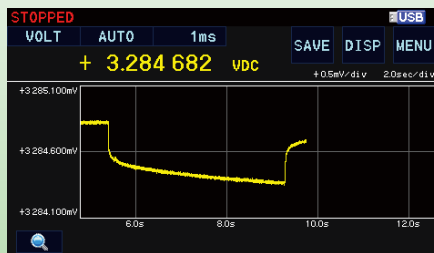
#### Higher-resolution and lower-noise measurement than an oscilloscope

In high-speed sampling mode, the DM7275/DM7276 can make up to 5000 successive measurements in response to a single trigger event. Integration times can be set from 1 ms. This capability makes it easy to acquire data in applications where the target waveform is likely to be obscured by noise when observed with an oscilloscope, for example in logging data from sensors requiring a high degree of resolution, recording biological signals, and measuring nanovolt-order voltages in superconductivity.

$$R = \frac{\Delta V}{\Delta I}$$



DC-IR measurement waveform for a battery

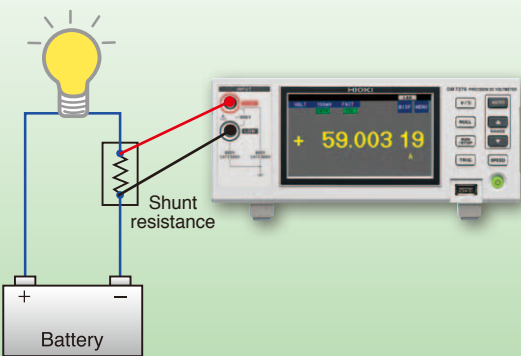


1 ms / sample → 5 sec

### Example application DM7275/DM7276

#### High-precision DC current measurement

Measure output from a high-precision shunt resistor (current sensing resistor). Current values can be displayed using the scaling function.



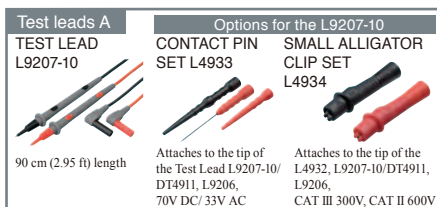
## PRECISION DC VOLTMETER DM7275/DM7276

### 7-1/2 Digit, 9ppm High Precision DC Voltmeter for Lithium-ion Batteries

- High-accuracy model with 1-year 9ppm Accuracy: DM7276
- Basic model with 1-year 20ppm Accuracy: DM7275
- Capacitance contact check (using built-in C-monitor)
- Built-in EXT I/O, LAN, and USB

Model No.	<b>DM7276-01</b> (standard model)	<b>DM7275-01</b> (standard model)
(Order Code)	<b>DM7276-02</b> (with GP-IB)	<b>DM7275-02</b> (with GP-IB)
	<b>DM7276-03</b> (with RS-232C)	<b>DM7275-03</b> (with RS-232C)

Basic specifications	DM7276	DM7275
DC Voltage	100 mV (±120.000 00 mV) to 1000 V (±1000.000 0 V), 5 ranges	
Basic accuracy	10 V range: ±0.0009 % rdg. ±3 μV	10 V range: ±0.0020 % rdg. ±3 μV
Temperature	-10.0°C to 60.0°C (14.0°F to 140°F), combined with sensor Z2001: ±0.5°C (5.0°C to 35°C)	
Integration time	Integration time unit: PLC/ms (PLC setting: 0.02/ 0.2/ 1/ 10/ 100, ms setting: 1 ms to 9999 ms)	
Measurement support functions	Smoothing function, null, temperature compensation, scaling, over-range display, auto-hold, contact check	
Management support functions	Comparator, BIN, absolute value judgment, label display, statistics, measurement information, communication monitor, EXT. I/O TEST	
Contact check	Check signal: 10 mV rms, threshold value: 0.5 nF to 50 nF (Cannot use in the 100 V/1000 V ranges), Contact check integration time: 1 ms to 100 ms	
Interfaces	Standard: LAN (100BASE-TX), EXT. I/O, USB flash drive / USB device (USB2.0 Full-Speed) Optional: GP-IB (-02 type only) / RS-232C (-03 type only) / PRINTER (-03 type only)	
Power supply	100 to 240 V AC, 50/60 Hz, 30 VA	
Dimensions and mass	215 mm (8.46 in) W × 88 mm (3.46 in) H × 232 mm (9.13 in) D, (-01 type): 2.3 kg (81.1 oz), (-02/-03 type): 2.4 kg (84.7 oz)	



