

Temperature measurement

Temperature transmitters

Field transmitters/field indicator

SITRANS TF320 (HART, universal)

Overview



SITRANS TF320 in dual chamber enclosure



SITRANS TF320 in single chamber enclosure

- 2-wire temperature transmitter with and without HART communication interface
- Universal input for virtually any type of temperature sensor
- Can be configured via PC, HART 7 or optional local operation

Benefits

- Universally applicable as a temperature transmitter with galvanic isolation for:
 - Resistance thermometer (2-wire, 3-wire, 4-wire connection)
 - Thermocouples
 - Linear resistances, potentiometer and DC voltage sources
- Local operation of the temperature transmitter via display (single chamber enclosure) or control keys accessible from outside (dual chamber enclosure)
- Rugged single or dual chamber enclosure made of die-cast aluminum or stainless steel 316L
- Electronic compartment isolated (watertight) from terminal compartment in dual chamber enclosure
- Degree of protection IP66/67/68 (1.5 m/2 h)
- Electromagnetic compatibility according to DIN EN 61326 and NE21
- Test terminals for direct read-out of the output signal without breaking the current loop
- Remote installation option:
 - Measuring point is difficult to access
 - Measuring point is subjected to high temperatures
 - Measuring point is subjected to vibration through plant
 - Long neck pipes and thermowells must be avoided
- Mounted directly on sensors
- Temperature transmitters of the "intrinsically safe protection type, increased safety for zone 2, flameproof and dust-protected" type of protection can be installed in hazardous areas. The transmitter meets the requirements of the EU Directive 2014/34/EU (ATEX), the FM and CSA regulations as well as other national approvals, e.g. EACEx, NEPSI, KCs, Inmetro.
- SIL2/3 (with order note C20)

Application

SITRANS TF320 can be used everywhere where temperatures need to be measured under particularly adverse conditions and where a user-friendly local display is ideal. Which is why users from all industries have opted for this field device. The rugged enclosure protects the electronics. The stainless steel model is almost completely resistant to sea water and other aggressive substances. The inner workings offer high measuring accuracy, universal input and a wide range of diagnostic options.

Function

Configuration

The communication capability over the HART protocol V 7 permits parameterization using a PC or HART communicator (hand-held communicator). The SIMATIC PDM makes it easy.

For the SITRANS TF320 without HART functionality, parameters are assigned with the PC. A special modem and the software tool SIPROM T are available for this purpose.

The optional local operation on the device gives you the possibility to configure the device's most important functions very quickly.

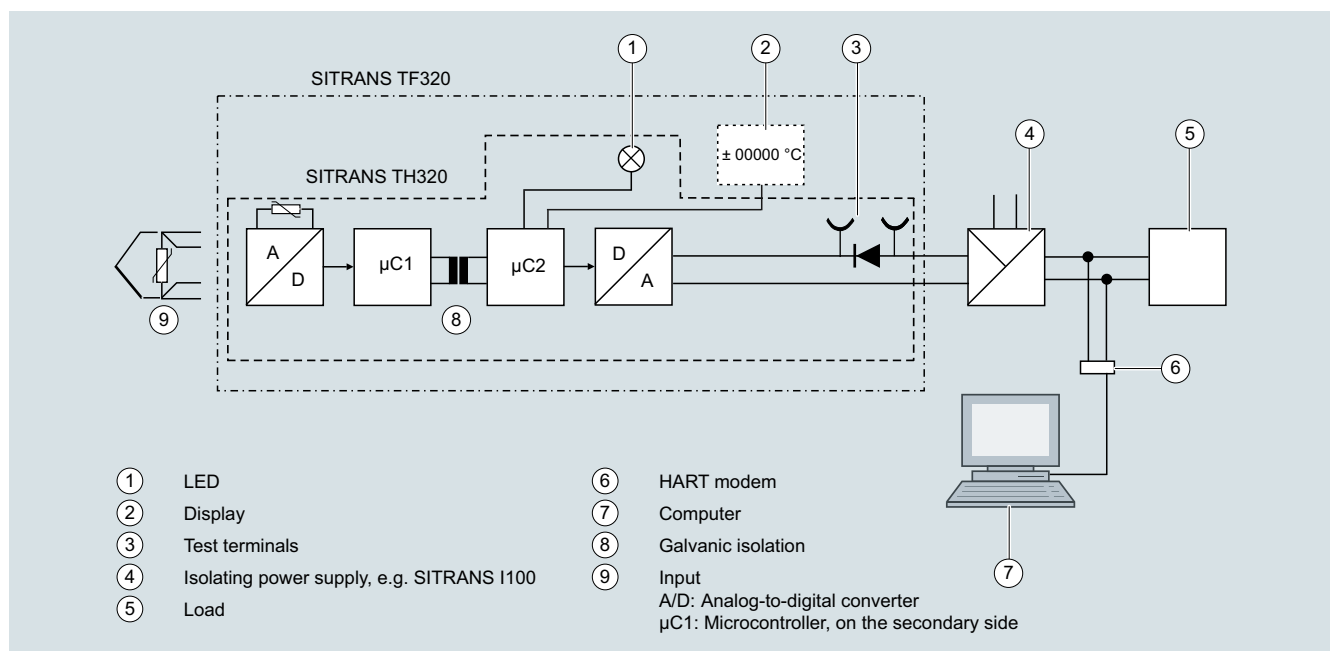
Principle of operation

SITRANS TF320 as temperature transmitter

The input signal, whether resistance thermometer (RTD), thermocouple (TC), Ω or mV signal, is amplified and linearized. Input and output side are galvanically isolated. An internal cold junction is integrated for measurements with thermocouples.

The device outputs a temperature-linear direct current from 4 to 20 mA. As well as the analog transmission of measured values from 4 to 20 mA, the HART version also supports digital communication for online diagnostics, measured value transmission, and configuration.

SITRANS TF320 automatically detects when a sensor should be interrupted or is indicating a short-circuit. The practical test terminals allow direct measurement of 4 to 20 mA signals over an ammeter without interrupting the output current loop.



Function block diagram SITRANS TF320 with integrated SITRANS TH320

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Technical specifications

General

Supply voltage ^{1) 2)}	
• Without explosion protection (non-Ex)	10.5 ... 48 V DC
• with explosion protection (Ex i)	10.5 ... 30 V DC
Additional minimum supply voltage when using test terminals	0.8 V
Maximum power loss	≤ 850 mW
Minimum load resistance at supply voltage > 37 V	$(V_{\text{supply}} - 37 \text{ V})/23 \text{ mA}$
Insulation voltage, test/operation	
• Without explosion protection (non-Ex)	2.5 kV AC/55 V AC
• with explosion protection (Ex i)	2.5 kV AC/42 V AC
Polarity protection	All inputs and outputs
Write protection	Wire jumper (transmitter), switch (on display) or software
Warm-up time	< 5 min
Starting time	< 2.75 s
Programming	SIPROM T and HART
Signal-to-noise ratio	> 60 dB
Long-term stability	Better than: • ± 0.05% of measuring span/year • ± 0.18% of measuring span/5 years
Response time	4 ... 20 mA: ≤ 55 ms HART: ≤ 75 ms (typically 70 ms)
Programmable damping	0 ... 60 s
Signal dynamic	
• Input	24 bit
• Output	18 bit
Influence of change in supply voltage	< 0.005% of measuring span/V DC

Input

Resistance thermometer (RTD)

Input type	
• Pt10 ... 10000	<ul style="list-style-type: none"> • IEC 60751 • JIS C 1604-8 • GOST 6651_2009 • Callendar-Van Dusen
• Ni10 ... 10000	<ul style="list-style-type: none"> • DIN 43760-1987 • GOST 6651-2009/OIML R84:2003
• Cu5 ... 1000	<ul style="list-style-type: none"> • Edison Copper Winding No. 15 • GOST 6651-2009/OIML R84:2003
Type of connection	2-wire, 3-wire or 4-wire
Wire resistance per wire	Max. 50 Ω
Input current	< 0.15 mA
Effect of the wire resistance (with 3-wire and 4-wire connections)	< 0.002 Ω/Ω
Cable, wire-wire capacity	
• Pt1000, Pt10000 (IEC 60751 and JIS C 1604-8)	Max. 30 nF
• All other input types	Max. 50 nF
Fault detection, programmable	None, short-circuited, defective, short-circuited or defective
	Note
	When the low limit for the configured input type is below the constant detection limit for short-circuited inputs, the detection of short circuits is disabled regardless of the configuration of the fault detection.
Detection limit for short-circuited input	15 Ω
Fault detection time (RTD)	≤ 75 ms (typically 70 ms)
Fault detection time (for 3-wire and 4-wire)	≤ 2 000 ms

Thermocouples (TC)

Input type	
• B	IEC 60584-1
• E	IEC 60584-1
• J	IEC 60584-1
• K	IEC 60584-1
• L	DIN 43710
• Lr	GOST 3044-84
• N	IEC 60584-1
• R	IEC 60584-1
• S	IEC 60584-1
• T	IEC 60584-1
• U	DIN 43710
• W3	ASTM E988-96
• W5	ASTM E988-96
• LR	GOST 3044-84
Cold junction compensation (CJC)	Constant, internal or external over Pt100 or Ni100 RTD
• Temperature range internal CJC	-50 ... +100 °C (-58 ... +212 °F)
• Connection external CJC	2-wire or 3-wire
• External CJC, wire resistance per wire (for 3-wire and 4-wire connections)	50 Ω
• Effect of the wire resistance (with 3-wire and 4-wire connections)	< 0.002 Ω/Ω
• Input current external CJC	< 0.15 mA
• Temperature range external CJC	-50 ... +135 °C (-58 ... +275 °F)
• Cable, wire-wire capacity	Max. 50 nF
• Total wire resistance	Max. 10 kΩ
• Fault detection, programmable	None, short-circuited, defective, short-circuited or defective
	Note
	The short-circuited fault detection only applies to the CJC input.
• Fault detection time (TC)	≤ 75 ms (typically 70 ms)
• Fault detection time, external CJC (for 3-wire and 4-wire)	≤ 2 000 ms
	Linear resistance
Input range	0 ... 100 kΩ
Minimum measuring span	25 Ω
Type of connection	2-wire, 3-wire or 4-wire
Wire resistance per wire	Max. 50 Ω
Input current	< 0.15 mA
Effect of the wire resistance (with 3-wire and 4-wire connections)	< 0.002 Ω/Ω
Cable, wire-wire capacity	
• R > 400 Ω	Max. 30 nF
• R ≤ 400 Ω	Max. 50 nF
Fault detection, programmable	None, defective
	Potentiometers
Input range	10 Ω ... 100 kΩ
Minimum measuring span	25 Ω
Type of connection	2-wire, 3-wire or 4-wire
Wire resistance per wire	Max. 50 Ω
Input current	< 0.15 mA
Effect of the wire resistance (with 4-wire and 5-wire connections)	< 0.002 Ω/Ω
Cable, wire-wire capacity	
• R > 400 Ω	Max. 30 nF
• R ≤ 400 Ω	Max. 50 nF

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Fault detection, programmable	None, short-circuited, defective, short-circuited or defective Note When the configured potentiometer size is below the constant detection limit for short-circuited inputs, the detection of short circuits is disabled regardless of the configuration of the fault detection.	Structural design	
Detection limit for short-circuited input	15 Ω	Weight	0.85 kg (1.87 lb) • Aluminum: 1.3 kg (2.87 lb) • Stainless steel: 3.3 kg (7.28 lb)
Fault detection time, wiper arm (no short-circuit detection)	≤ 75 ms (typically 70 ms)	• Single chamber enclosure	
Fault detection time, element	≤ 2 000 ms	• Dual chamber enclosure	
Fault detection time (for 4-wire and 5-wire)	≤ 2 000 ms	Maximum core cross-section	1.5 mm ² (AWG 16) 2.5 mm ² (AWG 14)
<u>Supply voltage</u>		• Single chamber enclosure	
Measuring range		• Dual chamber enclosure	
• Unipolar	-100 ... 1700 mV	Tightening torque for clamping screws	0.5 ... 0.6 Nm
• Bipolar	-800 ... +800 mV	Vibrations	IEC 60068-2-6 ± 1.6 mm (0.07 inch) ± 4 g
Minimum measuring span	2.5 mV	• 2 ... 25 Hz	
Input resistance	10 MΩ	• 25 ... 100 Hz	
Cable, wire-wire capacity		Certificates and approvals	
• Input range: -100 ... 1700 mV	Max. 30 nF	<u>Explosion protection ATEX/IECEx and others</u>	
• Input range: -20 ... 100 mV	Max. 50 nF	Certificates ³⁾	IECEx DEK 19.0069X IECEx DEK 19.0070X DEKRA 19ATEX0106 X (Category 1) DEKRA 19ATEX0108X (Category 2) DEKRA 19ATEX0107X (Category 3) A5E50642461A-2021X (Category 3)
Fault detection, programmable	None, defective	"Intrinsic safety ia/ib" type of protection	For use in Zone 0, 1, 2, 21 II 1 G Ex ia IIC T6 ... T4 Ga II 2 (1) G Ex ib [ia Ga] IIC T6 ... T4 Gb II 2 (1) D Ex ib [ia Da] IIIC T100 °C Db Ex ia IIC T6 ... T4 Ga Ex ib [ia Ga] IIC T6 ... T4 Gb Ex ib [ia Da] IIIC T 100 °C Db
Fault detection time	≤ 75 ms (typically 70 ms)	• ATEX	
Output and HART communication		• IECEx and others	
Normal range, programmable	3.8 ... 20.5 mA/20.5 ... 3.8 mA	"Intrinsic safety ic" type of protection	For use in Zone 2, 22 II 2 G Ex ic IIC T6...T4 Gc II 3 D Ex ic IIIC T100 °C Dc Ex ic IIC T6 ... T4 Gc Ex ic IIIC T100 °C Dc
Extended range (output limits), programmable	3.5 ... 23 mA/23 ... 3.5 mA	• ATEX	
Programmable input/output limits		• IECEx and others	
• Fault current	Enable/disable	"Non-sparking/increased safety nA/ec" type of protection	For use in Zone 2 II 2 G Ex nA IIC T6...T4 Gc II 2 G Ex ec IIC T6...T4 Gc Ex nA IIC T6 ... T4 Gc Ex ec IIC T6 ... T4 Gc For use in Zone 1 II 2 G Ex db IIC T6...T4 Gb Ex db IIC T6 ... T4 Gb For use in Zone 21, 22 II 2 D Ex tb IIC T100 °C Db II 3 D Ex tc IIIC T100 °C Dc Ex tb IIC T100 °C Db Ex tc IIIC T100 °C Dc
• Fault current setting	3.5 ... 23 mA	• ATEX	
Update time	10 ms	• IECEx and others	
Load (with current output)	≤ (V _{Supply} - 10.5)/0.023 Ω	"Flameproof enclosure db" type of protection	
Load stability	< 0.01% of measuring span/100 Ω (measuring span = currently selected range)	• ATEX	
Input error detection, programmable (detection of input short-circuits is ignored with TC and voltage inputs)	3.5 ... 23 mA	• IECEx and others	
NAMUR NE43 Upscale	> 21 mA	• "Protection by enclosure tb/tc" type of protection	
NAMUR NE43 Downscale	< 3.6 mA	• ATEX	
HART protocol versions	HART 7	• IECEx and others	
Measuring accuracy		• ATEX	
Input accuracy	See "Input accuracy" table	• IECEx and others	
Output accuracy	See "Output accuracy" table		
Operating conditions			
Ambient temperature			
• Without local operation in single chamber enclosure	-50 ... +85 °C (-58 ... +185 °F)		
• With local operation	-40 ... +85 °C (-40 ... +185 °F)		
• For transmitters with functional safety	-40 ... +80 °C (-40 ... +176 °F)		
Storage temperature	-50 ... +85 °C (-58 ... +185 °F)		
Reference temperature for sensor calibration	24 °C ±1.0 °C (75.2 °F ±1.8 °F)		
Relative humidity	< 99% (no condensation)		
Degree of protection			
• Temperature transmitter enclosure	IP66/IP67/IP68		
• Terminals	IP00		

1) Note that the minimum supply voltage must correspond to the value measured at the terminals of the SITRANS TF320.
All external voltage drops must be taken into consideration.

