

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

WIKA Data Sheet TE 24.01



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. Time-consuming 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.



Specification

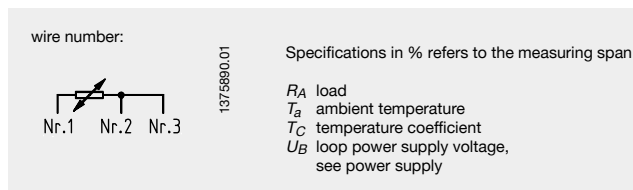
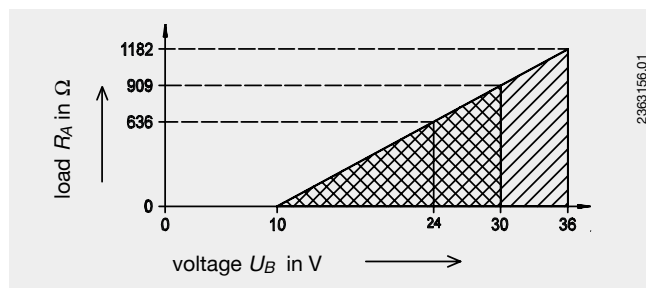
Model T24.10

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		3 wire 0 ... 150 °C	
Sensor current		approx. 0.5 mA	
Connection leads effect		$\pm 0.2 \text{ K} / 10 \Omega$ each wire ¹⁾	
permissible load resistance		30 Ω each wire, 3 wire symmetric	
Analogue output		4 ... 20 mA 2 wire design	
Measuring deviation per DIN EN 60770, 23 °C $\pm 5 \text{ K}$		$\pm 0.2 \%$ ²⁾	
Linearization		Linear to temperature per DIN EN 60751	
Linearity error		$\pm 0.1 \%$ ³⁾	
Temperature coefficient T_K zero		$\pm 0.1 \% / 10 \text{ K } T_a$ or ⁴⁾ $\pm 0.15 \text{ K} / 10 \text{ K } T_a$	
span		$\pm 0.15 \% / 10 \text{ K } T_a$	
Rising time t_{90}		< 1 ms	
Switch-on delay, electric		< 10 ms	
Signalling sensor burnout		Configurable: NAMUR downscale < 3.6 mA (typical 3 mA) 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 R_A		$R_A \leq (U_B - 10 \text{ V}) / 0.022 \text{ A}$ with R_A in Ω and U_B in V	
Load effect		$\pm 0.05 \% / 100 \Omega$	
Power supply effect		$\pm 0.025 \% / \text{V}$	
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		EC Type Test DMT 02 ATEX E 025 X	
Intrinsic Safety per EN 50 020		II 1G EEx ia IIB / IIC T4 / T5 / T6	
Model T24.10.xx2		-40 °C ... +85 °C with T4	
Permissible ambient temperature		-40 °C ... +75 °C with T5	
		-40 °C ... +60 °C with T6	
Maximum values for connection of the		$U_i = \text{DC } 30 \text{ V}$	$I_i = 120 \text{ mA}$ $P_i = 800 \text{ mW}$
current loop circuit (connections + and -)		$C_i = 6.2 \text{ nF}$	$L_i = 110 \mu\text{H}$
Maximum values for connection of the		$U_o = \text{DC } 6.4 \text{ V}$	$I_o = 42.6 \text{ mA}$ $P_o = 37.1 \text{ mW}$
sensor circuit (connections 1 up to 3)		Group II B:	$C_o = 500 \mu\text{F}$ $L_o = 50 \text{ mH}$
		Group II C:	$C_o = 20 \mu\text{F}$ $L_o = 10 \text{ mH}$

- 1) For 3 wire sensor connection, with 2 wire connection a total lead resistance up to 20 Ω is compensatable, otherwise the lead resistance causes additional error
- 2) For measuring span lower than 50 K additional: 0.1 K,
For measuring span higher than 550 K additional: 0.1 %
- 3) $\pm 0.2 \%$ with measuring ranges with initial value lower than 0 °C or measuring span higher than 800 K
- 4) Whichever is greater;
between the standard range of ambient temperature $-40 \text{ °C} \leq T_a \leq +85 \text{ °C}$,
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.



