

Operating Instructions
Temperature Transmitter Model T31



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Specifications according to WIKA data sheet TE 31.01.
Technical alteration rights observed.
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1 Models 2 Safety warnings

1 Models

Head mounting	Ex protection
T31.10. 1P0	without
1P2	II 1G EEx ia
1P4	II 2G EEx ib
1P9	II 3G EEx nL/ nA

2 Safety warnings

When mounting, initiating and operating these transmitters it is important to observe the safety precautions and regulations (e.g. IEC 60 364-6-61).

Nonobservance of the applicable regulations may cause severe injury to persons or damage to equipment.

Only staff with suitable qualification should work with these transmitters.

We draw your attention to the following which must be observed with transmitters with Ex protection:

- Observe the applicable regulations for the use of Ex-class instruments (e.g.: EN 50 014, EN 50 020, EN 50 021, EN 50 284).
- Observe the notes for mounting and operating in hazardous area described in section 6.
- It is forbidden to use a transmitter that is damaged externally.
- Repairs are forbidden.

Note

Before initial operation check the suitability for the intended application. In particular, it is important to fulfill the ambient and operation conditions as specified in the WIKA data sheet TE 31.01.

3 Mounting

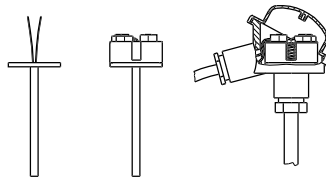
3 Mounting

3.0 General

These transmitters are designed to be mounted on a measuring insert in a DIN connecting head with form B.

The connecting wires of the measuring insert must be approx. 40 mm long and insulated.

Mounting example:



3.1 Mounting on measuring insert 3.2 Mounting in connection head

3.1 Mounting on measuring insert

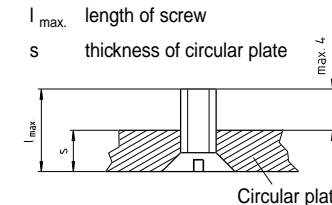
The transmitter can be mounted on the circular plate of the measuring insert using two countersunk head M3 screws per DIN EN 2009.

Appropriate threaded inserts have been press-fitted in the underside of the case.

Assuming the countersinking is carried out correctly, the permissible screw length can be calculated as follows:

$$l_{max} = s + 4 \text{ mm}$$

Dimensions in mm:



Check the screw length before affixing the transmitter to the measuring insert:

- stick the screw in the circular plate
- and verify additional length of 4 mm!

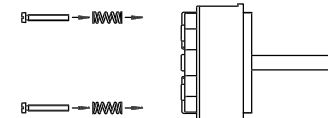
WARNING

Do not exceed the maximum allowable screw length!

The transmitter will be damaged if the screws are screwed further than 4 mm into the bottom of the transmitter.

3.2 Mounting in connection head

Insert the measuring insert with the mounted transmitter in the protective sheath and affix in the connecting head using screws in pressure springs.



4 Electrical connections

4 Electrical connections

!!! Important !!!

In the case of the transmitters described here there is an internal galvanic connection between the sensor input and analogue output!

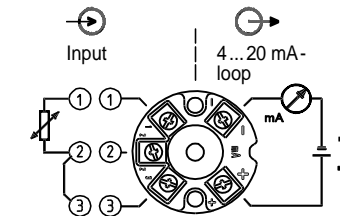
No external conducting is to be made (for example, by earthing) between the connected temperature sensor and analogue output!

4.0 General

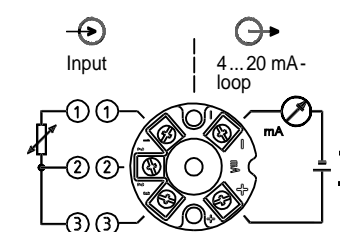
The transmitters have connecting terminals for electrical connection. We recommend the use of crimped connector sleeves in the case of flexible leads.

4.1 Input Pt100 2 wire

Set a jumper between the input terminals ② and ③. Otherwise the transmitter signals a sensor burnout and sets the output signal $\geq 22.5 \text{ mA}$.



4.2 Input Pt100 3 wire



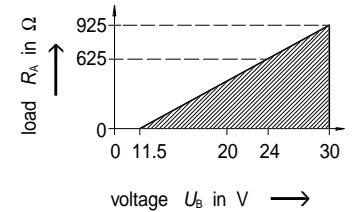
4.3 Connect 4...20 mA-loop 5 Maintenance

4.3 Connect 4...20 mA-loop

The electrical connection is made through the terminals \oplus and \ominus .

Load diagramm

The permissible load R_A dependent upon the loop power supply voltage U_B .



