Baumer
Passion for Sensors

Temperature measurement

TFR5

Room or outdoor temperature sensor

TFR5-####.##0#.####

Overview

- Sensor made of AISI 316L stainless steel
- Suitable for indoor and outdoor applications
- Optionally available with touch screen
- Cable or fixed sensor
- Wall or tube mounting

Technical data

Performance characteristics	
Pt100 accuracy class (EN 60751)	B (± 0.3 °C at 0 °C) ± (0.3 + 0.005 × t)°C A (± 0.15 °C at 0 °C) ± (0.15 + 0.002 × t)°C 1/3 B (± 0.1 °C at 0 °C) ± 1/3 × (0.3 + 0.005 × t)°C 1/6 B (± 0.05 °C at 0 °C) ± 1/6 × (0.3 + 0.005 × t)°C
Process connection	
Sensor tube dimensions	ø 5.8 x 60 mm , with cable sensor ø 6 x 100 mm , with fixed sensor
Sensor tube material	AISI 316L (1.4404)
Ambient conditions	
Operating temperature range	-30 … 80 °C , with DFON touch screen -40 … 85 °C , without DFON touch screen
Storage temperature range	-30 … 80 °C , with DFON touch screen -40 … 85 °C , without DFON touch screen
Degree of protection (EN 60529)	IP 67
Humidity	< 98 % RH , condensing
Output signal	
Without transmitter	1 x Pt100, 4-wire
With transmitter	4 … 20 mA , 2-wire 4 … 20 mA , 2-wire + HART®
Housing	
Style	FlexHousing, Ø80 mm
Overall size	Refer to section "Dimensional drawings"
Material	AISI 304 (1.4301)

Electrical connection	
Connector	M12-A, 5-pin, stainless steel M12-A, 8-pin, stainless steel
Cable gland	M16x1.5, plastic M16x1.5, stainless steel M20x1.5, plastic M20x1.5, stainless steel
ATEX II 1G Ex ia IIC T4/T5	
Maximum values for barrier selection, Ui	28 V DC
Maximum values for barrier selection, Ii	0.1 A
Maximum values for barrier selection, Pi	0.7 W
Internal capacitance, Ci	36 nF
Internal inductance, Li	11 µH
Temperature class, T1 ... T4	-20 < Tamb < 65 °C
Temperature class, T1 ... T5	-20 < Tamb < 60 °C
ATEX II 3G Ex nA IIC T4/T5	
Voltage supply range, Un	8 … 30 V DC , with FlexTop 2202 / 2221 6.5 … 30 V DC , with FlexTop 2211
Current rating, In	≤ 0.1 A
Temperature class, T1 ... T4	-20 < Tamb < 70 °C
Temperature class, T1 ... T5	-20 < Tamb < 60 °C
Compliance and approvals	
EMC	EN 61326-1
Explosion protection	ATEX II 1G Ex ia IIC T4/T5 ATEX II 3G Ex nA IIC T4/T5 Ex ia Simple apparatus, gas and dust

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Display

General information

Panel type	FSTN Graphical LCD
Display range	-9999 … 99999
Max. digit height	22 mm
Material	Polycarbonate

Ambient conditions

Optimal readability temperature range	-10 … 70 °C
Operating temperature range	-30 … 80 °C
Degree of protection (EN 60529)	IP 67 IP 69K

Input signal

Input signal from transmitter	FlexTop 2202 / 2211 / 2221: Analog, current loop FlexTop 2212 / 2222: Digital, 2-way for communication between transmitter and display
Update time	1 s , max. 0.3 s , typ.

