

Datasheet

# Platinum Resistance Pt100 In-head (Push Button) Temperature Transmitter

TX203P - 4-20mA output, default range supplied 0-100°C



The TX203P RTD in-head mounted temperature transmitter connects to any standard Pt100 resistance sensor and converts the linearised temperature to a (4 to 20) mA signal. The transmitter is a two wire device, and is fully configurable by the user over a wide temperature range, with the aid of a simple push button. This design incorporates additional configuration menus, allowing the user to push button trim the transmitter output at both zero and span, ideal for trimming out sensor errors. The transmitters advanced circuitry guaranties high stability over the wide operating ambient temperature ranges experienced by head mounted devices.

One of the transmitters features is the program LED, which provides visual indication of sensor fault when in normal operation and is also used to guide the operator through the simple menus during configuration.

## Ordering Information

Type	Allied code	RS Order Number
Pt100	70825787	363-0238

RS127/0816

### **What is the difference between a RTD and PRT sensor?**

Nothing. RTD means resistance thermometer detector (the sensing element) and PRT means Platinum resistance thermometer (the whole assembly) i.e. a PRT uses a RTD.

## **SPECIFICATION @ 20 °C**

### **INPUT**

Sensor Type	PT100 100 R @ 0°C 2 or 3 Wire
Sensor Range	(-200 to +850) ° C (18 to 390) Ω
Sensor Connection	Screw terminal
Minimum span (see note 1)	25 °C
Linearisation	BS EN 60751(IEC 751) standard / JISC1604 Accuracy (see note 2) ±0.1 ° C±0.05% of Reading
Thermal Drift	0.0025 % / °C
Excitation current	< 200 uA
Lead Resistance effect	0.002 ° C/ Ω
Maximum lead Resistance	20 Ω per leg

**Note 1** Any span may be selected, full accuracy is only guaranteed for spans greater than the minimum recommended span.

**Note 2** Basic measurement accuracy includes the effects of calibration, linearisation and repeatability

### **OUTPUT**

Type Two wire	(4 to 20) mA sink
Limits	Low 3.8 mA; high 21.5 mA
Accuracy	± (mA out / 2000) or ±5 uA which ever greater
Loop Effect	± 0.2 au / V measured @ 50 Hz 1 V (peak to peak)
Thermal Drift	± 1 uA / °C typical; ±1.5 uA Max
Max Load	[ (V supply – 10)/20] KΩ

### **GENERAL**

Update Time	0.5 Seconds
Response Time	1 Second to reach 90% of final value
Start-up time	From power up typically 5 Seconds
Filter Factor	Adaptive
Ambient Temperature	(-40 to 85) °C
Connection	Screw Terminal
Approvals	BS EN 61326; 1998 – Electrical equipment for measurement and control ANNEX A; ANNEX F
Factory Default	(0 to 100) °C upscale burnout (0.0 °C user trim)

### **Mechanical**

The RTD transmitter has been specifically designed to fit inside a DIN standard probe head enclosure which provides adequate protection from moisture, dust, corrosive atmosphere etc. All cable entries must be sealed using the correct size gland. Likewise, any probe assembly fitted must be sealed. Care must be taken when locating the transmitter to ensure the working ambient temperature range of (-40 to 85) °C is not exceeded. The transmitter enclosure has a centre hole allowing the sensor wired to enter screw terminals from the transmitter centre, this is applicable when the sensor is mounted directly below the transmitter.

### **Electrical**

Electrical connections to the transmitter are made to the screw terminal provided on the top face. The sensor wires must be equal length and type for the lead compensation to work correctly. The screw terminals allow for wires to enter either inner or outer direction.

