

Multifunction Process Calibrator MC 50 & 75



Description

The MC 50 is a multifunction calibrator. It is specially designed for calibration and maintenance and can measure and simulate physical and electrical quantities, either on site or in the laboratory.

Measurement and transmission can take simultaneously, with a double display. The input and output circuits are electrically insulated. Internal software facilitate this operation, which is useful in monitoring changes in physical quantities during processing, transformation phenomenon, heat exchange etc. Either in development or quality testing.

The MC 50 can perform all the following functions:

- ❑ Measure DC voltage and current, resistance and frequency.
- ❑ Measure temperatures using thermocouples and resistive probes.
- ❑ Supply power and measure a current loop which is compatible with the HART(R) protocol.
- ❑ Generate DC voltages and currents.
- ❑ Simulate resistance, thermocouples and resistive probes.

Features:

- ◆ Relative Measurement.
- ◆ Results displayed based on a linear or other conversion law.
- ◆ Generation of increments and simple or cyclic ramps.
- ◆ Synthesis of curves.
- ◆ Rapid access to all its functions.
- ◆ Advanced online help system.
- ◆ Multifunction keys defined step-by-step on the display.
- ◆ Protection against overload.
- ◆ Powered by rechargeable battery with rapid internal charger.
- ◆ Step-, ramp-, cycle-, HOLD- and scaling functions.
- ◆ Linear- and square function, filters.
- ◆ Serial USB interface
- ◆ Data logging function, 10,000 measured values (in MC75 Series)
- ◆ Graphical & tabular display of measured values
- ◆ Editable display units, real time clock, high speed call (%FS).
- ◆ Storage of 10 configuration files.
- ◆ Battery life 50 to 10 hours depending upon the function used.
- ◆ Stand for table mounting.
- ◆ Strap for carrying and on-site use.
- ◆ 240X320 pixel liquid crystal graphical display.
- ◆ Back-lit display controllable from a key on the keyboard.
- ◆ Automatic switch-off after a programmable time of inactivity.
- ◆ Includes battery charger.
- ◆ Charging time is only 3 hours.
- ◆ Case is ABS with rubber sheath.
- ◆ Dimensions are 210mmX110mmX50mm only
- ◆ Weight is only 900 grams
- ◆ In MC75 connection for external pressure modules
- ◆ Higher accuracy for MC75 on order- optional
- ◆ Precise module on requests for MC75 only

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Technical Specifications:

1.0 Measurement Functions:

1.1 Voltage Measurement (DC)

Range	Resolution	Accuracy	Notes
± 100 mV	1 μ V	0.013% of rdg.+ 3 μ V	Rin >10 Mohm
± 1 V	10 μ V	0.013% of rdg.+ 20 μ V	Rin >10 Mohm
± 10 V	100 μ V	0.015% of rdg.+ 200 μ V	Rin >1 Mohm
± 50 V	1 mV	0.015% of rdg.+2 mV	Rin >1 Mohm

1.2 Current Measurement (DC)

Range	Resolution	Accuracy	Notes
± 50 mA	1 μ A	0.0175 % of rdg.+ 2 μ A	Rin >25 Ohm
4 – 20 mA	1 μ A	0.0175 % of rdg.+ 2 μ A	Rin >25 Ohm
0 – 20 mA	1 μ A	0.0175 % of rdg.+ 2 μ A	Rin >25 Ohm
Loop power supply 24V $\pm$ 10% and Temperature Coefficient < 7 ppm / °C			

1.3 Resistance Measurement

Range	Resolution	Accuracy	Notes
400 Ω	1 m Ω	0.012% of rdg.+ 10 m Ω	Measurement current – 0.25 mA
4000 Ω	10 m Ω	0.012% of rdg.+ 100 m Ω	Measurement current – 0.25 mA
Temperature Coefficient <5 ppm			
Automatic detection connection scheme 2-wire, 3-wire or 4-wire			
Continuity test: for Open circuit for R>1000 Ω and Closed circuit for R <1000 Ω			