User configurable data

Error- / Warning-indication	Individually configurable display and backlight indication in white, green or red colour, steady or flashing light. Configurable limits over the range
Measuring unit	°C °F K
User defined measuring unit	8 × 20 pixel matrix

Relays

Contacts	2 x solid state relays
Max. load current	75 mA
Max. switching voltage	60 V

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Transmitter

FlexTop 2202	
Input Accuracy	≤ ± 0.25 °C
Min. measuring span	25 °C
Output	4 … 20 mA , 2-wire
Output Accuracy	≤ ± 0.1 % , measuring span ≤ ± 0.016 mA
Power supply	8 … 35 V DC
Programmability	With FlexProgrammer 9701
Please note	For further information please see data sheet for FlexTop 2202

FlexTop 2211	
Input Accuracy	≤ ± 0.1 °C
Min. measuring span	25 °C
Output	4 … 20 mA , 2-wire 20 … 4 mA , programmable
Output Accuracy	≤ ± 0.1 % , measuring span ≤ ± 0.016 mA
Power supply	8 … 35 V DC
Programmability	With FlexProgrammer 9701
Please note	For further information please see data sheet for FlexTop 2211

FlexTop 2221	
Input Accuracy	≤ ± 0.1 °C
Min. measuring span	25 °C
Output	4 … 20 mA , 2-wire + HART® 20 … 4 mA , programmable
Output Accuracy	≤ ± 0.1 % , measuring span ≤ ± 0.016 mA
Power supply	8 … 35 V DC
Programmability	With FlexProgrammer 9701 With HART® modem
Please note	For further information please see data sheet for FlexTop 2221

FlexTop 2212	
Input Accuracy	≤ ± 0.06 °C
Min. measuring span	10 °C
Output	4 … 20 mA , 2-wire 20 … 4 mA , programmable
Output Accuracy	≤ ± 0.025 % , measuring span ≤ ± 0.004 mA
Power supply	7 … 40 V DC
Programmability	With FlexProgram
Please note	For further information please see data sheet for FlexTop 2212

FlexTop 2222	
Input Accuracy	≤ ± 0.06 °C
Min. measuring span	10 °C
Output	4 … 20 mA , 2-wire + HART® 20 … 4 mA , programmable
Output Accuracy	≤ ± 0.025 % , measuring span ≤ ± 0.004 mA
Power supply	7 … 40 V DC
Programmability	With FlexProgram With HART® modem
Please note	For further information please see data sheet for FlexTop 2222

Factory settings FlexTop 2202	
Output range	0 … 120 °C
Damping	0 s
Output at sensor fault	23 mA

Factory settings FlexTop 2211	
Output range	0 … 100 °C
Damping	0 s
Output at sensor fault	23 mA

Factory settings FlexTop 2221	
Output range	0 … 100 °C
Damping	0 s
Output at sensor fault	23 mA

Factory settings FlexTop 2212	
Output range	0 … 100 °C
Damping	0 s
Output at sensor fault	23 mA

Factory settings FlexTop 2222	
Output range	0 … 100 °C
Damping	0 s
Output at sensor fault	23 mA

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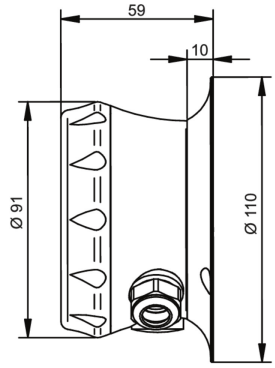
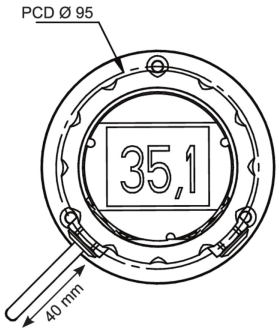
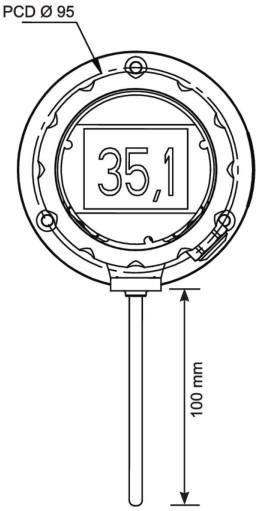
Dimensional drawings (mm)



