Temperature sensors

Temperature sensors - Highly optimized specialists for every requirement

Temperature is a critical factor in many industrial processes and has to be monitored constantly in order to operate machines and systems safely and efficiently. A reliable and practical solution for temperature measurement are electronic temperature sensors and transmitters. Reliability is not just provided through high accuracy and repeatability but also through many available interfaces to the process and the operator.
Temperature measurement in industrial applications is mainly implemented with resistance thermometers or thermoelements. Resistance thermometers accomplish this via temperature-sensitive electrical resistors. While the resistance of PTCs increases with the rise of temperature, NTCs behave opposite.
Thermoelements are applied to detect temperatures up to +1700 °C and higher. A thermoelement consists of two different interconnected metals or semiconductors. A temperature difference between the two metals causes electric potential of corresponding magnitude at the interconnection. In practice, the temperature of a cold spot is detected with a separate probe from which the temperature of the hot spot is then deduced.
Infrared sensors are applied for non-contact measurement of surface temperatures in a range between -70 °C and +1000 °C. The distance-spot ratio is thereby of importance because it indicates the diameter (S) of the spot at a given distance (D).
The TURCK product portfolio guarantees maximum flexibility for temperature measurement through numerous connection possibilities and output signals.
The intelligent sensors of the TS series fulfill all application specific requirements to the optimum through easy programming, flexible process connection and well readable displays. The compact sensors of the TT/TC series are available with integrated probe but also with standard M12 male connection to mount external probes. The infrared sensors of the T-Gage series measure temperatures contactless between 0 and +300 °C at wavelengths between 8 and 14 µm. A further important device of the product portfolio is the IP67 rated Pt100 resistance thermometer for temperature measurements between -50 and +500 °C. The temperature probes of the TP series are available in different lengths and diameters. The sensor can be adapted to critical applications with a thermowell.

Temperature sensors – TS series

Made-to-measure solutions

Due to its high accuracy of 0.2 K, the temperature sensors of the TS series handle a large spectrum of applications with only a few devices. Temperature is detected with a Pt100 directly connected to the M12 male or via a standard connection cable. Temperatures are detected in a range between -50 and +500 °C. The 4-digit 7-segment LED display indicates the temperature and makes programming easier. The devices are available with two transistor switching outputs or with one switching and one analog output. High EMC immunity and protection classes IP67/IP69K guarantee reliable operation, even under harsh conditions. All TS sensors are equipped with an IO-Link interface.

Flexible mounting

Inclined by 45° the display is well readable from any position and even from a great distance. Horizontal mounting is also possible. The read direction can be reversed by 180° degrees via software.
After locking the pressure connection, the TS500 can be rotated by 320° degrees and moved in any desired position. Once the final position is attained, the device is fixed in place with a second coupling nut. Special mounting aids are not required. With a diameter of only 34 mm, several sensors can be mounted side by side in confined spaces.

Clearly visible display

The bright 4-digit 7-segment display indicates the temperature during normal operation and is easy to program. The sloped display allows the sensors to be mounted on top or in front according to the position of the process connection. The read direction can be reversed by 180° degrees via software. Values are thus perfectly readable, even if the sensor is mounted horizontally.

TS series

Easy programming

Thanks to the user friendly menu guide the switch and release point, the output function, the analog range and various special functions are easily taught via pushbuttons.
The TS series is programmed with the buttons MODE and SET. Tools are not needed to view the parameter values. To protect against unintentional changes of data, the ENTER button for storing the values is recessed. The button can only be pressed with a pointed object, such as a ball pen for example.

Rugged design

The sensor body, temperature and electrical connection are made of stainless steel. All sensors feature excellent EMC properties and are IP67 protected. Absolute operational safety is thus guaranteed even in rough production environments. The mineral-insulated probes are enormously flexible and temperature-resistant. Rugged TURCK connection cables provide the necessary security for connection.

High system availability

The TS series excels in excellent EMC properties and is IP67 protected. Sensor body, temperature and electrical connection of the programmable devices are made of stainless steel and guarantee maximum operational safety:

- Excellent EMC properties, highly interference immune
- Protection against mechanical impacts thanks to the rugged design
- Minimum maintenance effort through optimized temperature coupling
- Short down-times through high system availability and short replacement times

Temperature sensors – TS series

Extremely service-friendly

Flexible mounting options, user-friendliness and accuracy provide calculable advantages, such as:

- Minimum maintenance effort through optimized performance of the sensors and a streamlined product portfolio.
- Easy configuration and operation via pushbuttons
- Recessed programming button
- Large and good readable display
- The upper part of the TS500 sensor is rotatable by 320°
- Communication via IO-Link
- VDMA menu guide (optional)

Efficient standardization

A single sensor replaces many conventional types. The intelligent temperature sensors fulfill many different control tasks and reduce the number of required sensors considerably.
A reduced inventory pays off for you:

- Only a few sensors are needed to cover a large range of applications
- Reduced training effort due to simple and failsafe operation
- High system safety achieved through a rugged design
- 4-pole standard M12 male connection at the probe and processor unit

ors – TS series

Type code

TS – 5 00 – LI2U PN 8 X – H1 1 4 1

TS	Functional principle	–	5 00	Mechanical version	–	LI2U PN 8 X	Electrical version	–

Functional principle
TS temperature sensor

Process connection
00 without process connection temperature probe via M12 x 1

Design
4 adjustable, with display, non-rotatable
5 adjustable, with display, rotatable

Indication
X... Number of LEDs or multicolor LED

Voltage range
8 15(18)…30 VDC

Output range
PN PNP/NPN output

Output function
2U output 1: switching output Ausgang 2: switching output
LUU output 1: switching output output 2: voltage output
LI2U output 1: switching output output 2: current/switching output reprogrammable

