

MECO 90DQ
Multifunctional Calibrator

Operators Manual

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1. USE AND CHARACTER

MODEL MECO-90DQ multifunctional calibrator can output standard AC voltage, DC voltage, AC current or DC current. Output actual value, percent and FS display at the same time. Calibrator may select FS (full scale) and relevant step in accord with scale of UUT (unit under test) . Keys or knobs adjust magnitude of the output signals.

Wide range, high accuracy, good stabilization, easy operation and portable.

The calibrator applies to test amperemeter and voltmeter under 0.2 class. Especially electrician meter produce corporation.

2. MAIN FUNCTIONS

2.1 $5\frac{1}{2}$ bits LED digital display.

2.2 Keys or knobs adjust magnitude of the output signals. When using keys, step adjustment of the output signals can select 100%FS/N, 10%FS/N, 1%FS/N and 0.1%FS/N. N may select 4, 5, 6, 10 and 15.

2.3 DC Voltage from 250mV to 1000V. (11 ranges)

AC voltage from 250mV to 1000V. (11 ranges)

DC current from 100u A to 50A. (11 ranges)

AC current from 2mA to 50A. (11 ranges)

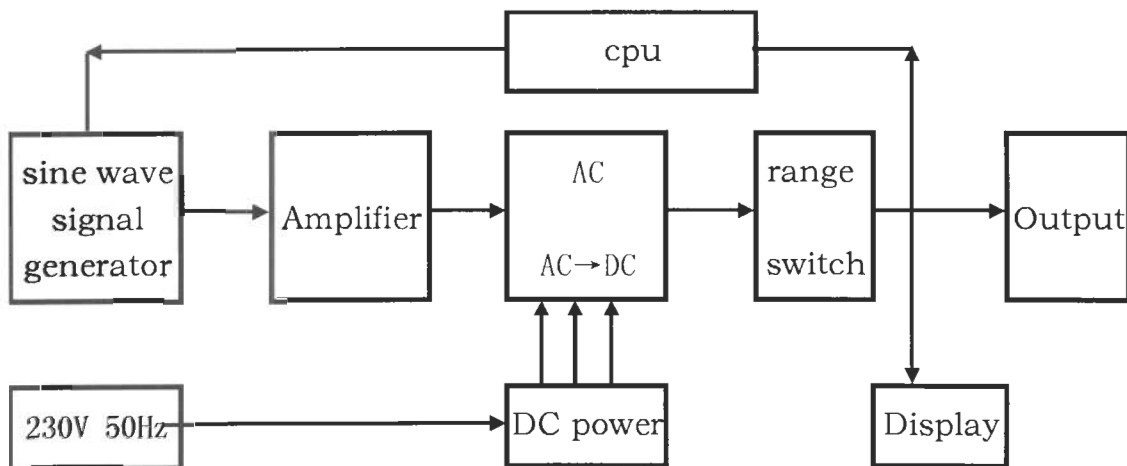
2.5 Can select r frequencies: 50Hz, 60Hz, 400Hz and 1kHz. When you select EXTERIOR, frequencies of AC output is same with

AC input. (IN AC230V)

2.6 If output overload, calibrator may protect itself automatically, and restart by pressing RESET key.

2.7 Use standard coil , you can measure clamp meter from 0A to 1000A. Accuracy reach $\pm 0.3\%$.

3. BLOCK DIAGRAM



4. TECHNICAL SPECIFICATION

4.1 Stabilization: AC < 0.02%FS/3min

DC < 0.01%FS/3min

4.2 Distortion: <0.5%

4.3 Ripple: <0.2%

4.4 Accuracy of frequency: <0.1%

Accuracy of measurement index see table 1 (temperature $23^{\circ}\text{C} \pm 2^{\circ}\text{C}$, output value must be higher than 10% of FS)

