

HIOKI

SUPER MEGOHM METER
SM7110, SM7120

NEW

instrumentos
de medida

300 Times Better Noise Resistance

Min. 6.4 ms Measurement Speed

Max. 2000 V Output

Max. $2 \times 10^{19} \Omega$ Display

Min. 0.1 fA Resolution



SUPER MEGOHM METER

SM7120

Flexible, Multipurpose Design

Electrometer

Picoammeter

IR Meter

Max. 1000 V Output
SM7110



instrumentos
de medida

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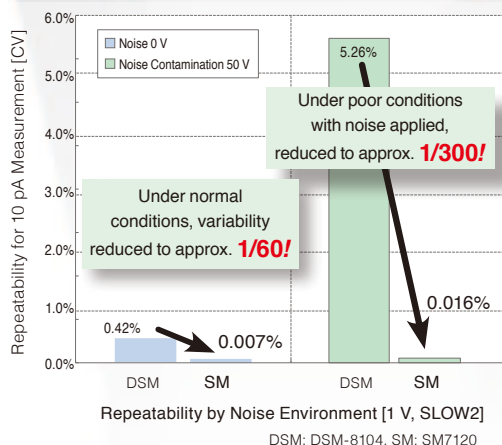
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Highly stable measurements with strong noise resistance



The stability you need for high resistance measurements

1/60 Variability, 300x Noise Resistance



Advanced 2 kV floating circuitry

Stability (repeatability) against power supply noise and external noise has improved dramatically due to a combination of new Super Megohm floating circuitry and triaxial connectors.

Variability in normal usage environments is reduced to 1/60 compared to previous models, and to 1/300* in conditions where 50 V noise is applied.

* Compared to legacy model, the DSM-8104



16 mm large-diameter triaxial connector

The large-diameter triaxial connector newly adopted for current input terminals has a triple coaxial structure with the internal shield connected to the GUARD line and the external shield connected to the GROUND.

This achieves both stability against noise and safety during high-voltage inspections.



Supports components with high voltage resistance

2000 V / $2 \times 10^{19} \Omega$ Measurement



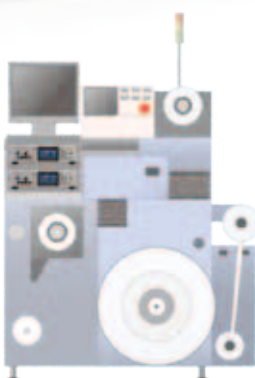
Perfect for EVs and other high-voltage applications

Improved high voltage resistance and isolation performance in components are essential to meet the demands for high efficiency in recent years for applications such as automotive parts and wearable devices. The SM7120 can output 2000 V without an external power supply, ensuring that it will remain relevant even as inspection requirements expand going forwards.

* $2 \times 10^{19} \Omega = 20,000 \text{ P(peta) } \Omega$

Supports mass production of 1600 units/minute

Min. 6.4 ms High-Speed Inspection



6.4 ms = 4.1 ms measurement + 2.3 ms contact check

Achieve high-speed measurement with an inspection time (from TRIG input to INDEX output) of 6.4 ms when contact checks that are essential for mass production inspections are included, and 7.0 ms when comparator measurement is included.

MLCC high-speed inspection with pre-charge function

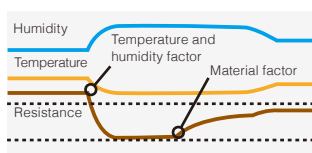
Large-capacity outputs of 2000 V/1.8 mA (SM7120 only) and 1000 V/10 mA are available, to reduce sample charging time.

[Charging terminals are equipped as standard.] The max. 50 mA/250 V pre-charge function achieves high throughput for MLCC mass production inspections.

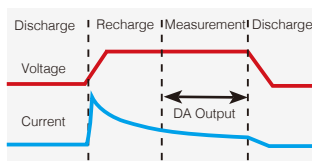
Optimal Utilities for Evaluation of New Materials



Evaluate Semiconductors and New Materials



Finding actual factors



Sequence Control

[Simultaneous measurement of temperature and humidity]

Temperature and humidity must be managed together, because changes in either can affect insulation resistance. Models SM7120 and SM7110 are equipped to perform highly accurate temperature and humidity measurements (temperature $\pm 0.5^{\circ}\text{C}$ ($\pm 0.9^{\circ}\text{F}$), humidity $\pm 5\%$ R.H.), for the measurement and management of new materials.

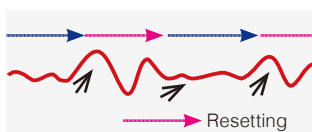
(When using the optional Z2011 HUMIDITY SENSOR: Temperature -40°C to 80°C (-40°F to 176°F), Humidity 20% to 80%)

[Sequence control] [D/A output]

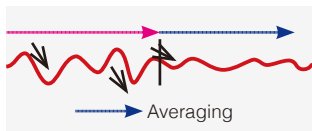
In sequence mode, set the time (max. 999.9 s) for "Discharge" - "Recharge" - "Measurement" - "Discharge", to perform repeated measurements without using a computer. During measurement, current fluctuations can also be saved to recorders from D/A output.

For even more precise evaluations, use external control such as USB to perform voltage resistance testing on semiconductors or to check the voltage dependence of new material.