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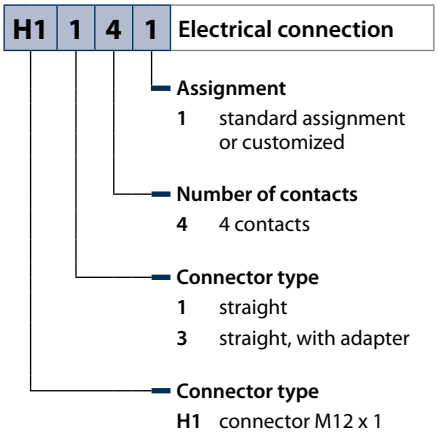

H1 1 4 1 Electrical connection
Assignment
1 standard assignment or customized
Number of contacts
4 4 contacts
Connector type
1 straight
3 straight, with adapter
Connector type
H1 connector M12 x 1

Designs and variants

	Mechanical connection	Connection	Output 1	Output 2	Page
Pt100 processing unit – Switching and analog outputs 	Cylindrical, Ø 18 mm	male, M12 x 1	Switching output or IO-Link mode	switching output Analog or switching output analog output	449
Pt100 processing unit rotatable – Switching and analog outputs 	Cylindrical, Ø 18 mm	male, M12 x 1	Switching output or IO-Link mode	switching output Analog or switching output analog output	451
Processing unit without probe – 1 current output (2-wire)) 	for compression ferrule fittings, protective tubing or direct mounting	male, M12 x 1	analog output	–	457
Processing unit without probe – 1 switching output 	–	male, M12 x 1	Switching output	–	457
Temperature transmitter with compact probe Ø 3 mm – 1 current output (2-wire) 	G ⅛" male thread	male, M12 x 1	analog output	–	458
Temperature switch with compact probe Ø 3 mm – 1 switching output 	G ⅛" male thread	male, M12 x 1	Switching output	–	458
Temperature transmitter with rod-type probe Ø 6 mm – 1 current output (2-wire) 	for compression ferrule fittings, protective tubing or direct mounting	male, M12 x 1	analog output	–	459

ts and variants

	Mechanical connection	Connection	Output 1	Output 2	Page
Transmitter with compact probe Ø 3 mm – Current output (2-wire) 	G ⅛" male thread	male, M12 x 1	analog output	–	461
Transmitter with rod-shaped probe Ø 6 mm – Current output (2-wire) 	for compression ferrule fittings, protective tubing or direct mounting	male, M12 x 1	analog output	–	461
Compact probe – Ø 3 mm – Process connection 	G ⅛" male thread	male, M12 x 1	–	–	473
Rod-type probe – Ø 3 mm 	for compression ferrule fittings, protective tubing or direct mounting	male, M12 x 1	–	–	473
Rod-type probe – Ø 6 mm 	for compression ferrule fittings, protective tubing or direct mounting	male, M12 x 1	–	–	474
Cable probe – Ø 6 mm 	for compression ferrule fittings, protective tubing or direct mounting	male, M12 x 1	–	–	474

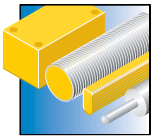
TS400 series – Pt 100 probe (4-wire)

The TS400 processor units are incorporated in a non-rotatable, rugged stainless steel housing. A standard male M12 x 1 connection is available for TP temperature probes. The display indicates the temperature during normal operation and guides the operator through the programming menu. We offer sensors with switching outputs or a combination of switching and analog outputs. IO-Link communication is integrated as a standard.

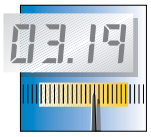
Features

- Temperature probes connected via male M12 x 1
- Housing, temperature and electrical connection are made of stainless steel
- Highest flexibility through modular system
- Secure programming through recessed pushbutton and keylock
- Permanent display of temperature (°C, °F, K, Ω)
- Storage of max/min values

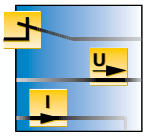
Properties



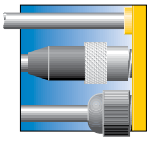
Designs
Cylindrical, non-rotatable, with display



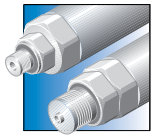
Measuring ranges
-50…+500 °C



Electrical versions
IO-Link capable, 2-channel, switching, current or voltage output



Electrical connections
Male M12 x 1, 4-pin



Connectivity
Cylindrical design 18 mm, for mounting bracket
Male M12 x 1 for probe

Special features
Failsafe 3-key operation, VDMA menu guide (optional), IP67, fully encapsulated sensor

Internet link
Scan the QR code to access our products on the internet

Pt100 processing unit – Switching and analog outputs

General data

Output 1	Switching output or IO-Link mode	**Protection class**	IP67
Connection	male, M12 x 1	**Temperature operating range**	-50…500 °C
Mechanical connection	Cylindrical, Ø 18 mm	**Response time**	100 ms
Housing material	V2A (1.4305)	**Switching frequency**	180 Hz
Remark	0.1% of full scale applies to temperatures > 200°C	**Switching point accuracy**	0.2 K

Types and data – selection table

Type	Output 2	Operating range	Operating voltage	Accuracy (Lin. + Hys. + Rep.)	w	d
TS-400-2UPN8X-H1141	switching output	–	15…30 VDC	–	w166	d641
TS-400-LI2UPN8X-H1141	Analog or switching output	4…20/ 0…20 mA (3-wire)	18…30 VDC	0.2 K	w167	d641
TS-400-LUUPN8X-H1141	analogue output	0…10 V/0…5 V/1…6 V (3-wire)	18…30 VDC	0.2 K	w168	d641

Temperature sensors

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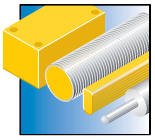
TS500 series fo Pt 100 probe (4-wire)

The TS500 processor units are rotatable by 320° and equipped with 4-digit 7-segment displays. A standard male M12 x 1 connection is available for TP temperature probes. The display indicates the temperature during normal operation and guides the operator through the programming menu. We offer sensors with switching outputs or a combination of switching and analog outputs. IO-Link communication is integrated as a standard.

