HIOKI

# DIGITAL HiTESTER

## 3239 (4-terminal Ω function)
## 3238 (Advanced model)
## 3237 (Economically priced)

Field measuring instruments

Outstanding performance for production lines with a sampling rate of 3.3 ms

# *High-speed DMM*

The **DIGITAL HiTESTER**s **3237**, **3238**, and **3239** can perform 3.3 ms high-speed sampling, and come equipped with a comparator, external input and output, and an RS-232C interface. These three high-performance DMMs can be used not only in laboratories, but in production lines that require the minimal tact time.

The **3237** is the basic model, and is equipped with the basic necessary functions. The **3238** is a high-precision, broadband model that also features current measurement terminals and a frequency measurement function. The **3239** includes the functions of the **3238** plus the 4-terminal resistance measurement function. All three units are designed with emphasis on measurement speed and safety.

**ISO 9001** JMI-0216

**ISO14001** JQA-E-90091

# 3.3 ms/sample
# High-speed Performance and Reliability

## Features

■ Samples at rates of up to 300 samples/sec. (3.3 ms/sample)
■ Comparator function provides high-speed pass/fail evaluation
■ Equipped with external input and output for sequence control
■ Usefull Save/Load function helps work go faster

The **3237**, **3238** and **3239** are equipped with a variety of functions that help minimize tact time in production lines.

For details, see page 2.

### ■ Low power resistance measurement function prevents sample deterioration

The **3237**, **3238** and **3239** use a low power Ω function to minimize sample degradation when measuring resistance. With this function, open terminal voltage never goes over 0.45 V DC, and measurement current never surpasses 100 μA DC.

For specifications, see pages 5 and 6.

**Sampling speed** Values in the ( ) show samples/second.

| Frequency | FAST* | MEDIUM | SLOW |
|---|---|---|---|
| 50 Hz | 3.3 ±1 ms (300) | 130 ±5 ms (8) | 1,040 ±50 ms (1) |
| 60 Hz | 3.3 ±1 ms (300) | 108 ±5 ms (9) | 1,080 ±50 ms (1) |

* Approximately 55 ms required for self-calibration at 30-minute intervals. Does not apply at resistances higher than 2MΩ, or LPΩ higher than 200kΩ (see page 5).
For the 3238 and 3239's frequency function gate time, see page 5.

### ■ True RMS value measurement

Both the **3237** and **3238** use true RMS measurement for determination of distorted waveforms. In fact, **HIOKI** guarantees accuracy of the **3238** and **3239** for AC voltage of 10 Hz to 300 kHz, and AC current of 10 Hz to 30 kHz.

For specifications, see pages 5 and 6.

### ■ Interface supports full remote operation

Measurement can be automated by using a controller to operate the **3237** or **3238** through the GP-IB or RS-232C interface.

For details, see page 3.

### ■ Select from 3 types of units

#### The basic and economical **3237**

✓ DC V basic accuracy: ±0.025% rdg.±2dgt.

| | | 3237 | 3238 | 3239 |
|---|---|---|---|---|
| ⎓V | DC voltage [5 ranges, 199.999 mV to 1000.00 V] | ✓ | ✓ | ✓ |
| ~V | AC voltage [4 ranges, 1999.99 mV to 700.00 V] | ✓ | ✓ | ✓ |
| Ω 2-terminal | Resistance [7 ranges, 199.999 Ω to 100.000 MΩ] | ✓ | ✓ | ✓ |
| LPΩ 2-terminal | Resistance LP [4 ranges, 1999.99 Ω to 1999.99 MΩ] | ✓ | ✓ | ✓ |
| | Continuity check [A buzzer sounds when resistance is less than 50.00 Ω] | ✓ | ✓ | ✓ |
| | Diode check [Anode-cathode voltage in the 1999.99 mV range] | ✓ | ✓ | ✓ |
| ~CLAMP | Current measurement by clamp sensor | ✓ | ✓ | ✓ |
| ⎓A ~A | AC/DC current [2 ranges, 199.999 mA and 1999.99 mA] | | ✓ | ✓ |
| Hz | Frequency [5 ranges, 99.9999 Hz to 300.000 kHz] | | ✓ | ✓ |
| Ω 4-terminal | Resistance [5 ranges,199.999 Ω to 1999.99 kΩ] | | | ✓ |
| LPΩ 4-terminal | Resistance LP [4 ranges,1999.99 Ω to 1999.99 MΩ] | | | ✓ |

For clamp specifications, see page 4
For DIGITAL HiTESTER specifications, see pages 5 and 6

#### The high-accuracy & multi-functional **3238**

✓ DC V basic accuracy: ±0.01% rdg.±2dgt.
✓ Includes frequency measurement for AC and DC A

#### For 4-terminal resistance measurement **3239**

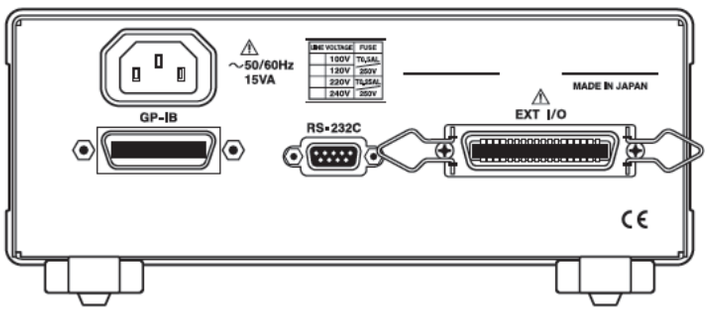
✓ DC V basic accuracy: ±0.01% rdg.±2dgt.
✓ All the functions of the 3238, plus 4-terminal Ω measurement

### ■ Reliable resistance measurement using the 4-terminal measurement method

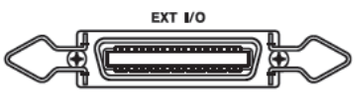
Using 4-terminal resistance measurement, which is unaffected by variables such as measurement lead wiring resistance, the **3239** displays outstanding resistance measurement capabilities.

