

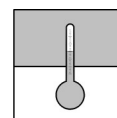


Prospectus

TW3#

Screw-in resistance thermometer
with Pt100 temperature sensor

Model series TW30, TW31, TW32, TW35, TW36



1 General

1.1 Performance characteristics

Typical applications

- High measuring accuracy
- Easy replacement
- A cost-effective measurement principle
- Can be fitted with double PT100

Main features

- Procedural technology
- Power plant technology
- Boiler and furnace construction
- Heating, ventilation and air conditioning
- Furnace construction

1.2 Intended use

TW3# series resistance thermometers are designed for the direct measurement of temperatures in gaseous and liquid media.

They can be adapted to meet specific requirements in terms of temperature, length, flexibility, vibration resistance and measurement accuracy. In addition to the standard range described in this brochure, designs for special applications are also available on request.

1.3 Design features

The screw-in resistance thermometers described in these data sheets largely comply with DIN 43765 in terms of their design, although some of them also incorporate additional developments.

All models have the following:

- Protective sleeve in accordance with DIN 43772
- Connection head as per DIN EN 50446
- Replaceable measuring insert as per DIN 43762

Measuring accuracy

The measuring inserts come fitted as standard with a measuring resistor in accordance with DIN EN 60751 Class B. The reference values and tolerance limits can be found in the appendix to this data sheet.

Protective sleeve

The protective tube on TW# series resistance thermometers is designed as a screw-in type. It protects the measuring insert and the measuring resistor from pressure, flow, corrosion, and other damage. It remains in place even when the measuring insert is replaced, and ensures that operations can continue.

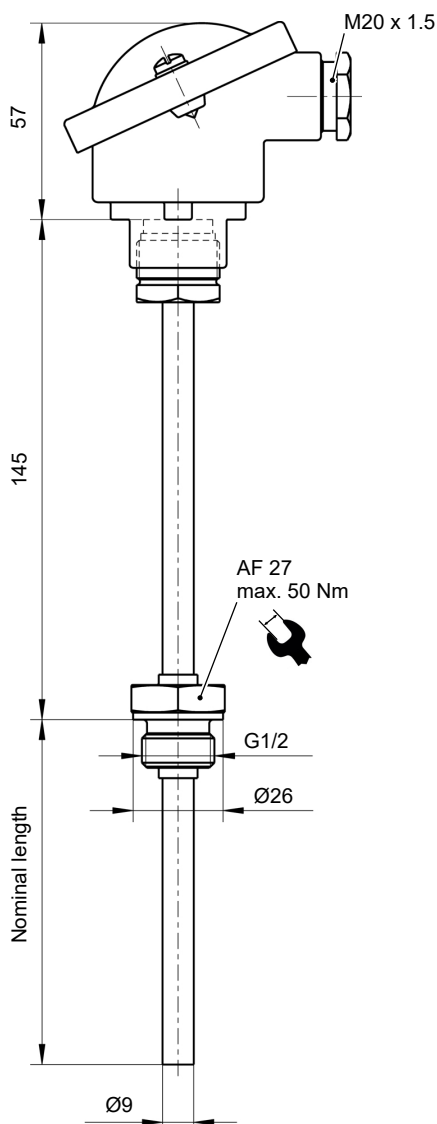
The structural design is determined by the pressure at the site and the temperature of the medium to be measured. Please refer to the load diagrams in the technical data sheet for the relevant model for the necessary specifications.

Connection head

The standard connection head is made of a light alloy in accordance with DIN EN 50446, Type B. However, versions with different connection heads can also be supplied. Please refer to the order codes for further details.

2 TW30 Screw-in resistance thermometer

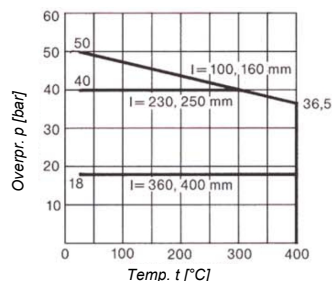
Type B DIN 43765 (for moderate pressure and flow loads)



Mechanical and thermal load-bearing capacity of the protective tube

Form 2G, DIN 43772

Diagram 1



Material 1.4571
(X6CrNiMoTi17122)

Permissible flow velocity:
25 m/s for air
3 m/s for water

- Measuring element: Measuring insert in compliance with DIN 43762
Insertion tube stainless steel 1.4571
Measuring resistor 1x or 2x Pt100 DIN EN60751
- Protective sleeve: in accordance with DIN 43772, Form 2G
Ø 9 mm; 1 mm wall thickness
Stainless steel 1.4571
- Neck pipe: Ø 9 mm; 1 mm wall thickness; 145 mm length
Stainless steel 1.4571
- Process connection: G1/2 screw thread to DIN 3852-2
Stainless steel 1.4571
- Connection head: Standard: Type B in accordance with DIN 43729
- Max. measurement temperature: +400°C
- Max. temperature in the connection head: +80°C

Order codes

T W 3 0

Base type

- Meas. insert with 1x Pt100/2-wire... > A
Meas. insert with 1x Pt100/3-wire... > B
Meas. insert with 1x Pt100/4-wire... > C
Meas. insert with 2xPt100/2-wire... > D
Meas. insert with 2xPt100/3-wire... > E

Model

- Form B (standard) > 1
Form BBK > 2
Form S79 > 3
Form BUSH > 4
Form BUS > 5

Nominal length

- 100 mm > 1
160 mm > 2
250 mm > 5
400 mm > 8
other lengths available on request > 9

