SITRANS TF - Transmitter, two-wire system and SITRANS TF - Field indicator for 4 to 20 mA

Overview



Our field devices for heavy industrial use

- HART, Universal
- 4 to 20 mA, universal
- Field indicator for 4 to 20 mA signals

The temperature transmitter SITRANS TF works where others feel uncomfortable.

Benefits

- Universal use
 - as transmitter for resistance thermometer, thermocouple element, $\boldsymbol{\Omega}$ or mV signal
- as field indicator for any 4 to 20 mA signals
- · Local sensing of measured values over digital display
- Rugged two-chamber enclosure in die-cast aluminium or stainless steel
- Degree of protection IP66/67/68
- Test terminals for direct read-out of the output signal without breaking the current loop
- · Can be mounted elsewhere if the measuring point
 - is hard to access,
 - is subject to high temperatures,
 - is subject to vibrations from the system,
 - or if you want to avoid long neck tubes and/or protective tubes.
- Can be mounted directly on American-design sensors
- Wide range of approvals for use in potentially explosive atmospheres. "Intrinsically safe, non-sparking and flameproof" type of protections, for Europe and USA.
- SIL2 (with Order code C20), SIL2/3 (with C23)

Application

SITRANS TF can be used everywhere where temperatures need to be measured under particularly adverse conditions, or where a convenient local display is ideal. For that reasons 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 elements. 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 5.9 of the SITRANS TF with an integrated SITRANS TH300 permits parameterization using a PC or HART communicator (hand-held communicator). The SIMATIC PDM makes it easy.

Parameterization is carried out using a PC for SITRANS TF with the integrated and programmable SITRANS TK. Available for this purpose are a special modem and the software tool SIPROM T.

Mode of operation

Mode of operation of SITRANS TF as temperature transmitter

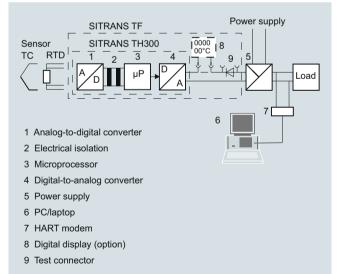
The sensor signal, whether resistance thermometer, thermocouple element or Ω or mV signal, is amplified and linearized. Sensor and output side are electrically isolated. An internal cold junction is integrated for measurements with thermocouple elements.

The device outputs a temperature-linear direct current of 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 TF 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.

Mode of operation of SITRANS TF as field indicator

Any 4 to 20 mA signal can be applied to the generous terminal block. As well as a range of predefined measurement units, the adjustable indicator also supports the input of customized units. This means that any 4 to 20 mA signal can be represented as any type of unit, e.g. pressure, flow rate, filling level or temperature.



Mode of operation: SITRANS TF with integrated transmitter and digital display $% \label{eq:stable}%$

Transmitter for field mounting/field indicator

SITRANS TF - Transmitter, two-wire system and SITRANS TF - Field indicator for 4 to 20 mA

