

RIGOL

Data Sheet

DM3000 Series Digital Multimeter DM3061/2/4, DM3051/2/4

Product Overview

DM3000 series digital multimeter are designed for the needs of high-precision, multifunction, and automatic measurement, which combine Data acquire, Auto measure, Inspect, Multiple math operations and Sensor measures as well as other functions in one. DM306X series has 6 1/2 digits readings resolution. DM305X series has 5 3/4 digits readings resolution.



Applications

- Production Line Test
- Power Supply Test
- Auto and Electronics Industry Test
- Communications Industry Test
- Biology, Medical and Electron Applications
- Education and Scientific Research

Main Features

- Real 6 1/2 digits readings resolution (2,400,000 Count)
- Up to 50 krdgs/s sampling rate and 2 Mrdgs Volatile storage
- True-RMS AC Voltage and Current measuring
- 16 circuits inspection function and control software (optional)
- Separately preset 10 groups of datum and 10 groups of settings for storage, as well as U disk storage and UltraLogger Infinite measurement storage
- Easy, convenient and flexible control software: UltraLogger inspect measuring and data acquisition control software
UltraSensor random sensor measuring control software
- Standard configuration interface: USB Device, USB Host, LAN (optional), RS-232, GPIB (optional), and support U-disc storage and Web remote control
- Support remote control commands

Easy to Use Design

- 256×64 LCD
- Support double displays, Chinese and English menu
- Push-help makes information acquire more easier
- File management (support for U-disc and local storage)

Powerful Measurement Functions

➤ Basic Measurement Function

- DC Voltage: 200 mV ~ 1000 V
- DC Current: 2 mA ~ 10 A
- AC Voltage: 200 mV ~ 750 V
- AC Current: 20 mA ~ 10 A
- 2-Wire, 4-Wire Resistance: 200 Ω ~ 100 MΩ
- Capacitance Measurement: 2 nF ~ 200 μF
- Continuity Test: Range is fixed at 2 kΩ
- Diode Test: Range is fixed at 2.0 V
- Frequency Measurement: 3 Hz ~ 300 kHz
- Period Measurement: 3.3 μs ~ 0.33 s
- Random Sensor Measurement: Support for Voltage, Current, Resistance, Frequency and other types of sensor.

➤ Math Function

Max, Min, Average, Upper Limit, Lower Limit, dBm, dB, NULL

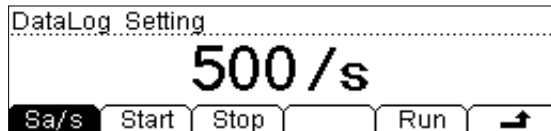
➤ High Speed Data Acquisition and Multiple Inspections

Data Acquire, Record, Inspect and Auto measure

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RIGOL Technologies, Inc

High Speed Data Acquisition



DM3000 series provide with up to 50krdgs/s sampling rate for acquiring data, especially for those have high-resolution such as audio waves as well as other datum under highly variable, in addition, a volatile storage with up to 2Mrdgs can be used.

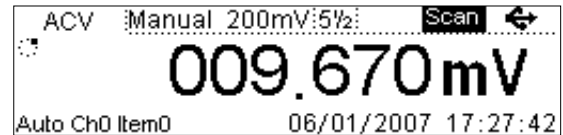
Unique Random Sensor

1	0.0000mV	0.0000°	Line
2	1.0000mV	10.0000°	
3	2.0000mV	30.0000°	Curve
Add Del Edit Top End			

The corresponding measurement value could be shown on the screen only if you pre-import response curve, meanwhile, you can edit or modify the display unit of measurand as required.

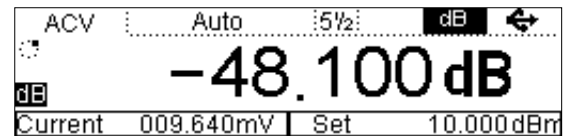
DM3058 supports 5 kinds of Sensor: DCV, DCI, and Freq, 2WR, and 4WR.

Multiple Inspection



An Inspection Module with 16 channels is separately built-in both DM3054 and DM3064, by using that, users can perform multiple inspecting and view or analyze measuring results based on UltraLogger.

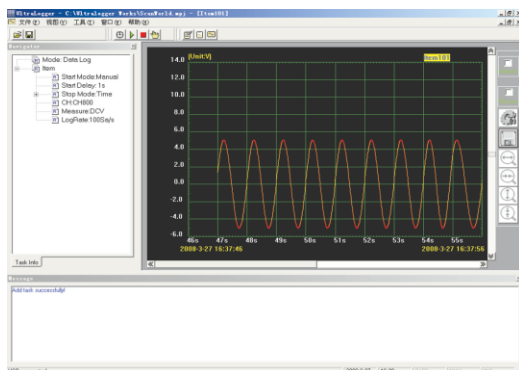
Math Operation



The available math operations provided by DM3000 series are: Max, Min, Average, Upper Limit, Lower Limit, dBm, dB and NULL.

If you combine math function with basic measurement and apply into operation, work efficiency may be improved apparently.

