Bimetal thermometer with switch contacts
Stainless steel version
Model TGS55

for further approvals
see page 8

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 instruments. 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 cable socket).

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.

Data sheets showing similar products and accessories:
Electrical switch contacts; model 8xx; see data sheet AC 08.01

Specifications

Basic information	
Standard	DIN 16196
Nominal size in mm [in]	100 [4"]
Window	■ Instrument glass ■ Laminated safety glass ■ Clear non-splintering plastic
Connection location	■ Back mount (axial) ■ Lower mount (radial) ■ Back mount, adjustable stem and dial
Connection design	→ For drawings, see page 9
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
"Adjustable stem and dial" case version	90° swivelling and 360° rotatable
Dampening, case filling	■ Without ■ With liquid dampening ■ With food-compatible liquid dampening
Material (in contact with the environment)	
Case, bayonet ring	■ Stainless steel 304SS ■ Stainless steel 316SS

1) Not for version "adjustable stem and dial"

Measuring element	
Type of measuring element	Bimetal coil
Nominal effective range	
Continuous load (1 year)	Measuring range (DIN 16196)
Short time (max. 24 h)	Scale range (DIN 16196)

Accuracy specifications		
Accuracy per DIN 16196 [1]	With single contact	With double contact
Stem diameter 6 mm [0.24 in]	Class 2	Class 2
Stem diameter 8 mm [0.31 in]	Class 1	Class 2
Stem diameter ≥ 10 mm [0.39 in]	Class 1	Class 1

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

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

1) 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 switch points!

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

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

Further details on: Scale range		
Unit	■ °C ■ °F ■ °C/°F (dual scale) ■ °F/°C (dual scale)	
Dial		
Scale graduation	■ Single scale ■ Dual scale	
Scale colour	Single scale	Black
	Dual scale	Red
		Other colours on request
Material	Aluminium	
Pointer		
Version	Adjustable pointer	
Pointer colour	Black	
Material	Aluminium	

Process connection	
Thread size	■ Plain, without thread ■ G ½ B ■ ½ NPT ■ G ½ female ■ ½ NPT female ■ M20 x 1.5 ■ M24 x 1.5 female
	Other threads on request
Material (in contact with the environment)	Stainless steel 316SS
Stem	
Diameter	■ 6 mm [0.24 in] ■ 8 mm [0.31 in] ■ 10 mm [0.39 in] ■ 12 mm [0.47 in]
Material (wetted)	Stainless steel 316SS
Thermowell/protection tube	In principle, the operation of a mechanical thermometer is possible without a thermowell/protection tube 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/protection tube from the extensive WIKA portfolio.
	→ For further information on the wake frequency calculation, see Technical information IN 00.15.

Output signal	
Type of contact	■ Inductive contact, model 831 (→ see page 5) ■ Electronic contact, model 830 E (→ see page 6)
Switching technology	
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
Electronic contact, model 830 E	■ For direct triggering of a programmable logic controller (PLC) ■ Long service life due to non-contact sensor ■ Low influence on the indication accuracy ■ Fail-safe switching at high switching frequency ■ Insensitive to corrosion
Contact setting	■ Contact adjustable, adjustment key mounted on the cable socket ■ Contacts fixed, without adjustment lock ■ Contact adjustment lock leaded (tamper-proof) ■ Contact adjustment key fixed