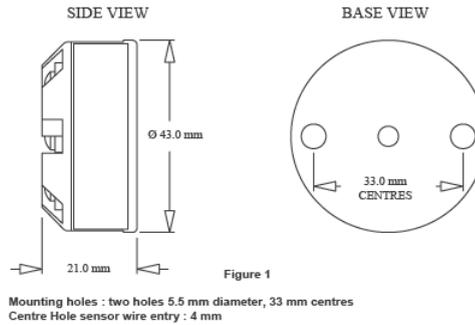
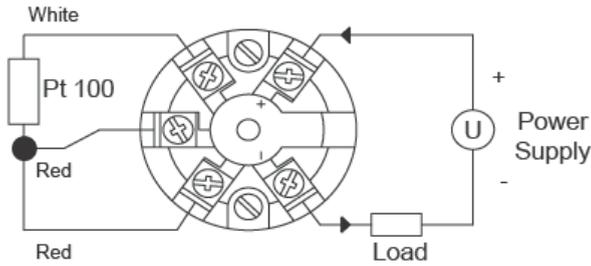
The transmitter is protected against reverse connection and over voltage. If no sensor (input) connection is made the transmitter will go into either up or down scale output current, depending on configuration.

The wiring diagram below gives connection details; the output is shown connected to a 24 V supply. The load symbol represents any other device connected in the loop, such as Monitoring equipment, panel indicators and loop isolators. The load value can range from 0 ohms to the max loop load for given supply.

The transmitter conforms with EC directive BS EN 61326: 1998 when correctly installed in a termination head providing at least IP20 protection and with sensor wires less than 3 metres. Screened or twisted pair wires are recommended for output wires. Always ensure the (4 to 20) mA loop is grounded at one point, this would normally be at the monitoring equipment or loop power supply. In normal operation the program LED acts as over-range LED.

**Wiring Diagram**

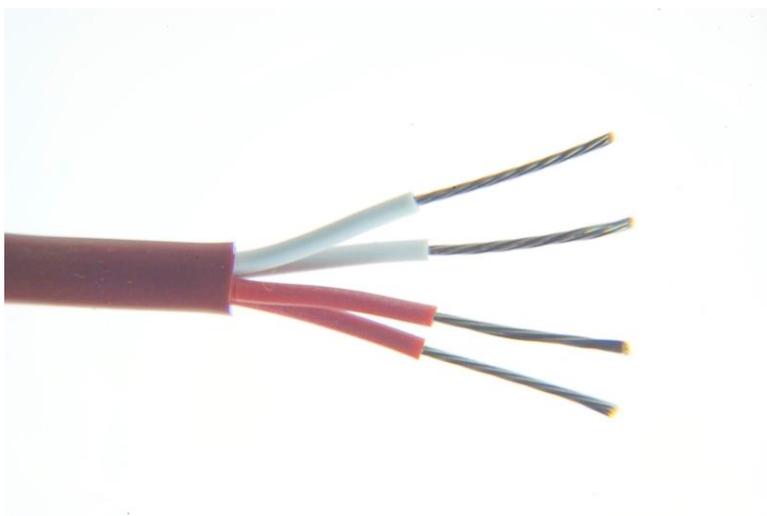
**Dimensions**



**Need RTD Cable or Pt100/Pt1000 Detectors?**

**RTD Extension Cable – 4 core (10 or 25 metre reel)**

Platinum Resistance Thermometer Extension Cable – Silicone Rubber Insulated



- Silicone rubber insulated cable for extending Platinum Resistance Thermometers
- Can be used to extend up to 4 wire RTD configurations
- Commonly used with Pt100Ω thermometers but suitable with other types Pt130/500/1000Ω etc.
- 4 core silicone rubber insulated 7/0.2mm tin plated copper conductors, twisted together with silicone rubber outer jacket

- Cores colour coded 2 x Red / 2 x White to IEC-751
- Good electrical and mechanical properties, highly flexible, resistant to oils, acids and other adverse fluids
- Good heat resistance up to 200°C
- Insulation rating -40°C to 200°C
- Supplied in 10 or 25 metre reel lengths

