



# 3154 DIGITAL MΩ HiTESTER

Safety Standards Measuring Instruments



For the Laboratory to the Production Line

## Six Test Voltages from 25 to 1000 V

The Model 3154 DIGITAL MΩ HiTESTER provides six selectable test voltages: 25, 50, 100, 250, 500 and 1000 V, in order to support a wide variety of tests to evaluate electrical and electronic components and equipment. Comparator and timer functions facilitate easy insulation resistance testing in accordance with various safety standards, and a complete external I/O interface is provided for efficient automated line testing.



**ISO14001**  
JQA-E-90091

# Efficient Insulation Resistance Testing

## ★ Insulation testing of electrical and electronic equipment

Motors, printers, magnetic heads, etc.

## ★ Insulation testing of electrical and electronic components

Transformers, coils, switches, relays, etc.

## ★ Insulation resistance testing according to various standards

Machinery, medical equipment, home appliances, office equipment, etc.

## ★ High voltage resistance testing

Resistance measurements of components in actual operating circuits.

### ● Six Measurement Voltages Provided in a Single Unit

Any of six measurement voltages can be selected for use in a wide range of applications, from electrical and electronic component testing to electrical and electronic equipment. The comparator can be set up for use with each measurement voltage.

### ● Storage for Ten Setting States

Up to ten setting states can be stored for quick selection when testing for compliance with various standards.

### ● Easy Standards Testing

Testing for compliance with various safety standards is simplified by using the comparator and timer functions for quick pass-fail judgment of minimum acceptable limits.

### ● Remote Control

Operations such as test start/stop and voltage selection can be controlled remotely, such as for start/stop control from a switching probe.



### ● Automatic Electrical Discharge Function

The unit discharges any charge buildup on the measured object as a result of electrical loading. This electrical discharge function prevents the effects of one test from being carried over to a subsequent procedure.

### ● Slow Sampling Selection to Minimize Instability

Selectable fast (10 sample/s) and slow (1 sample/s) sampling rates are provided. Slow sampling minimizes instability when measuring at highly reactive test points.

## Measurement Voltages and Ranges (Auto and Manual Range Switching)

Rated Measurement Voltage	25V	50V	100V	250V	500V	1000V
Measurement Range	2.000, 20.00 or 200.0 MΩ		2.000, 20.00, 200.0 or 2000 MΩ (4000 MΩ 1000V)			
Accuracy	±2% rdg. ±5 dgt.		0 to 20.00 MΩ		0 to 999 MΩ	
	±5% rdg.		19.0 to 200.0 MΩ	19.0 to 2000 MΩ	100.1 to 2000 MΩ	1000 to 4000 MΩ
No-Load Voltage	1 to 1.2 times Rated Measurement Voltage					
Min. Measurable Resistance (*1)	0.025 MΩ	0.05MΩ	0.1MΩ	0.25MΩ	0.5MΩ	2MΩ
Rated Measurement Current (*2)	1 to 1.2 mA					0.5 to 0.6 mA
Short-Circuit Current	1.2 mA max.					0.6 mA max.

\*1. Minimum resistance required to maintain rated measurement voltage.

\*2. Maximum current flow through the minimum measurable resistance.

### Auto Range

The range increments when the current range is exceeded by 2000 counts (except the top range).

The range decrements when the current range does not reach 190 counts (except from the 2 MΩ range).

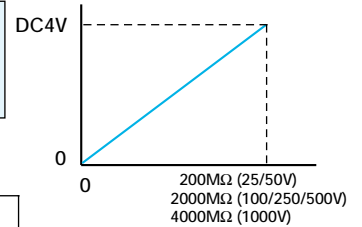
# Full Support for Automatic Operation

Both external I/O and RS-232C interfaces are provided to support fully automated operation. Measurement values can be tracked and recorded from the analog output, and printing is supported on an external printer using RS-232C.

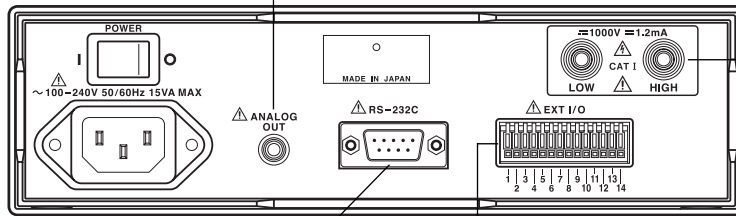
## ●Record Variations using Analog Output

For the maximum measurement range at 0 to each measurement voltage, insulation resistance is output linearly as 0 to +4 V DC and the variations can be recorded

This is not affected by the measurement range. For a measured voltage of 100V with a displayed resistance of 100.0 MΩ:  
 $4 [V] \times 100.0 / 2000 [M\Omega] = 0.2V$  is output at the Analog Output terminal



## ●Analog Output Terminal



## ●Rear Panel Measurement Terminal (always connected to front panel terminal)

## ●RS-232C Connector

Automatic calculation can be performed on a PC, and printing can be performed using the 9442 printer.



9442 Printer

1	3820 Mohm	
2	15.00 Mohm	
3	0.F. Mohm	
1	3800 Mohm	PASS
2	15.00 Mohm	FAIL
3	15.00 Mohm	DELAY

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 the 9443; printing capability approx. 3000 lines with full charge)

Note: the 9444 Cable and AC Adapter are required to connect the 9442 Printer.