Output signal: Inductive contact, model 831	
Connection method	Inductive contact
Number of switch contacts	Max. 2 switch contacts
Switching function	Contact versions: ■ 831-N ■ 831-SN, safety version [1)] ■ 831-S1N, safety version [1)], inverted signal The switching function of each switch is indicated by index 1 or 2
Model 831.1	Normally open (clockwise pointer motion)
Model 831.2	Normally closed (clockwise pointer motion)
Switch point setting	Set pointers of the contact pressure gauges are freely adjustable over the full scale range
Setting range (recommended)	10 ... 90 % of the scale range (0 ... 100 % on request)
Distance between switch points	Up to 2 contacts can be set to an identical set point. For a version with 3 contacts this is not possible. The left (no. 1) or right (no. 3) contact may not be set to the same set point as the other 2 contacts. The required displacement is approx. 30°, optionally to the right or to the left.
Switching current	Depending on the isolating amplifier/control unit used (→ see data sheet AC 08.01)
Switching voltage	Depending on the isolating amplifier/control unit used (→ see data sheet AC 08.01)
Switching power	Depending on the isolating amplifier/control unit used (→ see data sheet AC 08.01)
Permissible temperature ranges in hazardous areas	
T6	-20 ... +60 °C [-4 ... +140 °F]
T5 ... T1	-20 ... +70 °C [-4 ... +158 °F]
T135°C	-20 ... +70 °C [-4 ... +158 °F]

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

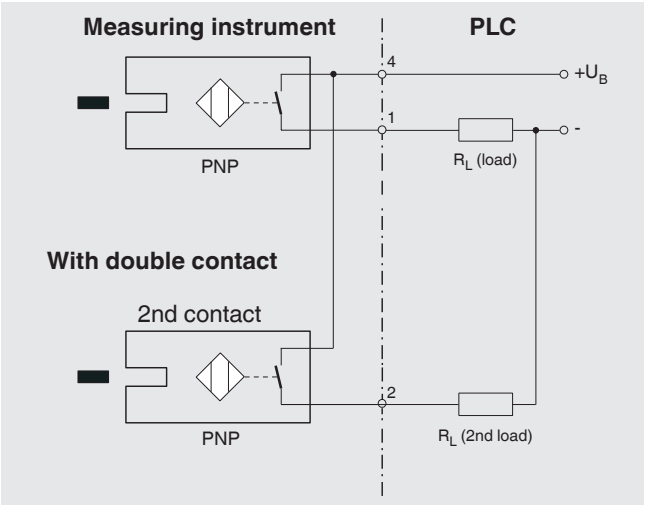
Associated isolating amplifiers/control units

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 version
904.33 KFD2 - SH - Ex1	1 contact	Yes - Safety version
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

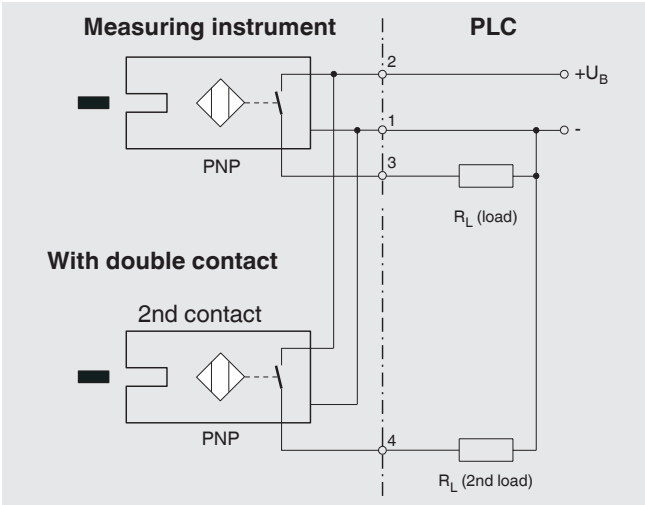
→ For further information on switch contacts, see data sheet AC 08.01

Output signal: Electronic contact, model 830 E	
Connection method	Electronic contact (PNP transistor)
Number of switch contacts	Max. 2 switch contacts
Switching function	Contact versions: ■ 2-wire system ■ 3-wire system The switching function of each switch is indicated by index 1 or 2
Model 830 E.1	Normally open (clockwise pointer motion)
Model 830 E.2	Normally closed (clockwise pointer motion)
Setting range (recommended)	10 ... 90 % of the scale range (0 ... 100 % on request)
Distance between switch points	Up to 2 contacts can be set to an identical set point. For a version with 3 contacts this is not possible. The left (no. 1) or right (no. 3) contact may not be set to the same set point as the other 2 contacts. The required displacement is approx. 30°, optionally to the right or to the left.
Switching current	≤ 100 mA
Switching voltage	DC 10 ... 30 V
Type of output	PNP transistor
Residual ripple	Max. 10 %
No-load current	≤ 10 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



