

Поверхностная термопара, извлекаемая Модель TC59-E



WIKATE 65.61



eTEFRACTO-PAD®

TEFRACTO-PAD®

-
-
-
-
-

TEFRACTO-PAD®

-
-
-
-
-
-

- 0 ... 1 260 °C [32 ... 2 300 °F]



eTEFRACTO-PAD®,

TEFRACTO-PAD®

WIKA

Inside the guide channel, an extractable thermocouple sensor is made from a mineral-insulated metal-sheathed cable. It contains the insulated internal leads compressed within a high-density ceramic composition. At the hot end, the internal leads are welded together to form an insulated (ungrounded) or non-insulated (grounded) measuring location. At the cold end, the ends of the leads are hermetically sealed and connected to lead ends that form the platform for the electrical connection. Cables, plug-in connectors or connector sockets can be connected to them.

This revolutionary sensor is an engineered solution for the tubeskin industry and will be designed for each application and installation. The materials of each component can be selected to match the application. By utilizing these engineered components you can be confident the eTEFRACTO-PAD® design will provide accurate measuring results.

eTEFRACTO-PAD®,

WIKA,

21215402.5 CN 202111548816.4).

: US 17/554,754, EP

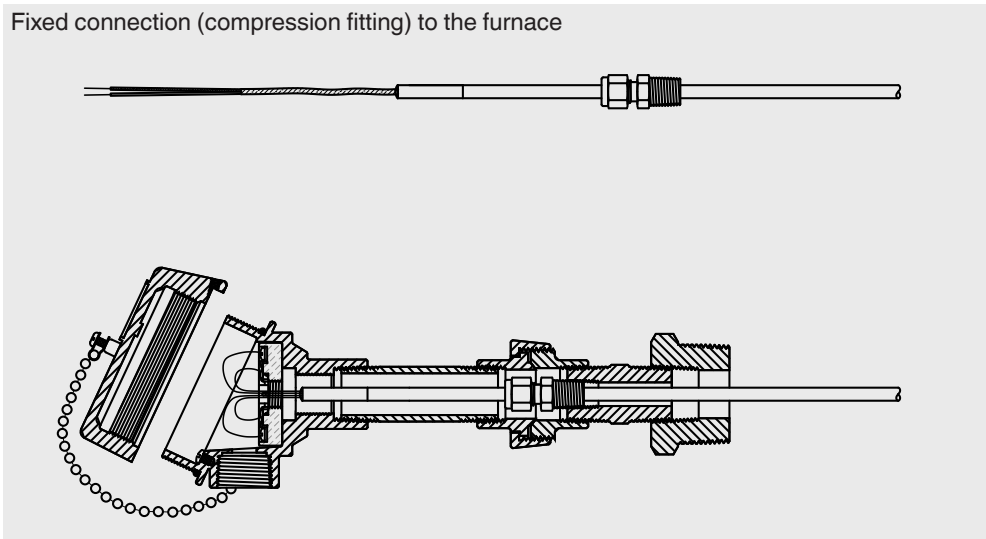
eTEFRACTO-PAD®



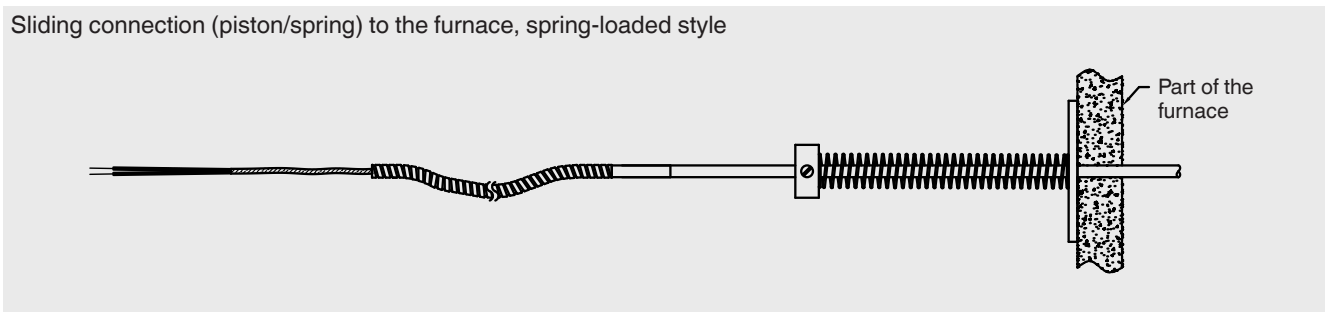
Measuring element

Overview of versions

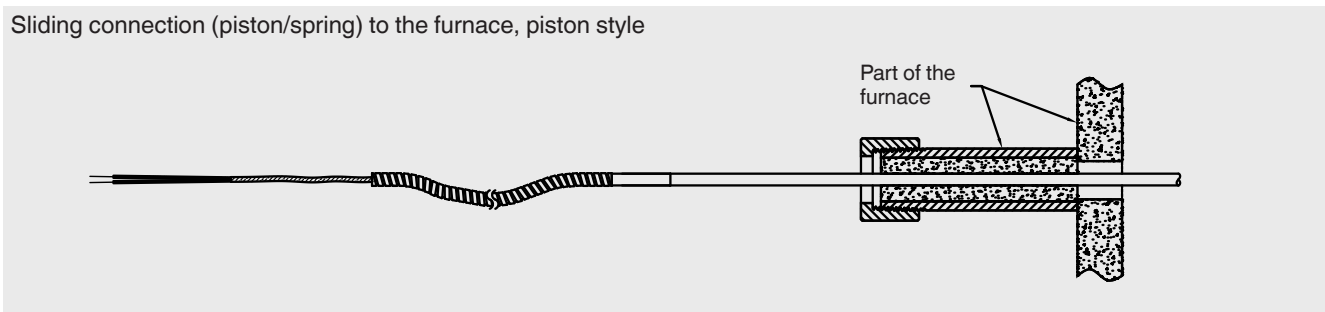
Fixed connection (compression fitting) to the furnace



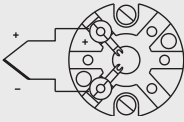
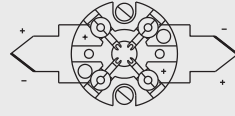
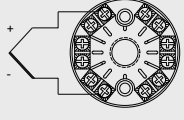
