

Test System Ideal for MLCC Leakage Current Measurement

SUPER MΩ HiTESTER SM7810



GP-IB/

RS-232C/

Not CE Marked

- Test the leakage current of MLCCs at the fastest speed of 6.8ms simultaneously over 8 channels
- Conduct high-speed leakage current testing of large-capacity MLCCs in the high current range (1mA)
- Improve testing reliability using the contact check function
- Build a flexible system by making best use of the individual settings of each channel

Order Code: SM7810 (100/110V AC power supply)
SM7810-20 (220V AC power supply)

Note: The Super MΩ HiTester SM7810 is produced to order. An input/output terminal connection cable*1 is required separately. Please contact your local HIOKI distributor.

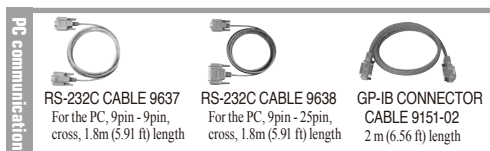
*1 Input/output terminal connector/plug and connection cable

• Current input terminal connector and voltage output terminal plug are not included. Voltage input terminal connector is included.

• Input/output terminal connection cables are available in various lengths to suit HIOKI measurement systems. Please consult with your HIOKI distributor.

Basic specifications (Accuracy guaranteed for 1 year, Post-adjustment accuracy guaranteed for 1 year)

Number of channels	8 channels (parallel and simultaneous measurement)
Applied voltage	Supply voltage from external power source (voltage input terminal on the rear panel)
Measurement range	Current: 1 pA to 1 mA, Ranges: 100 pA/ 1 nA/ 10 nA/ 100 nA/ 1 μA/ 10 μA/ 100 μA/ 1 mA Resistance: $1 \times 10^2 \Omega$ to $1 \times 10^{15} \Omega$
Measurement speed INDEX typical time	FAST: 6.8 ms, MED: 26.0 ms, SLOW: 100.0 ms, SLOW2: 320.0 ms
Basic measurement accuracy (1μA range, FAST)	Current accuracy: $\pm(2.0 + (0.5 \mu A / (\text{Measured current value}))) \%$ Resistance accuracy: Current accuracy + Voltage generation accuracy of external power supply
Testing voltage setting	0.1 V to 1000.0 V (Resolution: 0.1 V)
Contact check	Judges the contact state by comparing the measured capacitance to a reference value
Other functions	Trigger delay, averaging, contact check, jig capacity open correction, Measured value comparison and judgment, jig resistance open correction functions
Interfaces	GP-IB, RS-232C, EXT I/O
Power supply	SM7810: AC 100 V/110 V, 50/60 Hz, 30 VA SM7810-20: AC 220 V, 50/60 Hz, 30 VA
Dimensions and mass	425 mm (16.73 in) W × 99 mm (3.90 in) H × 488 mm (19.21 in) D, 10.5 kg (370.4 oz)
Accessories	Power cord ×1, Instruction manual ×1, Voltage input connector ×1, Spare fuse (built into inlet) ×1, Rubber feet ×4



Super Megohm Testers

The Power Source Unit Ideal for MLCC Leakage Current Measurement

POWER SOURCE UNIT SM7860 series



GP-IB/

RS-232C/

Not CE Marked

Combination example of the SM7610

Order Code: SM7860-01 /-02 /-03 /-04 /-05 /-06 /-07 (100V AC power supply)
SM7860-21 /-22 /-23 /-24 /-25 /-26 /-27 (220V AC power supply)

Note: The Power Source Unit SM7860 is produced to order. The SM7860 allows for setting the dual-line output voltage on 8 channels or 16 channels, and enables up to 32-channel output. Select a power source unit combining positive and negative power source (1 kV/500 V), discharge, and low-voltage power source (10 V) modules to build a power source ideal for the leakage current test system.