3-wire system



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

Electrical connections	
Connection type	■ Cable socket, black Per VDE 0110 insulation group C/250 V Cable gland M20 x 1.5 ■ Connector ■ Rear cable outlet
Wire cross-section	6 screw terminals + PE for conductor cross-section 2.5 mm²
Cable diameter	→ See dimensions from page 10
Pin assignment	Connection details are given on the product label of the instrument. Connection terminals and ground terminals are appropriately marked.
Material	PA 6 (polyamide)

Operating conditions	
Ambient temperature range (at the case) [1]	-20 ... +60 °C [-4 ... +140 °F]
Storage temperature range [1]	
Without liquid dampening	-50 ... +70 °C [-58 ... +158 °F]
With liquid dampening	-40 ... +70 °C [-40 ... +158 °F]
Max. operating pressure at stem	Max. 25 bar [362.59 psi], static
Ingress protection (IP code) per IEC/EN 60529	■ IP65 ■ IP66

1) For hazardous areas, the permissible temperatures of the contact model 831 shall apply exclusively (for permissible temperature ranges see 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.

Approvals

Logo	Description	Country
CE	**EU declaration of conformity**	European Union
	EMC directive	
	Low voltage directive	
	RoHS directive	

Optional approvals

Logo	Description	Country
Ex	**EU declaration of conformity**	European Union
	ATEX directive Hazardous areas - Ex ia Zone 1 gas II 2G Ex ia IIC T6/T5/T4 * Gb Zone 20 dust II 2D Ex ia IIIB T85°C/T95°C/T100°C/T135°C * Db	
IEC IECEx	**IECEx** [1] Hazardous areas - Ex ia Zone 1 gas Ex ia IIC T6/T5/T4 * Gb Zone 20 dust Ex ia IIIB T85°C/T95°C/T100°C/T135°C * Db	International
EAC Ex	**EAC**	Eurasian Economic Community
	EMC directive	
	Low voltage directive	
	Hazardous areas [1]	
	GOST Metrology, measurement technology	Russia
	KazInMetr Metrology, measurement technology	Kazakhstan
-	**MTSCHS** Permission for commissioning	Kazakhstan
	BelGIM Metrology, measurement technology	Belarus
	UkrSEPRO Metrology, measurement technology	Ukraine
	Ex Ukraine Hazardous areas	Ukraine
	Uzstandard Metrology, measurement technology	Uzbekistan
-	**CRN** Safety (e.g. electr. safety, overpressure, ...)	Canada

1) Only for instruments with inductive contact model 831

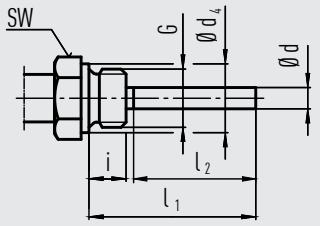
Certificates (option)

Certificates	
Certificates	■ 2.2 test report ■ 3.1 inspection certificate with 3 test points (optionally with 5 test points)
Calibration	DAkkS calibration certificate

Approvals and certificates, see website

Connection designs

Standard design (male threaded connection) [1)]

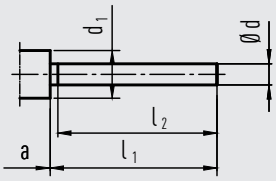


Standard insertion length l_1 = 63, 100, 160, 200, 250 mm

Nominal size	Process connection		Dimensions in mm		
NS	G	i	SW	d_4	Ø d
100	G ½ B	14	27	26	8
	G ¾ B	16	32	32	8
	½ NPT	19	22	-	8
	¾ NPT	20	30	-	8

