

# IS Intrinsically Safe UNIVERSAL CALIBRATOR FOR INSTRUMENTATION MCS-12-IS



Grupo IIC, Zona 0 / Ex ia IIC T4 Ga

- ✓ Intrinsically safe Universal Process Calibrator Certified Ex ia IIC T4 Ga for usage in Ex-hazardous areas Zones 0,1 and 2.
- ✓ Portable, compact, powered by rechargeable batteries.
- ✓ Measures and generates mA, mV, volts, ohms, RTD, TC and Hz.
- ✓ Simultaneous input and output operation.
- ✓ 12 Vcc/ 30 mA Power supply for 2-wire transmitters.
- ✓ Includes input for optional temperature probe.
- ✓ Callendar-Van Dunsen coefficients for Probe input.

**PRESYS**®



# Technical Specifications



## Specifications - Inputs

Input Ranges	Resolution	Accuracy	Remarks	
<b>milivolt</b>	-150 mV to 150 mV 150 mV to 2450 mV	0.001 mV 0.01m V	$\pm 0.01\% \text{ FS}^{***}$ $\pm 0.02\% \text{ FS}$	$R_{\text{input}} > 10 \text{ M}\Omega$ auto-range
<b>volt</b>	-10 V to 11 V 11 V to 45 V	0.0001 V 0.0001 V	$\pm 0.02\% \text{ FS}$ $\pm 0.02\% \text{ FS}$	$R_{\text{input}} > 1 \text{ M}\Omega$
<b>mA</b>	-5 mA to 24.5 mA	0.0001 mA	$\pm 0.02\% \text{ FS}$	$R_{\text{input}} < 100 \Omega$
<b>frequency*</b>	0 to 600 Hz 600 to 1300 Hz 1300 to 10000 Hz	0.01 Hz 0.1 Hz 1 Hz	$\pm 0.02 \text{ Hz}$ $\pm 0.2 \text{ Hz}$ $\pm 2 \text{ Hz}$	$R_{\text{input}} > 50 \text{ k}\Omega$ Voltage DC $I_{\text{maximum}} = 30 \text{ V}$ AC Signal from 1.5 to 30 V auto-range
<b>counter*</b>	0 to $10^5-1$ count	1 count	-----	Same remark as frequency Pulse Frequency < 3000 Hz
<b>resistance</b>	0 to 400 $\Omega$ 400 to 2500 $\Omega$	0.01 $\Omega$ 0.01 $\Omega$	$\pm 0.01\% \text{ FS}$ $\pm 0.03\% \text{ FS}$	Excitation current 0.31 mA, auto-range
<b>Pt-100</b>	-200 to 850 $^{\circ}\text{C}$ / -328 to 1562 $^{\circ}\text{F}$	0.01 $^{\circ}\text{C}$ / 0.01 $^{\circ}\text{F}$	$\pm 0.1\% \text{ C}$ / $\pm 0.2\% \text{ F}$	IEC-60751
<b>Pt-1000</b>	-200 to 400 $^{\circ}\text{C}$ / -328 to 752 $^{\circ}\text{F}$	0.1 $^{\circ}\text{C}$ / 0.1 $^{\circ}\text{F}$	$\pm 0.1\% \text{ C}$ / $\pm 0.2\% \text{ F}$	IEC-60751
