

Indication ranges, measuring ranges, smallest subdivision and error limits class 1 acc. to DIN EN 13 190				
Indication range °C	Measuring range 0-°C	Smallest subdivision °C	Error limits acc. to class 1, +/- °C	Available for measuring units
0 -- 60 °C	10 -- 50 °C	1	1	Bimetal
0 -- 80 °C	10 -- 70 °C	1	1	Bimetal and Gas-actuated
0 -- 100 °C	10 -- 90 °C	1	1	
0 -- 120 °C	10 -- 110 °C	2	2	
0 -- 160 °C	20 -- 140 °C	2	2	
0 -- 200 °C	20 -- 180 °C	2	2	
0 -- 250 °C	30 -- 220 °C	5	2.5	
0 -- 300 °C	30 -- 270 °C	5	5	
0 -- 400 °C	50 -- 350 °C	10	5	
0 -- 500 °C	50 -- 450 °C	10	5	
0 -- 600 °C	100 -- 500 °C	10	10	
-100 -- 100 °C	-80 -- -80 °C	2	2	Gas-actuated
-50 -- 50 °C	-40 -- -40 °C	1	1	Bimetal and Gas-actuated
-40 -- 40 °C	-30 -- -30 °C	1	1	
-40 -- 60 °C	-30 -- -50 °C	1	1	
-30 -- 50 °C	-20 -- -40 °C	1	1	
-30 -- 70 °C	-20 -- -60 °C	1	1	Bimetal
-20 -- 40 °C	10 -- -30 °C	1	1	
-20 -- 60 °C	-10 -- -50 °C	1	1	Bimetal and Gas-actuated
-20 -- 80 °C	-10 -- -70 °C	1	1	
50 -- 300 °C	80 -- 270 °C	5	2.5	Gas-actuated
50 -- 400 °C	100 -- 350 °C	5	5	
100 -- 500 °C	150 -- 450 °C	10	5	

Indication ranges, measuring ranges, smallest subdivision and error limits class 1 acc. to DIN EN 13 190				
Indication range °F	Measuring range 0-°F	Smallest subdivision °F	Error limits acc. to class 1, +/- °F	Available for measuring units
0 -- 150 °F	20 -- 130 °F	2	1.8	Bimetal and Gas-actuated
0 -- 200 °F	20 -- 180 °F	5	3.6	
0 -- 250 °F	20 -- 230 °F	5	3.6	
0 -- 300 °F	40 -- 260 °F	5	3.6	
-50 -- 130 °F	-30 -- 110 °F	2	1.8	
-40 -- 160 °F	-20 -- 140 °F	5	3.6	
-30 -- 120 °F	-10 -- 100 °F	2	1.8	
-10 -- 100 °F	10 -- 80 °F	2	1.8	Bimetal
20 -- 240 °F	40 -- 220 °F	5	3.6	Bimetal and Gas-actuated
30 -- 140 °F	50 -- 120 °F	2	1.8	Bimetal
40 -- 400 °F	80 -- 360 °F	5	3.6	Bimetal and Gas-actuated
50 -- 300 °F	70 -- 280 °F	5	3.6	
50 -- 500 °F	100 -- 450 °F	5	4.5	
100 -- 800 °F	150 -- 750 °F	10	9.0	
100 -- 1000 °F	190 -- 910 °F	10	9.0	
150 -- 700 °F	200 -- 650 °F	10	9.0	

Bimetal Thermometers

All Stainless Steel, Case with crimped-on ring

Ø 63 mm (2½"), Ø 80 mm (3"), Ø 100 mm (4"), Ø 125 mm (5") and Ø 160 mm (6")

Lower connection (TBI), Back connection (TBIB) or Everyangle (TBIE)

Standard or liquid filled (L)

Models :

TBI / TBIB / TBIE

63 / 80 / 100 / 125 / 160

APPLICATIONS

Industrial temperature measurement, for fluid or gaseous media. The appropriate versions are suitable also for aggressive media as you find in chemical industries, petrochemistry, process technology or apparatus engineering, and for food and beverage industries.

NOMINAL HEAD DIAMETERS

Ø 63mm (2½"), Ø 80mm (3"), Ø 100mm (4"), Ø 125mm (5") and 160mm (6")

ACCURACY CLASS (DIN EN 13 190)

Accuracy 1.0 according to EN standard
(i.e. ± max. 1.0% of full span)

PRESSURE LIMITATIONS

25 bar (350 psi) static pressure at the stem
(thermowell required for higher pressure)

PROTECTION TYPE (EN 60529 / IEC 529)

