

# HIOKI

## 3244

### CARD HITESTER

#### INSTRUCTION MANUAL

December 2001 Revised edition 7 Printed in Japan  
3244A980-07 01-12H

### Introduction

Thank you for purchasing this HIOKI "3244 CARD HITESTER." To get the maximum performance from the unit, please read this manual first, and keep this at hand.

### Accuracy

(23°C ± 5°C 80%RH or less, no condensation)

Function	Range	Accuracy *5	Remarks	Over load protection
DCV [ $\overline{\text{---}}\text{V}$ ]	420.0 mV	±2.0% rdg. ±4 dgt.	*1 100 M $\Omega$ or over 11 M $\Omega$ approx. 10 M $\Omega$ approx. 10 M $\Omega$ approx.	500 V DC/ ACrms (sin)
	4.200 V	±0.7% rdg. ±4 dgt.		
	42.00 V	±1.3% rdg. ±4 dgt.		
	420.0 V	±1.3% rdg. ±4 dgt.		
ACV [ $\sim\text{V}$ ]	4.200 V	±2.3% rdg. ±8 dgt.	*2 50 to 500 Hz *1 11 M $\Omega$ or over 10 M $\Omega$ approx. 10 M $\Omega$ approx.	or 3 x 10 <sup>6</sup> V·Hz
	42.00 V	±2.3% rdg. ±8 dgt.		
	420.0 V	±2.3% rdg. ±8 dgt.		
	500 V	±2.3% rdg. ±8 dgt.		
$\Omega$	420.0 $\Omega$	±2.0% rdg. ±4 dgt.	*3 3.4 V or less 0.7 V (typ.) 0.5 V (typ.) 0.5 V (typ.) 0.5 V (typ.)	250 V DC/ ACrms (sin)
	4.200 k $\Omega$	±2.0% rdg. ±4 dgt.		
	42.00 k $\Omega$	±2.0% rdg. ±4 dgt.		
	420.0 M $\Omega$	±5.0% rdg. ±4 dgt.		
Continuity	420.0 $\Omega$	±2.0% rdg. ±6 dgt.	*3 3.4 V or less *4 50 $\Omega$ +30 $\Omega$	

\*1: Input impedance \*2: Frequency range \*3: Open terminal voltage  
\*4: Threshold level \*5: rdg. Displayed value, dgt. Resolution

### Safety Symbols

	This symbol is affixed to locations on the equipment where the operator should consult corresponding topics in this manual (which are also marked with the  symbol) before using relevant functions of the equipment. In the manual, this mark indicates explanations which it is particularly important that the user read before using the equipment.
	Indicates a device which is double-insulated.
	Indicates DC (Direct Current).
	Indicates AC (Alternating Current).

The following symbols are used in this Instruction Manual to indicate the relative importance of cautions and warnings.

	<b>DANGER</b> Indicates that incorrect operation presents extreme danger of accident resulting in death or serious injury to the user.
	<b>WARNING</b> Indicates that incorrect operation presents significant danger of accident resulting in death or serious injury to the user.
	<b>CAUTION</b> Indicates that incorrect operation presents possibility of injury to the user or damage to the equipment.
<b>NOTE</b>	Denotes items of advice related to performance of the equipment or to its correct operation.

### Specification

Measurement method	Double integration
Display	3-1/2 digits, LCD, 4199 count max.
Battery low display	
Range switching	Auto-range
Sampling rate	2.5 times/second
Operating temperature and humidity	0 to 40°C (32 to 104 °F), 80%RH max (no condensation)
Storage temperature and humidity range	-20 to 60°C (-4 to 140 °F), 70%RH max (no condensation)
Temperature characteristics	Measurement accuracy x 0.1 /°C
(50/60 Hz)	NMRR: 40 dB or more [ $\overline{\text{---}}\text{V}$ ] (50 or 60 Hz [ $\sim\text{V}$ ])
Noise rejection ratio	CMRR: 100 dB or more [ $\overline{\text{---}}\text{V}$ ], 60 dB or more [ $\sim\text{V}$ ]
Power supply	CR2032 (3 VDC) x 1
Continuous operating time	150 hours [ $\overline{\text{---}}\text{V}$ ]
Rated power	4.0 mW [ $\overline{\text{---}}\text{V}$ ], 0.15 mW [Auto-power Save] (Maximum rated power: 15 mVA continuity test at short-circuit)
Dielectric strength	3.7 kVrms sin (for one minute) between input and case
Dimensions and mass	55W x 109H x 9.5D mm, 60 g 2.17"W x 4.28"H x 0.37"D, 2.1 oz.
Maximum rated working voltage (for 1 minute)	500 VDC/ACrms (sin) or 3 x 10 <sup>6</sup> V·Hz [ $\overline{\text{---}}\text{V}$ ], [ $\sim\text{V}$ ]
Accessories	Instruction Manual, carrying case
Standards accuracy	Safety EN 61010-1:1993 Pollution Degree 2 Overvoltage Category II (anticipated transient overvoltage 4000 V)
EMC	EN 61326-1:1997+A1:1998

### Safety

In order to ensure safe operation and to obtain maximum performance from the unit, observe the cautions listed below.