Output

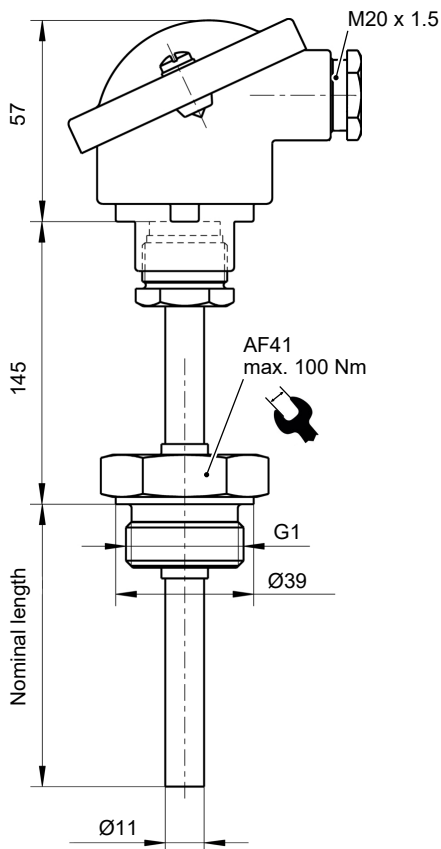
- Resistance output on the terminal > K
2-wire transmitter 4-20 mA/24 Vdc* > L
(*only possible with basic type 1xPt100/3-wire)

Measuring range of the 2-L transmitter

- without transmitter in the connector head > 0 0
- 50 ... 0 °C > 1 0
- 50 ... 50 °C > 2 0
- 0 ... 50 °C > 3 0
- 0 ... 100 °C > 4 0
- 0 ... 150 °C > 5 0
- 0 ... 200 °C > 6 0
- 0 ... 300 °C > 7 0
- 0 ... 400 °C > 8 0

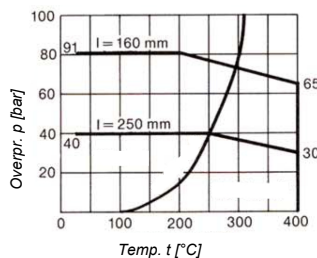
3 TW31 Screw-in resistance thermometer

Type C DIN 43765 (for higher pressure and flow loads)



Mechanical and thermal load-bearing capacity of the protective tube

Form 2G, DIN 43772
Diagram 2



Material 1.4571
(X6CrNiMoTi17122)

Permissible flow velocity:
40 m/s for air
5 m/s for water

Measuring element: Measuring insert in compliance with DIN 43762
Insertion tube stainless steel 1.4571
Measuring resistor 1x or 2x Pt100 DIN EN60751

Protective sleeve: in accordance with DIN 43772, Form 2G
Ø 11 mm; 2 mm wall thickness
Stainless steel 1.4571

Neck pipe: Ø 11 mm; 2 mm wall thickness; 145 mm length
Stainless steel 1.4571

Process connection: G1 screw thread to DIN 3852-2
Stainless steel 1.4571

Connection head: Standard: Type B in accordance with DIN 43729

Max. measurement temperature: +400°C

Max. temperature in the connection head: +80°C

Order codes

T W 3 1 0 0

Base type

Meas. insert with 1x Pt100/2-wire... > A
Meas. insert with 1x Pt100/3-wire... > B
Meas. insert with 1x Pt100/4-wire... > C
Meas. insert with 2xPt100/2-wire... > D
Meas. insert with 2xPt100/3-wire... > E

Model

Form B (standard) > 1
Form BBK > 2
Form S79 > 3
Form BUSH > 4
Form BUS > 5

Nominal length

100 mm > 1
160 mm > 2
250 mm > 5
400 mm > 8
other lengths available on request > 9

Output

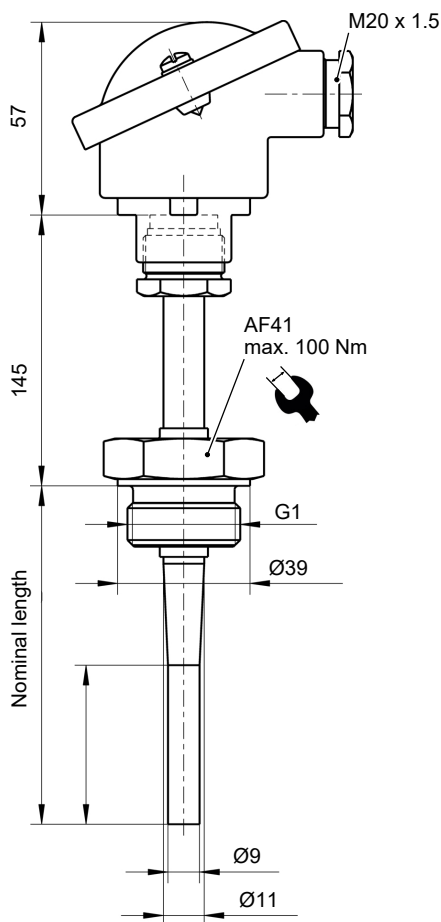
Resistance output on the terminal > K
2-wire transmitter 4-20 mA/24 Vdc* > L
(*only possible with basic type 1xPt100/3-wire)

Measuring range of the 2-L transmitter

without transmitter in the connector head.....	> 0	0
-50 ... 0 °C	> 1	0
-50 ... 50 °C	> 2	0
0 ... 50 °C	> 3	0
0 ... 100 °C	> 4	0
0 ... 150 °C	> 5	0
0 ... 200 °C	> 6	0
0 ... 300 °C	> 7	0
0 ... 400 °C	> 8	0