Easy, Convenient and Flexible Control Software



UltraLogger Software Interface

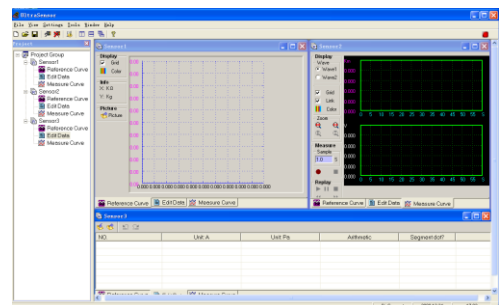
UltraLogger is used to control random sensor. The main functions include:

- Create a project for random sensor measurement which can be download to DM3000;
- Connect with DM3058 to achieve random sensor measurement;
- Monitor the sensor data in real time and show them in the form of figure;
- Enable to save data in the format of CSV and TXT, and reference curve in the format of BMP.

UltraLogger is used to control data acquisition (in DataLog mode) and Inspection measuring (in Scan mode), which can save datum from acquisition and inspection at regular time.

To enable the front panel channel measure in DataLog mode, two ways are optional: click "button" or "external". Among this menu, you can conveniently define the measure item, range, precision and other task attributes and intuitively observe the waveforms varying with time.

In Scan mode, four trigger types of task are available: Auto trigger, Manual trigger, External trigger and Timing trigger, also, you can group the task and execute especially in both Manual and External trigger mode. The waveform changes of every task can be intuitively observed via figure displays.



UltraSensor Software Interface

Specifications

Specifications of DM306X Series

DC Characteristics

Accuracy $\pm$ (% of reading + % of range) ^[1]						
Function	Range ^[3]	Test current or Load voltage	24 Hours ^[2] Tcal $\pm$ 1 $^{\circ}$ C	90 Days Tcal $\pm$ 5 $^{\circ}$ C	1Year Tcal $\pm$ 5 $^{\circ}$ C	Temperature Coefficient 0 $^{\circ}$ C ~Tcal-5 $^{\circ}$ C and Tcal+5 $^{\circ}$ C~55 $^{\circ}$ C
DC Voltage	200.0000 mV		0.0030 +	0.0065 +	0.0085 +	0.0005 + 0.0007
	2.000000 V		0.0020 +	0.0060 +	0.0078 +	0.0005 + 0.0001
	20.00000 V		0.0020 +	0.0065 +	0.0085 +	0.0005 + 0.0001
	200.0000 V		0.0020 +	0.0082 +	0.0100 +	0.0007 + 0.0002
	1000.000 V ^[5]		0.0025 +	0.0095 +	0.0110 +	0.0010 + 0.0001
DC Current	2.000000 mA	<0.03 V	0.010 + 0.014	0.060 + 0.035	0.076 + 0.050	0.0027 + 0.0070
	20.00000 mA	<0.3 V	0.010 + 0.002	0.058 + 0.006	0.075 + 0.006	0.0027 + 0.0007
	200.0000 mA	<0.3 V	0.020 + 0.002	0.065 + 0.005	0.081 + 0.005	0.0027 + 0.0008
	1.000000 A	<0.3 V	0.020 + 0.016	0.065 + 0.030	0.073 + 0.030	0.0027 + 0.0062
	10.00000 A ^[7]	<0.6 V	0.300 + 0.020	0.330 + 0.020	0.330 + 0.020	0.0030 + 0.0025
Resistance ^[4]	200.0000 Ω	1 mA	0.0106 +	0.018 + 0.011	0.020 + 0.011	0.0008 + 0.0007
	2.000000 k Ω	1 mA	0.0022 +	0.010 + 0.002	0.015 + 0.002	0.0008 + 0.0001
	20.00000 k Ω	100 μ A	0.0020 +	0.010 + 0.001	0.015 + 0.001	0.0008 + 0.0001
	200.0000 k Ω	10 μ A	0.0020 +	0.010 + 0.001	0.015 + 0.001	0.0008 + 0.0001
	1.000000 M Ω	2 μ A	0.0020 +	0.010 + 0.001	0.015 + 0.001	0.0008 + 0.0002
	10.00000 M Ω	200 nA	0.0112 + 0.005	0.0550 + 0.006	0.056 + 0.006	0.0060 + 0.0004
	100.0000 M Ω	200 nA 10 M Ω	0.300 + 0.010	0.800 + 0.011	0.800 + 0.015	0.1500 + 0.0002
Diode Test	2.4000 V ^[6]	1 mA	0.005 + 0.050	0.008 + 0.050	0.010 + 0.050	0.0010 + 0.0020
Continuity Test	2000 Ω	1 mA	0.005 + 0.050	0.008 + 0.050	0.010 + 0.050	0.0010 + 0.0020

Remarks:

- [1] Specifications are for 60 minutes warm-up and 6 ½ digits readings resolution.
- [2] Relative to calibration standards.
- [3] 20% over range on all ranges except for DCV 1000 V, ACV 750 V, DCI 10 A and ACI 10 A.
- [4] Specifications are for 4-wire measure or 2-wire measure under "Null" operation. $\pm$ 0.2 Ω of extra errors will be generated if perform 2-wire measure without "Null" operation.
- [5] Plus 0.02 mV of error per 1 V after the first $\pm$ 500 VDC.
- [6] Accuracy specifications are only for voltage measuring at input terminal. The typical value of current under measure is 1 mA. Voltage drop at the diode junction may vary with current supply.
- [7] 30 seconds OFF after 30 seconds ON is recommend for the continuous current that higher than DC 7 A or AC RMS 7 A.

