



#### Application area

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

#### Features

- Gas expansion thermometer for surface temperature measurement on pipes
- Simple mounting without thermowell
- Nominal ranges -40 °C...250 °C
- High quality case with bajonet ring NS 100/160, degree of protection IP 66
- Case and wetted parts of stainless steel
- Accuracy class 1 per EN 13190 when insulated in the plant
- Micro adjusting pointer for indication correction
- Design:
  - bulb fixed welded
  - indicating unit positioning by rotating the bulb
  - with capillary (indicating unit independent of 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

#### Application

These thermometers are suitable for use outdoors and in aggressive environments. Gas expansion thermometers with clip-on bulb offer some benefits to the user:

- no change in pipeline cross-section; the line thus remains piggable and retrofitting
- can be carried out without interfering with the process
- simple mounting

If the exact orientation of the indication is not known before mounting, we recommend using the positionable version. With this version the case may be re-positioned once by  $\pm 180^\circ$  with respect to the pipeline.

#### 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:	<b>For design with capillary only:</b> Stand-alone mounting with wall bracket per DIN 16281, alternatively with flange for surface mounting or for flush mounting with DIN mounting flange.
Weights:	NS 100:

Without filling:	approx. 0.8 kg
With filling:	approx. 1.2 kg
NS 160:	
Without filling:	approx. 1.4 kg
With filling:	approx. 2.0 kg

#### Process connection

Design:	Clip-on temperature detecting element, bottom or centre back connection, alternatively with capillary. Optional with screwing for one-off positioning of indicating unit (rotatable temperature detecting element).
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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:	Adapted to pipe or circle form, suitable for clamp mounting for diameters of approx. 25 to 150 mm. Further diameters upon request.
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#### Capillary

Capillary (optional):	Available in different lengths, alternatively coated with protective tube Material: stainless steel mat.-no. 1.4571 (316Ti)
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#### Nominal range

Nominal range (EN 13190):	-40 °C...250 °C. Measuring spans $\geq 60$ °C. See order details, further upon request. Alternatively extension of measuring range to the complete nominal range.
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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 ⊕ II 2G c TX ⊕ II 2D c TX
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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

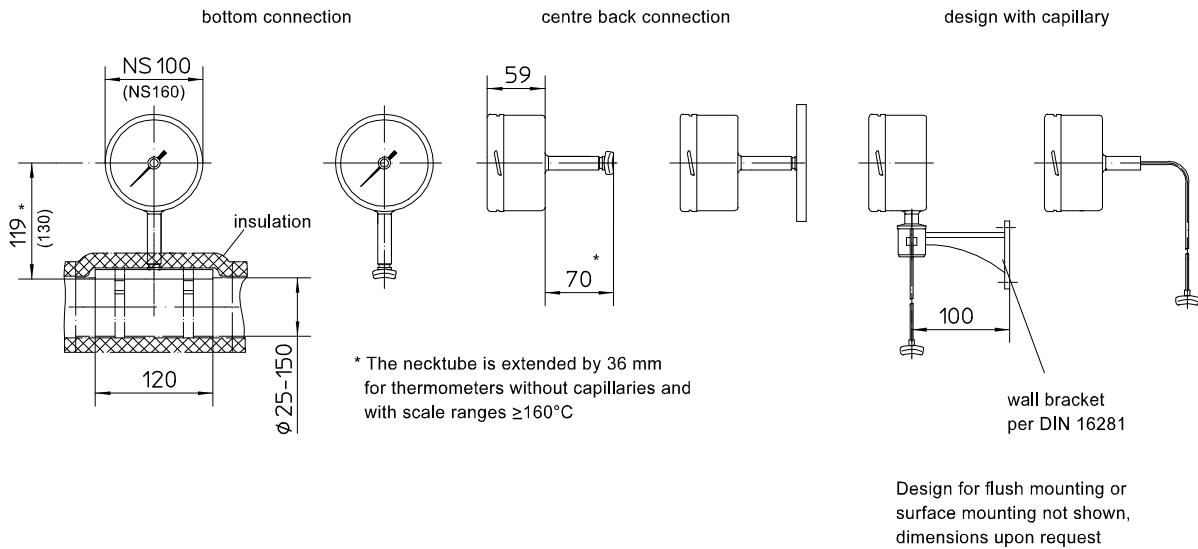
A technical examination might be necessary.

