

## INTRODUCTION

MetraVi Metrasafe-10 is a 6000-count true-RMS digital multimeter. A unique feature is the NCV function which can quickly identify live and neutral wires through light intensity. In addition, the Metrasafe-10 can measure temperature and detect live/neutral wire through a single test lead by contact. It is designed with audio/visual alarm, allowing you to observe the test result more intuitively. The flashlight and the auto backlight features are also convenient when measuring in the dark. With ergonomic design and durable double injection build. The Metrasafe-10 is a perfect measurement tools for electricians and hobbyists

## FEATURES

- Double injection, durable and ergonomic
- Audio/visual alarm (applied in voltage/current/capacitance/diode/transistor/continuity/NCV measurements)
- Up to 1000V voltage measurement
- Up to 20A current measurement
- NCV measurement with voltage levels can measure voltage down to about AC 12V/50Hz and distinguish live/neutral wires by sensing.
- Live measurement: single probe to identify live/neutral wire by contact
- Up to 100mF capacitance measurement
- LCD auto backlight and flashlight
- Design according to CAT III 600V, CAT II 1000V safety requirements and the following directive standards:  
LVD Directive (2014/35/EU):  
EN 61010-1:2010  
EN 61010-2-030:2010  
EN 61010-2-033:2012 (for hand-held meters with voltage measurement function)  
EMC Directive (2014/30/EU) :  
EN 61326-1:2013  
EN 61326-2-2:2013



**GENERAL SPECIFICATIONS**

- Display count : 6000
- Max capacitance : 99.9mF
- Range : Auto/manual
- Polarity : Auto
- Refreshes 2-3 times/s  
"OL" appears when over-range
- Display : LCD screen
- Operating temperature : 0°C~40°C (32°F~104°F)
- Storage temperature : -20°C~60°C (-4°F~140°F)
- Relative humidity : 0°C- below 30°C ≤ 75%, 30°C-40°C ≤ 50%
- Operating altitude : 0-2000m
- Battery : AAA 1.5V x 4
- Low battery indication : LCD displays "  " symbol
- Dimension: about 175mm x 81mm x 48.5mm
- Weight : about 345g (including batteries)
- EMC :  
RF field (1V/m) : overall accuracy = specified accuracy + 5% of range  
RF field (>3V/m) : no specified calculation
- Temperature : -40 to 1000°C
- Accuracy : 2%

**MEASUREMENT SPECIFICATIONS**

**DC Voltage Measurement**

Range	Resolution	Accuracy
600mV	0.1mV	± (0.5%+4)
6.000V	1mV	± (0.5%+2)
60.00V	10mV	
600.0V	100mV	
1000V	1V	± (0.7%+10)

 **Input impedance:** \*mV range ≥ 1000MΩ,  
\*other ranges : about 10MΩ.

Max input voltage: ±1000V

Input voltage ≥ 1000V: audio/visual alarm

Input voltage >1010V: "OL" appears on LCD

**AC Voltage Measurement T-RMS**

Range	Resolution	Accuracy
6.000V (45~400Hz)	1mV	± (0.8%+5)
60.00V (45~400Hz)	10mV	
600.0V (45~400Hz)	100mV	
1000V (45~400Hz)	1V	± (1.0%+10)
6.000V (400~1000Hz)	1mV	± (1.5%+8)
60.00V (400~1000Hz)	10mV	
600.0V (400~1000Hz)	100mV	
1000V (400~1000Hz)	1V	± (1.8%+12)

 **Input impedance:** \* about 10MΩ.

\* True RMS display.

\* Frequency response: 45-1 KHz

\* Non-sine wave frequency response: 45Hz-400Hz

AC crest factor at 3000 counts: allows ≤ 3.0

AC crest factor at 6000 counts (full range) ≤1.5

According to the crest factor, the additional error is calculated as follows:

a) Add 4% when crest factor is 1-2

b) Add 6% when crest factor is 2-2.5

c) Add 8% when crest factor is 2.5-3

\* AC voltage frequency measurement: 45Hz-1kHz. Min measurement amplitude: 10% of voltage range.

\* Accuracy guarantee range : 1-100% of range, shorted circuit allows least significant digit <10

Max input voltage : 1000Vrms

Input voltage >1000V : audio/visual alarm

Input voltage >1010V : "OL" appears on LCD

### Resistance Measurement

Range	Resolution	Accuracy
600.0Ω*	0.1Ω	± (0.8%+5)
6.000kΩ	0.001kΩ	± (0.8%+3)
60.00kΩ	0.01kΩ	
600.0kΩ	0.1kΩ	
6.000MΩ	0.001MΩ	± (1.5%+5)
60.00MΩ	0.01MΩ	± (1.5%+25)

⚠ **Open circuit voltage:** \*about 1V  
(test current is about 0.4mA)

**Overload protection:** 600V-PTC

### Capacitance Measurement

Range	Resolution	Accuracy
6.000nF	1pF	± (5%+35)
60.00nF	10pF	± (2.5%+20)
600.0nF	100pF	
6.000uF	1nF	
60.00uF	10nF	
600.0uF	100nF	± (6.0%+10)
6.000mF	1μF	
60.00mF	10μF	± (10%+0D)
100.0mF	100μF	± (10%+0D)

⚠ **Overload protection :** 600V-PTC

### Diode and Continuity Testing

Range	Resolution	Remark
	0.1Ω	Set value : Open circuit: resistance >30Ω, no beep; Well-connected circuit: resistance ≤30Ω, audio/visual alarm
	0.001V	Open circuit voltage : about 3 V (test current is about 1.2mA) Silicon PN junction normal voltage : about 0.5~0.8V, with audio/visual alarm.

