

Get a Complete Diagnosis of UPS Batteries with a Single Device



- Auto-hold and Auto-data storage
- Enhanced resistance against noise
- Store up to 4800 sets of data
- PC Interface
- User-exchangeable probe tip

**WIDE
60V RANGE**
Ideal for UPS
Backup Batteries

سازه گستر پایتخت

تامین کننده ملزومات برق



The New Standard for Assessing Deterioration of Lead-acid Batteries

Repeated recharging of a secondary battery can lead to battery deterioration and increase its internal resistance. Problems can intensify when there is a short-circuit in the internal cell leading to voltage drop, overheating and complete battery malfunction. Worst of all, these problems can cause life-threatening fires and other accidents.

HANDS FREE Data Capture Allows You to Focus on the Testing

Fully Automatic Data Capture

Toggle between 4 different ways to save data

AUTO HOLD & AUTO MEMO Automatically save data as soon as reading is stabilized

TEST & SAVE
Press the **HOLD** then **MEMO** keys whenever you need to save data

AUTO MEMO
Instantaneously save measurement data with one touch using the **Remote Control Switch 9466** saddled to the test lead

AUTO HOLD Check stabilized measurement value before saving with the **Remote Control Switch 9466**

Save up to **4800** Sets of Battery Data

Quickly Download Data to a PC via USB Interface - Effortlessly Manage Using Bundled Software

The hassle-free measurement process is extended to data management and processing using the bundled data management software. All 4800 sets of data can be uploaded to the PC quickly and effortlessly via a USB cable, and displayed neatly in table format. Edit comparator tables and send them back to the 3554.

Store and edit up to **250** sets of comparator settings

Pencil and Paper
Not Required



Table - [sample.csv]

Enter table: Table No: 1

Main Station 1

R-Range: 30mohm R-Lim1: 15.00 R-Lim2: 20.00

V-Range: 60V V-Lim: 20.00

No	Name	R-Range	R-Lim1[mohm]	R-Lim2[mohm]	V-Range	V-Lim[volt]
1	Main Station 1	30m	15.00	20.00	60V	20.00
2	Main Station 2	30m	10.00	12.00	60V	20.00
3	Main Station 3	30m	15.00	20.00	60V	24.00
4	Main Station 4	30m	5.00	24.00	60V	10.00
5	Main Station 5	3m	2.00			
6	Main Station 6	3m		18.00	bv	
12	Sub Station C-1	3m	2.00	3.00	6V	2.00
13	Sub Station C-2	3m	1.00	2.00	6V	2.00
14	Sub Station D-1	30m	15.00	20.00	60V	12.00
15	Sub Station D-2	30m	11.00	15.00	60V	12.00
16	Sub Station D-3	30m	22.00	27.00	60V	15.00
17	Backup A	3m	1.50			
18	Backup B	3m	1.30			
19	PS-1	1				
20	PS-2	300m				

Buttons: Save, Transfer

Edit and Send Comparator Settings

Automatically clear data from the 3554

Download Data to a Spreadsheet

- Download:**
- ✓ Data Memory Number
 - ✓ Range
 - ✓ Resistance value
 - ✓ Resistance limits
 - ✓ Voltage value
 - ✓ Voltage limit
 - ✓ Temperature
 - ✓ Judgement
 - ✓ Date & time



Microsoft Excel - Data3554

#	No	R-Range	Resistance	R-Lim1	R-Lim2	V-Range	Voltage	V-Lim	Judgement	Date	Time
9	1	30m	12.02	15	20	60V	12.06	20	PASS		
10	2	30m	12.01	15	20	60V	12.06	20	PASS		
11	3	30m	12.05	15	20	60V	12.09	20	PASS		
12	4	30m	20.27	15	20	60V	11.84	20	PASS		
13	5	30m	11.98	15	20	60V	12.98	20	PASS		
14	6	30m	12.46	15	20	60V	12.58	20	PASS		
15	7	30m	15.92	15	20	60V	12.31	20	WARN		
16	8	30m	11.98	15	20	60V	12.50	20	PASS		

Tough Against Noise Plus Wide 60V Range

Trying to measure UPS backup batteries while they are still being used naturally brings about noise coming from the battery's inverter or rectifying circuit. The enhanced measurement current in the 3554 plus fortified circuit design, added with the Averaging Function to handle batteries that have fluctuating measurement values no matter how steady you hold the probe makes the battery tester extra resistant against the adverse effects of noise.



