HIOKI

# 3454-11

## DIGITAL MΩ HiTESTER

### Instruction Manua

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### Introduction
Thank you for purchasing the HIOKI "3454-11 DIGITAL MΩ HiTESTER". To obtain maximum performance from the instrument, please read this manual first, and keep it handy for future reference.

### Initial Inspection
When you receive the instrument, inspect it carefully to ensure that no damage occurred during shipping. In particular, check the accessories, panel switches, and connectors. If damage is evident, or if it fails to operate according to the specifications, contact your dealer or Hioki representative.

### Preliminary Checks
- Before using the instrument the first time, verify that it operates normally to ensure that the no damage occurred during storage or shipping. If you find any damage, contact your dealer or Hioki representative.
- Before using the instrument, make sure that the insulation on the test leads and connection cords is undamaged and confirm that the white or red portion (insulation layer) inside the cable is not exposed. If a color inside the cable is exposed, do not use the cable. Using the product in such conditions could cause an electric shock, so contact your dealer or Hioki representative for replacements (Model L9787).

### Maintenance and Service
- To clean the instrument, wipe it gently with a soft cloth moistened with water or mild detergent. Never use solvents such as benzene, alcohol, acetone, ether, ketones, thinners or gasoline, as they can deform and discolor the case.
- If the instrument seems to be malfunctioning, confirm that the batteries are not discharged, and that the test leads and fuse are not open circuited before contacting your dealer or Hioki representative.
- When an indication Err.9 appears, send the instrument for repair.

## Specifications

### General Specifications

| | |
|---|---|
| Guaranteed accuracy period | 1 year at 23°C±5°C (73°F±9°F) and 90% RH |
| Display | Max. 4000 LCD |
| Sampling rate | twice/second |
| Response time | Insulation resistance (∞ → 0, ∞ → center value), resistance: Within 5 s, ACV: Within 2 s |
| Operating Temperature &Humidity | 0 to 40°C (32 - 104°F), 90%RH or lower (non-condensating) |
| Storage Temperature &Humidity | -20 to 50°C (-4 - 122°F), 90%RH or lower (non-condensating) |
| Operating Environment | Indoors, altitude up to 2000 m (6562-ft.) ASL, Pollution Degree 2 |
| Effect of temperature 0 to 18°C, 28 to 40°C (32 to 64°F, 82 to 104°F) | ±2% of reading ±5 dgt, plus basic allowance (Resistance Measurement 4 MΩ range: ±5% of reading plus basic allowance) |
| Influence quantity | $E_1$ (Position) : 0%<br>$E_2$ (Supply voltage) : Twice of the intrinsic uncertainty<br>$E_3$ (Temperature) : ±2%±5dgt.<br>(Influencing factor non-applicable for $E_4$ to $E_{10}$) |
| Degree of protection | IP40 (condition which the test lead is connected) |
| Power source | Rated power voltage: 1.5 V DC × 4,<br>R6P manganese battery × 4 or LR6 alkaline battery × 4 |
| Maximum rated power | 3 VA |
| Continuous operating time | Insulation → ∞ measurement at 250 V and 500 V for about 10 hours, at 1000 V for about 10 hours (with manganese battery) |
| Possible number of measurements | 250 V at 0.25 MΩ 300 times (R6P battery), 1600 times (LR6 battery)<br>500 V at 0.5 MΩ 250 times (R6P battery), 1400 times (LR6 battery)<br>1000 V at 1.0 MΩ 200 times (R6P battery), 1000 times (LR6 battery)<br>Ω at 1.0 Ω 1000 times (R6P battery), 1000 times (LR6 battery) |
| Additional function | Automatic power-saving mode, Comparator, High-voltage warning, Warning indication of false voltage input, Data hold, Display lighting, 1000 V output error protection, Zero adjustment |
| Dielectric strength | 5550 V AC 50/60 Hz for one minute<br>Between electric circuit and case |
| Maximum input voltage<br>Maximum rated voltage to earth | 600 V AC, Measurement Category III<br>(Anticipated Transient Overvoltage: 6000 V) |
| Input error protection for 10 second (overvoltage protection) | 600 V AC<br>(ACV function: 800 V AC)<br>(MΩ-1000 V function: 1200 V AC) |
| Dimensions (excluding protrusions) | 175W × 148H × 56D mm approx.<br>6.89"W × 5.83"H × 2.20"D approx. |
| Mass | 530 g, 18.7 oz. approx. (including batteries) |
| Accessories | L9787 Test Lead, Instruction Manual,<br>R6P manganese battery × 4, Strap |
| Options | L9787-91 Breaker Pin, 9804-02 Magnetic Adapter,<br>L9787 Test Lead |
| Standards applying | Safety EN61010<br>EMC EN61326<br>EN 61557-1/-2/-4 |