1) Not for version “adjustable stem and dial”

Design 1, plain stem (without thread)



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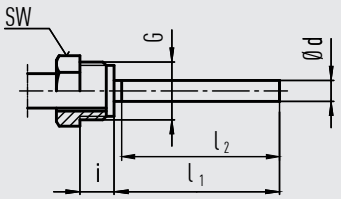
Standard insertion length l_1 = 140, 200, 240, 290 mm

Nominal size	Dimensions in mm			
NS	d_1	Ød	a for axial	a for adjustable stem and dial
100	18	8	15	25

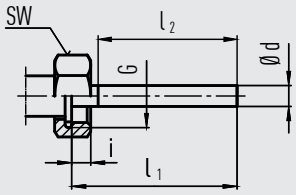
Design 2, male nut



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

Nominal size	Process connection		Dimensions in mm	
NS	G	i	SW	Ø d
100	G ½ B	20	27	8

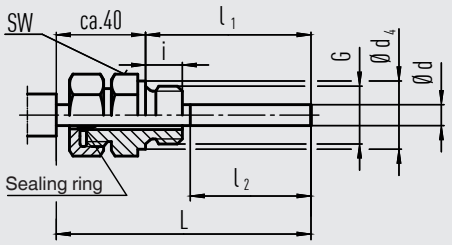
Design 3, union nut



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

Nominal size	Process connection		Dimensions in mm	
NS	G	i	SW	Ø d
100	G ½ B	8.5	27	8
	G ¾ B	10.5	32	8
	M24 x 1.5	13.5	32	8

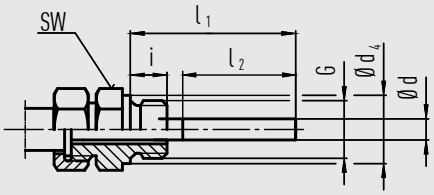
Design 4, compression fitting (sliding on stem)



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	Ø d
100	G ½ B	14	27	26	8
	G ¾ B	16	32	32	8
	M18 x 1.5	12	24	23	8
	½ NPT	19	22	-	8
	¾ NPT	20	30	-	8

Design 5, union nut and loose threaded connection



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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	Ø d
100	G ½ B	14	27	26	8
	G ¾ B	16	32	32	8
	M18 x 1.5	12	24	23	8

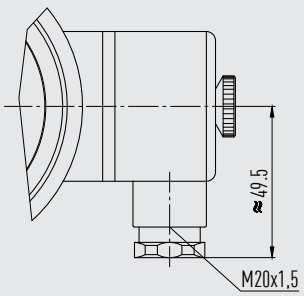
Legend:

G	Male thread
G_1	Female thread
i	Thread length (incl. collar)
a	Distance to the case/articulated joint
Ø d_4	Diameter of the sealing collar
SW	Spanner width
Ø d	Stem diameter
l_1	Insertion length
l_2	Active length

Dimensions in mm

Cable socket

Contact models: 831 and 830 E



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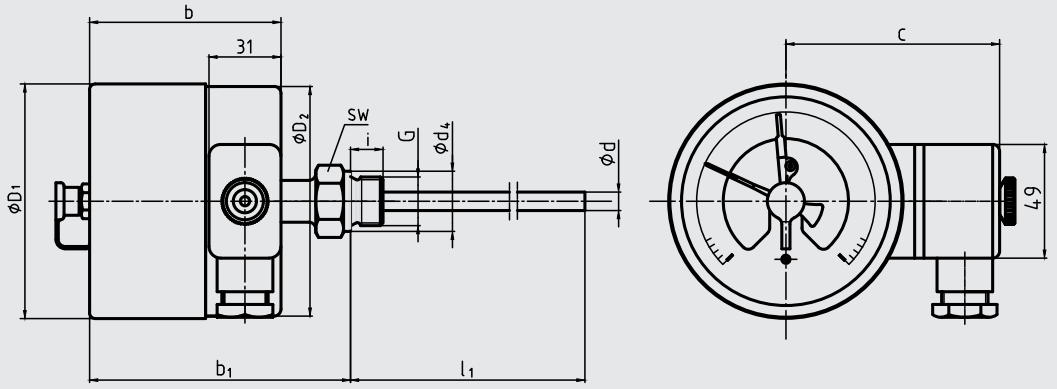
Only use cable with a diameter of 7 ... 13 mm

