

Gas thermometers

Chemical version with capillary or with contact sensor

Accuracy class 1



Description

The measuring system in the gas thermometers consists of the stem, capillary and Bourdon tube in a case. These parts are connected to form a unit. The complete measuring system is filled with an inert gas under pressure. A temperature change causes the internal pressure in the stem to change. The deflection of the Bourdon tube thus caused is transmitted to the pointer by a movement. A bi-metallic element is fitted between the movement and Bourdon tube to compensate for fluctuations of ambient temperature at the case.

The gas thermometers with capillaries facilitate separation of the display unit from the measuring point.

In conjunction with a matching thermowell, these thermometers can also be used with aggressive media.

The thermometers with contact sensors do not require the process lines to be punctured, and thus prevent the risk of leakage.

An extensive range of standard versions facilitates a variety of applications. In addition, special customised versions are available.

Features

- Short response time
- Separation of measuring point and display by the capillary
- Contact sensors for temperature measurement without intervention in the process
- For aggressive media
- Large selection of standard versions
- Special, customised versions available

Ranges

-80 ... 60 °C to 0 ... 700 °C

Applications

Chemical and petrochemical industry,
Process engineering
Food industry

**Model: T363, T364, T408, T409, T413, T414
T418, T419, T423, T424, T428, T429**

Technical data

Models	T408	T409	T418	T419	T428	T429	T363	T364	T413	T414	T423	T424	Options												
Symbol																									
Nominal size	100	160	100	160	100	160	100	160	100	160	100	160													
Accuracy class	1 (DIN 16 203)						1 (at thermal equilibrium)																		
Display ranges and scale spacing	-80 ... 60 °C -60 ... 40 °C -40 ... 60 °C -30 ... 50 °C -20 ... 60 °C -20 ... 80 °C 0 ... 60 °C 0 ... 80 °C 0 ... 100 °C 0 ... 120 °C 0 ... 160 °C 0 ... 200 °C 0 ... 250 °C 0 ... 300 °C 0 ... 400 °C 0 ... 500 °C 0 ... 600 °C 0 ... 700 °C						2 °C 1 °C 2 °C 5 °C 10 °C						-30 ... 50 °C -20 ... 60 °C -20 ... 80 °C 0 ... 60 °C 0 ... 80 °C 0 ... 100 °C 0 ... 120 °C 0 ... 160 °C 0 ... 200 °C 0 ... 250 °C 0 ... 300 °C						1 °C 1 °C 2 °C 5 °C						other display ranges Dual scale °C/°F Graduation °F/K electrical alarm contact ¹⁾
Scale angle	approx. 270 °																								
Application	Constant load: Measuring range (DIN 16 203) short-time (≤ 1h): 1.2 x Measuring range (DIN 16 203) > 500 °C 1.1 x measuring range																								
Permissible operating pressure	max. 25 bar (at stem) ²⁾						--																		
Measuring principle	Gas pressure, inert gas filling, physiologically harmless																								
Display correction	Adjustable pointer																								
Case / Bezel	1.4301																								
Filling liquid	none												Silicone oil												
Connection ³⁾	rear		bottom				rear		bottom				Stem position 3, 9 or 12 o'clock												
Window	Glass lens												Safety glass Acrylic glass												
Dial	Aluminium white, scale and imprint black																								
Pointer	Aluminium black, with micro-adjustable																								
Protection	IP 56 (EN 60 529/IEC 529)																								
Weight (kg)	1.4	1.8	1.4	1.8	1.4	1.8	0.8	0.9	0.8	1.9	0.8	1.0													

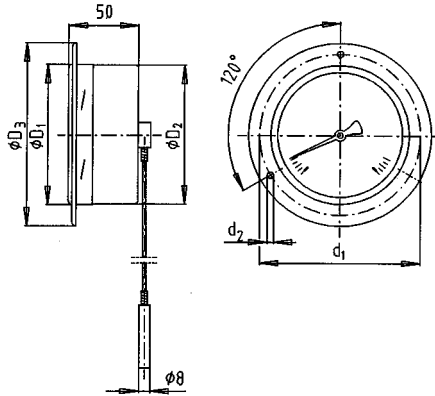
¹⁾ See data sheet DE 10 45 for units with electrical alarm contacts.

²⁾ Dependent on medium, medium pressure, temperature, flow velocity, installation length and material

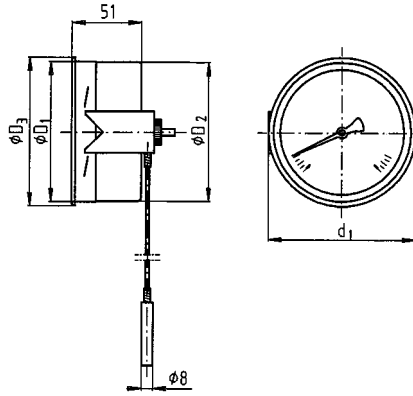
³⁾ See table on page 4 for connections to DIN; see data sheet DE 10 60 for thermowells

Dimensions (mm)

