

HIOKI

3454-51

DIGITAL MΩ HITESTER

INSTRUCTION MANUAL

November 2006 Revised edition 6 Printed in Japan
3454B981-06 06-11H

Introduction

Thank you for purchasing the HIOKI "3454-51 DIGITAL MΩ HITESTER". To obtain maximum performance from the instrument, please read this manual first, and keep it handy for future reference.

HIOKI

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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 probes and connection cords is undamaged and that no bare conductors are improperly exposed. Using the product in such conditions could cause an electric shock, so contact your dealer or Hioki representative for replacements. (Model 9294, 9289, 9257)

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 probes 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

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, <2000m (6562-ft.) ASL
Effect of temperature	±2% of reading ±5 dgt, plus basic allowance (Resistance Measurement 4 MΩ range: ±5% of reading plus basic allowance)
Degree of protection	IP40 (condition which the probe is connected)
Power source	Rated power voltage: 1.5 V DC X 4, R6P manganese battery X 4 or LR6 alkaline battery X 4
Maximum rated power	3 VA (when power saving: 2 mVA max)
Continuous operating time	Insulation → ∞ measurement at 250 V and 500 V for about 10 hours, at 1000V for about 10 hours (with manganese 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 Between electric circuit and case
Maximum input voltage	600 V AC
Maximum rated voltage to earth	600 V AC
Input error protection for 10 second (overvoltage protection)	600 V AC (ACV function: 800 V AC) (MΩ-1000 V function: 1200 V AC)

Dimensions (excluding protrusions)	175W X 148H X 56D mm approx. 6.89"W X 5.83"H X 2.20"D approx.
Mass	530 g, 18.7 oz. approx. (including batteries)
Accessories	9289 TEST PROBE, Instruction Manual, R6P manganese battery X 4, Strap, ALLIGATOR CLIP (To use the ALLIGATOR CLIP, clamp it to the end of the 9289 TEST PROBE.)
Options	9294 TEST PROBE, 9257 CONNECTION CORD
Safety	EN61010
Standards applying	Measurement Category III, Pollution Degree 2 (Anticipated Transient Overvoltage: 6000 V) EMC EN61326

rdg.: (reading value) The value currently being measured and indicated on the measuring instrument.

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

Insulation Resistance Measurement

Nominal test voltage, Max. effective reading

Nominal test voltage (DC)	Max. effective reading	Center scale reading
250 V / 500 V	500 MΩ	10 MΩ
1000 V	4000 MΩ	100 MΩ

Display range

Nominal test 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.

Effective measurement range, Accuracy
Guaranteed for one year under conditions not exceeding 23°C±5°C (73°F±9°F) and 90% RH.

Nominal test voltage	Name of measurement range	Measurement range	Accuracy
250 V / 500 V	1st effective measurement range	0.200 to 50.0 MΩ	±3%rdg. ±4dgt.
	2nd effective measurement range	0 to 0.199 MΩ, 50.1 to 500 MΩ	±5%rdg. ±5dgt.
1000 V	1st effective measurement range	0.200 to 200.0 MΩ	±3%rdg. ±4dgt.
	2nd effective measurement range	0 to 0.199 MΩ, 200.1 to 4000 MΩ	±5%rdg. ±5dgt.

Measurement terminal voltage characteristic.

Nominal test voltage	Open circuit voltage (when no load is applied)	Allowable no-load voltage range Minimum resistance measurement required to maintain the rated measurement voltage	Rated measurement 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 or less
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, Accuracy
Guaranteed for one year under conditions not exceeding 23°C±5°C (73°F±9°F) and 90% RH.

Display range (Auto range)	Max. reading	Resolution	Accuracy (After 0Ω 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	±5%rdg. ±6dgt.
400 kΩ range	400.0 kΩ	0.1 kΩ	
4 MΩ range	4.000 MΩ	0.001 MΩ	

Short circuit current: 200mA or more, open circuit terminal voltage: 5V DC±1 V

AC Voltage Measurement

Display range, Accuracy
Guaranteed for one year under conditions not exceeding 23°C±5°C (73°F±9°F) and 90% RH.

