Overview

SITRANS TF320 in dual chamber enclosure

Overview (continued)

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 316/316L
- Electronic compartment isolated (watertight) from terminal compartment in dual chamber enclosure
- Degree of protection IP66/68 (1.5 m/2 h)
- Electromagnetic compatibility according to 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
- 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) according to IEC 61508 and Electrical Equipment For Furnaces And Ancillary Equipment (EN 50156-2)

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

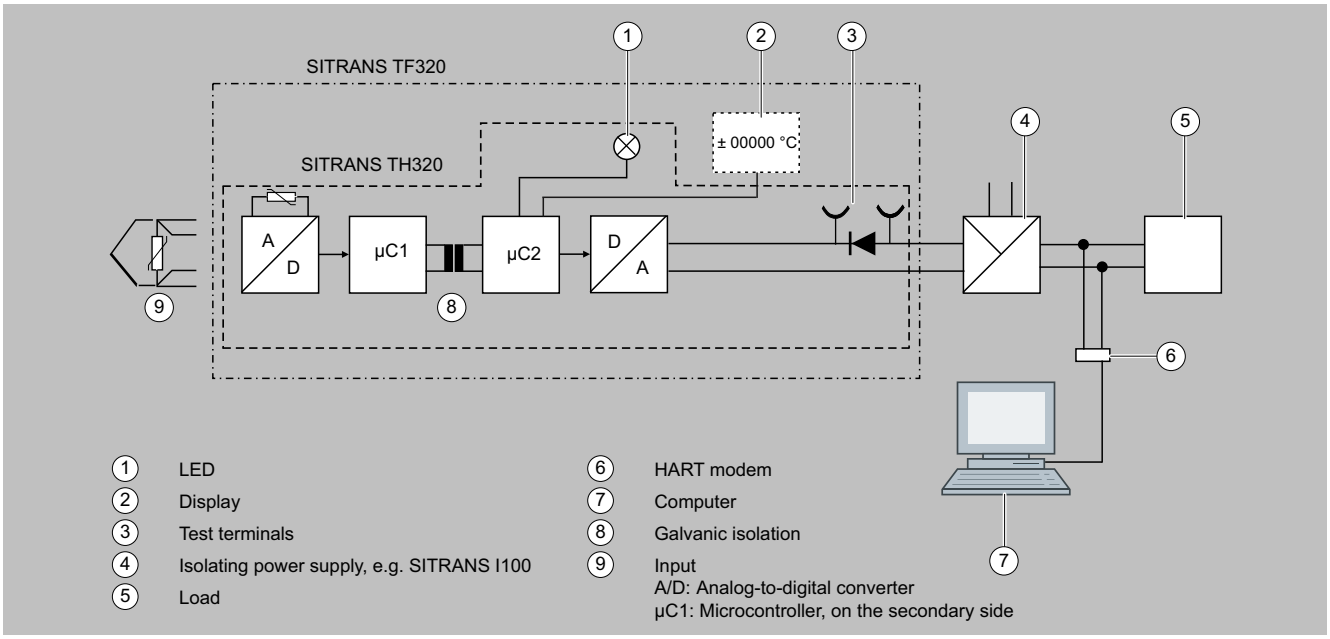
Configuration

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

Selection and ordering data

Single chamber enclosure

SITRANS TF320 temperature transmitter with single chamber enclosure for wall or pipe mounting, one configurable input and an electrically isolated 2-wire output.	Article No. 7NG034 ● - ● ● ● ● ● - 0 ● ● ●
Click the article number for online configuration in the PIA Life Cycle Portal.	
Communication	
With HART (4 ... 20 mA)	0
Without HART (4 ... 20 mA)	7
Primary value output	
Input 1	0
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
More types in option Vxx	Y
Input 2, type	
Without input 2	A
CJC configuration for TC	
None CJC	0
Internal CJC	1
External CJC RTD Pt100 (IEC 60751), 3-wire	3
External CJC RTD Ni100 (DIN 43760-87), 3-wire	6
Define fixed CJC value with option Y60	8
Material of non-wetted parts	
Die-cast aluminum enclosure	1
Enclosure made of stainless steel precision casting 1.4401 (similar to 316)	3
Type of protection (Ex)	
General safety	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) / increased safety zone 2 (Ex ec) / dust ignition proof (DIP) / 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
Flameproof enclosure (Ex d) / explosion proof (XP) / intrinsic safety (Ex i) / non-incendive / non-incendive field wiring (NIFW) / dust ignition protection by enclosure zone 21/22 (Ex t) / increased safety zone 2 (Ex ec) / dust ignition proof (DIP) / non-incendive (NI)	T
Electrical connection/cable entries	
2 × M20 × 1.5	F
2 × ½" NPT	M
Local operation	
Without local operation	0
Local operation (closed lid)	1
Local operation (lid with glass window)	2

Selection and ordering data (continued)

Options Add "-Z" to article number, specify order code and, if applicable, free text	Order code
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 (0.28 ... 0.47 inches) Cable outer diameter 10 ... 16 mm (0.39 ... 0.63 inches)	**A11**
CAPRI ADE 4F, stainless steel Cable inner diameter 7 ... 12 mm (0.28 ... 0.47 inches) Cable outer diameter 10 ... 16 mm (0.39 ... 0.63 inches)	**A12**
Han plug	
Device plug Han 7D, mounted on left, metal, straight	**A32**
Cable socket included, metal, for device plug Han 7D/8D	**A41**
M12 plug	
Device plug M12, mounted on left, stainless steel, without cable socket	**A62**
Device plug M12, mounted on left, 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**
Certificates for functional safety	
Functional safety (IEC 61508) - SIL2/3; Electrical equipment for furnaces and ancillary equipment (EN 50156-2)	**C20**
Device options	
PDF file with device settings	**D10**
IP66/IP68 degree of protection (not for device plug M12 and Han)	**D30**
Unlabeled TAG plate	**D40**
Without labeling of the measuring range on the TAG plate	**D41**
Nameplate and approval plate, stainless steel 1.4404/316L	**D42**
Overvoltage protection up to 20 kV (external)	**D71**
Jumper plug set on device for write protection	**D81**
Jumper plug set on device set for fault current >21 mA (instead of <3.6 mA) (only non-SIL)	**D82**
General approval without Ex approval	
Worldwide (CE, RCM) except EAC, FM, KCC	**E00**
Global	**E01**
EAC	**E07**
FM	**E08**
KCC	**E09**
Explosion protection certificates	
ATEX (Europe)	**E20**
FM (USA & Canada)	**E22**
IECEx (Worldwide)	**E23**
NEPSI (China)	**E27**
PESO (India)	**E28**
UKEX (United Kingdom)	**E33**
ATEX (Europe) and IECEx (Worldwide)	**E47**
ATEX, IECEx and FM	**E49**

Selection and ordering data (continued)

Options Add "-Z" to article number, specify order code and, if applicable, free text	Order code
Factory	
Made in France	**F00**
Mounting clamps	
Pipe mounting kit for single chamber enclosure, stainless steel 316L	**H06**
Wall mounting kit for single chamber enclosure, stainless steel 316L	**H07**
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: Callendar-Van Dusen	
2-wire (define wire resistance value in option Y51 and Callendar-Van Dusen parameter in option Y35)	**V50**
3-wire (define Callendar-Van Dusen parameter in option Y35)	**V51**
4-wire (define Callendar-Van Dusen parameter in option Y35)	**V52**
Input 1: RTD	
Pt x (IEC 60751), 2-wire (define wire resistance value in option Y51 and RTD factor x in option Y21)	**V60**
Pt x (IEC 60751), 3-wire, define RTD factor x in option Y21	**V61**
Pt x (IEC 60751), 4-wire, define RTD factor x in option Y21	**V62**
Pt x (JIS C1604), 2-wire (define wire resistance value in option Y51 and RTD factor x in option Y21)	**V63**
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), 2-wire (define wire resistance value in option Y51 and RTD factor x in option Y21)	**V66**
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), 2-wire (define wire resistance value in option Y51 and RTD factor x in option Y21)	**V69**
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), 2-wire (define wire resistance value in option Y51 and RTD factor x in option Y21)	**V72**
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), 2-wire (define wire resistance value in option Y51 and RTD factor x in option Y21)	**V75**
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), 2-wire (define wire resistance value in option Y51 and RTD factor x in option Y21)	**V78**
Cu x (GOST 6651-94), define 3-wire, define RTD factor x in option Y21	**V79**

Selection and ordering data (continued)

Options Add "-Z" to article number, specify order code and, if applicable, free text	Order code
Cu × (GOST 6651-94), define 4-wire, define RTD factor × in option Y21	**V80**
Cu × (GOST 6651-2009), define 3-wire, define RTD factor × in option Y21	**V82**
Cu × (GOST 6651-2009), define 4-wire, define RTD factor × 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**
Customer-specific programming in plain text (n-lines)	**Y09**
Tag (device parameters, max. 32 characters), adhesive label	**Y15**
Measuring point description (device parameters, max. 32 characters), adhesive label	**Y16**
Tag (device parameters, max. 8 characters), adhesive label	**Y17**
Descriptor (device parameters, max. 16 characters), adhesive label	**Y18**
Input 1: RTD factor; e.g. factor "200" = Pt200, adhesive label	**Y21**
Fault current for input circuit short-circuit & interruption instead of 22.4 mA (short-circuit) and 22.8 mA (interruption) e.g. 3.6 mA and 22.4 mA [3.6 - 3.6; 3.6 - 22.8; 22.4 - 3.6]	**Y31**
CvD Sensor matching factors input 1 R0, A, B, C, Beta, Delta Selection: CVDR - R0 (format for example 100.0), CVDA - A (format for example 0.003908), CVDB - B (format for example -5.775E-07), CVDC - C (format for example -4.183E-12)	**Y35**
Wire resistance value input 1 in ohms (0 ... 100 ohms)	**Y51**
Input 1: CJC sensor, fixed value (see measuring range for unit)	**Y60**
ID number of special design	**Y99**

Dual chamber enclosure

SITRANS TF320 temperature transmitter with dual chamber enclosure for wall or pipe mounting, one configurable input and an electrically isolated 2-wire output.	Article No. 7NG035 ● - ● ● ● ● ● - 0 ● ● ●
Click the article number for online configuration in the PIA Life Cycle Portal.	
Communication	
With HART (4 ... 20 mA)	0
Without HART (4 ... 20 mA)	7
Primary value output	
Input 1	0
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

Selection and ordering data (continued)

