

Analogue temperature transmitter

For Pt100 sensors, PC configurable, head mounting version

Model T24.10

WIKA data sheet TE 24.01



Applications

- Machine building and plant construction
- Process industry

Special features

- Analogue signal processing, ideal for multiplex-systems
- Configuration via Windows PC, sensor simulation for configuration not necessary
- Sensor burnout signalling per NAMUR NE43
- Configuration software WIKa_TT in 6 user languages
- Compact version



Analogue temperature transmitter model T24.10

Description

The model T24 temperature transmitter has been specifically designed for the application of a Pt100 with 2- or 3-wire connection or 4 ... 20 mA analogue output (loop-powered 2-wire design).

The T24 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 of the power supply 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 T24 temperature transmitter is suited for a wide range of applications in the machine-building 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 "Specifications") or configured according to customer specifications within the given limits.

Specifications

Input		
Models T24.10.1Px, T24.10.2Px	Pt100 per DIN EN 60751, 2-wire, 3-wire	
Max. measuring range	T24.10.1Px: -150 ... +850 °C	T24.10.2Px: -200 ... +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 ... +150 °C	T24.10.2Px: -200 ... +200 °C
End of measuring range, configurable	Dependent on initial value of measuring range, see diagram page 4	
Basic configuration	3-wire 0 ... 150 °C	
Measurement current	approx. 0.5 mA	
Connecting cable	Effect max. permissible resistance	± 0.2 K / 10 Ω each wire ¹⁾ 30 Ω each wire, 3-wire symmetric

1) For sensor connection in a 3-wire connection; with a 2-wire connection, an overall lead resistance of up to 20 Ω can be compensated, otherwise the lead resistance is recorded as an error.

Analogue output		
Analogue output, configurable	linear to temperature per IEC 60751 4 ... 20 mA, 2-wire design	
Measuring deviation per DIN EN 60770, 23 °C ±5 K	± 0.2 % ²⁾	
Linearisation	linear to temperature per DIN EN 60751	
Linearisation error	± 0.1 % ³⁾	
Temperature coefficient T_K	Zero point	± 0.1 % / 10 K_{T_a} or ⁴⁾ ± 0.15 K / 10 K_{T_a}
	Span	± 0.15 % / 10 K_{T_a}
Rise time t_{90}	< 1 ms	
Switch-on delay, electrical	< 10 ms	
Signalling	Sensor burnout	configurable: ■ NAMUR down scale < 3.6 mA (typical 3 mA) ■ NAMUR up scale > 21.0 mA (typical 23 mA)
	Sensor short-circuit	not configurable, in general: ■ NAMUR down scale < 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	
Effect of load	± 0.05 % / 100 Ω	
Power supply effect	± 0.025 % / V	

2) For measuring spans smaller than 50 K additional 0.1 K, for measuring spans larger than 550 K, additional 0.1 %

3) ±0.2 % for measuring ranges with a lower limit less than 0 °C or a measuring span greater than 800 K

4) Greater value applies; within the standard range of ambient temperature -40 °C ≤ T_a ≤ +85 °C, with extended range of ambient temperature, the double value is valid outside the standard range

5) Temperature value, in case of short circuit between wire no. 2 and no. 3 (operation of sensor in 2-wire connection)

Readings in % refer to the measuring span

T_a Ambient temperature

U_B Voltage of the loop supply, see power supply

Approvals	
Germanischer Lloyd (model T24.10.xxx-G)	Approval certificate No. 47183-03 HH Ambient category D, F, H, EMC1
Gost standard	Approval certificate DE.C.32.001.A No. 15279