## ●External I/O Connector

Pin	I/O	Signal	Description
1•2	O	INT.GND	Connects to internal ground and power line ground lead
3	I	EXT.COM	Connect to ground of external device
4	O	FAIL	LOW indicates Fail judgment
5	O	PASS	LOW indicates Pass judgment
6	O	TEST	LOW indicates Testing state
7	I	VOLT2	Sets the test voltage by appropriate combination (comparators that store each voltage are set simultaneously)
8	I	VOLT1	
9	I	VOLT0	
10	I	STOP	LOW = STOP key
11	I	START	LOW = START key
12	I	EXT.DCV	Power supplied from an external device
13•14	O	INT.DCV	+5V DC internal power (100 mA max.)

## Enhanced Efficiency in System Measurements

Efficient testing can be consistently performed using a controller to conduct protective grounding, insulation resistance and voltage withstand testing all at once. Contact us for system upgrades.



3154 DIGITAL MΩ HiTESTER

3157-01 AC GROUNDING HiTESTER

- Measurement current: Max. 31 A
- Resistance measurement range: 0 to 1.800 Ω

3158 AC WITHSTANDING VOLTAGE HiTESTER

- Voltage: Dual range: 0 to 2.5 or 5 kV
- Transformer power handling: 500 VA

Outlet Box

Operation Display Box

## ■ 3154 Specifications

### ● Basic Specifications

Measurement function : Insulation resistance (Applied DC voltage method)  
 Sampling rates : 10 samples/s (Fast), 1 sample/s (Slow)  
 Memory : Storage contents: rated measurement voltage, comparator minimum limit, test mode, beep upon judgment, test time, delay time, resistance range, sampling rate  
 Memory capacity: ten sets of settings (supports saving and loading)  
 Test modes : Selectable between continuous and fail-stop

### [ Comparator Functions ]

Minimum Limit : Set by key entry; select from following table; set by Setting  
 Setting RS-232C; can be set to desired resistance

Rated measurement voltage	Minimum settable limit (MΩ)
25V/50V	0.1/0.2/0.5/1/2/3/4/5/10/20/30/50/100/200
100V/250V/500V	0.1/0.2/0.5/1/2/3/4/5/10/20/30/50/100/200/300/500/1000/2000
1000V	1/2/3/4/5/10/20/30/50/100/200/300/500/1000/2000

Judgments : Pass = measured value  $\geq$  minimum limit, Fail = measured value  $<$  minimum limit

Judgment processing : Beep sound, PASS/FAIL indicator, output to external I/O  
 Beep sound selection : "Ring on Pass", "Ring on Fail", or disable beeper  
 OFF setting time : "- - -" indication

### [ Test Time Timer Function ] (ON/OFF selectable)

Function : After starting measurement, measurement is completed after 0.35s max. wait time + set time (when Delay time is OFF)  
 Setting range : 0.5 to 99s

### [ Delay Time Timer Function ] (ON/OFF selectable)

Function : After measurement starts, the test time timer and comparator functions do not start operating until a wait time of max. 0.35 s plus the set delay time has elapsed.  
 Setting range : 0.1 to 99s

### [ Response Times ]

Resistance range, test voltage		Measurement speed	
		FAST	SLOW
2 or 20 MΩ Manual ranging	All Voltages	less than 0.5 s	less than 1.5 s
	200 MΩ Manual ranging	25, 50 V	
100 to 1000 V		less than 0.5 s	
2000 or 4000 MΩ Manual ranging	100 to 1000 V	less than 0.7 s	
Auto ranging (including range selection)	25, 50 V	less than 2 s	less than 5 s
	100 to 1000 V	less than 2.5 s	less than 6 s

## General Specifications

Display type : LED  
 Operating temperature and humidity ranges : 0 to 40°C, max. 80% rh (no condensation)  
 Storage temperature and humidity ranges : -10 to 50°C, max. 90% rh (no condensation)  
 Guaranteed accuracy : 23  $\pm$  5°C, max. 80% rh (no condensation) temp. & humidity  
 Suitable environment : Indoors, max. 2000 m altitude  
 Power supply : 100 to 240 VAC  
 Power line frequency : 50 or 60 Hz  
 Maximum rated power : 15 VA  
 Withstand voltage : 1.35 kV AC for one minute between power lines and outer case, external connectors, grounding and measurement terminals (collectively);  
 1.1 kV DC for one minute between measurement terminal and ground terminals;  
 500 V AC for one minute between EXT I/O terminals and power line, ground and measurement terminals (collectively);  
 [Not including INT DCV and INT GND terminals in the EXT I/O terminals.]

Input overload protection : 1100 V DC between HIGH and LOW on measurement terminal (positive only).  
 Dimensions : Approx. 215W  $\times$  61H  $\times$  213D mm (not including projections)  
 Mass : Approx. 1.1 kg.  
 Conforming standards : EMC : EN61326-1:1997+A1:1998  
 Safety : EN61010-1:1993+A1:1995  
 Power : Contamination 2  
 Overvoltage category II  
 (expected transient overvoltage 2500 V)  
 Measurement : Contamination 2  
 Overvoltage category I  
 (expected transient overvoltage 330 V)  
 Accessories : Power Cord (1)

## 3154 DIGITAL MΩ HiTESTER

Note: Test leads are not included: optional leads are required for use.

### ■ Options

9185 TEST LEADS  
 9294 TEST PROBE  
 9299 SWITCHED PROBE  
 9094 OUTPUT CORD (Jack to banana plug)  
 9637 RS-232C CABLE (9pin-9pin/Cross/1.8 m)  
 9638 RS-232C CABLE (9pin-25pin/Cross/1.8 m)  
 9442 PRINTER  
 1196 RECORDING PAPER (25m, 10 rolls)



9443-02 AC ADAPTER (for printer, EU)  
 9443-03 AC ADAPTER (for printer, America)  
 9444 CONNECTION CABLE (for printer)