



# Cable Selection Guide

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## SELECTING SENSOR CABLES: GUIDE TO INSULATION & COVERING

Which insulation Material?	usable temperature range	Application Notes
PVC	-10°C to 105°C	Good general purpose insulation for 'light' environments. Waterproof and very flexible.
PFA (extruded)	-75°C to 250°C	Resistant to oils, acids other adverse agents and fluids. Good mechanical strength and flexibility. PTFE better for steam/elevated pressure environments
PTFE (taped & wrapped)	-75°C to 250/300°C	Resistant to oils, acids other adverse agents and fluids. Good mechanical strength and flexibility.
Glassfibre (varnished)	-60°C to 350/400°C	Good temperature range but will not prevent ingress of fluids. Fairly flexible but does not provide good mechanical protection.
High temperature glassfibre	-60°C to 700°C	Will withstand temperature up to 700°C but will not prevent ingress of fluids. Fairly flexible, not good protection against physical disturbance.
Ceramic Fibre	0 to 1000°C	Will withstand high temperature, up to 1000°C. Will not protect against fluids or physical disturbance.
Glassfibre (varnished) stainless steel overbraided	-60°C to 350/400°C	Good resistance to physical disturbance and high temperature (up to 400°C). Will not prevent ingress of fluids.

**Screened or unscreened?** With long cable runs, the cable may need to be screened and earthed at one end (at the instrument) to minimise noise pick-up (interference) on the measuring circuit. Alternative types of screened cable construction are available and these include the use of copper or mylar screening. Twisted pair configurations are offered and these can incorporate screening as required.

## THERMOCOUPLE ACCURACIES

Tolerance classes for thermocouples to IEC 60584-1 : 2013 / BS EN 60584-1 : 2013

Fe-Con (J)	Class	Temperature Range	Accuracy	Symbol	Max Deviation
Fe-Con (J)	Class 1	- 40 +750°C:	±0.004	. t	or ±1.5°C
	Class 2	- 40 +750°C:	±0.0075	. t	or ±2.5°C
	Class 3	- - -	-	-	-
Cu-Con (T)	Class 1	- 40 +350°C:	±0.004	. t	or ±0.5°C
	Class 2	- 40 +350°C:	±0.0075	. t	or ±1.0°C
	Class 3	-200 + 40°C:	±0.015	. t	or ±1.0°C
NiCr -Ni (K) and NiCrSi-NiSi (N)	Class 1	- 40 +1000°C:	±0.004	. t	or ±1.5°C
	Class 2	- 40 +1200°C:	±0.0075	. t	or ±2.5°C
	Class 3	-200 + 40°C:	±0.015	. t	or ±2.5°C
NiCr-Con (E)	Class 1	- 40 +800°C:	±0.004	. t	or ±1.5°C
	Class 2	- 40 +900°C:	±0.0075	. t	or ±2.5°C
	Class 3	-200 + 40°C:	±0.015	. t	or ±2.5°C
Pt10Rh-Pt (S) and Pt13Rh-Pt (R)	Class 1	0 +1600°C:	1 for $t < 1100^{\circ}\text{C}$ , [1 + 0,003 x (t - 1100)] for $t > 1100^{\circ}\text{C}$	. t	or ±1.0°C
	Class 2	0 +1600°C:	±0.0025	. t	or ±1.5°C
Pt30Rh-Pt6Rh (B)	Class 1	- - -	-	-	-
	Class 2	+600 +1700°C:	±0.0025	. t	or ±1.5°C
	Class 3	+600 +1700°C:	±0.005	. t	or ±4.0°C

Note: t = actual temperature Use the larger of the two deviation values

## COLOUR CODES: THERMOCOUPLE CONNECTORS, EXTENSION AND COMPENSATING WIRES AND CABLES

TYPE	CONDUCTORS +/-	INSULATION COLOUR CODES Extension & Compensating Leads			CABLE CODE
		BRITISH BS1843: 1952	FORMER STANDARD AMERICAN ANSI/MC 96.1	GERMAN DIN 43713 / 43714	
EX	NICKEL CHROMIUM/CONSTANTAN (Nickel Chromium/Copper Nickel, Chromel/Constantan, T1/Advance, NiCr/Constantan)				EX
J	IRON*/CONSTANTAN (Iron/Copper Nickel, Fe/Konst Iron/Advance, Fe/Constantan I/C)				JX
K	NICKEL CHROMIUM/NICKEL ALUMINIUM* (NC/NA, Chromel/ Alumel, C/A, T1/T2, NiCr/Ni, NiCr/ NiAl)				KX
N	NICROSIL/NISIL				NX NC
T	COPPER/CONSTANTAN (Copper/Copper Nickel, Cu/Con, Copper/Advance)				TX
Vx	COPPER/CONSTANTAN (LOW NICKEL) (Cu/Constantan) Compensating for K (Cu/Constantan)				KCB
U	COPPER/COPPER NICKEL Compensating for Platinum 10% or 13% Rhodium/Platinum (Codes S & R respectively) (Copper/Cupronic Cu/CuNi, Copper/No. 11 Alloy)				RCA SCA
* Magnetic, ( ) Alternative & Trade Name		FOR THERMOCOUPLE CONNECTORS body colours are similar to outer sheath colours		FOR THERMOCOUPLE CONNECTORS body colours are similar to outer sheath colours	