Back mount



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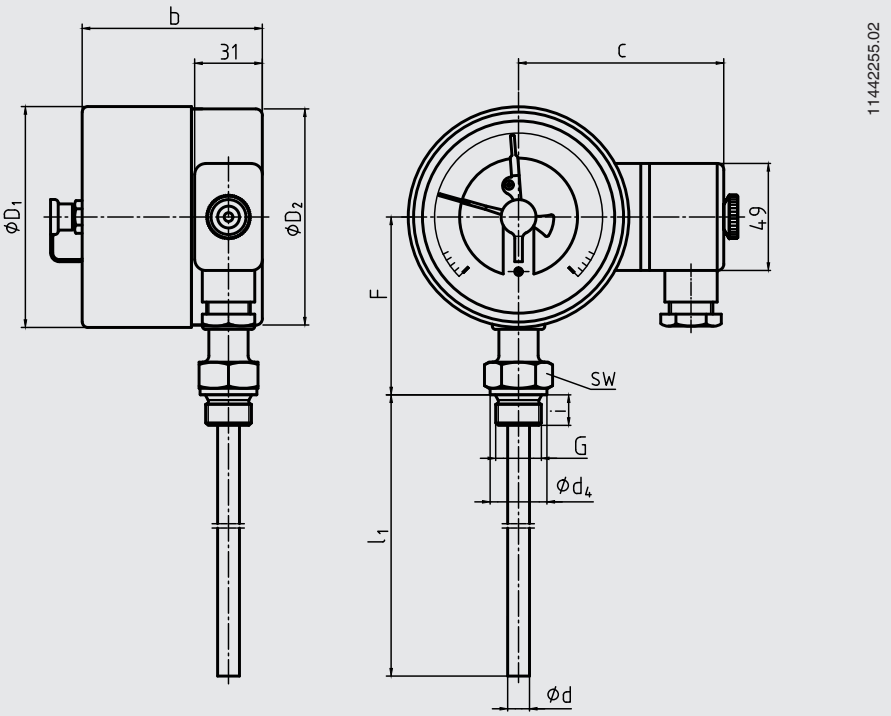
Lower mount



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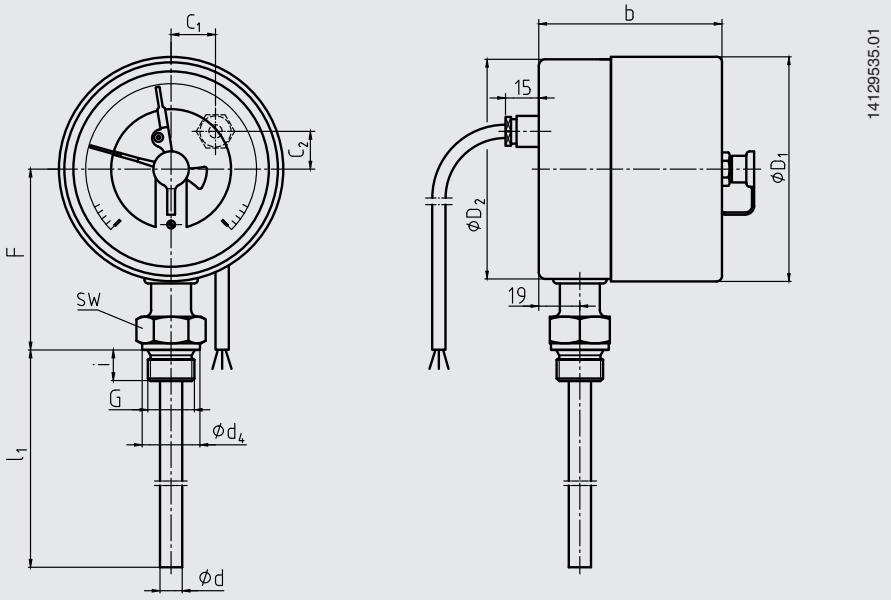
NS	Dimensions in mm									Weight in kg		
	Ø d [2]	Ø d_4	Ø D_1	Ø D_2	F [1]	G	C	d_4	SW	axial	radial	adjustable stem and dial
100	8	26	101	99	83	G ½ B	94	26	27	1.0	1.1	0.7

