Gas-actuated thermometer for connection to WIKA radio unit
Stainless steel version
Model TGU73.100

for further approvals,
see page 5

Applications

- Remote monitoring of the process temperature for non-critical applications in combination with WIKA radio unit, model NETRIS®3
- Process industry: oil and gas, chemical and petrochemical industries, power engineering, renewable energy, machine, plant and vessel construction

Special features

- IIoT-capable measuring instrument in combination with WIKA radio unit, model NETRIS®3
- Mechanical on-site indication with integrated digital interface
- Intrinsically safe version Ex i per ATEX, IECEx
- Compact design
- Scale ranges from -200 ... +700 °C [0 ... 500 °F]

Gas-actuated thermometer for connection to WIKA radio unit, model TGU73.100

Description

The model TGU73.100 thermometer in combination with the model NETRIS®3 radio unit is used wherever web-based remote monitoring of the process temperature is desired in addition to on-site indication. For the operation of TGU73.100 the use of a thermowell is necessary.

The model TGU73.100 combines a mechanical measuring system with electronic signal processing and is intended for the connection to the WIKA radio unit model NETRIS®3.
In this way, cloud-based process and plant monitoring can be realised in industrial applications.

This allows a condition-based and preventive maintenance through centralised big data analysis.
Due to the wide variety of possible versions, the model TGU73.100 gas-actuated thermometer can be perfectly adapted to any process connection or location. With the adjustable stem and dial version, the case can be adjusted precisely to the desired viewing angle. With the contact bulb version (without direct contact with the medium), the temperature can be measured and monitored even when the pipe diameter is extremely small.

The WIKA measuring instrument TGU73.100 is part of the WIKA IIoT solution. With this, WIKA offers a holistic solution for your digitalisation strategy.

Smart in sensing

Data sheets showing similar products:
Bourdon tube pressure gauge for connection to WIKA radio unit, models PGU23.100 and PGU26.100; see data sheet PV 42.03
Pressure sensor for connection to WIKA radio unit; models PEU-20, PEU-21; see data sheet PE 87.23
Radio unit with LoRaWAN® for WIKA measuring instruments; model NETRIS®3; see data sheet AC 40.03

Installation example

Model TGU73.100 with mounted WIKA radio unit, model NETRIS®3

Wall mounting of model NETRIS®3

Radio unit NETRIS®3 not included in delivery

Specifications

Basic information	
Standard	EN 13190
Nominal size (NS)	Ø 100 mm [4"]
Measuring element	Inert gas expansion system
Window	Laminated safety glass
Connection location	■ Back mount (axial) ■ Lower mount (radial) ■ Back mount (adjustable stem and dial) ■ Instruments with remote capillary
Connection design	→ For drawings, see page 7
S	Standard (threaded connection, fixed)
1	Plain stem (without thread)
2	Male nut
3	Union nut
4	Compression fitting (sliding on stem)
5	Union nut and loose threaded connection
6	Compression fitting (can be adjusted on either remote capillary or spiral protective sleeve)
7	Compression fitting at the case
	Contact bulb for external mounting
Adjustable stem and dial instrument design	■ 90° swivelling ■ 360° rotatable

Accuracy specifications	
Accuracy class [1]	2.0 per EN 13190, at 23 °C ± 10 °C ambient temperature
Temperature error	When the temperature of the measuring system deviates from the reference temperature (23 °C [73 °F]): max. ≤ ±0.4 %/10 K of full scale value

1) The accuracy class is valid for the mechanical indication and for the digitally transmitted temperature values.

Scale ranges, measuring ranges [1) 2)], error limits
Scale marking per WIKA factory standard

Scale range in °C	Measuring range in °C	Scale spacing in °C	Error limit ± °C
-200 ... +50	-170 ... +20	5	10
-200 ... +100	-170 ... +70	5	10
-80 ... +60	-60 ... +40	2	4
-60 ... +40	-50 ... +30	1	2
-40 ... +60	-30 ... +50	1	2
-30 ... +50	-20 ... +40	1	2
-20 ... +60	-10 ... +50	1	2
-20 ... +80	-10 ... +70	1	2
-20 ... +120	0 ... 100	2	6
-20 ... +140	0 ... 120	2	6
0 ... 60	10 ... 50	1	2
0 ... 80	10 ... 70	1	2
0 ... 100	10 ... 90	1	2
0 ... 120	10 ... 110	2	4
0 ... 160	20 ... 140	2	4
0 ... 200	20 ... 180	2	4
0 ... 250	30 ... 220	5	5
0 ... 300	30 ... 270	5	10
0 ... 400	50 ... 350	5	10
0 ... 500	50 ... 450	5	10
0 ... 600	100 ... 500	10	20
0 ... 700	100 ... 600	10	20

1) The limits of the measuring range are indicated on the dial by two triangular marks. Only within this range is the stated error limit valid per EN 13190
2) The temperature range at the adapter of the case is limited to -40 °C [-40 °F] ≤ Tref ≤ +100 °C [212 °F]

Scale range in °F	Measuring range in °F	Scale spacing in °F	Error limit ± °F
0 ... 200	20 ... 180	2	4
0 ... 250	30 ... 220	5	10
0 ... 500	50 ... 450	5	10

Further details on: Measuring ranges		
Unit	■ °C ■ °F	
Damping	■ Without ■ With silicone oil filling	
Range of use		
Constant loading (1 year)	Measuring range EN 13190	
Short time (max. 24 h)	Scale range EN 13190	
Remote capillary		
Material	Stainless steel (1.4571)	
Diameter	2 mm [0.079 in]	
Length	To customer specification	
Min. bending radius	6 mm [0.236 in]	
Standard line	max. 60 m [196.9 ft]	
Spiral protective sleeve	max. 40 m [131.2 ft]	
Protective cover	■ Without ■ With spiral protective sleeve Ø 7 mm [0.276 in], flexible	
Mounting options for instruments with remote capillary	■ Surface mounting flange ■ Panel mounting flange	
Reverse polarity protection	Yes	
Dial		
Scale layout	■ Single scale ■ Dual scale	
Scale colour	Single scale	Black
	Dual scale	Red
		Others on request