2) Protect the device from overvoltage with the help of a suitable power supply or suitable overvoltage protection equipment.

3) Additional available certificates are listed on the Internet at <http://www.siemens.com/processinstrumentation/certificates>

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Measuring ranges/Minimum measuring span

RTD

Input type	Standard	Measuring range in °C (°F)	α_0 in °C ⁻¹ (°F ⁻¹)	Minimum measuring span in °C (°F)
Pt10 ... 10000	IEC 60751	-200 ... +850 (-328 ... +1 562)	0.003851 (0.002139)	10 (50)
	JIS C 1604-8	-200 ... +649 (-328 ... +1 200)	0.003916 (0.002176)	10 (50)
	GOST 6651_2009	-200 ... +850 (-328 ... +1 562)	0.003910 (0.002172)	10 (50)
	Callendar-Van Dusen	-200 ... +850 (-328 ... +1 562)	-	10 (50)
Ni10 ... 10000	DIN 43760-1987	-60 ... +250 (-76 ... +482)	0.006180 (0.003433)	10 (50)
	GOST 6651-2009/OIML R84:2003	-60 ... +180 (-76 ... +356)	0.006170 (0.003428)	10 (50)
Cu5 ... 1000	Edison Copper Winding No. 15	-200 ... +260 (-328 ... +500)	0.004270 (0.002372)	100 (212)
	GOST 6651-2009/OIML R84:2003	-180 ... +200 (-292 ... +392)	0.004280 (0.002378)	100 (212)
	GOST 6651-94	-50 ... +200 (-58 ... +392)	0.004260 (0.002367)	100 (212)

TC

Input type	Standard	Measuring range in °C (°F)	Minimum measuring span in °C (°F)
B	IEC 60584-1	0 (85) ... 1 820 (32 (185) ... 3 308)	100 (212)
E	IEC 60584-1	-200 ... +1 000 (-392 ... +1 832)	50 (122)
J	IEC 60584-1	-100 ... +1 200 (-212 ... +2 192)	50 (122)
K	IEC 60584-1	-180 ... +1 372 (-356 ... +2 502)	50 (122)
L	DIN 43710	-200 ... +900 (-392 ... +1 652)	50 (122)
Lr	GOST 3044-84	-200 ... +800 (-392 ... +1 472)	50 (122)
N	IEC 60584-1	-180 ... +1 300 (-356 ... +2 372)	50 (122)
R	IEC 60584-1	-50 ... +1 760 (-122 ... +3 200)	100 (212)
S	IEC 60584-1	-50 ... +1 760 (-122 ... +3 200)	100 (212)
T	IEC 60584-1	-200 ... +400 (-392 ... +752)	50 (122)
U	DIN 43710	-200 ... +600 (-392 ... +1 112)	50 (122)
W3	ASTM E988-96	0 ... 2 300 (32 ... 4 172)	100 (212)
W5	ASTM E988-96	0 ... 2 300 (32 ... 4 172)	100 (212)
LR	GOST 3044-84	-200 ... +800 (-392 ... +1472)	50 (122)

Input accuracy

Basic values

Input type	Basic accuracy	Temperature coefficient ¹⁾
RTD		
Pt10	≤ ±0.8 °C (1.44 °F)	≤ ±0.020 °C/°C (°F/°F)
Pt20	≤ ±0.4 °C (0.72 °F)	≤ ±0.010 °C/°C (°F/°F)
Pt50	≤ ±0.16 °C (0.288 °F)	≤ ±0.004 °C/°C (°F/°F)
Pt100	≤ ±0.04 °C (0.072 °F)	≤ ±0.002 °C/°C (°F/°F)
Pt200	≤ ±0.08 °C (0.144 °F)	≤ ±0.002 °C/°C (°F/°F)
Pt500	$T_{\max} < 180 \text{ °C (356 °F)} = \leq \pm 0.08 \text{ °C (0.144 °F)}$ $T_{\max} > 180 \text{ °C (356 °F)} = \leq \pm 0.16 \text{ °C (0.288 °F)}$	≤ ±0.002 °C/°C (°F/°F)
Pt1000	≤ ±0.08 °C (0.144 °F)	≤ ±0.002 °C/°C (°F/°F)
Pt2000	$T_{\max} < 300 \text{ °C (572 °F)} = \leq \pm 0.08 \text{ °C (0.144 °F)}$ $T_{\max} > 300 \text{ °C (572 °F)} = \leq \pm 0.4 \text{ °C (0.72 °F)}$	≤ ±0.002 °C/°C (°F/°F)
Pt10000	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Pt x	Largest tolerance of neighboring points	Largest temperature coefficient of neighboring points
Ni10	≤ ±1.6 °C (2.88 °F)	≤ ±0.020 °C/°C (°F/°F)
Ni20	≤ ±0.8 °C (1.44 °F)	≤ ±0.010 °C/°C (°F/°F)
Ni50	≤ ±0.32 °C (0.576 °F)	≤ ±0.004 °C/°C (°F/°F)
Ni100	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Ni120	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Ni200	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Ni500	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Ni1000	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Ni2000	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)

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Ni10000	≤ ±0.32 °C (0.576 °F)	≤ ±0.002 °C/°C (°F/°F)
Ni x	Largest tolerance of neighboring points	Largest temperature coefficient of neighboring points
Cu5	≤ ±1.6 °C (2.88 °F)	≤ ±0.040 °C/°C (°F/°F)
Cu10	≤ ±0.8 °C (1.44 °F)	≤ ±0.020 °C/°C (°F/°F)
Cu20	≤ ±0.4 °C (0.72 °F)	≤ ±0.010 °C/°C (°F/°F)
Cu50	≤ ±0.16 °C (0.288 °F)	≤ ±0.004 °C/°C (°F/°F)
Cu100	≤ ±0.08 °C (0.144 °F)	≤ ±0.002 °C/°C (°F/°F)
Cu200	≤ ±0.08 °C (0.144 °F)	≤ ±0.002 °C/°C (°F/°F)
Cu500	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Cu1000	≤ ±0.08 °C (0.144 °F)	≤ ±0.002 °C/°C (°F/°F)
Cu x	Largest tolerance of neighboring points	Largest temperature coefficient of neighboring points
Linear resistance		
0 ... 400 Ω	≤ ±40 mΩ	≤ ±2 mΩ/°C (1.11 mΩ/°F)
0 ... 100 kΩ	≤ ±4 Ω	≤ ±0.2 Ω/°C (0.11 Ω/°F)
Potentiometers		
0 ... 100%	< 0.05%	< ± 0.005%
Supply voltage		
mV: -20 ... 100 mV	≤ ±5 μV	≤ ±0.2 μV/°C (0.11 μV/°F)
mV: -100 ... 1700 mV	≤ ±0.1 mV	≤ ±36 μV/°C (20 μV/°F)
mV: ± 800 mV	≤ ±0.1 mV	≤ ±32 μV/°C (17.8 μV/°F)
TC		
E	≤ ±0.2 °C (0.36 °F)	≤ ±0.025 °C/°C (°F/°F)
J	≤ ±0.25 °C (0.45 °F)	≤ ±0.025 °C/°C (°F/°F)
K	≤ ±0.25 °C (0.45 °F)	≤ ±0.025 °C/°C (°F/°F)
L	≤ ±0.35 °C (0.63 °F)	≤ ±0.025 °C/°C (°F/°F)
N	≤ ±0.4 °C (0.72 °F)	≤ ±0.025 °C/°C (°F/°F)
T	≤ ±0.25 °C (0.45 °F)	≤ ±0.025 °C/°C (°F/°F)
U	< 0 °C (32 °F) ≤ ±0.8 °C (1.44 °F) ≥ 0 °C (32 °F) ≤ ±0.4 °C (0.72 °F)	≤ ±0.025 °C/°C (°F/°F)
Lr	≤ ±0.2 °C (0.36 °F)	≤ ±0.1 °C/°C (°F/°F)
R	< 200 °C (392 °F) ≤ ±0.5 °C (0.9 °F) ≥ 200 °C (392 °F) ≤ ±1 °C (1.8 °F)	≤ ±0.1 °C/°C (°F/°F)
S	< 200 °C (392 °F) ≤ ±0.5 °C (0.9 °F) ≥ 200 °C (392 °F) ≤ ±1 °C (1.8 °F)	≤ ±0.1 °C/°C (°F/°F)
W3	≤ ±0.6 °C (1.08 °F)	≤ ±0.1 °C/°C (°F/°F)
W5	≤ ±0.4 °C (0.72 °F)	≤ ±0.1 °C/°C (°F/°F)
B ²⁾	≤ ±1 °C (1.8 °F)	≤ ±0.1 °C/°C (°F/°F)
B ³⁾	≤ ±3 °C (5.4 °F)	≤ ±0.1 °C/°C (°F/°F)
B ⁴⁾	≤ ±8 °C (14.4 °F)	≤ ±0.8 °C/°C (°F/°F)
B ⁵⁾	Not specified	Not specified
CJC (internal)	< ±0.5 °C (0.9 °F)	Included in basic accuracy
CJC (external)	≤ ±0.08 °C (0.144 °F)	≤ ±0.002 °C/°C (°F/°F)

1) Temperature coefficients correspond to the specified values or 0.002% of the input span, depending on which value is greater.

2) Accuracy of the specification range > 400 °C (752 °F)

3) Accuracy of the specification range > 160 °C (320 °F) < 400 °C (752 °F)

4) Accuracy of the specification range > 85 °C (185 °F) < 160 °C (320 °F)

5) Accuracy of the specification range < 85 °C (185 °F)

Output accuracy

Output type	Basic accuracy	Temperature coefficient
Analog output	≤ ±1.6 μA (0.01% of the full output span)	≤ ±0.48 μA/K (≤ ±0.003% of the full output span/K)

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Selection and ordering data

Single chamber enclosure

	Article No.	Options	Order code
SITRANS TF320 Temperature transmitter with single chamber enclosure for wall or pipe mounting, one configurable input and a galvanically isolated 2-wire output.	7NG034	Add "-Z" to article number, specify order code and, if applicable, free text.	
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.			
Communication		Cable gland included	
With HART (4 ... 20 mA)	0	Plastic	A00
Without HART (4 ... 20 mA)	7	Metal	A01
		Stainless steel	A02
		Stainless steel 316L/1.4404	A03
		CMP, for XP devices	A10
		CAPRI ADE 4F, CuZn, cable inner diameter 7 ... 12 mm, cable outer diameter 10 ... 16 mm	A11
		CAPRI ADE 4F, stainless steel, cable inner diameter 7 ... 12 mm, cable outer diameter 10 ... 16 mm	A12
Primary value output		Device plug Han mounted left	
Input 1	0	Device plug Han 7D (metal, straight)	A32
Input 1, type		Cable socket included	
RTD		Metal, for device plug Han 7D and Han 8D	A41
• Pt100 (IEC 60751), 3-wire	B	Device plug M12 mounted left	
• Pt100 (IEC 60751), 4-wire	C	Stainless steel, without cable socket	A62
• Pt1000 (IEC 60751), 3-wire	D	Stainless steel, with cable socket	A63
• Pt1000 (IEC 60751), 4-wire	E	Mounting cable glands/plugs	
TC		Cable gland mounted	A97
• Type B	F	Device plug for output, mounted right	A98
• Type E	G	Manufacturer's declarations	
• Type J	H	Inspection certificate EN 10204-3.1: Manufacturer test certificate for transmitters (5 measured values)	C11
• Type K	J	Device options	
• Type L	K	Degree of protection IP66 / IP68 (not for device plugs M12 and Han)	D30
• Type N	L	Unlabeled TAG plate	D40
• Type R	N	Overvoltage protection up to 20 kV (external)	D71
• Type S	P	General approval without Ex approval	
• Type T	Q	Worldwide (CE, RCM) except EAC, FM, KCC	E00
Potentiometer, 4-wire	R	Explosion protection certificates	
		ATEX (Europe) and IECEx (Worldwide)	E47
Input 2, type		Mounting system (only single chamber enclosures)	
Without input 2	A	Pipe mounting kit for single chamber enclosure, stainless steel 316L	H06
		Wall mounting kit for single chamber enclosure, stainless steel 316L	H07
CJC configuration for TC		External CJC types	
None CJC	0	Pt100, IEC 60751, 3-wire	J02
Internal CJC	1	Pt100, IEC 60751, 4-wire	J03
External CJC RTD Pt100 (IEC 60751), 3-wire	3	Ni100, DIN 43760-87, 3-wire	J05
External CJC RTD Ni100 (DIN 43760-87), 3-wire	6	Ni100, DIN 43760-87, 4-wire	J06
Material of non-wetted parts		Noise damping	
Die-cast aluminum enclosure	1	Noise damping 60 Hz instead of 50 Hz	P10
Enclosure made of stainless steel precision casting 1.4401 (similar to 316)	3	Input 1: TC	
Type of protection (Ex)		Type C W5	V01
General purpose	A	Type D W3	V02
Intrinsic safety (Ex i) / Non-incendive field wiring (NIFW)	B	Type U	V03
Flameproof enclosure (Ex d) / Explosion proof (XP)	C	Type Lr	V04
Dust ignition protection by enclosure zone 21/22 (Ex t) / Dust ignition proof (DIP) / Increased safety zone 2 (Ex ec) / Non-incendive (NI)	L	Input 1: RTD	
Flameproof enclosure (Ex d) / Intrinsic safety (Ex i) / Dust ignition protection by enclosure zone 21/22 (Ex t) / Increased safety zone 2 (Ex ec)	S	Pt x (IEC), 3-wire, define RTD factor x in option Y21	V61
Electrical connection/cable entries		Pt x (IEC), 4-wire, define RTD factor x in option Y21	V62
2x M20 x 1.5	F	Pt x (JIS C1604-81), 3-wire, define RTD factor x in option Y21	V64
2x ½" NPT	M		
Local operation			
Without local operation	0		
Local operation (closed lid)	1		
Local operation (lid with glass window)	2		

