

# HIOKI

## INSULATION TESTER IR4053

For Photovoltaic Generation Systems



## Perform PV insulation resistance measurements Safely, Accurately, Quickly

- Safely and accurately measure PV insulation resistance even during the daytime
- Built-in PV dedicated function, displays measurements in 4 seconds
- Five ranges (50/125/250/500/1000V) built in for normal insulation resistance measurement
- Built-in 1000 VDC voltage measurement for open voltage tests of PV systems that support 1000 V



**Use the PV dedicated function for accurate, safe measurements in 4 seconds**



**Measurement not affected by generating PV**

The IR4053, which was designed for PV, can accurately measure insulation resistance without being affected by the generating PV.




**Accurate and safe measurement without creating shorts**

Normally, to accurately measure the insulation resistance of a generating PV, one needs to short the measured circuit. That's not necessary with the IR4053. (Left figure: Short-circuit switch)




**Displays measurement in 4 seconds**

The IR4053 displays the measured value just 4 seconds after starting measurement. After the first display, the displayed value is updated each second. Comfortably carry out swift measurements.



**With voltage measurement range**



**With normal insulation resistance range**

**STEP 1**

**Turn off the isolator**

Be sure to turn the isolator and the output switch off before measurement.

\*If there is a surge absorber attached to the output switch input section, remove it prior to testing.

**STEP 2**

**Check the open voltage and polarity**

Place probes on P (+) and N (-) terminals to check the open voltage and polarity. If the polarity is incorrect, the display will light up in red. You can also perform open voltage tests of PV systems that support 1000 V.

**STEP 3**

**Measure between P (+) and the earth**

Once you check the polarity, be sure to measure the insulation resistance between P (+) and the earth first. If there is a problem in the measurement value, do not measure between N (-) and the earth. Proceed to STEP 5 and measure between the earth and P again.

\*Apply output voltage that matches the PV to be measured.

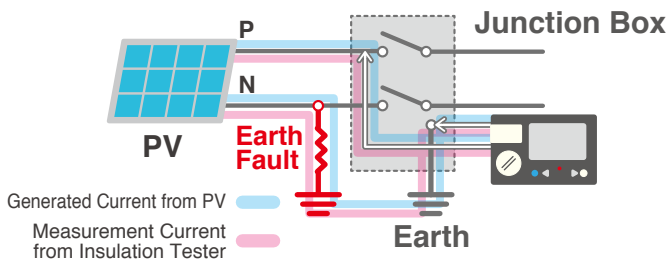
# Flow of Measurement

First, Pre-measurement Checks
Check for Problems in a Second
Easy Inspection

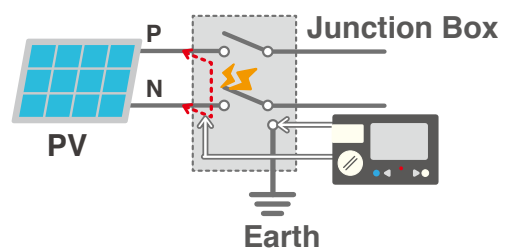
# What are the problems with conventional insulation testers?

Problems with conventional insulation testers and the 2 measurement methods determined by recognized guidelines

## Measurement that does not involve a short-circuit



## Measurement that involve a short-circuit



### Problems when measuring with a conventional insulation tester

**Can't accurately measure the insulation resistance**

This is not as dangerous, but depending on the circuit status, the measurement may be affected by the generating PV and may produce a result different from the actual insulation resistance.

**Safe, but not accurate**

### Problems when measuring with a conventional insulation tester

**Very dangerous and complex**

To accurately measure a generating PV, one needs to short the measured circuit, which requires that a short-circuit switch be separately installed. Short-circuiting will also pose the danger of creating an arc. In addition, to minimize hazards, it is recommended that the testing be conducted at night.

**Accurate, but not safe**

**STEP 4**

### Measure between N (-) and the earth

If there is no problem in the measurement between the earth and P (+), continue on to measure the insulation resistance between N (-) and the earth. If there is a problem in the measurement value, perform measurement again in STEP 5. **When the voltage is detected, the IR4053 will inform you of earth fault with a red flash.**

**With PVΩ function**

**0.400 MΩ**  
PV 500V PVΩ measurement result

**0.213 MΩ**  
Measurement result for the normal insulation resistance range

**STEP 5**

### Measure with PVΩ function

Use the PVΩ function to accurately measure the insulation resistance. Because it is a PV dedicated function, you can get accurate values that is impossible with normal insulation resistance measurement.

**Accurate Measurements**  
Measurement Done in 4 Seconds

## Functions useful in the field

**Comparator function / Red light**

You can compare measurements to any set values. If the result does not meet the set value, the red light will warn of non-conformance.

**Drop proof**

The sturdy design won't break even if dropped onto concrete from 1 m, so you can use it with peace of mind.

