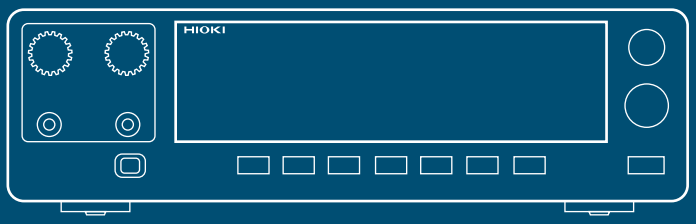
CATALOGO STRUMENTI

Ricerca & Sviluppo

PROVE E VERIFICHE

PROVA DI CONTINUITA'



TECNOLOGIA

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TECNOLOGIE DI MISURA

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SENSORI e ACCESSORI

HIOKI

AC GROUNDING HiTESTER 3157

CE certified low-resistance measurement compliant with major safety standards

Protective ground tester indispensable for standard certification

The 3157-01 AC GROUNDING HiTESTER is designed to measure whether the metal enclosure of an electrical equipment is connected to the ground terminal at sufficiently low resistance levels. It also can be used to evaluate the grounding conditions of large-scale electrical installations. Measurement is carried out by using a high current according to the specifications of the measurement object, and determining the voltage drop at the measurement point. Reference values are as set out in the various safety standards. The 3157-01 can carry out measurements in accordance with the stipulations of multiple standards.

CE

Low-resistance measurements in accordance with all major safety standards

Main applications

The 3157-01 passes a large AC current through the measurement object and measures the voltage drop according to the AC 4-terminal method, making it possible to measure very low resistance values.

- Protective grounding checks of medical and general electrical equipment
- Ground connection tracing of machine tools and wiring panels
- Safeguard and equal-potential connection checks of medical installations
- High-current behavior evaluation of connections

Major features

■ Compliant with a multitude of standards

The 3157-01 allows measurement as prescribed by most major safety standards. Using the 4-terminal method to measure the voltage drop for a high current, the unit offers evaluation features and a timer function to allow efficient standard compliance testing.

■ Constant-current testing (max. 31.0 A) with feedback control

The output current is controlled by a feedback loop to achieve stability, regardless of fluctuations in the load impedance.

■ Test data count function

For installations with many test points, the unit can automatically count the number of tests, to ensure that no points are missed.

■ Setting value store function

Up to 20 settings can be stored, allowing quick switching between the various setups for different standards and legal requirements.

■ [SOFT START] function

The unit checks whether the probe is connected to the measurement object, and raises the output current to the preset value when a connection is detected. This serves to prevent sparks caused by connecting a live probe to a measurement object, thereby guarding against equipment damage and ensuring operator safety.

■ Fluorescent tube display (VFD)

The display uses an easy to read fluorescent tube. Compared to conventional meters, the digital indication allows effortless reading of the data.

■ Light weight and compact dimensions

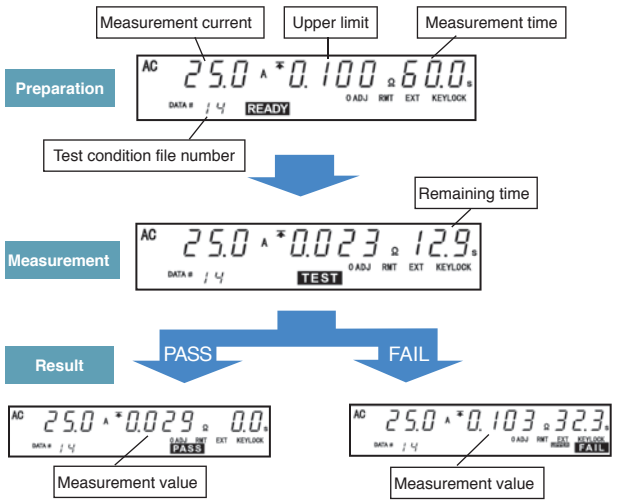
Whereas conventional testing equipment required a trolley for transport, the 3157-01 can be easily carried with one hand. Its small dimensions, light weight, and ease of maintenance make it ideal for use in the field.
[320 (W) × 90 (H) × 263 (D) mm
12.6" (W) × 3.56" (H) × 10.40" (D)
7 kg(247.2 oz)]

Standards supported by the 3157-01

- IEC60065
  Safety requirements for mains operated electronic and related apparatus for household and similar general use
- IEC60204-1
  Electrical equipment of industrial machines -Part1,General requirements
- IEC60335-1
  Safety of household and similar electrical appliances - Part 1, General requirements
- IEC60601-1
  Medical electrical equipment -Part 1, General requirements for safety
- IEC60950
  Safety of data processing equipment, including office equipment
- IEC61010-1
  Safety requirements for measurement, control, and laboratory electrical equipment
- UL standard
  Relevant standards
  (UL 1012, UL 1270, UL 1409, UL 1419, UL 1437, UL 2601, etc.)

