

Analogue Temperature Transmitter Model T31.10, Process Industry Series, Head Mounting

WIKAI Data Sheet TE 31.01



Applications

- Chemical industry
- Pharmaceutical industry
- Food industry

Special Features

- Fixed measuring ranges
- Potentiometer free
- Ex-protection
 - II 1G EEx ia IIB / IIC T4 / T5 / T6
 - II 2G EEx ib IIB / IIC T4 / T5 / T6
 - II 3G EEx nL/nA IIC T4 / T5 / T6
- High accuracy
- Compact



Analogue Temperature Transmitter Model T31.10

Description

The series T31 analogue temperature transmitters are designed for use in process industry to meet difficult and demanding conditions.

In the development phase, particular consideration was given to reliability and a practical design. These transmitters feature fixed measurement ranges without the use of potentiometers and are intrinsically safe. Industrial standard accuracy and effective protection against electro-magnetic influences are further performance features of these temperature transmitters. The compact transmitter fits any DIN connection head with Form B.

The transmitters are manufactured and tested in-house, using a largely automated production line and following the most stringent quality procedures. Prior to delivery all transmitters have to pass in-circuit and functional tests. Extensive type examinations and long-term tests with excellent results are evidence of the high reliability of this transmitter series.

Specifications		Model T31.10				
Input		Pt 100 DIN EN 60 751 3 wire				
Possible measuring ranges		From -200 °C to +650 °C in full digit °C values				
minimum span		40 K				
maximum span		650 K				
Standard measuring ranges		-200 ... 0 °C	-200 ... +50 °C	0 ... 50 °C	0 ... 150 °C	0 ... 400 °C
		-50 ... 0 °C	-50 ... +50 °C	0 ... 60 °C	0 ... 200 °C	0 ... 650 °C
		-40 ... 0 °C	-30 ... +60 °C	0 ... 100 °C	0 ... 250 °C	
			-20 ... +60 °C	0 ... 120 °C	0 ... 300 °C	
Special measuring ranges		On request				
Linearisation		Linear to temperature per DIN EN 60 751				
Sensor current		Approx. 0.8 mA				
Connection leads effect		$\leq \pm 0.22 \text{ K} / 10 \Omega$ ¹⁾				
permissible load resistance		10 Ω symmetric				
Analogue output		4 ... 20 mA 2 wire design linear to temperature				
Load R_A		$R_A \leq (U_B - 11.5 \text{ V}) / 0.02 \text{ A}$ with R_A in Ω and U_B ²⁾ in V				
Adjustment accuracy (factory adjusted)		$\pm 0.15 \%$ of measuring range or $\pm 0.3 \text{ K}$, the maximum value is valid ³⁾				
Linearity error		$\pm 0.1 \%$ of measuring range or $\pm 0.2 \%$ of measuring range with initial values lower than -120 °C				
Temperature influence zero		0.1 % of measuring range / 10 K or 0.1 K / 10 K, the maximum value is valid				
span		0.1 % of measuring range / 10 K or 0.1 K / 10 K, the maximum value is valid				
Rising time t_{90}		< 30 ms				
Switch-on delay, electric		< 1 s				
Power supply effect		0.01 % / V related to U_B ²⁾ 20 V				
With sensor burnout		Upscale, $\geq 22.5 \text{ mA}$				
With sensor short circuit		Downscale, $\leq 3.6 \text{ mA}$ ⁴⁾				
Power supply		DC 11.5 ... 30 V by the 4 ... 20 mA-loop				
Max. permissible ripple		10 %				