Other measuring ranges on request

Process connection		
Thread size	■ Plain without thread ■ G ½ B, male thread ■ ½ NPT, male thread ■ G ½ , female thread ■ ½ NPT, female thread ■ M20 x 1.5, male thread ■ M24 x 1.5, male thread	
	Others on request	
Stem diameter	■ 6 mm [0.236"] ■ 8 mm [0.315"] ■ 10 mm [0.394"] ■ 12 mm [0.472"]	
	Others on request	

Digital interface	
Signal type	Unified WIKA Interface (UWI)
Signal transmission of the temperature value	The temperature value of the main scale is transmitted digitally. With dual scales, the temperature value of the second scale is not transmitted digitally.
Digital signal resolution	0.04 % of measuring span
Connection type	NETRIS®3 plug connection for angular connectors

Material	
Plug connection	PA 6, black
Remote capillary	
Surface mounting flange	Stainless steel (1.4301)
Panel mounting flange	Stainless steel (1.4301)
Spiral protective sleeve	Stainless steel (316SS)
Contact bulb	Stainless steel (1.4571)
Material (wetted)	
Process connection	Stainless steel (304SS)
Stem	Stainless steel (316SS)
Material (non-wetted)	
Case	Stainless steel (316L)
Articulated joint “adjustable stem and dial”	Stainless steel (316L)
Ring	Stainless steel (304SS)
Dial	■ Aluminium ■ White ■ Black lettering
Pointer	■ Aluminium ■ Black ■ Adjustable pointer

Operating conditions	
Ambient temperature range	-40 ... +60 °C [-40 ... +140 °F] without/with liquid damping
Storage and transport	
Without liquid damping	-50 ... +70 °C [-58 ... +158 °F]
With liquid damping	-40 ... +70 °C [-40 ... +158 °F]
Ingress protection per IEC/EN 60529 [1]	IP65

1) The ingress protection only applies with a correct plug connection with model NETRIS®3.

Approvals

Logo	Description	Country
CE Ex	**EU declaration of conformity**	European Union
	ATEX directive Hazardous areas - Ex ia Zone 1 gas II 2G Ex ia IIC T4 Gb	
	EMC directive EN 61326 emission (group 1, class B) and immunity (industrial application)	
	RoHS directive	
IEC IECEx	**IECEx** Hazardous areas - Ex i Zone 1 gas Ex ia IIC T4 Gb	International

Certificates (option)

Certificates	
Certificates	■ 2.2 test report per EN 10204 (e.g. state-of-the-art manufacturing, material proof, indication accuracy) ■ 3.1 inspection certificate per EN 10204 (e.g. material proof for wetted metal parts, indication accuracy, calibration certificate)

→ For approvals and certificates, see website

Safety-related characteristic values (Ex)

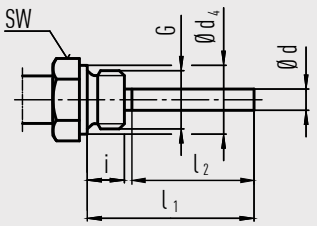
Safety-related characteristic values (Ex)	
Electrical parameters of the intrinsically safe voltage supply	
Max. input voltage U_i	DC 7 V
Max. input current for gas applications I_i	250 mA
Max. input power P_i	330 mW
Effective internal capacitance C_i	4.75 µF
Effective internal inductance L_i	Negligible
Temperature range	
Ambient temperature	-40 ... +60 °C [-40 ... +140 °F]
Adapter Tref[1)]	-40 ... +100 °C [-40 ... +212 °F]

1) The adapter Tref is located on the rear of the temperature probe where it is connected to the case of the thermometer.

The model TGU73.100 is intended for use with the intrinsically safe, battery-operated WIKA model NETRIS®3 radio unit with ignition protection type “ia”.

Connection designs

Standard design (threaded connection, fixed) [1)]

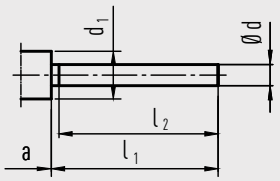


Standard insertion length: l = 63, 100, 160, 200, 250 mm [2.48, 3.94, 6.30, 7.84, 9.84 in]

Nominal size	Process connection		Dimensions in mm [in]		
NS	G	i	SW	d	∅ d
100	G ½ B	14	27 [1.06]	26 [1.02]	8 [0.32]
	G ¾ B	16	32 [1.26]	32 [1.26]	8 [0.32]
	½ NPT	19	22 [0.87]	-	8 [0.32]
	¾ NPT	20	30 [1.18]	-	8 [0.32]

1) The adapter Tcon is located on the rear of the temperature probe where it is connected to the case of the thermometer.