# Digital Multimeters

## DIGITAL MULTIMETER DT4200 series



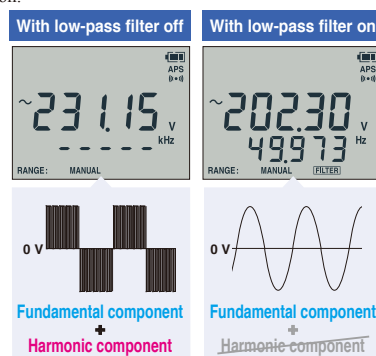
**Introducing an extensive line of instruments with advanced safety features and high-speed response**

- High-end models:  
Featuring high accuracy, extensive additional functionality, and a broad range of measurement parameters
- Standard models:  
Introducing a line of field-optimized instruments that can be chosen based on the application at hand
- Pocket models:  
Featuring a compact body for ergonomic hold and a reliable, safe design

Basic specifications	High-end models		Standard models					Pocket models	
	DT4281	DT4282	DT4252	DT4253	DT4254	DT4255	DT4256	DT4221	DT4222
Principal applications	For electrical work in the field	For laboratory and research use	For laboratory and research use	For instrumentation 4-20mA	Voltage measurement only model	For electrical work in the field	Multifunction model	For electrical work in the field	For laboratory and research use
DC voltage	60 mV to 1000 V		600 mV to 1000 V		600 mV to 1500 V	600 mV to 1000 V		600 mV to 600 V	
AC voltage	60 mV to 1000 V		6 V to 1000 V					6 V to 600 V	
DC + AC voltage	6 V to 1000 V		---	---	---	---	---	---	---
DC current	600 μA to 600 mA	600 μA to 10 A	6 A/10 A	60 μA to 60 mA	---	---	60 mA to 10 A	---	---
AC current	600 μA to 600 mA	600 μA to 10 A	6 A/10 A	---	---	---	600 mA to 10 A	---	---
AC current (use with Clamp on probes)	10 A to 1000 A	---	---	10 A to 1000 A	---	10 A to 1000 A	10 A to 1000 A	---	---
Resistance	60 Ω to 600 MΩ		600 Ω to 60 MΩ		---	600 Ω to 60 MΩ		---	600 Ω to 60 MΩ
Temperature (thermocouples)	K: -40.0 to 800.0 °C (-40.0 to 1472.0°F)		---	K: -40 to 400 °C (-40 to 752°F)	---	---	---	---	---
C (capacitance)	1nF to 100mF		1μF to 10mF		---	1μF to 10mF		---	1μF to 10mF
Frequency	AC V, DC+AC V, AC A measurement: 99.999 Hz (0.5 Hz or more) to 500.00 kHz, 5 ranges		99.99 Hz (5 Hz or more) to 99.99 kHz, 4 ranges (limited by the minimum detectable voltage and current)					AC V measurement: 99.99 Hz (5 Hz or more) to 9.999 kHz, 3 ranges	
Continuity check	Yes	Yes	Yes	Yes	---	Yes	Yes	Yes	Yes
Diode test	Yes	Yes	Yes	Yes	---	Yes	Yes	---	Yes
Conductance	---	600nS	---	---	---	---	---	---	---
Voltage detection	---	---	---	---	Yes	Yes	Yes	Yes	---
Power supply	LR6 (AA) alkaline batteries ×4, Continuous use: 100 hours		Alkaline (LR03) battery ×4 Continuous use: 130 hours					Alkaline (LR03) battery ×1 Continuous use: 40 hours	
Dimensions and mass	93mm(W)×197mm(H)×53mm(D) (3.66" W×7.76" H×2.09" D Inch) 650g (including batteries) (23 oz.)		84mm(W)×174mm(H)×52mm(D)(3.31" W×6.85" H×2.05" D Inch) 390g (including batteries and holster) (13.8 oz.)					72mm(W)×149mm(H)×38mm(D) (2.83" W×5.87" H×1.50" D Inch) 190g (including batteries and holster) (6.7 oz.)	

### Measure output voltage on the secondary sides of inverters

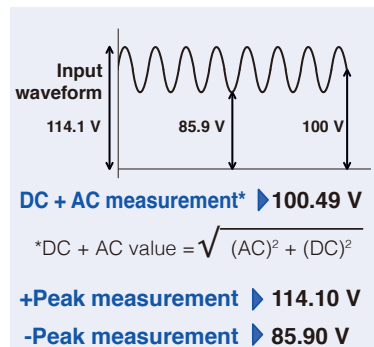
Accurately measure the fundamental value alone by eliminating harmonic components with the DMM's low-pass filter function.