Item	Measurement Range	Rated Burden	Max Burden	Accuracy
Voltage	0~300mV	20mA	100mA	Basic Error: DC: $\pm(0.02\%RD + 0.01\%FS)$ AC: $\pm(0.05\%RD + 0.02\%FS)$ 1kHz additional error: $\pm 0.05\%RD$ voltage additional error: $\pm 0.02mV$ ACI $\leq 1mA$ don't account the accuracy (RD---read FS---full scale)
	0~1V~3V	50mA	100mA	
	0~5V~10V~30V	100mA	200mA	
	0~50V~100V~300V	50mA	100mA	
	0~500V~1000V (AC 750V)	DC20mA AC40mA	DC40mA AC60mA	
Current	0~1A	2V	20V	
	0~10A	2V	DC:2.5V AC:6V	
	0~50A		1.5V	
Resistance	10、24、50、100、 240、500 (Ω) 1、2.4、5、10、 24 ($k\Omega$) and 10x1k、 24x1k、50x1k、100x1k 240x1k、500x1k、1kx1k 2.4kx1k、5kx1k、10x1k 24kx1k	0.25W		$\pm 0.2\% + 20m\Omega$
Notice: 1. temperature is above or below $23^{\circ}C \pm 2^{\circ}C$, every change of temperature below $10^{\circ}C$, additional error is below basic error. 2. 50A 1kHz error $\pm(0.05\%RD + 0.05\%FS)$				

Table 1

4.5 Working power source :AC230V, 50 (60) Hz.

4.6 Power consumption: below 250VA.

4.7 Working circumstance: temperature is $5^{\circ}C \sim 35^{\circ}C$, relative humidity $\leq 80\%$, no causticity gas.

4.8 Working time : continuous

4.9 Overall dimension: $180 \times 480 \times 540mm^3$

4.10 Total weight: 25kgs

5. HOW TO OPERATE

5.1 **Calibrator must be placed where there is well-ventilated, without sun, dry and clean. To avoid electric shock, make sure calibrator is safely grounded.**

5.2 Before turning on POWER, SELECT switch located “O” place. All knobs are rotated till zero widdershins. To avoid damaging UUT because of improper range, output terminals do not connect With UUT until you check it right.

5.3 Turn on POWER, LED display is lit. Value display, % display and M display are “-----”. “V. mV. A. mA. uA” indicators and OVERLOAD indicators are not lit. OUTPUT indicator is lit.

5.4 After turning on the calibrator, allow a warm-up period of at least five minutes for the internal components to keep stabilize. If you don't use it a long time or at big relative humidity, a warm-up period must be longer. Then you may select proper range, FS and N in accord with UUT.

5.5 If keys adjust magnitude of the output signals, step adjustment of output signals can select 100%FS/N, 10%FS/N, 1%FS/N and 0.1%FS/N. Output of every Range can reach 110% of FS. But 1000V Range only can reach 105% of FS.

5.6 If knobs adjust magnitude of the output signals, output is increased when knob is rotated clockwise. On the contrary, it

becomes decreasing.

5.7 User may select N according to requirement of test.

5.8 After finishing every measurement, press ↓ keys until output value is zero, then next measurement. (If you use knobs, knobs must be rotated to zero)

5.9 When OVERLOAD indicator is lit, “OFLO” appears on value display. Calibrator is protected automatically. You can restart by pressing RESET key. If the key does not work, it indicates that calibrator or operation is wrong. After checking reason, you can use it.

When “E-----” appears on value display, it indicates that output is excessive.

