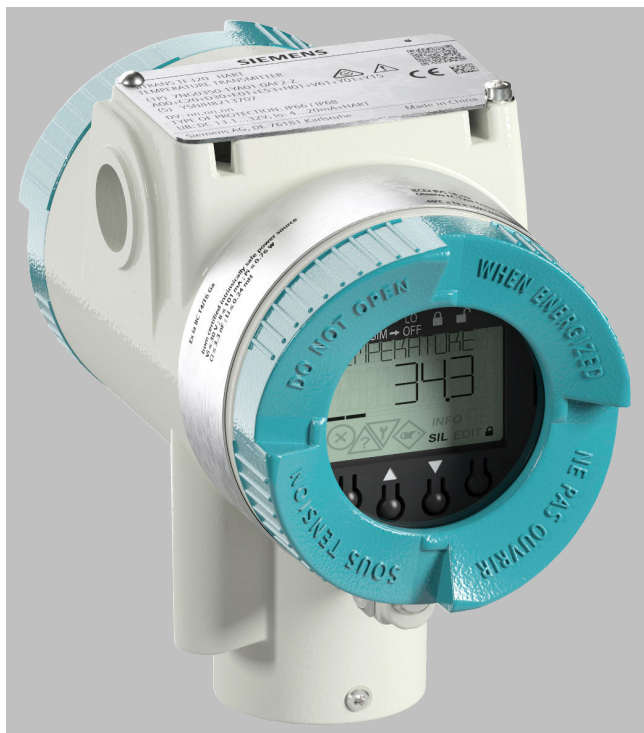


Temperature Measurement

Temperature transmitters

Field transmitters/field indicator / SITRANS TF320 (4 to 20 mA, HART, universal)

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

Temperature Measurement

Temperature transmitters

Field transmitters/field indicator / SITRANS TF320 (4 to 20 mA, HART, universal)

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
- Test terminals for ammeter for HART variant
- Input monitoring wire break, short-circuit and drift
- Self-monitoring
- Configuration status stored in EEPROM
- Expanded diagnostic functions, such as slave pointer, operating hours counter, etc.
- Special characteristic curve
- Up to 32 devices on a Profibus PA segment
- Backwards compatible to Profibus PA profile 3.x
- No GSD file update necessary if replacement for previous unit SITRANS TH400PA
- Transparent product lifecycle thanks to recording of supply voltage (PA variant only) and diagnostic messages
- 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
- Compact mounting directly on the sensor, via the optional process input with M24 or 1/2" NPT thread on the underside of the single chamber enclosure (see selection options "Thread cable entry / thread process input on underside")
- 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

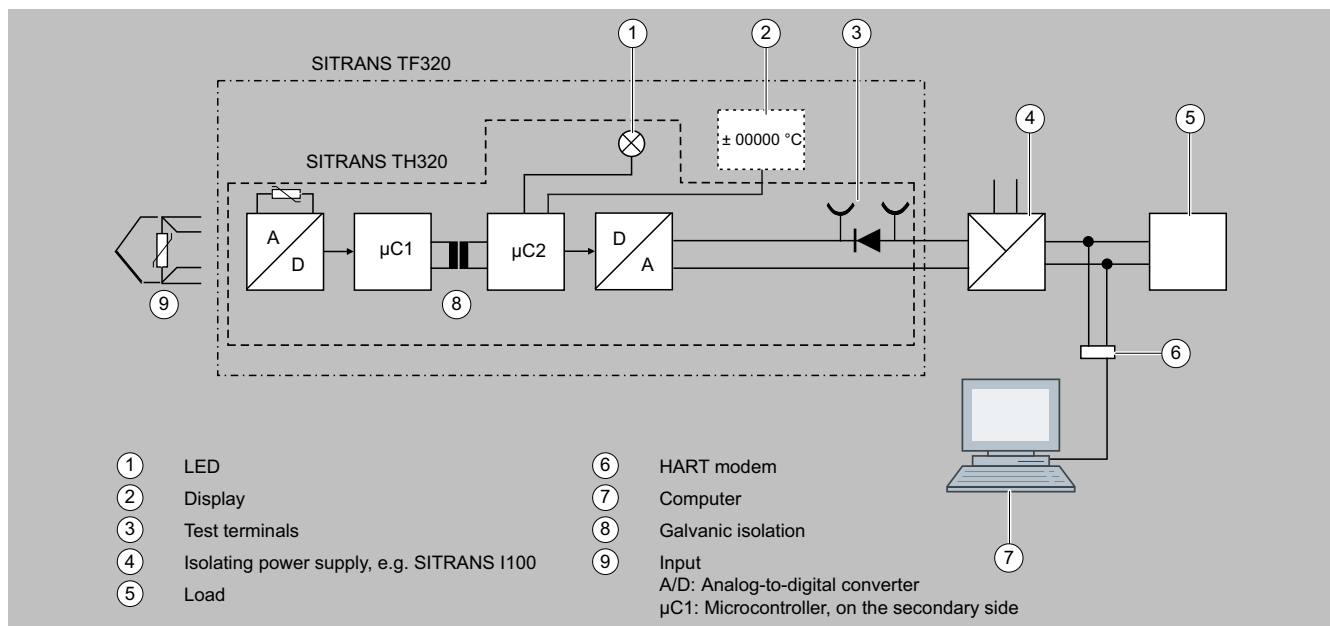
SITRANS TF320 as temperature transmitter

The input signal, whether resistance thermometer (RTD), thermocouple (TC), Ω or mV signal, is amplified and linearized. Input and out-

put 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

Temperature Measurement

Temperature transmitters

Field transmitters/field indicator / SITRANS TF320 (4 to 20 mA, HART, universal)

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	
1 × M20 × 1.5 / M24 × 1.5												G	
1 × M20 × 1.5 / ½" × 14 NPT												H	
2 × ½" NPT / closed												M	

Temperature Measurement

Temperature transmitters

Field transmitters/field indicator / SITRANS TF320 (4 to 20 mA, HART, universal)

Selection and ordering data (continued)

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
Local operation	● - ● ● ● ● ● - 0 ● ● ●
Without local operation	
Local operation (closed lid)	
Local operation (lid with glass window)	

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	A11
Cable inner diameter 7 ... 12 mm (0.28 ... 0.47 inches)	
Cable outer diameter 10 ... 16 mm (0.39 ... 0.63 inches)	
CAPRI ADE 4F, stainless steel	A12
Cable inner diameter 7 ... 12 mm (0.28 ... 0.47 inches)	
Cable outer diameter 10 ... 16 mm (0.39 ... 0.63 inches)	
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 6 kV/3 kA (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

Options	Order code
Add "-Z" to article number, specify order code and, if applicable, free text	
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
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 × (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 × (GOST 6651-2009), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	V66
Pt × (GOST 6651-2009), 3-wire, define RTD factor × in option Y21	V67

Temperature Measurement

Temperature transmitters

Field transmitters/field indicator / SITRANS TF320 (4 to 20 mA, HART, universal)

Selection and ordering data (continued)

Options Add "-Z" to article number, specify order code and, if applicable, free text	Order code
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 × (ECW-15), 2-wire (define wire resistance value in option Y51 and RTD factor × 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

Options Add "-Z" to article number, specify order code and, if applicable, free text	Order code
Device settings	
Measuring range setting temperature input (instead of 0 ... 100 °C): 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
Click the article number for online configuration in the PIA Life Cycle Portal.	● - ● ● ● ● ● - 0 ● ● ●
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

Temperature Measurement

Temperature transmitters

Field transmitters/field indicator / SITRANS TF320 (4 to 20 mA, HART, universal)

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									
• Type N		●	-	●	●	●	●	●	-	0	●
• Type R											●
• Type S											●
• Type T											●
Potentiometer, 4-wire											
More types in option Vxx											
Input 2, type											
Without input 2											
CJC configuration for TC											
Without CJC											
Internal CJC											
External CJC RTD Pt100 (IEC 60751), 3-wire											
External CJC RTD Ni100 (DIN 43760-87), 3-wire											
Define fixed CJC value with option Y60											
Material of non-wetted parts											
Die-cast aluminum enclosure											
Enclosure made of stainless steel precision casting CF3M/1.4409 (similar to 316L)											
Type of protection (Ex)											
General safety											
Intrinsic safety (Ex i) / non-incendive field wiring (NIFW)											
Flameproof enclosure (Ex d) / Explosion proof (XP)											
Dust ignition protection by enclosure zone 21/22 (Ex t) / increased safety zone 2 (Ex ec) / dust ignition proof (DIP) / non-incendive (NI)											
Flameproof enclosure (Ex d) / intrinsic safety (Ex i) / dust ignition protection by enclosure zone 21/22 (Ex t) / increased safety zone 2 (Ex ec)											
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)											
Electrical connection/cable entries											
2 × M20 × 1.5											
2 × ½" NPT											
Local operation											
Without local operation											
Local operation (closed lid)											
Local operation (lid with glass window)											

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	A11
Cable inner diameter 7 ... 12 mm (0.28 ... 0.47 inches)	
Cable outer diameter 10 ... 16 mm (0.39 ... 0.63 inches)	
CAPRI ADE 4F, stainless steel	A12
Cable inner diameter 7 ... 12 mm (0.28 ... 0.47 inches)	
Cable outer diameter 10 ... 16 mm (0.39 ... 0.63 inches)	
Device plug Han, mounted on left	
Device plug Han 7D (plastic, straight)	A30
Device plug Han 7D (plastic, angled)	A31

Options	Order code
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 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

Temperature Measurement

Temperature transmitters

Field transmitters/field indicator / SITRANS TF320 (4 to 20 mA, HART, universal)

Selection and ordering data (continued)

Options	Order code
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
Degree of protection IP66/IP68 (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
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

Options	Order code
Pt × (IEC 60751), 4-wire, define RTD factor × in option Y21	V62
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 × (GOST 6651-2009), 2-wire (define wire resistance value in option Y51 and RTD factor × 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 × (ECW-15), 2-wire (define wire resistance value in option Y51 and RTD factor × 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), 2-wire (define wire resistance value in option Y51 and RTD factor × in option Y21)	V81
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), 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

Temperature Measurement

Temperature transmitters

Field transmitters/field indicator / SITRANS TF320 (4 to 20 mA, HART, universal)

Selection and ordering data (continued)

Options	Order code
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 (internal thread)	7MP1990-0BA00
Thread adapter M20×1.5 (external thread) to G½ (internal thread)	7MP1990-0BB00
Local operation	
Local operation for temperature transmitter in dual chamber enclosure	7MF7902-1AD
Mounting system for local operation 7MF7902-1AD in single chamber enclosure	7MF7902-1AS
Mounting brackets (only dual chamber enclosure)	
Wall/pipe mounting bracket for dual chamber enclosure, steel, 5/16-24UNF	7MF7900-1AB
Wall/pipe mounting bracket for dual chamber enclosure, steel, M8	7MF7900-1AC
Wall/pipe mounting bracket for dual chamber enclosure, stainless steel 316L, 5/16-24UNF	7MF7900-1AH
Wall/pipe mounting bracket for dual chamber enclosure, stainless steel 316L, M8	7MF7900-1AJ
Mounting system (only single chamber enclosures)	
Pipe mounting kit for single chamber enclosure, stainless steel 316L	7MF7900-1AK
Wall mounting kit for single chamber enclosure, stainless steel 316L	7MF7900-1AL
Cable gland	
Cable gland, gray, non-Ex, M20	7MF7906-1AB
Cable gland, gray, non-Ex, NPT	7MF7906-1BB
Cable gland, metal, non-Ex, NPT	7MF7906-1BD
Cable gland, metal, non-Ex, M20	7MF7906-1AD
Cable gland, metal, Ex-d, NPT	7MF7906-1BE
Cable gland, metal, Ex-d, M20	7MF7906-1AE
Cable gland, 316L, non-Ex, NPT	7MF7906-1BH
Cable gland, 316L, non-Ex, M20	7MF7906-1AH
Cable gland, 316L, Ex-d, NPT	7MF7906-1BJ
Cable gland, 316L, Ex-d, M20	7MF7906-1AJ
Cable gland, E1FX Tri-Star ½-14 NPT, CMP	7MF7906-1NE
Cable gland, ½ NPT Capri ADE 4F cpl., CuZn	7MF7906-1PE
Cable gland, ½ NPT Capri ADE 4F cpl., stainless steel	7MF7906-1PJ
Plug and cable socket	
Plug Han 7D, plastic, straight	7MF7906-2AB
Plug Han 7D, plastic, angled	7MF7906-2AC

	Article No.
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 2x, without glass window, with seal NBR	7MF7901-1BB
Closed lid aluminum, painted 2x, without glass window, with seal FVMQ	7MF7901-1BC
Lid aluminum 2x coated, with glass window, with seal NBR	7MF7901-1BG
Lid aluminum 2x coated, with glass window, with seal FVMQ	7MF7901-1BH
Closed lid stainless steel precision casting, without glass window, with seal NBR	7MF7901-2AB
Closed lid stainless steel precision casting, without glass window, with seal FVMQ	7MF7901-2AC
Lid stainless steel precision casting, with glass window, with seal NBR	7MF7901-2AG
Lid stainless steel precision casting, with glass window, with seal FVMQ	7MF7901-2AH

Ordering example

SITRANS TF320 (single chamber enclosure)

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

Y01: -10 ... +100 °C

Y17: TICA123

Factory setting

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

Temperature Measurement

Temperature transmitters

Field transmitters/field indicator / SITRANS TF320 (4 to 20 mA, HART, universal)

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
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
Error 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 error detection.
Detection limit for short-circuited input	15 Ω

SITRANS TF320 (HART, universal)	
Error detection time (RTD)	≤ 75 ms (typically 70 ms)
Error 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
• Error detection, programmable	None, short-circuited, defective, short-circuited or defective Note The short-circuited error detection only applies to the CJC input.
• Error detection time (TC)	≤ 75 ms (typically 70 ms)
• Error 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
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

Temperature Measurement

Temperature transmitters

Field transmitters/field indicator / SITRANS TF320 (4 to 20 mA, HART, universal)

Technical specifications (continued)