<b>Cu-10</b>	-200 to 260 $^{\circ}\text{C}$ / -328 to 500 $^{\circ}\text{F}$	0.1 $^{\circ}\text{C}$ / 0.1 $^{\circ}\text{F}$	$\pm 2.0\% \text{ C}$ / $\pm 4.0\% \text{ F}$	MINCO 16-9
<b>Ni-100</b>	-60 to 250 $^{\circ}\text{C}$ / -76 to 482 $^{\circ}\text{F}$	0.1 $^{\circ}\text{C}$ / 0.1 $^{\circ}\text{F}$	$\pm 0.2\% \text{ C}$ / $\pm 0.4\% \text{ F}$	DIN-43760
<b>probe**</b>	-200 to 850 $^{\circ}\text{C}$ / -328 to 1562 $^{\circ}\text{F}$	0.01 $^{\circ}\text{C}$ / 0.01 $^{\circ}\text{F}$	$\pm 0.1\% \text{ C}$ / $\pm 0.2\% \text{ F}$	IEC-60751
<b>TC-J</b>	-210 to 1200 $^{\circ}\text{C}$ / -346 to 2192 $^{\circ}\text{F}$	0.1 $^{\circ}\text{C}$ / 0.1 $^{\circ}\text{F}$	$\pm 0.2\% \text{ C}$ / $\pm 0.4\% \text{ F}$	IEC-60584
<b>TC-K</b>	-270 to -150 $^{\circ}\text{C}$ / -454 to -238 $^{\circ}\text{F}$ -150 to 1370 $^{\circ}\text{C}$ / -238 to 2498 $^{\circ}\text{F}$	0.1 $^{\circ}\text{C}$ / 0.1 $^{\circ}\text{F}$ 0.1 $^{\circ}\text{C}$ / 0.1 $^{\circ}\text{F}$	$\pm 0.5\% \text{ C}$ / $\pm 1.0\% \text{ F}$ $\pm 0.2\% \text{ C}$ / $\pm 0.4\% \text{ F}$	IEC-60584
<b>TC-T</b>	-260 to -200 $^{\circ}\text{C}$ / -436 to -328 $^{\circ}\text{F}$ -200 to -75 $^{\circ}\text{C}$ / -328 to -103 $^{\circ}\text{F}$ -75 to 400 $^{\circ}\text{C}$ / -103 to 752 $^{\circ}\text{F}$	0.1 $^{\circ}\text{C}$ / 0.1 $^{\circ}\text{F}$ 0.1 $^{\circ}\text{C}$ / 0.1 $^{\circ}\text{F}$ 0.1 $^{\circ}\text{C}$ / 0.1 $^{\circ}\text{F}$	$\pm 0.6\% \text{ C}$ / $\pm 1.2\% \text{ F}$ $\pm 0.4\% \text{ C}$ / $\pm 0.8\% \text{ F}$ $\pm 0.2\% \text{ C}$ / $\pm 0.4\% \text{ F}$	IEC-60584
<b>TC-B</b>	50 to 250 $^{\circ}\text{C}$ / 122 to 482 $^{\circ}\text{F}$ 250 to 500 $^{\circ}\text{C}$ / 482 to 932 $^{\circ}\text{F}$ 500 to 1200 $^{\circ}\text{C}$ / 932 to 2192 $^{\circ}\text{F}$ 1200 to 1820 $^{\circ}\text{C}$ / 2192 to 3308 $^{\circ}\text{F}$	0.1 $^{\circ}\text{C}$ / 0.1 $^{\circ}\text{F}$ 0.1 $^{\circ}\text{C}$ / 0.1 $^{\circ}\text{F}$ 0.1 $^{\circ}\text{C}$ / 0.1 $^{\circ}\text{F}$ 0.1 $^{\circ}\text{C}$ / 0.1 $^{\circ}\text{F}$	$\pm 2.5\% \text{ C}$ / $\pm 5.0\% \text{ F}$ $\pm 1.5\% \text{ C}$ / $\pm 3.0\% \text{ F}$ $\pm 1.0\% \text{ C}$ / $\pm 2.0\% \text{ F}$ $\pm 0.7\% \text{ C}$ / $\pm 1.4\% \text{ F}$	IEC-60584
