

# Digital Multimeters

4 1/2 Digit DMM Series for Diverse Applications

## R6441 Series

- R6441A: DMM with low-price basic model
- R6441B: Multi-functional DMM with Frequency Measurements
- R6441C: DMM with Terminals Dedicated for Floating Current Measurement
- R6441D: DMM with Enhanced Current Measurement



(Photo is R6441C)

## R6441 Series Digital Multimeters

New R6441 series digital multimeters were designed for diverse applications. The series is provided with a variety of interfaces for use in R&D sections and production lines; it ensures battery operation for field applications. With dual-channel input and dual display, the R6441 series provides a new measurement environment.

The series includes three models: R6441A low-price basic model, R6441B with enhanced AC measurement functions, R6441C with enhanced very small current and floating method current measurement functions, and R6441D low-price model with enhanced current measurement functions.

- Maximum Display of 199999 (with a Sampling Rate of 2.5 Times/Second) and Maximum Sampling Rate of 80 Times/Second (with Maximum Display of 1999)
- AC Voltage and Current Measurement with True RMS (R6441B/6441C/6441D), AC + DC Measurement (R6441B) and Frequency Measurement (R6441B)
- Standard RS-232C Interface and Optional GPIB Interface and BCD Data Output Units
- Memory Card (SRAM Card Conforming to JEIDA Ver.4) Ensures Data Compatibility with Personal Computers
- Various Interfaces Can be Implemented for Automated Measurement
- Optional Battery Unit Allows the Use as a High-Performance DMM for Field Measurement
- Diverse and Combination Calculation Functions
- Memory Function for Panel Settings (Recalls Previous Condition Settings at Power On)
- Large Easy-to-Read Electron-Ray Indicator Tube
- High-Speed Analog Bar Graph with a Sampling Rate of 80 Times/Second is Available for Instantaneous Trendy Check (R6441A)
- Wide Power Range (90 to 250 V)
- Input Terminal Dedicated for Floating DC/AC Current (in 2- and 5-A Ranges) (R6441C)

#### Specifications

**Measurement accuracy:**  $23 \pm 5^\circ\text{C}$ , 85% RH or less (75% or less is guaranteed for 1 year at 20-M and 200-M $\Omega$  ranges.) The display value is  $\pm\%$  of reading  $\pm$  digits.

**Temperature coefficient:**  $0.1 \times$  (measurement accuracy)/ $^\circ\text{C}$  at 0 to  $50^\circ\text{C}$ . The display value is  $(\pm\%$  of reading  $\pm$  digits)/ $^\circ\text{C}$ .

#### DC voltage measurement

d:digit

Range	20 mV	200 mV	2000 mV	20 V	200 V	1000 V
Maximum display	19999					10999
Resolution	1 $\mu\text{V}$	10 $\mu\text{V}$	100 $\mu\text{V}$	1 mV	10 mV	100 mV
Measurement accuracy	$\pm 0.04\% \pm 5d$		$\pm 0.04\% \pm 2d$			
Input impedance	1 G $\Omega$ or more		11.1M $\Omega \pm 1\%$		10.1M $\Omega \pm 1\%$	10.0M $\Omega \pm 1\%$
Maximum allowable applied voltage	1100 V (all ranges, continuous)					

#### DC voltage noise rejection ratio

Sampling rate	Effective common mode noise rejection ratio (unbalanced impedance of 1 k $\Omega$ )	Normal mode noise rejection ratio
	50/60 Hz $\pm 0.1\%$ , DC	50/60 Hz $\pm 0.1\%$
FAST	Approx. 60 dB	0 dB
MID	Approx. 120 dB	Approx. 60 dB
SLOW		

