

Bimetal thermometer with switch contacts

Stainless steel version

Model TGS55

WIKA data sheet TV 25.01



for further approvals
see page 7

Applications

- Control and regulation of industrial processes
- Monitoring of plants and switching of circuits
- Chemical industry, petrochemical industry, process technology and food industry
- For aggressive media

Special features

- High reliability and long service life
- Universal application
- Case and stem from stainless steel
- Instruments with inductive contacts for use in hazardous areas
- Instruments with contacts for PLC applications



**Bimetal thermometer with switch contacts,
model TGS55**

Description

Wherever the process temperature has to be indicated on-site and, at the same time, circuits need to be switched, the bimetal thermometer with switch contacts finds its use.

Switch contacts (electrical alarm contacts) make or break circuits dependent upon the pointer position of the indicating measuring instrument. The switch contacts are adjustable over the full measuring range. The instrument pointer (actual value pointer) moves freely across the entire scale range, independent of the setting.

The set pointer can be adjusted via the window using a removable adjustment key (mounted on the terminal box).

Switch contacts consisting of several contacts can also be set to a single set point. Contact actuation is made when the actual value pointer travels beyond and below the desired set point.

As switch contacts, inductive contacts and electronic contacts are available. Inductive contacts can be used in hazardous areas. For triggering programmable logic controllers (PLC), electronic contacts can be used.

Specifications

Bimetal thermometer, model TGS55		
Measuring element	Bimetal coil	
Nominal size in mm	100	
Connection location	<ul style="list-style-type: none"> ■ Back mount (axial) ■ Lower mount (radial) ■ Back mount, adjustable stem and dial 	
Connection designs	<ul style="list-style-type: none"> ■ S, Standard (threaded connection) ¹⁾ ■ 1, Plain stem (without thread) ■ 2, Male nut ■ 3, Union nut ■ 4, Compression fitting (sliding on stem) ■ 5, Union nut and loose threaded connection 	
Unit (scale range)	°C Option: <ul style="list-style-type: none"> ■ °F ■ °C/°F (dual scale) 	
Process connection	<ul style="list-style-type: none"> ■ Plain, without thread ■ G ½ B ■ ½ NPT ■ G ½ female ■ ½ NPT female ■ M20 x 1.5 ■ M24 x 1.5 female others on request 	
Accuracy class per DIN 16196 ²⁾	With single contact	With double contact
Stem diameter 6 mm	Class 2	Class 2
Stem diameter 8 mm	Class 1	Class 2
Stem diameter ≥ 10 mm	Class 1	Class 1
Stem diameter	8 mm Option: <ul style="list-style-type: none"> ■ 6 mm ■ 10 mm ■ 12 mm 	
Working range		
Continuous load (1 year)	Measuring range (DIN 16196)	
Short time (max. 24 h)	Scale range (DIN 16196)	
Window	Instrument glass Option: <ul style="list-style-type: none"> ■ Laminated safety glass ■ Clear non-splintering plastic 	
Wetted materials		
Stem, process connection	Stainless steel 316SS	
Non-wetted materials		
Case, bayonet ring	Stainless steel 304SS (option: stainless steel 316SS)	
Dial	Aluminium, white, black lettering	
Pointer	Aluminium, black, adjustable pointer	
Ingress protection per IEC/EN 60529	IP65 Option: IP66	

1) Not for version "adjustable stem and dial"

2) Adjustable stem and dial version only available in class 2

Bimetal thermometer, model TGS55	
Permissible temperatures ³⁾	
Ambient (at the case)	-20 ... +60 °C [-4 ... 140 °F]
Storage and transport	
Without liquid dampening	-50 ... +70 °C [-58 ... +158 °F]
With liquid dampening	-40 ... +70 °C [-40 ... +158 °F]
Permissible operating pressure at the stem	max. 25 bar, static
Electrical connection	Cable socket PA 6, black According to VDE 0110 insulation group C/250 V Cable gland M20 x 1.5 Strain relief 6 screw terminals + PE for conductor cross-section 2.5 mm ² Dimensions see page 9 others on request

3) For hazardous areas, the permissible temperatures of the contact model 831 shall apply exclusively (for permissible temperature ranges see Seite 5). These must not be exceeded at the instrument either (for details see operating instructions). If necessary, measures for cooling (e.g. measuring point insulation) have to be taken.