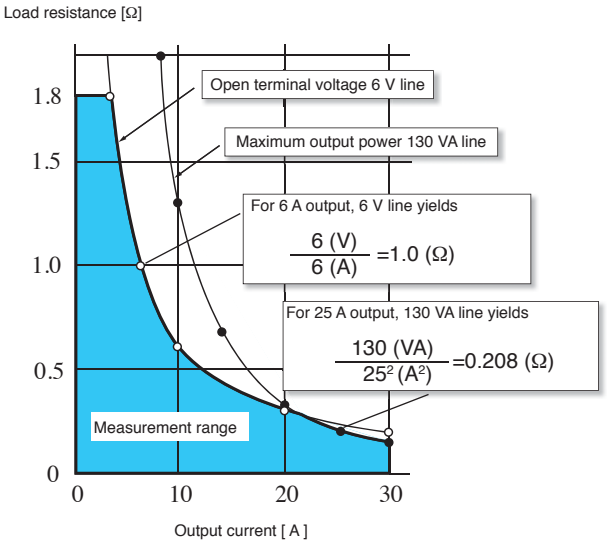
A multitude of functions in a compact body

Easy standard testing

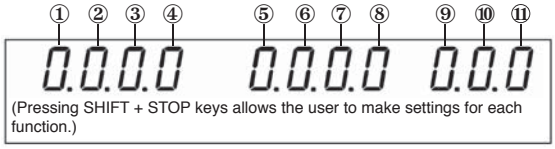


* If hold is not enabled, unit reverts to READY condition after 1 second.

Measurement range



Versatile functions



① Output current frequency switching (0: 50 Hz / 1: 60 Hz)

② PASS/FAIL hold function setting
Determines whether the condition is held after detecting PASS or FAIL.

	0	1	2	3
PASS	NO	YES	NO	YES
FAIL	YES	YES	NO	NO

③ Hold function setting (0: Hold disabled / 1: Hold enabled)
Holds the condition of the unit after the preset test time has elapsed or after the STOP key is pressed.

④ Use test lower limit setting (0: No / 1: Yes)
Disabling the setting allows only the upper limit to be set. Enabling the setting allows also the lower limit to be set.

⑤ Timer override (0: No / 1: Yes)
Determines whether a test time can be set. If test time is not set, the test ends only when the STOP key is pressed or the result is FAIL.

⑥ Test data count function (0: Disable/1: Enable)
Allows counting of test points for equipment with many test points.

⑦ Buzzer setting

	0	1	2	3
Evaluation	ON	OFF	OFF	ON
Error	ON	OFF	ON	OFF

⑧ Enable current control in test condition (0: No/1: Yes)
Allows changing of the output current value while a test is in progress.

⑨ Momentary out
Enabling this function allows the current to be output only when the START key is pressed.
0: Disabled (trigger operation)
1: Enabled (momentary out operation)

⑩ Test mode
0: Soft start mode
1: Normal mode
2: Continuous test mode

⑪ Print function
0: Not used
1: Automatically print PASS/FAIL result
2: Optionally print in PASS/FAIL hold condition

External I/O

The unit comes with I/O connectors as standard equipment. The connectors allow external START/STOP control, READY/TEST status checking, and PASS/FAIL result reading. Photocouplers are used to isolate the I/O signals from the internal circuitry.

External interface (option)

The 9518-02 GP-IB interface or 9593-02 RS-232C interface can be installed in the unit. This allows remote control from a computer as well as export of measurement data. The 9593-02 RS-232C interface also allows connection of the 9442 printer for producing a hard copy of measurement data.

9442 printer

Printing method : Thermal serial dot printer
Paper width : 112 mm
Printing speed : 52.5 cps
Power source : 9443 AC adapter, or supplied nickel-hydride battery (Charged through 9443; printing capability approx. 3000 lines with full charge)

* To use the 9442 printer, an optional 9593-02 RS-232C interface, 9446 connection cable, and AC adapter are required.

