

3½-DIGIT DIGITAL MULTIMETERS

Product Group
Catalog

This handy DMM combines superb portability with an unsurpassed range of functions to make it the perfect tool for a wide range of uses for everything from hobbies and electrical work to electronic equipment trouble-shooting... easy to use anywhere, by anyone. Market requirements for DMMs are diversifying fast, and Hioki offers a wide range of models from standard types to special application designs. The Hioki 3-1/2 DMM-the individualist's DMM.

(DIGITAL MULTIMETER)

3231 Digital Hi Tester

3233 Digital Hi Tester

3200 Digital Hi Tester

3210 Digital Pocket Hi Tester

3216 Digital Hi Tester

3218 Pencil Hi Tester

3240 Card Hi Tester

3241 Card Hi Tester

3242 Digital Hi Tester

(DIGITAL MULTIMETER WITH PRINTER)

3234 Print Hi Tester



Digital Multimeter

WARNING



Be sure to read the following if you are thinking about buying a multimeter.

For reasons of safety, most multimeters should not be used with any industrial power line of greater than 250V. Such industrial power lines may involve spikes of several times the rated voltage. For such lines, use multimeters with an overcurrent protector for preventing short-circuit accidents. HIOKI's 3008 multimeter is recommended.

Note: Industrial power lines include lines supplying power to motors and industrial equipment in factories and office buildings, but do not include domestic in-house lines, which are protected with circuit breakers or the like.

Dynamic range is 160% wider than the 1999 model, and the display large 18mm characters. The characters are easy to read, and all functions and unit settings can be checked with a glance.

Specifications

Measuring Method: Double Integration Method

Display: Maximum display value of 3199. 18-mm-high display characters.

Range switching: Automatic and manual (manual-only for current and frequency ranges)

Input overload indication:

OF or OF (Except for 1000 VDC, 750VAC, and 10A DC/AC ranges)
Alarm buzzer (Except for 1000 VDC, 750 VAC, 10A DC/AC and resistance ranges)

Polarity indication: "—" is displayed automatically.

Battery-low indication:  mark appears

Sampling rate: 2.5 times/s

Temperature and humidity:

Operating: 0 to 40°C, 80% RH or less, no condensation.

Power supply: 3231 SUM3(AA)×2

(Continuous use, approx. 500h).

3233 SUM3(AA)×4

(Continuous use, approx. 250h)

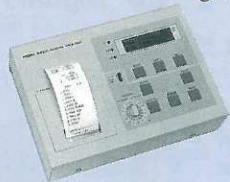
Dimensions/weight:

3231 160H×85W×33Dmm•330g

3233 73H×175W×200Dmm•800g

9200 Digital printer

Optional 9200 Digital printer is available for convenient data recording (3233 only)



General specifications

Printer: Thermal character printer

Recording paper: 38mm×8.5m, sufficient for approx. 2200 lines of printing.

Usable life: 50,000 lines

Printing modes: time or No., switchable

TIME mode: Automatic printing ever

preset interval. Printing intervals: 1 to 30s, min, 1h (15 steps)

No. mode: Manual printing with data No. assigned 1 to 1000

Comparator results: Hi, IN or Lo printed

Data processing: Data no., mean value, max., min., standard deviation, graph

Power supply: 100, 120, 220, 240VAC (specify at order) can supply power to 3233

Dimensions/weight: 147H×210W×48Dmm•1.5kg



3231·3233 DIGITAL Hi TESTER

Easy-to-read 18mm characters

- Maximum display 3199
- Large-size 18mm character height
- Frequency measurement to 320kHz
- Display hold function
- Overvoltage protection to 250VAC (Ω , μ A, mA)
- Conductivity test with audible tone
- Low-power ohm.
- Auto power-off (3231)
- Capacitor measurement to 32 μ F (3233)
- BCD output (3233)