Technical specifications			
Input		Measuring range	parameterizable max. 0 2200 Ω
Resistance thermometer			(see table "Digital measuring errors")
Measured variable	Temperature	Min measured anon	'
Sensor type		Min. measured span	5 25 Ω (see Table "Digital mea- suring errors")
• to IEC 60751	Pt25 Pt1000	Characteristic curve	Resistance-linear or special char-
• to JIS C 1604; a=0.00392 K-1	Pt25 Pt1000		acteristic
• to IEC 60751	Ni25 Ni1000	Thermocouples	
Units	°C and °F	Measured variable	Temperature
Connection		Sensor type (thermocouples)	
Normal connection	1 resistance thermometer (RTD)	• Туре В • Туре С	Pt30Rh-Pt6Rh to DIN IEC 584 W5 %-Re acc. to ASTM 988
· Constantion of overage value	in 2-wire, 3-wire or 4-wire system	• Type D • Type E	W3 %-Re acc. to ASTM 988
 Generation of average value 	Series or parallel connection of several resistance thermometers in	• Type L • Type J	NiCr-CuNi to DIN IEC 584 Fe-CuNi to DIN IEC 584
	a two-wire system for the genera-	• Type K	NiCr-Ni to DIN IEC 584
	tion of average temperatures or for adaptation to other device types	• Type L	Fe-CuNi to DIN 43710
 Generation of difference 	2 resistance thermometers (RTD)	• Type N • Type R	NiCrSi-NiSi to DIN IEC 584 Pt13Rh-Pt to DIN IEC 584
	in 2-wire system (RTD 1 – RTD 2	• Type S	Pt10Rh-Pt to DIN IEC 584
	or RTD 2 – RTD 1)	• Type T	Cu-CuNi to DIN IEC 584
Interface		• Type U	Cu-CuNi to DIN 43710
 Two-wire system 	Parameterizable line resistance $\leq 100 \Omega$ (loop resistance)	Units	°C or °F
 Three-wire system 	No balancing required	Connection	
 Four-wire system 	No balancing required	Normal connection	1 thermocouple (TC)
Sensor current	≤ 0.45 mA	Generation of average value	2 thermocouples (TC)
Response time	≤ 250 ms for 1 sensor with open- circuit monitoring	Generation of difference	2 thermocouples (TC) (TC 1 – TC 2 or TC 2 – TC 1)
Open-circuit monitoring	Always active (cannot be dis- abled)	Response time	≤ 250 ms for 1 sensor with open- circuit monitoring
Short-circuit monitoring	can be switched on/off (default	Open-circuit monitoring	Can be switched off
	value: ON)	Cold junction compensation	
Measuring range	parameterizable (see table "Digi- tal measuring errors")	 Internal 	With integrated Pt100 resistance thermometer
Min. measured span Characteristic curve	10 °C (18 °F) Temperature-linear or special	• External	With external Pt100 IEC 60751 (2-wire or 3-wire connection)
Resistance-based sensors	characteristic	 External fixed 	Cold junction temperature can be set as fixed value
Measured variable	Actual resistance	Measuring range	parameterizable (see table "Digi-
Sensor type	Resistance-based, potentiome-	0 0	tal measuring errors")
51	ters	Min. measured span	Min. 40 100 °C (72 180 °F)
Units	Ω		(see table "Digital measuring errors")
Connection		Characteristic curve	Temperature-linear or special
 Normal connection 	1 resistance-based sensor (R) in 2-wire, 3-wire or 4-wire system		characteristic
 Generation of average value 	2 resistance-based sensors in	mV sensor	
Ū.	2-wire system for generation of	Measured variable	DC voltage
Generation of difference	average value 2 resistance-based sensor in 2-wire system (R 1 – R 2 or	Sensor type	DC voltage source (DC voltage source possible over an exter- nally connected resistor)
	R 2 – R 1)	Units	mV
Interface		Response time	≤ 250 ms for 1 sensor with open-
 Two-wire system 	Parameterizable line resistance $\leq 100 \Omega$ (loop resistance)	Open-circuit monitoring	circuit monitoring Can be switched off
Three-wire system	No balancing required	Measuring range	-10 +70 mV
Four-wire system	No balancing required	weasunny range	-100 +100 mV
Sensor current	≤ 0.45 mA	Min. measured span	2 mV or 20 mV
Response time	≤ 250 ms for 1 sensor with open-	Overload capability of the input	-1.5 +3.5 V DC
	circuit monitoring	Input resistance	\geq 1 M Ω
Open-circuit monitoring	Can be switched off		

Characteristic curve

Voltage-linear or special charac-

teristic

Can be switched off

Can be switched off (value is adjustable)

Open-circuit monitoring

Short-circuit monitoring

Temperature Measurement Transmitter for field mounting/field indicator

SITRANS TF - Transmitter, two-wire system and SITRANS TF - Field indicator for 4 to 20 mA