■ 3157-01 Specifications

● Basic specifications

(Accuracy guaranteed for 1 year, Post-adjustment accuracy guaranteed for 1 year)

Basic functions : AC 4-terminal method resistance measurement

[Generator section]

Current generator principle	: PWM constant current control
Current setting range	: 3.0 A - 31.0 A AC (0.1 A resolution), into 0.1 Ω load
Accuracy	: ± (1% of setting + 0.2 A) within maximum output power range
Maximum output power	: 130 VA (at output terminals) * * Subject to derating according to ambient temperature [80% at 40˚C (104˚F)]
Open-terminal voltage	: Max. 6 V AC
Generator frequency	: 50 Hz or 60 Hz sine wave (selectable)
SOFT START function	: Apply current only after checking load connection

[Monitor section]

Resistance measurement range	: 0 - 1.800Ω (0.001Ω resolution)
Accuracy	: ± (2% rdg. +4 dgt.) after zero-adjust
Current monitoring range	: 0 - 35.0 A AC (0.1 A resolution)
Accuracy	: ± (1% rdg. +5 dgt.) (at 3 A or more)
Voltage monitor range	: 0 - 6.00 V AC (single range 0.01 V resolution)
Accuracy	: ± (1% rdg.+5 dgt.)
Monitoring cycle	: 0.5 s

[Timer section]

Setting ON	: Counts down time after start until preset time
Setting OFF	: Shows elapsed time after start
Setting range	: 0.5 - 999 s
Setting resolution	: 0.1 s (0.5 - 99.9 s)/ 1 s (100 - 999 s)
Accuracy	: ±50 ms (0.5 - 99.9 s)/±0.5 s (100 - 999 s)

[Other functions]

Comparator function	: PASS/FAIL evaluation using preset upper/lower limit
Comparator result output	: Internal buzzer (PASS/FAIL, ON/OFF switchable) and I/O output
Zero-adjust function	: For measurement probe impedance cancellation
Zero-adjust range	: 0 - 0.100Ω
Memory function	: Max. 20 settings (with save/load)

● General Specifications

Display	: Fluorescent tube (digital display)
Ambient conditions for use	: 0 to +40˚C (32 to 104˚F), 90% RH or less (no condensation)
Ambient conditions for storage	: -10 to +50˚C (14 to 122˚F), 95% RH or less (no condensation)
Ambient conditions for assured accuracy	: 23˚C ± 5˚C (73˚F ± 9˚F) 90% RH or less (no condensation) After 30 minute warm up period
Suitable environments	: Indoors, altitude up to 2000 m
Power supply	: 100 - 120 V/200 - 240 V AC (switching), 50 - 60 Hz
Withstand voltage	: 1.35 kV AC, 20 mA, 1 min., between power supply and chassis
Maximum rated power	: 350 VA (with optional equipment)
Fuse	: 250VT3. 15AL
Compatible standards	: 1. EMC : EN61326:1997+A1:1998 CLASS A EN61000-3-2:1995+A1:1998+A2:1998, EN61000-3-3:1995 2. Safety : EN61010-1:1993+A1:1995, Contamination 2 Measurement category II (expected overvoltage category 2500 V)
Interfaces	: 1. External I/O * Output signals: PASS /UP, FAIL /LOW, FAIL /TEST /READY, open collector, Input signals: START /STOP /External I/O, ENABLE .... 5 - 24 V DC 2. Front EXT connector *, External START/STOP input .... contact signal * When external start/stop connector is used, START key is inactive 3. RS-232C or GP-IB (option; one only), Remote control, measurement data output (When RMT indicator is on, operation keys are locked; only LOCAL, STOP, and external keys work)
Dimensions and Mass	: 320 (12.60") W × 90 (3.54") H × 263 (10.35") D mm, (Without protruding parts), Approx. 7 kg / 246.9 oz (without options)
Standard accessories	: Power cord, spare fuse (integrated in inlet), shorting bar × 2 (current output - voltage sensing terminal)

Model : AC GROUNDING HiTESTER 3157

Model No. (Order Code)	(Note)
3157-01	(100-120 / 200-240 VAC switching)