Explosion protection, power supply

Model	Approvals	Permissible ambient/storage temperature (in accordance with the relevant temperature classes)	Safety-related maximum values for Sensor (connections 1 up to 3)	Current loop (connections ±)	Power supply U_B (DC) ¹⁾
T24.10.xx0	without	-40 ... +85 °C	-	-	10 ... 36 V
T24.10.xx2	EC type-examination certificate: DMT 02 ATEX E 025 X II 1G EEx ia IIB/IIC T4/T5/T6 Intrinsically safe per directive 94/9/EG (ATEX)	-40 ... +85 °C at T4 -40 ... +75 °C at T5 -40 ... +60 °C at T6	$U_{OC} = DC 6.4 V$ $I_{SC} = 42.6 mA$ $P_{max} = 37.1 mW$ IIB: $C_0 = 500 \mu F$ $L_0 = 50 mH$ IIC: $C_0 = 20 \mu F$ $L_0 = 10 mH$	$U_i = DC 30 V$ $I_i = 120 mA$ $P_i = 800 mW$ $C_i = 6.2 nF$ $L_i = 110 \mu H$	10 ... 30 V
T24.10.xx6	CSA approval 105000-6 Class I, division 1, groups A, B, C, D	max. +85 °C at T4 max. +75 °C at T5 max. +60 °C at T6	$U_{OC} = DC 6.4 V$ $I_{SC} = 42.6 mA$ $P_{max} = 37.1 mW$ $C_a = 20 \mu F$ $L_a = 10 mH$	$U_{max} = DC 30 V$ $I_{max} = 120 mA$ $P_{max} = 800 mW$ $C_i = 6.2 nF$ $L_i = 110 \mu H$	10 ... 30 V
T24.10.xx8	FM approval 2475796 Class I, division 1, groups A, B, C, D	-40 ... +85 °C at T4 -40 ... +75 °C at T5 -40 ... +60 °C at T6	$U_{OC} = DC 6.4 V$ $I_{SC} = 21.1 mA$ $P_{max} = 34 mW$ $C_a = 20 \mu F$ $L_a = 10 mH$	$U_{max} = DC 30 V$ $I_{max} = 120 mA$ $P_{max} = 800 mW$ $C_i = 6.2 nF$ $L_i = 110 \mu H$	10 ... 30 V
T24.10.xx9	II 3 G Ex nA IIC T4...T6 II 3 G Ex nL IIC T4...T6 II 3 G Ex ic IIC T4...T6	-40 ... +85 °C at T4 -40 ... +65 °C at T5 -40 ... +50 °C at T6	$U_{OC} = DC 5.4 V$ $I_0 = 0.51 mA$ $C_0 = 200 \mu F$ $L_0 = 1000 mH$	$U_i = DC 36 V$ $C_i = 10 nF$ $L_i = 110 \mu H$	10 ... 36 V

1) Power supply input protected against reverse polarity; load $R_A \leq (U_B - 10 V) / 0.022 A$ with R_A in Ω and U_B in V

Ambient conditions

Ambient and storage temperature range	Standard: -40 ... +85 °C Option: -40 ... +105 °C ²⁾
Climate class per DIN EN 60654-1	Cx (-40 ... +85 °C, 5 ... 95 % relative air humidity)
Maximum permissible humidity per DIN EN 60068-2-30 var. 2	relative humidity 100 %, condensation allowed
Vibration per DIN EN 60068-2-6	10 ... 2000 Hz, 10 g
Shock	DIN EN 60068-2-27
Salt fog	DIN EN 60068-2-11
Electromagnetic compatibility (EMC)	2004/108/EC, EN 61326 emission (group 1, class A) and interference immunity (industrial application)

2) -40 ... +105 °C only without explosion protection

Case

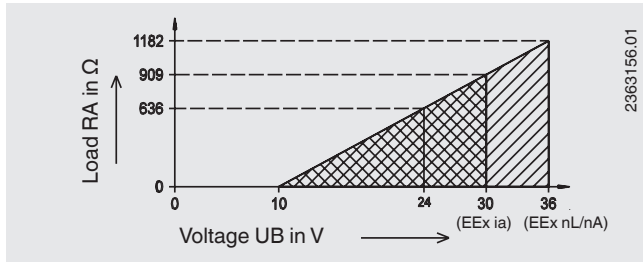
Material	Plastic, PBT, glass fibre reinforced
Ingress protection	Case IP 66/IP 67 per IEC 60529/EN 60529
Terminal connections	IP 00 per IEC 60529/EN 60529
Cross section of terminal connectors	0.14 ... 1.5 mm ²
Weight	approx. 0.04 kg
Dimensions	see dimensions

Miscellaneous

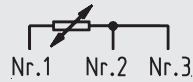
Temperature units	Configurable: °C, °F, K
Resistance sensor	Linear resistance sensors are connectable
Sensor connection	configurable: 2-wire or 3-wire configurable compensation of the connection lead with 2-wire connection
Info data	TAG No., descriptor and message per configuration can be stored in transmitter
Configuration and calibration data	permanently stored in EEPROM

Load diagram

The permissible load depends on the loop supply voltage.



Wire number:



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

The end of the measuring range is dependent on the corresponding start of the measuring range. For an overview please see this dependency in these diagrams shown, as an example, in 50 °C steps.