### Ripple voltage confirmation of DC charging systems

#### Peak value measurement / DC + AC voltage measurement

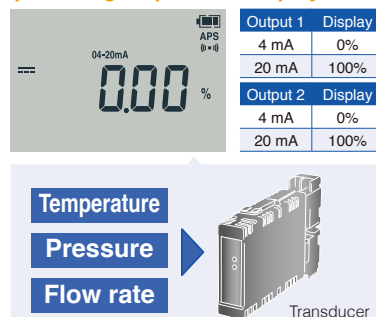
High-end models can detect ripple voltage with a superposed DC signal.



### Percentage display for instrumentation signal measurement

#### 4 to 20 mA / 0 to 20 mA percentage-equivalent display

You can check percentage-equivalent values.



### Manage measurement data on a computer

#### Using the Communication Package DT4900-01 (option)

Measurement results can be downloaded to a computer via a USB connection. Once downloaded, you can save them as a file (text format) or display them as a graph using the desired interval. Results can also be sent in real time while measurement is ongoing.

\*The computer and multimeter are electrically isolated by means of optical communications so that data can be sent with peace of mind.



# Current Probes / Current Sensors

## Use for measurement applications like these...

- Measuring inverter switching waveforms
- Measuring current in EVs, HEVs, and other electric vehicles
- Measuring current in solar power installations
- Measuring battery discharge current
- Performing evaluation testing of fuel cells



## Choose the current probe that's right for your application

- Input directly to your oscilloscope or Memory HiCorder's BNC terminal (except broadband power measurement)
- Make high-precision measurements across a broad operating temperature range (-40°C to 85°C): CT6840s
- Observe minuscule currents of just 1 mA, 10 times previous models: CT6700, CT6701
- Easily observe current waveforms simply by clipping around a conductor (except CT686x, 9709)
- Delivers broadband, high-precision, high-current (1000 A) measurement across a broad range of operating temperatures (-30°C to 85°C): CT6865



## Current Probes to Observe DC to MHz Bandwidth Waveforms on Oscilloscopes and Memory Recorders (options: POWER SUPPLY 3269, 3272)








Model No. (Order Code)	CT6700	CT6701	3273-50	3276	3274	3275
Frequency band-width	DC to 50 MHz (-3 dB)	DC to 120 MHz (-3 dB)	DC to 50 MHz (-3 dB)	DC to 100 MHz (-3 dB)	DC to 10 MHz (-3 dB)	DC to 2 MHz (-3 dB)
Continuous Max. input range	5 A rms		30 A rms		150 A rms	500 A rms
Output voltage rate	1V/A		0.1V/A		0.01V/A	
Measurement conductor	φ 5 mm (0.20 in) Core dia.		φ 5 mm (0.20 in) Core dia.		φ 20 mm (0.79 in) Core dia.	
Amplitude accuracy	Typ.: ±1.0% rdg. ±1mV (DC, 45Hz to 66Hz, 0 to 5A)		±1.0% rdg. ±1mV (DC, 45Hz to 66Hz, 0 to 30A)		±1.0% rdg. ±1mV (DC, 45Hz to 66Hz, 0 to 150A)	±1.0% rdg. ±5mV (DC, 45Hz to 66Hz, 0 to 500A)

**POWER SUPPLY 3272**  
Compatible sensors:  
up to 2 units  
3273-50, 3274, 3275  
or 3276: up to 1 unit

**POWER SUPPLY 3269**  
Compatible sensors:  
up to 4 units  
**SENSOR UNIT 9555-10**

*The optional POWER SUPPLY 3272 or 3269, or 9555-10 is required in order to supply power and connect the clamp to a Memory HiCorder. The clamp can be directly connected to the Power Analyzer PW6001 and 3390.*

## Current Probes to Observe Waveforms Using Wide-Band Power Analyzers PW6001(use -05 sensor models), 3390 for input current (Can also be used to observe waveforms, Option: SENSOR UNIT 9555-10)

Model No. (Order Code)		CT6841	CT6843	CT6844	CT6845	CT6846	CT6862	CT6863	CT6865	9709
-05: 12pin terminal		CT6841-05	CT6843-05	CT6844-05	CT6845-05	CT6846-05	CT6862-05	CT6863-05	CT6865-05	9709-05
										