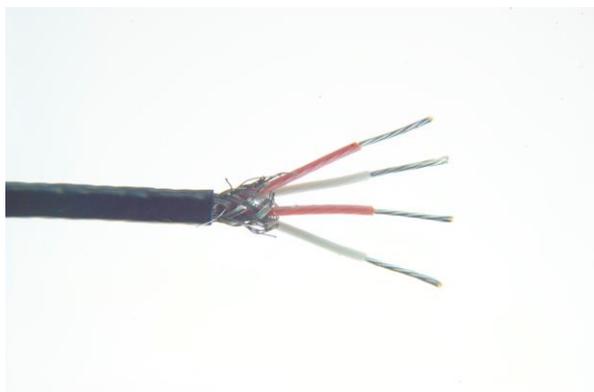
Type	Conductors	mm <sup>2</sup>	Cores (4 core)	Jacket	Reel Length	Allied Code	RS order Code
RTD	7/0.2mm	0.219	2x Red / 2 x White	Brown	10 metres	70657147	<b>827-5823</b>
RTD	7/0.2mm	0.219	2x Red / 2 x White	Brown	25 metres	70644361	<b>455-4242</b>

**Overall sheath Dimension** (approx.)

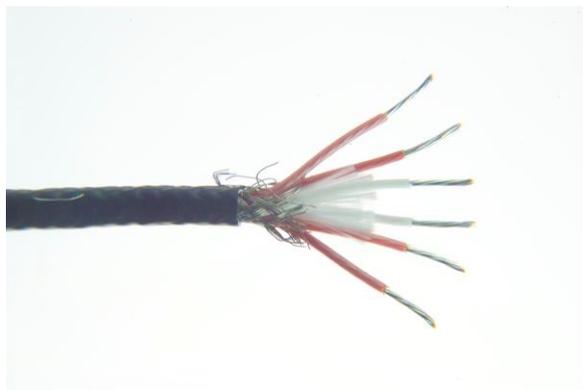
4.0mmØ

## RTD Extension Cable – 4 & 6 core PFA

Platinum Resistance Thermometer Extension Cable, PFA insulated & screened



4 core (cores: 2 x red / 2 white)



6 core (cores: 4 x red / 2 x white)

- PFA insulated cable for extending Platinum Resistance Thermometers
- High temperature to 260°C, extruded PFA Teflon® construction
- Commonly used for Pt100Ω thermometers, also suitable with other types such as Pt130, Pt500 & Pt1000Ω
- 4 & 6 core available – to extend 2, 3 or 4 wire RTD configurations, the 6 core can be used to extend 2 x 3 wire duplex (dual element) configurations
- Construction – PFA insulated 7/0.2mm tin plated copper conductors, twisted cores with nylon cord, tin plated copper braided screen with PFA insulated outer jacket
- Cores colour coded Red & White in accordance with IEC-751, black outer jacket
- Good mechanical strength and flexibility, resistant to oils, acids and other adverse fluids
- Insulation rating -75°C to 260°C
- See below for available reel lengths

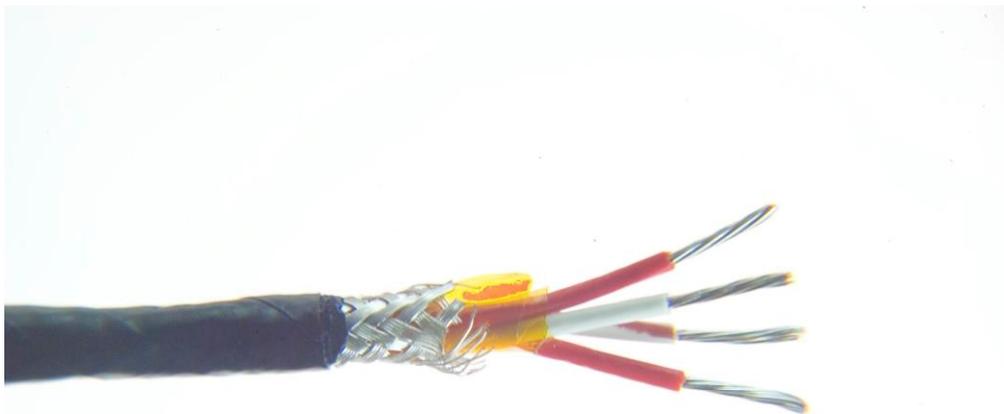
Type	Conductors	mm <sup>2</sup>	Cores	Screen	Jacket	Reel Length	Allied Code	RS
RTD	7/0.2mm	0.219	x 4	Yes	Black	10 metres	70646175	611-8078
RTD	7/0.2mm	0.219	x 4	Yes	Black	25 metres	70646176	611-8090
RTD	7/0.2mm	0.219	x 4	Yes	Black	50 metres	70657148	827-5827
RTD	7/0.2mm	0.219	x 4	Yes	Black	100 metres	70657150	827-5836
RTD	7/0.2mm	0.219	x 6	Yes	Black	25 metres	70646177	611-8107
RTD	7/0.2mm	0.219	x 6	Yes	Black	50 metres	70657151	827-5839

