

INTRODUCTION

The Metravi Metrasafe 20 is a handheld new auto-ranging multimeter in 4- 5/6 digit true virtual value which is complete in functions, high in quality and reliability, fashionable in structure, safe and has a jumbo screen display.

It can measure AC/DC Voltage/Current, Resistance, Diode, Capacitance, Frequency, Duty Cycle, Temperature, % (4-20mA), Conductivity, Voltage to Frequency converter (V.F.C), NCV (non-contact AC voltage sensing), and it is also equipped with functions as 600A AC/DC current clamp measurement, programmable square-wave output, Data Storage, mis-operation alarm, USB Bluetooth interfaces, etc.

It is a necessary, portable instrument for users in design, research and repair.

SAFETY OPERATION CRITERION

The design meets the safety standards of IEC/EN61010-1, pollution level 2, overvoltage category (CAT III 1000V and CAT IV 600V) and double insulation. Conforms to UL STD. 61010-1, 61010-2-030, 61010-2-033 Certified to CSA STD. C22.2 NO. 61010-1, 61010-2-030, IEE STD 61010-2-033

COMPREHENSIVE SPECIFICATION

- Overload protection voltage between input terminal and grounding shall be 1,000V
- 10 A terminal (CE): F 10A H 1,000V fast fuse Φ 10x38mm
- mA/ μ A terminal (CE): FF 800mA H 1000V fast fuse Φ 6x32mm
- Maximum display : 60,000 Counts
- Capacitance : 6,000 Counts
- Frequency : 60,000 Counts
- Duty ratio : 1-99.9%
- Diode : 0-3.0000V
- % (4-20mA): 0-100.0%
- Simulated pointer : 31 pointers
- Range : Automatic / Manual
- Polarity: Automatic
- Update 4-5 times per second (except for some functions).
- It will display "OL" in case of overrange.
- Operating Temperature : 0°C-40 °C
- Relative Humidity : 0°C-30°C \leq 75%, 30°C -40°C \leq 50%
- Storage Temperature : -10°C-50°C
- Operating Altitude : 0-2,000m
- Battery : Lithium battery 7.4V/1, 800mAh
- Low battery : LCD displays the symbol of "  "
- Displayer : OLED
- Dimensions : about (206 long x 95 wide x 53 high) mm
- Weight : about 500g (including batteries)
- Electromagnetic Compatibility : In 1V/m radio-frequency field: gross precision = specified precision + 5% of range. No specific index for radio-frequency field over 1V/m.
- Verification : CE ETL



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TECHNICAL SPECIFICATION

Accuracy: \pm (a% of reading + b counts). Accuracy is guaranteed for 1 year. Ambient Temperature: 23°C \pm 5°C (73.4°F \pm 9°F); Relative Humidity: ~ 75%

DC Voltage

Range	Resolution	Accuracy \pm (a% of reading + b counts)			
		DC	Frequency Response	45Hz-1kHz	>1kz-20kHz
600.00mV*	10 μ V	\pm (0.025%+5)	AC + DC	\pm (1.2+40)	\pm (6.0+40)
6.0000V	100 μ V				
60.000V	1mV				
600.00V	10mV	\pm (0.03%+5)	Undefined		
1000.0V	100mV	\pm (0.03%+5)			

⚠ Input impedance:

* Range \geq 1G Ω , input impedance for other ranges is 10M Ω . (For *range, unstable digit may be displayed in open circuit, digits \leq \pm 5 shall be stable after connecting up load).