SITRANS TF320 (HART, universal)	
• $R \leq 400 \Omega$	Max. 50 nF
Error detection, programmable	None, defective
Potentiometers	
Input range	10 Ω ... 100 k Ω
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	
• $R > 400 \Omega$	Max. 30 nF
• $R \leq 400 \Omega$	Max. 50 nF
Error 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 error detection.
Detection limit for short-circuited input	15 Ω
Error detection time, wiper arm (no short-circuit detection)	≤ 75 ms (typically 70 ms)
Error detection time, element	$\leq 2\,000$ ms
Error detection time (for 4-wire and 5-wire)	$\leq 2\,000$ ms
Supply voltage	
Measuring range	
• Unipolar	-100 ... 1700 mV
• Bipolar	-800 ... +800 mV
Minimum measuring span	2.5 mV
Input resistance	10 M Ω
Cable, wire-wire capacity	
• Input range: -100 ... 1700 mV	Max. 30 nF
• Input range: -20 ... 100 mV	Max. 50 nF
Error detection, programmable	None, defective
Error 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)	$\leq (V_{\text{supply}} - 10.5)/0.023 \Omega$
Load stability	< 0.01% of measuring span/100 Ω (measuring span = currently selected range)
Input error detection, programmable (detection of input short-circuits is ignored with TC and voltage inputs)	3.5 ... 23 mA
NAMUR NE43 Upscale	> 21 mA
NAMUR NE43 Downscale	< 3.6 mA
HART protocol versions	HART 7
Measuring accuracy	
Input accuracy	See "Input accuracy" table
Output accuracy	See "Output accuracy" table

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 $\pm$ 1.0 °C (75.2 °F $\pm$ 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 mm ² (AWG 16)
• Dual chamber enclosure	2.5 mm ² (AWG 14)
Tightening torque for clamping screws	0.4 Nm (single chamber enclosure) 0.5 ... 0.6 Nm (dual chamber enclosure)
Vibrations	IEC 60068-2-6
• 2 ... 25 Hz	± 1.6 mm (0.07 inches)
• 25 ... 100 Hz	± 4 g
Certificates and approvals	
<u>Explosion protection ATEX/IECEx and others</u>	
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

Temperature Measurement

Temperature transmitters

Field transmitters/field indicator / SITRANS TF320 (4 to 20 mA, HART, universal)

Technical specifications (continued)

SITRANS TF320 (HART, universal)		SITRANS TF320 (HART, universal)	
• "Flameproof enclosure db" type of protection	For use in Zone 1	• "Protection by enclosure tb/tc" type of protection	For use in Zone 21, 22
• ATEX	II 2 G Ex db IIC T6...T4 Gb	• ATEX	• II 2 D Ex tb IIC T100 °C Db • II 3 D Ex tc IIIC T100 °C Dc
• IECEx and others	Ex db IIC T6 ... T4 Gb	• 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)

Temperature Measurement

Temperature transmitters

Field transmitters/field indicator / SITRANS TF320 (4 to 20 mA, HART, universal)

Technical specifications (continued)

Input type	Basic accuracy	Temperature coefficient ¹⁾
Pt50	$\leq \pm 0.16\text{ °C (0.288 °F)}$	$\leq \pm 0.004\text{ °C/°C (°F/°F)}$
Pt100	$\leq \pm 0.04\text{ °C (0.072 °F)}$	$\leq \pm 0.002\text{ °C/°C (°F/°F)}$
Pt200	$\leq \pm 0.08\text{ °C (0.144 °F)}$	$\leq \pm 0.002\text{ °C/°C (°F/°F)}$
Pt500	$T_{\text{max.}} < 180\text{ °C (356 °F)} = \leq \pm 0.08\text{ °C (0.144 °F)}$ $T_{\text{max.}} > 180\text{ °C (356 °F)} = \leq \pm 0.16\text{ °C (0.288 °F)}$	$\leq \pm 0.002\text{ °C/°C (°F/°F)}$
Pt1000	$\leq \pm 0.08\text{ °C (0.144 °F)}$	$\leq \pm 0.002\text{ °C/°C (°F/°F)}$
Pt2000	$T_{\text{max.}} < 300\text{ °C (572 °F)} = \leq \pm 0.08\text{ °C (0.144 °F)}$ $T_{\text{max.}} > 300\text{ °C (572 °F)} = \leq \pm 0.4\text{ °C (0.72 °F)}$	$\leq \pm 0.002\text{ °C/°C (°F/°F)}$
Pt10000	$\leq \pm 0.16\text{ °C (0.288 °F)}$	$\leq \pm 0.002\text{ °C/°C (°F/°F)}$
Pt x	Largest tolerance of neighboring points	Largest temperature coefficient of neighboring points
Ni10	$\leq \pm 1.6\text{ °C (2.88 °F)}$	$\leq \pm 0.020\text{ °C/°C (°F/°F)}$
Ni20	$\leq \pm 0.8\text{ °C (1.44 °F)}$	$\leq \pm 0.010\text{ °C/°C (°F/°F)}$
Ni50	$\leq \pm 0.32\text{ °C (0.576 °F)}$	$\leq \pm 0.004\text{ °C/°C (°F/°F)}$
Ni100	$\leq \pm 0.16\text{ °C (0.288 °F)}$	$\leq \pm 0.002\text{ °C/°C (°F/°F)}$
Ni120	$\leq \pm 0.16\text{ °C (0.288 °F)}$	$\leq \pm 0.002\text{ °C/°C (°F/°F)}$
Ni200	$\leq \pm 0.16\text{ °C (0.288 °F)}$	$\leq \pm 0.002\text{ °C/°C (°F/°F)}$
Ni500	$\leq \pm 0.16\text{ °C (0.288 °F)}$	$\leq \pm 0.002\text{ °C/°C (°F/°F)}$
Ni1000	$\leq \pm 0.16\text{ °C (0.288 °F)}$	$\leq \pm 0.002\text{ °C/°C (°F/°F)}$
Ni2000	$\leq \pm 0.16\text{ °C (0.288 °F)}$	$\leq \pm 0.002\text{ °C/°C (°F/°F)}$
Ni10000	$\leq \pm 0.32\text{ °C (0.576 °F)}$	$\leq \pm 0.002\text{ °C/°C (°F/°F)}$
Ni x	Largest tolerance of neighboring points	Largest temperature coefficient of neighboring points
Cu5	$\leq \pm 1.6\text{ °C (2.88 °F)}$	$\leq \pm 0.040\text{ °C/°C (°F/°F)}$
Cu10	$\leq \pm 0.8\text{ °C (1.44 °F)}$	$\leq \pm 0.020\text{ °C/°C (°F/°F)}$
Cu20	$\leq \pm 0.4\text{ °C (0.72 °F)}$	$\leq \pm 0.010\text{ °C/°C (°F/°F)}$
Cu50	$\leq \pm 0.16\text{ °C (0.288 °F)}$	$\leq \pm 0.004\text{ °C/°C (°F/°F)}$
Cu100	$\leq \pm 0.08\text{ °C (0.144 °F)}$	$\leq \pm 0.002\text{ °C/°C (°F/°F)}$
Cu200	$\leq \pm 0.08\text{ °C (0.144 °F)}$	$\leq \pm 0.002\text{ °C/°C (°F/°F)}$
Cu500	$\leq \pm 0.16\text{ °C (0.288 °F)}$	$\leq \pm 0.002\text{ °C/°C (°F/°F)}$
Cu1000	$\leq \pm 0.08\text{ °C (0.144 °F)}$	$\leq \pm 0.002\text{ °C/°C (°F/°F)}$
Cu x	Largest tolerance of neighboring points	Largest temperature coefficient of neighboring points
Linear resistance		
0 ... 400 Ω	$\leq \pm 40\text{ mΩ}$	$\leq \pm 2\text{ mΩ/°C (1.11 mΩ/°F)}$
0 ... 100 kΩ	$\leq \pm 4\text{ Ω}$	$\leq \pm 0.2\text{ Ω/°C (0.11 Ω/°F)}$
Potentiometers		
0 ... 100%	$< 0.05\%$	$< \pm 0.005\%$
Supply voltage		
mV: -20 ... 100 mV	$\leq \pm 5\text{ μV}$	$\leq \pm 0.2\text{ μV/°C (0.11 μV/°F)}$
mV: -100 ... 1700 mV	$\leq \pm 0.1\text{ mV}$	$\leq \pm 36\text{ μV/°C (20 μV/°F)}$
mV: ± 800 mV	$\leq \pm 0.1\text{ mV}$	$\leq \pm 32\text{ μV/°C (17.8 μV/°F)}$
TC		
E	$\leq \pm 0.2\text{ °C (0.36 °F)}$	$\leq \pm 0.025\text{ °C/°C (°F/°F)}$
J	$\leq \pm 0.25\text{ °C (0.45 °F)}$	$\leq \pm 0.025\text{ °C/°C (°F/°F)}$
K	$\leq \pm 0.25\text{ °C (0.45 °F)}$	$\leq \pm 0.025\text{ °C/°C (°F/°F)}$
L	$\leq \pm 0.35\text{ °C (0.63 °F)}$	$\leq \pm 0.025\text{ °C/°C (°F/°F)}$
N	$\leq \pm 0.4\text{ °C (0.72 °F)}$	$\leq \pm 0.025\text{ °C/°C (°F/°F)}$
T	$\leq \pm 0.25\text{ °C (0.45 °F)}$	$\leq \pm 0.025\text{ °C/°C (°F/°F)}$
U	$< 0\text{ °C (32 °F)} \leq \pm 0.8\text{ °C (1.44 °F)}$ $\geq 0\text{ °C (32 °F)} \leq \pm 0.4\text{ °C (0.72 °F)}$	$\leq \pm 0.025\text{ °C/°C (°F/°F)}$
Lr	$\leq \pm 0.2\text{ °C (0.36 °F)}$	$\leq \pm 0.1\text{ °C/°C (°F/°F)}$
R	$< 200\text{ °C (392 °F)} \leq \pm 0.5\text{ °C (0.9 °F)}$ $\geq 200\text{ °C (392 °F)} \leq \pm 1\text{ °C (1.8 °F)}$	$\leq \pm 0.1\text{ °C/°C (°F/°F)}$
S	$< 200\text{ °C (392 °F)} \leq \pm 0.5\text{ °C (0.9 °F)}$ $\geq 200\text{ °C (392 °F)} \leq \pm 1\text{ °C (1.8 °F)}$	$\leq \pm 0.1\text{ °C/°C (°F/°F)}$
W3	$\leq \pm 0.6\text{ °C (1.08 °F)}$	$\leq \pm 0.1\text{ °C/°C (°F/°F)}$

Temperature Measurement

Temperature transmitters

Field transmitters/field indicator / SITRANS TF320 (4 to 20 mA, HART, universal)

Technical specifications (continued)

Input type	Basic accuracy	Temperature coefficient ¹⁾
W5	$\leq \pm 0.4\text{ °C}$ (0.72 °F)	$\leq \pm 0.1\text{ °C/°C}$ (°F/°F)
B ²⁾	$\leq \pm 1\text{ °C}$ (1.8 °F)	$\leq \pm 0.1\text{ °C/°C}$ (°F/°F)
B ³⁾	$\leq \pm 3\text{ °C}$ (5.4 °F)	$\leq \pm 0.1\text{ °C/°C}$ (°F/°F)
B ⁴⁾	$\leq \pm 8\text{ °C}$ (14.4 °F)	$\leq \pm 0.8\text{ °C/°C}$ (°F/°F)
B ⁵⁾	Not specified	Not specified
CJC (internal)	$< \pm 0.5\text{ °C}$ (0.9 °F)	Included in basic accuracy
CJC (external)	$\leq \pm 0.08\text{ °C}$ (0.144 °F)	$\leq \pm 0.002\text{ °C/°C}$ (°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 $> 400\text{ °C}$ (752 °F)

³⁾ Accuracy of the specification range $> 160\text{ °C}$ (320 °F) $< 400\text{ °C}$ (752 °F)

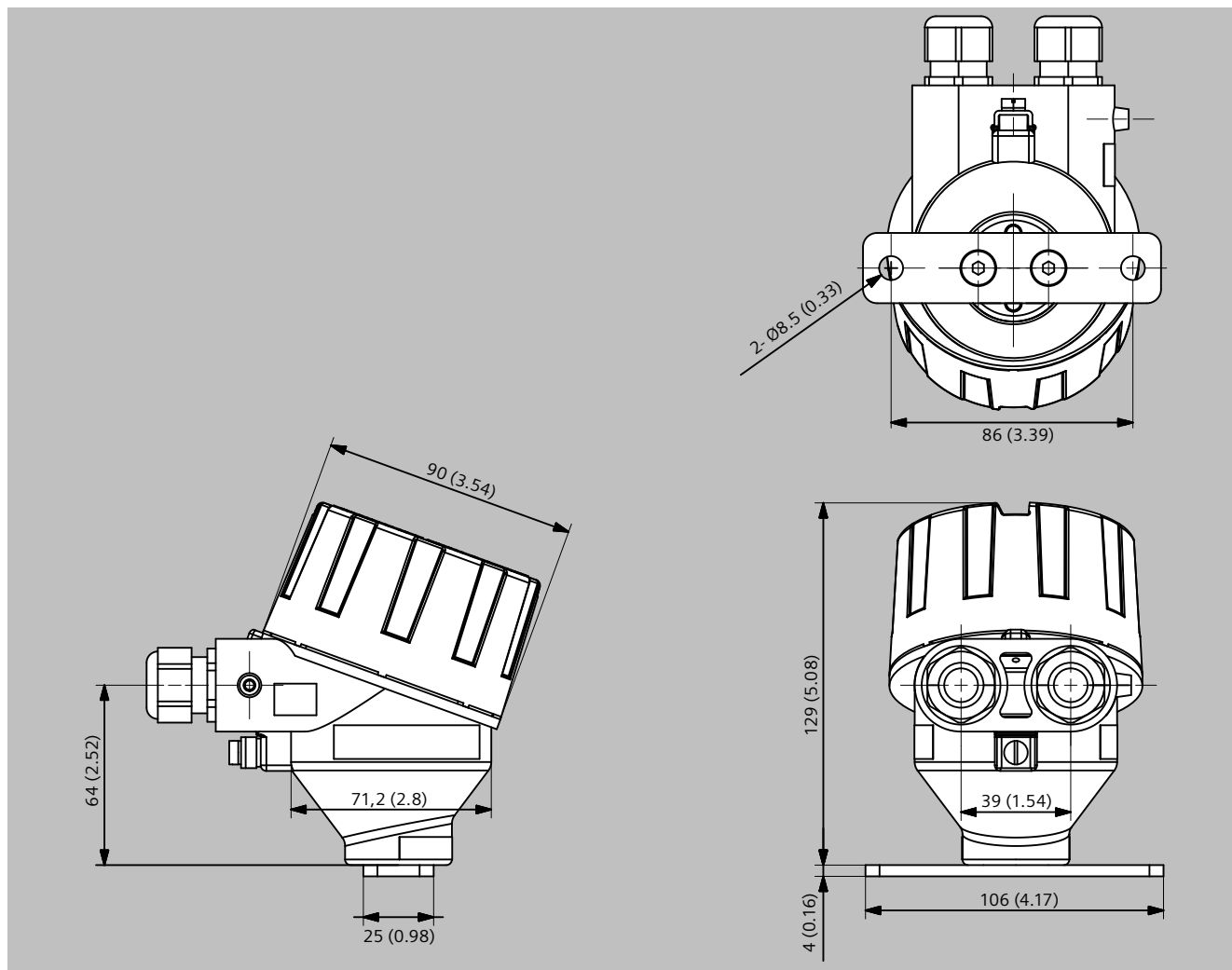
⁴⁾ Accuracy of the specification range $> 85\text{ °C}$ (185 °F) $< 160\text{ °C}$ (320 °F)