#### DANGER

This equipment is designed according to IEC 61010-1 Safety Standards, and has been tested for safety prior to shipment. During high voltage measurement, incorrect measurement procedures could result in injury or death, as well as damage to the equipment. Please read this manual carefully and be sure that you understand its contents before using the equipment. The manufacturer disclaims all responsibility for any accident or injury except that resulting due to defect in its product.

#### ■ Overvoltage Categories

To ensure safe use of measurement, IEC 60664 establishes safety level standards for different locations, classified as CAT I through CAT IV, and called overvoltage categories. These are defined as follows.

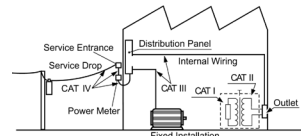
CAT I: Secondary electrical circuits that are connected to a wall outlet through a transformer or similar device.

CAT II: Primary electrical circuits in equipment connected to a wall outlet via 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 between the distribution panel and outlets.

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

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. Use of a lower category product in a higher category environment could result in a severe accident and must be carefully avoided.



### Inspection

When the unit is delivered, check and make sure that it has not been damaged in transit. If the unit is damaged or fails to operate according to the specifications, contact your dealer or HIOKI representative. If reshipping the unit, preferably use the original packing.

#### Before Use

Before using the unit, inspect it and check the operation to make sure that the sheathing on the leads is not damaged and that no bare wire is exposed. If there is damage, using the unit could cause electric shock. Contact your dealer or HIOKI representative.

### Precautions

#### WARNING

To prevent electric shock, do not allow the unit to become wet and do not use the unit when your hands are wet.

#### CAUTION

- The unit should always be operated indoors in a range from 0 to 40°C and 35 to 80%RH or less, but it can be safely used at temperatures as low as -10°C.
- Do not store or use the unit where it will be exposed to direct sunlight, high temperatures, high humidity, or condensation. If exposed to such conditions, the unit may be damaged, the insulation may deteriorate, and the unit may no longer satisfy its specifications.
- This unit is not constructed to be waterproof or dustproof, so do not use it in a very dusty environment or in one where it will get wet.
- Do not use the unit near any device which generates strong electromagnetic radiation or near a static electrical charge, as these may cause errors.
- Do not use the unit where it may be exposed to corrosive or explosive gases. The unit may be damaged, or explosion may occur.
- To avoid damage to the unit, do not subject the equipment to vibrations or shocks during transport or handling. Be especially careful to avoid dropping the equipment.

### Functions and Display

#### Auto Power Save Function

- This function automatically switches to the power save state when 30 minutes have elapsed since the last operation.
- The auto power save function is activated automatically when the power is turned on.
- To restore from the auto power save state, turn the function switch to the OFF position once.

**NOTE:** The auto-power save function cannot be canceled.

#### Auto-range Function

When measuring a DC voltage [ $\overline{\text{---}}\text{V}$ ], AC voltage [ $\sim\text{V}$ ], or resistance [ $\Omega$ ], the measurement range is automatically set to the most appropriate range. Manual range setting is not possible.

#### Overflow Display

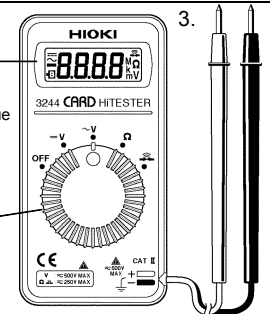
When the input exceeds the measurement range, "OF" is displayed.

### Names and Functions of Parts

- Display
- Function switch  
OFF / DC voltage [ $\overline{\text{---}}\text{V}$ ] /  
AC voltage [ $\sim\text{V}$ ] /  
Resistance [ $\Omega$ ] /  
Continuity check []
- Red test lead (+)
- Black test lead (-)

Display :  
Measured value  
Units  
Symbols  
Decimal point

Connect the test leads to the object to be measured.



### Measurement Method

#### DANGER

- Before taking a measurement, check the position of the function switch. Setting the function incorrectly may damage the unit or cause an accident that might result in injury or death. When changing the function, disconnect the test leads from the object to be measured.
- Do not input a voltage to the resistance measurement function and the continuity test function. Doing so may damage the unit or cause an accident resulting in injury or death.
- At the time as the continuity test, to avoid electrical accidents, turn off the power before measuring a circuit.