## CALIBRATION GUIDE

Thermocouple Type	emf in absolute millivolts (IEC 584)					
	100°C	400°C	800°C	1000°C	1200°C	1500°C
T	4.279	20.872	-	-	-	-
E	6.319	28.946	61.017	76.373	-	-
J	5.269	21.848	45.494	57.953	69.553	-
K	4.096	16.397	33.275	41.276	48.838	-
N	2.774	12.974	28.455	36.256	43.846	-
R	0.647	3.408	7.950	10.506	13.228	17.451
S	0.646	3.259	7.345	9.587	11.951	15.582
B	0.033	0.787	3.154	4.834	6.786	10.099

## PRACTICAL BRIDGE CIRCUITS FOR 2, 3 AND 4 WIRE THERMOMETERS

The connection between the thermometer assembly and the instrumentation. The cabling introduces electrical resistance which is placed in series with the resistance thermometer. **The two resistances are therefore cumulative and could be interpreted as an increased temperature if the lead resistance is not allowed for.** The longer and/or the smaller the diameter of the cable, the greater the lead resistance will be and the measurement errors could be appreciable. In the case of a **2 wire connection**, little can be done about this problem and some measurement error will result according to the cabling and input circuit arrangement.

For this reason, a **2 wire arrangement is only suitable for short cable lengths.** If it is essential to use only 2 wires, ensure that the largest possible diameter of conductors is specified and

that the length of cable is minimised to keep cable resistance to as low a value as possible.

**The use of 3 wires**, when dictated either by probe construction or by the input termination of the measuring instrument, will allow for a good level of lead resistance compensation. **However the compensation technique is based on the assumption that the resistance of all three leads is identical** and that they all reside at the same ambient temperature; this is not always the case. **Optimum accuracy is therefore achieved with a 4 wire configuration.**

2 Wire Connections    3 Wire Connections    4 Wire Connection



## STEM CONDUCTION

This is the mechanism by which heat is conducted from or to the process medium by the probe itself; an apparent reduction or increase respectively in measured temperature results. The **immersion depth** (the length of that part of the probe which is directly in contact with the medium) must be such as to ensure that the "sensing" length is exceeded (double the sensing length is recommended). Small immersion depths result in a large temperature gradient between the sensor and the surroundings which results in a large heat flow.

The ideal immersion depth can be achieved in practice by moving the probe into or out of the process medium incrementally; with each adjustment, note any apparent change in indicated temperature. The correct depth will result in no change in indicated temperature. For calibration purposes 150 to 300mm immersion is required depending on the probe construction.

## SELF-HEATING

In order to measure the voltage dropped across the Pt sensing resistor, a current must be passed through it. The measuring current produces heat dissipation in the sensor. This results in an increased temperature indication. It is necessary to minimise the current flow as much as possible; 1mA or less is usually acceptable.

If the sensor is immersed in flowing liquid or gas, the effect is reduced because of more rapid heat removal. Conversely, in still gas for example, the effect may be significant. The self-heating coefficient E is expressed as:

$$E = \Delta t / (R - I^2)$$

Where  $\Delta t$  = (indicated temperature) - (temperature of the medium)

R = Pt resistance

I = measurement current

## RESISTANCE V TEMPERATURE AND TOLERANCES FOR PLATINUM RESISTORS TO IEC 751(1995)/BS EN60751(1996)

Temp (°C)	Resistance (Ω)	Tolerance			
		Class A (±Ω)		Class B (±Ω)	
-200	18.52	0.55	0.24	1.3	0.56
-100	60.26	0.35	0.14	0.8	0.32
0	100.00	0.15	0.06	0.3	0.12
100	138.51	0.35	0.13	0.8	0.30
200	175.86	0.55	0.20	1.3	0.48
300	212.05	0.75	0.27	1.8	0.64
400	247.09	0.95	0.33	2.3	0.79
500	280.98	1.15	0.38	2.8	0.93
600	313.71	1.35	0.43	3.3	1.06
650	329.64	1.45	0.46	3.6	1.13
700	345.28	-	-	3.8	1.17
800	375.70	-	-	4.3	1.28
850	390.48	-	-	4.6	1.34

