

Hot runner thermocouple Model TC46

WIKA data sheet TE 65.46



for further approvals
see page 7

Applications

- Plastics and rubber industry
- Hot runner bushings, drops and nozzles
- Hot runner manifolds
- Moulds used in injection moulding machines
- For direct installation into the process

Special features

- Plastic-encapsulated transition eliminates all possibilities of potential defects when inserted, formed and used in hot runner systems.
- The thermocouple can be installed into the hot runner system without any fixing through bending or forming the sheathed cable or with a rotatable (if required, spring-loaded) union screw.
- The thermocouples are available with a variety of sheath materials, including austenitic 300 series and ferritic 400 series stainless steel, as well as corrosion-resistant, and at high temperatures oxidation-resistant, alloys.
- Sensor diameter from 0.5 ... 3.0 mm (0.020" ... 0.118")
- Compensating cable are available in a variety of insulation materials. These include Kapton, fibreglass, PTFE or PVC with or without stainless steel braid



Hot runner thermocouples, model TC46

Description

The TC46 series thermocouples are custom-designed to suit all applications where sheathed thermocouples are required. An extensive range of elements, transition sleeves and process connections can be individually selected for the appropriate application. With the flexibility and small diameters in which they are available, model TC46 thermocouples can be used in locations that are not easily accessible.

Thanks to their unique design, the hot runner thermocouples are especially suited for applications where the metal sensor

tip is fitted directly into a drilled hole or press-fitted into a grooved channel along the machined parts.

In the standard version the thermocouples are manufactured without process connections. Fastening elements such as a union screw, a compression fitting, or a spring-loaded or customer-specific hold down device can be attached and are available as options.

Sensor

The measuring point is located at the tip of the sensor.

Sensor type

- Type K
- Type J

Number of sensors

Single thermocouple
Dual thermocouple

Measuring point

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

Sensor types

Type	Recommended max. operating temperature
K	1,200 °C
J	800 °C

Thermocouple	Class	
	IEC 60584-1:2013	ASTM E230
K	1 and 2	Standard, special
J	1 and 2	Standard, special

Tolerance value

For the tolerance value of thermocouples, a cold junction temperature of 0 °C has been taken as the basis.

For detailed specifications for thermocouples, see Technical information IN 00.23 at www.wika.com.

The application range of this thermometer is limited both by the maximum permissible working temperature of the thermocouple and by the maximum permissible working temperature of the thermowell material.

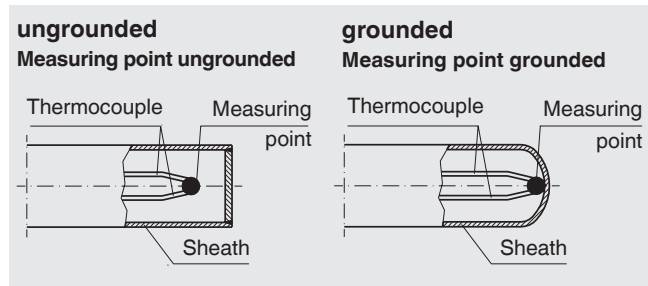
Options

- Customer-specific or standard lengths and diameters
- Single-point or multi-point calibration
- TAG identification for traceability of the thermocouple materials (compensating cable, sheath material and date of manufacture)
- Selectable accuracy tolerance
- Customer-specific mounting options
- Customer-specific transition versions

Sensor tip designs

In the standard version a sensor is incorporated which is appropriate for the selected measuring range.

Hot runner thermocouples can be constructed in two different ways:



Sheathed cable design

The metallic part of the sensor is a mineral-insulated cable (sheathed cable). This consists of a stainless steel outer sheath with conductors drawn through it and insulated with a highly compressed ceramic powder, magnesium oxide (MgO).

The sheathed cable has been soft-annealed during the manufacturing process, allowing for the sensor to be bent during installation or operation. The thermocouples adhere to the ASTM E839 – 8.5.2 specification which outlines the maximum permissible bend tolerance for sheathed cable. The sheathed cable can be closely wrapped three full turns on a mandrel with a diameter twice the sheath diameter. Due to this flexibility, the sensor can be used in areas that are difficult to access.