Auto Average to Cancel Irregular Input



Resetting when there is a large fluctuation



Auto Averaging Image

[Auto averaging]

With the SM series, auto averaging monitors fluctuations in current and automatically determines the optimum average, so there is no need to make changes to settings while observing measurement results. Unexpected measurement fluctuations, such as transient responses in recharge current and unstable contacts with large variations, are automatically removed to achieve stable measurement results.

(An average of a specified number with fixed measurement conditions is also possible.)

[5-stage measurement speed]

Speed switches between FAST, FAST2, MID, SLOW, and SLOW2 based on environment, and can be set according to environment such as FAST2 at $\frac{1}{2}$ PLC for the internal integration time.

Save a Huge Range Electrode Variations and Settings



[Electrode presets]

A variety of electrode and shield box presets are provided according to material.

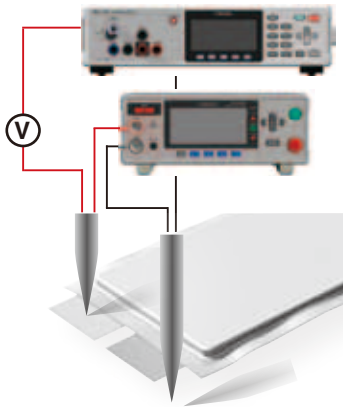
The electrode constant is set automatically by simply entering the name of the electrode to be used, allowing resistivity to be measured easily and accurately.

[Panel save/load]

Electrode names and various settings, such as the 60-second settings for sequence control, can be saved as panel data. This means that material switching can be performed easily simply by loading panel data.

Make Mass Production More Practical than Ever

High-Performance Contact Checks for Picoammeter Mode



[Low capacity contact checks]

The SM7110/SM7120 is equipped with contact checks that can identify low-capacity capacitors of only a few pF as well as measured objects with a small capacitance.

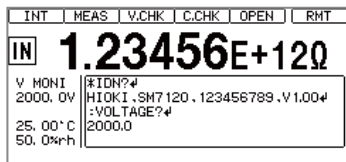
(Reference value: 0.1 pF to 99.99 pF)

[2-band selection]

As with battery production lines, to prevent the minute check signals on site with multiple various measuring instruments from getting crossed, select the frequency for contact checks.

These two contact checks can also be used in picoammeter mode with an external power supply. These are high-performance contact checks that prevent unnecessary retries and excess detection due to the effects of an external power supply, and that also prevent takt reduction and worsening yield ratio.

Faster Line Construction



Communication Monitor

EXT I/O TEST				I/O TYPE:NPN	
EOM	ERR	INDEX	C_CHK_GO		
V_CHK_GO	OPEN_GO	VON	HI		
IN	LO	PASS	FAIL		
TRIG	START	C_CHK	STOP		
V_CHK	OPEN	I LOCK	K LOCK		
EXIT		ON	OFF		

EXT I/O Test

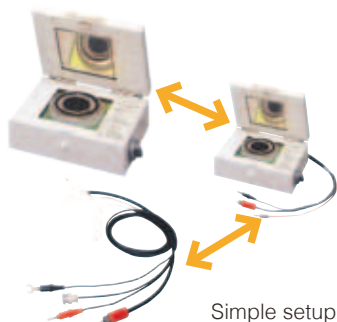
[External interfaces]

There are three types of external interface: GP-IB, RS-232C, and USB, as well as the built-in EXT I/O for easy linkage with programmable controllers.

[Communication monitor] [EXT IO test]

Because the communication monitor and EXT I/O test function can be used to assess all interfaces, work can be performed while observing operation conditions in real time as necessary during line construction.

Flexible Setup Changes



[Cable length correction]

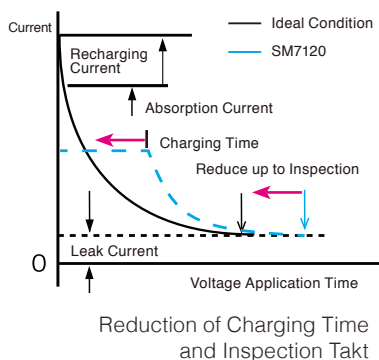
Replace measuring cables without adjustment by simply registering the cable length. (Cable length that can be registered: 0.5 m to 3.0 m (1.64 ft to 9.84 ft))

Capacitance contact check functions that are generally included with electrometers and picoammeters will require the impedance matching to be reset whenever the cable length changes. With the SM series, replacement is possible without any adjustments.

[Jig capacity open correction]

With the SM series, open correction is provided for jig switching, for a flexible response to changes in line structure without the need for adjustments.

High-Speed Low-Current Measurement and Large-Capacity Output: Perfect for MLCC Mass Production Lines



Reduction of Charging Time and Inspection Takt

[Input impedance 1 kΩ]

Because the SM7120 offers low input impedance of 1 kΩ for all current range and speed settings, there is no delay due to "settling time".

This is optimal for mass production lines, because there is no reduction in speed due to switching range.

[Max. 50 mA /250 V, 1.8 mA /2000 V large capacity output, low noise]

For the insulation resistance measurement of a capacitive sample such as MLCC, charging time when voltage is applied is also important, in addition to the inspection speed. Reduced charging time allows a shorter inspection takt. The SM series has a built-in large-capacity, low-noise power supply, for reliable and even high performance of MLCC.

