HIOKI

HIGH VOLTAGE INSULATION TESTER
IR3455



Transformers, Cables, Motors and Other Equipment

Measure the Insulation Resistance of High-Voltage Equipment

» NEW

Max. **10 TΩ**

Ideal for All Insulation Resistance Diagnostic Applications

» Features

250 V to 5 kV

Wide Range Test Voltage Settings

Backlight **White LED**

Operating Temperature Range **-10 to 50°C**

CAT IV 600 V

CE

3 year Warranty







Increased Functionality!

Max. Measurement 10 TΩ

Max. Generated Test Voltage 5 kV

NEW

Ideal for All Insulation Resistance Diagnostic Applications

Range of insulation resistance measurement expanded to a maximum of 10 TΩ. Functions such as automatic calculation and display of maximum PI (Polarization Index) and DAR (Dielectric Absorption Ratio), as well as step voltage test, temperature compensation, temperature measurement, and leakage current display make the IR3455 suitable for a variety of diagnostic applications.

Expanded operating temperature range

The temperature range in which the IR3455 can be used has been expanded to -10°C to 50°C (14°F to 122°F). This allows reliable use throughout the year, regardless of temperature.



White backlight

A white backlight makes the IR3455 easy to operate even in low-light conditions. Visibility has improved compared to the legacy model, making it easier to confirm measurement values.



Features

Wide Range Test Voltage Settings

Generate test voltages ranging from 250 V to 5 kV. Settings can be made in steps as fine as 25 V. Perfect for measuring the insulation of high-voltage equipment such as transformers, cables, and motors.

Data Memory Function

The IR3455 provides a manual storage function for 100 data and a logging function for 10 data (360 times). Date and time are also stored, reducing the need for handwritten notes.

Bundled software

Use the included application software to easily graph step voltage test data and create reports.



Safe and Easy-to-use Design

Shutter mechanism

A shutter mechanism prevents simultaneous access to measurement terminals with other terminals. Other safety features include a voltage measurement function, high-voltage warning indicator, and auto discharge function.

Bar-graph display

Use the logarithmic bar graph display for analog measurements. The insulation resistance is indicated by the number of dots that appear on-screen.

CAT IV 600 V

The IR3455 is designed to comply with safety regulations for category IV measurements (600 V), to reduce the risk of electric shock and other accidents from the input of high voltage.



USB interface

Install the included software on your computer and connect via USB to transfer the data stored in the internal memory of the IR3455 to your computer.

Battery pack support

Use either AA batteries or the rechargeable battery pack, for reliable operation in environments where batteries are not available or when there is no time to recharge.



Hard case

The hard case is ideal for use at work sites. It is compact and easy to carry, and provides room for storing test leads.

»Measurement Functions

Wide Range of Voltage Generated for
Measurement and Testing

Insulation resistance measurements

Select a test voltage from 250 V, 500 V, 1.00 kV, 2.50 kV, and 5.00 kV. More finely graded settings are also possible. When measurement is completed, the unit shows the insulation resistance value, test voltage (setting and actual output), leakage current, DAR, PI, and elapsed time. Save measurement conditions and measurement results to internal memory, and view them on a computer.

Insulation resistance measurement display

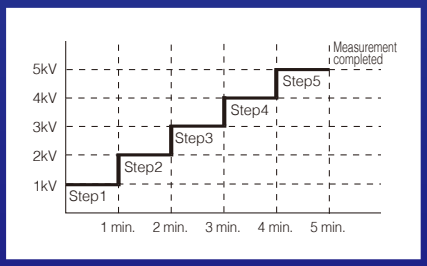


- Actual output voltage
- > flashes when the measurement range is exceeded
- Insulation resistance value
- Elapsed time

Step voltage test

In this type of test, the voltage is gradually raised and the insulation resistance and leakage current change is measured. Two different step settings are available: 500 V → 1 kV → 1.5 kV → 2 kV → 2.5 kV and 1 kV → 2 kV → 3 kV → 4 kV → 5 kV.