## NEW TOLERANCE CLASSES FOR RESISTORS TO IEC 60751(2008)

For wire wound resistors		For film resistors		Tolerance value <sup>a</sup> °C
Tolerance class	Temperature range of validity °C	Tolerance class	Temperature range of validity °C	
W 0.1	-100 to +350	F 0.1	0 to +150	± (0.1 + 0.0017  t )
W 0.15	-100 to +450	F 0.15	-30 to +300	± (0.15 + 0.002  t )
W 0.3	-196 to +660	F 0.3	-50 to +500	± (0.3 + 0.005  t )
W 0.6	-196 to +660	F 0.6	-50 to +600	± (0.6 + 0.01  t )

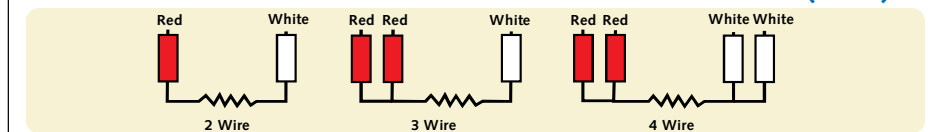
<sup>a</sup> |t| = modulus of temperature in °C without regard to sign. For any value of R.

## NEW TOLERANCE CLASSES FOR THERMOMETERS TO IEC 60751(2008)

Tolerance class	Temperature range of validity °C		Tolerance values <sup>a</sup> °C
	Wire wound resistors	Film resistors	
AA	-50 to +250	0 to +150	± (0.1 + 0.0017  t )
A	-100 to +450	-30 to +300	± (0.15 + 0.002  t )
B	-196 to +600	-50 to +500	± (0.3 + 0.005  t )
C	-196 to +600	-50 to +600	± (0.6 + 0.01  t )

<sup>a</sup> |t| = modulus of temperature in °C without regard to sign. For any value of R.

## RECOMMENDED TERMINATION COLOUR CODES IEC 751(1995)



Which insulation Material?	usable temperature range	Application Note
PVC	-10°C to 105°C	Good general-purpose insulation for “light” environments. Waterproof and very flexible.
PFA (extruded)	-75°C to 250°C	Resistant to oils, acids other adverse agents and fluids. Good mechanical strength and flexibility. PTFE better for steam/elevated pressure environments
PTFE (taped & wrapped)	-75°C to 250/300°C	Resistant to oils, acids other adverse agents and fluids. Good mechanical strength and flexibility.
Glassfibre (varnished)	-60°C to 350/400°C	Good temperature range but will not prevent ingress of fluids. Fairly flexible but does not provide good mechanical protection.
High temperature glass fibre	-60°C to 700°C	Will withstand temperature up to 700°C but will not prevent ingress of fluids. Fairly flexible, not good protection against physical disturbance.
Ceramic Fibre	0 to 1000°C	Will withstand high temperature, up to 1000°C. Will not protect against fluids or physical disturbance.
Glassfibre (varnished) stainless steel overbraid	-60°C to 350/400°C	Good resistance to physical disturbance and high temperature (up to 400°C). Will not prevent ingress of fluids.

For maximum accuracy extension cables should be used and terminals and connectors should be of thermocouple materials to maintain continuity.

The materials are made according to internationally accepted standards as laid down in IEC 584 1,2 which is based on the international Practical Temperature scale ITS 90. Operating temperature maxima are dependent on the conductor thickness of the thermoelements. The thermocouple types can be subdivided in 2 groups, base metal and rare (noble) metal:

## **-200°C up to 1200°C - These thermocouples use base metals**

**Type K - Chromel-Alumel:** The best known and dominant thermocouple belonging to the group chromium-nickel aluminium is type K. Its temperature range is extended (-200 up to 1100°C). Its e.m.f./ temperature curve is reasonably linear and its sensitivity is 41µV/°C

**Type J - Iron-Constantan:** Though in thermometry the conventional type J is still popular it has less importance in Mineral Insulated form because of its limited temperature range, - 200C to +750°C. Type J is mainly still in use based on the widespread applications of old instruments calibrated for this type. Their sensitivity rises to 55µV/°C.

**Type E - Chromel-Constantan:** Due to its high sensitivity (68µV/°C) Chromel-Constantan is mainly used in the cryogenic low temperature range (-200 up to +900°C). The fact that it is non magnetic could be a further advantage in some special applications.

**Type N - Nicrosil-Nisil:** This thermocouple has very good thermoelectric stability, which is superior to other base metal thermocouples and has excellent resistance to high temperature oxidation.