Temperature measurement

Temperature transmitters

Field transmitters/field indicator

SITRANS TF320 (HART, universal)

Options	Order code
Add "-Z" to article number, specify order code and, if applicable, free text.	
Pt x (JIS C1604-81), 4-wire, define RTD factor x in option Y21	V65
Pt x (GOST 6651-2009), 3-wire, define RTD factor x in option Y21	V67
Pt x (GOST 6651-2009), 4-wire, define RTD factor x in option Y21	V68
Ni x (DIN 43760-87), 3-wire, define RTD factor x in option Y21	V70
Ni x (DIN 43760-87), 4-wire, define RTD factor x in option Y21	V71
Ni x (GOST 6651-2009), 3-wire, define RTD factor x in option Y21	V73
Ni x (GOST 6651-2009), 4-wire, define RTD factor x in option Y21	V74
Cu x (ECW-15), 3-wire, define RTD factor x in option Y21	V76
Cu x (ECW-15), 4-wire, define RTD factor x in option Y21	V77
Cu x (GOST 6651-94), 3-wire, define RTD factor x in option Y21	V79
Cu x (GOST 6651-94), 4-wire, define RTD factor x in option Y21	V80
Cu x (GOST 6651-2009), 3-wire, define RTD factor x in option Y21	V82
Cu x (GOST 6651-2009), 4-wire, define RTD factor x in option Y21	V83
Device settings	
Measuring range setting temperature input: Lower range value (max. 5 characters), upper range value (max. 5 characters), unit (°C, °F, °Ra, K)	Y01
Long tag (device parameter, max. 32 characters), plate, stainless steel 316L/1.4404	Y15
Measuring point description (device parameter, max. 32 characters), stainless steel 316L/1.4404	Y16
Long tag (device parameter, max. 8 characters), adhesive label	Y17
Descriptor (device parameter, max. 16 characters), adhesive label	Y18
Input 1: RTD factor; e.g. factor "200" = Pt200, adhesive label	Y21

Dual chamber enclosure

SITRANS TF320 Temperature transmitter with dual chamber enclosure for wall or pipe mounting, one configurable input and a galvanically isolated 2-wire output.

➤ Click on the Article No. for the online configuration in the PIA Life Cycle Portal.

Communication

With HART (4 ... 20 mA)

Without HART (4 ... 20 mA)

Primary value output

Input 1

Input 1, type

RTD

- Pt100 (IEC 60751), 3-wire
- Pt100 (IEC 60751), 4-wire
- Pt1000 (IEC 60751), 3-wire
- Pt1000 (IEC 60751), 4-wire

TC

- Type B
- Type E
- Type J
- Type K
- Type L
- Type N
- Type R
- Type S
- Type T

Potentiometer, 4-wire

Input 2, type

Without input 2

CJC configuration for TC

Without CJC

Internal CJC

External CJC RTD Pt100 (IEC 60751), 3-wire

External CJC RTD Ni100 (DIN 43760-87), 3-wire

Material of non-wetted parts

Die-cast aluminum enclosure

Enclosure made of stainless steel precision casting CF3M/1.4409 (similar to 316L)

Type of protection (Ex)

General purpose

Intrinsic safety (Ex i) / Non-incendive field wiring (NIFW)

Flameproof enclosure (Ex d) / Explosion proof (XP)

Dust ignition protection by enclosure zone 21/22 (Ex t) / Dust ignition proof (DIP) / Increased safety zone 2 (Ex ec) / Non-incendive (NI)

Flameproof enclosure (Ex d) / Intrinsic safety (Ex i) / Dust ignition protection by enclosure zone 21/22 (Ex t) / Increased safety zone 2 (Ex ec)

Electrical connection/cable entries

2x M20 x 1.5

2x ½" NPT

Local operation

Without local operation

Local operation (closed lid)

Local operation (lid with glass window)

Article No.

7NG035

- - - - - 0

0

7

0

B

C

D

E

F

G

H

J

K

L

N

P

Q

R

A

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3

6

1

2

A

B

C

L

S

F

M

0

1

2

Temperature measurement

Temperature transmitters

Field transmitters/field indicator

SITRANS TF320 (HART, universal)

Options	Order code
Add "-Z" to article number, specify order code and, if applicable, free text.	
Cable gland included	
Plastic	A00
Metal	A01
Stainless steel	A02
Stainless steel 316L/1.4404	A03
CMP, for XP devices	A10
CAPRI ADE 4F, CuZn, cable inner diameter 7 ... 12 mm, cable outer diameter 10 ... 16 mm	A11
CAPRI ADE 4F, stainless steel, cable inner diameter 7 ... 12 mm, cable outer diameter 10 ... 16 mm	A12
Device plug Han mounted left	
Device plug Han 7D (plastic, straight)	A30
Device plug Han 7D (plastic, angled)	A31
Device plug Han 7D (metal, straight)	A32
Device plug Han 7D (metal, angled)	A33
Device plug Han 8D (plastic, straight)	A34
Device plug Han 8D (plastic, angled)	A35
Device plug Han 8D (metal, straight)	A36
Device plug Han 8D (metal, angled)	A37
Cable socket included	
Plastic, for device plug Han 7D and Han 8D	A40
Metal, for device plug Han 7D and Han 8D	A41
Device plug M12 mounted left	
Stainless steel, without cable socket	A62
Stainless steel, with cable socket	A63
Mounting cable glands/plugs	
Cable gland mounted	A97
Device plug for output, mounted right	A98
Manufacturer's declarations	
Inspection certificate EN 10204-3.1: Manufacturer test certificate for transmitters (5 measured values)	C11
Device options	
Double layer coating (epoxy resin and polyurethane) 120 µm of enclosure and lid	D20
Degree of protection IP66 / IP68 (not for device plugs M12 and Han)	D30
Unlabeled TAG plate	D40
Stainless steel Ex plate 1.4404/316L	D42
Overvoltage protection up to 20 kV (external)	D71
General approval without Ex approval	
Worldwide (CE, RCM) except EAC, FM, KCC	E00
Explosion protection certificates	
ATEX (Europe) and IECEx (Worldwide)	E47
Mounting brackets (only dual chamber enclosure)	
Wall/pipe mounting bracket for dual chamber enclosure, steel	H01
Wall/pipe mounting bracket for dual chamber enclosure, stainless steel 304	H02
Wall/pipe mounting bracket for dual chamber enclosure, stainless steel 316L	H03
External CJC types	
Pt100, IEC 60751, 3-wire	J02
Pt100, IEC 60751, 4-wire	J03
Ni100, DIN 43760-87, 3-wire	J05
Ni100, DIN 43760-87, 4-wire	J06

Options	Order code
Noise damping	
Noise damping 60 Hz instead of 50 Hz	P10
Input 1: TC	
Type C W5	V01
Type D W3	V02
Type U	V03
Type Lr	V04
Input 1: RTD	
Pt x (IEC), 3-wire, define RTD factor x in option Y21	V61
Pt x (IEC), 4-wire, define RTD factor x in option Y21	V62
Pt x (JIS C1604-81), 3-wire, define RTD factor x in option Y21	V64
Pt x (JIS C1604-81), 4-wire, define RTD factor x in option Y21	V65
Pt x (GOST 6651-2009), 3-wire, define RTD factor x in option Y21	V67
Pt x (GOST 6651-2009), 4-wire, define RTD factor x in option Y21	V68
Ni x (DIN 43760-87), 3-wire, define RTD factor x in option Y21	V70
Ni x (DIN 43760-87), 4-wire, define RTD factor x in option Y21	V71
Ni x (GOST 6651-2009), 3-wire, define RTD factor x in option Y21	V73
Ni x (GOST 6651-2009), 4-wire, define RTD factor x in option Y21	V74
Cu x (ECW-15), 3-wire, define RTD factor x in option Y21	V76
Cu x (ECW-15), 4-wire, define RTD factor x in option Y21	V77
Cu x (GOST 6651-94), 3-wire, define RTD factor x in option Y21	V79
Cu x (GOST 6651-94), 4-wire, define RTD factor x in option Y21	V80
Cu x (GOST 6651-2009), 3-wire, define RTD factor x in option Y21	V82
Cu x (GOST 6651-2009), 4-wire, define RTD factor x in option Y21	V83
Device settings	
Measuring range setting temperature input: Lower range value (max. 5 characters), upper range value (max. 5 characters), unit (°C, °F, °Ra, K)	Y01
Long tag (device parameter, max. 32 characters), plate, stainless steel 316L/1.4404	Y15
Measuring point description (device parameter, max. 32 characters), stainless steel 316L/1.4404	Y16
Long tag (device parameter, max. 8 characters), adhesive label	Y17
Descriptor (device parameter, max. 16 characters), adhesive label	Y18
Input 1: RTD factor; e.g. factor "200" = Pt200, adhesive label	Y21

Accessories

	Article No.
Additional accessories for assembly, connection and transmitter configuration, see page 2/251.	
Modems	
Modem with USB interface and SIPROM T software	7NG3092-8KN
HART modem with USB interface	7MF4997-1DB
Thread adapter	
Thread adapter M20x1.5 (male thread) to ½-14 NPT (female thread)	7MP1990-0BA00
Thread adapter M20x1.5 (male thread) to G½ (female thread)	7MP1990-0BB00
Local operation	
Local operation for temperature transmitter in dual chamber enclosure	7MF7902-1AD
Mounting system for local operation 7MF7902-1AD in single chamber enclosure	7MF7902-1AS
Mounting brackets (only dual chamber enclosure)	
Wall/pipe mounting bracket for dual chamber enclosure, steel, 5/16-24UNF	7MF7900-1AB
Wall/pipe mounting bracket for dual chamber enclosure, steel, M8	7MF7900-1AC
Wall/pipe mounting bracket for dual chamber enclosure, stainless steel 316L, 5/16-24UNF	7MF7900-1AH
Wall/pipe mounting bracket for dual chamber enclosure, stainless steel 316L, M8	7MF7900-1AJ
Mounting system (only single chamber enclosures)	
Pipe mounting kit for single chamber enclosure, stainless steel 316L	7MF7900-1AK
Wall mounting kit for single chamber enclosure, stainless steel 316L	7MF7900-1AL
Cable gland	
Cable gland, gray, non-Ex, M20	7MF7906-1AB
Cable gland, gray, non-Ex, NPT	7MF7906-1BB
Cable gland, metal, non-Ex, NPT	7MF7906-1BD
Cable gland, metal, non-Ex, M20	7MF7906-1AD
Cable gland, metal, Ex-d, NPT	7MF7906-1BE
Cable gland, metal, Ex-d, M20	7MF7906-1AE
Cable gland, 316L, non-Ex, NPT	7MF7906-1BH
Cable gland, 316L, non-Ex, M20	7MF7906-1AH
Cable gland, 316L, Ex-d, NPT	7MF7906-1BJ
Cable gland, 316L, Ex-d, M20	7MF7906-1AJ
Cable gland, E1FX Tri-Star ½-14 NPT, CMP	7MF7906-1NE
Cable gland, ½ NPT Capri ADE 4F cpl., CuZn	7MF7906-1PE
Cable gland, ½ NPT Capri ADE 4F cpl., stainless steel	7MF7906-1PJ

	Article No.
Additional accessories for assembly, connection and transmitter configuration, see page 2/251.	
Plug and cable socket	
Plug Han 7D, plastic, straight	7MF7906-2AB
Plug Han 7D, plastic, angled	7MF7906-2AC
Plug Han 7D, metal, straight, blue	7MF7906-2AQ
Plug Han 7D, metal, straight, grey	7MF7906-2AN
Plug Han 7D, metal, angled, blue	7MF7906-2AR
Plug Han 7D, metal, angled, grey	7MF7906-2AP
Plug Han 8D, plastic, straight	7MF7906-2EB
Plug Han 8D, plastic, angled	7MF7906-2EC
Plug Han 8D, metal, straight, blue	7MF7906-2EQ
Plug Han 8D, metal, straight, grey	7MF7906-2EN
Plug Han 8D, metal, angled, blue	7MF7906-2ER
Plug Han 8D, metal, angled, grey	7MF7906-2EP
Cable socket, plastic, for plug Han 7D	7MF7906-2BB
Cable socket, plastic, for plug Han 8D	7MF7906-2FB
Cable socket, metal, for Han 7D blue	7MF7906-2BQ
Cable socket, metal, for Han 8D blue	7MF7906-2FQ
Cable socket, metal, for Han 7D grey	7MF7906-2BN
Cable socket, metal, for Han 8D grey	7MF7906-2FN
Plug M12 with cable socket, stainless steel	7MF7906-3AB
Overvoltage protection	
Overvoltage protection up to 20 kV, M20	7MF7906-3AC
Overvoltage protection up to 20 kV, NPT	7MF7906-3AD
Lid	
Closed lid aluminum, painted 2x, without glass window, with seal NBR	7MF7901-1BB
Closed lid aluminum, painted 2x, without glass window, with seal FVMQ	7MF7901-1BC
Lid aluminum 2x coated, with glass window, with seal NBR	7MF7901-1BG
Lid aluminum 2x coated, with glass window, with seal FVMQ	7MF7901-1BH
Closed lid stainless steel precision casting, without glass window, with seal NBR	7MF7901-2AB
Closed lid stainless steel precision casting, without glass window, with seal FVMQ	7MF7901-2AC
Lid stainless steel precision casting, with glass window, with seal NBR	7MF7901-2AG
Lid stainless steel precision casting, with glass window, with seal FVMQ	7MF7901-2AH

Ordering example

SITRANS TF320 (single chamber enclosure)

7NG0340-0BA01-0AF2-Z Y01+Y17+P10

Y01: -10 ... +100 °C

Y17: TICA123

Factory setting

- Pt100 (IEC 60751) in 3-wire connection
- Measuring range: 0 ... 100 °C (32 ... 212 °F)
- Fault current
 - Input circuit wire break: 22.8 mA
 - Input circuit short circuit: 22.4 mA
 - Input monitoring wire break and short-circuit
- No trimming of input and output (offset)
- Damping 0.0 s