STEP 5.0 kV step voltage test



Voltage application time for each step: 30 s/1/2/5 m.

»Display Functionality

Leakage Current and Insulation Quality
Parameter Displays

Leakage current display

When measuring insulation resistance, the instrument can be switched to display the leakage current. This is possible before, during, and after measurement.

Leakage current display during measurement



- Actual output voltage
- Resistance value
- < flashes when less than 1 nA
- Current measured value
- Elapsed time

PI and DAR display

PI: Polarization Index
DAR: Dielectric Absorption Ratio

The PI and DAR values which are used as an evaluation standard for insulation are automatically calculated. With the insulation resistance measurement start point as reference, the calculation is performed as shown on the right, using two resistance values obtained at a prescribed time interval.

$$\text{Formulas: PI} = \frac{\text{resistance value 10 min after start}}{\text{resistance value 1 min after start}}$$

$$\text{DAR 1min/15s} = \frac{\text{resistance value 1 min after start}}{\text{resistance value 15 sec after start}}$$

$$\text{DAR 1min/30s} = \frac{\text{resistance value 1 min after start}}{\text{resistance value 30 sec after start}}$$

PI value display



Measurement time — Resistance value

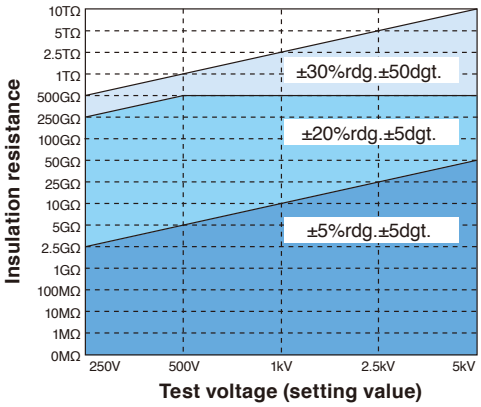
DAR value display



Measurement time — Resistance value

Accuracy and Functionality

Resistance Range Accuracy



Insulation Diagnosis

Temperature compensation	Result converted to insulation resistance at reference temperature. Ten (10) different temperature compensation tables can be selected, according to the insulation material of the object measured. Reference temperature: 20°C (68°F) or 40°C (104°F) by default. This setting can be changed.
PI/DAR display	PI: Polarization Index DAR: Dielectric Absorption Ratio After insulation resistance measurement has started, calculation is performed using two resistance values obtained at prescribed time intervals. Formulas: PI = resistance value 10 min after start/resistance value 1 min after start DAR 1min/15 s = resistance value 1 min after start/resistance value 15 sec after start DAR 1min/30 s = resistance value 1 min after start/resistance value 30 sec after start
Step voltage test	Measurement of insulation resistance while raising voltage at specific intervals. Two voltage step patterns can be selected. STEP 2.5 kV: 500 V → 1 kV → 1.5 kV → 2 kV → 2.5 kV STEP 5 kV: 1 kV → 2 kV → 3 kV → 4 kV → 5 kV Voltage application time for each step: 30 s/1/2/5 m.

Supplementary Functions

Data memory	Manual recording: Store up to 100 data. Data type: Standard measurement data/temperature compensation data/step voltage test data Data logging: Store measurement value at preset intervals, available for insulation resistance measurement only. Number of data: 10. Number of logging instances: 360 times per data. Recording interval: 15/30 s/1/2/5 m. Data content: Date, time, measurement interval, temperature, set voltage, actual output voltage × times, and resistance × times. Additional functions: Write mode, read mode, all clear, selective clear, and overwrite.
Communication	Interface: USB ver 2.0 (full speed) PC application software: Transfer of memory data from IR3455 to computer, data display, and create graph. IR3455 items that can be set/changed from computer: Date, time, PI time, step time for step voltage test, and report function.
Other	Temperature/humidity value input, timer, elapsed time display, clock, averaging, data hold, auto discharge, active voltage warning indication, hot conductor warning indication, LCD backlight, auto power-off, and buzzer.