SITRANS TF320 temperature transmitter with dual chamber enclosure for wall or pipe mounting, one configurable input and an electrically isolated 2-wire output.	Article No. 7NG035 ● - ● ● ● ● ● - 0 ● ● ●
• Type N	L
• Type R	N
• Type S	P
• Type T	Q
Potentiometer, 4-wire	R
More types in option Vxx	Y
Input 2, type	
Without input 2	A
CJC configuration for TC	
Without CJC	0
Internal CJC	1
External CJC RTD Pt100 (IEC 60751), 3-wire	3
External CJC RTD Ni100 (DIN 43760-87), 3-wire	6
Define fixed CJC value with option Y60	8
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 safety	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) / increased safety zone 2 (Ex ec) / dust ignition proof (DIP) / 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
Flameproof enclosure (Ex d) / explosion proof (XP) / intrinsic safety (Ex i) / non-incendive / non-incendive field wiring (NIFW) / dust ignition protection by enclosure zone 21/22 (Ex t) / increased safety zone 2 (Ex ec) / dust ignition proof (DIP) / non-incendive (NI)	T
Electrical connection/cable entries	
2 × M20 × 1.5	F
2 × ½" NPT	M
Local operation	
Without local operation	0
Local operation (closed lid)	1
Local operation (lid with glass window)	2

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 (0.28 ... 0.47 inches) Cable outer diameter 10 ... 16 mm (0.39 ... 0.63 inches)	**A11**
CAPRI ADE 4F, stainless steel Cable inner diameter 7 ... 12 mm (0.28 ... 0.47 inches) Cable outer diameter 10 ... 16 mm (0.39 ... 0.63 inches)	**A12**
Device plug Han, mounted on 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**

Selection and ordering data (continued)

Options	Order code
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 on 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**
Certificates for functional safety	
Functional safety (IEC 61508) - SIL2/3; Electrical equipment for furnaces and ancillary equipment (EN 50156-2)	**C20**
Device options	
PDF file with device settings	**D10**
Double layer coating (epoxy resin and polyurethane) 120 µm of enclosure and lid	**D20**
IP66/IP68 degree of protection (not for device plug M12 and Han)	**D30**
Unlabeled TAG plate	**D40**
Without labeling of the measuring range on the TAG plate	**D41**
Stainless steel Ex plate 1.4404/316L	**D42**
Overvoltage protection up to 20 kV (external)	**D71**
Jumper plug set on device for write protection	**D81**
Jumper plug set on device set for fault current >21 mA (instead of <3.6 mA) (only non-SIL)	**D82**
General approval without Ex approval	
Worldwide (CE, RCM) except EAC, FM, KCC	**E00**
Global	**E01**
EAC	**E07**
FM	**E08**
Explosion protection certificates	
ATEX (Europe)	**E20**
FM (USA & Canada)	**E22**
IECEx (Worldwide)	**E23**
NEPSI (China)	**E27**
PESO (India)	**E28**
ATEX (Europe) and IECEx (Worldwide)	**E47**
ATEX and IECEx and FM	**E49**
Factory	
Made in France	**F00**
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**
Noise damping	
Noise damping 60 Hz instead of 50 Hz	**P10**

Selection and ordering data (continued)

Options	Order code
Input 1: TC	
Type C W5	**V01**
Type D W3	**V02**
Type U	**V03**
Type Lr	**V04**
Input 1: Callendar-Van Dusen	
2-wire (define wire resistance value in option Y51 and Callendar-Van Dusen parameter in option Y35)	**V50**
3-wire (define Callendar-Van Dusen parameter in option Y35)	**V51**
4-wire (define Callendar-Van Dusen parameter in option Y35)	**V52**
Input 1: RTD	
Pt x (IEC 60751), 2-wire (define wire resistance value in option Y51 and RTD factor x in option Y21)	**V60**
Pt x (IEC 60751), 3-wire, define RTD factor x in option Y21	**V61**
Pt x (IEC 60751), 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), 2-wire (define wire resistance value in option Y51 and RTD factor x in option Y21)	**V66**
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), 2-wire (define wire resistance value in option Y51 and RTD factor x in option Y21)	**V69**
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), 2-wire (define wire resistance value in option Y51 and RTD factor x in option Y21)	**V72**
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), 2-wire (define wire resistance value in option Y51 and RTD factor x in option Y21)	**V75**
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), 2-wire (define wire resistance value in option Y51 and RTD factor x in option Y21)	**V78**
Cu x (GOST 6651-94), define 3-wire, define RTD factor x in option Y21	**V79**
Cu x (GOST 6651-94), define 4-wire, define RTD factor x in option Y21	**V80**
Cu x (GOST 6651-2009), 2-wire (define wire resistance value in option Y51 and RTD factor x in option Y21)	**V81**
Cu x (GOST 6651-2009), define 3-wire, define RTD factor x in option Y21	**V82**
Cu x (GOST 6651-2009), define 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**
Customer-specific programming in plain text (n-lines)	**Y09**

Selection and ordering data (continued)

Options	Order code
Tag (device parameters, max. 32 characters), plate, stainless steel 316L/1.4404	**Y15**
Measuring point description (device parameters, max. 32 characters), stainless steel 316L/1.4404	**Y16**
Tag (device parameters, max. 8 characters), stainless steel 316L/1.4404	**Y17**
Descriptor (device parameters, max. 16 characters), stainless steel 316L/1.4404	**Y18**
Input 1: RTD factor; e.g. factor "200" = Pt200, adhesive label	**Y21**
Fault current for input circuit short-circuit & interruption instead of 22.4 mA (short-circuit) and 22.8 mA (interruption) e.g. 3.6 mA and 22.4 mA [3.6 - 3.6; 3.6 - 22.8; 22.4 - 3.6]	**Y31**
CvD Sensor matching factors input 1 R0, A, B, C, Beta, Delta Selection: CVDR - R0 (format for example 100.0), CVDA - A (format for example 0.003908), CVDB - B (format for example -5.775E-07), CVDC - C (format for example -4.183E-12)	**Y35**
Wire resistance value input 1 in ohms (0 ... 100 ohms)	**Y51**
Input 1: CJC sensor, fixed value (see measuring range for unit)	**Y60**
ID number of special design	**Y99**

Accessories

	Article No.
See section "Other accessories for assembly, connection and transmitter configuration"	
Modems	
Modem with USB interface and SIPROM T software	**7NG3092-8KN**
HART modem with USB interface	**7MF4997-1DB**
Thread adapter	
Thread adapter M20×1.5 (external thread) to ½-14 NPT (feexternal thread)	**7MP1990-0BA00**
Thread adapter M20x1.5 (external thread) to G½ (feexternal 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**

Selection and ordering data (continued)

	Article No.
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
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, gray	7MF7906-2AN
Plug Han 7D, metal, angled, blue	7MF7906-2AR
Plug Han 7D, metal, angled, gray	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, gray	7MF7906-2EN
Plug Han 8D, metal, angled, blue	7MF7906-2ER
Plug Han 8D, metal, angled, gray	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 gray	7MF7906-2BN
Cable socket, metal, for Han 8D gray	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 2×, without glass window, with seal NBR	7MF7901-1BB
Closed lid aluminum, painted 2×, 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

Selection and ordering data (continued)

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

Technical specifications

SITRANS TF320 (HART, universal)	
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_{supply} - 37 V)/23 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	• IEC 60751 • JIS C 1604-8 • GOST 6651_2009 • Callendar-Van Dusen
• Ni10 ... 10000	• DIN 43760-1987 • GOST 6651-2009/OIML R84:2003
• Cu5 ... 1000	• Edison Copper Winding No. 15 • GOST 6651-2009/OIML R84:2003
Connection type	2-wire, 3-wire or 4-wire
Wire resistance per wire	Max. 50 Ω
Input current	< 0.15 mA

Technical specifications (continued)

SITRANS TF320 (HART, universal)	
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
Connection type	2-wire, 3-wire or 4-wire
Wire resistance per wire	Max. 50 Ω
Input current	< 0.15 mA

Technical specifications (continued)

SITRANS TF320 (HART, universal)	
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
Connection type	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
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 fault 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

Technical specifications (continued)

SITRANS TF320 (HART, universal)	
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/IP68
• Terminals	IP00
Structural design	
Weight	
• Single chamber enclosure	• Aluminum: 0.85 kg (1.87 lbs) • Stainless steel: 1.69 kg (3.73 lbs)
• Dual chamber enclosure	• Aluminum: 1.3 kg (2.87 lbs) • Stainless steel: 3.3 kg (7.28 lbs)
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	IEC 60068-2-6
• 2 ... 25 Hz	± 1.6 mm (0.07 inches)
• 25 ... 100 Hz	± 4 g
Certificates and approvals	
Explosion protection ATEX/IECEx and others	
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)
"Intrinsic safety ia/ib" type of protection	For use in Zone 0, 1, 2, 21
• 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
• IECEx and others	• Ex ia IIC T6 ... T4 Ga • Ex ib [ia Ga] IIC T6 ... T4 Gb • Ex ib [ia Da] IIIC T 100 °C Db
"Intrinsic safety ic" type of protection	For use in Zone 2, 22
• ATEX	• II 3 G Ex ic IIC T6...T4 Gc • II 3 D Ex ic IIIC T100 °C Dc
• IECEx and others	• Ex ic IIC T6 ... T4 Gc • Ex ic IIIC T100 °C Dc
"Increased safety ec" type of protection	For use in Zone 2
• ATEX	II 3 G Ex ec IIC T6...T4 Gc
• IECEx and others	Ex ec IIC T6 ... T4 Gc
• "Flameproof enclosure db" type of protection	For use in Zone 1
• ATEX	II 2 G Ex db IIC T6...T4 Gb
• IECEx and others	Ex db IIC T6 ... T4 Gb

Technical specifications (continued)

SITRANS TF320 (HART, universal)	
• "Protection by enclosure tb/tc" type of protection	For use in Zone 21, 22
• ATEX	• II 2 D Ex tb IIC T100 °C Db • II 3 D Ex tc IIIC T100 °C Dc
• IECEx and others	• Ex tb IIC T100 °C Db • Ex tc IIIC T100 °C Dc

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 account.
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 R84:20-03	-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)

Technical specifications (continued)

Input type	Basic accuracy	Temperature coefficient[1)]
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 °C (356 °F) = ≤ ±0.08 °C (0.144 °F) $T_{max.}$ > 180 °C (356 °F) = ≤ ±0.16 °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 °C (572 °F) = ≤ ±0.08 °C (0.144 °F) $T_{max.}$ > 300 °C (572 °F) = ≤ ±0.4 °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)
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)

