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HIOKI

ENG

3246-60

PENCIL HiTESTER

Instruction Manual

"600340344" (3246-61)

Warrant

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Introdu

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features

. pencil-shaped digital multimeter designed to
voltage and resistance, and conduct continuity
. Compact, safe, and easy to use, the 3246-60
300 V, CATIII 600 V safety requirements. Probe
around the protrusions on the rear. The unit also
light to illuminate the object to be measured.

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roduct, wipe it gently with a soft cloth moist-
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seems to be malfunctioning, confirm that the
t discharged, and contact your dealer or Hioki

Safety

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

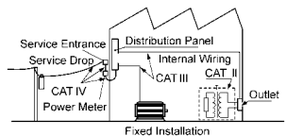
⚠DANGER

This instrument is designed to comply with 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 instrument Using the instrument in a way not described in this manual may negate the provided safety features. 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 instrument defects.

Measurement categories

This product complies with CAT IV (300 V), CAT III (600 V), CAT II (600 V) safety requirements.
To ensure safe operation of measurement products, IEC 61010 establishes safety standards for various electrical environments, categorized as CAT II to CAT IV, and called measurement categories.

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



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).

Using a measurement instrumentin an environment designated with a higher-numbered category than that for which the instrument is rated could result in a severe accident, and must be carefully avoided.
Use of a measurement instrument that is not CAT-rated in CAT II to CAT IV measurement applications could result in a severe accident, and must be carefully avoided.

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).

Symbols for Various Standards

CE	This symbol indicates that the product conforms to safety regulations set out by the EC Directive.
	WEEE marking: This symbol indicates that the electrical and electronic appliance is put on the EU market after August 13, 2005, and producers of the Member States are required to display it on the appliance under Article 11.2 of Directive 2002/96/EC (WEEE).

⚠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.**
- **To avoid electric shock when measuring live lines, wear appropriate protective gear, such as insulated rubber gloves, boots and a safety helmet.**

⚠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 dust-proof. 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.

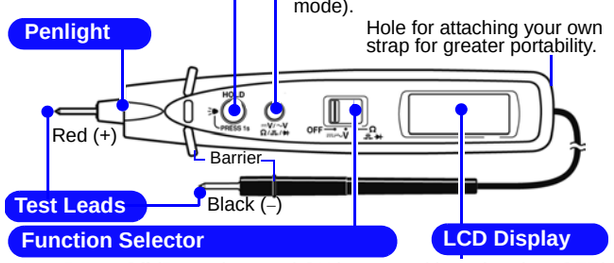
NOTE

- 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.

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.)

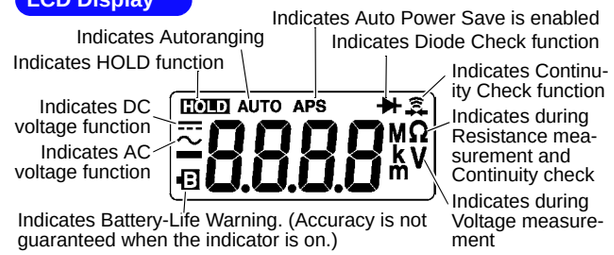
V ⎓: DC voltage function (DCV) / ∼: AC voltage function (ACV) — Select with the select button

Ω Resistance function

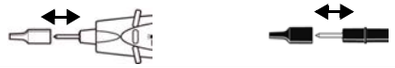
⊸ Continuity Check function

⊣▶⊢ Diode Check function — Select with the select button

LCD Display



Handling the Sleeve of test lead



⚠WARNING

Removable sleeves can be attached to the metal pins at the ends of the test leads. To prevent a short circuit accident, be sure to use the test leads with the sleeves attached when performing measurements in the CAT III and CAT IV measurement categories. Remove the sleeves from the test leads when performing measurements in the CAT II measurement category.
For details on measurement categories, see "Measurement categories") in the instruction manual.

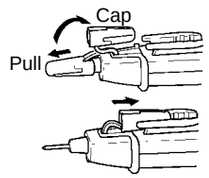
⚠CAUTION

- The tips of the metal pins are sharp, so take care not to injure yourself.
- When performing measurements with the sleeves attached, be careful to avoid damaging the sleeves.
- If the sleeves are inadvertently removed during measurement, be especially careful in handling the test leads to avoid electric shock.

Handling the Cap (yellow) of Pencil Hitester

⚠CAUTION

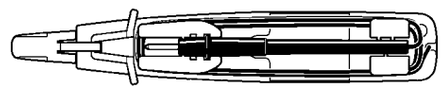
Observe the following to avoid damage to the product.
- Do not pull the cap with excessive force.
- Replace the cap when not using the product.



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 3246-60 test lead (black), be sure to wind the lead around the protrusion on the rear.

