Analogue Temperature Transmitter Model T24.10, PC configurable, Head Mounting



Applications

- Machinery, plant construction
- Process industry

Special Features

- Analogue signal processing, ideal for multiplex-systems
- Configuration via Windows-PC, simulation of the sensor not necessary
- Sensor burnout signalling according to NAMUR NE 43
- Configuration Software WIKA_TT current 6-language version
- Compact design



Analogue Temperature Transmitter Model T24.10

Description

Temperature transmitter for Pt100 in 2- or 3-wire connection with 4 ... 20 mA analogue output (loop powered 2 wire technique)

The T24 temperature transmitter combines the known quick response of an analogue transmitter with the flexibility of configuration by means of Windows PC.

The quick stabilisation of the output current after excitation voltage has been applied enables the use of this transmitter in multiplex systems.

Setting of the measuring range, type of sensor and sensor burnout behaviour takes only a matter of seconds thanks to the easy-to-use Windows configuration software. Timeconsuming adjustment and sensor simulation are not required for this transmitter. The T24 can be remotely configured from the control room via the current loop.

Possible measuring errors which might for example, result from poor thermometer position, can be compensated by

means of the function 'Adaption'.

Write protection and an increased ambient temperature range complete the spectrum of features offered by the temperature transmitter.

Due to its flexibility and reliability the temperature transmitter T24 is suited for a wide range of applications in the machine industry and plant construction. Versions with explosion protection approval in accordance with ATEX are available for applications in the process industry.

As a result of its extremely compact design this WIKA temperature transmitter can be fitted into any DIN connection head of form B.

The transmitters are delivered with a basic configuration (see ordering information). Alternatively, upon request, transmitters can be delivered with a customized configuration within the given limits.

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Specification	Model T24.10		
Input	Measuring range configurable with Windows PC		
Model T24.10.1Px / T24.10.2Px	Pt 100 DIN EN 60 751 2 wire 3 wire		
Measuring range maximum	T24.10.1Px: -150 °C +850 °C T24.10.2Px: -200 °C +850 °C		
Measuring span	T24.10.1Px: minimum 20 K T24.10.2Px: minimum 50 K		
Initial value of measuring range, configurable	T24.10.1Px: -150 °C +150 °C T24.10.2Px: -200 °C +200 °C		
End of measuring range, configurable	Dependent from initial value of measuring range, see diagram page 4		
Basic configuration			
Sensor current	approx 0.5 mA		
Connection leads effect	$+ 0.2 \text{ K} / 10 \Omega$ each wire ¹⁾		
permissible load resistance	30Ω each wire. 3 wire symmetric		
Analogue output	4 20 mA 2 wire design		
Measuring deviation per DIN EN 60770. 23 °C + 5 K	$+0.2\%^{2}$		
Linearization	Linear to temperature per DIN EN 60751		
Linearity error	$+0.1\%^{3)}$		
Temperature coefficient TK zero	$\pm 0.1 \% / 10 \text{ K}_{Ta} \text{ or }^{4)} \pm 0.15 \text{ K} / 10 \text{ K}_{Ta}$		
span	± 0.15 % / 10 K _{Ta}		
Rising time t90	< 1 ms		
Switch-on delay, electric	< 10 ms		
Signalling sensor burnout	Configurable: NAMUR downscale < 3.6 mA (typical 3 mA)		
5 5	NAMUR up scale > 21.0 mA (typical 23 mA)		
sensor short circuit	Not configurable, in general NAMUR downscale < 3.6 mA (typical 3 mA) ⁵⁾		
Load RA	$R_A \leq (U_B - 10 \text{ V}) / 0.022 \text{ A}$ with R_A in Ω and U_B in V		
Load effect	± 0.05 % / 100 Ω		
Power supply effect	± 0.025 % / V		
Power supply	By the 4 20 mA-loop		
Model T24.10.xx0 (without Ex-protection)	DC 10 36 V		
Model T24.10.xx2 (with Ex-protection, intrinsic safe ia)	DC 10 30 V		
Model T24.10.xx6 (with Ex-protection, CSA Class I)	DC 10 30 V		
Model T24.10.xx8 (with Ex-protection, FM Class I)	DC 10 30 V		
Model T24.10.xx9 (with Ex-protection, EEx nL/nA)	DC 10 36 V		
Input power supply protection	Reverse polarity		
Max. permissible ripple	10 % with 24 V / maximum load 300 Ω		
Ex-protection per Directive 94/9/EC ATEX Intrinsic Safety per EN 50 020	EC Type Test DMT 02 ATEX E 025 X		
Model T24.10.xx2	II 1G EEx ia IIB / IIC T4 / T5 / T6		
Permissible ambient temperature	-40 °C +85 °C with T4		
	-40 °C +75 °C with T5		
	-40 °C +60 °C with T6		
Maximum values for connection of the	$U_{\rm i}$ = DC 30 V $I_{\rm i}$ = 120 mA $P_{\rm i}$ = 800 mW		
current loop circuit (connections + and -)	$C_{\rm i} = 6.2 \rm nF$ $L_{\rm i} = 110 \mu \rm H$		
Maximum values for connection of the	$U_0 = DC 6.4 V$ $I_0 = 42.6 mA$ $P_0 = 37.1 mW$		
sensor circuit (connections 1 up to 3)	Group II B: $C_0 = 500 \mu\text{F}$ $L_0 = 50 \text{mH}$		
	Group II C: $C_0 = 20 \mu\text{F}$ $L_0 = 10 \text{mH}$		