⁵⁾ Accuracy of the specification range $< 85\text{ °C}$ (185 °F)

Output accuracy

Output type	Basic accuracy	Temperature coefficient
Analog output	$\leq \pm 1.6\text{ }\mu\text{A}$ (0.01% of the full output span)	$\leq \pm 0.48\text{ }\mu\text{A/K}$ ($\leq \pm 0.003\%$ of the full output span/K)

Dimensional drawings



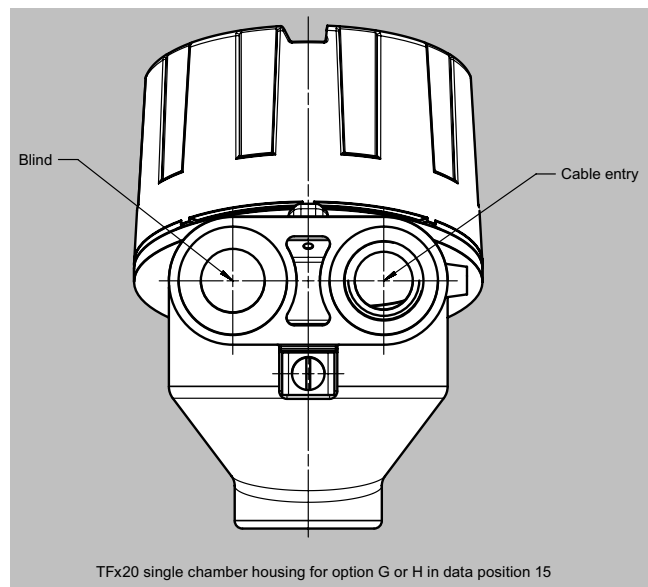
SITRANS TF320, single chamber enclosure, dimensions in mm (inch)

Temperature Measurement

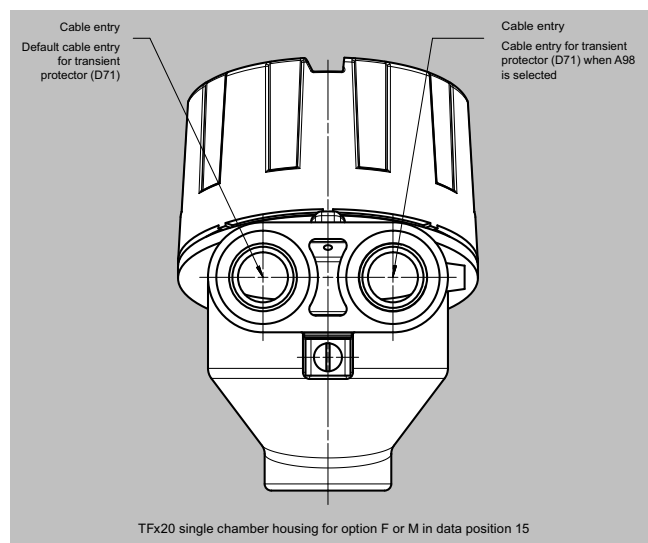
Temperature transmitters

Field transmitters/field indicator / SITRANS TF320 (4 to 20 mA, HART, universal)

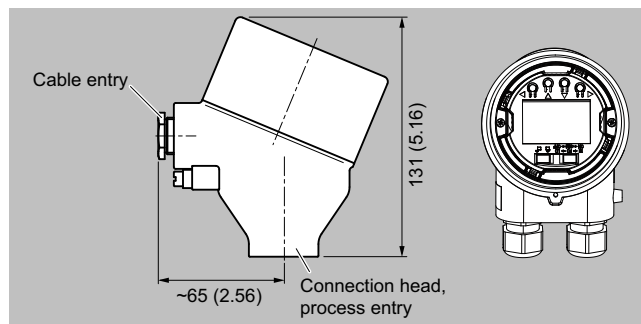
Dimensional drawings (continued)



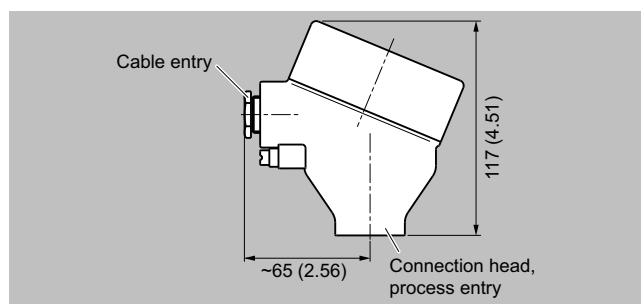
SITRANS TF320 single chamber enclosure



SITRANS TF320 single chamber enclosure

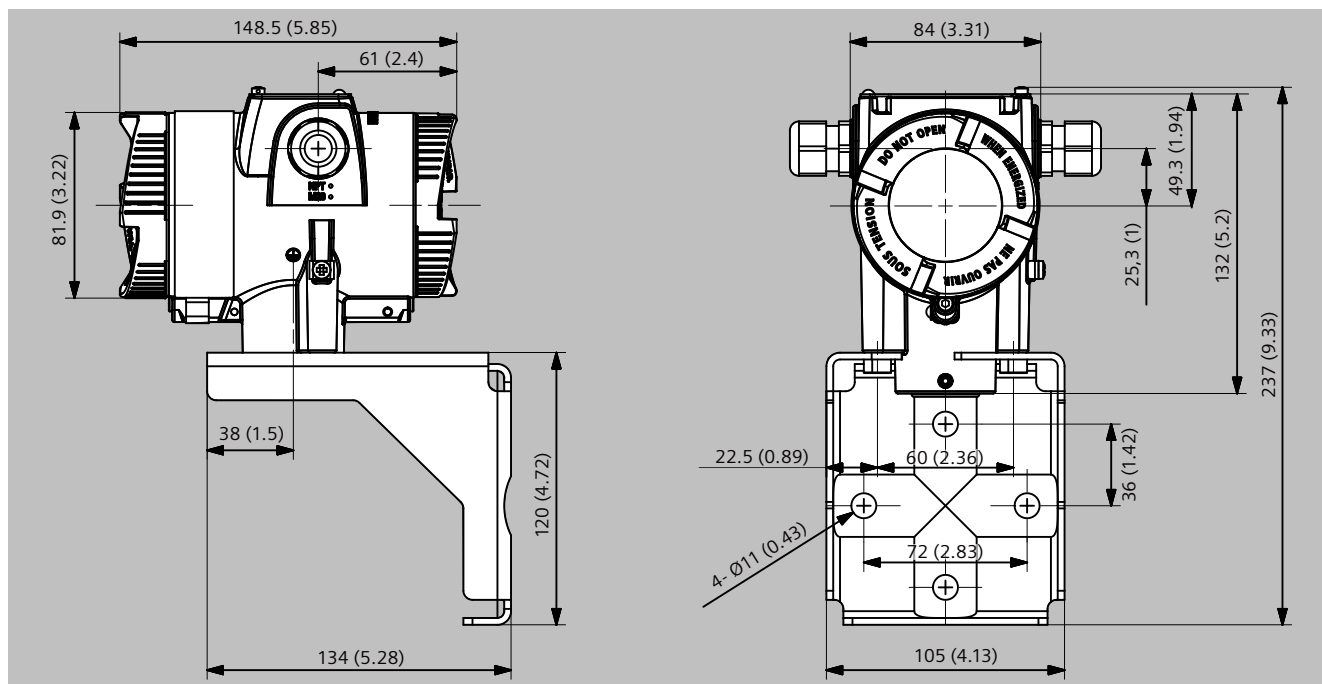


Connection head with 4-20 mA display, dimensions in mm (inch)



Connection head, dimensions in mm (inch)

Dimensional drawings (continued)



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

Temperature Measurement

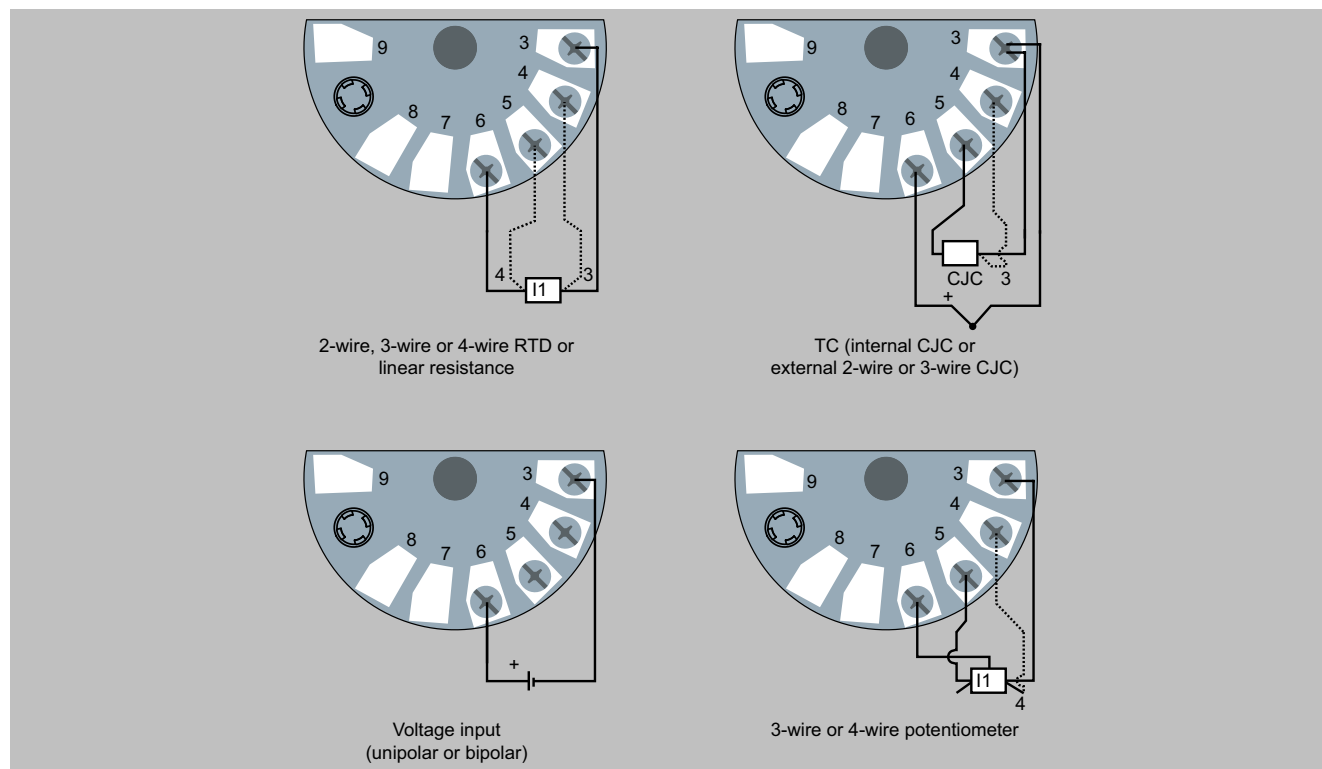
Temperature transmitters

Field transmitters/field indicator / SITRANS TF320 (4 to 20 mA, HART, universal)

Circuit diagrams

Connections

Input connection



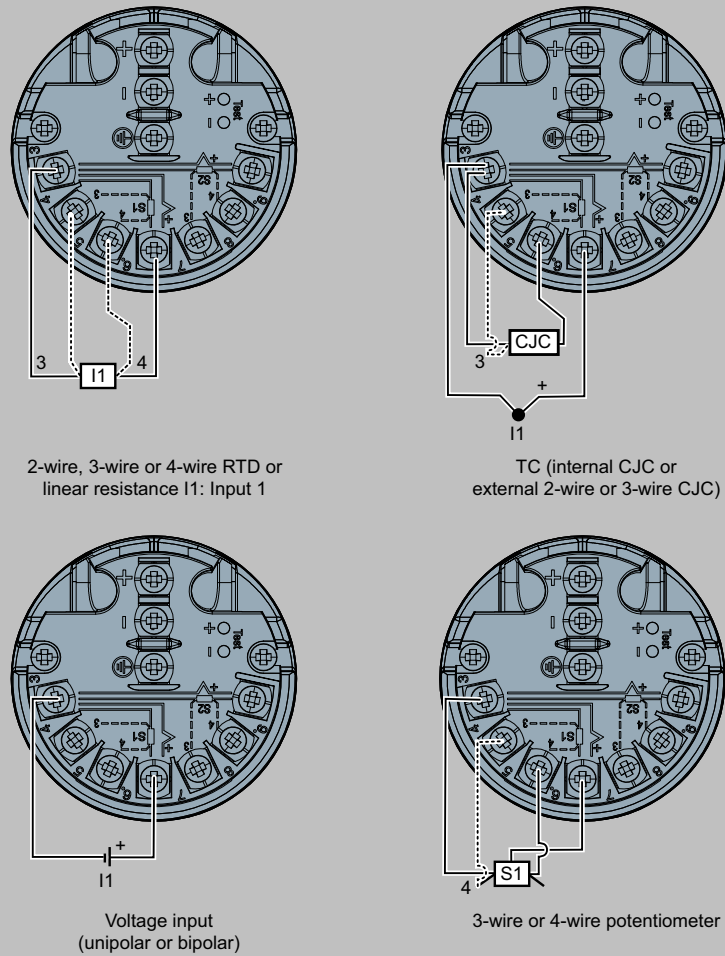
SITRANS TF320 in single chamber enclosure (7NG034*), input connection assignment

Temperature Measurement

Temperature transmitters

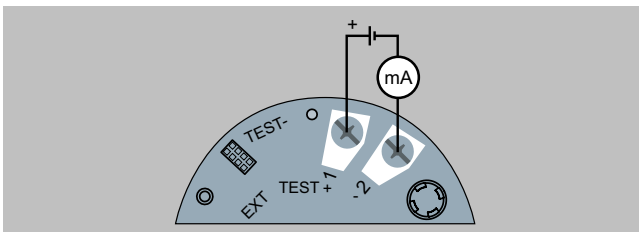
Field transmitters/field indicator / SITRANS TF320 (4 to 20 mA, HART, universal)

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

Temperature Measurement

Temperature transmitters

Field transmitters/field indicator / SITRANS TF420 (HART, PA, universal)

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
- Configurable via PC, HART 7, Profibus PA 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
- Test terminals for ammeter for HART variant
- Input monitoring wire break, short-circuit and drift
- Self-monitoring
- Configuration status stored in EEPROM
- Expanded diagnostic functions, such as slave pointer, operating hours counter, etc.
- Special characteristic curve
- Up to 32 devices on a Profibus PA segment
- Backwards compatible to Profibus PA profile 3.x
- No GSD file update necessary if replacement for previous unit SITRANS TH400PA
- Transparent product lifecycle thanks to recording of supply voltage (PA variant only) and diagnostic messages
- 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
- Compact mounting directly on the sensor, via the optional process input with M24 or 1/2" NPT thread on the underside of the single chamber enclosure (see selection options "Thread cable entry / thread process input on underside")
- 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.