Scale range, measuring range, error limit (DIN 16196)

Scale graduation per WIKA standard

Scale range in °C	Scale spacing in °C	Measuring range ³⁾ in °C	Error limit in °C	
			Class 1	Class 2
-70 ... +30	1	-60 ... +20	1.5	3.0
-50 ... +50	1	-40 ... +40	1.5	3.0
-30 ... +50	1	-20 ... +40	1.5	3.0
-20 ... +60	1	-10 ... +50	1.5	3.0
-20 ... +120	2	0 ... 100	3.0	6.0
-20 ... +140	2	0 ... 120	3.0	6.0
0 ... 60	1	10 ... 50	1.5	3.0
0 ... 80	1	10 ... 70	1.5	3.0
0 ... 100	1	10 ... 90	1.5	3.0
0 ... 120	2	10 ... 110	3.0	6.0
0 ... 160	2	20 ... 140	3.0	6.0
0 ... 200	2	20 ... 180	3.0	6.0
0 ... 250	5	30 ... 220	3.75	7.0
0 ... 300	5	30 ... 270	7.5	15.0
0 ... 400	5	50 ... 350	7.5	15.0
0 ... 500	5	50 ... 450	7.5	15.0
0 ... 600	10	100 ... 500	15.0	30.0

3) The measuring range is indicated on the dial by two triangular marks. Only within this range is the stated error limit valid per DIN 16196.

Please indicate switching points!

Unless otherwise specified, the instrument will be delivered with the adjustable switching points factory-set as follows:

- Single contact Start of measuring range
- Double contact Start and end of the measuring range

Switch contacts

Inductive contact model 831

- Suitable for use in hazardous areas with corresponding control unit (model 904.xx)
- Long service life due to non-contact sensor
- Low influence on the indication accuracy
- Fail-safe switching at high switching frequency
- Insensitive to corrosion
- Also available in safety version
- Up to 2 switch contacts per measuring instrument

Electronic contact model 830 E

- For direct triggering of a programmable logic controller (PLC)
- 2-wire system (option: 3-wire system)
- Long service life due to non-contact sensor
- Low influence on the indication accuracy
- Fail-safe switching at high switching frequency
- Insensitive to corrosion
- Up to 2 switch contacts per measuring instrument

Switching function

The switching function of the switch is indicated by index 1 or 2.

Model 8xx.1: Normally open (clockwise pointer motion)

Model 8xx.2: Normally closed (clockwise pointer motion)

For further information on switch contacts, see data sheet AC 08.01

Other versions

- Contacts fixed, without contact adjustment lock
- Contact adjustment lock leaded
- Contact adjustment key fixed
- Connector (instead of cable or cable socket)

Specifications for instruments with inductive contact model 831

The recommended setting range of the contacts is 10 ... 90 % of the scale (0 ... 100 % on request).

Available contact versions

- 831-N
- 831-SN, safety version ¹⁾
- 831-S1N, safety version ¹⁾, inverted signal

¹⁾ only operate with a corresponding isolating amplifier (model 904.3x)

Permissible temperature range

T6	T5 ... T1	T135 °C
-20 ... +60 °C	-20 ... +70 °C	-20 ... +70 °C

For further information on hazardous areas, see operating instructions.

