



Design Features

- High-degree of operational reliability with two different types of measuring system working independently of one another
- Mechanical spring measuring element and Pt 100 transmitter
- Transmitter output 4..20 mA; further standardized signals available as options
- Case and wetted parts of stainless steel
- Encapsulated electronics with Pt 100 break alarm
- Case protection type IP 66/electronics explosion proof EEx ia/ib
- Micro adjusting pointer for correcting the mechanical indication
- Zero point and span adjustment of electrical output

Application

These thermometers are local indicating mechanical devices and are suited for use in aggressive environments. The integrated transmitter converts the process temperature measured values to a load-independent current or voltage signal. Because of its robust design the device is suitable for use in tough environments in the chemical and petrochemical industries, in shipping and in process engineering. Great operational reliability with negligible installation costs is achieved with the two independent measuring systems at one process connection.

Design and Function

The device has been fitted with a mechanical spring measurement element for local indication. Ambient temperatures, which influence the indicating unit, are compensated with a bimetal link. The encapsulated electronics of a Pt 100 transmitter has been fitted in the indicator case. The Pt 100 measuring resistor has been fitted in the bulb at the height of the pressure vessel. The transmitter signal is available at the connection box for remote transmission.

Technical Data

Case

bayonet ring case of stainless steel 1.4301, nominal size 100 and 160 mm

Case design

protection type IP 66 per EN 60529

Process connection

rigid bulb stainless steel 1.4404, radially outgoing at bottom, alternatively centrally at rear for nominal size 160 only
different connections available, see order details

Bulb

stainless steel 1.4404, diameter 11 and 12 mm
further diameters upon request

Measuring system (mechanical)

spring measuring element with inert gas fill
pointer element of stainless steel with bimetal compensation

Measuring system (electrical)

encapsulated electronics unit with Pt 100 measuring resistor, enclosed and calibrated

Dial

aluminium, white with black inscription

Pointer

aluminium, black with micro adjusting device

Front glass

safety glass, alternatively macrolon with adjustable reference pointer

Electrical connection

connection box with cable gland conduit thread 13.5 and detachable test cover

Standard scale ranges

per EN 13190 (DIN 16203), see on page 4
max. -50...+400 °C, measuring spans ≥ 60 °C
other ranges upon request

Accuracy (mechanical)

per EN 13190 (DIN 16203) class 1

Linearity error

- error with Pt 100 sensor for class A measurements ; $\pm (0.15 \text{ °C} + 0.002 \cdot t)$ (t = unsigned measured medium temperature)
- error caused by amplifier ≤ 0.1 % f.s.

Ambient temperature

per EN 13190 (DIN 16203). Ambient temperatures that deviate from DIN are to be specified

Storage and transport temperature

per EN 13190 (DIN 16203), max. -20...+60 °C

Weights (without screwing and bulb)

DN 100: approx. 0.6 kg
DN 160: approx. 1.1 kg

The following details apply to the integrated transmitter:

Adjustment

zero point and span of electrical output may be adjusted after removing the bayonet ring using the positions marked on the dial.

zero point: ± 10 % f.s.
meas span: ± 10 % f.s..

Auxiliary energy supply

nominal voltage: 24 V DC
(connection polarity safe)
function range:
current output, 2-wire: 6...30 V DC
current output, 3-wire: 10...30 V DC
voltage output: 15...30 V DC

Influence of the supply voltage

≤ 0.1 % f.s. / 10 V

Signal output, temperature linear

2-wire circuitry: 4...20 mA
3-wire circuitry: 0...20 mA
0(2)...10 V

To be continued on page 2

Technical data (continued)

Break alarm

if the Pt 100 sensor is fractured, the output signal optionally takes values
 $\leq 0\%$ resp. $> 100\%$

Current limitation in output signal

max. output current $\leq 35\text{ mA}$

Load

for $U = 24\text{ V DC}$

current output: $R_a \leq 900\text{ Ohm}$

voltage output: $R_a \geq 900\text{ Ohm}$

Load influence

for 100 Ohm load change: $\leq 0.02\%$ f.s.

Ex-approval

certificate of conformity
 internal transmitter, type PA 2231
 EEx ia IIC T4/T5 and EEx ib IIC T4/T5
 PTB no. Ex-94.C.2008 X

Supply and signal circuit:

intrinsic safety ex type, for connection only to a certified intrinsically safe circuit with the following maximum values:

· for EEx ia IIC $U = 20\text{ V}$
 $I = 100\text{ mA}$
 $P = 0.6\text{ W}$

· for EEx ib IIC $U = 30\text{ V}$
 $I = 150\text{ mA}$
 $P = 1\text{ W}$

The effective inner self-inductance is negligible.
 The effective inner capacitance is 48.4 nF.