Temperature Measurement

Temperature transmitters

Field transmitters/field indicator / SITRANS TF420 (HART, PA, universal)

Function

Configuration

The communication capability via the HART protocol V 7 enables parameterization with a PC or HART Communicator (hand-held communicator) or Profibus PA. 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.

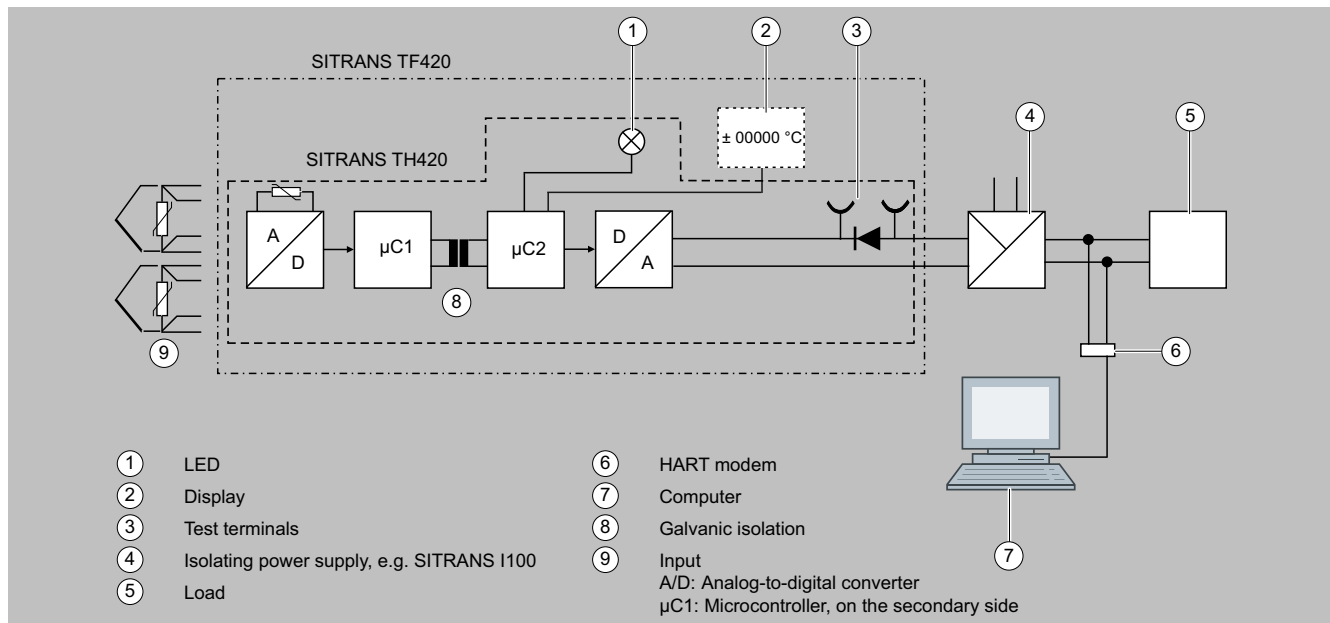
Principle of operation

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/Profibus PA 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.



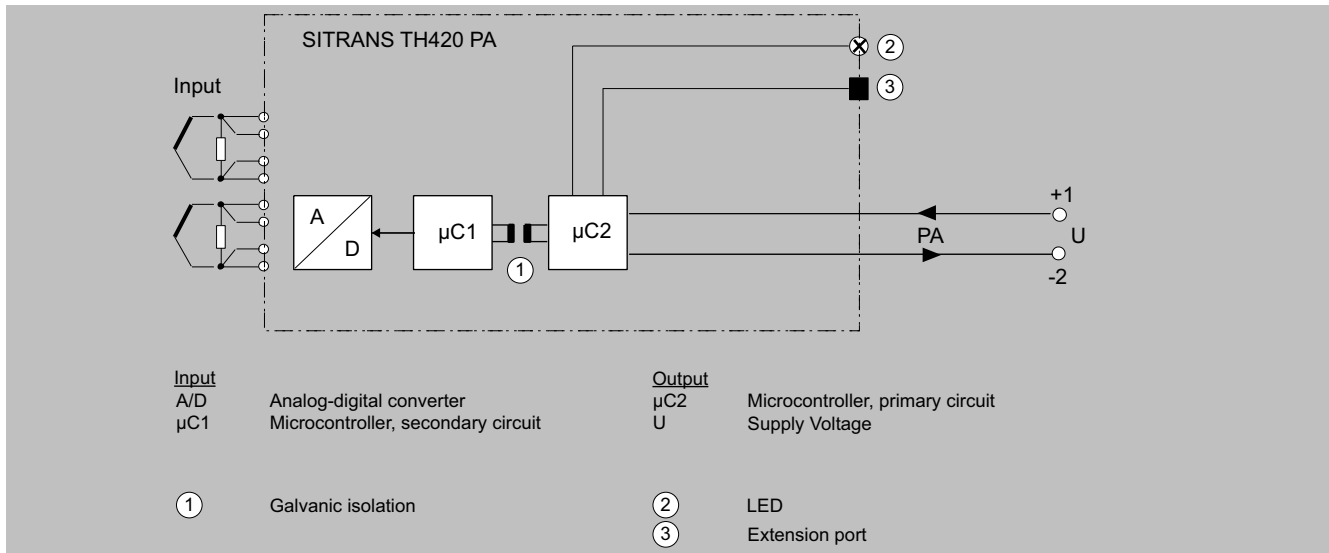
Function block diagram SITRANS TF420 with integrated SITRANS TH420

Temperature Measurement

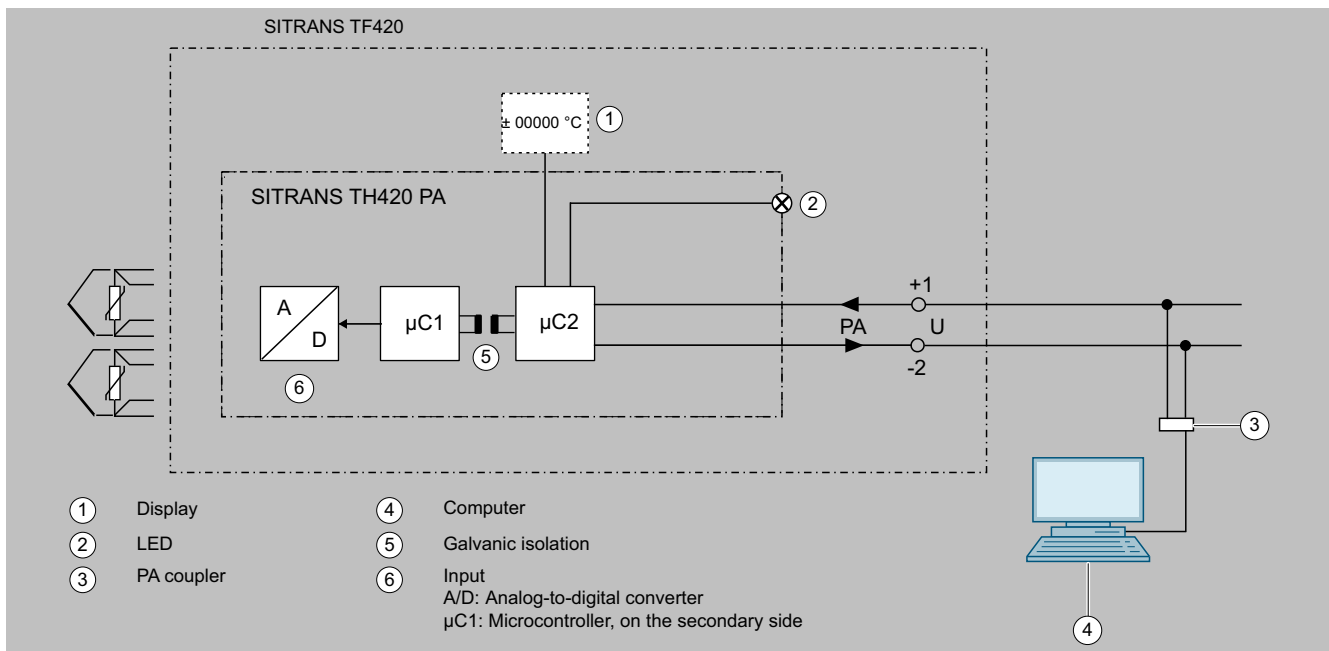
Temperature transmitters

Field transmitters/field indicator / SITRANS TF420 (HART, PA, universal)

Function (continued)



SITRANS TH420 PA, function block diagram



SITRANS TF420 PA, function block diagram

Temperature Measurement

Temperature transmitters

Field transmitters/field indicator / SITRANS TF420 (HART, PA, universal)

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										Order code		
Click the article number for online configuration in the PIA Life Cycle Portal.		●	-	●	●	●	●	●	●	-	0	●	●	●
Communication														
With HART (4 ... 20 mA)		0												
With Profibus PA		1												
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

Temperature Measurement

Temperature transmitters

Field transmitters/field indicator / SITRANS TF420 (HART, PA, universal)

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										Order code				
	●	-	●	●	●	●	●	-	0	●	●	●	●	●	●
• Type E															
• Type J															
• Type K															
• Type L															
• Type N															
• Type R															
• Type S															
• Type T															
Potentiometer, 4-wire															
More types in option Wxx															
CJC configuration for TC															
Input 1: None CJC; Input 2: No CJC															
Input 1: Internal CJC; Input 2: Internal CJC															
Input 1: External CJC; input 2: External CJC; define type in option Jxx															
Input 1: External CJC; define type in option Jxx; input 2: Internal CJC															
Input 1: Internal CJC; Input 2: External CJC; define type in option Jxx															
Input 1: Internal CJC; Input 2: No CJC															
Input 1: External CJC (define type in option Jxx); input 2: No CJC															
Input 1: Define fixed CJC value with option Y60; Input 2: None CJC															
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)													L	1	A
Input 1: External CJC (define type in option Jxx); Input 2: Define fixed CJC value with option Y61													L	1	B
Input 1: Define fixed CJC value with option Y60; Input 2: External CJC (define type in option Jxx)													L	1	C
Input 1: Define fixed CJC value with option Y60; Input 2: Internal CJC													L	1	D
Input 1: Internal CJC; Input 2: Define fixed CJC value with option Y61													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 ignition protection by enclosure zone 21/22 (Ex t) / increased safety zone 2 (Ex ec) / dust ignition proof (DIP) / non-incendive (NI)											T				
Thread cable entry / thread process input on underside															
2 × M20 × 1.5											F				
1 × M20 × 1.5 / M24 × 1.5											G				
1 × M20 × 1.5 / ½" – 14 NPT											H				
2 × ½" NPT / closed											M				
Local operation															
Without local operation												0			
Local operation (closed lid)												1			
Local operation (lid with glass window)												2			

Temperature Measurement

Temperature transmitters

Field transmitters/field indicator / SITRANS TF420 (HART, PA, universal)

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	A11
Cable inner diameter 7 ... 12 mm (0.28 ... 0.47 inches)	
Cable outer diameter 10 ... 16 mm (0.39 ... 0.63 inches)	
CAPRI ADE 4F, stainless steel	A12
Cable inner diameter 7 ... 12 mm (0.28 ... 0.47 inches)	
Cable outer diameter 10 ... 16 mm (0.39 ... 0.63 inches)	
Cable entry accessories	
Sealing element for 2 cables included	A20
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
Degree of protection IP66/IP68 (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 6 kV/3 kA (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
EACEx (GOST -R, -K, -B)	E24
KCs (Korea)	E26

Options Add "-Z" to article number, specify order code and, if applicable, free text	Order code
NEPSI (China)	E27
PESO (India)	E28
ECASEx (UAE)	E32
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
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 × (GOST 6651-2009), 2-wire (define wire resistance value in option Y51 and RTD factor × 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

Temperature Measurement

Temperature transmitters

Field transmitters/field indicator / SITRANS TF420 (HART, PA, universal)

Selection and ordering data (continued)

Options Add "-Z" to article number, specify order code and, if applicable, free text	Order code
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 × (ECW-15), 2-wire (define wire resistance value in option Y51 and RTD factor × 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
Input 2: TC	
TC type W5	W01
TC type W3	W02
TC type U	W03
TC type Lr	W04
Input 2: RTD	
Pt × (IEC 60751), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22)	W60
Pt × (IEC 60721), 3-wire, define RTD factor × in option Y22	W61
Pt × (IEC 60721), 4-wire, define RTD factor × in option Y22	W62
Pt × (JIS C1604), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22)	W63
Pt × (JIS C1604-81), 3-wire, define RTD factor × in option Y22	W64
Pt × (JIS C1604-81), 4-wire, define RTD factor × in option Y22	W65
Pt × (GOST 6651-2009), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22)	W66
Pt × (GOST 6651-2009), 3-wire, define RTD factor × in option Y22	W67
Pt × (GOST 6651-2009), 4-wire, define RTD factor × in option Y22	W68
Ni × (DIN 43760-87), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22)	W69
Ni × (DIN 43760-87), 3-wire, define RTD factor × in option Y22	W70
Ni × (DIN 43760-87), 4-wire, define RTD factor × in option Y22	W71
Ni × (GOST 6651-2009), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22)	W72
Ni × (GOST 6651-2009), 3-wire, define RTD factor × in option Y22	W73
Ni × (GOST 6651-2009), 4-wire, define RTD factor × in option Y22	W74
Cu × (ECW-15), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22)	W75
Cu × (ECW-15), 3-wire, define RTD factor × in option Y22	W76