#### AC voltage measurement

##### R6441A (with average measurement and rms value display)

Range	200 mV	2000 mV	20 V	200 V	700 V	
Maximum display	19999				7099	
Resolution	10 $\mu\text{V}$	100 $\mu\text{V}$	1 mV	10 mV	100 mV	
Measurement accuracy	20 to 45 Hz	$\pm 0.6\% \pm 40d$	$\pm 0.6\% \pm 35d$	$\pm 0.6\% \pm 45d$	$\pm 0.6\% \pm 45d$	$\pm 0.6\% \pm 35d$
	45 to 20 kHz	$\pm 0.25\% \pm 35d$	$\pm 0.25\% \pm 30d$	$\pm 0.25\% \pm 40d$	$\pm 0.25\% \pm 40d$	$\pm 0.25\% \pm 30d$
	20 to 30 kHz	$\pm 0.8\% \pm 40d$	$\pm 0.8\% \pm 35d$	$\pm 0.8\% \pm 45d$	$\pm 0.8\% \pm 45d$	$\pm 0.8\% \pm 35d$
	30 to 100 kHz	$\pm 5\% \pm 50d$	$\pm 5\% \pm 50d$	$\pm 5\% \pm 50d$	$\pm 5\% \pm 50d$	$\pm 5\% \pm 50d$
Input impedance	1.1 M $\Omega \pm 10\%$ , 100 pF or less					
Maximum allowable applied voltage	800 Vrms, 1100 Vpeak, $10^7$ VHz					
Response time	Approx. 4 seconds for VAC voltage and approx. 2 seconds for VAC voltage filter (0.1% or less of the final value in the same range)					

\* The frequency range of the VAC filter is 300 Hz to 100 kHz.

##### R6441B (True RMS, AC, AC+DC) / R6441C/R6441D (True RMS, AC)

With an input of 5% or more of the full scale

Range	200 mV	2000 mV	20 V	200 V	700 V
Maximum display	19999				7099
Resolution	10 $\mu\text{V}$	100 $\mu\text{V}$	1 mV	10 mV	100 mV
20 Hz to 45 Hz	$\pm 0.6\% \pm 35d$				
45 Hz to 20 kHz	$\pm 0.2\% \pm 30d$				
20 kHz to 30 kHz	$\pm 0.5\% \pm 30d$				
30 kHz to 100 kHz	$\pm 4\% \pm 50d$				
Input impedance	1.1 M $\Omega \pm 10\%$ , 100 pF or less				
Crest factor	3:1 at the full scale				
Maximum allowable applied voltage	800 Vrms, 1100 Vpeak, $10^7$ VHz				
Response time	Approx. 1 second (0.1% or less of the final value in the same range)				

#### Resistance measurement

Range	200 $\Omega$	2000 $\Omega$	20 k $\Omega$	200 k $\Omega$	2000 k $\Omega$	20 M $\Omega$	200 M $\Omega$
Maximum display	19999						
Resolution	10 m $\Omega$	100 m $\Omega$	1 $\Omega$	10 $\Omega$	100 $\Omega$	1 k $\Omega$	10 k $\Omega$
Measured applied current	3 mA	1 mA	100 $\mu\text{A}$	10 $\mu\text{A}$	1 $\mu\text{A}$	100 nA	10 nA
Measurement accuracy	$\pm 0.07\% \pm 10d$	$\pm 0.07\% \pm 2d$		$\pm 0.1\% \pm 2d$		$\pm 0.3\% \pm 5d$	$\pm 3.0\% \pm 10d$
Open circuit voltage	7.5 V or less						
Maximum allowable applied voltage	$\pm 500$ V						

\* When the null function is used

#### In-circuit resistance measurement

Range	200 $\Omega$	2000 $\Omega$	20 k $\Omega$	200 k $\Omega$	2000 k $\Omega$	20 M $\Omega$
Maximum display	19999					
Resolution	10 m $\Omega$	100 m $\Omega$	1 $\Omega$	10 $\Omega$	100 $\Omega$	1 k $\Omega$
Measured applied current	1 mA	100 $\mu\text{A}$	10 $\mu\text{A}$	1 $\mu\text{A}$	100 nA	10 nA
Measurement accuracy	$\pm 0.07\% \pm 100d$	$\pm 0.07\% \pm 20d$		$\pm 0.1\% \pm 20d$		$\pm 0.3\% \pm 50d$
Open circuit voltage	7.5 V or less					
Maximum allowable applied voltage	$\pm 500$ V					

\* When the null function is used

#### DC current measurement

##### R6441A/R6441B

Range	20 mA	200 mA	2000 mA	10 A
Maximum display	19999			10999
Resolution	1 $\mu\text{A}$	10 $\mu\text{A}$	100 $\mu\text{A}$	1 mA
Measurement accuracy	$\pm 0.2\% \pm 5d$		$\pm 0.6\% \pm 5d$	
Input terminal resistance	1.5 $\Omega$ or less *1		0.04 $\Omega$ or less *1	
Overcurrent protection	0.5 A/250 V IEC 127 sheet 1 Protected by a quick-blowing fuse		15 A/250 V with 10000-A interrupting capacity Protected by a quick-blowing fuse	

\*1 The resistance of the protection fuse is excluded.