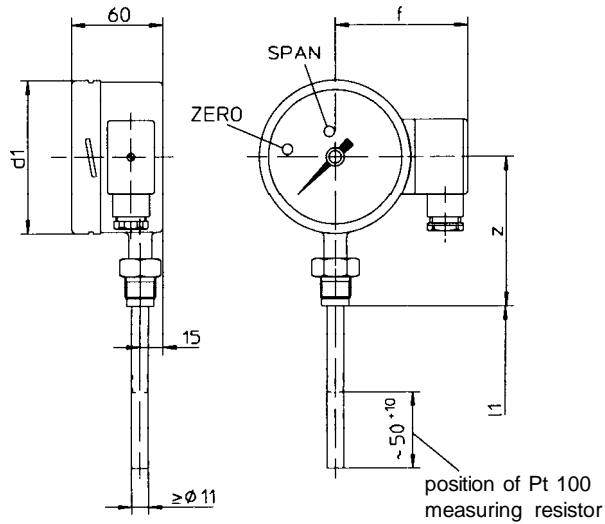
Special design

- with construction type approval for connection to zone 0 with protective tubes per DIN E 43772 (draft) upon request
- design without screwing (E40) also available with sliding screwing

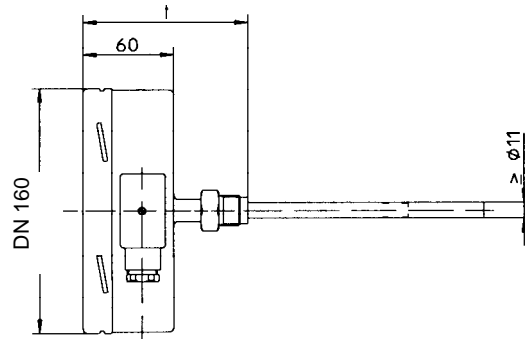
Information on other models upon request or see order details

Dimensions

process connection at bottom



process connection at rear

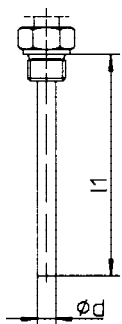


Dimensions (mm) DIN

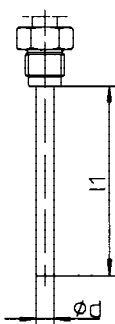
case	d1	f	z *		t *	
			E11, E12	E21, E31, E32, E40	E11, E12	E21, E31, E32, E40
DN 100	100	90	88	103	93	108
DN 160	160	120	118	133	93	108