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 current loop circuit (connections + und -)	$U_{\max} = \text{DC } 30 \text{ V}$ $I_{\max} = 120 \text{ mA}$ $P_{\max} = 800 \text{ mW}$ $C_i = 6.2 \text{ nF}$ $L_i = 110 \text{ }\mu\text{H}$
Maximum values for connection of the sensor circuit (connections 1 up to 3)	$U_{\text{OC}} = \text{DC } 6.4 \text{ V}$ $I_{\text{SC}} = 42.6 \text{ mA}$ $P_{\max} = 37.1 \text{ mW}$ $C_a = 20 \text{ }\mu\text{F}$ $L_a = 10 \text{ mH}$
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 current loop circuit (connections + und -)	$U_{\max} = \text{DC } 30 \text{ V}$ $I_{\max} = 120 \text{ mA}$ $P_i = 800 \text{ mW}$ $C_i = 6.2 \text{ nF}$ $L_i = 110 \text{ }\mu\text{H}$
Maximum values for connection of the sensor circuit (connections 1 up to 3)	$U_{\text{OC}} = \text{DC } 6.4 \text{ V}$ $I_{\text{SC}} = 21.1 \text{ mA}$ $P_o = 34 \text{ mW}$ $C_a = 20 \text{ }\mu\text{F}$ $L_a = 10 \text{ mH}$
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 current loop circuit (connections + und -)	$U_i = \text{DC } 36 \text{ V}$ $C_i = 6.2 \text{ nF}$ $L_i = 110 \text{ }\mu\text{H}$
Maximum values for connection of the sensor circuit (connections 1 up to 3)	$U_o = \text{DC } 5.4 \text{ V}$ $I_o = 0.5 \text{ mA}$ $C_o = 200 \text{ }\mu\text{F}$ $L_o = 1000 \text{ mH}$
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/EEG DIN EN 61 326:2002
Ambient conditions	
Ambient and storage temperature	Standard range: -40 ... +85 °C Extended range (option): -40 ... +105 °C ¹⁾
Climate class	Cx (-40 ... +85 °C, 5 % up to 95 % relative humidity) DIN EN 60 654-1
Maximum permissible humidity	100 % relative humidity, moisture condensation permissible DIN EN 60068-2-30 Var. 2
Vibration	10 ... 2000 Hz 10 g DIN EN 60 068-2-6
Shock	DIN EN 60 068-2-27
Salt fog	DIN EN 60 068-2-11
Special features	
Temperature units	Configurable: °C, °F, K
Resistance-sensor	Linear resistance-sensors are connectable
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 mm ²
Weight	Approx. 0.04 kg
Dimensions	See drawings