For 3 wire sensor connection, with 2 wire connection a total lead resistance up to 20 Ωis compensatable, otherwise the lead resistance causes additional error
 For measuring span lower than 50 K additional: 0.1 K,

For measuring span lower than 5750 K additional: 0.1 % \pm 0.2 % with measuring ranges with initial value lower than 0 °C or measuring span

higher than 800 K Whichever is greater; 4)

3)

between the standard range of ambient temperature -40 °C \leq Ta \leq +85 °C, with option "extended range of ambient temperature" the double value is valid

outside the standard range
5) Temperature value, in case of short between wire no. 2 and no. 3 (operation of sensor in 2 wire connection)



Load diagram

The permissible load is dependent upon the loop power supply voltage.

wire number: **r**≠+

Nr.1 Nr.2 Nr.3

Specifications in % refers to the measuring span 1375890.01

 R_A load T_a ambient temperature T_C temperature coefficient U_B loop power supply voltage,

see power supply

Specification, continued	Model T24.10			
Ex-protection. Intrinsic Safety per CSA	CSA File No. LR 105000-6			
Model T24.10.xx6	Class I, Division 1, Groups A, B, C and D			
Permissible ambient temperature	max. +85 °C with T4			
·	max. +75 °C with T5			
	max. +60 °C with T6			
Maximum values for connection of the	U _{max} = DC 30 V I _{max} = 120 mA P _{max} = 800 mW			
current loop circuit (connections + und -)	$C_{\rm i} = 6.2 \rm nF$ $L_{\rm i} = 110 \mu \rm H$			
Maximum values for connection of the	$U_{\rm OC}$ = DC 6.4 V $I_{\rm SC}$ = 42.6 mA $P_{\rm max}$ = 37.1 mW			
sensor circuit (connections 1 up to 3)	$C_{a} = 20 \mu\text{F}$ $L_{a} = 10 \text{mH}$			
Ex-protection, Intrinsic Safety per FM	Installation Drawing No. 2475796			
Model T24.10.xx8	Class I, Division 1, Groups A, B, C and D			
Permissible ambient temperature	-40 °C +85 °C with T4			
	-40 °C +75 °C with T5			
	-40 °C +60 °C with T6			
Maximum values for connection of the	$U_{max} = DC 30 V$ $I_{max} = 120 mA$ $P_i = 800 mW$			
current loop circuit (connections + und -)	$C_i = 6.2 \text{ nF}$ $L_i = 110 \mu\text{H}$			
Maximum values for connection of the	$U_{\rm OC} = DC \ 6.4 \ V$ $I_{\rm SC} = 21.1 \ mA$ $P_{\rm O} = 34 \ mW$			
sensor circuit (connections 1 up to 3)	$C_a = 20 \mu\text{F}$ $L_a = 10 \text{mH}$			
Ex-protection per Directive 94/9/EC energy-limited resp. non sparking equipment per EN 50 021	EC Type Test DMT 99 E 088 X			
Model T24.10.xx9	II 3G EEx nL/nA IIC T4 / T5 / T6			
Permissible ambient temperature	-40 °C +85 °C with T4			
	-40 °C +65 °C with T5			
	-40 °C +50 °C with T6			
Maximum values for connection of the	$U_{\rm i}$ = DC 36 V			
current loop circuit (connections + und -)	$C_{i} = 6.2 \text{ nF}$ $L_{i} = 110 \mu \text{H}$			
Maximum values for connection of the	$U_0 = DC 5.4 V$ $I_0 = 0.5 mA$			
sensor circuit (connections 1 up to 3)	$C_0 = 200 \mu\text{F}$ $L_0 = 1000 \text{mH}$			
Approval Germanischer Lloyd	Approval certificate no. 47183-03 HH			
Model T24.10.xxx-G	Environmental category D, F, H, EMC1			
Approval Gosstandart	Approval certificate DE.C.32.001.A no. 15279			
Electromagnetic compatibility (EMC)	per EMC Directive 89/336/EWG DIN EN 61 326:2002			
Ambient conditions				
Amplent and storage temperature				
	Extended range (option): -40 +105 °C $^{\prime}$			
Climate class	Cx (-40 +85 °C, 5 % up to 95 % relative humidity) DIN EN 60 654-1			
Vibration	100 % relative numidity, moisture condensation permissible DIN EN 60068-2-30 Var. 2			
Shoek	10 2000 HZ 10 g DIN EN 60 068-2-6			
Salt for	DIN EN 60.068.2.11			
Sait log	DIN LN 60 000-2-11			
Temperature units	Configurable: °C. °F.K			
Resistance-sensor				
Sensor connection	Configurable: 3 wire or 2 wire			
	configurable compensation of lead resistance with 2 wire connection			
Info data	TAG-No., Descriptor and Message via configuration storeable into transmitter			
Configuration and calibration data	Permanently stored in EEPROM			
Case	Head mounting design incl. spring-loaded mounting screws			
Material	Plastic. PBT, glass fibre reinforced			
Ingress protection case	IP 66/67 IEC 529 / EN 60 529			
terminal connections	IP 00 IEC 529 / EN 60 529			
Cross section of terminal connectors	0.14 1.5 mm²			
Weight	Approx. 0.04 kg			
Dimensions	See drawings			

