

THE 3000 SERIES

PORTABLE HIGH ACCURACY TEMPERATURE INDICATOR WITH FULL INSTRUMENT CONTROLS, PT25, PT100 AND 13 THERMOCOUPLE TYPES

Cropico has produced a family of precision digital thermometers, the series 3000. Three units, all with 1 Millikelvin resolution for RTDs, are offered with a range of standard features and a list of "mix-and-match" options which will provide a very high degree of flexibility.

The units can be used by Quality Assurance departments throughout the process industries for calibrating temperature probes, particularly in ISO-9000 applications, and they also have wide-ranging use where high accuracy temperature measurement is essential and where values have to be stored for data processing.

Two-channel input provides A, B or A-B measurement on an LCD display, and front panel keys are provided for the most commonly used functions. Pull-down menus provide further functions, such as the selection of thermocouples. Probe characteristics can be stored for optimum accuracy, and the measuring current can be reduced by half power to check the probe's self heating.

Other features include mains or rechargeable battery operation, with built-in charger, and two interface options - RS232 and IEEE-488 - by plug-in cards. An analogue output, via a BNC socket, is another option.

The 3000 series include an inbuilt data logger which can store upto 4000 date and time stamped readings. Recall the data from the front panel or send to a PC via either RS232 or IEEE both of which are options.

The 3000 series offer ease of use. Password protected digital calibration and a large clear backlit LCD graphics panel ensure the 3000 series are easy for all levels to use.

The 3000 series have the ability to take reverse measurements switching the polarity then computing the average to eliminate the error source. This reduces the thermal E.M.F. which most resistance thermometers suffer from. The thermal E.M.F error can be greater than the quoted accuracy of an instrument. If you need small measurement uncertainty for high temperature PRT work, you need this feature.

KEY FEATURE	3000	3001	3002
Accuracy of RTD measurement 0.01°C	■	■	■
Accuracy of T/C measurement 0.1°C	■	■	
1 milli kelvin resolution for RTD's	■	■	■
10 milli kelvin resolution for T/C	■	■	
2 Measuring inputs	■	■	■
10 thermocouples B,E,J,K,N,R,S,T,D,C	■	■	
T/C reference junction internal or external	■	■	
Pt 25 sensor	■		
Pt 100 sensor	■	■	■
Input of RTD characteristics	■	■	■
Probe self-heat check	■	■	■
Automatic current reversal for RTD's	■	■	■
Suitable for 3 and 4 wire RTD's	■	■	■
Units °C, °F, °K, mV or ohm	■	■	
Units °C, °F, °K or ohm	■	■	■
Maths function max / min std. deviation	■	■	■
Data logging 4000 values	■	■	■
Digital calibration	■	■	■
Rechargeable sealed lead acid battery	■	■	■



3000 SPECIFICATIONS

Sensor	Range °C	Resistance Ω	Current	Resolution °C, °F, °K	Accuracy Typically @ 20°C ±5°C
Pt25	-200 to -100	2.5 to 15	1mA	0.001	0.02°C
Pt25	-100 to +500	15 to 75	1mA	0.001	0.01°C
Pt25	+500 to +670	75 to 115	mA	0.001	0.02°C
Pt100	-200 to -100	10 to 60	0.5mA	0.001	0.02°C
Pt100	-100 to +500	60 to 280	0.5mA	0.001	0.01°C
Pt100	+500 to +670	280 to 460	0.5mA	0.001	0.02°C

3001 SPECIFICATIONS

Sensor	Range °C	Resistance Ω	Current	Resolution °C, °F, °K	Resistance	Accuracy Typically @ 20°C ±5°C
Pt100	-200 to -100	10 to 60	1mA	0.001	0.001Ω	0.02°C
Pt100	-100 to +500	60 to 280	1mA	0.001	0.001Ω	0.01°C
Pt100	+500 to +800	280 to 450	1mA	0.001	0.001Ω	0.02°C

3002 SPECIFICATIONS

Sensor	Range °C	Resistance Ω	Current	Resolution °C, °F, °K	Resistance	Accuracy Typically @ 20°C ±5°C
Pt100	-200 to -100	10 to 60	1mA	0.001	0.001Ω	0.02°C
Pt100	-100 to +500	60 to 280	1mA	0.001	0.001Ω	0.01°C
Pt100	+500 to +800	280 to 450	1mA	0.001	0.001Ω	0.02°C

