

# Fieldbus temperature transmitter

## For FOUNDATION™ Fieldbus and PROFIBUS® PA

### Model T53.10, head-mounted version

WIKA data sheet TE 53.01



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 factory configuration (see ordering information) or customer-specific configuration in line with the configuration options.

## Specifications

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

1) Other units e.g. °F and K possible

Factory configuration	
<b>Sensor</b>	Pt100
<b>Connection method</b>	3-wire connection
<b>Output limits</b>	0 ... 100 °C

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

Case (for head mounting, incl. spring-loaded mounting screws)	
<b>Material</b>	Plastic, PBT, glass-fibre reinforced
<b>Ingress protection</b> ■ Case ■ Connection terminals	IP68 per IEC/EN 60529 IP00 per IEC/EN 60529
<b>Connection cross-section of terminals</b>	0.14 ... 1.5 mm <sup>2</sup>
<b>Weight</b>	approx. 0.05 kg

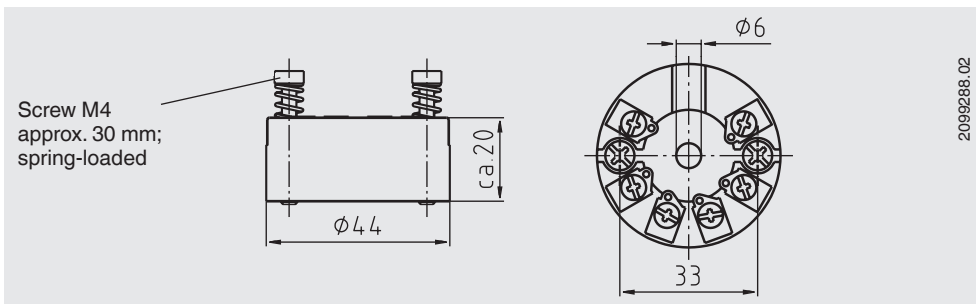
Explosion protection, power supply						
Model	Approvals	Permissible ambient/ storage temperature (in accordance with the relevant temperature classes)	Safety-related maximum values for			Power supply U <sub>B</sub> <sup>2)</sup> / current consumption
			Current loop (connections 1 + 2)		Sensor (connections 3 - 6)	
<b>T53.10.OIS</b>	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 Intrinsically safe version: Class I, division 1, group A, B, C, D  ■ FM approval 3027564 (Inst. Drg: 11175631) Intrinsically safe version: Class I, division 1, group A, B, C, D  Non-incendive version: Class I, division 2, group A, B, C, D	-40 ... +85 °C (T4)	U <sub>i</sub> = DC 30 V	C <sub>i</sub> = 2 nF	U <sub>o</sub> = 5.7 V I <sub>o</sub> = 8.4 mA P <sub>o</sub> = 12 mW C <sub>o</sub> = 40 µF L <sub>o</sub> = 200 mH	DC 9 ... 32 V/ < 11 mA
		-40 ... +75 °C (T5)	I <sub>i</sub> = 120 mA	L <sub>i</sub> = 1 µH		
		-40 ... +60 °C (T6)	P <sub>i</sub> = 0.84 W			
		-40 ... +75 °C (T4)	U <sub>i</sub> = DC 30 V	C <sub>i</sub> = 2 nF		
<b>T53.10.OIS</b>	EC-type examination certificate: KEMA 06ATEX0148X  Zone 0,1: II 2G (1)G Ex ib [ia] IIC T4/T5/T6  ■ CSA approval 1807316 Intrinsically safe version: Class I, division 1, group A, B, C, D  ■ FM approval 3027564 (Inst. Drg: 11175631) Intrinsically safe version: Class I, division 1, group A, B, C, D Class I, zone 0, Ex ia IIC or AEx ia IIC Class I, zone 1, Ex ib IIC or AEx ib IIC Class I, division 2, group A, B, C, D	-40 ... +65 °C (T5)	U <sub>i</sub> = DC 30 V	C <sub>i</sub> = 2 nF	U <sub>o</sub> = 5.7 V I <sub>o</sub> = 8.4 mA P <sub>o</sub> = 12 mW C <sub>o</sub> = 40 µF L <sub>o</sub> = 200 mH	DC 9 ... 32 V/ < 11 mA
