

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 ≥ 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 ≥ 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° , rotatable through 90° . 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 d_5 and standard immersion length l_1

no-minal 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

Ex-protection (ATEX) for mechanical measuring devices:

Ex II 2G Ex h IIC T1...T6 Gb X

Ex II 2D Ex h IIIC Txx°C Db X

Further details see operating instructions BA_066 and Ex Instructions XA_005, 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

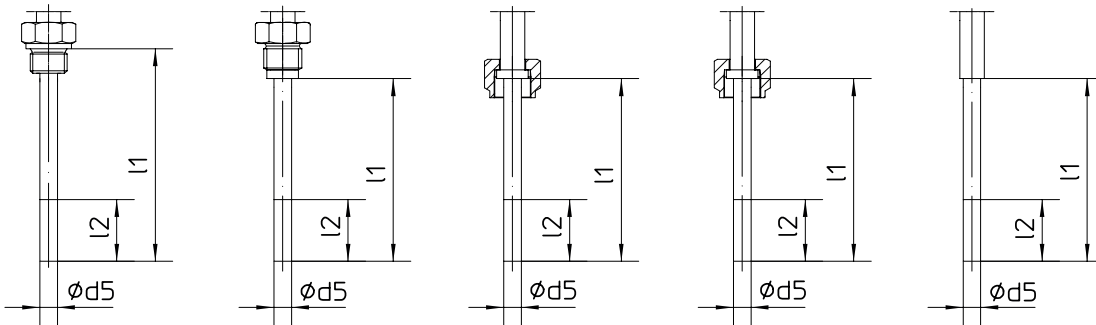
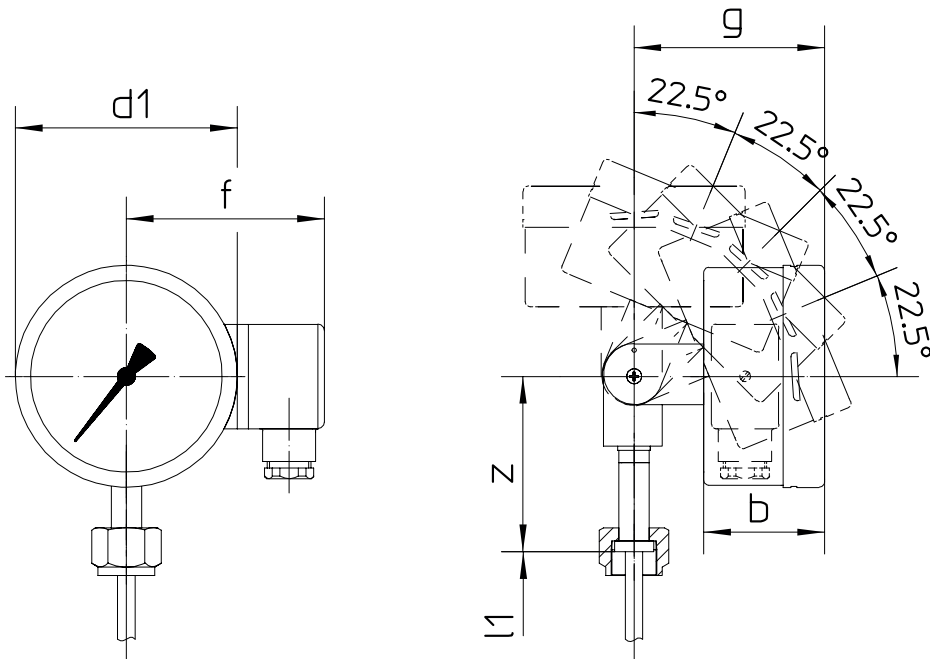
Instructions for use

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	d_1	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		
	· shanks rotating	· G 1/2 B		D1207		
		· G 1/2		D2007		
	· union nut	· G 3/4		D2009		
· OV		D1001				
temperature de- tecting element Ø d5	· 6 mm (l2 ≥ 180 mm) ³					F6 ...
	· 8 mm (l2 ≥ 80 mm) ³					F8 ...
	· 10 mm (l2 ≥ 50 mm) ³					F10 ...
immersion length l1 (mm) ⁴	D 11..	D1207	D2007	D2009	D1001	...
	shanks fixed	shanks rotating G 1/2 B	union nut G 1/2	union nut G 3/4	without screwing	
	100	080	089	093	100	
	160	140	126	130	160	
	250	230	186	190	250	
	400	380	276	280	400	
...	...	426	430	
deviating length: pls specify						999
contact	<i>touch contact</i>					L2 ... L4 ... M2 ... M4 ... N4 ... N1 ... N2 ... N600 .0
	· slow acting contact					
	· magnetic snap contact					
	· slow acting contact, separated circuits					
	· magnetic snap contact, separated circuits					
	<i>inductive contact</i>					
	· standard initiator (N)					
	· safety initiator (SN)					
· safety initiator invers (S1N) ²						
· with integrated switching amplifier ¹						
switch function	· single contact (1st figure per table)					.00 ←
	· double contact (1st + 2nd figure per table)					.0 ←

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

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	

¹ not with ex-protection

² with NS 100: one contact device, only

³ 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.

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