Temperature measurement

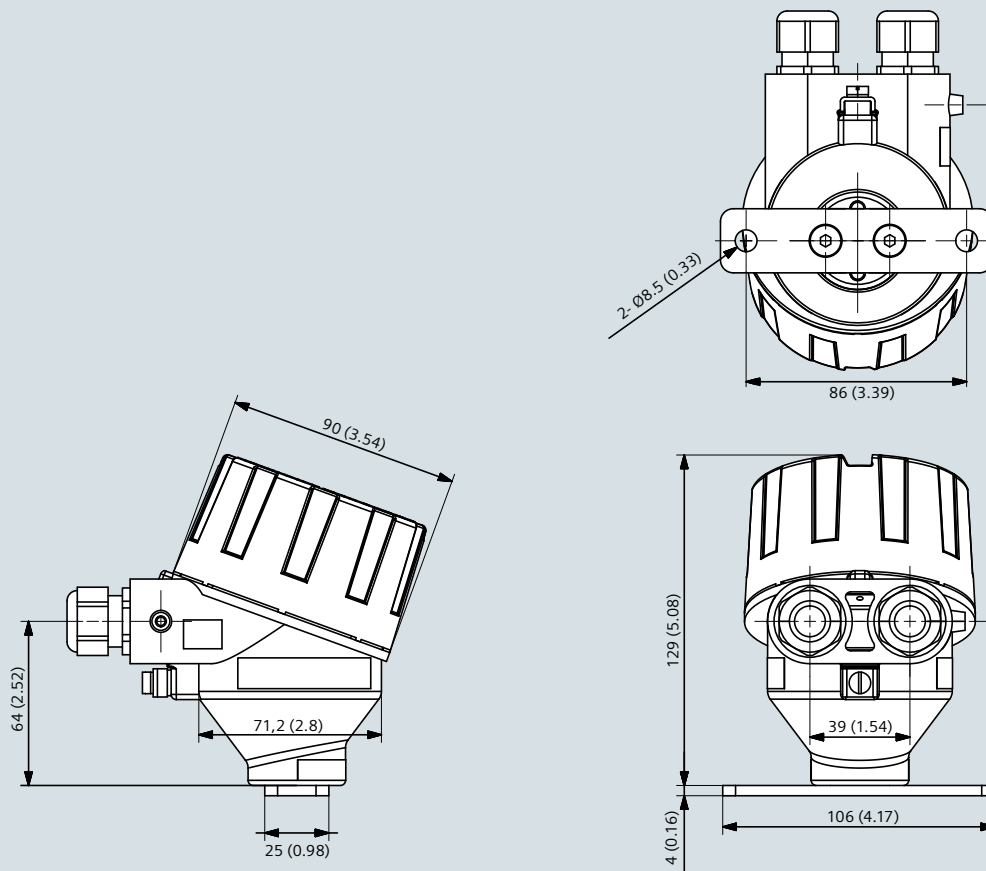
Temperature transmitters

Field transmitters/field indicator

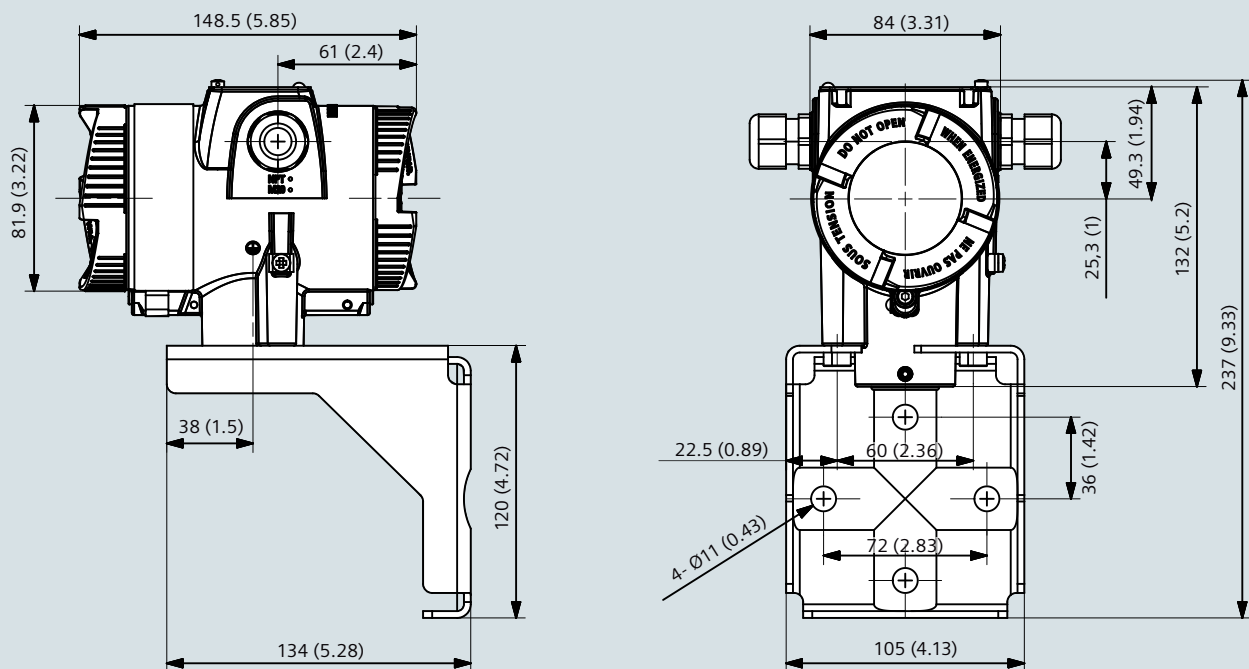
SITRANS TF320 (HART, universal)

Dimensional drawings

2



SITRANS TF320, single chamber enclosure, dimensions in mm (inch)

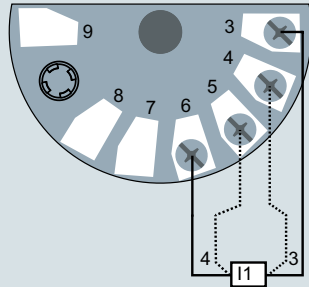


SITRANS TF320, dual chamber enclosure, dimensions in mm (inch)

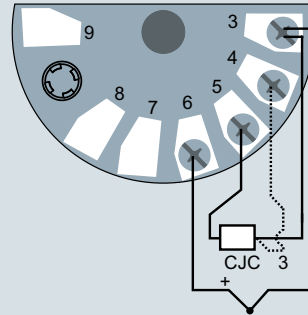
Circuit diagrams

Connections

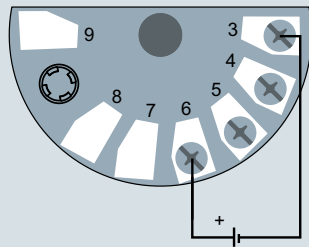
Input connection



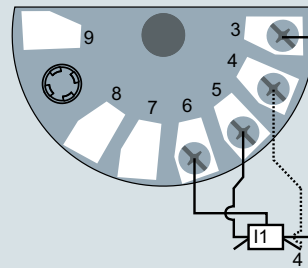
2-wire, 3-wire or 4-wire RTD or linear resistance



TC (internal CJC or external 2-wire or 3-wire CJC)



Voltage input (unipolar or bipolar)



3-wire or 4-wire potentiometer

SITRANS TF320 in single chamber enclosure (7NG034*), input connection assignment

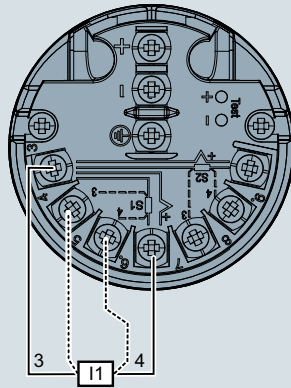
Temperature measurement

Temperature transmitters

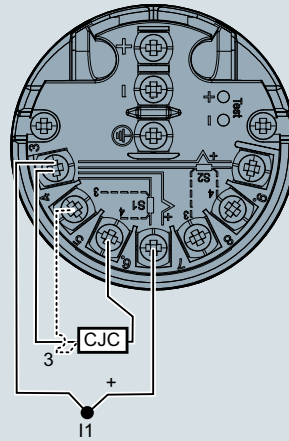
Field transmitters/field indicator

SITRANS TF320 (HART, universal)

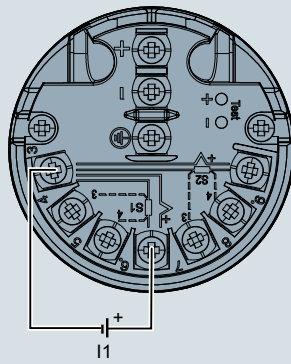
2



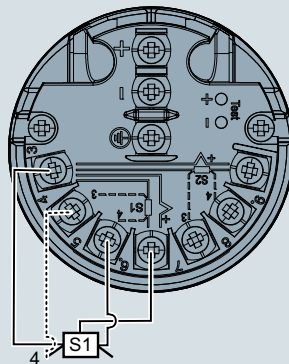
2-wire, 3-wire or 4-wire RTD or linear resistance I1: Input 1



TC (internal CJC or external 2-wire or 3-wire CJC)



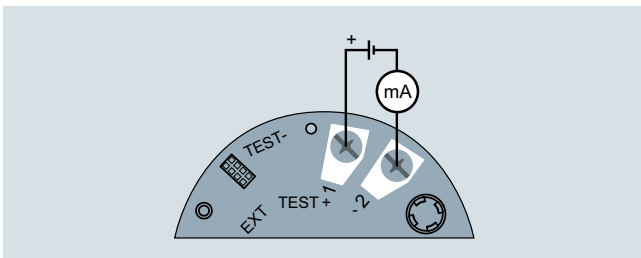
Voltage input (unipolar or bipolar)



3-wire or 4-wire potentiometer

SITRANS TF320 in dual chamber enclosure (7NG035*), input connection assignment

Output connection



SITRANS TF320 in single chamber enclosure (7NG034*), output connection assignment

Overview



SITRANS TF420 in dual chamber enclosure



SITRANS TF420 in single chamber enclosure

- 2-wire temperature transmitter with HART communication interface
- Universal input for virtually any type of temperature sensor
- Connection of two independent input circuits for redundant operation (high input availability)
- Input drift detection
- Can be configured via PC, HART 7 or optional local operation

Benefits

- Universally applicable as a temperature transmitter with galvanic isolation for:
 - Resistance thermometer (2-wire, 3-wire, 4-wire connection)
 - Thermocouples
 - Linear resistances, potentiometer and DC voltage sources
- Local operation of the temperature transmitter via display (single chamber enclosure) or control keys accessible from outside (dual chamber enclosure)
- Rugged single or dual chamber enclosure made of die-cast aluminum or stainless steel 316/316L
- Electronic compartment isolated (watertight) from terminal compartment in dual chamber enclosure
- Degree of protection IP66/67/68 (1.5 m/2 h)
- Electromagnetic compatibility according to DIN EN 61326 and NE21
- Test terminals for direct read-out of the output signal without breaking the current loop
- Remote installation option:
 - Measuring point is difficult to access
 - Measuring point is subjected to high temperatures
 - Measuring point is subjected to vibration through plant
 - Long neck pipes and thermowells must be avoided
- Mounted directly on sensors
- Temperature transmitters of the "intrinsically safe protection type, increased safety for zone 2, flameproof and dust-protected" type of protection can be installed in hazardous areas. The transmitter meets the requirements of the EU Directive 2014/34/EU (ATEX), the FM and CSA regulations as well as other national approvals, e.g. EACEx, NEPSI, KCs, Inmetro.
- SIL2/3 (with order note C20)

Application

SITRANS TF420 with its two sensor inputs can be used everywhere where temperatures need to be measured without interruption under particularly adverse conditions and where a convenient local display is ideal. Which is why users from all industries have opted for this field device. The rugged enclosure protects the electronics. The stainless steel model is almost completely resistant to sea water and other aggressive substances. The inner workings offer high measuring accuracy, universal input and a wide range of diagnostic options.

Temperature measurement

Temperature transmitters

Field transmitters/field indicator

SITRANS TF420 (HART, universal)

Function

Configuration

The communication capability over the HART protocol V 7 permits parameterization using a PC or HART communicator (hand-held communicator). The SIMATIC PDM makes it easy.

The optional local operation on the device gives you the possibility to configure the device's most important functions very quickly.

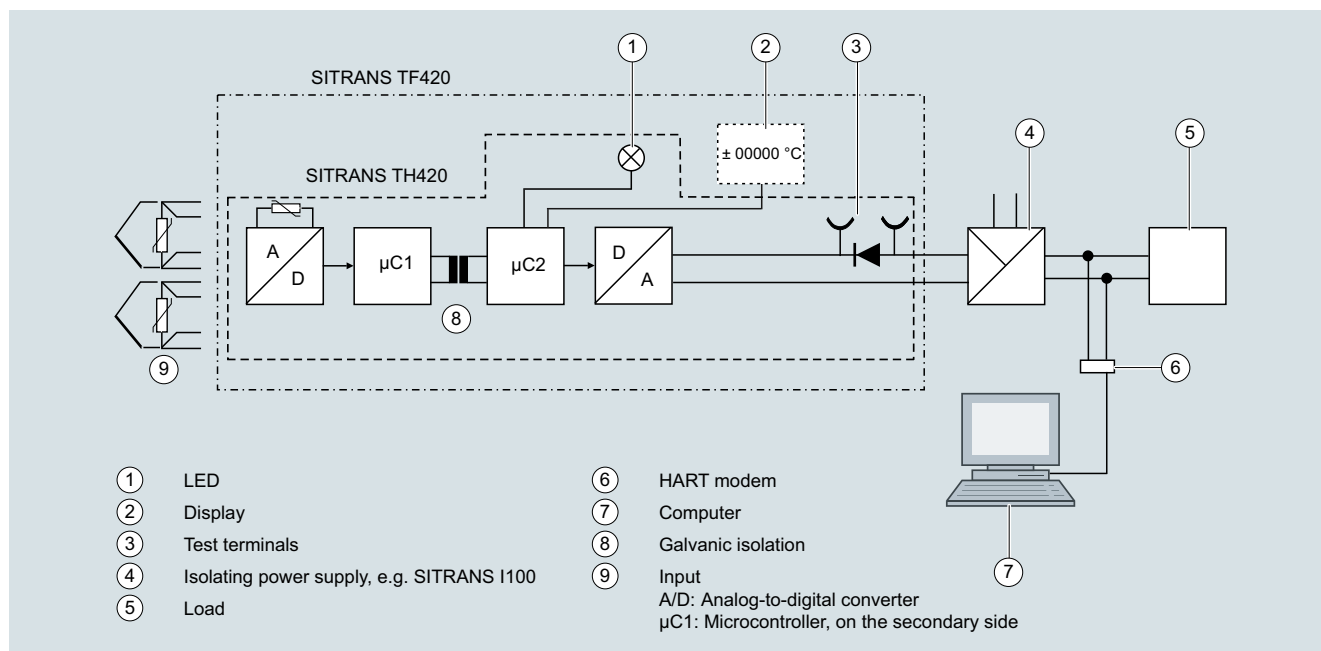
Principle of operation

SITRANS TF420 as temperature transmitter

Two sensor signals, whether resistance thermometers (RTD), thermocouples (TC), Ω or mV signals, are amplified and linearized. Input and output side are galvanically isolated. An internal cold junction is integrated for measurements with thermocouples.

The device outputs a temperature-linear direct current from 4 to 20 mA. As well as the analog transmission of measured values from 4 to 20 mA, the HART version also supports digital communication for online diagnostics, measured value transmission, and configuration.