Item		3231	3233
DC V	Range	300m/3/30/300/1000V	
	Accuracy	$\pm 0.35\% \text{rdg.} \pm 2 \text{dgt.} \pm 0.5\% \text{rdg.} \pm 2 \text{dgt.} (300 \text{V}), \pm 0.6\% \text{rdg.} \pm 2 \text{dgt.} (1000 \text{V})$	
	Input Impedance	100M Ω < (3000mV), Approx. 11M Ω (3V), Approx. 10M Ω (30V <)	
AC V	Range	3/30/300/750V	
	Accuracy	$\pm 1\% \text{rdg.} \pm 4 \text{dgt.}$	
	Input Impedance	Approx. 11M Ω (3V), 10M Ω (30V <)	
DC A	Range	300 μ (3231 only)/30m/300m/10A	
	Accuracy	$\pm 1\% \text{rdg.} \pm 2 \text{dgt.} (300\mu, 30 \text{m}, 300 \text{mA}), \pm 1.2\% \text{rdg.} \pm 2 \text{dgt.} (10 \text{A})$	
	Internal Resistance	Approx. 10 Ω (30mA)	
AC A	Range	300 μ (3231 only)/30m/300m/10A	
	Accuracy	$\pm 1.2\% \text{rdg.} \pm 4 \text{dgt.} (300\mu \cdot 30 \text{m} \cdot 300 \text{mA}), \pm 1.5\% \text{rdg.} \pm 4 \text{dgt.} (10 \text{A})$	
	Internal Resistance	Approx. 10 Ω (30mA)	
Ω	Range	300/3k/300k/3000k/30M Ω	
	Accuracy	$\pm 0.4\% \text{rdg.} \pm 2 \text{dgt.} (300 \Omega \text{ to } 300 \text{k} \Omega), \pm 1\% \text{rdg.} \pm 2 \text{dgt.} (3000 \text{k} \Omega)$	
	Open Circuit Voltage	0.65V $\pm 0.2 \text{V}$ > (3k Ω <)	
Hz	Range	300/3k/30k/300kHz	
	Accuracy	$\pm 0.15\% \text{rdg.} \pm 2 \text{dgt.} (300 \text{Hz}), \pm 0.1\% \text{rdg.} \pm 1 \text{dgt.} (3 \text{kHz} <)$	
	Gate Time	10s(300Hz), 1s(1kHz), 0.1s(30k to 300kHz)	
C	Range	3n	
	Frequency	1kHz(3V)	
	Accuracy	$\pm 1.5\% \text{rdg.} \pm 10 \text{dgt.}$	
Accessories		9170 Test leads Fuse(0.5A, non arcing) 600V fuse (1A, 3231-50, -51 provided)	9170 Test leads Fuse (0.5A, non arcing) Power cord (with power plug)

3231

3231-01 (with carrying case)

3231-50 (with 600V AC fuse)

3231-51 (with 600V AC fuse and carrying case)

Optional Accessories

9014 30kVDC high voltage probe

9145 Carrying case

Optional Accessories

9014 30kVDC high voltage probe

9200 Digital printer

9161 Connector cable (for 3233-9200)

9222 Recording paper



3200 DIGITAL HI TESTER

Stress on operability and safety

Design emphasizes ease in use and safety in this wide-range DMM... with an 20 μ A AC/DC range. The design is drop-proof, overload protected, dust resistant and protects you from shocks.

- Simple dust-resistant construction.
- Lamp warns of overvoltage



3210 DIGITAL POCKET HI TESTER

Compact Multi-type Tester

This compact, multi-measurement tester can handle both AC and DC measurements, with minimum weight. It fits right in your shirt pocket for maximum portability.

- Thickness 14mm



3216 DIGITAL HI TESTER

Simple Operation

This digital tester is easy to use, with the DMM function. The operation is simple, stresses safety.

- 10A DC-AC range

Common features

- Overvoltage protection up to 250V AC (Ω /continuity)
- Beeper continuity test.
- Low-power ohms enables in-circuit measurements of resistance.
- Diode check function.
- Safety plug, safety leads (3200, 3210, 3216)

General specifications

Display: 1999 (3 $\frac{1}{2}$ digit) LCD.

