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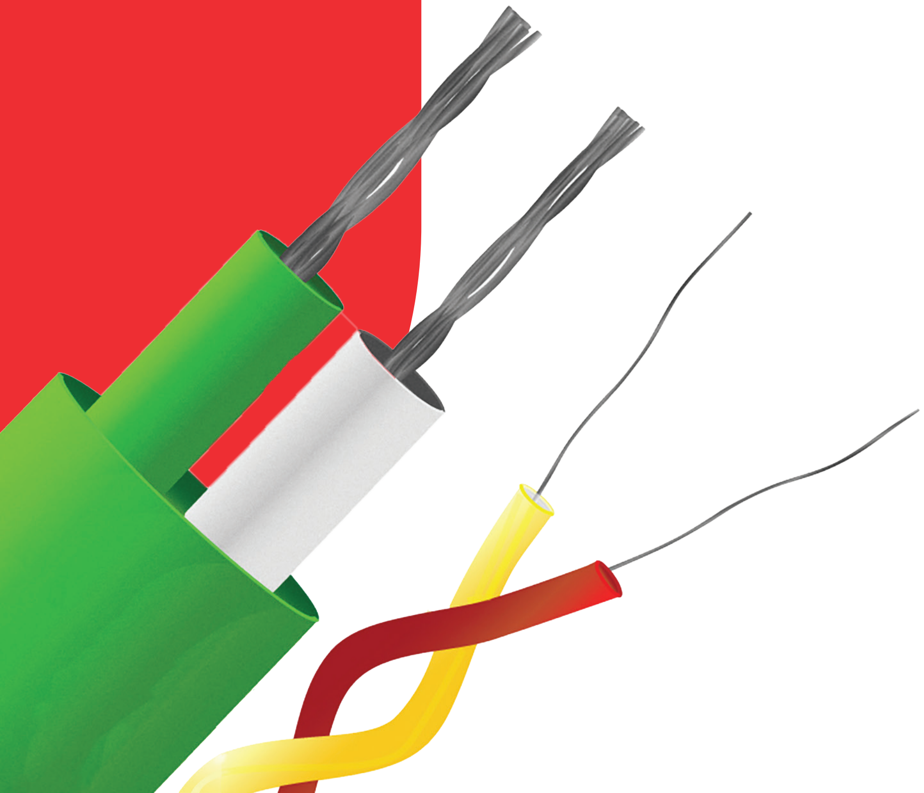
THERMOCOUPLE & PRT CABLE
SELECTION GUIDE



THERMOCOUPLE THERMOMETRY - AT A GLANCE

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Selecting sensor cables: Guide to insulation & covering

Which insulation material?	Useable 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.
Glass fibre (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, doesn’t provide 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.
Glass fibre (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.

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.

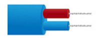
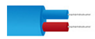
Thermocouple accuracies

Tolerance classes for thermocouples to IEC 60584-1 : 2013 / BS EN 60584-1 : 201

Fe-Con (J)	Class 1	-40°C - +750°C:	±0.004	.t	or ±1.5°C
	Class 2	-40°C - +750°C:	±0.0075	.t	or ±2.5°C
	Class 3	-	-		
Cu-Con (T)	Class 1	-40°C - +350°C:	±0.004	.t	or ±0.5°C
	Class 2	-40°C - +350°C:	±0.0075	.t	or ±1.0°C
	Class 3	-200°C - +40°C:	±0.015	.t	or ±1.0°C
NiCr -NI (K) and NiCrSi-NiSi (N)	Class 1	-40°C - +1000°C:	±0.004	.t	or ±1.5°C
	Class 2	-40°C - +1200°C:	±0.0075	.t	or ±2.5°C
	Class 3	-200°C - +40°C:	±0.015	.t	or ±2.5°C
NiCr-Con (E)	Class 1	-40°C - +800°C:	±0.004	.t	or ±1.5°C
	Class 2	-40°C - +900°C:	±0.0075	.t	or ±2.5°C
	Class 3	-200°C - +40°C:	±0.015	.t	or ±2.5°C
Pt10Rh-Pt (s) and Pt13Rh-Pt (R)	Class 1	0°C - +1600°C:	1 for t <1100°C, [1 + 0,003 × (t - 1100)] for t > 1100°C		or ±1.0°C
	Class 2	0°C - +1600°C:	±0.0025	.t	or ±1.5°C
	Class 3	-	-		
Pt30Rh-Pt6Rh (B)	Class 1	-	-		
	Class 2	+600°C - +1700°C:	±0.0025	.t	or ±1.5°C
	Class 3	+600°C - +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 +/-	Former Standard: British BS1843: 1952	Former Standard: American ANSI/MC 96.1	Former Standard: German DIN 43713 / 43714	IEC 60584-3(2007) BS EN60584-3(2008)	Cable Code
EX	Nickel chromium/Constantan (Nickel, Chromium/Copper Nickel, Chromel/Constantan, T1/Advance, NiCr/Constantan)					EX
J	Iron*/Contantan (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** For Thermocouple connectors body colours are similar to outer sheath colours

