



# Multifunction Process Calibrator – MCAL series

## Application

Ideal for calibration of thermocouples, RTDs, thermometers, transmitters, indicators, controllers, receivers, mA, V, mV, ohms, frequency measuring instruments etc.,

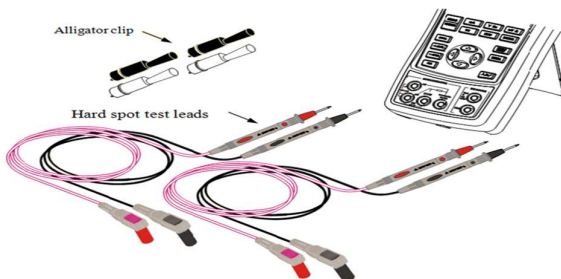
## Features

Split Screen Display, Measurement of thermocouple Provides automatic Reference Junction, Automatic and Manual cold end temperature compensation for TC. Super Strong Protection. Manual Stepping and automatic stepping and ramping. Having both measurement and source function. 24V DC Loop supply.

### MEASUREMENT MODE:

	Range	Maximum measurement range	Resolution	Accuracy (%of reading + counts)			
				MCAL-05	MCAL-20		
DC Voltage	28V (upper display)	-33V~33V	0.001V	0.05+2	0.025+2		
	200mV (upper display)	-80mV~80mV	0.001mV	0.05+20	0.025+20		
		-200mV~200mV	0.01mV	0.05+2	0.025+2		
	50V (lower display)	-1V~60V	0.001V	0.05+2	0.02+2		
	100mV (lower display)	-15mV~80mV	0.001mV	0.05+20	0.02+20		
80mV~125mV		0.01mV	0.05+2	0.02+2			
-10°C~18°C, +28°C~55°Ctemperature coefficient, ±0.005%FS/°C. Input resistance: >1MΩ.							
Ohms Upper Display	Range	Maximum output range	Resolution	Accuracy (% of reading + counts)			
				MCAL-05	MCAL-20		
	400Ω	0~440Ω	0.1Ω	0.05+2			
	3200Ω	420Ω~3300Ω	1Ω				
On-off test	0~200Ω	1Ω	0.05+1				
-10°C~18°C, +28°C~55°Ctemperature coefficient, ±0.005%FS/°C. Maximum load voltage: 20V, equivalent to voltage of 20mA on 1000Ω load resistance.							
Ohms Lower Display	Range	Maximum measurement range	Resolution	Accuracy (Ω)			
				MCAL-05		MCAL-20	
				2-wire, 3-wire	4-wire	2-wire, 3-wire	4-wire
400Ω	0~440Ω	0.01Ω	0.01Ω	0.25	0.15	0.15	0.10
3200Ω	420Ω~3600Ω	0.1Ω	0.1Ω	1.5	1.0	1.0	0.5
-10°C~18°C, +28°C~55°Ctemperature coefficient, ±0.005%FS/°C. Exciting current during measurement: 400Ω: 0.4mA±10% 3200Ω: 0.2mA±10% Two-wire: Does not include lead resistance. Three-wire: Assumes matched leads with a total resistance not exceeding 25Ω.							

	Range	Maximum measurement range	Resolution	Accuracy (%of reading + counts)	
				MCAL-05	MCAL-20
Frequency	100Hz	1~99.999Hz	0.001Hz	0.02+1	0.01+1
	1000Hz	100~999.99Hz	0.01Hz		
	10kHz	1k~9.9999kHz	10kHz		
	100kHz	10k~99.999kHz	1Hz		
Sensitivity: 10Hz~10kHz, Vp-p≥1V, rest: Vp-p≥2V. Wave form: Square wave. 5 counting points should be added to errors of other wave forms. Commercial frequency can be measured directly.					
DC Current	Range	Maximum measurement range	Resolution	Accuracy (% of reading + counts)	
				Mcal-05	Mcal-20
	20mA (upper display)	-24mA~24mA	0.001mA	0.05+2	
	20mA (upper display)	0~24mA	0.001mA	0.05+2	0.025+2
20mA (lower display)	0~24mA	0.001mA	0.05+2	0.02+2	
-10°C~18°C, +28°C~55°Ctemperature coefficient, ±0.005%FS/°C.. Input resistance: <100Ω.					



