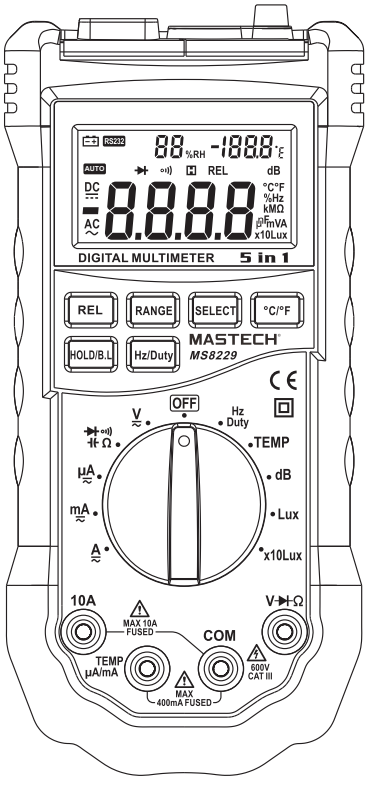
MASTECH®

MS8229

DIGITAL MULTIMETER
OPERATION MANUAL



CAT III 600V

Intertek

CE

3. Specifications

Calibration is required once a year, to be carried out at a temperature between 18°C and 28°C (64°F to 82°F) and relative humidity below 75%.

3.1 General Specifications

3.1.1 Auto range and manual range options are available.
3.1.2 Overrange protection is provided for all ranges.
3.1.3 Maximum voltage between terminals and earth ground: 600V DC or rms AC
3.1.4 Operating altitude: max. 2000 meters (7000 ft.)
3.1.5 Display: LCD, 3 readings at the same time
3.1.6 Maximum value display: 3999 digits
3.1.7 Polarity indication: automatic; '-' for negative polarity.
3.1.8 Overrange indication: '0L' or '-0L'
3.1.9 Sampling time: approx. 0.4 s econd per sample
3.1.10 Unit indication: function and unit.
3.1.11 Auto power off time: 30 min.
3.1.12 Specification of resettable fuse: F1 400mA/600V
3.1.13 Fuse protection: F2 10A/600V (quick acting).
3.1.14 Operating power : 3×1.5VAAA batteries
3.1.15 Battery low indication: '' on LCD
3.1.16 Temperature factor:<0.1xAccuracy \°C
3.1.17 Operating temperature: 0°C to 40°C (32°F to 104°F)
3.1.18 Storage temperature: -10°C to 50°C (10°F to 122°F)
3.1.19 Dimension: 195x92x55mm
3.1.20 Weight: approximate 400g(including batteries)

3.2 Technical Specifications

Ambient temperature: 23°C±5°C
Relative humidity: < 75%

3.2.1 DC Voltage

Range	Resolution	Accuracy
400mV	0.1mV	±(0.7% of reading+2 digits)
4V	1mV	
40V	10mV	
400V	100mV	
600V	1V	

-Input Impedance: 10MΩ
-Overload protection:
400mV range: 250V DC or rms AC,
4V- 600V ranges : 600V DC or AC.
-Max. input voltage: 600V DC or AC

Note:
At small voltage range, unsteady readings will appear before the test leads contact the circuit. This is normal because the meter is highly sensitive. When the test leads contact the circuit, the true reading will be shown.

3.2.2 AC Voltage

Range	Resolution	Accuracy
400mV	0.1mV	±(0.8% of reading+3 digits)
4V	1mV	
40V	10mV	
400V	100mV	
600V	1V	±(1.0% of reading+3 digits)

-Input Impedance: 10MΩ
-Overload protection:
400mV range: 250V DC or rms AC,
4V-600V ranges: 600V DC or AC.
-Max.input voltage: 600V DC or AC
-Frequency range: 40 to 400Hz
-Response: average, calibrated in rms of sine wave

Note:

At small voltage range, unsteady readings will appear before the test leads contact the circuit. This is normal because the meter is highly sensitive. When the test leads contact the circuit, the true reading will be shown.