Calibration Guide

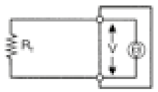
Thermocouple Type	emf in absolute millivolts (IEC 584): 100°C	400°C	800°C	1000°C	1200°C	1500°C
T	4.279	20.872	-	-	-	-
E	6.319	28.946	61.017	76.37	-	-
J	5.269	21.848	45.494	57.953	69.553	-
K	4.096	16.397	33.275	41.276	48.838	-
N	2.774	12.974	28.455	36.256	43.846	-
R	0.647	3.408	7.95	10.506	13.228	17.451
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

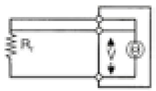
Practical Bridge Circuits For 2, 3 And 4 Wire Thermometers

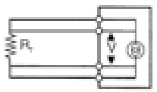
The connection between the thermometer assembly and the instrumentation. The cabling introduces electrical resistance which is placed in series with the resistance thermometer. The two resistances are therefore cumulative and could be interpreted as an increased temperature if the lead resistance is 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 Connections

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:

$E = \Delta t / (R - I2)$

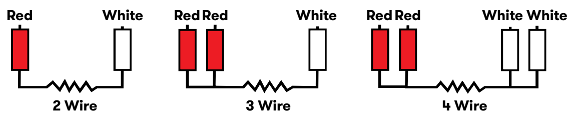
Where Δt = (indicated temperature) – (temperature of the medium)

R = Pt resistance

I = measurement current

Recommended Termination Colour Codes IEC 751(1995)

For dual sensors, IEC 60751(2008) specifies yellow & black(or grey) (instead of red & white as shown) to be introduced for the additional sensing resistor.



Resistance V Temperature and Tolerances for Platinum Resistors to IEC 751(1995)/BS EN60751(1996)

Temp	Resistance	Tolerance			
		Class A		Class B	
(°C)	(Ω)	(±°C)	(±Ω)	(±°C)	(±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 class	Temperature range of validity °C	Tolerance class	Temperature range of validity °C	Tolerance value° °C
W 0.1	-100 to +350	F 0.1	0 - +150	± (0.1 + 0.0017 | t |)
W 0.15	-100 to +450	F 0.15	-30 - +300	± (0.15 + 0.002 | t |)
W 0.3	-196 to +660	F 0.3	-50 - +500	± (0.3 + 0.005 | t |)
W 0.6	-196 to +660	F 0.6	-50 - +600	± (0.6 + 0.01 | t |)

° | 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° °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 |)

° | t | = modulus of temperature in °C without regard to sign. For any value of R°

GUIDE TO WIRE AND CABLE INSULATION AND COVERINGS

WHICH INSULATION MATERIAL?	USEABLE 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.
Glass fibre (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.
Glass fibre (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

THERMOCOUPLE CONSIDERATIONS

Different Thermocouple Junctions

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.

Performance Considerations When Connecting Thermocouples

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.

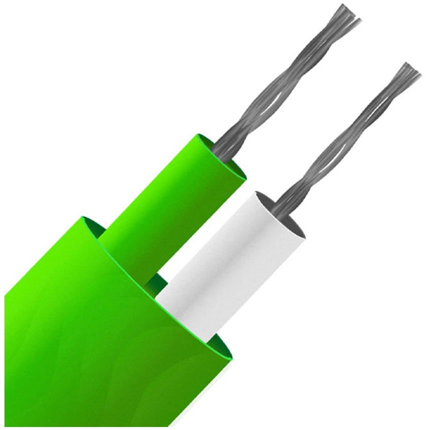
Generally, thermocouples in electrical contact with the protection tube can easily suffer interference from external voltages through voltage pickup. In addition, two such inputs form a current loop through which the two inputs are connected together. Since such current loops form a preferred path for 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.