rdg. :reading value (The value currently being measured and indicated on the measuring instrument)
dgt. :resolution (The smallest displayable unit, i.e., the input value that causes the digital display to show a "1".)

**Insulation Resistance Measurement**

| Rated output voltage (DC) | Max. effective reading | Center scale reading |
|---|---|---|
| 250 V / 500 V | 500 MΩ | 10 MΩ |
| 1000 V | 4000 MΩ | 100 MΩ |

| Rated output voltage | Display range | Max. reading | Resolution |
|---|---|---|---|
| 250 V / 500 V / 1000 V | 4 MΩ range | 4.000 MΩ | 0.001 MΩ |
| | 40 MΩ range | 40.00 MΩ | 0.01 MΩ |
| | 400 MΩ range | 400.0 MΩ | 0.1 MΩ |
| 250 V / 500 V | 500 MΩ range | 500 MΩ | 1 MΩ |
| 1000 V | 4000 MΩ range | 4000 MΩ | 1 MΩ* |

* Resistances of 1000 MΩ or higher are indicated in increments of 10 MΩ i.e., 1010 MΩ, 1020 MΩ, etc.

| Rated output voltage | Name of measurement range | Measurement range | Accuracy & Intrinsic uncertainty A |
|---|---|---|---|
| 250 V / 500 V | 1st effective measurement range | 0.200 to 50.0 MΩ | ±3%rdg. ±4dgt. |
| | 2nd effective measurement range | 50.1 to 500 MΩ | ±5%rdg. ±5dgt. |
| | other measurement range | 0 to 0.199 MΩ | |
| 1000 V | 1st effective measurement range | 0.200 to 200.0 MΩ | ±3%rdg. ±4dgt. |
| | 2nd effective measurement range | 200.1 to 4000 MΩ | ±5%rdg. ±5dgt. |
| | other measurement range | 0 to 0.199 MΩ | |

Operation uncertainty B: ±18% (1st effective measurement range)
Measurement terminal voltage characteristic.

| Rated output voltage | Open circuit voltage | Lower limit measurement resistance value to be maintained rated output voltage | Rated current | Short circuit current |
|---|---|---|---|---|
| 250 V | 1 to 1.2 times of nominal test voltage | 0.25 MΩ | 1 to 1.2 mA | 1.2 mA max. |
| 500 V | | 0.5 MΩ | | |
| 1000 V | | 1 MΩ | | |

Effect of radiated radio-frequency electromagnetic field: 3 V/m, within +10%rdg.

**Resistance Measurement**

| Display range | Max. reading | Resolution | Accuracy & Intrinsic uncertainty A (After 0 Ω Adjustment) |
|---|---|---|---|
| 40 Ω range | 40.00 Ω | 0.01 Ω | ±3%rdg. ±6dgt. |
| 400 Ω range | 400.0 Ω | 0.1 Ω | |
| 4 kΩ range | 4.000 kΩ | 0.001 kΩ | |
| 40 kΩ range | 40.00 kΩ | 0.01 kΩ | |
| 400 kΩ range | 400.0 kΩ | 0.1 kΩ | ±5%rdg. ±6dgt. |
| 4 MΩ range | 4.000 MΩ | 0.001 MΩ | |

