For the attention of:

# ATEX / IECEx Temperature Sensors Hazardous Areas Zones 0, 1 and 2

**Thermocouple & RTD sensors and accessories approved for use in explosion proof and intrinsically safe areas zones 0, 1 & 2 for a wide range of temperature measurement applications**

## TC Ltd for Temperature Sensing, Measurement and Control

# Certification

## Our ATEX & IECEx protection concepts

**All designs of temperature sensor and feedthrough in this catalogue have been approved for use in areas with the following protection concepts:**

### Ex d Flameproof/Explosion Proof – Category 2, Zones 1, 2 (Gas)

- Ex d IIC T6...T1 Gb Ta = –40°C to 60°C
- Standard EN IEC 60079-1 refers
- Designed to contain an explosion and quench the flame
- Sensors incorporate a suitable heavy duty enclosure or threaded fitting with tight seals

### Ex e Increased Safety – Category 2, Zones 1, 2 (Gas)

- Ex e IIC T6...T1 Gb Ta = –40°C to 60°C
- Standard EN IEC 60079-7 refers
- Design ensures no arcs, sparks or hot surfaces that could ignite an explosive mixture with a minimum IP54 enclosure rating
- Sensors incorporate a suitable heavy duty enclosure or threaded fitting with tight seals

### Ex tb Enclosure – Category 2, Zones 21, 22 (Dust)

- Ex tb IIIC T80°C…T440°C Db
- Standard EN IEC 60079-31 refers
- Protects against combustible and conductive dusts, rugged tight enclosures are used

### Ex ia/Ex ib Intrinsically Safe – Categories 1 & 2, Zones 0, 1, 2 (Gas), Zones 20, 21, 22 (Dust)

- Ex ia IIC T6...T1 Ga Ta = –40°C to 60°C
- Ex ib IIC T6...T1 Gb Ta = –40°C to 60°C
- Ex ia IIIC T80°C…T440°C Da
- Ex ib IIIC T80°C…T440°C Db
- Standard EN IEC 60079-11 refers
- Designed to limit the energy of arcs or sparks that could potentially ignite an explosive mixture
- Sensors used in this area must be wired through a suitably approved barrier

Also available with EAC Ex approval

Ex areas can be known by different names such as “Hazardous Locations”, “Hazardous Areas”, “Explosive Atmospheres” and the like and relate to areas where flammable vapours, gases, combustible dusts or liquids are likely to occur in quantities sufficient to cause a fire or explosion.

Once an area is classified as potentially explosive, a risk analysis will normally dictate that only electrical and mechanical equipment that is suitably certified can be installed. The European ATEX Directive (2014/34/EU) and IECEx international certification system force manufacturers to gain certification of electrical and/or mechanical products that can be used in a potentially explosive atmosphere.

Hazardous areas are divided into zones which relate to the predicted occurrence of when an explosive atmosphere may be present (see zone diagram below).

Our extensive range of ATEX / IECEx approved products is designed and tested for use in hazardous areas with type Ex d Ex e and Ex tb protection concepts allowing them to be used for both gas and dust applications in Zone 1/21 and 2/22 areas.

They are also suitable for installation in Ex ia/Ex ib intrinsically safe (IS) circuits in zones 0/20, 1/21 and 2/22 (see page 25 for details).

## Our ATEX / IECEx Approval Explained

| | | | | | | |
|---|---|---|---|---|---|---|
| CE | XXXX | Ex | II 2 G D | Ex d e IIC Gb | Ex tb IIIC Db | 2020 |
| CE | XXXX | Ex | II 1 G D | Ex ia IIC Ga | Ex ia IIIC Da | 2020 |

**CE Mark**

**Notified Body**

**EC Mark**

Denotes **equipment group, category** and **environment**. Our sensors and feedthroughs are designated non-mining and suitable for use up to zone 0 (gas) and zone 21 (dust).

**Approval for Gas Applications:**

Denotes **type of protection, gas group** and **protection level**. The sensors and feedthroughs meet the requirements of flameproof, increased safety and intrinsically safe protection types with gas group IIC (Acetylene, Hydrogen).

Ga protection level denotes suitability for Zones 0, 1 and 2 use.

**Approval for Dust Applications:**

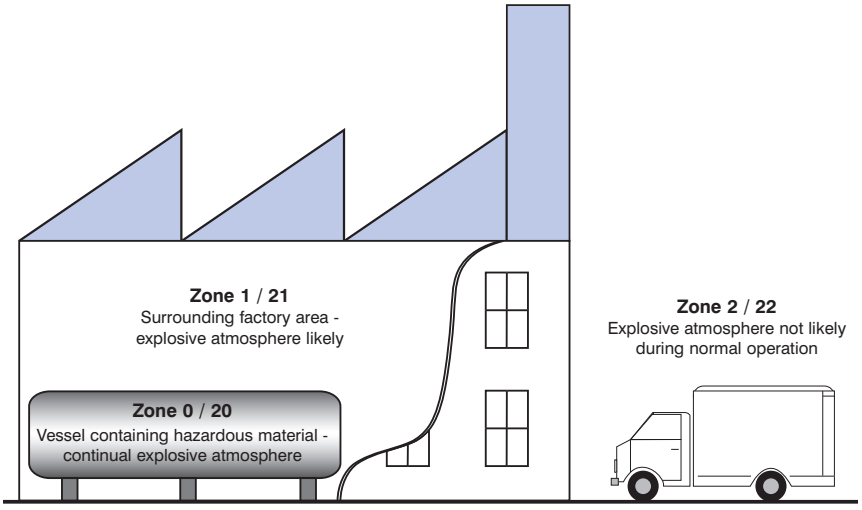
Denotes **type of protection, dust group** and **protection level**. The protection type is enclosure.

The fittings protect against combustible dusts (including conductive materials).

Db protection level denotes suitability for Zones 21 & 22 use.

**Year of manufacture**

## Typical ATEX / IECEx Zone Diagram



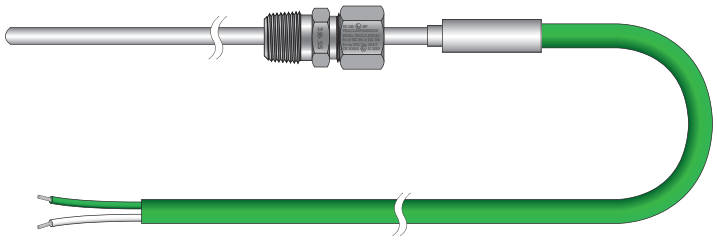
# ATEX / IECEx Temperature Sensors and Accessories

# ATEX / IECEx Thermocouples with Pot Seal

## Mineral Insulated Thermocouples 1.0mm to 3.0mm dia.

Our ATEX / IECEx mineral insulated thermocouple assemblies are manufactured from cable that conforms to IEC 61515 and their semi rigid construction allows them to be bent and formed to suit particular applications without impairing performance. An adjustable threaded compression fitting is required to achieve approval.

- **Approved to II 2 GD Ex d IIC Gb (Gas) and Ex tb IIIC Db (Dust)**
- **Also suitable for use in intrinsically safe areas to Ex II 1 GD Ex ia IIC Ga/IIC Da, see page 25 for details**
- **Temperature classification T6-T1, see page 26 for stand-off requirements**
- **Available in thermocouple types K, T, J, N, E, R, S and B**
- **Sheath diameters from 1.0mm to 3.0mm in a wide choice of materials**
- **Insulated measuring junction gives a floating output with high insulation resistance**
- **PVC or PFA insulated twisted extension cables. Other cables available.**
- **UKAS calibration available**



*The above sensor must be installed using the compression fitting supplied to maintain Ex d / Ex tb approval. For Ex ia applications a compression fitting is not required to maintain approval*

Also available with EAC Ex approval

| SECTION 1 | Thermocouple Type | Temperature Range (continuous) |
|---|---|---|
| K | Nickel Chromium vs Nickel Aluminium | 0°C to +1100°C |
| T | Copper vs Constantan | -185°C to +400°C |
| J | Iron vs Constantan | +50°C to +800°C |
| N | Nicrosil vs Nisil | 0°C to +1200°C |
| E | Nickel Chromium vs Constantan | 0°C to +800°C |
| R | Platinum - 13% Rhodium vs Platinum | 0°C to +1600°C |
| S | Platinum - 10% Rhodium vs Platinum | 0°C to +1550°C |
| B | Platinum - 30% Rhodium vs Platinum - 6% Rhodium | +100°C to +1600°C |

| SECTION 2 | Sheath Material | Operational Properties | Maximum Temperature |
|---|---|---|---|
| 321 | 321 Stainless Steel (Types K, J, T & E) | Very good corrosion resistance throughout the operating temperature range. Suited to a wide range of industrial applications. Enjoys high ductility. | 800°C |
| 310 | 310 Stainless Steel (Type K) | Good high temperature corrosion resistance and suitable for use in sulphur bearing atmospheres. Has high oxidisation resistance which is maintained if subsequent manipulation is strictly limited. | 1100°C |
| 600 | Inconel 600 (Types K, N, R, S & B) | Suitable for use in severely corrosive atmospheres to elevated temperatures. Enjoys a good resistance to oxidation. Type R, S or B thermocouples with an Inconel 600 sheath are not recommended for use above 800°C. Do not use in sulphur bearing atmospheres above 550°C. | 1100°C |
| 114 | Nicrobell D (Types K & N) | Recommended for use with high temperature type 'K' and most type 'N' applications. Very good high temperature strength. Excellent performance in oxidising, carburising, reducing and vacuum atmospheres. Do not use in sulphur containing atmospheres. | 1250°C |
| 156 | Hastelloy X (Type K) | Improved high temperature resistance to oxidation and attack by sulphur. Retains excellent tensile strength at high temperatures. This sheath is applicable to reducing neutral and inert atmospheres. Develops a tightly adherent oxide film which does not spall at high temperatures. | 1220°C |
| 446 | AISI 446 (Type K) | Suitable for use in severely corrosive atmospheres to elevated temperatures. Particularly suited for use in high concentration sulphur bearing atmospheres at high temperature. ** Should be mounted vertically at temperatures above 700°C.* | 1150°C |
| 800 | Incoloy 800 (Type K) | Suitable for use in severely corrosive atmospheres to elevated temperatures. Enjoys a good resistance to oxidation and carburisation. Resistant to sulphur bearing atmospheres. | 1100°C |

| SECTION 3 | Sheath Diameter (mm) | Sheath Diameter (inches) |
|---|---|---|
| Standard Sizes | 1.0mm | 0.039" |
| | 1.5mm | 0.059" |
| | 2.0mm | 0.079" |
| | 3.0mm | 0.118" |

| SECTION 4 | Type of Sensing Junction | |
|---|---|---|
| 2I<br>2ID<br>2IT |  | **INSULATED**<br>The hot (measuring) junction is insulated from the sheath and this gives a floating output with a typical insulation resistance in excess of 100 megohms.<br><br>Enter **2I** for simplex, **2ID** for duplex or **2IT** if a triplex element is required. |

| SECTION 5 | Extension Cables (please specify length in metres) | |
|---|---|---|
| A82 | PVC Insulation (105ºC) (Termination: 3P2L seal, temperature rating **90ºC**) |  |
| B55 | PFA Insulation (250ºC) (Termination: 3P2LA seal, temperature rating **230ºC**) |  |

** All cables have 7/0.2mm conductors. If no cable is required, leave this section of the order code blank and the sensor will be supplied with 50mm PTFE 'tails'.*

| SECTION 6 | Stainless Steel Adjustable Compression Fittings | | |
|---|---|---|---|
| Dia. | 1/8" BSPT | 1/4" BSPT | 1/2" BSPT |
| 1.0mm | SFS18T10EX | SFS14T10EX | – |
| 1.5mm | SFS18T15EX | SFS14T15EX | – |
| 2.0mm | SFS18T20EX | SFS14T20EX | – |
| 3.0mm | SFS18T30EX | SFS14T30EX | SFS12T30EX |

*Other thread sizes are available - please see page 14 for details.*

**Order Code** - Example

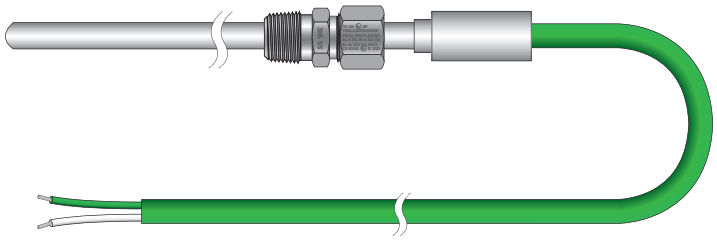
| Type Nº | I.S. Version (Optional, please see page 25 for details) | Thermocouple Type (See section 1) | Sheath Length in mm | Sheath Material (See section 2) | Sheath Diameter (See section 3) | Sensing Junction (See section 4) | Termination (Pot seal, see section 5) | Extension Cable (See section 5) | Compression Fitting (See section 6) |
|---|---|---|---|---|---|---|---|---|---|
| 52 | IS | K | 450 | 321 | 3.0 | 2I | 3P2L | 2m A82KX | SFS14T30EX |

# ATEX / IECEx Thermocouples with Pot Seal

## Mineral Insulated Thermocouples 4.5mm to 8.0mm dia.

Our ATEX / IECEx mineral insulated thermocouple assemblies are manufactured from cable that conforms to IEC 61515 and their semi rigid construction allows them to be bent and formed to suit particular applications without impairing performance. An adjustable threaded compression fitting is required to achieve approval.

- **Approved to II 2 GD Ex d IIC Gb (Gas) and Ex tb IIIC Db (Dust)**
- **Also suitable for use in intrinsically safe areas to Ex II 1 GD Ex ia IIC Ga/IIIC Da, see page 25 for details**
- **Temperature classification T6-T1, see page 26 for stand-off requirements**
- **Available in thermocouple types K, T, J, N, E, R, S and B**
- **Sheath diameters from 4.5mm to 8.0mm in a wide choice of materials**
- **Insulated measuring junction gives a floating output with high insulation resistance**
- **PVC or PFA insulated twisted extension cables. Other cables available.**
- **UKAS calibration available**



*The above sensor must be installed using the compression fitting supplied to maintain Ex d / Ex tb approval. For Ex ia applications a compression fitting is not required to maintain approval*

Also available with EAC Ex approval

| SECTION 1 | Thermocouple Type | Temperature Range (continuous) |
|---|---|---|
| K | Nickel Chromium vs Nickel Aluminium | 0°C to +1100°C |
| T | Copper vs Constantan | -185°C to +400°C |
| J | Iron vs Constantan | +50°C to +800°C |
| N | Nicrosil vs Nisil | 0°C to +1200°C |
| E | Nickel Chromium vs Constantan | 0°C to +800°C |
| R | Platinum - 13% Rhodium vs Platinum | 0°C to +1600°C |
| S | Platinum - 10% Rhodium vs Platinum | 0°C to +1550°C |
| B | Platinum - 30% Rhodium vs Platinum - 6% Rhodium | +100°C to +1600°C |

| SECTION 2 | Sheath Material | Operational Properties | Maximum Temperature |
|---|---|---|---|
| 321 | 321 Stainless Steel (Types K, J, T & E) | Very good corrosion resistance throughout the operating temperature range. Suited to a wide range of industrial applications. Enjoys high ductility. | 800°C |
| 310 | 310 Stainless Steel (Type K) | Good high temperature corrosion resistance and suitable for use in sulphur bearing atmospheres. Has high oxidisation resistance which is maintained if subsequent manipulation is strictly limited. | 1100°C |
| 600 | Inconel 600 (Types K, N, R, S & B) | Suitable for use in severely corrosive atmospheres to elevated temperatures. Enjoys a good resistance to oxidation. Type R, S or B thermocouples with an Inconel 600 sheath are not recommended for use above 800°C. Do not use in sulphur bearing atmospheres above 550°C. | 1100°C |
| 114 | Nicrobell D (Types K & N) | Recommended for use with high temperature type 'K' and most type 'N' applications. Very good high temperature strength. Excellent performance in oxidising, carburising, reducing and vacuum atmospheres. Do not use in sulphur containing atmospheres. | 1250°C |
| 156 | Hastelloy X (Type K) | Improved high temperature resistance to oxidation and attack by sulphur. Retains excellent tensile strength at high temperaturess. This sheath is applicable to reducing neutral and inert atmospheres. Develops a tightly adherent oxide film which does not spall at high temperatures. | 1220°C |
| 446 | AISI 446 (Type K) | Suitable for use in severely corrosive atmospheres to elevated temperatures. Particularly suited for use in high concentration sulphur bearing atmospheres at high temperature. ** Should be mounted vertically at temperatures above 700°C.* | 1150°C |
| 800 | Incoloy 800 (Type K) | Suitable for use in severely corrosive atmospheres to elevated temperatures. Enjoys a good resistance to oxidation and carburisation. Resistant to sulphur bearing atmospheres. | 1100°C |

| SECTION 3 | Sheath Diameter (mm) | Sheath Diameter (inches) |
|---|---|---|
| Standard Sizes | 4.5mm | 0.177" |
| | 6.0mm | 0.236" |
| | 8.0mm | 0.315" |

| SECTION 4 | Type of Sensing Junction | |
|---|---|---|
| 2I<br>2ID<br>2IT |  | **INSULATED**<br>The hot (measuring) junction is insulated from the sheath and this gives a floating output with a typical insulation resistance in excess of 100 megohms.<br><br>Enter **2I** for simplex, **2ID** for duplex or **2IT** if a triplex element is required. |

| SECTION 5 | Extension Cables (please specify length in metres) |
|---|---|
| A82 | PVC Insulation (105ºC) (Termination: 3P4CL seal, temperature rating **90ºC**)  |
| B55 | PFA Insulation (250ºC) (Termination: 3P4CLA seal, temperature rating **230ºC**)  |

** All cables have 7/0.2mm conductors. If no cable is required, leave this section of the order code blank and the sensor will be supplied with 50mm PTFE 'tails'.*

| SECTION 6 | Stainless Steel Adjustable Compression Fittings | | |
|---|---|---|---|
| Dia. | 1/8" BSPT | 1/4" BSPT | 1/2" BSPT |
| 4.5mm | SFS18T45EX | SFS14T45EX | SFS12T45EX |
| 6.0mm | SFS18T60EX | SFS14T60EX | SFS12T60EX |
| 8.0mm | – | SFS14T80EX | SFS12T80EX |

*Other thread sizes are available - please see page 14 for details.*

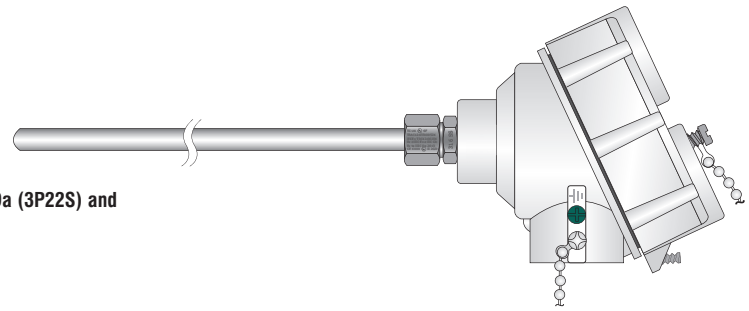
**Order Code** - Example

| Type Nº | I.S. Version (Optional, please see page 25 for details) | Thermocouple Type (See section 1) | Sheath Length in mm | Sheath Material (See section 2) | Sheath Diameter (See section 3) | Sensing Junction (See section 4) | Termination (Pot seal, see section 5) | Extension Cable (See section 5) | Compression Fitting (See section 6) |
|---|---|---|---|---|---|---|---|---|---|
| 52 | - IS | - J | - 450 | - 321 | - 6.0 | - 2I | - 3P4CLA | - 2m B55JX | - SFS12T60EX |

# ATEX / IECEx Thermocouples with Terminal Head

## Mineral Insulated Thermocouples 4.5mm to 8.0mm dia.

These semi rigid thermocouples are supplied with an IP68 terminal head and are ideal where a heavy duty connection with cable is to be made near the sensor. They can be used with service temperatures up to 1250ºC (minimum stand-off lengths shown on page 26 must be observed).