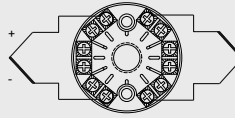
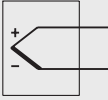
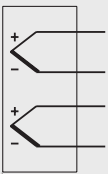
Sliding connection (piston/spring) to the furnace, spring-loaded style



Sliding connection (piston/spring) to the furnace, piston style



Measuring element	
Type of measuring element	Thermocouple per IEC 60584-1 or ASTM E230 Types K, J, N → Other measuring elements on request
Measuring point	<ul style="list-style-type: none"> ■ Ungrounded (standard) ■ Grounded (welded to the sheath)

Measuring element		
Marking of the polarity	The colour coding at the positive poles of the instrument decides the correlation of polarity and terminal	
Ceramic terminal block	Single thermocouple	
	Dual thermocouple	
Crastin terminal block	Single thermocouple	
	Dual thermocouple	
Cable connection	Single thermocouple	
	Dual thermocouple	

Validity limits of the class accuracy per EN 60584-1

Type K	Class 2	-40 ... +1,200 °C [-40 ... +2,192 °F]
	Class 1	-40 ... +1,000 °C [-40 ... +1,832 °F]
Type J	Class 2	-40 ... +750 °C [-40 ... +1,382 °F]
	Class 1	-40 ... +750 °C [-40 ... +1,382 °F]
Type N	Class 2	-40 ... +1,200 °C [-40 ... +2,192 °F]
	Class 1	-40 ... +1,000 °C [-40 ... +1,832 °F]

Validity limits of the class accuracy per ASTM-E230

Type K	Standard	0 ... 1,260 °C [32 ... 2,300 °F]
	Special	0 ... 1,260 °C [32 ... 2,300 °F]
Type J	Standard	0 ... 760 °C [32 ... 1,400 °F]
	Special	0 ... 760 °C [32 ... 1,400 °F]
Type N	Standard	0 ... 1,260 °C [32 ... 2,300 °F]
	Special	0 ... 1,260 °C [32 ... 2,300 °F]

