# **CombiTemp Temperature Measuring System**

Flexible building block concept

All wetted parts in acid-proof, stainless steel

Some hygienic connections conform to 3-A standards, FDA demands and EHEDG guidelines

Flush mounted surface sensor

ø80 mm stainless steel housing or DIN head, form B

Pt100 or Pt1000 sensors, 2- or 4-wire

DIN A or B (1/1, 1/3, 1/6) elements

Standard or fast response time

Display and 4...20 mA transmitter

**Cable sensors** 

Standard and Ex versions



### Description

CombiTemp comprises a series of basic elements which can be combined to various temperature sensors and transmitters. The system includes 4-wire Pt100 cable sensors.

Being a building block system CombiTemp offers a great flexibility in respect to modification, service and maintenance.

A wide range of process connections according to national and international standards, sensor elements and transmitters, can be selected to meet the actual requirements.

The parts can be assembled by the user or delivered assembled and calibrated, if relevant.

Provided an 80 mm dia. housing is used, options are also a 4...20 mA configurable display or, for stand alone indicating purposes, a battery powered display.

CombiTemp is particularly suitable for use in food, beverage, pharmaceutical and chemical industries.

A complete temperature sensor can be ordered on one type number. Please refer to CombiTemp Accessories data sheet for a comprehensive range of accessories.

Please refer to the separate data sheets for information and ordering details for transmitters and displays.



# **Technical Data**

Environmental conditions		Sensor tube and connection				
Media temperature, std.	-50400°C	Material	Acid-proof, stainless steel			
Surface sensor	-40150°C		(AISI 316L/W.1.4404)			
Ambient temperature	-40160°C	Media pressure	Max. 16 bar			
(or max. temperature range for display/transmitter)		Time constant t <sub>0.5</sub>	See table below			
Humidity	< 100% RH, condensing	Mechanical tolerances	ISO 2768-m			
(or max. humidity for display/transmitter)		Sensor element				
Protection class	DIN housing IP 65	Sensor type	Pt100. Class A or B			
	ø80 mm housing IP 65 + IP 66		Pt1000, Class B			
Vibrations	GL, test 2	Accuracy	DIN/EN/IEC 60751			
	(sensor tubes < 200 mm only)	1/1 DIN B	±(0.3 + 0.005 x t) °C			
Disposal of product and packing		1/3 DIN B	$\pm 1/3 \times (0.3 + 0.005 \times t) ^{\circ}C$			
According to national laws or by returning to Baumer		1/6 DIN B 1/1 DIN A	$\pm 1/6 \times (0.3 + 0.005 \times t) °C$ $\pm (0.15 + 0.002 \times t) °C$			

# Time Constant $\tau_{_{0.5}}$

Sensor type			Liquids	Air	
Dimension	Response	Insert	0.4 m/sec.	3 m/sec.	0 m/sec.
ø6 mm tube	fast		< 1.5 sec.	< 21.4 sec.	< 135.6 sec.
ø8 mm tube	fast		< 1.5 sec.	< 33.6 sec.	< 181.0 sec.
ø10 mm tube	fast		< 1.5 sec.	< 46.8 sec.	< 238.9 sec.
ø12 mm tube	fast		< 1.5 sec.	< 59.9 sec.	< 311.4 sec.
ø6 mm tube	normal		< 6.1 sec.	< 27.2 sec.	< 137.8 sec.
ø8 mm tube	normal		< 7.6 sec.	< 47.7 sec.	< 200.9 sec.
ø10 mm tube	normal		< 11.1 sec.	< 57.8 sec.	< 270.6 sec.
ø12 mm tube	normal		< 16.2 sec.	< 70.8 sec.	< 319.8 sec.
ø8 mm tube	normal	5.6 mm	< 13.6 sec.	< 51.1 sec.	< 253.1 sec.
ø10 mm tube	normal	5.6 mm	< 28.1 sec.	< 67.0 sec.	< 271.1 sec.
ø12 mm tube	normal	5.6 mm	< 31.3 sec.	< 82.3 sec.	< 289.3 sec.
Surface sensor, flus	h mounted		< 1.0 sec.		

# **Dimensional Drawings - Mounting Details**

[mm]



# **Examples of Application**

[mm]



8141 4211 0500 110 xxxx



8140 0007 03A2 010 0000 Cable sensor 8155-3xx-xxxx BattTemp 86 30-511



8142 3212 02A1 110 xxxx

8141 3211 0272 010 xxxx BattTemp 86 30-511



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8141 H241 07F0 110 xxxx

8142 D231 02A2 213 xxxx

Display 81 46-525

Transmitter 22xx-000x



8142 D232 0500 110 xxxx

PTFE

Thermal

isolation

3

74 - 03

8142 C252 0000 000 xxxx +CombiConnect connection



8140 E010 02A2 213 0000 Display 81 46-525 Transmitter 22xx-000x

74 - 03

8142 D231 07F0 210 xxxx Transmitter 22xx-000x



8141 3212 12A2 121 xxxx

### Sensor Tube and -Element Selection Table

Sensor tube [mm]	Embedded sensor, max. [mm]	Cable sensor, max. [mm]	Single, 2-wire	Duplex, 2-wire	Single, 4-wire	Duplex, 4 wire
6	6000		Х	Х	Х	
8	6000	1000	Х	Х	Х	
10	6000	6000	Х	Х	Х	
12	6000	6000	х	х	х	х