General Specifications

Accuracy guaranteed for 1 year

Measurement parameter	Insulation resistance, leakage current, voltage, and temperature
Operating temperature and humidity range	-10°C to 40°C (14°F to 104°F), less than 80% RH (no condensation) 40°C to 50°C (104°F to 122°F), at 50°C and below relative with linear decrease up to 50% RH Battery pack charge: 0°C to 40°C, less than 80% RH
Storage temperature and humidity range	-10 to 50°C (14 to 122°F), max. 90% RH (no condensation)
Operating environment	Indoors, up to 2,000 m (6562.20 ft) ASL
Measurement method	DC voltage application method (insulation resistance), average value rectification method (voltage)
A/D conversion	Double integral method
Display	LCD with backlight
Indication	Numeric: Up to 999 Bar graph: insulation resistance only, range 0 to 1 TΩ
Power supply	LR6 (AA) alkaline battery × 6 Battery pack 9459: 7.2 V DC (rechargeable, Ni-MH) AC adapter 9753: Rated input voltage 100 to 240 V AC, rated output 15 VA (When the AC adapter is connected to the tester, the battery pack can be charged, communicate with a PC, perform temperature measurement, and edit the settings. However, measure insulation resistance, and leakage current or voltage cannot be performed.)
Max. power consumption	15 VA (using AC adapter), 6 VA (using batteries or battery pack)
Continuous operating time	Approx. 5 hours (with alkaline batteries) Approx. 9 hours (with battery pack 9459) Conditions: 5 kV generated, +/- terminals open, and backlight off
Max. input voltage	AC 750 V, DC 1,000 V
Max. rated voltage to ground	AC 600 V (CAT IV), AC 1,000 V (CAT III)
Dust-proof/water-proof	IP40 (EN60529) Conditions: When the USB terminal is covered with the shutter
Max. load capacity	4 µF
Dimensions/mass	260 mm (10.24 in) W × 250.6 mm (9.87 in) H × 119.5 mm (4.70 in) D, 2.8 kg (98.8 oz)
Compliance standard	Safety: EN61010, EMC: EN61326

Product Specifications

Insulation resistance measurements

Test voltage	250 V to 5.00 kV DC	
Setting	Preset test voltages: 250 V, 500 V, 1 kV, 2.5 kV, 5 kV Fine adjustment: Possible in 25 V steps between 250 V and 1 kV and in 100 V steps between 1 and 5 kV Output voltage accuracy: Setting value -0%, +10% (Applies only when the measured resistance is equal to or higher than the value gained from dividing the test voltage (setting voltage) by the rated measurement current.)	
Measurement current	Test voltage	Measurement current
	250 V to 1.00 kV	1 mA
	1.10 kV to 2.50 kV	0.5 mA
	2.60 kV to 5.00 kV	0.25 mA
	Rated measurement current tolerance: -0%, +10%	
Short-circuit current	2 mA or less	
Output voltage monitor functions	Display range: 0 V to 999 V, 0.98 kV to 5.50 kV Monitor accuracy: ±5% rdg. ±5 dgt.	
Measurement range	Test voltage	Measurement range
	250 V	0.00 MΩ to 500 GΩ
	500 V	0.00 MΩ to 1.00 TΩ
	1 kV	0.00 MΩ to 2.00 TΩ
	2.5 kV	0.00 MΩ to 5.00 TΩ
	5 kV	0.00 MΩ to 10.0 TΩ
Resistance range (auto range)	Resistance range	Measurement range
	10 MΩ	0.00 MΩ to 9.99 MΩ
	100 MΩ	9.0 MΩ to 99.9 MΩ
	1,000 MΩ	90 MΩ to 999 MΩ
	10 GΩ	0.90 GΩ to 9.99 GΩ
	100 GΩ	9.0 GΩ to 99.9 GΩ
	1,000 GΩ	90 GΩ to 999 GΩ
	10 TΩ	0.90 TΩ to 9.99 TΩ
Accuracy	Measurement range	Accuracy
	Up to [Test voltage (setting value)/Resistance measurable at 100 nA]	±5% rdg. ±5 dgt.
	[Test voltage (setting value)/Resistance measurable at 100 nA] to [Test voltage (setting value)/Resistance measurable at 1 nA] or 500 GΩ	±20% rdg. ±5 dgt.
	[Test voltage (setting value)/Resistance measurable at 1 nA] or 501 GΩ to 9.99 TΩ	±30% rdg. ±50 dgt.
	Conditions: Temperature and humidity range for guaranteed accuracy 0 to 28°C (32 to 82°F), max. 80% RH, no condensation	
Response time	15 s max. (from measurement start until guaranteed accuracy display, no averaging)	