Battery low indication: BATT mark appears

Sampling rate: Approx. 2 times/s

Input over indication: MSD "1" flashes

Operating temperature: 0 to 40°C, 80%RH or less

Item		3200	3210	3216
DC V	Range	200m/2/20/200/1000V	200m/2/20/200/600V	200m/2/20/200/1000V
	Accuracy	$\pm 0.35\%$ rdg. ± 1 dgt. (200mV) $\pm 0.5\%$ rdg. " (2/20/200V) $\pm 1.0\%$ rdg. " (1000V)	$\pm 0.5\%$ rdg. ± 4 dgt. $\pm 1\%$ rdg. ± 4 dgt. (600V)	$\pm 0.35\%$ rdg. ± 1 dgt. (200mV) $\pm 0.5\%$ rdg. " (2/20/200V) $\pm 1.0\%$ rdg. " (1000V)
	Input Resistance	1000M \leq (200mV), 12M Ω (2V), 11M Ω (20V \leq)	1000M Ω \leq (mV), 11M Ω	1000M Ω \leq (mV), 12M Ω (2V), 11M Ω (20V \leq)
AC V	Range	2/20/200/750V	2/20/200/600V	2/20/200/1000V
	Accuracy	$\pm 1\%$ rdg. ± 4 dgt. 40 to 1kHz (500Hz at 2V/750V) $\pm 2\%$ rdg. ± 4 dgt. 1k to 5kHz (1kHz ")	$\pm 0.8\%$ rdg. ± 8 dgt. (40 to 500Hz) $\pm 1\%$ rdg. ± 8 dgt.	$\pm 1\%$ rdg. ± 4 dgt. 40 to 1kHz (500Hz at 2V/750V) $\pm 2\%$ rdg. ± 4 dgt. 1k to 5kHz (1kHz ")
	Input Impedance	Approx. 11M Ω (20V \leq)	Approx. 11M Ω (20V \leq)	Approx. 11M Ω (20V \leq)
DC A	Range	20 μ /200 μ /20m/200m/10A	200mA	200m/200 μ /20m/200m/10A
	Accuracy	$\pm 1.0\%$ rdg. ± 1 dgt. $\pm 1.2\%$ rdg. " (10A)	$\pm 1.2\%$ rdg. ± 4 dgt.	$\pm 1.0\%$ rdg. ± 1 dgt. $\pm 1.2\%$ rdg. " (10A)
	Internal Resistance	Approx. 1 Ω (200mA)	Approx. 1 Ω	Approx. 1 Ω (200mA)
ACA	Range	20 μ /200 μ /20m/200m/10A	200mA	200m/200 μ /20m/200m/10A
	Accuracy	$\pm 1.2\%$ rdg. ± 4 dgt. (40 to 1kHz) $\pm 1.5\%$ rdg. ± 4 dgt. (40 to 50Hz-20 μ A-10A)	$\pm 1.5\%$ rdg. ± 8 dgt.	$\pm 1.2\%$ rdg. ± 4 dgt. (40 to 1kHz) $\pm 1.5\%$ rdg. ± 4 dgt. (40 to 50Hz-20 μ A-10A)
	Range	200/2k/20k/200k/2000k/20M Ω (LP Ω)	200/2k/20k/200k/2000k/20M Ω	200/2k/20k/200k/2000k/20M Ω
Ω	Accuracy	$\pm 0.7\%$ rdg. ± 2 dgt. $\pm 1.0\%$ rdg. " (2000k Ω) $\pm 2.0\%$ rdg. " (20M Ω)	$\pm 0.7\%$ rdg. ± 4 dgt. (200 to 200k Ω) $\pm 1.2\%$ rdg. ± 4 dgt. (2000k Ω) $\pm 2.0\%$ rdg. ± 4 dgt. (20M Ω)	$\pm 0.7\%$ rdg. ± 2 dgt. $\pm 1.0\%$ rdg. " (2000k Ω) $\pm 2.0\%$ rdg. " (20M Ω)
	Open Circuit Voltage	Approx. 0.45V	0.45V \geq	0.45V \geq
	LP Ω			
Diode Check		○	○	○
Continuity		○ (1.6k to 15k Ω) \geq	○ (1.5k to 15k Ω) \geq	○ (1.6k to 15k Ω) \geq
Range Switching		Auto & manual	Auto & manual	Auto & manual
Display Hold		○	—	○
Power Supply		SUM-3(AA, 2) (Continuous use 500h)	LR-44 or SR-44(2) (Continuous use 80h)	SUM-3(AA, 2) (Continuous use 500h)
Dimensions		160H \times 85W \times 33Dmm \cdot 310g	150H \times 60W \times 14Dmm \cdot 120g	160H \times 85W \times 33Dmm \cdot 310g
Accessories		9170 Test leads Fuse (0.5A, non-arcing) Fuse (1A, non-arcing)	9170 Test leads Fuse (0.5A, non-arcing) Soft case	9170 Test leads Fuse (0.5A, non-arcing) Fuse (1A, non-arcing)

3200

3200-01 (with 9145 case)

3200-50 (with 600V fuse)

3200-51 (with 600V fuse and 9145 case)

Optional Accessories

9145 Carrying case

9038 DC 30kV high-voltage probe

3210

Optional Accessories

9038 DC 30kV high-voltage probe

9081 10A shunt

3216

3216-01 (with 9145 case)

3216-50 (with 600V fuse)

3216-51 (with 600V fuse and 9145 case)

Optional Accessories

9145 Carrying case

9038 DC 30kV high-voltage probe

9081 10A shunt



3218

ESTER PENCIL Hi TESTER

Easy to Use

Designed to be used in all of our need situations. Open the design

With auto-range and data hold

In addition to being compact, this pencil-type tester comes with auto-range and data hold functions for incredibly easy measurement of electrical and electronic circuitry.