Short circuit current: 200 mA or more, open circuit voltage: 5 VDC±1 V
Operation uncertainty B: ±30% (0.2 to 400 Ω)

**AC Voltage Measurement**

| Display range | Max. reading | Resolution | Accuracy (Guaranteed at 600 V or less) |
|---|---|---|---|
| 600 V range | 750 V | 1 V | ±3%rdg. ±6dgt. |

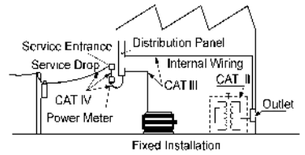
Input resistance: 100 kΩ or more, Frequency range: 50 to 60 Hz

## Safety

**⚠DANGER**

**This instrument is designed to comply with IEC 61010 Safety Standards, and has been thoroughly tested for safety prior to shipment. However, mishandling during use could result in injury or death, as well as damage to the instrument. Using the instrument in a way not described in this manual may negate the provided safety features.**
**Be certain that you understand the instructions and precautions in the manual before use. We disclaim any responsibility for accidents or injuries not resulting directly from instrument defects.**

### Measurement Categories
This instrument complies with CAT III safety requirements. To ensure safe operation of measurement instruments, IEC 61010 establishes safety standards for various electrical environments, categorized as CAT II to CAT IV, and called measurement categories.
CAT II: Primary electrical circuits in equipment connected to an AC electrical outlet by a power cord (portable tools, household appliances, etc.)
CAT II covers directly measuring electrical outlet receptacles.
CAT III: Primary electrical circuits of heavy equipment (fixed installations) connected directly to the distribution panel, and feeders from the distribution panel to outlets.




CAT IV:The circuit from the service drop to the service entrance, and to the power meter and primary overcurrent protection device (distribution panel).
Using a measurement instrument in an environment designated with a higher-numbered category than that for which the instrument is rated could result in a severe accident, and must be carefully avoided.
Use of a measurement instrument that is not CAT-rated in CAT II to CAT IV measurement applications could result in a severe accident, and must be carefully avoided.

### Safety Symbol
This manual contains information and warnings essential for safe operation of the instrument and for maintaining it in safe operating condition. Before using it, be sure to carefully read the following safety precautions.

| | |
|---|---|
| ⚠ | In the manual, the ⚠ symbol indicates particularly important information that the user should read before using the instrument. The ⚠ symbol printed on the instrument indicates that the user should refer to a corresponding topic in the manual (marked with the ⚠ symbol) before using the relevant function. |
| ⚠ | Indicates that dangerous voltage may be present at this terminal. |
| ⧈ | Indicates a double-insulated device. |
| ~ | Indicates AC (Alternating Current). |
| ⎓ | Indicates DC (Direct Current). |

The following symbols in this manual indicate the relative importance of cautions and warnings.

**⚠DANGER** Indicates that incorrect operation presents an extreme hazard that could result in serious injury or death to the user.
**⚠WARNING** Indicates that incorrect operation presents a significant hazard that could result in serious injury or death to the user.
**⚠CAUTION** Indicates that incorrect operation presents a possibility of injury to the user or damage to the instrument
**NOTE** Indicates advisory items related to performance or correct operation of the instrument.

## Usage Notes ⚠

Follow these precautions to ensure safe operation and to obtain the full benefits of the various functions.

**⚠DANGER**

**Observe the following precautions to avoid electric shock.**
- **Be sure to disconnect the test lead from the object to be measured and turn the function switch OFF before connecting or disconnecting the test lead from the MΩ HiTESTER.**
- **Always verify the appropriate setting of the function selector before connecting the test leads.**
  **Disconnect the test leads from the measurement object before switching the function selector.**

**⚠WARNING**

- **Do not use the instrument where it may be exposed to corrosive or combustible gases. The instrument may be damaged or cause an explosion.**
- **Do not allow the instrument to get wet, and do not take measurements with wet hands. This may cause an electric shock.**
- **Do not use any other electrical source other than the batteries. The use of any other sources may result in damage of the instrument or the object to be measured and also may cause electric shock.**
- **Before using the instrument, make sure that the insulation on the test leads and confirm that the white or red portion (insulation layer) inside the cable is not exposed. If a color inside the cable is exposed, do not use the cable. Using the product in such conditions could cause an electric shock, so contact your dealer or Hioki representative for replacements (Model L9787).**