* dimension increases by 40 mm for scale ranges $> 160\text{ }^\circ\text{C}$

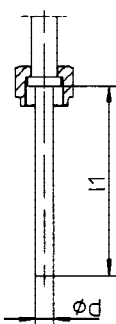
E 11/E 12
screw male
fixed



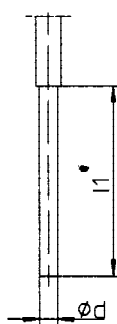
E 21
screw male
rotating



E 31/E 32
with union
nut

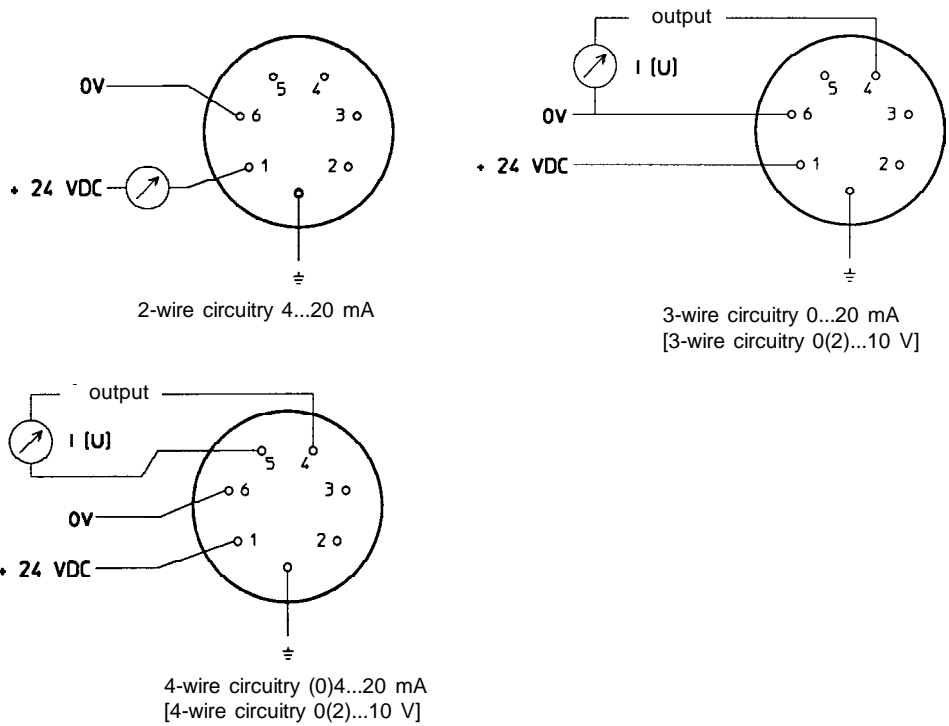


E 40
without screwing

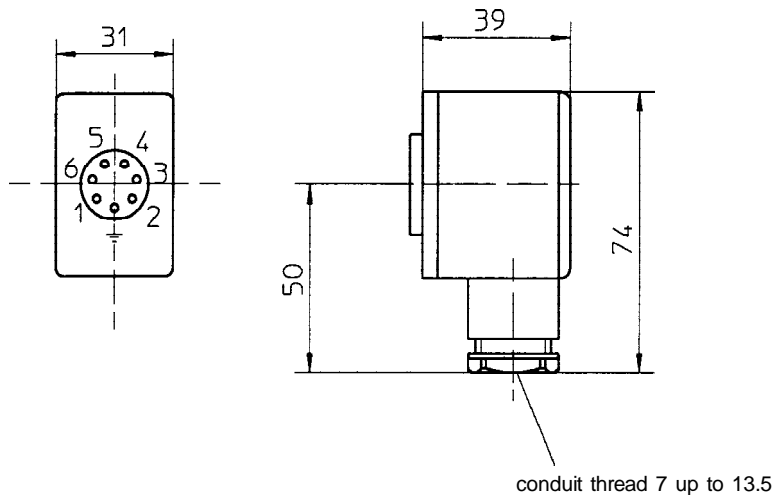


bulb diameter d and immersion length l1
 see order details

Connection diagram/plug connection



Connection plug/terminal connection



Mounting and operating instructions

The devices are adjusted at the factory. The mechanical indication may be corrected again with the micro adjusting pointer by removing the bayonet ring. If necessary, adaptations to the zero point and span adjustment for the electrical output may also be made by means of the positions marked on the dial.

Electrical equipment in hazardous areas should only be installed and commissioned by competent personnel. Modifications to devices and connections destroy the ex-proofing and the guarantee. The complete cable run, both inside and outside the hazardous areas in intrinsically safe circuits, should be equipotentially bonded. The limit values detailed in the certificate of conformity are to be observed.

The CE designations for devices certifies compliance with European Council guidelines (89/336/EWG), EMC legislation (13.11.1992), current generic standards, and product and basic standards. Clear operation in systems and plants is achieved when the conditions for screening, earthing, wiring and potential isolation are fulfilled.

Order Details

- please give additional specifications for models not listed -

Spring thermometer with Pt 100 transmitter

case	· DN 100		GF2 ...								
	· DN 160		GF3 ...								
case design	· IP 66 process connection at bottom		40 .								
	· IP 66 process connection at rear (DN 160 only)		30 .								
design	· standard		0								
	· ex-protection		1								
accuracy	· standard class 1 (full scale)			A2 ...							
standard measuring and scale ranges °C per DIN 16203 class 1	<u>scale range °C</u>	<u>measuring range °C</u>									
	-10...+50	-10...+30		360							
	-20...+40	-10...+30		340							
	-20...+60	-10...+50		346							
	-20...+140	-10...+50		353							
	-30...+50	-20...+40		322							
	-30...+100	-20...+40		327							
	-40...+40	-30...+30		220							
	-40...+60	-30...+50		222							
	-50...+200	-30...+150		165							
	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...350	50...300		625								
0...400	50...350		627								
bulb and connecting thread	· screw male fixed G 1/2 A			E11 ..							
	· screw male fixed G 3/4 A			E12 ..							
	· screw male rotating G 1/2 A			E21 ..							
	· union nut G 1/2			E31 ..							
	· union nut G 3/4			E32 ..							
	· without screwing			E40 ..							
bulb diameter	· 11 mm			6 .							
	· 12 mm			4 .							
immersion length l1 (in mm)	<u>E11</u>	<u>E12</u>	<u>E21</u>	<u>E31</u>	<u>E32</u>	<u>E40</u>					
	screw male fixed G 1/2 A	screw male fixed G 3/4 A	screw male rotating G 1/2 A	union nut G 1/2	union nut G 3/4	without screwing					
	100	100	80	89	93	100		1			
	160	160	140	126	130	160		2			
	250	250	230	186	190	250		3			
	400	400	380	276	280	400		4			
--	--	--	426	430	--		5				
deviating length: pls specify								9			
electrical output	· 4...20 mA, 2-wire							F1			
	· 0...20 mA, 3-wire							F2			
	· 0...10 V, 3-wire							F4			
break alarm	· signal > 100 % ¹							K1			
	· signal < 0 %							K2			
ex type (to be indicated in case of ex-protection)	· EEx ib II C T4							S61			
	· EEx ia II C T4							S62			
	· EEx ib II C T5							S63			
	· EEx ia II C T5							S64			
additional features (to be indicated in case of need, only)											
front glass	· macrolon with adjustable reference pointer								R513		
marking	· on dial (pls specify)								T2		
	· fast reference pointer (pls specify)								T3		
Order code (example):				GF2400	A2540	E1164	F1	K1			

¹ with GF...0-types, only