Associated isolating amplifiers and control units

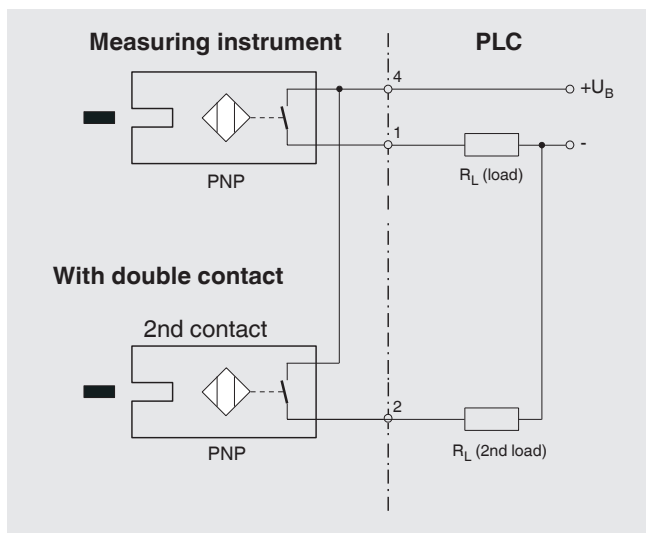
Model	Version	Ex version
904.28 KFA6 - SR2 - Ex1.W	1 contact	yes
904.29 KFA6 - SR2 - Ex2.W	2 contacts	yes
904.30 KHA6 - SH - Ex1	1 contact	yes - safety equipment
904.33 KFD2-SH-Ex1	1 contact	yes - safety equipment
904.25 MSR 010-I	1 contact	no
904.26 MSR 020-I	2 contacts	no
904.27 MSR 011-I	Two-point control	no

Specifications for instruments with electronic contact model 830 E

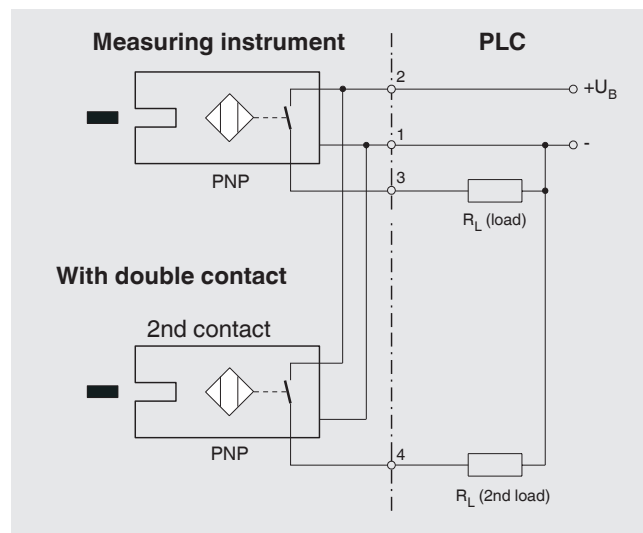
The recommended setting range of the contacts is 10 ... 90 % of the scale (0 ... 100 % on request).

Characteristics	
Contact version	Normally open, normally closed
Type of output	PNP transistor
Operating voltage	DC 10 ... 30 V
Residual ripple	max. 10 %
No-load current	≤ 10 mA
Switching current	≤ 100 mA
Residual current	≤ 100 μA
Voltage drop (with I _{max.})	≤ 0.7 V
Reverse polarity protection	Conditional U _B (the switched output 3 or 4 must never be set directly to minus)
Anti-inductive protection	1 kV, 0.1 ms, 1 kΩ
Oscillator frequency	approx. 1,000 kHz
EMC	per EN 60947-5-2









2-wire system (standard)



