

## Gas expansion thermometer with switch contact adjustable angel stem Type series FU . . . .



### Application area

- Chemie/Petrochemie
- Maschinenbau
- Seeschifffahrt

### Features

- Case, measuring system and wetted parts of stainless steel
- Case NS 100/160, degree of protection IP 66
- Stem diameter 6, 8 and  $\geq 10$  mm
- Short immersion lengths of the stem may be used
- Accuracy class 1 or 2 per DIN 16196, depending on range
- Micro adjustment pointer for indication correction
- Switch contacts (electrical contact devices) per DIN 16196:
  - slow acting contact
  - magnetic snap contact
  - inductive contact

### Options

- Case with liquid filling
- Explosion protection
- Classification per SIL 2
- Material certificate per DIN EN 10204
- Connection to Zone 0 with thermowells upon request

### Application

These thermometers are suitable for use outdoors and in aggressive environments. The devices can also be supplied with additional liquid damping for use in extreme conditions. Further information on mounting see operating instructions BA\_066.

## Technical data

### Case

high quality bayonet ring case NS 100/160 material: st. steel mat.-no. 1.4301 (304)

### Degree of protection (EN 60529)

IP 66

### Measuring element

bourdon tube dead zone free with inert gas filling

### Temperature detecting element

stainless steel material no. 1.4404 (316L), diameter 6, 8 and  $\geq 10$  mm, can be supplied in standard lengths. Active lengths depend on temperature detecting element diameter, see order details, other values upon request

### Case filling

liquid filling Labofin

### Process connection

rigid bulb, centrally at rear, latching every  $22.5^\circ$ , rotatable through  $90^\circ$ . Different connections can be supplied, see order details

### Movement

stainless steel with compensation

### Scale

pure aluminium, white with black inscription. Option: with marking

### Pointer

pure aluminium, black with micro adjusting device for zero-point correction

### Window

non splintering glass.  
Option: non splintering plastic (Macrolon) with contact lock

### Case seal

sealing ring: Perbunan  
filling plug: Desmopan

### Nominal ranges

per EN 13190, max.  $-100\dots700^\circ\text{C}$ , measuring spans  $\geq 60^\circ\text{C}$

### Accuracy class

data per DIN 16196 (depending on range) for all temperature detecting elements with diameter d5 and standard immersion length l1

no-nominal size	switch function	type of contact	
		inductive	touch contact
100	1 times	class 1	$\leq$ class 2
	2 times	class 1	$\leq$ class 2
160	1 times	class 2	class 2
	2 times	class 2	-

### Ambient temperature

per EN 13190, ambient temperatures that deviate from EN are to be specified

### Storage and transport temperature

per EN 13190, max.  $-20\dots+60^\circ\text{C}$

### Electrical connection

connection plug with cable gland M 20 x 1.5 and removable test cover, mat. Macrolon

### Switch contacts

Touch contacts or inductive contacts see order code. Further technical details see operating instructions BA\_066 and TA\_039.

### Explosion protection

#### magnetic snap contact

Simple electrical apparatus per IEC/DIN EN 60079-11 suitable for intrinsically safe circuits Ex IIC TX.

#### inductive contact

contact device suitable for intrinsically safe circuits

Ex II 2G Ex ia IIC T4/T5/T6 Gb

Reg.-no.: PTB 99 ATEX 2219X

PTB 00 ATEX 2049X

Further details see operating instructions BA\_066 and Ex Instructions XA\_013, XA\_014 and XA\_021.

### Functional safety

EN 61508, classification per SIL 2 for gauges with inductive contacts only.

### Weights

NS 100, without filling: approx. 1.2 kg

NS 100, with filling: approx. 2.1 kg

NS 160, without filling: approx. 2.1 kg

NS 160, with filling: approx. 4.4 kg

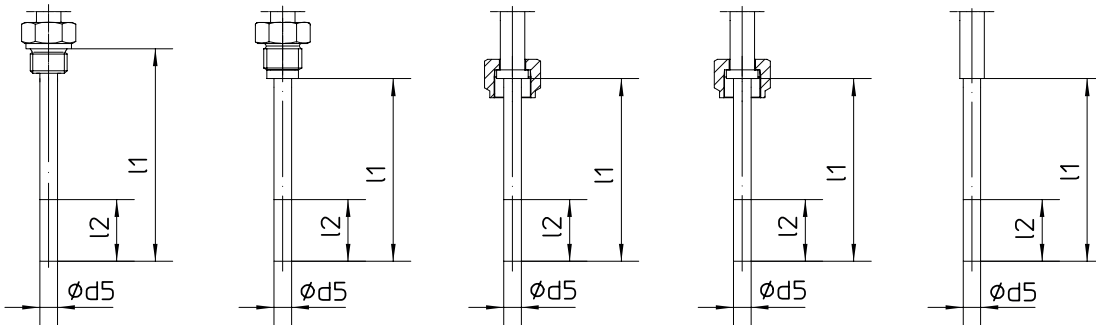
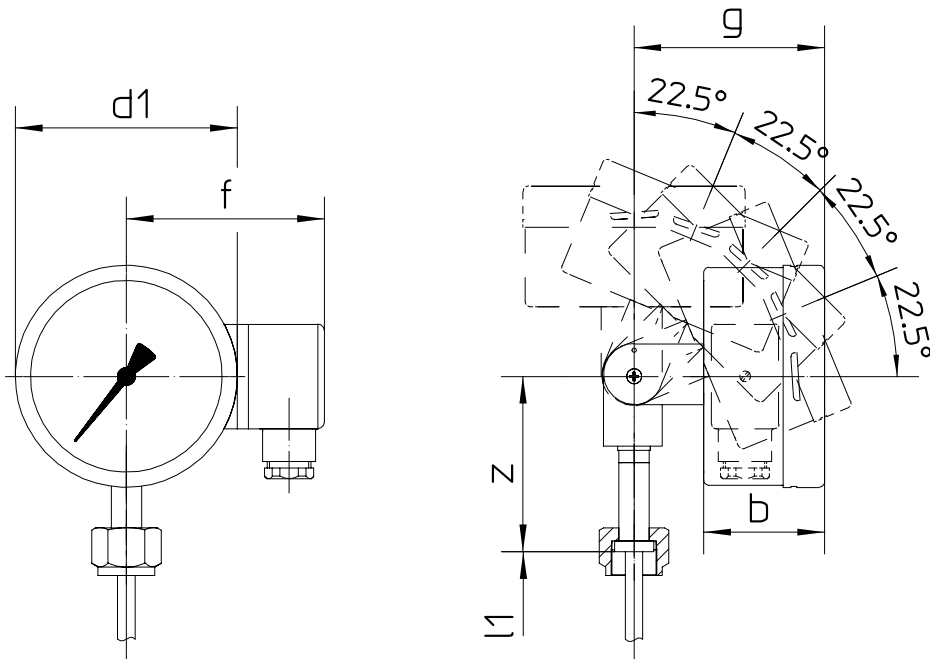
### Instructions for use