Technical specifications (continued)

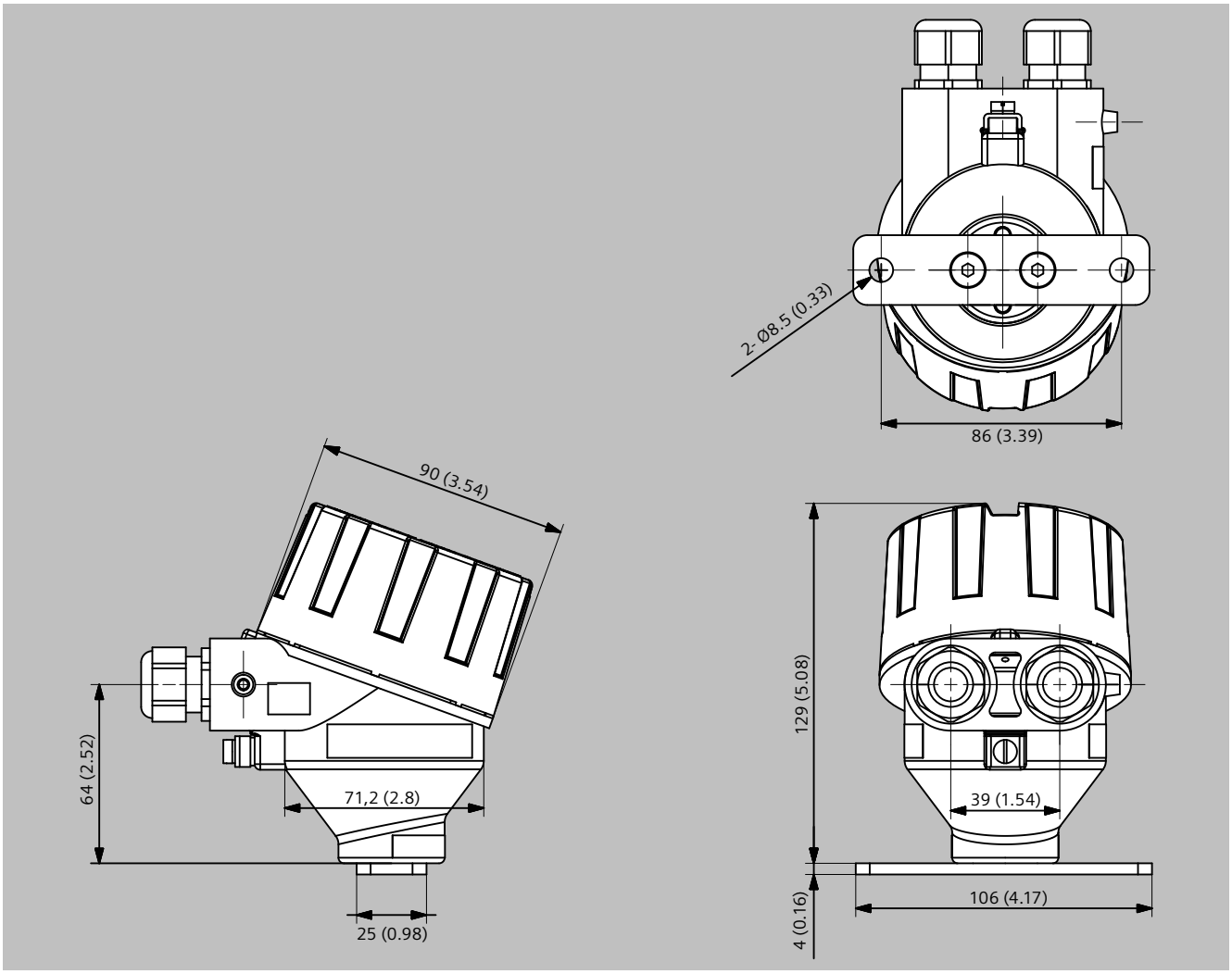
Input type	Basic accuracy	Temperature coefficient[1]
W5	≤ ±0.4 °C (0.72 °F)	≤ ±0.1 °C/°C (°F/°F)
B[2]	≤ ±1 °C (1.8 °F)	≤ ±0.1 °C/°C (°F/°F)
B[3]	≤ ±3 °C (5.4 °F)	≤ ±0.1 °C/°C (°F/°F)
B[4]	≤ ±8 °C (14.4 °F)	≤ ±0.8 °C/°C (°F/°F)
B[5]	Not specified	Not specified
CJC (internal)	< ±0.5 °C (0.9 °F)	Included 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

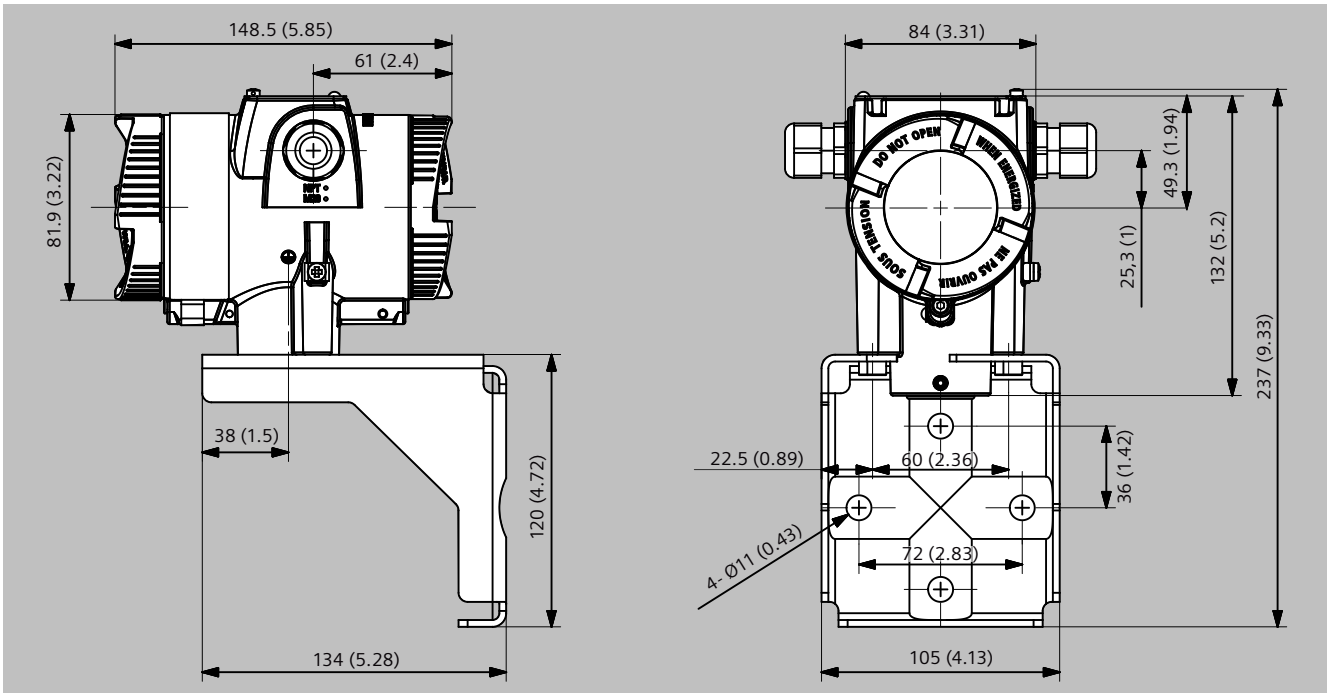
Output type	Basic accuracy	Temperature coefficient
Analog output	≤ ±1.6 µA (0.01% of the full output span)	≤ ±0.48 µA/K (≤ ±0.003% of the full output span/K)

Dimensional drawings



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

Dimensional drawings (continued)

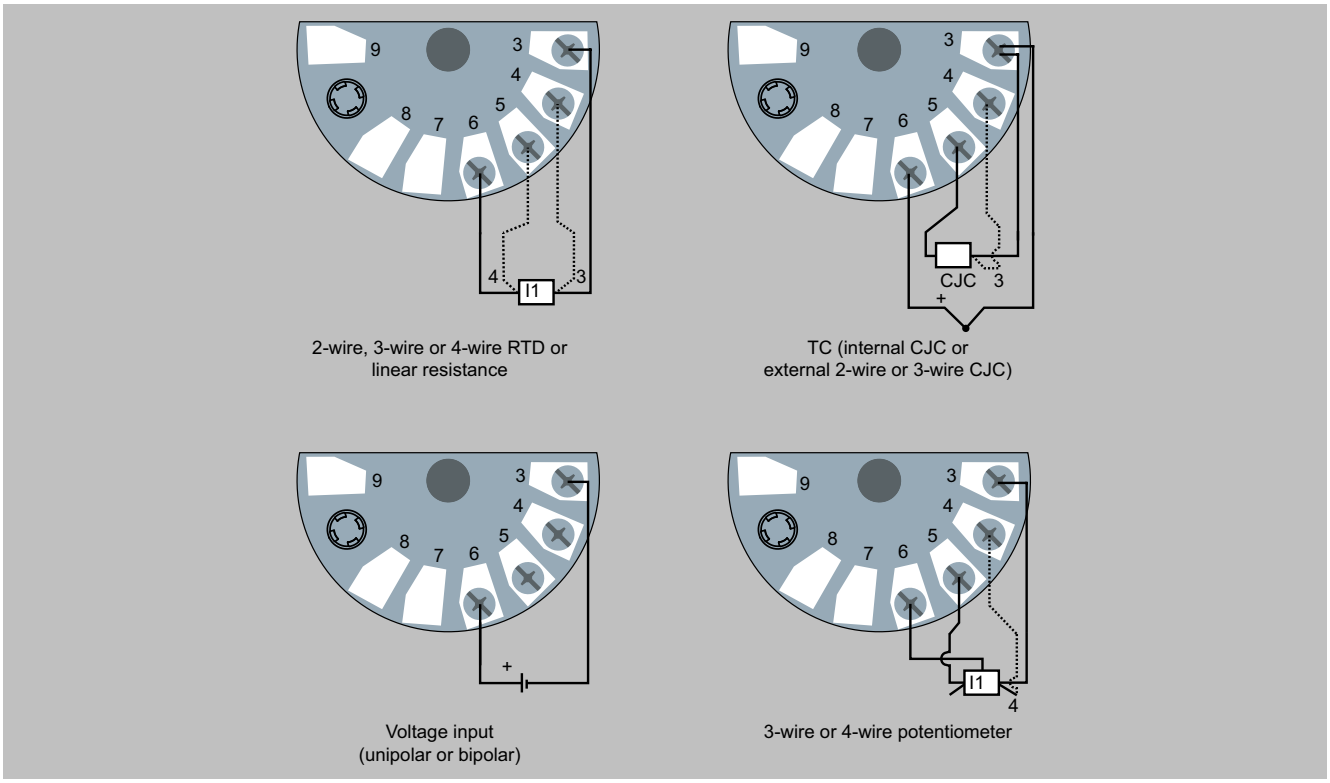


SITRANS TF320, dual chamber enclosure, dimensions in mm (inch)