**⚠WARNING**

- **Do not use the instrument where it may be exposed to oil, chemicals, or solvents. Contact with these substances may cause cracking in the instrument, resulting in damage or electric shock.**

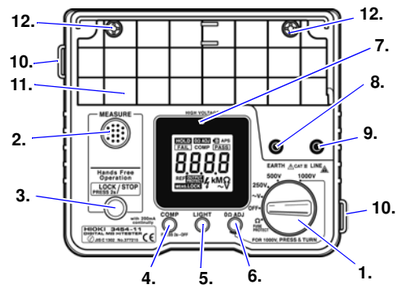
**⚠CAUTION**

- If the protective functions of the instrument are damaged, either remove it from service or mark it clearly so that others do not use it inadvertently.
- This instrument is designed for use indoors. It can be operated at temperatures between 0 and 40°C without degrading safety.
- Do not store or use the instrument where it could be exposed to direct sunlight, high temperature or humidity, or condensation. Under such conditions, the instrument may be damaged and insulation may deteriorate so that it no longer meets specifications.
- For safety reasons, when taking measurements, only use the L9787 Test Lead (or optional) provided with the instrument.
- To avoid damage to the instrument, protect it from physical shock when transporting and handling. Be especially careful to avoid physical shock from dropping.
- Calibration and repair of this instrument should be performed only under the supervision of qualified technicians knowledgeable about the dangers involved.
- Removable sleeves are attached to the metal pins at the ends of the test leads. To prevent a short circuit accident, be sure to use the test leads with the sleeves attached when performing measurements in the CAT III measurement category. Remove the sleeves from the test leads when performing measurements in the CAT I and CAT II measurement categories. For details on measurement categories, see "Measurement categories" in the instruction manual.

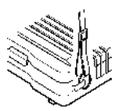
**NOTE**

- To avoid battery depletion, turn the function selector OFF after use (the Auto Power Save feature consumes a small amount of current).
- The safety sleeve is attached to the test lead plug. Remove the sleeve before connecting to the instrument.

## Names and Functions of Parts




1. Function Selector: Selects among power ON/OFF, the output voltage for insulation resistance measurement, ACV, or resistance (Ω).
2. MEASURE Key: Used to measure resistance and insulation resistance. This key remains ON while it is held down.
3. LOCK Key: Used to measure resistance and insulation resistance. This key switches ON if held down for more than 2 seconds. Press the key again to turn it OFF.
4. COMP Key: Used for the comparator function
5. LIGHT Key: Turns the display light ON/OFF. The light automatically switches OFF after 30 seconds.
6. 0ΩADJ Key: Used for the zero-adjust function in resistance measurement Used when "1000 V" is selected in insulation-resistance measurement Used to select the buzzer sound in the comparator function
7. High-voltage warning lamp: Begins flashing if the input voltage exceeds AC 70 V (±10 V) and during insulation resistance measurement.
8. EARTH Measurement Terminal: Connect the black test lead to this terminal.
9. LINE Measurement Terminal: Connect the red test lead to this terminal.
10. Strap Hole: Pass the strap through this hole.
11. Test lead Housing: Houses the test leads. The test leads may be housed without disconnecting them from the terminals after use.
12. Sleeve stand: Attach the sleeve removed from the tip of the test lead.



### Display Block


HOLD : Lights up when the measured value is held during the resistance/insulation-resistance measurement.
0Ω ADJ : Lights up when 0Ω adjustment is made during resistance measurement.
B : Indicates that battery power is low. (during which time accuracy cannot be guaranteed).
APS : Lights up when auto power save is enabled.
COMP : Lights up when the comparator function is enabled.
FAIL : Lights up when the measured value is less than the criterion for the comparator function during insulation-resistance measurement, or when the measured value is greater than the criterion during resistance measurement.

