Baumer
Passion for Sensors

CombiTemp™ TFRN

Industrial – RTD temperature sensor

IP 69K | Ex | V4A | Parameter

Main features

- Pt100 sensor element, 2- or 4-wire
- *HART*®
- Built in graphical display, *CombiView*™ DFON optional
- Head mounted 4...20 mA transmitter, FlexTop type 22xx
- ATEX
- Programmable by touch screen
- Easy and full programmable with FlexProgrammer 9701

Applications

- Oil and Gas
- Chemical
- Energy
- General Process Industrie

Main characteristics (20 °C)

Standard process temperature	-50 … 250 °C
Accuracy	Pt100 output as to DIN/EN/IEN 60751 Transmitter output <±0.1 °C / <±0,25 °C
Connections	Threaded

Technical specification

Measuring principle	Resistance Temperature Detector (RTD)
Measuring ranges	-50...400 °C
Immersion tube, diameter Immersion tube, length Immersion tube, tip	Ø6 mm, Ø8 mm Min. 20 mm - Max. 3000 mm Normal response - Ø6/Ø8 mm Fast response - Ø6/Ø4 or Ø8/Ø4 mm
Process connections	See page 4

Environment

Temperature, Ambient	-40…160 °C
- w. transmitter	-40…85 °C
- w. display	-30...80 °C
Protection rating, IEC 529	IP67 / IP69K, depending on electrical connection
Humidity, IEC 68-2-38	98%, condensing
Vibrations	DNV high vibration strain, class B 1.6 mm, 2...25 Hz IEC60068-2-6, test FC 25...100 Hz, 4.0 g

Material

Process connection	SS 1.4404, AISI 316L
Housing	SS 1.4301, AISI 304
Sealing	See ordering table

Approvals

Apply to	EMC directive 2004/108/CE in accordance with EN61000-6-2, EN 61000-6-3 Pressure directive 97/23/CE

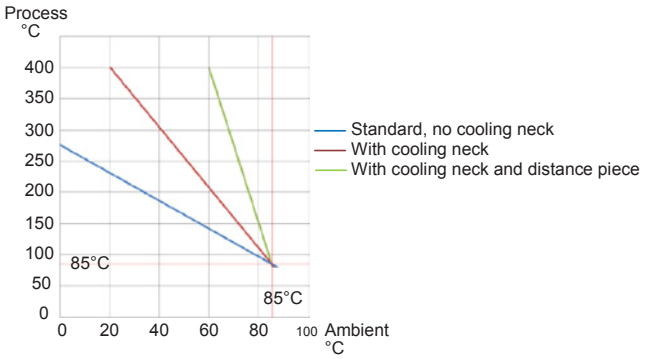
Sensor element and electrical specification

Sensor type	RTD type Pt100 (acc. to DIN/EN/IEC 60751) Single or Double 2-wire or 4-wire
Accuracy	Class 1/1 B ±(0,3 + (0,005 x T)) °C Class 1/3 B ±1/3 x (0,3 + (0,005 x T)) °C Class 1/6 B ±1/6 x (0,3 + (0,005 x T)) °C Class 1/1 A ±(0,15 + (0,002 x T)) °C
Analog output	4-20 mA, 20-4 mA 4-20mA+*HART*® See separate data sheet, series 22xx

Time constant, τ 0,5

Medium	Liquid	Air	Air
Velocity	0,4 m/sec.	0 m/sec.	3 m/sec.
ø 6 mm	<6,1	<138	<27,2
ø 6/4 mm	<1,5	<136	<21,4
ø 8 mm	<7,6	<201	<47,7
ø 8/4 mm	<1,5	<181	<33,6

Temperature curve



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Technical Data

Transmitter, type FlexTop 2202 - Standard

Input	Pt100
Output	4...20 mA
Accuracy	
Input	< ±0.25°C
Output	< ±0.1% of output span (16mA)
Range	-200...850°C
Minimum span	25°C
Supply	8...35 VDC
Programmability	By FlexProgrammer 9701
For further information please see data sheet for FlexTop 2202	

Transmitter, type FlexTop 2211 - Performance

Input	Pt100 / Pt1000 (universal)
Output	4...20 mA
Accuracy	
Input	< ±0.1°C
Output	< ±0.1% of output span (16mA)
Range	-200...850°C
Minimum span	25°C
Supply	8...35 VDC
Programmability	By FlexProgrammer 9701
For further information please see data sheet for FlexTop 2211	