Note: This instrument is not capable of performing measurement by itself. Please purchase two Current probe 9296 units or one Current probe 9296 and one Current apply probe 9297, depending on your measurement application.:

*When using the Printer 9442, also purchase the RS-232C Interface 9593-02

Printer options


PRINTER 9442
For printing numerical values 112 mm (4.41 in) paper width


AC ADAPTER 9443-02
For the Printer 9442, EU type


CONNECTION CABLE 9446
For the Printer 9442, 25 pin - 9 pin, 1.5 m (4.92 ft) length


RECORDING PAPER 1196
For the Printer 9442, 112 mm (4.41 in) × 25 m (82.03 ft), 10 rolls/set

*The 3157-01's handshake function cannot be used with the RS-232C Cable 9638

Input/Output cords


REMOTE CONTROL BOX (SINGLE) 9613
For Start/Stop control, 1.5m (4.92 ft) cord length


REMOTE CONTROL BOX (DUAL) 9614
For Start/Stop control, 1.5m (4.92 ft) cord length


CURRENT PROBE 9296
Alligator clip, 1.45m (4.76 ft) length


CURRENT APPLY PROBE 9297
With switch, 1.48m (4.86 ft) length


GP-IB CONNECTOR CABLE 9151-02
2 m (6.56 ft) length

GP-IB INTERFACE 9518-02
For the 3157-01, built in type

RS-232C INTERFACE 9593-02
For the 3157-01, built in type, not CE marked

Other

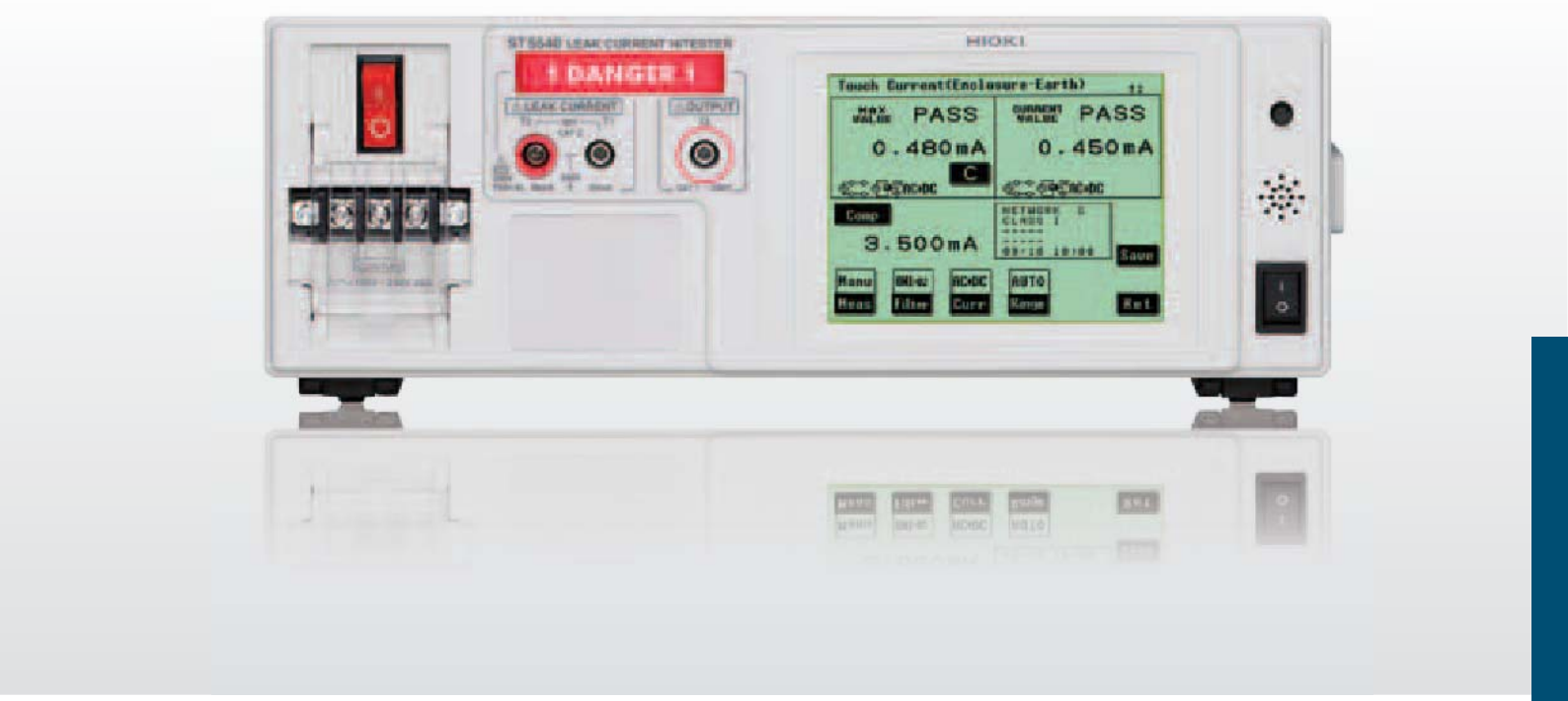
SAFETY TEST DATA MANAGEMENT SOFTWARE 9267
For PC control application software

