Fieldbus temperature transmitter
Model T53.10, for FOUNDATION™ Fieldbus and PROFIBUS® PA

for further approvals
see page 5

Applications

- Process industry
- Machine building and plant construction

Special features

- FOUNDATION™ Fieldbus ITK version 4.61
- PROFIBUS® PA profile 3
- Automatic switch between protocols
- Explosion protection Ex i, intrinsically safe/FISCO
- Explosion protection Ex n

Fieldbus temperature transmitter, model T53.10

Description

The model T53.10 fieldbus temperature transmitter with FOUNDATION™ and PROFIBUS® PA fieldbus communication is suitable for temperature measurement with resistance thermometers and thermocouples. Furthermore resistance and mV measurements with or without customer-specific linearisation are possible. Differential, average or redundancy temperature measurements can be realised.

The T53 is available at FOUNDATION™ Fieldbus with LAS functionality (Link Active Scheduler) and PID regulation. These functionalities allow for master-independent regulations in the field instrument.

The model T53.10 fieldbus temperature transmitter has a polarity-independent bus connection. Due to its small dimensions, the model T53 temperature transmitter is suitable for all DIN form B connection heads.

The model T53 temperature transmitter is delivered with a basic configuration (see ordering information) or customer-specific configuration in line with the configuration options.

Specifications

Input, configurable						
		Measuring range [1]	**Standard**	**α values**	**Basic accuracy**	**Temperature coefficient per °C**
Resistance sensor	Pt25 ... Pt1000	-200 ... +850 °C	IEC 60751	α = 0.00385	≤ ±0.1 °C	≤ ±0.002 °C
	Pt25 ... Pt1000	-200 ... +850 °C	JIS C1604: 1989	α = 0.003916	≤ ±0.1 °C	≤ ±0.002 °C
	Ni25 ... Ni1000	-60 ... +250 °C	DIN 43760		≤ ±0.15 °C	≤ ±0.002 °C
	Cu10 ... Cu1000	-50 ... +200 °C		α = 0.00427	≤ ±1.3 °C	≤ ±0.02 °C
	Resistance sensor	0 ... 10 kΩ			≤ ±0.05 Ω	≤ ±0.002 Ω
	Potentiometer	0 ... 100 kΩ				
Measuring current during measurement			typical 0.2 mA (Pt100)			
Connection methods			1 sensor 2-/4-/3-wire or 2 sensors 2-/3-wire (for further information, please refer to “Designation of connection terminals”)			
Max. lead resistance			50 Ω each wire			
Thermocouple	Type J (Fe-CuNi)	-100 ... +1,200 °C	IEC 60584		≤ ±0.5 °C	≤ ±0.01 °C
	Type K (NiCr-Ni)	-180 ... +1,372 °C	IEC 60584		≤ ±0.5 °C	≤ ±0.01 °C
	Type L (Fe-CuNi)	-200 ... +900 °C	DIN 43710		≤ ±0.5 °C	≤ ±0.01 °C
	Type E (NiCr-Cu)	-100 ... +1,000 °C	IEC 60584		≤ ±0.5 °C	≤ ±0.01 °C
	Type N (NiCrSi-NiSi)	-180 ... +1,300 °C	IEC 60584		≤ ±0.5 °C	≤ ±0.01 °C
	Type T (Cu-CuNi)	-200 ... +400 °C	IEC 60584		≤ ±0.5 °C	≤ ±0.01 °C
	Type U (Cu-CuNi)	-200 ... +600 °C	DIN 43710		≤ ±0.5 °C	≤ ±0.01 °C
	Type R (PtRh-Pt)	-50 ... +1,760 °C	IEC 60584		≤ ±1 °C	≤ ±0.025 °C
	Type S (PtRh-Pt)	-50 ... +1,760 °C	IEC 60584		≤ ±1 °C	≤ ±0.025 °C
	Type B (PtRh-Pt)	400 ... 1,820 °C	IEC 60584		≤ ±1 °C	≤ ±0.025 °C
	W3	0 ... 2,300 °C	ASTM E988-90		≤ ±1 °C	≤ ±0.025 °C
	W5	0 ... 2,300 °C	ASTM E988-90		≤ ±1 °C	≤ ±0.025 °C
	mV sensor	-800 ... +800 mV			≤ ±10 µV	≤ ±0.2 µV
External CJC (cold junction compensation)			-40 ... +135 °C			
Connection methods			1 sensor or 2 sensors (for further information, please refer to “Designation of connection terminals”)			
Max. lead resistance			5 kΩ each wire			
Error of cold junction compensation (CJC)			≤ ±0.5 °C			

1) Other units e.g. °F and K possible

Output	FOUNDATION™ Fieldbus	PROFIBUS® PA
Version	ITK version 4.61	EN 50170 vol. 2 / profile 3
Functionality	Basic or LAS	
Function blocks	2 analogue and 1 PID	2 analogue
Execution time, PID controller	< 200 ms	