1.4 Temperature Measurement (Thermocouples)

Sensor	Range of Measurement	Resolution	Accuracy
K	-250 °C to 1372 °C	0.2 °C to 0.05 °C	0.013% of rdg + 0.08°C to 0.80 °C
T	-250 °C to 400 °C	0.2 °C to 0.05 °C	0.013% of rdg + 0.08°C to 0.70 °C
J	-210 °C to 1200 °C	0.05 °C	0.013% of rdg + 0.08°C to 0.25 °C
R	-50 °C to 1768 °C	0.5 °C to 0.1 °C	0.013% of rdg + 0.02°C to 0.8 °C
S	-50 °C to 1768 °C	0.5 °C to 0.1 °C	0.013% of rdg + 0.025°C to 0.8 °C
E	-250 °C to 1000 °C	0.1 °C to 0.05°C	0.013% of rdg + 0.05°C to 0.45 °C
Other thermocouples like B, U, L, C, N, Pt, Mo and NiMo/NiCo can also be measured with similar accuracies (Accuracies on request)			
The Accuracy is guaranteed for the cold junction (JR) at 0°C for use of the internal JR (Except thermocouple B) add an additional uncertainty of 0.3°C.			

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1.5 Temperature Measurement (RTD)

Sensor	Range of Measurement	Resolution	Accuracy
Pt 50 ($\alpha = 3851$)	-220 °C to 1200 °C	0.01 °C	0.012% of rdg + 0.06 °C
Pt 100 ($\alpha = 3851$)	-220 °C to 1200 °C	0.01 °C	0.012% of rdg + 0.05 °C
JPt 100 ($\alpha = 3916$)	-200 °C to 510 °C	0.01 °C	0.012% of rdg + 0.05 °C
Pt 100 ($\alpha = 3926$)	-210 °C to 850 °C	0.01 °C	0.012% of rdg + 0.05 °C
Pt 200 ($\alpha = 3851$)	-220 °C to 600 °C	0.01 °C	0.012% of rdg + 0.12 °C
Pt 500 ($\alpha = 3851$)	-220 °C to 1200 °C	0.01 °C	0.012% of rdg + 0.07 °C
Pt 1000 ($\alpha = 3851$)	-220 °C to 1200 °C	0.01 °C	0.012% of rdg + 0.05 °C
Ni 100 ($\alpha = 618$)	-60 °C to 180 °C	0.01 °C	0.012% of rdg + 0.03 °C
Ni 120 ($\alpha = 672$)	-40 °C to 205 °C	0.01 °C	0.012% of rdg + 0.03 °C
Ni 1000 ($\alpha = 618$)	-60 °C to 180 °C	0.01 °C	0.012% of rdg + 0.03 °C
Cu 10 ($\alpha = 427$)	-70 °C to 150 °C	0.01 °C	0.012% of rdg + 0.18 °C
Cu 50 ($\alpha = 428$)	-50 °C to 150 °C	0.01 °C	0.012% of rdg + 0.06 °C

1.6 Frequency Measurement and counting

Range	Resolution	Accuracy	Notes
20 kHz	<0.01 Hz	0.005% of rdg.	
Triggering level 1 V, Scale in beats / min and Hz, Measurement of frequency output and dry contact.			

1.7 Additional Features at measurement mode

Manual or automatic range selection	Linearization
Relative measurement	Statistics – like min, max, average value and the number of measurement points. The statistics may be set to zero

2.0 Transmission / simulation function:

2.1 Voltage generation (DC)

Range	Resolution	Accuracy	Notes
100 mV	1 μ V	0.013% of rdg.+ 3 μ V	Output load min. = 1 K Ω
2 V	10 μ V	0.013% of rdg.+ 20 μ V	Output load min. = 2 K Ω
20 V	100 μ V	0.015% of rdg.+ 200 μ V	Output load min. = 4 K Ω