- **Approved to II 2 GD Ex d IIC Gb (Gas) and Ex tb IIIC Db (Dust)**
- **Also suitable for use in intrinsically safe areas to Ex II 1 GD Ex ia IIC Ga/IIIC Da (3P22S) and Ex II 2 GD Ex ib IIC Gb/IIIC Db (3P22/3P27), see page 25**
- **Temperature classification T6-T1, see page 26 for stand-off requirements**
- **Available in thermocouple types K, T, J, N, E, R, S and B**
- **Sheath diameters from 4.5mm to 8.0mm in a wide choice of materials**
- **Insulated measuring junction gives a floating output with high insulation resistance**
- **Die cast alloy or stainless steel terminal heads available**
- **Simplex, duplex and triplex sensors available as well UKAS calibration**

Also available with EAC Ex approval

| SECTION 1 | Thermocouple Type | Temperature Range (continuous) |
|---|---|---|
| K | Nickel Chromium vs Nickel Aluminium | 0°C to +1100°C |
| T | Copper vs Constantan | -185°C to +400°C |
| J | Iron vs Constantan | +50°C to +800°C |
| N | Nicrosil vs Nisil | 0°C to +1200°C |
| E | Nickel Chromium vs Constantan | 0°C to +800°C |
| R | Platinum - 13% Rhodium vs Platinum | 0°C to +1600°C |
| S | Platinum - 10% Rhodium vs Platinum | 0°C to +1550°C |
| B | Platinum - 30% Rhodium vs Platinum - 6% Rhodium | +100°C to +1600°C |

| SECTION 2 | Sheath Material | Maximum Temperature |
|---|---|---|
| 321 | 321 Stainless Steel (Types K, J, T & E) | 800°C |
| 310 | 310 Stainless Steel (Type K) | 1100°C |
| 600 | Inconel 600 (Types K, N, R, S & B) | 1100°C |
| 114 | Nicrobell D (Types K & N) | 1250°C |
| 156 | Hastelloy X (Type K) | 1220°C |
| 446 | AISI 446 (Type K) | 1150°C |
| 800 | Incoloy 800 (Type K) | 1100°C |

| SECTION 3 | Sheath Diameter (mm) | Sheath Diameter (inches) |
|---|---|---|
| Standard Sizes | 4.5mm | 0.177" |
| | 6.0mm | 0.236" |
| | 8.0mm | 0.315" |

### SECTION 4 — Type of Sensing Junction

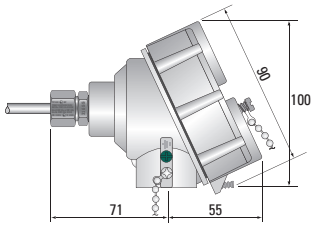
**2I**
**2ID**
**2IT**

**INSULATED**
The hot (measuring) junction is insulated from the sheath and this gives a floating output with a typical insulation resistance in excess of 100 megohms.
Enter **2I** for simplex, **2ID** for duplex or **2IT** if a triplex element is required.

### SECTION 5 — Type of Terminal Head

(supplied with an M20 cable entry as standard. Other sizes are available - see page 21 for details)

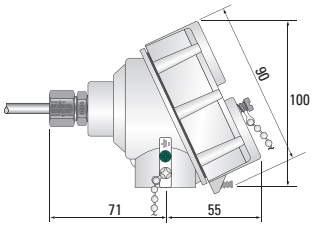
**3P22**




*Also available in blue (order code 3P22B)*

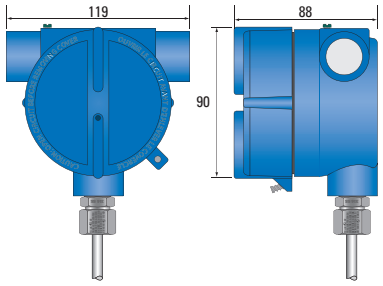
**Standard Die Cast Alloy Head**
Weatherproof and explosion proof die cast alloy terminal head with tube and cable entry at right angles to each other and ceramic terminal block. Suitable for simplex, duplex and triplex assemblies.

**3P22S**




**Standard Stainless Steel Head**
Weatherproof and explosion proof stainless steel terminal head with tube and cable entry at right angles to each other and ceramic terminal block. Suitable for simplex, duplex and triplex assemblies.

**3P27**




**Dual Cable Entry Die Cast Alloy Head**
Weatherproof and explosion proof die cast alloy terminal head for large devices with two cable entries at right angles to the tube entry and ceramic terminal block. Suitable for simplex, duplex and triplex assemblies.

### SECTION 6 — Optional Stainless Steel Adjustable Compression Fittings

| Dia. | 1/8" BSPT | 1/4" BSPT | 1/2" BSPT |
|---|---|---|---|
| 4.5mm | SFS18T45EX | SFS14T45EX | SFS12T45EX |
| 6.0mm | SFS18T60EX | SFS14T60EX | SFS12T60EX |
| 8.0mm | – | SFS14T80EX | SFS12T80EX |

*Other thread sizes are available - please see page 14 for details.*

### SECTION 7 — Optional 4 to 20mA ATEX Approved Head Mounted Transmitter

(please specify range in °C)

**TXISO/ ATEX**

*Fully Linearised*

Microprocessor based head mounted transmitter ATEX rated to Ex ia IIC T6. Fully scaleable and fully linearised for thermocouple input. The transmitter is pre-programmed to the required temperature range or, alternatively, it can be re-programmed easily by your PC using our software which should be ordered separately. Other types of transmitter are available on page 25.

### Order Code - Example

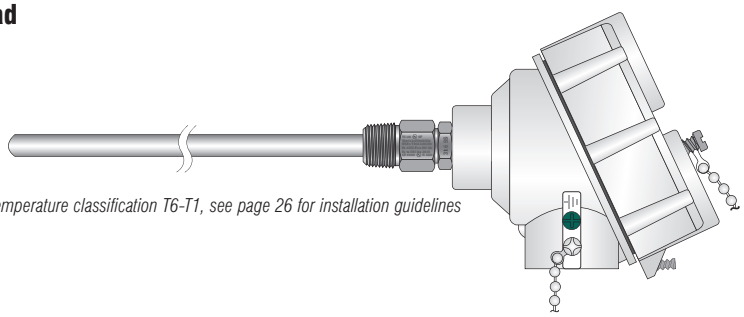
| Type Nº | I.S. Version (Optional, please see page 25 for details) | Thermocouple Type (See section 1) | Sheath Length in mm | Sheath Material (See section 2) | Sheath Diameter (See section 3) | Sensing Junction (See section 4) | Termination (See section 5) | Compression Fitting (Optional, see section 6) | Transmitter (Optional, see section 7) |
|---|---|---|---|---|---|---|---|---|---|
| 52 | - IS | - K | - 750 | - 321 | - 6.0 | - 2I | - 3P22 | - SFS14T60EX | - TXISO/ATEX(0/100°C) |

# ATEX / IECEx Thermocouples with Terminal Head

## Mineral Insulated Thermocouples with Fixed Process Thread

These semi rigid thermocouples are supplied with an IP68 terminal head and are ideal where a heavy duty connection with cable is to be made near the sensor. They can be used with service temperatures up to 1250ºC[2] (installation guidelines shown on page 26 must be observed).[1]

- **Approved to II 2 GD Ex d IIC Gb (Gas) and Ex tb IIIC Db (Dust)**
- **Also suitable for use in intrinsically safe areas to Ex II 1 GD Ex ia IIC Ga/IIIC Da (3P22S) and Ex II 2 GD Ex ib IIC Gb/IIIC Db (3P22/3P27)**
- **Fixed thread for direct process connection**
- **Available in thermocouple types K, T, J, N, E, R, S and B**
- **Sheath diameters from 4.5mm to 8.0mm in a wide choice of materials**
- **Insulated measuring junction gives a floating output with high insulation resistance**
- **Simplex, duplex and triplex sensors available as well UKAS calibration**



*Temperature classification T6-T1, see page 26 for installation guidelines*

Also available with EAC Ex approval

| SECTION 1 | Thermocouple Type | Temperature Range (continuous) |
|---|---|---|
| K | Nickel Chromium vs Nickel Aluminium | 0°C to +1100°C |
| T | Copper vs Constantan | -185°C to +400°C |
| J | Iron vs Constantan | +50°C to +800°C |
| N | Nicrosil vs Nisil | 0°C to +1200°C |
| E | Nickel Chromium vs Constantan | 0°C to +800°C |
| R | Platinum - 13% Rhodium vs Platinum | 0°C to +1600°C |
| S | Platinum - 10% Rhodium vs Platinum | 0°C to +1550°C |
| B | Platinum - 30% Rhodium vs Platinum - 6% Rhodium | +100°C to +1600°C |

| SECTION 2 | Sheath Material | Maximum Temperature |
|---|---|---|
| 321 | 321 Stainless Steel (Types K, J, T & E) | 800°C |
| 310 | 310 Stainless Steel (Type K) | 1100°C |
| 600 | Inconel 600 (Types K, N, R, S & B) | 1100°C |
| 114 | Nicrobell D (Types K & N) | 1250°C |
| 156 | Hastelloy X (Type K) | 1220°C |
| 446 | AISI 446 (Type K) | 1150°C |
| 800 | Incoloy 800 (Type K) | 1100°C |

| SECTION 3 | Sheath Diameter (mm) | Sheath Diameter (inches) |
|---|---|---|
| Standard Sizes | 4.5mm | 0.177" |
| | 6.0mm | 0.236" |
| | 8.0mm | 0.315" |

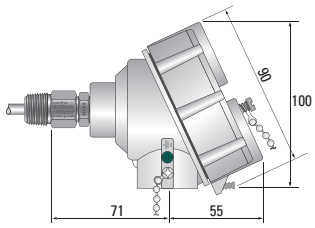
**SECTION 4 — Type of Sensing Junction**

| | |
|---|---|
| 2I<br>2ID<br>2IT | **INSULATED**<br>The hot (measuring) junction is insulated from the sheath and this gives a floating output with a typical insulation resistance in excess of 100 megohms.<br>Enter **2I** for simplex, **2ID** for duplex or **2IT** if a triplex element is required. |

**SECTION 5 — Type of Terminal Head**

(supplied with an M20 cable entry as standard. Other sizes are available - see page 21 for details)

**3P22**

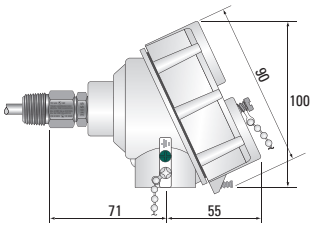



*Also available in blue (order code 3P22B)*

**Standard Die Cast Alloy Head**

Weatherproof and explosion proof die cast alloy terminal head with tube and cable entry at right angles to each other and ceramic terminal block. Suitable for simplex, duplex and triplex assemblies.

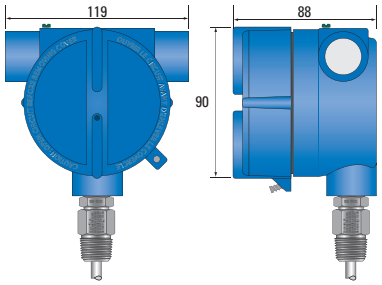
**3P22S**




**Standard Stainless Steel Head**

Weatherproof and explosion proof stainless steel terminal head with tube and cable entry at right angles to each other and ceramic terminal block. Suitable for simplex, duplex and triplex assemblies.

**3P27**




**Dual Cable Entry Die Cast Alloy Head**

Weatherproof and explosion proof die cast alloy terminal head for large devices with two cable entries at right angles to the tube entry and ceramic terminal block. Suitable for simplex, duplex and triplex assemblies.

**SECTION 6 — Process Connection Thread**

| Code | Thread Size | Code | Thread Type |
|---|---|---|---|
| 12 | 1/2" | T | BSPT |
| 34 | 3/4" | P | BSPP |
| M16 | M16 x 1.5mm | N | NPT |
| M20 | M20 x 1.5mm | M | Metric |

**SECTION 7 — Optional 4 to 20mA ATEX Approved Head Mounted Transmitter**

(please specify range in °C)

**TXISO/ATEX**

*Fully Linearised*

Microprocessor based head mounted transmitter ATEX rated to Ex ia IIC T6. Fully scaleable and fully linearised for thermocouple input. The transmitter is pre-programmed to the required temperature range or, alternatively, it can be re-programmed easily by your PC using our software which should be ordered separately. Other types of transmitter are available on page 25.

**Order Code** - Example

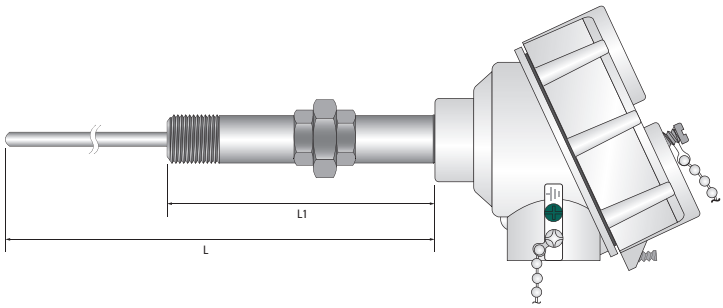
| Type Nº | I.S. Version (Optional, please see page 25 for details) | Thermocouple Type (See section 1) | Sheath Length in mm | Sheath Material (See section 2) | Sheath Diameter (See section 3) | Sensing Junction (See section 4) | Termination (See section 5) | Process Connection (See section 6) | Transmitter (Optional, see section 7) |
|---|---|---|---|---|---|---|---|---|---|
| 52 | - IS | - K | - 750 | - 321 | - 6.0 | - 2I | - 3P22 | - 12T | - TXISO/ATEX(0/100°C) |

*Notes (1)Sensor design shall be assessed by method (b) of our installation guidelines on page 26 as no stand-off is available.*
*(2) Maximum service temperature of terminal head end seals is 60ºC*

# ATEX / IECEx Spring Loaded Thermocouples

## Mineral Insulated Thermocouples 3.0mm to 8.0mm dia.

These semi rigid spring loaded thermocouples are supplied with an IP68 terminal head and threaded flameproof extension and are ideal for installation in thermowell pockets and where good contact with the process is required.They can be used with service temperatures up to 1250ºC (minimum stand-off lengths shown on page 26 must be observed).




- **Approved to II 2 GD Ex d IIC Gb (Gas) and Ex tb IIIC Db (Dust)**
- **Also suitable for use in intrinsically safe areas to Ex II 1 GD Ex ia IIC Ga/IIIC Da (3P22S) and Ex II 2 GD Ex ib IIC Gb/IIIC Db (3P22/3P27)**
- **Temperature classification T6-T1, see page 26 for stand-off requirements**
- **Available in thermocouple types K, T, J, N, E, R, S and B**
- **Sheath diameters from 3.0mm to 8.0mm in a wide choice of materials**
- **Insulated measuring junction gives a floating output with high insulation resistance**
- **Spring loaded thermocouple insert with wide choice of process connections**
- **UKAS calibration available**

Also available with EAC Ex approval

| SECTION 1 | Thermocouple Type | Temperature Range (continuous) |
|---|---|---|
| K | Nickel Chromium vs Nickel Aluminium | 0°C to +1100°C |
| T | Copper vs Constantan | -185°C to +400°C |
| J | Iron vs Constantan | +50°C to +800°C |
| N | Nicrosil vs Nisil | 0°C to +1200°C |
| E | Nickel Chromium vs Constantan | 0°C to +800°C |
| R | Platinum - 13% Rhodium vs Platinum | 0°C to +1600°C |
| S | Platinum - 10% Rhodium vs Platinum | 0°C to +1550°C |
| B | Platinum - 30% Rhodium vs Platinum - 6% Rhodium | +100°C to +1600°C |

| SECTION 2 | Sheath Material | Maximum Temperature |
|---|---|---|
| 321 | 321 Stainless Steel (Types K, J, T & E) | 800°C |
| 310 | 310 Stainless Steel (Type K) | 1100°C |
| 600 | Inconel 600 (Types K, N, R, S & B) | 1100°C |
| 114 | Nicrobell D (Types K & N) | 1250°C |
| 156 | Hastelloy X (Type K) | 1220°C |
| 446 | AISI 446 (Type K) | 1150°C |
| 800 | Incoloy 800 (Type K) | 1100°C |

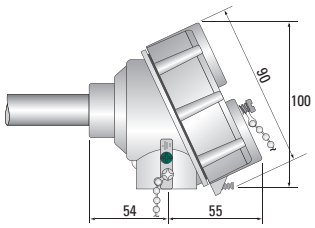
| SECTION 3 | Sheath Diameter (mm) | Sheath Diameter (inches) |
|---|---|---|
| Standard Sizes | 3.0mm | 0.177" |
| | 4.5mm | 0.118" |
| | 6.0mm | 0.236" |
| | 8.0mm | 0.315" |

| SECTION 4 | Type of Sensing Junction | |
|---|---|---|
| 2I<br>2ID<br>2IT |  | **INSULATED**<br>The hot (measuring) junction is insulated from the sheath and this gives a floating output with a typical insulation resistance in excess of 100 megohms.<br>Enter **2I** for simplex, **2ID** for duplex or **2IT** if a triplex element is required. |

## SECTION 5 — Type of Terminal Head

(supplied with an M20 cable entry as standard. Other sizes are available - see page 21 for details)

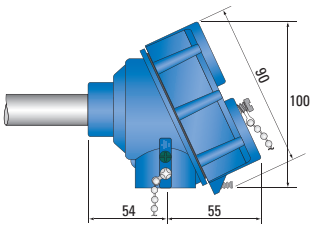
**3P22**




*Also available in blue (order code CE22B)*

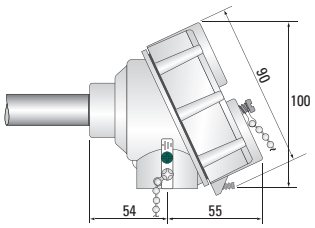
**Standard Die Cast Alloy Head**
Weatherproof and explosion proof die cast alloy terminal head with tube and cable entry at right angles to each other and ceramic terminal block. Suitable for simplex, duplex and triplex assemblies.

