Gas expansion thermometer with switch contact

radial bottom or centre back connection

Type Series FU . . . .

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 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.

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 temperature detecting element, radially protruding at bottom, alternatively centrically at rear.
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...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 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
Ⓔx 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:
Ⓔx II 2G Ex h IIC T1...T6 Gb X
Ⓔx 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.

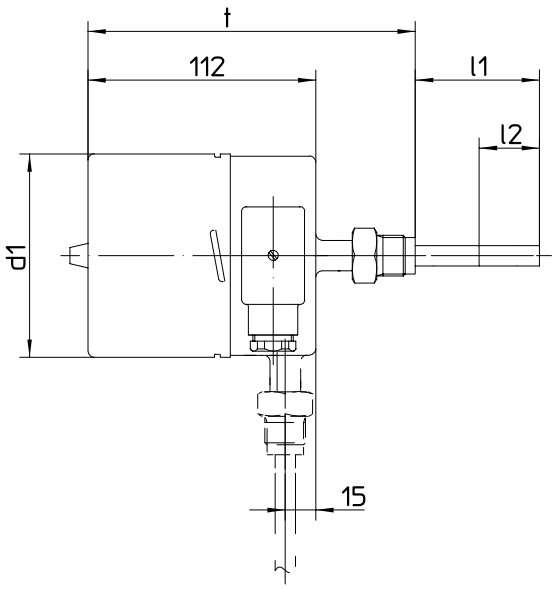
Functional safety
EN 61508, classification per SIL 2 for gauges with inductive contacts only.

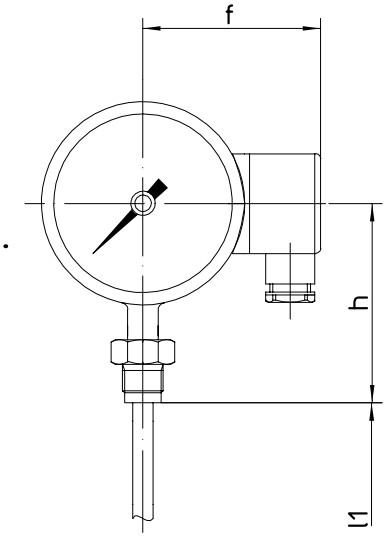
Weights
NS 100, without filling: approx. 1.1 kg
NS 100, with filling: approx. 2.0 kg
NS 160, without filling: approx. 2.0 kg
NS 160, with filling: approx. 4.3 kg

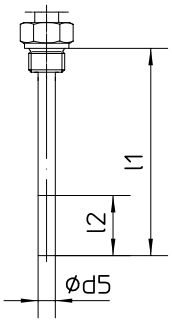
Instructions for use
the loading capacity of the temperature detecting element depends on the following parameters:
1. measured medium
2. measured medium pressure
3. measured medium temperature
4. flow velocity
5. immerison length
6. material

A technical test is necessary where required.

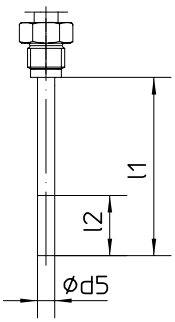
Dimensions



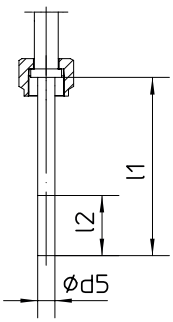




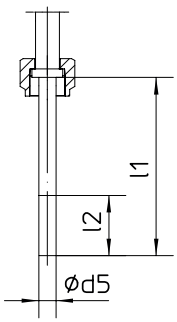
shanks, fixed
G1/2B, G3/4B,
1/2" NPT
D1107/1109/1122



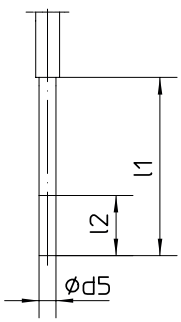
shanks
rotating,
G1/2B
D1207



union nut
G1/2
D2007



union nut
G3/4
D2009



without
screwing
D1001

Order details

Gas expansion thermometer with switch contact														
case design IP 66	process connection bottom	· NS 100		FU240 .										
		· NS 160		FU340 .										
		· NS 100	with liquid filling	FU260 .										
		· NS 160		FU360 .										
	process connection at back	· NS 100		FU230 .										
		· NS 160		FU330 .										
		· NS 100	with liquid filling	FU250 .										
		· NS 160		FU350 .										
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):						FU2400	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