Colour code of cable

IEC 60584-3

Thermocouple type	Positive leg	Negative leg
K	Green	White
J	Black	White
N	Pink	White


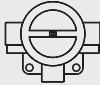

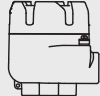
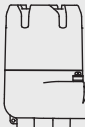
ASTM E230

Thermocouple type	Positive leg	Negative leg
K	Yellow	Red
J	White	Red
N	Orange	Red

→ For detailed specifications for thermocouples, see IEC 60584-1 or ASTM E230 and technical Information IN 00.23 at

The table shows the temperature ranges listed in the respective standards, in which the tolerance values (class accuracies) are valid. When using a compensating cable or thermocouple cable, an additional measuring error must be considered. For the tolerance value of thermocouples, a cold junction temperature of 0 °C [32 °F] has been taken as the basis.

Connection head

Model		Material	Cable entry thread size	Ingress protection (max.) ¹⁾ IEC/EN 60529	Cap	Surface	Connection to neck tube
	1/4000	Aluminium	<ul style="list-style-type: none"> ■ ½ NPT ■ ¾ NPT ■ M20 x 1.5 	IP66 ²⁾	Screw-on lid	Blue, painted (RAL 5022)	½ NPT
	1/4000	Stainless steel	<ul style="list-style-type: none"> ■ ½ NPT ■ ¾ NPT ■ M20 x 1.5 	IP66 ²⁾	Screw-on lid	Natural finish	½ NPT
	5/6000	Aluminium	<ul style="list-style-type: none"> ■ 3 x ½ NPT ■ 3 x ¾ NPT ■ 3 x M20 x 1.5 	IP66 ²⁾	Screw-on lid	Blue, painted (RAL 5022)	½ NPT
	5/6000	Stainless steel	<ul style="list-style-type: none"> ■ 3 x ½ NPT ■ 3 x ¾ NPT ■ 3 x M20 x 1.5 	IP66 ²⁾	Screw-on lid	Natural finish	½ NPT
	7/8000	Aluminium	<ul style="list-style-type: none"> ■ ½ NPT ■ ¾ NPT ■ M20 x 1.5 	IP66 ²⁾	Screw-on lid	Blue, painted (RAL 5022)	½ NPT
	7/8000	Stainless steel	<ul style="list-style-type: none"> ■ ½ NPT ■ ¾ NPT ■ M20 x 1.5 	IP66 ²⁾	Screw-on lid	Natural finish	½ NPT
	PIH-L	Aluminium	<ul style="list-style-type: none"> ■ ½ NPT / closed ■ M20 x 1.5 / closed ■ 2 x ½ NPT ■ 2 x M20 x 1.5 	IP66 ²⁾	Screw-on lid, flat	Blue lid, painted Grey lower body, painted	<ul style="list-style-type: none"> ■ ½ NPT ■ M20 x 1.5
	PIH-H	Aluminium	<ul style="list-style-type: none"> ■ ½ NPT / closed ■ M20 x 1.5 / closed ■ 2 x ½ NPT ■ 2 x M20 x 1.5 	IP66 ²⁾	Screw-on lid, high	Blue lid, painted Grey lower body, painted	<ul style="list-style-type: none"> ■ ½ NPT ■ M20 x 1.5

1) IP ingress protection of the connection head. The IP ingress protection of the complete TC59-E instrument does not necessarily have to correspond to the connection head.
 2) Suitable sealing/cable gland required





Field temperature transmitter, model TIF50 (option)

As an alternative to the standard connection head, the sensor can be fitted with an optional model TIF50 field temperature transmitter. A remote version for tube/surface mounting for the sensor designs with connection cable is also possible. The field temperature transmitter comprises a 4 ... 20 mA/HART® protocol output and is equipped with an LCD indication module.