The configuration software checks the required measuring range and only accepts permissible values. Intermediate values are configurable; the smallest increment is 0.1 °C.

Diagram for measuring ranges model T24.10.1Px

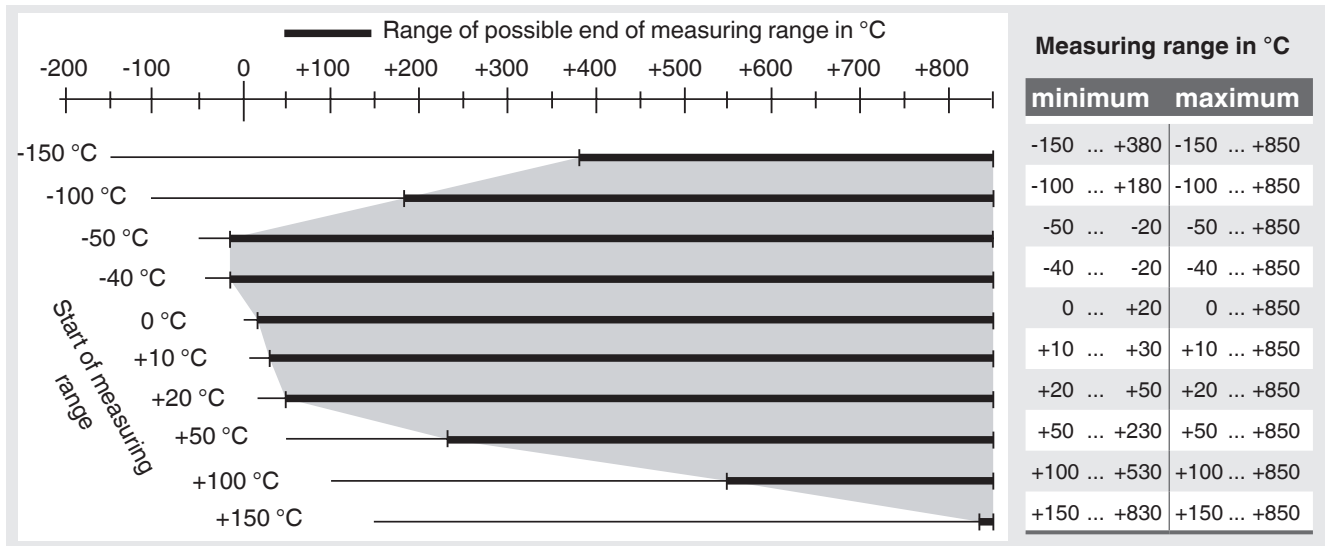
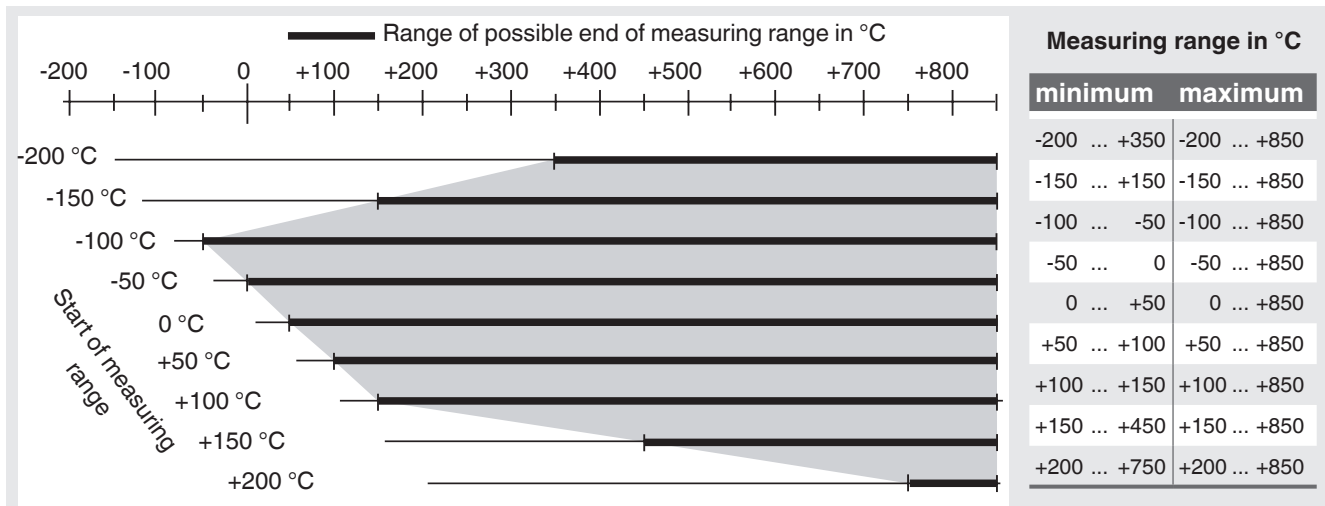
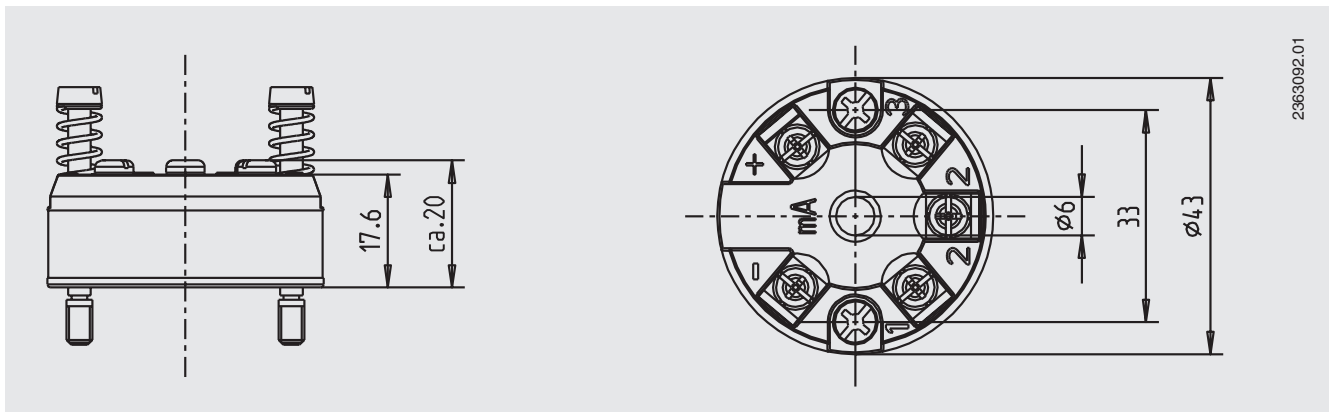


