

TFR5

Room or outdoor temperature sensor



Description

CombiTemp™ TFR5 comprises a series of basic elements which can be combined in various ways to a CombiTemp TFR5 temperature sensor. The product offers great flexibility in respect to modification, service and maintenance.

The sensor can be made to feature a RTD output signal or with a built in FlexTop™ temperature transmitter types 2202, 2211, 2221 with 4-20 mA output (for documentation of FlexTops, please see relevant data sheet or operating instructions).

WARNING

For electrical installations and commissioning of the explosion protected devices, the data given in the conformity certificate as also the local regulations for installation of electrical apparatus within explosion protected areas must be considered. The intrinsically safe versions can be mounted in the explosion hazarded area according to its specification and only connected to a certified intrinsically safe supply loop with the corresponding electrical values.

After mounting of the device - do check that the housing has a ground potential.

The product contains non-replaceable parts, except from insert and/or FlexTop transmitter if selected. In case of malfunction the product must be sent to Baumer for repair.

Field of application

CombiTemp™ TFR5 is a temperature sensor, based on RTD technology, which is designed for wall mounting or pipe mounting outdoor or indoor use, e.g. cold stores, freezing rooms or production facilities.

Safety instructions

This instrument is built and tested according to the current EU-directives and packed in technically safe conditions. In order to maintain this condition and to ensure safe operation, the user must follow the hints and warnings given in this instruction.

During the installation the valid national rules have to be observed. Ignoring the warnings may lead to severe personal injury or substantial damage of property.

The product must be operated by trained staff. Correct and safe operation of this equipment is dependent on proper transport, storage, installation and operation.

All electrical wirings must conform to local standards. In order to prevent stray electrical radiation, we recommend twisted and shielded input cables and also to keep power supply cables separated from the input cables. The connection must be made according to the connection diagrams.

Before switching on the power supply take care that other equipment is not affected. Ensure that the power voltage and the conditions is the environment comply with the specification of the device.

Before switching off the power supply voltage, check the possible effects on other equipment and the processing system.

ATEX data

Valid for TFR5 with FlexTop™ 2202 / 2211 / 2221

The FlexProgrammer 9701 configuration unit must not be connected to the FlexTop within the hazardous area.

Configuration procedure:

- a. Disconnect mains from the 4...20 mA loop circuit
- b. Disconnect the product from the circuitry within the hazardous area
- c. Bring the product to the safe area
- d. Connect the FlexProgrammer and perform the configuration
- e. Reinstall the product in the hazardous area
- f. Connect the power supply to the circuit

Valid for FlexTop™ 2221 only

Configuration for the FlexTop™ 2221 can be made within the hazardous area by means of a handheld HART configurator, providing the precautions and guidelines described in the product's manual are observed.

The TFR5 is also ATEX approved with transmitter for Ex nA for zone 2.

The TFR5 is ATEX approved without transmitter i.e. with Pt100 output only, as simple apparatus as Ex ia.

TFR5

Room or outdoor temperature sensor

Technical specifications

General specifications

Sensor	Stainless steel, AISI 316L
Housing	FlexHousing in Stainless steel, AISI 304
Mounting part	AISI 304
Electrical connection	Plug, M12, 5-wire or 8-wire
Cable gland	M16

⚠ Be sure to fixate the instrument before tightening the cable gland.

When using M16 stainless steel the maximum tightening torque is 4 Nm.

Ambient temperature (air temperature)	-50...160°C without transmitter / display -40...85°C with transmitter only -30...80°C with transmitter and display
Humidity	<98% RH, condensing
Protection class	IP67 / IP69K
Vibrations	GL, test 2

Sensor element specifications (DIN/EN/IEC 60751)

Sensor element	1 × Pt100
Accuracy (sensor element) (DIN/EN/IEC 60751)	Class B $\pm(0,3 + 0,005 \times t)^\circ\text{C}$ - 1/3 B $\pm 1/3 \times (0,3 + 0,005 \times t)^\circ\text{C}$ - 1/6 B $\pm 1/6 \times (0,3 + 0,005 \times t)^\circ\text{C}$ Class A $\pm(0,15 + 0,002 \times t)^\circ\text{C}$
Connection	Cable sensor 4-wire
Fixed sensor	2-wire
Cable	High-flexible silicone, grey
Cable temperature	-50...205°C
Protection class	Cable sensor IP 65
Response time, t_{50}	Air, 3 m/sec. 35 sec Air, no flow 135 sec.