IP 65

STANDARD CONFIGURATION

CASE AND BAYONET RING

304 stainless steel, crimped-on ring

STEM POSITION

Model TBI : Lower connection

Model TBIB : Centre back connection

Model TBIE : Centre back connection with everyangle

WINDOW

Single strength glass

STEM

Stainless steel 316 L

Ø 6 mm, Ø 8 mm, Ø 10 mm, Ø 12 mm, Ø 1/4"

stem length up to 450 mm

stem type and minimum stem length see page 39

MEASURING SYSTEM

Bimetallic coil



PROCES CONNECTION

1/2" NPT or 3/4" NPT

DIAL PLATE

Aluminum alloy, black figures, white background

POINTER

Aluminum black

ADJUSTMENT

± 4 % with adjustment screw from outside

SPECIAL CONFIGURATIONS

⇒ Other indication ranges or other units, e.g. °F or K, special scales such as dual ranges upon request

⇒ Other connection threads resp. connection types upon request

⇒ Thermowell or flange thermowell (see pages 49 or 50)

⇒ Red mark as moveable plastic clip on the outside of the ring

HOW TO ORDER :

Please select :

1. Model Code : TBI, TBIB or TBIE TBI
2. Nominal head diameter : 63 (2½"), 80 (3"), 100 (4"), 125 (5") and 160 (6") 100
3. STEM TYPE B3
 B1 : Plain Stem,
 B2 : Rigid Male Stem Connection thread
 B3 : Male Connection thread, adjustable on the Stem
4. If liquid filled, code letter : L —

EXAMPLE OF ORDER NUMBER

Thermometer everyangle

Dial size 100 mm

Range : 0-100 °C

Stem diameter : 6 mm

Stem length : 200 mm

Connection ½" NPT adjustable on the stem

order number : TBIE 100 B3, Ø 6 mm, L = 200 mm, ½" NPT

Bimetal Thermometers

All Stainless Steel, Case with crimped-on ring

Ø 63 mm (2½"), Ø 80 mm (3"), Ø 100 mm (4"), Ø 125 mm (5") and Ø 160 mm (6")

Lower connection (TBI), Back connection (TBIB) or Everyangle (TBIE)

Standard or liquid filled (L)

Models :