Setup Time Attentions

The setup time about voltage measurement is influenced by source resistance and media characteristics of cable as well as input signal. Generally, the setup time of readings of lower source resistance (less than 1 k Ω) is 1.5 s.

AC Characteristics

Accuracy $\pm$ (% of reading + % of range) ^[1]

Function	Range ^[3]	Test current or Load voltage	24 Hours ^[2] Tcal $\pm$ 1°C	90 Days Tcal $\pm$ 5°C	1Year Tcal $\pm$ 5°C	Temperature Coefficient 0°C ~Tcal-5°C and Tcal+5°C~55°C
True RMS AC Voltage ^[4]	200.000 mV	3 Hz - 10 Hz	5.0 + 0.05	5.0 + 0.07	5.1 + 0.07	0.15 + 0.006
		10 Hz - 40 Hz	0.53 + 0.05	0.57 + 0.06	0.60 + 0.07	0.035 + 0.004
		40 Hz - 20 kHz	0.08 + 0.05	0.14 + 0.06	0.15 + 0.07	0.005 + 0.004
		20 kHz - 50 kHz	0.10 + 0.05	0.14 + 0.06	0.16 + 0.07	0.011 + 0.005
		50 kHz - 100 kHz	0.5 + 0.10	0.6 + 0.20	0.60 + 0.20	0.06 + 0.008
		100 kHz - 300 kHz	4.0 + 0.80	4.5 + 0.80	4.50 + 0.80	0.2 + 0.02
	2.00000 V ~ 750.00 V	3 Hz - 10 Hz	5.0 + 0.05	5.0 + 0.07	5.10 + 0.07	0.15 + 0.006
		10 Hz - 40 Hz	0.35 + 0.05	0.37 + 0.06	0.38 + 0.07	0.035 + 0.003
		40 Hz - 20 kHz	0.08 + 0.05	0.10 + 0.06	0.11 + 0.07	0.005 + 0.003
		20 kHz - 50 kHz	0.40 + 0.05	0.40 + 0.06	0.40 + 0.07	0.011 + 0.005
		50 kHz - 100 kHz	0.55 + 0.10	0.60 + 0.10	0.60 + 0.10	0.07 + 0.008
		100 kHz - 300 kHz	4.0 + 0.80	4.0 + 0.80	4.00 + 0.80	0.2 + 0.02
True RMS AC Current ^[5,6]	20.0000 mA	3 Hz - 10 Hz	5.0 + 0.05	5.1 + 0.07	5.1 + 0.07	0.15 + 0.006
		10 Hz - 40 Hz	0.55 + 0.05	0.61 + 0.06	0.64 + 0.07	0.035 + 0.006
		40 Hz - 5 kHz	0.13 + 0.05	0.18 + 0.06	0.22 + 0.07	0.015 + 0.006
		5 kHz - 10 kHz	0.20 + 0.25	0.2 + 0.25	0.2 + 0.25	0.03 + 0.006
	200.000 mA	3 Hz - 10 Hz	5.0 + 0.05	5.1 + 0.07	5.1 + 0.07	0.15 + 0.006
		10 Hz - 40 Hz	0.55 + 0.05	0.62 + 0.06	0.64 + 0.07	0.035 + 0.006
		40 Hz - 5 kHz	0.13 + 0.05	0.20 + 0.06	0.22 + 0.07	0.015 + 0.006
		5 kHz - 10 kHz	0.20 + 0.25	0.20 + 0.25	0.22 + 0.25	0.03 + 0.006
	1.00000 A	3 Hz - 10 Hz	5.0 + 0.16	5.1 + 0.25	5.2 + 0.27	0.24 + 0.047
		10 Hz - 40 Hz	0.64 + 0.16	0.70 + 0.25	0.71 + 0.27	0.035 + 0.047
		40 Hz - 5 kHz	0.22 + 0.16	0.28 + 0.25	0.29 + 0.27	0.015 + 0.047
		5 kHz - 10 kHz	0.35 + 0.2	0.35 + 0.4	0.35 + 0.4	0.03 + 0.047
	10.0000 A ^[7]	3 Hz - 10 Hz	5.3 + 0.05	5.4 + 0.07	5.4 + 0.07	0.24 + 0.006
		10 Hz - 40 Hz	0.8 + 0.05	0.9 + 0.06	0.9 + 0.07	0.035 + 0.006
		40 Hz - 5 kHz	0.40 + 0.06	0.90 + 0.06	0.90 + 0.06	0.015 + 0.006
		5 kHz - 10 kHz	0.42 + 0.1	0.75+0.06	0.75 + 0.06	0.03 + 0.006

Remarks:

- [1] Specifications are for 60 minutes warm-up and 6 ½ digits readings resolution.
- [2] Relative to calibration standards.
- [3] 20% over range on all ranges except for DCV 1000 V, ACV 750 V, DCI 10 A and ACI 10 A.
- [4] Specifications are for amplitude of sine wave input >5% of range. 750 VAC range is limited to 8×10^7 Volt-Hz. For the inputs from 1% to 5% of range and the frequency <50 kHz, add 0.1% of range extra error. For 50 kHz to 100 kHz, add 0.13%.
- [5] Specifications are for sine wave input >5% of range. 0.1% errors will be added when the range of sine wave input is 1% ~ 5%.
- [6] Generally, 30% of reading errors may be occurred when frequency is 100 kHz.
- [7] 30 seconds OFF after 30 seconds ON is recommend for the continuous current that higher than DC 7 A or AC RMS 7 A.