Display range (Auto 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

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

⚠ DANGER

This instrument is designed to conform to IEC 61010-1 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. 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 (Overvoltage Categories)

This instrument conforms to the safety requirements for CAT III measurement instruments. To ensure safe operation of measurement instruments, IEC 61010 establishes safety standards for various electrical environments, categorized as CAT I to CAT IV, and called measurement categories. These are defined as follows.

CAT I: Secondary electrical circuits connected to an AC electrical outlet through a transformer or similar device.

CAT II: Primary electrical circuits in equipment connected to an AC electrical outlet by a power cord (portable tools, household appliances, etc.)

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). Higher-numbered categories correspond to electrical environments with greater momentary energy, so a measurement instrument designed for CAT III environments can endure greater momentary energy than one designed for CAT II. 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. Never use a CAT I measuring instrument in CAT II, III, or IV environments.

The measurement categories comply with the Overvoltage Categories of the IEC60664 Standards.

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

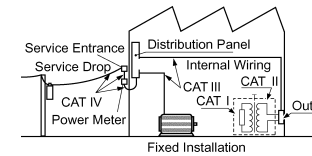
- Observe the following precautions to avoid electric shock.**
- Be sure to disconnect the probe from the object to be measured and turn the function switch OFF before connecting or disconnecting the probe from the MΩ HITESTER.
- Always verify the appropriate setting of the function selector before connecting the probes.
- Disconnect the probes 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 probes and connection cords is undamaged and that no bare conductors are improperly exposed. Using the product in such conditions could cause an electric shock, so contact your dealer or Hioki representative for replacements. (Model 9294, 9289, 9257)

⚠ 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.



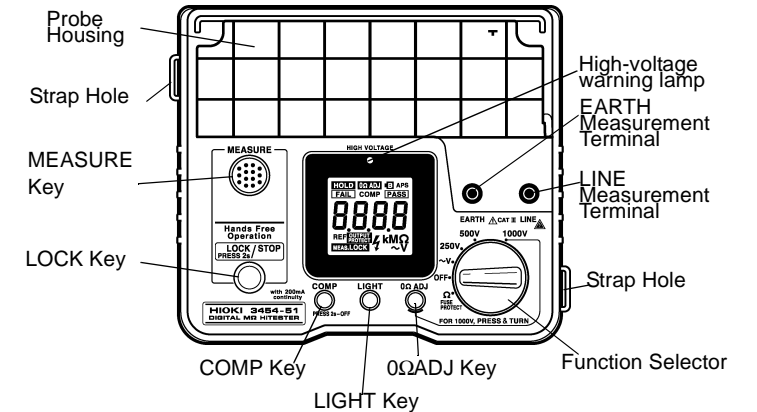
⚠ CAUTION

- For safety reasons, when taking measurements, only use the 9294 TEST PROBE provided with the instrument (or optional 9289, 9257).
- 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.

NOTE

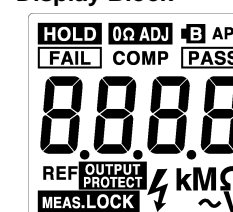
- To avoid battery depletion, turn the function selector OFF after use (the Auto Power Save feature consumes a small amount of current).
- The safety cap is attached to the probe plug. Remove the cap before connecting to the instrument.

Names and Functions of Parts



- Function Selector
Selects among power ON/OFF, the output voltage for insulation resistance measurement, ACV, or resistance (Ω).
- MEASURE Key
Used to measure resistance and insulation resistance. This key remains ON while it is held down.
- 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.
- COMP Key
Used for the comparator function
- LIGHT Key
Turns the display light ON/OFF. The light automatically switches OFF after 30 seconds.
- 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
- High-voltage warning lamp
Begins flashing if the input voltage exceeds AC 70 V (±10 V) and during insulation resistance measurement.
- EARTH Measurement Terminal
Connect the black earth probe to this terminal.
- LINE Measurement Terminal
Connect the red line probe to this terminal.
- Strap Hole
Pass the strap through this hole.
- Probe Housing
Houses the probes. The probes may be housed without disconnecting them from the terminals after use.