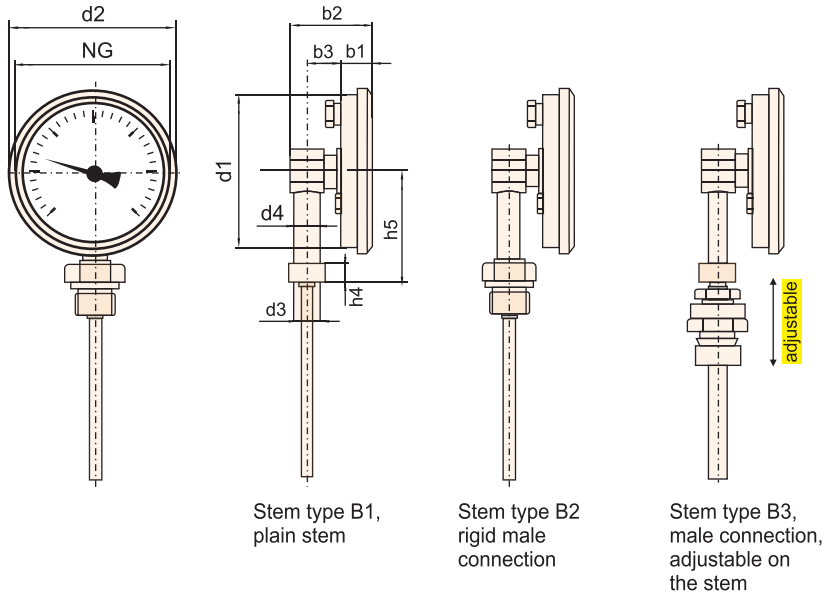
TBI / TBIB / TBIE

63 / 80 / 100 / 125 / 160

CASE CONFIGURATIONS AND DIMENSIONAL DATA

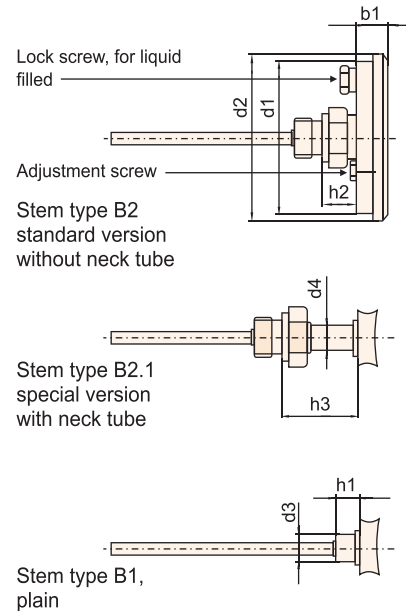
Model TBI

Lower stem position



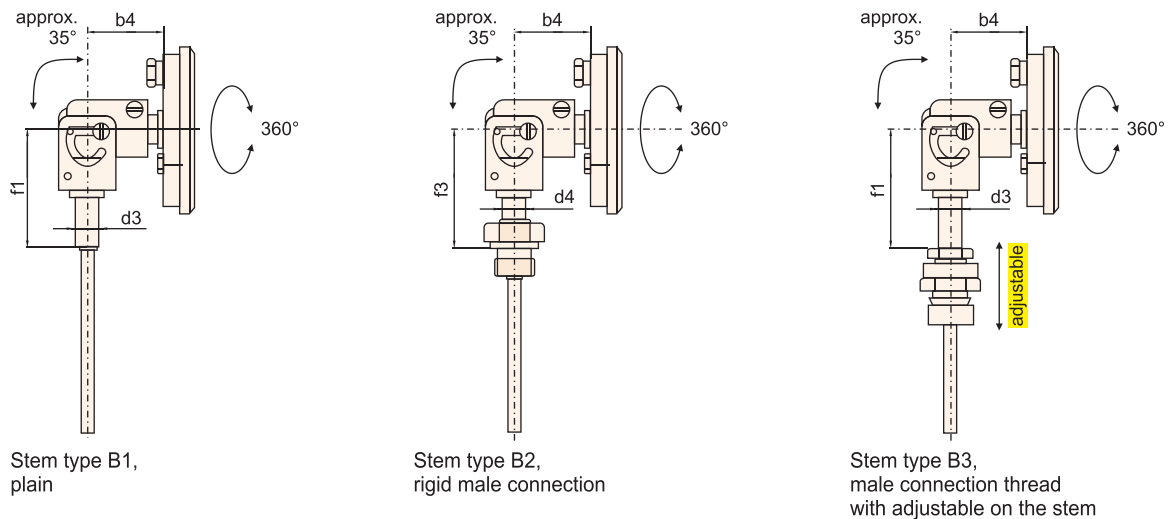
Model TBIB

Center Back Stem Position,



Model TBIE

Center back stem position, adjustable angle stainless steel, stem adjustment up to 135° and case rotation up to 360°



Dimensional Data (mm) and Weight (kg)

Nominal Case Size	b1	b2	b3	b4	d1	d2	d3	d4	f1	f3	h1	h2	h3	h4	h5	h6	Weight (approx.)		
																	TBI	TBIB	TBIE
63 mm (2½")	17	45			62	67									55	70	0.20	0.15	0.25
80 mm (3")	18	46	18.5	40	79	86	14	12	62	63	12.5	18.8	40	10.5	65	80	0.25	0.20	0.30
100 mm (4")					98	108									75	90	0.30	0.25	0.35
125 mm (5")	20.3	-	-	37	125	136				-	-	-	-	-	-	-	-	-	1.08

Bimetal Thermometers

All Stainless Steel, Case with crimped-on ring

Ø 63 mm (2½"), Ø 80 mm (3"), Ø 100 mm (4"), Ø 125 mm (5") and Ø 160 mm (6")

Lower connection (TBI), Back connection (TBIB) or Everyangle (TBIE)

Standard or liquid filled (L)

Models :

TBI / TBIB / TBIE

63 / 80 / 100 / 125 / 160

Standard Ranges Limits of Error, Minimum Immersion Length Stem

Nominal Range °C	Scale Subdivision °C	Minimum Immersion Length Stem ETmin		Nominal Range °F
		Ø 6 mm	Ø 8 mm	
-20 / +40	1	70	60	0 - 150
-20 / +60	1	60	40	0 - 200
-30 / +50	1	60	40	0 - 250
-40 / +40	1	60	40	0 - 300
-40 / +60	1	40	40	-50 / +130
0 - 60	1	70	60	-40 / +160
0 - 80	1	60	40	-30 / +120
0 - 100	1	40	40	-10 / +100
0 - 120	2	40	40	+20 / +240
0 - 160	2	40	40	+30 / +140
0 - 200	2	40	40	+40 / +400
0 - 250	2	40	40	+50 / +300
0 - 300	5	40	40	+50 / +500
0 - 400	5	40	40	+100 / +800
0 - 500	5	40	40	+100 / +1000
				+150 / +700

STEM TYPES AND CONNECTION TYPES

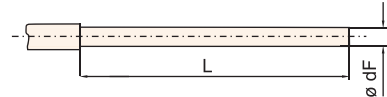
Thermowells or flange thermowell see pages 49 and 50

Material: Stem and connection pieces made of stainless steel 316 L

Stem type B 1

Plain stem (without thread connection)