HIOKI
HIOKI E.E. CORPORATION

HIOKI

LEAK CURRENT HiTESTER ST5540, ST5541

Fully Supporting IEC 60601-1 3rd Edition
and JIS T0601-1:2012 Standards (ST5540 only)



Leak Current Measurement - Essential to Electrical Safety

Compliance with IEC 60601-1:2005 (3rd Edition) is now mandatory.

(*Starting on June 1, 2012, medical electrical equipment sold in the EU must comply with IEC 60601-1:2005 (3rd Edition).)

The ST5540 also complies with JIS T0601-1:2012.

The ST5540 series features an improved measuring method and dramatically faster cycle times thanks to its uninterrupted polarity switching capability. The new devices support rated currents of up to 20A, making it more than ideal for use with products built to new standards.

CE

Medical Electrical Devices

IEC 60601-1:2005 (3rd Edition) and JIS T0601-1:2012-compliant ST5540

Complies with all standards (suitable for use with all networks)

Leak current parameters as defined for medical-use electrical devices include ground leak current, contact current, patient leak current, and patient measurement current. The ST5540 provides a single solution for measuring all of these leak current variants.

Some examples of the standards with which the instrument complies are listed below. The ST5540 can be used with all standards that apply to the networks in which it is used.

In order to prevent the danger of electric shock, electrical devices use power supplies that are isolated from parts of the device that may come into contact with the body. However, it is impossible to achieve infinite insulation resistance. Some leak current always exists, and its magnitude changes as the insulation degrades over time. The LEAK CURRENT HiTESTER ST5540/ST5541 provides an easy-to-operate solution for measuring leak current in electrical devices, making it eminently suitable for use in an extensive array of applications, ranging from production lines to equipment maintenance and inspections.

ST5540 compliance

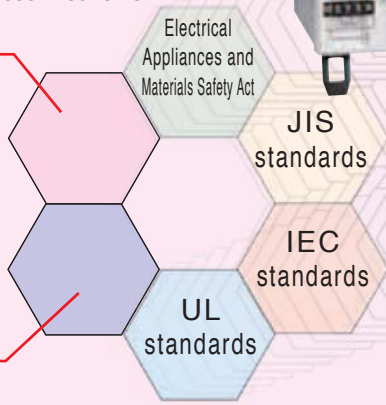
*Compliance with medical IEC standards became mandatory in June 2012.
*Medical JIS standards were revised in June 2012.

(Medical) JIS standards

JIS T0601-1:2012, 1999

(Medical) IEC standards

IEC 60601-1:2005 (3rd Edition)
IEC 60601-1:1988 Amendment A2:1995



■ Comparison of ST5540/ST5541 Functionality

	Measurement mode	Category	Standard compliance
ST5540 Medical-use electrical devices	• Patient leak current (between parts of device that come into contact with patient and ground) • Patient leak current(external SIP/SOP voltage) • Patient leak current(external voltage at specific F-type applied part) • Patient leak current (current resulting from external voltage at parts of device that come into contact with patients) • Patient measurement current • Total patient leak current (between parts of device that come into contact with patient and ground) • Total patient leak current (external SIP/SOP voltage) • Total patient leak current (external voltage at specific F-type applied part) • Total patient leak current (current resulting from external voltage at parts of device that come into contact with patient)	•Medical industry (Japan Association for Clinical Engineering Technologists, etc.) •Medical device manufacturers and dealers •Medical device repair and maintenance businesses •Hospitals	•IEC60601-1 3rd edition •IEC60990
ST5541 General-use electrical devices	• Contact current (between device enclosure and lines) • Contact current (between device enclosure and ground) • Contact current (between device enclosure and device enclosure) • Ground leak current • Free current measurement	•Public agencies •Electric vehicle manufacturers •Manufacturers of general electrical devices •Household appliance industry •Information device industry	•Electrical vehicle standards UL 2231-1 and UL 2231-2 •Electrical Appliances and Materials Safety Act •IEC, JIS, and UL standards

*The ST5540 also complies with old standards.