Field temperature transmitter
 Fig. left: model TIF50, head version
 Fig. right: model TIF50, wall mounting

Transmitter

Transmitter models	Model T16	Model T32	Model T38	Model TIF50
Transmitter data sheet	TE 16.01	TE 32.04	TE 38.01	TE 62.01
Figure				
Output				
4 ... 20 mA	x	x	x	x
HART® protocol	-	x	x	x
Input	<ul style="list-style-type: none"> ■ Type K ■ Type J ■ Type E ■ Type N ■ Type T 	<ul style="list-style-type: none"> ■ Type K ■ Type J ■ Type E ■ Type N ■ Type T 	<ul style="list-style-type: none"> ■ Type K ■ Type J ■ Type E ■ Type N ■ Type T 	<ul style="list-style-type: none"> ■ Type K ■ Type J ■ Type E ■ Type N ■ Type T
Explosion protection	Ex version possible			

Possible mounting positions for transmitters	Model T16	Model T32	Model T38
1/4000	○	○	○
5/6000	○	○	○
7/8000	○	○	○
PIH-L / PIH-H	○	○	○

Legend:

- Mounted instead of terminal block
- Mounting not possible

The mounting of a transmitter is possible with all the connection heads listed here. For a correct determination of the overall measuring deviation, the sensor and transmitter measuring deviations must be added.

Process connection

Process connection	
Design	eTEFRACTO-PAD® <ul style="list-style-type: none"> ■ Strong welded connection on three sides of the heat shield ■ This in combination with the moldable insulation offers accuracy and reliability in demanding applications ■ Designed for high heat flux and/or difficult applications, including flame impingement applications ■ A guide channel allows for easy sensor installation / removal. ■ Special features of the guide channel ensure intimate sensor contact with the tube being measured.
Material (weldable)	Stainless steel 310 → Other materials on request

Mineral-insulated metal-sheathed cable (MIMS cable)

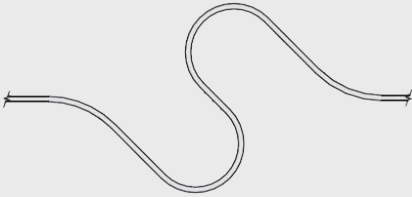



Sheathed cable (MIMS cable)			
Design	<ul style="list-style-type: none"> ■ Fixed connection (compression fitting) to the furnace ■ Sliding connection (piston/spring) to the furnace 		
Bending radius	Five times the sheath diameter		
Cable length	Fixed connection	150 mm [6 in] Other lengths on request	
	Sliding connection	User specifications	
Sheath diameter	<ul style="list-style-type: none"> ■ 6.0 mm [0.24 in] ■ 6.4 mm [0.25 in] ■ 7.9 mm [0.31 in] ■ 9.5 mm [0.37 in] 		
	→ Other diameters on request		
Compression fitting	Fixed connection	The sealing from the process is performed by the compression fitting. It can be supplied in most common thread sizes.	
	Sliding connection	-	
Compensating cable	Fixed connection	PTFE-insulated (standard)	
	Sliding connection	User specifications	
Wire ends	Terminal block	-	
	Cable connection	User specifications	
Sheath material	Resistance in sulphurous ambient	Resistance in maximum temperature	
	Stainless steel 310	Medium	1,150 °C [2,102 °F]
	Stainless steel 446 ¹⁾	High	1,150 °C [2,102 °F]
	Alloy X	Medium	1,150 °C [2,102 °F]
	Alloy 600	Low	1,150 °C [2,102 °F]
	Haynes HR 160®	Very high	1,200 °C [2,192 °F]
	Pyrosil D®	High	1,250 °C [2,282 °F]
	Stainless steel 316	Medium	850 °C [1,562 °F]
	→ Other materials on request		

1) Depending on design

Fixed connection: Can be mounted directly to the neck or remotely

Sliding connection: Can be mounted remotely

Expansion loops

Expansion loops	
Design	<ul style="list-style-type: none"> ■ Designed to account for maximum tube movement from startup position to operating temperature ■ In accordance with allowable space available
S-loop	
Single coil	
Multiple coil	
Spiral loop	

Operating conditions

Operating conditions	
Ambient and storage temperature	
PVC	105 °C [221 °F]
PTFE	250 °C [482 °F]
Fibreglass	400 °C [752 °F]
Vibration resistance	50 g (probe tip)

IP ingress protection per IEC/EN 60529

First index number	Degree of protection / Short description	Test parameters
Degrees of protection against solid foreign bodies (defined by the 1st index number)		
5	Dust-protected	Per IEC/EN 60529
6	Dust-tight	Per IEC/EN 60529
Degrees of protection against water (defined by the 2nd index number)		
4	Protected against splash water	Per IEC/EN 60529
5	Protected against water jets	Per IEC/EN 60529
6	Protected against strong water jets	Per IEC/EN 60529

Standard ingress protection of the model TC59-E is IP65.