Ex-protection per Directive 94/9/EC ATEX Intrinsic Safety per EN 50 020		EC Type Test DMT 02 ATEX E 106 X				
Model T31.10.1P2		II 1G EEx ia IIB / IIC T4 / T5 / T6				
Model T31.10.1P4		II 2G EEx ib IIB / IIC T4 / T5 / T6				
Permissible ambient temperature		-50 °C ... +85 °C with T4				
		-50 °C ... +75 °C with T5				
		-50 °C ... +60 °C with T6				
Maximum values for connection of the		$U_i = \text{DC } 30 \text{ V}$ $I_i = 100 \text{ mA}$ $P_i = 800 \text{ mW}$				
current loop circuit (connections + and -)		$C_i = 6.2 \text{ nF}$ $L_i = 110 \mu\text{H}$				
Maximum values for connection of the		$U_o = \text{DC } 6.4 \text{ V}$ $I_o = 100 \text{ mA}$ $P_o = 426 \text{ mW}$				
sensor circuit (connections 1 up to 3)		Group II B: $C_o = 500 \mu\text{F}$ $L_o = 10 \text{ mH}$				
		Group II C: $C_o = 10 \mu\text{F}$ $L_o = 3 \text{ mH}$				
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 T31.10.1P9 resp. T31.10.1PA		II 3G EEx nL IIC T4 / T5 / T6 resp. II 3G EEx nA IIC T4 / T5 / T6				
Permissible ambient temperature		-40 °C ... +85 °C with T4				
		-40 °C ... +70 °C with T5				
		-40 °C ... +50 °C with T6				
Maximum values for connection of the		$U_i = \text{DC } 30 \text{ V}$				
current loop circuit (connections + and -)		$C_i = 1.2 \text{ nF}$ $L_i = 100 \mu\text{H}$				
Maximum values for connection of the		$U_o = \text{DC } 2.5 \text{ V}$ $I_o = 1.2 \text{ mA}$				
sensor circuit (connections 1 up to 3)		$C_o = 1000 \mu\text{F}$ $L_o = 1000 \text{ mH}$				
Electromagnetic compatibility (EMC)		IEC: 801-2 {3}, 801-3 {3}, 801-4 {3}, 801-6 {3} degree of severity in { }				
Measurement uncertainty		(corresponds with NAMUR 5.93 requirement)				
		max. $\pm 1 \%$ of measuring range ⁵⁾				
Protection and other features		Reverse power supply, overvoltage protection 36 V				
Electrical protection class		-40 ... +85 °C				
Ambient and storage temperature		100 % relative humidity (unlimited with isolated sensor connection wires)				
Maximum permissible humidity		moisture condensation permissible DIN EN 60 068-2-30 Var. 2				
Climate class		Cx (-40 ... +85 °C, 5 % up to 95 % relative humidity) DIN EN 60 654-1				
Vibration		10 ... 2000 Hz 5 g DIN EN 60 068-2-6				
Shock		DIN EN 60 068-2-27 $g_N = 15$				
Info data		TAG-No., Descriptor and Message storable into transmitter via configuration				
Configuration and calibration data		Permanently stored in EEPROM				
Case		Head mounting design				
Material		Plastic, PBT, glass fibre reinforced ⁶⁾				
Ingress protection case		IP 50 IEC 529 / EN 60 529				
terminal connections		IP 00 IEC 529 / EN 60 529				
Cross section of terminal connectors		Max. 2.5 mm ² , screws captive				
Weight		Approx. 0.04 kg				

1) The lead resistance is recorded as fault in case of Pt 100 in 2 wire connection

2) U_B = Loop supply voltage, see power supply

3) Values valid at ambient temperature: 23 °C $\pm$ 5 °C
terminal voltage of energy supply: 24 V, load: 100 Ohm

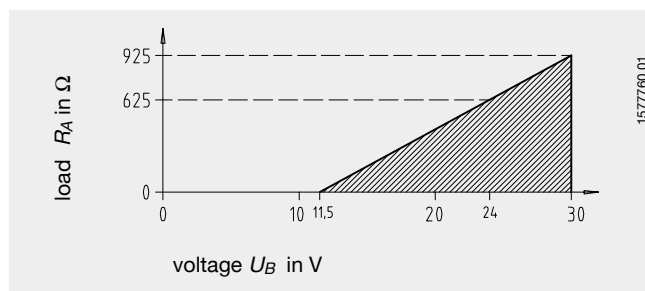
4) Temperature measured value, in case of short circuiting between leads no. 2 and no. 3 (operation of Pt 100 in 2 wire connection)