Design 1, plain stem (without thread)

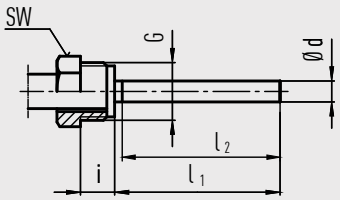


Standard insertion length: l = 63, 100, 160, 200, 250 mm [2.48, 3.94, 6.30, 7.84, 9.84 in]

Basis for design 4, compression fitting

Nominal size	Dimensions in mm [in]			
NS	d_1 [1)]	∅ d	a for axial	a for adjustable stem and dial
100	18 [0.71]	8 [0.32]	15 [0.60]	25 [0.98]

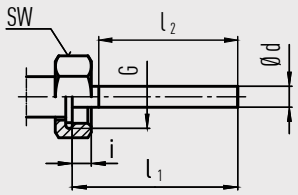
Design 2, male nut



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

Nominal size	Process connection		Dimensions in mm [in]	
NS	G	i	SW	∅ d
100	G ½ B	20	27 [1.06]	8 [0.32]
	M20 x 1.5	15	22 [0.87]	8 [0.32]

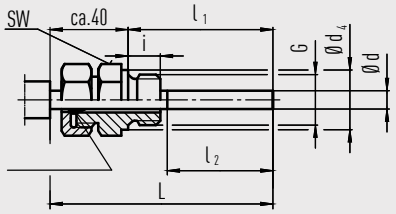
Design 3, union nut



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

Nominal size	Process connection		Dimensions in mm [in]	
NS	G	i	SW	∅ d
100	G ½ B	8.5	27 [1.06]	8 [0.32]
	G ¾ B	10.5	32 [1.26]	8 [0.32]
	M24 x 1.5	13.5	32 [1.26]	8 [0.32]

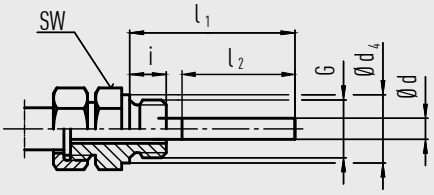
Design 4, compression fitting (sliding on stem)



Standard insertion length:	l = 63, 100, 160, 200, 250 mm [2.48, 3.94, 6.30, 7.84, 9.84 in]
Length	L = l + 40 mm [1.58 in]

Nominal size	Process connection		Dimensions in mm [in]		
NS	G	i	SW	d	Ø d
100	G ½ B	14	27 [1.06]	26 [1.02]	8 [0.32]
	G ¾ B	16	32 [1.26]	32 [1.26]	8 [0.32]
	M18 x 1.5	12	24 [0.95]	23 [0.91]	8 [0.32]
	½ NPT	19	22 [0.87]	-	8 [0.32]
	¾ NPT	20	30 [1.18]	-	8 [0.32]

Design 5, union nut and loose threaded connection



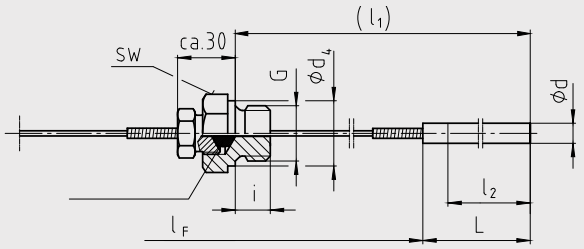
Standard insertion length:	l = 100, 140, 200, 240, 290 mm [3.94, 5.51, 7.87, 9.45, 11.42 in]

Nominal size	Process connection		Dimensions in mm [in]		
NS	G	i	SW	d	Ø d
100	G ½ B	14	27 [1.06]	26 [1.02]	8 [0.32]
	G ¾ B	16	32 [1.26]	32 [1.26]	8 [0.32]
	M18 x 1.5	12	24 [0.95]	23 [0.91]	8 [0.32]
	½ NPT	19	22 [0.87]	-	8 [0.32]
	¾ NPT	20	30 [1.18]	-	8 [0.32]

Option: Connection with union nut M24 x 1.5 and loose threaded connection M18 x 1.5

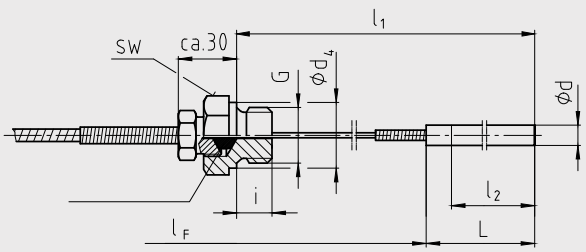
Nominal size	Process connection		Dimensions in mm [in]	
NS	G	i	SW	Ø d
100	M20 x 1.5	15	22 [0.87]	8 [0.32]

Design 6.1, compression fitting sliding on remote capillary (compression fitting is leak-proof)



Insertion length l_1:	Connection with union nut M24 x 1.5 and loose threaded connection M18 x 1.5

Design 6.2, compression fitting sliding on remote capillary with spiral protective sleeve (compression fitting is leak-proof)

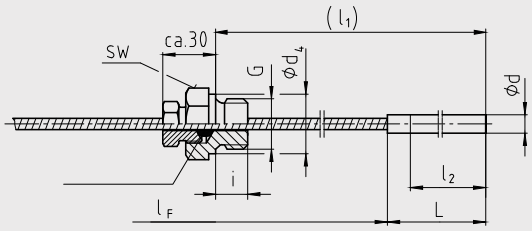


Insertion length l_1:	≥ 300 mm [11.81 in] with Ø d = 6 [0.24] or 8 mm [0.32 in] ≥ 200 mm [7.87 in] with Ø d ≥ 10 mm [0.39 in]

Probe length L: Standard 200 mm [7.87 in] with Ø d = 6 mm [0.24 in]
Standard 170 mm [6.69 in] with Ø d = 8 mm [0.32 in]
Standard 100 mm [3.94 in] with Ø d ≥ 10 mm [0.39 in]

Nominal size	Process connection		Dimensions in mm [in]		
NS	G	i	SW	d	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

Design 6.3, compression fitting sliding on spiral protective sleeve (compression fitting is not leak-proof)