<b>TC-R</b>	-50 to 300 $^{\circ}\text{C}$ / -58 to 572 $^{\circ}\text{F}$ 300 to 1760 $^{\circ}\text{C}$ / 572 to 3200 $^{\circ}\text{F}$	0.1 $^{\circ}\text{C}$ / 0.1 $^{\circ}\text{F}$ 0.1 $^{\circ}\text{C}$ / 0.1 $^{\circ}\text{F}$	$\pm 1.0\% \text{ C}$ / $\pm 2.0\% \text{ F}$ $\pm 0.7\% \text{ C}$ / $\pm 1.4\% \text{ F}$	IEC-60584
<b>TC-S</b>	-50 to 300 $^{\circ}\text{C}$ / -58 to 572 $^{\circ}\text{F}$ 300 to 1760 $^{\circ}\text{C}$ / 572 to 3200 $^{\circ}\text{F}$	0.1 $^{\circ}\text{C}$ / 0.1 $^{\circ}\text{F}$ 0.1 $^{\circ}\text{C}$ / 0.1 $^{\circ}\text{F}$	$\pm 1.0\% \text{ C}$ / $\pm 2.0\% \text{ F}$ $\pm 0.7\% \text{ C}$ / $\pm 1.4\% \text{ F}$	IEC-60584
<b>TC-E</b>	-270 to -150 $^{\circ}\text{C}$ / -454 to -238 $^{\circ}\text{F}$ -150 to 1000 $^{\circ}\text{C}$ / -238 to 1832 $^{\circ}\text{F}$	0.1 $^{\circ}\text{C}$ / 0.1 $^{\circ}\text{F}$ 0.1 $^{\circ}\text{C}$ / 0.1 $^{\circ}\text{F}$	$\pm 0.3\% \text{ C}$ / $\pm 0.6\% \text{ F}$ $\pm 0.1\% \text{ C}$ / $\pm 0.2\% \text{ F}$	IEC-60584
<b>TC-N</b>	-260 to -200 $^{\circ}\text{C}$ / -436 to -328 $^{\circ}\text{F}$ -200 to -20 $^{\circ}\text{C}$ / -328 to -4 $^{\circ}\text{F}$ -20 to 1300 $^{\circ}\text{C}$ / -4 to 2372 $^{\circ}\text{F}$	0.1 $^{\circ}\text{C}$ / 0.1 $^{\circ}\text{F}$ 0.1 $^{\circ}\text{C}$ / 0.1 $^{\circ}\text{F}$ 0.1 $^{\circ}\text{C}$ / 0.1 $^{\circ}\text{F}$	$\pm 1.0\% \text{ C}$ / $\pm 2.0\% \text{ F}$ $\pm 0.4\% \text{ C}$ / $\pm 0.8\% \text{ F}$ $\pm 0.2\% \text{ C}$ / $\pm 0.4\% \text{ F}$	IEC-60584
<b>TC-L</b>	-200 to 900 $^{\circ}\text{C}$ / -328 to 1652 $^{\circ}\text{F}$	0.1 $^{\circ}\text{C}$ / 0.1 $^{\circ}\text{F}$	$\pm 0.2\% \text{ C}$ / $\pm 0.4\% \text{ F}$	DIN-43710
<b>TC-C</b>	0 to 1500 $^{\circ}\text{C}$ / 32 to 2732 $^{\circ}\text{F}$ 1500 to 2320 $^{\circ}\text{C}$ / 2732 to 4208 $^{\circ}\text{F}$	0.1 $^{\circ}\text{C}$ / 0.1 $^{\circ}\text{F}$ 0.1 $^{\circ}\text{C}$ / 0.1 $^{\circ}\text{F}$	$\pm 0.5\% \text{ C}$ / $\pm 1.0\% \text{ F}$ $\pm 0.7\% \text{ C}$ / $\pm 1.4\% \text{ F}$	W5Re / W26Re W5Re / W26Re