##### R6441C/R6441D

Range	2 $\mu\text{A}$ *1	20 $\mu\text{A}$ *1	200 $\mu\text{A}$	2000 $\mu\text{A}$	20 mA	200 mA	2000 mA *1	5 A *1
Maximum display	19999						1999	4999
Resolution	100 pA	1 nA	10 nA	100 nA	1 $\mu\text{A}$	10 $\mu\text{A}$	100 $\mu\text{A}$	1 mA
Measurement accuracy	$\pm 0.2\% \pm 5d$						$\pm 2\% \pm 50d$	$\pm 2\% \pm 5d$
Input terminal resistance	Approx. 10 k $\Omega$ or less *2		102 $\Omega$ or less *2		2 $\Omega$ or less *2		0.1 $\Omega$ or less *2	
Overcurrent protection	0.5 A/250 V IEC 127 sheet 1 Protected by a quick-blowing fuse						6 A/250 V with 10000-A interrupting capacity Protected by a quick-blowing fuse	

\* When the floating method for 2000-mA and 5-A ranges and the null function are used.

\*1 Mounted only on the R6441C.

\*2 The resistance of the protection fuse is excluded.

#### AC current measurement

##### R6441A (with average measurement and rms value display)

Range	200 mA	10 A
Maximum display	10 $\mu\text{A}$	1 mA
Resolution	19999	10999
Measurement accuracy	20 Hz to 1 kHz 1 to 5 kHz	$\pm 0.8\% \pm 40d$ $\pm 5.0\% \pm 40d$
Input terminal resistance	1.5 $\Omega$ or less *1	
Overcurrent protection	0.5 A/250 V IEC 127 sheet 1 Protected by a quick-blowing fuse	15 A/250 V with 10000-A interrupting capacity Protected by a quick-blowing fuse
Response time	Approx. 4 seconds for AC current and approx. 2 seconds for AC current filter (0.1% or less of the final value in the same range)	

\* The AC current filter is 300 Hz to 5 kHz. (Display with input switching is not possible when an AC current filter is used.)

\*1 The resistance of the protection fuse is excluded.

##### R6441B (True RMS, AC, AC+DC)

With an input of 5% or more of the full scale

Range	200 mA	10 A
Maximum display	10 $\mu\text{A}$	1 mA
Resolution	19999	10999
Measurement accuracy	20 Hz to 1 kHz 1 kHz to 5 kHz	$\pm 0.8\% \pm 40d$ $\pm 5.0\% \pm 40d$
Crest factor	3:1 at the full scale	
Input terminal resistance	1.5 $\Omega$ or less *1	
Overcurrent protection	0.5 A/250 V IEC 127 sheet 1 Protected by a quick-blowing fuse	15 A/250 V with 10000-A interrupting capacity Protected by a quick-blowing fuse
Response time	Approx. 1 second (0.1% or less of the final value in the same range)	

\*1 The resistance of the protection fuse is excluded.

# Digital Multimeters

Data Sharing with Personal Computers via Memory Cards

## R6441 Series (Continued From Previous Page)

### R6441C/6441D (True RMS, AC)

With an input of 5% or more of the full scale

Range	200 $\mu$ A	2000 $\mu$ A	20 mA	200 mA	2000 mA *1	5 A *1	
Maximum display	19999					19999	4999
Resolution	10 nA	100 nA	1 $\mu$ A	10 $\mu$ A	100 $\mu$ A	1 mA	
Measurement accuracy	$\pm 0.8\% \pm 40d$			$\pm 2\% \pm 40d$			
accuracy	500Hz to 5kHz $\pm 5.0\% \pm 40d$						
Crest factor	3:1 at the full scale						
Input terminal resistance	Approx. 102 $\Omega$ or less *2		2 $\Omega$ or less *2		0.1 $\Omega$ or less *2		
Overcurrent protection	0.5 A/250 V IEC 127 sheet 1 Protected by a quick-blowing fuse			6 A/250 V with 10000-A interrupting capacity Protected by a quick-blowing fuse			
Response time	Approx. 1 second (0.1% or less of the final value in the same range)						

\* Floating method is used for 200-mA and 5-A ranges.