The Nicrosil-Nisil thermocouple is ideally suited for accurate measurements in air up to 1200°C. In vacuum or controlled atmosphere, it can withstand temperatures in excess of 1200°C. Its sensitivity of 39µV/°C

at 900°C is slightly lower than type K (41µV/°C). Interchangeability tolerances are the same as for type K.

**Type T - Copper-Constantan:** This thermocouple is used less frequently. Its temperature range is limited to -200°C up to +350°C. It is however very useful in food, environmental and refrigeration applications. Tolerance class is superior to other base metal types and close tolerance versions are readily obtainable. The e.m.f./temperature curve is quite non-linear especially around 0°C and sensitivity is 42µV/°C.

## **0°C up to +1600°C - Platinum-Rhodium (Noble metal) Thermocouples**

**Type S - Platinum rhodium 10% Rh-Platinum:** They are normally used in oxidising atmosphere up to 1600°C. Their sensitivity is between 6 and 12 µV/°C.

**Type R - Platinum rhodium 13% Rh-Platinum:** Similar version to type S with a sensitivity between 6 and 14µV/°C.

**Type B - Platinum rhodium 30% Rh-Platinum rhodium 6% Rh:** It allows measurements up to 1700°C. Very stable thermocouple but less sensitive in the lower range. (Output is negligible at room temperature).

Historically these thermocouples have been the basis of high temperature in spite of their high cost and their low thermoelectric power. Until the launching of the Nicrosil-Nisil thermocouples, type N, they remained the sole option for good thermoelectric stability.

## Length of cable runs and loop resistance.

The resistivity of extension and compensating cables varies according to the different conductor metals; the limit to cable lengths which can be accommodated by measuring instruments therefore depends on both the thermocouple type and instrument specifications. A general rule for electronic instruments is that up to 100 Ohms loop cable resistance (i.e. total of both legs) will not result in measurement errors.

## Interference and Isolation.

With long runs, the cables may need to be screened and earthed at one end (at the instrument) to minimise noise pick-up (interference) on the measuring circuit.

Alternative types of screened cable construction are available and these include the use of copper or mylar screening. Twisted pair configurations are offered and these can incorporate screening as required.

With mineral-insulated cables the use of the sheath for screening may raise problems. In certain forms the measuring point is welded to the sheath in order to reduce the response time; the screen is then connected directly to the sensor input of the instrument and is therefore ineffective. In thermocouples where the measuring point is welded to the protection tube it may be necessary to take special precautions against interference since the sheath tube can in this case act as an aerial.

Even if the measuring point is not welded to the protection tube it is inadvisable to use the sheath of a mineral-insulated thermocouple as a screen. Since it consists of non-insulated material there is a possibility with electrically heated furnaces that it can carry currents between the furnace material and the earthing point. These may result in measurement errors.

Generally, thermocouples in electrical contact with the protection tube can easily suffer interference from external voltages through voltage pick-up. In addition, two such inputs form a current loop through which the two inputs are connected together. Since such current loops form a preferred path for the introduction of interference, thermocouples should under these conditions always be isolated from each other, i.e. the amplifier circuits must have no electrical connection to the remaining electronics. This is already provided on most instruments intended for connection to thermocouples.

Ceramic materials used for insulating the thermocouples inside the protection tube suffer a definite loss of insulation resistance above 800 to 1000°C. The effects described can therefore appear at high temperatures even in thermocouples where the measuring junction is not welded to the protection tube. Here again full isolation is strongly recommended.

With electrically heated furnaces in the high-temperature range it is also necessary to consider that the increased conductivity of the ceramic insulating materials may cause the supply voltage to leak into the thermocouple. Here again full isolation against supply and earth potential with an insulating voltage exceeding the peak voltage of the supply (heater voltage) is essential.

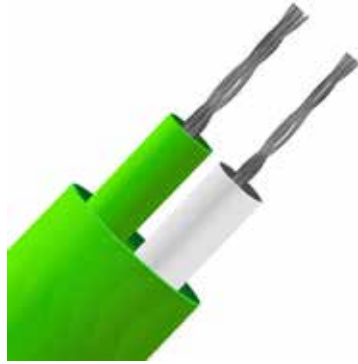
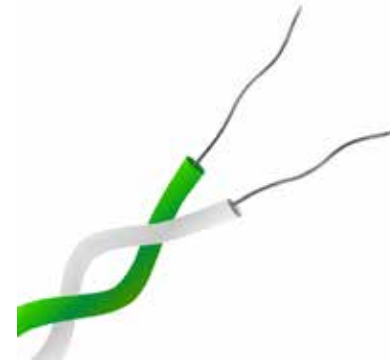
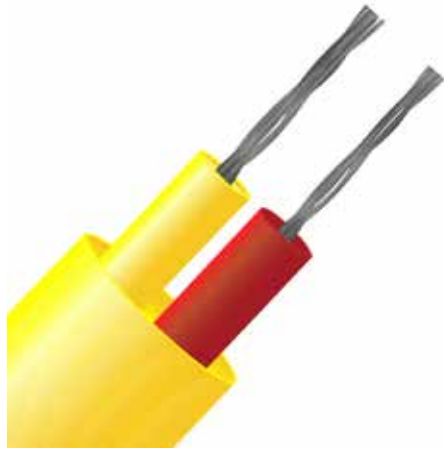