Sensor element specifications (DIN/EN/IEC 60751)

Type	Graphically LCD
Front glass	Polycarbonate
Display modes	8 modes, programmable e.g. value, bar graph, analogue
Background colour	White, green, red - programmable
Measuring range	-9999...99999
Digit height	Max. 22 mm
Accuracy	0,1% @ ambient -10...70 °C
Voltage drop	4V...6,5V depending on background light
Output	2 configurable relay output 60 Vp, 75 mA
Programming	Touch screen or FlexProgrammer 9701

Further information can be found in separate data sheet and/or operation instructions for the Baumer graphical display, CombiView DFON.

Transmitter, type FlexTop 2202

Input	Pt100
Output	4...20 mA
Accuracy,	input <0,25°C @ ≤ 0...100°C output <0,1% signal span (16 mA)
Range	-200...850°C
Minimum span	25°C
Supply	8...35 VDC
Programmability	By FlexProgrammer 9701

Further information can be found in separate data sheet and/or operation instructions for FlexTop 2202

Transmitter, type FlexTop 2211 or 2221

Input	Pt100
Output	2211 4...20 mA 2221 4...20 mA / HART
Accuracy,	input <0,1°C output <0,1% signal span (16 mA)
Range	-200...850°C
Minimum span	25°C
Supply	8...35 VDC
Programmability	By FlexProgrammer 9701

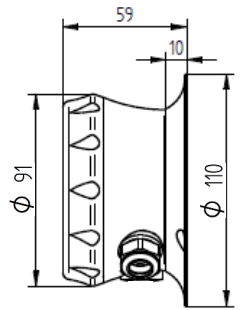
Further information can be found in separate data sheet and/or operation instructions for FlexTop 2211 or FlexTop 2221

TFR5

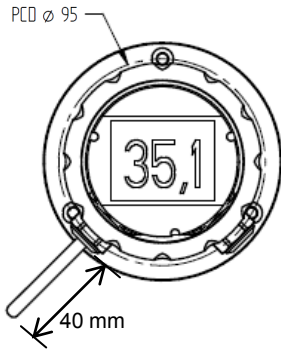
Room or outdoor temperature sensor

Dimensions and mounting

Wall mounting



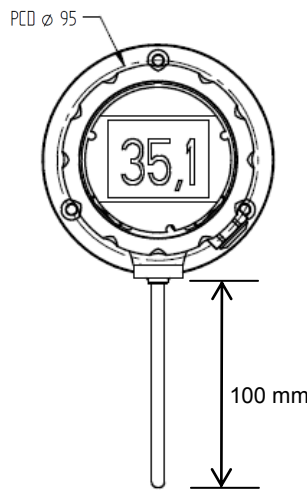
PCD for holes: Ø95 mm



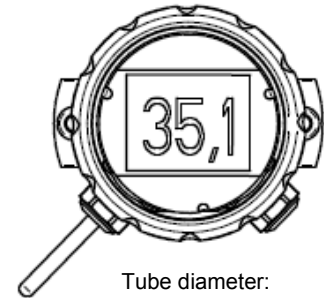
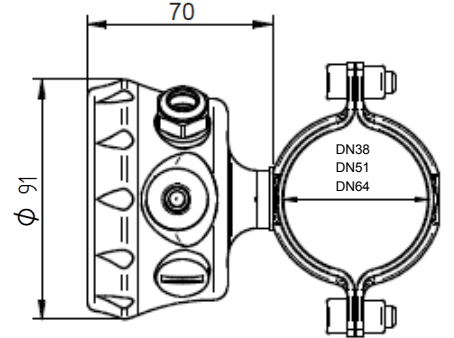
Can be delivered with cable between sensor and housing in free selectable length



Cable sensor



Fixed sensor



Tube diameter: Ø38 mm
Ø51 mm
Ø64 mm

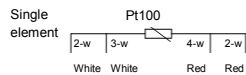
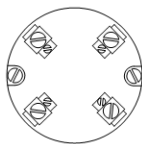
Warning

Note: Check the maximum temperature for the cable used, if not Baumer sensor.