PASS: Lights up when the measured value is equal to or greater than the criterion for the comparator function during insulation-resistance measurement, or when the measured value is equal to or less than the criterion during resistance measurement.

REF : Lights up when the criterion for the comparator function is indicated.

OUTPUT PROTECT: Lights up when "1000 V" is selected, if the 0ΩADJ key has not been pressed.

MEAS.LOCK : Lights up when the LOCK key is pressed to perform continuous measurement of insulation resistance or resistance.

⚡ : Indicated during insulation-resistance measurement, or begins flashing when the input voltage exceeds AC 70 V (±10 V).

OF : Overflow indicator. Indicated when the measurement exceeds the maximum indication value.

# Measurement Procedures

### Pre-measurement inspection

Ensure that the test leads are not disconnected

1. Use the function selector to select Ω function.
2. Short the test lead tips.
3. Confirm that the reading is below 1 Ω when pressing the **MEASURE** key.

## ● Insulation Resistance Measurement

**To select 1000 V, set the function selector to 1000 V while pressing the 0ΩADJ.**

### OF : Overflow indication

An abbreviation for overflow, the display OF is analogous to a ∞ indication in an analog insulation tester. When measurements are larger than the effective maximum indicated values of each function, the display will indicate OF.
[Measurement example] When the display indicates OF in the 1000 V function, measurements are detected as larger than 4000 MΩ. When nothing is connected to the test lead, OF is also displayed.

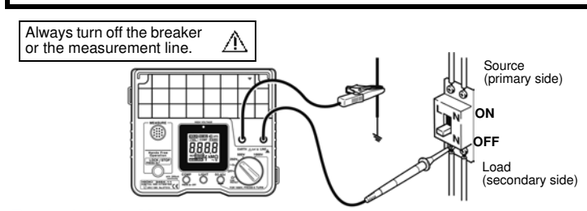
| Display | Function | Effective maximum indicated value |
|---|---|---|
| OF | 250 V | 500 MΩ |
| | 500 V | |
| | 1000 V | 4000 MΩ |

**⚠DANGER**

**To avoid electric shock, always verify the appropriate setting of the function selector before connecting the test leads.**

**⚠WARNING**

- **When measuring insulation resistance, dangerous voltage is applied to the measurement terminals. To avoid electric shock, do not touch the test lead.**
- **Never touch the object being measured immediately after measuring. There is a danger of electric shock from the charge accumulating during high voltage testing. (See Discharge Function)**
- **Discharge the subject conductor after measurement.**
- **Do not attempt to measure insulation resistance on a live conductor. Doing so could damage the instrument or cause an accident that might result in injury or death. Always turn off power to the conductor being measured before starting**




### Preparing for Measurement

1. Set the function selector to 250 V, 500 V, or 1000 V. To select 1000 V, set the function selector to 1000 V while pressing the **0ΩADJ** key. When the function switch is turned from OFF to 1000 V, hold down the **0ΩADJ** key until "MΩ" appears on the display. If the **0ΩADJ** key has not been pressed and "1000 V" is selected, OUTPUT PROTECT appears on the display. In this case 1000 V is not applied when the **MEASURE** key or **LOCK** key is turned on.
2. Make sure that 🔋 indicator does not appear. If the indicator appears, please replace the batteries.
3. Connect the black test lead to the measurement terminal on the earth side of the instrument. Connect the red test lead to the measurement terminal on the line side of instrument.
4. Connect the black test lead to the ground side of the object being measured. Except when measuring insulated resistance between ground and the object being measured, connect the black test lead to an optional point.
5. Connect the red test lead to the object being measured.

### Measuring Only While the Key is Pressed

- Start

1. Press the **MEASURE** key. The high-voltage warning lamp begins flashing, and the ⚡ indicator appears on the display.
2. Read the measurement after it has stabilized.

- End

1. Release the **MEASURE** key to end measurement. The current measurement is automatically held.
2. When the object to be measured must be discharged, read and follow the instructions given under "Discharge Function" below.