OutputAuxiliary powerOutput signal4 20 mA, 2-wireCommunication with SITRANS TH300acc. to HART Rev. 5.9Digital displayacc. to HART Rev. 5.9Digital display13.1 5 V DC (30 V for Ex 32 V for Ex ic and Ex nA)Digital displayIn current loopDigital display (optional)In current loopDigit height9 mm (0.35 inch)Display range-99 999 + 99 999Unitsany (max. 5 char.)Setting: Zero point, full-scale value and unitwith 3 buttons	
Communication with SITRANS TH300acc. to HART Rev. 5.932 V for Ex ic and Ex nA) 32 V for Ex ic and Ex nA)Digital displayIn current loop13.1 5 V DC (30 V for Ex 32 V for Ex ic and Ex nA)Digital display (optional)In current loopElectrically isolatedBetween input and output • Test voltageDigit height9 mm (0.35 inch)Electricales and approvalsExplosion protection ATEXDisplay range-99 999 + 99 999* "Intrinsic safety" type of protectionwith digital display: II 2 (1) G Ex ib [ia Ga] II C Ti II 2 G Ex ib II C T4 Gb	
TH300With digital display13.15 V DC (30 V for Ex 32 V for Ex ic and Ex nA)Digital display (optional)In current loopElectrically isolatedBetween input and outputDisplayMax. 5 digits• Test voltage $U_{eff} = 1 \ kV, 50 \ Hz, 1 \ min$ Digit height9 mm (0.35 inch)• Test voltage $U_{eff} = 1 \ kV, 50 \ Hz, 1 \ min$ Display range-99 999 + 99 999• "Intrinsic safety" type of protectionwith digital display: II 2 (1) G Ex ib [ia Ga] II C Ti II 2 G Ex ib II C T4 GbSetting:with 3 buttonsII 2 G Ex ib II C T4 Gb	
Digital display (optional) In current loop Electrically isolated Between input and output Display Max. 5 digits • Test voltage $U_{eff} = 1 \ kV, 50 \ Hz, 1 \ min$ Digit height 9 mm (0.35 inch) • Certificates and approvals Explosion protection ATEX Display range -99 999 + 99 999 • "Intrinsic safety" type of protection with digital display: Units any (max. 5 char.) • "Intrinsic safety" type of protection with digital display: Setting: with 3 buttons II 2 G Ex ib IIC T4 Gb	ID;
Display Max. 5 digits Digit height 9 mm (0.35 inch) Display range -99 999 + 99 999 Units any (max. 5 char.) Setting: with 3 buttons	
Digit height 9 mm (0.35 inch) Certificates and approvals Display range -99 999 + 99 999 Explosion protection ATEX Units any (max. 5 char.) "Intrinsic safety" type of protection Setting: with 3 buttons II 2 G Ex ib IIC T4 Gb	
Display range -99 999 + 99 999 Explosion protection ATEX Units any (max. 5 char.) • "Intrinsic safety" type of protection Setting: with 3 buttons II 2 G Ex ib IIC T4 Gb	
Units any (max. 5 char.) Setting: with 3 buttons	
Units any (max. 5 char.) II 2 (1) G Ex ib [ia Ga] IIC T Setting: with 3 buttons II 2 G Ex ib IIC T4 Gb	
With O Buttonio	4 Gb
Load voltage 2.1 V without digital display:	
Liad voitage 2.1 V II 2 (1) G Ĕx ib [ia Ga] IIC 1	6 Gb
Measuring accuracy II 2 G Ex ib IIC T6 Gb Disited measuring accuracy II 1D Ex ia IIIC T100 °C Da	
Digital measuring errors See table "Digital measuring errors" - EC type test certificate ZELM 11 ATEX 0471 X	
Reference conditions • "Operating equipment that is non- invitable and heallimited assume II 3 G Ex ic IIC T6/T4 Gc	
Auxiliary power 24 V ± 1 % ignitable and has limited energy for zone 2" type of protection II 3 G Ex nA IIC T6/T4 Gc II 3 G Ex nA [ic] IIC T6/T4 GC II 3 G Ex nA [ic] IIC T6/T4 GC II 3 G Ex nA [ic] IIC T6/T4 GC II 3 G Ex nA [ic] IIC T6/T4 GC III 3 G Ex nA [ic] IIC T6/T4 GC III 3 G Ex nA	àc
Load 500 Ω - EC type test certificate ZELM 11 ATEX 0471 X	
Ambient temperature 23 °C (73.4 °F) • "Flame-proof enclosure" type of II 2 G Ex d IIC T6/T5 Gb	
Warming-up time > 5 min protection II 2 D Ex tb IIIC T100 °C Db)
Error in the analog output (digi- tel/analog output (digi- tel/analog output (digi-	
tal/analog converter) Explosion protection to FM Certificate of Compliance Error due to internal cold junction < 0.5 °C (0.9 °F)	
Influence of ambient temperature • Identification (XP, DIP, NI, S) • XP/I/1/BCD/T5 Ta = 85 °C	
(185 °F), T6 Ta = 60 °C (1	
- with resistance thermometers 0.06 °C (0.11 °F)/10°C (18 °F) (185 °F), T6 Ta = 60 °C (1	
- with thermocouples 0.6 °C (1.1 °F)/10°C (18 °F)	
Auxiliary power effect< 0.001 % of span/V• NI/l/2/ABCD/T5 Ta = 85 ° (185 °F), T6 Ta = 60 °C (1	
Effect of load impedance $< 0.002 \%$ of span/100 Ω Type 4X	10 1),
• S/II, 111/2/FG/T5 Ta = 85 °C	
• In the first month < 0.02 % of span (185 °F) , T6 Ta = 60 °C (1 Type 4X	40 °F),
After one year < 0.3 % of span Other certificates IECEx, EAC Ex(GOST),	
After 5 years < 0.4 % of span INMETRO, NEPSI, KOSHA	
Conditions of use Hardware and software require- ments	
Ambient conditions • For the parameterization software	
Storage temperature -40 +85 °C (-40 +185 °F) SIPROM T for SITRANS TF with	
Condensation Permissible	
Electromagnetic compatibility According to EN 61326 and - Personal computer PC with CD-ROM drive and	
Degree of protection to EN 60529 IP66/67/68 PC operating system Windows 98, NT, 2000, XP, Win 8	/ and
Construction SIMATIC PDM for SITRANS TH300 SIMATIC PDM SIMATIC PDM	
Weight Approx. 1.5 kg (3.3 lb) without Communication	
options Load for HART connection 230 1100 Ω	
Dimensions See "Dimensional drawings" • Two-core shielded ≤ 3.0 km (1.86 mi)	
Enclosure material Die-cast aluminum, low in copper, GD-AlSi 12 or stainless steel, • Multi-core shielded ≤ 1.5 km (0.93 mi)	
less steel rating plate	
Electrical connection, sensor connection Screw terminals, cable inlet via M20 x 1.5 or ½-14 NPT screwed cland Factory setting (transmitter): • Pt100 (IEC 751) with 3-wire circuit	
Electrical connection, sensor connection Screw terminals, cable inlet via gland Factory setting (transmitter): Mounting bracket (ontional) Steel galvanized and chromo Pt100 (IEC 751) with 3-wire circuit Mounting bracket (ontional) Steel galvanized and chromo	
Electrical connection, sensor connection Screw terminals, cable inlet via dand Factory setting (transmitter): • Pt100 (IEC 751) with 3-wire circuit	