# Minimizing tact time with sequence control

## High-speed comparator and external input/output

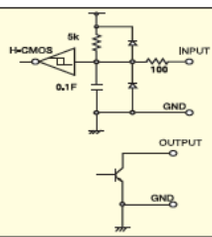



■ EXT.I/O




Connector used: 57RE-40360-730B (D29) (DDK Ltd.)
Conforming connector: ADS-HC360001-010 (Honda Tsushin Kogyo Co., Ltd.), RC30-36P (Hirose Electric Co., Ltd.) and other suitable connectors

Loading of saved settings from panel.....LOAD 0 to 4
Measurement start trigger input.....TRIG
Measurement end signal output.....EOC
Comparator output.....Hi, IN, Lo
Internal power supply +5 V (max. 50 mA).....INT. DC V
Internal GND.....INT. GND




Input type: CMOS level
Signal voltage: Hi 3.8 V to 5.0 V, Lo 0 V (shorted) to 1.2 V
Logic: Negative logic (Low active)

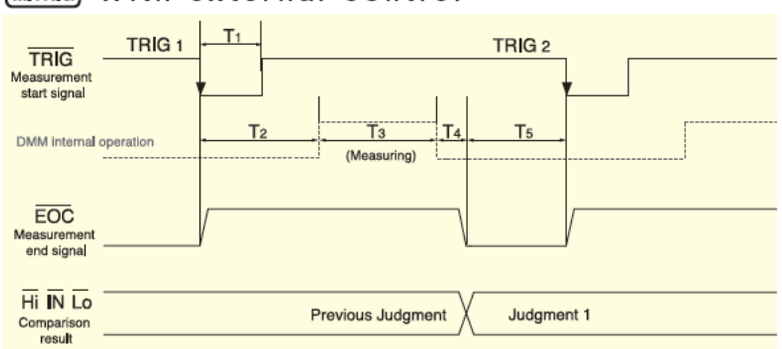
Output type: Open collector
Applied voltage: Max. 35 V DC, 50 mA
Logic: Negative logic (Low active)

### ● Comparator with external output COMP

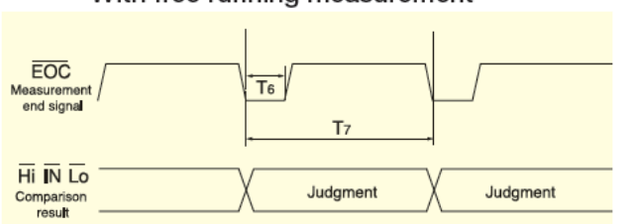
You can set the upper and lower limits, and display one of 3 results: Hi, IN or Lo. In addition to LED and buzzer results, open collector output results are provided through the external input/output terminals.

X: measurement value, H: Upper limit, L: Lower limit
X > H.....Hi
H ≧ X ≧ L.....IN
L > X.....Lo

### M.TRIG With external control




### INT. TRIG With free running measurement




| | | | Time MIN. | Time TYP. | Time MAX. |
|---|---|---|---|---|---|
| T1 | Measurement trigger pulse width | | 500 µs | ... | ... |
| T2 | Trigger delay time | | See below | | |
| T3 | Sampling time using external control | FAST | See the table at the top right of page 1. | | |
| | | MEDIUM | | | |
| | | SLOW | | | |
| T4 | Internal operation time | | ... | 2.0 ms | ... |
| T5 | From the end of measurement until the next trigger | | 500 µs | ... | ... |
| T6 | EOC Lo level time for free running measurement | FAST | ... | 1.7 ms | ... |
| | | MEDIUM | ... | 50 ms | ... |
| | | SLOW | ... | 500 ms | ... |
| T7 | Sampling time for free running measurement | FAST | See the table at the top right of page 1. | | |
| | | MEDIUM | | | |
| | | SLOW | | | |

### ■ Save/Load function for rapid response to various work situations

You can save and recall a maximum of 30 DMM setting conditions for various range and comparator values.

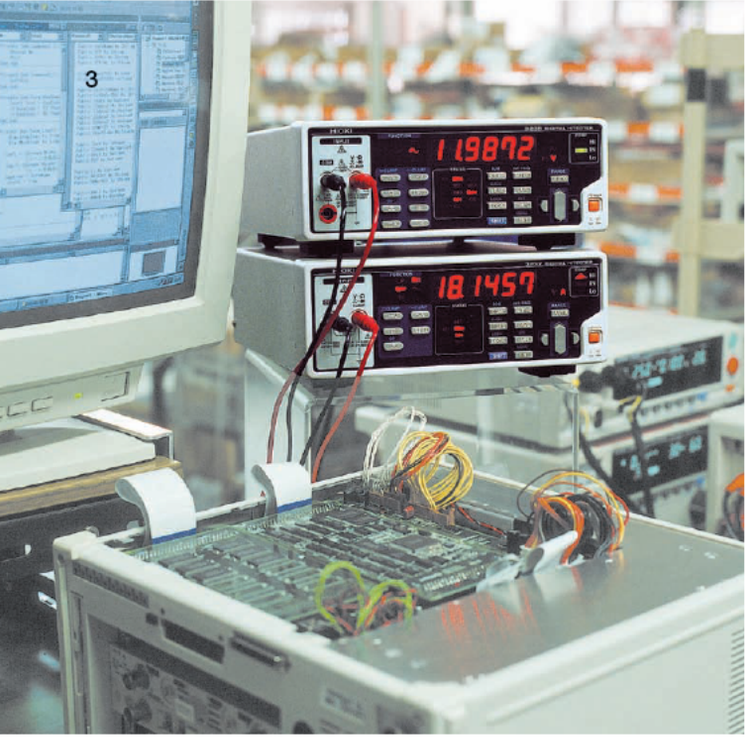
SAVE LOAD

### ■ A trigger delay designed for measurement safety

The **3237**, **3238** and **3239** are equipped with a trigger delay function that can be set to manual or automatic for the time period between trigger input and the display of the comparator result (see T2 in the figure above).

