Autoclave Thermocouples (Type 9) and Pt100 Sensors (Type 69)

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

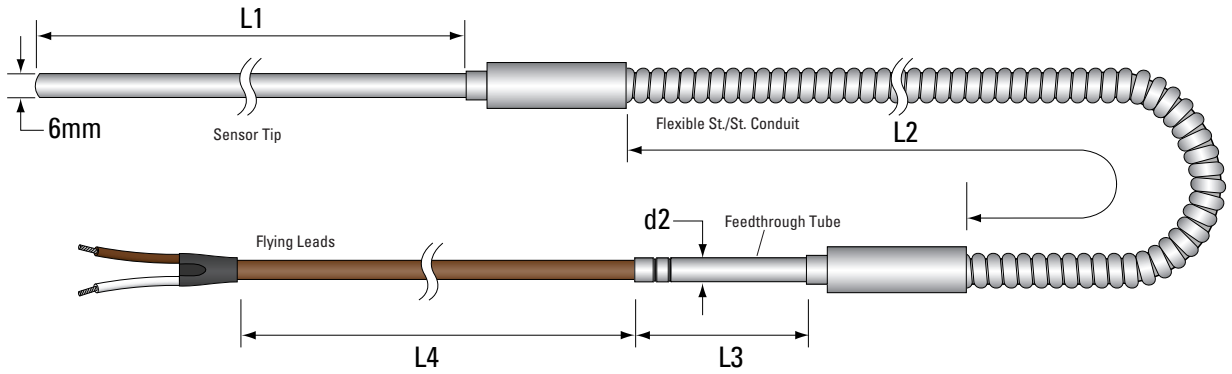
Type 9 Autoclave Thermocouples

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**



Order Code - 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	2I	1.5 MTRS	6MM	150MM	1.5 MTRS	R11

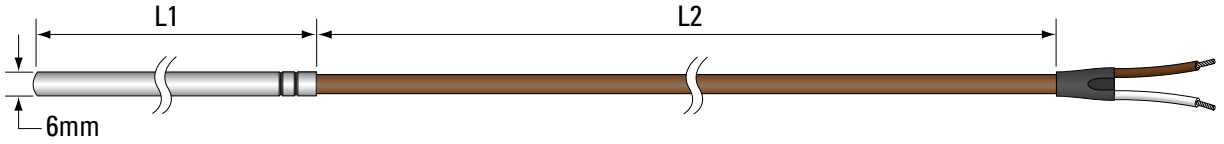
2I denotes an insulated thermocouple junction.

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.

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.

- **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**



Order Code - Example

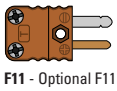
Style No.	Thermocouple Type	Sheath Diameter (6mm)	Sheath Length (L1)	Sensing Junction	Cable Length (L2)	Optional Connector (if required)
9B	T	6.0MM	100MM	2I	3 MTRS	R11

2I denotes an insulated thermocouple junction.

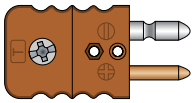
Type 9C: Miniature Autoclave Thermocouple

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

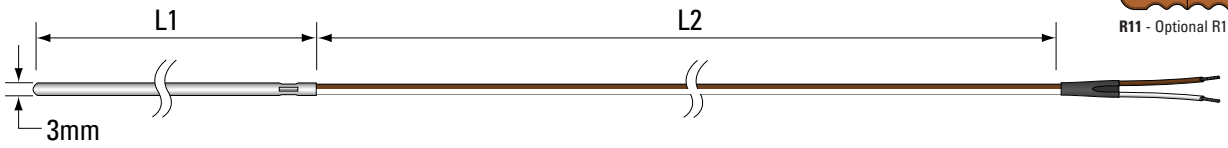
- **Thermocouple type T or K**
- **Sensor tip: 3mm diameter 316 Stainless Steel**
- **Tolerance to IEC 60584-1 Class 1 : 2013**
- **Flying leads: PTFE insulated**
- **Operating range: -100°C to +250°C**