Rated input current		20 A AC/DC	200 A AC/DC	500 A AC/DC		1000 A AC/DC	50 A AC/DC	200 A AC/DC	1000 A AC/DC	500 A AC/DC
Frequency characteristics	Amplitude	DC to 1 MHz	DC to 500 kHz	DC to 200 kHz	DC to 100 kHz	DC to 20 kHz	DC to 1 MHz	DC to 500 kHz	DC to 20 kHz	DC to 100 kHz
	Phase	DC to 300 kHz	DC to 300 kHz	DC to 200 kHz	DC to 100 kHz	DC to 20 kHz	DC to 300 kHz	DC to 300 kHz	DC to 1 kHz	DC to 100 kHz
Output voltage rate		0.1 V/A	0.01V/A	4 mV/A		2 mV/A	2 V/ 50 A	2 V/ 200A	2V/ 1000A	2 V/ 500 A
Measurement conductor		φ 20 mm (0.79 in) Core dia.			φ 50 mm (1.79 in) Core dia.		φ 24 mm (0.94 in) Core dia.		φ 36 mm (1.42 in) Core dia.	
Amplitude and Phase accuracy		±0.3% rdg. ±0.01% f.s., ±0.1° (DC < f ≤ 100 Hz)					±0.05% rdg. ±0.01% f.s., ±0.2° (DC, 16Hz ≤ f ≤ 66 Hz)		±0.05% rdg. ±0.01% f.s., ±0.2° (DC, 16Hz ≤ f ≤ 66 Hz)	

## AC/DC Current Clamps (Long-term waveforms recording/measuring, option: DISPLAY UNIT CM7290, CM7291)

Model No. (Order Code)	CT7742	CT7736	CT7731	CT7642	CT7636	CT7631
Rated input current	2000 A AC/DC	600 A AC/DC	100 A AC/DC	2000 A AC/DC	600 A AC/DC	100 A AC/DC
Frequency characteristics	DC to 5 kHz (-3 dB)			DC to 10 kHz (-3 dB)		
Output voltage rate	0.1 mV/A		1 mV/A	0.1 mV/A		1 mV/A
Measurement conductor	φ 55 mm (2.17 in) Core dia.	φ 33 mm (1.30 in) Core dia.		φ 55 mm (2.17 in) Core dia.	φ 33 mm (1.30 in) Core dia.	
Amplitude accuracy (Typ.)	±1.5% rdg. ±0.5% f.s.	±2.0% rdg. ±0.5% f.s.	±1.0% rdg. ±0.5% f.s.	±1.5% rdg. ±0.5% f.s.	±2.0% rdg. ±0.5% f.s.	±1.0% rdg. ±0.5% f.s.
Phase accuracy	±2.3 deg. (DC < f ≤ 66 Hz)	±1.8 deg. (DC < f ≤ 66 Hz)		±2.3 deg. (DC < f ≤ 66 Hz)	±1.8 deg. (DC < f ≤ 66 Hz)	

**DISPLAY UNIT CM7290, CM7291**

**Power supply and signal output for Current Sensor CT7600, CT7700 series**

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

# HIOKI

HIOKI E. E. CORPORATION

### HEADQUARTERS

81 Koizumi, Ueda, Nagano, 386-1192, Japan  
TEL +81-268-28-0562 FAX +81-268-28-0568  
http://www.hioki.com / E-mail: os-com@hioki.co.jp

### HIOKI USA CORPORATION

TEL +1-609-409-9109 FAX +1-609-409-9108  
http://www.hiokiusa.com / E-mail: hioki@hiokiusa.com

HIOKI (Shanghai) SALES & TRADING CO., LTD.  
TEL +86-21-63910090 FAX +86-21-63910360  
http://www.hioki.cn / E-mail: info@hioki.com.cn

HIOKI SINGAPORE PTE. LTD.  
TEL +65-6634-7677 FAX +65-6634-7477  
E-mail: info-sg@hioki.com.sg

HIOKI KOREA CO., LTD.  
TEL +82-2-2183-8847 FAX +82-2-2183-3360  
E-mail: info-kr@hioki.co.jp

### DISTRIBUTED BY

**instrumentos de medida**

Septiembre, 31 28022 Madrid  
Tel. 913000191 Fax. 913885433

[www.idm-instrumentos.es](http://www.idm-instrumentos.es)  
[idm@idm-instrumentos.es](mailto:idm@idm-instrumentos.es)