HIOKI

3246

PENCIL HiTESTER

Instruction Manual

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HIOKI

DECLARATION OF CONFORMITY

Manufacturer's Name: HIOKI E.E. CORPORATION
Manufacturer's Address: 81 Koizumi, Ueda, Nagano 386-1192, Japan
Product Name: PENCIL HiTESTER
Model Number: 3246
The above mentioned product conforms to the following product specifications:
Safety: EN61010-1:2001
EN61010-031:2002
EMC: EN61326-2-2:2006
Class B equipment
Portable test, measuring and monitoring equipment used in low-voltage distribution systems
Supplementary Information:
The product herewith complies with the requirements of the Low Voltage Directive 2006/95/EC and the EMC Directive 2004/108/EC.

HIOKI E.E. CORPORATION
22 December 2008
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Introduction

Thank you for purchasing the HIOKI "3246 PENCIL HiTESTER". To obtain maximum performance from the product, please read this manual first, and keep it handy for future reference.

Overview

The 3246 is a pencil-shaped digital multimeter designed to measure DC/AC voltage and resistance, and conduct continuity and diode checks. Compact, safe, and easy to use, the 3246 meets all CATIV 300V, CATIII 600V safety requirements. Probe leads are wound around the protrusions on the rear. The unit also features a built-in light to illuminate the object to be measured.

Initial Inspection

When you receive the product, inspect it carefully to ensure that no damage occurred during shipping. If damage is evident, or if it fails to operate according to the specifications, contact your dealer or Hioki representative.

Preliminary Checks

- Before using the product the first time, verify that it operates normally to ensure that the no damage occurred during storage or shipping. If you find any damage, contact your dealer or Hioki representative.
- Before using the product, make sure that the insulation on the leads is undamaged and that no bare conductors are improperly exposed. Using the product in such conditions could cause an electric shock, so contact your dealer or Hioki representative for repair.

Maintenance and Service

- To clean the product, wipe it gently with a soft cloth moistened with water or mild detergent. Never use solvents such as benzene, alcohol, acetone, ether, ketones, thinners or gasoline, as they can deform and discolor the case.
- If the product seems to be malfunctioning, confirm that the batteries are not discharged, and contact your dealer or Hioki representative.

Safety

Follow these precautions to ensure safe operation and to obtain the full benefits of the various functions.

⚠DANGER

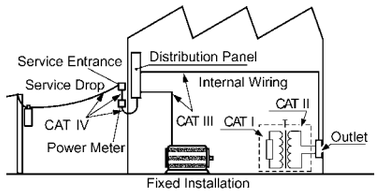
This product is designed to conform to IEC 61010 Safety Standards, and has been thoroughly tested for safety prior to shipment. However, mishandling during use could result in injury or death, as well as damage to the product. Be certain that you understand the instructions and precautions in the manual before use. We disclaim any responsibility for accidents or injuries not resulting directly from product defects.

Measurement categories (Overvoltage categories)

This product conforms to the safety requirements for CAT IV (300 V), CAT III (600 V) measurement products.
To ensure safe operation of measurement products, IEC 61010 establishes safety standards for various electrical environments, categorized as CAT I to CAT IV, and called measurement categories. These are defined as follows.

CAT I: Secondary electrical circuits connected to an AC electrical outlet through a transformer or similar device.

CAT II: Primary electrical circuits in equipment connected to an AC electrical outlet by a power cord (portable tools, household appliances, etc.)



CAT III: Primary electrical circuits of heavy equipment (fixed installations) connected directly to the distribution panel, and feeders from the distribution panel to outlets.

CAT IV: The circuit from the service drop to the service entrance, and to the power meter and primary overcurrent protection device (distribution panel).

Higher-numbered categories correspond to electrical environments with greater momentary energy, so a measurement product designed for CAT III environments can endure greater momentary energy than one designed for CAT II. Using a measurement product in an environment designated with a higher-numbered category than that for which the product is rated could result in a severe accident, and must be carefully avoided.

Never use a CAT I measuring product in CAT II, III, or IV environments.

The measurement categories comply with the Overvoltage Categories of the IEC60664 Standards.

Safety Symbol

⚠	In the manual, the ⚠ symbol indicates particularly important information that the user should read before using the product. The ⚠ symbol printed on the product indicates that the user should refer to a corresponding topic in the manual (marked with the ⚠ symbol) before using the relevant function.
⧈	Indicates a double-insulated device.
~	Indicates AC (Alternating Current).
⎓	Indicates DC (Direct Current).
⎓/~	Indicates DC (Direct Current) or AC (Alternating Current).
⏚	Indicates a grounding terminal.