Manual settings: Designate periods in terms of millisecond intervals between 0.000 s and 9.999 s
Automatic settings:

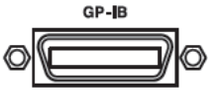
| | FAST | MEDIUM | SLOW |
|---|---|---|---|
| DC V | 3 ms | 3 ms | 3 ms |
| AC V | 500 ms | 800 ms | 1.5 s |
| Ω (200Ω to 200 kΩ) | 3 ms | 3 ms | 3 ms |



# Automation of Line Inspection

## Available interfaces

GP-IB



### ■ GP-IB (option –01 specifications)

**Purpose:** Remote control and measurement value output

**Standards conformance** : IEEE -488.1 1987

**Reference standard** : IEEE –488.2 1987

**Transmission speed**

(reference data)

Power line frequency: 60Hz
TRIG: EXT.Trig
Command: [:READ ?]

| | FAST | MEDIUM | SLOW |
|---|---|---|---|
| Transmission speed | 7.0 ms | 108 ms | 1,080 ms |

Controller: PC-9801 RA (NEC)
OS: MS-DOS Ver. 3.30, N88-BASIC Ver. 6.0

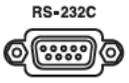
**Interface function:**

SH1, AH1, T6, L4, SR1, RL1, PP0, DC1, DT1, CO

**User code** : ASCII code

**User connector** : 24-pin IEEE488 interface bus connector

RS-232C



### ■ RS-232C (standard)

**Purpose:** Remote control and measurement value output

**Transmission system** : Asynchronous method Full duplex

**Transmission speed** : 9600 bps (fixed)

**Data bit length** : 8 bits

**Stop bits** : 1

**Parity bits** : None

**Delimiter** : CR+LF

**Handshaking** : Hardware

**XON/XOFF** : Not used

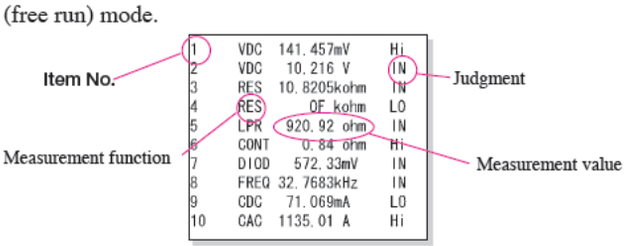
**Connector** : 9-pin D-sub connector

All functions except switching the power on and off can be completely remote controlled and measurement data collected via either the GP-IB or RS-232C interface

**Please inquire regarding compatibility with the command sets of other manufacturers.**

### ■ Output data to a printer (option)

When an RS-232C compatible **PRINTER 9442** is connected, you can print measurements by pressing the **M.TRIG** key if in manual trigger mode, or the **ENT** key if in internal trigger (free run) mode.




### ■ Equipped with a foot switch for printer control

As an alternative to pressing the **M.TRIG** key or the **ENT** key, you can also connect a foot switch to the external I/O TRIG terminal. You can then initiate printing by stepping on the foot switch (closing the circuit).

**PRINTER 9442**

**CONNECTOR CABLE 9444**

Cord length approx 1.5m

**AC ADAPTER 9443**

**9443-02** (For the EU) **9443-01** (For Japan)

**9443-03** (For the America)

Please specify appropriate model number suffix when ordering.

**Printing method** : Thermal serial dot matrix
**Paper width** : 112 mm
**Printing speed** : 52.5cps
**Power supply** : **AC ADAPTER 9443** or supplied nickel-hydride battery (capable of printing about 3000 lines on full charge from 9443)
**Dimensions and mass** : Approx. 160W × 66.5H × 170D mm; approx. 580 g

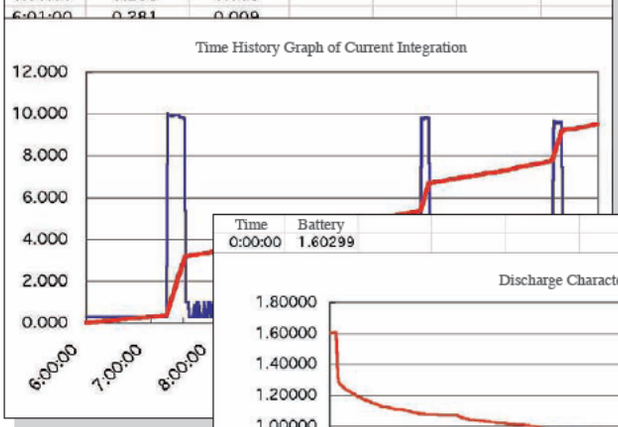
When you purchase a **PRINTER 9442**, you must also purchase a **CONNECTION CABLE 9444** and a **AC ADAPTER 9443** to connect it to the DMM.

# Efficient Evaluation Testing

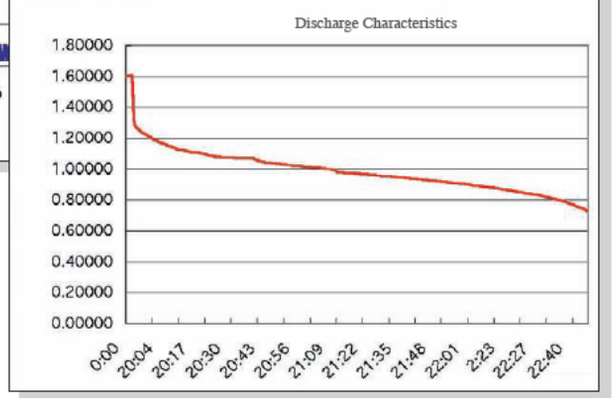
## PC measurement using the high accuracy and broad coverage of the 3238 and 3239

### Example of data processing with Microsoft Excel

| Time | Current | Integration |
|---|---|---|
| 6:00:00 | 0.288 | 0.005 |
| 6:01:00 | 0.281 | 0.009 |




| Time | Battery |
|---|---|
| 0:00:00 | 1.60299 |




### ■ Highly accurate measurement with minimal drift

The unit uses self-regulation to suppress drift. Also, the DMM is ideal for collecting data over extended periods of time.