Circuit diagrams

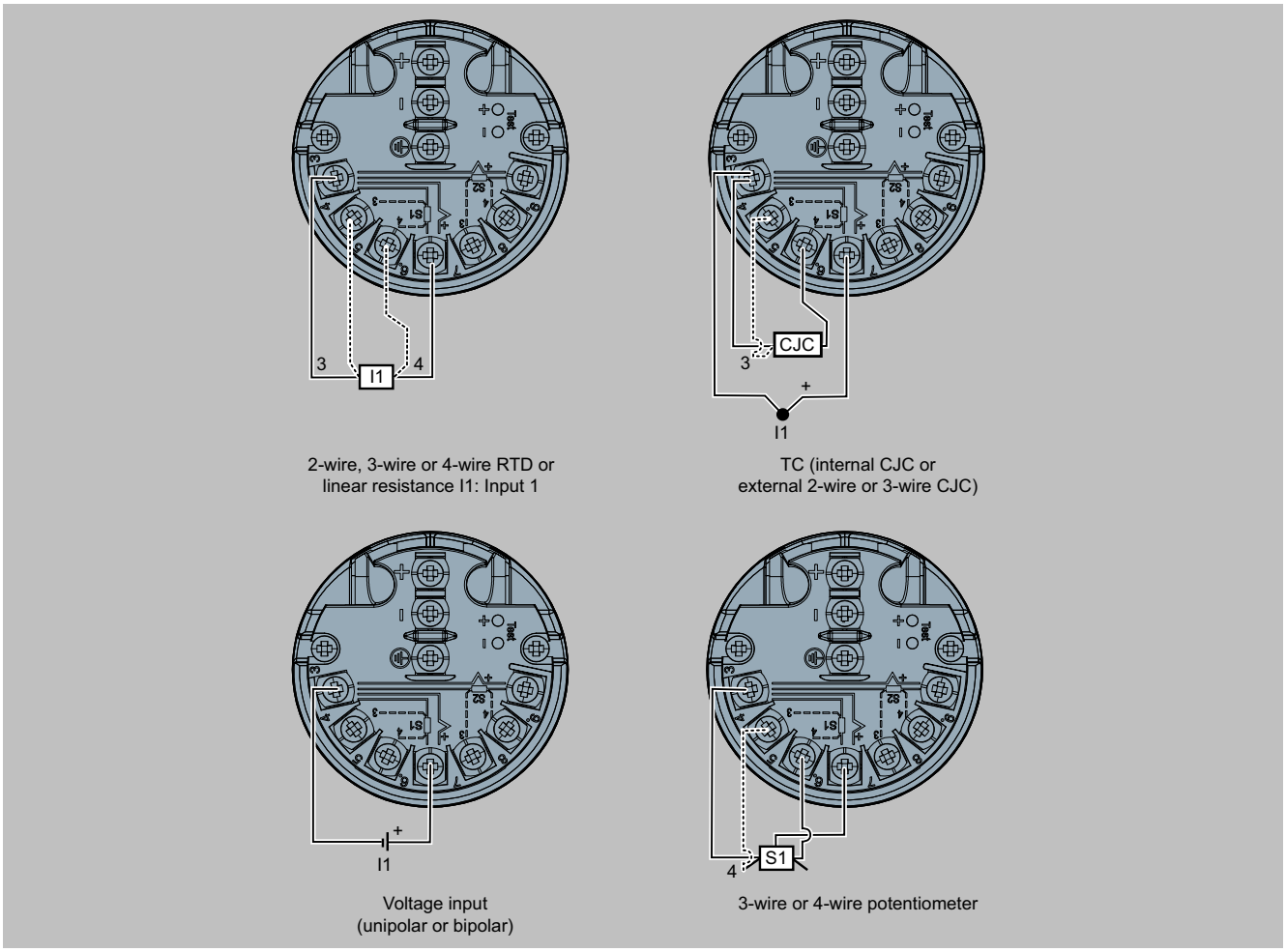
Connections

Input connection



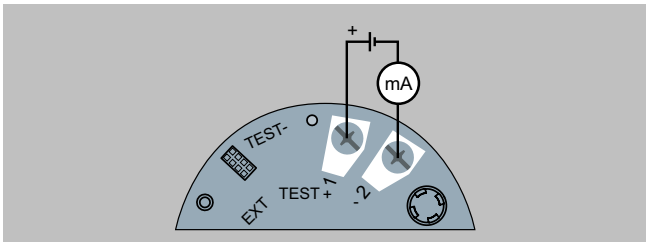
SITRANS TF320 in single chamber enclosure (7NG034*), input connection assignment

Circuit diagrams (continued)



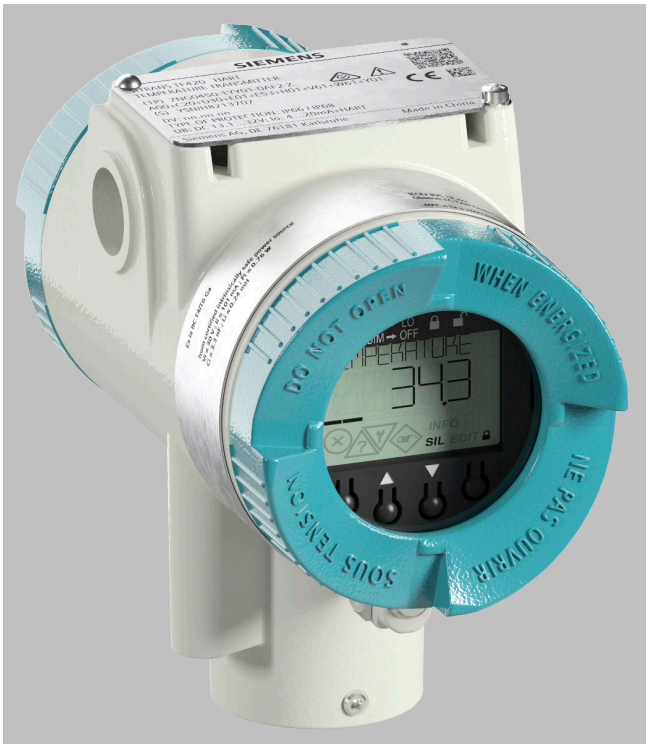
SITRANS TF320 in dual chamber enclosure (7NG035*), input connection assignment

Output connection



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

Overview



SITRANS TF420 in dual chamber enclosure

Overview (continued)

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 IP66/68 (1.5 m/2 h)
- Electromagnetic compatibility according to 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
- 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) according to IEC 61508 and Electrical Equipment For Furnaces And Ancillary Equipment (EN 50156-2)

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.

Function

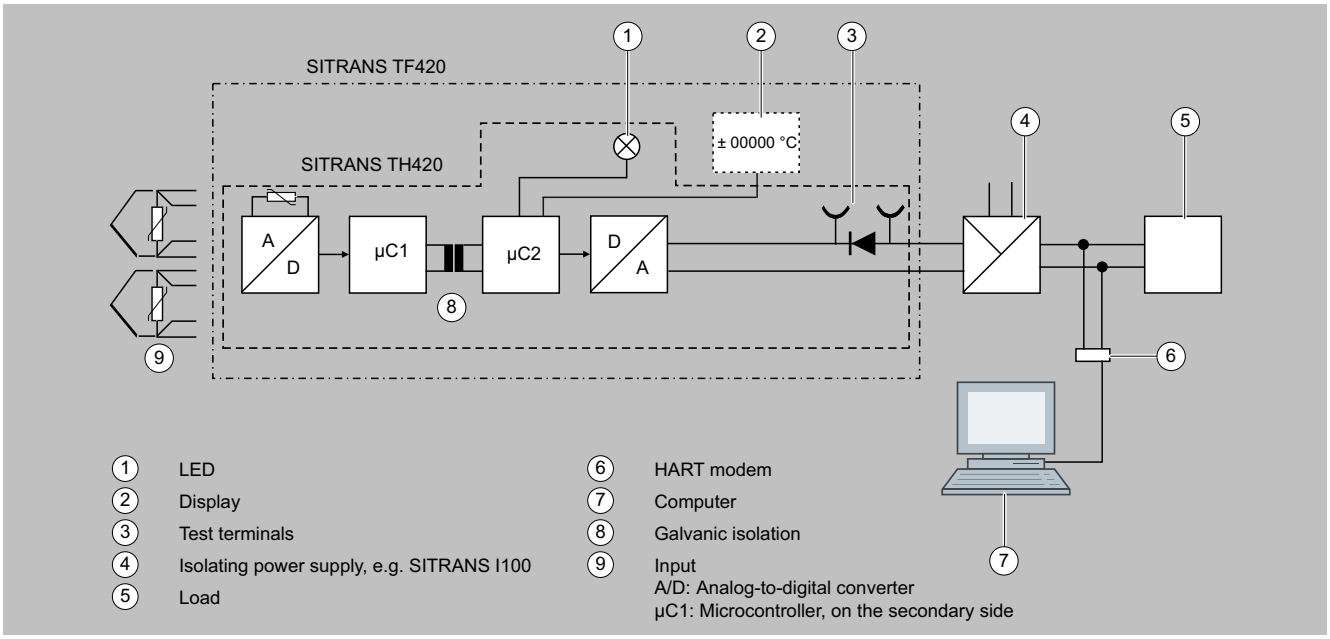
Configuration

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

Selection and ordering data

Single chamber enclosure

SITRANS TF420 temperature transmitter with single chamber enclosure for wall or pipe mounting, two separately configurable inputs and an electrically isolated 2-wire output.	Article No. 7NG044 ● - ● ● ● ● ● - 0 ● ● ●	Order code ● ● ●
Click the article number for 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	
Mean value 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	
Primary value output, customer-specific		
Minimum input 1 and input 2, without redundancy (hot backup)	9	H 1 A
Maximum input 1 and input 2, without redundancy (hot backup)	9	H 1 B
Mean value input 1 and input 2, without redundancy (hot backup)	9	H 1 C
Input 2	9	H 1 D
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	
More types in option Vxx	Y	
Input 2, type		
No input	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	