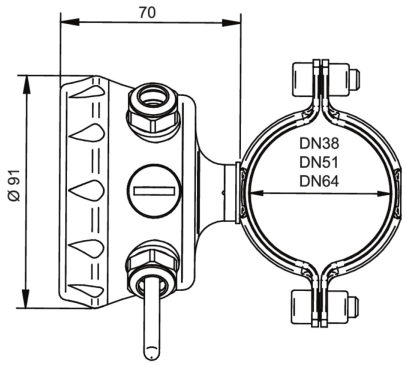
Wall mounted version



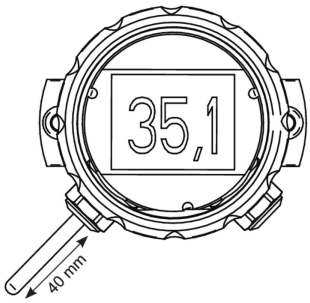
Wall mounted version, cable sensor



Wall mounted version, fixed sensor



Pipe mounted version



Pipe mounted version, cable sensor

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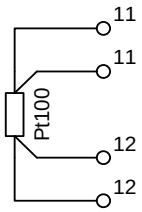
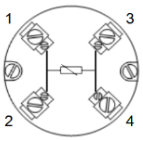
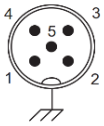
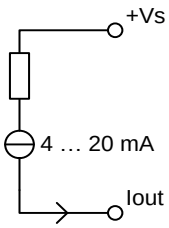
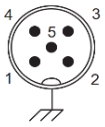
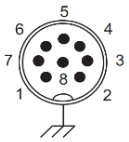
Electrical connection

Output type	Equivalent circuit	Electrical connection	Function	Pin assignment
Pt100 (Single element)			Pt100 11 Pt100 12	1, 2 3, 4
			Pt100 11 Pt100 12 N.C. Frame ground	1, 2 3, 4 5 Plug thread
4 … 20 mA, 2-wire			+Vs Iout	1 2
			+Vs Common for relays 11, 21 Iout Relay 22 Relay 12 Frame ground	1 2 3 4 5 Plug thread
			N.C. +Vs Relay 21 Relay 22 Relay 11 Relay 12 Iout N.C. Frame ground	1 2 3 4 5 6 7 8 Plug thread

Ordering information

Ordering key - Configuration possibilities see website

	TFR5	-	#	#	#	#	.	#	#	#	#	.	####
Product													
	TFR5												
Housing													
FlexHousing Ø80 mm, stainless steel AISI 304, wall mounting			A										
FlexHousing Ø80 mm, stainless steel AISI 304, pipe mounting DN38			B										
FlexHousing Ø80 mm, stainless steel AISI 304, pipe mounting DN51			C										
FlexHousing Ø80 mm, stainless steel AISI 304, pipe mounting DN65			D										
FlexHousing Ø80 mm, stainless steel AISI 304, wall mounting, fixed sensor 100 mm			E										
Electrical connection													
M12-A, 5-pins				1									
M12-A, 5-pins (male) + M12-A, 4-pins (female)				2									
M12-A, 8-pin				3									
M16x1.5 cable gland				5									
M20x1.5 cable gland				B									

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Ordering information

Ordering key - Configuration possibilities see website

	TFR5	-	#	#	#	#	.	#	#	#	#	.	####
Material el. connection													
Plastic					1								
Stainless steel AISI 304 (1.4301)					3								
Display													
Without display, Ø80 housing						1							
With display, relays not activated						2							
With display, relays activated						4							
Transmitter / socket													
Ceramic socket Pt100								1					
Transmitter 2202 4 ... 20 mA, accuracy ±0,25 °C								2					
Transmitter 2211 4 ... 20 mA, accuracy ±0,10 °C								3					
Transmitter 2221 4 ... 20 mA + HART®, accuracy ±0,10 °C								4					
Transmitter 2212 4 ... 20 mA, accuracy < ±0.06°C								6					
Transmitter 2222 4 ... 20 mA + HART®, accuracy < ±0.06°C								7					
Safety													
Standard									0				
Ex ia IIC T4/T5 1G (Gas)									1				
Ex nA II T4/T5 3G (Gas)									3				
Ex ia Simple apparatus, gas and dust									9				
Configuration													
No configuration										0			
Configuration of temperature range										1			
Configuration of Range + Display										2			
Sensor element													
None											0		
1 x Pt100, 1/1 B EN 60751											1		
1 x Pt100, 1/3 B EN 60751											5		
1 x Pt100, 1/6 B EN 60751											7		
1 x Pt100, 1/1 A EN 60751											A		
Cable length (cm)													
0 - 9999													####