

## 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



Picture similar



### Technical data

#### Performance characteristics

Pt100 accuracy class (EN 60751)	B ( $\pm 0.3 \text{ }^{\circ}\text{C}$ at $0 \text{ }^{\circ}\text{C}$ ) $\pm (0.3 + 0.005 \times t) \text{ }^{\circ}\text{C}$ A ( $\pm 0.15 \text{ }^{\circ}\text{C}$ at $0 \text{ }^{\circ}\text{C}$ ) $\pm (0.15 + 0.002 \times t) \text{ }^{\circ}\text{C}$ 1/3 B ( $\pm 0.1 \text{ }^{\circ}\text{C}$ at $0 \text{ }^{\circ}\text{C}$ ) $\pm 1/3 \times (0.3 + 0.005 \times t) \text{ }^{\circ}\text{C}$ 1/6 B ( $\pm 0.05 \text{ }^{\circ}\text{C}$ at $0 \text{ }^{\circ}\text{C}$ ) $\pm 1/6 \times (0.3 + 0.005 \times t) \text{ }^{\circ}\text{C}$
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#### Process connection

Sensor tube dimensions	$\varnothing 5.8 \times 60 \text{ mm}$ , with cable sensor $\varnothing 6 \times 100 \text{ mm}$ , with fixed sensor
Sensor tube material	AISI 316L (1.4404)

#### Ambient conditions

Operating temperature range	$-30 \dots 80 \text{ }^{\circ}\text{C}$ , with DFON touch screen $-40 \dots 85 \text{ }^{\circ}\text{C}$ , without DFON touch screen
Storage temperature range	$-30 \dots 80 \text{ }^{\circ}\text{C}$ , with DFON touch screen $-40 \dots 85 \text{ }^{\circ}\text{C}$ , without DFON touch screen

Degree of protection (EN 60529)	IP 67
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Humidity	< 98 % RH , condensing
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#### 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, $\varnothing 80 \text{ mm}$
Overall size	Refer to section "Dimensional drawings"
Material	AISI 304 (1.4301)

#### Electrical connection

Connector	M12-A, 4-pin, stainless steel M12-A, 5-pin, stainless steel M12-A, 8-pin, stainless steel
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#### Electrical connection

Cable	M16 plastic, cable dia. 5 ... 10 mm M16 stainless steel, cable dia. 5 ... 9 mm M20 plastic, cable dia. 8 ... 13 mm M20 stainless steel, cable dia. 9 ... 13 mm
Cable gland	M16x1.5, plastic M16x1.5, stainless steel M20x1.5, plastic M20x1.5, stainless steel

#### ATEX II 1 G Ex ia IIC T6...T4

Maximum values for barrier selection, Ui	28 V DC , with FlexTop 2202 30 V DC , with FlexTop 2212 30 V DC , with FlexTop 2222
Maximum values for barrier selection, Ii	0.1 A , with FlexTop 2202 0.095 A , with FlexTop 2212 0.095 A , with FlexTop 2222
Maximum values for barrier selection, Pi	0.7 W , with FlexTop 2202 0.75 W , with FlexTop 2212 0.75 W , with FlexTop 2222
Internal capacitance, Ci	10 nF , with FlexTop 2202 25 nF , with FlexTop 2202 and display 11 nF , with FlexTop 2212 26 nF , with FlexTop 2212 and display 11 nF , with FlexTop 2222 26 nF , with FlexTop 2222 and display
Internal inductance, Li	11 $\mu\text{H}$ , with FlexTop 2202 20 $\mu\text{H}$ , with FlexTop 2202 and display 24 $\mu\text{H}$ , with FlexTop 2212 34 $\mu\text{H}$ , with FlexTop 2212 and display 24 $\mu\text{H}$ , with FlexTop 2222 34 $\mu\text{H}$ , with FlexTop 2222 and display
Temperature class, T1 ... T4	$-20 < T_{\text{amb}} < 65 \text{ }^{\circ}\text{C}$ , with DFON touch screen $-40 < T_{\text{amb}} < 80 \text{ }^{\circ}\text{C}$ , with FlexTop 2212 $-40 < T_{\text{amb}} < 80 \text{ }^{\circ}\text{C}$ , with FlexTop 2222

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## Technical data

### ATEX II 1 G Ex ia IIC T6...T4

Temperature class, T5	-20 < Tamb < 60 °C , with DFON touch screen -40 < Tamb < 71 °C , with FlexTop 2212 -40 < Tamb < 71 °C , with FlexTop 2222
Temperature class, T1 ... T5	-40 < Tamb < 85 °C , with FlexTop 2202
Temperature class, T6	-40 < Tamb < 50 °C , with FlexTop 2202 -40 < Tamb < 56 °C , with FlexTop 2212 -40 < Tamb < 56 °C , with FlexTop 2222

### ATEX II 3 G Ex ec IIC T5...T4

Voltage supply range, Un	30 V DC , max.
Current rating, In	≤ 0.02 A
Temperature class, T1 ... T4	-20 < Tamb < 70 °C , with DFON touch screen

### ATEX II 3 G Ex ec IIC T5...T4

Temperature class, T1 ... T5	-20 < Tamb < 60 °C , with DFON touch screen
Temperature class, T1 ... T5	-40 < Tamb < 80 °C , with FlexTop 2202 -40 < Tamb < 80 °C , with FlexTop 2212 -40 < Tamb < 80 °C , with FlexTop 2222

### Compliance and approvals

EMC	EN 61326-1
Explosion protection	ATEX II 1 G Ex ia IIC T6...T4 IECEx Ex ia IIC T6...T4 ATEX II 3 G Ex ec IIC T5...T4 Ex ia Simple apparatus, gas and dust