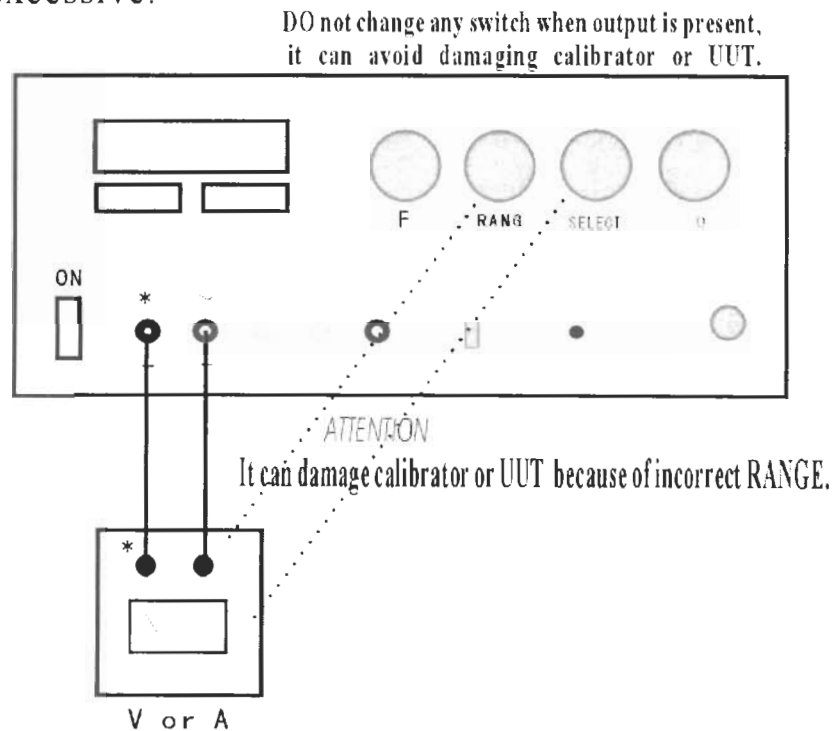
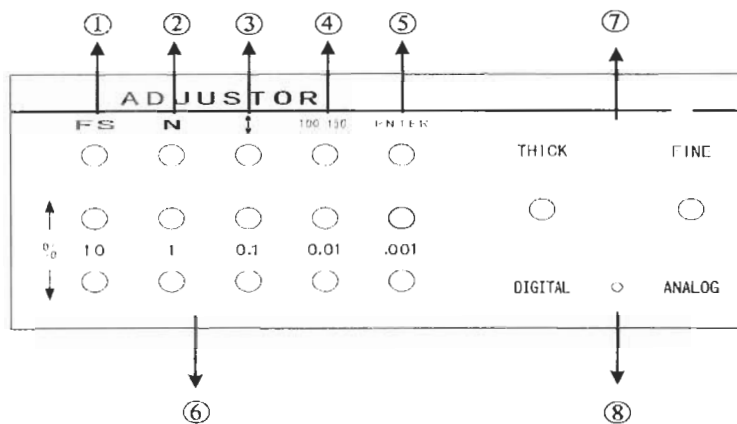


Figure1.Measurement connection

6. ADJUSTOR FEATURES



① **FS**: Press the key, you may select FS that is the same with FS of UUT. Number is displayed on M display.

② **N**: Press the key, you may select step adjustment. It is displayed on N indicator.

③ **↑ ↓**: Press the key once, it will increase output to FS slowly. Press the key again, output will become zero slowly. It is circulatory. It applies to measure indicator instrument.

④ **100/150**: Press the key, may choose 100 or 150. It is displayed on % display. Normally, you may choose 100.

⑤ **ENTER**: Only effecting when PC connected. Press the key, data will send into PC for save.

If "CHE---" appears on display, please press the key RESET.