3.2.3 DC Current

Range	Resolution	Accuracy
400μA	0.1μA	±(1.2% of reading+3 digits)
4000μA	1μA	
40mA	10μA	
400mA	100μA	
4A	1mA	±(2.0% of reading+10 digits)
10A	10mA	

-Overload protection:
μA、mA ranges: resettable fuses F1 400mA/600V
10A range:F2 10A/600V fuse (quick acting).
-Max. input current:
mA jack (μA ranges): 4mA,
mA jack (mA ranges): 400mA,
10A jack: 10A
-Voltage drop:
400μA ranges: 40mV,
4000μA ranges: 400mV,
40mA ranges: 40mV,
400mA ranges: 400mV,
4A range: 40mV
10A range: 100mV

For measurements>5A,the measuring time for high current (10A) should be<15 second for each measurement and interval time between two measurement should be greater than 2 minutes

3.2.4 AC Current

Range	Resolution	Accuracy
400μA	0.1μA	±(1.5% of reading + 5 digits
4000μA	1μA	
40mA	10μA	
400mA	100μA	
4A	1mA	±(3.0% of reading + 10 digits)
10A	10mA	

-Overload protection:
μA、mA ranges: resettable fuses F1 400mA/600V
10A range: F2 10A/600V fuse (quick acting).
-Max. input current:
mA jack(μA ranges): 4mA,
mA jack (mA ranges): 400mA,
10A jack: 10A
-Voltage drop:
400μA ranges: 40mV,
4000μA ranges: 400mV,
40mA ranges: 40mV,
400mA ranges: 400mV,
4A range: 40mV
10A range: 100mV
-Frequency range: 40 to 400Hz
-Response: average, calibrated in rms of sine wave.

3.2.5 Resistance

Range	Resolution	Accuracy
400Ω	0.1Ω	±(1.2%of reading + 2 digits)
4kΩ	1Ω	
40kΩ	10Ω	
400kΩ	100Ω	
4MΩ	1kΩ	
40MΩ	10kΩ	±(2.0%of reading + 5 digits)

-Open circuit voltage: ~0.25V
-Overload protection: 250V DC or rms AC

3.2.6 Capacitance

Range	Resolution	Accuracy
40nF	10pF	±(3.0% of reading + 3 digits)
400nF	0.1nF	
4μF	1nF	
40μF	10nF	
100μF	100nF	

-Overload protection: 250V DC or rms AC

3.2.7 Frequency

Range	Resolution	Accuracy
9.999Hz	0.001Hz	±(2.0% of reading + 5 digits)
99.99Hz	0.01Hz	±(1.5% of reading + 5 digits)
999.9Hz	0.1Hz	
9.999kHz	1Hz	
99.99kHz	10Hz	±(2.0% of reading + 5 digits)
199.9kHz	100Hz	
>200kHz		for reference only

-by Hz range:
Measurement range: 0~200kHz
Input voltage range: 0.5V-10V rms AC (higher input voltage at higher frequency)
Overload protection: 250V DC or rms AC

-by V range:
Measurement range: 0 ~ 40kHz
Input voltage range: 0.5V-600V rms AC (higher input voltage at higher frequency)
Input Impedance: 10MΩ
Max.input voltage: 600V DC or 600V rms AC

-byμ A,mA or A range
Measurement range:0~40kHz
Input current range: ≥ 1/4 range rms AC (higher input voltage at higher frequency)

-Max.input current:
mA jack(μA ranges): 4mA,
mA jack(mA ranges): 400mA,
10A jack: 10A

-Overload Protection:
μA、mA ranges: resettable fuses F1 400mA/600V
10A range: F2 10A/600V fuse (quick acting)

Note:
When measuring frequency, the range by Hz range is larger than that by the Hz of voltage range or current range, but the value measured beyond the range is for reference only.

3.2.8 Duty

Range	Resolution	Accuracy
0.1-99.9%	0.1%	±3.0%

-By Hz range:
Frequency response: 0~200kHz
Input voltage range: 0.5V-10V rms AC (higher input voltage at higher frequency)
Overload protection: 250V DC or rms AC (higher input voltage at higher frequency)

-By V range:
Frequency response: 0~40kHz
Input voltage range: 0.5V-600V rms AC (higher input voltage at higher frequency)
Input Impedance: 10MΩ
Max.Input Voltage: 600V DC or 600V rms AC

-Byμ A, mA or A range:
Frequency response: 0 ~ 40kHz
Input current range:≥1/4 of the rms AC for the range (higher input voltage at higher frequency)
-Max. input current:
mA jack (μA ranges): 4mA,
mA jack (mA ranges): 400mA,
10A jack: 10A
-Overload protection:
μA、mA ranges: resettable fuses F1 400mA/600V
10A range: F2 10A/600V fuse (quick acting).