3-wire system



Approvals

Logo	Description	Country
	EU declaration of conformity <ul style="list-style-type: none"> ■ EMC directive ■ Low voltage directive ■ RoHS directive ■ ATEX directive (option) ¹⁾ Hazardous areas - Ex ia Zone 1 gas [II 2G Ex ia IIC T6/T5/T4 * Gb] Zone 21 dust [II 2D Ex ia IIIB T85°C/T95°C/T100°C/T135°C * Db]	European Union
	IECEx (option) ¹⁾ Hazardous areas - Ex ia Zone 1 gas [Ex ia IIC T6/T5/T4 * Gb] Zone 21 dust [Ex ia IIIB T85°C/T95°C/T100°C/T135°C * Db]	International
	EAC (option) <ul style="list-style-type: none"> ■ EMC directive ■ Low voltage directive ■ Hazardous areas ¹⁾ 	Eurasian Economic Community
	GOST (option) Metrology, measurement technology	Russia
	KazInMetr (option) Metrology, measurement technology	Kazakhstan
-	MTSCHS (option) Permission for commissioning	Kazakhstan
	BelGIM (option) Metrology, measurement technology	Belarus
	UkrSEPRO (option) Metrology, measurement technology	Ukraine
	Uzstandard (option) Metrology, measurement technology	Uzbekistan
-	CRN (option) Safety (e.g. electr. safety, overpressure, ...)	Canada

1) Only for instruments with inductive contact model 831

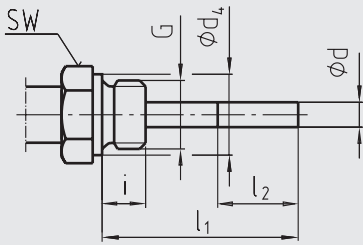
Certificates (option)

- 2.2 test report
- 3.1 inspection certificate with 3 test points
 (optionally with 5 test points)
- DKD/DAkkS calibration certificate

Approvals and certificates, see website

Connection designs

Standard design (male threaded connection) ¹⁾

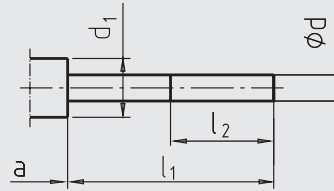


Standard insertion length $l_1 = 63, 100, 160, 200, 250$ mm

Nominal size	Process connection		Dimensions in mm		
	G	i	SW	d_4	$\varnothing d$
100	G 1/2 B	14	27	26	8
	G 3/4 B	16	32	32	8
	1/2 NPT	19	22	-	8
	3/4 NPT	20	30	-	8

1) Not for version "adjustable stem and dial"

Design 1, plain stem (without thread)

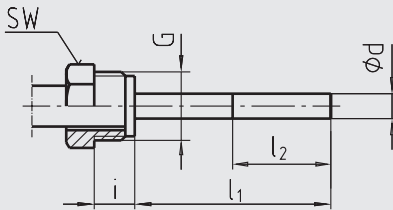


Standard insertion length $l_1 = 140, 200, 240, 290$ mm

Nominal size	Dimensions in mm			
	d_1	$\varnothing d$	a for axial	a for adjustable stem and dial
100	18	8	15	25

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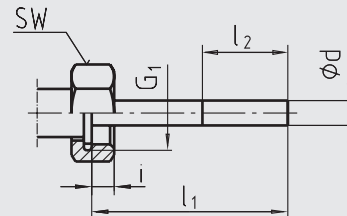
Design 2, male nut



Standard insertion length $l_1 = 80, 140, 180, 230$ mm

Nominal size	Process connection		Dimensions in mm	
	G	i	SW	$\varnothing d$
100	G 1/2 B	20	27	8

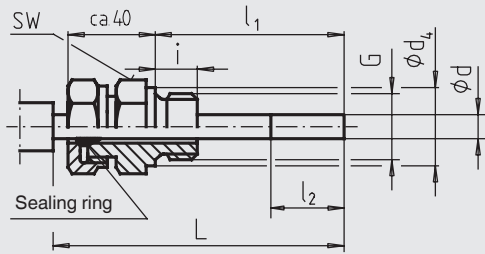
Design 3, union nut



Standard insertion length $l_1 = 89, 126, 186, 226, 276$ mm

Nominal size	Process connection		Dimensions in mm	
	G	i	SW	$\varnothing d$
100	G 1/2 B	8.5	27	8
	G 3/4 B	10.5	32	8
	M24 x 1.5	13.5	32	8