Three-rank rating of battery state: Pass, Warning or Fail

Assessment is based on a 6-way combination of comparisons against upper and lower resistance limits and a voltage threshold. Immediately see the judgement result on the bright LCD and keep on your choice of PASS or WARNING/FAIL.

Resistance	Low	In Range	High
VOLTAGE			
High	Pass	Warning	Fail
Low	Warning	Warning	Fail

First resistance limit Δ Second resistance limit Δ

- ✓ Common battery cells: 0 to 12V DC
- ✓ Fork lifts and electric vehicles: 48V DC

10 Hours of Continuous Operation

Save time and money with an uninterrupted workflow

Wide Selection of Tough and Versatile Test Probes

The standard Pin Type Leads 9465-10 with the single test pin on each lead has been fortified to withstand even the toughest use, while a new dual-axis mechanism incorporated in the new Pin Type Lead 9772 allows the TWO pins in each test lead to move independently. Just in case of breakage, the pins on both the 9465-10 and the 9772 can be replaced easily on site.



Pin Type Lead 9465-10
(standard accessory)
• 1.6 m (5.25 ft) between connector and junction
• 25 cm (0.82 ft) between junction and probe tip



Pin Type Lead 9772
• 1.6 m (5.25 ft) between connector and junction
• 25 cm (0.82 ft) between junction and probe tip



Clip Type Lead with Temperature Sensor 9460



• 1.7 m (5.58 ft) between connector and junction
• 25 cm (0.82 ft) between junction and probe tip



Large Clip Type Leads 9467

• 85 cm (2.79 ft) between connector and junction
• 25 cm (0.8 ft) between junction and probe tip
• Maximum jaw diameter: 29 mm (1.14 in)



Remote Control Switch 9466

• 2 m (6.56 ft) between connector and junction

Zero Adjustment Board 9454
(standard accessory)

Diagonal probing is no longer a problem.

www.sazehgostarsgp.com

The Advantages of 4-Terminal Measurement

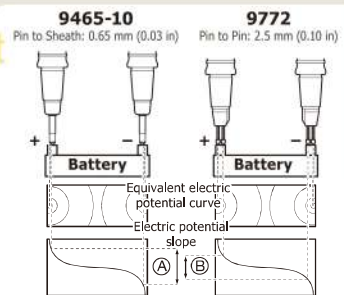
The Quality of Your Test Lead CAN Make a Difference

When measuring certain batteries such as lead-acid cells, the resulting measurement value may differ depending on the test leads used to conduct the measurement. This difference is due to the shape of the probe tip as well as the dimensions of the 4-terminal test leads used for measurement. However, despite a difference in value given by different test leads, it is safe to assume that each specific value reflects the correct value obtainable by the respective test leads.

Based on this principle, when diagnosing battery deterioration in a time series, it is particularly important to use test leads having the same tip shape

and dimensions in order to maintain measurement consistency.

The difference in the measurement values obtained by different test leads is a physical phenomenon caused by the difference in distance between the SOURCE and SENSE pins of the test leads. This is more significant when the battery terminal contains a resistance higher than the internal resistance of the battery under test. The figure on the right demonstrates how even minute physical differences between the SOURCE and SENSE pins for two types of test leads can affect the detected voltage level of the battery.