For Standard- and Regulation-compliance

Measurement of General-use Electrical Devices ST5541

There are various standards in place concerning networks (body simulated resistance), and a standard-compliant network is required in order to make measurements.

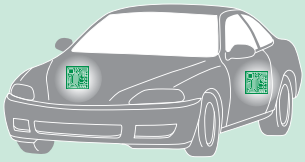
ST5541 provides standard support for standard-compliant networks (excluding medical-use electrical devices).

ST5540 compliance

Electrical Appliances and Materials Safety Act
Ministerial ordinance defining technical standards for electrical devices

JIS standards
JIS B8561: (2007), JIS C9250: (1992), +A1: (2007), etc.

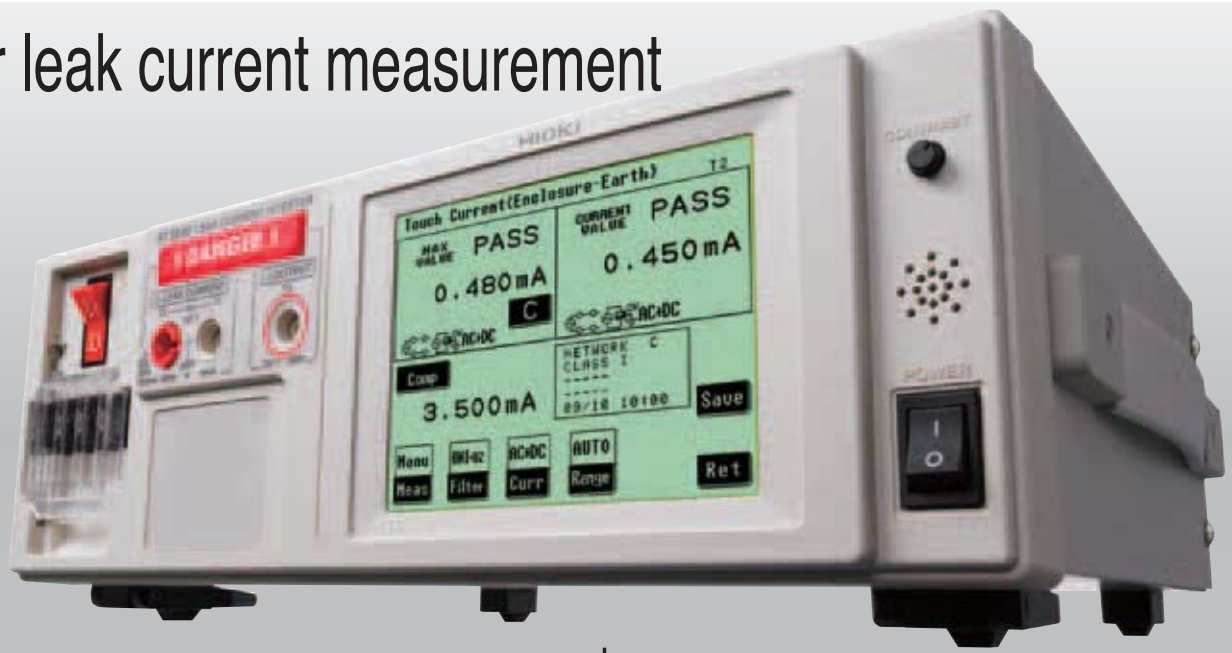
IEC standards
IEC 60065 (2001), +A1: (2005)
IEC 60335-1 (2010)
IEC 60950-1 (2005), IEC 60990 (1999)
IEC 61010-1 (2001), IEC 60601-1 (1988), A2: (1995)



UL standards
UL 2231-1 (2002), UL 2231-2 (2002),
UL 492 (1996), etc.