1) $-40 \dots +105$ °C only without Ex-protection

Possible combinations of initial value of measuring range / end of measuring range

The end of measuring range is dependent upon the respective initial value of measuring range. This is shown in the diagram below.

The configuration software checks the desired measuring range. Only permissible values are accepted.

Intermediate values are configurable, the smallest resolution is 0.1 °C.

Diagram for measuring ranges Model T24.10.1Px



Diagram for measuring ranges Model T24.10.2Px

Measuring range in °C Range of possible end of measuring range in °C -200 -100 +100 +200 +300 +400 +500 +600 +700 +800 minimum maximum --200 ... +350 -200 ... +850 -200 °C -150 °C -150 ... +150 -150 ... +850 initial value of the soluting fattoe -100 ... -50 -100 ... +850 -50 ... 0 -50 ... +850 0 ... +850 0 ... +50 +50 ... +100 +50 ... +850 +50 °C +100 ... +150 +100 ... +850 +100 °C +150 ... +450 +150 ... +850 +150 °C +200 ... +750 +200 ... +850 +200 °C

Dimensions in mm



Designation of terminal connectors



Connection of Programming Unit



Accessory

Configuration-Set



- ① Programming Unit for the connection to a Windows PC, incl. 9 V battery
- 2 Connection cable, RS 232-C (9 pin sub D plug)
- ③ Plug adapter (9 pin / 25 pin plug)
- \circledast Two additional connection cables $\mbox{ Programming Unit}\leftrightarrow\mbox{ Transmitter}$
- ⑤ Configuration Software WIKA_TT (3.5 " disk, multi-lingual, Online Help) (free of charge download from the WIKA Homepage www.wika.de)

Starter Kit



Accessory (please order separately)	Order No.
Configuration-Set for T12 and T24	36 34842
Configuration Software T24 on 3.5" disk 1)	23 75385
Starter Kit, consisting of T24 + Configuration-Set	24 10813

1) Free of charge download from the WIKA Homepage www.wika.de

Assembly accessories

Field case



Adapter, plastic/stainless steel



Adapter, steel tin galvanized

Adapter, steel zinc galvanized





Accessory (please order separately)	Order No.
Field case, plastic (ABS), IP 65, for mounting of a head mounting transmitter,	
permissible ambient temperature: -40 °C +80 °C,	
82x80x55 mm (WxLxH), with two cable glands M16x1.5	33 01732
Adapter for mounting on a DIN rail, plastic/stainless steel	35 93789
Adapter for mounting on a DIN rail, steel tin galvanized	36 19851
Adapter for mounting on a DIN rail, steel zinc galvanized	23 73633

Ordering information

Field I	No.	Code	Feature	95		
			Input			
		1P	resistar	nce thermometer Pt 100, small measuring ranges (minimum span 20 K)		
1		2P	resistar	nce thermometer Pt 100, large measuring ranges (minimum span 50 K)		
			Explos	ion protection		
		0	without			
		2	II 1G EI	Ex ia IIC T4/T5/T6 acc. Directive 94/9/EG (ATEX)		
		6	CSA CI	ass I, Division 1, Group A, B, C, D		
		8	FM Cla	ss I, Division 1, Group A, B, C, D		
2		9	II 3G EI	Ex nL/nA IIC T4/T5/T6		
			Approv	vals		
		Z	without			
3 G GL-Approval						
			Ambie	nt temperature		
		F	-40 +	85 °C (-40 +185 °F)		
4		н	extende	ed range: -40 °C +105 °C	not with explosion protection	
			Measu	ring range		
		GK	basic configuration (3 wire, 0150°C, signalling down scale < 3.6 mA)			
5		KL	custom	er's specification 1)		
		Additional order info				
		YES	NO			
6		Т	Z	additional text	Please state as clearly understandable text!	

1) Please use sheet " Help to Order " of the price list, when ordering temperature transmitter configured to customer's specification.

Order code:			
	1 2 3 4	5 6	
T24.10 -	-		
Additional text:			

Specifications and dimensions given in this leaflet represent the state of engineering at the time of printing. Modifications may take place and materials specified may be replaced by others without prior notice.

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