**Overall sheath Dimension (approx.)**

4 core: 3.2mmØ  
6 core: 3.8mmØ

**RTD Extension Cable – 4 core PTFE (10 & 25 reel lengths)**

Platinum Resistance Thermometer Extension Cable, PTFE insulated & screened



- PTFE insulated cable for extending Platinum Resistance Thermometers
- High temperature to 260°C, wrapped PTFE tape construction
- Can be used to extend 2, 3 or 4 wire RTD configurations
- Commonly used for Pt100Ω thermometers, also suitable with other types such as Pt130, Pt500 & Pt1000Ω
- 4 core PTFE insulated 7/0.2mm silver plated copper conductors, twisted cores, Mylar tape, silver plated copper braided screen with PTFE insulated outer jacket
- Cores colour coded 2 x Red / 2 x White to IEC-751 + black outer jacket
- Good mechanical strength and flexibility, resistant to oils, acids and other adverse fluids, steam, gasses etc.

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- Insulation rating -75°C to 260°C
- Supplied in 10, & 25 metre reel lengths

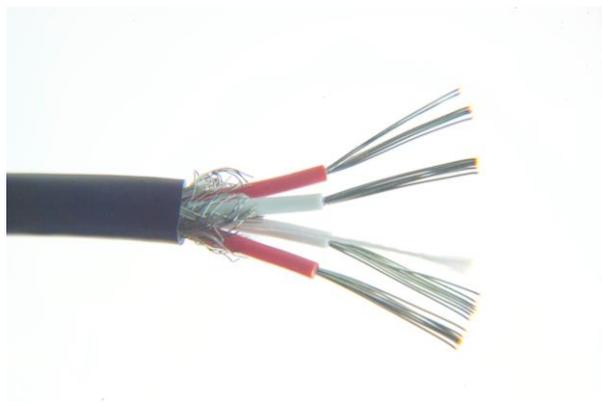
Type	Conductors	mm <sup>2</sup>	Cores (4 core)	Screen	Jacket	Reel Length	Allied Code	RS order code
RTD	7/0.2mm	0.219	2x Red/2x White	Yes	Black	10 metres	70644773	<b>492-9775</b>
RTD	7/0.2mm	0.219	2x Red/2x White	Yes	Black	25 metres	70642885	<b>290-4976</b>

#### Overall sheath Dimension (approx.)

3.5mmØ

## RTD Extension Cable – 4 core PVC (10, 25 & 50 reel lengths)

Platinum Resistance Thermometer Extension Cable, PVC insulated & screened



- PVC insulated cable for extending Platinum Resistance Thermometers
- Can be used to extend 2, 3 or 4 wire RTD configurations
- Commonly used for Pt100Ω thermometers but also suitable with other types such as Pt130, Pt500 & Pt1000Ω
- 4 core PVC insulated 7/0.2mm tin plated copper conductors, twisted cores, polyester tape & nylon cord, tin plated copper braided screen with PVC insulated outer jacket
- Cores colour coded 2 x Red / 2 x White to IEC-751 with black outer jacket
- Heat resistant PVC to 105°C
- Good for general purpose cable, highly flexible & waterproof
- Insulation rating -10°C to 105°C
- Supplied in 10, 25 & 50 metre reel lengths