1) -40 ... +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

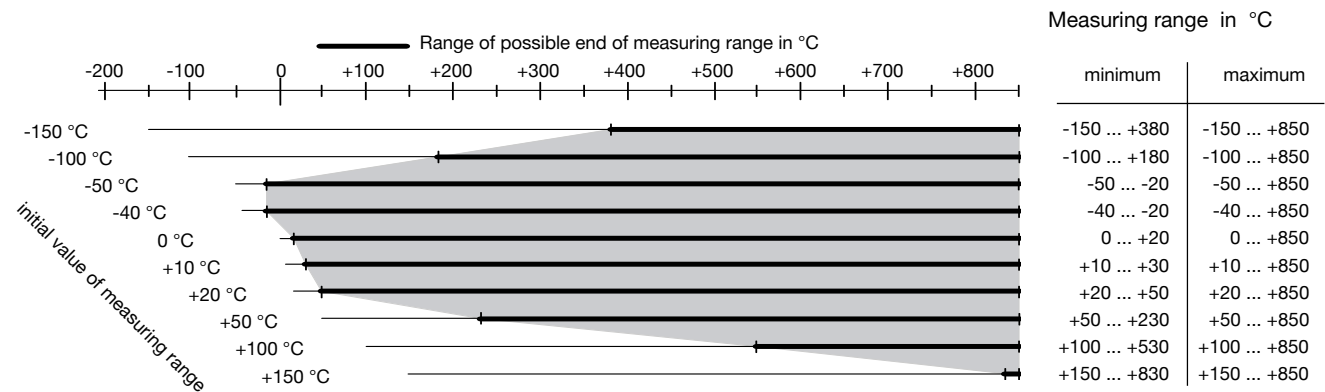
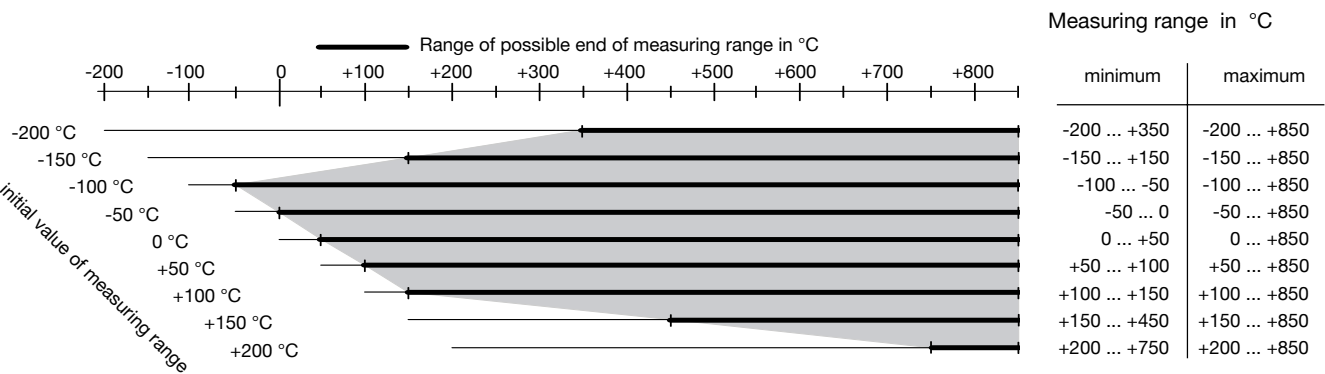
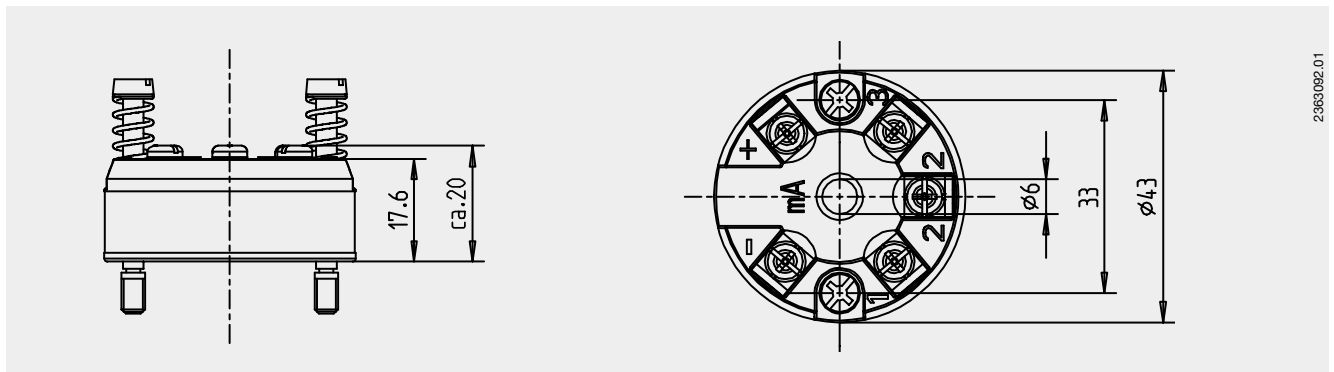