The following symbols in this manual indicate the relative importance of cautions and warnings.

⚠DANGER Indicates that incorrect operation presents an extreme hazard that could result in serious injury or death to the user.

⚠WARNING Indicates that incorrect operation presents a significant hazard that could result in serious injury or death to the user.

⚠CAUTION Indicates that incorrect operation presents a possibility of injury to the user or damage to the product.

NOTE Advisory items related to performance or correct operation of the product.

Usage Notes

This manual contains information and warnings essential for safe operation of the product and for maintaining it in safe operating condition. Before using the product, be sure to carefully read the following safety notes.

⚠WARNING

- **To avoid electric shock, do not allow the product to get wet, and do not use it when your hands are wet.**
- **Do not use the product where it may be exposed to corrosive or combustible gases. The product may be damaged or cause an explosion.**

⚠CAUTION

- Do not store or use the product where it could be exposed to direct sunlight, high temperature or humidity, or condensation. Under such conditions, the product may be damaged and insulation may deteriorate so that it no longer meets specifications.
- This product is not designed to be entirely water- or dustproof. To avoid damage, do not use it in a wet or dusty environment.
- This product is designed for indoor use, and operates reliably from 0°C to 40°C.
- To avoid damage to the product, protect it from vibration or shock during transport and handling, and be especially careful to avoid dropping.
- Do not use the product near a device that generates a strong electromagnetic field or electrostatic charge, as these may cause erroneous measurements.
- To avoid damaging the test leads, do not bend or pull the leads.
- If the protective functions of the product are damaged, either remove it from service or mark it clearly so that others do not use it inadvertently.

NOTE

- Accurate measurement may be impossible in the presence of strong magnetic fields, such as near transformers and high-current conductors, or in the presence of strong electromagnetic fields such as near radio transmitters.
- To avoid battery depletion, turn the Function Selector OFF after use (the Auto Power Save feature consumes a small amount of current).
- The B indicator appears when battery voltage becomes low. Replace the batteries as soon as possible.
- To avoid corrosion from battery leakage, remove the batteries from the product if it is to be stored for a long time.

Specifications

General

Measurement Method	Dual integration
AC Measurement System	Average rectifying measurement
Function	DC voltage (DCV), AC voltage (ACV), Resistance (Ω), Continuity check(), Diode check()(Forward direction/Reversed direction judgment only)
Additional Function	Auto Range function, Manual Range function, Hold function, Auto Power Save function (APS), Battery-Life Warning function, Overflow Warning function, Penlight function, LCD Backlight function
Display Type	TN type LCD, 1/4 duty, dynamic drive
Display Elements	3(1/2) dgt., Max. 4199 counts (600 VAC/DC range: 699 counts) Polarity indicator: "–" sign (automatic) Overflow indicator: "OF" or "–OF"
Units and Symbols	~(AC), ⎓(DC), B, AUTO, HOLD, , , APS, M, k, m, V, Ω
Range Switching	Auto/Manual range
Sampling Rate	2.5 S/s
Input Terminals	V/ Ω/ continuity/ diode terminal, COM terminal
Functions	OFF/ V/ Ω

General

Buttons	HOLD, ⎓/~ Ω/ / (select)
Power Supply	Coin-shaped lithium battery CR2032 × 1
Battery-Life Warning	B indicates low battery (2.3 V±0.15 V or less)
Dimensions	Approx. 30W ×182H ×26.5D mm (without protrusions) (1.18"W × 7.17"H × 1.04"D)
Mass	Approx.80 g (2.8 oz.)(including battery)
Operating Environment	Indoors, altitude up to 2000 m (6562-ft.)
Operating Temperature & Humidity	0 to 40°C (32 to 104°F), at 80%RH or less (non-condensating)
Storage Temperature & Humidity	-20 to 60°C (-4 to 140°F), at 70%RH or less (non-condensating)
Accessories	Instruction Manual Coin-shaped lithium battery (CR2032) x1 (supplied with this product for monitor)
Standards Applying	Safety EN61010 Pollution Degree 2 Measurement Category IV (300 V), Measurement Category III (600 V), (Anticipated Transient Overvoltage: 6000 V) EMC EN61326
Options	9081 EXTERNAL SHUNT (10A) (no CE marking)

