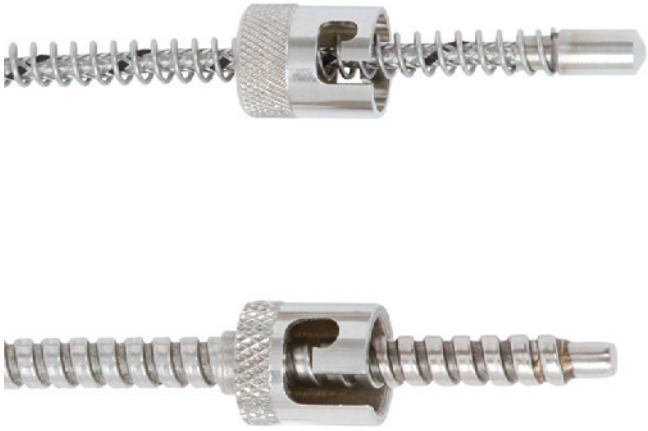
For the plastics machinery industry
Adjustable bayonet thermocouple
Model TC47-AB

Applications

- Plastics and rubber industry
- For direct installation into the process
- Dies for extrusion profiles
- Compression platens
- Packaging

Special features

- The sensor can be adjusted to a specific length and mounted into the process
- The thermocouple sensors are available with a variety of hold down mechanisms
- With or without stainless steel overbraid or interlocking flexible armour
- Tube and wire construction
- Interchangeable and easily replaceable



Adjustable bayonet thermocouple, model TC47-AB
Fig. top: spring design
Fig. bottom: armour design

Description

The TC47-AB adjustable bayonet thermocouple is a general purpose temperature sensor designed to suit all applications where metal sheathed thermocouples are required. An extensive range of elements and process connections can be individually selected for the appropriate application. With the flexibility of assorted diameters and manually adjustable immersion lengths, the model TC47-AB thermocouple can be used in a wide variety of easily accessible locations.

The adjustable bayonet cap allows the sensor to have a positive pressure at the tip when installed correctly.

The adjustable bayonet, tube and wire design is held in place with a bayonet adapter. They are especially suited for applications where the metal sensor tip is fitted directly into a drilled hole.

The temperature sensor can be modified to suit specific application as required.

Sensor

Sensor type
- Type J (Fe-CuNi)
- Type L (Fe-CuNi)
- Type K (NiCr-Ni)
- Type T (CuNi)
- Others on request

Number of sensors
- 2-wire single circuit
- 4-wire dual circuit

Classification tolerance
- European Class 1 and 2 per DIN EN 60584-2
  DIN 43714 and DIN 43713: 1991
  International (IEC) DIN 43722: 1994
  JISC 1610: 1981
  NFC 4232
  BS 1843
- North American Class 1 and 2
  ISA standard and special per ANSI MC 96.1 - 1982

Measuring point
- Isolated (ungrounded)
- Non isolated (grounded)

Tube and wire construction
The sheath section of the sensor is a tube and wire design. This consists of a stainless steel outer sheath with thermocouple wire drawn through it and secured into place. Due to the construction design and styles, these sensors can be applied in areas that are not difficult to access.

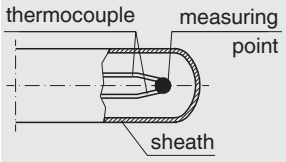
Options

- Lengths and diameters are customer specified
- Calibration classifications are customer specified
- Tag identification (customer specific identification number)
- Selectable accuracy tolerance
- Mounting options customer specified

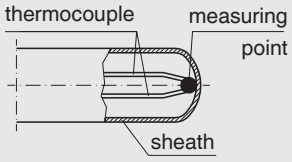
Sensor tip designs

In the standard version a sensor in incorporated which is appropriate for the selected measuring range.
Model TC47-AB can be constructed in two different ways:

ungrounded
measuring point (hot junction) isolated



grounded
measuring point (hot junction) non isolated



Basic values and limiting errors

A cold junction temperature of 0 °C is taken as the basis for the definition of the thermocouple's sensor limiting error.