SITRANS TF420 automatically detects when a sensor should be interrupted or is indicating a short-circuit. If the back-up functionality has been selected in the primary value display, the SITRANS TF420 automatically switches to the 2nd input without interrupting the measured value; e.g. primary value input 1 with input 2 as backup. The practical test terminals allow direct measurement of 4 to 20 mA signals over an ammeter without interrupting the output current loop.



Function block diagram SITRANS TF420 with integrated SITRANS TH420

Technical specifications

General

Supply voltage ^{1) 2)}	
• Without explosion protection (non-Ex)	10.5 ... 48 V DC
• with explosion protection (Ex i)	10.5 ... 30 V DC
Additional minimum supply voltage when using test terminals	0.8 V
Maximum power loss	≤ 850 mW
Minimum load resistance at supply voltage > 37 V	$(V_{\text{supply}} - 37 \text{ V})/23 \text{ mA}$
Insulation voltage, test/operation	
• Without explosion protection (non-Ex)	2.5 kV AC/55 V AC
• with explosion protection (Ex i)	2.5 kV AC/42 V AC
Polarity protection	All inputs and outputs
Write protection	Wire jumper (transmitter), switch (on display) or software
Warm-up time	< 5 min
Starting time	< 2.75 s
Programming	HART
Signal-to-noise ratio	> 60 dB
Long-term stability	Better than: • ± 0.05% of measuring span/year • ± 0.18% of measuring span/5 years
Response time	4 ... 20 mA: ≤ 55 ms HART: ≤ 75 ms (typically 70 ms)
Programmable damping	0 ... 60 s
Signal dynamic	
• Input	24 bit
• Output	18 bit
Influence of change in supply voltage	< 0.005% of measuring span/V DC

Input

Resistance thermometer (RTD)

Input type	
• Pt10 ... 10000	<ul style="list-style-type: none"> • IEC 60751 • JIS C 1604-8 • GOST 6651_2009 • Callendar-Van Dusen
• Ni10 ... 10000	<ul style="list-style-type: none"> • DIN 43760-1987 • GOST 6651-2009/OIML R84:2003
• Cu5 ... 1000	<ul style="list-style-type: none"> • Edison Copper Winding No. 15 • GOST 6651-2009/OIML R84:2003
Type of connection	2-wire, 3-wire or 4-wire
Wire resistance per wire	Max. 50 Ω
Input current	< 0.15 mA
Effect of the wire resistance (with 3-wire and 4-wire connections)	< 0.002 Ω/Ω
Cable, wire-wire capacity	
• Pt1000, Pt10000 (IEC 60751 and JIS C 1604-8)	Max. 30 nF
• All other input types	Max. 50 nF
Fault detection, programmable	None, short-circuited, defective, short-circuited or defective
	Note
	When the low limit for the configured input type is below the constant detection limit for short-circuited inputs, the detection of short circuits is disabled regardless of the configuration of the fault detection.
Detection limit for short-circuited input	15 Ω
Fault detection time (RTD)	≤ 75 ms (typically 70 ms)
Fault detection time (for 3-wire and 4-wire)	≤ 2 000 ms

Thermocouples (TC)

Input type	
• B	IEC 60584-1
• E	IEC 60584-1
• J	IEC 60584-1
• K	IEC 60584-1
• L	DIN 43710
• Lr	GOST 3044-84
• N	IEC 60584-1
• R	IEC 60584-1
• S	IEC 60584-1
• T	IEC 60584-1
• U	DIN 43710
• W3	ASTM E988-96
• W5	ASTM E988-96
• LR	GOST 3044-84
Cold junction compensation (CJC)	Constant, internal or external over Pt100 or Ni100 RTD
• Temperature range internal CJC	-50 ... +100 °C (-58 ... +212 °F)
• Connection external CJC	2-wire or 3-wire
• External CJC, wire resistance per wire (for 3-wire and 4-wire connections)	50 Ω
• Effect of the wire resistance (with 3-wire and 4-wire connections)	< 0.002 Ω/Ω
• Input current external CJC	< 0.15 mA
• Temperature range external CJC	-50 ... +135 °C (-58 ... +275 °F)
• Cable, wire-wire capacity	Max. 50 nF
• Total wire resistance	Max. 10 kΩ
• Fault detection, programmable	None, short-circuited, defective, short-circuited or defective
	Note
	The short-circuited fault detection only applies to the CJC input.
• Fault detection time (TC)	≤ 75 ms (typically 70 ms)
• Fault detection time, external CJC (for 3-wire and 4-wire)	≤ 2 000 ms

Linear resistance

Input range	10 Ω ... 100 kΩ
Minimum measuring span	25 Ω
Type of connection	2-wire, 3-wire or 4-wire
Wire resistance per wire	Max. 50 Ω
Input current	< 0.15 mA
Effect of the wire resistance (with 3-wire and 4-wire connections)	< 0.002 Ω/Ω
Cable, wire-wire capacity	
• R > 400 Ω	Max. 30 nF
• R ≤ 400 Ω	Max. 50 nF
Fault detection, programmable	None, defective
Potentiometers	
Input range	0 ... 100 kΩ
Minimum measuring span	25 Ω
Type of connection	2-wire, 3-wire or 4-wire
Wire resistance per wire	Max. 50 Ω
Input current	< 0.15 mA
Effect of the wire resistance (with 4-wire and 5-wire connections)	< 0.002 Ω/Ω
Cable, wire-wire capacity	
• R > 400 Ω	Max. 30 nF
• R ≤ 400 Ω	Max. 50 nF

Temperature measurement

Temperature transmitters

Field transmitters/field indicator

SITRANS TF420 (HART, universal)

Fault detection, programmable	None, short-circuited, defective, short-circuited or defective Note When the configured potentiometer size is below the constant detection limit for short-circuited inputs, the detection of short circuits is disabled regardless of the configuration of the fault detection.
Detection limit for short-circuited input	15 Ω
Fault detection time, wiper arm (no short-circuit detection)	≤ 75 ms (typically 70 ms)
Fault detection time, element	≤ 2 000 ms
Fault detection time (for 4-wire and 5-wire)	≤ 2 000 ms
Supply voltage	
Measuring range	
• Unipolar	-100 ... 1700 mV
• Bipolar	-800 ... +800 mV
Minimum measuring span	2.5 mV
Input resistance	10 MΩ
Cable, wire-wire capacity	
• Input range: -100 ... 1700 mV	Max. 30 nF
• Input range: -20 ... 100 mV	Max. 50 nF
Fault detection, programmable	None, defective
Fault detection time	≤ 75 ms (typically 70 ms)
Output and HART communication	
Normal range, programmable	3.8 ... 20.5 mA/20.5 ... 3.8 mA
Extended range (output limits), programmable	3.5 ... 23 mA/23 ... 3.5 mA
Programmable input/output limits	
• Fault current	Enable/disable
• Fault current setting	3.5 ... 23 mA
Update time	10 ms
Load (with current output)	≤ (V _{Supply} - 10.5)/0.023 Ω
Load stability	< 0.01% of measuring span/100 Ω (measuring span = currently selected range)
Input error detection, programmable (detection of input short-circuits is ignored with TC and voltage inputs)	3.5 ... 23 mA
NAMUR NE43 Upscale	> 21 mA
NAMUR NE43 Downscale	< 3.6 mA
HART protocol versions	HART 7
Measuring accuracy	
Input accuracy	See "Input accuracy" table
Output accuracy	See "Output accuracy" table
Operating conditions	
Ambient temperature	
• Without local operation in single chamber enclosure	-50 ... +85 °C (-58 ... +185 °F)
• With local operation	-40 ... +85 °C (-40 ... +185 °F)
• For transmitters with functional safety	-40 ... +80 °C (-40 ... +176 °F)
Storage temperature	-50 ... +85 °C (-58 ... +185 °F)
Reference temperature for sensor calibration	24 °C ±1.0 °C (75.2 °F ±1.8 °F)
Relative humidity	< 99% (no condensation)
Degree of protection	
• Temperature transmitter enclosure	IP66/IP67/IP68
• Terminals	IP00

Structural design

Weight

- Single chamber enclosure 0.85 kg (1.87 lb)
- Dual chamber enclosure
 - Aluminum: 1.3 kg (2.87 lb)
 - Stainless steel: 3.3 kg (7.28 lb)

Maximum core cross-section

- Single chamber enclosure 1.5 mm² (AWG 16)
- Dual chamber enclosure 2.5 mm² (AWG 14)

Tightening torque for clamping screws

0.5 ... 0.6 Nm

Vibrations

- 2 ... 25 Hz IEC 60068-2-6
- 25 ... 100 Hz ± 1.6 mm (0.07 inch) ± 4 g

Certificates and approvals

Explosion protection ATEX/IECEx and others

Certificates³⁾

IECEx DEK 19.0069X
IECEx DEK 19.0070X
DEKRA 19ATEX0106 X (Category 1)
DEKRA 19ATEX0108X (Category 2)
DEKRA 19ATEX0107X (Category 3)
A5E50642461A-2021X (Category 3)

"Intrinsic safety ia/ib" type of protection

- ATEX II 1 G Ex ia IIC T6 ... T4 Ga
II 2 (1) G Ex ib [ia Ga] IIC T6 ... T4 Gb
II 2 (1) D Ex ib [ia Da] IIIC T100 °C Db
Ex ia IIC T6 ... T4 Ga
Ex ib [ia Ga] IIC T6 ... T4 Gb
Ex ib [ia Da] IIIC T 100 °C Db

- IECEx and others

"Intrinsic safety ic" type of protection

- ATEX II 2 G Ex ic IIC T6...T4 Gc
II 3 D Ex ic IIIC T100 °C Dc
Ex ic IIC T6 ... T4 Gc
Ex ic IIIC T100 °C Dc

- IECEx and others

"Non-sparking/increased safety nA/ec" type of protection

- ATEX For use in Zone 2
II 2 G Ex nA IIC T6...T4 Gc
II 2 G Ex ec IIC T6...T4 Gc
Ex nA IIC T6 ... T4 Gc
Ex ec IIC T6 ... T4 Gc

- IECEx and others

"Flameproof enclosure db" type of protection

- ATEX II 2 G Ex db IIC T6...T4 Gb
Ex db IIC T6 ... T4 Gb

- IECEx and others

"Protection by enclosure tb/tc" type of protection

- ATEX For use in Zone 21, 22
II 2 D Ex tb IIC T100 °C Db
II 3 D Ex tc IIIC T100 °C Dc

- IECEx and others

¹⁾ Note that the minimum supply voltage must correspond to the value measured at the terminals of the SITRANS TF420. All external voltage drops must be taken into consideration.

²⁾ Protect the device from overvoltage with the help of a suitable power supply or suitable overvoltage protection equipment.

³⁾ Additional available certificates are listed on the Internet at <http://www.siemens.com/processinstrumentation/certificates>

Measuring ranges/Minimum measuring span

RTD

Input type	Standard	Measuring range in °C (°F)	α_0 in °C ⁻¹ (°F ⁻¹)	Minimum measuring span in °C (°F)
Pt10 ... 10000	IEC 60751	-200 ... +850 (-328 ... +1 562)	0.003851 (0.002139)	10 (50)
	JIS C 1604-8	-200 ... +649 (-328 ... +1 200)	0.003916 (0.002176)	10 (50)
	GOST 6651_2009	-200 ... +850 (-328 ... +1 562)	0.003910 (0.002172)	10 (50)
	Callendar-Van Dusen	-200 ... +850 (-328 ... +1 562)	-	10 (50)
Ni10 ... 10000	DIN 43760-1987	-60 ... +250 (-76 ... +482)	0.006180 (0.003433)	10 (50)
	GOST 6651-2009/OIML R84:2003	-60 ... +180 (-76 ... +356)	0.006170 (0.003428)	10 (50)
Cu5 ... 1000	Edison Copper Winding No. 15	-200 ... +260 (-328 ... +500)	0.004270 (0.002372)	100 (212)
	GOST 6651-2009/OIML R84:2003	-180 ... +200 (-292 ... +392)	0.004280 (0.002378)	100 (212)
	GOST 6651-94	-50 ... +200 (-58 ... +392)	0.004260 (0.002367)	100 (212)

TC

Input type	Standard	Measuring range in °C (°F)	Minimum measuring span in °C (°F)
B	IEC 60584-1	0 (85) ... 1 820 (32 (185) ... 3 308)	100 (212)
E	IEC 60584-1	-200 ... +1 000 (-392 ... +1 832)	50 (122)
J	IEC 60584-1	-100 ... +1 200 (-212 ... +2 192)	50 (122)
K	IEC 60584-1	-180 ... +1 372 (-356 ... +2 502)	50 (122)
L	DIN 43710	-200 ... +900 (-392 ... +1 652)	50 (122)
Lr	GOST 3044-84	-200 ... +800 (-392 ... +1 472)	50 (122)
N	IEC 60584-1	-180 ... +1 300 (-356 ... +2 372)	50 (122)
R	IEC 60584-1	-50 ... +1 760 (-122 ... +3 200)	100 (212)
S	IEC 60584-1	-50 ... +1 760 (-122 ... +3 200)	100 (212)
T	IEC 60584-1	-200 ... +400 (-392 ... +752)	50 (122)
U	DIN 43710	-200 ... +600 (-392 ... +1 112)	50 (122)
W3	ASTM E988-96	0 ... 2 300 (32 ... 4 172)	100 (212)
W5	ASTM E988-96	0 ... 2 300 (32 ... 4 172)	100 (212)
LR	GOST 3044-84	-200 ... +800 (-392 ... +1472)	50 (122)

Input accuracy

Basic values

Input type	Basic accuracy	Temperature coefficient ¹⁾
RTD		
Pt10	≤ ±0.8 °C (1.44 °F)	≤ ±0.020 °C/°C (°F/°F)
Pt20	≤ ±0.4 °C (0.72 °F)	≤ ±0.010 °C/°C (°F/°F)
Pt50	≤ ±0.16 °C (0.288 °F)	≤ ±0.004 °C/°C (°F/°F)
Pt100	≤ ±0.04 °C (0.072 °F)	≤ ±0.002 °C/°C (°F/°F)
Pt200	≤ ±0.08 °C (0.144 °F)	≤ ±0.002 °C/°C (°F/°F)
Pt500	$T_{\max} < 180 \text{ °C (356 °F)} = \leq \pm 0.08 \text{ °C (0.144 °F)}$ $T_{\max} > 180 \text{ °C (356 °F)} = \leq \pm 0.16 \text{ °C (0.288 °F)}$	≤ ±0.002 °C/°C (°F/°F)
Pt1000	≤ ±0.08 °C (0.144 °F)	≤ ±0.002 °C/°C (°F/°F)
Pt2000	$T_{\max} < 300 \text{ °C (572 °F)} = \leq \pm 0.08 \text{ °C (0.144 °F)}$ $T_{\max} > 300 \text{ °C (572 °F)} = \leq \pm 0.4 \text{ °C (0.72 °F)}$	≤ ±0.002 °C/°C (°F/°F)
Pt10000	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Pt x	Largest tolerance of neighboring points	Largest temperature coefficient of neighboring points
Ni10	≤ ±1.6 °C (2.88 °F)	≤ ±0.020 °C/°C (°F/°F)
Ni20	≤ ±0.8 °C (1.44 °F)	≤ ±0.010 °C/°C (°F/°F)
Ni50	≤ ±0.32 °C (0.576 °F)	≤ ±0.004 °C/°C (°F/°F)
Ni100	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Ni120	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Ni200	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Ni500	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Ni1000	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)
Ni2000	≤ ±0.16 °C (0.288 °F)	≤ ±0.002 °C/°C (°F/°F)