Electrical Characteristics

Accuracy guarantee for temperature and humidity	23°C±5°C (73°F±9°F), 80%RH or less (non-condensating)
Regulated power supply range	3.4 V or lower (until the B mark lights up)
Temperature Characteristic	(Measurement accuracy) × 0.1/°C (except 23°C±5°C)
Noise Suppression	NMRR DCV: 40dB or better (50/60 Hz) ACV: 40dB or better (DC) CMRR DCV:100dB or better (50/60 Hz) ACV: 60dB or better (50/60 Hz) (1kΩ Unbalance)
Dielectric Strength	Input terminals to case: 5.55 kVrms sin (50/60 Hz for one minute)
Maximum input Voltage	600 VDC/ 600 Vrms (sin) or 3 ×10^6 VHz
Maximum rated voltage between input terminals and ground	600 VDC/ 600 Vrms (sin) or 3 ×10^6 VHz
Rated Power Supply Voltage	3.0 VDC
Maximum Rated Power	30 mVA (Max) (supply voltage 3.0 VDC)
Rated Power	4 mVA (Typ) (supply voltage 3.0 VDC, in DCV mode)
Power during Auto Power Saving	0.1 mVA (Max)
Continuous Operating Time	Approx. 150 hours (in DCV mode) Approx. 30 hours (with light in repeating cycles of 10 seconds on and 20 seconds off, in DCV mode)

Accuracy (Accuracy guaranteed for one year at 23°C±5°C (73°F±9°F), 80%RH or less.)

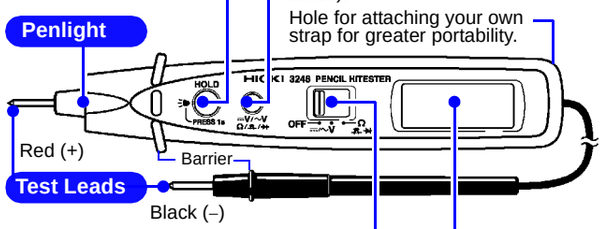
	Range	Accuracy	Input Impedance	Notes*1
DC Voltage Measurement (**DCV**)	420.0 mV 4.200 V 42.00 V 420.0 V 600 V	±1.3%rdg.±4dgt.	100 MΩ or more Approx. 11 MΩ Approx. 10 MΩ Approx. 10 MΩ Approx. 10 MΩ	
AC Voltage Measurement (**ACV**)	4.200 V 42.00 V 420.0 V 600 V	±2.3%rdg.±8dgt.	Approx. 11 MΩ Approx. 10 MΩ Approx. 10 MΩ Approx. 10 MΩ	Measurement frequency range: 50 Hz to 500 Hz
	Range	**Accuracy**	**Open terminal voltage**	**Notes*1**
Resistance Measurement (Ω)	420.0 Ω 4.200 kΩ 42.00 kΩ 420.0 kΩ 4.200 MΩ 42.00 MΩ	±2.0%rdg.±4dgt. ±2.0%rdg.±4dgt. ±2.0%rdg.±4dgt. ±2.0%rdg.±4dgt. ±5.0%rdg.±4dgt. ±10.0%rdg.±4dgt.	3.4 V or less Approx. 0.7 V Approx. 0.5 V Approx. 0.5 V Approx. 0.5 V Approx. 0.5 V	Measurement current: 800 µA max. Varies according to resistance levels to be measured.
Continuity Check()	420.0 Ω	±2.0%rdg.±4dgt.	3.4 V or less	Threshold level (beep sound): Less than (50 Ω±40 Ω).
Diode Check()	Judgment only (0.3 V to 2.0 V)		3.4 V or less	Measurement current: 800 µA max.

*1: Overload protection is 600 V DC/AC rms (sine wave) or 3x10^6 VHz (for 1 min.), for all functions and ranges.
dgt.: resolution (The smallest displayable unit, i.e., the input value that causes the digital display to show a "1".)
rdg.: reading value (The value currently being measured and indicated on the measuring product)

Parts Names

HOLD Button
- Holds the measurement value (**HOLD** lights up).
- Cancels the Auto-Power Save function (APS). (Turn on the power while pressing **HOLD**.)
- Turns on the light. (Press **HOLD** for at least 1 second.)

Select Button
- Selects DC/AC (⎓/∼ **V**) (Press the select button for at least 1 second in manual ranging mode.)
- Selects mode (Ω/⊣▸/)). (Press the select button for at least 1 second in manual ranging mode.)
- Changes to the manual range function. (Turn on the power while pressing the select button.)
- Selects range (in manual ranging mode).



OFF Power Off (Power is turned ON in any position other than OFF.)