Temperature (ITS 90) °C	Limiting error DIN EN 60584 Type J °C	Type K °C
0	± 2.5	± 2.5
200	± 2.5	± 2.5
400	± 3.0	± 3.0
600	± 4.5	± 4.5
800	not defined	± 6.0

Types J, L DIN EN 60584, ANSI MC 96.1

Class	Temperature range	Limiting error
1	-40 ... +375 °C	± 1.5 °C
1	+375 ... +750 °C	± 0.0040 • | t | [1)]
2	-40 ... +333 °C	± 2.5 °C
2	+333 ... +750 °C	± 0.0075 • | t | [1)]

Type K DIN EN 60584, ANSI MC 96.1

Class	Temperature range	Limiting error
1	-40 ... +375 °C	± 1.5 °C
1	+375 ... +750 °C	± 0.0040 • | t | [1)]
2	-40 ... +333 °C	± 2.5 °C
2	+333 ... +750 °C	± 0.0075 • | t | [1)]

Type T DIN EN 60584, ANSI MC 96.1

Class	Temperature range	Limiting error
1	-40 ... +125 °C	± 0.5 °C
1	+125 ... +350 °C	± 0.0040 • | t | [1)]
2	-40 ... +133 °C	± 1.0 °C
2	+133 ... +350 °C	± 0.0075 • | t | [1)]

1) \| t \| is the value of the temperature in °C without consideration of the sign.

Sheath material

- Stainless steel
  - up to 1200 °C (air)
  - good corrosion resistance with aggressive media
- Ni-alloy 2.4816 (Inconel 600)
  - standard material for applications which require specific corrosion resistance properties, exposure to high temperatures and resistant to induced stress
- Others on request

Lead wire

A variety of insulating materials are available to adapt to different prevailing process conditions.
The lead wire termination end can be supplied ready for connection or fitted with a plug as an option.

- Thermocouple, fit to process connection
- Lead extension cross section: min. 0.22 mm^2 (24 awg)
- Insulation material: fibreglass, Kapton, PTFE or PVC
- Other options available

Operating temperatures

The following temperatures limits apply to the conventional connecting lead wire.

- Fibreglass -50 … +482 °C
- Kapton -25 … +260 °C
- PTFE -50 … +260 °C
- PVC -20 … +105 °C

Kapton / Kapton

500 °F (260 °C)
Polyimide tape insulation for improved electrical properties and high temperature applications.

500 °F (260 °C)
Polyimide tape jacket for excellent abrasion and cut through properties and very high resistance to moisture and chemicals.

Fibreglass / Fibreglass

900 °F (482 °C)
Wrapped fibreglass insulation for improved moisture and abrasion resistance at high temperatures.

900 °F (482 °C)
Braided fibreglass for additional flexibility and abrasion resistance at high temperatures.

PVC / PVC

221 °F (105 °C)
PVC insulation for economy, durability and mechanical strength

221 °F (105 °C)
PVC jacket for economy, durability and mechanical strength. It is also tough and resistant to flame, abrasion and moisture.

PTFE / PTFE

500 °F (260 °C)
PFA insulation for improved electrical properties and high temperature applications.

500 °F (260 °C)
PFA jacket for chemical inertness to solvents, acids and oils.

Process connections

The thermocouple is fitted with an adjustable bayonet cap. These various caps are individually specified.

Lead wire coverings

- **Stainless steel overbraid (no tracer)**
  Stainless steel overbraid is by far the most common of the overbraids and is available on almost all thermocouples and extension duplex wire constructions. While highly resistant to corrosion, stainless steel is able to maintain a continuous operating temperature of 1400 °F (760 °C).

- **Stainless steel overbraid (with tracer)**
  Resembles stainless steel with a colour coded fibre tracer identifying the calibration type with minimum braid coverage of 85 %.

- **Tinned copper overbraid**
  Although similar in some characteristics to stainless steel, is a more economical alternative. This product offers an improved feature of shielding against static noise (if it is properly insulated and grounded) with a continuous operating temperature of 400 °F (204 °C).

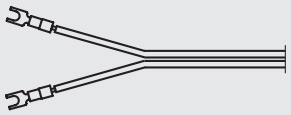
- **Interlocking flexible stainless steel armour**
  Is a half oval armour applied in a spiral wrap fashion. In addition to having similar characteristics to the overbraids, stainless steel armour maintains better crush and piercing resistant properties. It can operate in higher temperature 1400 °F (760 °C). This covering is a non-magnetic corrosive, and piercing resistant shield. Resistant to rusting in outdoor applications.

