



Featuring contact check functionality

The effects of test lead wire breaks, erroneous test results caused by faulty contact, and fluctuations in test voltage caused by variations in the instrument's supply voltage on withstanding voltage and insulation resistance testing are well known.

The AC Automatic Insulation/Withstanding HiTester 3174 is a [low-cost solution featuring contact check functionality as well as a stabilized power supply](#) to prevent the reduced test reliability that can result from these issues.

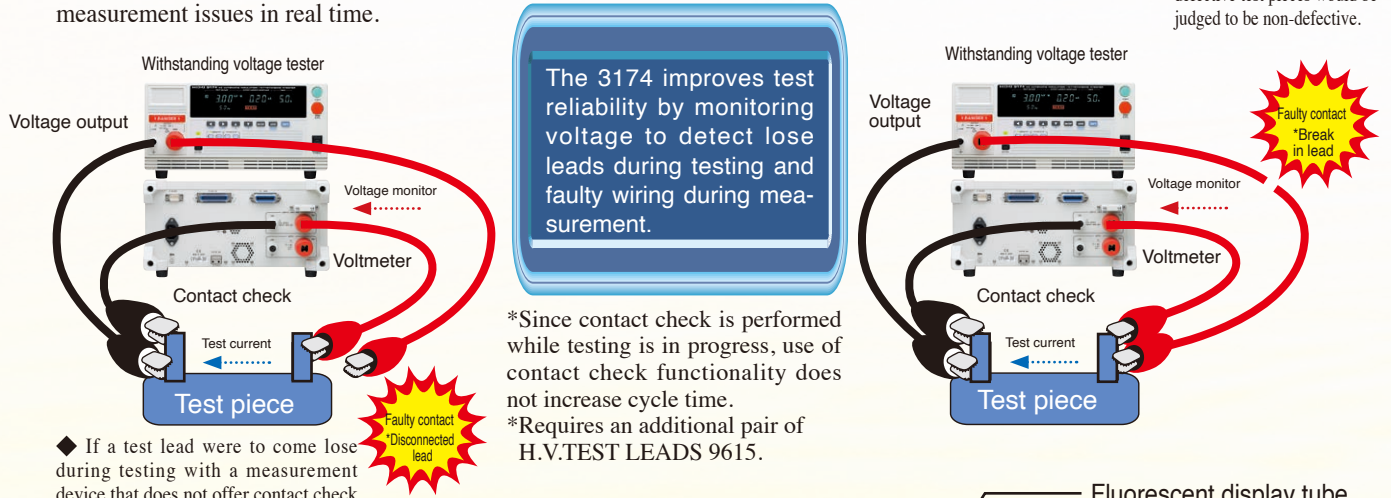
To streamline production line test processes, the HiTester also features configuration of test parameters via RS-232C and reading of parameters from the EXT I/O interface.

Improved Test Reliability

Contact check function improves test reliability

The 3174's contact check function lets you **detect test lead wire breaks and faulty contact** during testing by sensing measurement issues in real time.

◆ If a test lead wire were to break during testing with a tester that does not offer contact check functionality, defective test pieces would be judged to be non-defective.



◆ If a test lead were to come lose during testing with a measurement device that does not offer contact check functionality, defective test pieces would be judged to be non-defective.

Fluorescent display tube
The display uses a bright, easy-to-read fluorescent tube.

DANGER lamp

Flashes a warning during testing and whenever high voltage is present at the terminals.
The DANGER lamp turns off when the voltage at the output terminals is no greater than AC 30 V or DC 60 V.



9613
REMOTE CONTROL BOX (SINGLE) (option)

9614
REMOTE CONTROL BOX (DUAL) (option)

External switch
Enables start/stop control by means of the REMOTE CONTROL BOX (SINGLE) 9613 or REMOTE CONTROL BOX (DUAL) 9614. (The 9613 and 9614 are optional.)