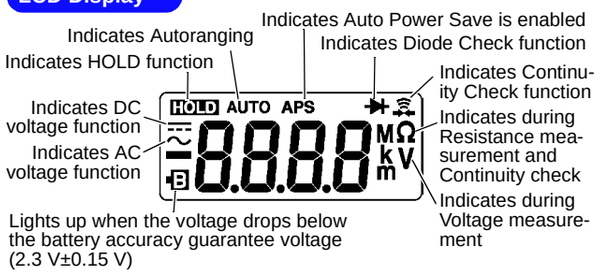
V ⎓: DC voltage function (DCV) ∼: AC voltage function (ACV) — Select with the select button

Ω Resistance function

Continuity Check function — Select with the select button

Diode Check function

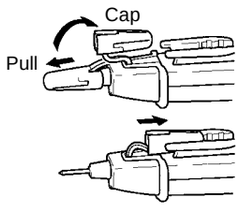
LCD Display



Handling the Cap

⚠CAUTION

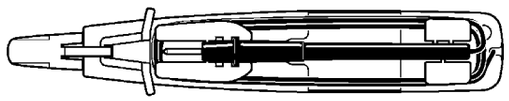
Observe the following to avoid damage to the product.
- Do not pull the cap with excessive force.
- Replace the cap when not using the product.



When using the 3246, remove the cap and securely fasten the cap to the rear, as shown in the figure.

When removing the cap, be careful not to prick your finger with the tip of the lead.

Handling the Test Leads



When storing the 3246 test lead (black), be sure to wind the lead around the protrusion on the rear.

Functions

Auto/Manual Range Function (⎓/∼V, Ω only)

Autoranging: The Autoranging function automatically selects the optimum measurement range.
Turning on the power also switches Autoranging on (**AUTO** lights up).
The range automatically switches up when the display shows 4200 counts or more, and down when the display shows less than 400 counts. (A beep sound is generated when the 3246 is switched to a different range.)

Manual ranging: Set a range manually.
Turn on the power while pressing the select button (**AUTO** is turned off).
Range selection: Each pressing of the select button selects the next larger range. After the largest range, pressing the select button again returns you to the smallest range.
Press and hold down the select button (for about 1 second) to select AC or DC in manual ranging mode, or select between resistance measurement, continuity check, and diode check in manual ranging mode.
The Manual ranging function is active until the 3246 is turned off.

Hold Function [HOLD] (Available for any measurement function.)

Press **HOLD** to hold the measurement value (**HOLD** lights up).
In hold mode, the select button operation, the warning beep for voltage measurement overflow, and beep for diode check judgment are disabled.
To cancel the hold mode: Press **HOLD** again.

Auto Power Save Function [APS] (Available for any measurement function.)
When the measurement product is turned on, it automatically enters Auto Power Save mode (**APS** lights up).
Approximately 10 minutes after completing final operation, the measurement product automatically enters Power Save mode with a beeping sound.
Exiting the Power Save State: turn off the power once.
Disabling Auto Power Saving: turn on the power while pressing **HOLD**. (**APS** is turned off)

Overflow Warning Function [OF] (⎓/∼V only)

When the measured value exceeds the maximum indication, a beep sound is generated (**OF** lights up).
This function is disabled in hold mode.

Penlight/LCD Backlight Function
- ON: Press and hold down **HOLD**. The penlight and LCD backlight will light. (The hold mode is not influenced)
- OFF: The lights will go off automatically in about 10 seconds. Operating the Function Selector or a key will turn off the lights in about 10 seconds after the last key operation.
- Hold down **HOLD** to keep the lights on.

Measurement Procedures

⚠DANGER

Observe the following precautions to avoid electric shock.
- **Do not grip the 3246 or test lead between the barrier and the tip during operation (See "Parts Names").**
- **Disconnect the test leads from the measurement object before handling the Cap.**
- **Always verify the appropriate setting of the Function Selector before connecting the test leads.**
- **Disconnect the test leads from the measurement object before switching the Function Selector.**
- **Never apply voltage to test leads when the Resistance, Continuity or Diode Check functions are selected. Doing so may damage the product and result in personal injury. To avoid electrical accidents, remove power from the circuit before measuring.**

Pre-Operation inspection

To avoid the possibility of electric shock or incorrect measurement, check the following items before using the product.
If the operation check reveals any abnormalities, stop the check immediately and do not use the product.

⚠WARNING

Before using the product check that the body of the product is not damaged. Also make sure that the insulation on the test leads is undamaged and that no bare conductors are improperly exposed. Using the product in such conditions could cause an electric shock accident may occur, so contact your dealer or Hioki representative for repair.
- For voltage measurement, short the test leads and check that 0 V is displayed.
- For Measuring Resistance or Continuity Check, short the test leads and check that 0 Ω is displayed.
- Measure a test item with a known value (battery, AC supply, resistor, etc.) to confirm that the known value can be displayed.