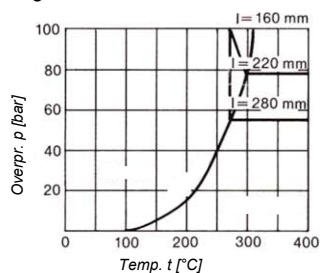
4 TW32 Screw-in resistance thermometer

Similar to type G, DIN 43766 (for higher pressure and flow loads)



Mechanical and thermal load-bearing capacity of the protective tube

Form 3G, DIN 43772
Diagram 3



Material 1.4571
(X6CrNiMoTi17122)

Permissible flow velocity:
40 m/s for air
5 m/s for water

- Measuring element: Measuring insert in compliance with DIN 43762
Insertion tube stainless steel 1.4571
Measuring resistor 1x or 2x Pt100 DIN EN60751
- Protective sleeve: Based on DIN 43772, Form 3G
Ø 12 mm; 2,75 mm wall thickness
Tapered to Ø 9 mm
Stainless steel 1.4571
- Neck pipe: Ø 12 mm; 2.75 mm wall thickness; 145 mm length
Stainless steel 1.4571
- Process connection: G1 screw thread to DIN 3852-2
Stainless steel 1.4571
- Connection head: Standard: Type B in accordance with DIN 43729
- Max. measurement temperature: +400°C
- Max. temperature in the connection head: +80°C

Order codes

T W 3 2 [] [] [] 0 [] 0 [] []

Base type

- Meas. insert with 1x Pt100/2-wire... > A
Meas. insert with 1x Pt100/3-wire... > B
Meas. insert with 1x Pt100/4-wire... > C
Meas. insert with 2xPt100/2-wire... > D
Meas. insert with 2xPt100/3-wire... > E

Model

- Form B (standard) > 1
Form BBK > 2
Form S79 > 3
Form BUSH > 4
Form BUS > 5

Nominal length

- 160 mm > 2
250 mm > 5
400 mm > 8
other lengths available on request > 9

Output

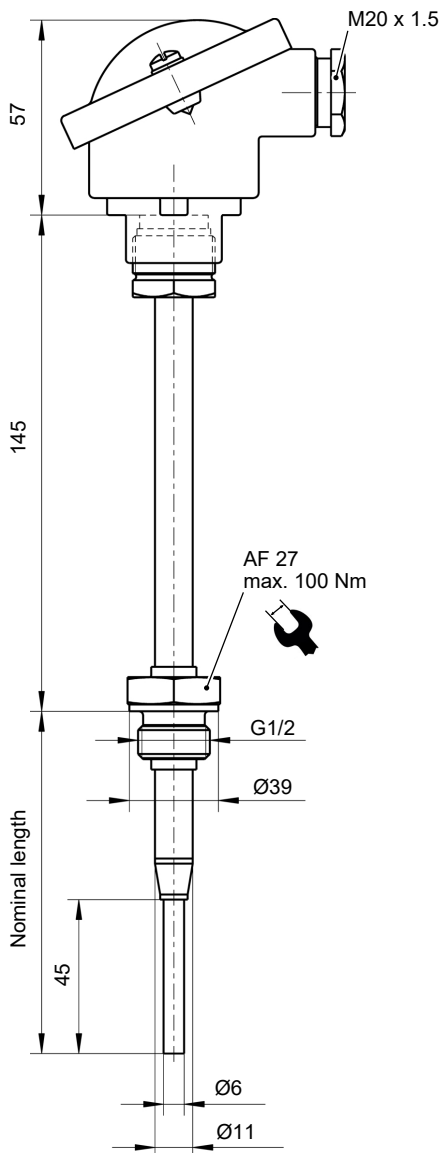
- Resistance output on the terminal > K
2-wire transmitter 4-20 mA/24 Vdc* > L
(*only possible with basic type 1xPt100/3-wire)

Measuring range of the 2-L transmitter

- without transmitter in the connector head > 0 0
- 50 ... 0 °C > 1 0
- 50 ... 50 °C > 2 0
- 0 ... 50 °C > 3 0
- 0 ... 100 °C > 4 0
- 0 ... 150 °C > 5 0
- 0 ... 200 °C > 6 0
- 0 ... 300 °C > 7 0
- 0 ... 400 °C > 8 0

5 TW35 Screw-in resistance thermometer

Lightweight version (for pressures up to 10 bar and moderate flow loads)



Mechanical load-bearing capacity of the protective tube

Overpressure of 10 bar at 400°C
Permissible flow velocity:
25 m/s for air
3 m/s for water

Measuring element:	Measuring insert to DIN 43762 (non-replaceable) Insert tube, stainless steel 1.4571 Measuring resistor, 1x or 2x Pt100 to DIN EN 60751
Protective sleeve:	Ø 11 mm; 1 mm wall thickness Tapered to Ø 6 mm Stainless steel 1.4571
Neck pipe:	Ø 11 mm; 1 mm wall thickness; 145 mm length Stainless steel 1.4571
Process connection:	G1/2 screw thread to DIN 3852-2 Stainless steel 1.4571
Connection head:	Standard: Type B in accordance with DIN 43729
Max. measurement temperature:	+400°C
Max. temperature in the connection head:	+80°C