V(Detected Voltage): A > B

Specifications

Basic Specifications

Measurement items : Resistance (AC four-terminal method), voltage, temperature (platinum temperature sensor, only when using 9460 leads)
Display : LCD

LCD All Segments Displayed



Sampling rate : Once per second
Averaging Function : OFF, 4, 8, or 16 times
Input overflow : [OF] is displayed
Constant current fault detection : [---] is displayed
Open-circuit terminal voltage : 5 VMax
Auto power off : Auto power off after 10 minutes unless during data transmission
Comparator Settings : First and second resistance limits, and lower voltage limit
Number of Comparator Settings : 200 Sets
Comparator Output : LCD display of PASS, WARNING, or FAIL. Select beeper to sound on PASS/WARNING or FAIL.
Operating temperature and humidity : 0 to 40°C (32°F to 104°F), 80% RH or less (no condensation)
Absolute maximum input voltage : 60V DC, No AC input allowed
Withstand voltage : Between input terminals and output terminals (including EXT. HOLD/MEMO, and USB terminals): 1.5 kV AC rms for 15 seconds
Maximum rated power consumption : 2 VA
Continuous operating time : Approx. 10 hours (When using alkaline batteries; may vary depending on conditions of use)
Power supply : AA (LR6) Alkaline Batteries x 8

The standard 3554 Package comes bundled with one Pin type Lead 9465-10, one USB Cable, data management PC software, tough carrying case, zero-adjustment board, eight AA batteries, and one spare fuse.

Dimensions and mass : Approx. 192 mm (7.56 in) W x 121 mm (4.76 in) H x 55 mm (2.17 in) D, 790 g (27.9 oz) (including batteries)
Accessories : PIN TYPE LEAD 9465-10 x 1, USB cable x 1, Application Software CD x 1, Strap x 1, Carrying case x 1, Zero adjustment board x 1, LR6 alkaline batteries x 8, Fuse x 1



Functions

HOLD : (1) Pressing the HOLD key
 (2) Inputting signals to the EXT.HOLD/MEMO terminal
 (3) Stabilizing measured values (when the auto-hold feature is on)
Data Storage : While the measured values are being held, pressing MEMO key will save them to internal memory.
 When the auto-memory feature is on, measured values will be saved to the instrument's internal memory when held.
Saved items: Date, time, resistance value, voltage value, temperature, comparator setting values, and comparator judgement. **Maximum storable data**: 4800 sets.
Memory structure: 400 data sets per unit (12 units)
Reading data PC Interface Application : Read stored data on instrument or with PC application
 USB
 Windows compatible, using USB interface
PC to 3554: transfer comparator tables edited on Excel, delete data from 3554, initialize the 3554, make clock settings.
3554 to PC: transfer data stored in memory (save files on PC in CSV format)

Measurement Accuracy

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

Guaranteed Accuracy : 23°C±5°C (73°F±9°F), non-condensating, after zero-conditions adjustment, warm-up time not required

Resistance Measurement

Temperature coefficient : ±0.01% rdg.±0.8 dgt./°C
 Measurement current frequency : 1 kHz±30 Hz
 Measurement current reliability : ±10%

Range	Max. display	Resolution	Measurement Current	Accuracy
3 mΩ	3.100 mΩ	1 μΩ	150 mA	±1.0% rdg. ±8 dgt.
30 mΩ	31.00 mΩ	10 μΩ	150 mA	±0.8% rdg. ±6 dgt.
300 mΩ	310.0 mΩ	100 μΩ	15 mA	
3 Ω	3.100 Ω	1 mΩ	1.5 mA	

Voltage Measurement

Temperature coefficient : ±0.005 %rdg.±0.5 dgt./°C

Range	Max. display	Resolution	Accuracy
6 V	±6.000 V	1 mV	±0.08% rdg. ±6 dgt.
60 V	±60.00 V	10 mV	

Temperature Measurement

Measurement Range	Resolution	Accuracy
-10°C to 60°C	0.1°C	±1.0°C

Order Code: 3554

To Our Valued Customers:

The thresholds for determining the pass/fail condition of a battery depends on the specifications and standards of the battery manufacturer, battery type, capacity, etc. It is important and necessary to always conduct battery testing against the internal resistance and terminal voltage of a new or reference battery. In some cases, it may be difficult to determine the deterioration state of traditional open type (liquid) lead-acid or alkaline batteries which demonstrate smaller changes in internal resistance than sealed lead acid batteries.

Options

Bundled with the standard 3554

Pin-type Lead **9465-10**
 Zero Adjustment Board **9454**

Clip-type Lead with Temperature Sensor **9460**
 Pin-type Lead **9772**
 Remote Control Switch **9466**
 Large Clip Type Lead **9467**
 Tip Pin **9465-90** (to replace the tip on Model 9465-10)
 Tip Pin **9772-90** (to replace the tip on Model 9772)

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EARTH HiTESTER 3143, 3151

Field measuring instruments



Ground resistance meter

Say goodbye auxiliary grounding rods with the 3143.