NOTE

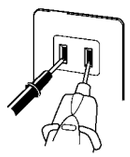
Periodic calibration and inspection is necessary in order to ensure that this product operates according to its product specifications.

Voltage Measurement

⚠DANGER

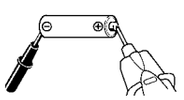
- **The maximum input voltage is 600 V DC/ 600 Vrms (sin) or 3x10⁶ V•Hz. Attempting to measure voltage in excess of the maximum rating could destroy the product and result in personal injury or death.**
- **To avoid electrical shock, be careful to avoid shorting live lines with the test leads.**
- **For safety, test lead connections must always be made at the secondary side of a circuit breaker.**
- **The maximum rated voltage between input terminals and ground is 600 V DC/AC. Attempting to measure voltages exceeding 600 V with respect to ground could damage the product and result in personal injury.**

1. Move the Function Selector to the **V** position. To select DC or AC (⎓/∼), use the select button. (During manual ranging, press the select button for at least 1 second.)



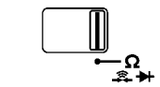
2. Connect the test leads to the measurement object, and read the indicated value.

AC Voltage Measurement

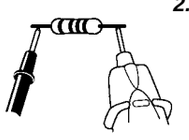


DC Voltage Measurement

Resistance Measurement

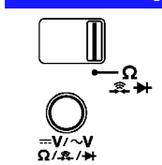


1. Move the Function Selector to the Ω position.

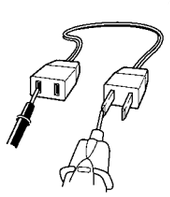


2. Connect the test leads to the measurement object, and read the indicated value.

Continuity Check

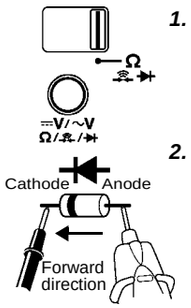


1. Move the Function Selector to the Ω position and press the select button. (⊣▸/)) lights up)
(During manual ranging, press the select button for at least 1 second.)



2. Connect the test leads to the measurement object.
When the continuity (threshold: 50±40 Ω or less) is established, the beeping sounds.

Diode Check



1. Move the Function Selector to the Ω position and press the select button twice. (⊣▸ lights up)
(During manual ranging, press the select button for at least 1 second.)

2. Connect the test leads to the measurement object.

NOTE

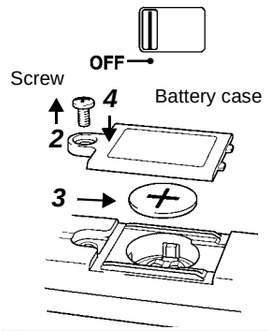
When the diode is connected in the forward direction, the display shows "-00-" with a beeping sound.
(When the forward voltage is out of the 0.3 V to 2.0 V range, the results may be incorrect.)
When connection is reversed, the display shows "----."
If displays for both directions are the same, the following may have occurred:
- The diode has malfunctioned.
- The forward voltage of the diode is out of the measurement range.

Replacing the Batteries

⚠WARNING

- **To avoid electric shock when replacing the batteries, first disconnect the test leads from the object to be measured.**
- **Before replacing the batteries, make sure that the Function Selector is OFF.**
- **When replacing the batteries, be sure to insert them with the correct polarity. Otherwise, poor performance or damage from battery leakage could result.**
- **Replace batteries only with the specified type. (Coin-shaped lithium battery CR2032)**
- **After replacing the batteries, replace the cover and screws before using the product.**
- **Keep batteries away from children to prevent accidental swallowing.**
- **To avoid the possibility of explosion, do not short circuit, disassemble or incinerate batteries.**
- **Handle and dispose of batteries in accordance with local regulations.**

Necessary tool:
- Phillips screwdriver
- Coin-shaped lithium battery (CR2032)



1. Turn OFF the power.
2. Turn the 3246 over and use a Phillips screwdriver to remove the one retaining screw from the battery case.
3. Remove the battery case and mount a new CR2032 battery. Make sure the polarity is correct.
4. Mount the battery case and tighten the retaining screw.

CALIFORNIA, USA ONLY
This product contains a CR Coin Lithium Battery which contains Perchlorate Material - special handling may apply.
See www.dtsc.ca.gov/hazardouswaste/perchlorate