PFA THERMOCOUPLE CABLE (IEC)

PFA INSULATED FLAT PAIR (IEC)



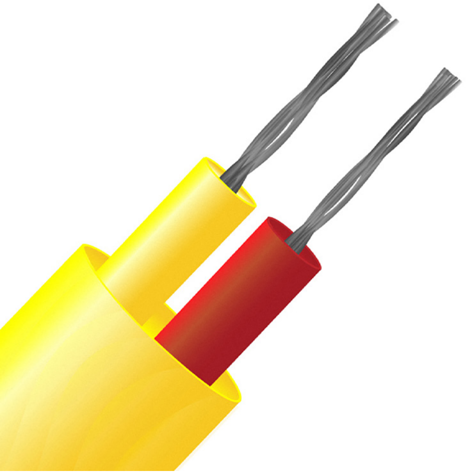
TYPE	CODE	CONDUCTORS	JACKET	10M REEL	25M REEL	50M REEL	100M REEL
K	IEC	1/0.3mm		827-5729	611-8012	827-5722	827-5726
K	IEC	7/0.2mm		827-5716	611-7980	611-8006	827-5710
J	IEC	7/0.2mm		827-5732	611-8034	611-8056	827-5741
T	IEC	7/0.2mm		827-5735	611-8028	611-8040	827-5738

INSULATED TWIN TWIST (IEC)

TYPE	CODE	CONDUCTORS	JACKET	10M REEL	25M REEL	50M REEL	100M REEL
K	IEC	1/0.2mm		827-5763	827-5766	611-7968	611-7946
K	IEC	7/0.2mm		827-5757	827-5750	611-7930	827-5754
T	IEC	1/0.2mm		827-5779	827-5772	611-7974	611-7952
N	IEC	1/0.2mm		827-5760	611-7996	-	-

PFA THERMOCOUPLE CABLE (ANSI)

PFA INSULATED FLAT PAIR (ANSI)



TYPE	CODE	CONDUCTORS	JACKET	25 METRE REEL	50 METRE REEL	100 METRE REEL
K	IEC	1/0.3mm		814-0119	814-0128	814-0121

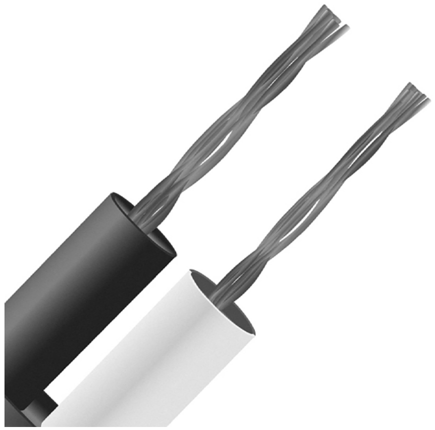
PFA INSULATED TWIN TWIST (ANSI)

TYPE	CODE	CONDUCTORS	JACKET	25 METRE REEL	50 METRE REEL	100 METRE REEL
K	ANSI	1/0.2mm		814-0030	814-0049	814-0042
K	ANSI	7/0.2mm		814-0046	814-0055	814-0058
K	ANSI	1/0.3mm		814-0024	814-0033	814-0036
T	ANSI	1/0.3mm		814-0080	814-0099	814-0092
T	ANSI	1/0.2mm		814-0096	814-0106	814-0109

This is just a small selection of PFA cable offered by RS PRO – Go online for the full range

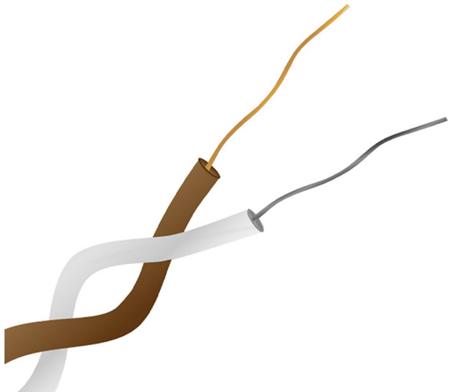
PTFE THERMOCOUPLE CABLE (IEC)