Plug (option)

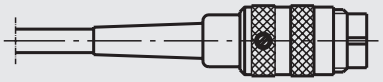
TC47-AB thermocouple can be supplied with plugs attached to the conductors.
The maximum permissible temperature at the plug is 85 °C.

The following options are available:

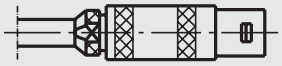
■ **Spade lugs**
(not suitable for versions with bare connecting wires)



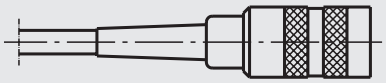
■ **Screw-in-plug, Binder** (male)



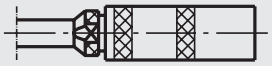
■ **Lemosa plug size 1 S** (male)
■ **Lemosa plug size 2 S** (male)



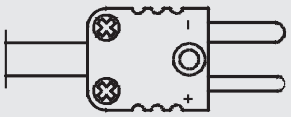
■ **Screw-in-plug, Binder** (female)



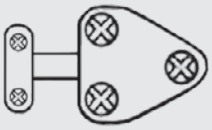
■ **Lemosa plug size 1 S** (female)
■ **Lemosa plug size 2 S** (female)



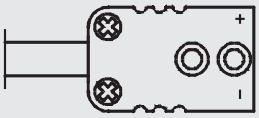
■ **Standard thermo plug 2-pin** (male)
■ **Miniature thermo plug 2-pin** (male)



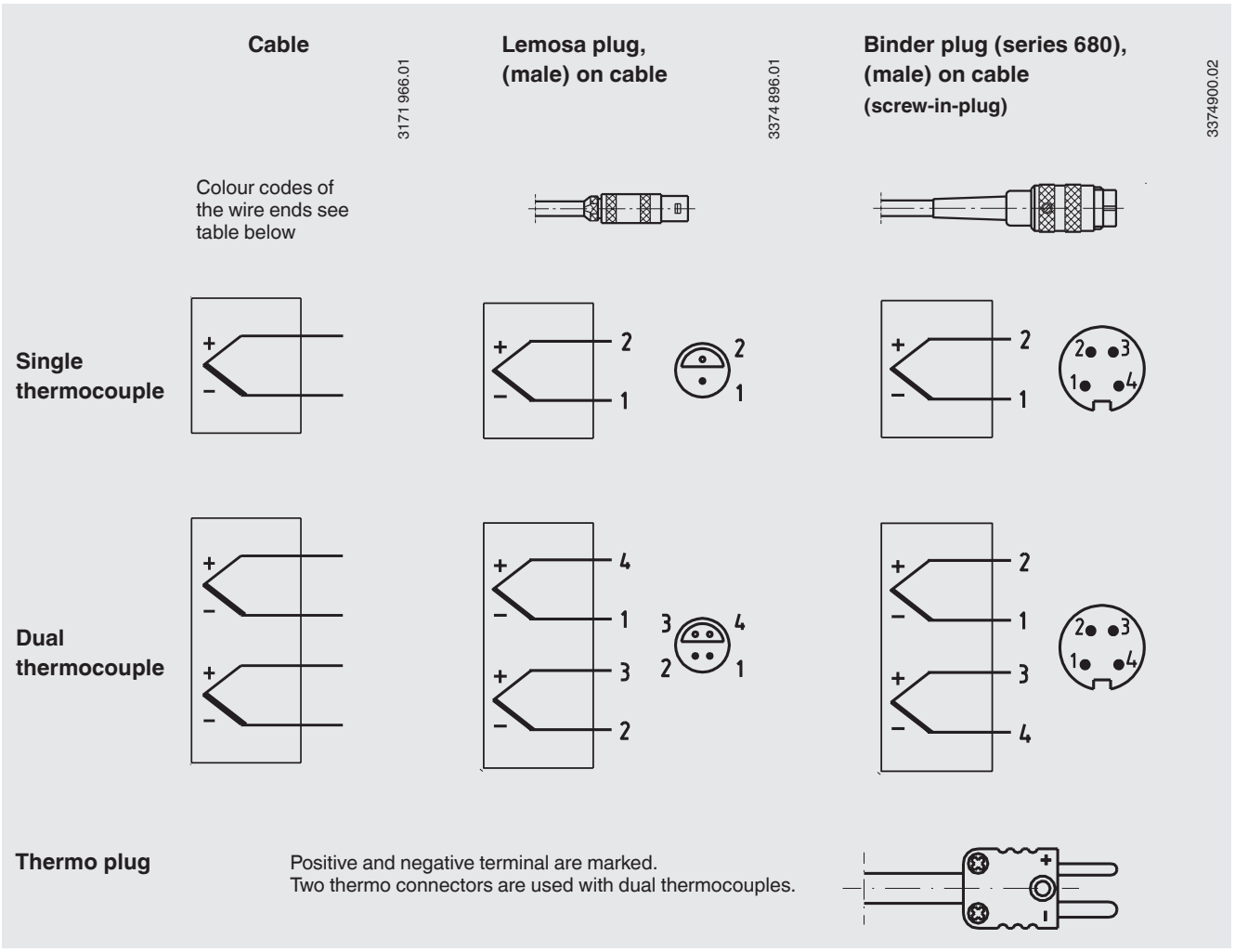
■ **Standard cable clamp** (option with thermo plug)
■ **Miniature cable clamp** (option with thermo plug)