2.2 Current generation (DC)

Range	Resolution	Accuracy	Notes
24 mA	1 μ A	0.0175 % of rdg.+ 2 μ A	
4 – 20 mA	1 μ A	0.0175 % of rdg.+ 2 μ A	
0 – 20 mA	1 μ A	0.0175 % of rdg.+ 2 μ A	

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2.3 Resistance Measurement

Range	Resolution	Accuracy	Notes
40 Ω	1 m Ω	0.014% of rdg.+ 3 m Ω 0.014% of rdg.+ 10 m Ω	$I_{ext} = 10$ mA $I_{ext} = 1$ mA
400 Ω	10 m Ω	0.014% of rdg.+ 20 m Ω 0.014% of rdg.+ 30 m Ω	$I_{ext} =$ From 1 to 10 mA $I_{ext} =$ from 0.1 to 1 mA
4000 Ω	100 m Ω	0.014% of rdg.+ 300 m Ω	$I_{ext} =$ from 0.01 to 0.1 mA

2.4 Temperature simulation (Thermocouples)

Sensor	Range of Measurement	Resolution	Accuracy
K	-250 °C to 1372 °C	0.2 °C to 0.05 °C	0.013% of rdg + 0.08°C to 0.60 °C
T	-250 °C to 400 °C	0.2 °C to 0.05 °C	0.013% of rdg + 0.08°C to 0.40 °C
J	-210 °C to 1200 °C	0.05 °C	0.013% of rdg + 0.08°C to 0.20 °C
R	-50 °C to 1768 °C	0.5 °C to 0.1 °C	0.013% of rdg + 0.02°C to 0.5 °C
S	-50 °C to 1768 °C	0.5 °C to 0.1 °C	0.013% of rdg + 0.025°C to 0.8 °C
E	-250 °C to 1000 °C	0.1 °C to 0.05°C	0.013% of rdg + 0.05°C to 0.25 °C
Other thermocouples like B, U, L, C, N, Pt, Mo and NiMo/NiCo can also be simulated with similar accuracies (Accuracies on request)			

2.5 Temperature simulation (RTD)

Sensor	Range of Measurement	Resolution	Accuracy
Pt 50 ($\alpha = 3851$)	-220 °C to 1200 °C	0.03 °C	0.014% of rdg + 0.18 °C
Pt 100 ($\alpha = 3851$)	-220 °C to 1200 °C	0.02 °C	0.014% of rdg + 0.12 °C
JPt 100 ($\alpha = 3916$)	-200 °C to 510 °C	0.02 °C	0.014% of rdg + 0.12 °C
Pt 100 ($\alpha = 3926$)	-210 °C to 850 °C	0.02 °C	0.014% of rdg + 0.12 °C
Pt 200 ($\alpha = 3851$)	-220 °C to 600 °C	0.10 °C	0.014% of rdg + 0.33 °C
Pt 500 ($\alpha = 3851$)	-220 °C to 1200°C	0.03 °C	0.014% of rdg + 0.18 °C
Pt 1000 ($\alpha = 3851$)	-220 °C to 1200 °C	0.02 °C	0.014% of rdg + 0.08 °C
Ni 100 ($\alpha = 618$)	-60 °C to 180 °C	0.01 °C	0.014% of rdg + 0.08 °C
Ni 120 ($\alpha = 672$)	-40 °C to 205 °C	0.01 °C	0.014% of rdg + 0.08 °C
Ni 1000 ($\alpha = 618$)	-60 °C to 180 °C	0.01 °C	0.014% of rdg + 0.08 °C
Cu 10 ($\alpha = 427$)	-70 °C to 150 °C	0.01 °C	0.014% of rdg + 0.10 °C
Cu 50 ($\alpha = 428$)	-50 °C to 150 °C	0.03 °C	0.014% of rdg + 0.15 °C

2.6 Frequency and pulse generation

Range	Resolution	Accuracy	Notes
1000 Hz	<0.01 Hz	0.005% of rdg.	
10 kHz	10 Hz	0.005% of rdg.	

2.7 Additional Features at simulation mode

- Generation of ramps
- Synthesizer
- Scale Correction

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