Sheath diameter

- 0.5 mm
- 1.0 mm
- 1.5 mm
- 1.6 mm
- 2.0 mm
- 3.0 mm
- Others on request

Sheath material

- Stainless steel
 - up to 800 °C (air)
 - good resistance against aggressive media and also against vapour and combustion gases in chemical media
- Ni alloy 2.4816 (Inconel 600)
 - up to 1,200 °C (air)
 - standard material for applications which require specific corrosion-resistant properties while simultaneously being exposed to high temperatures, resistant to induced stress corrosion cracking and pitting in media containing chloride
 - resistant to corrosion caused by aqueous ammonia in all temperatures and concentrations
 - highly resistant to halogens, chlorine, hydrogen chloride

Others on request

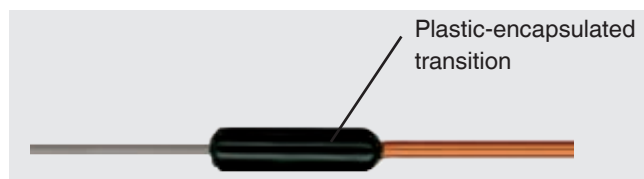
Transition

The transition between the sheathed cable and the compensating cable of the thermocouple is moulded, brazed, crimped or embedded in sealing compound, depending on the design. This area should not be immersed within the process and must not be bent. Compression fittings or mounting screws should not be attached to the transition. The design and dimensions of the transition depend largely on the combination between supply line and metal sheath and the sealing requirements. The temperature at the transition is further limited by the potted sealing compound.

Plastic-encapsulated transition

- A unique design highly recommended and used in the hot runner industry. The transition, which is plastic-encapsulated at high temperatures, eliminates all potential issues that may cause failures during installation or production processes.
- The plastic-encapsulated transition eliminates moisture leakage into the sheathed cable or connection lines.
- The transition can withstand temperatures of -20 ... +375 °C.
- The tensile strength of the plastic-encapsulated transition is tested up to 9 kg (20 lbs).
- Bending capabilities of the sheathed cable corresponds to the plastic-encapsulated transition
- Standard dimensions Ø 5 mm x 20 mm long (0.197" x 0.787")

Others on request



Connection line

A variety of insulating materials are available to adapt to different prevailing process conditions. The connection line ends can be supplied ready for connection and, as an option, fitted with a plug.

- Cross-section: min. 0.20 mm² (24 awg)
 - Insulation material: Kapton, PVC, PTFE or fibreglass, with or without stainless steel over braid
- Other options available

Permissible temperatures

The following temperatures limits apply to the conventional connection lines.

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

Kapton / Kapton

500 °F (260 °C)
Polyamide tape sheath for improved electrical properties and high-temperature applications.

500 °F (260 °C)
Polyamide tape sheath for excellent abrasion and perforation resistance and very high resistance to moisture and chemicals.



Fibreglass / fibreglass

900 °F (482 °C)
Wound glass fibre insulation for improved moisture and abrasion resistance at high temperatures.

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



PVC / PVC

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

221 °F (105 °C)
PVC jacket for cost effectiveness, 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.



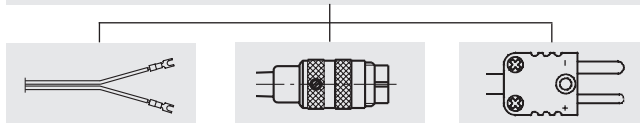
Optional connectors

For optionally fitted connectors the maximum permissible temperature at the connector is 85 °C.

Version

Depending on their electrical connection, hot runner thermocouples are divided into the following designs:

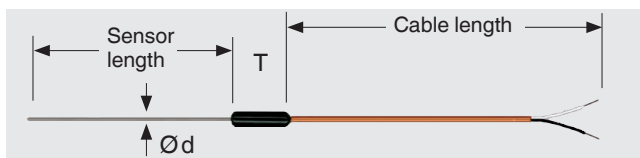
- Connecting individually insulated lead wires to the conductors of the sensor
- Connecting pair of insulated lead wire to the conductors of the sensor
- Optional connectors can be attached to the sensor conductors



Note

Standard lead lengths

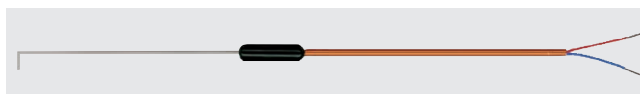
- 1,000 mm (39") with additional intervals of 500 mm (20")
- Other lengths on request



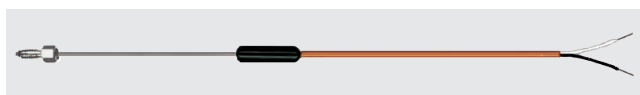
Process connections

The thermocouples can be fitted with optional process connections or formed within the ASTM E839 - 8.5.2 specifications. These various process connections can be specified individually.