### ■ Using Excel for efficient data processing

The DMM supports fast data processing by allowing you to transfer data directly to a worksheet through either the GP-IB or RS-232C interface.

Consult your nearest **HIOKI** dealer for details on software

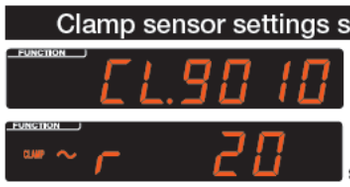
## ■ Supports large AC current measurement by clamp sensor

### ■ Easy setup ～CLAMP

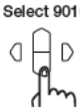
Both the **3237**, **3238** and **3239** can measure live line currents using an optional clamp sensor. Enter the name of the clamp sensor being used and display current values simply by selecting a range.

| CLAMP ON SENSOR | 9010-50 | 9018-50 | 9132 |
|---|---|---|---|
| | cord length 3m | cord length 3m | cord length 3m |
| Rated current | 10/20/50/100/200/500 A AC | | 20/50/100/200/500/1000 A AC |
| Accuracy (23 °C3 °C, 45 to 66Hz) | 3.0 % f.s. | 1.5 %rdg.0.1 %f.s. | 3.0 %f.s.0.5 mV |
| Frequency characteristics (deviation from the basic accuracy) | at 40 Hz to 1 kHz 6 % (10, 20A range) 3 % (50 to 500A range) | at 40 Hz to 3 kHz 1.0 % max. | at 40 Hz to 1 kHz 1.0 % max. |
| Max. permissible input (cont.) (45 to 66Hz) | 150 Arms(10 to 50A range) 400 Arms(100, 200A range) 650 Arms (500A range), 1400 Arms (For 1 min.) | | within 1000 Arms (cont.) 1500 Arms max. (for 2 min.) |
| Maximum rated voltage to earth | 600 Vrms (850 Vpeak) insulated conductor | | |
| Measurable conductor diameter | ø46 mm or 50X20 mm bus bar | | ø55X80 mm bus bar |
| Dimensions and mass | Approx. 78W×190H×35D mm, 420g | | Approx. 99 WX192 HX33 Dmm, 580g |

**Clamp sensor settings screen**




Select 9010



Select the 20 A range.

From the menu's clamp sensor selection screen, select the name of the sensor with the cursor key and press the ENT key. Then, select the same range as you set for the sensor with the cursor key.

* The accuracy of the clamp sensors shown on the left (when used with the DMM) is calculated by taking: the difference in the AC V accuracy for the DMM (dgt.) × 10 (dgt.).
For the AC V accuracy of the DMM, see page 6.

In addition to the sensors described above, you can also connect the **3283**, **3284**, **3285** (requires the **9094**) Clamp On HiTesters, and the **9277**, **9278**, **9279** (requires the **9555**) DC Sensors.

## ■ 3237, 3238, 3239 common specifications (Accuracy at 23˚C±5˚C (73˚F±9˚F), 80% rh or less)

### ● DC voltage (DC V)

| Range | Resolution | Full scale | Input impedance | Overload protection |
|---|---|---|---|---|
| 200 mV | 1 μV | 199.999mV | Greater than 100MΩ | 1000 V DC<br>750 V AC<br>However, less than $10^7$ V Hz |
| 2000 mV | 10 μV | 1999.99mV | Greater than 100MΩ | |
| 20 V | 100 μV | 19.9999 V | Appox. 11 MΩ | |
| 200 V | 1 mV | 199.999 V | Appox. 10 MΩ | |
| 1000 V | 10 mV | 1000.00 V | Appox. 10 MΩ | |

### ● AC voltage (AC V)

| Range | Resolution | Full scale | Input impedance | Overload protection |
|---|---|---|---|---|
| 2000 mV | 10 μV | 1999.99mV | Appox. 1 MΩ | 600 V DC<br>750 V rms, 1000Vpeak<br>However, less than $10^7$ V Hz |
| 20 V | 100 μV | 19.9999 V | Appox. 1 MΩ | |
| 200 V | 1 mV | 199.999 V | Appox. 1 MΩ | |
| 700 V | 10 mV | 750.00 V | Appox. 1 MΩ | |

### ● Resistance (Ω) 2-terminal measurement

| Range | Resolution | Full scale | Current | Open terminal voltage | Overload protection |
|---|---|---|---|---|---|
| 200 Ω | 1 mΩ | 199.999 Ω | Appox. 1 mA | 6V DC max. | 500Vpeak |
| 2000 Ω | 10 mΩ | 1999.99 Ω | Appox. 1 mA | 6V DC max. | |
| 20 kΩ | 100 mΩ | 19.9999kΩ | Appox. 100μA | 6V DC max. | |
| 200 kΩ | 1 Ω | 199.999kΩ | Appox. 10μA | 6V DC max. | |
| 2000 kΩ | 10 Ω | 1999.99kΩ | Appox. 1 μA | 6V DC max. | |
| 20 MΩ | 100 Ω | 19.9999MΩ | Appox. 100nA | 6V DC max. | |
| 100 MΩ | 1 kΩ | 100.000MΩ | Appox. 20nA | 6V DC max. | |

For fast sampling in the 20 MΩ range or higher.

| Frequency | FAST* | MEDIUM | SLOW |
|---|---|---|---|
| 50 Hz | 20 ±1 ms | 170 ±5 ms | 1,360 ±50 ms |
| 60 Hz | 16.7 ±1 ms | 142 ±5 ms | 1,420 ±50 ms |

For sampling at in the 2 MΩ range or the LPΩ 200 kΩ range or higher

| Frequency | FAST* |
|---|---|
| 50 Hz | 20 ±1 ms |
| 60 Hz | 16.7 ±1 ms |

* Approximately 55 ms required for self-calibration at 30-minute intervals.