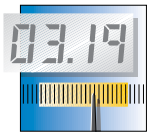
Features

- Sensor rotatable by 320°
- Temperature probes connected via male M12 x 1
- Housing, temperature and electrical connection are made of stainless steel
- Highest flexibility through modular system
- Secure programming through recessed pushbutton and keylock
- Permanent display of temperature (°C, °F, K,Ω)
- Storage of max/min values

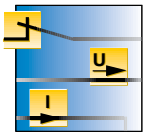
Properties



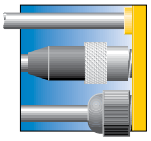
Designs
Cylindrical, rotatable, with display



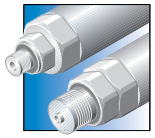
Measuring ranges
-50…+500 °C



Electrical versions
IO-Link capable, 2-channel, switching, current or voltage output



Electrical connections
Male M12 x 1, 4-pin



Connectivity
Cylindrical design 18 mm, for mounting bracket
Male M12x1 for probe

Special features
Failsafe 3-key operation, VDMA menu guide (optional), IP67, fully encapsulated sensor

Internet link
Scan the QR code to access our products on the internet

Pt100 processing unit rotatable – Switching and analog outputs

General data

Output 1	Switching output or IO-Link mode	**Protection class**	IP67
Connection	male, M12 x 1	**Temperature operating range**	-50…500 °C
Mechanical connection	Cylindrical, Ø 18 mm	**Response time**	100 ms
Housing material	V2A (1.4305)	**Switching frequency**	180 Hz
Remark	0.1% of full scale applies to temperatures > 200°C	**Switching point accuracy**	0.2 K

Types and data – selection table

Type	Output 2	Operating range	Operating voltage	Accuracy (Lin. + Hys. + Rep.)	w	d
TS-500-2UPN8X-H1141	switching output	–	15…30 VDC	–	w166	d642
TS-500-LI2UPN8X-H1141	Analog or switching output	4…20/ 0…20 mA (3-wire)	18…30 VDC	0.2 K	w167	d642
TS-500-LUUPN8X-H1141	analogue output	0…10 V/0…5 V/1…6 V (3-wire)	18…30 VDC	0.2 K	w168	d642

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Temperature sensors – TT/TC series

Flexible temperature transmitter and sensor

The sensors of the TT/TC series detect temperature with a Pt100 4-wire probe. Available are compact devices with integrated probe but also with standard M12 connector for separate probes. The temperature transmitters of the TT series feature an analog output 4…20 mA (2-wire). The devices of the TC series instead feature a switching output. Depending on the combination of sensor and probe, temperatures are measured in a range between -50…+500 °C. The temperature range can be customized on request.

Cost-efficient transmitter solution

Termperature transmitters and sensors of the TT/TC series are applied in places where transducers are not required and the customer needs highest flexibility regarding the choice of probe and thermowell:

- Temperature range -50…+500 °C
- Rugged stainless steel housing, IP67 protected
- Versions with integrated probe or without probe
- Connection of separate probes via M12 connector
- Highest flexibility in choice of probe
- Further mounting aids are not required
- Analog output 4…20 mA (TT series) or switching output (TC series)

Type code

TT	–	103A	–	G1/8	–	H1	1	4	0	–	L013	/	S713

TT	Functional principle	–	103A	Mechanical version	–	G1/8	Process connection	–

Functional principle

TC temperature switch

TT temperature transmitter

Housing

100A processor unit without probe, connection of probe via M12 x 1

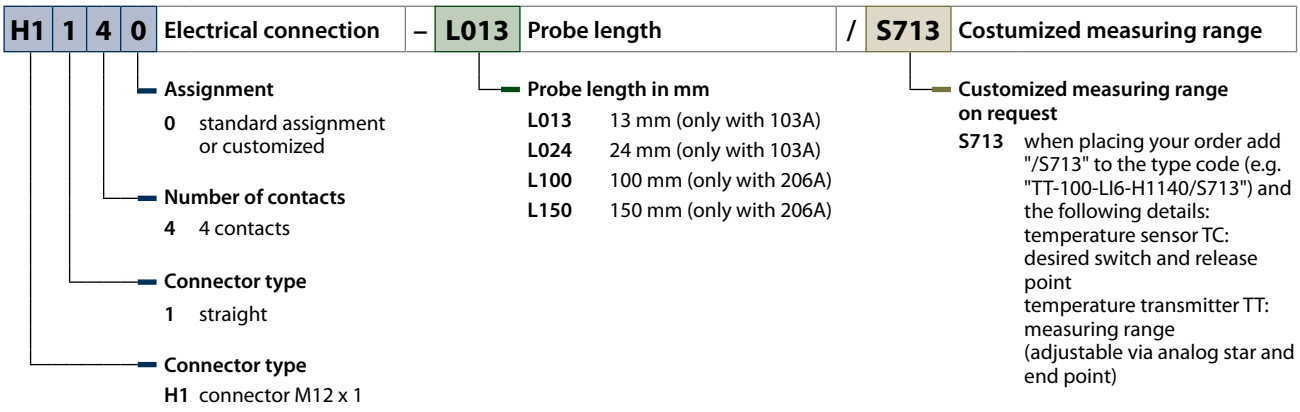
103A processor unit with probe Ø 3 mm, process connection via standard thread accuracy class A