Diagram for measuring ranges Model T24.10.2Px

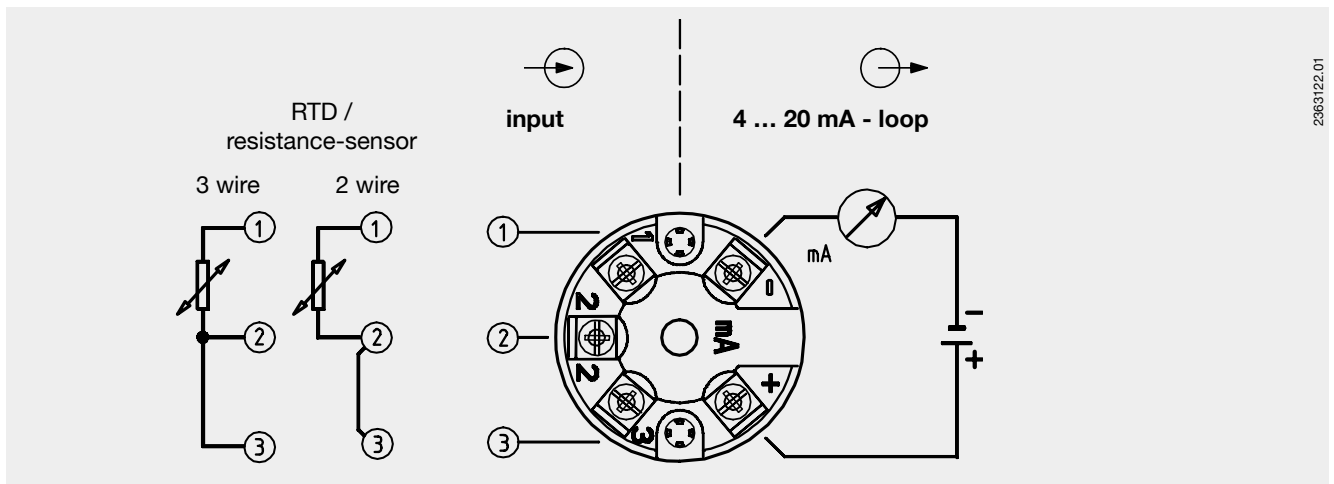


Dimensions in mm



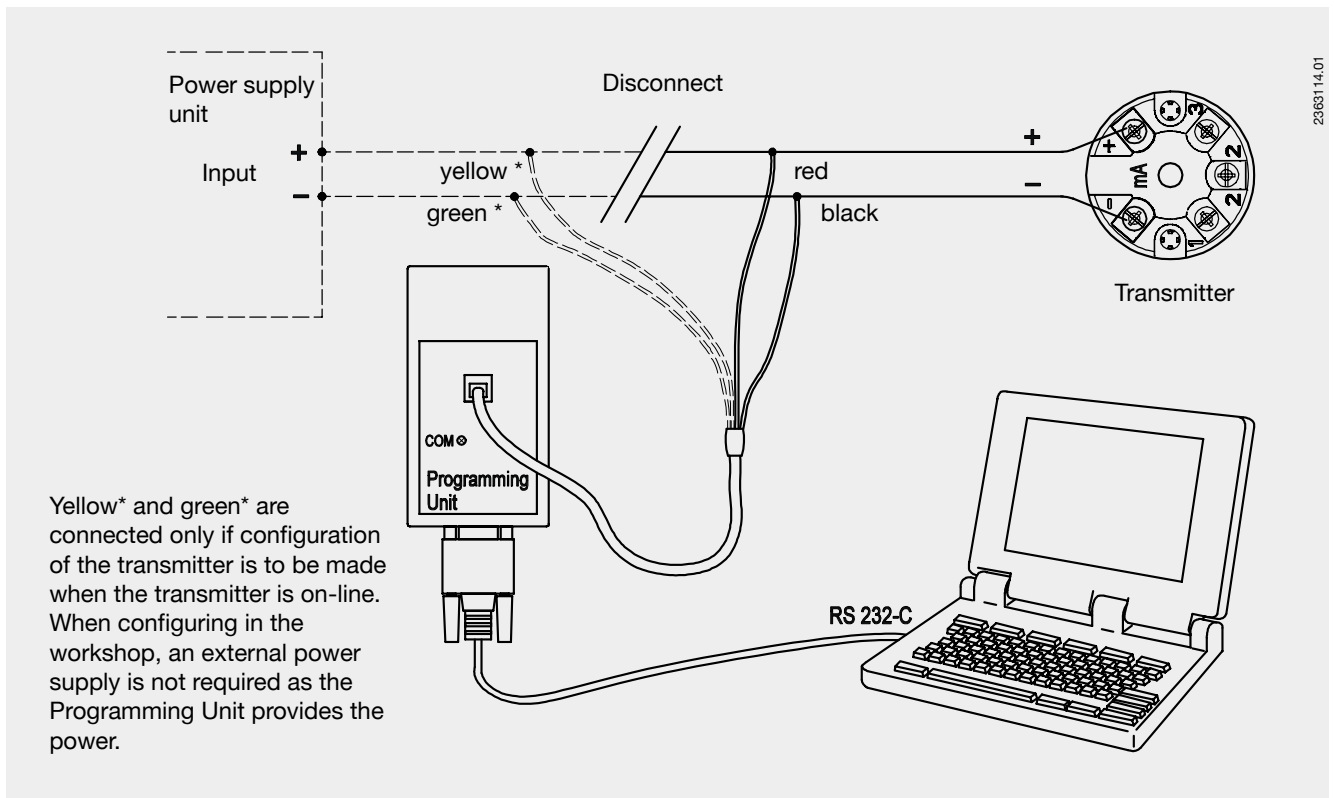
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Designation of terminal connectors