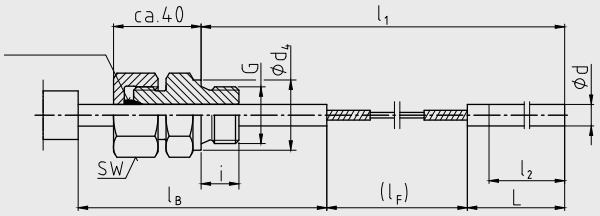


Insertion length l_1: variable

Probe length L: Standard 200 mm with Ø d = 6 mm [0.24 in]
Standard 170 mm with Ø d = 8 mm [0.32 in]
Standard 100 mm with Ø d ≥ 10 mm [0.32 in]

Nominal size	Process connection		Dimensions in mm [in]		
NS	G	i	SW	d	Ø d
100	G ½ B	14	27 [1.06]	26 [1.02]	8 [0.32]
	G ¾ B	16	32 [1.26]	32 [1.26]	8 [0.32]
	½ NPT	19	22 [0.87]	-	8 [0.32]
	¾ NPT	20	30 [1.18]	-	8 [0.32]

Design 7, compression fitting at the case



Insertion length l_1: ≥ 400 mm [15.75 in]

Probe length L: Standard 200 mm with Ø d = 6 mm [0.24 in]
Standard 170 mm with Ø d = 8 mm [0.32 in]
Standard 100 mm with Ø d ≥ 10 mm [0.32 in]

l_B: 100 mm (others on request)

Nominal size	Process connection		Dimensions in mm [in]		
NS	G	i	SW	d	Ø d
100	G ½ B	14	27 [1.06]	26 [1.02]	8 [0.32]
	G ¾ B	16	32 [1.26]	32 [1.26]	8 [0.32]
	½ NPT	19	22 [0.87]	-	8 [0.32]
	¾ NPT	20	30 [1.18]	-	8 [0.32]

Note for designs 6.1, 6.2, 6.3 and 7

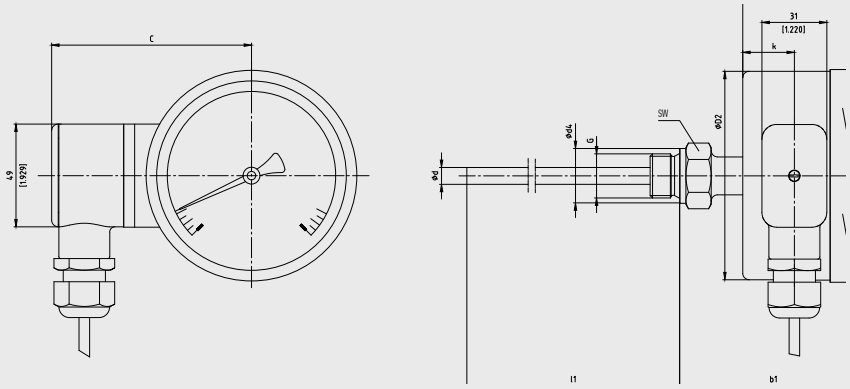
With some combinations, the active length l can correspond to the probe length L. If an additional compression fitting is desired, the probe length L increases by at least 60 mm.

Legend:

G	Male thread
$G_{1)}$	Female thread
i	Thread length (incl. collar)
a	Distance to the case/articulated joint
Ø $d_{1)}$	Diameter of the sealing collar
SW	Spanner width
Ø d	Stem diameter
$l_{1)}$	Insertion length
$l_{1)}$	Active length

Dimensions in mm [in]

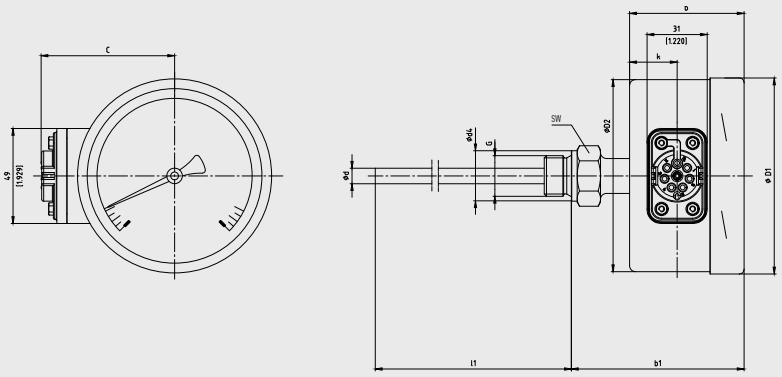
Back mount with mounted WIKA radio unit, model NETRIS®3



Nominal size	Dimensions in mm [in]										Weight in kg [lbs]
NS	b [1]	b [1]	C	Ø d	Ø d	Ø D	Ø D	G	k	SW	
100	60/68 [2.36/2.68]	92/100 [3.62/3.94]	94 [3.70]	8 [2] [0.32]	26 [1.02]	101 [3.98]	99 [3.90]	G 1/2 B	25 [0.98]	27 [1.06]	1.3 [2.87]

1) Dependent on required measuring system
2) Version with stem diameter 6 mm [0,24 in], 10 mm [0,39 in], 12 mm [0,47 in]

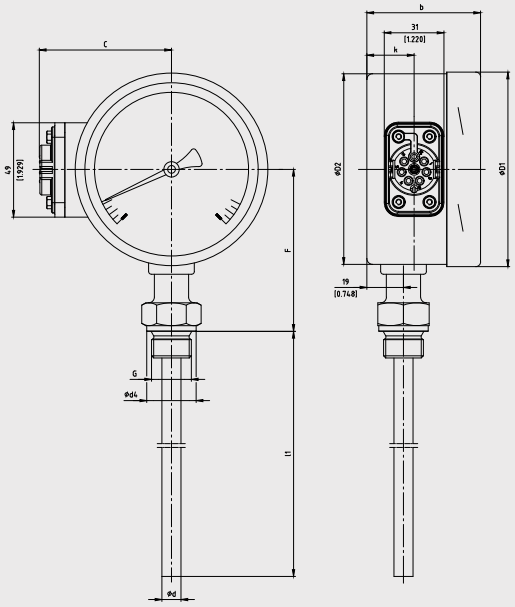
Back mount without WIKA radio unit, model NETRIS®3