- Support for multi-channel systems up to 32-channel output
- 8-channels or 16-channels dual-line output voltage setting
- Positive and negative polarities required for the MLCC test line included in a single unit
- Output ON/OFF and current limitation can be performed for each channel
- Support for the discharge of the charge capacitor
- Output voltage of 1 kV is available
- Large current output of 50 mA /channel allows for reducing the number of backup charges

* Output voltage of 1 kV is limited to 10 mA/channel

Basic specifications (Accuracy guaranteed for 1 year, Post-adjustment accuracy guaranteed for 1 year)

Supported device	Super MΩ HiTester SM7810 Object to which voltage is applied: MLCC (the Multilayer Ceramic Capacitor)
Generation accuracy	Output voltage accuracy: $\pm 2\%$ of set value ± 0.5 V (with no load) Inter-channel error: ± 0.01 V or less (between outputs on the same line with no load)
Interfaces	GP-IB, RS-232C, EXT I/O
Power supply	SM7860-01 to -07: 100 V AC, SM7860-21 to -27: 220 V AC, 50/60 Hz, 860 VA
Dimensions and mass	425 mm (16.73 in) W × 249 mm (9.80 in) H × 581 mm (22.87 in) D, 45 kg (158.73 oz) [SM7860-07 / -27]: 32 kg (112.87 oz)
Accessories	Power cable ×1, Instruction manual ×1, Voltage output connector ×4 [SM7860-01, 02, 21, 22]: ×2

Functions & output channel configuration

SM7860-XX*2		-01 / -21		-02 / -22		-03 / -23		-04 / -24		-05 / -25		-06 / -26		-07 / -27		
OUT1 to 4 output content	OUT1	OUT2	+500V		+1kV		+500V	+500V	+1kV	+1kV	+500V	discharge	+1kV	discharge	+10V	+10V
	OUT3	OUT4	-500V		-1kV		-500V	-500V	-1kV	-1kV	-500V	discharge	-1kV	discharge	+10V	discharge
Overview (Total number of channels and output voltage)		16 ch ±500 V		16 ch ±1000 V		32 ch ±500 V		32 ch ±1000 V		32 ch ±500 V, discharge		32 ch ±1000 V, discharge		32 ch 10 V, discharge		
Line A	Number of OUT1 channels	8 ch		8 ch		8 ch		8 ch		8 ch		8 ch		8 ch		
	OUT1 output voltage range *1	1.0 V to 500.0 V		250.0 V to 1000.0 V		1.0 V to 500.0 V		250.0 V to 1000.0 V		1.0 V to 500.0 V		250.0 V to 1000.0 V		1.0 V to 10.0 V		
	Number of OUT2 channels	---		---		8 ch		8 ch		8 ch		8 ch		8 ch		
	OUT2 output voltage range *1	---		---		1.0 V to 500.0 V		250.0 V to 1000.0 V		discharge		discharge		1.0 V to 10.0 V		
	Current limitation	±50 mA/ch		±10 mA/ch		±50 mA/ch		±10 mA/ch		±50 mA/ch		±10 mA/ch		±50 mA/ch		
Maximum output current *2		430 mA (200 VA)		100 mA (100 VA)		430 mA (200 VA)		100 mA (100 VA)		430 mA (200 VA)		100 mA (100 VA)		430 mA (200 VA)		
Line B	Number of OUT3 channels	8 ch		8 ch		8 ch		8 ch		8 ch		8 ch		8 ch		
	OUT3 output voltage range *1	-1.0 V to -500.0 V		-250.0 V to -1000.0 V		-1.0 V to -500.0 V		-250.0 V to -1000.0 V		-1.0 V to -500.0 V		-250.0 V to -1000.0 V		1.0 V to 10.0 V		
	Number of OUT4 channels	---		---		8 ch		8 ch		8 ch		8 ch		8 ch		
	OUT4 output voltage range *1	---		---		-1.0 V to -500.0 V		-250.0 V to -1000.0 V		discharge		discharge		discharge		
	Current limitation	±50 mA/ch		±10 mA/ch		±50 mA/ch		±10 mA/ch		±50 mA/ch		±10 mA/ch		±50 mA/ch		
Maximum output current *2		430 mA (200 VA)		100 mA (100 VA)		430 mA (200 VA)		100 mA (100 VA)		430 mA (200 VA)		100 mA (100 VA)		430 mA (200 VA)		

*1 The resolution of the output voltage range is 0.1 V.

*2 Only when the operating conditions as stated in the restriction warnings of the specifications are met.