206A processor unit with probe Ø 6 mm, process connection via compression fitting thermowell, accuracy class A

Process connection (only devices with built-on probe)

G1/8 G1/8" male thread (only 103A)

CF connection compression fitting thermowell (only 206A)


H1 1 4 0 Electrical connection
– L013 Probe length
/ S713 Costumized measuring range
Assignment
0 standard assignment or customized
Number of contacts
4 4 contacts
Connector type
1 straight
Connector type
H1 connector M12 x 1
Probe length in mm
L013 13 mm (only with 103A)
L024 24 mm (only with 103A)
L100 100 mm (only with 206A)
L150 150 mm (only with 206A)
Customized measuring range on request
S713 when placing your order add "/S713" to the type code (e.g. "TT-100-LI6-H1140/S713") and the following details:
temperature sensor TC: desired switch and release point
temperature transmitter TT: measuring range (adjustable via analog star and end point)

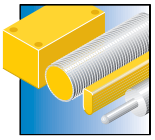
TT/ TC series – Temperature transmitters and switches

The temperature transmitters of the TT series as well as the temperature switches of the TC series are available with or without integrated probe. The versions without probe take any Pt100 (4-wire) probe of the TP series.
The TT temperature transmitters are set to 0…+150 °C by default. The processed signal is provided via an analog current output, 4…20 mA (2-wire). The TC devices feature a switching output, switch and release point are set by default. Customized settings are available on request.

Features

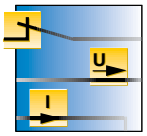
- Operating range -50 …+500 °C
- Customized settings
- Transmitter with analog current output 4…20 mA (2-wire), default temperature range 0…+150 °C
- Sensor with PNP output (NO), customized switch and release point

Properties

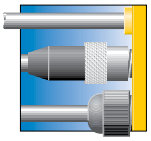


Designs
Compact cylindrical design, Ø 29 mm

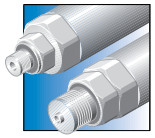
Measuring ranges
-50…+500 °C



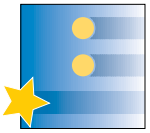
Electrical versions
Analog current output 4…20 mA (2-wire) or PNP switching output (NO)



Electrical connections
Male M12 x 1, 4-pin



Connectivity
Probes available with standard thread, compression fitting or thermowell



Special features
Customized temperature range, many connection possibilities for the probe

Internet link
Scan the QR code to access our products on the internet

Processing unit without probe – 1 current output (2-wire)

General data

Output 1	analog output	**Operating range**	4…20 mA (2-wire)
Protection class	IP67	**Connection**	male, M12 x 1
Temperature operating range	-50…500 °C	**Mechanical connection**	for compression ferrule fittings, protective tubing or direct mounting
Pressure resistance	100 bar	**Operating voltage**	8…35 VDC
Housing material	V4A 1.4401 (AISI 316)	**Response time**	Dependent on connected temperature sensor
Accuracy (Lin. + Hys. + Rep.)	0.2 K		

Types and data – selection table

Type	w	d
TT-100-LI6-H1140	w169	d643

Processing unit without probe – 1 switching output

General data

Output 1	switching output	**Protection class**	IP67
Connection	male, M12 x 1	**Temperature operating range**	-50…500 °C
Operating voltage	15…30 VDC	**Switching frequency**	1 kHz
Housing material	V4A 1.4401 (AISI 316)	**Ambient temperature**	-25…+80 °C
Response time	Dependent on connected temperature sensor	**Switching point accuracy**	0.2 K

Types and data – selection table

Type	w	d
TC-100-AP6-H1140	w170	d643
TC-100-AP6-H1140/S713	w170	d643

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Temperature transmitter with compact probe Ø 3 mm – 1 current output (2-wire)

General data

Output 1	analog output	**Operating range**	4…20 mA (2-wire)
Protection class	IP67	**Connection**	male, M12 x 1
Sensor quality	AISI 316	**Temperature operating range**	0…150 °C
Mechanical connection	G ⅛″ male thread	**Pressure resistance**	100 bar
Operating voltage	8…35 VDC	**Housing material**	V4A 1.4401 (AISI 316)
Outer diameter	3 mm	**Accuracy**	Class A
Accuracy (Lin. + Hys. + Rep.)	0.2 K		

Types and data – selection table

Type	Immersion depth (L)	w	d
TT-103A-G1/8-LI6-H1140-L013	13 mm	w169	d644
TT-103A-G1/8-LI6-H1140-L024	24 mm	w169	d645

Temperature switch with compact probe Ø 3 mm – 1 switching output

General data

Output 1	switching output	**Protection class**	IP67
Connection	male, M12 x 1	**Sensor quality**	AISI 316
Temperature operating range	0…150 °C	**Mechanical connection**	G ⅛″ male thread
Pressure resistance	100 bar	**Operating voltage**	15…30 VDC
Switching frequency	1 kHz	**Housing material**	V4A 1.4401 (AISI 316)
Outer diameter	3 mm	**Ambient temperature**	-25…+80 °C
Switching point accuracy	0.2 K	**Accuracy**	Class A

Types and data – selection table

Type	Immersion depth (L)	w	d
TC-103A-G1/8-AP6-H1140-L013	13 mm	w170	d644
TC-103A-G1/8-AP6-H1140-L024	24 mm	w170	d645

Temperature transmitter with rod-type probe Ø 6 mm – 1 current output (2-wire)

