HIOKI
3245
SOLAR HiTESTER
INSTRUCTION MANUAL

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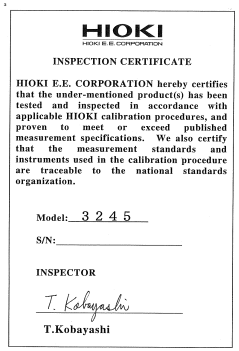
Introduction
Thank you for purchasing the HIOKI "3245 SOLAR HiTESTER". To obtain maximum performance from the product, please read this manual first, and keep it handy for future reference.


HIOKI
HIOKI E.E. CORPORATION
INSPECTION CERTIFICATE
HIOKI E.E. CORPORATION hereby certifies that the under-mentioned product(s) has been tested and inspected in accordance with applicable HIOKI calibration procedures, and proven to meet or exceed published measurement specifications. We also certify that the measurement standards and instruments used in the calibration procedure are traceable to the national standards organization.
Model: 3245
S/N:
INSPECTOR
T.Kobayashi
T.Kobayashi


HIOKI
DECLARATION OF CONFORMITY
Manufacturer's Name: HIOKI E.E. CORPORATION
Manufacturer's Address: 81 Koizumi, Ueda, Nagano 386-1192, Japan
Product Name: SOLAR HITESTER
Model Number: 3245
The above mentioned product conforms to the following product specifications:
Safety: EN61010-1:2001 EN61010-2-031:1994
EMC: EN61326:1997+A1:1998+A2:2001 ClassB equipment Portable test and measurement equipment
Supplementary Information:
The product herewith complies with the requirements of the Low Voltage Directive 73/23/EEC and the EMC Directive 89/336/EEC.
HIOKI E.E. CORPORATION
6 November 2003
Yuji Hioki
President
3245A999-02

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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.

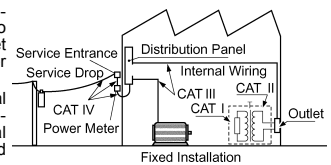
Safety
Follow these precautions to ensure safe operation and to obtain the full benefits of the various functions.

⚠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 complies with CAT III (600 V) safety requirements.
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 device designed for CAT III environments can endure greater momentary energy than a device 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 both DC (Direct Current) and 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 should be installed and operated indoors only, between 0 and 40°C and 80% RH or less. However, it can be safely operated down to -10°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.
- Adjustments and repairs should be made only by technically qualified personnel.
- The solar battery and the liquid crystal display are made of glass. In order to avoid damage to the product or injury to the user, do not strike, drop, or apply excess pressure to them.

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.
- When not in use, store the unit in a well-lit location rather than in a container such as a toolbox.
- To avoid battery depletion, turn the Function Selector OFF after use (the Auto Power Save feature consumes a small amount of current).
- The ▭ indicator appears when main battery voltage becomes low. Charge the battery as soon as possible.
- The ▭ indicator appears (flashes) when backup 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.
- Batteries are not included in the basic price of the 3245. (For testing purposes, a battery is inserted into the product, but if this should be exhausted it is not replaced free of charge.)

Specifications

General

Measurement Method	Dual integration
AC Measurement System	Average rectifying measurement
Function	DC voltage (DCV), AC voltage(ACV), Resistance (Ω), Continuity check(), Light check
Additional Function	Auto Range function, Manual Range function, Hold function, Auto Power Save function (APS), Overflow Warning function, Battery-Life Warning function
Display	TN type LCD, 1/4 duty, dynamic drive Max. 4199 counts
Range Switching	Auto-range, manual range
Sampling Rate	2.5 S/s
Power Supply	Main battery: Rechargeable lithium battery Backup battery: Coin-shaped lithium battery, CR2032 (3VDC) × 1
Battery-Life Warning	Main battery exhausted: ▭ lights (accuracy assured) Backup battery exhausted: ▭ flashes (accuracy not assured)
Dimensions	Approx. 60W ×135H ×23D mm (without protrusions) (2.36"W × 5.31"H × 0.91"D)
Mass	Approx.140 g (4.9 oz.)(including batteries)
Operating Environment	Indoors, up to 2000 m (6562-ft.) ASL
Operating Temperature & Humidity	0 to 40°C (32 to 104°F), at 80%RH or less (non-condensating)
Storage Temperature & Humidity	-20 to 50°C (-4 to 122°F), at 70%RH or less (non-condensating)
Accessories	Instruction Manual, carrying case, Coin-shaped lithium battery (CR2032) x1 (supplied with this product for monitor)
Applicable Standards	Safety EN61010-1:2001 EN61010-2-031:1994, Pollution Degree 2 Measurement Category III (600 V), (Anticipated Transient Overvoltage: 6000 V) EMC EN61326:1997+A1:1998+A2:2001