• Damping 0.0 s

Transmitter for field mounting/field indicator

SITRANS TF - Transmitter, two-wire system and SITRANS TF - Field indicator for 4 to 20 mA

Digital measuring errors

Resistance	thermometer

Thermocou	ples
	p.00

Input	Measuring range	Measuring range Min. mea- sured span		Digital accuracy	
	°C / (°F)	°C)	(°F)	°C	(°F)
to IEC 60751					
Pt25	-200 +850 (-328 +1562)	10	(18)	0.3	(0.54)
Pt50	-200 +850 (-328 +1562)	10	(18)	0.15	(0.27)
Pt100 Pt200	-200 +850 (-328 +1562)	10	(18)	0.1	(0.18)
Pt500	-200 +850 (-328 +1562)	10	(18)	0.15	(0.27)
Pt1000	-200 +350 (-328 +662)	10	(18)	0.15	(0.27)
to JIS C1604-81					
Pt25	-200 +649 (-328 +1200)	10	(18)	0.3	(0.54)
Pt50	-200 +649 (-328 +1200)	10	(18)	0.15	(0.27)
Pt100 Pt200	-200 +649 (-328 +1200)	10	(18)	0.1	(0.18)
Pt500	-200 +649 (-328 +1200)	10	(18)	0.15	(0.27)
Pt1000	-200 +350 (-328 +662)	10	(18)	0.15	(0.27)
Ni 25 Ni 1000	-60 +250 (-76 +482)	10	(18)	0.1	(0.18)

Input	Measuring range	Min. mea- sured span				
	°C / (°F)	°C	(°F)	°C	(°F)	
Туре В	100 1820 (212 3308)	100	(180)	2 ¹⁾	(3.6) ¹⁾	
Type C (W5)	0 2300 (32 4172)	100	(180)	2	(3.6)	
Type D (W3)	0 2300 (32 4172)	100	(180)	12)	(1.8) ²⁾	
Туре Е	-200 +1000 (-328 +1832)	50	(90)	1	(1.8)	
Туре Ј	-200 +1200 (-328 +2192)	50	(90)	1	(1.8)	
Туре К	-200 +1370 (-328 +2498)	50	(90)	1	(1.8)	
Type L	-200 +900 (-328 +1652)	50	(90)	1	(1.8)	
Туре N	-200 +1300 (-328 +2372)	50	(90)	1	(1.8)	
Туре R	-50 +1760 (-58 +3200)	100	(180)	2	(3.6)	
Type S	-50 +1760 (-58 +3200)	100	(180)	2	(3.6)	
Туре Т	-20 +400 (-328 +752)	40	(72)	1	(1.8)	
Туре U	-200 +600 (-328 +1112)	50	(90)	2	(3.6)	

 $^{1)}$ The digital accuracy in the range 100 to 300 °C (212 to 572 °F) is 3 °C (5.4 °F).