Options Add "-Z" to article number, specify order code and, if applicable, free text	Order code
Cu × (ECW-15), 4-wire, define RTD factor × in option Y22	W77
Cu × (GOST 6651-94), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22)	W78
Cu × (GOST 6651-94), 3-wire, define RTD factor × in option Y22	W79
Cu × (GOST 6651-94), 4-wire, define RTD factor × in option Y22	W80
Cu × (GOST 6651-2009), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22)	W81
Cu × (GOST 6651-2009), 3-wire, define RTD factor × in option Y22	W82
Cu × (GOST 6651-2009), 4-wire, define RTD factor × in option Y22	W83
Device settings	
Measuring range setting temperature input (instead of 0 ... 100 °C): 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
Input 2: RTD factor (e.g. factor = 200 => RTD Pt200), adhesive label	Y22
Preset bus address	Y25
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

Temperature Measurement

Temperature transmitters

Field transmitters/field indicator / SITRANS TF420 (HART, PA, universal)

Selection and ordering data (continued)

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	Order code									
Click the article number for online configuration in the PIA Life Cycle Portal.					● - ● ● ● ● ● - 0 ● ● ● ● ● ● ●										
Communication															
With HART (4 ... 20 mA)					0										
With Profibus PA					1										
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															
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	

Temperature Measurement

Temperature transmitters

Field transmitters/field indicator / SITRANS TF420 (HART, PA, universal)

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										Order code			
	●	-	●	●	●	●	●	-	0	●	●	●	●	●
• Type E														
• Type J														
• Type K														
• Type L														
• Type N														
• Type R														
• Type S														
• Type T														
Potentiometer, 4-wire														
More types in option Wxx														
CJC configuration for TC														
Input 1: None CJC; Input 2: No CJC														
Input 1: Internal CJC; Input 2: Internal CJC														
Input 1: External CJC; input 2: External CJC; define type in option Jxx														
Input 1: External CJC; define type in option Jxx; input 2: Internal CJC														
Input 1: Internal CJC; Input 2: External CJC; define type in option Jxx														
Input 1: Internal CJC; Input 2: No CJC														
Input 1: External CJC (define type in option Jxx); input 2: No CJC														
Material of non-wetted parts														
Die-cast aluminum enclosure														
Enclosure made of stainless steel precision casting CF3M/1.4409 (similar to 316L)														
Type of protection (Ex)														
General safety (non-Ex)														
Intrinsic safety (Ex i) / non-incendive field wiring (NIFW)														
Flameproof enclosure (Ex d) / Explosion proof (XP)														
Dust ignition protection by enclosure zone 21/22 (Ex t) / increased safety zone 2 (Ex ec) / dust ignition proof (DIP) / non-incendive (NI)														
Flameproof enclosure (Ex d) / intrinsic safety (Ex i) / dust ignition protection by enclosure zone 21/22 (Ex t) / increased safety zone 2 (Ex ec)														
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)														
Electrical connection/cable entries														
2 × M20 × 1.5														
2 × ½" NPT														
Local operation														
Without local operation														
Local operation (closed lid)														
Local operation (lid with glass window)														

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

Options	Order code
Add "-Z" to article number, specify order code and, if applicable, free text	
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

Temperature Measurement

Temperature transmitters

Field transmitters/field indicator / SITRANS TF420 (HART, PA, universal)

Selection and ordering data (continued)

Options Add "-Z" to article number, specify order code and, if applicable, free text	Order code
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
Degree of protection IP66/IP68 (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 6 kV/3 kA (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
EACEx (GOST -R, -K, -B)	E24
KCs (Korea)	E26
NEPSI (China)	E27
PESO (India)	E28
ECASEX (UAE)	E32
UKEX (United Kingdom)	E33
ATEX (Europe) and IECEX (Worldwide)	E47
ATEX, IECEX and FM	E49

Options Add "-Z" to article number, specify order code and, if applicable, free text	Order code
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
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
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 × (GOST 6651-2009), 2-wire (define wire resistance value in option Y51 and RTD factor × 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

Temperature Measurement

Temperature transmitters

Field transmitters/field indicator / SITRANS TF420 (HART, PA, universal)

Selection and ordering data (continued)

Options Add "-Z" to article number, specify order code and, if applicable, free text	Order code
Ni × (GOST 6651-2009), 4-wire, define RTD factor × in option Y21	V74
Cu × (ECW-15), 2-wire (define wire resistance value in option Y51 and RTD factor × 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
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 × (IEC 60751), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22)	W60
Pt × (IEC 60721), 3-wire, define RTD factor × in option Y22	W61
Pt × (IEC 60721), 4-wire, define RTD factor × in option Y22	W62
Pt × (JIS C1604), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22)	W63
Pt × (JIS C1604-81), 3-wire, define RTD factor × in option Y22	W64
Pt × (JIS C1604-81), 4-wire, define RTD factor × in option Y22	W65
Pt × (GOST 6651-2009), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22)	W66
Pt × (GOST 6651-2009), 3-wire, define RTD factor × in option Y22	W67
Pt × (GOST 6651-2009), 4-wire, define RTD factor × in option Y22	W68
Ni × (DIN 43760-87), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22)	W69
Ni × (DIN 43760-87), 3-wire, define RTD factor × in option Y22	W70
Ni × (DIN 43760-87), 4-wire, define RTD factor × in option Y22	W71
Ni × (GOST 6651-2009), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22)	W72
Ni × (GOST 6651-2009), 3-wire, define RTD factor × in option Y22	W73

Options Add "-Z" to article number, specify order code and, if applicable, free text	Order code
Ni × (GOST 6651-2009), 4-wire, define RTD factor × in option Y22	W74
Cu × (ECW-15), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22)	W75
Cu × (ECW-15), 3-wire, define RTD factor × in option Y22	W76
Cu × (ECW-15), 4-wire, define RTD factor × in option Y22	W77
Cu × (GOST 6651-94), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22)	W78
Cu × (GOST 6651-94), 3-wire, define RTD factor × in option Y22	W79
Cu × (GOST 6651-94), 4-wire, define RTD factor × in option Y22	W80
Cu × (GOST 6651-2009), 2-wire (define wire resistance value in option Y52 and RTD factor × in option Y22)	W81
Cu × (GOST 6651-2009), 3-wire, define RTD factor × in option Y22	W82
Cu × (GOST 6651-2009), 4-wire, define RTD factor × 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
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

Temperature Measurement

Temperature transmitters

Field transmitters/field indicator / SITRANS TF420 (HART, PA, universal)

Selection and ordering data (continued)

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	7MF4997-1DC
Thread adapter	
Thread adapter M20×1.5 (external thread) to ½-14 NPT (internal thread)	7MP1990-0BA00
Thread adapter M20×1.5 (external thread) to G½ (internal thread)	7MP1990-0BB00
Local operation	
Local operation for temperature transmitter in dual chamber enclosure	7MF7902-1AD
Mounting system for local operation 7MF7902-1AD in single chamber enclosure	7MF7902-1AS
Mounting brackets (only dual chamber enclosure)	
Wall/pipe mounting bracket for dual chamber enclosure, steel, 5/16-24UNF	7MF7900-1AB
Wall/pipe mounting bracket for dual chamber enclosure, steel, M8	7MF7900-1AC
Wall/pipe mounting bracket for dual chamber enclosure, stainless steel 316L, 5/16-24UNF	7MF7900-1AH
Wall/pipe mounting bracket for dual chamber enclosure, stainless steel 316L, M8	7MF7900-1AJ
Mounting system (only single chamber enclosures)	
Pipe mounting kit for single chamber enclosure, stainless steel 316L	7MF7900-1AK
Wall mounting kit for single chamber enclosure, stainless steel 316L	7MF7900-1AL
Cable gland	
Cable gland, gray, non-Ex, M20	7MF7906-1AB
Cable gland, gray, non-Ex, NPT	7MF7906-1BB
Cable gland, metal, non-Ex, NPT	7MF7906-1BD
Cable gland, metal, non-Ex, M20	7MF7906-1AD
Cable gland, metal, Ex-d, NPT	7MF7906-1BE
Cable gland, metal, Ex-d, M20	7MF7906-1AE
Cable gland, 316L, non-Ex, NPT	7MF7906-1BH
Cable gland, 316L, non-Ex, M20	7MF7906-1AH
Cable gland, 316L, Ex-d, NPT	7MF7906-1BJ
Cable gland, 316L, Ex-d, M20	7MF7906-1AJ
Cable gland, E1FX Tri-Star 1/2-14NPT, CMP	7MF7906-1NE
Cable gland, ½ NPT Capri ADE 4F cpl., CuZn	7MF7906-1PE
Cable gland, ½ NPT Capri ADE 4F cpl., stainless steel	7MF7906-1PJ
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

	Article No.
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 2x, without glass window, with seal NBR	7MF7901-1BB
Closed lid aluminum, painted 2x, without glass window, with seal FVMQ	7MF7901-1BC
Lid aluminum 2x coated, with glass window, with seal NBR	7MF7901-1BG
Lid aluminum 2x coated, with glass window, with seal FVMQ	7MF7901-1BH
Closed lid stainless steel precision casting, without glass window, with seal NBR	7MF7901-2AB
Closed lid stainless steel precision casting, without glass window, with seal FVMQ	7MF7901-2AC
Lid stainless steel precision casting, with glass window, with seal NBR	7MF7901-2AG
Lid stainless steel precision casting, with glass window, with seal FVMQ	7MF7901-2AH

Ordering example

SITRANS TF420 (single chamber enclosure)

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

Y01: -10 ... +100 °C (32 ... 212 °F)

Y17: TICA123

Factory setting (HART)

- 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

Selection and ordering data (continued)

Factory setting (Profibus PA)

- Input 1: Pt100 (IEC 751); 3-wire connection
- Input 2: not configured (inactive)
- No trimming of input and output (offset)
- Damping: 0.0 s
- Bus address: 126

Technical specifications

	SITRANS TF420 (HART, universal)	SITRANS TF420 PA
General		
Supply voltage ^{1) 2)}		
• Without explosion protection (non-Ex)	10.5 ... 48 V DC	9 ... 32 V DC
• With explosion protection (Ex i)	10.5 ... 30 V DC	9 ... 30 V DC
Additional minimum supply voltage when using test terminals	0.8 V	
Maximum power loss	≤ 850 mW	≤ 544 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	2.5 kV AC/55 V AC
• With explosion protection (Ex i)	2.5 kV AC/42 V AC	2.5 kV AC/42 V AC
Polarity protection	All inputs and outputs	Non-sensitive
Write protection	Wire jumper (transmitter), switch (on display) or software	Wire jumper or software
Warm-up time	< 5 min	< 5 min
Starting time	< 2.75 s	< 15 s
Programming	HART	PA
Signal-to-noise ratio	> 60 dB	
Long-term stability	Better than: • ± 0.05% of measuring span/year • ± 0.18% of measuring span/5 years	Better than • ± 0.05 % of the measured value/year • ± 0.1 % of the measured value/5 years
Response time	4 ... 20 mA: ≤ 55 ms HART: ≤ 75 ms (typically 70 ms)	≤ 400 ms
Programmable damping	0 ... 60 s	< 100 ms
Signal dynamic		0 ... 60 s
• Input	24 bit	
• Output	18 bit	
Influence of change in supply voltage	< 0.005% of measuring span/V DC	
Input		
<u>Resistance thermometer (RTD)</u>		
Input type		

	SITRANS TF420 (HART, universal)	SITRANS TF420 PA
• Pt10 ... 10000	• IEC 60751 • JIS C 1604-8 • GOST 6651_2009 • Callendar Van Dusen	• IEC 60751 • JIS C 1604-8 • GOST 6651_2009 • Callendar Van Dusen
• Ni10 ... 10000	• DIN 43760-1987 • GOST 6651-2009/OIML R84:2003	• DIN 43760-1987 • GOST 6651-2009/OIML R84:2003
• Cu5 ... 1000	• Edison Copper Winding No. 15 • GOST 6651-2009/OIML R84:2-003	• Edison Copper Winding No. 15 • GOST 6651-2009/OIML R84:2003
Connection type	2-wire, 3-wire or 4-wire	2-wire, 3-wire or 4-wire
Wire resistance per wire	Max. 50 Ω	Max. 50 Ω
Input current	< 0.15 mA	< 0.15 mA
Effect of the wire resistance (with 3-wire and 4-wire connections)	< 0.002 Ω/Ω	< 0.002 Ω/Ω
Cable, wire-wire capacity		
• Pt1000, Pt10000 (IEC 60751 and JIS C 1604-8)	Max. 30 nF	Max. 30 nF
• All other input types	Max. 50 nF	Max. 50 nF
Error 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 error detection.	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 error detection.
Detection limit for short-circuited input	15 Ω	15 Ω
Error detection time (RTD)	≤ 75 ms (typically 70 ms)	≤ 400 ms
Error detection time (for 3-wire and 4-wire)	≤ 2 000 ms	≤ 2 000 ms
<u>Thermocouples (TC)</u>		
Input type		
• B	IEC 60584-1	IEC 60584-1
• E	IEC 60584-1	IEC 60584-1

Temperature Measurement

Temperature transmitters

Field transmitters/field indicator / SITRANS TF420 (HART, PA, universal)

Technical specifications (continued)