Nominal size	Dimensions in mm [in]										Weight in kg [lbs]
NS	b [1]	b [1]	C	Ø d	Ø d	Ø D	Ø D	G	k	SW	
100	60/68 [2.36/2.68]	92/100 [3.62/3.94]	68.8 [2.71]	8 [2] [0.32]	26 [1.02]	101 [3.98]	99 [3.90]	G 1/2 B	25 [0.98]	27 [1.06]	1.3 [2.87]

1) Dependent on required measuring system
2) Version with stem diameter 6 mm [0,24 in], 10 mm [0,39 in], 12 mm [0,47 in]

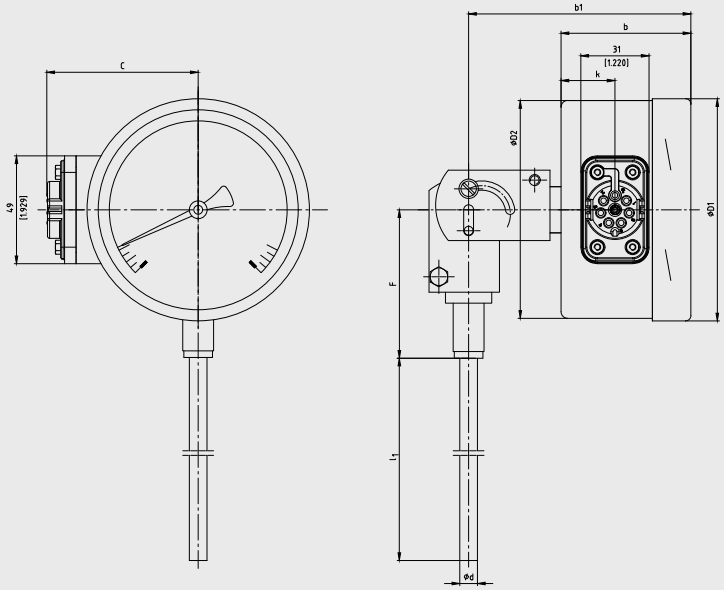
Lower mount



Nominal size	Dimensions in mm [in]									Weight in kg
NS	b [1]	b_1 [1]	C	Ø d	Ø d_1	Ø D_1	Ø D_2	F [3]	G	k	
100	60/68 [2.36/2.68]	92/100 [3.62/3.94]	68.8 [2.71]	8 [2] [0.32]	26 [1.02]	101 [3.98]	99 [3.90]	85 [3.35]	G ½ B	25 [0.98]	1.3

1) Dependent on required measuring system
2) Version with stem diameter 6 mm [0.24 in], 10 mm [0.39 in], 12 mm [0.47 in]
3) With scale ranges ≥ 0 ... 300 °C [≥ 32 ... 572 °F] the dimensions increase by 40 mm [1.58 in]

Back mount, adjustable stem and dial case

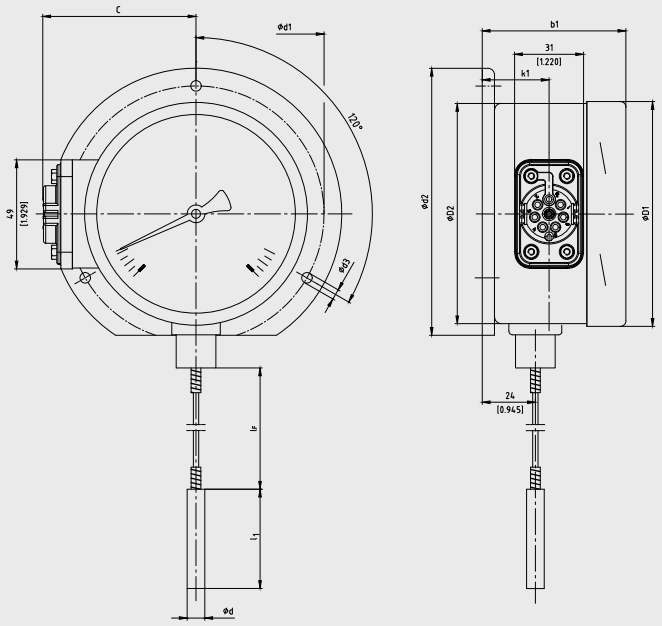


Nominal size	Dimensions in mm [in]							
NS	b [1]	b_1 [1]	C	d	D_1	D_2	F	k
100	60/68 [2.36/2.68]	104/112 [4.09/4.41]	68.8 [2.71]	8 [2] [0.32]	101 [3.98]	99 [3.90]	68 [2.68]	25 [0.98]

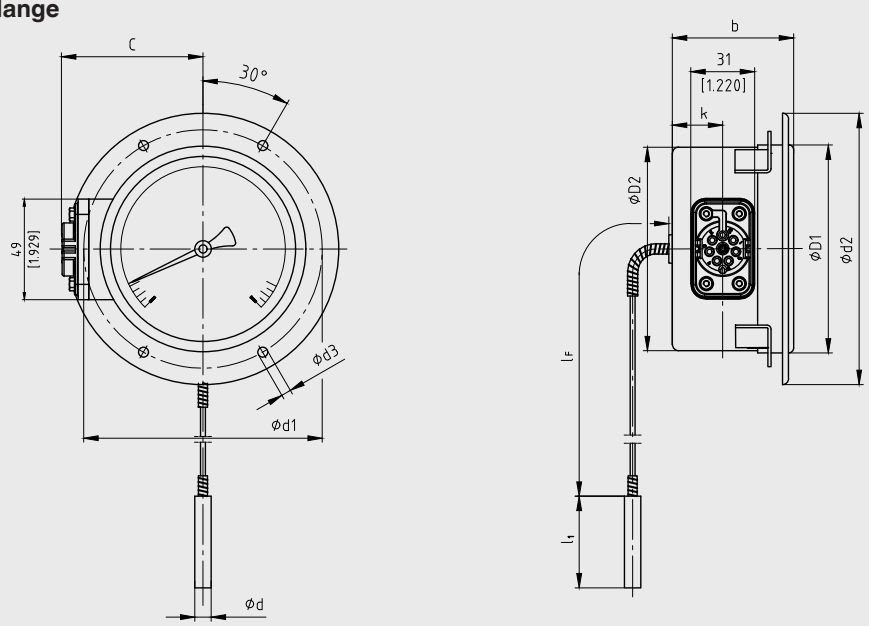
1) Dependent on required measuring system
2) Version with stem diameter 6 mm [0,24 in], 10 mm [0,39 in], 12 mm [0,47 in]