**3P22B**



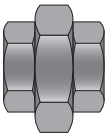

**Standard Die Cast Alloy Head (Blue)**
Weatherproof and explosion proof die cast alloy terminal head with tube and cable entry at right angles to each other and ceramic terminal block. Suitable for simplex, duplex and triplex assemblies.

**3P22S**




**Standard Stainless Steel Head**
Weatherproof and explosion proof stainless steel terminal head with tube and cable entry at right angles to each other and ceramic terminal block. Suitable for simplex, duplex and triplex assemblies.

| SECTION 6 | Process Connection Thread |
|---|---|
| Code | Thread Size |
| 12T | 1/2" BSPT |
| 12P | 1/2" BSPP |
| 12N | 1/2" NPT |
| M20 | M20 x 1.5mm |

| SECTION 7 | Optional (Rotating Union) Fitting | |
|---|---|---|
| RUSS |  | Stainless steel rotating union to allow positioning of the terminal head. |

| SECTION 8 | Optional 4 to 20mA ATEX Approved Head Mounted Transmitter (please specify range in °C) | |
|---|---|---|
| TXISO/ ATEX |  *Fully Linearised* | Microprocessor based head mounted transmitter ATEX rated to Ex ia IIC T6. Fully scaleable and fully linearised for thermocouple input. The transmitter is pre-programmed to the required temperature range or, alternatively, it can be re-programmed easily by your PC using our software which should be ordered separately. Other types of transmitter are available on page 25. |

**Order Code** - Example

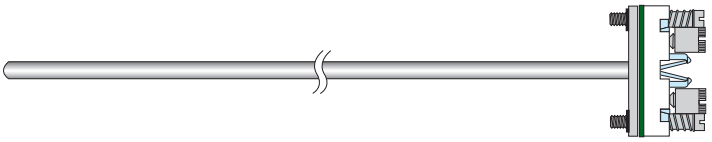
| Type Nº | I.S. Version (Optional, please see page 25 for details) | Thermocouple Type (See section 1) | Length 'L' (See diagram) | Sheath Material (See section 2) | Sheath Diameter (See section 3) | Sensing Junction (See section 4) | Termination (See section 5) | Length 'L1' (See diagram) | Process Thread (See section 6) | Rotating Union Fitting (Optional, see section 7) | Transmitter (Optional, see section 8) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 53 | - IS | - K | - 300 | - 321 | - 6.0 | - 2I | - 3P22 | - 150 | - 12P | - RUSS | - TXISO/ATEX(0/100°C) |

# ATEX / IECEx Thermocouples with DIN Terminal Block

## Mineral Insulated Thermocouples 6.0mm to 8.0mm dia.

Our ATEX / IECEx intrinsically safe mineral insulated thermocouple insert assemblies are manufactured from cable that conforms to IEC 61515 and their semi rigid construction allows them to be bent and formed to suit particular applications without impairing performance.

- **Approved to II 1 GD Ex ia IIC Ga (Gas) and Ex ia IIIC Da (Dust)**
- **High integrity construction suited to arduous operating conditions**
- **High accuracy and stability maintained throughout operating life**
- **Available in thermocouple types K, T, J, N, E, R, S and B**
- **Sheath diameters from 6.0mm to 8.0mm in a wide choice of materials**
- **Insulated measuring junction gives a floating output with high insulation resistance**
- **Spring loaded thermocouple insert for connection to a standard DIN terminal head (33mm centres)**
- **Simplex, duplex and triplex sensors available**
- **UKAS calibration available**



*The above sensor must be terminated in a suitable ATEX / IECEx approved enclosure or box using appropriate glands*

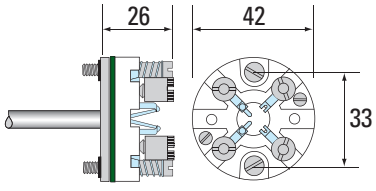
Also available with EAC Ex approval

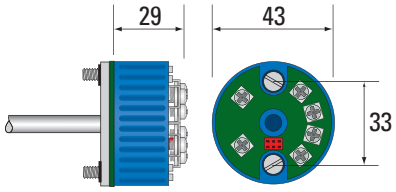
| SECTION 1 | Thermocouple Type | Temperature Range (continuous) |
|---|---|---|
| K | Nickel Chromium vs Nickel Aluminium | 0°C to +1100°C |
| T | Copper vs Constantan | -185°C to +400°C |
| J | Iron vs Constantan | +50°C to +800°C |
| N | Nicrosil vs Nisil | 0°C to +1200°C |
| E | Nickel Chromium vs Constantan | 0°C to +800°C |
| R | Platinum - 13% Rhodium vs Platinum | 0°C to +1600°C |
| S | Platinum - 10% Rhodium vs Platinum | 0°C to +1550°C |
| B | Platinum - 30% Rhodium vs Platinum - 6% Rhodium | +100°C to +1600°C |

| SECTION 2 | Sheath Material | Operational Properties | Maximum Temperature |
|---|---|---|---|
| 321 | 321 Stainless Steel (Types K, J, T & E) | Very good corrosion resistance throughout the operating temperature range. Suited to a wide range of industrial applications. Enjoys high ductility. | 800°C |
| 310 | 310 Stainless Steel (Type K) | Good high temperature corrosion resistance and suitable for use in sulphur bearing atmospheres. Has high oxidisation resistance which is maintained if subsequent manipulation is strictly limited. | 1100°C |
| 600 | Inconel 600 (Types K, N, R, S & B) | Suitable for use in severely corrosive atmospheres to elevated temperatures. Enjoys a good resistance to oxidation. Type R, S or B thermocouples with an Inconel 600 sheath are not recommended for use above 800°C. Do not use in sulphur bearing atmospheres above 550°C. | 1100°C |
| 114 | Nicrobell D (Types K & N) | Recommended for use with high temperature type 'K' and most type 'N' applications. Very good high temperature strength. Excellent performance in oxidising, carburising, reducing and vacuum atmospheres. Do not use in sulphur containing atmospheres. | 1250°C |
| 156 | Hastelloy X (Type K) | Improved high temperature resistance to oxidation and attack by sulphur. Retains excellent tensile strength at high temperatures. This sheath is applicable to reducing neutral and inert atmospheres. Develops a tightly adherent oxide film which does not spall at high temperatures. | 1220°C |
| 446 | AISI 446 (Type K) | Suitable for use in severely corrosive atmospheres to elevated temperatures. Particularly suited for use in high concentration sulphur bearing atmospheres at high temperature. ** Should be mounted vertically at temperatures above 700°C.* | 1150°C |
| 800 | Incoloy 800 (Type K) | Suitable for use in severely corrosive atmospheres to elevated temperatures. Enjoys a good resistance to oxidation and carburisation. Resistant to sulphur bearing atmospheres. | 1100°C |

| SECTION 3 | Sheath Diameter (mm) | Sheath Diameter (inches) |
|---|---|---|
| Standard Sizes | 6.0mm | 0.236" |
| | 8.0mm | 0.315" |

| SECTION 4 | Type of Sensing Junction | |
|---|---|---|
| 2I<br>2ID<br>2IT |  | **INSULATED**<br>The hot (measuring) junction is insulated from the sheath and this gives a floating output with a typical insulation resistance in excess of 100 megohms.<br><br>Enter **2I** for simplex, **2ID** for duplex or **2IT** if a triplex element is required. |

| SECTION 5 | Terminal Block |
|---|---|
| 3P20 |  |

| SECTION 6 | Optional 4 to 20mA ATEX Approved Head Mounted Transmitter (please specify range in °C) | |
|---|---|---|
| TXISO/ ATEX |  | Microprocessor based head mounted transmitter ATEX rated to Ex ia IIC T6. Fully scaleable and fully linearised for thermocouple input. The transmitter is pre-programmed to the required temperature range or, alternatively, it can be re-programmed easily by your PC using our software which should be ordered separately. Other types of transmitter are available on request. |

**Order Code** - Example

| Type Nº | Thermocouple Type (See section 1) | Sheath Length in mm | Sheath Material (See section 2) | Sheath Diameter (See section 3) | Sensing Junction (See section 4) | Termination (See section 5) | Transmitter (Optional, see section 6) |
|---|---|---|---|---|---|---|---|
| 52 - IS | - K | - 500 | - 600 | - 6.0 | - 2I | - 3P20 | - TXISO/ATEX(0/100°C) |

# ATEX / IECEx Thermocouples with Termination Entry Gland

## Mineral Insulated Thermocouples 1.0mm to 8.0mm dia.

Our ATEX / IECEx mineral insulated thermocouple assemblies are manufactured from cable that conforms to IEC 61515 and their semi rigid construction allows them to be bent and formed to suit particular applications without impairing performance.

*Model shown is fitted with connection tails.*
*A choice of cables is also available, see section 6*
*The above sensor must be terminated in a suitable ATEX approved Enclosure or Box*

- **Approved to II 2 GD Ex d IIC Gb (Gas) and Ex tb IIIC Db (Dust)**
- **Also suitable for use in intrinsically safe areas to Ex II 1 GD Ex ia IIC Ga/IIIC Da, see page 25 for details**
- **Temperature classification T6-T1, see page 26 for stand-off requirements**
- **Available in thermocouple types K, T, J, N, E, R, S and B**
- **Sheath diameters from 1.0mm to 8.0mm in a wide choice of materials**
- **Insulated measuring junction gives a floating output with high insulation resistance**
- **Terminated in a compression gland pot seal with 50mm PTFE sleeved tails**
- **Simplex, duplex and triplex sensors available**
- **UKAS calibration available**

Also available with EAC Ex approval

| SECTION 1 | Thermocouple Type | Temperature Range (continuous) |
|---|---|---|
| K | Nickel Chromium vs Nickel Aluminium | 0°C to +1100°C |
| T | Copper vs Constantan | -185°C to +400°C |
| J | Iron vs Constantan | +50°C to +800°C |
| N | Nicrosil vs Nisil | 0°C to +1200°C |
| E | Nickel Chromium vs Constantan | 0°C to +800°C |
| R | Platinum - 13% Rhodium vs Platinum | 0°C to +1600°C |
| S | Platinum - 10% Rhodium vs Platinum | 0°C to +1550°C |
| B | Platinum - 30% Rhodium vs Platinum - 6% Rhodium | +100°C to +1600°C |

| SECTION 2 | Sheath Material | Maximum Temperature |
|---|---|---|
| 321 | 321 Stainless Steel (Types K, J, T & E) | 800°C |
| 310 | 310 Stainless Steel (Type K) | 1100°C |
| 600 | Inconel 600 (Types K, N, R, S & B) | 1100°C |
| 114 | Nicrobell D (Types K & N) | 1250°C |
| 156 | Hastelloy X (Type K) | 1220°C |
| 446 | AISI 446 (Type K) | 1150°C |
| 800 | Incoloy 800 (Type K) | 1100°C |

| SECTION 3 | Sheath Diameter (mm) | Sheath Diameter (inches) |
|---|---|---|
| Standard Sizes | 1.0mm | 0.039" |
| | 1.5mm | 0.059" |
| | 3.0mm | 0.118" |
| | 4.5mm | 0.177" |
| | 6.0mm | 0.236" |
| | 8.0mm | 0.315" |

| SECTION 4 | Type of Sensing Junction |
|---|---|
| 2I<br>2ID<br>2IT | **INSULATED**<br>The hot (measuring) junction is insulated from the sheath and this gives a floating output with a typical insulation resistance in excess of 100 megohms.<br>Enter **2I** for simplex, **2ID** for duplex or **2IT** for a triplex element. |

| SECTION 5 | Termination Entry Gland (please use code number to specify thread size and material for the sensor diameter chosen) | | |
|---|---|---|---|
| Dia. | Thread Size | Order Code for **Brass** | Order Code for **Stainless Steel** |
| 1.0mm | 16mm ISO | SFBM16-10CBEX | SFSM16-10CBEX |
| 1.5mm | 16mm ISO | SFBM16-15CBEX | SFSM16-15CBEX |
| 3.0mm | 16mm ISO | SFBM16-30CBEX | SFSM16-30CBEX |
| 4.5mm | 16mm ISO | SFBM16-45CBEX | SFSM16-45CBEX |
| 6.0mm | 16mm ISO | SFBM16-60CBEX | SFSM16-60CBEX |
| 8.0mm | 16mm ISO | SFBM16-80CBEX | SFSM16-80CBEX |
| 3.0mm | 20mm ISO | SFBM20-30CBEX | SFSM20-30CBEX |
| 4.5mm | 20mm ISO | SFBM20-45CBEX | SFSM20-45CBEX |
| 6.0mm | 20mm ISO | SFBM20-60CBEX | SFSM20-60CBEX |
| 8.0mm | 20mm ISO | SFBM20-80CBEX | SFSM20-80CBEX |

| SECTION 6 | Optional Extension Cables (please specify length in metres) |
|---|---|
| A82 | PVC Insulation (105°C) (Seal rating: 90°C) |
| B55 | PFA Insulation (250°C) (Seal rating: 230°C) |
| C40 | Fibreglass Insulation (480°C) (Seal rating: 260°C) |

** All cables have 7/0.2mm conductors. If no cable is required, leave this section of the order code blank and the sensor will be supplied with 50mm PTFE 'tails' .*

| SECTION 7 | Optional Stainless Steel Adjustable Compression Fittings | | |
|---|---|---|---|
| Dia. | 1/8" BSPT | 1/4" BSPT | 1/2" BSPT |
| 1.0mm | SFS18T10EX | SFS14T10EX | – |
| 1.5mm | SFS18T15EX | SFS14T15EX | – |
| 3.0mm | SFS18T30EX | SFS14T30EX | SFS12T30EX |
| 4.5mm | SFS18T45EX | SFS14T45EX | SFS12T45EX |
| 6.0mm | SFS18T60EX | SFS14T60EX | SFS12T60EX |
| 8.0mm | – | SFS14T80EX | SFS12T80EX |

*Other thread sizes are available - please see page 14 for details.*

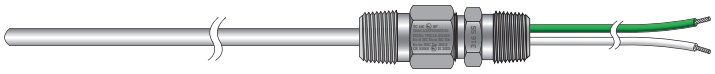
**Order Code** - Example

| Type Nº | I.S. Version (Optional, please see page 25 for details) | Thermocouple Type (See section 1) | Sheath Length in mm | Sheath Material (See section 2) | Sheath Diameter (See section 3) | Sensing Junction (See section 4) | Termination (See section 5) | Extension Cable (Optional, see section 6) | Compression Fitting (Optional, see section 7) |
|---|---|---|---|---|---|---|---|---|---|
| 52 | IS | K | 500 | 321 | 3.0 | 2I | SFSM1630CBEX | 2m A82KX | SFS14T30EX |

# ATEX / IECEx Thermocouples with Termination Entry Gland

## Mineral Insulated Thermocouples 1.0mm to 8.0mm dia.

Our ATEX / IECEx mineral insulated thermocouple assemblies are manufactured from cable that conforms to IEC 61515 and their semi rigid construction allows them to be bent and formed to suit particular applications without impairing performance.



