



# PROGRAMMABLE PANEL METERS

## Tracker 220 Series

- \* **Universal inputs for common process signals**  
*mA, mV/V, R, RTD, TC*
- \* **Universal mains power**  
*(optional low voltage AC/DC)*
- \* **Alarm relay as standard**  
*(up to three available)*
- \* **Transmitter & transducer supplies**
- \* **Analogue output**
- \* **Digital status inputs**
- \* **Four alarm set-points**
- \* **Maths functions**
- \* **Programmable function buttons**
- \* **Serial communications**



The Tracker 220 series universal input indicators; four models which offer measurement performance significantly better than that normally associated with indicators in this price range. The Tracker 220 Series can be used for simple measurement-only applications or in more demanding situations requiring digital communications, alarms, maths functions and complex signal conditioning. The powerful menu-driven software enables fast flexible set-up from the front panel or via the serial communications interface. No adjustments of internal potentiometers, internal links or plug-in cards are necessary.

### Universal input

The 220 Series can be directly connected to most popular process sensors. Process inputs can be scaled to any engineering unit and any input can be mapped to one of the thermosensor linearisation curves. External or internal cold junction compensation is available and sensor burnout detection can be set to either upscale or downscale. Temperature can be displayed in °C, °F or Kelvin. Decimal point position is either set by the user or is auto-ranging.

### User linearisation

User linearisation allows up to 24 points to be defined, either entered manually or directly from the sensor output.

### Analogue output

Models 223/224 provide an analogue output which can be scaled to any portion of the display range and set by the user to be either 0-10V, 0-20mA or 4-20mA. The output can be set to transmit the measured, max., min. or averaged value and has a programmable damping filter for noisy or fast-moving signals.

### Alarms

All models have four software alarms which may be user set for alarm type, set-point, on/off delay, and hysteresis value. Each alarm may be set to be latching or non-latching and to flash a message on the display when active. With models 223/224, the software alarms can operate a relay. In addition an AND function allows a relay to switch only if two or more alarms are active. Relays can be configured to be energised or de-energised in the alarm condition.

### Digital status inputs

Models 223/224 are fitted with two digital inputs which can be activated by external voltage-free contacts. Each can be programmed to perform one of the following functions: Tare, Auto zero, Display hold, Display max., Display min., Display average, Reset max./min./average, Alarm disable, Alarm acknowledge, Analogue output hold, Keyboard lock, Display text.

### Sensor excitation

All models are fitted with a fixed 24 VDC output for powering a 20mA loop. The 221/222 models have a fixed 10V regulated supply and the 223/224 models have a programmable 0-12VDC supply for strain gauge type sensors. All types are isolated.

### Front panel control / Function buttons

Full set-up is available using front panel buttons to step through a password protected menu. Some functions may be made directly accessible to an operator e.g. two front panels buttons can be user programmed to give access to functions such as tare, auto zero, display average, display hold etc. Units can also be provided without front panel buttons.

### Serial communications

Models 223/224 are fitted with an RS422/485 interface and models 221/222 can be optionally fitted with two-wire communications. All measured values and set-up parameters are accessible, however the instruments may be set to read only to protect their configuration.

## DISPLAY

Type: 14.2mm high brightness LED (red or green)  
 Range: 19999 to 99999 (T223, T224)  
 1999 to 9999 (T221, T222)  
 Update rate: 2 per second

## VOLTAGE INPUTS

Ranges:  $\pm 100\text{mV}$ ,  $\pm 10\text{V}$   
 Accuracy: 0.05 % of reading  $\pm 20\mu\text{V}$  (typically 0.02%)  
 Resolution:  $1\mu\text{V}$  (100mV range),  $100\mu\text{V}$  (10V range)  
 Input impedance:  $> 100\text{M Ohms (mV i/p)}$   $> 1\text{M Ohms (V i/p)}$

## CURRENT INPUT

Range:  $\pm 20\text{mA}$   
 Accuracy: 0.05% of reading  $\pm 4\mu\text{A}$  (Typically 0.02%)  
 Resolution:  $2.0\mu\text{A}$   
 Input impedance: 5 Ohms typical  
 Maximum burden: 100mV

## RESISTANCE/RTD INPUTS

Configuration: 2, 3 or 4 wire programmable.  
 Excitation current: 0.25mA typical  
 Range: 0-400 Ohms (0-4K Ohms using 10V input)  
 Accuracy: 0.4 Ohms (typically 0.2 Ohms)  
 $\pm 0.5\%$  (typically  $\pm 0.3\%$ ) on 0-4K using 10V input  
 Resolution: 0.01 Ohms

RTD Type	Accuracy Including Linearisation		
	Range (°C)	Worst case	Typical @ 25°C
Pt100 (alpha=385)	-200 to 850°C	$\pm 0.5^\circ\text{C}$	$\pm 0.2^\circ\text{C}$
Pt100 (alpha=392)	-200 to 457°C	$\pm 0.5^\circ\text{C}$	$\pm 0.2^\circ\text{C}$
Pt130	-200 to 500°C	$\pm 0.5^\circ\text{C}$	$\pm 0.2^\circ\text{C}$
Ni 100	-60 to 250°C	$\pm 0.5^\circ\text{C}$	$\pm 0.2^\circ\text{C}$

## THERMOCOUPLE INPUTS

Sensor break detection: programmable up or down scale  
 Reference Junction Compensation (CJC)  
 Accuracy: better than  $\pm 0.5^\circ\text{C}$  after 30 minutes