THERMOCOUPLE TYPE CHART FOR THE 3000 AND 3001

Sensor	Range °C	Common Name	Resolution °C, °F, °K	Standard	Uncertainty @ 20°C ±5°C 1 Year	Uncertainty @ 20°C ±5°C 60 Days
B	+250 to +1820	Platinum / Rhodium	0.01	NIST 175	±(0.025%Rdg. + 0.006%FS)	±(0.02%Rdg. + 0.006%FS)
C	0 to +2315	Tungsten / Rhenium	0.01	ASTM E988	±(0.075%Rdg. + 0.005%FS)	±(0.05%Rdg. + 0.005%FS)
D	0 to +2315	Tungsten / Rhenium	0.01	ASTM E988	±(0.075%Rdg. + 0.005%FS)	±(0.05%Rdg. + 0.005%FS)
E	-200 to +1000	Chromel / Constantan	0.01	NIST 175	±(0.026%Rdg. + 0.004%FS)	±(0.01%Rdg. + 0.004%FS)
J	-210 to +1200	Iron / Constantan (SAMA)	0.01	NIST 175	±(0.03%Rdg. + 0.005%FS)	±(0.008%Rdg. + 0.005%FS)
K	-200 to +1372	Chromel / Alumel	0.01	NIST 175	±(0.035%Rdg. + 0.006%FS)	±(0.01%Rdg. + 0.006%FS)
N	-200 to +1300	Nicrosil / Nisil	0.01	NIST 175	±(0.035%Rdg. + 0.005%FS)	±(0.01%Rdg. + 0.005%FS)
R	-50 to +1768	Platinum / Rhodium	0.01	NIST 175	±(0.02%Rdg. + 0.015%FS)	±(0.005%Rdg. + 0.015%FS)
S	-50 to +1768	Platinum / Rhodium	0.01	NIST 175	±(0.02%Rdg. + 0.015%FS)	±(0.005%Rdg. + 0.015%FS)
T	-200 to +400	Copper / Constantan	0.01	NIST 175	±(0.025%Rdg. + 0.015%FS)	±(0.005%Rdg. + 0.015%FS)
U	-200 to +600	Copper / Constantan	0.01	DIN 43710	±(0.025%Rdg. + 0.015%FS)	±(0.005%Rdg. + 0.015%FS)
L	-200 to +500	Iron / Constantan	0.01	DIN 43710	±(0.03%Rdg. + 0.005%FS)	±(0.008%Rdg. + 0.005%FS)
Au/Pt	0 to +1000	Gold / Platinum	0.01	NIST-Burns	±(0.02%Rdg. + 0.015%FS)	±(0.005%Rdg. + 0.015%FS)

3000 Series continued ►►

THE 3000 SERIES

Display

LCD Graphics panel with backlight

Terminals

4mm safety sockets and 6 pin Lemo socket

Working Temperature

0°C to +40°C re. humidity 80% max. non-condensing

Storage Temperature

-20°C to +50°C

Mains Supply

100/120/220/240 Volts +10% to 13%
47Hz to 63Hz 40VA

Safety

EN 61010-1 EMC-EN 61236

Dimensions

219mm x 315mm x 110mm (W H D) approx
1/2 19" Rack 2U high

Mass

5.5kg approx

Calibration

Digital Pass code protected

Battery

Sealed Lead acid battery with internal intelligent charger.
14 hours approx operation from full charge, may be used whilst charging

Inputs

Thermocouples via 4mm sockets in copper block on 19mm pitch, adaptor plugs available for direct thermocouple wire connection. PRT via Lemo low thermal sockets. 3002 model has low thermal E.M.F sockets only

Average

Automatic average and display of PRT measurements with forward and reverse current

Auto Temperature Compensation for Thermocouples

Automatic Internal- Automatically references measurement to temperature of 20°C or other user defined temperature. User coefficients may be used

Automatic External- External Pt100 sensor temperature manual value can also be used

Hi / Low Limits

Limit values can be set over entire measurement range

Interfaces

Interface cards are available as option, only one card may be fitted. **RS232:** To specification ANSI/EIA/TIA-232-E-1991

IEEE-488: Conforms to ANSI-IEEE Std 488, 1-1987 and performs the following functions: SH1, AH1,T5,TEO, L3, LEO, SR1, RL1, PPO, DT1, CO, E2. Interface may be set to 'talk only' mode to permit stand alone printer output

Scanner Option: 2 additional input cards may be fitted, each card has 4 measurement channels. Measurement and scan sequences may be configured from the front panel. Full accuracy is maintained

Thermocouples

The above readings apply to values with the reference junction switched off. Reference junction uncertainty when used in automatic mode is better than 0.1°C at 20 °C with a deviation of not more than 0.01 °C/°C over the range 0 to 100 °C. RTD types linearised to ITS-90 conforms to EN 60751. Thermocouples are not available on 3002 model

Scanner Options

The 3000 series scanner option provides for multi inputs of either thermocouples or Pt100 sensors. Two channel cards may be fitted each with four input channels, which may be either thermocouples or Pt100. The flexibility of the system is such that scanner cards can be interchanged giving 10 channels for Pt100, 10 channels for thermocouples, or 4 channels thermocouples plus 4 channels Pt100 plus the two front panel inputs, which may be either Pt100 or thermocouples. No other instrument in this price range gives the versatility and accuracy of measurement to match the 3000.

CODE	ITEM	3000 SERIES OPTIONS	3000	3001	3002
3000-01	RS232 interface		■	■	■
3000-03	IEEE-488 interface		■	■	■
3000-04	Analogue output		■	■	■
3000-05	Scanner option, input cards to be ordered separately		■	■	■
3000-06	Scanner card for Pt100 4 channels. Scanner option 3000-05 must be installed		■	■	■
3000-07	Scanner card for thermocouple inputs 4 channels. Scanner option 3000-05 must be installed		■	■	■
3000-A-10	Calibration cable		■	■	■
3000-A-11	Calibration standards for Pt100 channels, consisting of 3 standard resistors 100, 250, and 400 ohm		■	■	■
3000-A-12	Adapter box 4mm copper terminals to Lemo plug		■	■	■
3000-A-13	RTD Lemo input plug		■	■	■
3000-A-20	Thermocouple plug with screw terminals materials type R S B J T E K available please specify when ordering		■	■	■
3000-A22	External thermocouple reference junction		■	■	■
RSL-02	RS232 Cable		■	■	■





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