Case (for head mounting, incl. spring-loaded mounting screws)	
Material	Plastic, PBT, glass-fibre reinforced
Ingress protection ■ Case ■ Connection terminals	 IP68 per IEC/EN 60529 IP00 per IEC/EN 60529
Connection cross-section of terminals	0.14 ... 1.5 mm²
Weight	approx. 0.05 kg

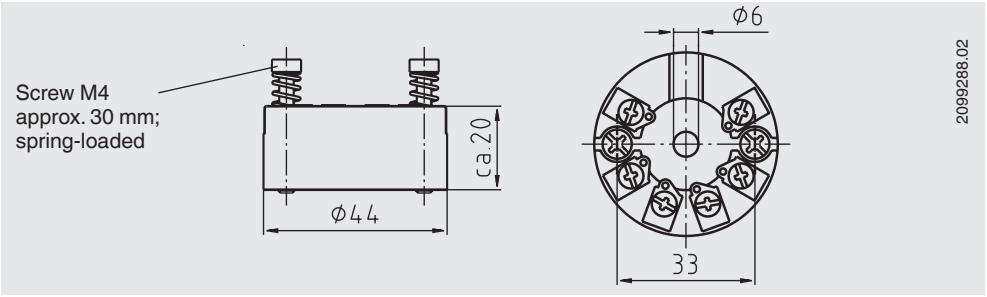
Explosion protection, power supply						
Model	**Approvals**	**Permissible ambient/storage temperature (in accordance with the relevant temperature classes)**	**Safety-related maximum values for**			**Power supply U_B [2] / current consumption**
			Current loop (Connections 1 + 2)		**Sensor (Connections 3 - 6)**	
T53.10.0IS	EC-type examination certificate: KEMA 06ATEX0148X Zone 0,1: II 1G Ex ia IIC T4/T5/T6 Zone 0,1: II 1D Ex iaD CSA approval 1807316 IS, class I, division 1, group A, B, C, D FM approval: 3027564 (inst. drg: 11175631) IS, class I, division 1, group A, B, C, D Non-incendive, class I, division 2, group A, B, C, D	-40 … +85 °C (T4) -40 … +75 °C (T5) -40 … +60 °C (T6)	U_i = DC 30 V I_i = 120 mA P_i = 0.84 W	C_i = 2 nF L_i = 1 µH	U_o = 5.7 V I_o = 8.4 mA P_o = 12 mW C_o = 40 µF L_o = 200 mH	9 … DC 32 V/ < 11 mA
		-40 … +75 °C (T4) -40 … +65 °C (T5) -40 … +45 °C (T6)	U_i = DC 30 V I_i = 300 mA P_i = 1.3 W	C_i = 2 nF L_i = 1 µH		
		-40 … +85 °C (T1 ... T4) -40 … +60 °C (T5) -40 … +45 °C (T6)	U_i = DC 17.5 V (FISCO) I_i = 250 mA P_i = 2.0 W	C_i = 2 nF L_i = 1 µH		
		-40 … +85 °C (T1 ... T4) -40 … +60 °C (T5) -40 … +45 °C (T6)	U_i = DC 15 V I_i = 900 mA P_i = 5.32 W	C_i = 2 nF L_i = 1 µH		
T53.10.0IS	EC-type examination certificate: KEMA 06ATEX0148X Zone 0,1: II 2G (1) G Ex ib [ia] IIC T4/T5/T6 CSA approval 1807316 IS, class I, division 1, group A, B, C, D FM approval: 3027564 (inst. drg: 11175631) IS, class I, division 1, group A, B, C, D IS, class I, zone 0, group IIC IS, class I, division 2, group A, B, C, D	-40 … +85 °C (T1 ... T4) -40 … +65 °C (T5) -40 … +45 °C (T6)	Linear barrier U_i = 30 V I_i = 120 mA P_i = 0.84 W	C_i = 2 nF L_i = 1 µH		
		-40 … +85 °C (T1 ... T4) -40 … +75 °C (T5) -40 … +60 °C (T6)	Trapezoid barrier U_i = 30 V I_i = 300 mA P_i = 1.3 W	C_i = 2 nF L_i = 1 µH		
T53.10.0NI	EC-type examination certificate: KEMA 06ATEX0149X Zone 2: II 3GD Ex nA [nL] IIC T4/T5/T6 Zone 2: II 3GD Ex nL IIC T4/T5/T6 Zone 2: II 3GD Ex nA [ic] IIC T4/T5/T6 Zone 2: II 3GD Ex ic IIC T4/T5/T6 CSA approval 1807316 FM approval: 3027564 (inst. drg: 11175631) Non-incendive, class I, division 2, group A, B, C, D	-40 … +85 °C (T1 ... T4) -40 … +75 °C (T5) -40 … +60 °C (T6)	U_i =DC 32 V FNICO (FISCO) U_i = DC 17.5 V	C_i = 2 nF L_i = 1 µH		

2) Depending on the safety-relevant upper limit values for the current loop circuit (for this, also see the type examination certificate).