- maximum permissible terminal voltage:

30 V

- maximum permissible load R_A (dependent upon the loop power supply voltage U_B)

925 Ω at 30 V power supply U_B

625 Ω at 24 V power supply U_B

$$R_A \leq (U_B - 11.5 \text{ V}) / 0.02 \text{ A}$$

with R_A in Ω and U_B in V

5 Maintenance

The temperature transmitters described here are totally maintenance-free!

The electronics are completely encapsulated and incorporate no components which could be repaired or replaced.

6 Notes for mounting and operating in hazardous area

6 Notes for mounting and operating in hazardous area

6.0 General


Use only such a transmitter in a hazardous area that have the corresponding approval for this hazardous area.

The transmitter Model T31.10.1P2 correspond to ignition protection type **intrinsically safe** apparatus II 1G EEx ia IIC T4/T5/T6.

The transmitter Model T31.10.1P4 correspond to ignition protection type **intrinsically safe** apparatus II 2G EEx ib IIC T4/T5/T6.

The transmitter Model T31.10.1P9 correspond to ignition protection type **energy-limited** apparatus II 3G EEx nL IIC T4/T5/T6 and to ignition protection type **non-sparking** apparatus II 3G EEx nA IIC T4/T5/T6.

Model, Ex protection class, Approval No. and Symbol are stated on the rating plate.
Example:

 T31.10.1P2
II 1G EEx ia IIC T4/T5/T6
DMT 02 ATEX E 106 X

6.1 Special conditions for safe use

6.1.1 Mounting in the hazardous area

T31..**2/T31.**.**4:** Transmitters in a hazardous area are supplied only with associated intrinsically safe apparatus that are approved for this hazardous area. These transmitters must be mounted in a case that must at least correspond to following ingress protection IP 20 according to EN 60 529 / IEC 529.

T31..**9 (Use as energy-limited equipment II 3G EEx nL):** The supply current circuit must fulfil the requirements for ignition protection type II 3G EEx nL energy-limited (EN 50 021). These transmitters must be mounted in a case that must at least correspond to following ingress protection IP 54 according to EN 60 529 / IEC 529.

T31..**9 (Use as non-incentive equipment II 3G EEx nA):** Disconnection of power supply is forbidden inside the hazardous area. When connecting or disconnecting the terminals ensure the power supply is disconnected outside the hazardous area. These transmitters must be mounted in a case that must at least correspond to following ingress protection IP 54 according to EN 60 529 / IEC 529.

When during use in circuits with the safety class nA (non-incendive) the permissible connected loads have been exceeded for a short term¹⁾, the use of these transmitters in circuits with the safety class EEx nL (energy limited) is not permissible any more.

1) When the transmitters are used in circuits with the safety class nA, it is permissible to exceed the maximum supply voltage by up to 40 % for a short term.

6.1.2 Operating transmitter in Zone 0

The temperature transmitter may be operated only in areas that require apparatus of category 1 when following atmospheric conditions exist:

temperature: -20 °C ... +60 °C
pressure: 0.8 bar ... 1.1 bar

7 Safety-engineering values

6.1.3 Operating the transmitter in Zone 1 and Zone 2

The transmitter may be used only in the following ambient temperature range according to the temperature class:

T31.10.1P2 II 1G EEx ia
T31.10.1P4 II 2G EEx ib
T4: -50 °C ≤ T _a ≤ +85 °C
T5: -50 °C ≤ T _a ≤ +75 °C
T6: -50 °C ≤ T _a ≤ +60 °C

T31.10.1P9 II 3G EEx nL/nA
T4: -40 °C ≤ T _a ≤ +85 °C
T5: -40 °C ≤ T _a ≤ +70 °C
T6: -40 °C ≤ T _a ≤ +50 °C

7 Safety-engineering values

7.1 Power Supply / 4 ... 20 mA-loop

The following safe technical maximum values must not be exceeded:

T31.10.1P2 II 1G EEx ia
T31.10.1P4 II 2G EEx ib
Voltage U _i = DC 30 V
Current I _i = 100 mA
Power P _i = 800 mW

T31.10.1P9 II 3G EEx nL/nA
Voltage U _i = DC 30 V

Following have an outward effect at the connection terminals ⊕ und ⊖ of the transmitter

Model T31.10.1P2 and T31.10.1P4:
effective internal capacity C_i = 6.2 nF
effective internal inductivity L_i = 110 µH
Model T31.10.1P9:
effective internal capacity C_i = 1.2 nF
effective internal inductivity L_i = 100 µH

7.2 Sensor (terminal 1 to 3)

Connect the sensor according to section 4 to the terminals ①, ② and ③.