(\*) Accuracy since frequency output is not configured. (\*\*) Probe is a spare input for a reference RTD in order to use as standard thermometer. The accuracy is related to calibrator only. (\*\*\*) FS = Full Scale.

## Specifications - Output

Output Ranges	Resolution	Accuracy	Remarks	
<b>milivolt</b>	-10 mV to 110 mV	0.001 mV	$\pm 0.02\% \text{ FS}$	$R_{\text{output}} < 0.3 \Omega$
<b>volt</b>	-0.5 V to 12 V	0.0001 V	$\pm 0.02\% \text{ FS}$	$R_{\text{output}} < 0.3 \Omega$
<b>mA</b>	0 to 24 mA	0.0001 mA	$\pm 0.02\% \text{ FS}$	$R_{\text{maximum}} = 400 \Omega$
<b>Two-wire transmitter (XTR)</b>	4 to 24 mA	0.0001 mA	$\pm 0.02\% \text{ FS}$	$V_{\text{maximum}} = 30 \text{ V}$
<b>frequency</b>	0 to 100 Hz 0 to 10000 Hz	0.01 Hz 1 Hz	$\pm 0.02 \text{ Hz}$ $\pm 2 \text{ Hz}$	Peak Value: 12 V / 25 mA max.
<b>pulse</b>	0 to $10^5-1$ pulse	1 pulse	-----	Peak Value: 12 V / 25 mA max. Pulse Frequency up to 10000 Hz
<b>resistance</b>	0 to 400 $\Omega$ 0 to 2500 $\Omega$	0.01 $\Omega$ 0.1 $\Omega$	$\pm 0.02\% \text{ FS}$ $\pm 0.03\% \text{ FS}$	For external excitation current of 1 mA
<b>Pt-100</b>	-200 to 850 $^{\circ}\text{C}$ / -328 to 1562 $^{\circ}\text{F}$	0.01 $^{\circ}\text{C}$ / 0.01 $^{\circ}\text{F}$	$\pm 0.2\% \text{ C}$ / $\pm 0.4\% \text{ F}$	IEC-60751
<b>Pt-1000</b>	-200 to 400 $^{\circ}\text{C}$ / -328 to 752 $^{\circ}\text{F}$	0.1 $^{\circ}\text{C}$ / 0.1 $^{\circ}\text{F}$	$\pm 0.1\% \text{ C}$ / $\pm 0.2\% \text{ F}$	IEC-60751
<b>Cu-10</b>	-200 to 260 $^{\circ}\text{C}$ / -328 to 500 $^{\circ}\text{F}$	0.1 $^{\circ}\text{C}$ / 0.1 $^{\circ}\text{F}$	$\pm 2.0\% \text{ C}$ / $\pm 4.0\% \text{ F}$	MINCO 16-9
<b>Ni-100</b>	-60 to 250 $^{\circ}\text{C}$ / -76 to 482 $^{\circ}\text{F}$	0.1 $^{\circ}\text{C}$ / 0.1 $^{\circ}\text{F}$	$\pm 0.2\% \text{ C}$ / $\pm 0.4\% \text{ F}$	DIN-43760
<b>TC-J</b>	-210 to 1200 $^{\circ}\text{C}$ / -346 to 2192 $^{\circ}\text{F}$	0.1 $^{\circ}\text{C}$ / 0.1 $^{\circ}\text{F}$	$\pm 0.4\% \text{ C}$ / $\pm 0.8\% \text{ F}$	IEC-60584
<b>TC-K</b>	-270 to -150 $^{\circ}\text{C}$ / -454 to -238 $^{\circ}\text{F}$ -150 to 1370 $^{\circ}\text{C}$ / -238 to 2498 $^{\circ}\text{F}$	0.1 $^{\circ}\text{C}$ / 0.1 $^{\circ}\text{F}$ 0.1 $^{\circ}\text{C}$ / 0.1 $^{\circ}\text{F}$	$\pm 1.0\% \text{ C}$ / $\pm 2.0\% \text{ F}$ $\pm 0.4\% \text{ C}$ / $\pm 0.8\% \text{ F}$	IEC-60584
<b>TC-T</b>	-260 to -200 $^{\circ}\text{C}$ / -436 to -328 $^{\circ}\text{F}$ -200 to -75 $^{\circ}\text{C}$ / -328 to -103 $^{\circ}\text{F}$ -75 to 400 $^{\circ}\text{C}$ / -103 to 752 $^{\circ}\text{F}$	0.1 $^{\circ}\text{C}$ / 0.1 $^{\circ}\text{F}$ 0.1 $^{\circ}\text{C}$ / 0.1 $^{\circ}\text{F}$ 0.1 $^{\circ}\text{C}$ / 0.1 $^{\circ}\text{F}$	$\pm 1.2\% \text{ C}$ / $\pm 2.4\% \text{ F}$ $\pm 0.8\% \text{ C}$ / $\pm 1.6\% \text{ F}$ $\pm 0.4\% \text{ C}$ / $\pm 0.8\% \text{ F}$	IEC-60584
<b>TC-B</b>	50 to 250 $^{\circ}\text{C}$ / 122 to 482 $^{\circ}\text{F}$ 250 to 500 $^{\circ}\text{C}$ / 482 to 932 $^{\circ}\text{F}$ 500 to 1200 $^{\circ}\text{C}$ / 932 to 2192 $^{\circ}\text{F}$ 1200 to 1820 $^{\circ}\text{C}$ / 2192 to 3308 $^{\circ}\text{F}$	0.1 $^{\circ}\text{C}$ / 0.1 $^{\circ}\text{F}$ 0.1 $^{\circ}\text{C}$ / 0.1 $^{\circ}\text{F}$ 0.1 $^{\circ}\text{C}$ / 0.1 $^{\circ}\text{F}$ 0.1 $^{\circ}\text{C}$ / 0.1 $^{\circ}\text{F}$	$\pm 5.0\% \text{ C}$ / $\pm 10.0\% \text{ F}$ $\pm 3.0\% \text{ C}$ / $\pm 6.0\% \text{ F}$ $\pm 2.0\% \text{ C}$ / $\pm 4.0\% \text{ F}$ $\pm 1.4\% \text{ C}$ / $\pm 2.8\% \text{ F}$	IEC-60584
