HIOKI

AC GROUNDING HiTESTER 3157-01

Safety Standards Measuring Instruments



CE

CE certified low-resistance measurement compliant with major safety standards

Protective ground tester indispensable for standard certification

The **AC GROUNDING HiTESTER 3157-01** 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.

JMI-0216 JQA-E-90091

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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)]

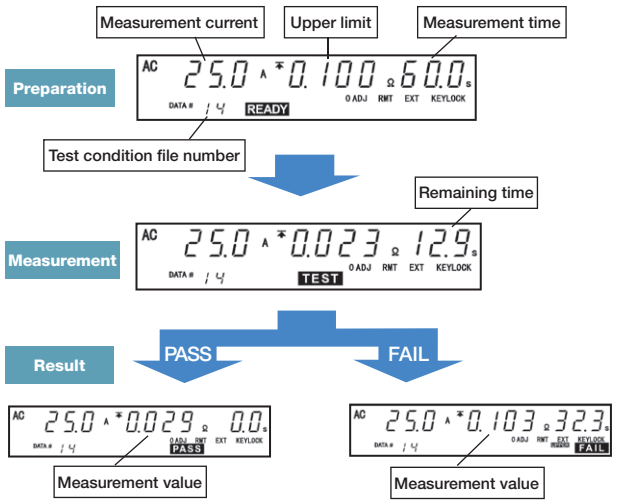
Standards supported by the 3157-01

- **IEC60065** ('01)
  Safety requirements for mains operated electronic and related apparatus for household and similar general use
- **IEC60204-1** ('97) + am1 ('99)
  Electrical equipment of industrial machines -Part1,General requirements
- **IEC60335-1** ('01) + am1 ('04)
  Safety of household and similar electrical appliances - Part 1, General requirements
- **IEC60601-1** ('88) + am1 ('91) + am2 ('95)
  Medical electrical equipment -Part 1, General requirements for safety
- **IEC60950** ('91) + am1 ('92) + am2 ('93) + am3 ('95) + am4 ('96)
  Safety of data processing equipment, including office equipment
- **IEC61010-1** ('01)
  Safety requirements for measurement, control, and laboratory electrical equipment
- **UL standard**

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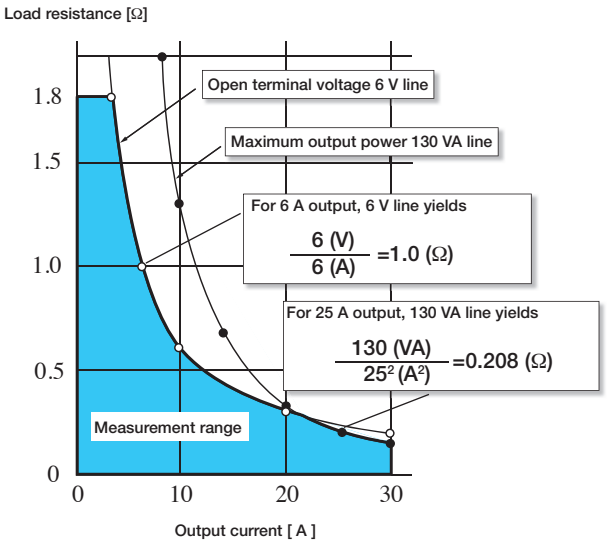
A multitude of functions in a compact body

■ Easy standard testing

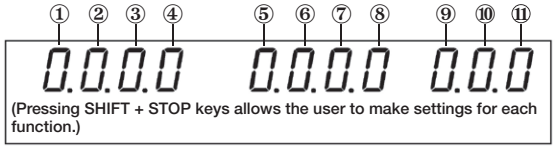


* If hold is not enabled, unit reverts to READY condition after 1 second.

■ 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 GP-IB interface 9518-02 or RS-232C interface 9593-02 can be installed in the unit. This allows remote control from a computer as well as export of measurement data. The RS-232C interface 9593-02 also allows connection of the printer 9442 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 : AC adapter 9443, or supplied nickel-hydride battery (Charged through 9443; printing capability approx. 3000 lines with full charge)

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■ 3157-01 Specifications

● Basic specifications

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 0.1Ω 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] *1

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] *2

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)

*1 Averaging processing may result in a delay in response of approximately 0.5 sec.
*2 Operates when the current monitor (internal) falls within ±1 A of the set current.

● General Specifications

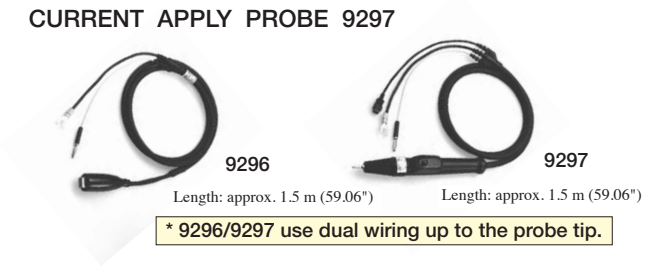
Display	: Fluorescent tube (digital display)
Ambient conditions for use	: 0 to +40°C (32 to 104°F), 90% rh or less (no condensation)
Ambient conditions for storage	: -10 to +50°C (14 to 122°F), 95% rh or less (no condensation)
Ambient conditions for assured accuracy	: 23°C ± 5°C (73°F ± 9°F) 90% rh or less (no condensation) After 30-minute warmup period
Suitable environments	: Indoors, altitude up to 2000 m
Power supply voltage range	: 100 - 120 V/200 - 240 V AC (switching)
Power line frequency	: 50 - 60 Hz
Withstand voltage	: 1.39 kV AC, 20 mA, 15 second., between power supply and chassis
Maximum rated power	: 350 VA (with optional equipment)
Fuse	
Compatible standards	: 250VT3. 15AL : 1. EMC : EN61326 EN61000-3-2 EN61000-3-3 2. Safety : EN61010
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	: Approx. 320 (W) × 90 (H) × 263 (D)mm Approx. 12.60" (W) × 3.54" (H) × 10.35" (D) (Without protruding parts)
Mass	: 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)

AC GROUNDING HiTESTER 3157-01

* For measurement, two 9296 or one each of 9296 and 9297 are required.

■ Options

CURRENT PROBE 9296
CURRENT APPLY PROBE 9297



9296 Length: approx. 1.5 m (59.06")
9297 Length: approx. 1.5 m (59.06")

* 9296/9297 use dual wiring up to the probe tip.

GP-IB INTERFACE 9518-02
GP-IB CABLE (2m) 9151-02
RS-232C INTERFACE 9593-02
PRINTER 9442
RECORDING PAPER (25m, 10 rolls) 1196
AC ADAPTER (for printer, EU) 9443-02
AC ADAPTER (for printer, America) 9443-03
CONNECTION CABLE (for printer) 9446
REMOTE CONTROL BOX (SINGLE) 9613
REMOTE CONTROL BOX (DUAL) 9614

HIOKI
HIOKI E. E. CORPORATION

HEAD OFFICE :
81 Koizumi, Ueda, Nagano, 386-1192, Japan
TEL +81-268-28-0562 / FAX +81-268-28-0568
E-mail: os-com@hioki.co.jp

Shanghai Representative Office :
1704 Shanghai Times Square Office
93 Huaihai Zhong Road
Shanghai, 200021, P.R.China
TEL +86-21-6391-0090, 0092

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