Low frequency Characteristics (Three levels of filter are optional)	
Slow	3 Hz ~ 300 kHz
Mid	20 Hz ~ 300 kHz
Fast	200 Hz ~ 300 kHz

Measure Attentions

No extra errors would be produced when frequency is higher than setting value of filter.

Setup Time Attentions

The setup time of AC Measuring is relative to the settings of filter. If the inputs is >300 Vrms (or >2 Arms), the adjusting element of signal will be self-heating thus change the temperatures internal, which will cause extra errors to smaller AC level and this kind of error has already included in the characteristics of the instrument. For those errors smaller than 0.02% readings, generally may disappeared in a few minute.

Frequency and Period Characteristics

Accuracy ± (% of reading + % of range) ^[1]						
Function	Range	Frequency Range	24 Hours ^[2] Tcal±1℃	90 Days Tcal±5℃	1Year Tcal±5℃	Temperature Coefficient 0℃ ~Tcal-5℃ and Tcal+5℃~55℃
Frequency, Period	200 mV to 750 V ^[3]	3 Hz - 5 Hz	0.07	0.07	0.07	0.005
		5 Hz - 10 Hz	0.04	0.04	0.04	0.005
		10 Hz - 40 Hz	0.02	0.02	0.02	0.002
		40 Hz - 300 kHz	0.005	0.006	0.007	0.002
	20 mA 至 10 A ^[4]	3 Hz - 5 Hz	0.07	0.07	0.07	0.005
		5 Hz - 10 Hz	0.04	0.04	0.04	0.005
		10 Hz - 10 kHz	0.005	0.006	0.007	0.002

Remarks:

- [1] Specifications are for 0.5 hour warm-up and 6 ½ digits readings resolution.
 [2] Relative to calibration standards.
 [3] Except for special marks, the AC input voltage is 10% to 120% of range. 750 V range is limited to 750 VRMS. 100 mV ranges is for full scale or higher. For inputs from 10 mV to 100 mV, multiply total % of reading error by 10.
 [4] Except for special marks, range 20 mA, 200 mA and 10 A are the AC input currents at the range of 10%~120%, 1A is the AC input currents at the range of 50%~120%.

Measure Attentions

Generally, errors are leaded into all frequency counters when measuring low voltage or low frequency signal. Shielding input can extremely help to reduce measuring errors caused by exterior noise

Setup Time Attentions

If the variational DC components appeared in signals under measure, errors may be caused while measuring period or frequency. Please ensure that the RC loop at input terminal must be stable during exact measuring (higher than 1 sec)

Capacitance Characteristics

Accuracy ± (% of reading + % of range) ^[1]				
Function	Range ^[2]	Test Current	1Year Tcal±5℃	Temperature Coefficient 0℃ - 18℃ 28℃ - 50℃
Capacitance	2.000 nF	200 nA	2 + 2.5	0.05 + 0.05
	20.00 nF	1 μA	1 + 0.5	0.05 + 0.01
	200.0 nF	10 μA	1 + 0.5	0.01 + 0.01
	2.000 μF	100 μA	1 + 0.5	0.01 + 0.01
	20.00 μF	1 mA	1 + 0.5	0.01 + 0.01
	200.0 μF	1 mA	1 + 0.5	0.01 + 0.01

Remarks:

- [1] Specifications are for 0.5 hour warm-up and "REF" operation. Using of non-film capacitor may generate additional errors.
 [2] Specifications are for from 1% to 120% on 1 nF range and ranges from 10% to 120% on other ranges.

Measuring Characteristics

DC Voltage	
Input Resistance	Range 200 mV, 2 V and 20 V, 10 MΩ ± 2% or >10 GΩ are optional Range 200 V and 1000 V, fixup at 10 MΩ ± 2%
Resistance	
Measurement Method	4-wire resistance or 2-wire resistance optional Current supply refers to LO input
Open Circuit Voltage	Limit at <7 V
Max. Lead Resistance (4-wire resistance)	10% of range per lead for 200 Ω, 1 kΩ 1 kΩ for per lead on all other ranges