Order codes

T	W	3	5				0		0		
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Base type

Meas. insert with 1x Pt100/2-wire...	> A
Meas. insert with 1x Pt100/3-wire...	> B
Meas. insert with 1x Pt100/4-wire...	> C
Meas. insert with 2xPt100/2-wire...	> D
Meas. insert with 2xPt100/3-wire...	> E

Model

Form B (standard)	> 1
Form BBK	> 2
Form S79	> 3
Form BUSH	> 4
Form BUS	> 5

Nominal length

100 mm	> 1
220 mm	> 2
300 mm	> 5
other lengths available on request	> 9

Output

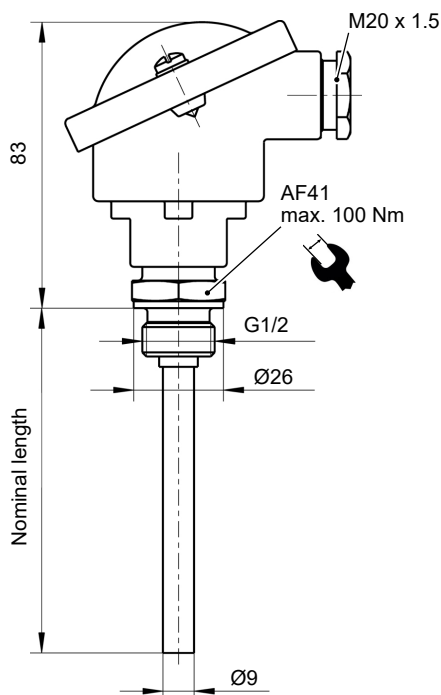
Resistance output on the terminal	> K
2-wire transmitter 4-20 mA/24 Vdc*	> L
(*only possible with basic type 1xPt100/3-wire)	

Measuring range of the 2-L transmitter

without transmitter in the connector head	> 0	0
-50 ... 0 °C	> 1	0
-50 ... 50 °C	> 2	0
0 ... 50 °C	> 3	0
0 ... 100 °C	> 4	0
0 ... 150 °C	> 5	0
0 ... 200 °C	> 6	0
0 ... 300 °C	> 7	0
0 ... 400 °C	> 8	0

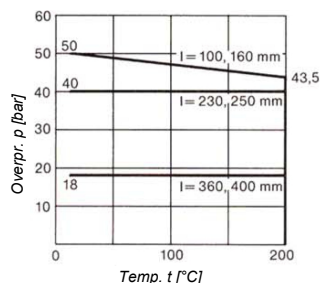
6 TW36 Screw-in resistance thermometer

for medium pressure and flow loads



Mechanical and thermal load-bearing capacity of the protective tube

Form 2G, DIN 43772
Diagram 6



Material 1.4571
(X6CrNiMoTi17122)

Permissible flow velocity:
25 m/s for air
3 m/s for water

Measuring element:	Measuring insert in compliance with DIN 43762 Insertion tube stainless steel 1.4571 Measuring resistor 1x or 2x Pt100 DIN EN60751
Protective sleeve:	in accordance with DIN 43772, Form 2G Ø 9 mm; 1 mm wall thickness Stainless steel 1.4571
Neck pipe:	None
Process connection:	G1/2 screw thread to DIN 3852-2 Stainless steel 1.4571
Connection head:	Standard: Type B in accordance with DIN 43729
Max. measurement temperature:	+200°C
Max. temperature in the connection head:	+80°C

Order codes

T	W	3	6				0		0		
---	---	---	---	--	--	--	---	--	---	--	--

Base type

Meas. insert with 1x Pt100/2-wire...	> A
Meas. insert with 1x Pt100/3-wire...	> B
Meas. insert with 1x Pt100/4-wire...	> C
Meas. insert with 2xPt100/2-wire...	> D
Meas. insert with 2xPt100/3-wire...	> E

Model

Form B (standard)	> 1
Form BBK	> 2
Form S79	> 3
Form BUSH	> 4
Form BUS	> 5

Nominal length

160 mm	> 2
220 mm	> 5
280 mm	> 8
other lengths available on request	> 9

Output

Resistance output on the terminal	> K
2-wire transmitter 4-20 mA/24 Vdc*	> L

(*only possible with basic type 1xPt100/3-wire)

Measuring range of the 2-L transmitter

without transmitter in the connector head	> 0	0
-50 ... 0 °C	> 1	0
-50 ... 50 °C	> 2	0
0 ... 50 °C	> 3	0
0 ... 100 °C	> 4	0
0 ... 150 °C	> 5	0
0 ... 200 °C	> 6	0

7 Annex

7.1 Basic specifications for Pt100 resistance thermometers

The DIN EN 60751 standard uses the following functional relationships between temperature and resistance.

1. For the temperature range -200°C to 0°C:

$$R_t = R_0 [1 + At + Bt^2 + C(t-100^\circ\text{C})t^3]$$

2. For the temperature range 0°C to 850°C

$$R_t = R_0 (1 + At + Bt^2)$$

The following applies:

R_0 := the resistance in ohms at $t = 0^\circ\text{C}$

R_t := the resistance at the measured temperature t in $^\circ\text{C}$

The following values apply for the coefficients:

$$A := 3.9083 \times 10^{-3} \text{ } ^\circ\text{C}^{-1}$$

$$B := -5.775 \times 10^{-7} \text{ } ^\circ\text{C}^{-2}$$

$$C := -4.183 \times 10^{-12} \text{ } ^\circ\text{C}^{-4}$$

These equations and coefficients are used to calculate the table of resistance values for a platinum resistor with $R_0 = 100 \text{ } \Omega$.