*Model shown is fitted with connection tails.*
*A choice of cables is also available, see section 6*
*The above sensor must be terminated in a suitable ATEX approved Enclosure or Box*

- **Approved to II 2 GD Ex d IIC Gb (Gas) and Ex tb IIIC Db (Dust)**
- **Also suitable for use in intrinsically safe areas to Ex II 1 GD Ex ia IIC Ga/IIIC Da, see page 25 for details**
- **Temperature classification T6-T1, see page 26 for stand-off requirements**
- **Available in thermocouple types K, T, J, N, E, R, S and B**
- **Sheath diameters from 1.0mm to 8.0mm in a wide choice of materials**
- **Insulated measuring junction gives a floating output with high insulation resistance**
- **Terminated in a compression gland pot seal with threaded process entry and 50mm PTFE sleeved tails**
- **Simplex, duplex and triplex sensors available**
- **UKAS calibration available**

Also available with EAC Ex approval

| SECTION 1 | Thermocouple Type | Temperature Range (continuous) |
|---|---|---|
| K | Nickel Chromium vs Nickel Aluminium | 0°C to +1100°C |
| T | Copper vs Constantan | -185°C to +400°C |
| J | Iron vs Constantan | +50°C to +800°C |
| N | Nicrosil vs Nisil | 0°C to +1200°C |
| E | Nickel Chromium vs Constantan | 0°C to +800°C |
| R | Platinum - 13% Rhodium vs Platinum | 0°C to +1600°C |
| S | Platinum - 10% Rhodium vs Platinum | 0°C to +1550°C |
| B | Platinum - 30% Rhodium vs Platinum - 6% Rhodium | +100°C to +1600°C |

| SECTION 2 | Sheath Material | Maximum Temperature |
|---|---|---|
| 321 | 321 Stainless Steel (Types K, J, T & E) | 800°C |
| 310 | 310 Stainless Steel (Type K) | 1100°C |
| 600 | Inconel 600 (Types K, N, R, S & B) | 1100°C |
| 114 | Nicrobell D (Types K & N) | 1250°C |
| 156 | Hastelloy X (Type K) | 1220°C |
| 446 | AISI 446 (Type K) | 1150°C |
| 800 | Incoloy 800 (Type K) | 1100°C |

| SECTION 3 | Sheath Diameter (mm) | Sheath Diameter (inches) |
|---|---|---|
| Standard Sizes | 1.0mm | 0.039" |
| | 1.5mm | 0.059" |
| | 3.0mm | 0.118" |
| | 4.5mm | 0.177" |
| | 6.0mm | 0.236" |
| | 8.0mm | 0.315" |

| SECTION 4 | Type of Sensing Junction |
|---|---|
| 2I<br>2ID<br>2IT | **INSULATED**<br>The hot (measuring) junction is insulated from the sheath and this gives a floating output with a typical insulation resistance in excess of 100 megohms.<br>Enter **2I** for simplex, **2ID** for duplex or **2IT** for a triplex element. |

| SECTION 5 | Termination Entry Gland (please use code number to specify thread size and material for the sensor diameter chosen) | | |
|---|---|---|---|
| Dia. | Thread Size | Order Code for **Brass** | Order Code for **Stainless Steel** |
| 1.0mm | 16mm ISO | SFBM16-10CBEX | SFSM16-10CBEX |
| 1.5mm | 16mm ISO | SFBM16-15CBEX | SFSM16-15CBEX |
| 3.0mm | 16mm ISO | SFBM16-30CBEX | SFSM16-30CBEX |
| 4.5mm | 16mm ISO | SFBM16-45CBEX | SFSM16-45CBEX |
| 6.0mm | 16mm ISO | SFBM16-60CBEX | SFSM16-60CBEX |
| 8.0mm | 16mm ISO | SFBM16-80CBEX | SFSM16-80CBEX |
| 3.0mm | 20mm ISO | SFBM20-30CBEX | SFSM20-30CBEX |
| 4.5mm | 20mm ISO | SFBM20-45CBEX | SFSM20-45CBEX |
| 6.0mm | 20mm ISO | SFBM20-60CBEX | SFSM20-60CBEX |
| 8.0mm | 20mm ISO | SFBM20-80CBEX | SFSM20-80CBEX |

| SECTION 6 | Optional Extension Cables (please specify length in metres) |
|---|---|
| A82 | PVC Insulation (105°C) (Seal rating: 90°C) |
| B55 | PFA Insulation (250°C) (Seal rating: 230°C) |
| C40 | Fibreglass Insulation (480°C) (Seal rating: 260°C) |

** All cables have 7/0.2mm conductors. If no cable is required, leave this section of the order code blank and the sensor will be supplied with 50mm PTFE 'tails' .*

| SECTION 7 | Process Connection Thread | | |
|---|---|---|---|
| Code | Thread Size | Code | Thread Type |
| 12 | 1/2" | T | BSPT |
| M16 | M16 x 1.5mm | P | BSPP |
| M20 | M20 x 1.5mm | N | NPT |
| | | M | Metric |

**Order Code** - Example

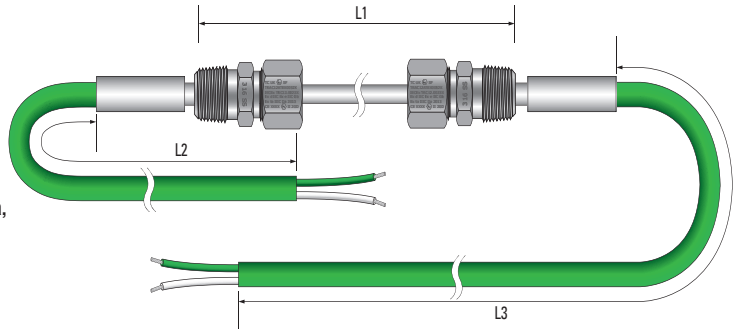
| Type Nº | I.S. Version (Optional, please see page 25 for details) | Thermocouple Type (See section 1) | Sheath Length in mm | Sheath Material (See section 2) | Sheath Diameter (See section 3) | Sensing Junction (See section 4) | Termination (See section 5) | Extension Cable (Optional, see section 6) | Process Connection (See section 7) |
|---|---|---|---|---|---|---|---|---|---|
| 52 | - IS | - K | - 500 | - 321 | - 3.0 | - 2I | - SFSM1630CBEX | - 2m A82KX | - 12T |

# ATEX / IECEx Thermocouple Feedthrough Assemblies

## Thermocouple Feedthrough Assemblies

Our ATEX / IECEx mineral insulated feedthrough assemblies are typically used to extend thermocouple signals over medium to long distances up to 120 metres. The seamless metal sheath allows installation in the most arduous conditions.

- **Approved to II 2 GD Ex d IIC Gb (Gas) and Ex tb IIIC Db (Dust)**
- **Also suitable for use in intrinsically safe areas to Ex II 1 GD Ex ia IIC Ga/IIIC Da, see page 25 for details**
- **Available in thermocouple types K, T, J, N, E, R, S and B**
- **High integrity construction suited to arduous operating conditions**
- **Sheath diameters from 1.5mm to 6.0mm in a wide choice of materials**
- **Simplex, duplex and triplex feedthroughs available**
- **PVC, PFA and fibreglass insulated extension cables. Other cables available**
- **A wide range of connection threads and sizes are available**




Also available with EAC Ex approval

| SECTION 1 | Thermocouple Type | Temperature Range (continuous) |
|---|---|---|
| K | Nickel Chromium vs Nickel Aluminium | 0°C to +1100°C |
| T | Copper vs Constantan | -185°C to +400°C |
| J | Iron vs Constantan | +50°C to +800°C |
| N | Nicrosil vs Nisil | 0°C to +1200°C |
| E | Nickel Chromium vs Constantan | 0°C to +800°C |
| R | Platinum - 13% Rhodium vs Platinum | 0°C to +1600°C |
| S | Platinum - 10% Rhodium vs Platinum | 0°C to +1550°C |
| B | Platinum - 30% Rhodium vs Platinum - 6% Rhodium | +100°C to +1600°C |

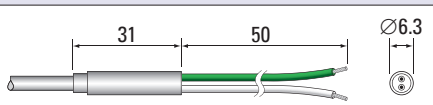
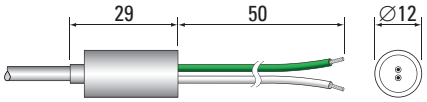
| SECTION 2 | Sheath Material | Maximum Temperature |
|---|---|---|
| 321 | 321 Stainless Steel (Types K, J, T & E) | 800°C |
| 310 | 310 Stainless Steel (Type K) | 1100°C |
| 600 | Inconel 600 (Types K, N, R, S & B) | 1100°C |
| 114 | Nicrobell D (Types K & N) | 1250°C |
| 156 | Hastelloy X (Type K) | 1220°C |
| 446 | AISI 446 (Type K) | 1150°C |
| 800 | Incoloy 800 (Type K) | 1100°C |

| SECTION 3 | Sheath Diameter (mm) | Sheath Diameter (inches) |
|---|---|---|
| Standard Sizes | 1.5mm | 0.059" |
| | 2.0mm | 0.079" |
| | 3.0mm | 0.118" |
| | 4.5mm | 0.177" |
| | 6.0mm | 0.236" |

| SECTION 4 | Number of Elements |
|---|---|
| S | Simplex (2 wire) |
| D | Duplex (4 wire) |
| T | Triplex (6 wire) |

### SECTION 5 — Pot Seal Terminations

**Standard Pot Seals**

| Temperature Rating | Dimensions | Description |
|---|---|---|
| **90ºC** for PVC cables<br>**230ºC** for PTFE and PFA cables<br>**260ºC** for fibreglass cables |  | **For sheath diameters up to 3mm.** Crimp on stainless steel pot seal potted with resin or high temperature resin. Supplied with PTFE solid tails 50mm long as standard. |
| **90ºC** for PVC cables<br>**230ºC** for PTFE and PFA cables<br>**260ºC** for fibreglass cables |  | **For sheath diameters between 3mm and 6mm.** Crimp on stainless steel pot seal potted with resin or high temperature resin. Supplied with PTFE solid tails 50mm long as standard. |

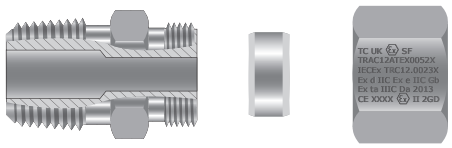
### SECTION 6 — Optional Extension Cables

(please specify length in metres)

| | | |
|---|---|---|
| A82 | PVC Insulation (105°C) |  |
| B55 | PFA Insulation (250°C) |  |
| C40 | Fibreglass Insulation (480°C) |  |

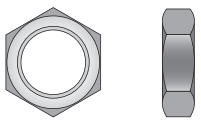
** All cables have 7/0.2mm conductors. If no cable is required, leave this section of the order code blank and the sensor will be supplied with 50mm PTFE 'tails' . Other cables are available on request, please contact us for details.*

### SECTION 7 — Stainless Steel Adjustable Compression Fittings with Counter Bore



| Code | Thread Size | Code | Thread Type |
|---|---|---|---|
| 18 | 1/8" | T | BSPT |
| 14 | 1/4" | P | BSPP |
| 12 | 1/2" | N | NPT |
| 34 | 3/4" | M | M |
| M16 | M16 x 1.5mm | | |
| M20 | M20 x 1.5mm | | |

**Optional Locknut**

| Code | Diagram |
|---|---|
| L |  |

*Only available for 'P' and 'M' threads*

### Order Code - Example

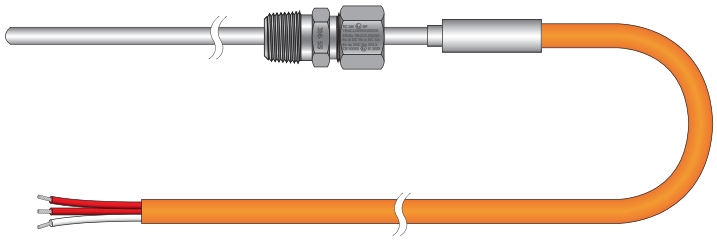
| General Details | | | | | | | Process End | | | Connection End | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Type Nº | I.S. Version (Optional, please see page 25 for details) | Thermocouple Type (See section 1) | Sheath Length 'L1' | Sheath Material (See section 2) | Sheath Diameter (See section 3) | No. of Elements (See section 4) | Cable Length 'L2' | Cable Type (See section 6) | Fitting Thread 1 (See section 7) | Cable Length 'L3' | Cable Type (See section 6) | Fitting Thread 2 (See section 7) |
| 54 | - IS - | K | - 1000 | - 600 | - 3.0 | - S | - 1m | - A82 | - 12PL | - 1m | - A82 | - 12PL |

# ATEX / IECEx RTD Pt100 Sensors with Pot Seal

## RTD Pt100 Resistance Thermometers 3.0mm to 8.0mm dia.

Our ATEX / IECEx approved flexible mineral insulated platinum resistance thermometers utilise, as standard, detector elements with a resistance of 100 ohms @ 0°C and a fundamental interval of 38.5 ohms to IEC 60751. Single and duplex elements are available. An adjustable threaded compression fitting is required to achieve approval.

- **Approved to II 2 GD Ex d IIC Gb (Gas) and Ex tb IIIC Db (Dust)**
- **Also suitable for use in intrinsically safe areas to Ex II 1 GD Ex ia IIC Ga/IIIC Da, see page 25 for details**
- **Temperature classification T6-T1, see page 26 for stand-off requirements**
- **Available in B, A, 1/3, 1/5 and 1/10 grade accuracies**
- **Sheath diameters from 3.0mm to 8.0mm**
- **PVC or PFA insulated extension cables**
- **Wide operating temperature range of -100°C to +600°C**
- **UKAS calibration available**



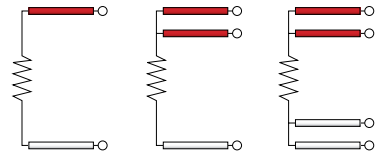
*The above sensor must be installed using the compression fitting supplied to maintain Ex d / Ex tb approval. For Ex ia applications a compression fitting is not required to maintain approval*

Also available with EAC Ex approval

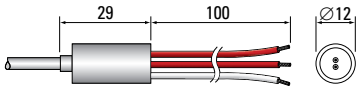
| SECTION 1 | N° of Elements |
|---|---|
| 1 | Simplex |
| 2 | Duplex |
| 3 | Triplex |

| SECTION 2 | Sheath Diameter (mm) | Sheath Diameter (inches) |
|---|---|---|
| Standard Sizes | 3.0mm | 0.118" |
| | 4.5mm | 0.177" |
| | 6.0mm | 0.236" |
| | 8.0mm | 0.315" |

| SECTION 3 | N° of Wires |
|---|---|
| 2 | 2 wire |
| 3 | 3 wire |
| 4 | 4 wire |



| SECTION 4 | Sheath Length |
|---|---|
| As Required | |

| SECTION 5 | Termination |
|---|---|
| CE4CL |  |



*Other lengths of cable available*

| SECTION 6 | Tolerance of Element (IEC 60751) | | |
|---|---|---|---|
| Grade | Accuracy @ 0°C | Accuracy @100°C | Order Code |
| B | ±0.30°C | ±0.80°C | R100 - B |
| A | ±0.15°C | ±0.35°C | R100 - A |
| 1/3 | ±0.08°C | ±0.19°C | R100 - 1/3 |
| 1/5 | ±0.05°C | ±0.15°C | R100 - 1/5 |
| 1/10 | ±0.03°C | ±0.12°C | R100 - 1/10 |

| SECTION 7 | Extension Cables (please specify length in metres) | | |
|---|---|---|---|
| RP | PVC Insulation (105°C) (Termination: CE4CL seal, temperature rating 90°C) |  | **RP37** (3-wire) |
| | | | **RP47** (4-wire) |
| | | | **RP67** (Duplex 3-wire) |
| RT | PFA Insulation (250°C) (Termination: CE4CLA seal, temperature rating 230°C) |  | **RT37** (3-wire) |
| | | | **RT47** (4-wire) |
| | | | **RT67** (Duplex 3-wire) |

* *All cables have 7/0.2mm conductors. If no cable is required, leave this section of the order code blank and the sensor will be supplied with 100mm Kapton 'tails'.*

| SECTION 8 | Stainless Steel Adjustable Compression Fittings | | |
|---|---|---|---|
| Dia. | 1/8" BSPT | 1/4" BSPT | 1/2" BSPT |
| 3.0mm | SFS18T30EX | SFS14T30EX | SFS12T30EX |
| 4.5mm | SFS18T45EX | SFS14T45EX | SFS12T45EX |
| 6.0mm | SFS18T60EX | SFS14T60EX | SFS12T60EX |
| 8.0mm | – | SFS14T80EX | SFS12T80EX |

*Other thread sizes are available - please see page 14 for details.*

**Order Code** - Example

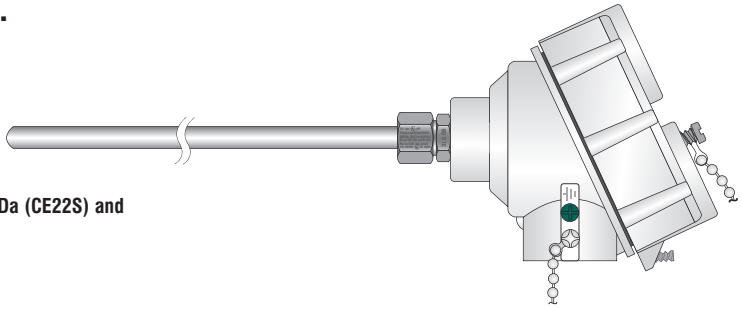
| Type N° | I.S. Version (Optional, please see page 25 for details) | N° of Elements (See section 1) | Sheath Diameter (See section 2) | N° of Wires (See section 3) | Sheath Length (mm) | Termination (See section 5) | Resistance Value of Element | Grade of Element (See section 6) | Extension Cable (See section 7) | Compression Fitting (See section 8) |
|---|---|---|---|---|---|---|---|---|---|---|
| 57 | - IS | - 1 | - 6.0 | - 3 | - 250 | - CE4CL | - R100 | - B | - 1m RP37 | - SFS12T60EX |

**Need advice**
on using our **ATEX** approved products?
Contact one of our experienced engineers on
**01895 252222**
International +44 1895 252222
or send an email to atex@tc.co.uk

# ATEX / IECEx RTD Pt100 Sensors with Terminal Head

## RTD Pt100 Resistance Thermometers 4.5mm to 8.0mm dia.

Our ATEX / IECEx approved flexible mineral insulated platinum resistance thermometers utilise, as standard, detector elements with a resistance of 100 ohms @ 0°C and a fundamental interval of 38.5 ohms to IEC 60751. Single and duplex elements are available.