Selection and ordering data (continued)

SITRANS TF420 temperature transmitter with single chamber enclosure for wall or pipe mounting, two separately configurable inputs and an electrically isolated 2-wire output.	Article No. 7NG044 ● - ● ● ● ● ● - 0 ● ● ● ●	Order code ● ● ●
• Type S	P	
• Type T	Q	
Potentiometer, 4-wire	R	
More types in option Wxx	Y	
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	
Input 1: Define fixed CJC value with option Y60; Input 2: None CJC	7	
CJC configuration for TC, customer-specific		
Input 1: Fixed CJC value (define value in option Y60); Input 2: Fixed CJC value (define value in option Y61)	9	L 1 A
Input 1: External CJC (define type in option Jxx); Input 2: Define fixed CJC value with option Y61	9	L 1 B
Input 1: Define fixed CJC value with option Y60; Input 2: External CJC (define type in option Jxx)	9	L 1 C
Input 1: Define fixed CJC value with option Y60; Input 2: Internal CJC	9	L 1 D
Input 1: Internal CJC; Input 2: Define fixed CJC value with option Y61	9	L 1 E
Material of non-wetted parts		
Die-cast aluminum enclosure	1	
Enclosure made of stainless steel precision casting 1.4401 (similar to 316)	3	
Type of protection (Ex)		
General safety	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) / increased safety zone 2 (Ex ec) / dust ignition proof (DIP) / 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	
Flameproof enclosure (Ex d) / explosion proof (XP) / intrinsic safety (Ex i) / non-incendive / non-incendive field wiring (NIFW) / dust explosion protection by enclosure zone 21/22 (Ex t) / increased safety zone 2 (Ex ec) / dust ignition proof (DIP) / non-incendive (NI)	T	
Electrical connection/cable entries		
2 × M20 × 1.5	F	
2 × ½" NPT	M	
Local operation		
Without local operation	0	
Local operation (closed lid)	1	
Local operation (lid with glass window)	2	

Options Add "-Z" to article number, specify order code and, if applicable, free text	Order code
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 (0.28 ... 0.47 inches) Cable outer diameter 10 ... 16 mm (0.39 ... 0.63 inches)	**A11**
CAPRI ADE 4F, stainless steel Cable inner diameter 7 ... 12 mm (0.28 ... 0.47 inches) Cable outer diameter 10 ... 16 mm (0.39 ... 0.63 inches)	**A12**
Cable entry accessories	
Sealing element for 2 cables included	**A20**

Selection and ordering data (continued)

Options Add "-Z" to article number, specify order code and, if applicable, free text	Order code
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**
Certificates for functional safety	
Functional safety (IEC 61508) - SIL2/3; Electrical equipment for furnaces and ancillary equipment (EN 50156-2)	**C20**
Device options	
PDF file with device settings	**D10**
IP66/IP68 degree of protection (not for device plug M12 and Han)	**D30**
Unlabeled TAG plate	**D40**
Without labeling of the measuring range on the TAG plate	**D41**
Nameplate and approval plate, stainless steel 1.4404/316L	**D42**
Overvoltage protection up to 20 kV (external)	**D71**
Jumper plug set on device for write protection	**D81**
Jumper plug set on device set for fault current >21 mA (instead of <3.6 mA) (only non-SIL)	**D82**
General approval without Ex approval	
Worldwide (CE, RCM) except EAC, FM, KCC	**E00**
Global	**E01**
EAC	**E07**
FM	**E08**
KCC	**E09**
Explosion protection certificates	
ATEX (Europe)	**E20**
FM (USA and Canada)	**E22**
IECEx (Worldwide)	**E23**
NEPSI (China)	**E27**
PESO (India)	**E28**
UKEX (United Kingdom)	**E33**
ATEX (Europe) and IECEx (Worldwide)	**E47**
ATEX, IECEx and FM	**E49**
Factory	
Made in France	**F00**
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**

Selection and ordering data (continued)

Options Add "-Z" to article number, specify order code and, if applicable, free text	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: Callendar-Van Dusen	
2-wire (define wire resistance value in option Y51 and Callendar-Van Dusen parameter in option Y35)	**V50**
3-wire (define Callendar-Van Dusen parameter in option Y35)	**V51**
4-wire (define Callendar-Van Dusen parameter in option Y35)	**V52**
Input 1: RTD	
Pt × (IEC 60751), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	**V60**
Pt × (IEC 60751), 3-wire, define RTD factor × in option Y21	**V61**
Pt × (IEC 60751), 4-wire, define RTD factor × in option Y21	**V62**
Pt × (JIS C1604), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	**V63**
Pt × (JIS C1604-81), 3-wire, define RTD factor × in option Y21	**V64**
Pt × (JIS C1604-81), 4-wire, define RTD factor × in option Y21	**V65**
Pt x (GOST 6651-2009), 2-wire (define wire resistance value in option Y51 and RTD factor x in option Y21)	**V66**
Pt × (GOST 6651-2009), 3-wire, define RTD factor × in option Y21	**V67**
Pt × (GOST 6651-2009), 4-wire, define RTD factor × in option Y21	**V68**
Ni × (DIN 43760-87), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	**V69**
Ni × (DIN 43760-87), 3-wire, define RTD factor × in option Y21	**V70**
Ni × (DIN 43760-87), 4-wire, define RTD factor × in option Y21	**V71**
Ni × (GOST 6651-2009), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	**V72**
Ni × (GOST 6651-2009), 3-wire, define RTD factor × in option Y21	**V73**
Ni × (GOST 6651-2009), 4-wire, define RTD factor × in option Y21	**V74**
Cu x (ECW-15), 2-wire (define wire resistance value in option Y51 and RTD factor x in option Y21)	**V75**
Cu × (ECW-15), 3-wire, define RTD factor × in option Y21	**V76**
Cu × (ECW-15), 4-wire, define RTD factor × in option Y21	**V77**
Cu × (GOST 6651-94), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	**V78**
Cu × (GOST 6651-94), define 3-wire, define RTD factor × in option Y21	**V79**
Cu × (GOST 6651-94), define 4-wire, define RTD factor × in option Y21	**V80**
Cu × (GOST 6651-2009), define 3-wire, define RTD factor × in option Y21	**V82**
Cu × (GOST 6651-2009), define 4-wire, define RTD factor × in option Y21	**V83**

Selection and ordering data (continued)

Options Add "-Z" to article number, specify order code and, if applicable, free text	Order code
Input 2: TC	
TC type W5	**W01**
TC type W3	**W02**
TC type U	**W03**
TC type Lr	**W04**
Input 2: RTD	
Pt x (IEC 60751), 2-wire (define wire resistance value in option Y52 and RTD factor x in option Y22)	**W60**
Pt x (IEC 60721), 3-wire, define RTD factor x in option Y22	**W61**
Pt x (IEC 60721), 4-wire, define RTD factor x in option Y22	**W62**
Pt x (JIS C1604), 2-wire (define wire resistance value in option Y52 and RTD factor x in option Y22)	**W63**
Pt x (JIS C1604-81), 3-wire, define RTD factor x in option Y22	**W64**
Pt x (JIS C1604-81), 4-wire, define RTD factor x in option Y22	**W65**
Pt x (GOST 6651-2009), 2-wire (define wire resistance value in option Y52 and RTD factor x in option Y22)	**W66**
Pt x (GOST 6651-2009), 3-wire, define RTD factor x in option Y22	**W67**
Pt x (GOST 6651-2009), 4-wire, define RTD factor x in option Y22	**W68**
Ni x (DIN 43760-87), 2-wire (define wire resistance value in option Y52 and RTD factor x in option Y22)	**W69**
Ni x (DIN 43760-87), 3-wire, define RTD factor x in option Y22	**W70**
Ni x (DIN 43760-87), 4-wire, define RTD factor x in option Y22	**W71**
Ni x (GOST 6651-2009), 2-wire (define wire resistance value in option Y52 and RTD factor x in option Y22)	**W72**
Ni x (GOST 6651-2009), 3-wire, define RTD factor x in option Y22	**W73**
Ni x (GOST 6651-2009), 4-wire, define RTD factor x in option Y22	**W74**
Cu x (ECW-15), 2-wire (define wire resistance value in option Y52 and RTD factor x in option Y22)	**W75**
Cu x (ECW-15), 3-wire, define RTD factor x in option Y22	**W76**
Cu x (ECW-15), 4-wire, define RTD factor x in option Y22	**W77**
Cu x (GOST 6651-94), 2-wire (define wire resistance value in option Y52 and RTD factor x in option Y22)	**W78**
Cu x (GOST 6651-94), 3-wire, define RTD factor x in option Y22	**W79**
Cu x (GOST 6651-94), 4-wire, define RTD factor x in option Y22	**W80**
Cu x (GOST 6651-2009), 2-wire (define wire resistance value in option Y52 and RTD factor x in option Y22)	**W81**
Cu x (GOST 6651-2009), 3-wire, define RTD factor x in option Y22	**W82**
Cu x (GOST 6651-2009), 4-wire, define RTD factor x in option Y22	**W83**
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**
Customer-specific programming in plain text (n-lines)	**Y09**
Tag (device parameters, max. 32 characters), adhesive label	**Y15**
Measuring point description (device parameters, max. 32 characters), adhesive label	**Y16**
Tag (device parameters, max. 8 characters), adhesive label	**Y17**

Selection and ordering data (continued)

Options Add "-Z" to article number, specify order code and, if applicable, free text	Order code
Descriptor (device parameters, max. 16 characters), adhesive label	**Y18**
Input 1: RTD factor; e.g. factor "200" = Pt200, adhesive label	**Y21**
Input 2: RTD factor (e.g. factor = 200 => RTD Pt200), adhesive label	**Y22**
Fault current for input circuit short-circuit & interruption instead of 22.4 mA (short-circuit) and 22.8 mA (interruption) e.g. 3.6 mA and 22.4 mA [3.6 - 3.6; 3.6 - 22.8; 22.4 - 3.6]	**Y31**
CvD Sensor matching factors input 1 R0, A, B, C, Beta, Delta Selection: CVDR - R0 (format for example 100.0), CVDA - A (format for example 0.003908), CVDB - B (format for example -5.775E-07), CVDC - C (format for example -4.183E-12)	**Y35**
CvD Sensor matching factors input 2 R0, A, B, C, Beta, Delta Selection: CVDR - R0 (format for example 100.0), CVDA - A (format for example 0.003908), CVDB - B (format for example -5.775E-07), CVDC - C (format for example -4.183E-12)	**Y36**
Wire resistance value input 1 in ohms (0 ... 100 ohms)	**Y51**
Wire resistance value input 2 in ohms (0 ... 100 ohms)	**Y52**
Input 1: CJC sensor, fixed value (see measuring range for unit)	**Y60**
Input 2: CJC sensor, fixed value (see measuring range for unit)	**Y61**
ID number of special design	**Y99**