Super Megohm Testers

High-Speed and High-Precision Measurement of Super Megohm or Very Small Current

DIGITAL SUPER MEGOHMMETER DSM-8104



GP-IB

RS-232C

Not CE Marked

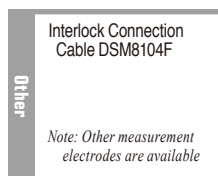
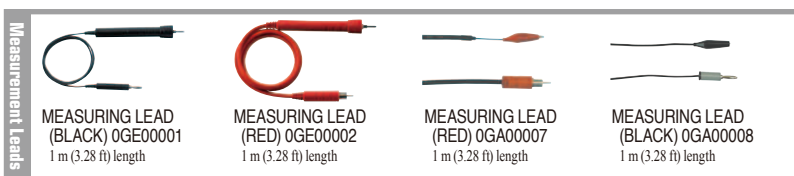
- Measure insulation resistance of capacitive/highly insulated materials at high speed with high accuracy
- Resistance measurement range : 1×10^3 to $3 \times 10^{16} \Omega$
- Low current measurement: 0.1 fA to 10 mA
- Testing voltage: 0.1 V DC to 1000 V DC
- Histogram display of selected results
- Compatible for measurement of several sample types with electrodes & other devices

Order Code: **DSM-8104** (1 ch)

Note: RS-232C connection cable: The optional RS-232C Cable 9637 cannot be used with this product. Use a cross cable for connections as described in the instruction manual.

Basic specifications (Accuracy guaranteed for 1 year, Post-adjustment accuracy guaranteed for 1 year)

Number of channels	1 ch
DC current measurement	10 pA range (0.1 fA resolution), Accuracy: $\pm(3.0\% \text{ of rdg.} + 1.2\% \text{ of range})$ 100 pA range (1.0 fA resolution), Accuracy: $\pm(1.5\% \text{ of rdg.} + 0.6\% \text{ of range})$ 1 nA range (10 fA resolution), Accuracy: $\pm(0.6\% \text{ of rdg.} + 0.6\% \text{ of range})$ 10 nA range (100 fA resolution), Accuracy: $\pm(0.4\% \text{ of rdg.} + 0.5\% \text{ of range})$ 100 nA range (1 pA resolution), Accuracy: $\pm(0.4\% \text{ of rdg.} + 0.5\% \text{ of range})$ 1 μ A range (10 pA resolution), Accuracy: $\pm(0.4\% \text{ of rdg.} + 0.5\% \text{ of range})$ 10 μ A range (100 pA resolution), Accuracy: $\pm(0.4\% \text{ of rdg.} + 0.5\% \text{ of range})$ 100 μ A range (1 nA resolution), Accuracy: $\pm(0.4\% \text{ of rdg.} + 0.5\% \text{ of range})$ (1) With 300 ms measurement time, with averaging processing enabled (2) At a temperature of $23 \pm 5^\circ\text{C}$ with humidity of 85% rh (3) After self-calibration (1 min. interval) (4) With averaging processing enabled
Resistance measurement capabilities	$1 \times 10^3 \Omega$ to $3 \times 10^{16} \Omega$ (Open-circuit), (Measurement time is 300 ms) Note: Resistance measurement accuracy is defined by the current range accuracy and voltage setting accuracy.
Setting voltage range (Accuracy)	0.1 to 250.0 V, 100 mV resolution, Accuracy: $\pm 0.1\%$ of setting ± 150 mV 251 to 1000 V, 1 V resolution, Accuracy: $\pm 0.1\%$ of setting ± 400 mV
Current Limiter	0.1 to 250.0 V: 5/10/50 mA, 251 to 1000 V: 5/10 mA
Measurement time setting	Delay: 0 to 9,999 msec, Sampling time: 2 to 300 msec
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.
Data storage	Up to 1,000 measurement values can be stored
Display	LCD (8 lines of 30 characters), with backlight, High voltage warning indicator
Interfaces	GP-IB, RS-232C or Handler Interface
Power supply	100 V AC $\pm 10\%$ (standard), (115, 220 or 240 V AC factory option), 50/60 Hz, 55 VA
Dimensions and mass	332 mm (13.07 in)W \times 89 mm (3.50 in)H \times 450 mm (17.72 in)D, 6.7 kg (236.3 oz)
Accessories	Power cord \times 1, Instruction manual \times 1



4-Channel Measurement System

DIGITAL SUPER MEGOHMMETER DSM-8542 POWER SUPPLY UNIT PSU-8541



DSM-8542

PSU-8541



Rear panel

- Measure insulation resistance of capacitive/highly insulated materials at high speed with high accuracy
- The DSM-8542 is 4-channel version of the DSM-8104 (Not available for testing voltage output), measurement or other functions are the same as DSM-8104 specifications
- Simultaneous 4-channel measurement capabilities available when combined with the PSU-8541