**Test lead with remote switch**

This allows you to apply output voltage with the switch in your hand, work with a light, and see the result of the comparator with an LED.

# Specifications

Accuracy guaranteed for 1 year, Post-adjustment accuracy guaranteed for 1 year  
Accuracy guarantee for temperature and humidity: 23°C±5°C (73°F ±9°F) and 90% rh or lower

## Insulation resistance measurement

Output voltage (DC)	50 V	125 V	250 V	500 V	1000 V
Effective maximum indicated value	100 MΩ	250 MΩ	500 MΩ	2000 MΩ	4000 MΩ
1st effective measuring range [MΩ]	0.200 to 10.00	0.200 to 25.0	0.200 to 50.0	0.200 to 500	0.200 to 1000
Accuracy	±4% rdg.				
2nd effective measuring range [MΩ]	10.1 to 100.0	25.1 to 250	50.1 to 500	501 to 2000	1010 to 4000
Accuracy	±8% rdg.				
Other measuring range [MΩ]	0 to 0.199				
Accuracy	±2% rdg. ±6 dgt.				
Lower limit resistance value to maintain nominal output voltage	0.05 MΩ	0.125 MΩ	0.25 MΩ	0.5 MΩ	1 MΩ

## Voltage measurement

Range	4.2 V	42 V	420 V	1000 V
DC V	4.200 V	42.00 V	420.0 V	1100 V
Accuracy	±1.3% rdg. ±4 dgt. (Ranges in excess of 1000 V are not guaranteed for accuracy.)			
Range	420 V	600 V		
AC V	420.0 V	750 V		
Accuracy	±2.3% rdg. ±8 dgt. (Ranges in excess of 600 V are not guaranteed for accuracy.)			

## PVΩ measurement

Output voltage (DC)	500 V	1000 V		
Maximum indicated value	2000 MΩ	4000 MΩ		
Measurement range [MΩ]	0.200 to 500	501 to 2000	0.200 to 1000	1010 to 4000
Accuracy	±4% rdg.	±8% rdg.	±4% rdg.	±8% rdg.
Other measuring range [MΩ]	0 to 0.199			
Accuracy	±2% rdg. ±6 dgt.			

## Functions

Backlight	YES
Drop proof	On concrete: 1 m (3.28 ft)
Battery power indicator	YES
Auto power save	Turns off after approx. 10 minutes
Live circuit indicator	YES
Automatic electric discharge	YES
Comparator	YES
Automatic DC/AC detection	YES

## Basic specifications

Operating temperature and humidity	0°C to 40°C (32 to 104°F), 90% rh or lower (non-condensing)
Storage temperature and humidity	-10°C to 50°C (14 to 122°F), 90% rh or lower (non-condensing)
Maximum rated voltage to earth	600 V AC/DC, Measurement category III, Anticipated transient overvoltage: 6000 V
Dielectric strength	7060 V AC, 50/60 Hz, Measurement terminals - electrical enclosure, 1 min
Degree of protection	IP40 (EN60529)
Standards	JIS C1302 (Insulation resistance measurement), EN61326 (EMC), EN61557-1/-2

## Power supply

Power supply type	AA alkaline batteries (LR6) x4
Continuous operating time	Approx. 20 hours

## Dimensions and mass

Dimensions	159W × 177H × 53D mm (6.26"W × 6.97"H × 2.09"D)
Mass	Approx. 600 g (21.2 oz) (including batteries, excluding test lead)

## Model : INSULATION TESTER IR4053

Model No. (Order Code) (Note)

IR4053-10 (Bundled Test lead L9787)



TEST LEAD L9787

[Other Accessories] Neck strap x1, Instruction manual x1  
AA alkaline batteries (LR6) x4

## options

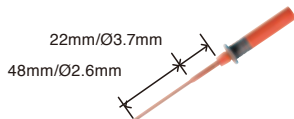


## TEST LEAD SET WITH REMOTE SWITCH L9788-11

Bundled with Remote switch type test lead L9788-10/ Earth lead, alligator clip, 1.2 m (3.94 ft) length

## L9787 options

For checking breaker terminals  
Attach to the L9787's red probe tip



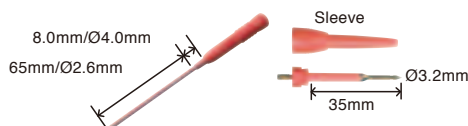
BREAKER PIN L9787-91

## L9788-11 options

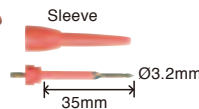
For checking breaker terminals  
Attach to the L9788-10's red probe tip



TEST LEAD WITH REMOTE SWITCH L9788-10



BREAKER PIN L9788-92



TIP PIN L9788-90



MAGNETIC ADAPTER 9804-02

## Shared options

Attaches to tip of the earth lead;  
11 mm diameter.

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