F11 - Optional F11 Miniature Plug



R11 - Optional R11 Standard Plug

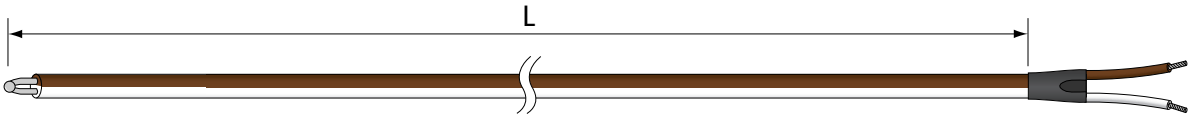


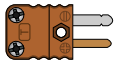
Order Code - Example

Style No.	Thermocouple Type	Sheath Diameter (3mm)	Sheath Length (L1)	Sensing Junction	Cable Length (L2)	Optional Connector (if required)
9C	K	3.0MM	30MM	2I	3 MTRS	R11

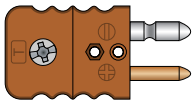
2I denotes an insulated thermocouple junction.

Autoclave Thermocouples Type 1 B13





F11 - Optional F11 Miniature Plug



R11 - Optional R11 Standard Plug

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

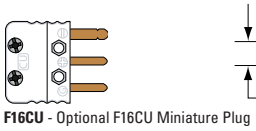
Autoclave Pt100 Sensors Type 69

Type 69A: Autoclave Load RTD Pt100 Sensor

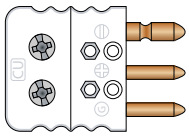
The harsh conditions found in the autoclave chambers of sterilisers require a reliable sensor, as all too often sensors can fail and instrumentation be damaged through ingress of moisture. These autoclave load resistance thermometers offer a reliable solution to the problem.

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.

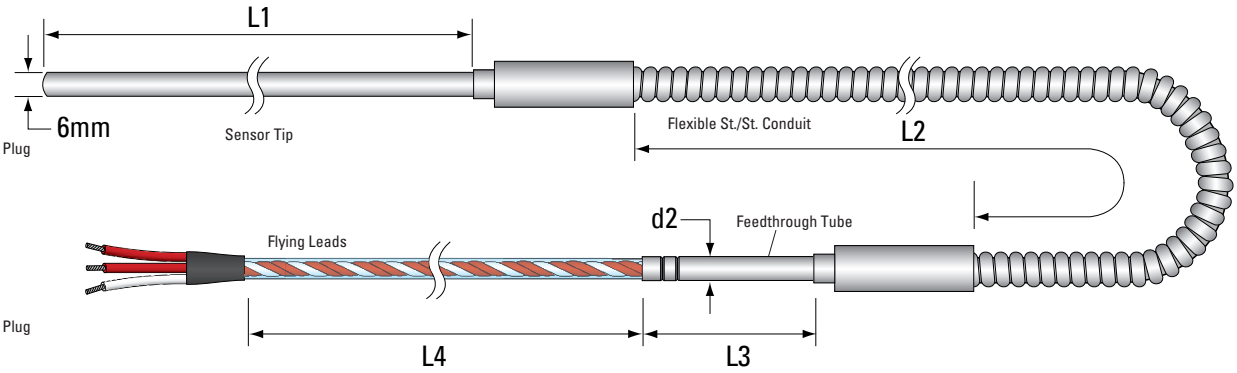
- **Simplex or Duplex 3 or 4 wire Pt100 element meets IEC 60751 Class B or A**
- **Sensor tip: 6mm diameter 316 Stainless Steel**
- **Stainless Steel conduit**
- **Flying leads: PFA insulated with silicone rubber sheath**
- **Bulkhead feedthrough tube sizes to suit application, 6mm as standard**
- **Operating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



F16CU - Optional F16CU Miniature Plug



R16CU - Optional R16CU Standard Plug



Order Code - Example

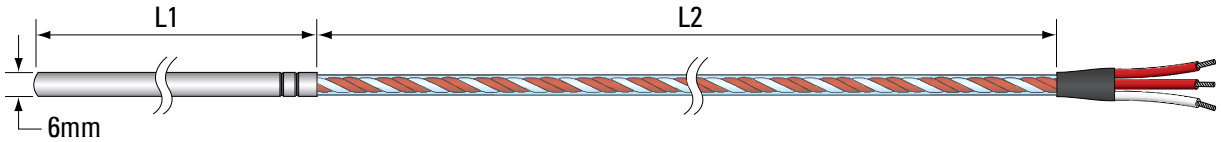
Style No.	Tolerance Class	No. of Wires	Sheath Diameter	Sheath Length (L1)	No. of Elements*	Conduit Length (L2)	Feedthrough Diameter (d2)	Feedthrough Length (L3)	Cable Length (L4)	Optional Connector (if required)
69A -	A -	3 -	6.0MM -	150MM -	2 -	1.5 MTRS -	6MM -	150MM -	1.5 MTRS -	F16CU