Display DFON

Type	Graphically LCD
Front glass	Polycarbonate
Display modes	8 modes, programmable, e.g. value, bar graph, analogue, tank illustration
Background	White, green, red - programmable
Measuring range	-9999...99999
Digit height	Max. 22 mm
Accuracy	0,1% @ ambient -10…70 °C
Voltage drop	4V...6.5 V
Output	2 configurable relay output, 60 Vp, 75 mA
Programming	Touch screen or FlexProgrammer 9701
Further information can be found in separate data sheet for DFON	

Transmitter, type FlexTop 2221 - Standard

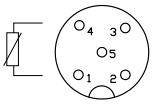
Input	Pt100 / Pt1000 (universal)
Output	4...20 mA / HART
Accuracy	
Input	< ±0.1°C
Output	< ±0.1% of output span (16mA)
Range	-200...850°C
Minimum span	25°C
Supply	8...35 VDC
Programmability	By FlexProgrammer 9701 By HART terminal/modem
For further information please see data sheet for FlexTop 2221	

Transmitter, type FlexTop 2212 - Performance

Input	Pt100 / Pt1000 (universal)
Output	4...20 mA / 20...4 mA
Accuracy	
Input	≤ ±0.06°C
Output	< ±0.025% of output span (16mA)
Range	-200...850°C
Minimum span	10°C
Supply	7...40 VDC
Programmability	By FlexProgram
For further information please see data sheet for FlexTop 2212	

Electrical connections

M12, 5-wire

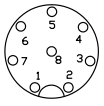


4...20 mA

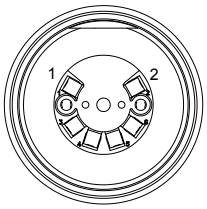
RTD	Single	Double
1+2	Pt100-1	
3+4	Pt100-1	
1		Pt100 – 1
2		Pt100 – 1
3		Pt100 – 2
4		Pt100 – 2
5	N.C.	N.C.

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

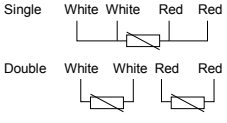
M12, 8-wire



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.



RTD



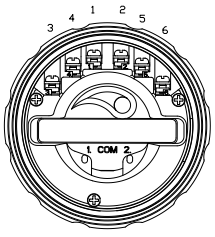
Cable gland

Transmitter

1	+24VDC / - 4...20mA
2	- 24VDC / +4...20mA
1	Red clip (FlexProgrammer)
2	Black clip (FlexProgrammer)

Display

1	+ 4...20 mA
2	- 4...20 mA
3	Relay 2
4	Relay 2
5	Relay 1
6	Relay 1
Com 1	Red clip (FlexProgrammer)
Com 2	Black clip (FlexProgrammer)



EN/2018-10-08

ATEX data for temperature transmitters and displays

Transmitter, type FlexTop 2202 - ATEX

Approval	Ex ia IIC T5/T6, ATEX II 1G Ex nA II T5, ATEX II 3G
Supply	8...28 VDC
Internal inductivity Internal capacity	L_i ≤ 10 µH C_i ≤ 10 nF
Temperature class	T1...T5: -40 <Tamb < 85°C T6: -40 <Tamb < 50°C
Barrier data	U: ≤ 28 VDC I: ≤ 0.1A P: ≤ 0.75 W

Transmitter, type FlexTop 2211 - ATEX

Approval	Ex ia IIC T5/T6, ATEX II 1G Ex nA II T5, ATEX II 3G
Supply	6.5...30 VDC
Internal inductivity Internal capacity	L_i ≤ 1 5 µH C_i ≤ 5 nF
Temperature class	T1...T5: -40 <Tamb <85°C T6: -40 <Tamb <50°C
Barrier data	U: ≤ 30 VDC I: ≤ 0.1A P: ≤ 0.75 W

Display DFON - ATEX

ATEX Gas ia and for ATEX Dust ia

Approval Gas Zone 0/1 Dust Zone 20/21	Ex II 1 G, Ex ia IIC T5 Ga Ex II 1 D, Ex ia IIIC T100°C Da
Voltage drop	U_{Disp} 4.5 ... 6.5 VDC
Temperature class	L_i ≤ 1 5 µH C_i ≤ 5 nF
Temperature class	T1...T5 Zone 0 and 20 -20 ... 60 °C Zone 1/2 and 21/22 -40 ... 65 °C
Internal inductivity	L_i <10 µH
Internal capacity	C_i <15 nF
Barrier data	U_i <30 VDC I_i <0.1 A P_i <0.75 W