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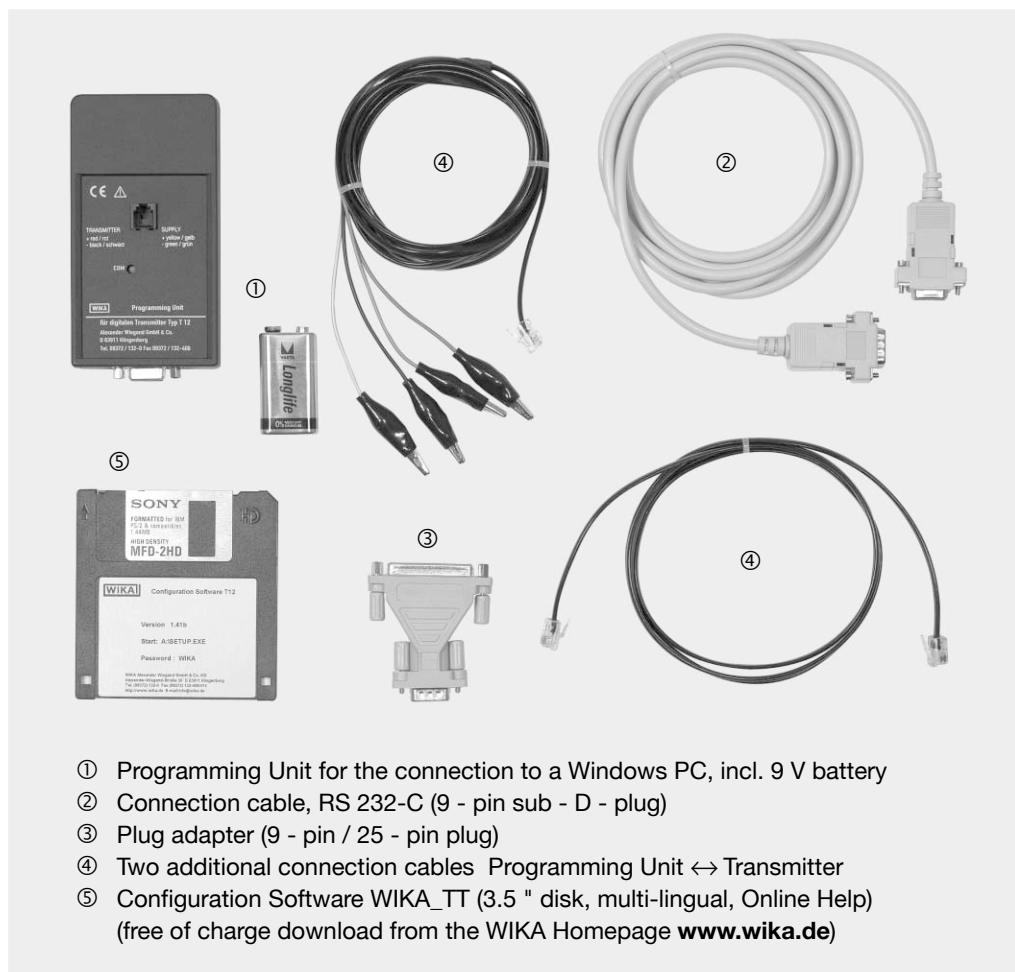
Connection of Programming Unit