# **Ordering Details - CombiTemp Series**

		814x	хххх	
Sensor tip	4´ digit			
Not specified		0		
Normal response sensor tip		1		
Fast response sensor tip, Note {1}, {6}		2		
Connection	5´ digit			
Not specified			0	
Sensor tube without thread or connection				
R 1/2 Male nipple, ISO // I			2	
G 1/2 A Male hipple, ISO 228/1			3	
G 1/2 Rotating remain hul, ISO 228/1			4	
G1/2A holduling lindle hipple, ISO 220/1			5	
G3/4 Rotating male ninnle ISO 220/1			7	
G1 Rotating famale nut ISO 228/1			8	
G14 Rotating male ninner ISO 228/1			a	
1/2" - 14 NPT Male ninple, ANSI/ASME B1 20 1			Δ	
G1/2A Male nipple for CombiConnect ISO 228/1			c	
3A/DN38 Hydienic sensor tube 3-A conform Note {8}			D	
3A/DN38 Hygienic, flush mounted surface sensor, 3-A conform, Note {8}			E	
GEA Tuchenhagen Varivent flange. DN40/DN50			G	
Clamp DN25/38, ISO 2852, 3-A conform, Note {8}			H	
Clamp DN51, ISO 2852, 3-A conform, Note {8}			1	
1/2" - 3/4" Tri-clamp®			к	
M20 x 1.5 Male nipple, DS/ISO 261			М	
SMS 1145 Rotating female nut, DN38			Р	
SMS 1145 Rotating female nut, DN51			Q	
As customer specification			S	
Sensor tube dimension	6´ digit			
Not specified			0	
06 mm x 1 mm, AISI 316L, see table page 3				
at $0 \text{ mm} \times 1 \text{ mm}$ AlSI STOL, see table page 3			2	
a12 mm x 1 mm AISI 316L, see table page 3			4	
As customer specification			s	
Sensor element	7´ digit			
Not specified or empty sensor tube			0	
Pt100, 1/1 DIN B, single, specified accuracy -50400°C			1	
Pt100, 1/1 DIN B, duplex, specified accuracy -50400°C			2	
PT100, 1/3 DIN B, single, specified accuracy 0150°C			3	
PH100, 1/6 DIN B, single specified accuracy 0, 100°C			5	
Pt100 1/6 DIN B dunley specified accuracy 0 100°C			6	
Pt100, 1/1 DIN A. single, specified accuracy -50400°C			7	
Pt100, 1/1 DIN A, duplex, specified accuracy -50400°C			8	
Pt100, 1/1 DIN B, single, specified accuracy -50600°C, Note {7}			9	
Pt1000, 1/3 DIN B, single, specified accuracy -50400°C			A	
Pt1000, 1/1 DIN B, single, specified accuracy -50400°C			В	
As customer specification			S	
Canaar insert turs	٥٢ ما ما ه			
Not specified	o uigit		0	
Sensor tube with embedded sensor element. 2-wire			1	
Sensor tube with embedded sensor element. 4-wire			2	
ø5.6 x 0.5 mm insert AISI 316, 2-wire, max. length 600 mm, Note {3}, {7}			3	
ø5.6 x 0.5 mm insert AISI 316, 4-wire, max. length 600 mm, Note {3}, {7}			4	
ø5.6 x 0.5 mm insert spring-loaded AISI 316, 2-wire, max. length 600 mm, Note {3}, {7}			5	
ø5.6 x 0.5 mm insert spring-loaded AISI 316, 4-wire, max. length 600 mm, Note {3}, {7}			6	
Cable sensor, 4-wire, Note {4}			7	