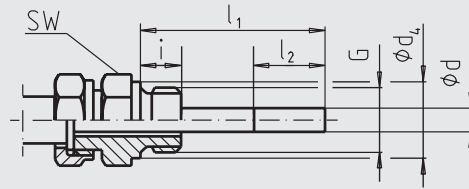
Design 4, compression fitting (sliding on stem)



Standard insertion length $l_1 = 63, 100, 160, 200, 250$ mm
 Length $L = l_1 + 40$ mm

Nominal size	Process connection		Dimensions in mm			
	NS	G	i	SW	d_4	$\varnothing d$
100		G 1/2 B	14	27	26	8
		G 3/4 B	16	32	32	8
		M18 x 1.5	12	24	23	8
		1/2 NPT	19	22	-	8
	3/4 NPT	20	30	-	8	

Design 5, union nut and loose threaded connection



Insertion length $l_1 =$ variable
 Length $L = l_1 + 40$ mm
 Stainless steel 1.4571

Nominal size	Process connection		Dimensions in mm			
	NS	G	i	SW	d_4	$\varnothing d$
100		G 1/2 B	14	27	26	8
		G 3/4 B	16	32	32	8
		M18 x 1.5	12	24	23	8

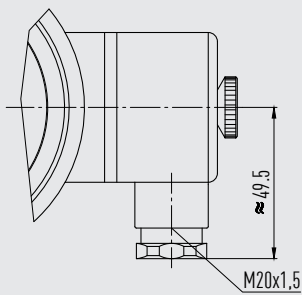
Legend:

- G Male thread
- G₁ Female thread
- i Thread length (incl. collar)
- a Distance to the case/articulated joint
- $\varnothing d_4$ Diameter of the sealing collar
- SW Spanner width
- $\varnothing d$ Stem diameter
- l_1 Insertion length
- l_2 Active length