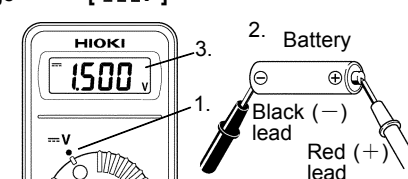
#### Voltage Measurements

#### DANGER

- The maximum rated working voltage is 500 VAC/DCrms or 3 x 10<sup>6</sup> V/Hz. Do not measure voltage in excess of these limitations, as doing so may damage the unit or cause an accident that might result in injury or death.
- If the end of a test lead short-circuits lines with a voltage between them, this is very dangerous and can lead to a serious accident. Exercise great care when measuring voltages.
- For safety, always carry out measurement with the test leads on the secondary side of the breaker.
- The maximum rated voltage to earth is 500 VAC/DCrms. Do not attempt to measure voltages exceeding 500 V with respect to earth. This could result in injury or damage to the unit.

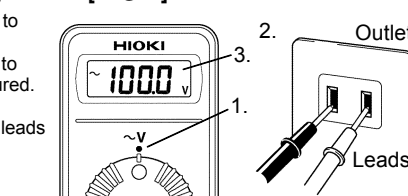
#### Measuring DC Voltage [ $\overline{\text{---}}\text{V}$ ]

- Set the function switch to  $\overline{\text{---}}\text{V}$ .
- Connect the test leads to the object to be measured.
- Read the display.



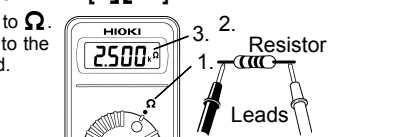
#### Measuring AC Voltage [ $\sim\text{V}$ ]

- Set the function switch to  $\sim\text{V}$ .
- Connect the test leads to the object to be measured. When measuring AC voltage, the polarity of leads can be ignored.
- Read the display.



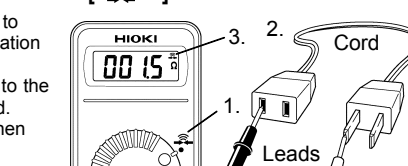
#### Measuring Resistance [ $\Omega$ ]

- Set the function switch to  $\Omega$ .
- Connect the test leads to the object to be measured.
- Read the display.



#### Continuity Test []

- Set the function switch to . The "" indication appears.
- Connect the test leads to the object to be measured.
- Conductivity is good when the buzzer sounds.



### Maintenance

#### WARNING

Do not attempt to adjust or repair the unit with the case open and with voltage being input. Such adjustments or repairs should only be made by a technician who fully understands the dangers involved.

#### CAUTION

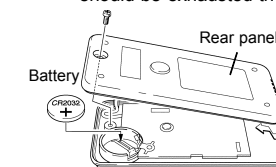
- If the protective functions of the unit are damaged, either remove the unit from service or post warnings to prevent others from using the unit inadvertently.
- Gently wipe dirt from the surface of the unit with a soft cloth moistened with a small amount of water or mild detergent. Do not try to clean the unit using cleaners containing organic solvents such as benzene, alcohol, acetone, ether, ketones, thinners, or gasoline. They may cause discoloration or damage.
- When not in use for a long time, to prevent possible corrosion caused by battery leakage, remove the battery before storage.
- If the unit is not functioning properly, check the battery and test leads wiring. If a problem is found, contact your dealer or HIOKI representative. Pack the unit carefully so that it will not be damaged during transport, and write a detailed description of the problem. HIOKI cannot bear any responsibility for damage that occurs during shipment.

### Replacing Batteries

#### WARNING

- If the unit is connected to a line that is to be measured, dangerous voltage levels may be applied to the terminals, and removing the case may expose live components. To avoid electric shock when replacing the battery, first disconnect the test leads from the object to be measured. Also, after replacing the battery, always replace the cover and tighten the screw before using the unit.
- Always use the specified battery, and when replacing the battery, be sure to insert them with the polarity correct.
- Do not short-circuit used battery, disassemble them, or throw them in a fire. Doing so may cause the battery to explode.
- Keep used battery out of the reach of children.
- Dispose of used battery according to their type in the prescribed manner and in the proper location.

- Remove the test leads from the test item, and power the unit off.
  - Remove the unit from the case, and remove the screws on the rear panel.
  - Remove the used battery.
  - Being careful about the polarity, insert the new battery of the specified type.
  - Replace the rear panel and fasten the screws.
- NOTE:** When the battery are exhausted, the "" indication appears in the display. Batteries are not included in the basic price of this unit. (For testing purposes, battery are inserted into the unit, but if these should be exhausted they are not replaced free of charge.)



## HIOKI

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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:	CARD HITESTER
Model Number:	3244
The above mentioned product conforms to the following product specifications:	
Safety:	EN61010-1:1993 EN61010-2-031:1994
EMC:	EN61326-1:1997+A1:1998 Class B 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 Yuji Hioki President 3244A999-02 7 August 2001	

## HIOKI 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: 3 2 4 4

S/N: \_\_\_\_\_

INSPECTOR

T. Kobayashi  
T. Kobayashi