PTFE INSULATED FLAT PAIR (IEC)



TYPE	CODE	CONDUCTORS	JACKET	10 METRE REEL	25 METRE REEL	50 METRE REEL
K	IEC	7/0.2mm		827-5776	236-3858	827-5785
J	IEC	7/0.2mm		827-5798	455-4258	827-5808
T	IEC	1/0.3mm		827-5791	363-0418	827-5794
T	IEC	7/0.2mm		827-5788	236-3892	827-5782

PTFE INSULATED TWIN TWIST (IEC)

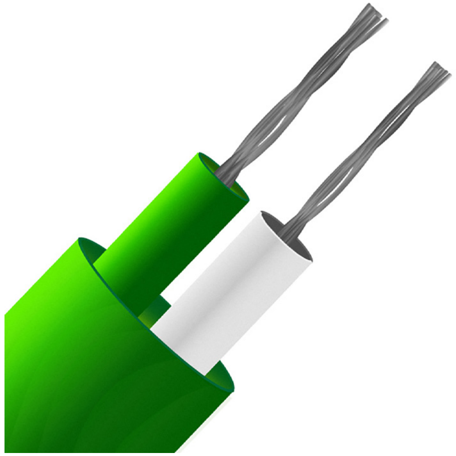


TYPE	CODE	CONDUCTORS	JACKET	10 METRE REEL	25 METRE REEL	50 METRE REEL	100 METRE REEL
K	IEC	1/0.2mm		827-5801	363-0389	827-5805	827-5814
J	IEC	1/0.315mm		-	827-6000	827-6019	-
T	IEC	1/0.508mm		-	827-5990	827-6003	-
T	IEC	1/0.2mm		827-5817	363-0402	827-5811	827-5820

This is just a small selection of PTFE Thermocouple cable offered by RS PRO – Go online for the full range

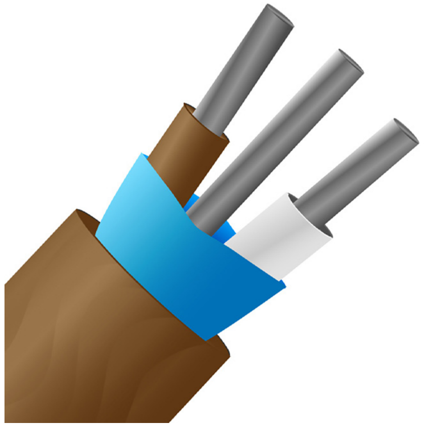
PVC INSULATED THERMOCOUPLE CABLE (IEC)

PVC INSULATED FLAT PAIR (IEC)



TYPE	CODE	CONDUCTORS	JACKET	10 METRE REEL	25 METRE REEL	50 METRE REEL	100 METRE REEL	200 METRE REEL
K	IEC	7/0.2mm		827-5615	236-3820	827-5619	611-7889	827-5628
K	IEC	13/0.2mm		-	827-5883	827-5892	-	-
K	IEC	23/0.2mm		-	827-5883	-	-	-
J	IEC	7/0.2mm		219-4753	827-5592	827-5596	236-3915	827-5606
T	IEC	7/0.2mm		219-4703	236-3870	827-5653	762-1146	827-5662

PVC INSULATED & SCREENED (IEC)

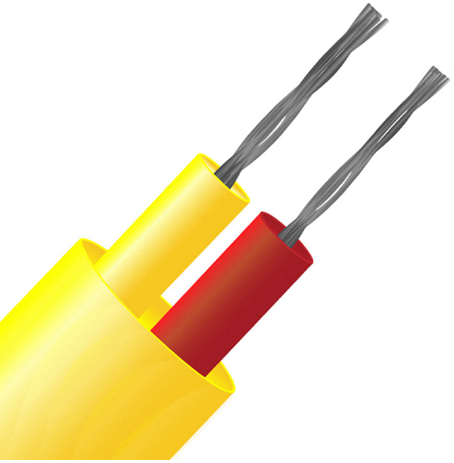


TYPE	CODE	CONDUCTORS	JACKET	10 METRE REEL	25 METRE REEL	50 METRE REEL	100 METRE REEL	200 METRE REEL
K	IEC	7/0.2mm		827-5678	236-3864	827-5671	611-7895	827-5675
J	IEC	7/0.2mm		827-5665	236-3921	827-5669	611-7918	-
T	IEC	7/0.2mm		827-5684	762-1140	827-5687	762-1159	827-5681
Vx	IEC	7/0.2mm		827-5690	236-3959	827-5693	611-7924	827-5697