**A**
**PFA Insulated Flat Pair (IEC)**

**B**
**PFA Insulated Twin Twist (IEC)**

Image	Type	Code	Conductors	Jacket	10 Metre Reel		25 Metre Reel		50 Metre Reel		100 Metre Reel	
					RS Order Code	Allied Code	RS Order Code	Allied Code	RS Order Code	Allied Code	RS Order Code	Allied Code
<b>A</b>	K	IEC	1/0.3mm	Green	827-5729	70657118	611-8012	70646169	827-5722	70657116	827-5726	70657117
<b>A</b>	K	IEC	7/0.2mm	Green	827-5716	70657115	611-7980	70646166	611-8006	70646168	827-5710	70657113
<b>A</b>	J	IEC	7/0.2mm	Black	827-5732	70657119	611-8034	70646171	611-8056	-	827-5741	70657122
<b>A</b>	T	IEC	7/0.2mm	Brown	827-5735	70657120	611-8028	70646173	611-8040	70646172	827-5738	70657121

Image	Type	Code	Conductors	Jacket	10 Metre Reel		25 Metre Reel		50 Metre Reel		100 Metre Reel	
					RS Order Code	Allied Code	RS Order Code	Allied Code	RS Order Code	Allied Code	RS Order Code	Allied Code
<b>B</b>	K	IEC	1/0.2mm	Green/White	827-5763	70657129	827-5766	70657130	611-7968	70646164	611-7946	70646162
<b>B</b>	K	IEC	7/0.2mm	Green/White	827-5757	70657127	827-5750	70657125	611-7930	70646161	827-5754	70657126
<b>B</b>	T	IEC	1/0.2mm	Brown/White	827-5779	70657133	827-5772	70657131	611-7974	70646165	611-7952	70646163
<b>B</b>	N	IEC	1/0.2mm	Pink/White	827-5760	70657128	611-7996	70646167	-	-	-	-

This is just a small selection of PFA Thermocouple cable offered by RS / Allied


**A**
**PFA Insulated Flat Pair (ANSI)**

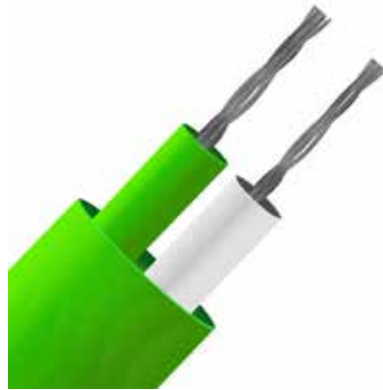
**B**
**PFA Insulated Twin Twist (ANSI)**

Image	Type	Code	Conductors	Jacket	25 Metre Reel		50 Metre Reel		100 Metre Reel	
					RS Order Code	Allied Code	RS Order Code	Allied Code	RS Order Code	Allied Code
<b>A</b>	K	ANSI	7/0.2mm	Yellow	814-0119	70656132	814-0128	70656457	814-0121	70656133

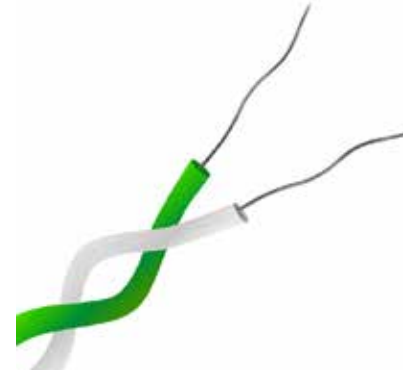
Image	Type	Code	Conductors	Jacket	25 Metre Reel		50 Metre Reel		100 Metre Reel	
					RS Order Code	Allied Code	RS Order Code	Allied Code	RS Order Code	Allied Code
<b>B</b>	K	ANSI	1/0.2mm	Yellow/Red	814-0030	70656106	814-0049	70656111	814-0042	70656109
<b>B</b>	K	ANSI	7/0.2mm	Yellow/Red	814-0046	70656110	814-0055	70656113	814-0058	70656114
<b>B</b>	K	ANSI	1/0.3mm	Yellow/Red	814-0024	70656104	814-0033	70656107	814-0036	70656108
<b>B</b>	T	ANSI	1/0.3mm	Blue/Red	814-0080	70656121	814-0099	70656126	814-0092	70656124
<b>B</b>	T	ANSI	1/0.2mm	Blue/Red	814-0096	70656125	814-0106	70656128	814-0109	70656129

