Baumer
Passion for Sensors

CombiTemp™ TFRH

Hygienic – RTD temperature sensor

Main features

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

Applications

- Food and beverage
- Pharmaceutical
- Water treatment
- General process industry

HD Hygienic Design | 3-A | Ex | FDA | CIP | SIP | IP 69K

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	Hygienic

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
Vibration IEC60068-2-6	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	S.S. 1.4404, AISI 316L
Housing	S.S. 1.4301, AISI 304
Sealing	To be ordered separately see table page 4

Approvals

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

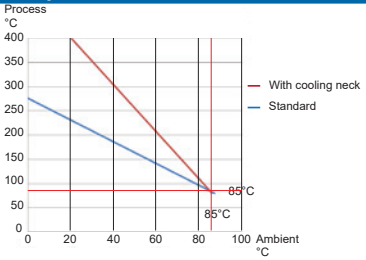
Sensor element and electrical specification

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 6mm	<6,1	<138	<27,2
ø 6/4mm	<1,5	<136	<21,4
ø 8mm	<7,6	<201	<47,7
ø 8/4mm	<1,5	<181	<33,6

Temperature curve



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CombiTemp™ TFRH

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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 - Performance, HART®

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

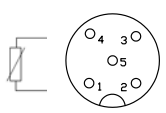
Input	Pt100 / Pt1000 (universal)
Output	4-20 mA / 20-4 mA
Accuracy	
Input	≤ ±0.06°C
Output	< ±0.025% of output span (16mA)
Range	-200...850°C
Minimum span	10°C
Supply	7...40 VDC
Programmability	By FlexProgram
For further information please see data sheet for FlexTop 2212	

Transmitter, type FlexTop 2222 - Performance, HART®

Input	Pt100 / Pt1000 (universal)
Output	4-20 mA / 20-4 mA / HART®
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 By HART® terminal/modem
For further information please see data sheet for FlexTop 2222	

Electrical connections

M12, 5-wire



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.

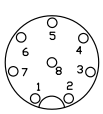
4...20 mA

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

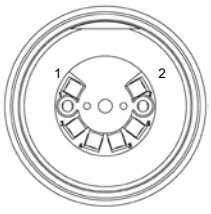
2 x 4...20 mA

1	+ supply, FlexTop 1
2	- supply, FlexTop 1
3	- supply, FlexTop 2
4	+ supply, FlexTop 2
5	N.C.

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.



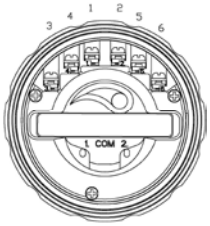
Cable gland

Transmitter

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

Display

1	N.C.
2	N.C.
3	Relay 2
4	Relay 2
5	Relay 1
6	Relay 1
Com 1	Red clip (FlexProgrammer)
Com 2	Black clip (FlexProgrammer)



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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 ≤ 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

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

Display DFON - ATEX

ATEX Gas ia and for ATEX Dust ia

Approval Gas Zone 0/1 Dust Zone 20/21	Ⓔx II 1 G, Ex ia IIC T5 Ga Ⓔx 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	Ⓔx 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} <0.1A

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CombiTemp™ TFRH

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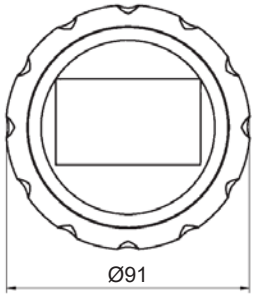
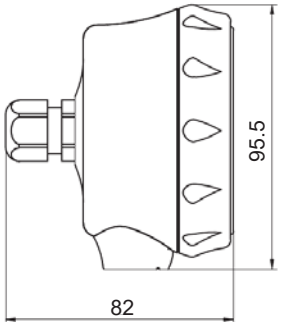
Dimensions (mm)