A single, robust solution

for leak current measurement



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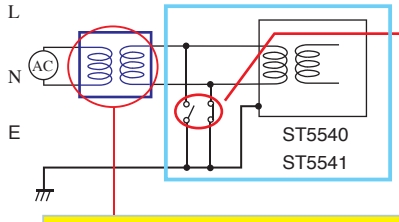
ST5540/ST5541 Features

■Uninterrupted polarity switching function

The ability to conduct tests without turning off the power when switching the power supply polarity dramatically reduces cycle times.

The ST5540/ST5541 can switch polarity without stopping the supply of power to the device under measurement. Old models require that the device under measurement be turned off and then back on again when switching polarity, but the ST5540 and ST5541 let you progress smoothly to the next testing process.



*Only the ground is switched, allowing an uninterrupted supply of power.

*Requires isolation transformer. (not included)

■Improved test reliability

Blown fuse check function

When measurement starts, the instrument checks for unintentional probe misalignment using of a preconfigured lower limit setting.

■Safety conductor current measurement function

The ST5540/ST5541 can perform safety conductor current measurement as defined in standards such as IEC 60990 and IEC 60950-1.

■Automatic measurement functionality

Simple operation allows you to switch power supply polarity and automatically make measurements with the target device in the normal and single-fault states, displaying the peak values. You can also set the measurement time and wait time. These capabilities help reduce operation time.

■110% voltage application jack

The instrument's 110% voltage application jack, which is used during testing of medical devices, outputs the target device line power supply voltage as-is. The polarity can be switched (ST5540 only).

■Circuit breaker for device under measurement

The instrument's workbench-type design features a terminal block and a circuit breaker on the front panel, making it deal for embedding in test lines and simplifying connectivity with the device being measured, even while rack-mounted.

■Save measurement data for 100 devices

Measurement data (peak values) can be stored in the instrument's built-in memory. Saved data can be checked on the stored data reference screen after measurement is complete. Data can be stored for up to 100 test targets, with each target being identified by a registered device name and control number. Additionally, the instrument can store a maximum of 2,000 peak value data points. Together, these capabilities eliminate the need to jot down measured values at the measurement site.

■Simple, interactive operation

The ST5540/ST5541 uses a touch panel that lets you configure settings by touching selections in response to information displayed on the panel, keeping operation simple.

Peak value display

Displays the type of power supply fault and the peak value for the leak current, which varies with target device operation.

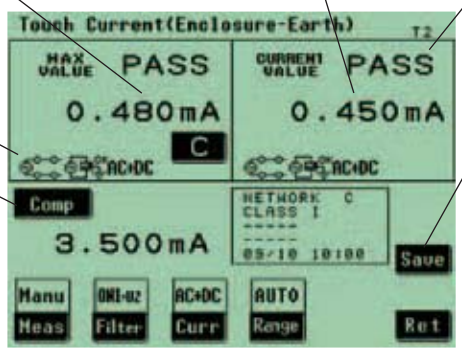
Power supply polarity/device status/measurement current

Allowable value

The maximum allowable value under the standard in question is automatically set. Settings can also be changed as desired by the user.

Current measured value

Judgment result based on set allowable value



[Measurement screen]

Data storage

Measurement data:
For up to 100 target devices
Measurement conditions:
Up to 30 sets

■Ability to store up to 30 sets of measurement conditions

The instrument can save and load up to 30 sets of measurement conditions, allowing you to immediately switch between conditions.

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Le tecnologie di misura Hioki sono ampiamente e globalmente utilizzate per manutenzione, controllo qualità, ricerca e sviluppo, in ambito industriale, aziendale e delle infrastrutture, contribuendo alla sicurezza ed alla protezione del nostro vivere quotidiano.
L'azienda supporta inoltre lo sviluppo delle tecnologie di nuova generazione nei settori automotive ed energie rinnovabili, favorendo la diffusione di prodotti di elevata qualità a prezzi competittivi.
La mission di Hioki è di pordurre e divulgare tecnologie di misura volte a proteggere la sicurezza delle persone e consentire, attraverso il supporto alla ricerca, il progresso della scienza e della tecnica.

I numeri:

10% del fatturato investito in R&S
250 ingegneri impiegati nella ricerca
30 nuovi prodotti all'anno
100 brevetti depositati all'anno
1200 prodotti a catalogo
800.000 pezzi venduti all'anno
50 ppm (pezzi per milione) indice di difettosità
10.000 prove di apertura e chiusura per testare la durata dei toroidi
1 metro di caduta per testare la resistenza degli strumenti

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