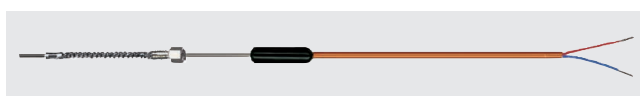
- Formed / bent sensor
Individually specified as per drawings



- Union screw connection
For fitting the sensor into a threaded connection with a female thread.

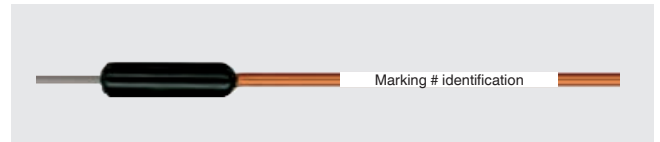


- Spring-loaded connection
Allows simple adjustments to the required insertion length at the installation point and ensures a positive contact between the medium and the measuring point of the thermocouple.



Optional marking

- Custom tag identification number and calibration code
- Batch identification for manufacturing traceability



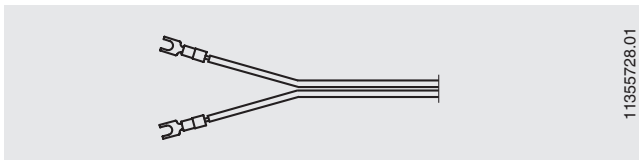
Connector (option)

Hot runner thermocouples can be supplied with connector fitted.

The following options are available:

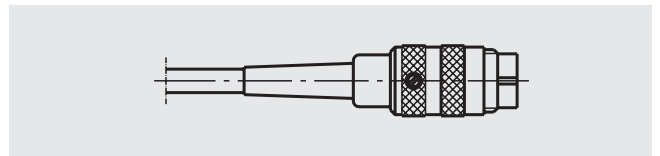
■ Spade lugs

(not suitable for versions with bare connection wires)



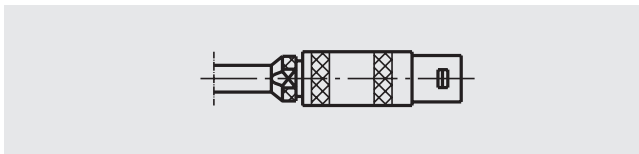
11385728.01

■ Screw-in-plug, Binder (male)

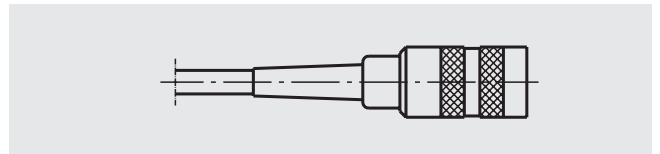


■ Lemosa connector, size 1 S (male)

■ Lemosa connector, size 2 S (male)

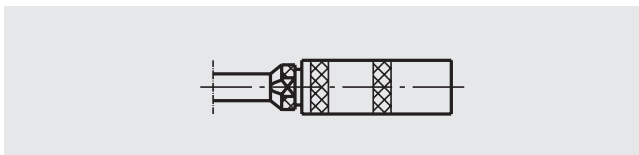


■ Screw-in-plug, Binder (female)



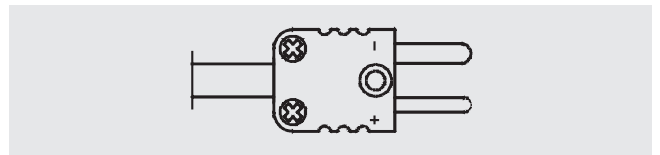
■ Lemosa free socket, size 1 S (female)

■ Lemosa free socket, size 2 S (female)