\*1 Mounted only on the R6441C.

\*2 The resistance of the protection fuse is excluded.

### Frequency measurement

#### R6441B

Range	20 Hz	200 Hz	2 kHz	20 kHz	200 kHz
Maximum display	19999				
Measurement accuracy	1 mHz	10 mHz	100 mHz	1 Hz	10 Hz
Measurement time	$\pm 0.02\% \pm 2d$				

\* Waveform : Sine, square

Duty ratio : 3 or less

**Sampling mode:** Free-run

Function	Measurement time		
	FAST (3 1/2)	MID (4 1/2)	SLOW (4 1/2)
DC voltage measurement	12.5 (80)	100 (10)	400 (2.5)
AC voltage measurement (AC coupling)	12.5 (80)	100 (10)	400 (2.5)
Resistance measurement	12.5 (80)	100 (10)	400 (2.5)
DC current measurement	12.5 (80)	100 (10)	400 (2.5)
AC current measurement	12.5 (80)	100 (10)	400 (2.5)
Frequency measurement (R6441B)	210 (4.7)	300 (3.3)	600 (1.5)
Conductive measurement	12.5 (80)	100 (10)	400 (2.5)
Diode measurement	12.5 (80)	100 (10)	400 (2.5)

Unit [ms] (times/second)

**Conductive measurement:** Measurement range of 200  $\Omega$  and continuity judgment value of 20  $\Omega$

Other specifications are the same as those for the 200  $\Omega$  range for resistance measurement.

**Diode measurement:** Measurement range of 2000 mV

Other specifications are the same as those for the 2000  $\Omega$  range for resistance measurement.

Sampling rate	FAST	MID	SLOW
Number of measurements (times/second)	80	10	2.5

**Calculation function:** Null, smoothing, dB/dBm, scaling, MAX/MIN, comparator

### General specifications

**Measurement method:** Integrating type

**Input method:** Floating type

**Range switching:** Auto and manual

**Data display:** 5-digit decimal, 7-segment electron ray indicator tube

**Overinput indication:** "OL" is displayed for inputs out of the rated measurement range.

**Low-battery indication:** If the battery power voltage drops to below the rated voltage, a low-battery mark is indicated in the display section.

**Dielectric strength:** Withstands 450 V continuously applied between the COM terminal and chassis and between the Com terminal and AC power line.

**Operating environment:**

**Operating temperature:** 0 to 50°C

(0 to 40°C when the battery is mounted)

**Operating humidity:** 85% RH or less

**Storage temperature:** -25 to 70°C

(-20 to 50°C when the battery is mounted)

**Power consumption:** 15 VA or less

**AC power:** Specified at time of ordering.

Option No.	Standard	32	42	44
Power voltage (V)	90 to 110	103 to 132	198 to 242	207 to 250

**DC power supply:** 6-hour continuous operation is possible by means of the R15807 battery unit.

**Dimensions:** Approx. 212 (W)  $\times$  88 (H)  $\times$  310 (D) mm

**Mass:** 2.2 kg maximum (main unit), 3.5 kg maximum (with options)

**Accessories:**

Product name	A01402	A01034
Model	Power cable	Input cable x1

**Standard accessories:** RS-232C, baud rate of 9600, 4800, 2400, 1200, 600, and 300

**Optional accessories**

**A08316** Alligator clip adapter

**A08317** Miniature clip adapter

**A01001** Input cable

**A01265** RS-232C cable (For 1 m, 250- and 9-pin (DMM))

**A09507** SRAM card (64 kbytes)

**TR1116** DC high-voltage probe

**TR1111** Terminal adapter

**A02464** EIA rack mount kit (twin)

**A02463** EIA rack mount kit

**A02264** JIS rack mount kit (twin)

**A02263** JIS rack mount kit

**R16215** Carrying bag