### ● Resistance (Ω) at Low Power function 2-terminal measurement

| Range | Resolution | Full scale | Current | Open terminal voltage | Overload protection |
|---|---|---|---|---|---|
| 2000 Ω | 10 mΩ | 1999.99 Ω | Appox. 100μA | 0.45V DC max. | 500Vpeak |
| 20 kΩ | 100 mΩ | 19.9999kΩ | Appox. 10μA | 0.45V DC max. | |
| 200 kΩ | 1 Ω | 199.999kΩ | Appox. 1 μA | 0.45V DC max. | |
| 2000 kΩ | 10 Ω | 1999.99kΩ | Appox. 100nA | 0.45V DC max. | |

### ● Continuity check

| Range | Resolution | Full scale | Current | Open terminal voltage | Overload protection |
|---|---|---|---|---|---|
| 2000 Ω | 10 mΩ | 1999.99 Ω | Appox. 100μA | 0.45V DC max. | 500 Vpeak |

A built-in buzzer sounds when the resistance value is less than 50.00 Ω.

### ● Diode check

| Range | Resolution | Full scale | Current | Open terminal voltage | Overload protection |
|---|---|---|---|---|---|
| 2000 mV | 10 μV | 1999.99mV | Appox. 1 mA | 6V DC max. | 500 Vpeak |

## ■ 3238, 3239 specifications (Accuracy at 23˚C±5˚C (73˚F±9˚F), 80% rh or less)

### ● AC/DC current (A)

| Range | Resolution | Full scale | Internal resistance | Overload protection |
|---|---|---|---|---|
| 200 mA | 1 μA | 199.999mA | Appox. 1 Ω | 250V, 2A fuse |
| 2000 mA | 10 μA | 1999.99mA | Appox. 100 m Ω | |

### ● DC current (DC A) Accuracy %, ppm=reading error, d=digit error

| Range | Sampling | | | Thermal coefficient |
|---|---|---|---|---|
| | SLOW | MEDIUM | FAST | |
| 200 mA | ±0.1 %±6d | ±0.1 %±10d | ±0.1 %±300d | ±100ppm±0.6d |
| 2000 mA | ±0.15%±6d | ±0.15%±10d | ±0.15%±300d | ±150ppm±0.6d |

### ● AC current (AC A) 200mA range Accuracy %, ppm=reading error, d=digit error

### ● AC current (AC A) 2000mA range Accuracy

| Range | Frequency | Sampling | | | Thermal coefficient | Sampling | | | Thermal coefficient |
|---|---|---|---|---|---|---|---|---|---|
| | | SLOW | MEDIUM | FAST | | SLOW | MEDIUM | FAST | |
| All Ranges | 10 Hz to 20 Hz | ±1.0%±200d | undefined | undefined | ±0.1 %±20d | ±1.2%±200d | undefined | undefined | ±0.12%±20d |
| | 20 Hz to 45 Hz | ±0.4%±200d | undefined | undefined | ±400ppm±20d | ±0.6%±200d | undefined | undefined | ±600ppm±20d |
| | 45 Hz to 300 Hz | ±0.3%±100d | ±0.5%±200d | undefined | ±300ppm±10d | ±0.4%±100d | ±0.6%±200d | undefined | ±400ppm±10d |
| | 300 Hz to 1 kHz | ±0.3%±100d | ±0.4%±200d | ±0.4%±300d | ±300ppm±10d | ±0.4%±100d | ±0.6%±200d | ±0.6%±300d | ±400ppm±10d |
| | 1 kHz to 3 kHz | ±0.3%±100d | ±0.4%±200d | ±0.4%±300d | ±300ppm±10d | ±0.6%±200d | ±0.6%±200d | ±0.6%±300d | ±600ppm±20d |
| | 3 kHz to 10 kHz | ±0.5%±300d | ±0.5%±300d | ±0.5%±400d | ±500ppm±30d | ±1.2%±300d | ±1.2%±300d | ±1.2%±400d | ±0.12%±30d |
| | 10 kHz to 30 kHz | ±1.0%±300d | ±1.0%±300d | ±1.0%±400d | ±0.1 %±30d | undefined | undefined | undefined | undefined |

Specified input is 16 mA or higher

Specified input is 160 mA or higher

Additional error due to crest factor: 1<CF≦2: ±200d, 2<CF≦3: ±500d, 3<CF: Outside the assured accuracy range

### ● Frequency (Hz) Source is AC V only and input level is higher than 8% of full scale

| Range | Resolution | Full scale | Internal resistance | Min. measurement | Overload protection |
|---|---|---|---|---|---|
| 100 Hz | 0.1 mHz | 99.9999 Hz | Appox. 1M Ω | 10 Hz | 600 V DC<br>750 V rms,<br>1000Vpeak<br>However, less than $10^7$ V Hz |
| 1 kHz | 1 mHz | 999.999 Hz | Appox. 1M Ω | 10 Hz | |
| 10 kHz | 10 mHz | 9.99999kHz | Appox. 1M Ω | 10 Hz | |
| 100 kHz | 100mHz | 99.9999kHz | Appox. 1M Ω | 10 Hz | |
| 300 kHz | 1 Hz | 999.999kHz | Appox. 1M Ω | 10 Hz | |

### ● Frequency (Hz) Accuracy %, ppm=reading error, d=digit error

| Range | For all gate times | Thermal coefficient |
|---|---|---|
| | Square-wave input between 10 Hz to 300 kHz, 10 V p-p. | |
| All Ranges | ±0.015% ±2d | ±5 ppm |