- **Approved to II 2 GD Ex d IIC Gb (Gas) and Ex tb IIIC Db (Dust)**
- **Also suitable for use in intrinsically safe areas to Ex II 1 GD Ex ia IIC Ga/IIIC Da (CE22S) and Ex II 2 GD Ex ib IIC Gb/IIIC Db (CE22/CE27), see page 25**
- **Temperature classification T6-T1, see page 26 for stand-off requirements**
- **Available in B, A, 1/3, 1/5 and 1/10 grade accuracies**
- **Sheath diameters from 4.5mm to 8.0mm**
- **316 seamless stainless steel sheath (other grades/materials available)**
- **Die cast alloy or stainless steel terminal heads available**
- **Wide operating temperature range of -100°C to +600°C, UKAS calibration is also available**

IECEx Ex EAC Ex
Also available with EAC Ex approval

### SECTION 1 – N° of Elements

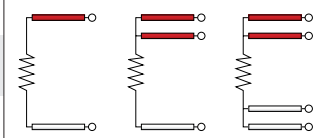
| | |
|---|---|
| 1 | Simplex |
| 2 | Duplex |
| 3 | Triplex |

### SECTION 2 – Sheath Diameter

| | Sheath Diameter (mm) | Sheath Diameter (inches) |
|---|---|---|
| Standard Sizes | 4.5mm | 0.177” |
| | 6.0mm | 0.236” |
| | 8.0mm | 0.315” |

### SECTION 3 – N° of Wires

| | |
|---|---|
| 2 | 2 wire |
| 3 | 3 wire |
| 4 | 4 wire |



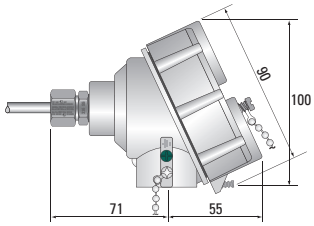
### SECTION 4 – Sheath Length

**As Required**

### SECTION 5 – Type of Terminal Head

(supplied with an M20 cable entry as standard. Other sizes are available - see page 21 for details)

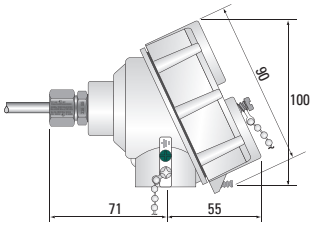
**CE22**




*Also available in blue (order code 3P22B)*

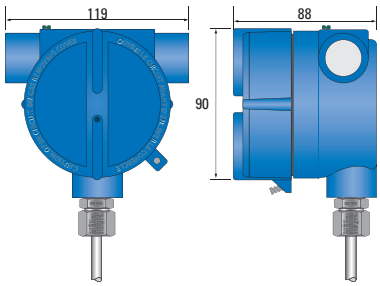
**Standard Die Cast Alloy Head**
Weatherproof and explosion proof die cast alloy terminal head with tube and cable entry at right angles to each other and ceramic terminal block. Suitable for simplex, duplex and triplex assemblies.

**CE22S**




**Standard Stainless Steel Head**
Weatherproof and explosion proof stainless steel terminal head with tube and cable entry at right angles to each other and ceramic terminal block. Suitable for simplex, duplex and triplex assemblies.

**CE27**




**Dual Cable Entry Die Cast Alloy Head**
Weatherproof and explosion proof die cast alloy terminal head for large devices with two cable entries at right angles to the tube entry and ceramic terminal block. Suitable for simplex, duplex and triplex assemblies.

### SECTION 6 – Tolerance of Element

(IEC 60751)

| Grade | Accuracy @ 0°C | Accuracy @100°C | Order Code |
|---|---|---|---|
| B | ±0.30°C | ±0.80°C | R100 - B |
| A | ±0.15°C | ±0.35°C | R100 - A |
| 1/3 | ±0.08°C | ±0.19°C | R100 - 1/3 |
| 1/5 | ±0.05°C | ±0.15°C | R100 - 1/5 |
| 1/10 | ±0.03°C | ±0.12°C | R100 - 1/10 |

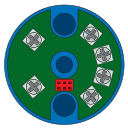
### SECTION 7 – Optional Stainless Steel Adjustable Compression Fittings

| Dia. | 1/8” BSPT | 1/4” BSPT | 1/2” BSPT |
|---|---|---|---|
| 4.5mm | SFS18T45EX | SFS14T45EX | SFS12T45EX |
| 6.0mm | SFS18T60EX | SFS14T60EX | SFS12T60EX |
| 8.0mm | – | SFS14T80EX | SFS12T80EX |

*Other thread sizes are available - please see page 14 for details.*

### SECTION 8 – Optional 4 to 20mA ATEX Approved Head Mounted Transmitter (please specify range in °C)

**TXISO/ ATEX**



*Fully Linearised*

Microprocessor based head mounted transmitter ATEX rated to Ex ia IIC T6. Fully scaleable and fully linearised for PT100 input. The transmitter is pre-programmed to the required temperature range or, alternatively, it can be re-programmed easily by your PC using our software which should be ordered separately. Other types of transmitter are available on page 25.

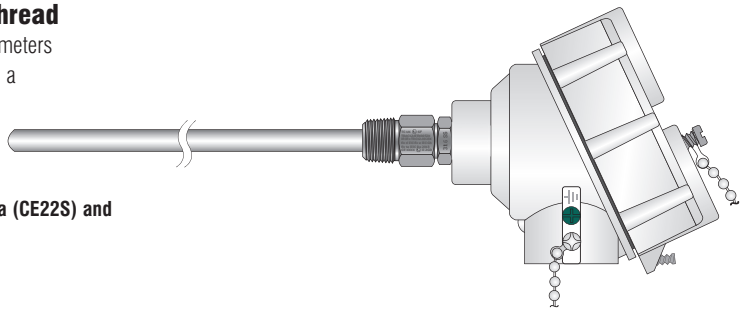
### Order Code - Example

| Type Nº | I.S. Version (Optional, please see page 25 for details) | N° of Elements (See section 1) | Sheath Diameter (See section 2) | N° of Wires (See section 3) | Sheath Length (mm) | Termination (See section 5) | Resistance Value of Element | Grade of Element (See section 6) | Compression Fitting (Optional, see section 7) | Transmitter (Optional, see section 8) |
|---|---|---|---|---|---|---|---|---|---|---|
| 57 | - IS | - 1 | - 6.0 | - 3 | - 450 | - CE22S | - R100 | - B | - SFS14T60EX | - TXISO/ATEX(0/100°C) |

# ATEX / IECEx RTD Pt100 Sensors with Terminal Head

## RTD Pt100 Resistance Thermometers with Fixed Process Thread

Our ATEX / IECEx approved flexible mineral insulated platinum resistance thermometers utilise, as standard, detector elements with a resistance of 100 ohms @ 0°C and a fundamental interval of 38.5 ohms to IEC 60751. Single and duplex elements are available.



- **Approved to II 2 GD Ex d IIC Gb (Gas) and Ex tb IIIC Db (Dust)**
- **Also suitable for use in intrinsically safe areas to Ex II 1 GD Ex ia IIC Ga/IIIC Da (CE22S) and Ex II 2 GD Ex ib IIC Gb/IIIC Db (CE22/CE27), see page 25**
- **Temperature classification T6-T1, see page 26 for stand-off requirements**
- **Available in B, A, 1/3, 1/5 and 1/10 grade accuracies**
- **Sheath diameters from 4.5mm to 8.0mm**
- **316 seamless stainless steel sheath (other grades/materials available)**
- **Die cast alloy or stainless steel terminal heads available**
- **Wide operating temperature range of -100°C to +600°C, UKAS calibration is also available**

Also available with EAC Ex approval

### SECTION 1 — N° of Elements

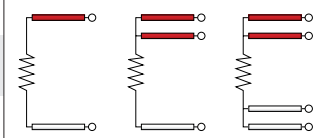
| | |
|---|---|
| 1 | Simplex |
| 2 | Duplex |
| 3 | Triplex |

### SECTION 2 — Sheath Diameter (mm) / Sheath Diameter (inches)

| | Sheath Diameter (mm) | Sheath Diameter (inches) |
|---|---|---|
| Standard Sizes | 4.5mm | 0.177" |
| | 6.0mm | 0.236" |
| | 8.0mm | 0.315" |

### SECTION 3 — N° of Wires

| | |
|---|---|
| 2 | 2 wire |
| 3 | 3 wire |
| 4 | 4 wire |



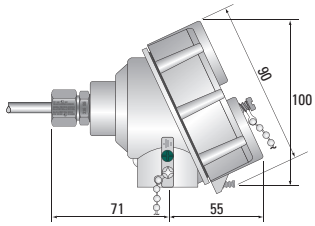
### SECTION 4 — Sheath Length

**As Required**

### SECTION 5 — Type of Terminal Head

(supplied with an M20 cable entry as standard. Other sizes are available - see page 21 for details)

**CE22**

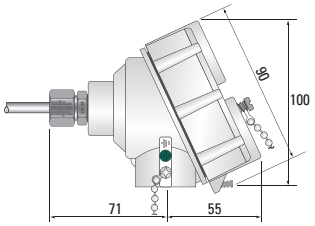



*Also available in blue (order code 3P22B)*

**Standard Die Cast Alloy Head**

Weatherproof and explosion proof die cast alloy terminal head with tube and cable entry at right angles to each other and ceramic terminal block. Suitable for simplex, duplex and triplex assemblies.

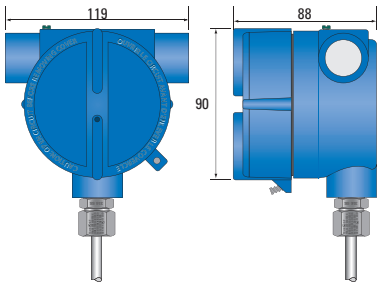
**CE22S**




**Standard Stainless Steel Head**

Weatherproof and explosion proof stainless steel terminal head with tube and cable entry at right angles to each other and ceramic terminal block. Suitable for simplex, duplex and triplex assemblies.

**CE27**




**Dual Cable Entry Die Cast Alloy Head**

Weatherproof and explosion proof die cast alloy terminal head for large devices with two cable entries at right angles to the tube entry and ceramic terminal block. Suitable for simplex, duplex and triplex assemblies.

### SECTION 6 — Tolerance of Element (IEC 60751)

| Grade | Accuracy @ 0°C | Accuracy @100°C | Order Code |
|---|---|---|---|
| B | ±0.30°C | ±0.80°C | R100 - B |
| A | ±0.15°C | ±0.35°C | R100 - A |
| 1/3 | ±0.08°C | ±0.19°C | R100 - 1/3 |
| 1/5 | ±0.05°C | ±0.15°C | R100 - 1/5 |
| 1/10 | ±0.03°C | ±0.12°C | R100 - 1/10 |

### SECTION 7 — Process Connection Thread

| Code | Thread Size | Code | Thread Type |
|---|---|---|---|
| 12 | 1/2" | T | BSPT |
| 34 | 3/4" | P | BSPP |
| M16 | M16 x 1.5mm | N | NPT |
| M20 | M20 x 1.5mm | M | Metric |

### SECTION 8 — Optional 4 to 20mA ATEX Approved Head Mounted Transmitter (please specify range in °C)

**TXISO/ATEX**

*Fully Linearised*

Microprocessor based head mounted transmitter ATEX rated to Ex ia IIC T6. Fully scaleable and fully linearised for PT100 input. The transmitter is pre-programmed to the required temperature range or, alternatively, it can be re-programmed easily by your PC using our software which should be ordered separately. Other types of transmitter are available on page 25.

### Order Code - Example

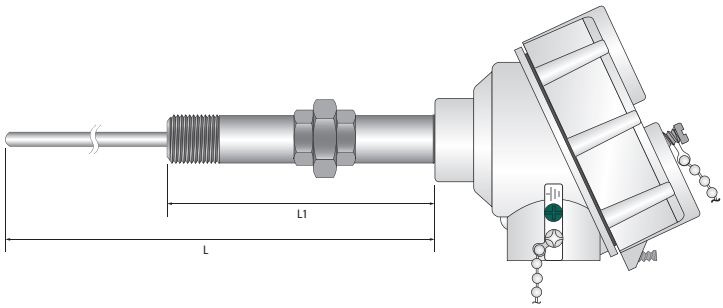
| Type N° | I.S. Version (Optional, please see page 25 for details) | N° of Elements (See section 1) | Sheath Diameter (See section 2) | N° of Wires (See section 3) | Sheath Length (mm) | Termination (See section 5) | Resistance Value of Element | Grade of Element (See section 6) | Process Connection (See section 7) | Transmitter (Optional, see section 8) |
|---|---|---|---|---|---|---|---|---|---|---|
| 57 | - IS | - 1 | - 6.0 | - 3 | - 450 | - CE22S | - R100 | - B | - 12T | - TXISO/ATEX(0/100°C) |

# ATEX / IECEx Spring Loaded RTD Pt100 Sensors

## RTD Pt100 Resistance Thermometers 3.0mm to 8.0mm dia.

These spring loaded flexible mineral insulated platinum resistance thermometers utilise, as standard, detector elements with a resistance of 100 ohms @ 0°C and a fundamental interval of 38.5 ohms to IEC 60751. The threaded flameproof extension is ideal for installation in thermowell pockets and where good contact with the process is required.

- **Approved to II 2 GD Ex d IIC Gb (Gas) and Ex tb IIIC Db (Dust)**
- **Also suitable for use in intrinsically safe areas to Ex II 1 GD Ex ia IIC Ga/IIIC Da (CE22S) and Ex II 2 GD Ex ib IIC Gb/IIIC Db (CE22/CE27)**
- **Temperature classification T6-T1, see page 26 for stand-off requirements**
- **Available in B, A, 1/3, 1/5 and 1/10 grade accuracies**
- **Sheath diameters from 3.0mm to 8.0mm**
- **316 seamless stainless steel sheath (other grades/materials available)**
- **Spring loaded RTD Pt100 insert with wide choice of process connections**
- **Wide operating temperature range of -100°C to +600°C**
- **UKAS calibration available**

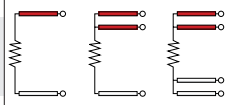



Also available with EAC Ex approval

| SECTION 1 | N° of Elements |
|---|---|
| 1 | Simplex |
| 2 | Duplex |
| 3 | Triplex |

| SECTION 2 | Sheath Dia. (mm) | Sheath Dia. (inches) |
|---|---|---|
| Standard Sizes | 3.0mm | 0.118” |
| | 4.5mm | 0.177” |
| | 6.0mm | 0.236” |
| | 8.0mm | 0.315” |

| SECTION 3 | N° of Wires |
|---|---|
| 2 | 2 wire |
| 3 | 3 wire |
| 4 | 4 wire |

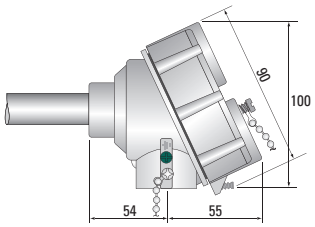


| SECTION 4 | Tolerance of Element (IEC 60751) | | |
|---|---|---|---|
| Grade | Accuracy @ 0°C | Accuracy @100°C | Order Code |
| B | ±0.30°C | ±0.80°C | R100 - B |
| A | ±0.15°C | ±0.35°C | R100 - A |
| 1/3 | ±0.08°C | ±0.19°C | R100 - 1/3 |
| 1/5 | ±0.05°C | ±0.15°C | R100 - 1/5 |
| 1/10 | ±0.03°C | ±0.12°C | R100 - 1/10 |

## SECTION 5 Type of Terminal Head

(supplied with an M20 cable entry as standard. Other sizes are available - see page 21 for details)

**CE22**

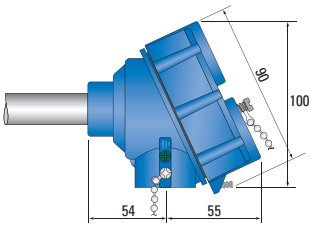



*Also available in blue (order code CE22B)*

### Standard Die Cast Alloy Head

Weatherproof and explosion proof die cast alloy terminal head with tube and cable entry at right angles to each other and ceramic terminal block. Suitable for simplex, duplex and triplex assemblies.

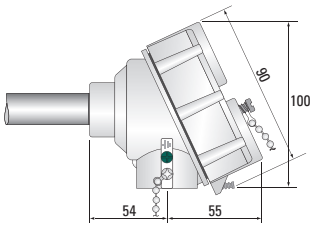
**CE22B**




### Standard Die Cast Alloy Head (Blue)

Weatherproof and explosion proof die cast alloy terminal head with tube and cable entry at right angles to each other and ceramic terminal block. Suitable for simplex, duplex and triplex assemblies.

**CE22S**



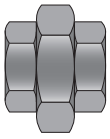

### Standard Stainless Steel Head

Weatherproof and explosion proof stainless steel terminal head with tube and cable entry at right angles to each other and ceramic terminal block. Suitable for simplex, duplex and triplex assemblies.

| SECTION 6 | Process Connection Thread |
|---|---|
| Code | Thread Size |
| 12T | 1/2” BSPT |
| 12P | 1/2” BSPP |
| 12N | 1/2” NPT |
| M20 | M20 x 1.5mm |

## SECTION 7 Optional (Rotating Union) Fitting

**RUSS**



Stainless steel rotating union to allow positioning of the terminal head.

## SECTION 8 Optional 4 to 20mA ATEX Approved Head Mounted Transmitter (please specify range in °C)

**TXISO/ ATEX**

*Fully Linearised*

Microprocessor based head mounted transmitter ATEX rated to Ex ia IIC T6. Fully scaleable and fully linearised for PT100 input. The transmitter is pre-programmed to the required temperature range or, alternatively, it can be re-programmed easily by your PC using our software which should be ordered separately. Other types of transmitter are available on page 25.

**Order Code** - Example

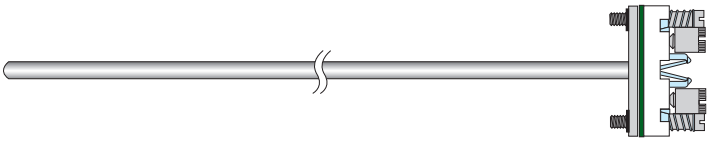
| Type N° | I.S. Version (Optional, please see page 25 for details) | N° of Elements (See section 1) | Length ‘L’ (See diagram) | Sheath Diameter (See section 2) | N° of Wires (See section 3) | Termination (See section 5) | Length ‘L1’ (See diagram) | Resistance Value of Element | Grade of Element (See section 4) | Process Thread (See section 6) | Rotating Union Fitting (Optional, see section 7) | Transmitter (Optional, see section 8) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 58 | IS | 1 | 300 | 4.5 | 3 | CE22 | 150 | R100 | B | 12P | RUSS | TXISO/ATEX(0/100°C) |

# ATEX / IECEx RTD Pt100 Sensors with Terminal Block

## RTD Pt100 Resistance Thermometers 6.0mm to 8.0mm dia.

These intrinsically safe spring loaded flexible mineral insulated platinum resistance thermometers utilise, as standard, detector elements with a resistance of 100 ohms @ 0°C and a fundamental interval of 38.5 ohms to IEC 60751.