■ **Standard thermo plug 2-pin** (female)
■ **Miniature thermo plug 2-pin** (female)

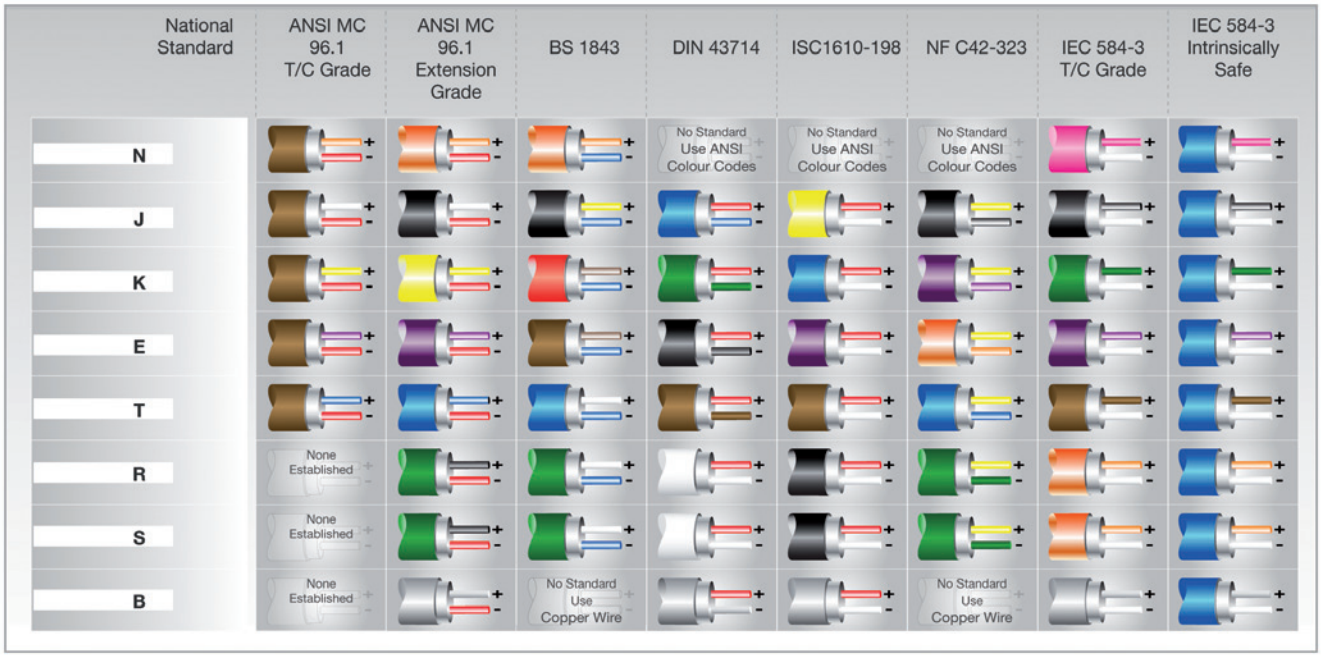


Electrical connection



Other connector plugs and pin assignments on request.