#### Frequency gate time

| FAST | MEDIUM | SLOW |
|---|---|---|
| 15 ±6 ms | 110 ±10 ms | 1,010 ±20 ms |

Measurement time: from gate time to the input signal period × 2

## ■ 3239 specifications (Accuracy at 23˚C±5˚C (73˚F±9˚F), 80% rh or less)

### ● Resistance (Ω) 4-terminal measurement

| Range | Resolution | Full scale | Current | Open terminal voltage | Overload protection |
|---|---|---|---|---|---|
| 200 Ω | 1 mΩ | 199.999 Ω | Appox. 1 mA | 6V DC max. | V, Ω terminal 500Vpeak<br>SENSE terminal 400Vpeak |
| 2000 Ω | 10 mΩ | 1999.99 Ω | Appox. 1 mA | 6V DC max. | |
| 20 kΩ | 100 mΩ | 19.9999kΩ | Appox. 100μA | 6V DC max. | |
| 200 kΩ | 1 Ω | 199.999kΩ | Appox. 10μA | 6V DC max. | |
| 2000 kΩ | 10 Ω | 1999.99kΩ | Appox. 1 μA | 6V DC max. | |

### ● Resistance (Ω) at Low Power function 4-terminal measurement

| Range | Resolution | Full scale | Current | Open terminal voltage | Overload protection |
|---|---|---|---|---|---|
| 2000 Ω | 10 mΩ | 1999.99 Ω | Appox. 100μA | 0.45V DC max. | V, Ω terminal 500Vpeak<br>SENSE terminal 400Vpeak |
| 20 kΩ | 100 mΩ | 19.9999kΩ | Appox. 10μA | 0.45V DC max. | |
| 200 kΩ | 1 Ω | 199.999kΩ | Appox. 1 μA | 0.45V DC max. | |
| 2000 kΩ | 10 Ω | 1999.99kΩ | Appox. 100nA | 0.45V DC max. | |

● 3237 DC voltage (DC V) Accuracy %, ppm=reading error, d=digit error

| Range | Sampling | | | Thermal coefficient |
|---|---|---|---|---|
| | SLOW | MEDIUM | FAST | |
| 200 mV | ±0.026%±6d | ±0.026%±10d | ±0.035%±300d | ±20ppm±0.6d |
| 2000mV | ±0.025%±2d | ±0.025%±8d | ±0.03%±100d | ±15ppm±0.2d |
| 20 V | ±0.028%±5d | ±0.028%±10d | ±0.035%±100d | ±20ppm±0.5d |
| 200 V | ±0.028%±2d | ±0.028%±8d | ±0.035%±100d | ±20ppm±0.2d |
| 1000 V | ±0.028%±2d | ±0.028%±8d | ±0.035%±100d | ±20ppm±0.2d |

CMRR (50/60Hz Rl=1kΩ): SLOW 130dB, MEDIUM 90dB, FAST 20dB NMRR (50/60Hz ): SLOW 70dB, MEDIUM 50dB, FAST 0dB

● 3238, 3239 DC voltage (DC V) Accuracy %, ppm=reading error, d=digit error

| Sampling | | | Thermal coefficient |
|---|---|---|---|
| SLOW | MEDIUM | FAST | |
| ±0.012%±6d | ±0.012%±10d | ±0.02%±300d | ±12ppm±0.6d |
| ±0.01 %±2d | ±0.01 %±8d | ±0.015%±100d | ±10ppm±0.2d |
| ±0.016%±5d | ±0.016%±10d | ±0.02%±100d | ±16ppm±0.5d |
| ±0.016%±2d | ±0.016%±8d | ±0.02%±100d | ±16ppm±0.2d |
| ±0.016%±2d | ±0.016%±8d | ±0.02%±100d | ±16ppm±0.2d |

● 3237 AC voltage (AC V) Accuracy %, ppm=reading error, d=digit error

| Range | Frequency | Sampling | | | Thermal coefficient |
|---|---|---|---|---|---|
| | | SLOW | MEDIUM | FAST | |
| All Ranges | 10 Hz to 20 Hz | ±1.5%±200d | undefined | undefined | ±0.15%±20d |
| | 20 Hz to 45 Hz | ±0.5%±200d | undefined | undefined | ±500ppm±20d |
| | 45 Hz to 300 Hz | ±0.2%±100d | ±0.5%±300d | undefined | ±200ppm±10d |
| | 300 Hz to 3 kHz | ±0.2%±100d | ±0.2%±200d | ±0.2%±300d | ±200ppm±10d |
| | 3 kHz to 10 kHz | ±0.3%±200d | ±0.3%±200d | ±0.3%±300d | ±300ppm±20d |
| | 10 kHz to 30 kHz | ±1.5%±600d | ±1.5%±600d | ±1.5%±700d | ±0.15%±60d |
| | 30 kHz to 50 kHz | undefined | undefined | undefined | undefined |
| | 50 kHz to 100kHz | undefined | undefined | undefined | undefined |
| | 100kHz to 300kHz | undefined | undefined | undefined | undefined |

● 3238, 3239 AC V Accuracy %, ppm=reading error, d=digit error

| Sampling | | | Thermal coefficient |
|---|---|---|---|
| SLOW | MEDIUM | FAST | |
| ±0.8%±200d | undefined | undefined | ±800ppm±20d |
| ±0.2%±200d | undefined | undefined | ±200ppm±20d |
| ±0.1%±100d | ±0.3%±200d | undefined | ±100ppm±10d |
| ±0.1%±100d | ±0.1%±200d | ±0.1%±300d | ±100ppm±10d |
| ±0.1%±100d | ±0.1%±200d | ±0.1%±300d | ±100ppm±10d |
| ±0.3%±400d | ±0.3%±400d | ±0.3%±500d | ±300ppm±40d |
| ±0.3%±400d | ±0.3%±400d | ±0.3%±500d | ±300ppm±40d |
| ±1.5%±1000d | ±1.5%±1000d | ±1.5%±1100d | ±0.15%±100d |
| ±5.0%±5000d | ±5.0%±5000d | ±5.0%±5000d | ±0.5%±500d |

The accuracy above is standard for inputs higher than 8% of full scale (higher than 160 V for a range of 750 V).