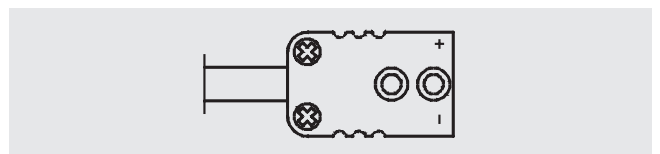
■ Standard thermo connector, 2-pin (male)

■ Miniature thermo connector, 2-pin (male)

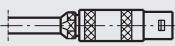

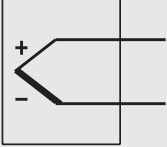
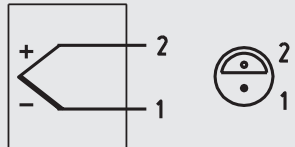
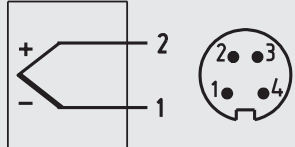
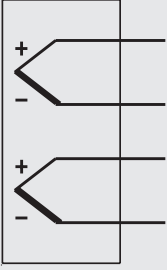
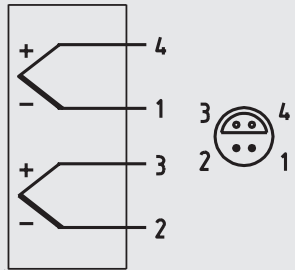
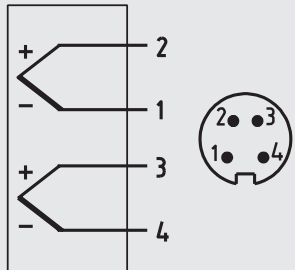
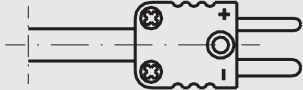


■ Standard thermo socket, 2-pin (female)

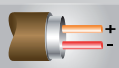
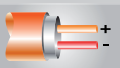
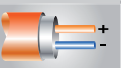



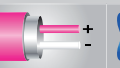
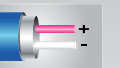




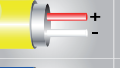

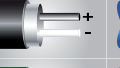
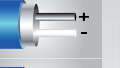










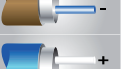
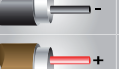

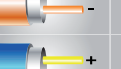
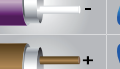






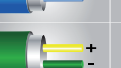







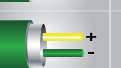



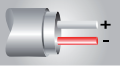

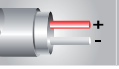
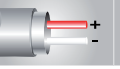

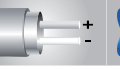
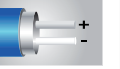








■ Miniature thermo socket, 2-pin (female)



Electrical connection

	Cable	Lemosa connector, male at the cable	Binder connector (series 680), male at the cable (screw-in plug)
	For the marking of the cable ends, see table	3171966.01 	3374896.01 
Single thermocouple			
Dual thermocouple			
Thermo connector	Positive and negative terminal are marked. Two thermo connectors are used with dual thermocouples.		

Thermocouple and compensating cable colour codes

	ASTM E230 Thermocouple cable	ASTM E230 Compensating cable	BS 1843	DIN 43714	ISC1610-198	NF C42-323	IEC 60584-3	IEC 60584-3 intrinsic safety
N								
J								
K								
E								
T								
R								
S								
B								

Approvals

Logo	Description	Country
	EAC Electromagnetic compatibility	Eurasian Economic Community
	GOST Metrology, measurement technology	Russia
	KazInMetr Metrology, measurement technology	Kazakhstan
-	MTSCHS Permission for commissioning	Kazakhstan
	Uzstandard Metrology, measurement technology	Uzbekistan

Certificates (option)

- 2.2 test report
- 3.1 inspection certificate
- DKD/DAkkS calibration certificate

Approvals and certificates, see website

Ordering information

Model / Sensor diameter / Thermocouple type / Tolerance value / Design of the measuring point / Connection cable, sheath / Design of the lead ends / Colour coding of the connection lead / Certificates / Options

© 2010 WIKA Alexander Wiegand SE & Co. KG, all rights reserved.
The specifications given in this document represent the state of engineering at the time of publishing.
We reserve the right to make modifications to the specifications and materials.

