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**

(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 and R6441C with enhanced very small current and floating method 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), 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)**

R6441 Series

Specifications

Measurement accuracy: 23 ± 5°C, 85% RH or less (75% or less is guaranteed for 1 year at 20-M and 200-MΩ ranges.) The display value is ±% of reading ± digits.

Temperature coefficient: 0.1 × (measurement accuracy)/°C at 0 to 50°C. The display value is (±% of reading ± digits)/°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 µV	10 µV	100 µV	1 mV	10 mV	100 mV
Measurement accuracy	±0.04%±5d	± 0.04% ± 2d				
Input impedance	1 GΩ or more			11.1MΩ±1%	10.1M±1%	10.0MΩ±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 kΩ)	Normal mode noise rejection ratio
	50/60 Hz ± 0.1%, DC	50/60 Hz ± 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 µV	100 µV	1 mV	10 mV	100 mV
Measurement accuracy	20 to 45 Hz	±0.6%±40d	±0.6%±35d	±0.6%±45d	±0.6%±45d	±0.6%±35d
	45 to 20 kHz	±0.25%±35d	±0.25%±30d	±0.25%±40d	±0.25%±40d	±0.25%±30d
	20 to 30 kHz	±0.8%±40d	±0.8%±35d	±0.8%±45d	±0.8%±45d	±0.8%±35d
	30 to 100 kHz	±5%±50d	±5%±50d	±5%±50d	±5%±50d	±5%±50d
Input impedance		1.1 MΩ ± 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/6441D** (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 µV	100 µV	1 mV	10 mV	100 mV
20 Hz to 45 Hz	±0.6%±35d				
45 Hz to 20 kHz	±0.2%±30d				
20 kHz to 30 kHz	±0.5%±30d				
30 kHz to 100 kHz	±4%±50d				
Input impedance	1.1 MΩ±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 Ω	2000 Ω	20 kΩ	200 kΩ	2000 kΩ	20 MΩ	200 MΩ
Maximum display	19999						
Resolution	10 mΩ	100 mΩ	1 Ω	10 Ω	100 Ω	1 kΩ	10 kΩ
Measured applied current	3 mA	1 mA	100 µA	10 µA	1 µA	100 nA	10 nA
Measurement accuracy	±0.07%±10d	±0.07%±2d			±0.1%±2d	±0.3%±5d	±3.0%±10d
Open circuit voltage	7.5 V or less						
Maximum allowable applied voltage	±500 V						

* When the null function is used

In-circuit resistance measurement

Range	200 Ω	2000 Ω	20 kΩ	200 kΩ	2000 kΩ	20 MΩ
Maximum display	19999					
Resolution	10 mΩ	100 mΩ	1 Ω	10 Ω	100 Ω	1 kΩ
Measured applied current	1 mA	100 µA	10 µA	1 µA	100 nA	10 nA
Measurement accuracy	±0.07%±100d	±0.07%±20d			±0.1%±20d	±0.3%±50d
Open circuit voltage	7.5 V or less					
Maximum allowable applied voltage	±500 V					

* When the null function is used

DC current measurement

R6441A/6441B

Range	20 mA	200 mA	2000 mA	10 A
Maximum display	19999			10999
Resolution	1 µA	10 µA	100 µA	1 mA
Measurement accuracy	±0.2%±5d		±0.6%±5d	
Input terminal resistance	1.5 Ω or less *1		0.04 Ω 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

Range	2 µA *1	20 µA *1	200 µA	2000 µA	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 µA	10 µA	100 µA	1 mA
Measurement accuracy	±0.2%±5d						±2%±50d	±2%±5d
Input terminal resistance	Approx. 10 kΩ or less*2		102 Ω or less *2		2 Ω or less *2		0.1 Ω 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 µA	1 mA
Resolution		19999	10999
Measurement accuracy	20 Hz to1 kHz	±0.8%±40d	±0.8%±40d
	1 to 5 kHz	±5.0%±40d	±5.0%±40d
Input terminal resistance		1.5 Ω or less *1	0.04 Ω 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 µA	1 mA
Resolution		19999	10999
Measurement accuracy	20 Hz to 1 kHz	±0.8%±40d	±0.8%±40d
	1 kHz to 5 kHz	±5.0%±40d	±5.0%±40d
Crest factor		3:1 at the full scale	
Input terminal resistance		1.5 Ω or less *1	0.04 Ω 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.

R6441 Series (Continued From Previous Page)

R6441C (True RMS, AC)
With an input of 5% or more of the full scale

Range		200 µA	2000 µA	20 mA	200 mA	2000 mA*1	5 A*1
Maximum display		19999				19999	4999
Resolution		10 nA	100 nA	1 µA	10 µA	100 µA	1 mA
Measurement accuracy	20Hz to 500Hz	±0.8%±40d				±2%±40d	
	500Hz to 5kHz	±5.0%±40d					
Crest factor		3:1 at the full scale					
Input terminal resistance		Approx. 102 Ω or less *2		2 Ω or less *2		0.1 Ω 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)					

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

*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	±0.02%±2d				

* Waveform : Sine, square
Duty ratio : 3 or less

Measurement time
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 Ω and continuity judgment value of 20 Ω
Other specifications are the same as those for the 200 Ω range for resistance measurement.