Measure even on paved roads.



سازه گستر پایتخت



3-electrode measurement on the 3151 gives greater precision!



Tangle-free



www.hioki.com

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

The 3143 requires no auxiliary grounding rods, making measurement easy.

Presenting a next-generation ground resistance meter

Grounding is increasingly important for the safe operation and maintenance of communications equipment and many other types of facilities. However, in an urban environment where the ground is covered with concrete or asphalt, conventional measurement methods that require inserting auxiliary grounding electrodes are difficult to use. The 3143 uses a new measurement principle that makes auxiliary grounding electrodes unnecessary, so it can be used to measure ground resistance on paved roads.

Features

- Auxiliary grounding rods are unnecessary, greatly reducing time and effort. Measurement can be done easily on concrete or asphalt pavements.
- Measurements are easy to read. A large digital display shows measured values.
- Resistant to dirt. Dust resistance of parts such as the power switch and measurement dial has been increased and durability has been improved.

Measurement Principle of the 3143

The 3143 obtains ground resistance R_x by measuring the loop impedance of the closed path that goes from the lead wire to earth, then back to a return line which is strung along the surface of the earth.

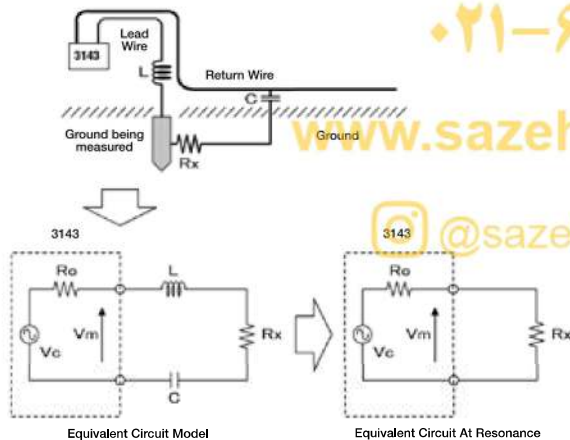
The drawing below shows an equivalent circuit, where R_x is the ground resistance of the object being measured, C is the capacitance of the return wire relative to ground, and L is the inductance of the measurement cable.

By varying the frequency of the measurement signal source so that LCR is serially resonant, the ground resistance R_x can be determined as follows.

$$R_x = V_m / (V_c - V_m) \times R_o$$

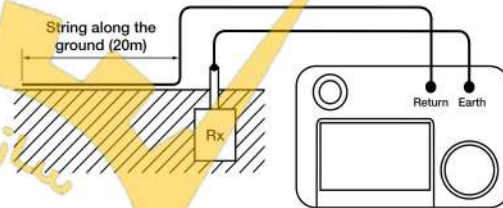
Here, V_c is the signal source voltage, V_m is the voltage between the measurement terminals, and R_o is the signal source output resistance.

With the 3143 you turn the measurement knob to vary the signal source frequency. As the knob is turned, the smallest value that appears (the value at the resonance point) is the ground resistance value R_x .



Using the 3143

1. Wire as shown in the diagram.
2. Turn the rotary knob to measure. As the rotary knob is turned, the lowest resistance value that is displayed is the grounding resistance value.



The 3143 is most appropriate for measuring the ground resistance of an individually grounded rod-shaped electrode.

Convenient Features

Bar graph display makes it easy to find measured resistance. Turn the rotary knob so that the graduations are centered.



Differences from the Previous Instrument (Model 3151)

Common ground resistance meters such as the 3151 measure the resistance using a frequency between 500 Hz and several kHz. The 3143 uses a frequency between 100 kHz and 1.5 MHz, close to that of a lightning surge. Therefore, measurement errors can result if the 3143 is used in situations such as the following. In these instances, we recommend using Model 3151.

- Electrical grounding or mesh grounding.
- Electrical power equipment grounding.
- When the measurement point is located at a distance from the insertion point of the grounding electrode.

