

## Thermocouple Series – Standard with Thermocouple contacts

### Technical Data

#### RoHS

Panel connector, cable connector and coupler connector

Panel connector



Cable connector



Coupler connector



rectangular housing

screw connection

IP 50 to IP 54 with conexil in the housing, flat-gasket for panel connector and cable connector seal

3 contacts: 1  $\varnothing$  2 mm and 2 (the thermocouple)  $\varnothing$  3 mm, non-removable solder contacts

15 A  $\varnothing$  2 mm – 35 A  $\varnothing$  3 mm

Contact resistance between pin and socket < 0,0015  $\Omega$   $\varnothing$  2 mm, Depending on thermocouple  $\varnothing$  3 mm < 0,0015  $\Omega$   $\longleftrightarrow$  < 0,0045  $\Omega$

> 1500 Volts (RMS)

> 1500 Volts efficace

> 5000 M $\Omega$

-40 °C to +100 °C (500 hours at +125 °C)

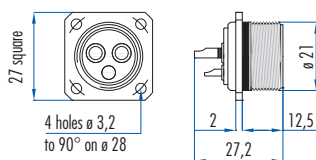
Nickel-plated light alloy, silver-plated brass contact, thermocouple contacts see below, PBT insert

1,34 mm<sup>2</sup>  $\varnothing$  2 mm – 3,39 mm<sup>2</sup>  $\varnothing$  3 mm

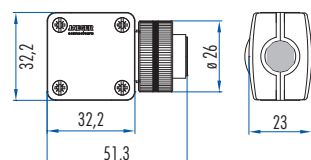
Thermocouple	Identification of contacts		Identification of connectors by a coloured ring
	Polarity	Number	
iron	+	1	Black type J
constantan	-	2	
chromel	+	1	Green type K
alumel	-	2	
copper	+	1	Brown type T
constantan	-	2	

### Dimensional Data

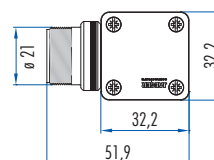
Panel connector



Cable connector



Coupler connector



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### Part Number

Housing	1	1	1
Number of Contacts	3	3	3
Thermocouple (J: iron constantan, K: chromel alumel, T: copper constantan)	J	K	T

#### Male panel connectors – Female cable connectors – Male coupler connectors

Square male panel connector	536 161 006	536 162 006	536 163 006
Female cable connector	532 161 006	532 162 006	532 163 006
Male coupler connector	532 121 006	532 122 006	532 123 006
Type 3 cable clamp	630 135 006	630 135 006	630 135 006
End fitting for soldering	532 998 006	or 042 547 006	or 042 937 006
Pyrometer tube end fitting	530 126 026	530 126 026	530 126 026
Protective cap for panel connector	536 910 006	536 910 006	536 910 006
Protective cap for cable connector	532 260 006	532 260 006	532 260 006

- For assembly, wiring, panel connector installation and contact arrangement instructions, see: Technical guides.
- Other accessories, see: Accessories.
- For configurations requiring a larger number of contacts and with different technical characteristics, see page 128.

### Thermocouple data

In 1821, Seebeck discovered that an electric current flows in a closed loop with two wires made of different metals if the temperature of one of the two junctions is higher than that of the other. This bimetallic combination was called a **Thermocouple**.

If one of the junctions is open whilst keeping its two ends at the same temperature, the electromotive force measured between the two ends depends on the difference in temperature between the two junctions more precisely, the electromotive force depends on the temperature of a single junction if the other is maintained at constant temperature.

Different combinations of metals and alloys were tested to form a Thermocouple or Thermoelectric couple. The main types of pairs selected are:

- **Type J:** an iron component and a constantan component
- **Type K:** a chromel component and an alumel component
- **Type T:** a copper component and a constantan component
- **Type S:** a platinum rhodium 10% Rh component and a platinum component
- **Type E:** a chromel component and a constantan component

There are other Thermocouples but they are less commonly used.

The thermoelectric properties thus discovered gave rise to temperature measurement in industry. Some examples of use: pyrometer tubes, freeze-driers, medical, engine bearing temperature control, etc.

The choice of Thermocouple is governed by:

- the temperature range to be measured
- its resistance to pollution and corrosion
- the resistance of the Thermocouple for a given gas atmosphere

Type	Colour Code standard: IEC 584.3	Conductor +	Conductor -	Temperature	Application recommended in atmospheres				
					vacuum	oxidizing	reducing	inert	gaseous
J	Black	Iron	Constantan	-210 °C +1200 °C	x	x	x	x	Air argon nitrogen
K	Green	Chromel	Alumel	-270 °C +1370 °C		x		x	Air argon
T	Brown	Copper	Constantan	-270 °C +400 °C		x	x		Air argon nitrogen
S	Yellow	platinum rhodium 10% Rh	Platinum	-50 °C +1760 °C		x			Air
E	Purple	Chromel	Constantan	-270 °C +1000 °C		x		x	Air argon