Thermocouple	Accuracy Including Linearisation		
	Range (°C)	Worst case	Typical @ 25°C
Type J Fe/NiCu	-210 to 1200°C	$\pm 0.5^\circ\text{C}$	$\pm 0.2^\circ\text{C}$
Type K NiCh/Ni/Al	-270 to 1372°C	$\pm 0.5^\circ\text{C}$	$\pm 0.2^\circ\text{C}$
Type T Cu/CuNi	-270 to 400°C	$\pm 0.5^\circ\text{C}$	$\pm 0.2^\circ\text{C}$
Type B Pt30%/6%Rh	0 to 1820°C	$\pm 1.5^\circ\text{C}$	$\pm 0.8^\circ\text{C}$
Type E NiCh/CuNi	-270 to 1000°C	$\pm 0.5^\circ\text{C}$	$\pm 0.3^\circ\text{C}$
Type N Nicrosil-Nisil	-200 to 1300°C	$\pm 0.5^\circ\text{C}$	$\pm 0.3^\circ\text{C}$
Type R Pt13%-Rh Pt	-50 to 1767°C	$\pm 1.0^\circ\text{C}$	$\pm 0.6^\circ\text{C}$
Type S Pt10%-Rh Pt	-50 to 1767°C	$\pm 1.0^\circ\text{C}$	$\pm 0.6^\circ\text{C}$
Type U Cu/CuNi	-200 to 400°C	$\pm 0.7^\circ\text{C}$	$\pm 0.4^\circ\text{C}$
Type L Fe/Con	-200 to 900°C	$\pm 0.7^\circ\text{C}$	$\pm 0.4^\circ\text{C}$
Type G W/W26%Rh	0 to 2320°C	$\pm 1.0^\circ\text{C}$	$\pm 0.4^\circ\text{C}$
Type D W3%/26%Rh	0 to 2320°C	$\pm 1.0^\circ\text{C}$	$\pm 0.4^\circ\text{C}$
Type C W5%/26%Rh	0 to 2320°C	$\pm 1.0^\circ\text{C}$	$\pm 0.4^\circ\text{C}$
Ni/Ni 18% Moly	0 to 1370°C	$\pm 1.0^\circ\text{C}$	$\pm 0.4^\circ\text{C}$
Platinel II	0 to 1370°C	$\pm 1.0^\circ\text{C}$	$\pm 0.4^\circ\text{C}$
Palaplat	0 to 240°C	$\pm 1.0^\circ\text{C}$	$\pm 0.4^\circ\text{C}$

## TRANSMITTER/TRANSDUCER SUPPLIES

Isolation: 500 Vdc/peak ac (all types)  
 Transmitter supply: All models nominally 24V @ 32mA maximum  
 Transducer supply: (T221, T222) 10 volts  $\pm 0.1\text{V}$  @ 30mA max.  
 Transducer supply: (T223, T224) programmable 0-12V ( $\pm 0.05\text{V}$  typ. 0.02V)  
 Resolution: 0.01V  
 Accuracy:  $\pm 0.05\text{V}$  (Typically 0.02V)  
 Temperature Drift:  $< 100\text{ppm}/^\circ\text{C}$   
 Output Ripple: mV; Output Current: 35mA maximum

## ANALOGUE OUTPUT (T223, T224)

Isolation: 500 Vdc/peak ac  
 Ranges: User selectable 0-10V, 0 – 20mA or 4 – 20mA  
 Accuracy: 0.2% of span (typically 0.1%)  
 Temperature drift:  $< 100\text{ppm}/^\circ\text{C}$   
 Output ripple:  $< 10\text{mV}$   
 Response: 63% within 32ms, 99% within 100ms  
 Resolution: 0.05% of span (5mV or 0.01mA)  
 Max. voltage output: 11V @ 22mA  
 Max. current output: 22mA @ 18V into 900 Ohms max.  
 Programmable damping filter

## SAFETY AND EMC CERTIFICATIONS

Safety: EN61010, IEC1010  
 Susceptibility: EN50082 – 2, EN50082 – I  
 Emissions: EN500B1 – 1, CE Certified 1995, 1999

## TRACKER SELECTION CHART

Functions common to all types: °C, °F or Kelvin • User Linearisation • Display Filter • Maths Functions • Max, Min and Averaging • Internal or External CJC • 2 X Function Buttons • 4 X Software Alarms • 24v Transmitter Supply • RS422/485 Serial Interface

	221	222	223	224
Display Digits	4	4	5	5
10v Transducer Supply	✓	✓		
Programmable 0-12v Transducer Supply			✓	✓
Digital Status Inputs			✓	✓
Two Alarm Relays Change over contacts 1 Amp @ 250VAC 5 Amp @ 30VDC		✓		✓
Analogue Output			✓	✓

## SERIAL COMMUNICATIONS

Type: RS422/485 2 or 4 wire multidrop  
 Protocol: MODBUS™ (RTU or ASCII), J-BUS and DTP1  
 Speed: 1200, 2400, 4800 or 9600 baud  
 Parity: Odd, even or none; Stop Bits: 1 or 2; Isolation: 500 Vdc/peak ac

## PHYSICAL/MECHANICAL

Dimensions: 48mm (H) x 96mm (W) x 173mm (D)  
 Panel Cutout: 44mm (H) x 92mm (W)  
 Depth Behind Panel 166mm including terminals  
 Front Panel: Protection to IP65 (NEMA4)  
 Weight: 0.4kg maximum; Packed weight 0.55kg.

## ENVIRONMENTAL

Temperature: 10 – 50°C operating, -10 to 70°C storage.  
 Humidity: 0 – 95% RH non condensing

Ordering Code	Model Number			Power	Display
<b>Power</b>	1 = 90-265VAC (50/60Hz), 2 = 10-32VDC/AC				
<b>Display</b>	R = Red                      G = Green				
<b>Example</b>	223-1-R Tracker 223, mains powered with red display				



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