Type	Conductors	mm <sup>2</sup>	Cores (4 core)	Screen	Jacket	Reel Length	Allied Code	RS order code
RTD	7/0.2mm	0.219	2x Red/2x White	Yes	Black	10 metres	70644772	492-9753

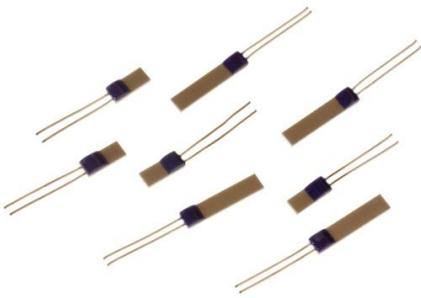
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RTD	7/0.2mm	0.219	2x Red/2x White	Yes	Black	25 metres	70642884	290-4954
RTD	7/0.2mm	0.219	2x Red/2x White	Yes	Black	50 metres	70646179	611-8129

**Overall sheath Dimension (approx.)**

4.4mmØ

**Platinum Resistance Pt100 & Pt1000 Thin Film Detectors** Platinum Sensing Resistors – Thin Film (Pt100 & Pt1000 Ohm)



**Pt100 Elements, Thin Film (100 Ohm)**

- Pt100 elements to IEC751 Class A, B and 1/3DIN
- For use from -50°C to +500°C
- Thin film construction
- Suitable for surface & immersion applications where protected
- Vibration resistant

**Specifications:**

Sensor type:	Pt100 (100 Ohms @ 0°C)
Construction:	Thin film, 10mm tails
Temperature range:	-50°C to +500°C
Ice point resistance:	100Ω
Fundamental interval (0°C to 100°C):	38.5Ω (nominal)
Self-heating:	<0.5°C/mW
Thermal response:	0.1s
Stability:	±0.05%

Resistance	Dimensions (width x length)	Tolerance Class	Allied code	RS order code
Pt100	2 x 5.0mm	Class A	70646146	<b>611-7788</b>
Pt100	2 x 5.0mm	Class B	70646148	<b>611-7801</b>
Pt100	2 x 5.0mm	Class B	70642888	<b>290-5070</b> (Packet of 5)
Pt100	2 x 10mm	Class A	70643577	<b>362-9799</b>
Pt100	2 x 10mm	Class B	70641762	<b>237-1607</b>
Pt100	2.0 x 10mm	1/3DIN	70643578	<b>362-9812</b>
Pt100	2.0 x 2.3mm	Class A	70643579	<b>362-9834</b>
Pt100	2.0 x 2.3mm	Class B	70643580	<b>362-9840</b>
Pt100	2.0 x 2.3mm	1/3DIN	70643581	<b>362-9856</b>

#### Pt100 Elements (continued)

Resistance	Dimensions (width x length)	Tolerance Class	Allied code	RS order code
Pt100	1.2 x 1.6mm	Class A	70646834	<b>666-7362</b>
Pt100	1.2 x 1.6mm	Class B	70646831	<b>666-7353</b>
Pt100	1.0 x 3.0mm	Class A	70646833	<b>666-7359</b>
Pt100	1.0 x 3.0mm	Class B	70646832	<b>666-7356</b>
Pt100	2.0 x 5.0mm	1/3 Din	70656467	<b>814-0162</b>
Pt100	1.2 x 4.0mm	Class B	70656468	<b>814-0165</b>
Pt100	1.2 x 4.0mm	Class A	70656469	<b>814-0169</b>

#### Pt1000 Elements, Thin Film (1000 Ohm)

- Pt1000 elements to IEC 751 Class A and B
- For use from -50°C to +500°C
- Thin film construction
- Suitable for surface & immersion applications where protected
- Vibration resistant