Temperature measurement

Temperature transmitters

Field transmitters/field indicator

SITRANS TF420 (HART, universal)

Input type	Basic accuracy	Temperature coefficient ¹⁾
Ni10000	$\leq \pm 0.32 \text{ }^\circ\text{C}$ (0.576 °F)	$\leq \pm 0.002 \text{ }^\circ\text{C}/^\circ\text{C}$ (°F/°F)
Ni x	Largest tolerance of neighboring points	Largest temperature coefficient of neighboring points
Cu5	$\leq \pm 1.6 \text{ }^\circ\text{C}$ (2.88 °F)	$\leq \pm 0.040 \text{ }^\circ\text{C}/^\circ\text{C}$ (°F/°F)
Cu10	$\leq \pm 0.8 \text{ }^\circ\text{C}$ (1.44 °F)	$\leq \pm 0.020 \text{ }^\circ\text{C}/^\circ\text{C}$ (°F/°F)
Cu20	$\leq \pm 0.4 \text{ }^\circ\text{C}$ (0.72 °F)	$\leq \pm 0.010 \text{ }^\circ\text{C}/^\circ\text{C}$ (°F/°F)
Cu50	$\leq \pm 0.16 \text{ }^\circ\text{C}$ (0.288 °F)	$\leq \pm 0.004 \text{ }^\circ\text{C}/^\circ\text{C}$ (°F/°F)
Cu100	$\leq \pm 0.08 \text{ }^\circ\text{C}$ (0.144 °F)	$\leq \pm 0.002 \text{ }^\circ\text{C}/^\circ\text{C}$ (°F/°F)
Cu200	$\leq \pm 0.08 \text{ }^\circ\text{C}$ (0.144 °F)	$\leq \pm 0.002 \text{ }^\circ\text{C}/^\circ\text{C}$ (°F/°F)
Cu500	$\leq \pm 0.16 \text{ }^\circ\text{C}$ (0.288 °F)	$\leq \pm 0.002 \text{ }^\circ\text{C}/^\circ\text{C}$ (°F/°F)
Cu1000	$\leq \pm 0.08 \text{ }^\circ\text{C}$ (0.144 °F)	$\leq \pm 0.002 \text{ }^\circ\text{C}/^\circ\text{C}$ (°F/°F)
Cu x	Largest tolerance of neighboring points	Largest temperature coefficient of neighboring points
Linear resistance		
0 ... 400 Ω	$\leq \pm 40 \text{ m}\Omega$	$\leq \pm 2 \text{ m}\Omega/^\circ\text{C}$ (1.11 m Ω /°F)
0 ... 100 k Ω	$\leq \pm 4 \text{ } \Omega$	$\leq \pm 0.2 \text{ } \Omega/^\circ\text{C}$ (0.11 Ω /°F)
Potentiometers		
0 ... 100%	< 0.05%	< $\pm 0.005\%$
Supply voltage		
mV: -20 ... 100 mV	$\leq \pm 5 \text{ } \mu\text{V}$	$\leq \pm 0.2 \text{ } \mu\text{V}/^\circ\text{C}$ (0.11 μV /°F)
mV: -100 ... 1700 mV	$\leq \pm 0.1 \text{ mV}$	$\leq \pm 36 \text{ } \mu\text{V}/^\circ\text{C}$ (20 μV /°F)
mV: $\pm 800 \text{ mV}$	$\leq \pm 0.1 \text{ mV}$	$\leq \pm 32 \text{ } \mu\text{V}/^\circ\text{C}$ (17.8 μV /°F)
TC		
E	$\leq \pm 0.2 \text{ }^\circ\text{C}$ (0.36 °F)	$\leq \pm 0.025 \text{ }^\circ\text{C}/^\circ\text{C}$ (°F/°F)
J	$\leq \pm 0.25 \text{ }^\circ\text{C}$ (0.45 °F)	$\leq \pm 0.025 \text{ }^\circ\text{C}/^\circ\text{C}$ (°F/°F)
K	$\leq \pm 0.25 \text{ }^\circ\text{C}$ (0.45 °F)	$\leq \pm 0.025 \text{ }^\circ\text{C}/^\circ\text{C}$ (°F/°F)
L	$\leq \pm 0.35 \text{ }^\circ\text{C}$ (0.63 °F)	$\leq \pm 0.025 \text{ }^\circ\text{C}/^\circ\text{C}$ (°F/°F)
N	$\leq \pm 0.4 \text{ }^\circ\text{C}$ (0.72 °F)	$\leq \pm 0.025 \text{ }^\circ\text{C}/^\circ\text{C}$ (°F/°F)
T	$\leq \pm 0.25 \text{ }^\circ\text{C}$ (0.45 °F)	$\leq \pm 0.025 \text{ }^\circ\text{C}/^\circ\text{C}$ (°F/°F)
U	< 0 °C (32 °F) $\leq \pm 0.8 \text{ }^\circ\text{C}$ (1.44 °F) $\geq 0 \text{ }^\circ\text{C}$ (32 °F) $\leq \pm 0.4 \text{ }^\circ\text{C}$ (0.72 °F)	$\leq \pm 0.025 \text{ }^\circ\text{C}/^\circ\text{C}$ (°F/°F)
Lr	$\leq \pm 0.2 \text{ }^\circ\text{C}$ (0.36 °F)	$\leq \pm 0.1 \text{ }^\circ\text{C}/^\circ\text{C}$ (°F/°F)
R	< 200 °C (392 °F) $\leq \pm 0.5 \text{ }^\circ\text{C}$ (0.9 °F) $\geq 200 \text{ }^\circ\text{C}$ (392 °F) $\leq \pm 1 \text{ }^\circ\text{C}$ (1.8 °F)	$\leq \pm 0.1 \text{ }^\circ\text{C}/^\circ\text{C}$ (°F/°F)
S	< 200 °C (392 °F) $\leq \pm 0.5 \text{ }^\circ\text{C}$ (0.9 °F) $\geq 200 \text{ }^\circ\text{C}$ (392 °F) $\leq \pm 1 \text{ }^\circ\text{C}$ (1.8 °F)	$\leq \pm 0.1 \text{ }^\circ\text{C}/^\circ\text{C}$ (°F/°F)
W3	$\leq \pm 0.6 \text{ }^\circ\text{C}$ (1.08 °F)	$\leq \pm 0.1 \text{ }^\circ\text{C}/^\circ\text{C}$ (°F/°F)
W5	$\leq \pm 0.4 \text{ }^\circ\text{C}$ (0.72 °F)	$\leq \pm 0.1 \text{ }^\circ\text{C}/^\circ\text{C}$ (°F/°F)
B ²⁾	$\leq \pm 1 \text{ }^\circ\text{C}$ (1.8 °F)	$\leq \pm 0.1 \text{ }^\circ\text{C}/^\circ\text{C}$ (°F/°F)
B ³⁾	$\leq \pm 3 \text{ }^\circ\text{C}$ (5.4 °F)	$\leq \pm 0.1 \text{ }^\circ\text{C}/^\circ\text{C}$ (°F/°F)
B ⁴⁾	$\leq \pm 8 \text{ }^\circ\text{C}$ (14.4 °F)	$\leq \pm 0.8 \text{ }^\circ\text{C}/^\circ\text{C}$ (°F/°F)
B ⁵⁾	Not specified	Not specified
CJC (internal)	< $\pm 0.5 \text{ }^\circ\text{C}$ (0.9 °F)	Included in basic accuracy
CJC (external)	$\leq \pm 0.08 \text{ }^\circ\text{C}$ (0.144 °F)	$\leq \pm 0.002 \text{ }^\circ\text{C}/^\circ\text{C}$ (°F/°F)

⁴⁾ Temperature coefficients correspond to the specified values or 0.002% of the input span, depending on which value is greater.

⁵⁾ Accuracy of the specification range > 400 °C (752 °F)

⁶⁾ Accuracy of the specification range > 160 °C (320 °F) < 400 °C (752 °F)

⁷⁾ Accuracy of the specification range > 85 °C (185 °F) < 160 °C (320 °F)

⁸⁾ Accuracy of the specification range < 85 °C (185 °F)

Output accuracy

Output type	Basic accuracy	Temperature coefficient
Average value measurement	Average of accuracy of input 1 and input 2	Average of temperature coefficient of input 1 and input 2
Differential measurement	Sum of accuracy of input 1 and input 2	Sum of temperature coefficient of input 1 and input 2
Analog output	$\leq \pm 1.6 \text{ } \mu\text{A}$ (0.01% of the full output span)	$\leq \pm 0.48 \text{ } \mu\text{A}/\text{K}$ ($\leq \pm 0.003\%$ of the full output span/K)

Selection and ordering data

Single chamber enclosure

	Article No.	Order code		Article No.	Order code																
<p>SITRANS TF420 Temperature transmitter with single chamber enclosure for wall or pipe mounting, two separately configurable inputs and a galvanically isolated 2-wire output.</p> <p>Click on the Article No. for the online configuration in the PIA Life Cycle Portal.</p>	7NG044	- - - - - 0 - - - - -	<p>SITRANS TF420 Temperature transmitter with single chamber enclosure for wall or pipe mounting, two separately configurable inputs and a galvanically isolated 2-wire output.</p> <p>CJC configuration for TC</p> <p>Input 1: None CJC; Input 2: No CJC</p> <p>Input 1: Internal CJC; Input 2: Internal CJC</p> <p>Input 1: External CJC; input 2: External CJC; define type in option Jxx</p> <p>Input 1: External CJC; define type in option Jxx; input 2: Internal CJC</p> <p>Input 1: Internal CJC; Input 2: External CJC; define type in option Jxx</p> <p>Input 1: Internal CJC; Input 2: No CJC</p> <p>Input 1: External CJC (define type in option Jxx); input 2: No CJC</p> <p>Material of non-wetted parts</p> <p>Die-cast aluminum enclosure</p> <p>Type of protection (Ex)</p> <p>General purpose</p> <p>Intrinsic safety (Ex i) / Non-incendive field wiring (NIFW)</p> <p>Flameproof enclosure (Ex d) / Explosion proof (XP)</p> <p>Dust ignition protection by enclosure zone 21/22 (Ex t) / Dust ignition proof (DIP) / Increased safety zone 2 (Ex ec) / Non-incendive (NI)</p> <p>Flameproof enclosure (Ex d) / Intrinsic safety (Ex i) / Dust ignition protection by enclosure zone 21/22 (Ex t) / Increased safety zone 2 (Ex ec)</p> <p>Electrical connection/cable entries</p> <p>2x M20 x 1.5</p> <p>2x 1/2" NPT</p> <p>Local operation</p> <p>Without local operation</p> <p>Local operation (closed lid)</p> <p>Local operation (lid with glass window)</p>	7NG044	- - - - - 0 - - - - -																
<p>Communication</p> <p>With HART (4 ... 20 mA)</p>	0		<p>Input 1, type</p> <p>RTD</p> <ul style="list-style-type: none"> Pt100 (IEC 60751), 3-wire Pt100 (IEC 60751), 4-wire Pt1000 (IEC 60751), 3-wire Pt1000 (IEC 60751), 4-wire <p>TC</p> <ul style="list-style-type: none"> Type B Type E Type J Type K Type L Type N Type R Type S Type T <p>Potentiometer, 4-wire</p> <p>RTD</p> <ul style="list-style-type: none"> Pt100 (IEC 60751), 3-wire Pt100 (IEC 60751), 4-wire Pt1000 (IEC 60751), 3-wire Pt1000 (IEC 60751), 4-wire <p>TC</p> <ul style="list-style-type: none"> Type B Type E Type J Type K Type L Type N Type R Type S Type T <p>Potentiometer, 4-wire</p>	0	B	C	D	E	F	G	H	J	K	L	N	P	Q	R			
<p>Primary value output</p> <p>Input 1</p> <p>Input 1, input 2 as redundancy (hot backup)</p> <p>Input 2, input 1 as redundancy (hot backup)</p> <p>Average input 1 and input 2, both as redundancy (hot backup)</p> <p>Minimum input 1 and input 2, both as redundancy (hot backup)</p> <p>Maximum input 1 and input 2, both as redundancy (hot backup)</p> <p>Difference input 1 - input 2</p> <p>Difference input 2 - input 1</p> <p>Absolute difference</p>	0	1	2	3	4	5	6	7	8												
				0	1	2	3	4	5	6	1	A	B	C	L	S	F	M	0	1	2

Temperature measurement

Temperature transmitters

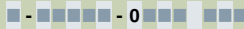
Field transmitters/field indicator

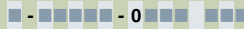
SITRANS TF420 (HART, universal)

Options	Order code
Add "-Z" to article number, specify order code and, if applicable, free text.	
Cable gland included	
Plastic	A00
Metal	A01
Stainless steel	A02
Stainless steel 316L/1.4404	A03
CMP, for XP devices	A10
CAPRI ADE 4F, CuZn, cable inner diameter 7 ... 12 mm, cable outer diameter 10 ... 16 mm	A11
CAPRI ADE 4F, stainless steel, cable inner diameter 7 ... 12 mm, cable outer diameter 10 ... 16 mm	A12
Device plug Han mounted left	
Device plug Han 7D (metal, straight)	A32
Cable socket included	
Metal, for device plug Han 7D and Han 8D	A41
Device plug M12 mounted left	
Stainless steel, without cable socket	A62
Stainless steel, with cable socket	A63
Mounting cable glands/plugs	
Cable gland mounted	A97
Device plug for output, mounted right	A98
Manufacturer's declarations	
Inspection certificate EN 10204-3.1: Manufacturer test certificate for transmitters (5 measured values)	C11
Device options	
Degree of protection IP66 / IP68 (not for device plugs M12 and Han)	D30
Unlabeled TAG plate	D40
Overvoltage protection up to 20 kV (external)	D71
General approval without Ex approval	
Worldwide (CE, RCM) except EAC, FM, KCC	E00
Explosion protection certificates	
ATEX (Europe) and IECEx (Worldwide)	E47
Mounting system (only single chamber enclosures)	
Pipe mounting kit for single chamber enclosure, stainless steel 316L	H06
Wall mounting kit for single chamber enclosure, stainless steel 316L	H07
External CJC types	
Pt100, IEC 60751, 3-wire	J02
Pt100, IEC 60751, 4-wire	J03
Ni100, DIN 43760-87, 3-wire	J05
Ni100, DIN 43760-87, 4-wire	J06
Noise damping	
Noise damping 60 Hz instead of 50 Hz	P10
Input 1: TC	
Type C W5	V01
Type D W3	V02
Type U	V03
Type Lr	V04