Electrodes for a Variety of Materials and Uses

SURFACE/VOLUME RESISTANCE MEASUREMENT ELECTRODE SM9001

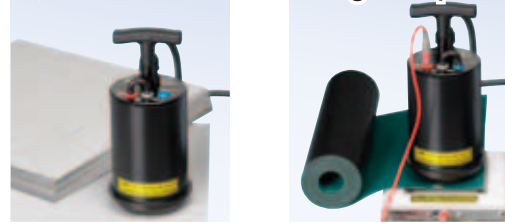
Measure sheets, film, plate products, materials, and antistatic flooring materials as they are - no need to cut samples

- Compliance Standards

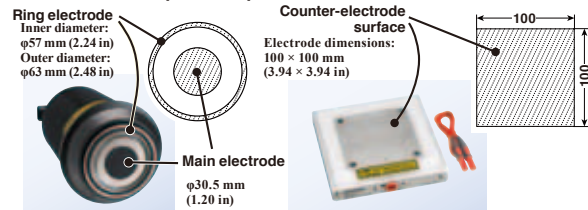
JIS C2170, IEC61340-2-3

"Methods of test for determining the resistance and resistivity of solid planar materials used to avoid electrostatic charge accumulation"

Measure without cutting samples



- Electrode Shapes Compliant with Standards



Main body electrode
(Bottom view of the SM9001)

Counter-electrode with
integrated stand
(SM9001 accessory)

The electrode on the main body uses conductive rubber in a size conforming to standards. Just place the electrode on the sample or measurement point to make stable measurements under a load of 2.5 kg (88.2 oz). Furthermore, measurement voltage up to 1000 V enables highly accurate measurements.

- Test Before Use With the SM9002
Verification Fixture for Surface
Resistance Measurement (Optional)

The SM9002 Verification Fixture for Surface Resistance Measurement (optional) allows you to check the operation of the electrode to increase the reliability of measurement results.

Verification Fixture for Surface
Resistance Measurement
SM9002



When using the SM9002

- Main body
SURFACE/VOLUME RESISTANCE MEASUREMENT
ELECTRODE SM9001

(With integrated low resistance [500 kΩ]/high resistance [1 TΩ] test surfaces)

- Options
VERIFICATION FIXTURE FOR SURFACE
RESISTANCE MEASUREMENT SM9002

(With integrated low resistance [500 kΩ]/high resistance [1 TΩ] test surfaces)

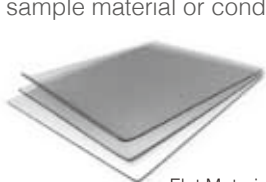
Not CE
Marked



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

- Resistivity Measurement

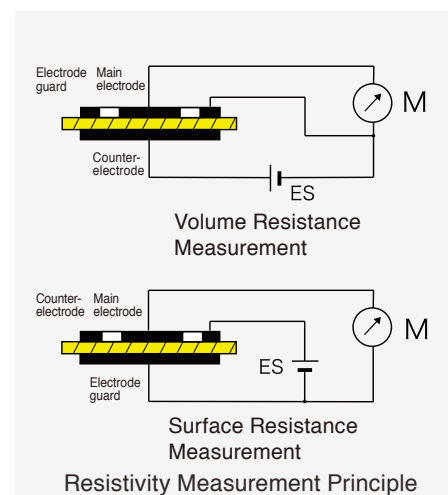
Resistivity (specific resistance) is measured to determine the quality of an insulating material. Resistivity can be classified as volume resistivity or surface resistivity, respectively indicated by the resistance between two sides relative to that of a 1 cm³ cube, or by the resistance relative to that of a 1 cm² surface. HIOKI's super megohm meter SM series provides a wide variety of electrodes to ensure easy measurement regardless of sample material or condition.



Flat Material



Roll Sample

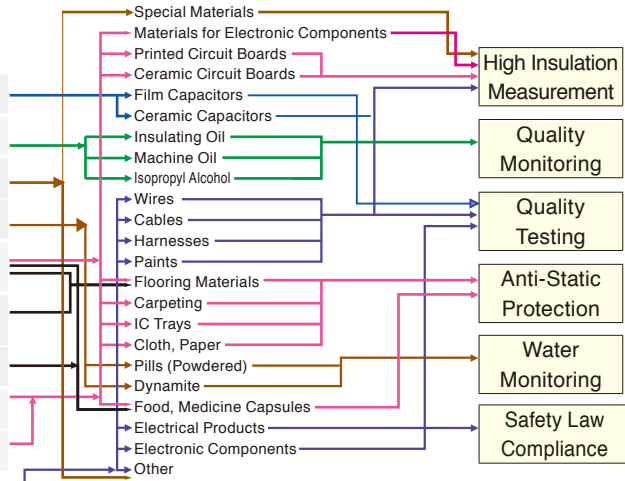


Application Map

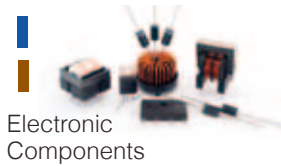
ELECTRODE FOR CHIP CAPACITOR	SME-8360
LIQUID SAMPLE ELECTRODE	SME-8330
SHIELDING BOX	SME-8350
WEIGHT ELECTRODE	SME-8320
SURFACE/VOLUME RESISTANCE MEASUREMENT ELECTRODE	SM9001
SURFACE RESISTANCE MEASUREMENT ELECTRODE	SME-8301
ELECTRODE FOR SURFACE RESISTANCE	SME-8302
PLATE SAMPLE ELECTRODE	SME-8310
ELECTRODE FOR FLAT SAMPLE	SME-8311

Not CE Marked

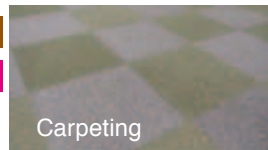
Electrode not required



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



Electronic Components



Carpeting

ELECTRODE FOR CHIP CAPACITOR SME-8360



This electrode is for measuring the insulation resistance of chip capacitors, **with an adjustable jig from 0 mm to 11 mm (0 in to 0.43 in).**

An interlock connection cable is connected to the main unit, so that measurement voltage becomes "OFF" while the lid is open to ensure safety.