5) With measurement spans < 100 K : 2 % for 801-6 and 801-2

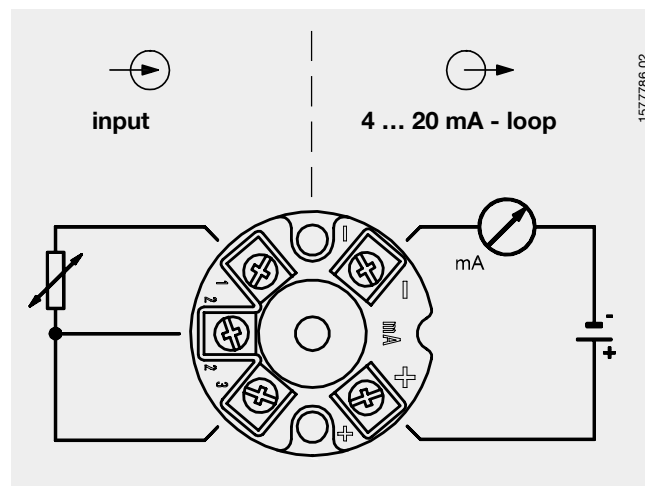
6) Press-fitted, brass threaded inserts M 3 on underside

Load diagram

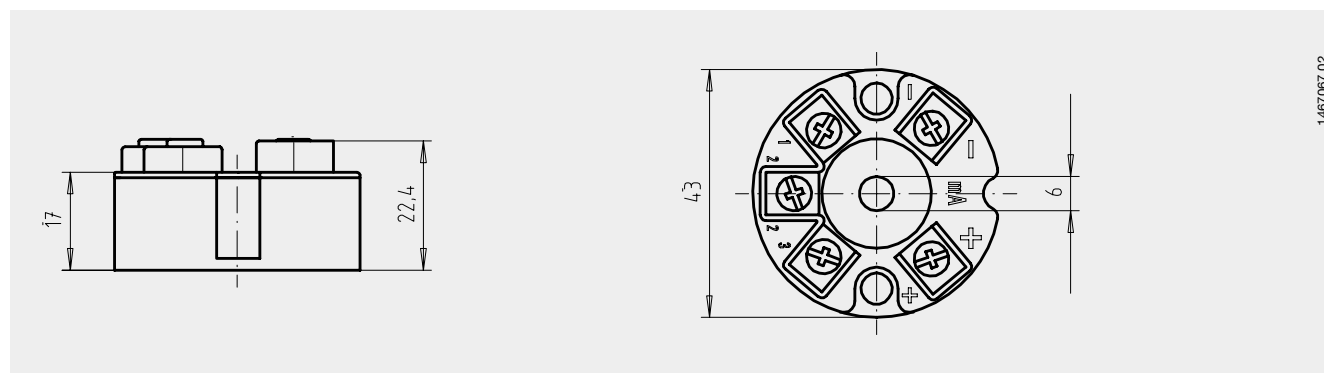
The permissible load is dependent upon the loop power supply voltage.



