



A range of thermocouple sensors specifically designed to withstand the harsh conditions within autoclaves.

Autoclave Load and Drain thermocouples custom built to your specification.

TC Ltd for Temperature Sensing, Measurement and Control

Type 9 Autoclave Thermocouples

Type 9A: Autoclave Load Thermocouple

The harsh conditions found in the autoclave chambers of sterilisers require a reliable sensor, as all too often sensors can fail and instrumentation be damaged through the ingress of moisture. These autoclave load thermocouples offer a reliable solution to the problem.

Available in thermocouple types T or K, they can be supplied as simplex or duplex assemblies and comprise of a stainless steel sensor tip, a length of cable inside a flexible stainless steel conduit, a stainless steel feedthrough and then flying leads oversheathed with silicone rubber.

- Thermocouple types T or K, Simplex or Duplex
- Sensor tip: 6mm diameter 316 Stainless Steel
- Stainless Steel conduit
- Bulkhead feedthrough tube sizes to suit application, 6mm as standard
- Flying leads: PFA insulated with Silicone Rubber sheath
- Operating range: -50°C to +200°C



Uraer	Gode - Example								
Style No.	Thermocouple Type	Sheath Diameter (6mm)	Sheath Length (L1)	Sensing Junction	Conduit Length (L2)	Feedthrough Tube Diameter (d2)	Feedthrough Tube Length (L3)	Cable Length (L4)	Optional Connector (if required)
9A	- T -	6.0MM	- 150MM	- 21 -	1.5 MTRS	- 6MM -	- 150MM	- 1.5 MTRS	- R11

2I denotes an insulated thermocouple junction

Type 9B: Autoclave Drain Thermocouple

Designed specifically for autoclave drain applications, these sensors incorporate similar manufacturing techniques to the load sensor which results in a very reliable sensor being produced.

- Thermocouple type T or K, Simplex or Duplex
- Sensor tip: 6mm diameter 316 Stainless Steel
- Flying leads: PFA insulated with Silicone Rubber sheath
- Operating range: -50°C to +200°C

Available in thermocouple types T or K, they can be supplied as simplex or duplex assemblies and comprise of a stainless steel sensor tip with a length of flying leads that are oversheathed with silicone rubber.



Order Code - Example

Style No.	Therm Ty	ocouple pe	Sheath Diameter (6mm)	Sheath Length (L1)	Sensing Junction	Cable Length (L2)	Optional Connector (if required)
9B	- 1	· -	6.0MM	- 100MM	- 21	- 3 MTRS	- R11

2I denotes an insulated thermocouple junction.

Type 9C: Miniature Autoclave Thermocouple

L1

A miniature thermocouple sensor specifically designed for general purpose use in autoclaves and other similarly demanding applications.

- Thermocouple type T or K
- Sensor tip: 3mm diameter 316 Stainless Steel

- Tolerance to IEC 60584-1 Class 1 : 2013
 - Flying leads: PTFE insulated

L2

• Operating range: -100°C to +200°C





Order Code - Example							
Style No.		Thermocouple Type	Sheath Diameter (3mm)	Sheath Length (L1)	Sensing Junction	Cable Length (L2)	Optional Connector (if required)
9C	-	К -	3.0MM	- 30MM	- 21	- 3 MTRS	- R11
I danata an insulated thermosoundia junction							

Autoclave Thermocouples Type 1 B13



Type 1 B13: Welded Tip 'Gas and Water Tight' PTFE Thermocouple

Made from gas, water and steam tight PTFE 'single shot' insulation, these fast response thermocouples are ideal for general purpose temperature measurements in and around autoclaves and sterilisers. Round construction, 2.3mm diameter, made to any length required. Temperature range: -75°C to +250°C. Available in thermocouple type T, K or J.