Test mode selection
Select from three test modes:
1. Manual test mode: W (withstand voltage testing) / I (insulation resistance testing)
2. Automatic test mode: W→I / I→W

Judgment output at forced stop

The ability to obtain a judgment even after a forced stop increases testing freedom.

Continued analytical testing after FAIL judgments

Test pieces can now be analyzed by means of detailed monitoring of the test current accompanying FAIL judgments.

Ramp timer function

The ramp-up initial value, ramp-up and ramp-down time parameters can be set independently.

True effective value display

Eliminate the effects of supply voltage fluctuations

Delay timer function

Safe, Automated Operation

Convenient

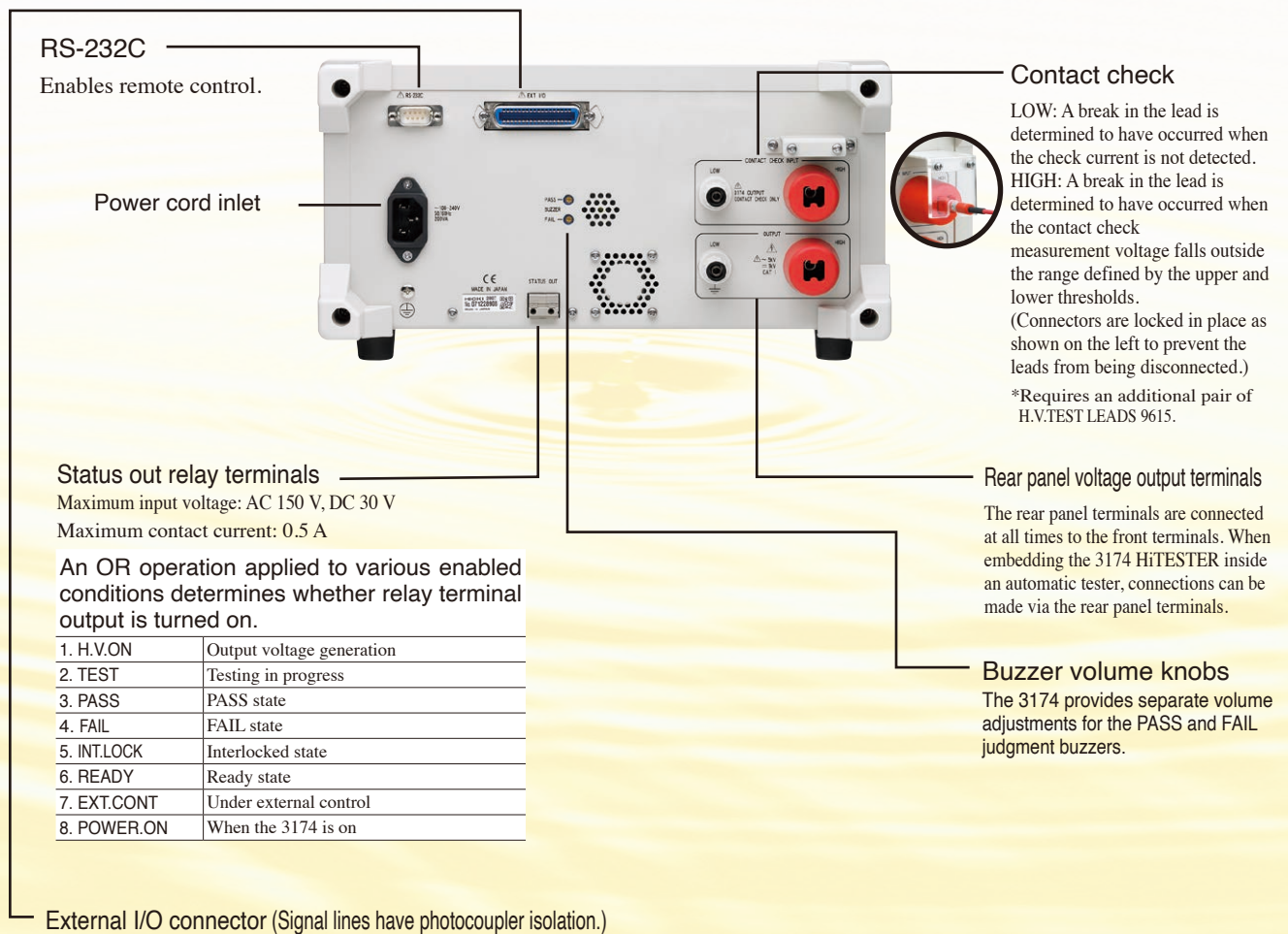
- Continuous full-auto withstanding voltage and insulation resistance testing