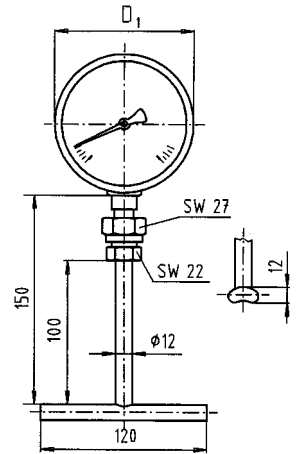
Model T408, T409
Front flange



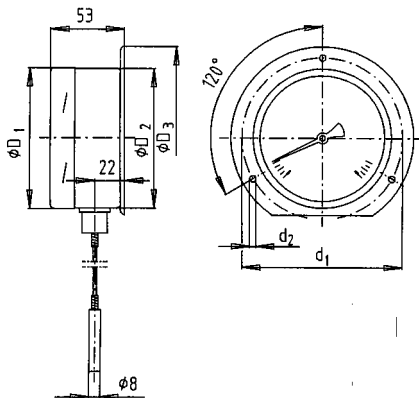
Model T408, T409
Triangular bezel



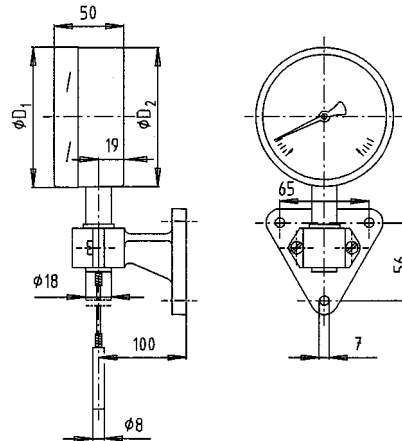
Model T363, T364



Model T418, T419



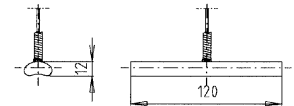
Model T428, T429



Model T413, T414, T423, T424

Versions with contact sensor

- T413: Flange at rear, as T418
- T414: Flange at rear, as T419
- T423: for instrument holder, as T428
- T424: for instrument holder, as T429



Model	Version	Dimensions (mm)					
		D (ND)	D ₁	D ₂	D ₃	d ₁	d ₂
T363	Contact sensor	100	101	--	--	--	--
T364	fixed	160	161	--	--	--	--
T408	Front flange	100	101	99	132	116	4.8
	Triangular bezel	100	101	99	107	107	--
T409	Front flange	160	161	159	196	178	5.8
	Triangular bezel	160	161	159	166	172	--
T413	Rear flange	100	101	99	132	116	4.8
T414		160	161	159	196	116	5.5
T418	Contact sensor	100	101	99	132	116	4.8
T419	Rear flange	160	161	159	196	116	5.5
T423	Contact sensor	100	101	99	--	--	--
T424	Instrument holder	160	161	159	--	--	--
T428	Instrument holder	100	101	99	--	--	--
T429		160	161	159	--	--	--

For further dimensions, see table on page 4: "Connections to DIN"

Technische Änderungen vorbehalten

Possible connection types

	Connection types										
	Smooth, without thread basis for clamp coupling	rotating; matching; thermowells: DIN Form BD, BE, BS	Union nut, matching thermowells: DIN Form CD, CE, CS	Clamp nuts; m ovable along stem	Union nut loose screw coupling G 1/2 / G 1/2 G 1/2 / G 3/4 M 24 x 1.5 / M 18 x 1.5						
Material	1.4571	1.4571	1.4571	1.4571	1.4571						
Stem length l_1	140 mm 200 mm 240 mm 290 mm	80 mm 140 mm 180 mm 230 mm	89 mm 126 mm 186 mm 226 mm 276 mm	variable minimum insertion depth l_{min} approx. 60 mm Length $L = l_1 + \text{approx. } 35 \text{ mm}$	63 mm 100 mm 160 mm 200 mm 250 mm						
Stem diameter	$d = 8 \text{ mm}$	$d = 8 \text{ mm}$	$d = 8 \text{ mm}$	$d_{min} = 8 \text{ mm}$	$d = 8 \text{ mm}$						
Dimensions											
	G	SW	i	SW	i	SW	d_4	i	SW	d_4	i
	G 3/4	--	--	32	10.5	32	32	16	32	32	16
	G 1/2	27	20	27	8.5	27	26	14	27	26	14
	M 24 x 1.5	--	--	32	13.5	--	--	--	--	--	--
	M 18 x 1.5	--	--	--	--	24	23	12	32	23	12
	3/4 NPT	--	--	--	--	30	--	20	--	--	--
1/2 NPT	--	--	--	--	22	--	19	--	--	--	

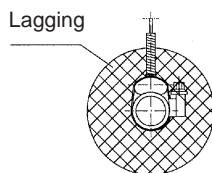
See data sheet DE 13 60 for thermowells

Notes on installation of contact sensors

Contact sensors are intended for external installation on pipes and vessels. They are to be fitted in such a way that the sensor is in contact with the measuring point throughout its entire length. Accurate measurements depend on good thermal coupling between the contact sensor and the outer wall of the pipe or vessel, as little heat dissipation as possible from the measuring point and from the contact sensor to the environment. If the installation point is insulated, the insulation must be sufficiently temperature resistant. If the temperatures to be expected are below 200 °C, a heat transfer compound can be used to optimise the transfer of heat.

Installation on pipes

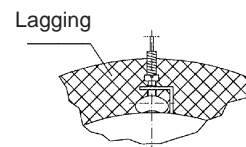
The contact sensor can be used with pipes with external diameters of 20 to 160 mm. Pipes clamps can be used to fasten the sensor.



Pipe clamp installation

Installation on vessels

The contact sensor can be fitted direct to vessels with an external radius of up to 80 mm. For larger vessels, the use of a spacer in a material with good thermal conductivity is recommended.



Bracket mounting

- Order details:**
- | | |
|--------------------|--------------------|
| 1. Model | 4. Connection size |
| 2. Display range | 5. Length l, l_1 |
| 3. Connection type | 6. Options |

Technische Änderungen / Modifications reserved