3240·3241

CARD Hi TESTER

Card-size DMM

Only 8mm in thickness, this 60g card-size DMM comes with its own case. Use it as a novelty in various campaigns or sales promotions.

● With clock function (3241)

3242

DIGITAL Hi TESTER

No battery replacement needed

This solar-powered tester never requires a battery change, and the test leads can be stored in the space provided behind the back cover.

● Full auto-ranging design.

3216	3218	3240 · 3241	3242
200/1000V	200m/2/20/200/500V	200m/2/20/200/500V	200m/2/20/200/500V
±4dgt. (200m/2V)	±2.0%rdg. ±4dgt. (200m)	±2.0%rdg. ±4dgt. (200mV)	±0.9%rdg. ±4dgt. (200mV)
±4dgt. (20/200V)	±0.7%rdg. ±4dgt. (2V)	±0.7%rdg. ±4dgt. (2V)	±0.7%rdg. ±4dgt. (2V)
±4dgt. (1000V)	±1.3%rdg. ±4dgt. (20V<)	±1.3%rdg. ±4dgt. (20V<)	±1.3%rdg. ±4dgt. (20V<)
200mV, 11MΩ	100MΩ<(200mV), 11MΩ	100MΩ<(200mV), 12MΩ, 11MΩ (20V<)	1000MΩ<(200mV), 12MΩ, 11MΩ (20V<)
50V	2/20/200/500V	2/20/200/500V	2/20/200/500V
8dgt. (40 to 500Hz)	±2.3%rdg. ±8dgt. (40 to 500Hz)	±2.3%rdg. ±8dgt. (40 to 500Hz)	±2.3%rdg. ±8dgt. (40 to 500Hz)
8dgt. (750V/40 to 500Hz)			
4Ω (2V), 11MΩ	12MΩ (2V), 11MΩ	12MΩ, 11MΩ (20V<)	12MΩ, 11MΩ (20V<)
	—	—	—
±4dgt.	—	—	—
200mA/15mΩ>(10A)	—	—	—
	—	—	—
±8dgt.	—	—	—
200k/2000k/20MΩ	200/2k/20k/200k/2000k/20MΩ	200/2k/20k/200k/2000k/20MΩ	200/2k/20k/200k/2000k/20MΩ
±4dgt.	±2.0%rdg. ±4dgt.	±2.0%rdg. ±4dgt.	±2.0%rdg. 4dgt.
±4dgt. (2000kΩ)	±5.0%rdg. ±4dgt. (1.8M to 10MΩ)	±5.0%rdg. ±4dgt. (1.8M to 10MΩ)	±10%rdg. ±4dgt. (20MΩ)
±4dgt. (20MΩ)	±10%rdg. ±4dgt. (10.01M to 20.00MΩ)	±10%rdg. ±4dgt. (10.01M to 20.00MΩ)	
	0.45V>	0.45V>	0.46V>
○	○	○	○
○	—	○	○
5kΩ>	○(1.5k to 15kΩ)>	○(1.5k to 15kΩ)>	○(1.5k to 15kΩ)>
Auto	Auto	Auto	Auto
—	○	—	—
2)	LR44(4mW, 2)	LR44(2) (Continuous use 80h)	Two NiCad cells (approx. 16 h
use 400h)	(Continuous use 80h)	For watch of 3241,	continuous use after 8 hr.
V×29Dmm·240g	37H×161W×19Dmm·60g	SR626W or LR626W	charging in bright sunlight.)
ads		108H×54W×8Dmm·60g	120H×65W×18Dmm·110g
non-arcing)	Case	Case	Transparent vinyl case

3240

3241 (with clock)

(with case)

Additional Accessories

- DC 30kV high-voltage probe
- Carrying case



3234

PRINT HI TESTER

DMM with data recording capabilities

The 3234 Print hi-tester is a portable DMM with printer functions. Its many capabilities let it work as not only a DMM, but also as a printer, in a variety of applications.