Input Protection	1000 V, on all ranges
DC Current	
Shunt Resistor	0.025 Ω at 1 A, 10 A 为 1.025 Ω at 200 mA 11.025 Ω at 2 mA and 20 mA
Input Protection	The renewable 10 A, 250 V fuse at the rear panel 12 A, 250 V fuse internal
Continuity / Diode Test	
Measuring Method	Use 1 mA $\pm$ 0.2% current supply, <7 V open circuit voltage
Response Time	25 sampling /sec
Continuity Period	1 Ω ~ 2000 Optional
Input Protection	1000 V
AC Voltage	
Measurement Method	To measure the True RMS of AC coupling (Note: more than 400 V of DC offsets are permitted on arbitrary range.)
Input Impedance	1 M Ω $\pm$ 2% in parallel <100 pF capacitance on all ranges
Input Protection	750 Vrms on all ranges
AC Current	
Measurement Method	Separately couple DC to fuse and diverter and AC to true virtual value measuring (to measure the AC components that has been input)
Max. Input	the peak value of DC+AC current must <300% of range The RMS current including DC current <10 A
Shunt Resistor	0.025 Ω at 1 A, 10 A 1.025 Ω at 200 mA 11.025 Ω at 20 mA
Input Protection	Replaceability 10A and 250 V fuse lies on the rear panel 12 A, 250 V fuse inside the instrument
Frequency and Period	
Measurement Type	Equal precision frequency measurement, AC coupling input, or use AC Voltage or AC Current function.
Input Impedance (voltage signal)	1 M Ω $\pm$ 2% in parallel <100 pF capacitance
Shunt Resistor (current signal)	0.025 Ω at 1 A, 10 A 1.025 Ω at 200 mA 11.025 Ω at 20 mA
Input Protection	Voltage signal: 750 Vrms on all ranges; Current signal: 10 A, 250V on rear panel; 12 A, 250 V fuse inside the instrument
Capacitance Measurement	
Measurement Method	To measure the oblique wave generated when inputting current
Connection Type	2-wire
Trigger and Memory	
Samples per Trigger	1 ~ 2000,000
Trigger Delay	0 s ~ 3600 s
Input External Trigger	
Input Level	TTL compatible (It will up to Max. when input terminal is hang in the air)
Trigger Condition	Rising edge, falling edge, low level and high level are optional
Input Impedance	>20 kohm in parallel 400 pF, DC coupling
Delay	<1 μ S
Jitter	<1 μ S
Min. Pulse Width	1 μ S
VMC Output	
Electrical Level	TTL compatible (input to $\geq$ 1 kohm of loading)
Output Polarity	Positive and Negative polarity are optional
Output Impedance	200 ohm, typical
Nonvolatile Memory	512K readings
Volatile Memory	2M readings
Inspection Function on Rear Panel (only for the models with this function)	
Number of Channel	12-road difference voltage channel, 4-road difference current channel
Measuring Type	2-wire resistance, capacitance, DC voltage, DC current, AC voltage, AC current, diode, frequency and period.
Working Characteristics	Thermal emf <6 μ V. Max. inspection rate is 2 channels/sec.

Input Characteristics	Max. difference input voltage: 150 Vpeak; Isolation Voltage between input terminal: 150 Vpeak (Max.); Max. difference input current: 1 Apeak; Insulation between channels >60 dB (@10 kHz); Voltage from all terminals to chassis ground is limited at 150 Vpeak (Max).
Current Protection	2 A Self-restoring fuse inside the inspector
Voltage Protection	250 V over voltage protection



CAUTION:

For the instruments equipped with inspection expansion card (DM3054 and DM3064), the voltage of LO relatives to chassis ground is limited to 150 Vpeak (Max.).

Real Time Clock	
Accuracy	1 min/month (Operating Environment higher than 0°C)
Battery Life of Clock	2 years
Random Sensor Measurement	
Support for various sensors that both based on Ansi Basic and enable to output Thermocouple, Voltage, Current, Resistance signals.	
Math Operation	
Null, Min/Max/Average, dBm, dB, Limits test	
Data Acquisition	
Data record, Inspect, Auto measure	
Up to 50 KSPS sampling rate	
Other Functions	
Auto read/ Readings hold, Rate measure, built-in 10 groups of settings for storage	
Reading Resolution	
480,000 Count, higher than 6 ½ digits	
USB Interface	
USB Host, USB Device interface, support for U disc	
Other Interfaces	
RS-232, GPIB(optional), support for SCPI Commands; Difference switching inspect interface (optional), LAN interface (optional)	
General Characteristics	
Display	256×64 LCD, support for Double display, Menu display, Operating help and wave display
Data Acquisition and Virtual Software	Support Microsoft® Windows 98, Windows Me, Windows 2000, Windows XP
Power Supply	100 V/120 V/220 V/240 V ±10%
Grid frequency	45 Hz ~ 66 Hz
Power Consumption	20 VA peak value
Operating Environment	Full accuracy from 0°C to 50°C; 95% R.H., 40°C, non condensing
Storage Temperature	-20~70°C
Safety	Measure CAT II 300 V, CAT I 1000 V Class of pollution: 1
Strike and Shake	Conforming to MIL-T-28800E, Class III, 5 Level (only for sine)
Weight	2.5 kg
Dimension	107.0 mm (H)×231.6 mm (W)×290.5 mm (D)

Specifications of DM305X Series

DC Characteristics

Accuracy ± (% of reading + % of range) ^[1]					
Function	Range ^[2]	Test current or Load voltage	Input Impedance	1 Year 23℃±5℃	Temperature Coefficient 0℃ - 18℃ 28℃ - 55℃
DC Voltage	400.000 mV		10 MΩ 或 >10 GΩ	0.025 + 0.008	0.0015 + 0.0005
	4.00000 V		10 MΩ 或 >10 GΩ	0.025 + 0.006	0.0010 + 0.0005
	40.0000 V		10 MΩ	0.025 + 0.006	0.0020 + 0.0005
	400.000 V		10 MΩ	0.030 + 0.006	0.0020 + 0.0005
	1000.00 V ^[4]		10 MΩ	0.030 + 0.005	0.0015 + 0.0005
DC Current	2.00000 mA	<0.03 V		0.050 + 0.070	0.0040 + 0.0070
	20.0000 mA	<0.3 V		0.050 + 0.008	0.0040 + 0.0007
	200.000 mA	<0.3 V		0.050 + 0.009	0.0040 + 0.0008
	1.00000 A	<0.3 V		0.100 + 0.070	0.0100 + 0.0062
	10.0000 A ^[5]	<0.6 V		0.200 + 0.007	0.0100 + 0.0007
Resistance ^[3]	400.000 Ω	1 mA		0.050 + 0.010	0.0030 + 0.0005
	4.00000 kΩ	100 μA		0.015 + 0.006	0.0030 + 0.0005
	40.0000 kΩ	10 μA		0.015 + 0.006	0.0030 + 0.0005
	400.000 kΩ	2 μA		0.030 + 0.007	0.0030 + 0.0005
	4.00000 MΩ	200 nA		0.060 + 0.010	0.0030 + 0.0005
	100.000 MΩ	200 nA 10 MΩ		2.00 + 0.005	0.1500 + 0.0005
Diode Test	2.4000 V ^[6]	1 mA		0.05 + 0.010	0.0050 + 0.0005
Continuity Test	2000 Ω	1 mA		0.05 + 0.010	0.0050 + 0.0005