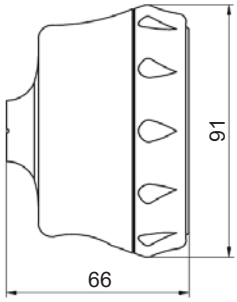
Ø80 mm housing front view



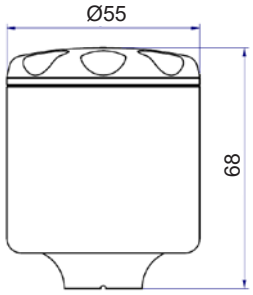
Ø80 mm housing bottom connection

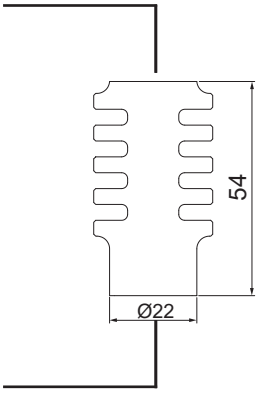


Ø80 mm housing rear connection

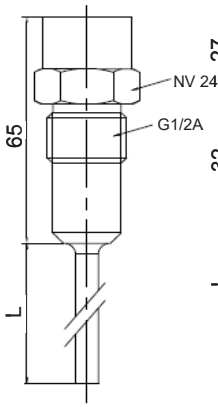


Ø55 mm housing

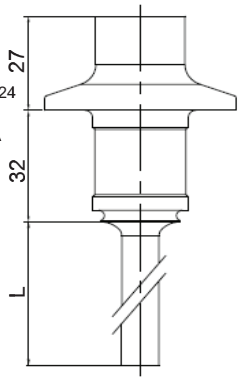




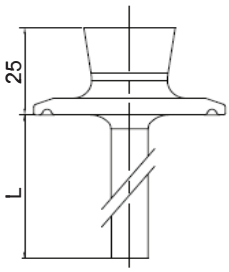
G½A Hygiene
Code 51



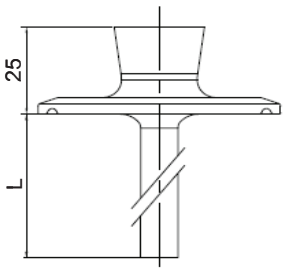
3-A DN 38
Code 60



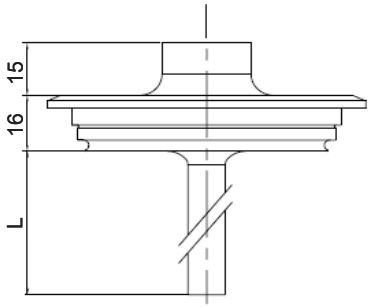
ISO 2852 DN 38
Code 65

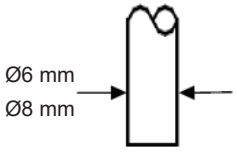


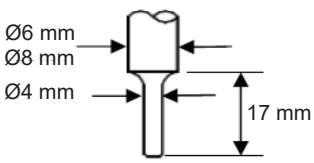
ISO 2852 DN 51
Code 66



Variline® type N
Code 70







Seal is to be purchased separately.
For other types and materials please see data sheet for accessories.

Accessories – seals

Seal type	Code	Material	Approvals		Item Number
O-ring	60	EPDM	3-A	FDA	ZPX2-123
-	70	EPDM	3-A	FDA	ZPX2-323
Gasket	65	EPDM		FDA	ZPX3-7232
-	66	EPDM		FDA	ZPX3-7262

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CombiTemp™ TFRH

Hygienic – RTD temperature sensor

Ordering details

																				–		
Model																						
CombiTemp™																				TFRH		
Housing material																						
ø 80 mm, Stainless steel, AISI 304	Bottom																			5		
ø 80 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	
Transmitter 2222	4-20 / 20-4 mA / HART®	≤ ±0,06 °C (Accuracy class)																			7	
2 x Transmitter 2212	4-20 / 20-4 mA	≤ ±0,06 °C (Accuracy class)																			D	
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	
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
Process connection																						
G½ hygienic																						51
3-A DN38	Hygienic connection	3-A																				60
DN25/DN38 Clamp	ISO 2852, 1" - 1½"	3-A																				65
DN51 Clamp	ISO 2852, 2"	3-A																				66
Variline® type N	Gea Tuchenhagen																					70
Seal																						
Without (to be ordered separately)																						0
Sensor diameter																						
ø 6 mm AISI 316																						1
ø 8 mm AISI 316																						2
Sensor tip																						
Standard	Normal response																					1
Fast	Fast response	ø 4 mm tip	Max sensor length : 300 mm																			2
Approvals																						
None																						0
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.

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