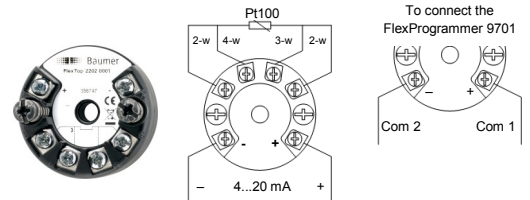
Cable diameter for M16 cable gland (black) 3...9 mm

Electrical connection

Ceramic terminal block



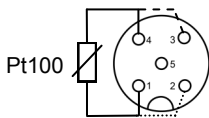
Temperature transmitter



M12 plug

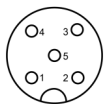
5-wire Pt100

- 1+2 Pt100
- 3+4 Pt100
- 5 N.C



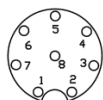
5-wire 4-20 mA

- 1 + supply, 4-20 mA
- 2 Common for relays
- 3 - supply, 4-20 mA
- 4 Relay 2
- 5 Relay 1



8-wire 4-20 mA

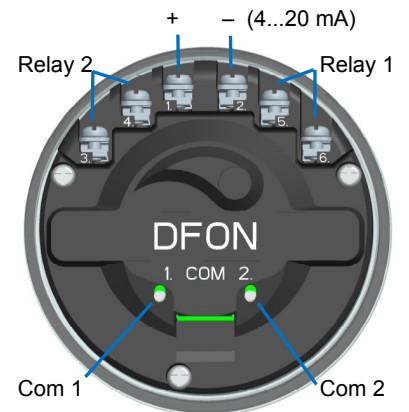
- 1 N.C.
- 2 + supply, 4-20 mA
- 3 Relay 2
- 4 Relay 2
- 5 Relay 1
- 6 Relay 1
- 7 - supply, 4-20 mA
- 8 N.C.



Cable gland

- 1 + 4...20 mA
 - 2 - 4...20 mA
 - 3 Relay 2
 - 4 Relay 2
 - 5 Relay 1
 - 6 Relay 1
- (3 + 5 can be connected common)

To connect the FlexProgrammer 9701
COM 1 Red clip
COM 2 Black clip



⚠ When upgrading the TFR5 without display with a DFON touch screen, remember to remove the O-ring from the sealing. Otherwise the sealing won't be tight.

TFR5

Room or outdoor temperature sensor

Hazardous area (ATEX)

The CombiTemp™ TFR5 can be supplied for hazardous area. Either as a Simple Apparatus with RDT output or with built in transmitter with 4 ... 20 mA output.

A CombiTemp™ TFR5 with built in transmitter will have two possible ATEX approvals, Ex ia (zone 0, 1 or 2) or Ex nA (zone 2).

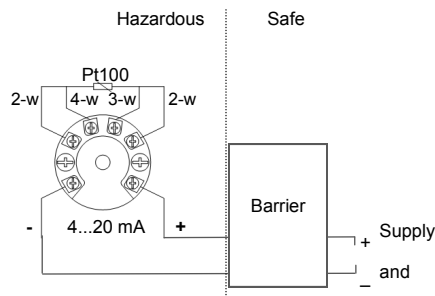
- ⊕ II 1 G, EX ia IIC T4/T5, Gas
- ⊕ II 3 G, Ex nA IIC T4/T5, Gas

The remaining Ex parameters depend on the type of transmitter and display selected for the product. See detailed data below.