* AD+DC the specifications are defined for signal input > 10% of range

AC Voltage

Range	Resolution	Accuracy \pm (a% of reading + b counts)			
		45Hz-1kHz	>1kz-10kHz	>10kz-20kHz	>20kz-100kHz
600.00mV*	10 μ V	\pm (0.4%+40)	\pm (5.0%+40)	\pm (5.5%+40)	\pm (8.0%+40)
6.0000V	100 μ V		\pm (1.2%+40)	\pm (3.0%+40)	\pm (8.0%+40)
60.000V	1mV		\pm (1.2%+40)	\pm (3.0%+40)	\pm (6.0%+40)
600.00V	10mV		\pm (3.0%+40)	Undefined	
1000.0V	100mV	\pm (0.6%+40)	\pm (3.5%+40)		
LoZ /1000-V	0.1V	\pm (2%+40)			
V.F.C 600V/1000V	0.01V/0.1V	\pm (4%+10) Frequency Response :45 - 400Hz			

⚠ Input Impedance : about 10M Ω .

Display : true virtual value; range of accuracy guarantee: 10-100% of range (the 1000V range is 20 -100%); it is allowed to have residual readings < 50 digits in short circuit.

AC Wave Peak Factor : can reach 3.0 in full-range value (excluding 750V range which is 1.5 in full-range value)

Non-sinusoidal Waveform : the accuracy shall be increased by 3.0% if the wave peak factor is within 1.0-2.0

The accuracy shall be increased by 5.0% if the wave peak factor is within 2.0-2.5

The accuracy shall be increased by 7.0% if the wave peak factor is within 2.5-3.0

DC Current

Range	Resolution	Accuracy \pm (a% of reading + b counts)			
		DC	FrequencyResponse	45Hz-1kHz	> 1kHz-10kHz
600.00 μ A	0.01 μ A	\pm (0.25% + 20)	AC+DC	\pm (1.5%+20)	\pm (2.0%+40)
6000.0 μ A	0.1 μ A	\pm (0.25%+2)		\pm (1.5%+20)	\pm (2.0%+40)
60.000mA	1 μ A	\pm (0.15%+10)		\pm (1.5%+20)	\pm (2.0%+40)
600.00 μ A	10 μ A	\pm (0.15%+10)		\pm (1.5%+20)	\pm (3.0%+40)
6.0000A	100 μ A	\pm (0.5%+10)		\pm (2.0%+20)	\pm (6.0%+40)
10.000A	1mA	\pm (0.5%+2)		\pm (1.5%+ 10)	\pm (5.0%+10)
%(4-20mA)	0.01%	\pm (0.5%+2)			

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AC Current

Range	Resolution	Accuracy $\pm(a\% \text{ of reading} + b \text{ counts})$		
		45Hz-1kHz	>1kz-20kHz	> 20kz-100kHz
600.00 μ A	0.01 μ A	$\pm(0.75\%+20)$	$\pm(1.2\%+40)$	$\pm(6.0\%+40)$
6000.0 μ A	0.1 μ A	$\pm(0.75\%+20)$	$\pm(1.2\%+40)$	$\pm(3.0\%+40)$
60.000mA	1 μ A	$\pm(0.75\%+20)$	$\pm(1.2\%+40)$	$\pm(9.0\%+40)$
600.00 μ A	10 μ A	$\pm(0.75\%+20)$	$\pm(1.5\%+10)$	$\pm(4.0\%+40)$
6.0000A	100 μ A	$\pm(1.5\%+20)$	$\pm(6.0\%+40)$	Undefined
10.000A	1 μ A	$\pm(1.5\%+5)$	$\pm(5.0\%+10)$	

Display : true virtual value; range of accuracy guarantee: 10-100% of range; it is allowed to have residual readings < 50 digits in short circuit.