Dimensions: 200 mm (7.87 in) W × 52 mm (2.05 in) H × 150 mm (5.91 in) D, Lead length: 85 cm (2.79 ft)

* Connection option for SM7110 and SM7120 Interlock connection cable DSM8104F

LIQUID SAMPLE ELECTRODE SME-8330



Dimensions: $\phi 36 \times 140$ mm (1.42 × 5.51 in)

Accessory: Connection cable 60 cm (1.97 ft) length Red: 0GA00029, Black: 0GA00030

An **electrically guarded** electrode for liquid samples.

* Inspection data sheet included

Measure resistance up to $10^{19} \Omega \cdot \text{cm}$ (at 1000 V).

Total volume: 25 mL

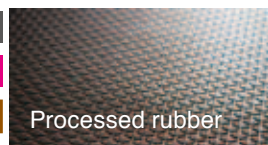
Capacitance between main and counter electrode: Approx. 45 pF

Electrode constant: Approx. 500 cm (16.41 ft)

Distance between electrodes: 1 mm (0.04 in)



Liquid



Processed rubber

ELECTRODE FOR SURFACE RESISTANCE SME-8302



(Distance between electrodes: 4 mm (0.16 in))

An electrode for surface **resistance of curved samples**, such as resin and rubber processed goods and TV cathode tubes, and **small samples**. Surface resistance can be measured by pressing the rubber tips at the tip onto the sample. Measure electrodes up to 1011 Ω at 10 mm intervals or greater.

Dimensions: $\phi 40 \times 115$ mm (0.16 × 4.53 in), Lead length: 1 m (3.28 ft)

STANDARD RESISTOR SR-2



A resistor box for calibration of the super megohmmeters.

It uses a structure that ensures a guard.

Max. voltage: 1000 V DC

Resistance: 10 to 10,000 M Ω (24 points)

Dimensions: 270 mm (10.63 in) W × 90 mm (3.54 in) H × 195 mm (7.68 in) D

* Inspection data sheet included

SHIELDING BOX SME-8350



Accessory: Rubber sheet

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.

When used in combination with weight electrode SME-8320, the electrode can be used as a counter electrode or a guard electrode.

When measuring electronic components such as capacitors and transducers, external noise and leakage currents are prevented to ensure stable measurement.

Dimensions: 250 mm (9.84 in) W × 100 mm (3.94 in) H × 200 mm (7.87 in) D, Lead length: 80 cm (2.62 ft)

* Connection option for SM7110 and SM7120 Interlock connection cable DSM8104F

WEIGHT ELECTRODE SME-8320



Combined with SHIELDING BOX (SME-8350)

This is an electrode for plate samples for use together with SHIELDING BOX SME-8350.

This electrode enables extremely easy measurement of surface and volume resistivity **even on carpets and other coarse surfaces**.

The main electrode dia. is 50 mm (1.97 in), and the ring electrode inner dia. are 70 mm (2.76 in) and 80 mm (3.15 in), respectively. A jig that holds the electrodes in a concentric arrangement and two banana clips are also included.

ELECTRODE FOR FLAT SAMPLE SME-8311



An electrode for measuring the resistivity of plate samples. Samples of 40 to 100 mm (1.57 to 3.94 in) square by up to 8 mm (0.31 in) in thickness are measurable.

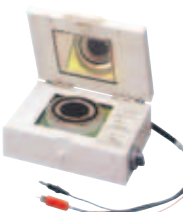
The main electrode dia. is 19.6 mm (0.77 in) and the inner & outer dia. of the ring electrode are 24.1 mm (0.95 in) & 28.8 mm (1.13 in), respectively.

The fundamental specifications are the same as SME-8310.

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

* Connection option for SM7110 and SM7120 Interlock connection cable DSM8104F

PLATE SAMPLE ELECTRODE SME-8310



An electrode for measuring the resistivity of plate samples.

Samples of 100 mm (3.94 in) square by up to 8 mm (0.31 in) in thickness are measurable.

The main electrode dia. is 50 mm (1.97 in) and the inner & outer dia. of the ring electrode are 70 mm (2.76 in) & 80 mm (3.15 in), respectively.

An interlock connection cable is connected to the main unit, so that measurement voltage becomes "OFF" while the lid is open to **ensure safety**.

A selector switch allows selection of volume resistivity or surface resistivity.