Count on The 3151 for Dependable Measurements

The 3151 is a Standard Ground Resistance Meter

Ground resistance measurement involves factors that are not encountered during ordinary resistance measurement, such as polarization of the earth, the influence of grounding current due to leak current and grounding voltage, and the influence of auxiliary grounding resistance. The 3151 is able to make more accurate measurements more safely under difficult conditions because it uses the alternating current potentiometer method to provide measurement accuracy, and because it contains features such as an auxiliary grounding resistance check feature and measurement frequency switching.

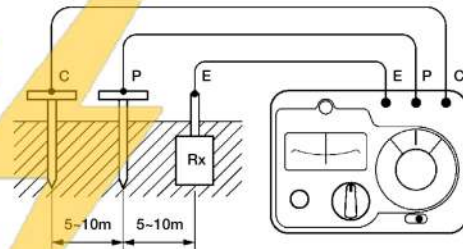
Features

- **Wide measurement range**
Take measurements to 115% of the measurement range.
- **More stable measurement**
Easily check the grounding condition of auxiliary grounding rods for better accuracy. Further, the measurement frequency switching lets you avoid influences such as that of high frequency grounding current.
- **Simple measurement feature**
Switch between "normal" and "simple" measurement modes with the press of a button.
- **Overvoltage protection and alarm feature**
If wires are incorrectly connected (as often happens during simple measurement of commercial power supplies), safety is provided by an alarm buzzer and overvoltage protection.
- **Resistant to dirt**
Parts such as the measurement switches and measurement dial have increased dust resistance and durability.
- **More convenient accessories**
A cable winder ensures freedom from cable tangles, and a convenient carrying case accommodates all measurement materials.

Using the 3151

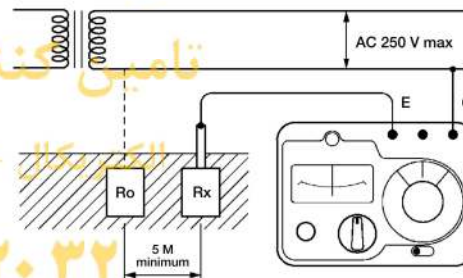
Normal Measurement (3 Electrode Method)

1. Wire as shown in the diagram.
 2. Set the 2/3 electrode method switch to 3 electrode measurement.
 3. Check for grounding voltage in the grounding voltage range.
 4. Check the auxiliary grounding resistance values for C and P in the auxiliary grounding resistance range.
 5. Measure using the appropriate resistance range.
- While pressing the measurement button, turn the resistance dial knob and read the resistance when the galvanometer reaches a balance.



Simple Measurement (2 Electrode Method)

1. Wire as shown in the diagram. (Example of power supply grounding line connection)
 2. Set the 2/3 electrode method switch to 2 electrode measurement.
 3. Check for grounding voltage in the grounding voltage range.
 4. Take measurements, choosing either $\times 10$ or $\times 100$.
- While pressing the measurement button, turn the resistance dial knob and read the resistance when the galvanometer reaches a balance. (Measured value = $R_x + R_o$.)



Convenient Features

Shock resistant taut band meter

High durability measurement switches with dust-resistant construction

Auxiliary resistance (P/C) check feature
Check the ground condition of auxiliary grounding resistance, which can cause measurement error.

Measurement method and frequency switching switches
Push a button to select simple measurement (two electrode method). And, a feature to select the measurement frequency in order to reduce the influence of grounding voltage or grounding current due to high power supply frequency.

Overvoltage protection and alarm buzzer
Prevents damage due to incorrect connection during simple measurement (commercial power supply grounding), and warns of incorrect connection by buzzer.

The resistance measurement is increased to 115% of range

Easy-grip elastomer knob

Accessories for Greater Convenience

- Convenient cable winder for total away the measurement cable.
- Carrying case holds everything for total portability.

3143 Specifications

Measurement Item	Measurement Range	Accuracy
Grounding Resistance	20.0 to 49.9 Ω	± 10% rdg.
	50.0 to 500.0 Ω	± 5% rdg.

(Temperature and humidity: Within rated operating temperature and humidity range.)