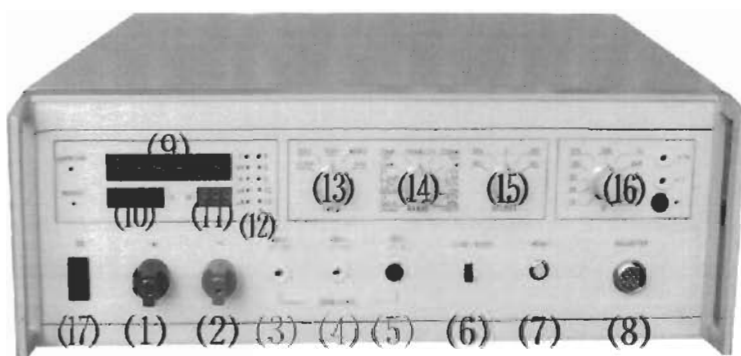
⑥ These keys provided step adjustment of the output signals. if you press **10 ↑** key once, output actual value will become 10% of FS. Twice, 20% of FS. Hold the key, output increase until it become

100% of FS. On the contrary, Hold the key 10 ↓ for three or five seconds, output value will become zero.

⑦ Knobs adjustment: Adjustment of left knob is thick. Other is fine. Output is increased when knob is rotated clockwise.

⑧ Knob or Key switch: Switch choose “ANALOG” place, knobs adjust magnitude of the output signals. Switch choose “DIGITAL” place, keys adjust it.

7. FRONT PANEL FEATURES



(1). (2): Can output current (0~50A) or voltage(0~1000V).

Normally (1) and (2) terminals can answered our needs.

ACI or DCI select 50A RANGE, output lead must use thick wire with fork.

ACI<5mA, output is well from (1) and (4) terminals .

(1). (3): Can output AC current(0~10A) **Max voltage 5V**

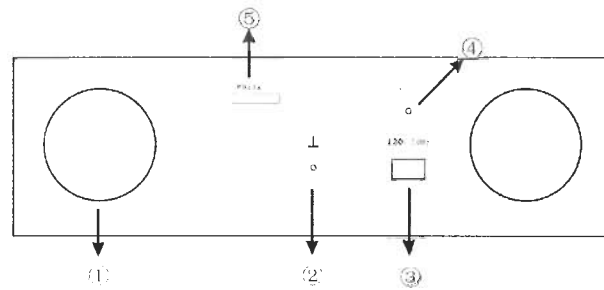
(1). (4): Can output AC current(0~1A) **Max voltage 20V**

(1). (5): Can output DC current(0~1A) **Max voltage 20V**

Above three apply to test ampere meter of biggish inner impedance or clamp meter.

- (6) clamp meter: When you use standard coil to measure clamp meter, switch select clamp meter. (inverse proportion 100:1)
- (6) Knobs adjustment: Adjustment of left knob is thick. Other is fine.
- (7) RESET key
If OVERLOAD indicator is lit, you may press it.
Output can not become zero by pressing this key.
- (8) Input port of key adjustor
- (9). Output value display
- (10). Percent display
- (11). FS display
- (12). N indicator: default number is 10.
- (13) When output is AC, you can select frequency. 50Hz, 60Hz,400Hz and 1kHz. But you select EXTERIOR, frequencies of AC output is same with AC input. (IN AC230V)
- (14). RANGE switch: According to requirement, you can select range manually.
- (15). SELECT switch: Can select DCV, DCI, ACV and ACI.
- (16). Standard resistance switch: You may select twenty kinds of resistances.
- (17). Power switch