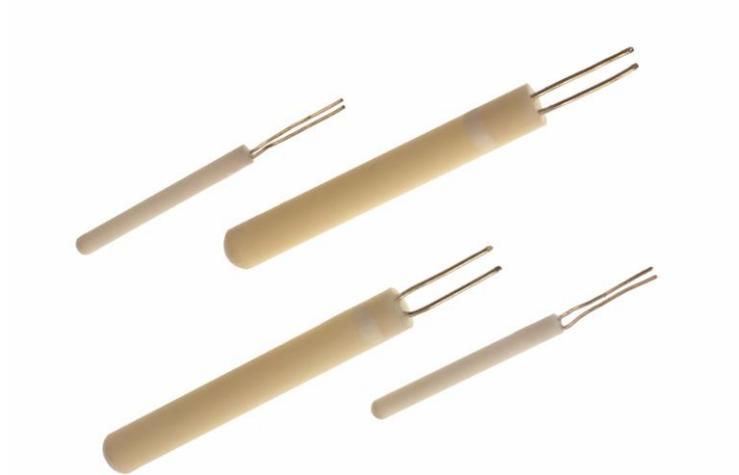
#### Specifications:

Sensor type:	Pt1000 (1000 Ohms @0°C)
Construction:	Thin film, 10mm tails
Temperature range:	-50°C to +500°C
Ice point resistance:	1000Ω
Fundamental interval (0°C to 100°C):	385Ω (nominal)
Self-heating:	<0.5oC/mW
Thermal response:	0.1s
Stability:	±0.05%

Resistance	Dimensions (width x length)	Tolerance Class	Allied code	RS order code
Pt1000	2.0 x 10.0mm	Class A	70643582	<b>362-9907</b>
Pt1000	2.0 x 10.0mm	Class B	70643583	<b>362-9913</b>
Pt1000	2.0 x 10.0mm	1/3 Din	70656472	<b>814-0178</b>
Pt1000	1.0 x 3.0mm	Class B	70656470	<b>814-0171</b>
Pt1000	1.25 x 1.7mm	Class B	70656471	<b>814-0175</b>

## Resistance Pt100 Wire-Wound Detector Elements

Pt100 platinum resistance thermometer elements in a choice of sizes – single & dual element



- Pt100 elements to IEC 60751 Class A or B
- 100 $\Omega$  Ohms @ 0°C
- Single or dual element
- Platinum coil wire-wound construction sealed inside a high purity alumina ceramic body
- Optimum performance & stability
- Temperature range –200°C to +650°C

### Specifications:

Sensor type: Pt100 (100 Ohms @ 0°C)

RS127/0816

Construction:	Wire-Wound, 10mm tails
Temperature range:	-200°C to +650°C
Ice point resistance:	100Ω
Fundamental interval (0°C to 100°C):	38.5Ω (nominal)
Self-heating:	0.02 to 0.3°C/mW
Thermal response:	<0.4s (secs. to 63% of final value – in water @ 1m/s)
Measuring current:	1mA
Tolerance Class:	In accordance with IEC 60751 W0.15 (Class A) -100°C to +450°C W0.3 (Class B) -196°C to +660°C

Continued:

### Single element:

Resistance	Tolerance Class	Diameter ('D')	Length ('L')	Allied code	RS order code
Pt100	Class B	1.5mm	8mm	70646153	<b>611-7851</b>
Pt100	Class A	1.5mm	8mm	70646155	<b>611-7873</b>
Pt100	Class B	1.5mm	15mm	70646154	<b>611-7867</b>
Pt100	Class A	1.5mm	15mm	70646151	<b>611-7839</b>
Pt100	Class B	2.8mm	15mm	70646150	<b>611-7823</b>
Pt100	Class A	2.8mm	15mm	70646152	<b>611-7845</b>
Pt100	Class B	2.8mm	25mm	70646147	<b>611-7794</b>
Pt100	Class A	2.8mm	25mm	70646149	<b>611-7817</b>

### Dual element:

Pt100 (x2)	Class A	1.5mm	15mm	70643873	<b>397-1595</b>
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