Resistance at a temperature of $t_{\text{ITS90}} / ^\circ\text{C} [\Omega]$											
ITS90	0	-1	-2	-3	-4	-5	-6	-7	-8	-9	ITS90
-200	18.52										
-190	22.83	22.40	21.97	21.54	21.11	20.68	20.25	19.82	19.38	18.95	-190
-180	27.10	26.67	26.24	25.82	25.39	24.97	24.54	24.11	23.68	23.25	-180
-170	31.34	30.91	30.49	30.07	29.64	29.22	28.80	28.37	27.95	27.52	-170
-160	35.54	35.12	34.70	34.28	33.86	33.44	33.02	32.60	32.18	31.76	-160
-150	39.72	39.31	38.89	38.47	38.05	37.64	37.22	36.80	36.38	35.96	-150
-140	43.88	43.46	43.05	42.63	42.22	41.80	41.39	40.97	40.56	40.14	-140
-130	48.00	47.59	47.18	46.77	46.36	45.94	45.53	45.12	44.70	44.29	-130
-120	52.11	51.70	51.29	50.88	50.47	50.06	49.65	49.24	48.83	48.42	-120
-110	56.19	55.79	55.38	54.97	54.56	54.15	53.75	53.34	52.93	52.52	-110
-100	60.26	59.85	59.44	59.04	58.63	58.23	57.82	57.41	57.01	56.60	-100
-90	64.30	63.90	63.49	63.09	62.68	62.28	61.88	61.47	61.07	60.66	-90
-80	68.33	67.92	67.52	67.12	66.72	66.31	65.91	65.51	65.11	64.70	-80
-70	72.33	71.93	71.53	71.13	70.73	70.33	69.93	69.53	69.13	68.73	-70
-60	76.33	75.93	75.53	75.13	74.73	74.33	73.93	73.53	73.13	72.73	-60
-50	80.31	79.91	79.51	79.11	78.72	78.32	77.92	77.52	77.12	76.73	-50
-40	84.27	83.87	83.48	83.08	82.69	82.29	81.89	81.50	81.10	80.70	-40
-30	88.22	87.83	87.43	87.04	86.64	86.25	85.85	85.46	85.06	84.67	-30
-20	92.16	91.77	91.37	90.98	90.59	90.19	89.80	89.40	89.01	88.62	-20
-10	96.09	95.69	95.30	94.91	94.52	94.12	93.73	93.34	92.95	92.55	-10
0	100.00	99.61	99.22	98.83	98.44	98.04	97.65	97.26	96.87	96.48	0

Resistance at a temperature of t_{ITS90} / °C [Ω]											
ITS90	0	1	2	3	4	5	6	7	8	9	ITS90
0	100.00	100.39	100.78	101.17	101.56	101.95	102.34	102.73	103.12	103.51	0
10	103.90	104.29	104.68	105.07	105.46	105.85	106.24	106.63	107.02	107.40	10
20	107.79	108.18	108.57	108.96	109.35	109.73	110.12	110.51	110.90	111.29	20
30	111.67	112.06	112.45	112.83	113.22	113.61	114.00	114.38	114.77	115.15	30
40	115.54	115.93	116.31	116.70	117.08	117.47	117.86	118.24	118.63	119.01	40
50	119.40	119.78	120.17	120.55	120.94	121.32	121.71	122.09	122.47	122.86	50
60	123.24	123.63	124.01	124.39	124.78	125.16	125.54	125.93	126.31	126.69	60
70	127.08	127.46	127.84	128.22	128.61	128.99	129.37	129.75	130.13	130.52	70
80	130.90	131.28	131.66	132.04	132.42	132.80	133.18	133.57	133.95	134.33	80
90	134.71	135.09	135.47	135.85	136.23	136.61	136.99	137.37	137.75	138.13	90
100	138.51	138.88	139.26	139.64	140.02	140.40	140.78	141.16	141.54	141.91	100
110	142.29	142.67	143.05	143.43	143.80	144.18	144.56	144.94	145.31	145.69	110
120	146.07	146.44	146.82	147.20	147.57	147.95	148.33	148.70	149.08	149.46	120
130	149.83	150.21	150.58	150.96	151.33	151.71	152.08	152.46	152.83	153.21	130
140	153.58	153.96	154.33	154.71	155.08	155.46	155.83	156.20	156.58	156.95	140
150	157.33	157.70	158.07	158.45	158.82	159.19	159.56	159.94	160.31	160.68	150
160	161.05	161.43	161.80	162.17	162.54	162.91	163.29	163.66	164.03	164.40	160
170	164.77	165.14	165.51	165.89	166.26	166.63	167.00	167.37	167.74	168.11	170
180	168.48	168.85	169.22	169.59	169.96	170.33	170.70	171.07	171.43	171.80	180
190	172.17	172.54	172.91	173.28	173.65	174.02	174.38	174.75	175.12	175.49	190
200	175.86	176.22	176.59	176.96	177.33	177.69	178.06	178.43	178.79	179.16	200
210	179.53	179.89	180.26	180.63	180.99	181.36	181.72	182.09	182.46	182.82	210
220	183.19	183.55	183.92	184.28	184.65	185.01	185.38	185.74	186.11	186.47	220
230	186.84	187.20	187.56	187.93	188.29	188.66	189.02	189.38	189.75	190.11	230
240	190.47	190.84	191.20	191.56	191.92	192.29	192.65	193.01	193.37	193.74	240
250	194.10	194.46	194.82	195.18	195.55	195.91	196.27	196.63	196.99	197.35	250
260	197.71	198.07	198.43	198.79	199.15	199.51	199.87	200.23	200.59	200.95	260
270	201.31	201.67	202.03	202.39	202.75	203.11	203.47	203.83	204.19	204.55	270
280	204.90	205.26	205.62	205.98	206.34	206.70	207.05	207.41	207.77	208.13	280
290	208.48	208.84	209.20	209.56	209.91	210.27	210.63	210.98	211.34	211.70	290
300	212.05	212.41	212.76	213.12	213.48	213.83	214.19	214.54	214.90	215.25	300
310	215.61	215.96	216.32	216.67	217.03	217.38	217.74	218.09	218.44	218.80	310
320	219.15	219.51	219.86	220.21	220.57	220.92	221.27	221.63	221.98	222.33	320
330	222.68	223.04	223.39	223.74	224.09	224.45	224.80	225.15	225.50	225.85	330
340	226.21	226.56	226.91	227.26	227.61	227.96	228.31	228.66	229.02	229.37	340
350	229.72	230.07	230.42	230.77	231.12	231.47	231.82	232.17	232.52	232.87	350
360	233.21	233.56	233.91	234.26	234.61	234.96	235.31	235.66	236.00	236.35	360
370	236.70	237.05	237.40	237.74	238.09	238.44	238.79	239.13	239.48	239.83	370
380	240.18	240.52	240.87	241.22	241.56	241.91	242.26	242.60	242.95	243.29	380
390	243.64	243.99	244.33	244.68	245.02	245.37	245.71	246.06	246.40	246.75	390