AC wave peak factor : can reach 3.0 in full-range value

Non-sinusoidal waveform : the accuracy shall be increased by 3.0% if the wave peak factor is within 1.0-2.0

The accuracy shall be increased by 5.0% if the wave peak factor is within 2.0-2.5

The accuracy shall be increased by 7.0% if the wave peak factor is within 2.5-3.0

Resistance & Conductance

Range	Resolution	Accuracy $\pm (a\% \text{ of reading} + b \text{ counts})$
600.00 Ω	0.01 Ω	$\pm (0.05\% + 10)$
6.0000k Ω	0.1 Ω	$\pm (0.05\%+2)$
60.000k Ω	1 Ω	$\pm (0.05\%+2)$
600.00k Ω	10 Ω	$\pm (0.05\%+2)$
6.0000M Ω	100 Ω	$\pm (0.15\%+5)$
60.000M Ω	1k Ω	$\pm (3\%+2)$
60.00nS	0.10nS	$\pm (1\%+10)$

Capacitance

Range	Resolution	Accuracy $\pm (a\% \text{ of reading} + b \text{ counts})$
6.000nF	1pF	$\pm (3.0\% + 30)$
60.00nF ~ 600.0mF	10pF ~ 100nF	$\pm (2.5\%+5)$
6.000mF ~ 60.00mF	1mF ~ 10mF	$\pm 10\%$

Frequency / Duty Ratio / Cycle

Range	Resolution	Accuracy $\pm (a\% \text{ of reading} + b \text{ counts})$
60.000Hz ~ 10.000MHz	0.001Hz ~ 0.001MHz	$\pm (0.01\%+5)$
1.0% ~ 99.0%	0.1%	$\pm (3.0\%+40)$
100.0mS ~ 0.100 μ S	0.1mS ~ 0.001 μ S	$\pm (0.1\%+5)$



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- 1) Input range a:
 - ≤ 100kHz: 500mVrms ≤ a ≤ 30Vrms
 - >100kHz-1MHz: 600mVrms ≤ a ≤ 30Vrms
 - > 1MHz: 1Vrms ≤ a ≤ 30Vrms
- 2) Duty ratio % is applicable to measuring ≤ 100kHz only
- 3) During AC Voltage or AC Current measuring, when frequency or duty ratio is required to be read online, the following requirements must be met:
 - a. frequency response: ≤ 100 kHz
 - b. AC voltage:
 - input range for 600mV ≥ range x 10%
 - input range for 6.0000V / 60.000V / 600.00V ≥ range x 10%
 - input range for 1000.0V ≥ range x 30%
 - c. AC current:
 - input range for 6000.0μA / 600.00mA ≥ range x 10%
 - input range for 600.00μA / 60.000mA / 6.0000A ≥ range x 10%
 - input range for 10.000A ≥ range x 30%



Temperature

Range		Resolution	Accuracy
°C	-40 ~ 1000°C	-40 ~ 0°C	±(2%+3°C)
		> 0 ~ 100°C	±(1.0%+3°C)
		> 100 ~ 1000°C	±(2.5%)
°F	-40 ~ 1832°F	-40 ~ 32°F	±(2.5%+5°F)
		> 32 ~ 212°F	±(1.5%+5°F)
		> 212 ~ 18320°F	± (2.5%+5°F)

Current Clamp

Range	Resolution	Accuracy
60A/600A DC	0.001A / 0.01A	±(1.0%+30)
60A/600A AC	0.001A / 0.01A	±(1.2%+30)

⚠ Caution:

- * When the outer caliper head is used for current measuring, the corresponding relationship between its input range and adaptive conversion ratio is (60A; 10mV/A) or (600A; 1mV/A).
- * The frequency response range is not defined under ACA mode and it can be determined according to the frequency response of clamp.
- * These specifications are defined for signal input > 10% of range.

Square-Wave Output

Range	Resolution	Accuracy
Frequency	10.5HZ-4800HZ (0.1Hz is the stepping level)	± (0.01%+5)
Duty Ratio %	0%-100% (0.1% is the stepping level)	±(0.5%)
Amplitude	about 0.8Vp	±0.2Vp

⚠ Caution:

- 1) The maximum square-wave output impedance is 50Ω.
- 2) The positive or negative pulse width during adjusting the duty ratio must be more than 50μs.

ACCESSORIES

- Operation Manual
- Probes
- K-type thermocouple one piece
- Lithium battery charger
- USB cable
- Bluetooth interface (optional)

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