²⁾ The digital accuracy in the range 1750 to 2300 °C (3182 to 4172 °F) is 2 °C (3.6 °F).

Resistance-based	sensors

Input	Measuring range	Min. mea- sured span	Digital accuracy
	Ω	Ω	Ω
Resistance	0 390	5	0.05
Resistance	0 2200	25	0.25

mV sensor			
Input	Measuring span	Min. mea- sured span	Digital accuracy
	mV	mV	μ
mV sensor	-10 +70	2	40
mV sensor	-100 +1100	20	400

The digital accuracy is the accuracy after the analog/digital conversion including linearization and calculation of the measured value.

An additional error is generated in the output current 4 to 20 mA as a result of the digital/analog conversion of 0.025 % of the set span (digital-analog error).

The total error under reference conditions at the analog output is the sum from the digital error and the digital-analog error (poss. with the addition of cold junction errors in the case of thermocouple measurements).

© Siemens AG 2018

Temperature Measurement

Transmitter for field mounting/field indicator

Selection and Ordering data	Article No.		Further designs	Order code
Temperature transmitter in field housing Two-wire system 4 20 mA, with electrical	7 NG 3 1 3		Please add "-Z" to Article No. and specify Order code(s) and plain text.	
isolation, with documentation on MiniDVD			Test protocol (5 measuring points)	C11
↗ Click on the Article No. for the online con-			Functional safety SIL2	C20
figuration in the PIA Life Cycle Portal.			Functional safety SIL2/3	C23
Integrated transmitter			Explosion protection	
SITRANS TH200, programmable			Explosion protection Ex ia to INMETRO	E25 ²⁾
 Without Ex protection 	5	0	(Brazil) (only with 7NG3131)	Fac ²)
• With Ex ia (ATEX + IECEx)	5	1	 Explosion protection Ex d to INMETRO (Brazil) (only with 7NG3134) 	E26 ²⁾
• With Ex nAL for zone 2 (ATEX + IECEx)	5	2	Explosion protection Ex nA to INMETRO	E27 ²⁾
 Total device SITRANS TF Ex d (ATEX + IECEx)¹⁾ 	5	4	(Brazil) (only with 7NG3132)	
Total device SITRANS TF according to FM (XP, DIP, NI, S) ¹⁾	5	5	• Explosion protection Ex i to NEPSI (China) (only with 7NG3131)	E55 ²⁾
SITRANS TH300, communication capability according to HART V 5.9			• Explosion protection Ex d to NEPSI (China) (only with 7NG3134)	E56 ²⁾
Without Ex-protection	6	0	 Explosion protection Ex nA to NEPSI 	E57 ²⁾
 With Ex ia (ATEX + IECEx) 	6	1	(China) (only with 7NG3132)	
 With Ex nAL for zone 2 (ATEX + IECEx) 	6	2	 Explosion protection Ex d to KOSHA 	E70 ²⁾
Total device SITRANS TF Ex d	6	4	(Korea) (only with 7NG3134)	
(ATEX + IECEx) ¹⁾ • Total device SITRANS TF according to FM	6	5	Explosion protection Ex i according to EAC (Duration/Delement (Karachaster))	E81 ²⁾
(XP, DIP, NI, S) ¹⁾	Ŭ	J	(Russia/Belarus/Kazahstan) (only for 7NG3131)	
Enclosure	_		Explosion protection Ex d according to EAC	E82 ²⁾
Die-cast aluminium		Α	(Russia/Belarus/Kazahstan)	
Stainless steel precision casting		E	(only for 7NG3134)	
Connections/cable inlet	-		 Explosion protection Ex nA according to EAC 	E83 ²⁾
Screwed glands M20x1.5		В	(Russia/Belarus/Kazahstan)	
Screwed glands ½-14 NPT		С	(only for 7NG3132)	
Digital indicator			Marine approvals	
Without		0	Det Norske Veritas Germanischer Lloyd	D01
With		1	(DNV GL)	D 00
Mounting bracket and securing parts			Bureau Veritas (BV)	D02
Without		0	American Bureau of Chipping (ABC)	D04
Made of steel		1		D05
Made of stainless steel		2	Two coats of lacquer on casing and cover (PU on epoxy)	G10
			Transient protection	J01
			Cable gland CAPRI 1/2 NPT ADE 4F,	D57
			nickle-plated brass (CAPRI 848694 and 810634) included	
			Cable alard 1/2 NDT ADE 1E	D58