General data			
Output 1	analog output	**Operating range**	4…20 mA (2-wire)
Protection class	IP67	**Connection**	male, M12 x 1
Sensor quality	AISI 316	**Temperature operating range**	0…150 °C
Mechanical connection	for compression ferrule fittings, protective tubing or direct mounting	**Pressure resistance**	100 bar
Operating voltage	8…35 VDC	**Housing material**	V4A 1.4401 (AISI 316)
Outer diameter	6 mm	**Accuracy**	Class A
Accuracy (Lin. + Hys. + Rep.)	0.2 K		

Types and data – selection table

Type	Immersion depth (L)	w	d
TT-206A-CF-LI6-H1140-L0100	100 mm	w169	d646
TT-206A-CF-LI6-H1140-L0150	150 mm	w169	d647

Temperature sensors

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Temperature sensors – TTM series

Miniature transmitters

The TTM miniature sensors detect temperature with a 4-wire Pt1000 probe. Available are compact devices with integrated probe. The TTMs are transmitters with analog output 4…20 mA (2-wire) and have the electronics incorporated in the M12 x 1 connector. Depending on the combination of sensor and probe, temperatures are measured in a range between -50… +500 °C. The temperature range can be customized on request.

Cost-efficient transmitter solution

Miniature transmitters of the TTM series are applied in places where transducers are not required and customers need highest flexibility regarding the choice of probe and thermowell:

- Analog output 4…20 mA in the M12 x 1 connector hood
- Versions with integrated rod-type or screw-in probe
- Highest flexibility in choice of probe
- Depending on the type of probe used, mounting aids are not required
- Temperature range -50…+500 °C
- Protection class IP67

Type code

TTM	–	100C	–	203A	–	CF	–	LI6	–	H1	1	4	0	–	L100

TTM	Functional principle	–	100C	Measuring range	–	203A	Housing	–

Type

TTM Temperature transmitter miniature

Measuring range (other ranges on request)

50C 0…50 °C

100C 0…100 °C

150C 0…150 °C

Housing

103A processor unit with probe Ø 3 mm, process connection via standard thread, accuracy class A

203A for ferrule/thermowell, probe Ø 3 mm, accuracy class A

206A for ferrule/thermowell, probe , probe Ø 6 mm

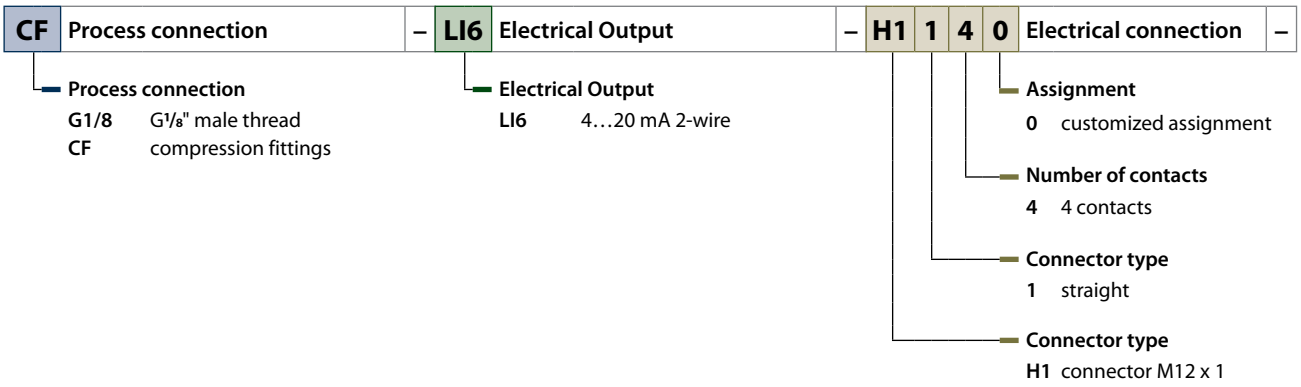
L100	Insertion depth

Probe length in mm

L100 100 mm

L150 150 mm

special lengths on request!


CF
Process connection
–
LI6
Electrical Output
–
H1
1
4
0
Electrical connection
–
Process connection
G1/8 G⅛" male thread
CF compression fittings
Electrical Output
LI6 4…20 mA 2-wire
Assignment
0 customized assignment
Number of contacts
4 4 contacts
Connector type
1 straight
Connector type
H1 connector M12 x 1

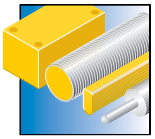
TTM series – Miniature transmitters

The miniature transmitters of the TTM series are available with integrated probe. Miniature sensors of the TTM series fit in the most confined spaces and measure temperatures precisely via the integrated processor and the Pt1000 class A measuring element. The overmoulded sensor electronics is only 25 mm longer and 1.5 mm wider than a standard M12 x 1 male connector and provides an output signal of 4…20 mA in 2-wire technology.