Dimensions in mm [in] for instruments with remote capillary

Surface mounting flange



Panel mounting flange

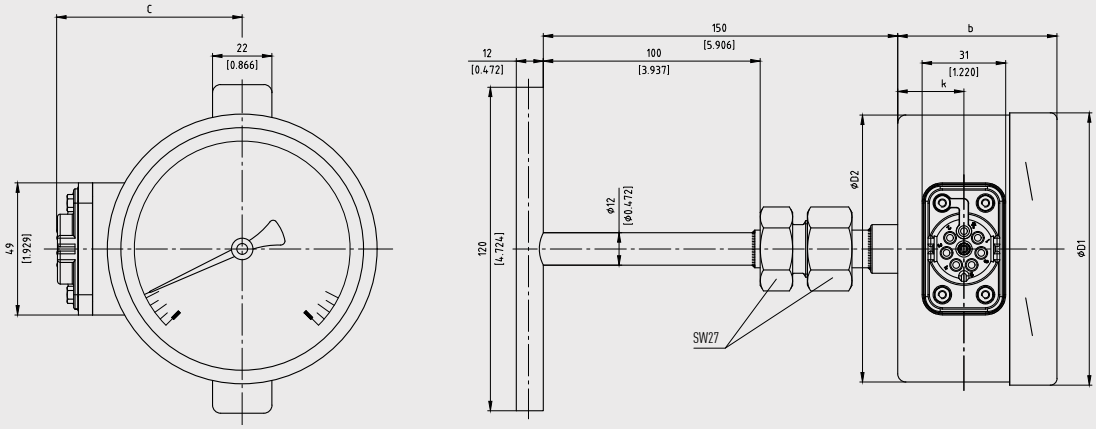


Nominal size	Dimensions in mm [in]										
NS	b [1)]	b_1 [1)]	C	d	d_1	d_2	d_3	D_1	D_2	k	k_1
100	60/68 [2.36/ 2.68]	65/73 [2.56/ 2.84]	68.8 [2.71]	8 [2)] [0.32]	116 [4.57]	132 [5.20]	68 [2.68]	25 [0.98]	99 [3.90]	25 [0.98]	30 [1.18]

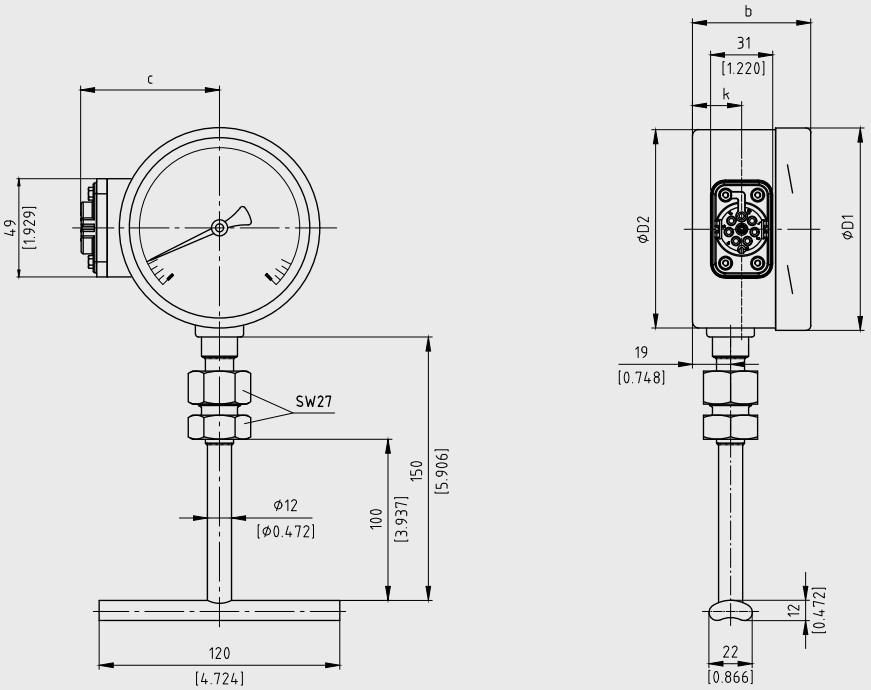
1) Dependent on required measuring system
2) Option: Stem diameter 6 mm [0,24 in], 10 mm [0,39 in], 12 mm [0,47 in]