### Measuring without Holding the Key (Continuous Measurement)

- Start

1. Hold down the **LOCK** key for more than 2 seconds. The high-voltage warning lamp begins flashing, and the ⚡ indicator and MEAS.LOCK appear on the display.
   The MΩ HiTESTER continues with measurement even if the **LOCK** key or **MEASURE** key is not held down.
2. Read the measured value after it has stabilized.

- End (Shutdown method when MEAS.LOCK is indicated)

1. Press the **LOCK** (STOP) key or **MEASURE** key to end measurement. The current measurement is automatically held.
2. When the object to be measured must be discharged, read and follow the instructions given under "Discharge Function" below.

**NOTE**

- If the object to which the test leads are connected is live, even if the MΩ HiTESTER is not performing measurement, the high-voltage warning lamp and ⚡ indicator will flash on the display.
- Insulation resistances are unstable by nature. The readings may not stabilize with some objects; this does not necessarily indicate a malfunction.
- If the object has a capacitive component, the MΩ HiTESTER may indicate a value smaller than the actual resistance immediately after the start of measurement. The reading will gradually increase to indicate the actual resistance.
- If the function switch is turned during measurement, the MΩ HiTESTER will stop measurement.
- If OF is indicated even if the measurement is performed with the tip of the test leads short-circuited, a conductor in the test leads may be broken.
- Make sure the high-voltage warning lamp off first, and then select the Resistance Measurement functions or OFF.
- Some objects may require time until the measurements are stable. (Approx. 5 sec.)

### Discharge Function

When measuring an insulation resistance that contains a capacitance element, a charge proportional to the measurement voltage accumulates, and if undischarged could lead to an electric shock accident.

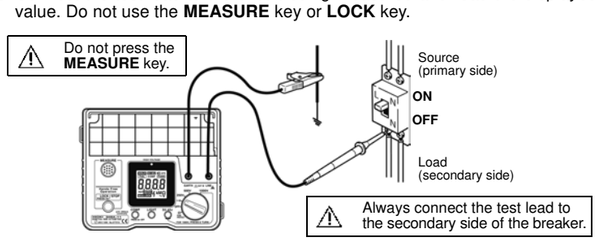
1. End measurement without disconnecting the test leads from the object.
2. The built-in discharge circuit automatically discharges the item.
3. During discharging, the high-voltage warning lamp and ⚡ indicator flash. They will go out when the voltage falls below approximately 30 V.
4. Discharge time varies with capacity.

## ● AC Voltage Measurement

**⚠DANGER**

- **Test lead should only be connected to the secondary side of a breaker, so the breaker can prevent an accident if a short circuit occurs.**
  **Connections should never be made to the primary side of a breaker, because unrestricted current flow could cause a serious accident if a short circuit occurs.**
- **The maximum input voltage is 600 V AC. Attempting to measure voltage in excess of the maximum input could destroy the instrument and result in personal injury or death.**
- **To avoid electrical shock, be careful to avoid shorting live lines with the test lead.**

1. Set the function selector to ∿V.
2. Connect the test lead to the instrument's measurement terminal.
3. Connect the test lead to the circuit being measured and read the displayed value. Do not use the **MEASURE** key or **LOCK** key.




## ● Resistance Measurement

**⚠DANGER**

**Never apply voltage to test lead when the Resistance Measurement functions is selected. Doing so may damage the instrument and result in personal injury. To avoid electrical accidents, remove power from the circuit before measuring.**

### Preparing for Measurement

1. Set the function selector to Ω.
2. Connect the test lead to the instrument's measurement terminal.
3. Connect the test lead to the object being measured.

### Measuring Only While the Key is Pressed

- Start

1. Press the **MEASURE** key and read the displayed value.

- End

1. Release the **MEASURE** key to end measurement. The current measurement is automatically held.

### Measuring without Holding the Key (Continuous Measurement)

- Start

1. Hold down the **LOCK** key for more than 2 seconds. The MEAS.LOCK appear on the display.
   The MΩ HiTESTER continues with measurement even if the **LOCK** key or **MEASURE** key is not held down.
2. Read the measured value.