Diagram for measuring ranges model T24.10.2Px

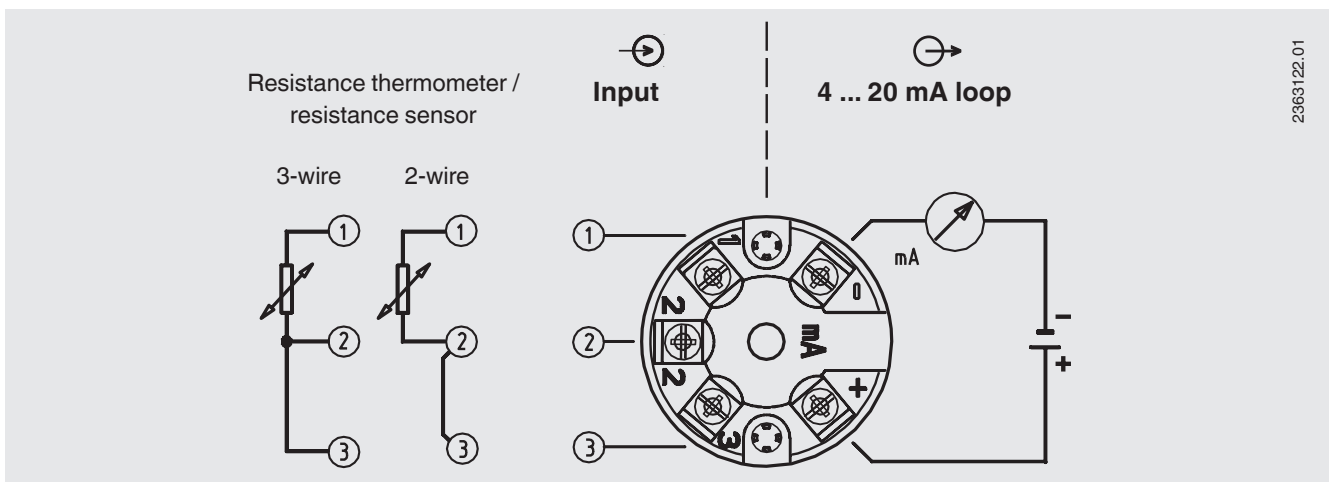


Dimensions in mm



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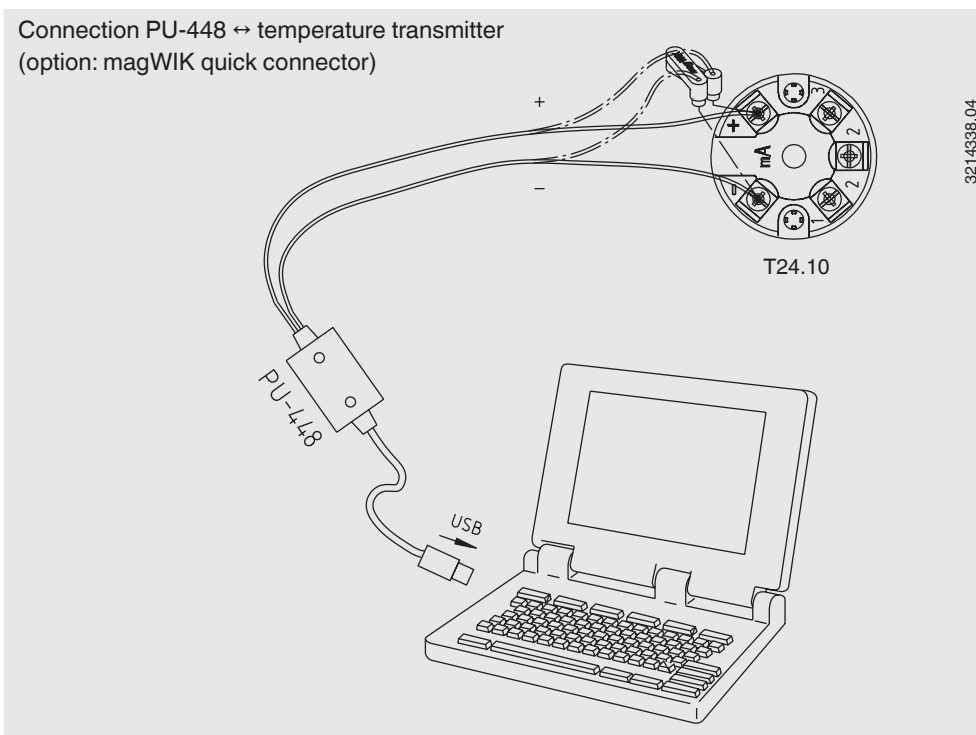
Designation of terminal connectors



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Connecting PU-448 programming unit



Connection PU-448 \leftrightarrow temperature transmitter
(option: magWIK quick connector)



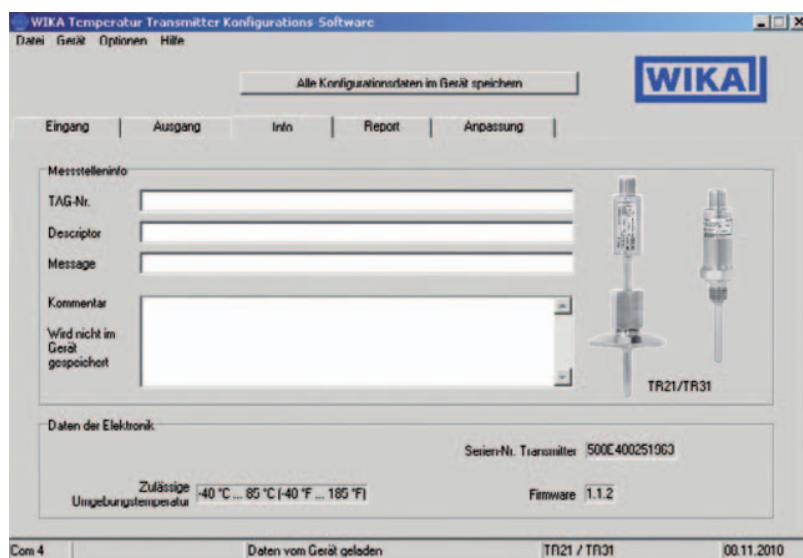
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Accessories

Configuration set

Model	Special features	Order No.
Programming unit Model PU-448 	<ul style="list-style-type: none"> ■ Easy to use ■ LED statusdisplay ■ Compact version ■ Now no further power supply is needed for either the programming unit or for the transmitter ■ Measuring the loop current of the model T24 temperature transmitter possible 	11606304
Magnetic quick connector magWIK 	<ul style="list-style-type: none"> ■ Replacement for crocodile clips and HART® terminals ■ Fast, safe and tight electrical connection ■ For all configuration and calibration processes 	11604328