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

* Connection option for SM7110 and SM7120 Interlock connection cable DSM8104F

General Specifications

SM7110/SM7120

Basic Specifications

Operating environment	Indoors, pollution degree 2, altitude up to 2000 m (6562.20 ft)
Operating temperature and humidity range	0°C to 40°C (32°F to 104°F), 80% R.H. or less, no condensation
Storage temperature and humidity range	-10°C to 50°C (14°F to 122°F), 80% R.H. or less, no condensation
Power supply/Maximum rated power consumption	100 to 240 V AC, (50/60 Hz)/45 VA
Dielectric strength	4,000 V AC, sensed current: 10 mA Between all mains supply terminals and protective ground, interfaces, and measurement jacks
Standards met	EMC: EN61326 Safety: EN61010
Dimensions/mass	Approx. 330 mm (12.99 in) W × 80 mm (3.15 in) H × 400 mm (15.75 in) D, Approx. 6.7 kg (236.3 oz)
Accessories	Power cord x1, Instruction manual x1, short plug x1, CD-R (Communications command instruction manual, USB driver) EXT I/O male connector x1

Measurement Specifications

Measurement types	DC current, DC voltage, temperature, humidity	
Applied voltage	SM7110: 0.1 V to 1000.0 V SM7120: 0.1 V to 2000.0 V	
Measurement method	Current measurement method through application of constant voltage to measured object	
Maximum rated voltage to ground	2,000 V DC	
Ammeter input resistance	1 kΩ ±10%	
I/O terminal	Current input terminals	Triaxial BNC connector
	Voltage output terminal	Banana terminal
	Charge voltage output terminal	Banana terminal
	GUARD terminal	Banana terminal
Display refresh rate	200 ms ± 5 ms (display refreshment can be turned ON/OFF during measurement.)	
Display unit	Monochrome graphic LCD	
Warning display	Voltage output value: Red LED comes on when approx. 30 V or higher	
Conditions of guaranteed accuracy	Accuracy guarantee period	1 year
	Guaranteed accuracy period after adjustment made by Hioki	1 year
	Temperature and humidity range for guaranteed accuracy	23°C ±5°C (73°F ±9°F), 80% RH or less
	Warm-up time	30 minutes or more
	Power supply frequency range	50/60 Hz ±2 Hz
	Temperature coefficient	Add ±(measurement accuracy × 1/10)/°C for the following ranges: 0°C to 18°C (32°F to 64°F) and 28°C to 40°C (82°F to 104°F).

Functions

Measured value display mode	Display 1: Select one of the following: Resistance/current/surface resistivity/volume resistivity	
	Display 2: Measurement voltage (voltage monitor)	
	Display method: EXT (index display) or UNIT (units display), Number of significant figures: 3 to 6	
Voltage output function	Sink/source (supports recharging and discharging) Selection when output is OFF: Discharge/high impedance (Hi-Z)	
Voltage for resistance calculation	Select from the following: V.MONI (voltage measurement value)/MES.V (voltage setting value)/SET (voltage setting value for calculation)	
Delay Function	Time from trigger input until start of measurement	
Averaging Function	Measurement value averaging (OFF / ON / AUTO) ON 2 to 255 AUTO Automatically changes the number of averaging iterations based on the amount of change in the measurement value	
Self-Calibration	Set time: 1 s to 600 s * Automated when the power is turned on	
Jig Capacity	Display range: 0.00 pF to 99.99 pF	
Open Correction Function	Capacity measurement accuracy ±(20% rdg. ±0.1 pF)	
Contact Check Function	Capacitance measurement method using high-frequency signals	
	Display range: 0.000 pF to 99.999 pF	
	Measurement frequency: 300 kHz / 245 kHz	
Comparator Function	Determine with dgt. value (Hi, IN, Lo) * When using the comparator function, the range is fixed.	
Sequence Program	Executes the Discharge - Recharge - Measurement - Discharge pattern in order Measurement: 1 ms to 999.9 s, Other than measurement: 0 ms to 999.9 s	
Other functions	Judgment sound setting function, interlock function, voltage monitor check, reset, self-test	

Accuracy Specifications

Accuracy guaranteed for 1 year; Post-adjustment accuracy guaranteed for 1 year

* The 2000 V range is for the SM7120 only. Note that the voltage resistance for the electrodes will be 1000 V.

Current Measurement Accuracy

Range	Maximum display value	Resolution	Current measurement accuracy (±% rdg. ± dgt.)				
			FAST	FAST2	MED	SLOW	SLOW2
20 pA	19.9999 pA	0.1 fA	-	-	-	2.0+450	2.0+30
200 pA	199.999 pA	1 fA	-	-	1.0+600	1.0+45	1.0+30
2 nA	1.99999 nA	10 fA	0.5+600	0.5+600	0.5+40	0.5+30	0.5+20
20 nA	19.9999 nA	100 fA	0.5+30	0.5+30	0.5+20	0.5+15	0.5+10
200 nA	199.999 nA	1 pA	0.5+30	0.5+30	0.5+20	0.5+15	0.5+10
2 μA	1.99999 μA	10 pA	0.5+30	0.5+30	0.5+20	0.5+15	0.5+10
20 μA	19.9999 μA	100 pA	0.5+30	0.5+30	0.5+20	0.5+15	0.5+10
200 μA	199.999 μA	1 nA	0.5+30	0.5+30	0.5+20	0.5+15	0.5+10
2 mA	1.99999 mA	10 nA	0.5+30	0.5+30	-	-	-

Voltage Measurement Accuracy

Range	Maximum display value	Resolution	Voltage measurement accuracy (±% rdg. ± dgt.)
10 V	10.000 V	0.001 V	0.03+2
100 V	100.00 V	0.01 V	0.03+2
1000 V	1000.0 V	0.1 V	0.03+2
2000 V*	2000.0 V	0.1 V	0.2 +2

Resistance Accuracy

Current measurement accuracy + voltage measurement accuracy

Accuracy is not guaranteed if the voltage setting value is selected to calculate resistance.