		-40 ... +45 °C (T6)	I <sub>i</sub> = 300 mA	L <sub>i</sub> = 1 µH		
		-40 ... +85 °C (T1 ... T4)	P <sub>i</sub> = 1.3 W			
		-40 ... +60 °C (T5)	U <sub>i</sub> = DC 17.5 V (FISCO)	C <sub>i</sub> = 2 nF		
<b>T53.10.ONI</b>	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 version: Class I, division 2, group A, B, C, D Class I, zone 2, Ex nA IIC Class I, zone 2, AEx nA IIC	-40 ... +45 °C (T6)	U <sub>i</sub> = DC 15 V	C <sub>i</sub> = 2 nF	U <sub>o</sub> = 5.7 V I <sub>o</sub> = 8.4 mA P <sub>o</sub> = 12 mW C <sub>o</sub> = 40 µF L <sub>o</sub> = 200 mH	DC 9 ... 32 V/ < 11 mA
		-40 ... +60 °C (T5)	I <sub>i</sub> = 900 mA	L <sub>i</sub> = 1 µH		
		-40 ... +85 °C (T1 ... T4)	P <sub>i</sub> = 5.32 W			
		-40 ... +60 °C (T5)	U <sub>i</sub> = DC 32 V	C <sub>i</sub> = 2 nF		
<b>T53.10.OIS</b>	EC-type examination certificate: KEMA 06ATEX0148X  Zone 0,1: II 2G (1)G Ex ib [ia] IIC T4/T5/T6  ■ CSA approval 1807316 Intrinsically safe version: Class I, division 1, group A, B, C, D  ■ FM approval 3027564 (Inst. Drg: 11175631) Intrinsically safe version: Class I, division 1, group A, B, C, D Class I, zone 0, Ex ia IIC or AEx ia IIC Class I, zone 1, Ex ib IIC or AEx ib IIC Class I, division 2, group A, B, C, D	-40 ... +85 °C (T1 ... T4)	Linear barrier	C <sub>i</sub> = 2 nF	U <sub>o</sub> = 5.7 V I <sub>o</sub> = 8.4 mA P <sub>o</sub> = 12 mW C <sub>o</sub> = 40 µF L <sub>o</sub> = 200 mH	DC 9 ... 32 V/ < 11 mA
		-40 ... +65 °C (T5)	U <sub>i</sub> = 30 V	L <sub>i</sub> = 1 µH		
		-40 ... +45 °C (T6)	I <sub>i</sub> = 120 mA			
		-40 ... +85 °C (T1 ... T4)	P <sub>i</sub> = 0.84 W			
<b>T53.10.ONI</b>	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 version: Class I, division 2, group A, B, C, D Class I, zone 2, Ex nA IIC Class I, zone 2, AEx nA IIC	-40 ... +75 °C (T5)	Trapezoid barrier	C <sub>i</sub> = 2 nF	U <sub>o</sub> = 5.7 V I <sub>o</sub> = 8.4 mA P <sub>o</sub> = 12 mW C <sub>o</sub> = 40 µF L <sub>o</sub> = 200 mH	DC 9 ... 32 V/ < 11 mA
		-40 ... +60 °C (T6)	U <sub>i</sub> = 30 V	L <sub>i</sub> = 1 µH		
		-40 ... +85 °C (T1 ... T4)	I <sub>i</sub> = 300 mA			
		-40 ... +60 °C (T6)	P <sub>i</sub> = 1.3 W			
<b>T53.10.ONI</b>	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 version: Class I, division 2, group A, B, C, D Class I, zone 2, Ex nA IIC Class I, zone 2, AEx nA IIC	-40 ... +85 °C (T1 ... T4)	U <sub>i</sub> = DC 32 V	C <sub>i</sub> = 2 nF	U <sub>o</sub> = 5.7 V I <sub>o</sub> = 8.4 mA P <sub>o</sub> = 12 mW C <sub>o</sub> = 40 µF L <sub>o</sub> = 200 mH	DC 9 ... 32 V/ < 11 mA
		-40 ... +75 °C (T5)	FNICO (FISCO)	L <sub>i</sub> = 1 µH		
		-40 ... +60 °C (T6)	U <sub>i</sub> = DC 17.5 V			
		-40 ... +85 °C (T1 ... T4)				