Order Code - Example							
Type No.	Thermocouple Type		Overall Length	Connector (optional)			
1 B13	- K	-	2 MTRS	-	F11		

Autoclave Pt100 Sensors Type 69

Type 69A: Autoclave Load RTD Pt100 Sensor

The harsh conditions found in the autoclave chambers of sterilisers require a reliable sensor, as all too often sensors can fail and instrumentation be damaged through ingress of moisture. These autoclave load resistance thermometers offer a reliable solution to the problem.

Available in tolerance classes B or A, they can be supplied as simplex or duplex assemblies in a 3 or 4-wire configuration and comprise of a stainless steel sensor tip, a length of cable inside a flexible stainless steel conduit, a stainless steel feedthrough and then flying leads oversheathed with silicone rubber.

- Simplex or Duplex 3 or 4 wire Pt100 element meets IEC 60751 Class B or A : 2008
- Sensor tip: 6mm diameter 316 Stainless Steel
- Stainless Steel conduit
- Flying leads: PFA insulated with silicone rubber sheath
- Bulkhead feedthrough tube sizes to suit application, 6mm as standard
- Operating range: -50°C to +200°C



Order 0	Order Code - Example									
Style No.	Tolerance Class	No. of Wires	Sheath Diameter	Sheath Length (L1)	No. of Elements*	Conduit Length (L2)	Feedthrough Diameter (d2)	Feedthrough Length (L3)	Cable Length (L4)	Optional Connector (if required)
69A	- A -	3 -	- 6.0MM -	150MM	- 2 -	1.5 MTRS	- 6MM	- 150MM	- 1.5 MTRS	- F16CU

* enter '1' for simplex or '2' for duplex

F11 - Optional F11 Miniature Plug

R11 - Optional R11 Standard Plug

Type 69B: Autoclave Drain RTD Pt100 Sensor

Whilst the conditions endured by autoclave drain sensors are not as harsh as in the main autoclave chamber, a reliable simplex or duplex sensor should still be used. Our model incorporates similar manufacturing techniques to the autoclave load sensor in order to produce a dependable sensor.

- Simplex or Duplex 3 or 4 wire Pt100 element meets IEC 60751 Class B : 2008
- Sensor tip: 6mm diameter 316 Stainless Steel
- Flying leads: PFA insulated with Silicone Rubber sheath
- Operating range: -50°C to +200°C



Order Code - Example								
Style No.	Tolerand Class	e	No. of Wires	Sheath Diameter	Sheath Length (L1)	No. of Elements*	Cable Length (L2)	Optional Connector (if required)
69B	- B	-	3	- 6.0MM	- 100MM	- 1	- 3 MTRS	- F16CU
* enter '1' for sir	enter '1' for simplex or '2' for duplex							

Pressure and Vacuum Sealed Feedthroughs

Pressure and Vacuum Sealed Feedthroughs

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.

- Inhibit the leakage of gas or other media
- Restrain the elements from moving in the assembly
- Versions available to seal on both single and multiple elements
- Generally ex-stock for quick delivery
- Technical support and advice available



		Spectite [®] Sealed Feedthroughs	Spectite® Sealed Feedthroughs				
SEC-	Illustration	Features	Notes				
PF	Feedthroughs for single elements	 Seals on probes, sensors, small-bore tubes and other similar elements Immersion length of the element can be easily adjusted 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 Immersion length of the element can be easily adjusted 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.				

Thermocouple Connectors rated to 220°C

A range of standard and miniature thermocouple and RTD connectors to suit our sensors and cables for connection to instrumentation, panels etc.