General specifications

Display: LCD (DMM and clock)

DMM display: 3199 (3½-digit)

Clock display: 6 digit

Sample rate: 2.5 times/s

Power supply: Ni-cd batteries (4.8V × 4) or AC adapter (9V-1A), LR-44 (for clock, 1)

Dimensions: 200H × 85W × 30Dmm • 400g

Accessories: 9170 test leads (1), alligator clips (1), LR-44 (1), 0.5A fuse (1), 9227 recording paper (1 roll), AC adapter (1)

Printer

Printing Method: Thermal, serial dot

Printing Speed: 1.2s/line (approx)

Recording Paper: 38mm × 3m (750 lines)

TIME Mode: Interval 10/30s/1/3/5/10/30min/1h (± 3s over daily precision)

Clock

Clock Type: 24-hour clock

Clock Precision: ± 90s/mon.

Calendar: Automatically set for year and month end (to 2019)

- Printer function provided.
- Maximum display 3199.
- Synchronized operation supported.
- Option terminal (for monitoring other than voltage, current or resistance)
- Two-way AC/DC power supply.
- Low-power ohm measurement.
- Full auto-ranging.
- Easy-to-read stand-type design.

DCV	Range	300m/3/30/300/500V
	Accuracy	± 0.35%rdg. ± 2dgt. (300mV)
	Input resistance	Approx. 100MΩ < (300mV) 11MΩ < (3V)
ACV	Range	3/30/300/500V
	Accuracy	± 1%rdg. ± 4dgt. (40 to 500Hz)
	Input resistance	Approx. 11MΩ < (3V) 10MΩ < (30V <)
Ω	Range	300mA
	Accuracy	± 1%rdg. ± 2dgt. (DC)
	Internal resistance	Approx. 1Ω
LPΩ	Range	300/3k/30k/300k/3000k/30MΩ
	Accuracy	± 0.5%rdg. ± 2dgt. (— 300 to 300kΩ)
	Open circuit voltage	Approx. 1.5V (300Ω) 0.65V ± 0.2V (3kΩ <)
DCA	Range	3k/30k/300k/3000k/30MΩ
	Accuracy	± 0.5%rdg. ± 4dgt.
	Open circuit voltage	Approx. 0.45V >
ACA	Range	DC 300mV
	Accuracy	± 0.35%rdg. ± 2dgt.
Option	Input resistance	100MΩ <

Optional Accessories

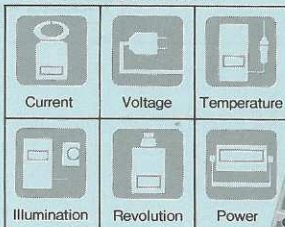
9227 Recording Paper (3m × 5 rolls)

9357 Carrying Case

Print function

Printouts are easy from both automatic and manual operation. In combination with an analog-output measurement device it can also be used as printer.

Possible applications

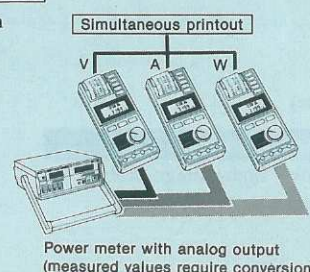


* Measurement values will be displayed with the V unit symbol, and unit conversion is needed.

Synchronized operation supported

Any number of 3234 can be linked up for simultaneous printout, making it possible to measure and record voltage, current, and power phasing for a single live line.

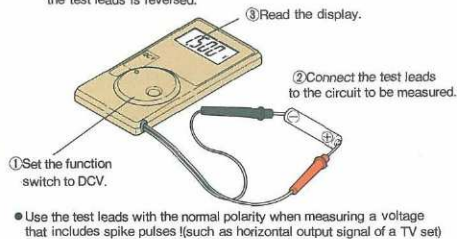
Example of synchronous operation



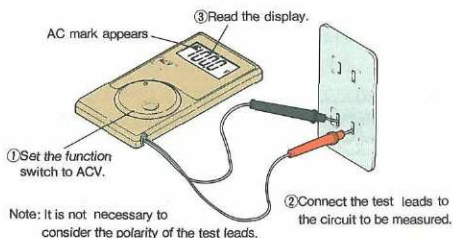
How to use DMM

I. Measuring DC voltages

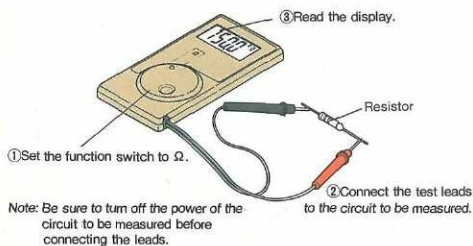
Note: "—" (minus sign) is displayed when the polarity of the test leads is reversed.