Resistance at a temperature of t_{ITS90} /°C [Ω]											
ITS90	0	1	2	3	4	5	6	7	8	9	ITS90
400	247.09	247.44	247.78	248.13	248.47	248.81	249.16	249.50	249.85	250.19	400
410	250.53	250.88	251.22	251.56	251.91	252.25	252.59	252.93	253.28	253.62	410
420	253.96	254.30	254.65	254.99	255.33	255.67	256.01	256.35	256.70	257.04	420
430	257.38	257.72	258.06	258.40	258.74	259.08	259.42	259.76	260.10	260.44	430
440	260.78	261.12	261.46	261.80	262.14	262.48	262.82	263.16	263.50	263.84	440
450	264.18	264.52	264.86	265.20	265.53	265.87	266.21	266.55	266.89	267.22	450
460	267.56	267.90	268.24	268.57	268.91	269.25	269.59	269.92	270.26	270.60	460
470	270.93	271.27	271.61	271.94	272.28	272.61	272.95	273.29	273.62	273.96	470
480	274.29	274.63	274.96	275.30	275.63	275.97	276.30	276.64	276.97	277.31	480
490	277.64	277.98	278.31	278.64	278.98	279.31	279.64	279.98	280.31	280.64	490
500	280.98	281.31	281.64	281.98	282.31	282.64	282.97	283.31	283.64	283.97	500
510	284.30	284.63	284.97	285.30	285.63	285.96	286.29	286.62	286.95	287.29	510
520	287.62	287.95	288.28	288.61	288.94	289.27	289.60	289.93	290.26	290.59	520
530	290.92	291.25	291.58	291.91	292.24	292.56	292.89	293.22	293.55	293.88	530
540	294.21	294.54	294.86	295.19	295.52	295.85	296.18	296.50	296.83	297.16	540
550	297.49	297.81	298.14	298.47	298.80	299.12	299.45	299.78	300.10	300.43	550
560	300.75	301.08	301.41	301.73	302.06	302.38	302.71	303.03	303.36	303.69	560
570	304.01	304.34	304.66	304.98	305.31	305.63	305.96	306.28	306.61	306.93	570
580	307.25	307.58	307.90	308.23	308.55	308.87	309.20	309.52	309.84	310.16	580
590	310.49	310.81	311.13	311.45	311.78	312.10	312.42	312.74	313.06	313.39	590
600	313.71	314.03	314.35	314.67	314.99	315.31	315.64	315.96	316.28	316.60	600
610	316.92	317.24	317.56	317.88	318.20	318.52	318.84	319.16	319.48	319.80	610
620	320.12	320.43	320.75	321.07	321.39	321.71	322.03	322.35	322.67	322.98	620
630	323.30	323.62	323.94	324.26	324.57	324.89	325.21	325.53	325.84	326.16	630
640	326.48	326.79	327.11	327.43	327.74	328.06	328.38	328.69	329.01	329.32	640
650	329.64	329.96	330.27	330.59	330.90	331.22	331.53	331.85	332.16	332.48	650
660	332.79	333.11	333.42	333.74	334.05	334.36	334.68	334.99	335.31	335.62	660
670	335.93	336.25	336.56	336.87	337.18	337.50	337.81	338.12	338.44	338.75	670
680	339.06	339.37	339.69	340.00	340.31	340.62	340.93	341.24	341.56	341.87	680
690	342.18	342.49	342.80	343.11	343.42	343.73	344.04	344.35	344.66	344.97	690
700	345.28	345.59	345.90	346.21	346.52	346.83	347.14	347.45	347.76	348.07	700
710	348.38	348.69	348.99	349.30	349.61	349.92	350.23	350.54	350.84	351.15	710
720	351.46	351.77	352.08	352.38	352.69	353.00	353.30	353.61	353.92	354.22	720
730	354.53	354.84	355.14	355.45	355.76	356.06	356.37	356.67	356.98	357.28	730
740	357.59	357.90	358.20	358.51	358.81	359.12	359.42	359.72	360.03	360.33	740
750	360.64	360.94	361.25	361.55	361.85	362.16	362.46	362.76	363.07	363.37	750
760	363.67	363.98	364.28	364.58	364.89	365.19	365.49	365.79	366.10	366.40	760
770	366.70	367.00	367.30	367.60	367.91	368.21	368.51	368.81	369.11	369.41	770
780	369.71	370.01	370.31	370.61	370.91	371.21	371.51	371.81	372.11	372.41	780
790	372.71	373.01	373.31	373.61	373.91	374.21	374.51	374.81	375.11	375.41	790