The 3174 lets you **set independent test conditions including test voltage for withstanding voltage and insulation resistance testing**, and you can perform these tests continuously. Press the W→I key to automatically perform withstanding voltage followed by insulation resistance tests, or press the I→W key to automatically perform insulation resistance followed by withstanding voltage tests.

Safe

- Interlock function

Signal input from an external device such as an automatic tester can be used to disable output and prevent testing, **ensuring safety during automatic testing and other uses.**



| Pin | I/O | Signa | Function |
|-------|-----|------------|--|
| 1 | OUT | READY | Low in ready state |
| 2 | OUT | L-FAIL | Low in FAIL state (lower bound) |
| 3 | OUT | U-FAIL | Low in FAIL state (upper bound) |
| 4 | OUT | PASS | Low in PASS state |
| 5 | OUT | TEST | Low in test state |
| 6 | OUT | H.V.ON | Low when voltage is present at output terminals |
| 7 | IN | EXT-E | When low, external I/O input signals are enabled |
| 8 | IN | START | When low, same function as START key |
| 9 | IN | STOP | When low, same function as STOP key |
| 10 | IN | INT.LOCK | Interlock on open |
| 11 | OUT | W-MODE | Low during withstanding voltage testing |
| 12 | OUT | I-MODE | Low during insulation resistance testing |
| 13 | OUT | W-FAIL | Low in FAIL state during withstand voltage testing |
| 14 | OUT | I-FAIL | Low in FAIL state during insulation resistance testing |
| 15-18 | IN | ISO.COM | Ground inputs for external devices |
| 22-25 | IN | MEM-0 to 3 | Saved test selected pins |
| 27 | IN | MEM-E | When low, enables memory selected pins |
| 28-29 | OUT | MODE-0,1 | Current test mode |
| 33-36 | OUT | ISO.DCV | Internal DC 15 V power supply (100 mA) |

Interface specifications

EXT I/O : Output signals

Open collector output (with photocoupler isolation)
All active low with a maximum load voltage of DC 30 V
Maximum output current: DC 100 mA per signal
Output saturation voltage: DC 1.5 V or less

Input signals

All active low input (with photocoupler isolation)
Maximum applied voltage: 30 V
High level voltage: from DC 15 V to 30 V, or open
Low level voltage: DC 5 V or less (-6 mA typ.)

EXT SW : Input signals (contact input)

START, STOP, SW.EN (external switch terminal enable)

Output signals

LED activation signal (maximum load current: 40 mA)

Model 3174 Specifications

Withstanding Voltage Testing

Test Voltage

| | |
|------------------------------|---|
| Output voltage | : AC 0.2 to 5 kV (50/60 Hz), single-range output |
| Voltage output method | : PWM switching method (0 V start; voltage can be changed while generating output) |
| Voltage specification method | : Digital (setting resolution: 0.01 kV) |
| Output voltage accuracy | : $\pm 1.5\%$ of setting ± 20 V |
| Maximum rated output | : AC 100 VA (5 kV/20 mA) continuous rating |
| Transformer capacity | : 100VA |
| Voltmeter | : True effective value display Digital meter: AC 0 kV to 5.00 kV Accuracy: $\pm 1.5\%$ rdg. (1,000 V or less, ± 15 V) |
| Output waveform | : Sine wave |
| Voltage change rate | : 15% or less (converges to setting within 1 s during change from maximum rated load to no load) |
| Distortion factor | : 5% or less (tester impedance during measurement with 5 kV output under 40 M Ω load) |
| Frequency | : 50/60Hz ($\pm 0.2\%$) |