# Ordering Details - CombiTemp Series (continued)

		XXXX	XXX	XXXX
Cooling neck	9´ digit			
Not specified		0		
off cooling neck (71 mm)		1		
2 off cooling neck (142 mm)		2		
off cooling neck (213 mm)		3		
s customer specification		S		
ousing	10´ digit			
t specified		0		
0 mm stainless steel housing, Note {5}		2		
0 mm stainless steel housing with Ø110 mm wall bracket, Note {5}		3		
IN B head with cover and M20 gland		5		
IN B head with cover and M20 gland, shield connection terminal		6		
E i Field housing (no display)		/		
3 customer specification		5		
lectrical connection	11' digit			
at specified or std. DIN B head selected in the previous choice	i i uigit	0		
80 mm housing: 1 off M20 x 1.5 adaptor and 1 off blind plug (no gland incl.)		5		
R0 mm housing: 1 off M20 x 1.5 adaptor and 1 off bind plug (10 gland incl.)		6		
30 mm housing: 2 off blind plugs		7		
80 mm housing: 1 off M16 gland and 1 off blind plug		A		
80 mm housing: 2 off M16 gland		B		
80 mm housing: 1 off M16 with shield connection terminal and 1 off blind blug		č		
DIN B head: 1 off M20 gland for marine applications				
E1 housing: M12 plug, 4 pole		E		
E1 housing: M16. plastic		F		
E1 housing: M16 gland, nickel plated brass		G		
E1 housing: M16 gland, nickel plated brass, with earth connection terminal		H		
80 mm housing: M12 plug, 4 pole		1		
s customer specification		S		
over or display	12´ digit			
ot specified		0		
over for ø80 mm housing		1		
isplay, Note {4}		2		
erminal block or transmitter	13 digit		0	
or specified			U	
			1	
ransmiller, Note {4}			2	
Assembling	14' digit			
ot specified			0	
sembled, process connection at the base			ĭ	
ssembled, process connection at the rear (ø80 mm housing only)			2	
/elded. process connection at the base (ø80 mm housing only)			3	
Velded, process connection at the rear (ø80 mm housing only)			4	
· · · · · · · · · · · · · · · · · · ·				
Approvals	15´ digit			1
tandard version			0	
x ia (zone 0) II 1 G EEx ia IIC			4	
x n (zone 2) II 3 G EEx nA II			5	
Sensor tube length (L)	1619´ digit			
ength in mm. Please observe max. lengths				XXXX
alibration certificate, -30150°C, 4 points, order type number 5509-142				
laterial certificate, 3.1 (EN10 204), order type number 5509-227				
able time no i				
/able type no.:				
32548 4 poi M 12 plug with 5m cable				
2/004 4 poi Mil2 angle plug With 5m cable				
mer.com		Γ	Jata Sh	eet 2000-1
		-		

Design and specifications subject to change without notice

#### Notes:

- {1} Single sensor element only. Max. sensor length 300 mm.
- (3) ø80 mm housing: Insert only if sensor tube is mounted at the rear. Observe length, refer to "Sensor Insert Type".
- {4} Refer to data sheet. Specify separate type number and configuration.
- [5] Assembling is mandatory. Valid for 3A applications.
- [6] Embedded sensors only.
- {7} Not valid for a sensor with fast response tip.

### **Dimensional Drawings**

#### [mm]





Male nipple G1/2A, R1/2 and M20 x 1.5

Rotating male nipple G1/2A, G3/4A and G1A



Clamp DN25/38/51 EPDM gasket included, Note {8}



Rotating female nut G1/2, G3/4 and G1

### **Dimensional Drawings**



Male nipple G1/2A for CombiConnect



3A/DN38 hygienic sensor tube EPDM O-ring included, Note {8}

51.5

3A/DN38 hygienic flush mounted surface sensor EPDM O-ring included, Note {8}

[mm]







Sensor tube without connection



SMS 1145 rotating female nut

30 025 06...12 04...12

Tri-Clamp® 1/2 - 3/4



GEA Tuchenhagen Varivent DN40/DN50

www.baumer.com

Design and specifications subject to change without notice

### **Sensor inserts**



DIN housing with G1/2A male nipple connection and sensor insert Note {8} Housing shaft DIN housing: 11.5 mm ø80 housing: 6.5 mm

### Notes

- {1} Single sensor element only. Max. sensor length 300 mm.
- {3} ø80 mm housing: Insert only if sensor tube is mounted at the rear. Observe length, refer to "Sensor Insert Type".
- {4} Refer to data sheet. Specify separate type number and configuration.
- [5] Assembling is mandatory. Valid for 3-A applications.
- {6} Embedded sensors only.
- {7} Not valid for a sensor with fast response tip.

Calculation of insert length:

When ordering an insert the length must be calculated from the formula:

Insert length = Sensor length + total body length + housing shaft (Total body length can be calculated from the dimensional drawings on pages 6 and 7)

#### Example.

Insert for a G1/2A male nipple sensor in a DIN housing, 100 mm sensor tube, normal response sensor tip:

Housing shaft = 11.5 mmTotal body length = 27.5 + 12.5 = 40 mm (see page 6) Sensor length = 100 mm

This insert must be ordered with a 151.5 mm sensor tube.

{8} The 3-A mark is valid only when the product is mounted in a 3-A marked counter part and installed according to the installation manual. Use also a 3-A marked O-ring or gasket if relevant. The 3-A marked products conforms to the 3-A Sanitary Standard criteria. Materials and surfaces fulfill the FDA demands and follow the EHEDG guidelines regarding design, materials and finishing.

EPDM O-rings supplied with 3-A marked products are conform to Sanitary Standard Class II (8% milk fat max.)

EPDM gaskets supplied with 3-A marked products are conform to Sanitary Standard Class I (8% milk fat max.)





ø80 mm housing with FlexView Gland (blind plug at the rear) Clamp connection Fast response sensor



Cut through DIN - B housing FlexTop 2201 temperature transmitter G1/2A male nipple connection Normal response sensor



ø80 mm housing with 2 glands Cover not mounted 3A/DN38 connection at the rear Fast response sensor