Resistance at a temperature of t_{ITS90} / °C [Ω]											
ITS90	0	1	2	3	4	5	6	7	8	9	ITS90
800	375.70	376.00	376.30	376.60	376.90	377.19	377.49	377.79	378.09	378.39	800
810	378.68	378.98	379.28	379.57	379.87	380.17	380.46	380.76	381.06	381.35	810
820	381.65	381.95	382.24	382.54	382.83	383.13	383.42	383.72	384.01	384.31	820
830	384.60	384.90	385.19	385.49	385.78	386.08	386.37	386.67	386.96	387.25	830
840	387.55	387.84	388.14	388.43	388.72	389.02	389.31	389.60	389.90	390.19	840
850	390.48										850

7.2 Deviations from the limit values for Pt100 resistance thermometers

The tolerance limits for Pt100 temperature sensors are specified in accordance with DIN EN 60751:

Class	Valid range [°C]		Limit deviation [°C]
	Wire-wound resistors	Sheet resistances	
Class AA	-50 to +250	0 to +150	$\pm (0.10 + 0.0017 \times t)$
Class A	-100 to +450	-30 to +300	$\pm (0.15 + 0.002 \times t)$
Class B	-196 to +600	-50 to +600	$\pm (0.30 + 0.005 \times t)$

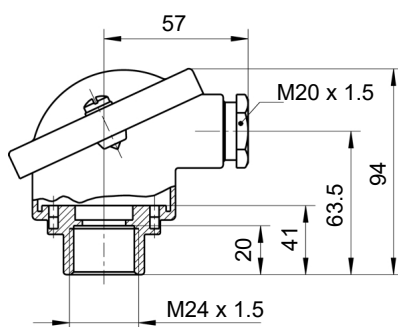
ITS90	Class AA		Class A		Class B	
[°C]	[°C]	Ω	[°C]	Ω	[°C]	Ω
-200	-	-	-	-	-	-
-196	-	-	-	-	1.28	0.50
-100	-	-	0.35	0.14	0.80	0.31
-50	-	-	0.25	0.10	0.55	0.21
-30	-	-	0.21	0.08	0.45	0.18
0	0.10	0.04	0.15	0.06	0.30	0.12
50	0.19	0.07	0.25	0.10	0.55	0.21
100	0.27	0.11	0.35	0.14	0.80	0.31
150	0.36	0.14	0.45	0.18	1.05	0.41
200	-	-	0.55	0.21	1.30	0.51
300	-	-	0.75	0.29	1.80	0.70
400	-	-	0.95	0.37	2.30	0.90
450	-	-	1.05	0.41	2.55	1.00
600	-	-	-	-	3.30	1.29
800	-	-	-	-	-	-

7.3 Connection heads

(all connection dimensions in accordance with DIN EN 50446)

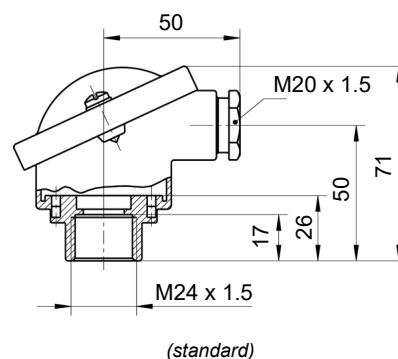
Form A

Material: Die-cast aluminium
Cover: Ø90, 2 screws
Seal: Rubber
Protection class: IP54



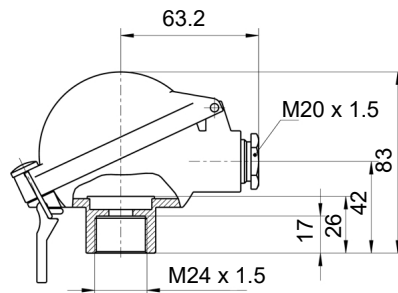
Form B

Material: Die-cast aluminium
Cover: Ø70, 2 screws
Seal: Rubber
Protection class: IP54

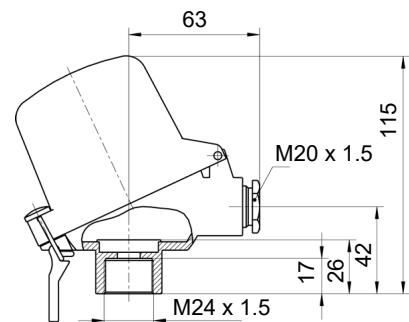


Form BUS

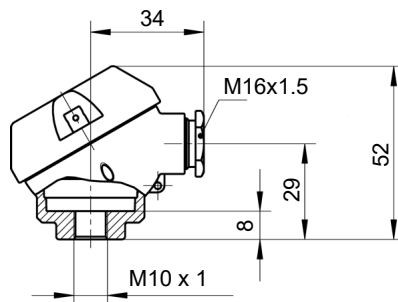
Material: Die-cast aluminium
 Cover: Ø83, hinged lid
 Seal: Silicon
 Protection class: IP65