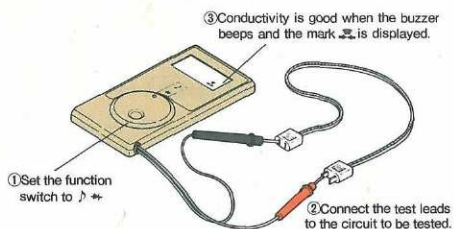
II. Measuring AC voltages



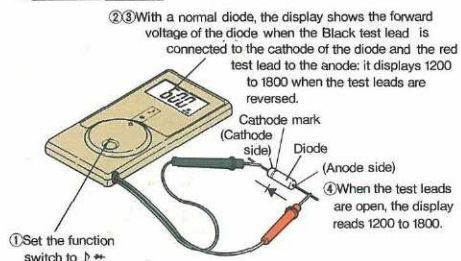
III. Measuring Resistance



IV. Conductivity Test



V. Diode Test



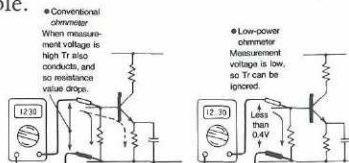
Digital Multimeter Q & A

Measuring volts in Ω range

Don't worry. Hioki DMM are designed to withstand one minute at 250VAC even in Ω/conductance or mA ranges. Even if you accidentally input an over voltage the internal circuitry will not be damaged.

High measurement voltage prevents circuit resistance measurement.

That's why electronic circuits with diodes and transistors use the low-power ohm measurement function. Resistance measurement is possible even when connected through low-power Ω (LP Ω) measurement. This measurement approach eliminates the effect of semiconductor direction, making in-circuit measurement possible.



How do you check for conductance?

Just listen for the tone. The conductance check can also be used to check diode polarity, sounding the tone in the diode operational direction.

How do you read accuracy? what are "rdg" and "dgt"?

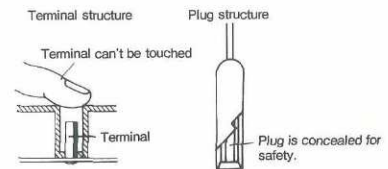
"rdg" stands for reading, or what the display shows you. "dgt" is the minimum unit of resolution of the meter itself, in other words, the unit "1" in the lowest column of the read-out.

Generally the accuracy is expressed as ± 1 dgt, based on the rounding off function of analog/digital conversion, but in fact the full-scale (fs) deviation is converted to dgt value for use.

What are safety plugs and safety leads?

The Hioki DMM stresses safety in every

design step. The metal parts of test leads and plugs cannot be touched.



Before you send it out for repairs...

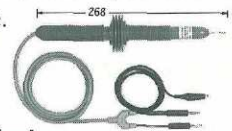
- Check the following points first. Is there a B mark on the display, at the left side? If there is, it means your batteries are low and have to be replaced.
- Is the fuse blown? The fuse is blown if the tone continues even when the test leads are open.

Accessories

Voltage probes

Designs offer insulation and dielectric strength to handle up through 30kV
9014: Use with products with a 10MΩ input resistance. (For 3231, 3233)
9038: Use with products with 11MΩ or 12MΩ input resistance. (For 3200, 3210, 3216)

Both have a 1000:1 voltage ratio, allowing measurement of 1,000 times the displayed voltage.
Accuracy: $\pm 5\%$



Temperature adapters

9020: Used as a temperature sensor with digital testers and measurement and recording instruments.

Measurement Range: -50°C to 250°C ($1\text{mV}/^{\circ}\text{C}$)
Accuracy: $(\pm 0.5 \pm 0.005t)^{\circ}\text{C}$
Sensor: Platinum resistance (1,000Ω at 0°C), sheath type, $\phi 2.3 \times 50\text{mm}$
Power Supply: 006p (continuous use 200 h)
Dimensions: 71H \times 48W \times 22D mm 140g



Test leads

9170: For a variety of DMM. Supplied with tester unit.
9090-03: Test lead with fuse



HIOKI E.E. CORPORATION

DISTRIBUTED BY

HEAD OFFICE: P.O. Box 1, Sakaki, Nagano, 389-06 Japan.
Tlx: 3327508 HIOKI J / Cable: HEWLOV, Ueda
Tel. (0268) 82-3030 / Fax. (0268) 82-3215

HIOKI-RCC, INC.: 11B Princess Road Lawrenceville,
New Jersey 08648 U.S.A.
Telephone: (609) 895-0505