This is just a small selection of PFA Thermocouple cable offered by RS / Allied





**A** PTFE Insulated Flat Pair (IEC)

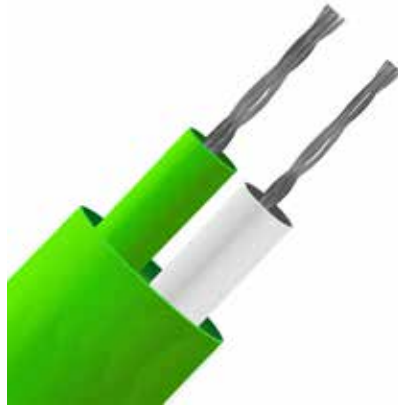


**B** PTFE Insulated Twin Twist (IEC)

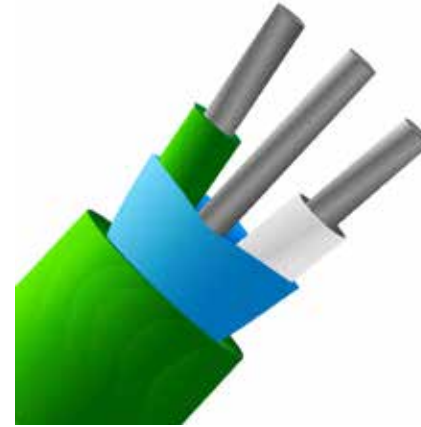
Image	Type	Code	Conductors	Jacket	10 Metre Reel		25 Metre Reel		50 Metre Reel	
					RS Order Code	Allied Code	RS Order Code	Allied Code	RS Order Code	Allied Code
<b>A</b>	K	IEC	7/0.2mm	Green	827-5776	70657132	236-3858	70641732	827-5785	70657135
<b>A</b>	J	IEC	7/0.2mm	Black	827-5798	70657139	455-4258	70644362	827-5808	70657142
<b>A</b>	T	IEC	1/0.3mm	Brown	827-5791	70657137	363-0418	70643610	827-5794	70657138
<b>A</b>	T	IEC	7/0.2mm	Brown	827-5788	70657136	236-3892	70641735	827-5782	70657134

Image	Type	Code	Conductors	Jacket	10 Metre Reel		25 Metre Reel		50 Metre Reel		100 Metre Reel	
					RS Order Code	Allied Code	RS Order Code	Allied Code	RS Order Code	Allied Code	RS Order Code	Allied Code
<b>B</b>	K	IEC	1/0.2mm	Green/White	827-5801	70657140	363-0389	70643608	827-5805	70657141	827-5814	70657144
<b>B</b>	K	IEC	1/0.315 <sub>mm</sub>	Green/White	-	-	827-6000	70657200	827-6019	70657205	-	-
<b>B</b>	J	IEC	1/0.508 <sub>mm</sub>	Black/White	-	-	827-5990	70657197	827-6003	70657201	-	-
<b>B</b>	T	IEC	1/0.2mm	Brown/White	827-5817	70657145	363-0402	70643609	827-5811	70657143	827-5820	70657146