Order Code: **DSM-8542** (4 ch)
PSU-8541 (power supply)

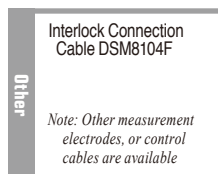
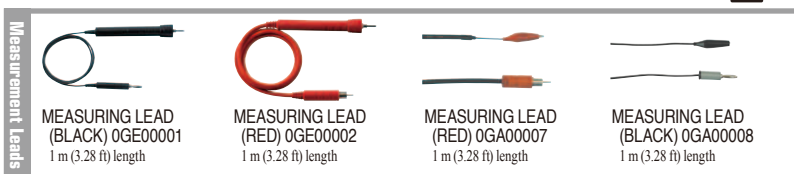
Note: RS-232C connection cable: The optional RS-232C Cable 9637 cannot be used with this product. Use a cross cable for connections as described in the instruction manual.

DSM-8542 Basic specifications (Accuracy guaranteed for 1 year, Post-adjustment accuracy guaranteed for 1 year)

Number of channels	4 ch
Other	Same as DSM-8104 specifications (Except with 4 measurement channels. Not available for voltage generator, Mass: 7.0 kg (246.9 oz))

PSU-8541 Basic specifications

Configuration	Voltage generator [HIGH]: 1 circuit, [LOW]: 1 circuit Current limiter circuits [Measurement system]: 4 circuits (common ground 2 circuits \times 2 pairs) Current limiter circuits [Charge System]: 20 circuits (common ground 5 circuits \times 4 pairs)
Voltage Generator HIGH (Accuracy)	0.1 V to 250.0 V ($\pm 0.1\%$ of setting ± 150 mV), Max. 600 mA 251 V to 1,000 V ($\pm 0.1\%$ of setting ± 400 mV), Max. 120 mA
Voltage Generator LOW (Accuracy)	0.1 V to 10.0 V ($\pm 0.1\%$ of setting ± 150 mV), Max. 600 mA
Current limiter	0.1 V to 250.0 V: 5/10/25/50 mA, 251 V to 1,000 V: 5 mA
Control	Controlled by the DSM-8542
Control Method	Voltage Setting, Current Limit for Measurement (common for all channels), Current Limit for Charging (common for all channels), Voltage Output On/Off, Voltage Generator Filter On/Off
Power supply	100 V AC $\pm 10\%$, 50/60 Hz, 350 VA
Dimensions and mass	332 mm (13.07 in)W \times 178 mm (7.01 in)H \times 450 mm (17.72 in)D, 28 kg (98.77 oz)
Accessories	Power cable \times 1, 3P-2P Conversion adapter \times 1, Connection cable for voltage control \times 1, Connection cable for high voltage \times 1, Operational manual \times 1



Super Megohm Testers

Super Megohm Measurement in Any Field

SUPER MEGOHMMETER SM-8213/8215/8220



SM-8220

RS-232C

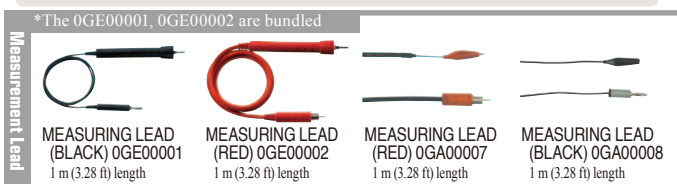
Not CE Marked

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

Order Code: SM-8213 (max. $2 \times 10^{12} \Omega$)
SM-8215 (max. $2 \times 10^{13} \Omega$)
SM-8220 (max. $2 \times 10^{16} \Omega$)

Note: RS-232C connection cable: The optional RS-232C Cable 9637 cannot be used with this product. Use a commercially available straight 9-pin/9-pin cable.

