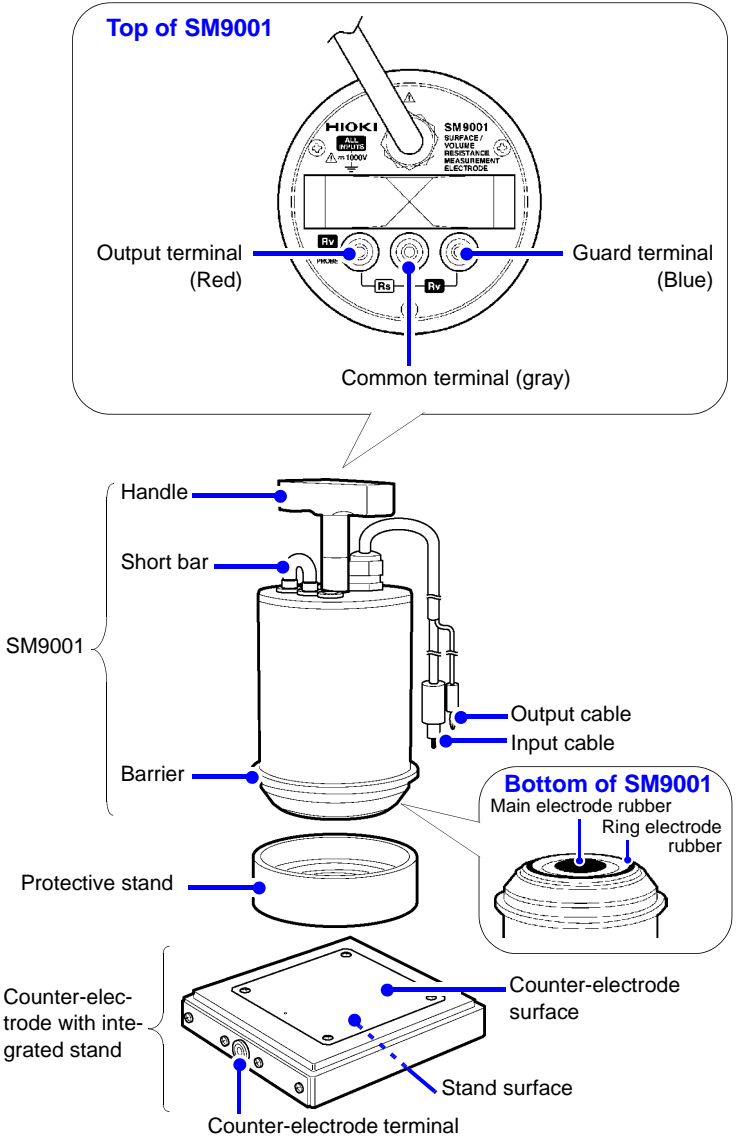


Names of Parts



Pre-Operation Inspection

Check the following before using the device.	
Check Items	Diagnose and Solution
Is the insulation of the cable to be used damaged, or is bare metal exposed?	Do not use a damaged cable doing so may result in electric shock.
Is there a break in a cable? <ul style="list-style-type: none">Between the main electrode rubber and the input cable's inner wireBetween the guard terminal (blue) and the input cable's outer wireBetween the output terminal (red) and the output cable	Have the SM9001 repaired if there is a break in a cable.
Is the electrode's internal resistance at least $1 \times 10^{14} \Omega$? <ul style="list-style-type: none">Place the SM9001 in a horizontal orientation and take a measurement while the main electrode and ring electrode are not in contact with anything. (Applied voltage: 100 V/1 min.)	Remove dirt and other foreign matter from between the main electrode and ring electrode.

Measurement Procedures

WARNING
When measuring insulation resistance, a dangerous voltage will be applied to the electrodes in the START, MEASURE, and CHARGE states. To avoid electric shock, do not touch the electrodes.

- CAUTION**
- To avoid breaking the cable, do not bend or pull it.
 - Avoid stepping on or pinching cables, which could damage the cable insulation.
 - The cable is hardened under the 0 degree or colder environment. Do not bend or pull it to avoid tearing its shield or cutting cable.
 - Keep the cables well away from heat sources, as bare conductors could be exposed if the insulation melts.