This is just a small selection of PVC Thermocouple cable offered by RS PRO – Go online for the full range

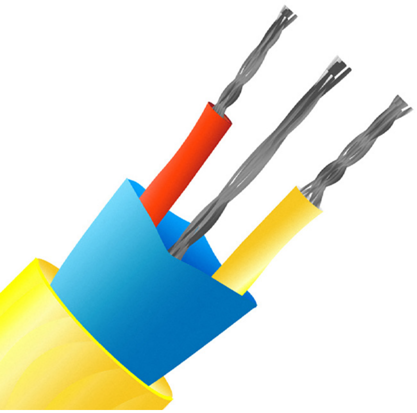
PVC INSULATED THERMOCOUPLE CABLE (ANSI)

PVC INSULATED FLAT PAIR (ANSI)



TYPE	CODE	CONDUCTORS	JACKET	25 METRE REEL	100 METRE REEL	200 METRE REEL
K	ANSI	7/0.2mm		814-0018	814-0027	814-0020
J	ANSI	7/0.2mm		813-9995	814-0005	814-0008
T	ANSI	7/0.2mm		814-0074	814-0083	814-0086
Vx	ANSI	7/0.2mm		814-0103		814-0115

PVC INSULATED & SCREENED (ANSI)

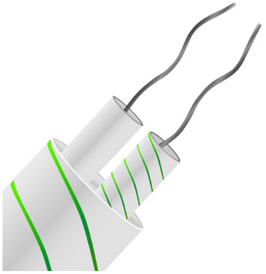


TYPE	CODE	CONDUCTORS	JACKET	25 METRE REEL	100 METRE REEL	200 METRE REEL
K	ANSI	7/0.2mm		814-0068	814-0077	814-0070
J	ANSI	7/0.2mm		814-0002	814-0011	814-0014

This is just a small selection of PVC Thermocouple cable offered by RS PRO – Go online for the full range

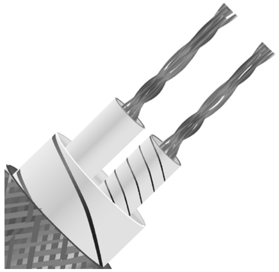
GLASSFIBRE INSULATED THERMOCOUPLE CABLE (IEC / ANSI)

GLASSFIBRE INSULATED (IEC)



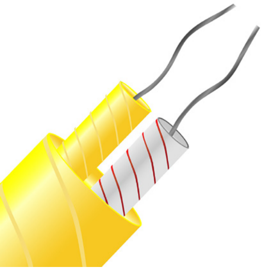
TYPE	CODE	CONDUCTORS	JACKET	10 METRE REEL	25 METRE REEL	50 METRE REEL	100 METRE REEL	200 METRE REEL
K	IEC	1/0.3mm		219-4589	236-3836	827-5833	827-5842	827-5845
J	IEC	7/0.2mm		827-5851	455-4264	827-5855	827-5864	-
T	IEC	1/0.3mm		236-3909	827-5849	827-5858	-	-

GLASSFIBRE INSULATED WITH STAINLESS STEEL OVERBRAID (IEC)



TYPE	CODE	CONDUCTORS	JACKET	10 METRE REEL	25 METRE REEL	50 METRE REEL	100 METRE REEL
K	IEC	7/0.2mm		219-4595	236-3842	827-5867	827-5861
J	IEC	7/0.2mm		827-5870	236-3937	827-5873	827-5877

GLASSFIBRE INSULATED WITH STAINLESS STEEL OVERBRAID (ANSI)

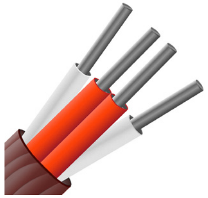


TYPE	CODE	CONDUCTORS	JACKET	25 METRE REEL	50 METRE REEL	100 METRE REEL
K	ANSI	1/0.3mm		814-0052	814-0061	814-0064

This is just a small selection of Glassfibre Insulated Thermocouple cable offered by RS PRO – Go online for the full range