Current Detection

| | |
|------------------------------------|---|
| Current measurement range | : 0.01 mA to 20 mA (2 ranges) |
| Measurement range | : 10mA/ 20mA |
| Indicated value | : True effective value display |
| Measurement ranges and resolutions | : 0.00 mA to 10.00 mA, 0.01 mA (10 mA range) 0.0 mA to 20.0 mA, 0.1 mA (20 mA range) |
| Measurement accuracy | : $\pm 2\%$ rdg. ± 0.05 mA (10 mA range) $\pm 2\%$ rdg. ± 0.5 mA (20 mA range) |

Insulation Resistance Measurement

Test Voltage

| | |
|---------------------------------------|---|
| Rated voltage | : DC 500 V/1,000 V (positive polarity) |
| Unloaded voltage | : 1 to 1.2 times rated voltage |
| Rated measurement current | : 1 to 1.2 mA |
| Short-circuit current | : 4 to 5 mA (500 V), 2 to 3 mA (1,000 V) |
| Measurement range | : 0.5 M Ω to 2,000 M Ω (500 V), 1 M Ω to 2,000 M Ω (1,000 V) |
| Guaranteed accuracy ranges/accuracies | : 0.5 M Ω to 999 M Ω (500 V), 1 M Ω to 999 M Ω (1,000 V): $\pm 4\%$ rdg. 1,000 M Ω to 2,000 M Ω : $\pm 8\%$ rdg. |
| Measurement resolution | : 0.01 M Ω (0.20 M Ω to 19.9 M Ω), 1 M Ω (200 M Ω to 2,000 M Ω) |
| Measured resistance ranges | : 2 M Ω , 20 M Ω , 200 M Ω , 2,000 M Ω (500 V) 4 M Ω , 40 M Ω , 400 M Ω , 2,000 M Ω (1,000 V) |

General Specifications

(Accuracy guaranteed for 1 year)

| | |
|--|---|
| Display | : Fluorescent display tube (digital display) |
| Monitor functions | : Output voltage, detected current, insulation resistance |
| Monitor period | : 2 times per second, minimum |
| Operating temperature range | : 0°C to 40°C, 80% RH or less (non-condensing) |
| Storage temperature range | : -10°C to 50°C, 90% RH or less (non-condensing) |
| Temperature and humidity range for guaranteed accuracy | : 23 \pm 5°C, 80% RH or less (non-condensing) (With warm-up period of at least 10 min) |
| Supply voltage | : AC 100 to 240 V Designed to tolerate voltage fluctuations of $\pm 10\%$ of the rated supply voltage |
| Power supply frequency | : 50Hz/ 60Hz |
| Withstanding voltage | : Power supply to chassis: 1.39 kV at 10 mA for 15 s |
| Maximum rated power | : 200VA |
| Dimensions | : Approx. 320 (W) \times 155 (H) \times 395 (D) mm (excluding protruding parts) |
| Mass | : Approx. 15 kg |
| Applicable standards | : EMC: EN61326 Class A, EN61000-3-2, EN61000-3-3, Safety: EN61010 |
| Included accessories | : H.V.TEST LEAD 9615 (high voltage side and return, 1 each), Power cord, Instruction manual, Disconnection prevention plate |

Timers

| | |
|-----------------------------|--|
| Setting range | : 0.3 to 999 s |
| Operation | : When set to on: Display counts down from the set time after start. When set to off: Display indicates time elapsed since start. |
| Setting resolution/accuracy | : 0.1 s (0.3 to 99.9 s) ± 50 ms 1 s (100 to 999 s) ± 0.5 s |

