Gas expansion thermometer
with capillary, Type series FN….

Application area

- Shipping
- Machinery construction
- Chemical and petrochemical industry
- General process technology

Features

- High quality case with bajonet ring NS 100/160, degree of protection IP 66
- Nominal ranges -40 °C…700 °C, further nominal ranges from -200 °C...700 °C upon request
- Case and wetted parts of stainless steel
- Different connections can be supplied
- Temperature detecting element 6, 8 and ≥ 10 mm diameter
- Short immersion lengths of the temperature detecting element may be used
- Accuracy class 1 as per EN 13190
- Micro adjusting pointer for indication correction
- Capillary isolates indicating unit from measuring point
- EAC declaration (upon request)

Options

- Approvals/Certificates
  - Explosion protection (ATEX) for mechanical devices
  - Certificate of measuring equipment for Russian Federation
  - Calibration certificate as per EN 10204
- Case with liquid filling
- Electronical angle-of-rotation sensor, Type series PL1100, see data sheet D6-020
- 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. Suitable thermowells see product group T5.

Technical data

Constructional design / case

Design:	High quality case with bajonet ring, material: stainless steel mat.-no. 1.4301 (304)
Nominal size:	NS 100 or NS 160
Degree of protection per EN 60529:	IP 66
Case filling:	Labofin Further filling liquids upon request.
Case seal:	Material gasket: NBR
Window:	Non-splintering laminated glass. Option: non-splintering plastic (Macrolon) with adjustable reference pointer
Movement:	Stainless steel with compensation
Scale:	Pure aluminium, white with black inscription. Alternatively with marking or fixed reference pointer.
Pointer:	Pure aluminium, black with micro adjustment for zero point correction
Mounting:	Stand-alone mounting with wall bracket per DIN 16281, alternatively with flange for surface mounting or for flush mounting with DIN mounting flange.

Weights: Without capillary, screwing and temperature detecting element

NS 100:	
without filling:	approx. 1.0 kg
with filling:	approx. 1.3 kg
NS 160:	
without filling:	approx. 1.5 kg
with filling:	approx. 2.1 kg

Process connection

Design: Temperature detecting element via capillary connected radially at bottom or at rear with indicating unit.

Different connections can be supplied (see order details).

Measuring element

Measuring element: Bourdon tube, dead zone free with noble gas filling.

Temperature sensor

Temperature-detecting element: Diameter 6, 8 and ≥ 10 mm. Standard lengths and active lengths see order details, further sizes upon request

Material: stainless steel mat.-no. 1.4404 (316L)

Capillary

Capillary: Available in different lengths, alternatively with sliding screwing. Coated with protective tube upon request.

Material: stainless steel mat.-no. 1.4571 (316Ti)

Nominal range

Nominal range (EN 13190): -40…700 °C

Measuring spans ≥ 60 °C, see order details

Further nominal ranges from -200 °C up to 700 °C (no normal range) upon request.

Accuracy

Accuracy class: 1.0 per EN 13190

Temperature ranges

Ambient: Per EN 13190.

Ambient temperatures that deviate from EN are to be specified.

Storage and transport: -20…60 °C

Further temperature ranges upon request.

Tests and certificates

Explosion protection: Ex- protection (ATEX) for mechanical devices

Ⓔx II 2G c TX

Ⓔx II 2D c TX

Further details and temperature limits see Ex Instruction XA_005.

- EAC declaration (upon request)
- Certificate of measuring equipment for Russian Federation

Instructions for use

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

- Media
- Media pressure
- Media temperature
- Flow velocity
- Insertion length
- Material

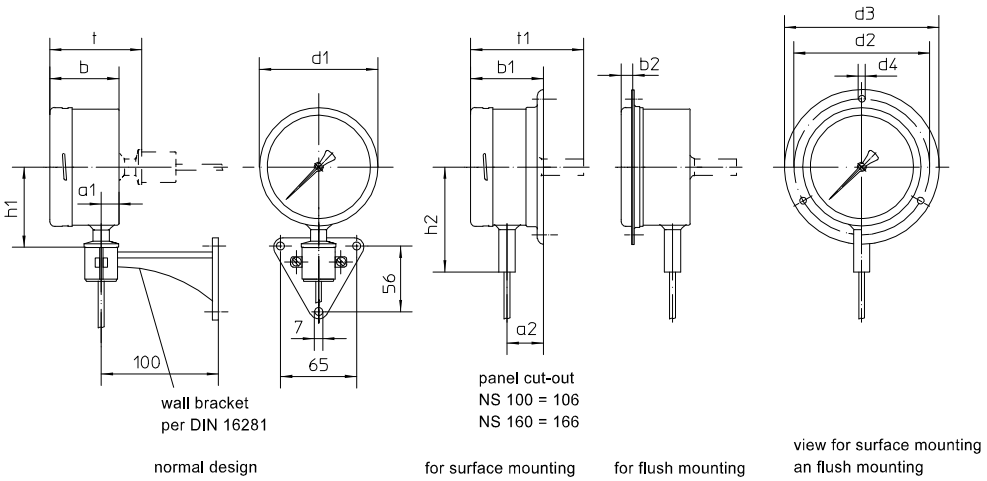
A technical examination might be necessary as well as the use of a separate thermowell (Product group D5).

Information on other models see order details or upon request.

