Gas expansion thermometer with switch function
adjustable angel stem, Type Series FU . . . .

SIL2

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 functions (electrical contact device) per DIN 16196:
  - slow acting contact
  - magnetic snap contact
  - inductive contact devices

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 area

· Chemical and petrochemical industry
· Machinery construction
· Shipping

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. See data sheets T5-... for suitable thermowells per DIN 43772.

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

Case seal
sealing ring: Perbunan
filling plug: Desmopan

Nominal ranges
per EN 13190, max. -100...700 °C,
measuring spans ≥ 60 °C

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

nominal size	switch function	type of contact	
		inductive	touch contact
100	1 times	class 1	≤ class 2
	2 times	class 1	≤ 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...+60 °C

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

Switch function
Touch contacts or inductive contact devices 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.

Functional safety
EN 61508, classification per SIL 2 for gauges with inductive contact device only.

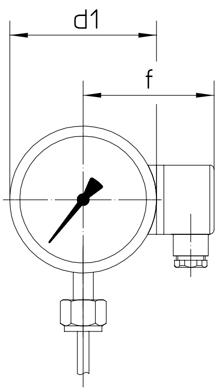
Weights

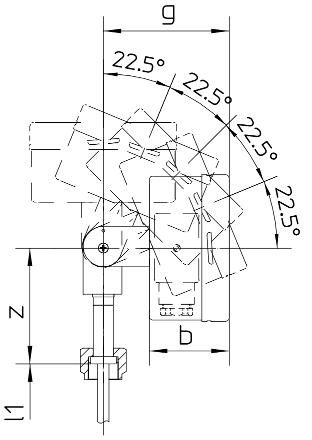
NS 100, without filling:	approx. 1.2 kg
NS 100, with filling:	approx. 2.1 kg
NS 160, without filling:	approx. 2.1 kg
NS 160, with filling:	approx. 4.4 kg

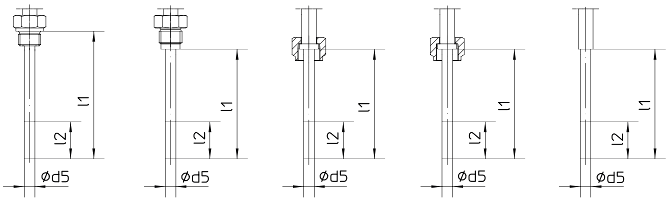
Instructions for use
the loading capacity of the temperature detecting element depends on the following parameters:
1. measured medium
2. measured medium pressure
3. measured medium temperature
4. flow velocity
5. immerison length
6. material

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 d5, immersion length l1 and active length l2 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 - please give additional specifications for models not listed -

Gas expansion thermometer with switch function			
case design IP 66	process connection at back with adjustable joint stem	· NS 100	FU231 .
		· NS 160	FU331 .
		· NS 100 with liquid filling	FU251 .
		· NS 160 with liquid filling	FU351 .
design	· standard		0
	· ex-protection		1
nominal range	· per table		A2...
process connection	· shanks fixed	· G 1/2 B	D1107
		· G 3/4 B	D1109
		· 1/2" NPT	D1122
	· shanks rotating	· G 1/2 B	D1207
	· union nut	· G 1/2	D2007
		· G 3/4	D2009
	· without screwing	· OV	D1001
temperature detecting 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.. shanks fixed	D1207 shanks rotating G 1/2 B	D2007 union nut G 1/2	D2009 union nut G 3/4	D1001 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	*touch contact*	
	· slow acting contact	L2 . . .
	· magnetic snap contact	L4 . . .
	· slow acting contact, separated circuits	M2 . . .
	· magnetic snap contact, separated circuits	M4 . . .
	inductive contact	
	· standard initiator (N)	N4 . . .
	· safety initiator (SN)	N1 . . .
	· safety initiator invers (S1N) ²	N2 . . .
	· with integrated switching amplifier ¹	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			

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

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

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