Note:
The range by DUTY of the Hz range is larger than that of the voltage range or current range.

3.2.9 Relative Humidity

(on RH and humidity display)

Range	Resolution	Accuracy
20 - 95%	0.1%	±5.0%RH

-Operating temperature: 0°C to 40°C
-Sampling Period: ~20s.

3.2.10 Temperature

3.2.10.1 Temperature (on sensor, thermoresistor NTC and temperature display)

Range	Resolution	Accuracy	
°C	0.1°C	0°C to 40°C	± 2°C
°F	0.1°F	32°F to 104°F	± 4°F

-Sampling Period: ~20s.

3.2.10.2 Temperature

(on sensor, thermocouple and main display)

Range	Resolution	Accuracy	
°C	1°C	-20°C to 0°C	±5.0% of reading or ±3°C
		0°C to 400°C	±1.0% of reading or ±2°C
		400°C to 1000°C	±2.0% of reading
°F	1°F	-4°F to 32°F	±5.0% of reading or ±6°F
		32°F to 752°F	±1.0% of reading or ±4°F
		752°F to 1832°F	±2.0% of reading

-Overload protection: resettable fuses F1 400mA/600V.

3.2.11 Sound Level (dB)

Range	Resolution	Accuracy
40-100dB	0.1 dB	±3.5%dB at 94dB, 1kHz sine wave

-Typical instrument frequency range: 100 ~ 8000Hz

3.2.12 Luminance (Lux)

Range	Resolution	Accuracy
Lux (4000)	1 Lux	±(5.0% of reading + 10 digits) at color temp. 2856K calibrated to standard incandescent lamp
x10Lux (40000)	10Lux	

-Repeatability: ±2%.

3.2.13 Diode Test

Range	Resolution	Function
⊣◀	1mV	displaying approximate forward voltage of diode

-Forward DC current ~1mA
-Reversed DC voltage ~1.5V
-Overload Protection: 250V DC or rms AC

3.2.14 Continuity Test

Range	Function
)))	Built-in buzzer will sound if resistance is lower than 40Ω.

-Open circuit voltage ~ 0.5V
-Overload Protection: 250V DC or rms AC

4. Operating Instruction

4.1 Holding Readings

1) Press the "HOLD/B.L" button to hold the readings while taking measurement, and the value on the display will be held.
2) Press the "HOLD/B.L" button again to release the READING HOLD function.

4.2 SWitching Functions

1) Press the **"SELECT"** button to switch between AC and DC measurement at the current and voltage ranges.
2) Press the **"SELECT"** button to switch among resistance, diode and continuity ranges.

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4.3 Switching Ranges

1) When the meter is turned on, it is at the auto range mode for measuring current, voltage and resistance.
2) Press the **"RANGE"** button for manual range mode. The range will go up one level at each press and return to the lowest level when the highest level is reached.
3) Press the **"RANGE"** button for two or more seconds to return to the auto range.

4.4 Switching Between Frequency/Duty

1) Press the "Hz/DUTY" button at the frequency range to switch between frequency and duty measurement.
2) When the meter is at the voltage and current ranges, press the "Hz/DUTY" button to measure the frequency of the voltage or current signal. Another press on the "Hz/DUTY" button will change into the Duty range for measuring the duty cycle of the voltage or current signal.
3) Press the "Hz/DUTY" again to resume the meter to voltage and current measurement at the manual range mode.

4.5 Switching To Relative Measurement

1) Press the "REL" button to enter the relative measurement mode when taking measurements. The initial reading will resume zero.
2) At the relative measurement mode, the existing reading will be stored in the memory as reference value for later measurements. The displayed reading is the difference between the input value and reference value. i.e. REL (present reading) = input value - reference value