HIOKI

HIGH VOLTAGE INSULATION HiTESTER

3455

Field Measuring Instruments

5KV COMPACT PERFORMANCE

Test Voltage 250V to 5kV
Insulation Resistance Measurement Up to 5TΩ

- Measure insulation of high-voltage equipment (such as transformers, cables, and motors)
- Automatically calculate and display PI (Polarization Index) and DAR (Dielectric Absorption Ratio)
- Step voltage testing, temperature compensation, temperature measurement, and leakage current display
- Data storage and USB interface

ISO 9001 JMI-0216
ISO14001 JQA-E-90091

INTERNET HIOKI Website www.hioki.com

HIOKI company overview, new products, environmental considerations and other information are available on our website.

3 years Guaranteed for 3 years

CAT IV 600V
CE

Wide Range Test Voltage Settings

Features

Generate Test Voltages Across a Wide Spectrum

The **3455** can generate test voltages ranging from 250 V to 5 kV. Settings can be made in steps as fine as 25 V. Very high insulation resistance measurement up to 5 teraohms is possible.

Ideal for All Insulation Diagnostic Applications

Functions such as automatic calculation and display of PI (Polarization Index) and DAR (Dielectric Absorption Ratio), as well as step voltage test, temperature compensation, temperature measurement, and leakage current display make the 3455 suitable for a variety of diagnostic applications.

Data Memory Function

The 3455 provides a manual storage function for 100 data and a logging function for 10 data (360 times). The date and time of measurement are also recorded.

USB Interface

Easily transfer data to a PC via the USB interface using our free PC application software. The software also features a convenient report creation function.

Safety Foremost

The 3455 complies with safety regulations for category IV measurements (600 V). A shutter mechanism prevents simultaneous use of measurement terminals and other terminals. Other safety features include a voltage measurement function, high-voltage warning indicator, and auto discharge function.

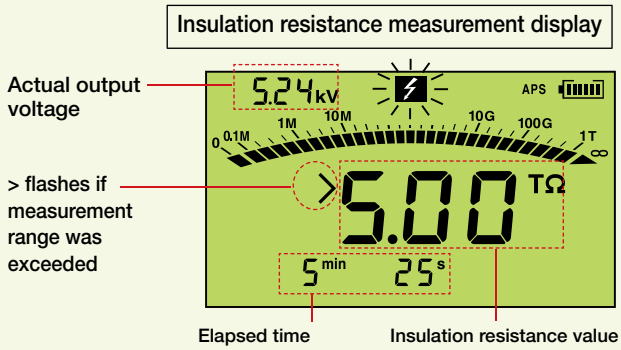
Large, Easy to Read Display

The display is backlit and features a logarithmic bar graph as an analog type indicator in addition to the digital readout.

Primary Measurement Functions

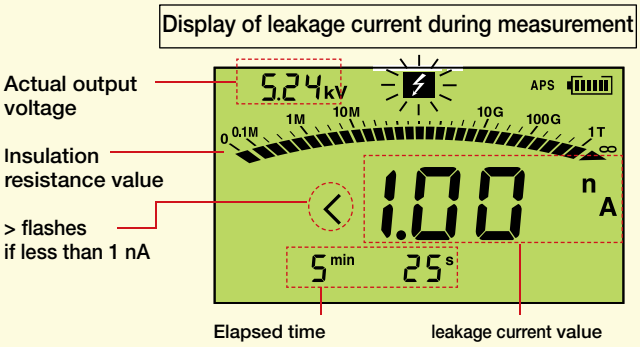
Insulation resistance measurement

Measurement voltage is selectable 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.



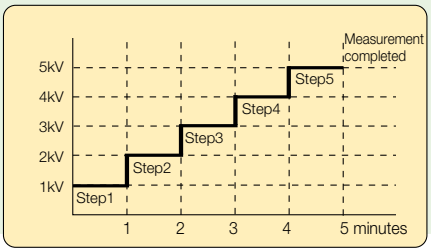
Leakage current display

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



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. The test time for each step can also be selected.