Ramp Timers (Withstand voltage testing)

| | |
|--------------------|--|
| Setting range | : 0.1 to 99.9 s: Ramp-up and ramp-down can be set independently. |
| Operation | : Ramp-up: The output voltage increases linearly from the initial voltage to the test voltage over the ramp-up time. Ramp-down: The output voltage decreases from the set voltage to 0 V over the ramp-down time after the test time elapses, and the display counts down from the set time. *The actual ramp-up waveform varies with the load due to the analog response delay. |
| Setting resolution | : 0.1s |

Delay Timers (Insulation resistance testing)

| | |
|--------------------|-----------------|
| Setting range | : 0.1 to 99.9 s |
| Setting resolution | : 0.1 s |

Decision Function

| | |
|---------------------|---|
| Decision method | : Window comparison method with upper and lower bound settings (digital specification) |
| Decision results | : UPPER-FAIL: The measured current (measured insulation value) exceeded the specified upper threshold. PASS: The measured current (measured insulation value) fell within the range defined by the specified upper and lower thresholds. LOWER-FAIL: The measured current (measured insulation value) was less than the specified lower bound. UPPER LOWER-FAIL: A testing error occurred, for example due to a failure to generate the set voltage. |
| Decision processing | : Display, buzzer, and EXT I/O signal output is generated according to each decision result. |
| Setting range | : AC withstanding voltage: 0.1 to 20.0 mA (upper threshold), 0.1 to 19.9 mA (lower threshold) DC insulation: 0.2 to 2,000 M Ω (500 V) or 1.0 to 2,000 M Ω (1,000 V) for both upper and lower thresholds |
| Setting resolution | : AC withstanding voltage: 0.1 mA DC insulation: 0.01 M Ω (0.2 to 2.00 M Ω), 0.1 M Ω (2.10 to 20.0 M Ω), 1 M Ω (21.0 to 200 M Ω), 10 M Ω (210 to 2,000 M Ω) |

Contact Check

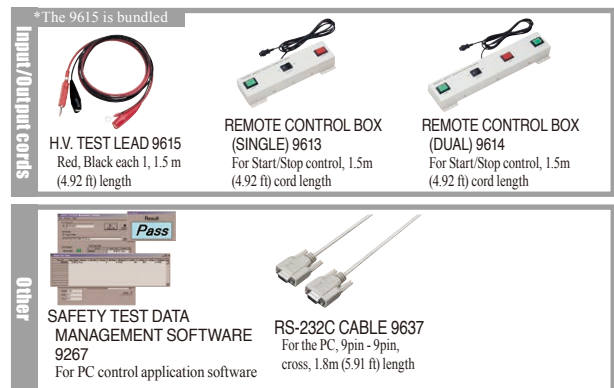
| | |
|-----------------------|--|
| Voltmeter accuracy | : Detection method: Average value detection/effective value conversion Accuracy: Setting ± 50 V *Inaccuracy may increase when the waveform is distorted. |
| Decision results | : Enables the contact check function (does not increase cycle time). LOW: A break in the lead is determined to have occurred when the check current is not detected. HIGH: Upper and lower thresholds for the check detection voltage can be set. A break in the lead is determined to have occurred when the contact check measurement voltage falls outside the range defined by the upper and lower thresholds. |
| Voltage setting range | : Withstanding voltage testing: 0.20 kV to 5.0 kV (0.01 kV resolution; applies to both upper and lower thresholds) Insulation resistance measurement: Upper threshold of 600 V and lower threshold of 500 V (during 500 V measurement); upper threshold of 1,200 V and lower threshold of 1,000 V (during 1,000 V measurement) (both fixed) |

Model : AC AUTOMATIC INSULATION/WITHSTANDING HITESTER 3174

Model No. (Order Code)

3174

Note: To perform contact checks, please purchase another High Voltage Test Lead 9615 set separately.



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