- End (Shutdown method when MEAS.LOCK is indicated)

1. Press the **LOCK** (STOP) key or **MEASURE** key to end measurement. The current measurement is automatically held.

### 0ΩAdjustment Function

To indicate the resistance of the object itself, the zero-adjust function stores the resistances of the test leads and fuse and deducts these values from measurement values.

1. Set the function selector to Ω.
2. Connect the test lead to the instrument's measurement terminal.
3. Short-circuit the metal tips of the test leads.
4. To start measurement, press the **MEASURE** key, or hold down the **LOCK** key for more than 2 seconds.
5. Press the **0ΩADJ** key. 0Ω ADJ lights up, and the display indicates "0.00 Ω".
6. Connect the test lead to the object being measured.
7. Read the measured value.

**NOTE**

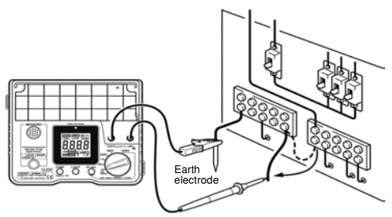
- The indication can be zero-adjusted when the reading is 3 Ω or less. If the **0ΩADJ** key is pressed when the reading is over 3 Ω, "Err.1" is displayed.
- If the test leads are short-circuited during resistance measurement, the measurement current will exceed 200 mA, accelerating battery consumption. Perform the zero adjustment as quickly as possible and open the circuit as soon as the adjustment is complete.
- If OF is indicated even if the measurement is performed with the tip of the test leads short-circuited, a conductor in the test leads or the fuse may be broken.

## ● Example of measuring the earthing conductor resistance

**⚠CAUTION**

If an additional operating circuit is connected in parallel to the circuit under measurement, the measurement error may occur due to the effects of impedance of the circuit connected in parallel or transient currents.

Measure the earthing conductor resistance at Ω range. Please refer to the low resistance measurement for measuring method.




## ● Comparator Function

The comparator function compares the measurement with a set criterion, indicates PASS or FAIL, and sounds the buzzer during resistance or insulation-resistance measurement.

### Using Comparator

1. Set the function selector to 250 V, 500 V, or 1000 V or Ω.
2. Press the **COMP** key. The **COMP** indicator, **REF** indicator, criterion, and the condition for sounding the buzzer (PASS or FAIL) appear on the display. The display changes to the criterion-setting screen. The criterion changes each time the **COMP** key is pressed. Press the key repeatedly until the criterion to be used is displayed.
   Press the **0ΩADJ** key. This switches the display between PASS and FAIL, allowing you to select the criterion for sounding the buzzer. For example, if you switch the display to FAIL, the buzzer sounds when the comparator result is FAIL.
3. Press the **MEASURE** key or the **LOCK** key to start measurement. The **REF** indicator and the criterion go out. The display returns to the measurement display screen. The MΩ HiTESTER compares measurements and the criterion.

### Result Indication

Insulation-resistance measurement: When the measurement is smaller than the criterion, FAIL is indicated. When the measurement is equal to or greater than the criterion, PASS is indicated.
Resistance measurement: When the measurement is greater than the criterion, FAIL is indicated. When the measurement is equal to or smaller than the criterion, PASS is indicated.

Select a criterion from the presets shown in the table below.

| Function | Established reference value available [MΩ] |
|---|---|
| 250 V/500 V | 0.2/0.4/0.5/1/2/3/5/10/20/30/50/100/200 unit [MΩ] |
| 1000 V | 1/2/3/5/10/20/30/50/100/200/500/1000/2000 unit [MΩ] |
| Ω | 0.5/1/2/3/4/5/6/10/20/50/100/200/1k unit [Ω] |

For example, when the function switch is turned to "250 V," every time the COMP key is pressed, the criterion changes as follows: 0.2 MΩ → 0.4 MΩ → ... → 200 MΩ → 0.2 MΩ → ....