Electrical Characteristics

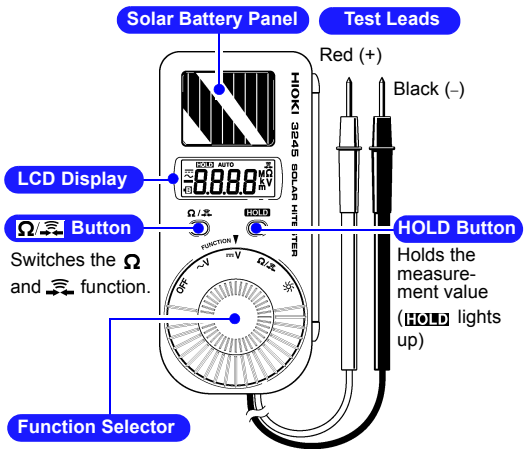
Temperature Characteristic	(Measurement accuracy) × 0.1/°C (0 to 18, 28 to 40°C)
Noise Suppression (50/60Hz)	NMRR:40dB or better(DCV) CMRR:100dB or better(DCV), 60dB or better(ACV)
Operating time and charging time	8 hours when charged for 3 hours at about 50,000 lx (DCV)
Backup battery life	Approx. 150 hours (DCV, continuous)
Dielectric strength	5550 Vrms sin (50/60Hz for one minute), between input and case
Maximum input Voltage	600 VDC/ 600 Vrms(sin) or 3 ×10^6VHz
Rated Power	15 mW max.(continuity test at short-circuit) 4.0 mW typ.(DCV) 0.15 mW typ.(Auto-power save)

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

	Range	Accuracy	Notes
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. (50 to 500 Hz)	Approx. 11 MΩ Approx. 10 MΩ Approx. 10 MΩ Approx. 10 MΩ
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.	3.4V max. 0.7 V typ. 0.5 V typ. 0.5 V typ. 0.5 V typ. 0.5 V typ.
Continuity Check ()	420.0Ω	±2.0%rdg.±4dgt.	3.4V or less Threshold: 50±30Ω
Light check	4200		"1000" is displayed at approx. 50,000lx

Overload protection is 600V 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



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

~V AC voltage function (ACV)

⎓V DC voltage function (DCV)

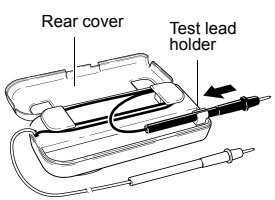
Ω Resistance function

Continuity Check function

Light meter

Using the Test Lead Holder

Use the test lead holder to secure the test lead probe in place.



1. Open the rear cover.
2. Unwind the extra lead.
3. Insert the test lead probe into the test lead holder.
4. Shut the rear cover.

Functions

Auto Range Function (~V/ ⎓V/ Ω)	The Autoranging function automatically selects the optimum measurement range. ("AUTO" lights up)
Manual Range Function (~V/ ⎓V/ Ω)	Turn on the power while pressing the **HOLD** button and then press the Ω/ button to select the range. ("AUTO" is turned off)) The Manual ranging function is active until the 3245 is turned off.
Hold Function (All measurement)	Press the **HOLD** button to hold the measurement value. (HOLD lights up) To cancel the hold mode: Press the **HOLD** button again, or turn the Function Selector.
Auto Power Save Function (All measurement)	Approximately 30 minutes after completing final operation, the measurement product automatically enters Power Save mode. Exiting the Power Save State: turn off the power once. The auto power save function cannot be canceled.
Overflow Display Function (~V/ ⎓V only)	When the input exceeds the measurement range, "OF" is displayed.

Measurement Procedures

⚠DANGER

Observe the following precautions to avoid electric shock.

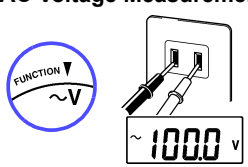
- **Always verify the appropriate setting of the Function Selector before connecting the test leads.**
- **Disconnect the test leads from the measurement object before switching the Function Selector.**
- **Never apply voltage to test leads when the Resistance or Continuity Check functions are selected. Doing so may damage the product and result in personal injury. To avoid electrical accidents, remove power from the circuit before measuring.**

Voltage Measurement

⚠DANGER

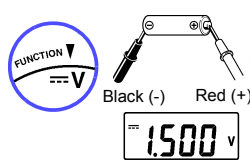
- **The maximum input voltage is 600 V DC/ 600 Vrms(sin) or 3x10⁶ V•Hz. Attempting to measure voltage in excess of the maximum input could destroy the product and result in personal injury or death.**
- **To avoid electrical shock, be careful to avoid shorting live lines with the test leads.**
- **For 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.**

AC Voltage Measurement



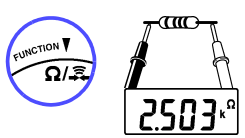
1. Move the Function Selector to the ~V position.
2. Connect the test leads to the measurement object, and read the indicated value. When measuring AC voltage, the polarity of leads can be ignored.