2

D58

D59

D60

Cable gland 1/2 NPT ADE 1F, cable diam. 6 ... 12 (CAPRI 818694 and 810534) included

Cable gland 1/2 NPT ADE 4F, stainless steel (CAPRI 848699 and 810634) included

Cable gland 1/2 NPT ADE 1F, cable diam. 4 ... 8.5 (CAPRI 818674 and 810534) included

Transmitter for field mounting/field indicator

SITRANS TF - Transmitter, two-wire system and SITRANS TF - Field indicator for 4 to 20 mA

Selection and Ordering data	Order code	Selection and Ordering data	Article No.
Customer-specific programming Add "-Z" to Article No. and specify Order code(s)	2	Accessories Further accessories for assembly, connection and transmitter configuration, see page 2/238.	
Measuring range to be set Specify in plain text (max. 5 digits): Y01: to °C, °F Measuring point no. (TAG), max. 8 characters	Y01 ³⁾ Y17 ⁴⁾	Modem for SITRANS TH100, TH200, TR200 and TF with TH200 incl. parameterization software T	7NG3092-8KN
Meas. point descriptor, max. 16 characters	Y23 ⁵⁾	with USB interface	
Meas. point message, max. 32 characters	Y24 ⁵⁾	HART modem With USB interface	7454007 100
Only inscription on measuring point label: specify in plain text: Measuring range	Y22 ⁵⁾	SIMATIC PDM parameterization software also for SITRANS TH300	7MF4997-1DB see chapter 8
Pt100 (IEC) 2-wire, $R_L = 0 \Omega$	U02 ⁶⁾	Mounting bracket and securing parts	-
Pt100 (IEC) 3-wire	U03 ⁶⁾	Made of steel for 7NG313B	7MF4997-1AC
Pt100 (IEC) 4-wire	U04 ⁶⁾	Made of steel for 7NG313C	7MF4997-1AB
Thermocouple type B	U20 ⁶⁾⁷⁾	Made of stainless steel for 7NG313B	7MF4997-1AJ
Thermocouple type C (W5)	U21 ⁶⁾⁷⁾	Made of stainless steel for 7NG313C	7MF4997-1AH
Thermocouple type D (W3)	U22 ⁶⁾⁷⁾	Digital indicator ¹⁾	7MF4997-1BS
Thermocouple type E	U23 ⁶⁾⁷⁾	Connection board	A5E02226423
Thermocouple type J	U24 ⁶⁾⁷⁾	1) It is not possible to upgrade devices with Ex pro	tection
Thermocouple type K	U25 ⁶⁾⁷⁾	1 10 1	
Thermocouple type L	U26 ⁶⁾⁷⁾	Ordering example 1:	
Thermocouple type N	U27 ⁶⁾⁷⁾	7NG3135-0AB11-Z Y01+Y23+U03 Y01: -10 +100 °C	
Thermocouple type R	U28 ⁶⁾⁷⁾	Y23: TICA1234HEAT	
Thermocouple type S	U29 ⁶⁾⁷⁾	Ordering example 2:	
Thermocouple type T	U30 ⁶⁾⁷⁾	7NG3136-0AC11-Z Y01+Y23+Y24+U25	
Thermocouple type U	U31 ⁶⁾⁷⁾	Y01: -10 +100 °C Y23: TICA 1234 ABC	

Special differing customer-specific program-Y09⁸⁾ ming, specify in plain text Fail-safe value 3.6 mA (instead of 22.8 mA) U34⁴⁾

With TC: CJC external (Pt100, 3-wire)

With TC: CJC external with fixed value, spec-

Supply units see Chapter "Supplementary Components".

1) Without cable gland.

ify in plain text

2) Option does not include ATEX/IECEx approval, only country-specific approval.

³⁾ For customer-specific programming for RTD and TC, the start value and the end value of the required measuring span must be specified here. For specification on TAG plate, please select Y22.