Resistance display range

50 Ω to 2×10¹⁹Ω

Voltage Generation Accuracy Setting when output is OFF: Discharge or Hi-Z

Range	Setting voltage range	Setting resolution	Voltage generation accuracy (±% setting. ±% f.s.)	Time from the START signal until voltage output
10 V	0.1 V to 10.0 V	0.1 V	0.1+0.05	0.1 ms max.
100 V	10.1 V to 100.0 V	0.1 V	0.1+0.05	0.1 ms max.
1000 V	101 V to 1000 V	1 V	0.1 +0.05	0.1 ms max.
2000 V*	1001 V to 2000 V	1 V	0.2 +0.10	0.1 ms max.

Voltage Generation Current Limiter

Recharge setting	Setting voltage range	Setting value	Total current	Current value	
				Measurement	Recharge
ON	0.1 V to 250.0 V	50 mA	50 mA	5 mA	45 mA
		10 mA	10 mA	5 mA	5 mA
		5 mA	5 mA	5 mA	0 mA
	251 V to 1000 V	10 mA	10 mA	5 mA	5 mA
		5 mA	5 mA	5 mA	0 mA
	1001 V to 2000 V*	1.8 mA	1.8 mA	1.8 mA	0 mA
OFF	0.1 V to 250.0 V	50 mA	50 mA	50 mA	0 mA
		10 mA	10 mA	10 mA	0 mA
		5 mA	5 mA	5 mA	0 mA
	251 V to 1000 V	10 mA	10 mA	10 mA	0 mA
		5 mA	5 mA	5 mA	0 mA
	1001 V to 2000 V*	1.8 mA	1.8 mA	1.8 mA	0 mA

Measurement Time (INDEX Time)

Measurement speed (internal integration time)		Power supply frequency	
		50 Hz	60 Hz
FAST	2 ms	6.4 ms	6.4 ms
FAST2	½ PLC	16.0 ms	15.0 ms
MED	1 PLC	26.0 ms	23.0 ms
SLOW	4 PLC	112.0 ms	96.0 ms
SLOW2	13 PLC	322.0 ms	322.0 ms

PLC: Power Line Cycle

Temperature/Humidity

When used together with the

Measurement Accuracy

Z2011 HUMIDITY SENSOR

Temperature accuracy range	-40.00°C~80.00°C ±0.5°C
Humidity accuracy range	20.0% R.H. to 80.0% R.H. ±5% R.H.

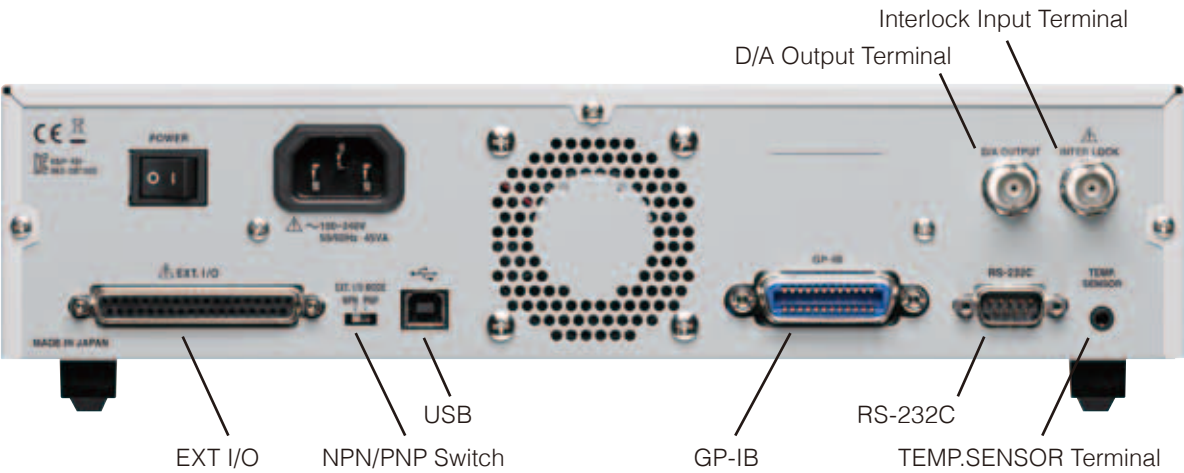
Measurement Time (INDEX Time, EOM Time)

Contact check (2.3 ms)	Comparator (0.2 ms)	Measurement speed (Power supply frequency)			
		FAST (50 Hz)		FAST2 (60 Hz)	
		INDEX	EOM	INDEX	EOM
OFF	OFF	4.1 ms	4.5 ms	12.7 ms	13.1 ms
OFF	ON	4.1 ms	4.7 ms	12.7 ms	13.3 ms
ON	OFF	6.4 ms	6.8 ms	15.0 ms	15.4 ms
ON	ON	6.4 ms	7.0 ms	15.0 ms	15.6 ms

INDEX time = Contact check time + Delay time + measurement time

EOM time = Index time + Comparator time +0.4 ms (+1.0 ms *use a measured voltage value for resistance calculation)

External Interface



Communication Monitor

Monitor the USB, RS-232C, and GP-IB transmission contents on the panel.