Dual chamber enclosure

SITRANS TF420 temperature transmitter with dual chamber enclosure for wall or pipe mounting, two separately configurable inputs and an electrically isolated 2-wire output.	Article No. 7NG045 ● - ● ● ● ● ● - 0 ● ● ●	Order code ● ● ●
Click the article number for 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	
Mean value 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	
Primary value output, customer-specific		
Minimum input 1 and input 2, without redundancy (hot backup)	9	H 1 A
Maximum input 1 and input 2, without redundancy (hot backup)	9	H 1 B
Mean value input 1 and input 2, without redundancy (hot backup)	9	H 1 C
Input 2	9	H 1 D
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	

Selection and ordering data (continued)

SITRANS TF420 temperature transmitter with dual chamber enclosure for wall or pipe mounting, two separately configurable inputs and an electrically isolated 2-wire output.	Article No. 7NG045 ● - ● ● ● ● ● - 0 ● ● ●	Order code ● ● ●
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	
More types in option Vxx	Y	
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	
More types in option Wxx	Y	
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 safety (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) / increased safety zone 2 (Ex ec) / dust ignition proof (DIP) / 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	
Flameproof enclosure (Ex d) / explosion proof (XP) / intrinsic safety (Ex i) / non-incendive / non-incendive field wiring (NIFW) / dust ignition protection by enclosure zone 21/22 (Ex t) / increased safety zone 2 (Ex ec) / dust ignition proof (DIP) / non-incendive (NI)	T	

Selection and ordering data (continued)

SITRANS TF420 temperature transmitter with dual chamber enclosure for wall or pipe mounting, two separately configurable inputs and an electrically isolated 2-wire output.	Article No. 7NG045 ● - ● ● ● ● ● - 0 ● ● ●	Order code ● ● ●
Electrical connection/cable entries		
2 × M20 × 1.5	F	
2 × ½" NPT	M	
Local operation		
Without local operation	0	
Local operation (closed lid)	1	
Local operation (lid with glass window)	2	

Options Add "-Z" to article number, specify order code and, if applicable, free text	Order code
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 (0.28 ... 0.47 inches), cable outer diameter 10 ... 16 mm (0.39 ... 0.63 inches)	**A11**
CAPRI ADE 4F, stainless steel, cable inner diameter 7 ... 12 mm (0.28 ... 0.47 inches), cable outer diameter 10 ... 16 mm (0.39 ... 0.63 inches)	**A12**
Cable entry accessories	
Sealing element for 2 cables 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**
Certificates for functional safety	
Functional safety (IEC 61508) - SIL2/3; Electrical equipment for furnaces and ancillary equipment (EN 50156-2)	**C20**
Device options	
PDF file with device settings	**D10**
Double layer coating (epoxy resin and polyurethane) 120 µm of enclosure and lid	**D20**

Selection and ordering data (continued)

Options Add "-Z" to article number, specify order code and, if applicable, free text	Order code
IP66/IP68 degree of protection (not for device plug M12 and Han)	**D30**
Unlabeled TAG plate	**D40**
Without labeling of the measuring range on the TAG plate	**D41**
Stainless steel Ex plate 1.4404/316L	**D42**
Overvoltage protection up to 20 kV (external)	**D71**
Jumper plug set on device for write protection	**D81**
Jumper plug set on device set for fault current >21 mA (instead of <3.6 mA) (only non-SIL)	**D82**
General approval without Ex approval	
Worldwide (CE, RCM) except EAC, FM, KCC	**E00**
Global	**E01**
EAC	**E07**
FM	**E08**
KCC	**E09**
Explosion protection certificates	
ATEX (Europe)	**E20**
FM (USA and Canada)	**E22**
IECEx (Worldwide)	**E23**
NEPSI (China)	**E27**
PESO (India)	**E28**
ATEX (Europe) and IECEx (Worldwide)	**E47**
ATEX, IECEx and FM	**E49**
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**
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: Callendar-Van Dusen	
2-wire (define wire resistance value in option Y51 and Callendar-Van Dusen parameter in option Y35)	**V50**
3-wire (define Callendar-Van Dusen parameter in option Y35)	**V51**
4-wire (define Callendar-Van Dusen parameter in option Y35)	**V52**
Input 1: RTD	
Pt × (IEC 60751), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	**V60**
Pt × (IEC 60751), 3-wire, define RTD factor × in option Y21	**V61**

Selection and ordering data (continued)

Options Add "-Z" to article number, specify order code and, if applicable, free text	Order code
Pt x (IEC 60751), 4-wire, define RTD factor x in option Y21	**V62**
Pt x (JIS C1604), 2-wire (define wire resistance value in option Y51 and RTD factor x in option Y21)	**V63**
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), 2-wire (define wire resistance value in option Y51 and RTD factor x in option Y21)	**V66**
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), 2-wire (define wire resistance value in option Y51 and RTD factor x in option Y21)	**V69**
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), 2-wire (define wire resistance value in option Y51 and RTD factor x in option Y21)	**V72**
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), 2-wire (define wire resistance value in option Y51 and RTD factor x in option Y21)	**V75**
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), 2-wire (define wire resistance value in option Y51 and RTD factor x in option Y21)	**V78**
Cu x (GOST 6651-94), define 3-wire, define RTD factor x in option Y21	**V79**
Cu x (GOST 6651-94), define 4-wire, define RTD factor x in option Y21	**V80**
Cu x (GOST 6651-2009), define 3-wire, define RTD factor x in option Y21	**V82**
Cu x (GOST 6651-2009), define 4-wire, define RTD factor x in option Y21	**V83**
Input 2: TC	
TC type W5	**W01**
TC type W3	**W02**
TC type U	**W03**
TC type Lr	**W04**
Input 2: Callendar-Van Dusen	
2-wire (define wire resistance value in option Y52 and Callendar-Van Dusen parameter in option Y36)	**W50**
3-wire (define Callendar-Van Dusen parameter in option Y36)	**W51**
4-wire (define Callendar-Van Dusen parameter in option Y36)	**W52**
Input 2: RTD	
Pt x (IEC 60751), 2-wire (define wire resistance value in option Y52 and RTD factor x in option Y22)	**W60**
Pt x (IEC 60721), 3-wire, define RTD factor x in option Y22	**W61**
Pt x (IEC 60721), 4-wire, define RTD factor x in option Y22	**W62**
Pt x (JIS C1604), 2-wire (define wire resistance value in option Y52 and RTD factor x in option Y22)	**W63**
Pt x (JIS C1604-81), 3-wire, define RTD factor x in option Y22	**W64**

Selection and ordering data (continued)

Options Add "-Z" to article number, specify order code and, if applicable, free text	Order code
Pt x (JIS C1604-81), 4-wire, define RTD factor x in option Y22	**W65**
Pt x (GOST 6651-2009), 2-wire (define wire resistance value in option Y52 and RTD factor x in option Y22)	**W66**
Pt x (GOST 6651-2009), 3-wire, define RTD factor x in option Y22	**W67**
Pt x (GOST 6651-2009), 4-wire, define RTD factor x in option Y22	**W68**
Ni x (DIN 43760-87), 2-wire (define wire resistance value in option Y52 and RTD factor x in option Y22)	**W69**
Ni x (DIN 43760-87), 3-wire, define RTD factor x in option Y22	**W70**
Ni x (DIN 43760-87), 4-wire, define RTD factor x in option Y22	**W71**
Ni x (GOST 6651-2009), 2-wire (define wire resistance value in option Y52 and RTD factor x in option Y22)	**W72**
Ni x (GOST 6651-2009), 3-wire, define RTD factor x in option Y22	**W73**
Ni x (GOST 6651-2009), 4-wire, define RTD factor x in option Y22	**W74**
Cu x (ECW-15), 2-wire (define wire resistance value in option Y52 and RTD factor x in option Y22)	**W75**
Cu x (ECW-15), 3-wire, define RTD factor x in option Y22	**W76**
Cu x (ECW-15), 4-wire, define RTD factor x in option Y22	**W77**
Cu x (GOST 6651-94), 2-wire (define wire resistance value in option Y52 and RTD factor x in option Y22)	**W78**
Cu x (GOST 6651-94), 3-wire, define RTD factor x in option Y22	**W79**
Cu x (GOST 6651-94), 4-wire, define RTD factor x in option Y22	**W80**
Cu x (GOST 6651-2009), 2-wire (define wire resistance value in option Y52 and RTD factor x in option Y22)	**W81**
Cu x (GOST 6651-2009), 3-wire, define RTD factor x in option Y22	**W82**
Cu x (GOST 6651-2009), 4-wire, define RTD factor x in option Y22	**W83**
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**
Customer-specific programming in plain text (n-lines)	**Y09**
Tag (device parameters, max. 32 characters), plate, stainless steel 316L/1.4404	**Y15**
Measuring point description (device parameter, max. 32 characters), stainless steel 316L/1.4404	**Y16**
Tag (device parameters, max. 8 characters), stainless steel 316L/1.4404	**Y17**
Descriptor (device parameters, max. 16 characters), stainless steel 316L/1.4404	**Y18**
Input 1: RTD factor; e.g. factor "200" = Pt200, adhesive label	**Y21**
Input 2: RTD factor (e.g. factor = 200 => RTD Pt200), adhesive label	**Y22**

Selection and ordering data (continued)