**NOTE**

- When the criterion setting screen is shown (step 2 above), if the MΩ HiTESTER remains idle for 2 seconds, the **REF** indicator, the criterion, and PASS or FAIL are no longer displayed, and the display reverts to the previous screen. However, the **COMP** indicator remains on, indicating that the comparator function is enabled.
- If power is turned OFF after the comparator function is enabled, the function is automatically enabled when the power is turned ON again. The last criterion setting made before the power is turned OFF is also held.

### When Not Using Comparator

To disable the comparator function, hold down the **COMP** key for more than 2 seconds. The **COMP** indicator goes out, and the comparator function is disabled.

## ● Automatic Power-Saving Mode

The instrument will automatically enter power-saving mode about 10 minutes following the last operation, and all displayed values disappear.
When the power is turned ON, the auto power save function is automatically enabled (**APS** lights up).

### To Switch from Power-Saving Mode

Set the function selector to **OFF** before returning to the original position.

### Disabling the Auto Power Save Function

While holding down **LIGHT** key, turn the function switch to turn ON the power.

## ● Measurement principles

**1. Insulation Resistance Measurement**
The insulation resistance of test object Rx is obtained by supplying a voltage V to the test object and measuring the current leaking from the test object and the voltage supplied using the formula (Voltage supplied, V) / (current leakage, I).

**2. AC Voltage Measurement**
This is obtained from converting the value of the current flowing from the voltage source through the instrument to a voltage value.

**3. Low Resistance Measurement**
The resistance of test object Rx is obtained by supplying a specific current I to the test object and measuring the voltage occurring between the test terminals using the formula (inter-terminal voltage, V) / (supplied current I).

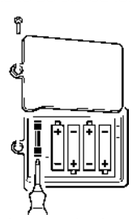
# Replacing of Batteries and Fuse

**⚠WARNING**

- **To avoid electric shock, turn off the function switch and disconnect the test lead before replacing the batteries and fuse.**
- **After replacing the batteries or fuse, replace the cover and screws before using the instrument.**
- **Do not mix old and new batteries, or different types of batteries. Also, be careful to observe battery polarity during installation. Otherwise, poor performance or damage from battery leakage could result.**
- **To avoid the possibility of explosion, do not short circuit, disassemble or incinerate batteries.**
- **Handle and dispose of batteries in accordance with local regulations.**
- **Replace the fuse only with one of the specified characteristics and voltage and current ratings. Using a non-specified fuse or shorting the fuse holder may cause a life-threatening hazard.**
  **Fuse type: 7012540 (made by SIBA Inc.), Rating 0.5 A/700 V AC, very fast-Acting.**

**NOTE**

To avoid corrosion from battery leakage, remove the batteries from the instrument if it is to be stored for a long time.



1. For safety, set the function selector to **OFF** and remove the test lead from the instrument.
2. Loosen the screw located at the center of the back of the instrument and remove the battery cover.
3. Replace all four batteries or fuse.
4. Reinstall the battery cover and

HIOKI

DECLARATION OF CONFORMITY

Manufacturer's Name: HIOKI E.E. CORPORATION
Manufacturer's Address: 81 Koizumi, Ueda, Nagano 386-1192, Japan
Product Name: DIGITAL MΩ HITESTER
Model Number: 3454-10, 3454-11
Accessory: L9787 TEST LEAD
Option: L9787 TEST LEAD, L9787-91 BREAKER PIN, 9804-02 MAGNETIC ADAPTER

The above mentioned products conform to the following product specifications:
Safety: EN61010-1:2001, EN61010-031:2002+A1:2008, EN61557-1:2007(3454-11 only), EN61557-2:2007(3454-11 only), EN61557-4:2007(3454-11 only)
EMC: EN61326-2-2:2006 Class B equipment, Portable test, measuring and monitoring equipment used in low-voltage distribution systems

Supplementary Information:
The products herewith comply with the requirements of the Low Voltage Directive 2006/95/EC and the EMC Directive 2004/108/EC.

HIOKI E.E. CORPORATION
28 March 2011
Atsushi Mizuno
Director of Quality Assurance
3454A999-08