The CombiTemp™ TFR5 with Ex ia must be installed in accordance with prevailing guidelines for zone 0 and zone 1 and a certified intrinsically safe zener barrier with the listed maximum values must be used. Electrical connection for the temperature transmitter as per below diagram.

CombiTemp™ TFR5 with Ex nA must be installed in accordance with prevailing guidelines for zone 2 without a barrier.

Electrical connection ATEX ia



Ex-data for FlexTop™ 2202

Approval	ATEX II 1G, Ex ia IIC T5/T6	
Voltage supply range	8...28 V DC	
Internal inductivity	L_i	$\leq 10 \mu\text{H}$
Internal capacity	C_i	$\leq 10 \text{nF}$
Temperature class	T1...T5:	$-40 < T_{\text{amb}} < 85^\circ\text{C}$
	T6:	$-40 < T_{\text{amb}} < 50^\circ\text{C}$
Barrier data	U_i :	$\leq 28 \text{VDC}$
	I_i :	$\leq 0,1 \text{A}$
	P_i :	$\leq 0,7 \text{W}$

Ex-data for FlexTop™ 2211 and 2221

Approval	ATEX II 1G, Ex ia IIC T5/T6	
Voltage supply range	2211	6,5...30 V DC
	2221	8 ... 30 V DC
Internal inductivity	L_i	$\leq 15 \mu\text{H}$
Internal capacity	C_i	$\leq 5 \text{nF}$
Temperature class	T1...T5:	$-40 < T_{\text{amb}} < 85^\circ\text{C}$
	T6:	$-40 < T_{\text{amb}} < 50^\circ\text{C}$
Barrier data	U_i :	$\leq 28 \text{VDC}$
	I_i :	$\leq 0,1 \text{A}$
	P_i :	$\leq 0,7 \text{W}$

Ex-data for FlexTop™ with nA approval

Approval	ATEX II 3G, Ex nA IIC T4/T5	
Voltage supply range	2202, 2221:	U_i : 8...30 V DC,
	2211:	U_i : 6,5...30 V DC,
		I_i : $< 100 \text{mA}$
Temperature class	T4:	$-20 < T_{\text{amb}} < 70^\circ\text{C}$
	T5:	$-20 < T_{\text{amb}} < 60^\circ\text{C}$

Ex-data for Simple apparatus (no transmitter or display)

Approval	ATEX II 1G, Ex ia IIC T5/T6	
Internal inductivity	L_i	$\leq 0 \mu\text{H}$
Internal capacity	C_i	$\leq 0 \text{nF}$
Temperature class	T1...T5:	$-40 < T_{\text{amb}} < 75^\circ\text{C}$
	T6:	$-40 < T_{\text{amb}} < 60^\circ\text{C}$
Barrier data	U_i :	$\leq 15 \text{VDC}$
	I_i :	$\leq 50 \text{mA}$
	P_i :	$\leq 25 \text{mW}$

TFR5

Room or outdoor temperature sensor

ATEX Gas ia for DFON display

Approval: Zone 0/1 ATEX II 1G, Ex ia IIC T5 Ga

Voltage drop U_{Disp} 4,5 or 6,5 VDC

Temperature class T1...T5 Zone 0 -20°C...60°C
Zone 1/2 -40°C...65°C

Internal inductivity L_i <10 μ

Internal capacity C_i <15 nF

Barrier data U_i <30 VDC

I_i <0,1 A

P_i <0,75 W

Suitable barrier: e.g. Pepperl+Fuchs, Z728

If the relays are enabled, each relay must be protected by a zener barrier. Use a barrier for each relay or a barrier with multiple channels. However the two relays must have each a barrier.