Dimensions in mm [in] for instruments with contact bulb

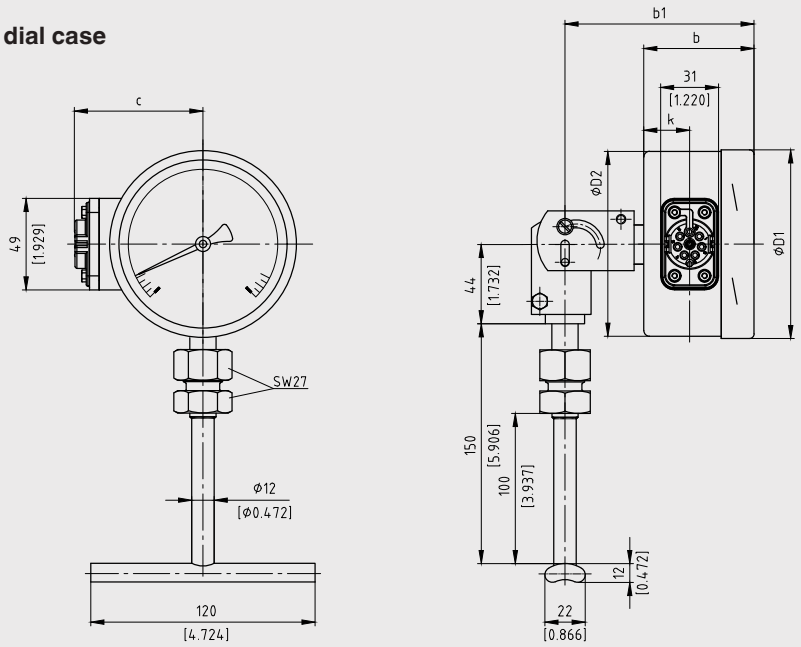
Back mount



Lower mount



Back mount
Adjustable stem and dial case

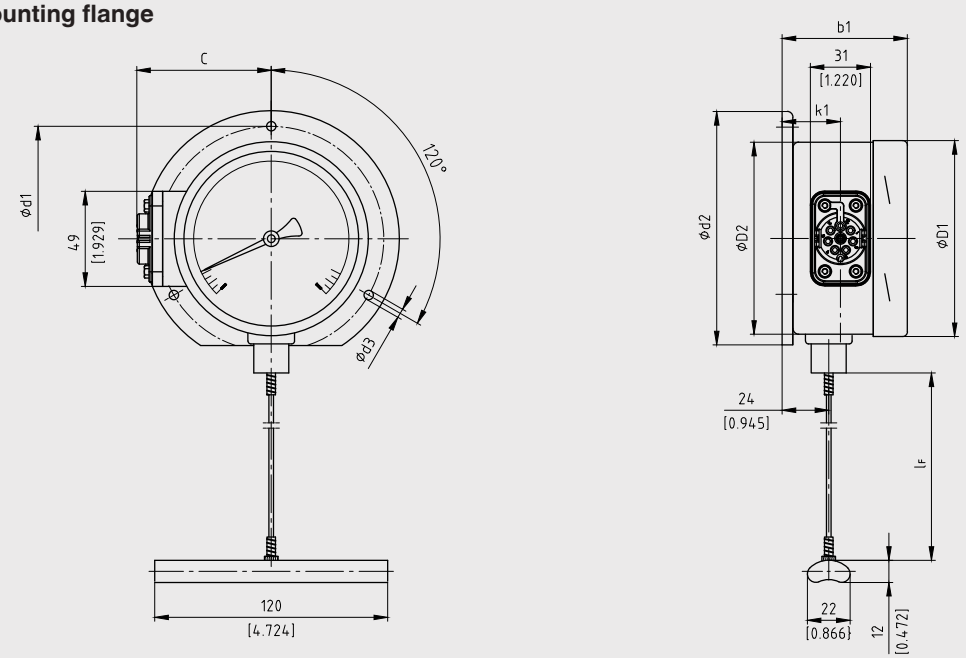


Connection location	Nominal size	Dimensions in mm [in]					
	NS	b 1)	b_1 1)	C	D_1	D_2	k
Back mount	100	60/68 [2.36/ 2.68]	104/112 [4.09/ 4.41]	68.8 [2.71]	101 [3.98]	99 [3.90]	25 [0.98]
Lower mount	100	60/68 [2.36/ 2.68]	104/112 [4.09/ 4.41]	68.8 [2.71]	101 [3.98]	99 [3.90]	25 [0.98]
Adjustable stem and dial	100	60/68 [2.36/ 2.68]	104/112 [4.09/ 4.41]	68.8 [2.71]	101 [3.98]	99 [3.90]	25 [0.98]

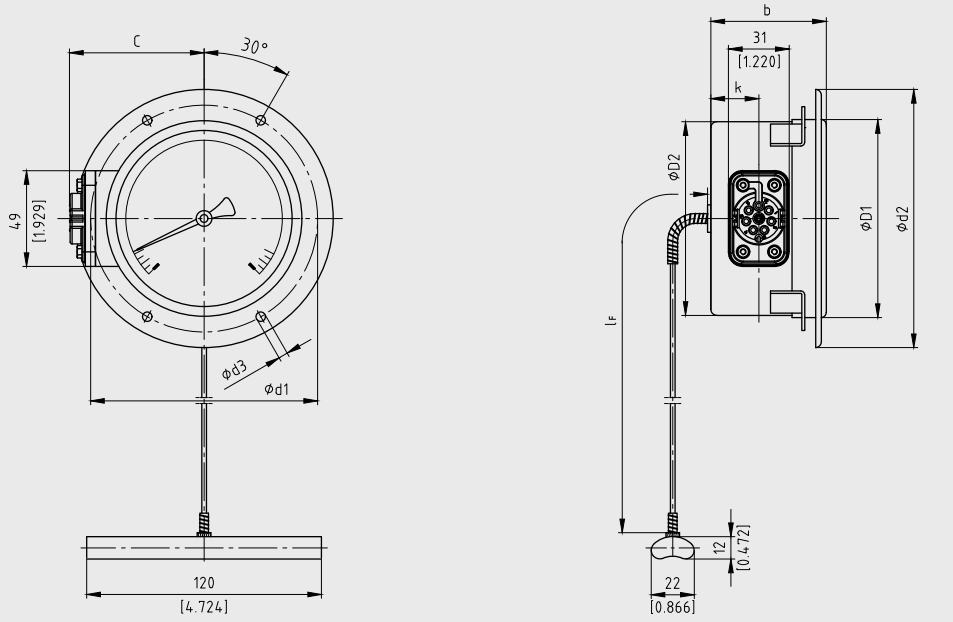
1) Dependent on required measuring system