the loading capacity of the temperature detecting element depends on the following parameters:

1. measured medium
2. measured medium pressure
3. measured medium temperature
4. flow velocity
5. immersion length
6. material

A technical test is necessary where required.

# Dimensions



shanks, fixed  
G1/2B, G3/4B,  
1/2" NPT  
D1107/1109/1122

shanks  
rotating,  
G1/2B  
D1207

union nut  
G1/2  
D2007

union nut  
G3/4  
D2009

without  
screwing  
D1001

temperature detecting element diameter  $d_5$ , immersion length  $l_1$  and active length  $l_2$  see order details

dimensions (mm)					$z^*$				
case	d1	b	g	f	D1001	D1107/1109/1122	D1207	D2007	D2009
NS 100	100	60	92	90	83	68	83	83	83
NS 160	160	60	92	120	83	68	83	83	83

\* dimension increases by 36 mm for scale ranges > 160 °C

# Order details

## Gas expansion thermometer with switch contact

case design IP 66	process connection at back with adjustable joint stem	· NS 100		FU231 .
		· NS 160		FU331 .
		with liquid filling	· NS 100	FU251 .
			· NS 160	FU351 .
design	· standard	0		
	· ex-protection	1		

nominal range · per table **A2...** ←

process con- nection	· shanks fixed	· G 1/2 B	D1107
		· G 3/4 B	D1109
		· 1/2" NPT	D1122
		· G 1/2 B	D1207
	· shanks rotating	· G 1/2 B	D2007
	· union nut	· G 1/2	D2009
		· G 3/4	D1001
	· without screwing	· OV	D1001

temperature de- tecting element Ø d5	· 6 mm (l2 ≥ 180 mm) <sup>3</sup>	F6 ...
	· 8 mm (l2 ≥ 80 mm) <sup>3</sup>	F8 ...
	· 10 mm (l2 ≥ 50 mm) <sup>3</sup>	F10 ...

immersion length l1 (mm) <sup>4</sup>	D 11.. shanks fixed	D1207 shanks rotating G 1/2 B	D2007 union nut G 1/2	D2009 union nut G 3/4	D1001 without screw- ing	
	100	080	089	093	100	...
	160	140	126	130	160	...
	250	230	186	190	250	...
	400	380	276	280	400	...
	--	--	426	430	--	...

contact	<i>touch contact</i>					
	· slow acting contact	L2 ...				
	· magnetic snap contact	L4 ...				
	· slow acting contact, separated circuits	M2 ...				
	· magnetic snap contact, separated circuits	M4 ...				
	<i>inductive contact</i>					
	· standard initiator (N)	N4 ...				
	· safety initiator (SN)	N1 ...				
	· safety initiator invers (S1N) <sup>2</sup>	N2 ...				
	· with integrated switching amplifier <sup>1</sup>	N6 ...				

switch function · single contact (1st figure per table) **.00** ←

· double contact (1st + 2nd figure per table) **.0** ←

**additional features (to be indicated in case of need, only):**

window	· macrolon	R11
marking	· on scale (pls. specify)	T2
functional safety per EN 61508, classification per SIL 2		W2605

**Order code (example):** FU2310 A2548 D1109 F8100 L4100 R11 T2 W2605

standard measuring and nominal ranges °C per EN 13190

nominal range °C	meas. range °C	order code
-20...+40	-10...+30	340
-20...+60	-10...+50	346
-30...+50	-20...+40	322
-40...+40	-30...+30	220
-40...+60	-30...+50	222
0...60	10...50	520
0...80	10...70	522
0...100	10...90	524
0...120	20...100	540
0...160	20...140	544
0...200	20...180	548
0...250	30...220	560
0...300	30...270	565
0...400	50...350	627
0...500	50...450	630
0...600	100...500	640
0...700	100...600	650

switch function	fig.
· increasing temperature makes contact	1
· increasing temperature breaks contact	2
· decreasing temperature makes contact	4
· decreasing temperature breaks contact	5
· change-over elements increasing temperature makes or breaks contact	3
· change-over elements decreasing temperature makes or breaks contact	6

<sup>1</sup> not with ex-protection

<sup>2</sup> with NS 100: one contact device, only

<sup>3</sup> the active length l2 must completely reach the process temperature that is to be measured. The depth of immersion length l1 should be increased accordingly.

<sup>4</sup> standard immersion length to be specified in order code, e.g. l1 100 mm: order code 100