<b>TC-R</b>	-50 to 300 $^{\circ}\text{C}$ / -58 to 572 $^{\circ}\text{F}$ 300 to 1760 $^{\circ}\text{C}$ / 572 to 3200 $^{\circ}\text{F}$	0.1 $^{\circ}\text{C}$ / 0.1 $^{\circ}\text{F}$ 0.1 $^{\circ}\text{C}$ / 0.1 $^{\circ}\text{F}$	$\pm 2.0\% \text{ C}$ / $\pm 4.0\% \text{ F}$ $\pm 1.4\% \text{ C}$ / $\pm 2.8\% \text{ F}$	IEC-60584
<b>TC-S</b>	-50 to 300 $^{\circ}\text{C}$ / -58 to 572 $^{\circ}\text{F}$ 300 to 1760 $^{\circ}\text{C}$ / 572 to 3200 $^{\circ}\text{F}$	0.1 $^{\circ}\text{C}$ / 0.1 $^{\circ}\text{F}$ 0.1 $^{\circ}\text{C}$ / 0.1 $^{\circ}\text{F}$	$\pm 2.0\% \text{ C}$ / $\pm 4.0\% \text{ F}$ $\pm 1.4\% \text{ C}$ / $\pm 2.8\% \text{ F}$	IEC-60584
<b>TC-E</b>	-270 to -150 $^{\circ}\text{C}$ / -454 to -238 $^{\circ}\text{F}$ -150 to 1000 $^{\circ}\text{C}$ / -238 to 1832 $^{\circ}\text{F}$	0.1 $^{\circ}\text{C}$ / 0.1 $^{\circ}\text{F}$ 0.1 $^{\circ}\text{C}$ / 0.1 $^{\circ}\text{F}$	$\pm 0.6\% \text{ C}$ / $\pm 1.2\% \text{ F}$ $\pm 0.2\% \text{ C}$ / $\pm 0.4\% \text{ F}$	IEC-60584
<b>TC-N</b>	-260 to -200 $^{\circ}\text{C}$ / -436 to -328 $^{\circ}\text{F}$ -200 to -20 $^{\circ}\text{C}$ / -328 to -4 $^{\circ}\text{F}$ -20 to 1300 $^{\circ}\text{C}$ / -4 to 2372 $^{\circ}\text{F}$	0.1 $^{\circ}\text{C}$ / 0.1 $^{\circ}\text{F}$ 0.1 $^{\circ}\text{C}$ / 0.1 $^{\circ}\text{F}$ 0.1 $^{\circ}\text{C}$ / 0.1 $^{\circ}\text{F}$	$\pm 2.0\% \text{ C}$ / $\pm 4.0\% \text{ F}$ $\pm 0.8\% \text{ C}$ / $\pm 1.6\% \text{ F}$ $\pm 0.4\% \text{ C}$ / $\pm 0.8\% \text{ F}$	IEC-60584
<b>TC-L</b>	-200 to 900 $^{\circ}\text{C}$ / -328 to 1652 $^{\circ}\text{F}$	0.1 $^{\circ}\text{C}$ / 0.1 $^{\circ}\text{F}$	$\pm 0.4\% \text{ C}$ / $\pm 0.8\% \text{ F}$	DIN-43710
<b>TC-C</b>	0 to 1500 $^{\circ}\text{C}$ / 32 to 2732 $^{\circ}\text{F}$ 1500 to 2320 $^{\circ}\text{C}$ / 2732 to 4208 $^{\circ}\text{F}$	0.1 $^{\circ}\text{C}$ / 0.1 $^{\circ}\text{F}$ 0.1 $^{\circ}\text{C}$ / 0.1 $^{\circ}\text{F}$	$\pm 1.0\% \text{ C}$ / $\pm 2.0\% \text{ F}$ $\pm 1.4\% \text{ C}$ / $\pm 2.8\% \text{ F}$	W5Re / W26Re W5Re / W26Re

Accuracy values are valid within one year and temperature range of 20 to 26  $^{\circ}\text{C}$ . Outside these limits add 0.001 % FS /  $^{\circ}\text{C}$ , taking 23  $^{\circ}\text{C}$  as the reference temperature. For thermocouples using the internal cold junction compensation add a cold junction compensation error of  $\pm 0.2\% \text{ C}$  or  $\pm 0.4\% \text{ F}$ .

**Serial Communication:** Modbus® RTU Protocol (RS-232/RS-485).  
**Dimensions:** 140 mm x 225 mm x 80 mm (HxWxD).  
**Warranty:** 1 year, except for rechargeable battery.  
**Included Items:** carrying case, test leads, manual and battery charger.

**Optional Accessories:**  
 Temperature Sensors:  
 1/5 DINR Probe - Order Code: 04.06.0001-21;  
 1/5 DINA Probe - Order Code: 04.06.0007-21;  
 1/5 DINAL Probe - Order Code: 04.06.0002-21;  
 Communication Interface - Order Code: 06.02.0007-00.