Remarks:

- [1] Specifications are for 60 minutes warm-up and 5 ¾ digits readings resolution, calibration temperature 18℃ - 28℃.
- [2] 20% over range on all ranges except for DCV 1000 V, ACV 750 V, DCI 10 A and ACI 10 A.
- [3] Specifications are for 4-wire measure or 2-wire measure under "Null" operation. ± 0.2 Ω of extra errors will be generated if perform 2-wire measure without "Null" operation.
- [4] Plus 0.02 mV of error per 1 V after the first ±500 VDC.
- [5] 30 seconds OFF after 30 seconds ON is recommend for the continuous current that higher than DC 7 A or AC RMS 7 A.
- [6] Accuracy specifications are only for voltage measuring at input terminal. The typical value of current under measure is 1 mA. Voltage drop at the diode junction may vary with current supply.

Setup Time Attentions

The setup time about voltage measurement is influenced by source resistance and media characteristics of cable as well as input signal. Generally, the setup time of readings of lower source resistance (less than 1 kΩ) is 1.5 s.

AC Characteristics

Accuracy ± (% of reading + % of range) ^[1]				
Function	Range ^[2]	Frequency Range	1 Year 23℃±5℃	Temperature Coefficient 0℃ - 18℃ 28℃ - 55℃
True RMS AC Voltage ^[3]	200.000 mV	10 Hz - 45 Hz	1.0 + 0.1	0.02 + 0.02
		45 Hz - 20 kHz	0.2 + 0.1	0.02 + 0.02
		20 kHz - 50 kHz	2.0 + 0.2	0.02 + 0.02
		50 kHz - 100 kHz	4.0 + 0.2	0.02 + 0.02
	2 V to 750.00 V	10 Hz - 45 Hz	1.0 + 0.1	0.02 + 0.02
		45 Hz - 20 kHz	0.2 + 0.1	0.02 + 0.02
		20 kHz - 50 kHz	1.0 + 0.1	0.02 + 0.02
		50 kHz - 100 kHz	2.0 + 0.2	0.02 + 0.02
True RMS AC Current ^[5]	20.0000 mA	10 Hz - 45Hz	1.5 + 0.1	0.02 + 0.02
		45 Hz - 2 kHz	0.5 + 0.1	0.02 + 0.02
		2 kHz - 10 kHz	2.0 + 0.2	0.02 + 0.02

	200.000 mA	10 Hz - 45 Hz	1.5 + 0.1	0.02 + 0.02
		45 Hz - 2 kHz	0.5 + 0.1	0.02 + 0.02
		2 kHz - 10 kHz	2.0 + 0.2	0.02 + 0.02
	1.00000 A	10 Hz - 45 Hz	1.5 + 0.5	0.02 + 0.05
		45 Hz - 2 kHz	0.5 + 0.5	0.02 + 0.05
		2 kHz - 10 kHz	2.0 + 0.5	0.02 + 0.05
	10.0000 A ^[6]	10 Hz - 45 Hz	1.5 + 0.1	0.02 + 0.02
		45 Hz - 2 kHz	0.5 + 0.1	0.02 + 0.02
		2 kHz - 10 kHz	2.0 + 0.2	0.02 + 0.02

Remarks:

- [1] Specifications are for 60 minutes warm-up and 5 ³/₄ digits readings resolution, calibration temperature 18°C - 28°C.
- [2] 20% over range on all ranges except for DCV 1000 V, ACV 750 V, DCI 10 A and ACI 10 A.
- [3] Specifications are for amplitude of sine wave input >5% of range. 750 V range limited to 8x10⁷ Volt-Hz. For inputs from 1% to 5% of range and <50 kHz, add 0.1% of range extra error. For 50 kHz to 100 kHz, add 0.13%.
- [4] Specifications are for sine wave input >5% of range. 0.1% errors will be added when the range of input sine wave is 1% ~ 5%.
- [5] Generally, 30% of reading errors may be occurred when frequency is 100 kHz.
- [6] 30 seconds OFF after 30 seconds ON is recommend for the continuous current that higher than DC 7 A or AC RMS 7 A.

Low frequency Characteristics (Three levels of filter are optional)	
Slow	3 Hz ~ 300 kHz
Mid	20 Hz ~ 300 kHz
Fast	200 Hz ~ 300 kHz

Attention when measuring

No extra errors would be produced when frequency is higher than setting value of filter.

