

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 ($\pm 0.3 \text{ }^\circ\text{C}$ at $0 \text{ }^\circ\text{C}$) $\pm (0.3 + 0.005 \times t)^\circ\text{C}$ A ($\pm 0.15 \text{ }^\circ\text{C}$ at $0 \text{ }^\circ\text{C}$) $\pm (0.15 + 0.002 \times t)^\circ\text{C}$ 1/3 B ($\pm 0.1 \text{ }^\circ\text{C}$ at $0 \text{ }^\circ\text{C}$) $\pm 1/3 \times (0.3 + 0.005 \times t)^\circ\text{C}$ 1/6 B ($\pm 0.05 \text{ }^\circ\text{C}$ at $0 \text{ }^\circ\text{C}$) $\pm 1/6 \times (0.3 + 0.005 \times t)^\circ\text{C}$
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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
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, $\varnothing 80 \text{ mm}$
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
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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 1G Ex ia IIC T4/T5

Maximum values for barrier selection, U _i	28 V DC
Maximum values for barrier selection, I _i	0.1 A
Maximum values for barrier selection, P _i	0.7 W
Internal capacitance, C _i	36 nF
Internal inductance, L _i	11 μH
Temperature class, T1 ... T4	$-20 < T_{\text{amb}} < 65 \text{ }^\circ\text{C}$
Temperature class, T1 ... T5	$-20 < T_{\text{amb}} < 60 \text{ }^\circ\text{C}$

ATEX II 3G Ex ec IIC T4/T5

Voltage supply range, U _n	8 ... 30 V DC, with FlexTop 2202 / 2221 6.5 ... 30 V DC, with FlexTop 2211
Current rating, I _n	$\leq 0.1 \text{ A}$
Temperature class, T1 ... T4	$-20 < T_{\text{amb}} < 70 \text{ }^\circ\text{C}$
Temperature class, T1 ... T5	$-20 < T_{\text{amb}} < 60 \text{ }^\circ\text{C}$

Compliance and approvals

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

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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 0

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	$\leq \pm 0.25 \text{ }^\circ\text{C}$
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

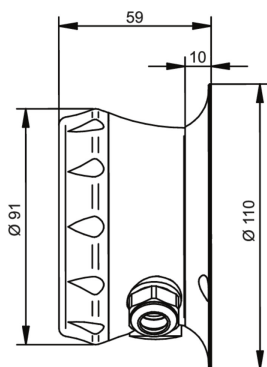
Factory settings FlexTop 2212

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

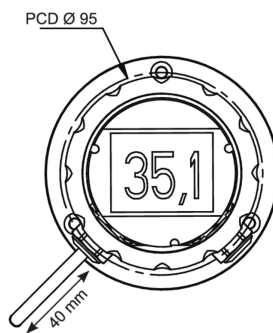
Factory settings FlexTop 2222

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

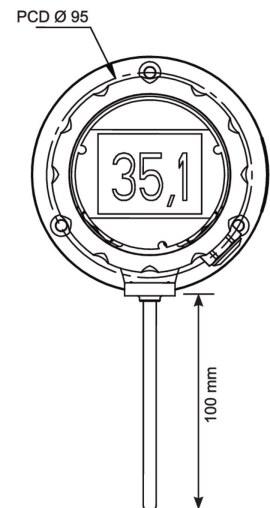
Dimensional drawings (mm)



Wall mounted version



Wall mounted version, cable sensor



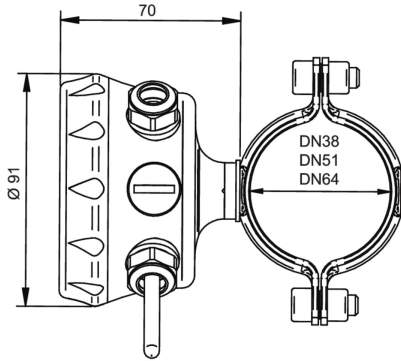
Wall mounted version, fixed sensor

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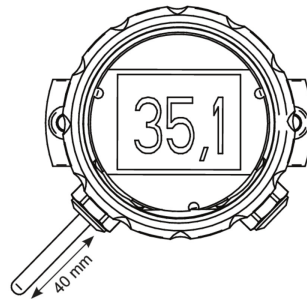
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Dimensional drawings (mm)



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 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
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 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 T6/T5...T4 (Gas)													1
Ex ec IIC T5...T4 (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													####