*The 0GE00001, 0GE00002 are bundled



Other measurement electrodes are available

Basic specifications (Accuracy guaranteed for 1 year, Post-adjustment accuracy guaranteed for 1 year)

		SM-8213	SM-8215	SM-8220
Measuring resistance range	5 V	$2.5 \times 10^4 - 1 \times 10^{11} \Omega$		
	10 V	$5 \times 10^4 - 2 \times 10^{11} \Omega$		$5 \times 10^4 - 2 \times 10^{14} \Omega$
	15 V	$7.5 \times 10^4 - 3 \times 10^{11} \Omega$		
	25 V	$1.25 \times 10^5 - 5 \times 10^{11} \Omega$		$1.25 \times 10^5 - 5 \times 10^{14} \Omega$
	50 V	$2.5 \times 10^5 - 1 \times 10^{12} \Omega$	$2.5 \times 10^5 - 1 \times 10^{12} \Omega$	$2.5 \times 10^5 - 1 \times 10^{15} \Omega$
	100 V	$5 \times 10^5 - 2 \times 10^{12} \Omega$	$5 \times 10^5 - 2 \times 10^{12} \Omega$	$5 \times 10^5 - 2 \times 10^{15} \Omega$
	250 V		$1.25 \times 10^6 - 5 \times 10^{12} \Omega$	$1.25 \times 10^6 - 5 \times 10^{15} \Omega$
	500 V		$2.5 \times 10^6 - 1 \times 10^{13} \Omega$	$2.5 \times 10^6 - 1 \times 10^{16} \Omega$
1000 V		$5 \times 10^6 - 2 \times 10^{13} \Omega$	$5 \times 10^6 - 2 \times 10^{16} \Omega$	
Measuring accuracy	$\pm 10\%$ (within 10 times range of min. value on each range at 20°C), but $\pm 20\%$ at 10^8 range of the SM-8220			
Output current	Max. 50 mA		Max. 2 mA	
Display	LCD (digital & analog display)			
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)			
Accessories	Instruction manual $\times 1$, Power cord $\times 1$, Measuring lead (black) 0GE00001 $\times 1$, Measuring lead (red) 0GE00002 $\times 1$, Short plug (internal) $\times 1$			

DC Output (1/R) RI-8000

DC Output (Resistivity-Proportional Output)
RP-8000

*To connect the Super Meg-ohm meter to a printer, a commercially available RS-232C cross 9-pin (female) to 9-pin (male) cable is required



Super Megohm Testers

Options for Super megohm meters (for surface resistance or volume resistance measurement)

SURFACE/VOLUME RESISTANCE MEASUREMENT ELECTRODE SM9001

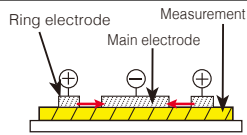


Not CE Marked

- Electrodes compliant with the JIS C 2170 and IEC 61340-2-3 standards
- Measurement voltage up to 1,000 V_i 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

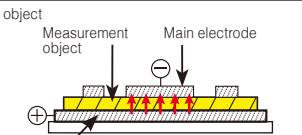
Dimensions: ϕ 100mm (3.94in) \times 223mm (8.78in), Mass: 2.5 kg (88.2oz)
Cable length: 1 m (3.28 ft)

Order Code: **SM9001**
SM9002



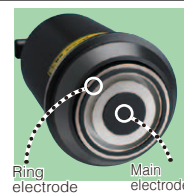
Surface Resistance Measurement

Measure the surface resistance between the main electrode and ring electrode of the main body electrode.



Volume Resistance Measurement

Measure the volume resistance of the sample sandwiched between the main electrode and counter-electrode.



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.



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

Order Code: **SME-8301**

Electrode for surface resistance SME-8302



Not CE Marked

An electrode distance: 4mm (0.16in)
Dimensions: ϕ 40mm (1.57in) \times 115mm (4.53in),
Lead length 1m (3.28ft)

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.

Order Code: **SME-8302**

Electrode for plate samples SME-8310



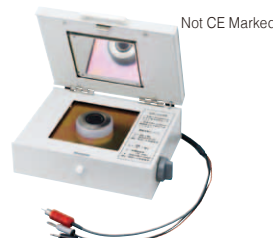
Not CE Marked

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.

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

Order Code: **SME-8310**

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.

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

Order Code: **SME-8311**

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.

Order Code: **SME-8320**

Note: Included: Banana clips \times 2

Photo is Combination with Shield box SME-8350

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-8216.

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

Dimensions: ϕ 36mm (1.42in) \times 140mm (5.51in)

Order Code: **SME-8330**

Note: Includes inspection data sheet

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)

Order Code: **SME-8350**

Note: Includes 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 Ω to 10,000 M Ω in 24 points.

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

Order Code: **SR-2**

Note: Includes inspection data sheet



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.

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

Order Code: **SME-8360**