Additional error due to crest factor: 1<CF<2: ±200d, 2<CF<3: ±0.2%rdg.±500d(3237), ±500d(3238, 3239), 3<CF: Outside the assured accuracy range

● 3237 Resistance (Ω) Accuracy %, ppm=reading error, d=digit error

| Measure-ment | Range | Sampling | | | Thermal coefficient |
|---|---|---|---|---|---|
| | | SLOW | MEDIUM | FAST | |
| 2-terminal measurement | 200 Ω | ±0.05 %±8d | ±0.05 %±18d | ±0.05%±300d | ±50ppm±0.8d |
| | 2000 Ω | ±0.05 %±2d | ±0.05 %±12d | ±0.05%±100d | ±50ppm±0.2d |
| | 20 kΩ | ±0.05 %±2d | ±0.05 %±12d | ±0.05%±100d | ±50ppm±0.2d |
| | 200 kΩ | ±0.05 %±2d | ±0.05 %±12d | ±0.05%±200d | ±50ppm±0.2d |
| | 2000 kΩ | ±0.05 %±2d | ±0.05 %±12d | ±0.05%±200d | ±50ppm±0.2d |
| | 20 MΩ | ±0.3 %±4d | ±0.3 %±20d | ±0.3 %±200d | ±300ppm±0.4d |
| | 100 MΩ | ±3.0 %±10d | ±3.0 %±50d | ±3.0 %±500d | ±0.3%±1d |

● 3238, 3239 Resistance (Ω) Accuracy %, ppm=reading error, d=digit error

| Sampling | | | Thermal coefficient |
|---|---|---|---|
| SLOW | MEDIUM | FAST | |
| ±0.03 %±8d | ±0.03 %±18d | ±0.03%±300d | ±30ppm±0.8d |
| ±0.02 %±2d | ±0.02 %±12d | ±0.02%±100d | ±20ppm±0.2d |
| ±0.02 %±2d | ±0.02 %±12d | ±0.02%±100d | ±20ppm±0.2d |
| ±0.02 %±2d | ±0.02 %±12d | ±0.02%±200d | ±20ppm±0.2d |
| ±0.03 %±2d | ±0.03 %±12d | ±0.03%±200d | ±30ppm±0.2d |
| ±0.2 %±4d | ±0.2 %±20d | ±0.2 %±200d | ±200ppm±0.4d |
| ±3.0 %±10d | ±3.0 %±50d | ±3.0 %±500d | ±0.3%±1d |

After zero adjustment. When measuring high resistance, use a shielded cable such as the **9236 CONNECTION CORD** (1.7m).

● 3237 Resistance (Ω) Accuracy at Low Power function

| Measure-ment | Range | Sampling | | | Thermal coefficient |
|---|---|---|---|---|---|
| | | SLOW | MEDIUM | FAST | |
| 2-terminal measurement | 2000 Ω | ±0.05 %±6d | ±0.05 %±14d | ±0.05 %±300d | ±50ppm±0.6d |
| | 20 kΩ | ±0.05 %±6d | ±0.05 %±14d | ±0.05 %±300d | ±50ppm±0.6d |
| | 200 kΩ | ±0.05 %±6d | ±0.05 %±14d | ±0.05 %±300d | ±50ppm±0.6d |
| | 2000 kΩ | ±0.3 %±6d | ±0.3 %±20d | ±0.3 %±500d | ±300ppm±0.6d |

● 3238, 3239 Resistance (Ω) Accuracy at Low Power function

| Sampling | | | Thermal coefficient |
|---|---|---|---|
| SLOW | MEDIUM | FAST | |
| ±0.02 %±6d | ±0.02 %±14d | ±0.02%±300d | ±20ppm±0.6d |
| ±0.02 %±6d | ±0.02 %±14d | ±0.02%±300d | ±20ppm±0.6d |
| ±0.02 %±6d | ±0.02 %±14d | ±0.02%±300d | ±20ppm±0.6d |
| ±0.2 %±6d | ±0.2 %±20d | ±0.2 %±300d | ±200ppm±0.6d |

After zero adjustment. When measuring high resistance, use a shielded cable such as the **9236 CONNECTION CORD** (1.7m).

● 3237 Continuity check Accuracy %, ppm=reading error, d=digit error

| Range | Sampling | Thermal coefficient |
|---|---|---|
| | FAST only | |
| 2000 Ω | ±0.05 %±300d | ±50ppm±0.6d |

● 3238, 3239 Continuity check Accuracy %, ppm=reading error, d=digit error

| Sampling | Thermal coefficient |
|---|---|
| FAST only | |
| ±0.02 %±300d | ±20ppm±0.6d |

● 3237 Diode check Accuracy %, ppm=reading error, d=digit error

| Range | Sampling | | | Thermal coefficient |
|---|---|---|---|---|
| | SLOW | MEDIUM | FAST | |
| 2000 Ω | ±0.025% ±2d | ±0.025% ±8d | ±0.03% ±100d | ±15ppm±0.2d |

● 3238, 3239 Diode check Accuracy %, ppm=reading error, d=digit error

| Sampling | | | Thermal coefficient |
|---|---|---|---|
| SLOW | MEDIUM | FAST | |
| ±0.01 %±2d | ±0.01 %±8d | ±0.015%±100d | ±10ppm±0.2d |