Dimensions in mm

Cable socket

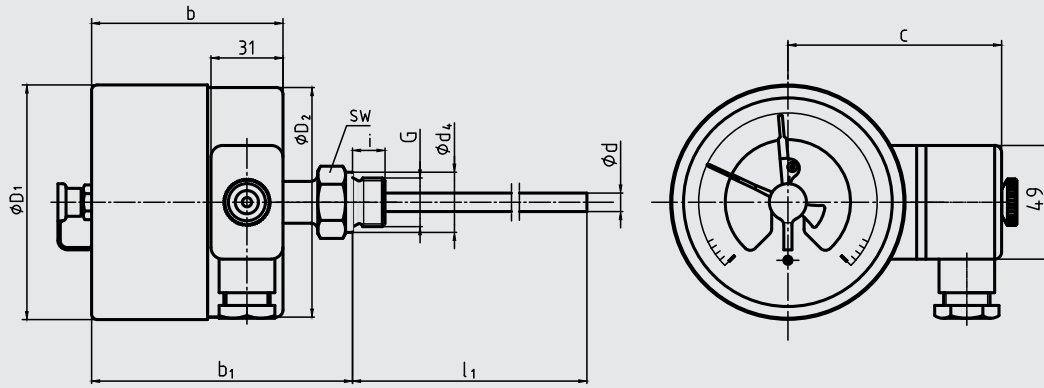
Contact models: 831 and 830 E



Only use cable with a diameter of 7 ... 13 mm

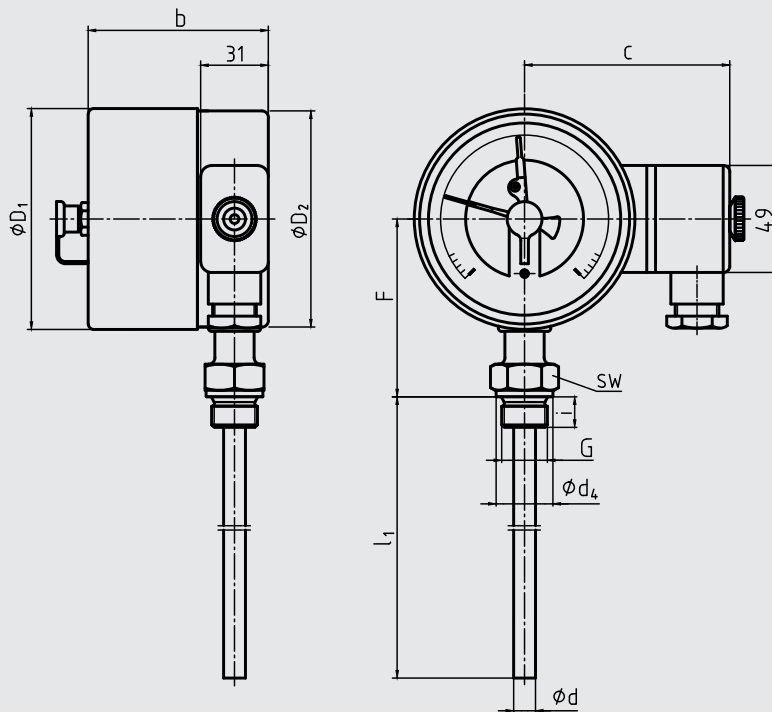
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Back mount



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Lower mount



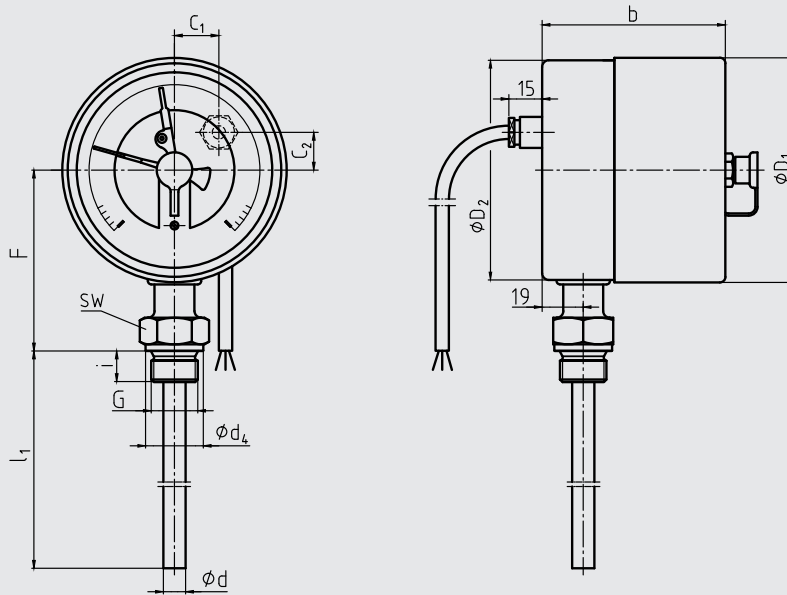
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NS	Dimensions in mm									Weight in kg		
	$\varnothing d^{2)}$	$\varnothing d_4$	$\varnothing D_1$	$\varnothing D_2$	F ¹⁾	G	C	d_4	SW	axial	radial	adjustable stem and dial
100	8	26	101	99	83	G ½ B	94	26	27	1.0	1.1	0.7

NS	Dimensions in mm			
	Switch contact model 831		Switch contacts models 831.11 or 831.22	
	1- or 2-way			
	b	b ₁ ¹⁾	b	b ₁ ¹⁾
100	88	121	88	121

1) With scale ranges $\geq 0 \dots 300$ °C the dimensions increase by 40 mm
 2) Option: Stem $\varnothing 6, 10, 12$ mm