ATEX Gas nA

Approval Gas Zone 2	Ex II 3 G, Ex nA II T5
Voltage drop	U_{Disp} 4.5 ... 6.5 VDC
Temperature class	T1...T5 -30 < T_{amb} < 65 °C
Internal inductivity	L_i <10 µH
Internal capacity	C_i <15 nF
Maximum voltage	U_{max} <35 VDC
Maximum current	U_{max} <35 VDC

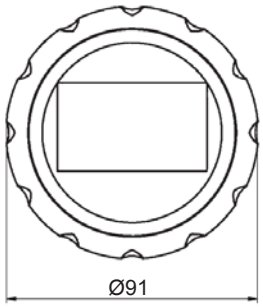
Transmitter, type FlexTop 2221 - ATEX

Approval	Ex ia IIC T5/T6, ATEX II 1G Ex nA II T5, ATEX II 3G
Supply	8...30 VDC (Ex nA : 12...30 VDC)
Internal inductivity Internal capacity	L_i ≤ 15 µH C_i ≤ 5 nF
Temperature class	T1...T5: -40 <Tamb < 85°C T6: -40 <Tamb < 50°C
Barrier data	U: ≤ 30 VDC I: ≤ 0.1A P: ≤ 0.75 W

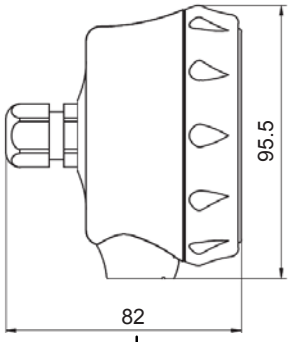
EN/2018-10-08

Dimensions (mm)