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

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**
- **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.	Tolerance Class	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

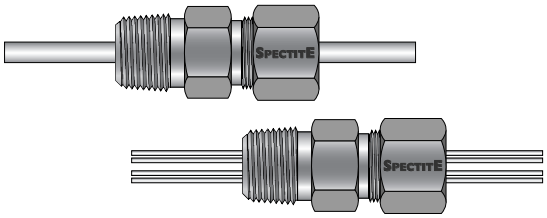
** enter '1' for simplex or '2' for duplex*

Pressure and Vacuum Sealed Feedthroughs

Pressure and Vacuum Sealed Feedthroughs

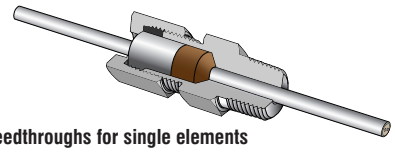
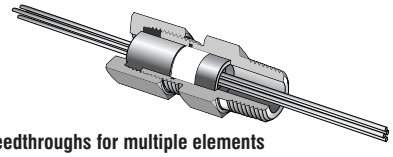
Spectite® sealed feedthroughs from TC Ltd. are essential when probes, sensors, electrodes, wires and other types of static elements need to be sealed as they pass through a pressure or environmental boundary.

- **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**



SECTION 1

Spectite® Sealed Feedthroughs

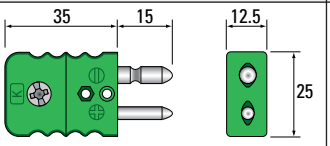
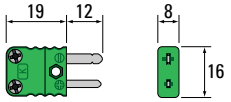
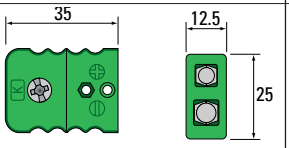
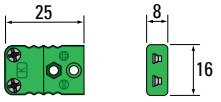
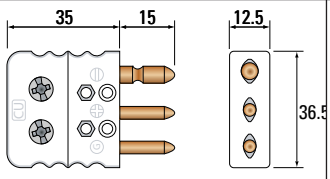
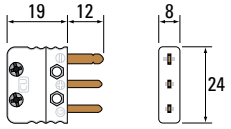
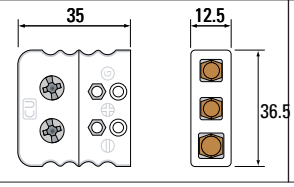
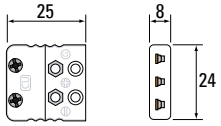
	Illustration	Features	Notes
PF	 **Feedthroughs for single elements**	• Seals on probes, sensors, small-bore tubes and other similar elements • Immersion length of the element can be easily adjusted • Vacuum to 700 bar	These feedthroughs are designed for sealing single elements, usually sensors, probes 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 220ºC

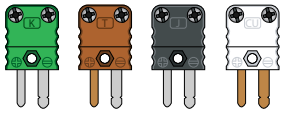
A range of standard and miniature thermocouple and RTD connectors to suit our sensors and cables for connection to instrumentation, panels etc.