DC Voltage Measurement



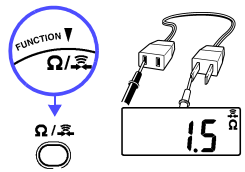
1. Move the Function Selector to the ⎓V position.
2. Connect the test leads to the measurement object, and read the indicated value. Connecting the leads of negative and positive side oppositely, "-" is displayed.

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 Ω/ button. (lights up)
2. Connect the test leads to the measurement object. When the continuity is established, the beeping sounds.

Recharging and Replacing the Batteries

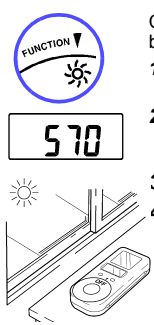
Recharging the Main Battery

⚠CAUTION

- Do not charge the unit outdoors where it will be exposed to direct sunlight, or place on the dashboard of automobiles. If the unit gets hot, the case may be disfigured or the unit damaged.
- You cannot charge the main battery when power is on. When charging, power the unit off.
- The main battery discharges naturally and may be discharged when the unit is purchased or if left unused for long periods. If this occurs, charge the battery for longer than usual.
- If the solar battery panel is soiled, you cannot charge the battery.

NOTE

- If the B mark lights, the internal main battery (rechargeable battery) is exhausted. If this occurs, the internal backup battery is used as a power source.
- If you charge the main battery according to the Instruction Manual and battery life is shorter than usual, the battery may be deteriorated. Please have the main battery replaced at the place where you purchased the unit.



Check the amount of light and charge the battery.

1. Move the Function Selector to the position
2. Place the 3245 with the solar battery panel facing the light, such as, near a window, but avoid direct sunlight.
3. Read the indicated value.
4. Turn off the power to charge. The main battery cannot be charged while the power is on. For charging time, refer to the table below.

Approximate charging and operating time

Display	Charging time	Operating time (approx.) *1	Illuminance (approx.)
1000 or more	5 hours	10 hours	50,000 lx or more
	3 hours	8 hours	
	1 hours	3 hours	
500	5 hours	5 hours	25,000 lx
100	10 hours	2 hours	5,000 lx
10	10 hours	10 minutes	1,000 lx

*1:Operating time is typical for DCV.

Replacing the Backup Battery and Disposing of the Main Battery

⚠WARNING

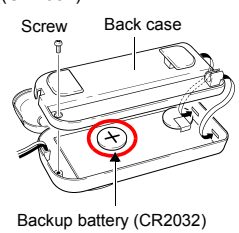
- **To avoid electric shock when replacing the batteries, first disconnect the test leads from the object to be measured.**
- **Before replacing the batteries, make sure that the Function Selector is OFF.**
- **When replacing the batteries, be sure to insert them with the correct polarity. Otherwise,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

NOTE

- Make sure you use the unit with the backup battery installed. If the backup battery is not installed, the unit will not function properly.
- If the B mark flashes, the back up battery is exhausted. Replace the backup battery. In this case, the internal main battery is exhausted and must be charged in a well-lit place.

Replacing the Backup Battery

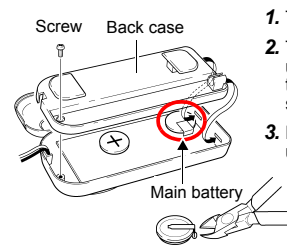
Necessary tool:
Precision Phillips screwdriver, Coin-shaped lithium battery (CR2032)



1. Turn OFF the power.
2. Turn the 3245 over and use a Phillips screwdriver to remove the one retaining screw from the back case.
3. Replace the CR2032 battery. Make sure the polarity is correct.
4. Mount the back case and tighten the retaining screw. After replacing, charge the main battery.

Disposing of the Main Battery

Necessary tool:
Precision Phillips screwdriver, wire cutter



1. Turn OFF the power.
2. Turn the 3245 over and use a Phillips screwdriver to remove the one retaining screw from the back case.
3. Remove the main battery using the wire cutter.