Options	Order code
Add "-Z" to article number, specify order code and, if applicable, free text.	
Input 1: RTD	
Pt x (IEC), 3-wire, define RTD factor x in option Y21	V61
Pt x (IEC), 4-wire, define RTD factor x in option Y21	V62
Pt x (JIS C1604-81), 3-wire, define RTD factor x in option Y21	V64
Pt x (JIS C1604-81), 4-wire, define RTD factor x in option Y21	V65
Pt x (GOST 6651-2009), 3-wire, define RTD factor x in option Y21	V67
Pt x (GOST 6651-2009), 4-wire, define RTD factor x in option Y21	V68
Ni x (DIN 43760-87), 3-wire, define RTD factor x in option Y21	V70
Ni x (DIN 43760-87), 4-wire, define RTD factor x in option Y21	V71
Ni x (GOST 6651-2009), 3-wire, define RTD factor x in option Y21	V73
Ni x (GOST 6651-2009), 4-wire, define RTD factor x in option Y21	V74
Cu x (ECW-15), 3-wire, define RTD factor x in option Y21	V76
Cu x (ECW-15), 4-wire, define RTD factor x in option Y21	V77
Cu x (GOST 6651-94), 3-wire, define RTD factor x in option Y21	V79
Cu x (GOST 6651-94), 4-wire, define RTD factor x in option Y21	V80
Cu x (GOST 6651-2009), 3-wire, define RTD factor x in option Y21	V82
Cu x (GOST 6651-2009), 4-wire, define RTD factor x in option Y21	V83
Device settings	
Measuring range setting temperature input: Lower range value (max. 5 characters), upper range value (max. 5 characters), unit (°C, °F, °Ra, K)	Y01
Long tag (device parameter, max. 32 characters), plate, stainless steel 316L/1.4404	Y15
Measuring point description (device parameter, max. 32 characters), stainless steel 316L/1.4404	Y16
Long tag (device parameter, max. 8 characters), adhesive label	Y17
Descriptor (device parameter, max. 16 characters), adhesive label	Y18
Input 1: RTD factor; e.g. factor "200" = Pt200, adhesive label	Y21

Dual chamber enclosure

	Article No.	Order code
SITRANS TF420 Temperature transmitter with dual chamber enclosure for wall or pipe mounting, two separately configurable inputs and a galvanically isolated 2-wire output.	7NG045	
Click on the Article No. for the online configuration in the PIA Life Cycle Portal.		
Communication		
With HART (4 ... 20 mA)		0
Primary value output		
Input 1		0
Input 1, input 2 as redundancy (hot backup)		1
Input 2, input 1 as redundancy (hot backup)		2
Average input 1 and input 2, both as redundancy (hot backup)		3
Minimum input 1 and input 2, both as redundancy (hot backup)		4
Maximum input 1 and input 2, both as redundancy (hot backup)		5
Difference input 1 - input 2		6
Difference input 2 - input 1		7
Absolute difference		8
Input 1, type		
RTD		
• Pt100 (IEC 60751), 3-wire		B
• Pt100 (IEC 60751), 4-wire		C
• Pt1000 (IEC 60751), 3-wire		D
• Pt1000 (IEC 60751), 4-wire		E
TC		
• Type B		F
• Type E		G
• Type J		H
• Type K		J
• Type L		K
• Type N		L
• Type R		N
• Type S		P
• Type T		Q
Potentiometer, 4-wire		R
Input 2, type		
Without input 2		A
RTD		
• Pt100 (IEC 60751), 3-wire		B
• Pt100 (IEC 60751), 4-wire		C
• Pt1000 (IEC 60751), 3-wire		D
• Pt1000 (IEC 60751), 4-wire		E
TC		
• Type B		F
• Type E		G
• Type J		H
• Type K		J
• Type L		K
• Type N		L
• Type R		N
• Type S		P
• Type T		Q
Potentiometer, 4-wire		R

	Article No.	Order code
SITRANS TF420 Temperature transmitter with dual chamber enclosure for wall or pipe mounting, two separately configurable inputs and a galvanically isolated 2-wire output.	7NG045	
CJC configuration for TC		
Input 1: None CJC; Input 2: No CJC		0
Input 1: Internal CJC; Input 2: Internal CJC		1
Input 1: External CJC; input 2: External CJC; define type in option Jxx		2
Input 1: External CJC; define type in option Jxx; input 2: Internal CJC		3
Input 1: Internal CJC; Input 2: External CJC; define type in option Jxx		4
Input 1: Internal CJC; Input 2: No CJC		5
Input 1: External CJC (define type in option Jxx); input 2: No CJC		6
Material of non-wetted parts		
Die-cast aluminum enclosure		1
Enclosure made of stainless steel precision casting CF3M/1.4409 (similar to 316L)		2
Type of protection (Ex)		
General purpose (non-Ex)		A
Intrinsic safety (Ex i) / Non-incendive field wiring (NIFW)		B
Flameproof enclosure (Ex d) / Explosion proof (XP)		C
Dust ignition protection by enclosure zone 21/22 (Ex t) / Dust ignition proof (DIP) / Increased safety zone 2 (Ex ec) / Non-incendive (NI)		L
Flameproof enclosure (Ex d) / Intrinsic safety (Ex i) / Dust ignition protection by enclosure zone 21/22 (Ex t) / Increased safety zone 2 (Ex ec)		S
Electrical connection/cable entries		
2x M20 x 1.5		F
2x 1/2" NPT		M
Local operation		
Without local operation		0
Local operation (closed lid)		1
Local operation (lid with glass window)		2



Temperature measurement

Temperature transmitters

Field transmitters/field indicator

SITRANS TF420 (HART, universal)

Options	Order code
Add "-Z" to article number, specify order code and, if applicable, free text.	
Cable gland included	
Plastic	A00
Metal	A01
Stainless steel	A02
Stainless steel 316L/1.4404	A03
CMP, for XP devices	A10
CAPRI ADE 4F, CuZn, cable inner diameter 7 ... 12 mm, cable outer diameter 10 ... 16 mm	A11
CAPRI ADE 4F, stainless steel, cable inner diameter 7 ... 12 mm, cable outer diameter 10 ... 16 mm	A12
Cable entry accessories	
Dual hole insert included	A20
Device plug Han mounted left	
Device plug Han 7D (plastic, straight)	A30
Device plug Han 7D (plastic, angled)	A31
Device plug Han 7D (metal, straight)	A32
Device plug Han 7D (metal, angled)	A33
Device plug Han 8D (plastic, straight)	A34
Device plug Han 8D (plastic, angled)	A35
Device plug Han 8D (metal, straight)	A36
Device plug Han 8D (metal, angled)	A37
Cable socket included	
Plastic, for device plug Han 7D and Han 8D	A40
Metal, for device plug Han 7D and Han 8D	A41
Device plug M12 mounted left	
Stainless steel, without cable socket	A62
Stainless steel, with cable socket	A63
Mounting cable glands/plugs	
Cable gland mounted	A97
Device plug for output, mounted right	A98
Manufacturer's declarations	
Inspection certificate EN 10204-3.1: Manufacturer test certificate for transmitters (5 measured values)	C11
Device options	
Double layer coating (epoxy resin and polyurethane) 120 µm of enclosure and lid	D20
Degree of protection IP66 / IP68 (not for device plugs M12 and Han)	D30
Unlabeled TAG plate	D40
Stainless steel Ex plate 1.4404/316L	D42
Overvoltage protection up to 20 kV (external)	D71
General approval without Ex approval	
Worldwide (CE, RCM) except EAC, FM, KCC	E00
Explosion protection certificates	
ATEX (Europe) and IECEx (Worldwide)	E47
Mounting brackets (only dual chamber enclosure)	
Wall/pipe mounting bracket for dual chamber enclosure, steel	H01
Wall/pipe mounting bracket for dual chamber enclosure, stainless steel 304	H02
Wall/pipe mounting bracket for dual chamber enclosure, stainless steel 316L	H03

Options	Order code
Add "-Z" to article number, specify order code and, if applicable, free text.	
External CJC types	
Pt100, IEC 60751, 3-wire	J02
Pt100, IEC 60751, 4-wire	J03
Ni100, DIN 43760-87, 3-wire	J05
Ni100, DIN 43760-87, 4-wire	J06
Noise damping	
Noise damping 60 Hz instead of 50 Hz	P10
Input 1: TC	
Type C W5	V01
Type D W3	V02
Type U	V03
Type Lr	V04
Input 1: RTD	
Pt x (IEC), 3-wire, define RTD factor x in option Y21	V61
Pt x (IEC), 4-wire, define RTD factor x in option Y21	V62
Pt x (JIS C1604-81), 3-wire, define RTD factor x in option Y21	V64
Pt x (JIS C1604-81), 4-wire, define RTD factor x in option Y21	V65
Pt x (GOST 6651-2009), 3-wire, define RTD factor x in option Y21	V67
Pt x (GOST 6651-2009), 4-wire, define RTD factor x in option Y21	V68
Ni x (DIN 43760-87), 3-wire, define RTD factor x in option Y21	V70
Ni x (DIN 43760-87), 4-wire, define RTD factor x in option Y21	V71
Ni x (GOST 6651-2009), 3-wire, define RTD factor x in option Y21	V73
Ni x (GOST 6651-2009), 4-wire, define RTD factor x in option Y21	V74
Cu x (ECW-15), 3-wire, define RTD factor x in option Y21	V76
Cu x (ECW-15), 4-wire, define RTD factor x in option Y21	V77
Cu x (GOST 6651-94), 3-wire, define RTD factor x in option Y21	V79
Cu x (GOST 6651-94), 4-wire, define RTD factor x in option Y21	V80
Cu x (GOST 6651-2009), 3-wire, define RTD factor x in option Y21	V82
Cu x (GOST 6651-2009), 4-wire, define RTD factor x in option Y21	V83
Device settings	
Measuring range setting temperature input: Lower range value (max. 5 characters), upper range value (max. 5 characters), unit (°C, °F, °Ra, K)	Y01
Long tag (device parameter, max. 32 characters), plate, stainless steel 316L/1.4404	Y15
Measuring point description (device parameter, max. 32 characters), stainless steel 316L/1.4404	Y16
Long tag (device parameter, max. 8 characters), adhesive label	Y17
Descriptor (device parameter, max. 16 characters), adhesive label	Y18
Input 1: RTD factor; e.g. factor "200" = Pt200, adhesive label	Y21

Accessories

	Article No.
Additional accessories for assembly, connection and transmitter configuration, see page 2/251.	
Modems	
Modem with USB interface and SIPROM T software	7NG3092-8KN
HART modem with USB interface	7MF4997-1DB
Thread adapter	
Thread adapter M20x1.5 (male thread) to ½-14 NPT (female thread)	7MP1990-0BA00
Thread adapter M20x1.5 (male thread) to G½ (female thread)	7MP1990-0BB00
Local operation	
Local operation for temperature transmitter in dual chamber enclosure	7MF7902-1AD
Mounting system for local operation 7MF7902-1AD in single chamber enclosure	7MF7902-1AS
Mounting brackets (only dual chamber enclosure)	
Wall/pipe mounting bracket for dual chamber enclosure, steel, 5/16-24UNF	7MF7900-1AB
Wall/pipe mounting bracket for dual chamber enclosure, steel, M8	7MF7900-1AC
Wall/pipe mounting bracket for dual chamber enclosure, stainless steel 316L, 5/16-24UNF	7MF7900-1AH
Wall/pipe mounting bracket for dual chamber enclosure, stainless steel 316L, M8	7MF7900-1AJ
Mounting system (only single chamber enclosures)	
Pipe mounting kit for single chamber enclosure, stainless steel 316L	7MF7900-1AK
Wall mounting kit for single chamber enclosure, stainless steel 316L	7MF7900-1AL
Cable gland	
Cable gland, gray, non-Ex, M20	7MF7906-1AB
Cable gland, gray, non-Ex, NPT	7MF7906-1BB
Cable gland, metal, non-Ex, NPT	7MF7906-1BD
Cable gland, metal, non-Ex, M20	7MF7906-1AD
Cable gland, metal, Ex-d, NPT	7MF7906-1BE
Cable gland, metal, Ex-d, M20	7MF7906-1AE
Cable gland, 316L, non-Ex, NPT	7MF7906-1BH
Cable gland, 316L, non-Ex, M20	7MF7906-1AH
Cable gland, 316L, Ex-d, NPT	7MF7906-1BJ
Cable gland, 316L, Ex-d, M20	7MF7906-1AJ
Cable gland, E1FX Tri-Star 1/2-14NPT, CMP	7MF7906-1NE
Cable gland, ½ NPT Capri ADE 4F cpl., CuZn	7MF7906-1PE
Cable gland, ½ NPT Capri ADE 4F cpl., stainless steel	7MF7906-1PJ
Dual hole gasket for 2 cables in cable gland	7MF7906-1WN

	Article No.
Plug and cable socket	
Plug Han 7D, plastic, straight	7MF7906-2AB
Plug Han 7D, plastic, angled	7MF7906-2AC
Plug Han 7D, metal, straight, blue	7MF7906-2AQ
Plug Han 7D, metal, straight, grey	7MF7906-2AN
Plug Han 7D, metal, angled, blue	7MF7906-2AR
Plug Han 7D, metal, angled, grey	7MF7906-2AP
Plug Han 8D, plastic, straight	7MF7906-2EB
Plug Han 8D, plastic, angled	7MF7906-2EC
Plug Han 8D, metal, straight, blue	7MF7906-2EQ
Plug Han 8D, metal, straight, grey	7MF7906-2EN
Plug Han 8D, metal, angled, blue	7MF7906-2ER
Plug Han 8D, metal, angled, grey	7MF7906-2EP
Cable socket, plastic, for plug Han 7D	7MF7906-2BB
Cable socket, plastic, for plug Han 8D	7MF7906-2FB
Cable socket, metal, for Han 7D blue	7MF7906-2BQ
Cable socket, metal, for Han 8D blue	7MF7906-2FQ
Cable socket, metal, for Han 7D grey	7MF7906-2BN
Cable socket, metal, for Han 8D grey	7MF7906-2FN
Plug M12 with cable socket, stainless steel	7MF7906-3AB
Overvoltage protection	
Overvoltage protection up to 20 kV, M20	7MF7906-3AC
Overvoltage protection up to 20 kV, NPT	7MF7906-3AD
Lid	
Closed lid aluminum, painted 2x, without glass window, with seal NBR	7MF7901-1BB
Closed lid aluminum, painted 2x, without glass window, with seal FVMQ	7MF7901-1BC
Lid aluminum 2x coated, with glass window, with seal NBR	7MF7901-1BG
Lid aluminum 2x coated, with glass window, with seal FVMQ	7MF7901-1BH
Closed lid stainless steel precision casting, without glass window, with seal NBR	7MF7901-2AB
Closed lid stainless steel precision casting, without glass window, with seal FVMQ	7MF7901-2AC
Lid stainless steel precision casting, with glass window, with seal NBR	7MF7901-2AG
Lid stainless steel precision casting, with glass window, with seal FVMQ	7MF7901-2AH