- **Approved to II 1 GD Ex ia IIC Ga (Gas) and Ex ia IIIC Da (Dust)**
- **Temperature classification T6-T1, see page 26 for stand-off requirements**
- **Available in B, A, 1/3, 1/5 and 1/10 grade accuracies**
- **Sheath diameters from 6.0mm to 8.0mm**
- **316 seamless stainless steel sheath (other grades/materials available)**
- **Spring loaded RTD Pt100 insert with wide choice of process connections**
- **Wide operating temperature range of -100°C to +600°C**
- **UKAS calibration available**

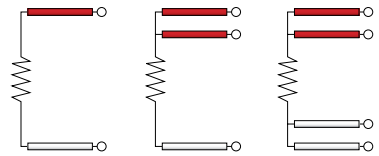


*The above sensor must be terminated in a suitable ATEX / IECEx approved enclosure or box using appropriate glands*

Also available with EAC Ex approval

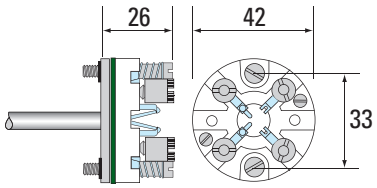
| SECTION 1 | N° of Elements |
|---|---|
| 1 | Simplex |
| 2 | Duplex |
| 3 | Triplex |

| SECTION 2 | Sheath Diameter (mm) | Sheath Diameter (inches) |
|---|---|---|
| Standard Sizes | 6.0mm | 0.236" |
| | 8.0mm | 0.315" |

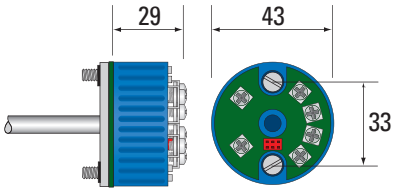
| SECTION 3 | N° of Wires | |
|---|---|---|
| 2 | 2 wire |  |
| 3 | 3 wire | |
| 4 | 4 wire | |

| SECTION 4 | Tolerance of Element (IEC 60751) | | |
|---|---|---|---|
| Grade | Accuracy @ 0°C | Accuracy @100°C | Order Code |
| B | ±0.30°C | ±0.80°C | R100 - B |
| A | ±0.15°C | ±0.35°C | R100 - A |
| 1/3 | ±0.08°C | ±0.19°C | R100 - 1/3 |
| 1/5 | ±0.05°C | ±0.15°C | R100 - 1/5 |
| 1/10 | ±0.03°C | ±0.12°C | R100 - 1/10 |

| SECTION 5 | Sheath Length |
|---|---|
| | As Required |

| SECTION 6 | Terminal Block | |
|---|---|---|
| 3P20 |  | |



| SECTION 7 | Optional 4 to 20mA ATEX Approved Head Mounted Transmitter (please specify range in °C) | |
|---|---|---|
| TXISO/ ATEX |  | Microprocessor based head mounted transmitter ATEX rated to Ex ia IIC T6. Fully scaleable and fully linearised for thermocouple input. The transmitter is pre-programmed to the required temperature range or, alternatively, it can be re-programmed easily by your PC using our software which should be ordered separately. Other types of transmitter are available on request. |



**Order Code** - Example

| Type N° | N° of Elements (See section 1) | Sheath Diameter (See section 2) | N° of Wires (See section 3) | Sheath Length (mm) | Termination (See section 6) | Resistance Value of Element | Grade of Element (See section 4) | Transmitter (Optional, see section 7) |
|---|---|---|---|---|---|---|---|---|
| 57 - IS | - 1 | - 6.0 | - 3 | - 450 | - CE20 | - R100 | - B | - TXISO/ATEX(0/100°C) |

# ATEX / IECEx RTD Pt100s with Termination Entry Gland

## RTD Pt100 Resistance Thermometers 3.0mm to 8.0mm dia.

Our ATEX / IECEx approved mineral insulated platinum resistance thermometers utilise, as standard, detector elements with a resistance of 100 ohms @ 0°C and a fundamental interval of 38.5 ohms to IEC 60751. Single and duplex elements are available.

*Model shown is fitted with connection tails.*
*A choice of cables is also available, see section 7*

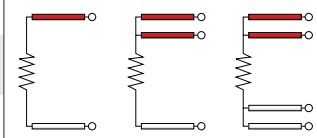
*The above sensor must be terminated in a suitable ATEX / IECEx approved Enclosure or Box*

- **Approved to II 2 GD Ex d IIC Gb (Gas) and Ex tb IIIC Db (Dust)**
- **Also suitable for use in intrinsically safe areas to Ex II 1 GD Ex ia IIC Ga/IIIC Da, see page 25 for details**
- **Temperature classification T6-T1, see page 26 for stand-off requirements**
- **Available in B, A, 1/3, 1/5 and 1/10 grade accuracies**
- **Sheath diameters from 3.0mm to 8.0mm**
- **316 seamless stainless steel sheath (other grades/materials available)**
- **Terminated in a compression gland pot seal with 100mm Kapton® sleeved tails**
- **Wide operating temperature range of -100°C to +600°C**
- **UKAS calibration available**

Also available with EAC Ex approval

| SECTION 1 | N° of Elements |
|---|---|
| 1 | Simplex |
| 2 | Duplex |
| 3 | Triplex |

| SECTION 2 | Sheath Diameter (mm) | Sheath Diameter (inches) |
|---|---|---|
| Standard Sizes | 3.0mm | 0.118" |
| | 4.5mm | 0.177" |
| | 6.0mm | 0.236" |
| | 8.0mm | 0.315" |

| SECTION 3 | N° of Wires | |
|---|---|---|
| 2 | 2 wire |  |
| 3 | 3 wire | |
| 4 | 4 wire | |

| SECTION 4 | Sheath Length |
|---|---|
| | **As Required** |

| SECTION 5 | Termination Entry Gland (please use code number to specify thread size and material for the sensor diameter chosen) | | |
|---|---|---|---|
| Dia. | Thread Size | Order Code for **Brass** | Order Code for **Stainless Steel** |
| 3.0mm | 16mm ISO | SFBM16-30CBEX | SFSM16-30CBEX |
| 4.5mm | 16mm ISO | SFBM16-45CBEX | SFSM16-45CBEX |
| 6.0mm | 16mm ISO | SFBM16-60CBEX | SFSM16-60CBEX |
| 8.0mm | 16mm ISO | SFBM16-80CBEX | SFSM16-80CBEX |
| 3.0mm | 20mm ISO | SFBM20-30CBEX | SFSM20-30CBEX |
| 4.5mm | 20mm ISO | SFBM20-45CBEX | SFSM20-45CBEX |
| 6.0mm | 20mm ISO | SFBM20-60CBEX | SFSM20-60CBEX |
| 8.0mm | 20mm ISO | SFBM20-80CBEX | SFSM20-80CBEX |

| SECTION 6 | Tolerance of Element (IEC 60751) | | |
|---|---|---|---|
| **Grade** | Accuracy @ 0°C | Accuracy @100°C | Order Code |
| **B** | ±0.30°C | ±0.80°C | R100 - B |
| **A** | ±0.15°C | ±0.35°C | R100 - A |
| **1/3** | ±0.08°C | ±0.19°C | R100 - 1/3 |
| **1/5** | ±0.05°C | ±0.15°C | R100 - 1/5 |
| **1/10** | ±0.03°C | ±0.12°C | R100 - 1/10 |

| SECTION 7 | Optional Extension Cables (please specify length in metres) | | |
|---|---|---|---|
| **RP** | PVC Insulation (105°C) (Seal rating: **90°C**) |  | **RP37** (3-wire) |
| | | | **RP47** (4-wire) |
| | | | **RP67** (Duplex 3-wire) |
| **RT** | PFA Insulation (250°C) (Seal rating: **230°C**) |  | **RT37** (3-wire) |
| | | | **RT47** (4-wire) |
| | | | **RT67** (Duplex 3-wire) |

* *All cables have 7/0.2mm conductors. If no cable is required, leave this section of the order code blank and the sensor will be supplied with 100mm Kapton 'tails'.*

| SECTION 8 | Optional Stainless Steel Adjustable Compression Fittings | | |
|---|---|---|---|
| Dia. | 1/8" BSPT | 1/4" BSPT | 1/2" BSPT |
| 3.0mm | SFS18T30EX | SFS14T30EX | SFS12T30EX |
| 4.5mm | SFS18T45EX | SFS14T45EX | SFS12T45EX |
| 6.0mm | SFS18T60EX | SFS14T60EX | SFS12T60EX |
| 8.0mm | – | SFS14T80EX | SFS12T80EX |

*Other thread sizes are available - please see page 14 for details.*

**Need advice**
on using our **ATEX** approved products?
Contact one of our experienced engineers on
**01895 252222**
International +44 1895 252222
or send an email to atex@tc.co.uk

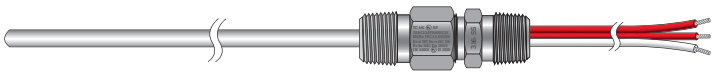
**Order Code** - Example

| Type N° | I.S. Version (Optional, please see page 25 for details) | N° of Elements (See section 1) | Sheath Diameter (See section 2) | N° of Wires (See section 3) | Sheath Length (mm) | Termination (See section 5) | Resistance Value of Element | Grade of Element (See section 6) | Extension Cable (Optional, see section 7) | Compression Fitting (Optional, see section 8) |
|---|---|---|---|---|---|---|---|---|---|---|
| 57 | - IS | - 1 | - 3.0 | - 3 | - 250 | - SFSM2030CBEX | - R100 | - B | - 1m RP37 | - SFS14T30EX |

# ATEX / IECEx RTD Pt100s with Termination Entry Gland

## RTD Pt100 Resistance Thermometers 3.0mm to 8.0mm dia.

Our ATEX / IECEx approved mineral insulated platinum resistance thermometers utilise, as standard, detector elements with a resistance of 100 ohms @ 0°C and a fundamental interval of 38.5 ohms to IEC 60751. Single and duplex elements are available.



*Model shown is fitted with connection tails.*
*A choice of cables is also available, see section 7*

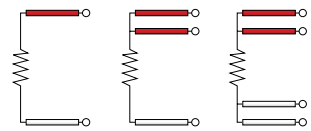
*The above sensor must be terminated in a suitable ATEX / IECEx approved Enclosure or Box*

- **Approved to II 2 GD Ex d IIC Gb (Gas) and Ex tb IIIC Db (Dust)**
- **Also suitable for use in intrinsically safe areas to Ex II 1 GD Ex ia IIC Ga/IIIC Da, see page 25 for details**
- **Temperature classification T6-T1, see page 26 for stand-off requirements**
- **Available in B, A, 1/3, 1/5 and 1/10 grade accuracies**
- **Sheath diameters from 3.0mm to 8.0mm**
- **316 seamless stainless steel sheath (other grades/materials available)**
- **Terminated in a compression gland pot seal with threaded process entry and 100mm Kapton® sleeved tails**
- **Wide operating temperature range of -100°C to +600°C**
- **UKAS calibration available**

Also available with EAC Ex approval

| SECTION 1 | N° of Elements |
|---|---|
| 1 | Simplex |
| 2 | Duplex |
| 3 | Triplex |

| SECTION 2 | Sheath Diameter (mm) | Sheath Diameter (inches) |
|---|---|---|
| Standard Sizes | 3.0mm | 0.118" |
| | 4.5mm | 0.177" |
| | 6.0mm | 0.236" |
| | 8.0mm | 0.315" |

| SECTION 3 | N° of Wires | |
|---|---|---|
| 2 | 2 wire |  |
| 3 | 3 wire | |
| 4 | 4 wire | |

| SECTION 4 | Sheath Length |
|---|---|
| | **As Required** |

| SECTION 5 | Termination Entry Gland (please use code number to specify thread size and material for the sensor diameter chosen) | | |
|---|---|---|---|
| Dia. | Thread Size | Order Code for **Brass** | Order Code for **Stainless Steel** |
| 3.0mm | 16mm ISO | SFBM16-30CBEX | SFSM16-30CBEX |
| 4.5mm | 16mm ISO | SFBM16-45CBEX | SFSM16-45CBEX |
| 6.0mm | 16mm ISO | SFBM16-60CBEX | SFSM16-60CBEX |
| 8.0mm | 16mm ISO | SFBM16-80CBEX | SFSM16-80CBEX |
| 3.0mm | 20mm ISO | SFBM20-30CBEX | SFSM20-30CBEX |
| 4.5mm | 20mm ISO | SFBM20-45CBEX | SFSM20-45CBEX |
| 6.0mm | 20mm ISO | SFBM20-60CBEX | SFSM20-60CBEX |
| 8.0mm | 20mm ISO | SFBM20-80CBEX | SFSM20-80CBEX |

| SECTION 6 | Tolerance of Element (IEC 60751) | | |
|---|---|---|---|
| **Grade** | Accuracy @ 0°C | Accuracy @100°C | Order Code |
| **B** | ±0.30°C | ±0.80°C | R100 - B |
| **A** | ±0.15°C | ±0.35°C | R100 - A |
| **1/3** | ±0.08°C | ±0.19°C | R100 - 1/3 |
| **1/5** | ±0.05°C | ±0.15°C | R100 - 1/5 |
| **1/10** | ±0.03°C | ±0.12°C | R100 - 1/10 |

| SECTION 7 | Optional Extension Cables (please specify length in metres) | | |
|---|---|---|---|
| **RP** | PVC Insulation (105°C) (Seal rating: **90°C**) |  | **RP37** (3-wire) |
| | | | **RP47** (4-wire) |
| | | | **RP67** (Duplex 3-wire) |
| **RT** | PFA Insulation (250°C) (Seal rating: **230°C**) |  | **RT37** (3-wire) |
| | | | **RT47** (4-wire) |
| | | | **RT67** (Duplex 3-wire) |

** All cables have 7/0.2mm conductors. If no cable is required, leave this section of the order code blank and the sensor will be supplied with 100mm Kapton 'tails'.*

| SECTION 8 | Process Connection Thread | | |
|---|---|---|---|
| **Code** | Thread Size | **Code** | Thread Type |
| **12** | 1/2" | **T** | BSPT |
| **M16** | M16 x 1.5mm | **P** | BSPP |
| **M20** | M20 x 1.5mm | **N** | NPT |
| | | **M** | Metric |

**Need advice**
on using our **ATEX** approved products?
Contact one of our experienced engineers on
**01895 252222**
International +44 1895 252222
or send an email to atex@tc.co.uk

**Order Code** - Example

| Type N° | I.S. Version (Optional, please see page 25 for details) | N° of Elements (See section 1) | Sheath Diameter (See section 2) | N° of Wires (See section 3) | Sheath Length (mm) | Termination (See section 5) | Resistance Value of Element | Grade of Element (See section 6) | Extension Cable (Optional, see section 7) | Process Connection (Optional, see section 8) |
|---|---|---|---|---|---|---|---|---|---|---|
| **57** | **IS** | **1** | **3.0** | **3** | **250** | **SFSM2030CBEX** | **R100** | **B** | **1m RP37** | **12T** |

# ATEX / IECEx Compression Fittings

Our extensive range of ATEX / IECEx approved compression fittings is designed and tested for use in hazardous areas with type Ex d, Ex e and Ex tD protection concepts allowing them to be used for both gas and dust applications in zone 1 and 2 areas.

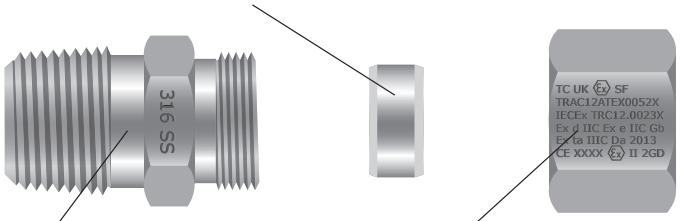
They are available from stock with a variety of thread types and sizes to suit various diameter sensors. As an alternative to 316 stainless steel we can also offer all varieties in Hastelloy X or C276 for more arduous applications.

Compression fittings are essential when probes, sensors and other types of static elements need to be sealed as they pass into the area or enclosure.

Full approval rating is Ex II 2GD, Ex d IIC, Ex e IIC Gb & Ex ta IIIC Da. Certificate Nos. TRAC12ATEX0052X (ATEX) / TRC12.0023X (IECEx) refer (available on request).

## Single Ferrule Fittings - Features at a Glance

**Ferrule**
Seals against the media and grips the sensor




**Main Body**
Available in a wide range of imperial and metric thread sizes

**Cap Nut**
Compresses the fitting onto the tube

The single ferrule system gives a reliable seal against the media and ensures a good mechanical grip on the sensor itself.

| SECTION 1 | Material |
|---|---|
| S | Stainless Steel |
| B | Brass |
| H | Hastelloy |

| SECTION 2 | Thread Size | | |
|---|---|---|---|
| Code | Size | Code | Size |
| 18 | 1/8" | 10 | 1" |
| 14 | 1/4" | M10 | M10 x 1.0mm |
| 38 | 3/8" | M16 | M16 x 1.5mm |
| 12 | 1/2" | M20 | M20 x 1.5mm |
| 34 | 3/4" | M24 | M24 x 1.5mm |

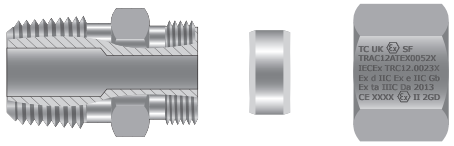
| SECTION 3 | Thread Type |
|---|---|
| Code | Type |
| T | BSPT |
| P | BSPP |
| N | NPT |
| M | ISO |

### Stainless Steel Locknuts

Available in a range of sizes to suit our range of compression fittings and cable glands.

| Code | Type |
|---|---|
| LN10S | M10 x 1.0mm |
| LN16S | M16 x 1.5mm |
| LN20S | M20 x 1.5mm |
| LN24S | M24 x 1.5mm |
| LN1/2S | 1/2" BSPP |

| SECTION 4 | Insert Diameter (diameter of sensor to suit) | | | | |
|---|---|---|---|---|---|
| Code | Size | Code | Size | Code | Size |
| 05 | 0.5mm | 48 | 4.75mm (3/16") | 120 | 12.0mm |
| 10 | 1.0mm | 55 | 5.5mm | 127 | 12.7mm (1/2") |
| 15 | 1.5mm | 60 | 6.0mm | 159 | 15.9mm (5/8") |
| 16 | 1.59mm (1/16") | 64 | 6.35mm (1/4") | 190 | 19.05mm (3/4") |
| 20 | 2.0mm | 80 | 8.0mm | 213 | 21.3mm (13/16") |
| 30 | 3.0mm | 95 | 9.53mm (3/8") | 254 | 25.4mm (1") |
| 32 | 3.175mm (1/8") | 100 | 10.0mm | | |
| 45 | 4.5mm | 108 | 10.8mm | | |

| SECTION 5 | Optional Counter Bore |
|---|---|
| Code | Diagram |
| CB |  |

All fittings are available with counter bored bodies for use as termination entry glands when sealing probes (with pot seals) or feedthroughs into terminal heads / conduit boxes, etc.