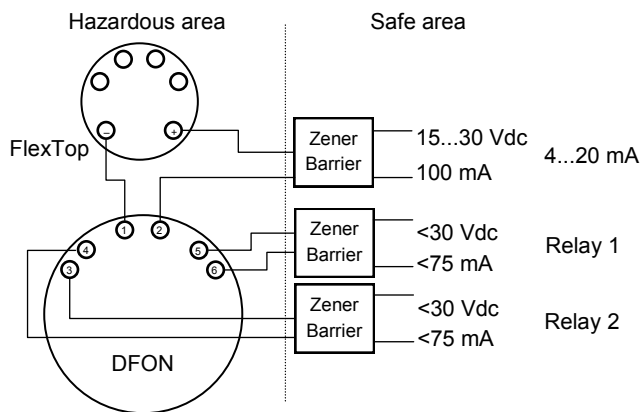
Barrier data U_i <30 VDC

I_i <75 mA

P_i <0,75 W

Suitable barrier: e.g. Pepperl+Fuchs, Z779

Electrical connection with DFON display



TFR5

Room or outdoor temperature sensor

TFR5

Room or outdoor temperature sensor

EU-Konformitätserklärung

EU Declaration of Conformity

Déclaration UE de Conformité

Wir erklären in alleiniger Verantwortung, dass die Produkte, auf die sich diese Erklärung bezieht, die grundlegenden Anforderungen der angegebenen Richtlinie(n) erfüllen und basierend auf den aufgeführten Norm(en) bewertet wurden.

We declare under our sole responsibility that the products to which the present declaration relates comply with the essential requirements of the given directive(s) and have been evaluated on the basis of the listed standard(s).

Nous déclarons sous notre seule responsabilité que les produits auxquels se réfère la présente déclaration sont conformes aux exigences essentielles de la directive/ des directives mentionnée(s) et ont été évalués sur la base de la norme/ des normes listée(s).

Hersteller
 Manufacturer
 Fabricant
 Baumer A/S

Bezeichnung
 Description
 Description
 Elektronische Temperaturmessung
 Electronic temperature measurement
 Electronique mesure de température

Typ(en) / Type(s) / Type(s)

TCR6-xxxx.x1xx.xxxx.xxxx.xxxx	TCR6-xxxx.x3xx.xxxx.xxxx.xxxx
TFR5-xxxx.x1xx.xxxx	TFR5-xxxx.x3xx.xxxx
TFRN-xxxx.x1xx.xxxx.xxxx.xxxx	TFRN-xxxx.x3xx.xxxx.xxxx.xxxx
TFRH-xxxx.x1xx.xxxx.xxxx.xxxx	TFRH-xxxx.x3xx.xxxx.xxxx.xxxx

x = beliebige Zahl oder Buchstabe / any figure or letter / n'importe quel nombre ou lettre

Richtlinie(n)
 Directive(s)
 Directive(s)
 2014/30/EU, 2014/34/EU, 2011/65/EU

Norm(en)
 Standard(s)
 Norme(s)
 EN 61326-1:2013, EN 60079-0:2012+A11:2013, EN 60079-11:2012, EN 60079-15:2010
 EN 60079-26:2007

Konformitätsbewertungsstelle:
 Conformity assessment center
 Centre d'évaluation et de mise en conformité
 TÜV Nord 0044
 Am TÜV 1
 30519 Hannover

EU- Baumusterprüfbescheinigung:
 EU type examination certificate
 Attestation d'examen UE de type
 TÜV 07 ATEX 347158 X

Ort und Datum
 Place and date
 Lieu et date
 Aarhus, 06.07.2016

Unterschrift/Name/Funktion
 Signature/name/function
 Signature/nom/fonction



Ib V. Pedersen
 Managing Director

Baumer_CombiTemp TxRx_DE-EN-FR_CoC_81141616.docx/BRAA

1/1

Baumer A/S
 Runetofte 19
 DK-8210 Aarhus V
 CVR: DK25275071
 VAT. No.: DK11841813

DK Phone +45 8931 7611
 SE Phone +46 (0) 36 13 9430
 sales.dk@baumer.com
 sales.se@baumer.com
 www.baumer.com

Danske Bank: SWIFT: DABADKKK
 (DKK) Konto: 4387-3627293852
 (EUR) IBAN: DK0230003617021021
 (SEK) Bankgiro: 5220-9632

For further information please refer to www.baumer.com