	Types of Connector							
SEC	Diagram	Specification		Diagram	Specification			
R11		Standard 2-pin (round) Plug Suitable for wires from 0.2mm to 2.0mm diameter R11 Plug rated to 220°C	F11		Miniature 2-pin (flat) Plug Suitable for wire diameters up to 0.6mm F11 Socket rated to 220°C			
R20		Standard 2-pin (round) Socket Suitable for wires from 0.2mm to 2.0mm diameter R20 Socket rated to 220°C	F20		Miniature 2-pin (flat) Socket Suitable for wire diameters up to 0.6mm F20 Socket rated to 220°C			
R17	35 15 12.5	Standard 3-pin (round) Plug Suitable for wires from 0.2mm to 2.0mm diameter R17 Plug rated to 220°C	F17	19 12 ● ● ● ● ● ● ● ● ● ●	Miniature 3-pin (flat) Plug Suitable for wire diameters up to 0.6mm F17 Plug rated to 220°C			
R25	35 12.5 36.5 36.5	Standard 3-pin (round) Socket Suitable for wires from 0.2mm to 2.0mm diameter R25 Socket rated to 220°C	F25		Miniature 3-pin (flat) Socket Suitable for wire diameters up to 0.6mm F25 Socket rated to 220°C			



Thermocouple and RTD Cables for use in Autoclaves

All cables shown here are suitable for • autoclave and sterilizer applications PFA and PTFE withstands attack from • virtually all known chemicals, oils and fluids. All our PFA / PTFE cables are made in extruded form and are therefore gas, steam and water tight which makes them particularly suitable for applications such as autoclaves or sterilizers PTFE and PFA cables are rated to 250°C. whereas the Silicone Rubber cable is suitable for use up to 200°C (continuous) **PTFE Single Shot PFA Flat Twin PFA** Twisted PFA / Silicone Rubber Insulated One pair of stranded conductors PFA insulated. Pair twisted One pair of solid Two pairs of stranded Cores of stranded copper conductors. Cores PFA conductors Pair laid flat conductors PEA insulated Pair insulated. Cores bunched together. Silicone rubber and PTFE sheathed. Round together and fibreglass braided. sheathed overall. twisted and silicone rubber Silicone Rubber is highly flexible and is • construction (B13) or oval Clear PFA sheathed overall. sheathed overall. more suitable for pressurised vacuum seals (B15). **Stock Number B13 B15 B94** SM0302 **RS37 RS47 RS67 RS87** 7 7 Number of Strands 1 1 3 7 7 7 CONDUCTORS .3 .2 .2 .2 Diameter (mm) .376 .376 .32 .2 Total Area (mm²) .11 .11 .56 .21 .22 .22 .22 .22 Size of Strand SWG 28 28 21 25 36 36 36 36 Approx. Gauge AWG 27 27 20 24 32 32 32 32 Insulation PTFE PFA PFA PFA Number of Pairs 1 1 2 3 cores 4 cores 6 cores 8 cores PAIRS Laid Flat or Twisted Laid Flat Twisted Twisted Twisted Screen No No No No No Insulation Fibreglass / PFA Silicone Rubber Silicone Rubber Continuous -75 to +250 -75 to +250 -40 to +200 -40 to +200 Insulation Rating (°C) Short Term +300 +300 -50 to +250 -50 to +250 **Colour Coding** Yes Yes Yes Yes OVERAL Abrasion Resistance Good Good Good Good Physical Moisture Resistance Very Good Very Good Very Good Very Good Properties Typical Weight (Kg/100m) 3 4 2 4 1 1 3 3 ng reel Diameter under Armour (mm) Diameter over Armour (mm) Overall Diameter¹ 2.3 1.5x2.6 4 4 4 4 5 5 Gas, steam and water Gas, steam and water tight Gas, steam and water tight Gas, steam and water tight insulation. Rejects Notes tight insulation. Single insulation. Round section insulation. Rejects electromagnetic and electrostatic interference shot construction. electromagnetic and Round section. Ideal for use in autoclaves electrostatic interference. Round section.

1 These values are nominal and if critical to your application, please request a physical check.

The above cables where applicable have cores which are colour coded in accordance with IEC 60751:2008 and BS EN 60751. These cables are normally available from us for immediate delivery from stock.

If you have any specific requirements regarding cable lengths please let us know so that we may make a satisfactory offer to meet your needs.

Colour Codes available (other colour codes on request)



Order Code - Example					
Stock Number	Thermocouple Type	Colour Code			
B15 ·	- ТХ -	IEC			



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