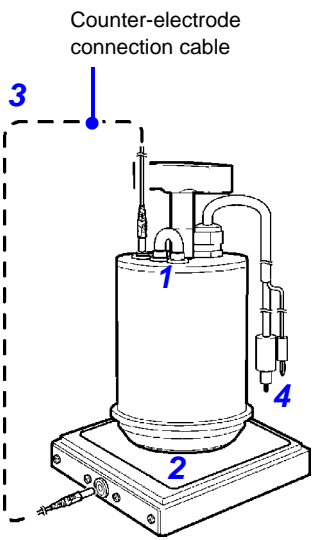
- NOTE**
- When placing the SM9001 in contact with the sample, do so gently and from directly above the sample.
 - Check the surface of the electrode rubber for dirt, foreign matter, scratches, or other impediments to proper operation.
 - Place the measurement target (or when measuring volume resistance, the counter-electrode) on a level surface.
 - While performing measurement, avoid contact with the SM9001. Avoid subjecting the SM9001 to excessive force by pulling on or twisting cables.
 - Do not subject the electrode rubber to twisting (friction) or mechanical shock.
 - If unable to obtain stable measurement results, clean the surface of the SM9001's electrode rubber with industrial-use ethanol (use a concentration of at least 95%). If cleaning fails to yield improvement, remove the SM9001's electrode rubber and clean the entire unit with industrial-strength ethanol (use a concentration of at least 95%). For more information, see "Removing and reattaching the electrode rubber."
 - To protect the electrode rubber, place the SM9001 on its protective stand when not using it to measure samples and avoid sitting it directly on the bottom surface. When placing the SM9001 on the protective stand, do so carefully and avoid subjecting the stand to excessive force.

Measuring surface resistance

- Connect the short bar to the surface resistance measurement [Rs] terminals (common terminal [gray] and output terminal [red]).
- Place the sample on the stand surface of the counter-electrode with integrated stand and gently place the SM9001 on top of the sample at least 10 mm from the edge, lowering it from directly above.
- Verify that no voltage is being output from the Super Megohm Meter. Connect the input cable to the Super Megohm Meter's input terminal and the output cable to the Super Megohm Meter's output terminal.
- Operate the Super Megohm Meter to start measurement. For more information about measurement, see the Super Megohm Meter's instruction manual.

Measuring volume resistance

- Connect the short bar to the volume resistance measurement [Rv] terminals (common terminal [gray] and guard terminal [blue]).
- Place the sample on the counter-electrode surface of the counter-electrode with integrated stand and gently place the SM9001 on top of the sample at least 10 mm from the edge, lowering it from directly above so that it does not extend beyond the counter-electrode surface.
- Connect the included counter-electrode connection cable to the output terminal (red) and the counter-electrode terminal.
- Verify that no voltage is being output from the Super Megohm Meter. Connect the input cable to the Super Megohm Meter's input terminal and the output cable to the Super Megohm Meter's output terminal.
- Operate the Super Megohm Meter to start measurement. For more information about measurement, see the Super Megohm Meter's instruction manual.



Maintenance and Service

- If damage is suspected, check the "Before Returning for Repair" section before contacting your dealer or Hioki representative.
- Use the original packing materials when transporting the device, if possible.

Cleaning
To clean the device, wipe it gently with a soft cloth moistened with water or mild detergent. Never use solvents such as benzene, acetone, ether, ketones, thinners or gasoline, as they can deform and discolor the case. Clean the electrode rubber with industrial-use ethanol (use a concentration of at least 95%).

About electrode rubber

Removing and reattaching the electrode rubber

- The electrode rubber can be removed by gripping it carefully so as not to scratch it and pulling it off.
- The electrode rubber has a top and a bottom. Check for proper orientation before reattaching it. The surface that makes contact with the measurement target is thinner, while the surface that makes contact with the metal portion of the SM9001 is thicker.
- Gently insert the electrode rubber and then fit it tightly against the metallic surface by pushing it against a level base such as the counter-electrode.

- Contact your dealer or Hioki representative if:
- The electrode rubber no longer covers the adjacent metal
 - The electrode rubber exhibits visible damage
 - The electrode rubber is excessively dirty and efforts at cleaning prove to be ineffective

Before Returning for Repair

If abnormal operation occurs, check the following items.

Symptom	Check Items	Solution
The resistance value is abnormal.	Are the terminals connected properly?	Connect the terminals securely.
	Has the short bar been connected properly?	Connect the short bar to the proper pair of terminals for the type of measurement you intend to perform.
	Is the electrode rubber dirty?	Clean the electrode rubber.