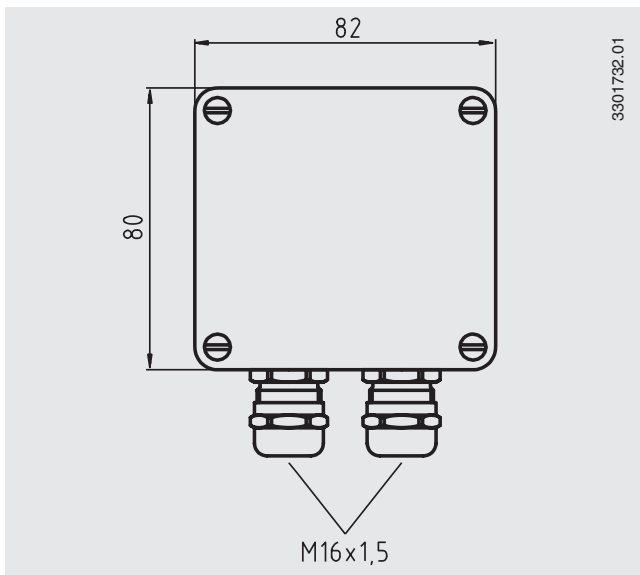
Software



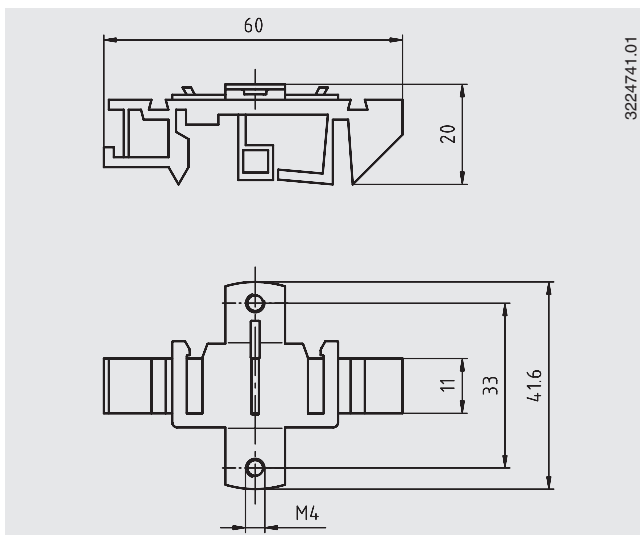
WIKA_TT configuration software (multilingual) as a free download from www.wika.com

Mounting accessories

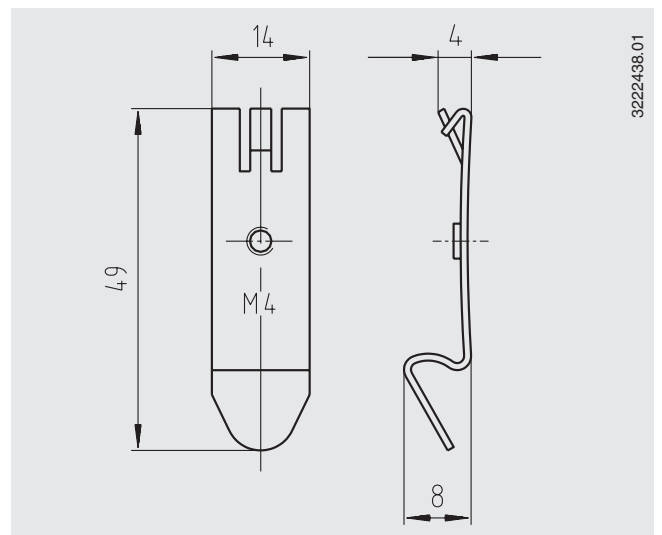
Field case



Adapter, plastic/stainless steel



Adapter, steel tin galvanized



Accessories (please order separately)	Order No.
Field case, plastic (ABS), IP 65, for mounting of a head mounting transmitter, permissible ambient temperature: -40 ... +80 °C, 82 x 80 x 55 mm (W x L x H), with two cable glands M16 x 1.5	3301732
Adapter, plastic/stainless steel, for mounting on a DIN rail	3593789
Adapter, steel tin galvanized, for mounting on a DIN rail	3619851

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