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

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

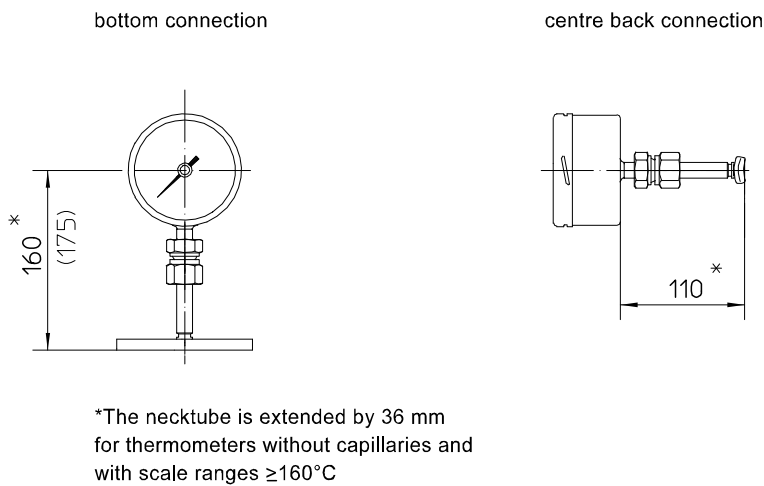
# Dimensions

## Version with fast welded connection

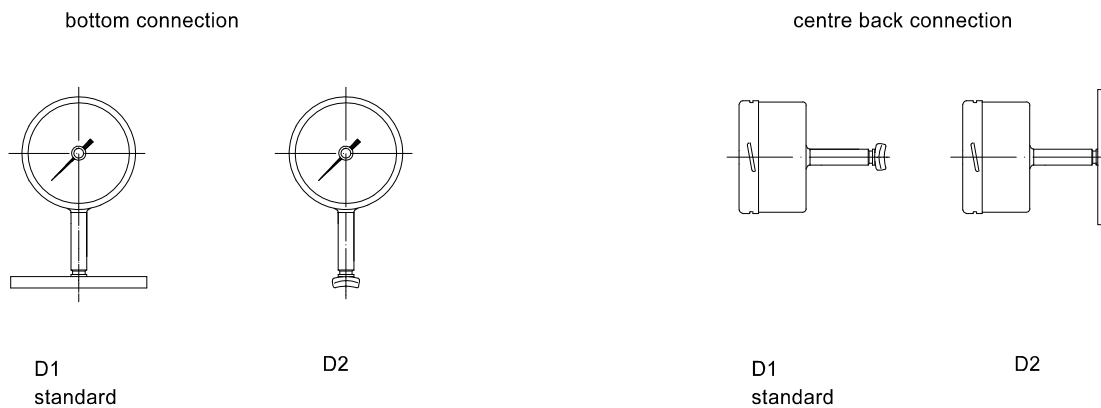


## Version with positionable connection

clip-on temperature detecting element rotatable by  $\pm 180^\circ$  with respect to indicator.



## Orientation to temperature detecting element



## Mounting and operating instructions

The clip-on temperature detecting element should be insulated when mounted on piping. For further information see operating instruction BA\_017.

**Positionable version:** When the clip-on temperature detecting element has been mounted on the pipeline, the case may be rotated (re-positioned) once by  $\pm 180^\circ$  with respect to the pipeline, by loosening the screwing.

## Order details

### Gas expansion thermometer with clip-on bulb Type series FN....

Order details FN....				
FN2460	case design degree of protection IP 66	bottom connection, fast welded	NS 100	without liquid filling
FN3460			NS 160	
FN2660			NS 100	with liquid filling
FN3660			NS 160	
FN2360		centre back connection, fast welded	NS 100	without liquid filling
FN3360			NS 160	
FN2560			NS 100	with liquid filling
FN3560			NS 160	
FN2420		bottom connection, rotatable bulb (positionable indicator)	NS 100	without liquid filling
FN3420			NS 160	
FN2620			NS 100	with liquid filling
FN3620			NS 160	
FN2320		centre back connection, rotatable bulb (positionable indicator)	NS 100	without liquid filling
FN3320			NS 160	
FN2520			NS 100	with liquid filling
FN3520			NS 160	
FN2440		capillary bottom connection	NS 100	without liquid filling
FN3440			NS 160	
FN2640			NS 100	with liquid filling
FN3640			NS 160	
FN2340	capillary centre back connection <sup>1</sup>	NS 100	without liquid filling	
FN3340		NS 160		
FN2540		NS 100	with liquid filling	
FN3540		NS 160		
		<b>nominal range</b>	<b>measuring range</b>	
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	
D1		alignment of temperature detecting element <sup>2</sup>	parallel to indicator (standard)	
D2	90° rotated to indicator			

G1	mounting <sup>3</sup>	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 <sup>3</sup> 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 <sup>3</sup> 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>4</sup>	⊕ II 2G c TX
		⊕ II 2D c TX
R13	window	macrolon with adjustable reference pointer <sup>5</sup>
T2	marking	on scale (please specify)
T3		fixe reference pointer (please specify)
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 <sup>5</sup>	

Order code (example): FN2460 - A2524 - D1 - G1 - K311 - ..

<sup>1</sup> for flush mounting, only

<sup>2</sup> not to be stated for design with capillary

<sup>3</sup> to be stated for design with capillary, only

<sup>4</sup> within the temperature limits according to Ex instruction XA\_005

<sup>5</sup> not for devices with Ex-protection