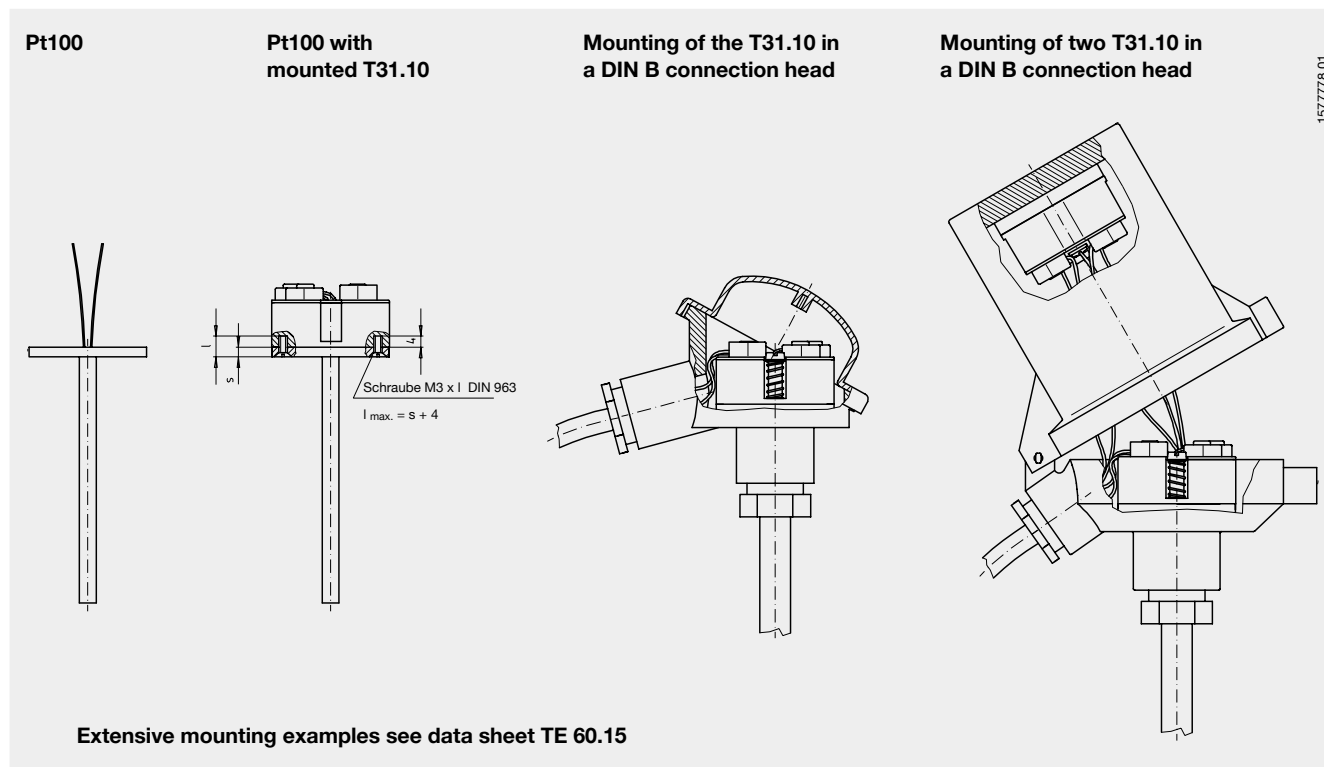
Designation of terminal connectors



Dimensions in mm



Mounting examples



Extensive mounting examples see data sheet TE 60.15

Ordering information

Field No.	Code	Features
		Explosion protection
	2	II 1G EEx ia IIC T4/T5/T6 acc. to Directive 94/9/EC (ATEX)
	4	II 2G EEx ib IIC T4/T5/T6 acc. to Directive 94/9/EC (ATEX)
	9	II 3G EEx nL IIC T4/T5/T6 acc. to Directive 94/9/EC
1		A II 3G EEx nA IIC T4/T5/T6 acc. to Directive 94/9/EC
		Measuring range
		Standard measuring range ¹⁾
2		?? Special measuring range ²⁾ <i>please state as additional text</i>
		Additional order info
	YES	NO
3		T Z additional text <i>Please state as clearly understandable text!</i>

1) Standard measuring ranges and their code

Standard measuring ranges	Code
-200 °C ... 0 °C	L1
-200 °C ... +50 °C	LA
-50 °C ... 0 °C	E1
-50 °C ... +50 °C	EA
-40 °C ... 0 °C	D1
-30 °C ... +60 °C	CC
-20 °C ... +60 °C	BB
0 °C ... +50 °C	1A
0 °C ... +60 °C	1C
0 °C ... 100 °C	1E
0 °C ... 120 °C	1F
0 °C ... 150 °C	1H
0 °C ... 200 °C	1L
0 °C ... 250 °C	1M
0 °C ... 300 °C	1N
0 °C ... 400 °C	1Q
0 °C ... 650 °C	1V

2) Special measuring ranges

Special measuring ranges	Span
-200 °C ... +650 °C	Min. 40 K, max. 650 K
-328 °F ... +1202 °F	Min. 72 °F, max. 1170 °F

The special measuring ranges are freely selectable taking the minimum/maximum values specified for measuring range and span into account.

Order code:

T31.10 - 1P

1

2

3

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.