Features

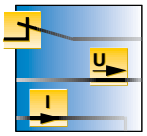
- Operating range depending on the transmitter -50…+500 °C
- Customized default settings on request
- Analog current output 4…20 mA (2-wire)
- For factory setting see type code

Properties

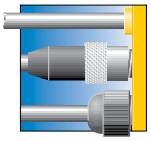


Designs
Compact miniature design, Ø 15 mm

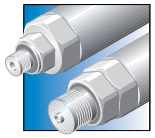
Measuring ranges
-50…+500 °C



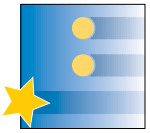
Electrical versions
Analog current output 4…20 mA (2-wire)



Electrical connections
Male M12 x 1, 4-pin



Connectivity
Probes available with standard thread, compression fitting or thermowell



Special features
Customized temperature ranges

Internet link
Scan the QR code to access our products on the internet

Transmitter with compact probe Ø 3 mm – Current output (2-wire)

General data

Output 1	analog output	**Operating range**	4…20 mA (2-wire)
Protection class	IP67	**Connection**	male, M12 x 1
Sensor quality	AISI 316L	**Mechanical connection**	G ⅛" male thread
Pressure resistance	100 bar	**Operating voltage**	10…24 VDC
Housing material	V4A (1.4404)	**Outer diameter**	3 mm
Response time	t0.5 = 1.5 s/ t0.9 = 6.0 s in water at 0.2 m/s	**Accuracy**	Class A
Accuracy (Lin. + Hys. + Rep.)	0.2 K		

Types and data – selection table

Type	Temperature operating range	Immersion depth (L)	w	d
TTM100C-103A-G1/8-LI6-H1140-L013	0…100 °C	13 mm	w171	d648
TTM050C-103A-G1/8-LI6-H1140-L013 -50…50°C	-50…50 °C	13 mm	w171	d648
TTM100C-103A-G1/8-LI6-H1140-L024	0…100 °C	24 mm	w171	d649
TTM050C-103A-G1/8-LI6-H1140-L024 -50…50°C	-50…50 °C	24 mm	w171	d649

Transmitter with rod-shaped probe Ø 3 or 6 mm – Current output (2-wire)

General data

Output 1	analog output	**Operating range**	4…20 mA (2-wire)
Protection class	IP67	**Connection**	male, M12 x 1
Sensor quality	AISI 316L	**Mechanical connection**	for compression ferrule fittings, protective tubing or direct mounting
Pressure resistance	100 bar	**Operating voltage**	10…24 VDC
Housing material	V4A (1.4404)	**Accuracy**	Class A
Accuracy (Lin. + Hys. + Rep.)	0.2 K		

Types and data – selection table

Type	Temperature operating range	Outer diameter	Immersion depth (L)	Response time	w	d
TTM100C-203A-CF-LI6-H1140-L100	0…100 °C	3 mm	100 mm	t0.5 = 1.5 s/ t0.9 = 6.0 s in water at 0.2 m/s	w171	d650
TTM100C-203A-CF-LI6-H1140-L150	0…100 °C	3 mm	150 mm	t0.5 = 1.5 s/ t0.9 = 6.0 s in water at 0.2 m/s	w171	d651
TTM150C-203A-CF-LI6-H1140-L100	0…150 °C	3 mm	100 mm	t0.5 = 1.5 s/ t0.9 = 6.0 s in water at 0.2 m/s	w171	d650
TTM150C-203A-CF-LI6-H1140-L150	0…150 °C	3 mm	150 mm	t0.5 = 1.5 s/ t0.9 = 6.0 s in water at 0.2 m/s	w171	d651
TTM150C-203A-CF-LI6-H1140-L100-50…150°C	-50…150 °C	3 mm	100 mm	t0.5 = 1.5 s/ t0.9 = 6.0 s in water at 0.2 m/s	w171	d650
TTM150C-203A-CF-LI6-H1140-L150-50…150°C	-50…150 °C	3 mm	150 mm	t0.5 = 1.5 s/ t0.9 = 6.0 s in water at 0.2 m/s	w171	d651
TTM050C-203A-CF-LI6-H1140-L100-50…50°C	-50…50 °C	3 mm	100 mm	t0.5 = 1.5 s/ t0.9 = 6.0 s in water at 0.2 m/s	w171	d650

Table continues on the next page…

… Table starts on previous page

Type	Temperature operating range	Outer diameter	Immersion depth (L)	Response time		
TTM050C-203A-CF-LI6-H1140-L150-50…50°C	-50…50 °C	3 mm	150 mm	t0.5 = 1.5 s/ t0.9 = 6.0 s in water at 0.2 m/s	w171	d651
TTM100C-206A-CF-LI6-H1140-L100	0…100 °C	6 mm	100 mm	t0.5 = 6 s/ t0.9 = 15 s in water at 0.2 m/s	w171	d652
TTM100C-206A-CF-LI6-H1140-L150	0…100 °C	6 mm	150 mm	t0.5 = 6 s/ t0.9 = 15 s in water at 0.2 m/s	w171	d652
TTM150C-206A-CF-LI6-H1140-L100	0…150 °C	6 mm	100 mm	t0.5 = 6 s/ t0.9 = 15 s in water at 0.2 m/s	w171	d652
TTM150C-206A-CF-LI6-H1140-L150	0…150 °C	6 mm	150 mm	t0.5 = 6 s/ t0.9 = 15 s in water at 0.2 m/s	w171	d652
TTM150C-206A-CF-LI6-H1140-L100-50…150°C	-50…150 °C	6 mm	100 mm	t0.5 = 6 s/ t0.9 = 15 s in water at 0.2 m/s	w171	d652
TTM150C-206A-CF-LI6-H1140-L150-50…150°C	-50…150 °C	6 mm	150 mm	t0.5 = 6 s/ t0.9 = 15 s in water at 0.2 m/s	w171	d652
TTM050C-206A-CF-LI6-H1140-L100-50…50°C	-50…50 °C	6 mm	100 mm	t0.5 = 6 s/ t0.9 = 15 s in water at 0.2 m/s	w171	d652
TTM050C-206A-CF-LI6-H1140-L150-50…50°C	-50…50 °C	6 mm	150 mm	t0.5 = 6 s/ t0.9 = 15 s in water at 0.2 m/s	w171	d652
–	–	6 mm	100 mm	t0.5 = 6 s/ t0.9 = 15 s in water at 0.2 m/s	w171	d652

Wiring diagrams on page 658 Dimension drawing on page 670 Accessories on page 560

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Temperature probes – TP series

Highest possible flexibility

A temperature probe has to be flexible and robust. All Pt100 probes of the TP series are therefore mineral-insulated, equipped with a standard process connection and available ex-stock. Moreover, TURCK Pt100 probes are provided in 4-wire technology. The power resistance is thus compensated and a possible influence on the measured value is avoided right from the start when using long cable connections between the probes and the processing units.