⚠ **Overload protection:** 600V-PTC

Reading <0.12V: Red indicator will be on with continuous beeps, indicating the diode may break down;

Reading within 0.12V-2V: Green indicator will be on with one beep, indicating the diode works well.

### DC Current Measurement

	Range	Resolution	Accuracy
μA	60μA	0.01μA	± (0.8%+8)
mA	60mA	10μA	
		600mA	0.1mA
A	20A	10mA	±(2%+5)

⚠ **Overload protection :**

- μA mA range: F1 fuse (φ5x20)mm 630mA 250V
- 20A range: F2 fuse (φ5x20)mm 20A 250V
- Input >10A: audio/visual alarm
- Input >20.1A: "OL" appears on LCD

### Temperature Measurement

Range	Resolution	Accuracy
-40°C ~0°C	1°C	± (6%+5)
0°C ~400°C	1°C	± (2%+4)
400°C ~1000°C	1°C	± (2%+5)
-40°F~32°F	1°C	± (6%+9)
32°F ~752°F	1°C	± (2%+8)
752°F~1832°F	1°C	± (2%+9)

⚠ **Overload protection :** 600V-PTC

### Transistor Measurement

Range	Resolution	Remark
1000β	1β	(NPN/PNP) 1.8V, 5μA

**AC Current Measurement (T-RMS)**

	Range	Resolution	Accuracy
mA	60mA (45~400Hz)	10μA	±(1.0%+12)
	60mA (45~400Hz)	0.1mA	±(2.0%+3)
A	20A (45~400Hz)	10mA	±(3.0%+5)
mA	60mA (400~1000Hz)	10μA	±(1.5%+12)
	600mA (400~1000Hz)	0.1mA	±(2.5%+5)
A	20A (400~1000Hz)	10mA	±(3.5%+8)

True RMS display. Frequency response : 45 ~ 1KHz

\* Non-sine wave frequency response : 45Hz ~ 400Hz

AC crest factor at 3000 counts : allows ≤ 3.0

AC crest factor at 6000 counts (full range) ≤ 1.5

According to the crest factor, the additional error is calculated as follows:

a) Add 4% when crest factor is 1-2

b) Add 6% when crest factor is 2-2.5

c) Add 8% when crest factor is 2.5-3

\* AC current frequency measurement : 45Hz-1 KHz.

Min measurement range : mA gear position > 35mA, 20A gear position > 5.5A.

Accuracy guarantee range : 1-100% of range, open circuit allows least significant digit < 2.

Input > 10A : audio/visual alarm

Input > 20.1A : "OL" appears on LCD.

⚠ Overload protection : (similar to DC current overload protection)

**Frequency/Duty Ratio Measurement**

	Range	Resolution	Accuracy
Frequency	9.999Hz - 10MHz	0.001 Hz-100kHz	± (0.1%+4)
Duty ratio	0.1% - 99.9%	0.1%	± (2%+5)

Measurement range : 10Hz~10MHz (auto range)

≤ 100kHz : 100mVrms ≤ input amplitude ≤ 30Vrms

> 100kHz~1MHz: 200mVrms ≤ input amplitude ≤ 30Vrms

> 1MHz: 600mVrms ≤ input amplitude ≤ 30Vrms

The duty ratio is only applied to square wave measurement

(≤ 10kHz, 300mVrms ≤ input amplitude ≤ 30Vrms)

Frequency ≤ 1kHz : duty ratio is 10.0%-95.0%

Frequency > 1kHz: duty ratio is 30.0%-70.0%

⚠ Overload protection: 600V-PTC

**LED Three-colour Indicator**

Function	LED Indicator Colour	Description	
NCV	LED off	>12V	Note: The voltage range is for reference only.
	LED on (green)	12V-48V: green LED flickers from slow to fast, buzzer beeps from slow to fast.	
	LED on (yellow)	>48V-220V: yellow LED flickers from slow to fast, buzzer beeps from slow to fast.	
	LED on (red)	>220V: red LED is on.	
LIVE	LED off	<60V	Note: The voltage range is for reference only.
	LED on (red)	>60V: red LED flickers from slow to fast, buzzer beeps from slow to fast to indicate different voltage level.	
Continuity	LED off	OL	
	LED on (red)	Non-conducting (>30Ω)	
	LED on (green)	Conducting (≤30Ω)	
Diode	LED on (green)	Conducting (0.12V-2V)	
	LED on (red)	Breakdown (<0.12V)	
	LED off	>2V	
Transistor	LED on (green)	Amplification factor >50	
	LED on (yellow)	Amplification factor ≤ 50	
	LED off	Amplification factor = 0	
Capacitance	LED off	<20pF	
	LED on (green)	The capacitor is fully charged	
	LED on (yellow)	The capacitor is charging	
Voltage	LED off	DCV <1000V, ACV <1000V	
	LED on (red)	DCV ≥ 1000V, ACV ≥ 1000V	
Current	LED off	<10A	
	LED on (red)	≥10A	

**TECHNICAL INDEX**

Accuracy : ± (a% of reading + b digits), 1 year warranty

Ambient temperature : 23°C±5°C (73.4°F±9°F)

Relative humidity : ≤75%

**ACCESSORIES**

- 1) User manual ----- 1 pc
- 2) Test leads ----- 1 pair
- 3) K-type (NiCr-NiSi) thermocouple ----- 1 pc
- 4) 1.5V AAA battery ----- 4 pcs
- 5) Warranty card ----- 1 pc
- 6) Indicator function description colour card-----1 pc

