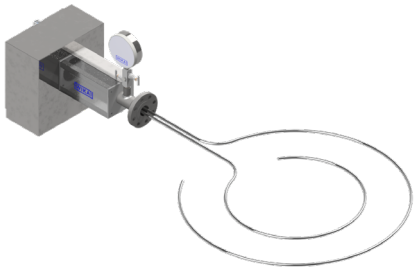
Multipoint thermocouple in single sheath design
Model TC96-L

Applications

- Oil, gas and petrochemical industry
- Measurement of temperature profiles in reactors, regenerators, and a variety of colums
- Detection of hots pots and uneven flow distribution

Special features

- Real-time temperature readings
- High point density through consolidated measuring points
- Ability to insert greater number of measuring points through existing nozzles
- Simplified installation



Flexible multipoint thermocouple, model TC96-L

Description

Process refining is an integral part of operations in a petrochemical plant. As markets shift and regulations on emissions are put in place, operating efficiency becomes more important in order to achieve the highest output possible while minimising environmental impact. Accurately monitoring these conditions is necessary to ensure operations are running as smoothly and efficiently as they're meant to. Advancements in technologies provide new process conditions and present challenging conditions for measuring instruments inserted into the process.

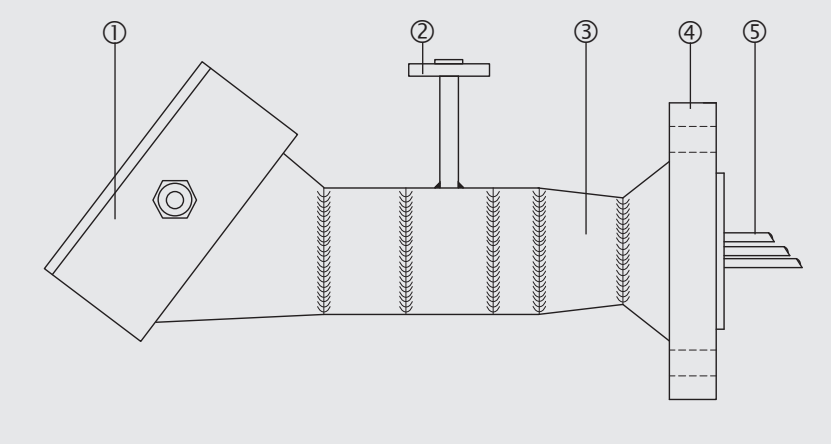
WIKA's model TC96-L multipoint thermocouple provides operators with the opportunity for advanced reactor temperature profiling, while reducing the amount of measurement strings inserted into the process. Multiple thermocouple points, formed completely independent from one another, are housed inside a single heavy-duty sheath to make up a linear array measurement string.

In doing this, the amount of non-reactive material inserted into the process flow is reduced when compared to a bundle of standard single-point measurement strings. Combining multiple measurement strings into one process connection maximizes the measurement coverage while minimizing the number of entries into the vessel, saving time and money during vessel construction. Monitoring temperatures inside the vessel provides the unique ability to evaluate various aspects of the operation including process hot spots, channeling effects and maldistribution of the catalyst, among others.

Data sheets showing similar products:
Flexible multipoint thermometer, Flex-R; model TC96-R; see data sheet TE 70.10

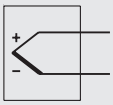
Specifications

Base elements of a multipoint thermocouple in single sheath design, model TC96-L
A multipoint thermocouple can be basically divided into five individual sections which are described separately:



① Enclosure
② Pressure monitoring connection
③ Neck tube incl. primary and secondary containment
④ Process connection
⑤ Multi-junction sensor element

Overview of versions	
Model	**Description**
TC96-L-C	With flange connection
TC96-L-R	With Radial Tap®
TC96-L-N	With Radial Tap® Nex Gen

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	Ungrounded	
Marking of the polarity	The colour coding at the positive poles of the instrument decides the correlation of polarity and terminal	
Cable connection	Single thermocouple	
Validity limits of the class accuracy in accordance with IEC 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 in accordance with 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]

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 measured 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.

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 www.wika.com

Transmitter models	Model T16	Model T38
Data sheet	TE 16.01	TE 38.01
Transmitter case	■ T16.H ■ T16.R	■ T38.H ■ T38.R
Figure		
Output		
4 ... 20 mA	x	x
HART® protocol	-	x
Input	■ Type K ■ Type J ■ Type E ■ Type N ■ Type T	■ Type K ■ Type J ■ Type E ■ Type N ■ Type T
Explosion protection	Ex version possible	

Mineral-insulated metal-sheathed cable (MIMS cable)	
Design	■ Specially made sheath with heavy-duty wall ■ Up to 9 independent measuring points per sheath
Thermocouple	■ Type K ■ Type J ■ Type N
	→ Others thermocouples on request
Minimum bending radius	5 times the sheath diameter
Measuring point tolerance	±25 mm [±1 in]
Sheath diameter	■ 12.7 mm [0.50 in] ■ 9.5 mm [0.37 in]
	→ Other diameters on request
Sheath material	■ Stainless steel 321 ■ Stainless steel 347 ■ Alloy 600 ■ Alloy 825
	→ Other materials on request

Process connection		
Flange		
EN 1092-1/DIN 2527	Nominal width	DN 50 ... DN 200
	Pressure rating	PN 16 ... PN 100
ASME B16.5	Nominal width	1" ... 12"
	Pressure rating	Class 150 ... 2,500
High-pressure coupling	■ Radial Tap® ■ Radial Tap® Nex Gen	
Material	■ Stainless steel 321 ■ Stainless steel 347 ■ Alloy 600 ■ Alloy 825	
	→ Other materials on request	
Secondary containment		
Single disc seal design	Size and material varies by process connection	
Primary seal leak detection	■ Flanged connection according to customer specification ■ Threaded connection according to customer specification ■ Pressure gauge ■ Pressure gauge with relief valve	

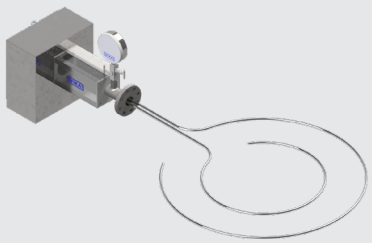
→ Other process connections on request

Routing of the MIMS cable inside the reactor

The correct length of the TC96-L will be designed depending on the vessel data:

- Diameter
- Height
- Material

Multipoint thermocouple in single sheath design, with two measurement strings



HART® is a registered trademark of FieldComm Group, Inc.
Radial Tap® is a registered trademark of HilTap Fittings Ltd.

Ordering information
To order the described product, the order number is sufficient.

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