Options Add "-Z" to article number, specify order code and, if applicable, free text	Order code
Fault current for input circuit short-circuit & interruption instead of 22.4 mA (short-circuit) and 22.8 mA (interruption) e.g. 3.6 mA and 22.4 mA [3.6 - 3.6; 3.6 - 22.8; 22.4 - 3.6]	**Y31**
CvD Sensor matching factors input 1 R0, A, B, C, Beta, Delta Selection: CVDR - R0 (format for example 100.0), CVDA - A (format for example 0.003908), CVDB - B (format for example -5.775E-07), CVDC - C (format for example -4.183E-12)	**Y35**
CvD Sensor matching factors input 2 R0, A, B, C, Beta, Delta Selection: CVDR - R0 (format for example 100.0), CVDA - A (format for example 0.003908), CVDB - B (format for example -5.775E-07), CVDC - C (format for example -4.183E-12)	**Y36**
Wire resistance value input 1 in ohms (0 ... 100 ohms)	**Y51**
Wire resistance value input 2 in ohms (0 ... 100 ohms)	**Y52**
Input 1: CJC sensor, fixed value (see measuring range for unit)	**Y60**
Input 2: CJC sensor, fixed value (see measuring range for unit)	**Y61**
ID number of special design	**Y99**

Accessories

	Article No.
See section "Other accessories for assembly, connection and transmitter configuration"	
Modems	
Modem with USB interface and SIPROM T software	**7NG3092-8KN**
HART modem with USB interface	**7MF4997-1DB**
Thread adapter	
Thread adapter M20×1.5 (external thread) to ½-14 NPT (feexternal thread)	**7MP1990-0BA00**
Thread adapter M20x1.5 (external thread) to G½ (feexternal 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**

Selection and ordering data (continued)

	Article No.
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
Sealing element for 2 cables in cable gland.	7MF7906-1WN
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, gray	7MF7906-2AN
Plug Han 7D, metal, angled, blue	7MF7906-2AR
Plug Han 7D, metal, angled, gray	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, gray	7MF7906-2EN
Plug Han 8D, metal, angled, blue	7MF7906-2ER
Plug Han 8D, metal, angled, gray	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 gray	7MF7906-2BN
Cable socket, metal, for Han 8D gray	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 2×, without glass window, with seal NBR	7MF7901-1BB
Closed lid aluminum, painted 2×, 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)

Selection and ordering data (continued)

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

Technical specifications

SITRANS TF420 (HART, universal)	
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_{supply} - 37 V)/23 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	• IEC 60751 • JIS C 1604-8 • GOST 6651_2009 • Callendar-Van Dusen
• Ni10 ... 10000	• DIN 43760-1987 • GOST 6651-2009/OIML R84:2003
• Cu5 ... 1000	• Edison Copper Winding No. 15 • GOST 6651-2009/OIML R84:2003
Connection type	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)	

Technical specifications (continued)

SITRANS TF420 (HART, universal)	
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
Connection type	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
Connection type	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

Technical specifications (continued)

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 fault 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/IP68
• Terminals	IP00
Structural design	
Weight	
• Single chamber enclosure	• Aluminum: 0.85 kg (1.87 lbs) • Stainless steel: 1.69 kg (3.73 lbs)

Technical specifications (continued)

SITRANS TF420 (HART, universal)	
• Dual chamber enclosure	• Aluminum: 1.3 kg (2.87 lbs) • Stainless steel: 3.3 kg (7.28 lbs)
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	IEC 60068-2-6
• 2 ... 25 Hz	± 1.6 mm (0.07 inches)
• 25 ... 100 Hz	± 4 g
Certificates and approvals	
Explosion protection ATEX/IECEx and others	
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)
"Intrinsic safety ia/ib" type of protection	For use in Zone 0, 1, 2, 21
• 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
• IECEx and others	• Ex ia IIC T6 ... T4 Ga • Ex ib [ia Ga] IIC T6 ... T4 Gb • Ex ib [ia Da] IIIC T 100 °C Db
"Intrinsic safety ic" type of protection	For use in Zone 2, 22
• ATEX	• II 3 G Ex ic IIC T6...T4 Gc • II 3 D Ex ic IIIC T100 °C Dc
• IECEx and others	• Ex ic IIC T6 ... T4 Gc • Ex ic IIIC T100 °C Dc
"Increased safety ec" type of protection	For use in Zone 2
• ATEX	II 3 G Ex ec IIC T6...T4 Gc
• IECEx and others	Ex ec IIC T6 ... T4 Gc
• "Flameproof enclosure db" type of protection	For use in Zone 1
• ATEX	II 2 G Ex db IIC T6...T4 Gb
• IECEx and others	Ex db IIC T6 ... T4 Gb
• "Protection by enclosure tb/tc" type of protection	For use in Zone 21, 22
• ATEX	• II 2 D Ex tb IIC T100 °C Db • II 3 D Ex tc IIIC T100 °C Dc
• IECEx and others	• Ex tb IIC T100 °C Db • Ex tc IIIC T100 °C Dc

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 account.
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

Technical specifications (continued)

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 R84:20-03	-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 °C (356 °F) = ≤ ±0.08 °C (0.144 °F) $T_{max.}$ > 180 °C (356 °F) = ≤ ±0.16 °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 °C (572 °F) = ≤ ±0.08 °C (0.144 °F) $T_{max.}$ > 300 °C (572 °F) = ≤ ±0.4 °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)

Technical specifications (continued)

Input type	Basic accuracy	Temperature coefficient[1]
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)
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)

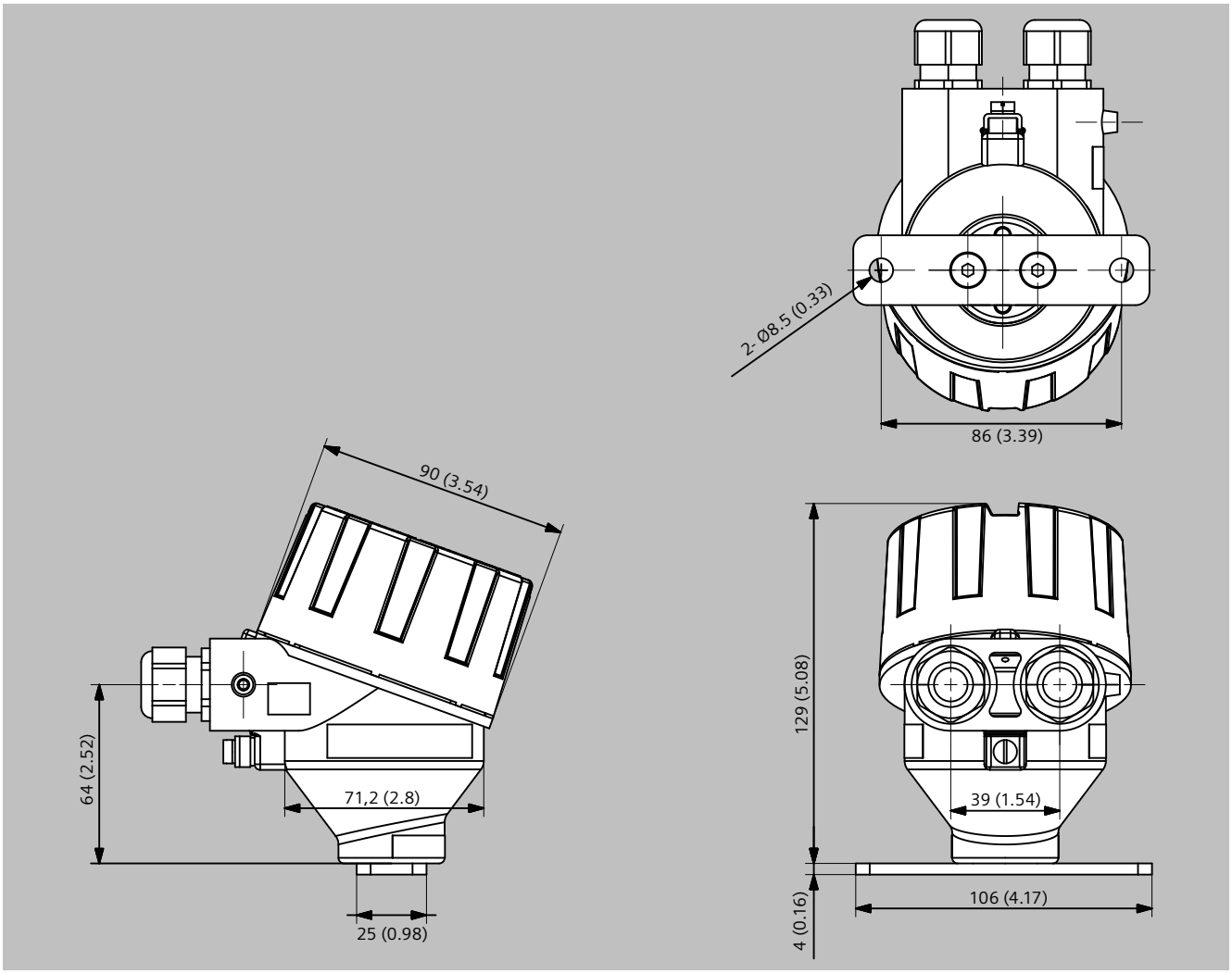
1) Temperature coefficients correspond to the specified values or 0.002% of the input span, depending on which value is greater.
2) Accuracy of the specification range > 400 °C (752 °F)
3) Accuracy of the specification range > 160 °C (320 °F) < 400 °C (752 °F)
4) Accuracy of the specification range > 85 °C (185 °F) < 160 °C (320 °F)
5) Accuracy of the specification range < 85 °C (185 °F)

Technical specifications (continued)