Ordering example

SITRANS TF420 (single chamber enclosure)

7NG0450-0BA02-0AF2-Z Y01+Y17+P10

Y01: -10 ... +100 °C (32 ... 212 °F)

Y17: TICA123

Factory setting

- Input 1: Pt100 (IEC 751); 3-wire connection
- Input 2: not configured (inactive)
- Measuring range: 0 ... 100 °C (32 ... 212 °F)
- Fault current
 - Input circuit wire break: 22.8 mA
 - Input circuit short circuit: 22.4 mA
 - Input circuit drift: 22 mA (active when input 2 is active)
 - Input monitoring wire break and short-circuit
- No trimming of input and output (offset)

Damping 0.0 s

Temperature measurement

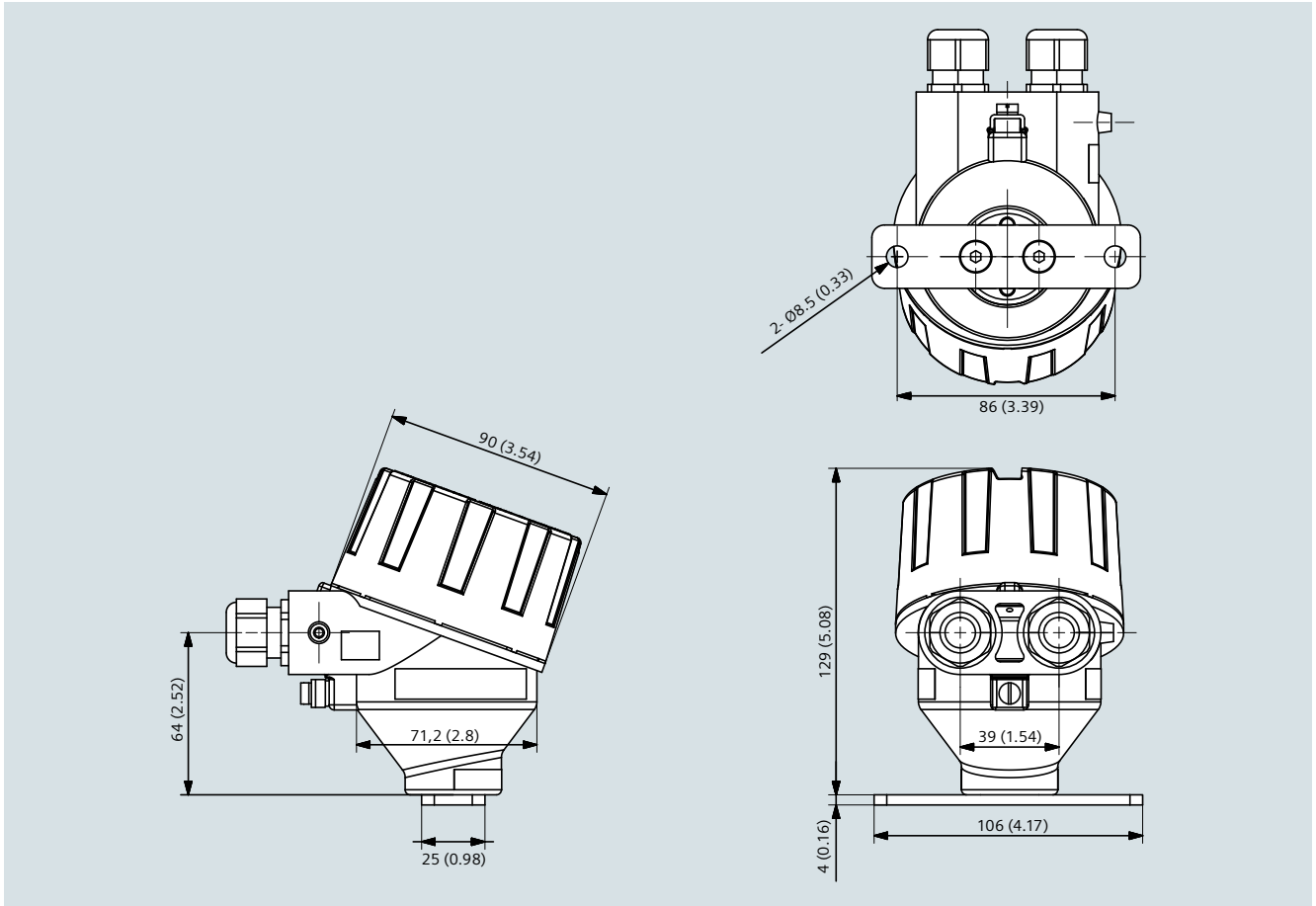
Temperature transmitters

Field transmitters/field indicator

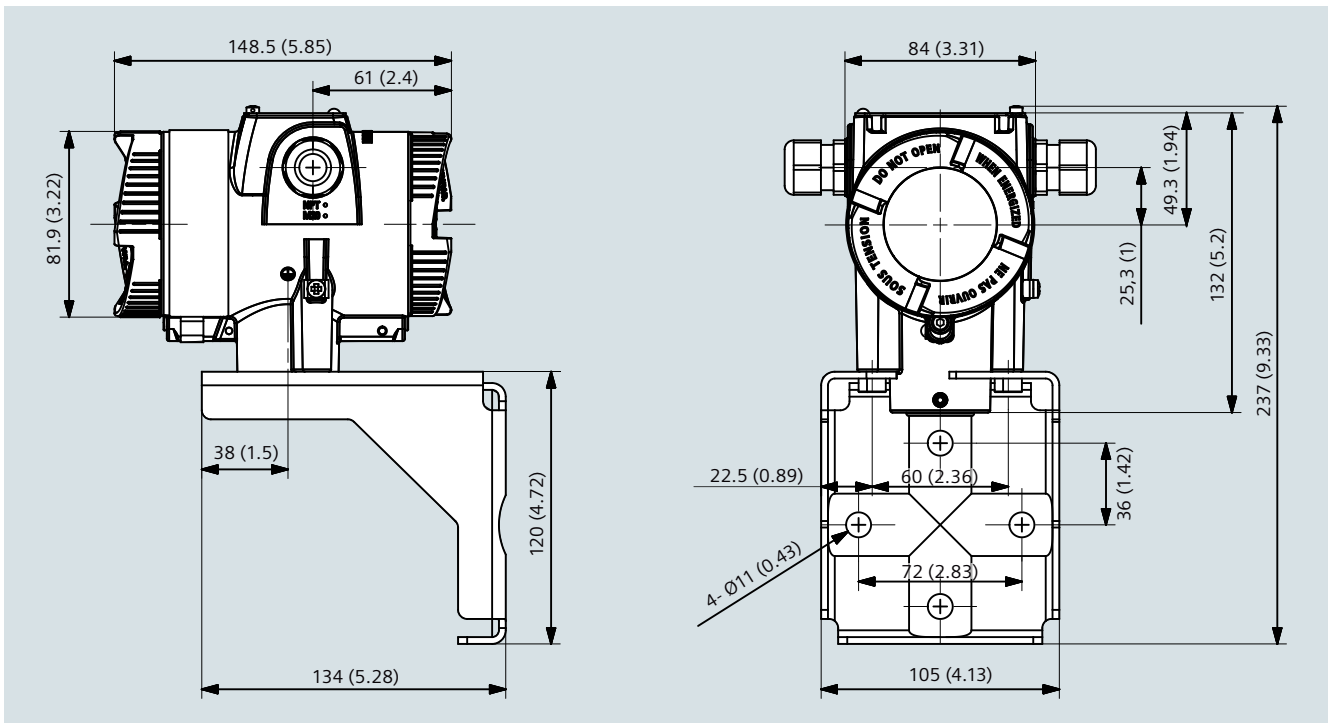
SITRANS TF420 (HART, universal)

Dimensional drawings

2



SITRANS TF420, single chamber enclosure, dimensions in mm (inch)

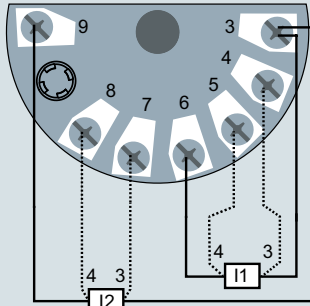


SITRANS TF420, dual chamber enclosure, dimensions in mm (inch)

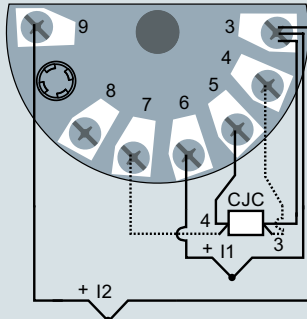
Circuit diagrams

Connections

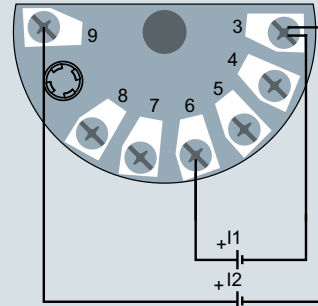
Input connection



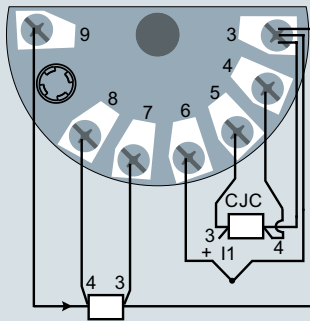
Input 1 and/or input 2:
 2-wire, 3-wire or 4-wire RTD or
 linear resistance



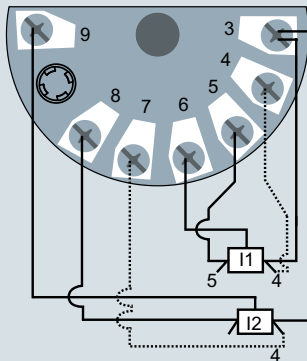
Input 1 and/or input 2:
 TC (internal CJC or
 external 2-wire, 3-wire or
 4-wire CJC)



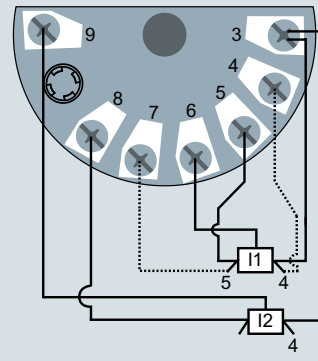
Input 1 and/or input 2:
 Voltage input
 (unipolar or bipolar)



Input 1: TC (internal CJC or
 external 2-wire or 3-wire CJC)
 Input 2: 2-wire, 3-wire or 4-wire RTD



Input 1 and/or Input 2:
 3-wire or 4-wire potentiometer



Input 1: 5-wire potentiometer
 Input 2: 3-wire potentiometer

SITRANS TF420 in single chamber enclosure (7NG044*), input connection assignment

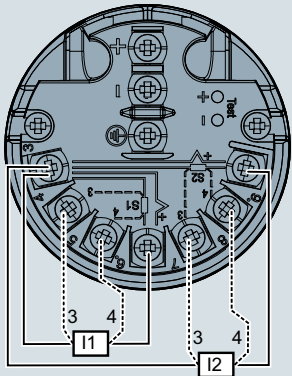
Temperature measurement

Temperature transmitters

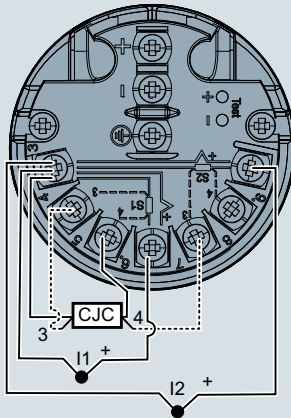
Field transmitters/field indicator

SITRANS TF420 (HART, universal)

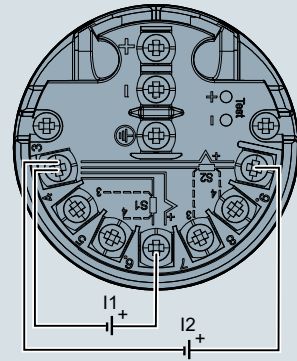
2



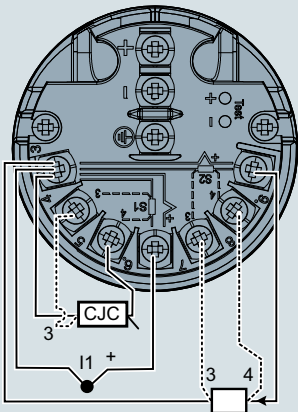
Input 1 (I1) and/or input 2 (I2):
2-wire, 3-wire or 4-wire RTD or
linear resistance



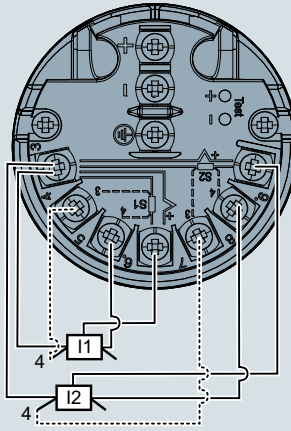
Input 1 (I1) and/or input 2 (I2):
TC (internal CJC or
external 2-wire, 3-wire or
4-wire CJC)



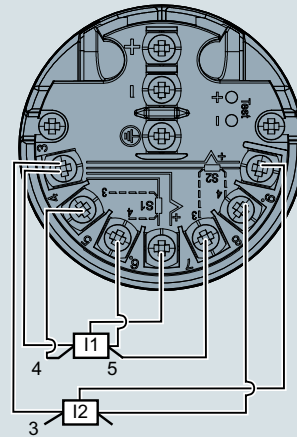
Input 1 (I1) and/or input 2 (I2):
Voltage input
(unipolar or bipolar)



Input 1: TC (internal CJC or
external 2-wire or 3-wire CJC)
Input 2: 2-wire, 3-wire or 4-wire RTD



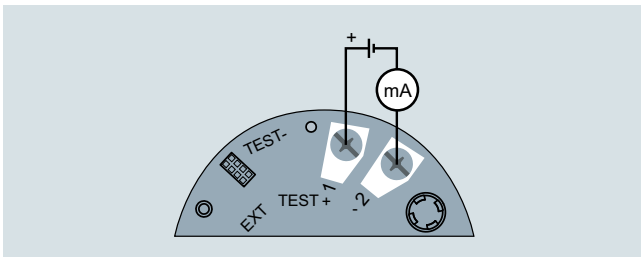
Input 1 (I1) and/or input 2 (I2):
3-wire or 4-wire potentiometer



Input 1 (I1): 5-wire potentiometer
Input 2 (I2): 3-wire potentiometer

SITRANS TF420 in dual chamber enclosure (7NG045*), input connection assignment

Output connection



SITRANS TF420 in single chamber enclosure (7NG044*), output connection assignment