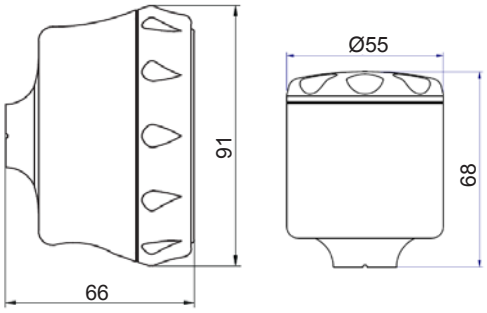
Ø80 mm housing front view

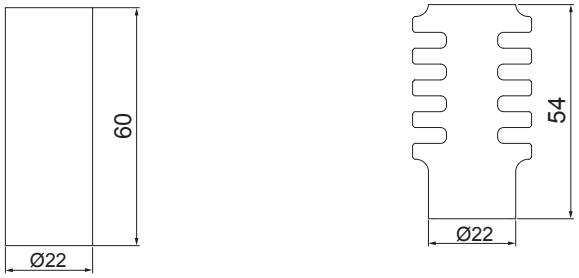


Ø80 mm housing bottom connection

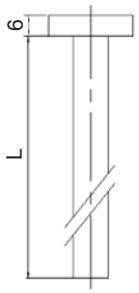


Ø80 mm housing rear connection

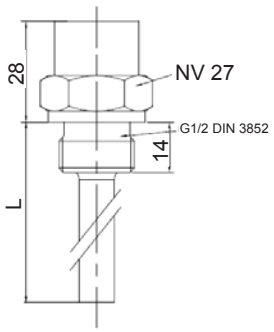




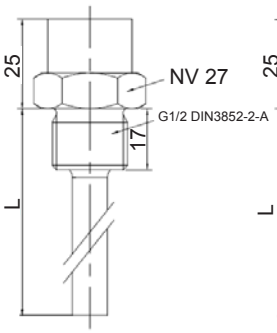
Tube without connection
Code 10



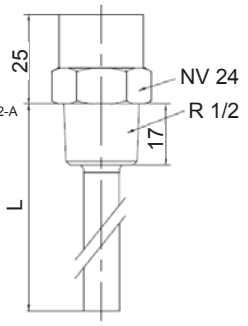
G½A DIN 3852-E
Code 11



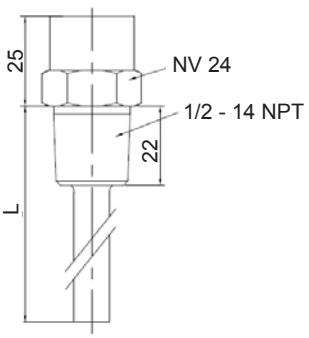
G½A DIN 3852-A
Code 12

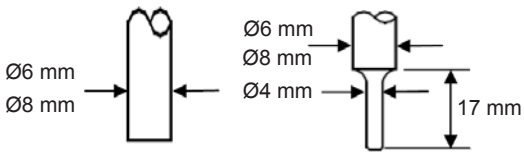


R½
Code 13



½" NPT
Code 30





CombiTemp™ TFRN

Industrial – RTD temperature sensor

Ordering details

	–																				
Model																					
CombiTemp™	TFRN																				
Housing material																					
Ø80 mm, Stainless steel, AISI 304 Bottom		5																			
Ø80 mm, Stainless steel, AISI 304 Rear		6																			
Field housing Ø55, stainless steel, AISI 304		7																			
Electrical connection																					
M12, 5 pins			1																		
M12, 8 pins			3																		
Cable gland, M16			5																		
Cable gland, M20			B																		
Material el. connection																					
Plastic				1																	
AISI 304				3																	
Display																					
Without display, Ø55 housing					0																
Without display					1																
With display No relays activated					2																
With display With activated relays					4																
Transmitter / socket																					
Flying leads						0															
Ceramic socket Pt100						1															
Transmitter 2202 4-20 mA ±0,25 °C (Accuracy class)						2															
Transmitter 2211 4-20 mA ±0,10 °C (Accuracy class)						3															
Transmitter 2221 4-20 mA / *HART*® ±0,10 °C (Accuracy class)						4															
Transmitter 2212 4-20 / 20-4 mA ±0,06 °C (Accuracy class)						6															
Safety																					
Standard							0														
Ex ia IIC T4/T5 1G (Gas)							1														
Ex nA II T4/T5 3G (Gas)							3														
Ex ia II 1 G Eex ia IIC, Zone 0, simple apparatus							9														
Configuration																					
No configuration								0													
Configuration of Range								1													
Configuration of Range + Display								2													
Configuration of Range + Display incl. 2 relays								3													
Sensor element (DIN/EN/IEC 60751)																					
None (for cable sensor)									0												
1x Pt100 Class 1/1 B									1												
2x Pt100 Class 1/1 B									2												
1x Pt100 Class 1/3 B									5												
2x Pt100 Class 1/3 B									6												
1x Pt100 Class 1/6 B									7												
2x Pt100 Class 1/6 B									8												
1x Pt100 Class 1/1 A									A												
2x Pt100 Class 1/1 A									B												
1x Pt100 Class 1/1 B, < 600°C									C												
Sensor insert type																					
Sensor tube with embedded sensor element 2-wire										1											
Sensor tube with embedded sensor element 4-wire										2											
Cable sensor Pt100 Class 1/1 B (1xPt100 only, for ø 8 mm only)										A											
Cable sensor Pt100 Class 1/3 B (1xPt100 only, for ø 8 mm only)										B											
Cable sensor Pt100 Class 1/6 B (1xPt100 only, for ø 8 mm only)										C											
Cable sensor Pt100 Class 1/1 A (1xPt100 only, for ø 8 mm only)										D											
Cooling neck																					
None											0										
Cooling neck											4										
Cooling neck + 1 spacer											5										
Cooling neck + 2 spacers											6										
Process connection																					
Tube without connection												10									
G½ Male DIN 3852 form E												11									
G½ Male DIN 3852 form A												12									
R½ Male ISO 7/1												13									
½"-14 NPT Male ANSI/ASME B1.20.1												30									
Seal																					
No seal													0								
Seal NBR For G½ DIN 3852 - E													1								
Seal EPDM For G½ DIN 3852 - E													2								
Seal FKM (*Viton*®) For G½ DIN 3852 - E													3								
Sensor diameter																					
No sensor														0							
ø 6 mm AISI 316														1							
ø 8 mm AISI 316														2							
Sensor tip																					
No sensor															0						
Standard Normal response															1						
Fast Fast response ø 4 mm tip Max sensor length : 300 mm															2						
Approvals																					
None																0					
DNV marine approval																3					
EAC (TR CU 020/2011)																B					
Sensor tube length																					
Length in mm (min. 20 mm)																		x	x	x	x

If the product wanted is not available from above list please inquire.

EN/2018-10-08