GP-IB Interface

Communication method	IEEE-488.2 compliant Interface functions: SH1, AH1, T6, L4, SR1, RL1, PP0, DC1, DT1, C0
Addresses	0~30

RS-232C Interface

Connector	9-pin D-sub male connector with #4-40 inch screws
Communication method	Full duplex, start stop synchronization, stop bit of 1 (fixed), data length of 8 (fixed), no parity, no flow control
Communication speed (bps)	4800 / 9600 / 19200 / 38400 / 115200

USB Device

Connector	Series B receptacle
Electrical specifications	USB2.0 (Full-speed)
Class	CDC class (COM mode) HID class (USB keyboard mode)

D/A Output

Output terminal	BNC terminal
Output voltage	0 V to 2 V DC (2.0 V at current range F.S.)
Output impedance	1 kΩ

Interlock Input

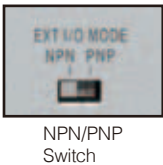
Input terminals	BNC terminal (Parallel with the EXT I/O terminal)
Interlock operation	When this setting is enabled, interlock is disengaged when Lo is input or when there is a short circuit between terminals.
Operation when the function is enabled	Output and measurement of the measurement voltage are stopped. Measurement is not possible by key or communication.

TEMP. SENSOR Terminal

Input sensor	HUMIDITY SENSOR Z2011
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EXT I/O Interface (with test function)

Use the rear panel's switch to select either the NPN type (which supports sink output) or the PNP type (which supports source output) for the input signal polarity to match the programmable controller's common polarity.

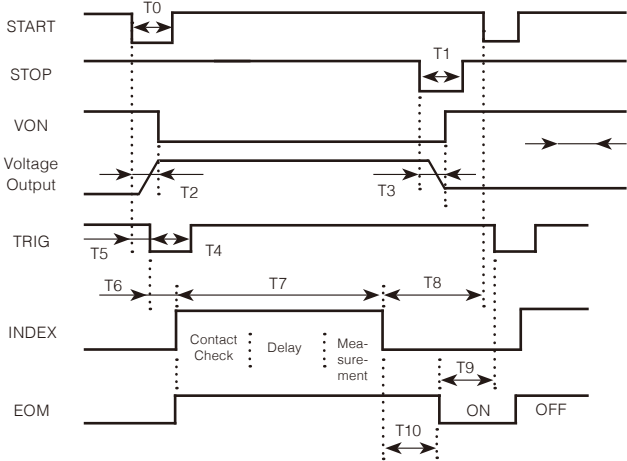


Connector

Connector used	: 37-pin D-sub female connector with #4-40 inch screws (on the main unit)
Compatible connectors	: DC-37P-ULR (solder type), DCSP-JB37PR (crimped type) Japan Aviation Electronics Industry, Ltd.

Input signals	Input type	Photocoupler isolation: Non-voltage contact inputs (Current sink output supported) (negative logic)
	Input ON voltage	1 V or less
	Input OFF voltage	OPEN (Shield current: 100 μA or less)
Output signals	Output type	Photocoupler isolation: Open drain npn output (non-polar)
	Max. load voltage	30 V
	Max. output current	50 mA/ch
	Residual voltage	0.5 V (10 mA), 1.0 V (50 mA)
Built-in insulation power	Output voltage	Sink output support: +5.0 V ±10% Source output support: -5.0 V ±10%
	Max. output current	100 mA
	External power input	None
	Isolated	Floating from protective ground potential and measurement circuitry
	Insulation rating	Terminal-to-ground voltage: 50 V DC, 33 V rms AC, 46.7 V peak AC or less

Dynamic Chart (Voltage output, External trigger measurement)



T0: 0.1 ms or greater, T1: 0.1 ms or greater, T4: 0.1 ms or greater
T2 (T3): Voltage output (stop) time: Less than 0.1 ms, T5: Trigger accepted: 0 s or greater
T6: INDEX, EOM delay time, T7: INDEX time, T8: START setup time: 4 ms or greater
T9: TRIG setup time: Display ON (40 ms or greater) Display OFF (1 ms or greater)
T10: Less than (Comparator measurement time + 0.1 ms)

Product Name: SUPER MEGOHM METER SM7110 SUPER MEGOHM METER SM7120

Model name (order code)	Output channels	Maximum output voltage
SM7110	1 ch	1000 V
SM7120	1 ch	2000 V

Options

Probes



PIN TYPE LEAD (RED) L2230
Cable length: 1 m (3.28 ft)



PIN TYPE LEAD (BLACK) L2231
Cable length: 1 m (3.28 ft)



CLIP TYPE LEAD (RED) L2232
Cable length: 1 m (3.28 ft)



CLIP TYPE LEAD (RED) L2233
Cable length: 1 m (3.28 ft)



OPEN LEAD (RED) L2234
Cable length: 3 m (9.84 ft)



OPEN LEAD (RED) L2235
Cable length: 3 m (9.84 ft)

Sensor



HUMIDITY SENSOR Z2011
HUMIDITY SENSOR
Cord length: 1.5 m (4.92 ft)

Communication Interfaces

RS-232C CABLE 9637
9pin-9pin, cross
Cord length: 1.8 m (5.91 ft)

RS-232C CABLE 9638
9pin-25pin, cross
Cord length: 1.8 m (5.91 ft)

GP-IB CONNECTION CABLE 9151-02
Cord length: 2 m (6.56 ft)

Contact your local Hioki distributor for information about the pricing and specifications for CONVERSION ADAPTER Z5010.