Setup Time Attentions

The setup time of AC Measuring is relative to the settings of filter. If the inputs is >300 Vrms (or >2 Arms), the adjusting element of signal will be self-heating thus change the temperatures internal, which will cause extra errors to smaller AC level and this kind of error has already included in the characteristics of the instrument. For those errors smaller than 0.02% readings, generally may disappeared in a few minute.

Frequency and Period Characteristics

Accuracy ± (% of reading + % of range)^[1]

Function	Range	Frequency Range	1 Year 23°C ± 5°C	Temperature Coefficient 0°C - 18°C 28°C - 55°C
Frequency/Period	200 mV to 750 V ^[2]	3 Hz - 5 Hz	0.10	0.005
		5 Hz - 10 Hz	0.07	0.005
		10 Hz - 40 Hz	0.02	0.005
		40 Hz - 300 kHz	0.02	0.005
	20 mA to 10 A ^[3]	3 Hz - 5 Hz	0.10	0.005
		5 Hz - 10 Hz	0.07	0.005
		10 Hz - 10 kHz	0.02	0.005

Remarks:

- [1] Specifications are for 60 minutes warm-up.
- [2] Except for special marks, the AC input voltage is 10% to 120% of range. 750 V range is limited to 750 VRMS. 100 mV ranges is for full scale or higher. For inputs from 10 mV to 100 mV, multiply total % of reading error by 10.
- [3] Except for special marks, range 20 mA, 200 mA and 10 A are the AC input currents at the range of 10%~120%, 1A is the AC input currents at the range of 50%~120%.

Measure Attentions

Generally, errors are leaded into all frequency counters when measuring low voltage or low frequency signal. Shielding input can extremely help to reduce measuring errors caused by exterior noise

Setup Time Attentions

If the variational DC components appeared in signals under measure, errors may be caused while measuring period or frequency. Please ensure that the RC loop at input terminal must be stable during exact measuring (higher than 1 sec)

Capacitance Characteristics

Accuracy $\pm$ (% of reading + % of range) ^[1]

Function	Range ^[2]	Test Current	1 Year 23°C $\pm$ 5°C	Temperature Coefficient 0°C - 18°C 28°C - 55°C
Capacitance	4.000 nF	1 μ A	2 + 2.5	0.05 + 0.05
	40.00 nF	10 μ A	1 + 0.5	0.05 + 0.01
	400.0 nF	10 μ A	1 + 0.5	0.01 + 0.01
	4.000 μ F	1 mA	1 + 0.5	0.01 + 0.01
	40.00 μ F	1 mA	1 + 0.5	0.01 + 0.01
	200.0 μ F	1 mA	1 + 0.5	0.01 + 0.01

Remarks:

[1] Specifications are for 60 minutes warm-up and "REF" operation. Using of non-film capacitor may generate additional errors.

[2] Specifications are for from 1% to 120% on 1 nF range and ranges from 10% to 120% on other ranges.

Measuring Characteristics

DC Voltage	
Input Resistance	Range 400 mV and 4 V 10 M Ω or >10 G Ω optional Range 40 V, 400 V and 1000 V fixup at 10 M Ω $\pm$ 2%
Resistance	
Measurement Method	4-wire resistance or 2-wire resistance optional Current supply refers to LO input
Open Circuit Voltage	Limit at <7 V
Max. Lead Resistance (4-wire resistance)	0% range for per lead when the range is 400 Ω 1 k Ω for per lead at all other ranges
Input Protection	1000 V, on all ranges
DC Current	
Shunt Resistor	0.025 Ω at 1 A, 10 A 1.025 Ω at 200 mA 11.025 Ω at 2 mA and 20 mA
Input Protection	Replaceability 10A and 250 V fuse lies on the rear panel 12 A, 250 V fuse inside the instrument
Continuity / Diode Test	
Measurement Method	Use 1 mA $\pm$ 0.2% current supply, <8 V open circuit voltage
Response Time	25 sampling /sec
Continuity Period	1 Ω ~ 2000 Optional
Input Protection	1000 V
AC Voltage	
Measurement Method	To measure the True RMS of AC coupling (Note: more than 400 V of DC offsets are permitted on arbitrary range.)
Input Impedance	1 M Ω $\pm$ 2% in parallel <100 pF capacitance on all ranges
Input Protection	750 Vrms on all ranges
AC Current	
Measurement Method	Separately couple DC to fuse and diverter and AC to true virtual value measuring (to measure the AC components that has been input)
Max. Input	the peak value of DC+AC current must <300% of range The RMS current including DC current <10 A
Shunt Resistor	0.025 Ω at 1 A, 10 A 1.025 Ω at 200 mA 11.025 Ω at 20 mA
Input Protection	Replaceability 10A and 250 V fuse lies on the rear panel 12 A, 250 V fuse inside the instrument
Frequency and Period	
Measurement Type	Equal precision frequency measurement, AC coupling input, or use AC Voltage or AC Current function.
Input Impedance (Voltage Signal)	1 M Ω $\pm$ 2% in parallel <100 pF capacitance