Further information to mounting and operation see Operating Instruction BA_017.

Dimensions

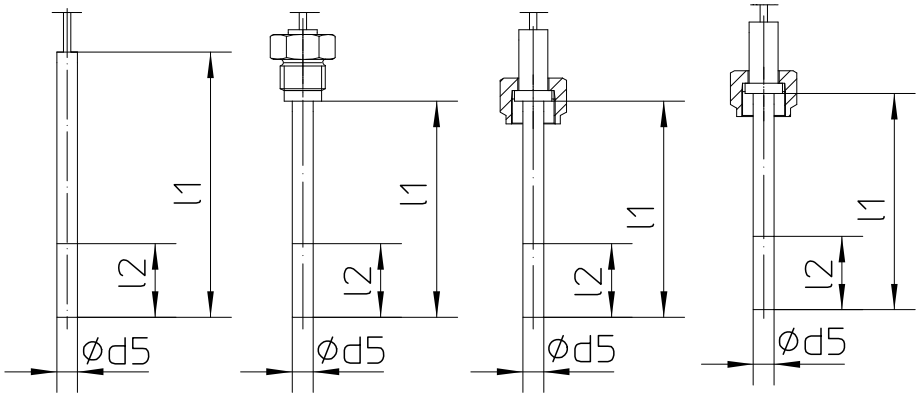
Case



Temperature detecting element diameter d5, insertion length l1 and active length l2 see order details.

Dimensions (mm)												
case	d1	a1	b	h1	a2	b1	h2	l1	b2	d2	d3	d4
NS 100	100	15	60	78	21	66	103	113	10	116	132	4.8
NS 160	160	15	60	108	21	66	133	113	10	178	196	5.8

Dimensional drawing of process connections



without screwing D1001

shanks, rotating G1/2B D1207

union nut G1/2 D2007

union nut G3/4 D2009

Order details

Gas expansion thermometer with capillary
Type series FN….

Order details FN….				
FN2430	case design degree of protection IP 66	capillary bottom connection	NS 100	without liquid filling
FN3430			NS 160	
FN2630			NS 100	with liquid filling
FN3630			NS 160	
FN2330		capillary centre back connection	NS 100	without liquid filling
FN3330			NS 160	
FN2530			NS 100	with liquid filling
FN3530			NS 160	

		nominal ranges	measuring ranges
A2340	standard ranges [°C], accuracy class 1 per EN 13190	-20...40	-10...30
A2346		-20...60	-10...50
A2322		-30...50	-20...40
A2220		-40...40	-30...30
A2222		-40...60	-30...50
A2520		0...60	10...50
A2522		0...80	10...70
A2524		0...100	10...90
A2540		0...120	20...100
A2544		0...160	20...140
A2548		0...200	20...180
A2560		0...250	30...220
A2565		0...300	30...270
A2627		0...400	50...350
A2630		0...500	50...450
A2640		0...600	100...500
A2650		0...700	100...600
D1207	process connection	shanks, rotating	G1/2 B
D1209			G3/4 B
D2007		union nut	G1/2
D2009			G3/4
D1001		without screwing	

F6	temperature detecting element Ø d5	6 mm (l2 ≥ 180 mm) [1]			
F8		8 mm (l2 ≥ 80 mm) [1]			
F10		10 mm (l2 ≥ 50 mm) [1]			
	insertion lenght l1 (mm) [2]	**D1207** shanks rotating G1/2 B	**D2007** union nut G1/2	**D2009** union nut G3/4	**D1001** without screwing
...		080	089	093	100
...		140	126	130	160
...		230	186	190	250
...		380	276	280	400
...		-	426	430	-
999		deviating length; please specify			

G1	mounting	prepared for wall bracket
G2		for surface mounting
G3		for flush mounting
G4		with wall bracket, aluminium
G5		with wall bracket, stainless steel
K311	capillary material stainless steel	1 m
K312		1.6 m
K313		2.5 m
K314		4 m
K315		6 m
K316		8 m
K317		10 m
K322		12 m
K323		15 m
K39		length acc. to specification per m
K411	capillary material stainless steel with protective tube	1 m
K412		1.6 m
K413		2.5 m
K414		4 m
K415		6 m
K416		8 m
K417		10 m
K422		12 m
K423		15 m
K49		length acc. to specification per m

Additional features (to be indecated if required)		
S30	Ex-protection (ATEX) mechanical devices[3]	Ⓔx II 2G c TX
		Ⓔx II 2D c TX
R13	window	macrolon with adjustable reference pointer [4]
T2	marking	on scale (please specify)
T3		fixed reference pointer (please specify)
V10	sliding screwing on capillary[5]	G1/2 B
V11		G3/4 B
V20		1/2 NPT
W1204	calibration certificate	per EN 10204-3.1, 3 measuring points
W1201		per EN 10204-3.1, 5 measuring points
W2673	certificate of measuring equipment for Russian Federation	

Order code (example): FN2430 - A2524 - D1207 - F6 - ...

[1] the active length l2 shall reach the media temperature completely. The insertion length l1 should have adequate size.
[2] standard insertion length to be specified in order code, e.g. Ø d5= 6 mm, l1 = 100 mm: order code F6100
[3] within the temperature limits according to Ex instruction XA_005
[4] not for devices with Ex-protection [4]
[5] operating temperature max. 250 °C, but not with coated capillary