SECTION 1

Types of Connector

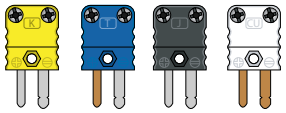
	Diagram	Specification		Diagram	Specification
R11		**Standard 2-pin (round) Plug** Suitable for wires from 0.2mm to 2.0mm diameter R11 Plug rated to **220**°C	**F11**		**Miniature 2-pin (flat) Plug** Suitable for wire diameters up to 0.6mm F11 Socket rated to **220**°C
R20		**Standard 2-pin (round) Socket** 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		**Standard 3-pin (round) Plug** Suitable for wires from 0.2mm to 2.0mm diameter R17 Plug rated to **220**°C	**F17**		**Miniature 3-pin (flat) Plug** Suitable for wire diameters up to 0.6mm F17 Plug rated to **220**°C
R25		**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

Colour Codes available
to IEC 60584-3 : 2007



Thermocouple Type	K	T	J	Cu

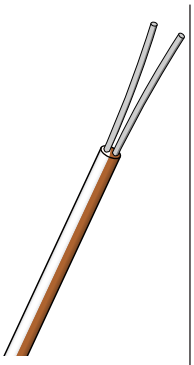
Colour Codes available
to ANSI MC96.1



Thermocouple Type	K	T	J	Cu

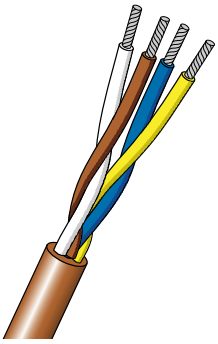
Thermocouple and RTD Cables for use in Autoclaves

- 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)
- Silicone Rubber is highly flexible and is more suitable for pressurised vacuum seals

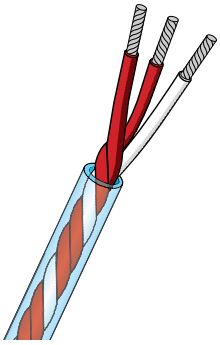


PTFE Single Shot
One pair of solid conductors. Pair laid flat and PTFE sheathed. Round construction (B13) or oval (B15).

PFA Flat Twin
One pair of stranded conductors. PFA insulated. Pair twisted together and fibreglass braided. Clear PFA sheathed overall.



PFA Twisted
Two pairs of stranded conductors PFA insulated. Pair twisted and silicone rubber sheathed overall.



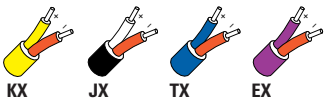
PFA / Silicone Rubber Insulated
Cores of stranded copper conductors. Cores PFA insulated. Cores bunched together. Silicone rubber sheathed overall.

	Stock Number		B13	B15	B94	SM0302	RS37	RS47	RS67	RS87
CONDUCTORS	Number of Strands		1	1	7	3	7	7	7	7
	Size of Strand	Diameter (mm)	.376	.376	.32	.3	.2	.2	.2	.2
		Total Area (mm^2)	.11	.11	.56	.21	.22	.22	.22	.22
		Approx. Gauge 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			
PAIRS	Number of Pairs		1		1	2	3 cores	4 cores	6 cores	8 cores
	Laid Flat or Twisted		Laid Flat		Twisted	Twisted	Twisted			
	Screen		No	No	No	No	No			
OVERALL	Insulation		—		Fibreglass / PFA	Silicone Rubber	Silicone Rubber			
	Insulation Rating (°C)	Continuous	-75 to +250		-75 to +250	-40 to +200	-40 to +200			
		Short Term	+300		+300	-50 to +250	-50 to +250			
	Colour Coding		Yes		Yes	Yes	Yes			
	Physical Properties	Abrasion Resistance	Good		Good	Good	Good			
		Moisture Resistance	Very Good		Very Good	Very Good	Very Good			
		Typical Weight (Kg/100m) (excluding reel)	1	1	3	4	2	3	3	4
	Diameter under Armour (mm)		—		—	—	—			
	Diameter over Armour (mm)		—		—	—	—			
	Overall Diameter[1]		2.3	1.5x2.6	4	4	4	4	5	5
	Notes		Gas, steam and water tight insulation. Single shot construction. Ideal for use in autoclaves.		Gas, steam and water tight insulation. Round section.	Gas, steam and water tight insulation. Rejects electromagnetic and electrostatic interference. Round section.	Gas, steam and water tight insulation. Rejects electromagnetic and 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 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	-	TX	-	IEC

PO Box 130
Uxbridge
UB8 2YS
United Kingdom
Tel: 01895 252222
International: +44 1895 252222
Email: info@tc.co.uk
Web: www.tc.co.uk

© TC Ltd. 2021
Issue Number: 0722

TC Ltd for Temperature Sensing, Measurement and Control