**Order Code** - Example

| Type Nº | Material (See section 1) | Thread Size and Type (See sections 2 and 3) | Insert Diameter (See section 4) | Counter Bore* (if required) | ATEX / IECEx |
|---|---|---|---|---|---|
| SF | S | 12 T | 60 | CB | EX |

Also available with EAC Ex approval

# ATEX / IECEx Cable Glands

Our range of cable glands is tailored to suit the terminal heads and extension cables available in this catalogue and will maintain the Zone 1/21 Ex d, Ex e and Ex tD approval. The glands are available in either brass or stainless steel and give a reliable IP66 and IP68 seal to 25 metres. An IP O-ring is supplied as standard on metric thread versions.

- **Ex d / Ex e / Ex tD approved to zone 1/21**
- **IP66 and IP68 seal to 25 metres**
- **Supplied with a Neoprene seal which has an operating temperature -20 to +85ºC**
- **Optional accessories include a locknut, earth tag, IP washers, shroud etc. - please contact us for details**
- **Generally ex-stock for quick delivery**

Also available with EAC Ex approval

**Cable Gland Selection Table**
(diameter of sensor to suit)

| Type | Gland Size Code | Cable dia. | Thread Code | Thread Type | Material | Approval |
|---|---|---|---|---|---|---|
| CGA | 16 | 4.0~8.4mm | M20 | M20 x 1.5mm | B Brass S St./Steel | EX |
| | 20S | 7.2~11.7mm | 12N | 1/2" NPT | | |
| | 20 | 9.4~14.0mm | 34N | 3/4" NPT | | |

**Order Code** - Example

| Type Nº | Gland Size | Thread Code | Material | Approval |
|---|---|---|---|---|
| CGA | 16 | M20 | B | EX |

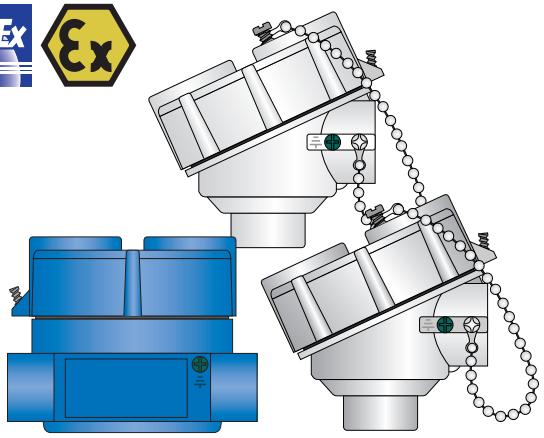
The above glands are a small part of our cable gland range, selected for use with the sensors and enclosures shown in this catalogue. For other cable types, gland sizes, materials etc., please contact TC Ltd for a quotation.

# ATEX / IECEx Terminal Heads

## Ex d Component Certified Terminal Heads & Enclosures

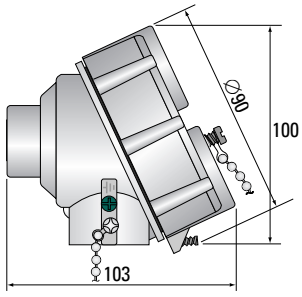
Our range of terminal heads and enclosures is available in a variety of sizes, materials and finishes and have ATEX / IECEx component approval to Ex d IIC T6 Gb (Gas) and Ex tb IIIC Db (Dust) for zone 1 use. All terminal heads and enclosures are supplied without glands/fittings (available to purchase as separate items - see page 14 for details).

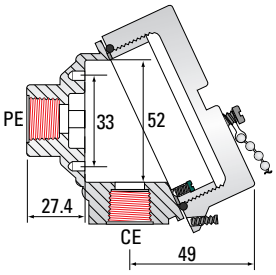
- **Approved to Ex d IIC T6 Gb (Gas) & Ex tb IIIC Db (Dust)**
- **Choice of die cast aluminium or 316 stainless steel for the most arduous applications**
- **Wide selection of BSPP, NPT & metric (ISO) threadforms**
- **Weatherproof to IP68**
- **Options for large devices and dual cable entry available**
- **Generally ex-stock for quick delivery**
- **See page 14 for termination entry glands and cable glands**



## Terminal Head Selection Table

### P22

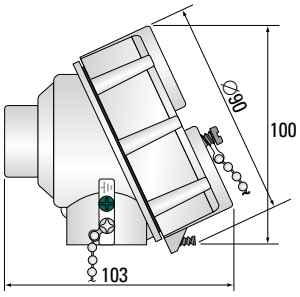


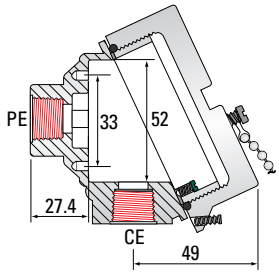




Die cast aluminium head with epoxy coating. Screw top lid. Probe and cable entry at right angles to each other.
Accepts terminal blocks or transmitters up to 50mm dia. with M4 screws on 33mm centres. Weight: 0.5kg.
Suitable for use over the temperature range: -40 to +85ºC. IP68 rated with O-ring supplied. Also available in blue - order code P22B.

| Code | PE - Probe Entry | CE - Cable Entry |
|---|---|---|
| 18 | 1/2" BSPP | 1/2" BSPP |
| 04 | 1/2" BSPP | 3/4" BSPP |
| 05 | 1/2" BSPP | M20 x 1.5mm |
| 49 | 3/4" BSPP | 3/4" BSPP |
| 47 | 3/4" BSPP | M20 x 1.5mm |
| 02 | 1/2" NPT | 1/2" NPT |
| 01 | 1/2" NPT | 3/4" NPT |
| 08 | 1/2" NPT | M20 x 1.5mm |
| 33 | 3/4" NPT | 3/4" NPT |
| 12 | M20 x 1.5mm | M20 x 1.5mm |

### P22S

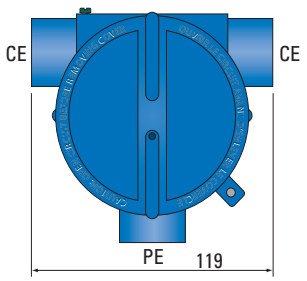


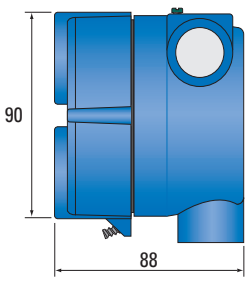



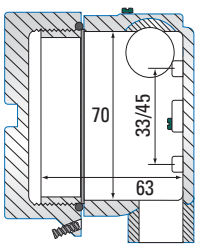

316 stainless steel head with electro polished finish. Screw top lid. Probe and cable entry at right angles to each other.
Accepts terminal blocks or transmitters up to 50mm dia. with M4 screws on 33mm centres. Weight: 1.0kg.
Suitable for use over the temperature range: -40 to +85ºC. IP68 rated with O-ring supplied.

| Code | PE - Probe Entry | CE - Cable Entry |
|---|---|---|
| 18 | 1/2" BSPP | 1/2" BSPP |
| 04 | 1/2" BSPP | 3/4" BSPP |
| 05 | 1/2" BSPP | M20 x 1.5mm |
| 49 | 3/4" BSPP | 3/4" BSPP |
| 47 | 3/4" BSPP | M20 x 1.5mm |
| 02 | 1/2" NPT | 1/2" NPT |
| 01 | 1/2" NPT | 3/4" NPT |
| 08 | 1/2" NPT | M20 x 1.5mm |
| 33 | 3/4" NPT | 3/4" NPT |
| 12 | M20 x 1.5mm | M20 x 1.5mm |

### P27




Die cast aluminium, dual cable entry terminal head / pipe mount enclosure. Functions both as a dual cable entry terminal head and as a remote wall/pipe mounted field enclosure (see page 17, section 2 for mounting bracket options). Screw top lid. Probe and cable entries at right angles to each other. Accepts terminal blocks or transmitters up to 67mm dia. with M4 screws on 33/45mm centres. Weight: 0.6kg. Epoxy coated, suitable for use over the temperature range: -40 to +85ºC. IP68 rated with O-ring supplied.

| Code | PE - Probe Entry | CE - Cable Entry |
|---|---|---|
| 02 | M16 x 2.0mm* | 3/4" NPT |
| 03 | M16 x 2.0mm* | M20 x 1.5mm |
| 04 | 1/2" NPT | 3/4" NPT |
| 05 | 1/2" NPT | 1/2" NPT |
| 06 | 1/2" NPT | M20 x 1.5mm |
| 11 | 1/2" BSPP | 1/2" NPT |
| 12 | 1/2" BSPP | M20 x 1.5mm |

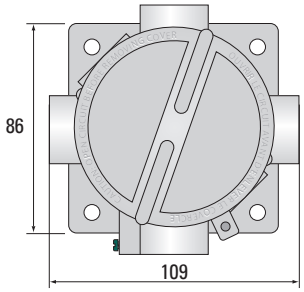
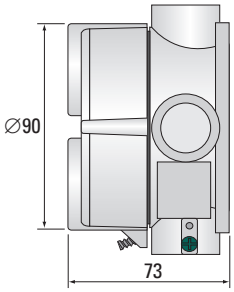
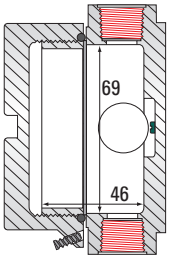
** M16 x 2.0mm thread is supplied for use with pipe mount bracket 01 and is not a thru-hole.*

**Order Code** - Example

| Enclosure Code No. | | Thread Code |
|---|---|---|
| **P22** | **-** | **05** |

# ATEX / IECEx Terminal Heads (continued)

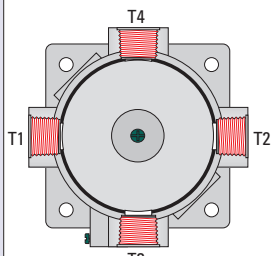
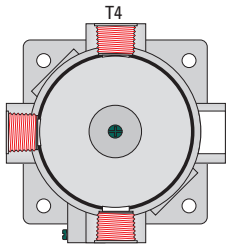
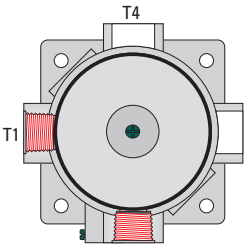
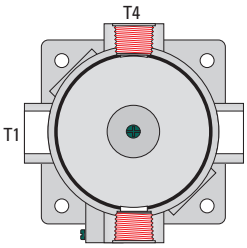
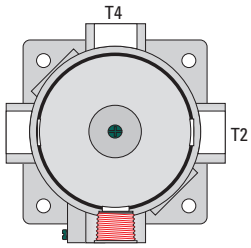
**SECTION 1** — **P30 Multiple Entry Junction Box Details and Thread Selection**

| Code | Top View | Side View | Internal View |
|---|---|---|---|
| P30 |   |   |   |

Multiple entry die cast aluminium junction box with grey epoxy finish. Screw top lid. Weight 0.6kg. Suitable for use over the temperature range -40 to +85ºC. IP68 Rated with O-ring supplied. Can be wall mounted using the integral bolt holes.

| Thread Selection Tables | |
|---|---|
| Code | T1, T2, T3 and T4 |
| 02 | 1/2" NPT |
| 03 | 3/4" NPT |
| 04 | M20 x 1.5mm |
| 05 | 1/2" BSPP |
| 06 | 1/2" BSPT |

**SECTION 2** — **Entry Configuration**

| Code | 00 | 01 | 02 | 03 | 04 |
|---|---|---|---|---|---|
| P30 |   4 ENTRIES |   3 ENTRIES |   2 ENTRIES AT 90º |   2 ENTRIES AT 180º |   1 ENTRY ONLY |

**Order Code** - Example

| Enclosure Code No. | | Entry Type (See section 2) | | Thread Code (See section 1) |
|---|---|---|---|---|
| P30 | - | 01 | - | 05 |

# Custom ATEX / IECEx Enclosures

Also available with EAC Ex approval

In addition to the terminal heads and junction boxes shown above and on page 15, TC Ltd can also provide a range of custom enclosures to suit a wide variety of hazardous areas and applications.

- **Available in die cast aluminium, stainless steel and Polycarbonate materials**
- **ATEX & IECEx approved to Ex e, Ex d & Ex nA concepts to zones 1 & 2**
- **Over 20 sizes of enclosure available**
- **Wide operating temperature up to -40ºC to +80ºC (dependant on model selected)**
- **Ingress protection up to IP68**
- **Corrosion resistant**
- **Custom entries can be drilled and tapped to accommodate most threadforms on all sides**
- **Internal DIN rail and terminals can be supplied to suit a variety of equipment (sensors, barriers, transmitters, etc.)**
- **Please contact our sales department for more details and pricing information**

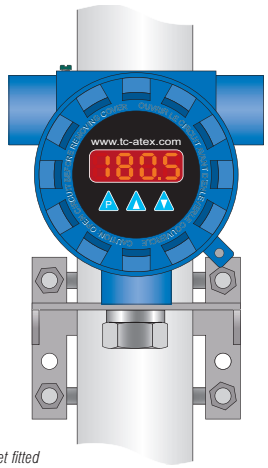
**Need advice**
on using our **ATEX** approved products?
Contact one of our experienced engineers on
**01895 252222**
International +44 1895 252222
or send an email to atex@tc.co.uk

# ATEX / IECEx 4 to 20mA Indicator

## Explosion Proof 4~20mA Loop Powered Indicator

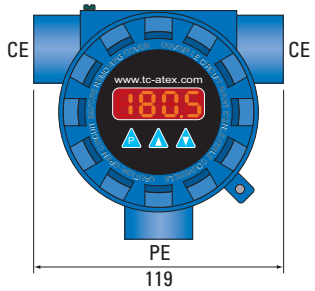
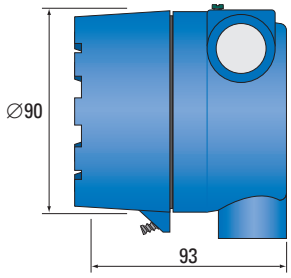
The P27D is a loop powered digital indicator, ATEX/IECEx approved to Ex d IIC T6 Gb (Gas) and Ex tb IIIC Db (Dust) for zone 1 use. It allows a process variable from any 4 to 20mA current source to be monitored. Since the unit derives its power from the loop, no additional power supply or wiring is needed. A low voltage drop (5 Volts at 20mA) means it can be incorporated into almost any 2 wire loop where local or remote indication is needed. The P27D has a 4 digit display which can be configured to read from -999 to 9999 with a 4 to 20mA input signal. The decimal point location and engineering units are adjusted using membrane switches and the indicator can be mounted directly to our thermocouple & RTD sensors or alternatively wall/pipe mounted using the mounting brackets shown below.

- **Approved to Ex II 2 GD Ex d IIC Gb (Gas) and Ex tb IIIC Db (Dust)**
- **IP68 die cast alloy enclosure as standard, 316SS version available on request**
- **For local or remote indication of 4~20mA signal. Direct sensor or wall/pipe mounting options available.**
- **Can accommodate a head mount 4~20mA transmitter if required**




*P27D shown with 01 pipe mount bracket fitted*

## SECTION 1 — Head Details

| Code | Top View | Side View |
|---|---|---|
| P27D |   |   |

**Thread Selection Tables**

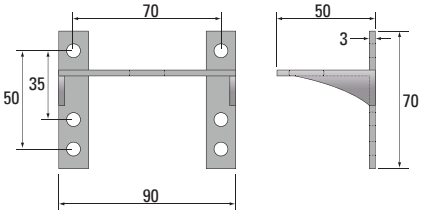
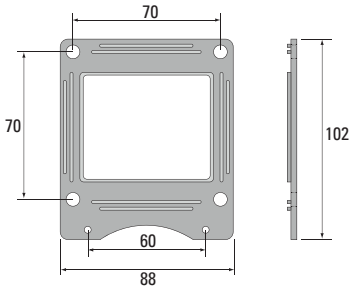
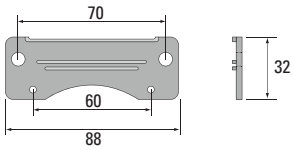
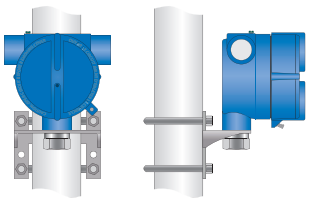
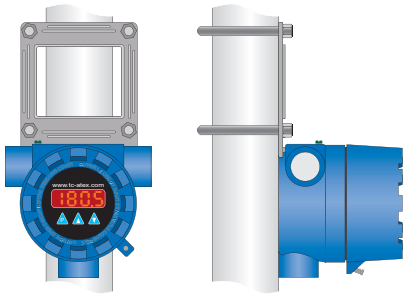
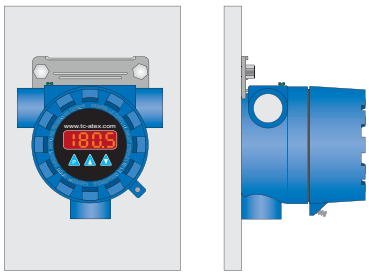
| Code | PE - Probe Entry | CE - Cable Entry |
|---|---|---|
| 02 | M16 x 2.0mm* | 3/4" NPT |
| 03 | M16 x 2.0mm* | M20 x 1.5mm |
| 04 | 1/2" NPT | 3/4" NPT |
| 05 | 1/2" NPT | 1/2" NPT |
| 06 | 1/2" NPT | M20 x 1.5mm |
| 11 | 1/2" BSPP | 1/2" NPT |
| 12 | 1/2" BSPP | M20 x 1.5mm |

** M16 x 2.0mm thread is supplied for use with pipe mount bracket 01 and is not a thru-hole.*

**Order Code** - Example

| Code No. | Thread Code | Optional Mounting Bracket (See section 2) |
|---|---|---|
| P27D - | 05 - | 01 |

## SECTION 2 — Optional Mounting Brackets for P27D Indicator and P27 Head

| Code | 01 | 02 | 03 |
|---|---|---|---|
| |   |   |   |
| | Simple 'L' shaped bracket made from stainless steel. Can be used to mount a P27/D on either a wall, panel or 2" dia. pipe using the 'U' bolts supplied in the kit. | Stainless steel bracket used to mount a P27/D on a 2" dia. pipe using the 'U' bolts supplied in the kit. Ideal for when all three ports on the enclosure are required. | Stainless steel bracket used to mount a P27/D on a wall or panel. Ideal for when all three ports on the enclosure are required. |
| |  |  |  |

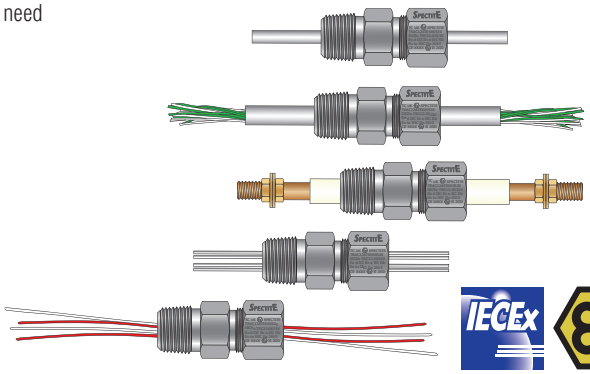
# ATEX / IECEx Sealed Feedthroughs

## ATEX / IECEx Pressure and Vacuum Sealed Feedthroughs

ATEX / IECEx approved Spectite® sealed feedthroughs from TC Ltd. are essential when probes, sensors, electrodes, wires and other types of static elements need to be sealed as they pass through a pressure or environmental boundary.