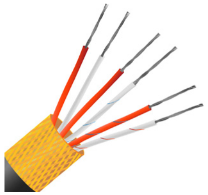
PRT EXTENSION CABLE

SILICONE RUBBER INSULATED



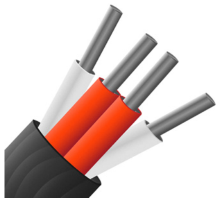
TYPE	CONDUCTORS	JACKET	CORES	10 METRE REEL	25 METRE REEL
PRT	7/0.2mm		4	827-5823	455-4242

PVC INSULATED & SCREENED



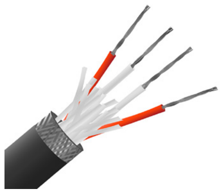
TYPE	CONDUCTORS	JACKET	CORES	10 METRE REEL	25 METRE REEL	50 METRE REEL
PRT	7/0.2mm		4	492-9753	290-4954	611-8129

PTFE INSULATED & SCREENED



TYPE	CONDUCTORS	JACKET	CORES	10 METRE REEL	25 METRE REEL
PRT	7/0.2mm		4	492-9775	290-4976

PFA INSULATED & SCREENED



TYPE	CODE	JACKET	CONDUCTORS	10 METRE REEL	25 METRE REEL	50 METRE REEL	100 METRE REEL
PRT	7/0.2mm		4	611-8078	611-8090	827-5827	827-5836
PRT	7/0.2mm		6	-	611-8107	827-5839	-

This is just a small selection of PRT cable offered by RS PRO – Go online for the full range

L200 Digital Thermometer & Data Logger

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.

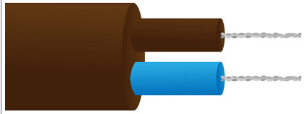
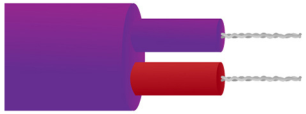
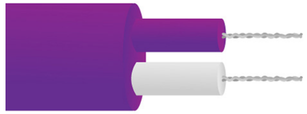
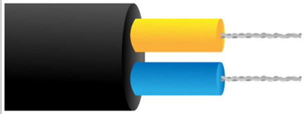
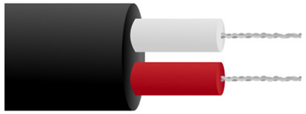
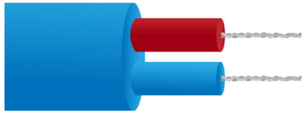
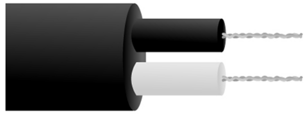
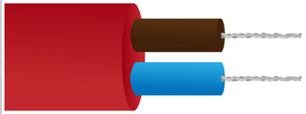
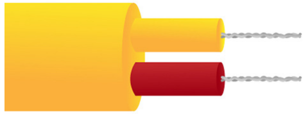
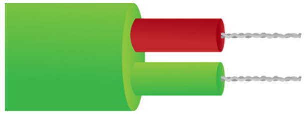
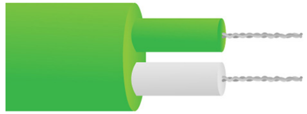
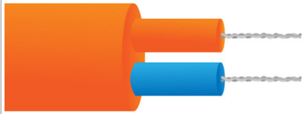
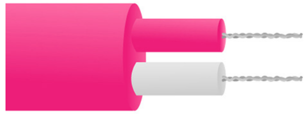
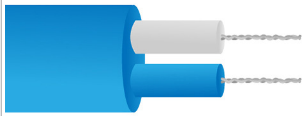
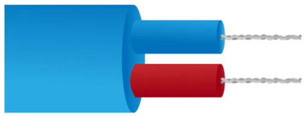
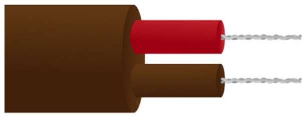
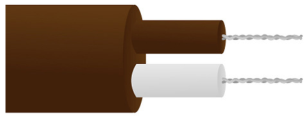
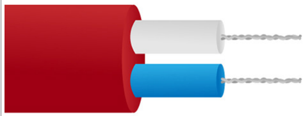
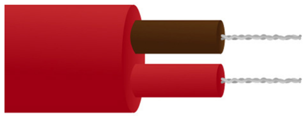
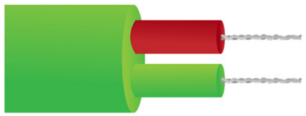
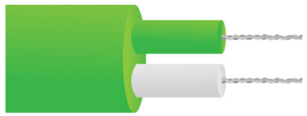
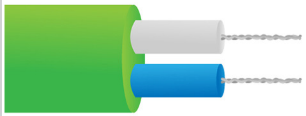
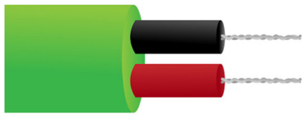
- Simple to use Thermocouple Welder
- Designed for the production of commercial grade thermocouple junctions (See below for range of thermocouple cables)
- Also suitable for other fine wire work
- Front panel or footswitch operation
- Argon gas shield facility

