

MESR100 V2 User Guide V1.0

Features:

JINGYAN MESR-100 V2 Auto-ranging capacitor ESR and Low Ohm Meter

Measuring range from 0.001 to 100.0R, support IN CIRCUIT Testing.

Using true 100 KHz sine wave to measure the ESR value, which is equal to the testing method of capacitor manufacturer. In the market, there is some technique using short pulse method to testing, but the value will be varying vs the capacitance and sometimes reading is different from the manufacturer's value.

What is ESR of capacitor?

There is a series resistor inside capacitor, using 100kHz to remove the impedance $1/(2\pi F C)$, the impedance become small, and we can then measure the true series resistor value.

A bad E-capacitor will have larger ESR and create large ripple rather than filtering noise. Normally, a big capacitor is larger than 3 ohm.

Using this theory, we can measure the capacitor is bad/ damaged or good in condition.

Because our ESR meter only applies less than 15mV DC or peak to peak on a good capacitor, as a result we can use it as in circuit test. Because this low testing voltage, it cannot turn on the semiconductor inside a circuit under testing.

During repairing TV, LCD, Audio board, etc. we can in circuit testing the capacitor is good or not.

*Dual terminal, for fast and easy inspect general capacitor or resistor, a printed ESR table for fast check

Compare MESR100 old V1 and new V2 Improvement:

- 1) Change square wave to sine wave 100 KHz, reduce square wave's high frequency component, and affect the reading passing the test leads and capacitor.
- 2) Higher Resolution up to 0.001 ohm.
- 3) 128X64 dot matrix LCD, with more larger value display and information
- 4) Embedded 25V capacitor table at LCD, auto display the capacitor is good or bad reference to common 25V electrolytic capacitor.
- 5) New plastic case, curve design for hand carrying. New stand for 60 degree stand on desk.
- 6) Use 2X AA battery, more convenience and longer battery life than 9V battery.
- 7) Support external USB power, using standard micro-USB port.

Specification:

Range	Accuracy (After Zero, tested with 1,10,100R resistor)	Refresh Time (Manual Mode) *Auto mode take 0 to 2s more time depend on value
0.000 to 1.000R	1%+2Digit	~0.4s
1.000 to 10.00R	1%+1Digit	~0.4s
10.00 to 100.0R	2%+1Digit	~0.4s

***Accuracy maybe affected by the test lead's length and contact point resistance.**

Standard test leads is 15cm, for longer test leads need special shielding to affect the EMI inference (Can contact sales' person for more detail)

- 1) Accuracy: Up to 1% (detail on above table)
- Wide Measurement Range: $>1\mu F$ (for 0.1 μF the error will be larger on equation $1/(2\pi F C)$ @ 100Khz)
- 2) High Resolution: 4 digit, or 0.001Ohm @ 1 Ohm range
 - 3) Measuring voltage: $<\sim 40mV$ RMS (TESTING VOLTAGE)
 - 4) Clamping voltage: $\sim 0.15V$ (open voltage)
 - 5) Battery 2X AA 1.5V battery
 - 6) External Power: 5V micro USB
 - 7) Operating current 0.02A
 - 8) Battery Life time: >80 Hours

Operating Introduction:

1) POWER ON

Press and hold the ON/ OFF circle orange button for 2 to 3 second to power on.

Press and release the ON/ OFF button to shut down meter.

2) AUTO/ MANUAL mode:

i) Auto Range:

Press and release the RANGE button and at the first line of LCD will show "AUTO:"

At auto mode meter will automatically select the best range to detect.

ii) Manual Range:

Scroll the manual range from 1R, 10R and 100R range by press and release the RANGE button
In LCD will show MANUAL at first LCD line and show at second line: 0-1R, 1-10R and 10-100R.

3) 1 Key Zero:

Short circuit the test leads' terminal, cancelling the wire resistance.

Press and release the "ZERO" button, LCD shows "ZERO" and wait the zero disappear.

If you are using the meter array socket, you need to use a short pin to short circuit to set zero.



4) Backlight:

LCD backlight will on during power on

5) Auto Sleep:

Around 10 hours for not testing, it will shut down automatically to save power.

6) OVERFLOW or OL:

Display overflow when the value is out of range, you can check that you are zero correctly.

7) ESR TABLE:

It is for reference only, different manufacturer of capacitor has different ESR, better to test a good cap ESR and compare with what you are testing, usually bad cap with higher ESR few times larger than good one.

Standard Worst-Case Electrolytic Capacitor ESR Table

	10V	16V	25V	35V	63V	100V	250V
1uF				14	16	18	20
2.2uF			6.0	8.0	10	10	18
4.7uF			15	7.5	4.2	2.3	5.0
10uF		8.0	5.3	3.2	2.4	3.0	2.5
22uF	5.4	3.6	2.1	1.5	1.5	1.5	1.8
47uF	2.2	1.6	1.2	0.68	0.56	0.7	0.8
100uF	1.2	0.7	0.32	0.32	0.3	0.15	0.8
220uF	0.6	0.33	0.23	0.17	0.16	0.09	0.5
470uF	0.24	0.18	0.12	0.09	0.09	0.05	0.3
1000uF	0.12	0.09	0.08	0.07	0.05	0.06	
4700uF	0.23	0.20	0.12	0.08	0.04		
10000uF	0.12	0.08	0.06	0.04			

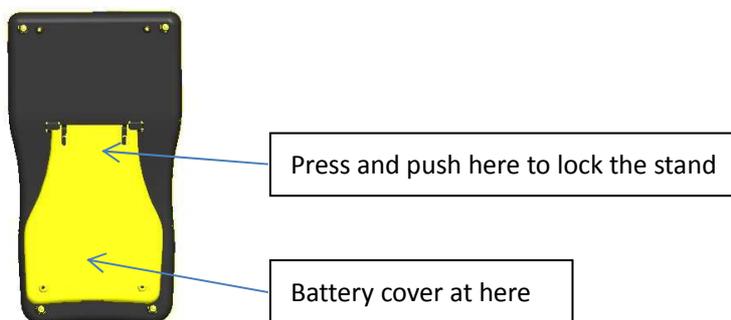
7) SOFTWARE ESR:

Put the 25V Electrolytic capacitor value to LCD, and compare,

GOOD if $C < XX\mu F$, means the capacitor maybe good condition if it is less than $XX\mu F$

8) PLASTIC STAND:

If you don't use the stand, press and push the lock position:



*PLEASE DISCHARGE THE CAPACITOR BEFORE TESTING, you can use a screwdriver to short circuit, or series with a resistor around 10 ohm and short for 5 to 10s. There is 2 fast diode inside the meter to prevent high voltage, but it is important to discharge the capacitor firstly, as it is a large surge current and voltage and may damage the meter.