Supports 0201- Size Packages: Electrode for SMD Samples SM9060

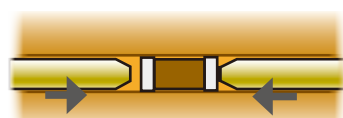
Fine chip electrode with floating structures that can ignore jig surface resistance

* EIA SIZE: 008004



Operability

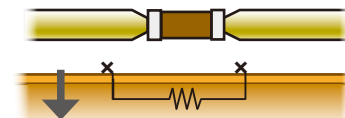
Simple chuck for size 0201



The fine chip is easily secured via the groove, and a dedicated wire probe firmly holds the sample.

Measurement Performance

Accurate measurement due to floating structures



During an inspection, the stage lowers so that the surface resistance of the jig can be ignored, allowing the sample to be measured accurately.

When connecting electrodes to a SUPER MEGOHM METER, note that CONVERSION ADAPTER Z5010 or a change of connectors is required.

DIGITAL SUPER MEGOHMMETER DSM-8542

POWER SUPPLY UNIT PSU-8541

Improving MLCC Inspection Throughput

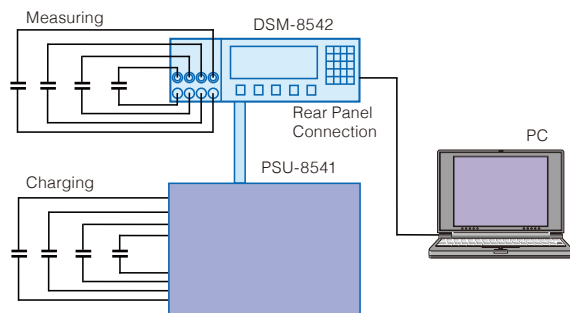


Not CE Marked

High-Speed Measurement of Capacitors by Charging with the Reserve Charge

There are 20 channels of charge terminals (current limiters for recharging), and recharging is performed at the same voltage as the measured voltage. Each current limiter terminal is independent.

■ Capacitor Measurement Example



* Each capacitor is charged for the specified time before connection to a measurement terminal for leakage current measurement.

* Because there are 20 charging channels and four measurement channels, the charging time prior to leakage current measurement can be shortened to one fifth of the time required when using measurement terminals only, increasing leakage current measurement throughput by a factor of five.

DIGITAL SUPER MEGOHMMETER DSM-8542

• DC Measurement Capabilities

Measurement range	Maximum display value	Resolution	Accuracy
10 pA	9.9999 pA	0.1 fA	±(3.0% rdg. + 1.2% of range)
100 pA	99.999 pA	1.0 fA	±(1.5% rdg. + 0.6% of range)
1 nA	999.99 pA	10 fA	±(0.6% rdg. + 0.6% of range)
10 nA	9.9999 nA	100 fA	±(0.4% rdg. + 0.5% of range)
100 nA	99.999 nA	1 pA	±(0.4% rdg. + 0.5% of range)
1 μA	999.99 nA	10 pA	±(0.4% rdg. + 0.5% of range)
10 μA	9.9999 μA	100 pA	±(0.4% rdg. + 0.5% of range)
100 μA	99.999 μA	1.0 nA	±(0.4% rdg. + 0.5% of range)

* Measurement time is 300 ms, with Average Processing enabled

* Within 23°C ±5°C (73°F ±9°F), 85% R.H. or less, with self-calibration

* Input impedance is constant at 100 Ω

• Resistance Measurement Capabilities (1000 V measurement voltage)

Measurement range	Current range
1x10 ¹⁴ to 3x10 ¹⁶ (Open-circuit)	10 pA
1x10 ¹³ to 3x10 ¹⁴	100 pA
1x10 ¹² to 3x10 ¹³	1 nA
1x10 ¹¹ to 3x10 ¹²	10 nA
1x10 ¹⁰ to 3x10 ¹¹	100 nA
1x10 ⁹ to 3x10 ¹⁰	1 μA
1x10 ⁸ to 3x10 ⁹	10 μA
1x10 ⁷ to 3x10 ⁸	100 μA

* Measurement time is 300 ms.

* Measured values in each measurement range are derived by dividing the measurement voltage by the measured current.

POWER SUPPLY UNIT PSU-8541

• Structure

Component	Number of circuits	Structure	Note: Figures in () are continuous rated values.
Voltage Generator A (HIGH)	1		150.0 W (50 W) / 250 V
Voltage Generator B (LO)	1		120.0 W (50 W) / 1000 V
Current control circuit (measurement) (Recharge)	4	2 common circuits × 2 sets	6.0 W / 10 V
	20	5 common circuits × 4 sets	

* High and low voltage amplifiers and current limiter connections are by internal terminal block (when external control not used).

* Either one or both of systems A and B may be grounded systems.

• Voltage Generator – Setting Voltage Accuracy and Resolution

Setting voltage range	Current capacity (continuous rating)	Setting resolution	Accuracy
Voltage Generator A (HIGH) 0.1 to 250.0 V 251 to 1000 V	Max. 600 mA (200 mA) Max. 120 mA (50 mA)	100 mV 1 V	±(0.1% of setting +150 mV) ±(0.1% of setting +400 mV)
Voltage Generator (LO) 0.1 to 10.0 V	Max. 600 mA	100 mV	±(0.1% of setting +150 mV)

* Values in parentheses () are continuous ratings of current capacity.

See the DSM-8104/DSM-8542 product catalogs for details.

HIOKI

HIOKI E. E. CORPORATION

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