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.
- 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.

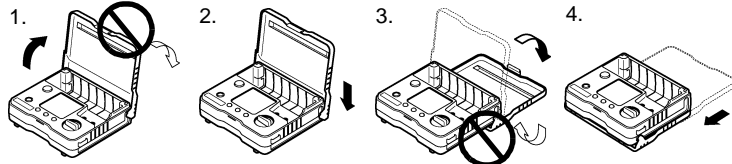
MEAS. LOCK : Lights up when the LOCK key is pressed to perform continuous measurement of insulation resistance or resistance.

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

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

Opening The Cover

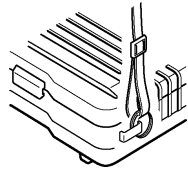
1. Raise the cover upright.
To prevent damage to the cover, do not force it past its intended position.
2. Slide the cover down while maintaining its upright position.
3. Fold it back from the upright position until it is parallel to the surface on which the instrument rests. To prevent damage to the cover, do not force it past its intended position.
4. Slide the cover toward the main unit.
Push the cover firmly forward as far as it will go.



CAUTION

- Make sure that the function selector is OFF when closing the cover. Closing the cover while the function selector is not OFF may result in damage to the MΩ HiTESTER.

Attaching The Hand Strap



Fasten the rings on the strap ends to the two strap attachment on either side of the instrument.

Measurement Procedures



Insulation Resistance Measurement

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

DANGER

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

WARNING

- When measuring insulation resistance, dangerous voltage is applied to the measurement terminals. To avoid electric shock, do not touch the probe.
- 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. Connect the black EARTH probe to the measurement terminal on the earth side of the instrument. Connect the red LINE probe to the measurement terminal on the line side of instrument.
3. Connect the black EARTH probe to the ground side of the object being measured. Except when measuring insulated resistance between ground and the object being measured, connect the black probe to an optional point.
4. Connect the red LINE probe 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 probes 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 ⚡ is indicated even if the measurement is performed with the tip of the probes short-circuited, a conductor in the probes may be broken.

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 probes 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

- Probe 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 600V 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 probe.

1. Set the function selector to \sim V.
2. Connect the test probe to the instrument's measurement terminal.
3. Connect the test probe 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 probe when the Resistance Measurement function 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 probe to the instrument's measurement terminal.
3. Connect the test probe 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 probes and fuse and deducts these values from measurement values.

1. Set the function selector to Ω.
2. Connect the test probe to the instrument's measurement terminal.
3. Short-circuit the metal tips of the test probes.
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 probe to the object being measured.
7. Read the measured value.

NOTE

- The indication can be zero-adjusted when the reading is 5 Ω or less. If the 0ΩADJ key is pressed when the reading is over 5 Ω, "Err.1" is displayed.
- If the probes 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 ⚡ is indicated even if the measurement is performed with the tip of the probes short-circuited, a conductor in the probes or the fuse may be broken.

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.

Options

- 9294 TEST PROBE
The black EARTH probe is a clip type probe.
- 9257 CONNECTION CORD
Both red and black probe are clip type probe.

NOTE

- The clips for the 9294 TEST PROBE and the 9257 CONNECTION CORD are larger than the ALLIGATOR CLIP supplied with the MΩ HiTESTER.

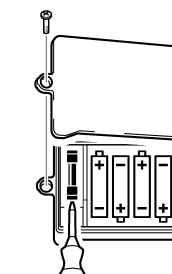
Replacing of Batteries and Fuse

WARNING

- To avoid electric shock, turn off the function switch and disconnect the probe 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/700V 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 probe 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 fasten the screw.

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INSPECTION CERTIFICATE

HIOKI E.E. CORPORATION hereby certifies that the under-mentioned product(s) has been tested and inspected in accordance with applicable HIOKI calibration procedures, and proven to meet or exceed published measurement specifications. We also certify that the measurement standards and instruments used in the calibration procedure are traceable to the national standards organization.

Model: 3454-51

S/N: _____

INSPECTOR

T. KITO

T. Kito