- **Display:** 4-digit LCD, values above 999.9 Ω displayed as "OF"
- **Influence of grounding voltage:** ± 5% rdg. for 0 to 10 V
- **Principle of operation:** voltage comparison method (Measurement of voltage at loop impedance serial resonance)
- **Open circuit voltage:** AC 1 Vp typ
- **Measurement current:** AC 3.6 mA max (With terminals shorted)
- **Measurement frequency:** 100 kHz to 1.5 MHz
- **Features:**
 - Energy saving mode: after 3 minutes with no operation, displays "HOLD" and enters the standby state
 - Resonance indicator: bar graph indicator shows approximate location of resonance point
 - Battery check: battery light flashes when the power supply voltage drops
- **Operating temperature and humidity:** 0 to 40°C, 80% rh maximum (no condensation)
- **Storage temperature and humidity:** -10 to 50°C, 80% rh maximum (no condensation)
- **Applicable standards:**
 - Safety: EN61010, Measurement Category I, Pollution Degree 2
 - EMC: EN61326
- **Power supply:** LR6 alkaline battery × 4
- **Operating time:** 8 hours continuous (23°C reference value)
- **Dimensions and mass:** 155 (W) × 98 (H) × 49 (D) mm (not including projections), 380 g (main unit only)
- **Accessories:**
 - MEASURING CABLE 9265 (black 1 m, red 20 m, one each; cable winder × 1)
 - PORTABLE CASE 9338 × 1
 - Instruction manual × 1

3151 Specifications

Measurement Item	Measurement Range	Nominal Deviation
Grounding Resistance	10 Ω (0 to 11.5 Ω)	± 2.5 % f.s.
	100 Ω (0 to 115 Ω)	± 2.5 % f.s.
	1000 Ω (0 to 1150 Ω)	± 2.5 % f.s.
Grounding Voltage	30 V (0 to 30 V)	± 3.0 % f.s.

(Temperature and humidity: 23°C ± 5°C, 80% rh maximum)
(100Ω/1000Ω ranges only with 2 electrode measurement)

- **Influence of auxiliary grounding resistance:** ± 5% for a fluctuation of 0 to 5 kΩ
- **Influence of grounding voltage:**
 - ± 2% for 0 to 5 V
 - ± 5% for 0 to 10 V (for 50/60 Hz)
 - ± 5% for 0 to 3 V (for DC, 16²/3, 400 Hz)
- **Influence of power supply voltage:** within nominal deviation for DC 6 to 10 V
- **Operating method:** AC potentiometer method
- **Open circuit voltage:** AC 50V max
- **Measurement current:** AC 15 mA max (AC 3 mA max when using the two electrode method)
- **Measurement frequency:** 575 Hz (with 3a or 2a selected) or 600 Hz (with 3b or 2b selected)
- **Operating temperature and humidity:** 0 to 40°C, 80% rh maximum (no condensation)
- **Storage temperature and humidity:** -10 to 50°C, 80% rh maximum (no condensation)
- **Applicable standards:**
 - Safety: EN61010, Measurement Category II, Pollution Degree 2
 - EMC: EN61326
- **Environment protection:** IP40 (EN60529)
- **Overvoltage protection:** AC 250 V, 1 minute (between E - P (S), E - C (H) terminals)
- **Power supply:** R6P manganese battery × 6, or LR6 alkaline battery × 6
- **Operating time:** Approx 350 operations (using R6P battery)
Approx 1100 operations (using LR6 battery)
(30 seconds measurement / 30 seconds off condition)
- **Dimensions and mass:** 164 (W) × 119 (H) × 88 (D) mm (not including protrusions), 800 g (main unit only)
- **Accessories:**
 - AUXILIARY GROUNDING RODS 9214 × 2
 - MEASURING CABLE 9215 (black 5 m, yellow 10 m, red 20 m, one each; cable winder × 3)
 - PORTABLE CASE 9393 × 1
 - Instruction manual × 1
- **Optional accessory**
 - EARTH NETS 9050 (set of two)
 - Use in places where auxiliary grounding rods cannot be inserted (but where water can penetrate)

سازگار پائتخت

ملزومات برق

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