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

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Display El	3(1/2) dgt., Max. 4199 counts (600 VAC/DC range: 699 counts) Polarity indicator: "–" sign (automatic) Overflow indicator: "OF" or "–OF"
Units and	∼(AC), ⎓(DC), B, AUTO, HOLD,))), ⊣▷⊢, APS, M, k, m, V, Ω
Range Sw	Auto/Manual range
Sampling	2.5 S/s
Input Term	V/ Ω/ continuity/ diode terminal, COM terminal
Functions	OFF/ V/ Ω
Buttons	HOLD, ⎓/∼ Ω/⊣▷⊢/))) (select)
Power Sup	Coin-shaped lithium battery CR2032 × 1
Battery-Lif	B indicates low battery
Dimension	Approx. 30W ×182H ×26.5D mm (without protrusions) (1.18"W × 7.17"H × 1.04"D) Cable length:Approx. 800 mm (31.50")
Mass	Approx.80 g (2.8 oz.)(including battery)
Operating Environme	Indoors,Pollution Degree 2, altitude up to 2000 m (6562-ft.)
Operating ture & Hur	0 to 40°C (32 to 104°F), at 80%RH or less (non-condensating)
Storage Te ture & Hur	-20 to 60°C (-4 to 140°F), at 70%RH or less (non-condensating)
Accessorie	Instruction Manual Coin-shaped lithium battery (CR2032) x1 (supplied with this product for monitor), Sleeves (red and black 1 piece for each)
Standards Applying	Safety EN61010 EMC EN61326

Electric cteristics

Accuracy for temper humidity	23°C±5°C (73°F±9°F), 80%RH or less (non-condensating)
Regulated power sup	2.15 V to 3.4 V (Battery low display B is off)
Temperatu Characteri	(Measurement accuracy) × 0.1/°C (except 23°C±5°C)
Noise Sup	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	Input terminals to case: 5.55 kVrms sin (50/60 Hz for one minute)
Maximum Voltage	600 VDC/ 600 Vrms (sin) or 3 ×10⁶ VHz
Maximum voltage to	When sleeve is installed : CAT IV (300 V) / CAT III (600 V) When sleeve is uninstalled: CAT II (600 V), Anticipated Transient Overvoltage: 6000 V)
Rated Pov Supply Vo	3.0 VDC
Maximum Rated Pov	30 mVA (Max) (supply voltage 3.0 VDC)
Rated Pov	4 mVA (Typ) (supply voltage 3.0 VDC, in DCV mode)
Power dur Power Sav	0.1 mVA (Max)
Continuou Operating	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)

Accurac

Accuracy guaranteed for one year at 23°C±5°C (73°F±9°F), (80%RH or less.) Battery low display B is off.

	Accuracy	Input Impedance	Notes*1
DC Voltage Measurement (**DCV**)	±1.3%rdg.±4dgt.	100 MΩ or more Approx. 11 MΩ Approx. 10 MΩ Approx. 10 MΩ Approx. 10 MΩ	
AC Voltage Measurement (**ACV**)	±2.3%rdg.±8dgt.	Approx. 11 MΩ Approx. 10 MΩ Approx. 10 MΩ Approx. 10 MΩ	Measurement frequency range: 50 Hz to 500 Hz

	Accuracy	Open terminal voltage	Notes*1
Resistance Measurement (Ω)	±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()))	±2.0%rdg.±4dgt.	3.4 V or less	Threshold level (beep sound): 50 Ω±40 Ω

	Range	Accuracy	Input Impedance	Notes*1
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 3x10⁶ 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)

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 3246-60 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 3246-60 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 3246-60 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

To prevent an electric shock accident, confirm that the white portion (insulation layer) inside the cable is not exposed. If a color inside the cable is exposed, do not use the cable. Using the instrument in such conditions could cause an electric shock, 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.

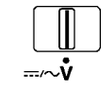
NOTE

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

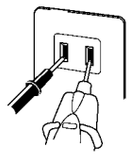
Voltage Measurement

⚠ 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.**

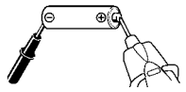


1. Move the Function Selector to the **V** position. To select DC or AC (⎓/∼), use the select button. (During manual ranging, press the select button for at least 1 second.)



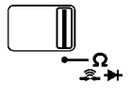
2. Connect the test leads to the measurement object, and read the indicated value.

AC Voltage Measurement

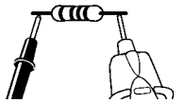


DC Voltage Measurement

Resistance Measurement

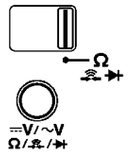


1. Move the Function Selector to the Ω position.

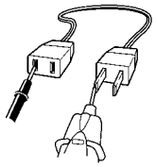


2. Connect the test leads to the measurement object, and read the indicated value.

Continuity Check

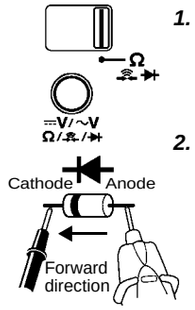


1. Move the Function Selector to the Ω position and press the select button. ())) lights up)
(During manual ranging, press the select button for at least 1 second.)



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

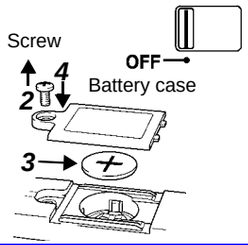
When the diode is connected in the forward direction, the display shows "-00-" with a beeping sound.
(When the forward voltage is out of the 0.3 V to 2.0 V range, the results may be incorrect.)
When connection is reversed, the display shows "----."
If displays for both directions are the same, the following 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.**
- **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 3246-60 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