	SITRANS TF420 (HART, universal)	SITRANS TF420 PA		SITRANS TF420 (HART, universal)	SITRANS TF420 PA
• J	IEC 60584-1	IEC 60584-1	• $R \leq 400 \Omega$	Max. 50 nF	Max. 50 nF
• K	IEC 60584-1	IEC 60584-1	Error detection, programmable	None, defective	None, defective
• L	DIN 43710	DIN 43710	<u>Potentiometers</u>		
• Lr	GOST 3044-84	GOST 3044-84	Input range	0 ... 100 kΩ	10 ... 100 kΩ
• N	IEC 60584-1	IEC 60584-1	Minimum measuring span	25 Ω	25 Ω
• R	IEC 60584-1	IEC 60584-1	Connection type	2-wire, 3-wire or 4-wire	3-wire, 4-wire or 5-wire
• S	IEC 60584-1	IEC 60584-1	Wire resistance per wire	Max. 50 Ω	Max. 50 Ω
• T	IEC 60584-1	IEC 60584-1	Input current	< 0.15 mA	< 0.15 mA
• U	DIN 43710	DIN 43710	Effect of the wire resistance (with 4-wire and 5-wire connections)	< 0.002 Ω/Ω	< 0.002 Ω/Ω
• W3	ASTM E988-96	ASTM E988-96	Cable, wire-wire capacity		
• W5	ASTM E988-96	ASTM E988-96	• $R > 400 \Omega$	Max. 30 nF	Max. 30 nF
• LR	GOST 3044-84	GOST 3044-84	• $R \leq 400 \Omega$	Max. 50 nF	Max. 50 nF
Cold Junction Compensation (CJC)	Constant, internal or external over Pt100 or Ni100 RTD	Constant, internal or external over Pt100 or Ni100 RTD	Error detection, programmable	None, short-circuited, defective, short-circuited or defective	None, short-circuited, defective, short-circuited or defective
• Temperature range internal CJC	-50 ... +100 °C (-58 ... +212 °F)	-50 ... +100 °C (-58 ... +212 °F)	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 error detection.		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 error detection.
• Connection external CJC	2-wire or 3-wire	2-wire, 3-wire or 4-wire	Detection limit for short-circuited input	15 Ω	15 Ω
• External CJC, wire resistance per wire (for 3-wire and 4-wire connections)	50 Ω	50 Ω	Error detection time, wiper arm (no short-circuit detection)	≤ 75 ms (typically 70 ms)	≤ 400 ms
• Effect of the wire resistance (with 3-wire and 4-wire connections)	< 0.002 Ω/Ω	< 0.002 Ω/Ω	Error detection time, element	≤ 2 000 ms	≤ 2 000 ms
• Input current external CJC	< 0.15 mA	< 0.15 mA	Error detection time (for 4-wire and 5-wire)	≤ 2 000 ms	≤ 2 000 ms
• Temperature range external CJC	-50 ... +135 °C (-58 ... +275 °F)	-50 ... +135 °C (-58 ... +275 °F)	<u>Supply voltage</u>		
• Cable, wire-wire capacity	Max. 50 nF	Max. 50 nF	Measuring range		
• Total wire resistance	Max. 10 kΩ	Max. 10 kΩ	• Unipolar	-100 ... 1700 mV	-100 ... 1700 mV
• Error detection, programmable	None, short-circuited, defective, short-circuited or defective	None, short-circuited, defective, short-circuited or defective	• Bipolar	-800 ... +800 mV	-800 ... +800 mV
Note The short-circuited error detection only applies to the CJC input.		Note The short-circuited error detection only applies to the CJC input.	Minimum measuring span	2.5 mV	2.5 mV
• Error detection time (TC)	≤ 75 ms (typically 70 ms)	≤ 400 ms	Input resistance	10 MΩ	10 MΩ
• Error detection time, external CJC (for 3-wire and 4-wire)	≤ 2 000 ms	≤ 2 000 ms	Cable, wire-wire capacity		
<u>Linear resistance</u>			• Input range: -100 ... 1700 mV	Max. 30 nF	Max. 30 nF
Input range	10 Ω ... 100 kΩ	0 ... 100 kΩ	• Input range: -20 ... 100 mV	Max. 50 nF	Max. 50 nF
Minimum measuring span	25 Ω	25 Ω	Error detection, programmable	None, defective	None, defective
Connection type	2-wire, 3-wire or 4-wire	2-wire, 3-wire or 4-wire	Error detection time	≤ 75 ms (typically 70 ms)	≤ 400 ms
Wire resistance per wire	Max. 50 Ω	Max. 50 Ω	Output and HART communication		
Input current	< 0.15 mA	< 0.15 mA	Normal range, programmable	3.8 ... 20.5 mA/20.5 ... 3.8 mA	
Effect of the wire resistance (with 3-wire and 4-wire connections)	< 0.002 Ω/Ω	< 0.002 Ω/Ω	Extended range (output limits), programmable	3.5 ... 23 mA/23 ... 3.5 mA	
Cable, wire-wire capacity			Programmable input/output limits		
• $R > 400 \Omega$	Max. 30 nF	Max. 30 nF	• Fault current	Enable/disable	
			• Fault current setting	3.5 ... 23 mA	
			Update time	10 ms	100 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)	

Temperature Measurement

Temperature transmitters

Field transmitters/field indicator / SITRANS TF420 (HART, PA, universal)

Technical specifications (continued)

	SITRANS TF420 (HART, universal)	SITRANS TF420 PA
Input error detection, programmable (detection of input short-circuits is ignored with TC and voltage inputs)	3.5 ... 23 mA	
NAMUR NE43 Upscale	> 21 mA	
NAMUR NE43 Downscale	< 3.6 mA	
HART protocol versions	HART 7	
Measuring accuracy		
Input accuracy	See "Input accuracy" table	See "Input accuracy" table
Output accuracy	See "Output accuracy" table	See "Output accuracy" table
Operating conditions		
Ambient temperature		
• Without local operation in single chamber enclosure	-50 ... +85 °C (-58 ... +185 °F)	-40 ... +85 °C (-40 ... +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)	-40 ... +85 °C (-40 ... +185 °F)
Reference temperature for sensor calibration	24 °C ±1.0 °C (75.2 °F ±1.8 °F)	24 °C ±1.0 °C (75.2 °F ±1.8 °F)
Relative humidity	< 99% (no condensation)	< 99% (no condensation)
Degree of protection		
• Temperature transmitter enclosure	IP66/IP68	IP68
• Terminals	IP00	IP00
Structural design		
Weight		50 g (0.11 lb)
• 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 mm ² (AWG 16)	1.5 mm ² (AWG 16)
• Dual chamber enclosure	2.5 mm ² (AWG 14)	2.5 mm ² (AWG 14)
Tightening torque for clamping screws	0.4 Nm (single chamber enclosure) 0.5 ... 0.6 Nm (dual chamber enclosure)	0.4 Nm (single chamber enclosure) 0.5 ... 0.6 Nm (dual chamber enclosure)
Vibrations	IEC 60068-2-6	IEC 60068-2-6
• 2 ... 25 Hz	± 1.6 mm (0.07 inches)	± 1.6 mm (0.07 inches)
• 25 ... 100 Hz	± 4 g	± 4 g

	SITRANS TF420 (HART, universal)	SITRANS TF420 PA
Certificates and approvals		
<u>Explosion protection ATEX/IECEx and others</u>		
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)	• in progress • in progress • in progress
"Intrinsic safety ia/ib" type of protection	For use in Zone 0, 1, 2, 21	For use in Zone 0, 1, 2, 20, 21, 22
• 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	• II 1 G Ex ia IIC T6 ... T4 Ga • II 2(1) G Ex ib [ia Ga] IIC T6 ... T4 Gb • II 2 D Ex ia IIIC Db • I M1 Ex ia I Ma
• 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	• Ex ia IIC T6 ... T4 Ga • Ex ib [ia Ga] IIC T6 ... T4 Gb • Ex ia IIIC Db • Ex ia I Ma
"Intrinsic safety ic" type of protection	For use in Zones 2 and 22	For use in Zones 2 and 22
• ATEX	• II 3 G Ex ic IIC T6...T4 Gc • II 3 D Ex ic IIIC T100 °C Dc	• II 3 G Ex ic IIC T6...T4 Gc • II 3 D Ex ic IIIC Dc
• IECEx and others	• Ex ic IIC T6 ... T4 Gc • Ex ic IIIC T100 °C Dc	• Ex ic IIC T6 ... T4 Gc • Ex ic IIIC Dc
"Increased safety ec" type of protection	For use in Zone 2	For use in Zones 2 and 22
• ATEX	II 3 G Ex ec IIC T6...T4 Gc	• II 3 G Ex ec IIC T6...T4 Gc
• IECEx and others	Ex ec IIC T6 ... T4 Gc	• 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 and 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>

Temperature Measurement

Temperature transmitters

Field transmitters/field indicator / SITRANS TF420 (HART, PA, universal)

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)
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)

Temperature Measurement

Temperature transmitters

Field transmitters/field indicator / SITRANS TF420 (HART, PA, universal)

Technical specifications (continued)

Input type	Basic accuracy	Temperature coefficient ¹⁾
Ni120	$\leq \pm 0.16\text{ °C (0.288 °F)}$	$\leq \pm 0.002\text{ °C/°C (°F/°F)}$
Ni200	$\leq \pm 0.16\text{ °C (0.288 °F)}$	$\leq \pm 0.002\text{ °C/°C (°F/°F)}$
Ni500	$\leq \pm 0.16\text{ °C (0.288 °F)}$	$\leq \pm 0.002\text{ °C/°C (°F/°F)}$
Ni1000	$\leq \pm 0.16\text{ °C (0.288 °F)}$	$\leq \pm 0.002\text{ °C/°C (°F/°F)}$
Ni2000	$\leq \pm 0.16\text{ °C (0.288 °F)}$	$\leq \pm 0.002\text{ °C/°C (°F/°F)}$
Ni10000	$\leq \pm 0.32\text{ °C (0.576 °F)}$	$\leq \pm 0.002\text{ °C/°C (°F/°F)}$
Ni x	Largest tolerance of neighboring points	Largest temperature coefficient of neighboring points
Cu5	$\leq \pm 1.6\text{ °C (2.88 °F)}$	$\leq \pm 0.040\text{ °C/°C (°F/°F)}$
Cu10	$\leq \pm 0.8\text{ °C (1.44 °F)}$	$\leq \pm 0.020\text{ °C/°C (°F/°F)}$
Cu20	$\leq \pm 0.4\text{ °C (0.72 °F)}$	$\leq \pm 0.010\text{ °C/°C (°F/°F)}$
Cu50	$\leq \pm 0.16\text{ °C (0.288 °F)}$	$\leq \pm 0.004\text{ °C/°C (°F/°F)}$
Cu100	$\leq \pm 0.08\text{ °C (0.144 °F)}$	$\leq \pm 0.002\text{ °C/°C (°F/°F)}$
Cu200	$\leq \pm 0.08\text{ °C (0.144 °F)}$	$\leq \pm 0.002\text{ °C/°C (°F/°F)}$
Cu500	$\leq \pm 0.16\text{ °C (0.288 °F)}$	$\leq \pm 0.002\text{ °C/°C (°F/°F)}$
Cu1000	$\leq \pm 0.08\text{ °C (0.144 °F)}$	$\leq \pm 0.002\text{ °C/°C (°F/°F)}$
Cu x	Largest tolerance of neighboring points	Largest temperature coefficient of neighboring points
Linear resistance		
0 ... 400 Ω	$\leq \pm 40\text{ m}\Omega$	$\leq \pm 2\text{ m}\Omega/\text{°C (1.11 m}\Omega/\text{°F)}$
0 ... 100 k Ω	$\leq \pm 4\text{ }\Omega$	$\leq \pm 0.2\text{ }\Omega/\text{°C (0.11 }\Omega/\text{°F)}$
Potentiometers		
0 ... 100%	$< 0.05\%$	$< \pm 0.005\%$
Supply voltage		
mV: -20 ... 100 mV	$\leq \pm 5\text{ }\mu\text{V}$	$\leq \pm 0.2\text{ }\mu\text{V/°C (0.11 }\mu\text{V/°F)}$
mV: -100 ... 1700 mV	$\leq \pm 0.1\text{ mV}$	$\leq \pm 36\text{ }\mu\text{V/°C (20 }\mu\text{V/°F)}$
mV: $\pm 800\text{ mV}$	$\leq \pm 0.1\text{ mV}$	$\leq \pm 32\text{ }\mu\text{V/°C (17.8 }\mu\text{V/°F)}$
TC		
E	$\leq \pm 0.2\text{ °C (0.36 °F)}$	$\leq \pm 0.025\text{ °C/°C (°F/°F)}$
J	$\leq \pm 0.25\text{ °C (0.45 °F)}$	$\leq \pm 0.025\text{ °C/°C (°F/°F)}$
K	$\leq \pm 0.25\text{ °C (0.45 °F)}$	$\leq \pm 0.025\text{ °C/°C (°F/°F)}$
L	$\leq \pm 0.35\text{ °C (0.63 °F)}$	$\leq \pm 0.025\text{ °C/°C (°F/°F)}$
N	$\leq \pm 0.4\text{ °C (0.72 °F)}$	$\leq \pm 0.025\text{ °C/°C (°F/°F)}$
T	$\leq \pm 0.25\text{ °C (0.45 °F)}$	$\leq \pm 0.025\text{ °C/°C (°F/°F)}$
U	$< 0\text{ °C (32 °F)} \leq \pm 0.8\text{ °C (1.44 °F)}$ $\geq 0\text{ °C (32 °F)} \leq \pm 0.4\text{ °C (0.72 °F)}$	$\leq \pm 0.025\text{ °C/°C (°F/°F)}$
Lr	$\leq \pm 0.2\text{ °C (0.36 °F)}$	$\leq \pm 0.1\text{ °C/°C (°F/°F)}$
R	$< 200\text{ °C (392 °F)} \leq \pm 0.5\text{ °C (0.9 °F)}$ $\geq 200\text{ °C (392 °F)} \leq \pm 1\text{ °C (1.8 °F)}$	$\leq \pm 0.1\text{ °C/°C (°F/°F)}$
S	$< 200\text{ °C (392 °F)} \leq \pm 0.5\text{ °C (0.9 °F)}$ $\geq 200\text{ °C (392 °F)} \leq \pm 1\text{ °C (1.8 °F)}$	$\leq \pm 0.1\text{ °C/°C (°F/°F)}$
W3	$\leq \pm 0.6\text{ °C (1.08 °F)}$	$\leq \pm 0.1\text{ °C/°C (°F/°F)}$
W5	$\leq \pm 0.4\text{ °C (0.72 °F)}$	$\leq \pm 0.1\text{ °C/°C (°F/°F)}$
B ²⁾	$\leq \pm 1\text{ °C (1.8 °F)}$	$\leq \pm 0.1\text{ °C/°C (°F/°F)}$
B ³⁾	$\leq \pm 3\text{ °C (5.4 °F)}$	$\leq \pm 0.1\text{ °C/°C (°F/°F)}$
B ⁴⁾	$\leq \pm 8\text{ °C (14.4 °F)}$	$\leq \pm 0.8\text{ °C/°C (°F/°F)}$
B ⁵⁾	Not specified	Not specified
CJC (internal)	$< \pm 0.5\text{ °C (0.9 °F)}$	Included in basic accuracy
CJC (external)	$\leq \pm 0.08\text{ °C (0.144 °F)}$	$\leq \pm 0.002\text{ °C/°C (°F/°F)}$

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 $> 400\text{ °C (752 °F)}$

³⁾ Accuracy of the specification range $> 160\text{ °C (320 °F)} < 400\text{ °C (752 °F)}$