Make Complete Diagnostic Tests of Transformers, Cables, Motors and Other Equipment

PI and DAR display

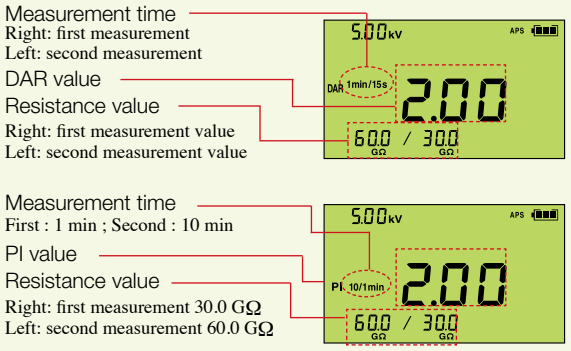
PI: Polarization Index **DAR: Dielectric Absorption Ratio**

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 follows, using two resistance values obtained at a prescribed time interval.

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

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

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



Specifications

Measurement Items: Insulation resistance, leakage current, voltage, temperature

Insulation Resistance

Test voltage: 250V to 5.00kV 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

Measurement current: 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. Output voltage is not guaranteed if measured resistance is lower than [test voltage/rated measurement current].

Test voltage	Measurement current
250V to 1.00kV	1mA
1.10kV to 2.50kV	0.5mA
2.60kV to 5.00kV	0.25mA

Rated measurement current tolerance: -0%, +10%

Short-circuit current: 2 mA or less

Output voltage

Monitor function: Display range: 0 to 999 V, 0.98 to 5.50 kV
Monitor accuracy: ± 5% rdg. ± 5 dgt.

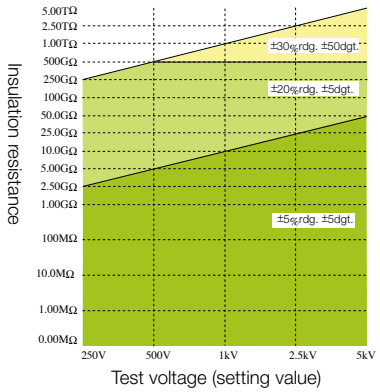
Measurement range:

Test voltage	Measurement range
250 V	0.00MΩ to 250GΩ
500 V	0.00MΩ to 500GΩ
1 kV	0.00MΩ to 1.00TΩ
2.5 kV	0.00MΩ to 2.50TΩ
5 kV	0.00MΩ to 5.00TΩ

Resistance range: (auto range)

Resistance range	Measurement range
10MΩ	0.00MΩ to 9.99MΩ
100MΩ	9.0MΩ to 99.9MΩ
1000MΩ	90MΩ to 999MΩ
10GΩ	0.90GΩ to 9.99GΩ
100GΩ	9.0GΩ to 99.9GΩ
1000GΩ	90GΩ to 999GΩ
5TΩ	0.90TΩ to 5.00TΩ

Resistance range accuracy



Accuracy:

Measurement range	Accuracy
Up to [Test voltage / Resistance measurable at 100 nA]	±5%rdg.±5dgt.
[Test voltage / Resistance measurable at 100 nA] to 500 GΩ	±20%rdg.±5dgt.
501GΩ to 5.00TΩ	±30%rdg.±50dgt.

(temperature and humidity range for guaranteed accuracy 0 to 28°C, max. 90%rh, no condensation)

Response time: 15s max. (from measurement start to until guaranteed accuracy display, no averaging)

Leakage Current

(current measurement with test voltage being generated)

Measurement range: 1.00nA to 1.20mA

Current range and accuracy:

Current range	Measurement range	Accuracy
10nA	1.00nA to 9.99nA	±15%rdg. ±1nA
100nA	9.0nA to 99.9nA	± 15%rdg. ±5dgt.
1000nA	90nA to 999nA	±2.5%rdg. ±5dgt.
10μA	0.90μA to 9.99μA	±2.5%rdg. ±5dgt.
100μA	9.0μA to 99.9μA	±2.5%rdg. ±5dgt.
1mA	90μA to 999μA, 0.90mA to 1.20mA	±2.5%rdg. ±5dgt.

