

## 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.

The bimetal thermometer with centre back connection is designed for the installation in a separate thermowell. Suitable thermowells see type series HP1100 and HP1200 (data sheets T5-051 and T5-050).

## 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: <table border="1"><tr><td>without filling:</td><td>approx. 1.0 kg</td></tr><tr><td>with filling:</td><td>approx. 1.3 kg</td></tr></table> NS 160: <table border="1"><tr><td>without filling:</td><td>approx. 1.5 kg</td></tr><tr><td>with filling:</td><td>approx. 2.1 kg</td></tr></table>	without filling:	approx. 1.0 kg	with filling:	approx. 1.3 kg	without filling:	approx. 1.5 kg	with filling:	approx. 2.1 kg
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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).
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### Measuring element

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

Temperature-detecting element:	Diameter 6, 8 and $\geq 10$ mm. Standard lengths and active lengths see order details, further sizes upon request Material: stainless steel mat.-no. 1.4404 (316L)
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### Capillary

Capillary:	Available in different lengths, alternatively with sliding screwing. Coated with protective tube upon request. Material: stainless steel mat.-no. 1.4571 (316Ti)
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### Nominal range

Nominal range (EN 13190):	-40...700 °C Measuring spans $\geq 60$ °C, see order details Further nominal ranges from -200 °C up to 700 °C (no normal range) upon request.
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### Accuracy

Accuracy class:	1.0 per EN 13190
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### 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  
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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

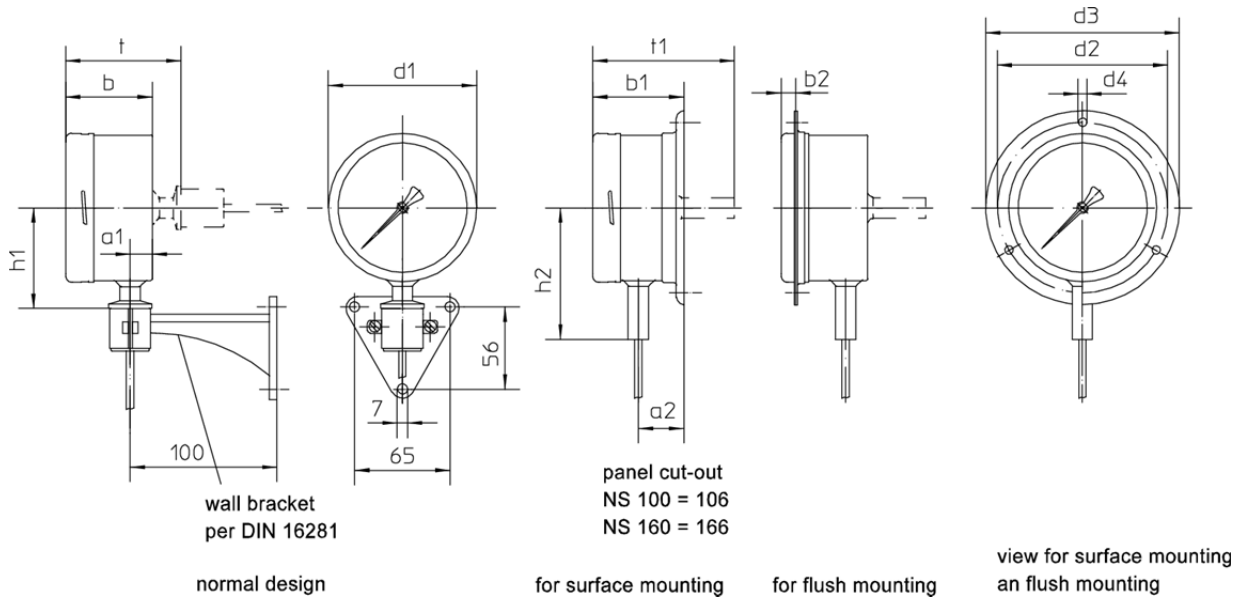
A technical examination might be necessary as well as the use of a separate thermowell (Product group D5).

**Information on other models see order details or upon request.**

Further information to mounting and operation see Operating Instruction BA\_017.

## Dimensions

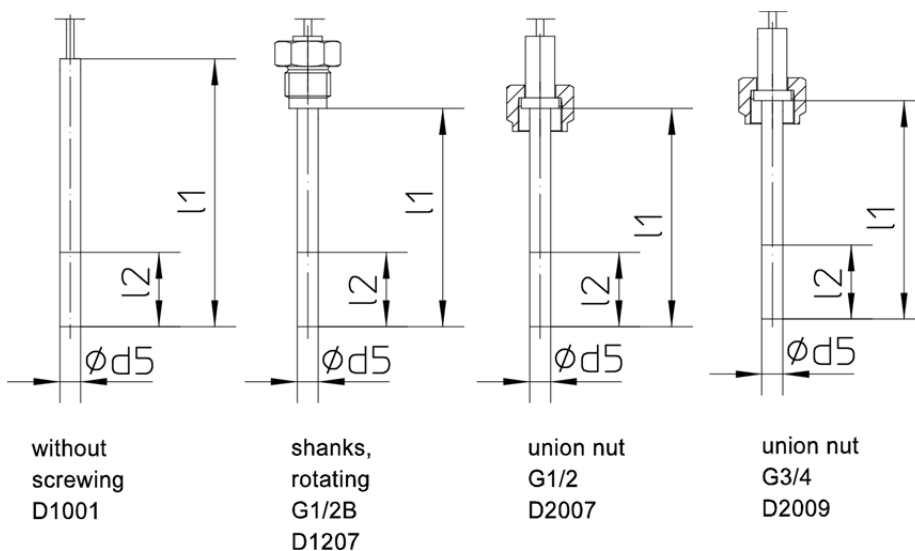
### Case



Temperature detecting element diameter  $d_5$ , insertion length  $l_1$  and active length  $l_2$  see order details.

Dimensions (mm)												
case	$d_1$	$a_1$	$b$	$h_1$	$a_2$	$b_1$	$h_2$	$l_1$	$b_2$	$d_2$	$d_3$	$d_4$
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





## 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) <sup>1</sup>			
F8		8 mm (l2 ≥ 80 mm) <sup>1</sup>			
F10		10 mm (l2 ≥ 50 mm) <sup>1</sup>			
	insertion length l1 (mm) <sup>2</sup>	<b>D1207</b> shanks rotating G1/2 B	<b>D2007</b> union nut G1/2	<b>D2009</b> union nut G3/4	<b>D1001</b> 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
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 indicated if required)		
S30	Ex-protection (ATEX) mechanical devices <sup>3</sup>	 II 2G Ex h IIC T1...T6 Gb X  II 2D Ex h IIIC Txx°C Db X
R13	window	macrolon with adjustable reference pointer <sup>4</sup>
T2	marking	on scale (please specify)
T3		fixed reference pointer (please specify)
V10	sliding screwing on capillary <sup>5</sup>	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 - ...

<sup>1</sup> the active length l2 shall reach the media temperature completely. The insertion length l1 should have adequate size.

<sup>2</sup> standard insertion length to be specified in order code, e.g. Ø d5= 6 mm, l1 = 100 mm: order code F6100

<sup>3</sup> within the temperature limits according to Ex instruction XA\_005

<sup>4</sup> not for devices with Ex-protection<sup>4</sup>

<sup>5</sup> operating temperature max. 250 °C, but not with coated capillary