

Gas expansion thermometer with switch contact and capillary Type series FU



Application area

- Chemical and petrochemical industry
- Machinery construction
- Shipping

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
 - Inductiv 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

Capillary

stainless steel material no. 1.4571 (316Ti) resp. 1.4404 (316L) in different lengths with buckling protection, coated with protective tube upon request, alternatively with sliding screwing

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, connected via capillary radially protruding at bottom resp. 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 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	\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. $-20...+60$ °C

Electrical connection

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

Switch contact

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

⊕ 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:

⊕ II 2G Ex h IIC T1...T6 Gb 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.

Mounting

stand-alone mounting with wall bracket; alternatively with flange for surface mounting or for flush mounting with DIN mounting flange

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

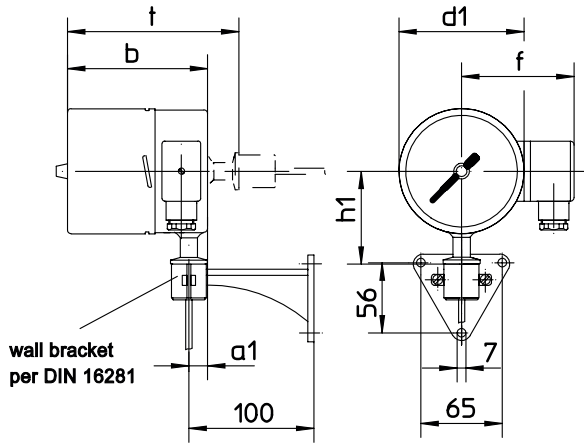
the loading capacity of the temperature detecting element depends on the following parameters:

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

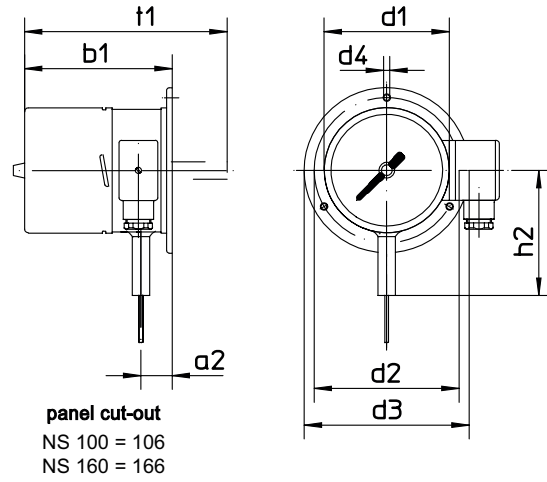
A technical test is necessary where required.

Dimensions

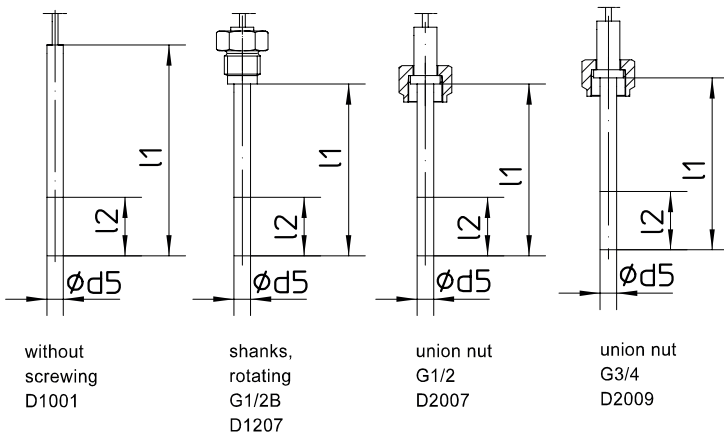
normal design



for surface mounting



dimensions (mm)													
case	d1	a1	b	h1	l	a2	b1	h2	l1	d2	d3	d4	
NS 100	100	15	112	78	140	21	118	103	165	116	132	4.8	
NS 160	160	15	112	108	140	21	118	133	165	178	196	5.8	



Order details

Gas expansion thermometer with switch contact and capillary																			
case design IP 66	capillary bottom	· NS 100		FU243 .															
		· NS 160		FU343 .															
		· NS 100		with liquid filling		FU263 .													
	capillary at back	· NS 160		FU363 .															
		· NS 100		FU233 .															
		· NS 160		with liquid filling		FU333 .													
design	· standard		0																
	· ex-protection		1																
nominal ranges	· per table		A2 ...																
process connection	· without screwing		· OV		D1001														
	· shanks rotating		· G 1/2 B		D1207														
	· union nut		· G 1/2		D2007														
temperature detecting element Ø d5	· 6 mm (l2 ≥ 180 mm) ³		F6 ...																
	· 8 mm (l2 ≥ 80 mm) ³		F8 ...																
immersion length l1 (mm) ⁴	D 1001 without screwing		D1207 shanks rota- ting G 1/2 B		D2007 union nut G 1/2		D2009 union nut G 3/4		F10 ...										
	100		080		089		093		...										
	160		140		126		130		...										
	250		230		186		190		...										
	400		380		276		280		...										
	--		--		426		430		...										
	deviating length: pls specify		999																
mounting	· with wall bracket, aluminium		G4																
	· prepared for wall bracket		G1																
	· for surface mounting		G2																
	· für flush mounting		G3																
	· with wall bracket, st. steel		G5																
capillary	· st. steel, length acc. to specification per m		K39																
	· st. steel with protective tube, length acc. to specification		K49																
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) 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																
sliding screwing on capillary ⁵	· G 1/2 B		V10																
	· G 3/4 B		V11																
functional safety per EN 61508, classification per SIL 2	· 1/2" NPT		V20																
			W2605																
Order code (example):			FU2430	A2540	D1207	F8100	G1	K39	N4200										

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

⁵ operating temperature max. 250 °C, but not with coated capillary