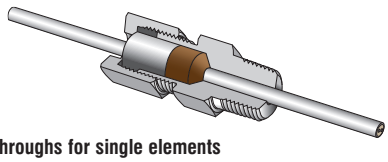
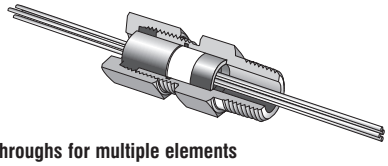
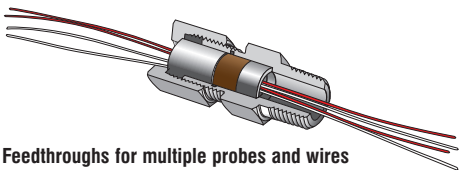
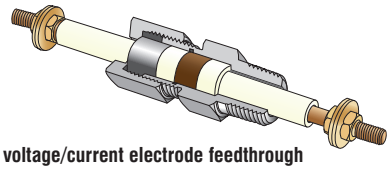
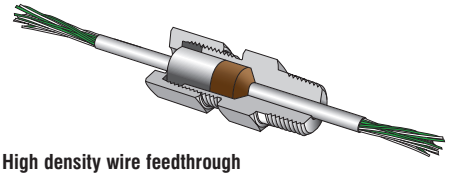
- **Approved to Ex II 2 GD, Ex d IIC Gb/Ex e IIC Gb, Ex ta IIIC Da**
- **Inhibit the leakage of gas or other media**
- **Restrain the elements from moving in the assembly**
- **Wide choice of feedthroughs to suit most applications**
- **Wide temperature range**
- **Versions available to seal on both single and multiple elements**
- **Generally ex-stock for quick delivery**
- **Technical support and advice available**

SPECTITE® from TC Ltd



IECEx Ex EAC Ex

Also available with EAC Ex approval

| SECTION 1 | Spectite® Sealed Feedthroughs | | |
|---|---|---|---|
| **Series** | Illustration | Features | Notes |
| **PF** |  **Feedthroughs for single elements** | • Seals on probes, sensors, small-bore tubes and other similar elements<br>• Immersion length of the element can be easily adjusted<br>• Vacuum to 700 bar | These feedthroughs are designed for sealing single elements, usually sensors, probes or tubes, where they penetrate a pressure or environmental boundary. |
| **MF** |  **Feedthroughs for multiple elements** | • Saves time and costs as multiple sensors pass through one feedthrough<br>• Immersion length of the element can be easily adjusted<br>• Vacuum to 700 bar | A single access port into an enclosure or process vessel is all that is needed to allow multiple probes, sensors, etc., to pass through an environmental or pressure boundary using a single feedthrough assembly. |
| **WF** |  **Feedthroughs for multiple probes and wires** | • Seal on Kapton® insulated copper or thermocouple wires - Series WFS<br>• Seal on bare wires carrying instrumentation voltages / currents - Series WFR<br>• Seal on small diameter sheathed sensors up to 3.2mm dia. - Series WFP | When multiple wires must pass through a pressure boundary, series WF feedthroughs can provide an efficient seal without recourse to epoxies or other non-adjustable fixture methods. |
| **EF** |  **High voltage/current electrode feedthrough** | • Copper or stainless steel electrodes<br>• Three sizes of feedthrough assembly<br>• Rated for use at 2KV up to 200A<br>• Vacuum to 700 bar | The integral electrode mounted in these feedthroughs enables specifiers to provide high-voltage, high-current supplies in process enclosures, autoclaves, vacuum furnaces and reactor vessels to power heaters, electric motors and other devices needing high power supply. |
| **HF** |  **High density wire feedthrough** | • Saves time and costs as multiple sensor wires pass through one feedthrough<br>• Sealed tubes with continuous, multiple, insulated conductors - without epoxies or glues<br>• Copper or thermocouple material wires | A PTFE-lined, stainless steel tube is swaged over multiple, insulated, single-core copper and/or thermocouple-material wires to make a continuous wire, high-density, sealed feedthrough tube. These are used for thermocouples, resistance thermometers and low voltage instrumentation. |


**Ask us about our dedicated**

### ATEX / IECEx Spectite® Sealed Feedthrough Catalogue

featuring full feedthrough technical specifications, selection guide and ordering information. Contact one of our engineers on **01895 252222** to request your copy.

# Notes for Intrinsically Safe Applications

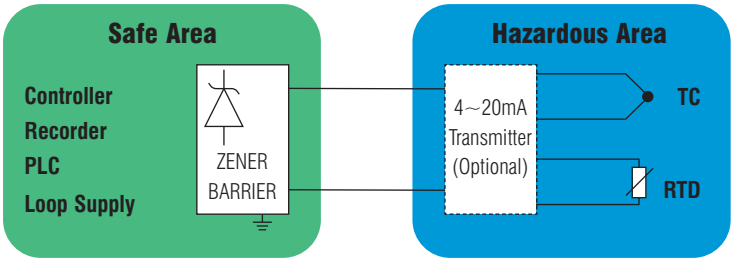
### Specifying Sensors for Ex ia/Ex ib Circuits

All thermocouple and RTD sensors shown in this catalogue are suitable for use in intrinsically safe (IS) applications when used with an appropriate barrier. The full classification is Ex II 1 GD Ex ia IIC Ga/IIIC Da for pot seal and Stainless Steel head terminations. Where Aluminum terminal heads are used, the classification is Ex II 2 GD Ex ib IIC Gb/IIIC Db. The mineral insulated construction gives suitable insulation resistance (minimum 1000 M Ω) to guarantee conformance. Extension leads can be supplied with blue outer sheaths upon request.

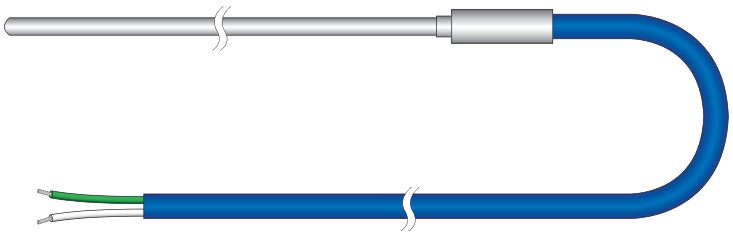
The barrier isolates the signal from the hazardous area and no further certification of the sensor is necessary.

When a 4~20mA transmitter is selected this is also Ex ia approved. When specifying sensors for IS areas please add IS after the type reference i.e. 52-IS and we will provide the following documentation with the order:

- **TC Ltd Ex ia/Ex ib certificate of conformity & letter of conformity from TrAC Global Ltd (our notified body)**
- **Ex ia/Ex ib tags**
- **ATEX certificate for transmitter (if required)**




*Example of an IS circuit.*

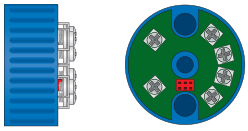


*Example of an IS sensor.*

## Other Products **available from TC to help complete your IS installation**

(Please contact our sales engineers for further information and pricing)

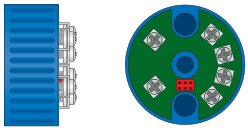
### 4 to 20mA Transmitters



**TXISO/ATEX**

**ATEX Approved Head Mounted Transmitter**

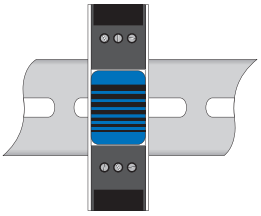
- Approved to: Ex II 1 G Ex ia IIC Ga
- Accepts input from all thermocouple and RTD sensors
- Fully isolated and temperature linearised
- Can be user configured with optional software kit



**TXISO/HART/ATEX**

**HART® Protocol ATEX Approved Head Mounted Transmitter**

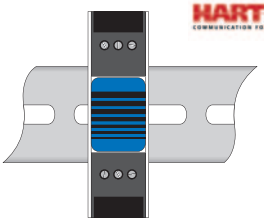
- Approved to: Ex II 1 G Ex ia IIC Ga
- Accepts input from all thermocouple and RTD sensors
- Fully isolated and temperature linearised
- Can be configured by both HART enabled devices and software kit



**TDISO/ATEX**

**ATEX Approved DIN Rail Mounted Transmitter**

- Approved to: Ex II 1 G Ex ia IIC Ga
- Accepts input from all thermocouple and RTD sensors
- Fully isolated and temperature linearised
- Can be user configured with optional software kit

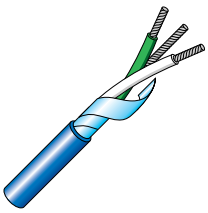


**TDISO/HART/ATEX**

**HART® Protocol ATEX Approved DIN Rail Mounted Transmitter**

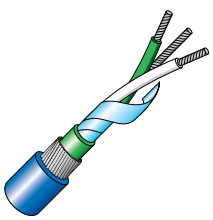
- Approved to: Ex II 1 G Ex ia IIC Ga
- Accepts input from all thermocouple and RTD sensors
- Fully isolated and temperature linearised
- Can be configured by both HART enabled devices and software kit

### Thermocouple Cables



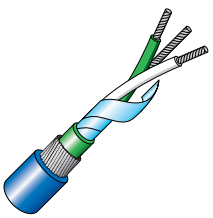
**GS29**

**XLPE insulated, Twisted with Screen (LSF)**
One pair of 16/0.2mm (0.5mm²) stranded conductors.
Cores XLPE insulated.
Pair twisted, screened with Mylar® aluminium tape and drain wire.
LSF sheathed overall (blue).



**GS94**

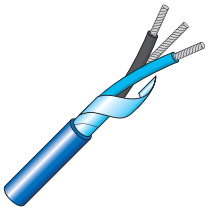
**XLPE insulated, Twisted with Screen and Armour (LSF)**
One pair of 16/0.2mm (0.5mm²) stranded conductors.
Cores XLPE insulated. Pair twisted, screened with Mylar® aluminium tape and drain wire. LSF bedded.
Steel wire armoured and LSF sheathed (blue).



**GS95**

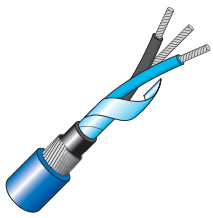
**XLPE insulated, Twisted with Screen and Armour (LSF)**
One pair of 24/0.2mm (0.75mm²) stranded conductors.
Cores XLPE insulated. Pair twisted, screened with Mylar® aluminium tape and drain wire. LSF bedded.
Steel wire armoured and LSF sheathed (blue).

### Instrument Cables



**M6101/BLUE**

**BS5308 Part 1, Type 1 Instrument Cable**
16/0.2mm (0.5mm²) copper conductors Polyethylene insulated.
2 cores twisted and screened with Mylar® aluminium tape and drainwire. FR PVC sheathed (blue).



**M6101/SWA/BLUE**

**BS5308 Part 1, Type 2 Instrument Cable**
16/0.2mm (0.5mm²) copper conductors Polyethylene insulated.
2 cores twisted and screened with Mylar® aluminium tape and drainwire. PE bedded.
Steel wire armoured and FR PVC sheathed (blue).

# General Specifications and Further Information

## Process Connections

Feedthrough bodies can be specified with a choice of threaded process connections. Feedthroughs with the common tapered threadforms, BSPT (conical gas thread or 'R' thread) to BS21, DIN 2999 ISO 7/1 & JIS B0203 and NPT (national pipe tapered thread) to ANSI/ASME B1.20.1 are generally stocked items.

Feedthroughs with parallel threaded process connections, BSPP (parallel gas thread or 'G' thread) to BS2779, DIN ISO 228/1 & JIS B0202 UNF/UNEF to ANSI/ASME B1.20.1, PG to DIN 40430, ET to BS31 and ISO metric to DIN13, may also be specified. Feedthroughs with parallel mounting threads need an 'O' ring or a gasket seal (not supplied) to prevent leakage at the process connection.

## UKAS Calibration

We offer a full UKAS calibration service from our in-house accredited laboratory. With the drive towards higher product quality standards and energy efficiency, end users are demanding more certainty and traceability from the products they purchase.

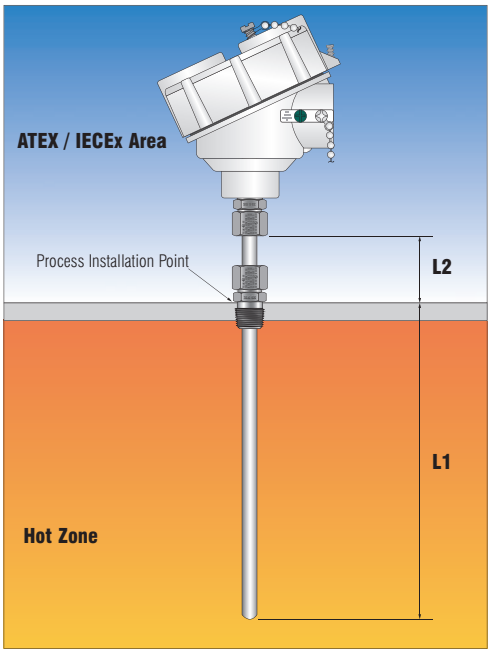
UKAS CALIBRATION 0564

A speedy, economical and reliable calibration service is provided in all respects. Our application engineers who have all been trained in our laboratory are available if required to give assistance in recommending a calibration strategy suitable for your application. Whilst there are some limitations as to which sensors can be calibrated, we can, if necessary custom build sensors in order to meet both the requirements of the application as well as the relevant calibration equipment.

## Installation Guidelines:

**Stand-Off Length:** Our sensors are passive units and are not self-heating. However heat transfer along the sheath shall be considered when positioning the sensor in the process to maintain the temperature rating of the end seal termination. See value L2 shown on the typical installation diagram. The below table gives guidance for stand-off length based on the process temperature[1].

**T Class:** All the sensors and feedthroughs shown on this catalogue can be used with service temperatures up to 1250ºC dependant on the sheath material used. Typically the hazardous area protection concept is applied to the portion of the assembly outside the process boundary as shown below. When selecting the appropriate sensor design for your application, overall temperature class shall be determined by either:
(a) determined by process temperature as stated in the table below.
Or (b) The temperature class may be determined by temperature measurement on the actual installation. This must be performed when no flammable atmosphere is present. The overall temperature class of the assembly shall be established at the point of exit through the boundary wall into the zoned area.To ensure safe use both calculations (stand-off length to maintain end seal rating and overall t class of assembly) shall be considered.




| Process Temperature (Tp) [ºC] | Temperature class of the assembly | Max. surface temperature of the assembly at process installation point [ºC] | To maintain temperature rating of end seal termination (Guideline values, see note[1]) | |
|---|---|---|---|---|
| | | | Recommended Stand-off L2 (mm) for pot seal and termination entry gland terminations[2] | Recommended Stand-off L2 (mm) for terminal head terminations[3] |
| <=80 | T6 | 85ºC | 60 | 60 |
| 95 | T5 | 100ºC | 75 | 75 |
| 130 | T4 | 135ºC | 90 | 90 |
| 190 | T3 | 200ºC | 105 | 165 |
| 290 | T2 | 300ºC | 120 | 200 |
| 440 | T1 | 450ºC | 130 | 210 |
| >440 | Tp + 10 | Tp + 10 | 130 | 210 |

*[1] The values given are considered "worst-case" for assemblies in a vertical installation. If method (b) is used to calculate overall t class then shorter stand-off lengths may also be considered by the same method.*
*[2] Values for a standard resin filled pot seal with 90ºC rating. High temperature pot seals can achieve shorter stand-off lengths which shall be calculated by temperature measurement on the actual installation as per method (b) above.*
*[3] Terminal head terminations have a maximum rating of 60ºC .*

If you are in any doubt about whether your application meets the requirements of any of the mentioned standards in this catalogue, TC Ltd recommend that independent advice be taken from the appropriate approving body. The technical data and guideline information presented in this publication is provided in good faith; however, no warranty, express or implied is given whatsoever as to its accuracy, and no liability is accepted for any errors or omissions. The suitability of any products described herein for a particular application is entirely at the discretion of the purchaser as being the best judge for that particular application.


**PO Box 130**
**Uxbridge**
**UB8 2YS**
**United Kingdom**
**Tel: +44 (0)1895 252222**
**Fax: +44 (0)1895 273540**
**Email: info@tc.co.uk**
**Web: www.tc.co.uk**




## Other Hazardous Area literature available from TC Ltd.


EAC Ex zones 0, 1 and 2 sensors


Ex nA Zone 2 Bearing Sensors


Compression Fittings

Sealed Feedthroughs