Lower mount, with rear cable entry

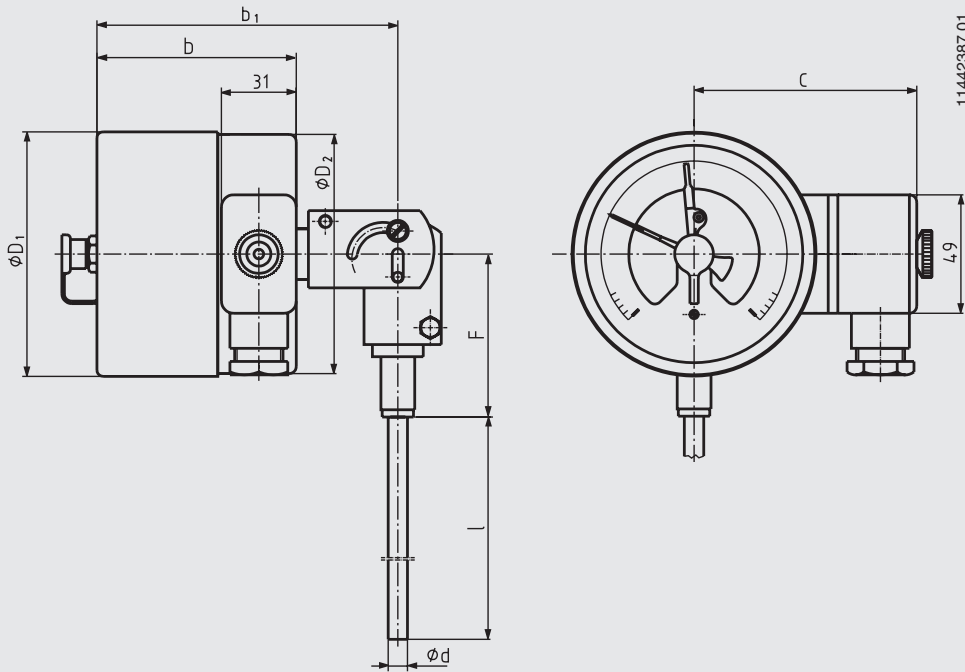


NS	Dimensions in mm											Weight in kg		
	ϕd ²⁾	ϕd_4	ϕD_1	ϕD_2	F ¹⁾	G	C ₁	C ₂	i	SW	axial	radial	adjustable stem and dial	
100	8	26	101	99	83	G ½ B	20	17	14	27	1.0	1.1	0.7	

NS	Dimensions in mm	
	Switch contact model 831	Switch contacts models 831.11 or 831.22
	1- or 2-way	
	b	b
100	88	88

1) With scale ranges $\geq 0 \dots 300 \text{ }^\circ\text{C}$ the dimensions increase by 40 mm
 2) Option: Stem $\phi 6, 10, 12 \text{ mm}$

Adjustable stem and dial version



Attention: For this version, a fixed design is not possible.

NS	Dimensions in mm					Weight in kg
	Ø d ²⁾	Ø D ₁	Ø D ₂	F	C	
100	8	101	99	68	94	0.7

NS	Dimensions in mm			
	Switch contact model 831		Switch contacts models 831.11 or 831.22	
	1- or 2-way			
	b	b ₁	b	b ₁
100	88	131	88	131

2) Option: Stem Ø 6, 10, 12 mm

Thermowell

In principle, the operation of a mechanical thermometer is possible without a thermowell with low process-side loading (low pressure, low viscosity and low flow velocities).

However, in order to enable exchanging the thermometer during operation (e.g. instrument replacement or calibration) and to ensure a better protection of the measuring instrument and also the plant and the environment, it is advisable to use a thermowell from the extensive WIKA thermowell portfolio.

For further information on the wake frequency calculation, see Technical information IN 00.15.

Ordering information

Model / Nominal size / Type of contact and switching function / Scale range / Connection size / Connection location / Options

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