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

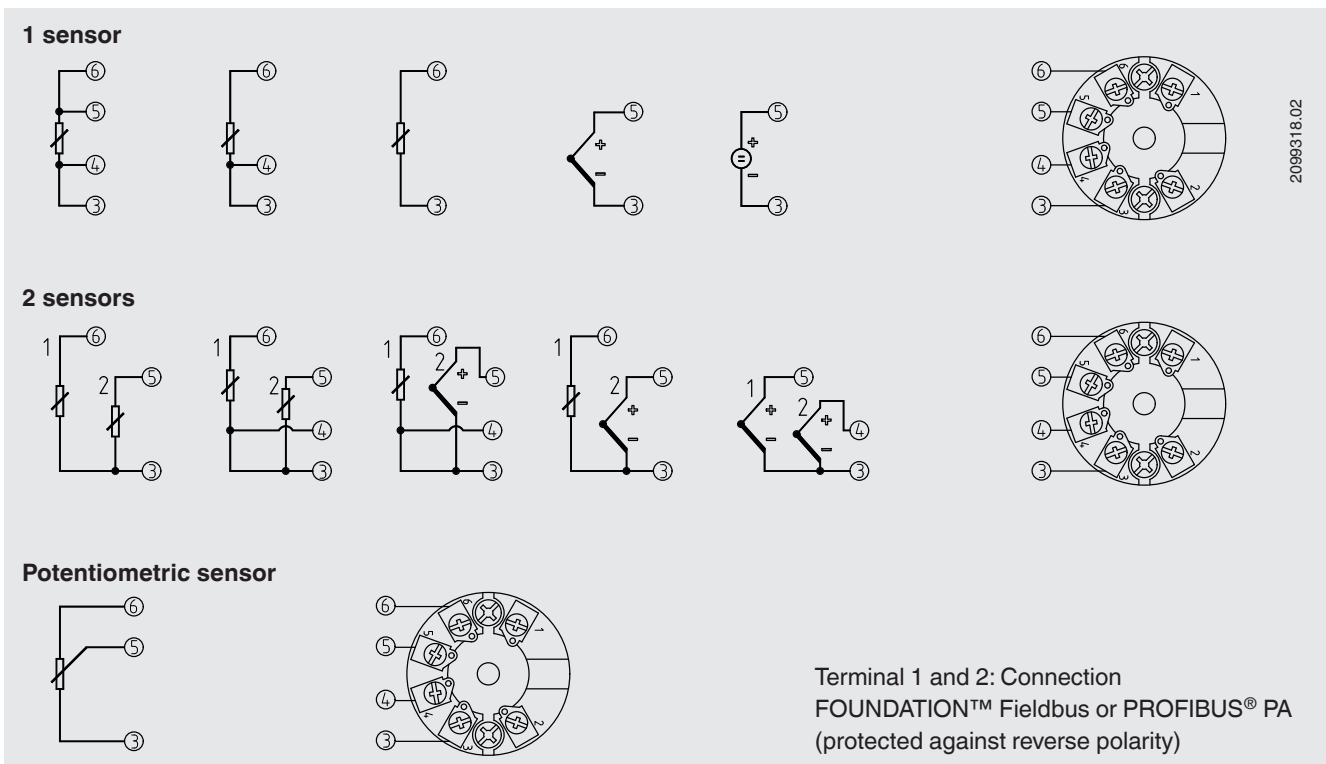
Ambient conditions	
Ambient and storage temperature range	-40 ... +85 °C
Maximum permissible humidity	95 % r. h., non-condensing
Vibration resistance per DIN EN 60068-2-6	2 ... 100 Hz, 4 g

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



## Accessories

Model	Description	Order number
<b>Adapter</b> 	<ul style="list-style-type: none"> <li>■ Suitable for TS 35 per DIN EN 60715 (DIN EN 50022) or TS 32 per DIN EN 50035</li> <li>■ Material: Plastic / stainless steel</li> <li>■ Dimensions: 60 x 20 x 41.6 mm</li> </ul>	3593789
<b>Adapter</b> 	<ul style="list-style-type: none"> <li>■ Suitable for TS 35 per DIN EN 60715 (DIN EN 50022)</li> <li>■ Material: Steel, tin-plated</li> <li>■ Dimensions: 49 x 8 x 14 mm</li> </ul>	3619851

## Approvals

Logo	Description	Country
 	<b>EC declaration of conformity</b> <ul style="list-style-type: none"> <li>■ EMC directive EN 61326 emission (group 1, class B) and interference immunity (industrial application)</li> <li>■ RoHS directive</li> <li>■ ATEX directive Hazardous areas</li> </ul>	European Union
	<b>FM</b> Hazardous areas	USA
	<b>CSA</b> <ul style="list-style-type: none"> <li>■ Safety (e.g. electr. safety, overpressure, ...)</li> <li>■ Hazardous areas</li> </ul>	Canada
	<b>EAC</b> <ul style="list-style-type: none"> <li>■ EMC directive</li> <li>■ Hazardous areas</li> </ul>	Eurasian Economic Community
	<b>GOST</b> Metrology, measurement technology	Russia
	<b>KazInMetr</b> Metrology, measurement technology	Kazakhstan
-	<b>MTSCHS</b> Permission for commissioning	Kazakhstan
	<b>BelGIM</b> Metrology, measurement technology	Belarus
	<b>UkrSEPRO</b> Metrology, measurement technology	Ukraine
	<b>DNOP - MakNII</b> <ul style="list-style-type: none"> <li>■ Mining</li> <li>■ Hazardous areas</li> </ul>	Ukraine
	<b>NEPSI</b> Hazardous areas	China

## Manufacturer's information and certifications

Logo	Description
-	China RoHS directive

### 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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