8. REAR PANEL FEATURES



- ① Fan
- ② Chassis ground terminal
- ③ AC power input module
- ④ Fuse
- ⑤ RS232

9. USE OF CLAMP METER STANDARD COIL

9.1 Frequency of input from DC to **50Hz**.

9.2 Standard coil turns ratio is 1/100.

9.3 Sketch map

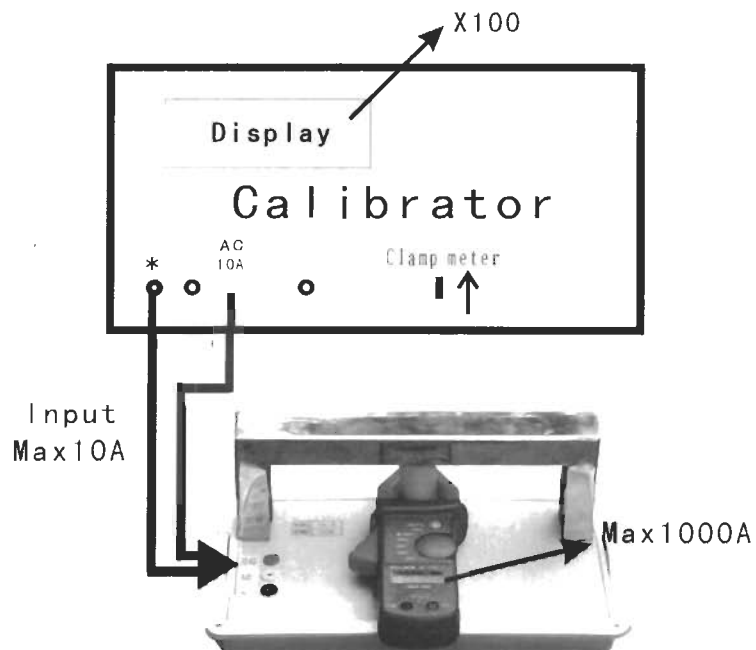


Table2

Basic Range	Can select FS (Extendable Range)	
V	250mV	75mV、100mV、125mV、150mV、200mV、250mV、300mV
	1V	0.5V、0.75V、0.8V、0.9V、1V、1.2V
	2.5V	1.25V、1.5V、2V、2.5V、3V
	5V	4V、4.5V、5V、6V
	10V	7.5V、8V、9V、10V、12V
	25V	12.5V、15V、20V、22.5V、25V、30V
	50V	40V、45V、50V、60V
	100V	75V、80V、90V、100V、120V
	250V	125V、150V、200V、225V、250V、300V
	500V	400V、450V、500V、600V
	1000V	750V、800V、900V、1000V
I	100uA	50uA、60uA、75uA、90uA、100uA、120uA
	500uA	150uA、200uA、250uA、300uA、400uA、450uA、500uA、600uA
	2.5mA	1mA、1.25mA、1.5mA、2mA、2.25mA、2.5mA、3mA
	10mA	4mA、4.5mA、5mA、6mA、7.5mA、9mA、10mA、12mA
	25mA	12.5mA、15mA、20mA、22.5mA、25mA、30mA
	100mA	40mA、45mA、50mA、60mA、75mA、90mA、100mA、120mA
	250mA	125mA、150mA、200mA、225mA、250mA、300mA
	1A	0.4A、0.45A、0.5A、0.6A、0.75A、0.9A、1A、1.2A
	2.5A	1.25A、1.5A、2A、2.25A、2.5A、3A
	10A	4A、4.5A、5A、6A、7.5A、9A、10A、12A
	50A	15A、25A、30A、37.5A、40A、50A、60A

Notice: Accuracy of basic range accords Table 1.

Red and blue ranges must add error.

Blue ranges add 0.02%FS. Red ranges add 0.04%FS.

10. ATTENTION

10.1 **DO not change any switch when output is present, it may avoid damaging calibrator or UUT.**

10.2 **The calibrator is capable of supplying lethal voltages. So must take care of safety. To avoid shocking hazard, do not make connections to the output terminals when any voltages is present.**

10.3 Output lead must be of good insulation. It's section must be above 5 mm².

10.4 **Before turning off POWER, output must become zero.**

10.5 The calibrator is not fit for work at big relative humidity (>80%RH). Bad AC power sources has influencing on stabilization of output.

10.6 When you restart calibrator, zero will appears on value display at DC status. At AC status, it may display number. But it is below 0.1%FS.

11. STANDARD EQUIPMENT

ITEM	NUMBER
Model XF30DQ Calibrator	one
Adjustor	one
Power Cord	one
Output Lead	one
Data Cable	one
Fuse (4 A)	two
MECO-90DQ Operators Manual	one

Table 3