Dimensions in mm [in] for instruments with contact bulb and remote capillary

Surface mounting flange



Panel mounting flange



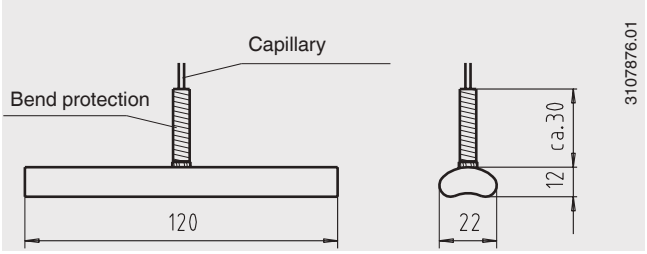
Nominal size	Dimensions in mm												Weight in kg [lbs]
NS	b 1)	b_1 1)	C	d_1	d_2	d_3	D_1	D_2	D_3	h	k	k_1	
100	60/68 [2.36/ 2.68]	65/73 [2.56/ 2.84]	68.8 [2.71]	116 [4.57]	132 [5.20]	4.8 [0.19]	101 [3.98]	99 [3.90]	107 [4.21]	107 [4.21]	25 [0.98]	30 [1.18]	1.6 [3.5]

1) Dependent on required measuring system

Mounting instructions for contact bulb

General

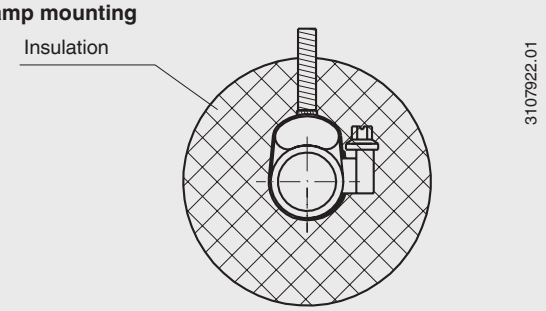
The contact bulb has been designed for mounting on pipes or tanks. When mounting this thermometer version, it must be ensured that the contact bulb is in contact with the measuring location over its complete length. The basic requirements to ensure a perfect measuring result is to retain good thermal contact between the contact bulb and the outside wall of the pipe or tank with minimal heat dissipation to the environment from the contact bulb and measuring location.



Mounting on pipes

The geometry of the contact bulb has been designed for pipes with outer diameters between 20 mm [0,79 in] and 160 mm [6,3 in]. For fixing the contact bulb to the pipe, pipe clamps are sufficient. The contact bulb should have direct metallic contact with the measuring location and have firm contact with the surface of the pipe. Where temperatures under 200 °C [392 °F] are expected, a thermal compound can be used to optimise the heat transfer between contact bulb and pipe. Insulation must be applied at the mounting point to avoid error due to heat loss. This insulation must have sufficient temperature resistance and is not included in the scope of delivery.

Pipe clamp mounting

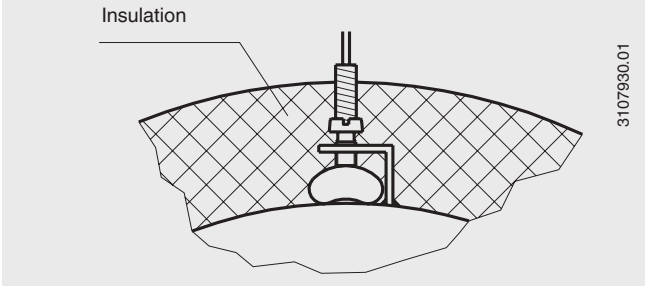


Mounting on vessel

The geometry of the contact bulb has been designed for tanks with an external radius up to 80 mm [3,15 in]. If the mounting point of the contact bulb on the tank has an external radius greater than 80 mm [3,15 in], we recommend the use of an intermediate piece designed for the respective tank diameter, made of a material with good thermal conductivity. The contact bulb can be fastened to the tank by means of an angle bracket with clamping screws, or any similar method. The contact bulb should have direct metallic contact with the measuring location and have firm contact with the surface of the tank.

A thermal compound can be used to optimise the heat transfer between contact bulb and tank, if temperatures under 200 °C [392 °F] are expected. Insulation must be applied at the mounting location to avoid error due to heat loss.
This insulation must have sufficient temperature resistance and is not included in the scope of delivery.

Angle bracket mounting



Thermowells

For the operation of TGU73.100 the use of a thermowell is absolutely necessary.

This allows the replacement of the thermometer during operation and ensures an increased protection of the measuring instrument and of the plant and environment. It is advisable to use a thermowell/protection tube from the extensive WIKA-portfolio.

For further information on the wake frequency calculation of the thermowell, see technical information IN 00.15.

Accessories

	Model	Description
	**NETRIS®3**	Radio unit with LoRaWAN® for WIKA measuring instruments For applications in hazardous areas → See data sheet AC 40.03
	Model TW10	→ see data sheet TW 95.10
	Model TW15	→ see data sheet TW 95.15
	Model TW25	→ see data sheet TW 95.25
	Model TW45	→ see data sheet TW 95.45
	Model TW50	→ see data sheet TW 95.50
	Model TW55	→ see data sheet TW 95.55

Ordering information

Model / Case filling / Scale range / Connection design / Process connection / Length l_1 / Capillary length l_F / Options

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