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

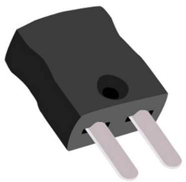
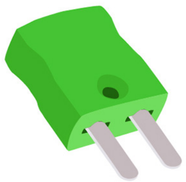
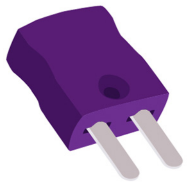
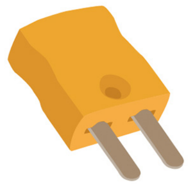
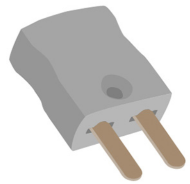
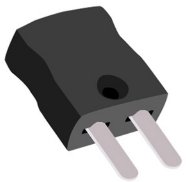
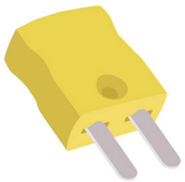
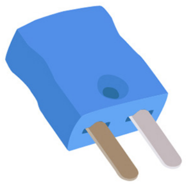
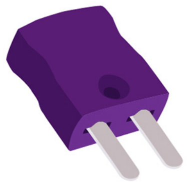
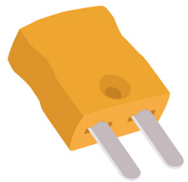
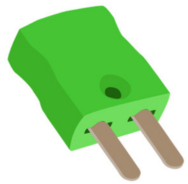
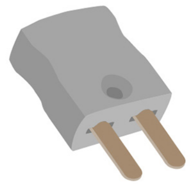
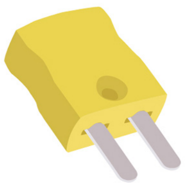
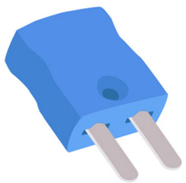
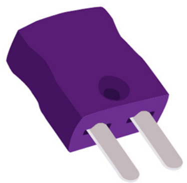
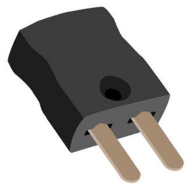
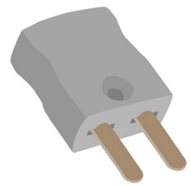
STOCK NO
363-0351

COLOUR CODES FOR THERMOCOUPLE EXTENSION & COMPENSATING WIRES/CABLES

Type	CONDUCTORS +/-	FORMER STANDARD BRITISH BS1843:1952	FORMER STANDARD AMERICAN ANSI/MC 96.1	FORMER STANDARD GERMAN DIN 43713/43714	IEC 60584-3(2007) BS ENG60584-3(2008)	CABLE CODE
EX	Nickel chromium/Constantan (Nickel, Chromium/Copper Nickel, Chromel/ Constantan, T1/Advance, NiCr/ Constantan)					EX
J	Iron*/Contantan (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** For Thermocouple connectors body colours are similar to outer sheath colours

THERMOCOUPLE COLOUR CODES FOR CONNECTOR BODIES

Type	J	K	T	E	N	R/S	B	Cu (Copper)
IEC								
ANSI								
JIS								

All connectors use true thermocouple alloys for optimum accuracy, except for types R, S & B which use compensating alloys.