⁴⁾ Accuracy of the specification range $> 85\text{ °C (185 °F)} < 160\text{ °C (320 °F)}$

⁵⁾ Accuracy of the specification range $< 85\text{ °C (185 °F)}$

Temperature Measurement

Temperature transmitters

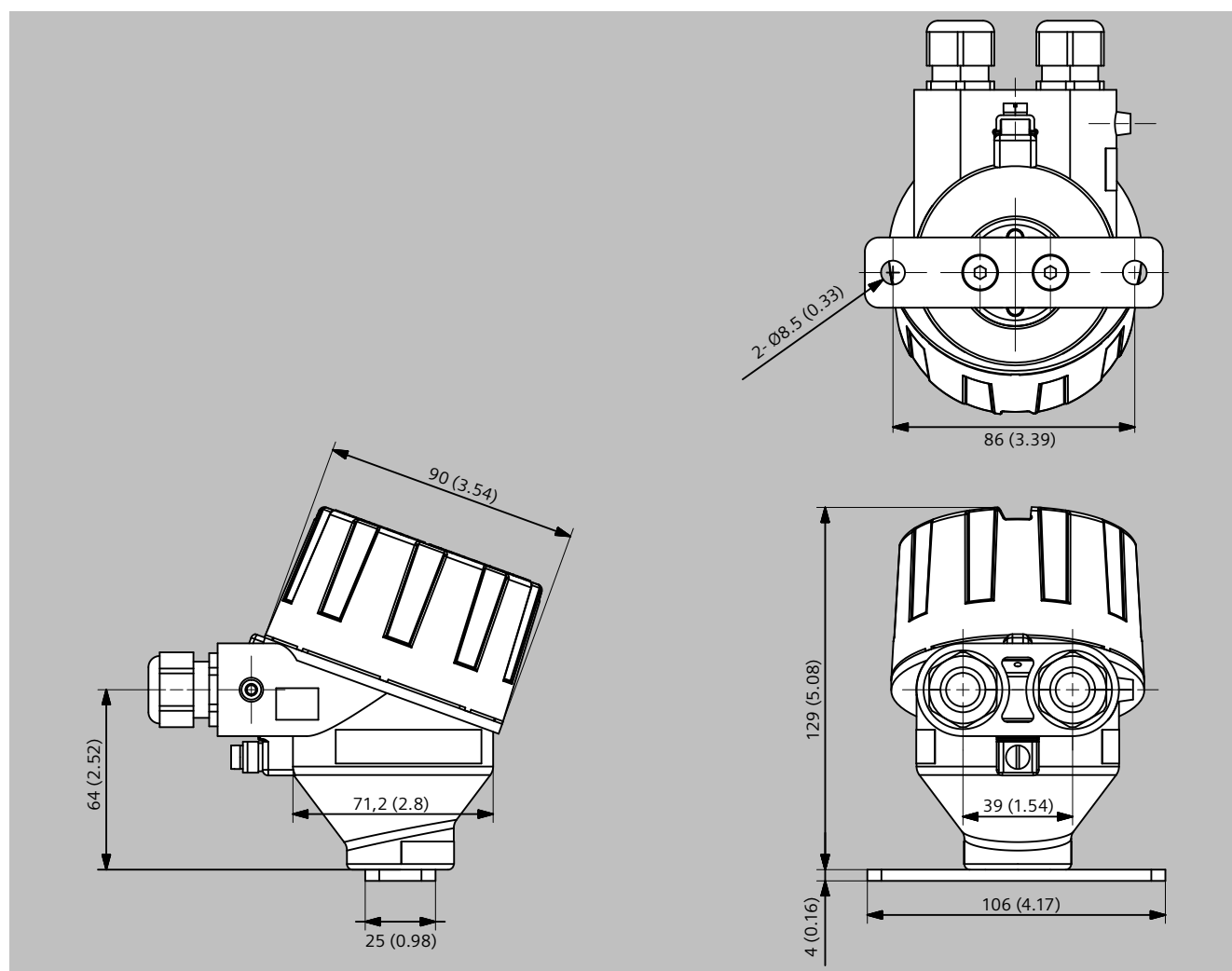
Field transmitters/field indicator / SITRANS TF420 (HART, PA, universal)

Technical specifications (continued)

Output accuracy

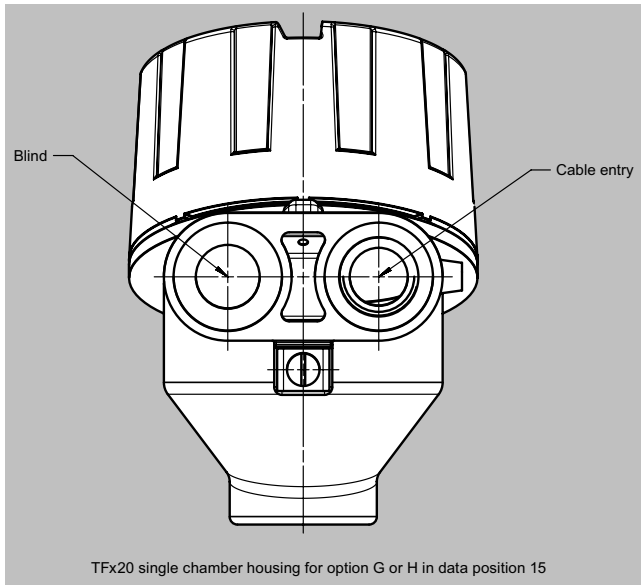
Output type	Basic accuracy	Temperature coefficient
Average value measurement	Average of accuracy of input 1 and input 2	Average of temperature coefficient of input 1 and input 2
Differential measurement	Sum of accuracy of input 1 and input 2	Sum of temperature coefficient of input 1 and input 2
Analog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

Dimensional drawings

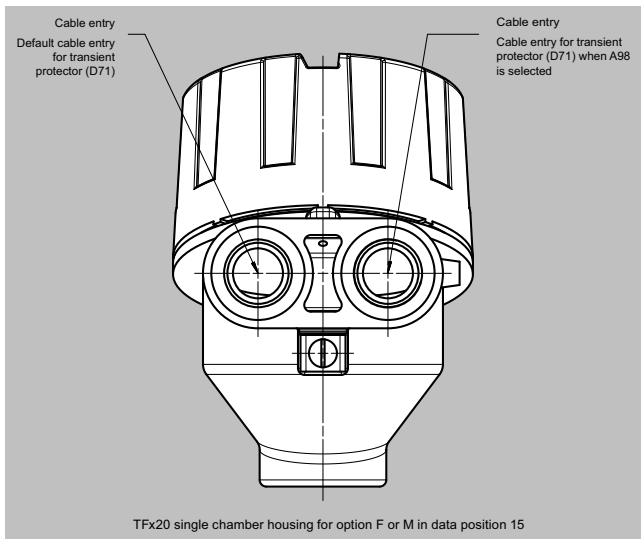


SITRANS TF420, single chamber enclosure, dimensions in mm (inch)

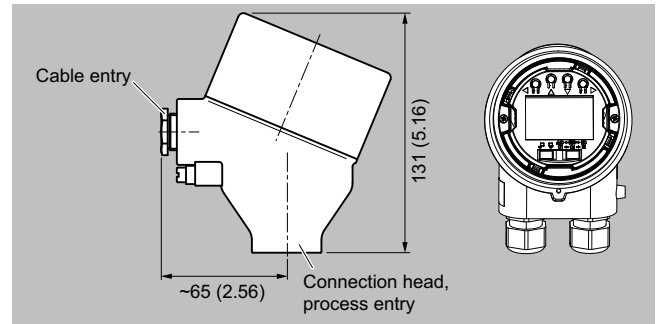
Dimensional drawings (continued)



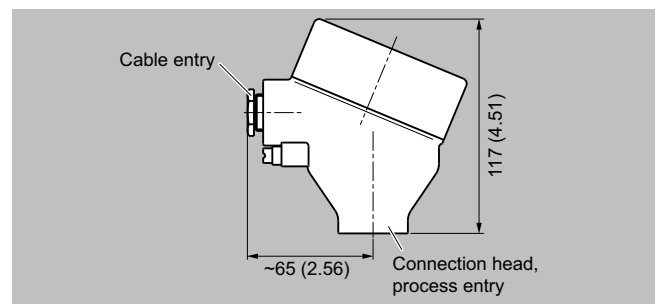
SITRANS TF420 single chamber enclosure



SITRANS TF420 single chamber enclosure



Connection head with 4-20 mA display, dimensions in mm (inch)



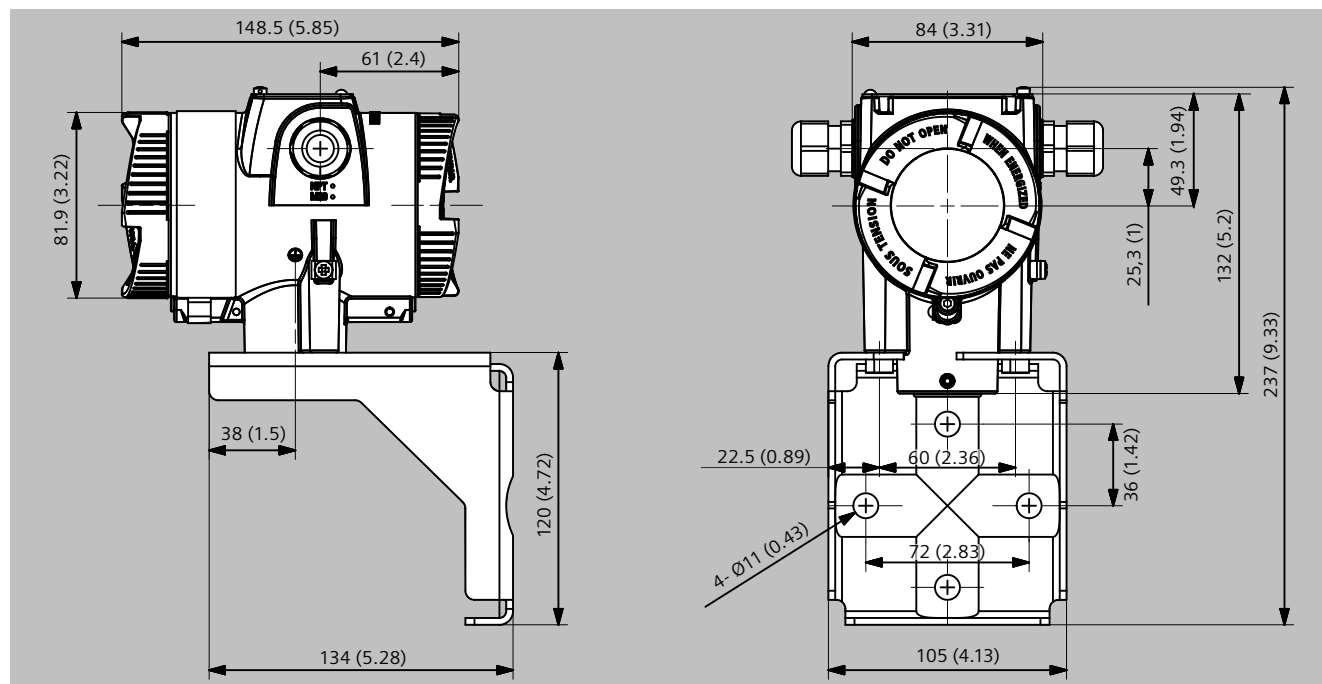
Connection head, dimensions in mm (inch)

Temperature Measurement

Temperature transmitters

Field transmitters/field indicator / SITRANS TF420 (HART, PA, universal)

Dimensional drawings (continued)

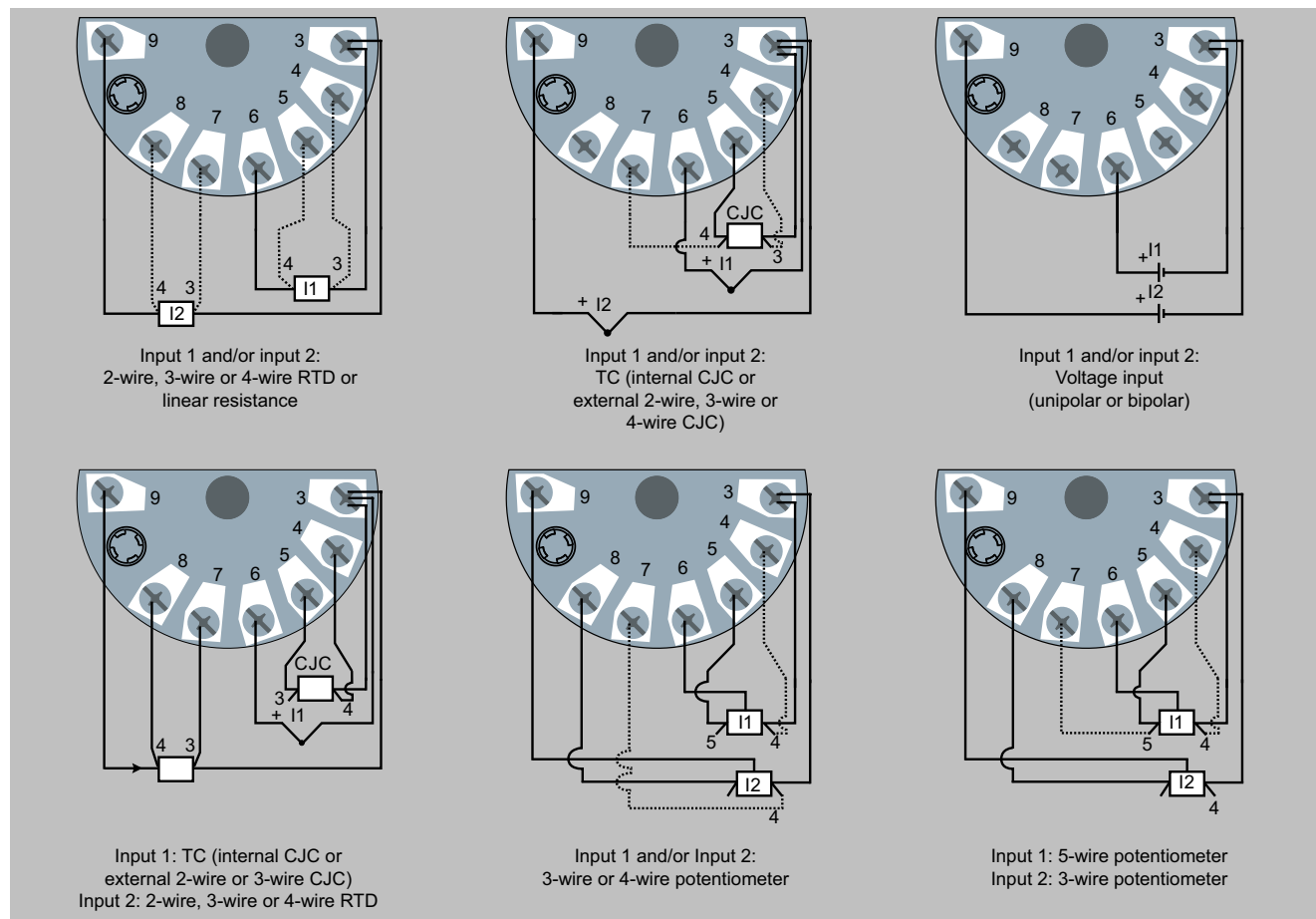


SITRANS TF420, dual chamber enclosure, dimensions in mm (inch)