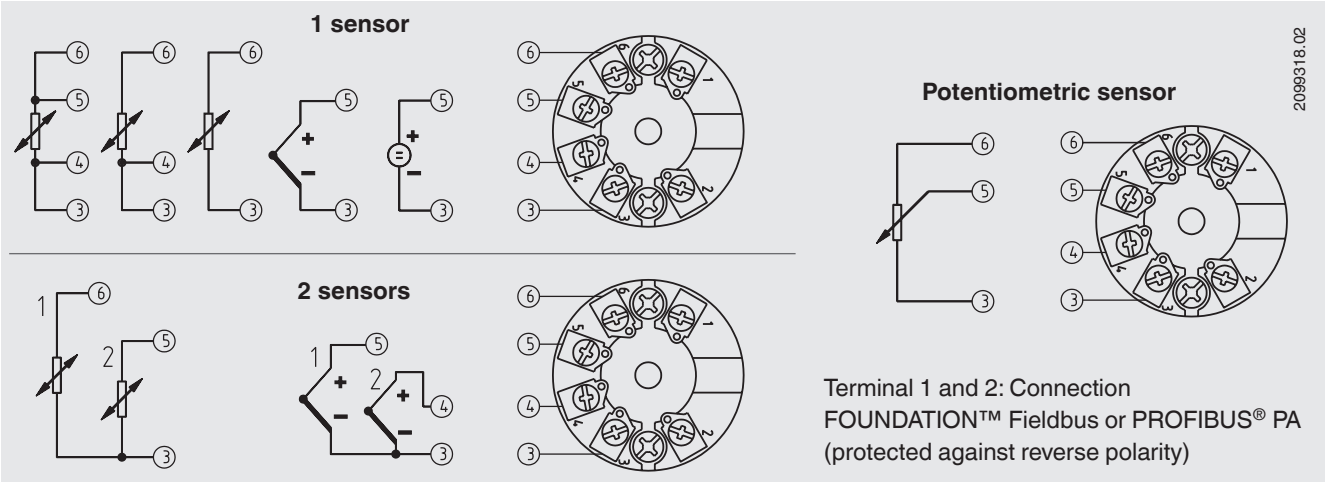
Ambient conditions	
Ambient and storage temperature range	-40 ... +85 °C
Maximum permissible humidity	95 % r. h., non-condensing
Vibration resistance per DIN EN 60068-2-6	2 ... 100 Hz, 4 g

Other	
Insulation voltage, test / operation	AC 1.5 kV / AC 50 V
Response time (programmable)	1 ... 60 s
Updating time	< 400 ms
Execution time, analogue input block	< 50 ms

Dimensions in mm

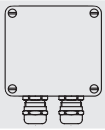


Designation of connection terminals



Terminal 1 and 2: Connection
FOUNDATION™ Fieldbus or PROFIBUS® PA
(protected against reverse polarity)

Accessories

Type	Version	Special features	Dimensions	Order no.
Field case 	Plastic (ABS)	IP65, for mounting of a head mounting transmitter, permissible ambient temperature range: -40 ... +80 °C, with two cable glands M16 x 1.5	82 x 80 x 55 mm (W x L x H)	3301732
Adapter 	Plastic / stainless steel	Suitable for TS 35 per DIN EN 60715 (DIN EN 50022) or TS 32 per DIN EN 50035 for mounting on a DIN rail	60 x 20 x 41.6 mm	3593789
Adapters 	Steel, tin-plated	Suitable for TS 35 per DIN EN 60715 (DIN EN 50022) for mounting on a DIN rail (2 adapters per transmitter necessary)	49 x 8 x 14 mm	3619851
FC475FP1EKLUGMT 	HART® protocol, FOUNDATION™ Fieldbus, Li-Ion battery, voltage supply AC 90 ... 240 V, with EASY UPGRADE; ATEX, FM and CSA (intrinsically safe)			on request

Approvals

Logo	Description	Country
CE Ex	**EC declaration of conformity** ■ EMC directive EN 61326 emission (group 1, class B) and interference immunity (industrial application) ■ ATEX directive	European Community
FM APPROVED	**FM** Hazardous areas	USA
SP	**CSA** ■ Safety (e.g. electr. safety, overpressure, ...) ■ Hazardous areas	Canada
EAC Ex	**EAC** ■ Electromagnetic compatibility ■ Hazardous areas	Eurasian Economic Community
	GOST Metrology, measurement technology	Russia
	KazInMetr Metrology, measurement technology	Kazakhstan
-	**MTSCHS** Permission for commissioning	Kazakhstan
	BelGIM Metrology, measurement technology	Belarus
	DNOP - MakNII ■ Mining ■ Hazardous areas	Ukraine
Ex NEPSI	**NEPSI** Hazardous areas	China

Certificates (option)

- 2.2 test report
- 3.1 inspection certificate
- DKD/DAkkS calibration certificate

Approvals and certificates, see website

Ordering information
Model / Explosion protection / Configuration / Options

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