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Accessory

Configuration-Set



Starter Kit

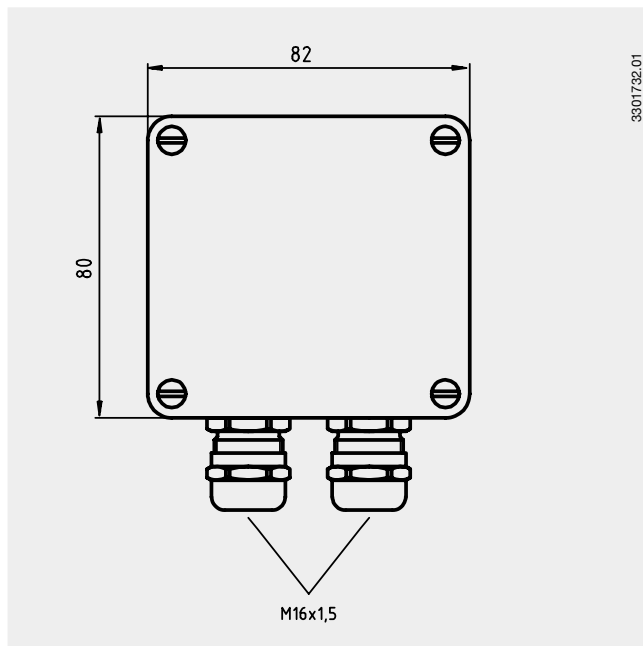


Accessory (please order separately)	Order No.
Configuration-Set for T12 and T24	36 34842
Configuration Software T24 on 3.5" disk ¹⁾	23 75385
Starter Kit, consisting of T24 + Configuration-Set	24 10813

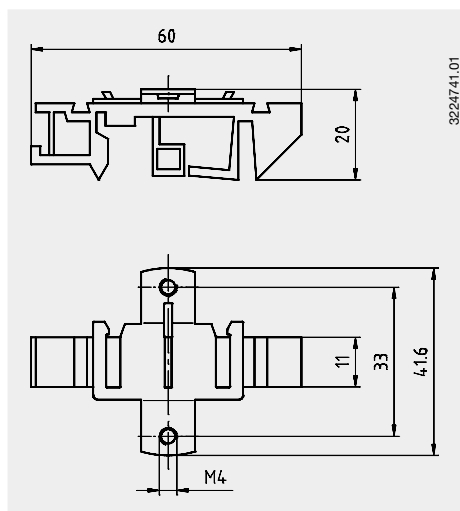
1) Free of charge download from the WIKA Homepage www.wika.de

Assembly accessories

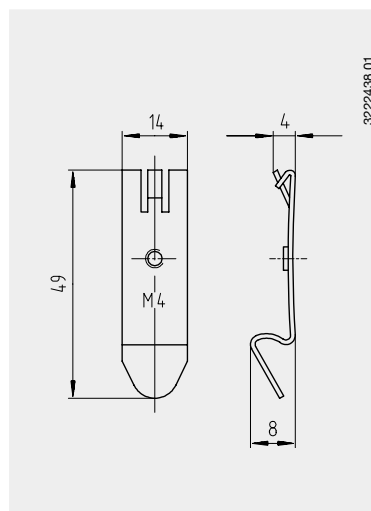
Field case



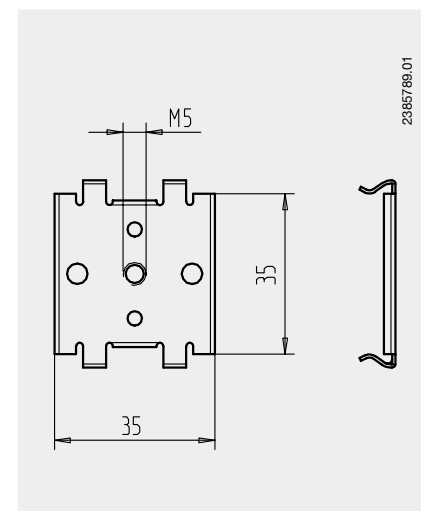
Adapter, plastic/stainless steel



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 No.	Code	Features
Input		
1	1P	resistance thermometer Pt 100, small measuring ranges (minimum span 20 K)
	2P	resistance thermometer Pt 100, large measuring ranges (minimum span 50 K)
Explosion protection		
2	0	without
	2	II 1G EEx ia IIC T4/T5/T6 acc. Directive 94/9/EG (ATEX)
	6	CSA Class I, Division 1, Group A, B, C, D
	8	FM Class I, Division 1, Group A, B, C, D
	9	II 3G EEx nL/nA IIC T4/T5/T6
Approvals		
3	Z	without
	G	GL-Approval
Ambient temperature		
4	F	-40 ... +85 °C (-40 ... +185 °F)
	H	extended range: -40 °C ... +105 °C <i>not with explosion protection</i>
Measuring range		
5	GK	basic configuration (3 wire, 0...150°C, signalling down scale < 3.6 mA)
	KL	customer's specification ¹⁾
Additional order info		
6	YES	NO
	T	Z additional text <i>Please state as clearly understandable text!</i>

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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