(auto range, temperature and humidity range for guaranteed accuracy 0 to 28°C, max. 90%rh, no condensation)

Response time: 15 s max. (from measurement start to until guaranteed accuracy display, no averaging)

Voltage

(temperature and humidity range for guaranteed accuracy 23±5 °C, max. 90%rh, no condensation)

Measurement range: DC ±50V to ±1.00kV , AC 50V to 750V

Frequency: DC/ 50Hz/ 60Hz

Accuracy: ±5%rdg. ±5dgt.
(for DC, absolute values of 1.01 kV and above are out of guaranteed accuracy range)

Input impedance: Approx. 10 MΩ

Response time: 3 s or less

Temperature

Measurement range and Accuracy:

Measurement range	Accuracy
–10.0°C to –0.1°C	±1.5°C
0.0°C to 40.0°C	±1.0°C
40.1°C to 70.0°C	±1.5°C

When using the temperature sensor 9631-05, accuracy is guaranteed only for 0.0 - 40.0 °C range

Response time: Approx. 100 s, including response of temperature sensor models **9631-01** to **9631-05**
(reference value, time until a 90% value of a temperature change is shown)

Specifications

Insulation Diagnosis

Temperature compensation: Result converted to insulation resistance at reference temperature. 10 different temperature compensation tables can be selected, according to insulation material of measurement object. Reference temperature: 20°C or 40°C by default, 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.

Step voltage test: Measurement of insulation resistance while raising voltage at specific intervals. Two voltage step patterns can be selected.
STEP 2.5kV : 500V→1kV→1.5kV→2kV→2.5kV
STEP 5kV : 1kV→2kV→3kV→4kV→5kV
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 /1/2/5m, Data content: date, time, measurement interval, temperature, set voltage, actual output voltage × times, resistance × times, Additional functions: write mode, read mode, all clear, selective clear, overwrite

Communication: Interface: USB ver 2.0 (full speed)
PC application software: transfer of memory data from 3455 to computer, data display, create graph,
3455 items that can be set/changed from computer: date, time, PI time, step time for step voltage test, report function

Other items: 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, buzzer

General Specifications

Operating temp. , humidity: 0 to 40°C, max90%rh (no condensation)
10 to 40°C, max. 80%rh for battery pack charging

Storage temp. , humidity: -10 to 50°C, max 90%rh (no condensation)

Guaranteed accuracy period: 1 year

Operating environment: Indoors, up to 2000 m 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

Display update rate: Insulation resistance/leakage current: 1 time/second (0.25 times/second when using averaging)
Output voltage monitor: 2 times/second
Voltage measurement: 4 times/second
Temperature measurement: 1 time/second

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 output15VA
(When the AC adapter is connected to the tester, you can harge the battery pack, communicate with a PC, perform temperature measurement, and edit the settings. However, you cannot measure insulation resistance, leakage current or voltage.)

Max. power consumption: 15 VA (using AC adapter), 6 VA (using batteries or battery pack) (5 kV generated, +/- terminals open, backlight off)

Continuous operation time: approx. 5 hours (with alkaline batteries)
(reference value) approx. 9 hours (with battery pack **9459**)

Max. input voltage: AC750Vrms, DC1000V

Max.rated voltage to ground: 600Vrms(CATIV) , 1000Vrms (CATIII)

Withstand voltage: 6880 V AC, 15 sec.

Dimensions and Mass: 260(W) × 250.6(H) × 119.5(D) mm, 2.8kg

Applicable standards: Safety: EN61010-1:2001, EN61010-031:2002
EMC:EN61326:1997+A1:1998+A2:2001
EN61000-3-2:2000
EN61000-3-3:1995+A1:2001

Accessories: TEST LEAD (RED) **9750-01** × 1, TEST LEAD (BLACK) **9750-02** × 1, TEST LEAD (BLUE, GUARD) **9750-03** × 1, ALLIGATOR CLIP (RED) **9751-01** × 1, ALLIGATOR CLIP (BLACK) **9751-02** × 1, ALLIGATOR CLIP (BLUE, GUARD) **9751-03** × 1, LR6 (size AA) battery × 6, USB CABLE × 1, CD-R (Data Analysis Software for 3455) × 1, Instruction manual × 1

Options:

TEMPERATURE SENSOR **9631-01**
(Thermistor, Molded type, Approx. 1 m)
TEMPERATURE SENSOR **9631-05**
(Thermistor, Molded type, Approx. 6 cm)
TEST LEAD **9750-11** (Red, Approx. 10 m)
TEST LEAD **9750-12** (Black, Approx. 10 m)
TEST LEAD **9750-13** (Blue, Approx. 10 m, GUARD)
BATTERY PACK **9459**
AC ADAPTER **9753**

TEST LEAD 9750
ALLIGATOR CLIP 9751

TEMPERATURE SENSOR 9631-01
Molded plastic, thermistor type

TEMPERATURE SENSOR 9631-05
Molded plastic, thermistor type

BATTERY PACK 9459

AC ADAPTER 9753

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