High operational safety

The mineral-insulated probes from TURCK are characterized by enormous flexibility and temperature resistance.
Further advantages:

- High accuracy
- Weldability (like a tube)
- Longevity even under extreme conditions (sheathed cables oxidize only on one side and thus achieve double life cycles compared to tubes with the same wall thickness)

Type code

TP	–	103	A	–	G1/8	–	H1	1	4	0	–	L013

TP	Functional principle	–	103	A	Mechanical version	–	G1/8	Process connection	–

Functional principle

TP temperature probe

Accuracy

A accuracy class A

Housing

103 processor unit with probe Ø 3 mm, process connection via standard thread accuracy class A

104 process connection for food applications, probe Ø 4 mm, accuracy class A

203 for compression fitting/ thermowell mounting probe Ø 3 mm, accuracy class A

206 for compression fitting/ thermowell mounting probe Ø 6 mm,

306 cable probe Ø 6 mm

Process connection (only devices with built-on probe)

DN25 DN25 für milk pipe connection DIN 11851

CF connection via compression fitting or thermowell

G1/8 G1/8" male thread

TRI3/4 3/4" Tri-Clamp

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H1	1	4	0	Electrical connection	–	L013	Insertion depth

Assignment
0 customized

Number of contacts
4 4 contacts

Connector type
1 straight

Connector type
H1 connector M12 x 1

Probe length in mm

L013	13 mm (only 103A)
L024	25 mm (only 103A)
L035	35 mm (only 104A)
L100	100 mm (only 104A, 203A, 206A)
L150	150 mm (only 203A, 206A)
L200	200 mm (only 203A, 206A)
L250	250 mm (only 203A, 206A)
L300	300 mm (only 203A, 206A)
L1000	1000 mm (only 306A)
L2000	2000 mm (only 306A)
L5000	5000 mm (only 306A)

special lengths on request!

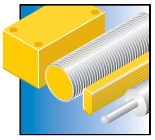
Pt100 temperature probes in 4-wire technology

The core element of the TP series is a Pt 100 measuring resistor in 4-wire technology. All probes are connected to the processing unit via standard male M12 x 1.
Resistance thermometers are used in places where temperatures must be detected and monitored to control and optimize processes. Typical applications are process plants, manufacturing facilities and units as well as air-conditioning systems.

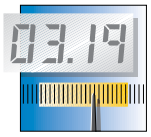
Features

- Pt100 probe acc. to DIN EN 60751
- Vibration and shock-resistant
- Class A for temp. < 350 °C
- Class B for temp. > 350 °C
- Connectable to TS, TT and TC series as well as IM34, BL20 and BL67

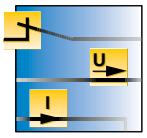
Properties



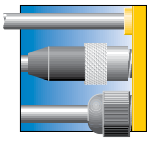
Designs
All types available: With standard process connection, lengths and diameters (3/6 mm), up to freely selectable types



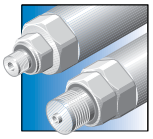
Measuring ranges
-50…+500 °C



Electrical versions
Pt100 4-wire, other types on request



Electrical connections
Male M12 x 1, 4-pin



Connectivity
Probes available with standard thread, compression fitting or thermowell

Special features
Mineral-insulated probe, IP68

Internet link
Scan the QR code to access our products on the internet

Compact probe – Ø 3 mm – Process connection

General data

Protection class	IP67	**Connection**	male, M12 x 1
Sensor quality	AISI 316L	**Temperature operating range**	-50…120 °C
Mechanical connection	G ⅛" male thread	**Pressure resistance**	100 bar
Housing material	V4A (1.4404)	**Outer diameter**	3 mm
Response time	t0.5 = 1.5 s/ t0.9 = 6.0 s in water at 0.2 m/s	**Accuracy**	Class A

Types and data – selection table

Type	Immersion depth (L)	w	d
TP-103A-G1/8-H1141-L013	13 mm	w172	d653
TP-103A-G1/8-H1141-L024	24 mm	w172	d654

Rod-type probe – Ø 3 mm

General data

Protection class	IP67	**Connection**	male, M12 x 1
Sensor quality	AISI 316L	**Temperature operating range**	-50…500 °C
Mechanical connection	for compression ferrule fittings, protective tubing or direct mounting	**Pressure resistance**	100 bar
Housing material	V4A (1.4404)	**Outer diameter**	3 mm
Response time	t0.5 = 1.5 s/ t0.9 = 6.0 s in water at 0.2 m/s	**Accuracy**	Class A

Types and data – selection table

Type	Immersion depth (L)	w	d
TP-203A-CF-H1141-L100	100 mm	w172	d655
TP-203A-CF-H1141-L150	150 mm	w172	d655
TP-203A-CF-H1141-L250	250 mm	w172	d655
TP-203A-CF-H1141-L200	200 mm	w172	d655
TP-203A-CF-H1141-L300	300 mm	w172	d655

w Wiring diagrams on page 658 d Dimension drawing on page 670 Accessories on page 560