U41

Y50

- 4) For this selection, Y01 or Y09 must also be selected. For specification on TAG plate, please select Y23.
- ⁵⁾ If only Y22, Y23 or Y24 are ordered and the label only has to be on the tag plate, Y01 does not have to be specified.
- 6) For this selection, Y01 must also be selected.
- 7) Internal reference junction compensation is selected as the default for TC.
- 8) For customer-specific programming, for example mV and ohm, the start value and the end value of the required measuring span and the unit must be entered here.

Factory setting (transmitter): Pt100 (IEC 751) with three-wire circuit
Measuring range: 0 ... 100 °C (32 ... 212 °F)
Fault current 22.8 mA

Sensor offset: 0 °C (0 °F) •

Y24: HEATING BOILER 56789

Damping 0.0 s

© Siemens AG 2018

Temperature Measurement

Transmitter for field mounting/field indicator

SITRANS TF - Transmitter, two-wire system and SITRANS TF - Field indicator for 4 to 20 mA

Selection and Ordering data	Article No.	-
SITRANS TF field indicator	7 NG 3 1 3 0 -	
 Click on the Article No. for the online con- figuration in the PIA Life Cycle Portal. 		
Without Ex-protection	0 1	
With Ex ia (ATEX + IECEx) With Ex nAL for zone 2 (ATEX + IECEx)	1 1 2 1	
Total device SITRANS TF Ex d	4 1	
(ATEX + IECEx) ¹⁾ Total device SITRANS TF according to FM (XP, DIP, NI, S) ¹⁾	5 1	
Enclosure		
Die-cast aluminium Stainless steel precision casting	A E	
Connections/cable inlet		
Screwed glands M20x1.5 Screwed glands ½-14 NPT	B	
Digital indicator	- C	
With	1	
Mounting bracket and securing parts Without		
Made of steel	0	
Made of stainless steel	2	
<i>Further designs</i> Please add "- Z " to Article No. and specify	Order code	
Order code(s) and plain text.		
Test protocol (5 measuring points) Explosion protection	C11	
 Explosion protection Ex ia to INMETRO 	E25 ²⁾	
(Brazil) (only with 7NG3131) • Explosion protection Ex d to INMETRO	E26 ²⁾	
(Brazil) (only with 7NG3134) • Explosion protection Ex nA to INMETRO	E27 ²⁾	
(Brazil) (only with 7NG3132)		
 Explosion protection Ex i to NEPSI (China) (only with 7NG3131) 	E55 ²⁾	
 Explosion protection Ex d to NEPSI (China) (only with 7NG3134) 	E56 ²⁾	
• Explosion protection Ex nA to NEPSI (China) (only with 7NG3132)	E57 ²⁾	
 Explosion protection Ex d to KOSHA 	E70 ²⁾	
(Korea) (only with 7NG3134)	E81 ²⁾	
 Explosion protection Ex i according to EAC (Russia/Belarus/Kazahstan) 		
(only for 7NG3131)	E82 ²⁾	
 Explosion protection Ex d according to EAC (Russia/Belarus/Kazahstan) 		
(only for 7NG3134) • Explosion protection Ex nA according to EAC	E83 ²⁾	
(Russia/Belarus/Kazahstan)		
(only for 7NG3132) Marine approvals		
 Det Norske Veritas Germanischer Lloyd 	D01	
(DNV GL) • Bureau Veritas (BV)	D02	
Lloyd's Register of Shipping (LR)	D04	
 American Bureau of Shipping (ABS) Two coats of lacquer on casing and cover 	D05 G10	
(PU on epoxy) Transient protection	J01	
Cable gland CAPRI 1/2 NPT ADE 4F,	D57	
nickle-plated brass (CAPRI 848694 and 810634) included		
Cable gland 1/2 NPT ADE 1F, cable diam. 6 12 (CAPRI 818694 and 810534) included	D58	
Cable gland 1/2 NPT ADE 4F, stainless steel	D59	
(CAPRI 848699 and 810634) included Cable gland 1/2 NPT ADE 1F, cable diam.	D60	
4 8.5 (CAPRI 818674 and 810534) included		
		_

Selection and Ordering data	Order code
Customer-specific programming Add "-Z" to Article No. and specify Order code(s)	
Measuring range to be set Specify in plain text (max. 5 digits): Y01: to °C, °F	Y01 ³⁾
Only inscription on TAG plate: specify in plain text: Measuring range	Y22 ⁴⁾
Only inscription on TAG plate: Measuring point descriptor, max. 16 characters	Y23 ⁴⁾
Only inscription on TAG plate: Measuring point message, max. 27 characters	Y24 ⁴⁾
Special differing customer-specific program- ming, specify in plain text	Y09 ⁵⁾
Supply units see Chapter "Supplementary Compone	ents".