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	83	115	83	115

1) With scale ranges ≥ 0 ... 300 °C the dimensions increase by 40 mm
2) Option: Stem Ø 6, 10, 12 mm

Lower mount, with rear cable outlet

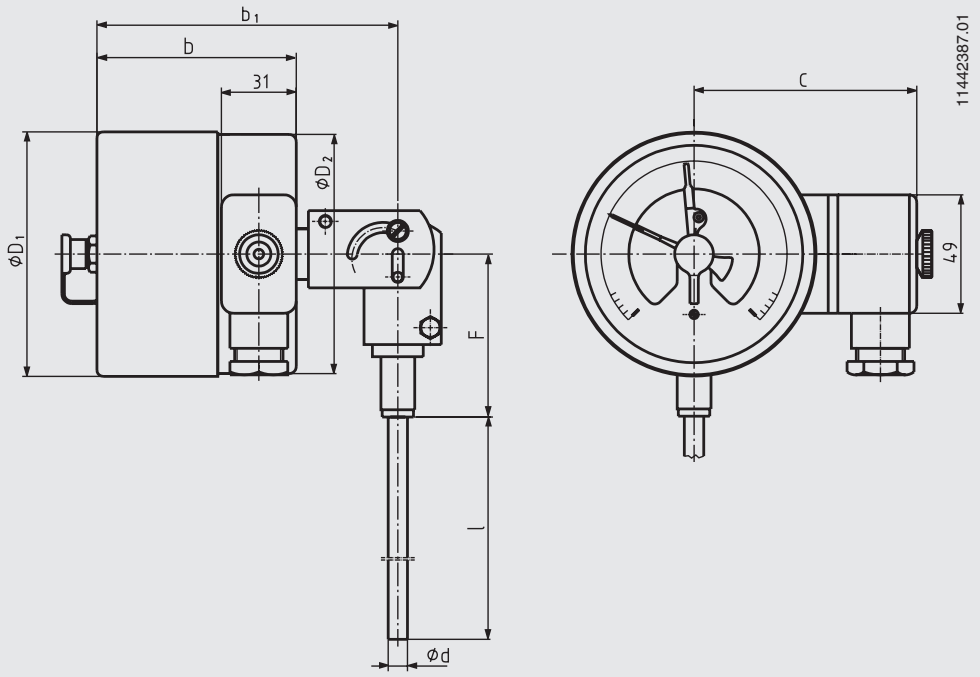


NS	Dimensions in mm										Weight in kg		
	Ø d 2)	Ø d_4	Ø D_1	Ø D_2	F 1)	G	C_1	C_2	i	SW	axial	radial	adjustable stem and dial
100	8	26	101	99	83	G ½ B	20	17	14	27	1.0	1.1	0.7

NS	Dimensions in mm	
	Switch contact model 831	Switch contacts models 831.11 or 831.22
	1- or 2-way	
	b	b
100	83	83

1) With scale ranges ≥ 0 ... 300 °C the dimensions increase by 40 mm
2) Option: Stem Ø 6, 10, 12 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	83	127	83	127

2) Option: Stem Ø 6, 10, 12 mm

Ordering information

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

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