The connected sensor must not warm up inadmissably according to the temperature class of the respective hazardous area for the following values for voltage, current and power:

T31.10.1P2 II 1G EEx ia
T31.10.1P4 II 2G EEx ib
maximum possible values
U ₀ = DC 6.4 V
I ₀ = 100 mA
P ₀ = 426 mW

T31.10.1P9 II 3G EEx nL/nA
effective values during operation
U ₀ = DC 2.5 V
I ₀ = 1.2 mA

The sum of the values of the connected sensor and the connection line must not exceed the following values for the maximum permissible capacity and inductivity:

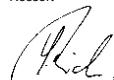
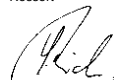
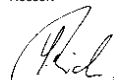
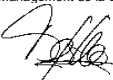
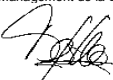
T31.10.1P2 II 1G EEx ia IIB
T31.10.1P4 II 2G EEx ib IIB
C _{sensor} + C _{line} < C ₀ C ₀ = 500 µF
L _{sensor} + L _{line} < L ₀ L ₀ = 10 mH

(to be continued, see next column)

8 Declaration of conformity

T31.10.1P2 II 1G EEx ia IIC
T31.10.1P4 II 2G EEx ib IIC
C _{sensor} + C _{line} < C ₀ C ₀ = 10 µF
L _{sensor} + L _{line} < L ₀ L ₀ = 3 mH

T31.10.1P9 II 3G EEx nL/nA IIC
C _{sensor} + C _{line} < C ₀ C ₀ = 1000 µF
L _{sensor} + L _{line} < L ₀ L ₀ = 1000 mH

EG-Konformitäts- erklärung	EC Declaration of Conformity	Déclaration de Conformité CE
Dokument Nr.: 11134755.01	Document No.: 11134755.01	Document No.: 11134755.01
Wir erklären, dass die CE mit CE gekennzeichneten Produkte	We declare that the marked products	Nous déclarons que les appareils marqués
Typen: T31.10.xxx	Models: T31.10.xxx	Types: T31.10.xxx
Beschreibung: Analoge Temperatur-Transmitter, Chemieausführung, Kopfmontage	Description: Analogue temperature transmitter, Process Industries Series, head mounting	Description: Transducteur de température, Série chimie, pour montage dans les sondes
gemäß gültigem Datenblatt: TE 31.01	according to the valid data-sheet: TE 31.01	selon fiche technique valide: TE 31.01
die grundlegenden Anforderungen der folgenden Richtlinien und Normen erfüllen:	are in conformity with the essential requirements of the directives and standards:	sont conformes aux exigences essentielles de les directives et normes :
1) 89/336/EWG (EMV) EN 61326:1997 +A1:98 +A2:01	1) 89/336/EEC (EMC) EN 61326:1997 +A1:98 +A2:01	1) 89/336/CEE (CEM) EN 61326:1997 +A1:98 +A2:01
2) 94/9/EG (ATEX) ⁽¹⁾ T31.10.1Px EN 50014:1997 +A1:98 +A2:99 EN 50020:1994 EN 50284:1999	2) 94/9/EC (ATEX) ⁽¹⁾ T31.10.1Px EN 50014:1997 +A1:98 +A2:99 EN 50020:1994 EN 50284:1999	2) 94/9/CE (ATEX) ⁽¹⁾ T31.10.1Px EN 50014:1997 +A1:98 +A2:99 EN 50020:1994 EN 50284:1999
⁽¹⁾ EG-Baumusterprüfbescheinigung DMT 02 ATEX E 106 X von EXAM BBG Prüf- und Zertifizier GmbH, Bochum (Reg.-Nr. 0158).	⁽¹⁾ EC-type-examination certificate DMT 02 ATEX E 106 X of EXAM BBG Prüf- und Zertifizier GmbH, Bochum (reg. no. 0158).	⁽¹⁾ Attestation d'examen CE de type DMT 02 ATEX E 106 X de EXAM BBG Prüf- und Zertifizier GmbH, Bochum (reg. no. 0158).
3) 94/9/EG (ATEX) T31.10.009 EN 50021:1999	3) 94/9/EC (ATEX) T31.10.009 EN 50021:1999	3) 94/9/CE (ATEX) T31.10.009 EN 50021:1999
WIKA Alexander Wiegand GmbH & Co. KG Klingenberg, 2006-05-08	Wika Alexander Wiegand GmbH & Co. KG Klingenberg, 2006-05-08	Wika Alexander Wiegand GmbH & Co. KG Klingenberg, 2006-05-08
Geschäftsbereich TRONIC Company division TRONIC Ressort TRONIC	Qualitätsmanagement TRONIC Quality management TRONIC Management de la qualité TRONIC	Qualitätsmanagement TRONIC Quality management TRONIC Management de la qualité TRONIC
		
i. V. Stefan Richter	i. V. Stefan Richter	i. V. Stefan Richter
		
	i. A. Thomas Gerling	i. A. Thomas Gerling