Circuit diagrams

Connections

Input connection



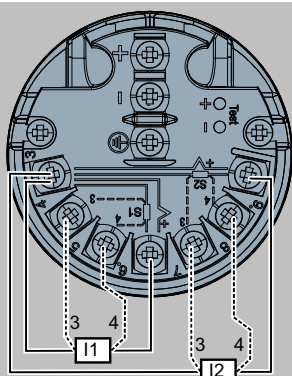
SITRANS TF420 in single chamber enclosure (7NG044*), input connection assignment

Temperature Measurement

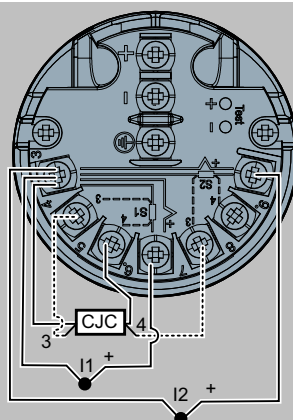
Temperature transmitters

Field transmitters/field indicator / SITRANS TF420 (HART, PA, universal)

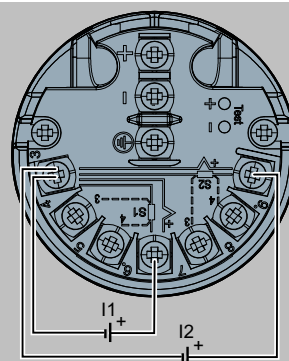
Circuit diagrams (continued)



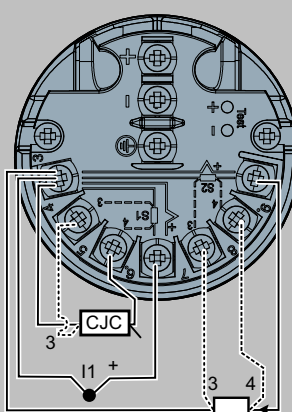
Input 1 (I1) and/or input 2 (I2):
2-wire, 3-wire or 4-wire RTD or
linear resistance



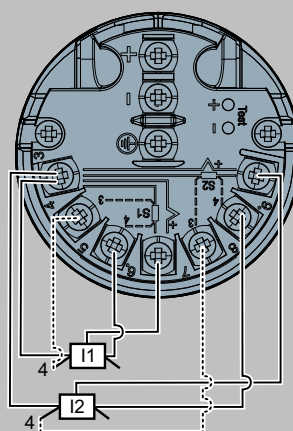
Input 1 (I1) and/or input 2 (I2):
TC (internal CJC or
external 2-wire, 3-wire or
4-wire CJC)



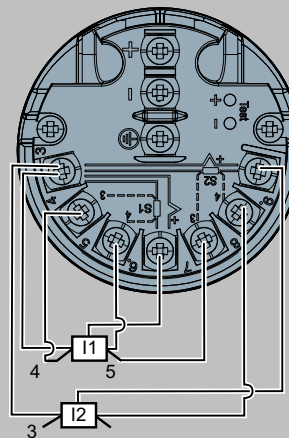
Input 1 (I1) and/or input 2 (I2):
Voltage input
(unipolar or bipolar)



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



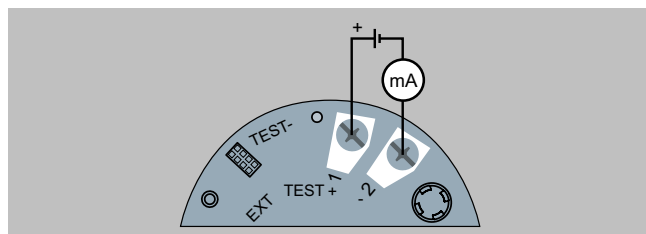
Input 1 (I1) and/or input 2 (I2):
3-wire or 4-wire potentiometer



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

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

Output connection



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

Overview

Other accessories for assembly, connection and transmitter configuration

- Transmitter configuration for SITRANS TH / TR / TF and SITRANS TS
- Cable glands and adapters for SITRANS TF and SITRANS TS
- Lightning protection for SITRANS TF (SITRANS TS on request)
- Plugs for SITRANS TF and SITRANS TS
- Indicator for SITRANS TS500
- Connection and mounting accessories for SITRANS TH
- Connection and mounting accessories for field transmitter SITRANS TF
- Measuring inserts for SITRANS TS500 Measuring inserts: See SITRANS TSinsert
- Connection heads type B for SITRANS TS500 (accessory resistance thermometer)
- Enclosure gaskets for SITRANS TS500
- Connection heads type A and accessories for straight thermocouples
- Installation accessories for connection heads for straight thermocouples

Selection and ordering data

Transmitter configuration for SITRANS TH / TR / TF and SITRANS TS

	Article No.
Modems	
Modem with USB interface and SIPROM T software 4 ... 20 mA	7NG3092-8KN
• With USB connection • For SITRANS TH100, TH200, TH320, TR200, TR320, TF320, TF420 and TF, with TH200	
HART modem with USB interface for all HART devices	7MF4997-1DB
• With USB connection • For SITRANS TH300, TH320, TH420, TR300, TR320, TR420, TF320, TF420, TF in HART	
SIMATIC PDM parameterization software	See section 8 "Digitalization and communication"
• For SITRANS TH300, TR300, TH400, TF320, TF420, TF in HART / PROFIBUS PA / FOUNDATION Fieldbus	

Cable glands and adapters for SITRANS TF and SITRANS TS

	Article No.
M20 × 1.5 nickel-plated brass; with Ex-d approval	7MF4997-2FR
½-NPT nickel-plated brass; with Ex-d approval	7MF4997-2FU
CAPRI screw connection M20 × 1.5 nickel-plated brass; with Ex-d approval	7MF4997-2LA
CAPRI screw connection M20 × 1.5 stainless steel; with Ex-d approval	7MF4997-2LB
CAPRI screw connection ½-14 NPT nickel-plated brass; with Ex-d approval	7MF4997-2LC
CAPRI screw connection ½-14 NPT stainless steel; with Ex-d approval	7MF4997-2LD
Thread adapter M20 × 1.5 (external thread) to ½-14 NPT (internal thread)	7MP1990-0BA00
Thread adapter M20 × 1.5 (external thread) to G½ (internal thread)	7MP1990-0BB00

Lightning protection for SITRANS TF (SITRANS TS on request)

	Article No.
Transient protector M20 × 1.5 (lightning protection)	7MF4997-2DU
Transient protector ½-14 NPT (lightning protection)	7MF4997-2DV

Plugs for SITRANS TF and SITRANS TS

	Article No.
Han 7D plug made of plastic	7MF4997-2FB
Han 7D plug made of metal	7MF4997-2FC
M12 socket angled for cable diameter 4 ... 6 mm (0.158 ... 0.236 inches), -25 ... +85 °C (-13 ... 185 °F)	3RK1902-4CA00-4AA0

Indicator for SITRANS TS500

	Article No.
Local operation with temperature transmitters SITRANS TH320/TH420 4 ... 20 mA/HART	7MF7902-1AD
Mounting system for local operation in single chamber enclosure including fastening and connecting cable	7MF7902-1AS

Temperature Measurement

Accessories

Further accessories for assembly, connection and transmitter configuration

Selection and ordering data (continued)

Connection and mounting accessories for SITRANS TH

	Article No.
Mounting rail adapter for head-mounted transmitter (order quantity: 5 units)	7NG3092-8KA
Connecting cable 4-wire, 200 mm (7.87 inches), for input connections when using head-mounted transmitters in the high spring flap (set with 5 units)	7NG3092-8KC

Connection and mounting accessories for field transmitter SITRANS TF

	Article No.
Mounting bracket and fastening parts	
Made of steel for 7NG313... and 7MP1110	7MF4997-1AC
Made of steel for 7NG313...C..	7MF4997-1AB
Made of stainless steel 304 for 7NG313... and 7MP1110	7MF4997-1AJ
Made of stainless steel 304 for 7NG313...C..	7MF4997-1AH
Made of stainless steel 316L for 7NG313...B..	7MF4997-1AQ
Made of stainless steel 316L for 7NG313...C..	7MF4997-1AP
Digital indicator for SITRANS TF ¹⁾	7MF4997-1BS
Connection board for SITRANS TF	ASE02391790
Lid, die-cast aluminum, without inspection window	7MF4997-1BB
Lid, die-cast aluminum, with inspection window	7MF4997-1BE

¹⁾ Retrofitting not possible with Ex devices.

Measuring inserts for SITRANS TS500

Measuring inserts, see SITRANS TSinsert.

Connection heads type B for SITRANS TS500 (resistance thermometer accessories)

	Article No.
Degree of protection IP54	
Connection head type: similar to BA0; aluminum; flange cover	7MC1907-1BA
Connection head type: similar to BM0; plastic; screw cover	7MC1907-1BK
Degree of protection IP65	
Connection head type: similar to BB0; aluminum; small spring flap	7MC1907-1BF
Connection head type: similar to BC0; aluminum; high spring flap	7MC1907-1BL
Quick-release lock for connection heads BB0, BC0, degree of protection of connection head reduced to IP20, weight: 0.02 kg (0.04 lb)	7MC1907-1BS

Spare parts/enclosure gaskets for SITRANS TF320/TF420 and SITRANS TS500

	Article No.
Lid gasket SITRANS TF320/TF420 single chamber enclosure as well as for SITRANS TS500 enclosure AGO, AVO, AUO, AVU	7MF7901-3AB

Selection and ordering data (continued)

Connection heads type A and accessories for straight thermocouples

Metal thermowells for straight thermocouples according to EN 50446

	Article No.
X 10 CrAl 24, material no. 1.4749 Ø 22 × 2 mm (Ø 0.87 × 0.08 inches), 0.55 ... 1.10 kg (1.21 ... 2.42 lb), dished Nominal length/thermowell length in mm (inch):	
• 500 (19.7)/520 (20.5)	7MC2900-1DA
• 710 (28.0)/730 (28.7)	7MC2900-2DA
• 1 000 (39.4)/1 020 (40.2)	7MC2900-3DA
X 18 CrNi28, material no. 1.4749 Ø 26 × 4 mm (Ø 1.02 × 0.16 inches), 1.25 ... 2.20 kg (2.76 ... 4.85 lb), dished Nominal length/thermowell length in mm (inch):	
• 500 (19.7)/520 (20.5)	7MC2900-1EC
• 710 (28.0)/730 (28.7)	7MC2900-2EC
• 1 000 (39.4)/1 020 (40.2)	7MC2900-3EC
X 15 CrNiSi 25 20, material no. 1.4841 Ø 22 × 2 mm (Ø 0.87 × 0.08 inches), 1.05 kg (2.31 lb), dished Nominal length/thermowell length in mm (inch):	
• 1 000 (39.4)/1 020 (40.2)	7MC2900-3FA
CrAl 205 (Kanthal AF), material no. 1.4767 Ø 22 × 2 mm (Ø 0.87 × 0.05 inches), 0.55 ... 1.10 kg (1.21 ... 2.42 lb) Nominal length/thermowell length in mm (inch):	
• 500 (19.7)/520 (20.5)	7MC2900-1HA
• 710 (28.0)/730 (28.7)	7MC2900-2HA
• 1 000 (39.4)/1 020 (40.2)	7MC2900-3HA

Thermocouples for straight thermocouples according to EN 50446

	Article No.
Base thermocouple with isolating pipe Wire diameter 3 mm (0.12 inches) Ni Cr/Ni, up to 1 000 °C (max. 1 300 °C), (up to 1 832 °F (max. 2 372 °F)) 0.55 ... 2.10 kg (1.21 ... 4.63 lb) Nominal length L1/Thermowell length L2 in mm (inch):	
• 500 (19.7)/540 (21.3)	7MC2903-1CA
• 1 000 (39.4)/1 040 (40.9)	7MC2903-3CA

Connection heads for straight thermocouples

	Article No.
Connection head, type A (without terminal base and terminals), 1 cable entry, degree of protection IP53, 0.35 kg (0.77 lb) Light metal, screw-on cover, for thermowell diameter in mm (inch) (hole = thermowell diameter +0.5 mm) (0.02 inches)	
• 22 (0.87)	7MC2905-1AA

Selection and ordering data (continued)

	Article No.
• 26 (1.02) Light metal, high spring flap, for thermowell diameter in mm (inch) (hole = thermowell diameter +0.5 mm) (0.02 inches)	7MC2905-1BA
• 22 (0.87)	7MC2905-4AA
• 26 (1.02)	7MC2905-4BA

Installation accessories for connection heads for straight thermocouples

- Terminal base
- Terminal
- Sealing rings
- Washer
- Stop flange
- Threaded sleeve

	Article No.
Terminal base without terminals for base thermocouples; 0.06 kg (0.13 lb)	7MC2998-1AA
Terminal for base thermocouples; 0.01 kg (0.02 lb)	7MC2998-1BA
Set of sealing rings (100 units) for the lid of the connection head; 0.01 kg (0.02 lb)	7MC2998-1CA
Set of washers (100 units) for the terminal base; 0.01 kg (0.02 lb)	7MC2998-1CB
Stop flange, adjustable, from GTW	
• For thermowell outer diameter 22 mm (0.87 inches); 0.35 kg (0.77 lb)	7MC2998-2CB
• For thermowell outer diameter 26 mm (1.02 inches); 0.32 kg (0.71 lb)	7MC2998-2CC
Threaded sleeve, gas-tight up to 1 bar (14.5 psi), adjustable, material no. 1.0718, with seal; 0.40 kg (0.88 lb)	
• For thermowell outer diameter 22 mm (0.87 inches), G1	7MC2998-2DB
• For thermowell outer diameter 26 mm (1.02 inches), G1	7MC2998-2DC