Output accuracy

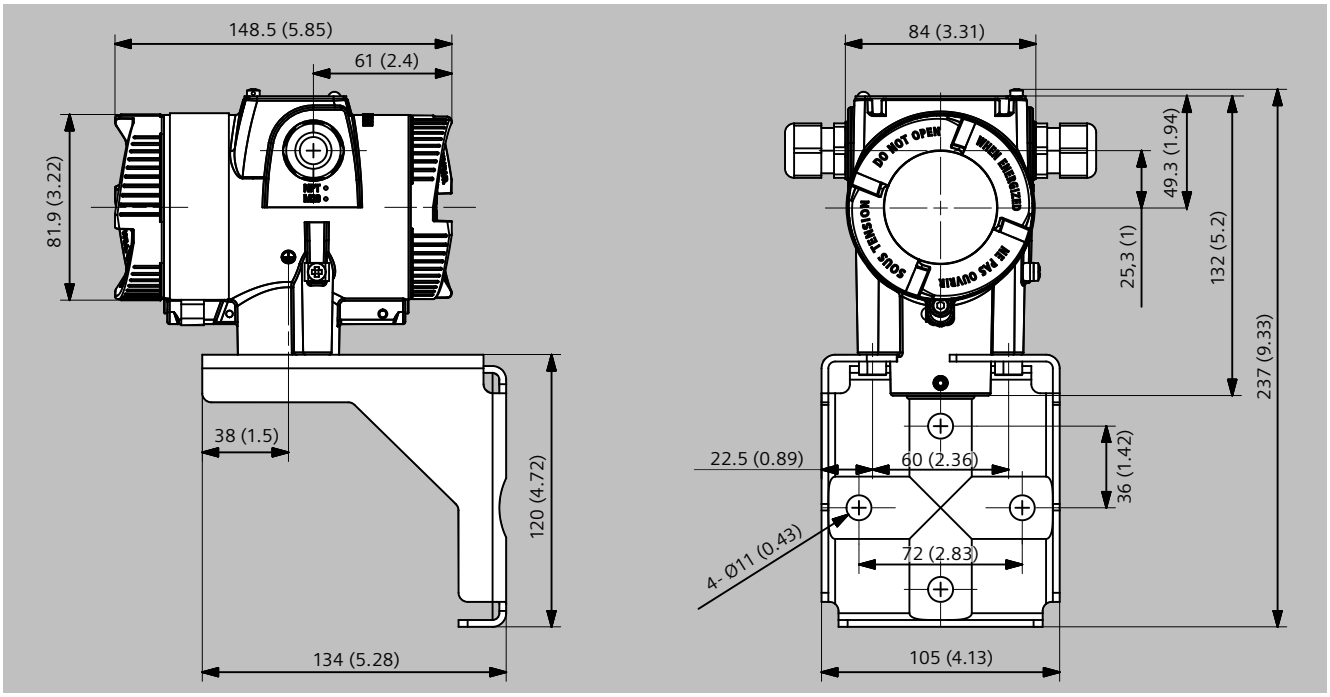
Output type	Basic accuracy	Temperature coefficient
Average value measurement	Average of accuracy of input 1 and input 2	Average of temperature coefficient of input 1 and input 2
Differential measurement	Sum of accuracy of input 1 and input 2	Sum of temperature coefficient of input 1 and input 2
Analog output	≤ ±1.6 µA (0.01% of the full output span)	≤ ±0.48 µA/K (≤ ±0.003% of the full output span/K)

Dimensional drawings



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

Dimensional drawings (continued)

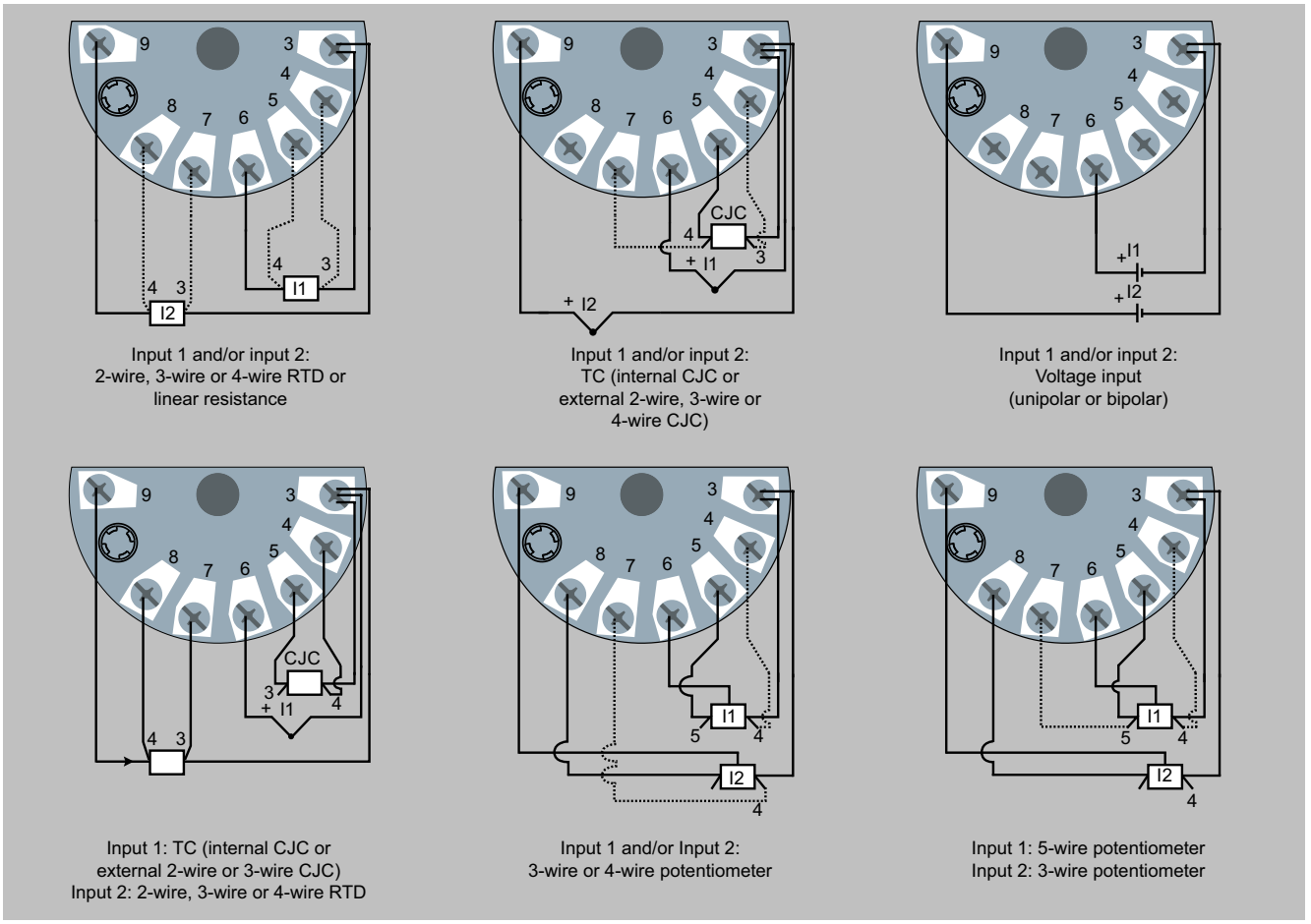


SITRANS TF420, dual chamber enclosure, dimensions in mm (inch)

Circuit diagrams

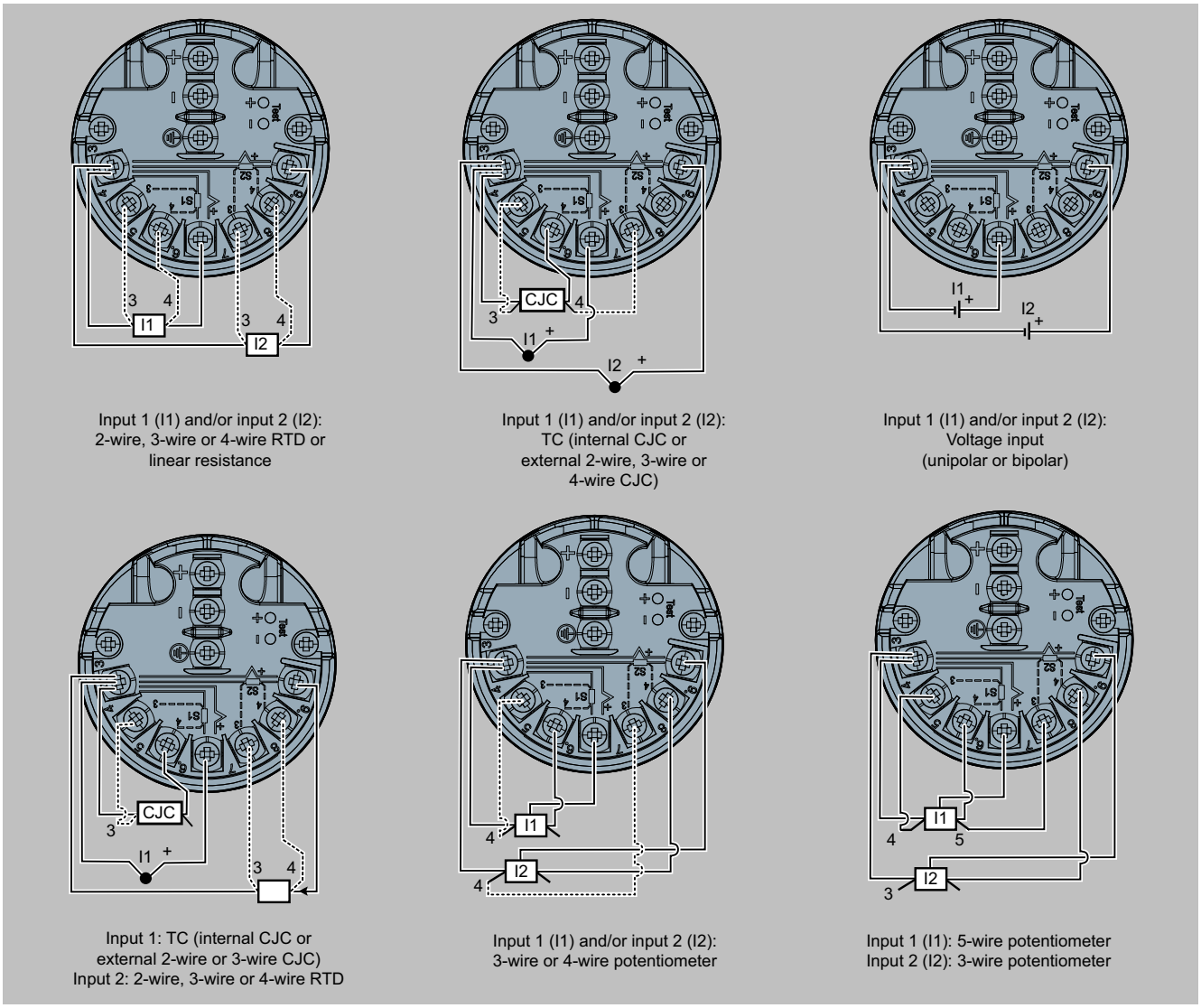
Connections

Input connection



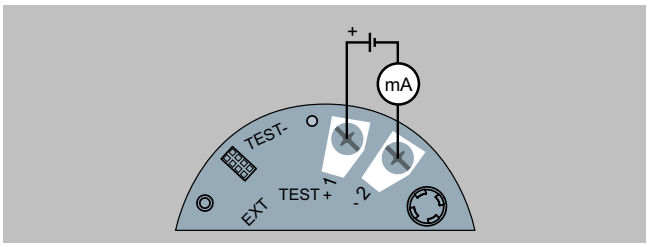
SITRANS TF420 in single chamber enclosure (7NG044*), input connection assignment

Circuit diagrams (continued)



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

Output connection



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