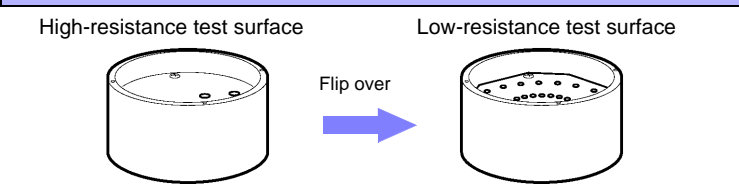
SM9002 Verification Fixture for Surface Resistance Measurement

The SM9002 Verification Fixture for Surface Resistance Measurement is a system verification fixture for use in measuring surface resistance as required by Section 8.4 of JIS C 2170:2004 (IEC 61340-2-3:2000). The SM9002 is an option designed specifically for use with the SM9001 and cannot be used for system verification of other devices.

Specifications

General Specifications	
Operating environment	Indoors, altitude up to 2000 m (6562 feet), Pollution degree 2
Operating temperature and humidity	18 to 28°C (64.4 to 82.4°F), 60%RH or less. (non-condensing)
Storage temperature and humidity	-10 to 50°C (14 to 122°F), 80%RH or less. (non-condensing)
Dielectric strength	Between electrodes (together) and SM9002 enclosure: 1120 V DC, for 15 seconds
Electrode structure	High-resistance : Chrome-plated metal (brass) Low-resistance : Gold-plated copper cladding formed on PC board
Dimensions	Approx. $\phi 100 \times 56$ H mm ($\phi 3.94" \times 2.20"$ H)
Mass	Approx. 300 g (10.6 oz.)

Measurement functionality	
Measurement items	Low-resistance measurement Resistance measurement electrodes connected to a measuring instrument are secured to the inspection fixture, and a judgment is made concerning whether the system is functioning properly. (Test voltage: 10 V DC) Verification consists of a series of repeated measurements while varying the phase position of the fixture and electrodes by 90°.
	High-resistance measurement Resistance measurement electrodes connected to a measuring instrument are secured to the inspection fixture, and a judgment is made concerning whether the system is functioning properly. (Test voltage: 100 V DC)
Circuit design	Low-resistance measurement The circuit consists of contact electrodes arranged in a radial pattern at the center and ring measurement electrode positions and twenty 10 M Ω ±1% resistors placed at an even interval. The circuit forms a 500 k Ω ±1% parallel connection.
	High-resistance measurement The circuit consists of contact electrodes placed at the center and ring measurement electrode positions and one 1 T Ω ±5% resistor.
Maximum rated voltage to earth	100 V DC
Appearance	



Using the fixture

The following describes how the fixture is used in a typical application. Customers needing to perform a rigorous verification process that complies with JIS C 2170:2004 should be sure to check the actual JIS document.

Low-resistance measurement

- Connect the short bar to the surface resistance measurement [Rs] terminals (common terminal [gray] and output terminal [red]).
- Gently place the SM9001 on the SM9002's low-resistance test surface, lowering it from directly above.
- Apply 10 V and read the resistance value after 15 sec.
- Stop applying the voltage. Lift up the SM9001 and rotate the SM9002 90°.
- Repeat steps (3) and (4) until the SM9002 has been rotated through 360°.

If the acquired resistance values are both within 5% of 500 k Ω , then the system is operating properly.

High-resistance measurement

- Connect the short bar to the surface resistance measurement [Rs] terminals (common terminal [gray] and output terminal [red]).
- Gently place the SM9001 on the SM9002's high-resistance test surface, lowering it from directly above.
- Apply 100 V and verify that a stable resistance value of 1 T Ω ±5% is obtained.

- NOTE**
- Some Super Megohm Meter models are capable of generating a terminal-to-ground voltage of 1,000 V, but the SM9002 is rated for a maximum terminal-to-ground voltage of 100 V.
 - Check the SM9002 test surface and the SM9001 electrode rubber for dirt, foreign matter, scratches, or other impediments to proper operation.
 - While performing measurement, avoid contact with the SM9001. Avoid subjecting the SM9001 to excessive force by pulling on or twisting cables.
 - Due to the delicate nature of the contact with the SM9001, you may obtain out-of-range measured values even if the product is operating properly if the SM9001 has not been placed on the surface from directly above. Remove and then reposition the SM9001 if the value is out of range.
 - If unable to obtain stable measurement results, clean the surface of the SM9001's electrode rubber and the SM9002 test surface with industrial-use ethanol (use a concentration of at least 95%). If cleaning fails to yield improvement, remove the SM9001's electrode rubber and clean the entire unit with industrial-strength ethanol (use a concentration of at least 95%). For more information, see "Removing and reattaching the electrode rubber."
 - Place the SM9002 on a level surface.
 - The SM9002 should be stored in a pouch inside the SM9001's included carrying case.
 - Do not touch the test surface or get it dirty.