Thermocouple and extension wire colour codes



Thermocouple tolerances (cold junction temperature at 0 °C)

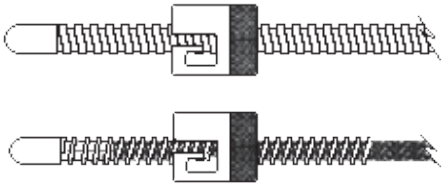
IEC tolerance values per EN 60584-2				
Thermocouple type		**Tolerance class 1**	**Tolerance class 2**	**Tolerance class 3**
T	Temperature range	-40 ... +125 °C	-40 ... +133 °C	-67 ... +40 °C
	Tolerance value	±0.5 °C	±1.0 °C	±1.0 °C
	Temperature range	+125 ... +350 °C	+133 ... +350 °C	-200 ... -67 °C
	Tolerance value	±0.004 |t|	±0.0075 |t|	±0.015 |t|
J	Temperature range	-40 ... +375 °C	-40 ... +333 °C	-
	Tolerance value	±1.5 °C	±2.5 °C	-
	Temperature range	+375 ... +750 °C	+333 ... +750 °C	-
	Tolerance value	±0.004 |t|	±0.0075 |t|	-
E	Temperature range	-40 ... +375 °C	-40 ... +333 °C	-167 ... +40 °C
	Tolerance value	±1.5 °C	±2.5 °C	±2.5 °C
	Temperature range	+375 ... +800 °C	+333 ... +900 °C	-200 ... -167 °C
	Tolerance value	±0.004 |t|	±0.0075 |t|	±0.015 |t|
K or N	Temperature range	-40 ... +375 °C	+40 ... +333 °C	-167 ... +40 °C
	Tolerance value	±1.5 °C	±2.5 °C	±2.5 °C
	Temperature range	+375 ... +1000 °C	+333 ... +1200 °C	-200 ... -167 °C
	Tolerance value	±0.004 |t|	±0.0075 |t|	±0.015 |t|
R or S	Temperature range	0 ... +1100 °C	0 ... +600 °C	-
	Tolerance value	±1.0 °C	±1.5 °C	-
	Temperature range	+1100 ... +1600 °C	+600 ... +1600 °C	-
	Tolerance value	±[1 + 0.003 (t-1100)]	±0.0025 |t|	-
B	Temperature range	-	-	+600 ... +800 °C
	Tolerance value	-	-	+4.0 °C
	Temperature range	-	+600 ... +1700 °C	+800 ... +1700 °C
	Tolerance value	-	±0.0025 |t|	+0.005 |t|

ASTM tolerance values (ASTM E230)					
Thermocouple type		**Standard limits** (whichever value is greater)		**Special limits** (whichever value is greater)	
T	Temperature range	0 ... +370 °C	+32 ... +700 °F	0 ... +370 °C	+32 ... +700 °F
	Tolerance value	±1 °C or ±0.75 %	±1.8 °F or ±0.75 %	±0.5 °C or 0.4 %	±0.9 °F or 0.4 %
	Temperature range	-200 ... 0 °C	-328 ... +32 °F	-	-
	Tolerance value	±1.0 °C or ±1.5 %	±1.8 °F or ±1.5 %	-	-
J	Temperature range	0 ... +760 °C	+32 ... +1400 °F	0 ... +760 °C	+32 ... +1400 °F
	Tolerance value	±2.2 °C or ±0.75 %	±4.0 °F or ±0.75 %	±1.1 °C or 0.4 %	±2.0 °F or 0.4 %
E	Temperature range	0 ... +870 °C	+32 ... +1600 °F	0 ... +870 °C	+32 ... +1600 °F
	Tolerance value	±1.7 °C or ±0.5 %	±3.1 °F or ±0.5 %	±1.0 °C or ±0.4 %	±1.8 °F or ±0.4 %
	Temperature range	-200 ... 0 °C	-328 ... +32 °F	-	-
	Tolerance value	±1.7 °C or ±1.0 %	±3.1 °F or ±1.0 %	-	-
K	Temperature range	0 ... +1260 °C	+32 ... +2300 °F	0 ... +1260 °C	+32 ... +2300 °F
	Tolerance value	±2.2 °C or ±0.75 %	±4.0 °F or ±0.75 %	±1.1 °C or ±0.4 %	±2.0 °F or ±0.4 %
	Temperature range	-200 ... 0 °C	-328 ... +32 °F	-	-
	Tolerance value	±2.2 °C or ±2.0 %	±4.0 °F or ±2.0 %	-	-
N	Temperature range	0 ... +1260 °C	+32 ... +2300 °F	0 ... +1260 °C	+32 ... +2300 °F
	Tolerance value	±2.2 °C or ±0.75 %	±4.0 °F or ±0.75 %	±1.1 °C or ±0.4 %	±2.0 °F or ±0.4 %
R or S	Temperature range	0 ... +1480 °C	+32 ... +2700 °F	0 ... +1480 °C	+32 ... +2700 °F
	Tolerance value	±1.5 °C or ±0.25 %	±2.7 °F or ±0.25 %	±0.6 °C or ±0.1 %	±1.1 °F or ±0.1 %
B	Temperature range	+870 ... +1700 °C	+1600 ... +3100 °F	+870 ... 1700 °C	+1600 ... +3100 °F
	Tolerance value	±0.5 %	±0.5 %	±0.25 %	±0.25 %