Leakage current measurement

Measurement range	1.00 nA to 1.20 mA		
Current range and accuracy (auto range)	Current range	Measurement range	Accuracy
	10 nA	1.00 nA to 9.99 nA	±15% rdg. ±1 nA
	100 nA	9.0 nA to 99.9 nA	±15% rdg. ±5 dgt.
	1,000 nA	90 nA to 999 nA	±2.5% rdg. ±5 dgt.
	10 µA	0.90 µA to 9.99 µA	±2.5% rdg. ±5 dgt.
	100 µA	9.0 µA to 99.9 µA	±2.5% rdg. ±5 dgt.
	1 mA	90 µA to 999 µA, 0.90 mA to 1.20 mA	±2.5% rdg. ±5 dgt.
	Conditions: Temperature and humidity range for guaranteed accuracy 0 to 28°C (32 to 82°F), max. 80% RH, no condensation		
Response time	15 s max. (from measurement start until guaranteed accuracy display, no averaging)		

Voltage measurement

Measurement range	DC ±50 V to ±1.00 kV, AC 50 V to 750 V
Frequency	DC/50 Hz/60 Hz
Accuracy	±5% rdg. ±5 dgt.
Input resistance	10 MΩ or higher
Response time	3 s or less

Temperature measurement

Measurement range accuracy	Measurement range	Accuracy
	-10.0°C to -0.1°C (14°F to 32°F)	±1.5°C (±2.7°F)
	0.0°C to 40.0°C (32°F to 104°F)	±1.0°C (±1.8°F)
	40.1°C to 70.0°C (104.2°F to 158°F)	±1.5°C (±2.7°F)
	When using the temperature sensor 9631-05, accuracy is guaranteed only within the range of 0.0 - 40.0°C (32 to 104°F).	
Response time	Approx. 100 s, including response of temperature sensor models 9631-01 to 9631-05	

Instrument and Options



HIGH VOLTAGE INSULATION TESTER IR3455

Model No. (Order Code) IR3455

Accessories

TEST LEAD 9750-01, -02, -03 (× 1 ea.)
ALLIGATOR CLIP 9751-01, -02, -03 (× 1 ea.)
LR6 (AA) alkaline battery × 6
USB cable × 1
CD-R (Data Analysis Software) × 1
Instruction Manual × 1



TEST LEAD 9750 -01 (RED), -02 (BLACK), -03 (BLUE) 3 m (9.84 ft) ea.
TEST LEAD 9750 -11 (RED), -12 (BLACK), -13 (BLUE) 10 m (32.81 ft) ea.
ALLIGATOR CLIP 9751 -01 (RED), -02 (BLACK), -03 (BLUE)



TEMPERATURE SENSOR 9631-01
Molded plastic
Thermistor type
(1 m (3.28 ft))



TEMPERATURE SENSOR 9631-05
Molded plastic
Thermistor type
(5 cm (0.16 ft))



AC ADAPTER 9418-15



BATTERY PACK 9459

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