Shunt Resistor (Current Signal)	0.025 Ω at 1 A, 10 A 1.025 Ω at 200 mA 11.025 Ω at 20 mA
Input Protection	Voltage signal: 750 Vrms on all ranges; Current signal: 10 A, 250V on rear panel; 12 A, 250 V fuse inside the instrument
Capacitance	
Measurement Method	To measure the oblique wave generated when inputting current
Connection Mode	2-wire
Trigger and Memory	
Sample per Trigger	1 ~ 2000,000
Trigger Delay	0 s ~ 3600 s
Input External Trigger	
Input Level	TTL compatible (It will up to Max. when input terminal is hang in the air)
Trigger Condition	Rising edge, falling edge, low level and high level are optional
Input Impedance	>20 kohm in parallel 400 pF, DC coupling
Delay	<1 μ S
Jitter	<1 μ S
Min. Pulse Width	1 μ S
VMC Output	
Electrical Level	TTL compatible (input to ≥ 1 kohm of loading)
Output Polarity	Positive and Negative polarity are optional
Output Impedance	200 ohm, typical
Nonvolatile Memory	512K readings
Volatile Memory	2M readings
Inspection Function on Rear Panel (only for the models with this function)	
Number of Channel	12-road difference voltage channel, 4-road difference current channel
Measuring Type	2-wire resistance, capacitance, DC voltage, DC current, AC voltage, AC current, diode, frequency and period.
Working Characteristics	Thermal emf <6 μ V. Max. inspection rate is 2 channels/sec.
Input Characteristics	Max. difference input voltage: 150 Vpeak; Isolation Voltage between input terminal: 150 Vpeak (Max.); Max. difference input current: 1 Apeak; Insulation between channels >60 dB (@10 kHz); Voltage from all terminals to chassis ground is limited at 150 Vpeak (Max.).
Current Protection	2 A Self-restoring fuse inside the inspector
Voltage Protection	250 V over voltage protection



CAUTION:

For the instruments equipped with inspection expansion card (DM3054 and DM3064), the voltage of LO relatives to chassis ground is limited to 150 Vpeak (Max.).

Real Time Clock	
Accuracy	1 min/month (Operating Environment higher than 0°C)
Battery Life of Clock	2 years
Random Sensor Measurement	
Support for various sensors that both based on Ansi Basic and enable to output Thermocouple, Voltage, Current, Resistance signals.	
Math Operation	
Pass/Fail, Min/Max/Average, dBm, dB, Limits test	
Data Acquisition	
Data record, Inspect, Auto measure Up to 50 KSPS sampling rate	
Other Functions	
Auto read/ Readings hold, Rate measure, built-in 10 groups of settings for storage	
Reading Resolution	
480,000 Count, higher than 5 3/4 digits	
USB Interface	
USB Host, USB Device interface, support for U disc	
Other Interfaces	
RS-232, GPIB(optional), support for SCPI Commands; Difference switching inspect interface (optional), LAN interface (optional)	

General Characteristics	
Display	256×64 LCD, support for Double display, Menu display, Operating help and wave display
Data Acquisition and Virtual Software	Support for Microsoft® Windows 98, Windows Me, Windows 2000, Windows XP
Power Supply	100 V/120 V/220 V/240 V ±10%
Grid frequency	45 Hz ~ 66 Hz
Power Consumption	20 VA peak value
Operating Environment	Full accuracy from 0°C to 50°C; 95% R.H., 40°C, non condensing
Storage Temperature	-20~70°C
Safety	Measure CAT II 300 V, CAT I 1000 V Class of pollution: 1
Vibration & Shock	Conforming to MIL-T-28800E, Class III, 5 Level (only for sine)
Weight	2.5 kg
Dimension	231.6 mm (W) ×107.0 mm (H)×290.5 mm (D)

Ordering Information

Name of Product

RIGOL DM3000 Digital Multimeter

Standard Accessories

- A Power Cord that fits the standard of destination country
- An USB Data Cable
- Two Test Leads (black and red)
- Quick Guide
- DMM External Connection Module (available for DM3064/3054)
- User's Guide and Application software (CD-ROM)

Optional Accessories

- RS232 Cable
- Kelvin Test Clips
- Extension Cord of Inspection Module (available for DM3064/3054)

Contact Us

If you have any problem or requirement during using our products, please contact **RIGOL** Technologies, Inc. or the local distributors.

Domestic: Please call
Tel: (86-10) 8070 6688
Fax: (86-10) 8070 5070

Service & Support Hotline: 800 810 0002

9:00 am –5: 00 pm from Monday to Friday

Or by e-mail:

Service@rigol.com

Or mail to:

RIGOL Technologies, Inc.
156# CaiHe Village, ShaHe Town, ChangPing District, Beijing, China
Post Code: 102206

Overseas: Contact the local **RIGOL** distributors or sales office.

For the latest product information and service, visit our website: <http://www.rigolna.com/>

Warranty

Very thank you for choosing **RIGOL** products!

RIGOL Technologies, Inc. warrants that this product will be free from defects in materials and workmanship from the date of shipment. If a product proved defective within the respective period, **RIGOL** will provide repair or replacement as described in the complete warranty statement.

For the copy of complete warranty statement or maintenance, please contact with your nearest **RIGOL** sales and service office.

RIGOL do not provide any other warranty items except the one being provided by this summary and the warranty statement. The warranty items include but not being subjected to the hint guarantee items related to tradable characteristic and any particular purpose.

RIGOL will not take any responsibility in cases regarding to indirect, particular and ensuing damage.