This is just a small selection of PTFE Thermocouple cable offered by RS / Allied



**A** PVC Insulated Flat Pair (IEC)

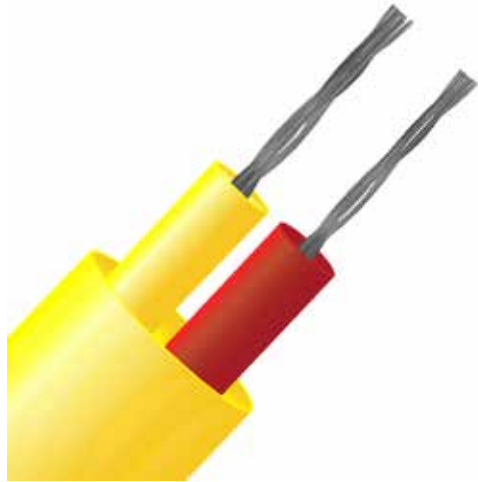


**B** PVC Insulated & Screened (IEC)

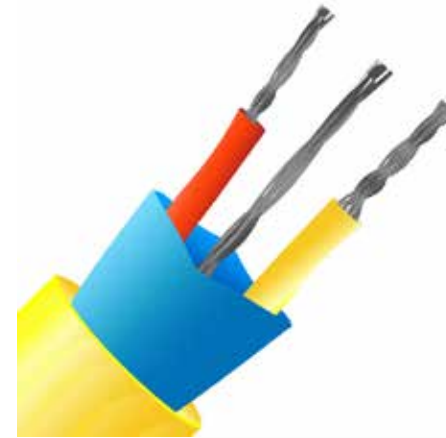
Image	Type	Code	Conductors	Jacket	10 Metre Reel		25 Metre Reel		50 Metre Reel		100 Metre Reel		200 Metre Reel	
					RS Order Code	Allied Code	RS Order Code	Allied Code	RS Order Code	Allied Code	RS Order Code	Allied Code	RS Order Code	Allied Code
<b>A</b>	K	IEC	7/0.2mm	Green	827-5615	70657084	236-3820	70641729	827-5619	70657085	611-7889	70646156	827-5628	70657088
<b>A</b>	K	IEC	13/0.2mm	Green	-	-	827-5883	-	827-5892	-	-	-	-	-
<b>A</b>	K	IEC	23/0.2mm	Green	-	-	827-5895	-	-	-	-	-	-	-
<b>A</b>	J	IEC	7/0.2mm	Black	219-4753	70641640	827-5592	70657078	827-5596	70657079	236-3915	70641737	827-5606	70657081
<b>A</b>	T	IEC	7/0.2mm	Brown	219-4703	70641637	236-3870	70641734	827-5653	70657095	762-1146	70651749	827-5662	70657098

Image	Type	Code	Conductors	Jacket	10 Metre Reel		25 Metre Reel		50 Metre Reel		100 Metre Reel		200 Metre Reel	
					RS Order Code	Allied Code	RS Order Code	Allied Code	RS Order Code	Allied Code	RS Order Code	Allied Code	RS Order Code	Allied Code
<b>B</b>	K	IEC	7/0.2mm	Green	827-5678	70657103	236-3864	70641733	827-5671	70657101	611-7895	70646157	827-5675	70657102
<b>B</b>	J	IEC	7/0.2mm	Black	827-5665	70657099	236-3921	70641738	827-5669	70657100	611-7918	70646159	-	-
<b>B</b>	T	IEC	7/0.2mm	Brown	827-5684	70657105	762-1140	70651747	827-5687	70657106	762-1159	70651752	827-5681	70657104
<b>B</b>	Vx	IEC	7/0.2mm	Green	827-5690	70657107	236-3959	70641740	827-5693	70657108	611-7924	70646160	827-5697	70657109

This is just a small selection of PVC Thermocouple cable offered by RS / Allied



**A** PVC Insulated Flat Pair (ANSI)



**B** PVC Insulated & Screened (ANSI)

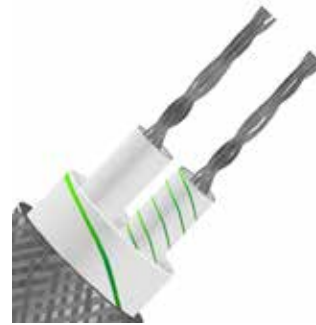
Image	Type	Code	Conductors	Jacket	25 Metre Reel		100 Metre Reel		200 Metre Reel	
					RS Order Code	Allied Code	RS Order Code	Allied Code	RS Order Code	Allied Code
<b>A</b>	K	ANSI	7/0.2mm	Yellow	814-0018	70656102	814-0027	70656105	814-0020	70656103
<b>A</b>	J	ANSI	7/0.2mm	Black	813-9995	70656096	814-0005	70656098	814-0008	70656099
<b>A</b>	T	ANSI	7/0.2mm	Blue	814-0074	70656119	814-0083	70656122	814-0086	70656123
<b>A</b>	Vx	ANSI	7/0.2mm	Yellow	814-0103	70656127	814-0112	70656130	814-0115	70656131

Image	Type	Code	Conductors	Jacket	25 Metre Reel		100 Metre Reel		200 Metre Reel	
					RS Order Code	Allied Code	RS Order Code	Allied Code	RS Order Code	Allied Code
<b>B</b>	K	ANSI	7/0.2mm	Yellow	814-0068	70656117	814-0077	70656120	814-0070	70656118
<b>B</b>	J	ANSI	7/0.2mm	Black	814-0002	70656097	814-0011	70656100	814-0014	70656101