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## SOURCE MODE:

	Range	Maximum output range	Resolution	Accuracy (% of reading + counts)		
				MCAL-05	MCAL-20	
DC voltage	100mV	-15mV~99.999mV	0.001mV	0.05+20	0.02+20	
		100mV~125mV	0.01mV	0.05+2	0.02+2	
	10V	0~11V	0.001V	0.05+2	0.02+2	
10°C~18°C, +28°C~55°C temperature coefficient, ±0.005%FS/°C. Maximum load: 1mA or 1kΩ (It should be based on the lower load.)						
Frequency	Range	Maximum output range	Resolution	Accuracy (% of reading + counts)		
				MCAL-05	MCAL-20	
	200Hz	0~200Hz	0.01Hz	0.02+1	0.01+1	
	2000Hz	0~2000Hz	0.1Hz			
20kHz	0~20kHz	1Hz				
Output amplitude: ≥4.5Vp-p; Wave form: Square wave						
ohms	Range	Maximum output range	Resolution	External exciting current	Accuracy (Ω)	
					MCAL-05	MCAL-20
	400Ω	0~440Ω	0.01Ω	0.40mA~3.30mA	0.25	0.15
3200Ω	400~3600Ω	0.1Ω	0.1mA~0.6mA	1.0	0.50	
-10°C~18°C, +28°C~55°C temperature coefficient, ±0.005%FS/°C						

	Range	Maximum output range	Resolution	Accuracy (% of reading + counts)	
				MCAL-05	MCAL-20
DC current	20mA	0~24mA	0.001mA	0.05+2	0.02+2
	20mA (Transducer simulation)	0~24mA	0.001mA	0.05+2	0.02+2
-10°C~18°C, +28°C~55°C temperature coefficient, ±0.005%FS/°C. Maximum load voltage: 20V, equivalent to voltage of 20mA on 1000Ω load resistance.					

### Ordering Information

#### Model

MCAL (Multifunction Process Calibrator)

#### Accuracy

20 = 0.02 % of reading

05 = 0.05 % of reading

MCAL-\_\_\_\_\_



# R&D Instrument Services

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**Manufacturer of Test benches  
Calibration Instruments**

THERMOCOUPLE & RTD-MEASURE & SOURCE								
Graduation	Range	Resolution	Accuracy (°C)					
			MCAL-05	MCAL-20				
J	-200°C~0°C 0°C~1200°C	0.1°C	1.5°C 1.0°C	1.0°C 0.7°C				
K	-200°C~0°C 0°C~1370°C	1.0°C	1.8°C 1.2°C	1.2°C 0.8°C				
T	-200°C~0°C 0°C~400°C	0.1°C	1.8°C 1.2°C	1.2°C 0.8°C				
E	-200°C~0°C 0°C~950°C	0.1°C	1.5°C 1.0°C	0.9°C 0.7°C				
R	-20°C~0°C 0°C~500°C 500°C~1750°C	0.1°C	4°C 2.5°C 2°C	2.5°C 1.8°C 1.4°C				
S	-20°C~0°C 0°C~500°C 500°C~1750°C	0.1°C	4°C 2.5°C 2°C	2.5°C 1.8°C 1.4°C				
B	600°C~800°C 800°C~1000°C 1000°C~1800°C	0.1°C	3.5°C 2.5°C 2°C	2.2°C 1.8°C 1.4°C				
N	-200°C~0°C 0°C~1300°C	0.1°C	2.0°C 1.2°C	1.5°C 1.9°C				
Errors of cold-junction compensation are not included in the table. Accuracy of cold-junction compensation: 1.5°C								
Graduation	Range	Resolution	Accuracy (°C)					
			MCAL-05			MCAL-20		
			2-wire, 3-wire	4-wire	O/P	2-wire, 3-wire	4-wire	O/P
Pt100	-200°C~850°C	0.1°C	0.7	0.4	0.7	0.4	0.3	0.3
Pt1000	-200°C~650°C		0.4	0.3	0.3	0.3	0.15	0.15
Cu50	-50°C~150°C		1.2	0.8	0.8	0.8	0.5	0.5
Cu100	-50°C~150°C		0.7	0.4	0.4	0.4	0.25	0.25
As for exciting current during measurement, please refer to resistance measurement function. As for allowable external exciting current during output, please refer to resistance output function. 2-wire: Does not include lead resistance. 3-wire: Assumes matched leads with a total resistance not exceeding 25Ω.								

### Standard delivery

- Instrument:1no.
- Charger:1no.
- Carrying Case, 'AAA' Battery : 6nos.
- Test Lead(2wire):2no.
- Alligator Clips: 2 no.
- UserManual:1no
- Traceable Calibration Certificate

### Optional

-Accredited (NABL) Calibration Certificate as per ISO/IEC 17025 Standard

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