Diode measurement: Measurement range of 2000 mV
Other specifications are the same as those for the 2000 Ω 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(optional) battery unit.
Dimensions: Approx. 212 (W) × 88 (H) × 310 (D) mm
Mass: 2.2 kg maximum (main unit), 3.5 kg maximum (with options)
Accessories:

Model	A01402	A01034
Product name	Power cable	Input cable x1

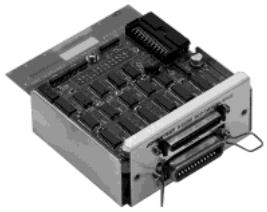
Standard accessories: RS-232C, baud rate of 9600, 4800, 2400, 1200, 600, and 300

Optional accessories

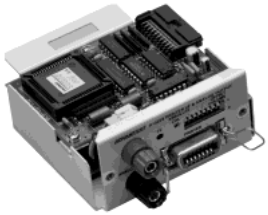
A08316 Alligator clip adapter
A08317 Miniature clip adapter
A01001 Input cable
A01265 RS-232C cable (For 1 m, 250- and 9-pin (DMM))
A09507 SRAM card (64 kbytes)
TR1116 DC high-voltage probe
TR1111 Terminal adapter
A02464 EIA rack mount kit (twin)
A02463 EIA rack mount kit
A02264 JIS rack mount kit (twin)
A02263 JIS rack mount kit
R16215 Carrying bag
R15807 Battery unit

R13220, R13015, R13223, R13016, R13221, R15807, R13222

R13220
GPIB Interface Unit



R13015
BCD Data Output Unit

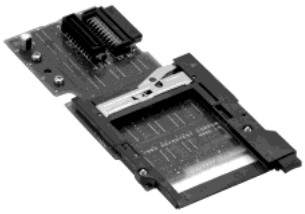


R13223
Printer I/F & Analog Output Unit

R13016
Digital Comparator Unit

R13221
Printer Interface Unit

R15807
Battery Unit



R13222
Memory Card Interface Unit

R13220 GPIB Interface Unit

Electrical specifications: Conforms to IEEE488-1978 and IEC625-1.
Mechanical specifications: Conforms to IEEE488-1978.
Connector: 24-pin Amphenol
Interface specifications: SH1, AH1, T5, L4, SR1, RL1, PP0, DC1, DT1, C0, and E2
Code system: ASCII code
Address designation: 31 talker/listener addresses can be set from the front panel of the main unit.

R13015 BCD Data Output Unit

Output data: BCD parallel code
Output data contents: Measured data, decimal point, polarity and unit (output only at first display unit)
Print command signal output: TTL-level positive logic (with a pulse width of approx. 1 ms)
External start signal:
A (Data output): TTL-level positive logic (with a pulse width of 100 µs to 10 ms)
B (Remote control input): TTL-level negative logic (with a pulse width of 100 µs to 10 ms), Input impedance of approx. 10 kΩ
External control: Function, range, buzzer on/off, sampling mode, sampling rate, null calculation and comparator calculation
Connector: Data output DHA-RC50 DDK
Remote input 57-40240 DDK

R13223 Printer I/F & Analog Output Unit

Printer I/F section: Same as the R13221.
Analog output section
Output voltage: 0 V to +0.999 V (+1 V output at the time of IVFS calibration)
Number of conversion digits: 8 to 9 types of digits can be selected by means of the DIP switch on the accessory panel (rear panel of the main unit)
Conversion output: Can be selected from NORMAL, OFFSET NORMAL, ABSOLUTE, or OFFSET ABSOLUTE.
Conversion accuracy: ±0.2% of the full scale (0˚C to 50˚C), 85% RH or less, for 1 year)
Output impedance: Approx. 180 Ω
Output terminal: Binding post

R13016 Digital Comparator Unit

Comparison level: Upper and lower limits (HIGH LIMIT/LOW LIMIT
Determination condition:
HIGH Measured data > HIGH LIMIT
PASS HIGH LIMIT ≥ Measured data ≥ LOW LIMIT
LOW Measured data < LOW LIMIT
Level setting: Set from the front panel of the main unit.
END signal: TTL-level, negative logic (with a pulse width of approx. 1 ms)
Contact output: Optical MOS relay HI, PASS, LO
Contact capacity: Allowable switching voltage of 50 V and allowable switching current of 0.1 A
Dielectric strength: 200 V (between input/output signal and chassis)
Transistor output: Open-collector output
Maximum collector voltage/current of 50 V/0.3A
Buzzer output: Generated when the comparison result is HIGH, PASS, LOW or HIGH/LOW.
Connector: 57-40140 DDK

R13221 Printer Interface Unit

Output code: Centronics
Output data contents: Measured data, decimal point, polarity and unit
Printing interval: Continuous, 5 seconds to 4 hours
Setting: Set from the main unit panel.
Connector: 57-40140 DDK

R15807 Battery Unit

Built-in battery : 12 V lead storage battery
Capacity : 1.8 Ah
Charging method : Fully charged for approx. 12 hours with the main unit power turned off and power supply connected.
Low-battery indication : Displayed on the front panel of the main unit. Goes on for a remaining time of 2 hours. Does not affect main unit specifications.
Weight : 1 kg maximum

R13222 Memory Card Interface Unit

Available card : A09507 (64 kbytes): SRAM card conforming to JEIDA ver.4 (with attribute information)
Memory contents : Measured data and panel settings are stored with DOS format. (Up to 128 files and up to 4000 data items are stored.)