## Display

### General information

Panel type	FSTN Graphical LCD
Display range	-9999 ... 99999
Max. digit height	22 mm
Material	Polycarbonate
Voltage drop	4 ... 6.5 V , depending on backlight intensity

### Input signal

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

### Relays

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

### 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

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## Transmitter

### FlexTop 2202

Input Accuracy	$\leq \pm 0.25 \text{ }^\circ\text{C}$
Min. measuring span	$25 \text{ }^\circ\text{C}$
Output	4 ... 20 mA, 2-wire
Output Accuracy	$\leq \pm 0.1 \%$ , measuring span $\leq \pm 0.016 \text{ mA}$
Power supply	8 ... 35 V DC
Programmability	With FlexProgrammer 9701
Please note	For further information please see data sheet for FlexTop 2202

### FlexTop 2212

Input Accuracy	$\leq \pm 0.06 \text{ }^\circ\text{C}$
Min. measuring span	$10 \text{ }^\circ\text{C}$
Output	4 ... 20 mA, 2-wire 20 ... 4 mA, programmable
Output Accuracy	$\leq \pm 0.025 \%$ , measuring span $\leq \pm 0.004 \text{ mA}$
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	$\leq \pm 0.06 \text{ }^\circ\text{C}$
Min. measuring span	$10 \text{ }^\circ\text{C}$
Output	4 ... 20 mA, 2-wire + HART® 20 ... 4 mA, programmable
Output Accuracy	$\leq \pm 0.025 \%$ , measuring span $\leq \pm 0.004 \text{ mA}$
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

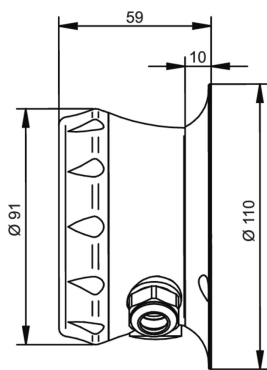
### Factory settings FlexTop 2212

Output range	0 ... 100 °C
Damping	0 s
Output at sensor fault	23 mA

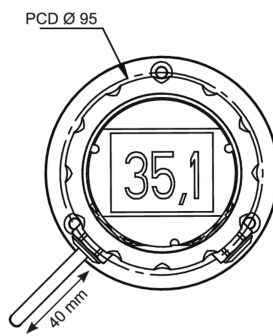
### Factory settings FlexTop 2222

Output range	0 ... 100 °C
Damping	0 s
Output at sensor fault	23 mA

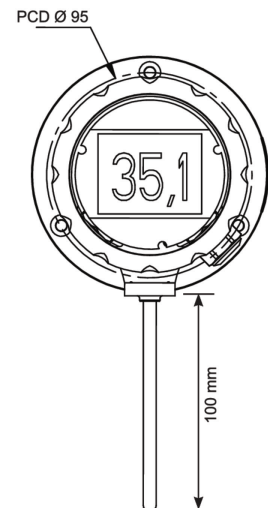
## Dimensional drawings (mm)



Wall mounted version



Wall mounted version, cable sensor



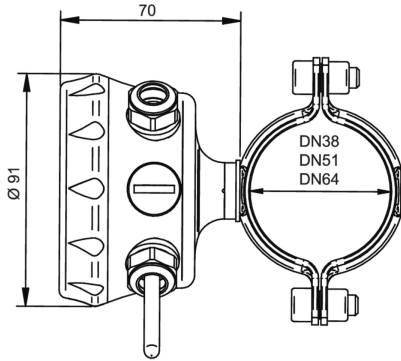
Wall mounted version, fixed sensor

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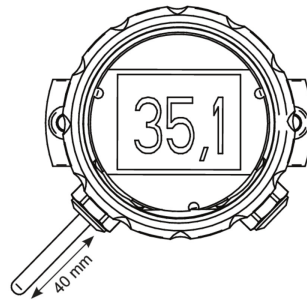
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## Dimensional drawings (mm)



Pipe mounted version



Pipe mounted version, cable sensor

## Electrical connection

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

## Ordering information

Ordering key - Configuration possibilities see website

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Ordering key - Configuration possibilities see website

	TFR5	-	#	#	#	#	.	#	#	#	#	.	####
<b>Product</b>	TFR5												
<b>Housing</b>													
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
<b>Electrical connection</b>													
M12-A, 5-pin													1
M12-A, 5-pin (male) + M12-A, 4-pin (female)													2
M12-A, 8-pin													3
M16x1.5 cable gland													5
M20x1.5 cable gland													B
<b>Material el. connection</b>													
Plastic													1
Stainless steel AISI 304 (1.4301)													3
<b>Display</b>													
Without display, Ø80 housing													1
With display, relays not activated													2
With display, relays activated													4
<b>Transmitter / socket</b>													
Ceramic socket Pt100													1
Transmitter 2202 4 ... 20 mA, accuracy ±0,25 °C													2
Transmitter 2212 4 ... 20 mA, accuracy < ±0.06°C													6
Transmitter 2222 4 ... 20 mA + HART®, accuracy < ±0.06°C													7
<b>Safety</b>													
Standard													0
Ex ia IIC T6/T5...T4 (Gas)													1
Ex ec IIC T5...T4 (Gas)													3
Ex ia Simple apparatus, gas and dust													9
<b>Configuration</b>													
No configuration													0
Configuration of temperature range													1
Configuration of Range + Display													2
<b>Sensor element</b>													
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
<b>Cable length (cm)</b>													
0 - 9999													####