Rod-type probe – Ø 6 mm

General data

Protection class	IP67	**Connection**	male, M12 x 1
Sensor quality	AISI 316L	**Temperature operating range**	-50…500 °C
Mechanical connection	for compression ferrule fittings, protective tubing or direct mounting	**Pressure resistance**	100 bar
Housing material	V4A (1.4404)	**Outer diameter**	6 mm
Response time	t0.5 = 6 s/ t0.9 = 15 s in water at 0.2 m/s	**Accuracy**	Class A

Types and data – selection table

Type	Immersion depth (L)	w	d
TP-206A-CF-H1141-L100	100 mm	w172	d656
TP-206A-CF-H1141-L150	150 mm	w172	d656
TP-206A-CF-H1141-L200	200 mm	w172	d656
TP-206A-CF-H1141-L300	300 mm	w172	d656

Cable probe – Ø 6 mm

General data

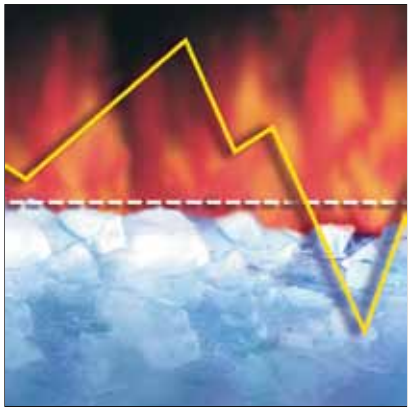
Protection class	IP67	**Connection**	male, M12 x 1
Sensor quality	AISI 316L	**Temperature operating range**	-50…105 °C
Mechanical connection	for compression ferrule fittings, protective tubing or direct mounting	**Housing material**	V4A (1.4404)
Outer diameter	6 mm	**Response time**	t0.5 = 8 s/ t0.9 = 20 s in water at 0.2 m/s
Accuracy	Class A		

Types and data – selection table

Type	Immersion depth (L)	w	d
TP-306A-CF-H1141-L1000	1000 mm	w172	d657
TP-306A-CF-H1141-L5000	5000 mm	w172	d657

Wiring diagrams on page 658 Dimension drawing on page 670 Accessories on page 560

Temperature sensors – M18T series



Resistant infrared sensors

Infrared sensors of the M18T series detect heat contactless in a range between 0…+300 °C. The sensors operate as receivers and the objects are the heat emitting sources. The thermal radiation of an object, normally between 8 and 14 µm, is transformed into an electrical signal by a thermopile and then converted into an output signal.
No matter which device you use, the switchpoint as well as the measuring range are easily taught.

Non-contact detection of temperature

The rugged MT18 infrared sensors monitor hot objects such as bakery products, metals or bottles. They also monitor flame brazing, blasting or straightening processes and also hot glueing applied in packaging stations, book binding and product assembly.

- Temperature range 0…+300 °C
- Versions with analog output 0…10 V or switching output
- Easy teaching of measuring range or swichtpoint.
- Compact and rugged stainless steel housing for harsh environments

Infrared sensors M18T

The non-contact sensors of the M18T series are mainly passive receivers. The thermal radiation of an object, normally between 8 and 14 µm, is transformed into an electrical signal in a thermopile and then converted into an output signal. The D:S (distance: spot) ratio, which specifies the spot diameter at a defined distance, is important in this context. To monitor the surface temperature of the object optimally, the spot should be covered completely by the object.
Available are devices with switching output (NO/ PNP) or with analog voltage output 0…10 V. Easy teaching of measuring range or swichtpoint.

Features

- Temperature range 0…+300 °C
- DS-ratio 6:1, 8:1 and 14:1
- Teaching via pushbutton or cable
- Switching output PNP/NPN or analog output 0…10 V/4…20 mA
- Version with analog output: PNP-alarm outputs 10 V/20 mA when reaching the end of the measuring range
- 2 m connection cable or male M12 x 1

Type code M18T

M18T B 8 Q

M18T Design

Design

M18T cylinder, smooth
59.2 x 18 mm
65 x 18 mm
78 x 18 mm
83.8 x 18 mm

B Electrical output

Electrical output

B PNP/NPN
UP U_o = 0…10V
alarm output, PNP

8 Special functions

Special functions

8 distance - spot ratio

Q Electrical connection

Electrical connection

Q connector, M12 x 1.5-pole

M18T – Switching output/analog output

General data

Protection class	IP67	**Connection**	male, M12 x 1
Temperature operating range	0…300 °C	**Housing material**	V2A (1.4301)
Ambient temperature	-20…+70 °C	**Function**	infrared sensor

Types and data – selection table

Type	Operating voltage	Output	D:S ratio	w	d
M18TB8Q	10…30 VDC	_⌒_, PNP/NPN	8:1	w173	d658
M18TB6EQ	10…30 VDC	_⌒_, PNP/NPN	6:1	w173	d659
M18TB14Q	10…30 VDC	_⌒_, PNP/NPN	14:1	w173	d660
M18TIP8Q	12…30 VDC	_⌒_, PNP/analog output, 4…20 mA	8:1	w174	d658
M18TIP6EQ	12…30 VDC	_⌒_, PNP/analog output, 4…20 mA	6:1	w174	d659
M18TIP14Q	12…30 VDC	_⌒_, PNP/analog output, 4…20 mA	14:1	w174	d660
M18TUP8Q	12…30 VDC	_⌒_, PNP/analog output, 0…10 V	8:1	w175	d658
M18TUP6EQ	12…30 VDC	_⌒_, PNP/analog output, 0…10 V	6:1	w175	d659
M18TUP14Q	12…30 VDC	_⌒_, PNP/analog output, 0…10 V	14:1	w175	d660

Many different types available, also with cable, see type code