This is just a small selection of PVC Thermocouple cable offered by RS / Allied



**A** Glassfibre Insulated (IEC)



**B** Glassfibre Insulated with Stainless Steel Overbraid (IEC)



**C** Glassfibre Insulated with Stainless Steel Overbraid (ANSI)

Image	Type	Code	Conductors	Jacket	10 Metre Reel		25 Metre Reel		50 Metre Reel		100 Metre Reel		200 Metre Reel	
					RS Order Code	Allied Code	RS Order Code	Allied Code	RS Order Code	Allied Code	RS Order Code	Allied Code	RS Order Code	Allied Code
<b>A</b>	K	IEC	1/0.3mm	Green/White	219-4589	70641631	236-3836	70641730	827-5833	70657149	827-5842	70657152	827-5845	70657153
<b>A</b>	J	IEC	7/0.2mm	Black/White	827-5851	70657155	455-4264	70644363	827-5855	70657156	827-5864	70657159	-	-
<b>A</b>	T	IEC	1/0.3mm	Brown/White	236-3909	70641736	827-5849	70657154	827-5858	70657157	-	-	-	-

Image	Type	Code	Conductors	Jacket	10 Metre Reel		25 Metre Reel		50 Metre Reel		100 Metre Reel	
					RS Order Code	Allied Code	RS Order Code	Allied Code	RS Order Code	Allied Code	RS Order Code	Allied Code
<b>B</b>	K	IEC	7/0.2mm	Green/White	219-4595	70641632	236-3842	70641731	827-5867	70657160	827-5861	70657158
<b>B</b>	J	IEC	7/0.2mm	Black/White	827-5870	70657161	236-3937	70641739	827-5873	70657162	827-5877	70657163

Image	Type	Code	Conductors	Jacket	25 Metre Reel		50 Metre Reel		100 Metre Reel	
					RS Order Code	Allied Code	RS Order Code	Allied Code	RS Order Code	Allied Code
<b>C</b>	K	ANSI	1/0.3mm	Yellow/Red	814-0052	70656112	814-0061	70656115	814-0064	70656116

This is just a small selection of Glassfibre Insulated Thermocouple cable offered by RS / Allied



**A** Silicone Rubber Insulated



**B** PVC insulated & screened



**C** PTFE insulated & screened



**D** PFA insulated & screened

Image	Type	Conductors	Jacket	Cores	10 Metre Reel		25 Metre Reel	
					RS Order Code	Allied Code	RS Order Code	Allied Code
<b>A</b>	PRT	7/0.2mm	Brown	4	827-5823	70657147	455-4242	70644361

Image	Type	Conductors	Jacket	Cores	10 Metre Reel		25 Metre Reel		50 Metre Reel	
					RS Order Code	Allied Code	RS Order Code	Allied Code	RS Order Code	Allied Code
<b>B</b>	PRT	7/0.2mm	Black	4	492-9753	70644772	290-4954	70642884	611-8129	70646179

Image	Type	Conductors	Jacket	Cores	10 Metre Reel		25 Metre Reel	
					RS Order Code	Allied Code	RS Order Code	Allied Code
<b>C</b>	PRT	7/0.2mm	Black	4	492-9775	70644773	290-4976	70642885

Image	Type	Conductors	Jacket	Cores	10 Metre Reel		25 Metre Reel		50 Metre Reel		100 Metre Reel	
					RS Order Code	Allied Code	RS Order Code	Allied Code	RS Order Code	Allied Code	RS Order Code	Allied Code
<b>D</b>	PRT	7/0.2mm	Black	4	611-8078	70646175	611-8090	70646176	827-5827	70657148	827-5836	70657150
<b>D</b>	PRT	7/0.2mm	Black	6	-	-	611-8107	70646177	827-5839	70657151	-	-

This is just a small selection of PRT cable offered by RS / Allied



The Thermocouple Welder is a compact, simple-to-use instrument designed for thermocouple and fine wire welding.

It is primarily designed for use by sensor manufacturers to produce commercial grade thermocouple junctions; it is ideal for producing large numbers of exposed junction thermocouples for test and development laboratories. The L60 Thermocouple Welder is ideally suited to transducer and RTD extension lead attachment.

Use of the Thermocouple Welder does not require special skills and most operatives will be capable of producing quality work with little practice. The instrument is supplied with a full range of user accessories including a footswitch.

Suitable for use with wires of up to 1.1mm diameter an argon gas shield facility is included but a satisfactory thermocouple junction is produced

without the need for argon. The output energy of the L60 Thermocouple Welder can be varied up to 60 Joules.

- Simple to use Thermocouple Welder
- Designed for the production of commercial grade thermocouple junctions (See below for range of thermocouple cables)
- Also suitable for other fine wire work
- Front panel or footswitch operation
- Argon gas shield facility

#### **Supplied complete with the following accessories:**

- Wire Holding Pliers & Lead
- Safety Glasses
- Magnifying Eyeglass
- Carbon Electrodes
- Spare 2A Fuse
- Argon Hose
- Mains Lead
- Footswitch for greater ease of use

RS Code	Allied Code
363-0351	70825788