4-terminal measurement

● Resistance (Ω) Accuracy %, ppm=reading error, d=digit error

| Measure-ment | Range | Sampling | | | Thermal coefficient |
|---|---|---|---|---|---|
| | | SLOW | MEDIUM | FAST | |
| 4-terminal measurement | 200 Ω | ±0.03 %±8d | ±0.03 %±18d | ±0.03 %±300d | ±30ppm±0.8d |
| | 2000 Ω | ±0.02 %±2d | ±0.02 %±12d | ±0.02 %±100d | ±20ppm±0.2d |
| | 20 kΩ | ±0.02 %±2d | ±0.02 %±12d | ±0.02 %±100d | ±20ppm±0.2d |
| | 200 kΩ | ±0.02 %±2d | ±0.02 %±12d | ±0.02 %±200d | ±20ppm±0.2d |
| | 2000 kΩ | ±0.03 %±2d | ±0.03 %±12d | ±0.03 %±200d | ±30ppm±0.2d |

4-terminal measurement

● Resistance (Ω) Accuracy at Low Power function

| Sampling | | | Thermal coefficient |
|---|---|---|---|
| SLOW | MEDIUM | FAST | |
| No range | No range | No range | No range |
| ±0.02 %±6d | ±0.02 %±14d | ±0.02%±300d | ±20ppm±0.6d |
| ±0.02 %±6d | ±0.02 %±14d | ±0.02%±300d | ±20ppm±0.6d |
| ±0.02 %±6d | ±0.02 %±14d | ±0.02%±300d | ±20ppm±0.6d |
| ±0.2 %±6d | ±0.2 %±20d | ±0.2 %±300d | ±200ppm±0.6d |

The accuracy quoted above is for a contact resistance of 100 Ω or less.

## ■ 3237, 3238, 3239 General Specifications

- **AC measurement:** True RMS value measurement
- **Crest factor:** 3.0 max.
- **Ancillary functions:** Comparator, Average (0 to 99 times), Zero Adjust, Trigger (the display changes when the trigger is activated), and the Save/Load functions. (Up to 30 types of setting conditions)
- **Interface:** External input/output, RS-232C and GP-IB (option -01 specifications)
- **Display:** LED max. 199999 (999999 for frequency)
- **Sampling rate** (see page 1)**:** SLOW approx. 1 samples/s
  MEDIUM approx. 8 to 9 samples/s
  FAST approx. 300 samples/s (Does not apply at resistances higher than 2MΩ, or LPΩ higher than 200kΩ)
  (self-calibration takes place for approximately 55 ms at 30-minute intervals for FAST sampling only.)
- **Range selection:** Auto and Manual
- **Applicable standards: Safety:** EN61010-1+A2, EN61010-2-031
  Lo terminal: CAT I (500V), CAT II (300V)
  Hi terminal: CAT I (1000V), CAT II (600V)
  **EMC:** EN61326+A1 Class B, EN61000-3-2+A1+A2, EN61000-3-3
- **Ambient temperature of use:** 0 to 40 °C(32°F to 104°F) 80%RH (no condensation)
- **Storage temperature range:** -10 to 50°C(-14°F to 122°F) 70%RH (no condensation)
- **Power supply:** Select from AC 100 V/120 V/220 V/240 V, (50/60 Hz) specify when ordering
- **Maximum rated power:** 15 VA
- **Dimensions and mass:** Approx. 215 W×80 H×265 D mm, 2.6kg
  Approx 8.5˝ W × 3.5˝ H ×10.4˝ D, 91.7 oz.

Economical Type

# DIGITAL HiTESTER 3237
# DIGITAL HiTESTER 3237-01 (with GP-IB)

Advanced Type

# DIGITAL HiTESTER 3238
# DIGITAL HiTESTER 3238-01 (with GP-IB)

4-terminal Ω function & Advanced Type

# DIGITAL HiTESTER 3239
# DIGITAL HiTESTER 3239-01 (with GP-IB)

cord length 65cm
**TEST LEAD 9170-10** (included)

### Options

**Clamp sensors**

CLAMP ON PROBE 9010-50 (10/20/50/100/200/500A AC )
CLAMP ON PROBE 9018-50 (10/20/50/100/200/500A AC, Broadband type)
CLAMP ON PROBE 9132 (20/50/100/200/500/1000A AC )

For Clamp sensors specifications, see page 4.

### Options

**RS-232C cable**

RS-232C CABLE 9637 (9pin-9pin, Reverse type/1.8m)
RS-232C CABLE 9638 (9pin-25pin, Reverse type/1.8m)

**GP-IB cable** The specifications of the 3237, 3238 and 3239 are –01 specifications

GP-IB CABLE 9151-02 (2m)
GP-IB CABLE 9151-04 (4m)

**Printer**

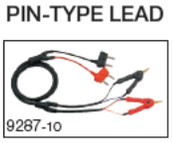
| | | |
|---|---|---|
| PRINTER | 9442 | |
| CONNECTOR CABLE | 9444 | (For 9442 printer) |
| AC ADAPTER | 9443-01 | (For 9442 printer, Japan) |
| AC ADAPTER | 9443-02 | (For 9442 printer, EU) |
| AC ADAPTER | 9443-03 | (For 9442 printer, America) |
| RECORDING PAPER | 1196 | (For printer, 10 rolls) |

When you purchase a **PRINTER 9442**, you must also purchase a **9444 CONNECTOR CABLE** and a **AC ADAPTER 9443** to connect it to the DMM.

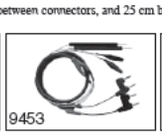
For printer specifications, see page 3.

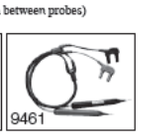
**4-Terminal Ω measurement probe for 3239**

CLIP-TYPE LEAD 9287-10 (Approx. 85 cm between connectors, and 8 cm between probes)
CLIP-TYPE LEAD 9452 (Approx. 80 cm between connectors, and 20 cm between probes)
FOUR-TERMINAL LEAD 9453 (Approx. 80 cm between connectors, and 30 cm between probes)
PIN-TYPE LEAD 9461 (Approx. 40 cm between connectors, and 25 cm between probes)


9287-10

9452


9453


9461

HIOKI
HIOKI E. E. CORPORATION