Ordering information

The adjustable bayonet thermocouple cap can be manually adjusted to a preferred length. The junction tip is submersed in a pre-determined hole. This style is held into position with a bayonet adapter. The adjustable thermocouple senses temperature at the bottom of the bored hole.

When ordering choose from each category.



Ajustable bayonet

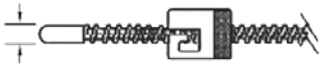
- Spring up to 200 mm or 8" of adjustability
- Armour full lead length of adjustability

Junction

- Grounded (unisolated)
- Ungrounded (isolated)

Tip diameter (Ø)

- 3/16"
- 1/4"
- 3/8"
- 4 mm
- 6 mm
- 8 mm
- 10 mm
- Others on request



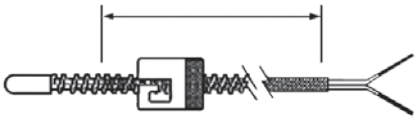
Probe length

- Standard
- Others on request

Bayonet cap	Id Ø	Fits bayonet adapter
Single slot	11.4 mm (7/16")	11 mm O.D.
Double slot	11.4 mm (7/16")	11 mm O.D.
Double slot	12.2 mm (31/64")	12 mm O.D.
Double slot	14.2 mm (9/16")	12 mm O.D.
Double slot	15.2 mm (19/32")	15 mm O.D.
Others on request		

Lead length

- 500 mm
- 1000 mm
- 1500 mm
- 2000 mm
- 2500 mm
- Others on request



Lead wire

- Fibreglass / fibreglass
- PTFE / PTFE
- PVC / PVC
- Kapton / Kapton
- Others on request

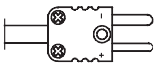
Lead wire covering

- None
- Stainless steel overbraid (no tracer)
- Stainless steel overbraid (with tracer)
- Tin copper overbraid
- Interlocking flexible armour

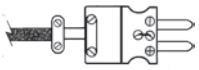
Termination at lead end

- Bare ends

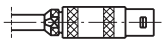
- Standard thermo plug 2-pin (male)
- Miniature thermo plug 2-pin (male)



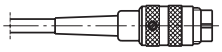
- Standard plug with cable clamp (male)
- Miniature plug with cable clamp (male)



- Lemosa plug size 1S (male)
- Lemosa plug size 2S (male)



- Screw-in plug, Binder (male)



- Others on request

Calibration type

J	ANSI MC96.1	red ⊖	white ⊕
K	ANSI MC96.1	red ⊖	yellow ⊕
T	ANSI MC96.1	red ⊖	blue ⊕
J	IEC 584-3	white ⊖	black ⊕
K	IEC 584-3	white ⊖	green ⊕
T	IEC 584-3	white ⊖	brown ⊕
J	DIN 43714	blue ⊖	red ⊕
K	DIN 43714	green ⊖	red ⊕
T	DIN 43714	brown ⊖	red ⊕

- Others on request

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