The specified degrees of protection apply under the following conditions:

- Use of a suitable cable gland
- Use of a cable cross-section appropriate for the gland or select the appropriate cable gland for the available cable
- Adhere to the tightening torques for all threaded connections

Approvals

Logo	Description	Region
	EU declaration of conformity	European Union

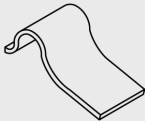
Optional approvals

Logo	Description	Region
	EU declaration of conformity ATEX directive Hazardous areas - Ex d Zone 1 gas II 2G Ex db IIB + H2 T6...T4 Gb Zone 1 gas II 2G Ex db IIC T6...T4 Gb Zone 1 dust II 2D Ex tb IIIC T85°C Db IP66	European Union
	IECEx Hazardous areas - Ex d Zone 1 gas Ex db IIB + H2 T6...T4 Gb Zone 1 gas Ex db IIC T6...T4 Gb Zone 1 dust Ex tb IIIC T85°C Db IP66	International
	FM Hazardous areas - Ex d (XP) Division 1 gas Class I, division 1, groups B, C, D, T6, type 4/4X Division 1 dust Class II or III, division 1, groups E, F, G T6, type 4/4X Division 2 gas Class I, division 2, groups A, B, C, D, T6 type 4/4X	USA and Canada
	CSA Hazardous areas - Ex d (XP) Division 1 gas Class I, division 1, groups B, C, D, type 4/4X Division 1 dust Class II, groups E, F, G, type 4/4X Division 1 dust Class III, type 4/4X - Ex NI Division 2 gas Class I, division 2, groups B, C, D, type 4/4X - Ex d (FP - CAN) Zone 1 gas Ex d IIC Gb T6/T5/T4 Zone 1 gas Ex d IIB + H2 Gb T6/T5/T4 - Ex d (FP - USA) Zone 1 gas Class I, zone 1, AEx d IIC Gb T6/T5/T4 Zone 1 gas Class I, zone 1, AEx d IIB + H2 Gb T6/T5/T4	USA and Canada

Patents, property rights

Patent number	Description
US 17/554,754 EP 21215402.5 CN 202111548816.4	Thermocouple sensor assembly (patent pending)

Accessories

Model	Description	Order number	
	Tube clips	Material: Stainless steel 310	
		MI cable Ø 6.0 ... 6.4 mm [0.24 ... 0.25 in]	55984097
		MI cable Ø 7.9 ... 9.5 mm [0.31 ... 0.37 in]	55984101

→ Other materials on request

Design consideration

WIKA uses trained specialists to customise the temperature measuring locations to the application. These specialists utilise best practices derived from scientific properties to optimise the life and accuracy of the thermocouple. They make suggestions to optimise the system for temperature, movement, and burner firing.

Some design considerations that can help determine measuring locations for the specific application in order to choose the best suitable product:

- Heat transfer (radiation, convection, conduction)
- Junction (grounded, ungrounded)
- Flame impingement
- Furnace exit design options
- Burner fuel (flue gas composition)
- Welding procedure (TIG, stick, temperature monitoring)
- Mounting (location, orientation)
- Operating vs. design temperatures
- Bending radius
- Path to furnace wall
- Furnace design (burner locations)

Benefits



- Short downtimes
- Fast commissioning
- Ensuring process safety
- Options for extended warranty
- Compliance with local safety regulations
- Environmentally conscious handling

Ordering information

Model / Explosion protection / Connection head / Terminal block, transmitter / Expansion loops / Mineral-insulated sheathed cable (MIMS cable) / Material / Cable entry / Design / Electrical connection / Measuring element / Sensor type / Temperature range / Probe diameter / Tube diameter / Materials / Thread size / Connection cable, sheath / Lengths N, W, A / Accessories / Options

© 08/2023 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.
In case of a different interpretation of the translated and the English data sheet, the English wording shall prevail.