1) Without cable gland.

- ²⁾ Option does not include ATEX/IECEx approval, only country-specific approval.
- ³⁾ For customer-specific programming for RTD and TC, the start value and the end value of the required measuring span must be specified here.
- ⁴⁾ If only Y22, Y23 or Y24 are ordered and the label <u>only</u> has to be on the tag plate, Y01 does not have to be specified.
- 5) For customer-specific programming, for example mV and ohm, the start value and the end value of the required measuring span and the unit must be entered here.

Selection and Ordering data	Article No.
Accessories Further accessories for assembly, connection and transmitter configuration, see page 2/238.	
Mounting bracket and securing parts	
Made of steel for 7NG313B	7MF4997-1AC
Made of steel for 7NG313C	7MF4997-1AB
Made of stainless steel for 7NG313B	7MF4997-1AJ
Made of stainless steel for 7NG313C	7MF4997-1AH
Digital indicator ¹⁾	7MF4997-1BS
Connection board	A5E02226423

 $^{\mbox{1}\mbox{1}}$ It is not possible to upgrade devices with Ex protection

Ordering example 1:

7NG3130-0AB10-Z Y01+Y23 Y01: -5...100 °C Y23: TICA1234HEAT

Ordering example 2: 7NG3130-0AC10-Z Y01+Y23+Y24 Y01: 0 ... 20 BAR Y23: PICA 1234 ABC Y29: HEATING BOILER 67890

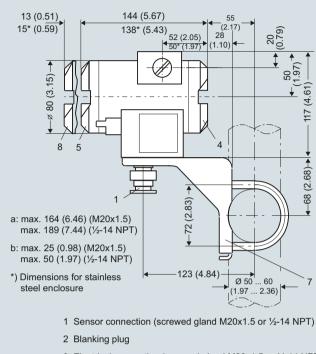
Factory setting (field indicator):

4 ... 20 mA

Transmitter for field mounting/field indicator

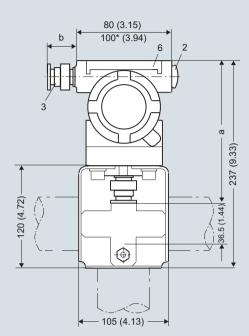
SITRANS TF - Transmitter, two-wire system and SITRANS TF - Field indicator for 4 to 20 mA

Dimensional drawings



- 3 Electrical connection (screwed gland M20x1.5 or 1/2-14 NPT)
- 4 Terminal side, output signal
- 5 Terminal side, sensor

SITRANS TF, dimensions in mm (inches)



- 6 Protective cover (without function)
- 7 Mounting bracket (option) with clamp for securing to a vertical or horizontal pipe
- 8 Cover with window for digital display

Resistance

Two-wire system 1)

Three-wire system

Four-wire system

(R)

R2

Generation of average

value / difference 1)

Temperature Measurement

Transmitter for field mounting/field indicator

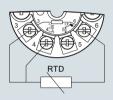
SITRANS TF - Transmitter, two-wire system and SITRANS TF - Field indicator for 4 to 20 mA

Schematics

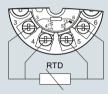




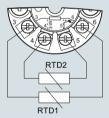
Two-wire system 1)



Three-wire system

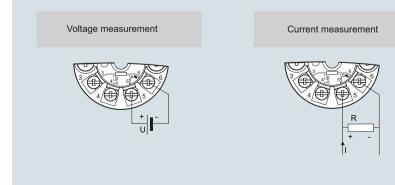


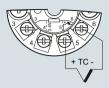
Four-wire system



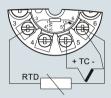
Generation of average value / difference 1)

¹⁾ Programmable line resistance for the purpose of correction.

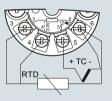




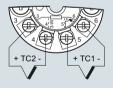
Cold junction compensation Internal/fixed value



Cold junction compensation with external Pt100 in two-wire system 1)



Cold junction compensation with external Pt100 in three-wire system



Generation of average value / difference with internal cold junction compensation

Thermocouple



2