**Form BUSH**

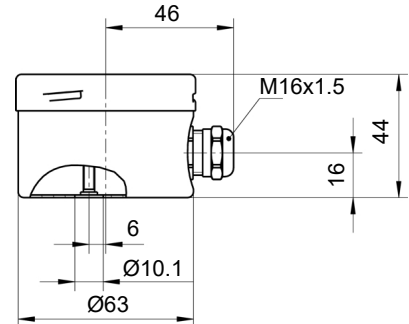
Material: Die-cast aluminium
 Cover: Ø71, hinged lid
 Seal: Silicon
 Protection class: IP65

**Form F**

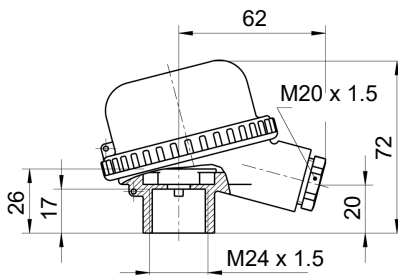
Material: Die-cast aluminium
 Cover: Ø48.5, 2 screws
 Seal: Rubber
 Protection class: IP54

**Form S79**

Material: Stainless steel 1.4301
 Cover: Ø64, bayonet mount
 Seal: NBR
 Protection class: IP65

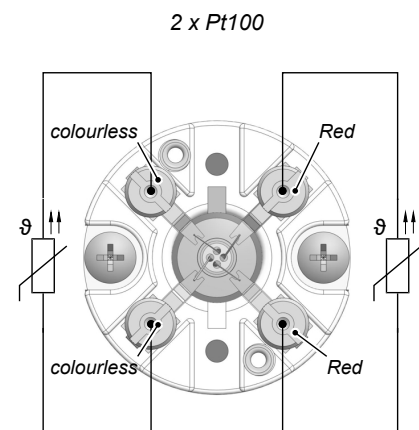
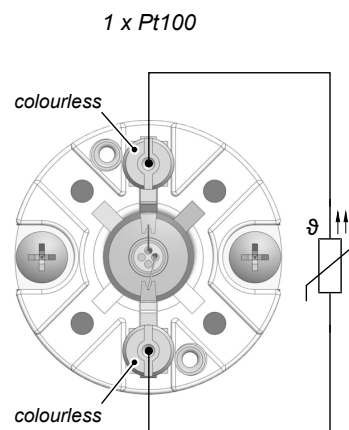
**Form BKK**

Material: Polyamide (max. 120°C)
 Cover: Ø76, screw cap
 Seal: Rubber
 Protection class: IP54

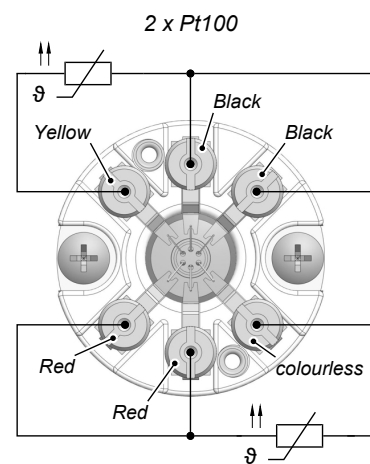
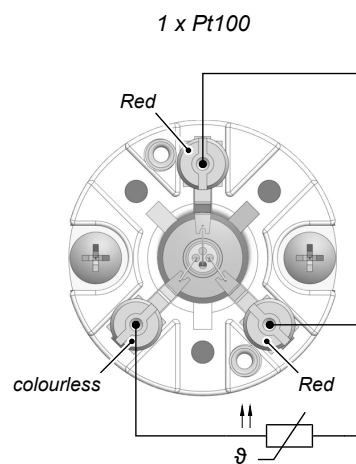


7.4 Pin assignment

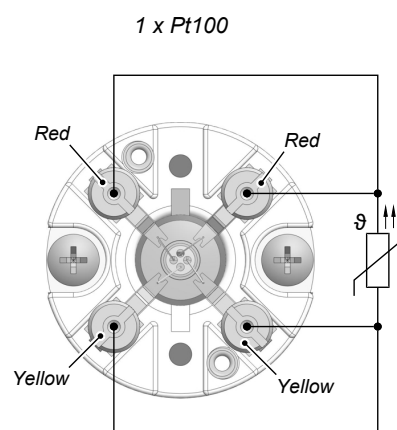
2-wire



3-wire

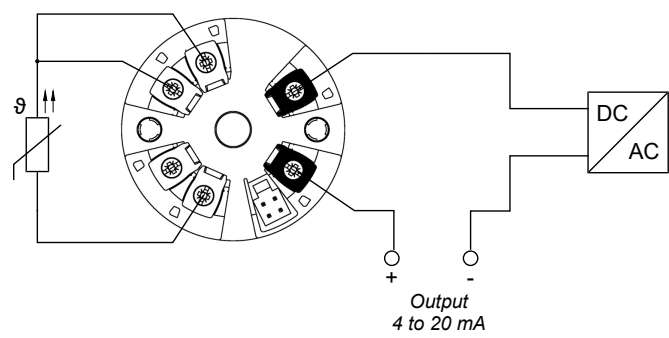


4-wire



Transmitter

1x Pt100 / 3-wire measuring insert + transmitter





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