Stem diameter dF: 6mm or 8 mm

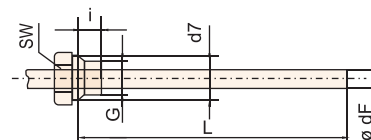


Minimum stem length $L_{min} = ET_{min}$

Stem type B 2

Rigid male connection thread

dF	G	SW	d7	i
mm 6, 8, 10, 12, 1/4"	½" NPT	24	-	19
	¾" NPT	27	-	19
	G ½ B ½" BSP-m	27	26	14
	G ¾ B ¾" BSP-m	32	32	16

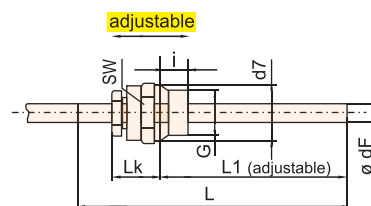


Minimum stem length $L_{min} = ET_{min} + l$

Stem type B3

Male thread connection, fitting adjustable on the stem

dF	G	SW	d7	i	Lk
mm 6, 8, 10, 12, 1/4"	½" NPT	24	-	19	approx 37
	¾" NPT	27	-	19	
	G ½ B ½" BSP-m	27	26	14	
	G ¾ B ¾" BSP-m	32	32	16	



Minimum stem length $L_{min} = ET_{min} + 55 \text{ mm}$

Gas-Actuated Thermometers, Rigid Stem

All Stainless Steel, Case with Bayonet Ring

Ø 63 mm (2 ½"), Ø 100 mm (4") and Ø 160 mm (6")

Standard or Liquid Filled (L)

Models :
TGI / TGIL
63 / 100 / 160

STANDARD VERSIONS

Measuring Unit

with nitrogen filling
(inert gas, physiological harmless)

Accuracy (EN 13 190)

Class 1

Case

With bayonet ring, 1.4301 (304 stainless steel)

Case Protection Type (EN 60 529 / IEC 529)

IP 65

Case Filling

For model TGIL : silicone oil

Nominal Case Sizes

TGI : 63, 100, 160 (mm) (2½", 4", 6")

TGIL : 63, 100, 160 (mm) (2½", 4", 6")

Case Configuration

Connection temperature

sensor (stem): rigid connection with neck tube

Stem position:

vertical bottom position,
optional: with angle (**w**, **wst**, **wl**, **wr**) or
centre back position (**rm**),
see page 2

Mounting device:

without,
optional: for centre back connection (**rm**),
back flange for surface
mounting (**Rh**), see page 2

Temperature Ranges (EN 13 190)

Temperature differences from 80 K to 600 K

Temperature Sensor (Stem)

1.4571 (316 stainless steel),

max. static operating pressure: 25 bar

Stem models: A1, A3, A4, A4.1, A5 or A6,

Stem- Ø dF: 6, 8, 10 or 12 mm

Stem length L resp. L1: Lmin resp. L1min up to max. 2.50 m

Please regard the minimum stem length against the active length (La) and stem model, see page 3.

Window

Instrument glass

Movement

Brass/German silver

Dial

Aluminum, black figures, white background

Pointer

Aluminum, black

Zero Adjustment (± 6%)

Externally by a screw



SPECIAL VERSIONS AND FURTHER OPTIONS AMONG OTHERS

- Other stem models, e. g.
 - without bent tube
 - with connection for food- / biotechnics / pharmaceutical industry,
 - Contact stem for temperature measurement at the outsides of the cases and pipe barrels up to 300 °C
- Other stem-Ø, connection thread and materials upon request
- Other temperature ranges and/or special scales, e.g. double scale °C/°F, coloured fields or areas, dial inscriptions, etc.
- Min.- or max.- drag indicator upon request
- Case parts 1.4404 (316 stainless steel) upon request
- Model TGI : for ambient temperatures up to -60 °C upon request
Model TGIL : for ambient temperatures up to -40 °C.
For ambient temperatures below -20°C we recommend: thermometers with crimped-on ring case model TGI resp. TGIL
- Position of connection at 3 o'clock, 9 o'clock, 12 o'clock, others upon request or other than vertical installation (90°)

ACCESSORIES

Mechanical:

Thermowells or flange thermowell see pages 49 and 50

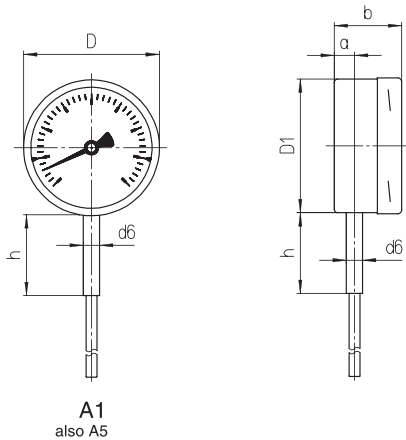
Electronical:

Limit switch contact assemblies, see page 17

Stem Position / Case Configurations, Code Letters, Dimensional Data and Weights

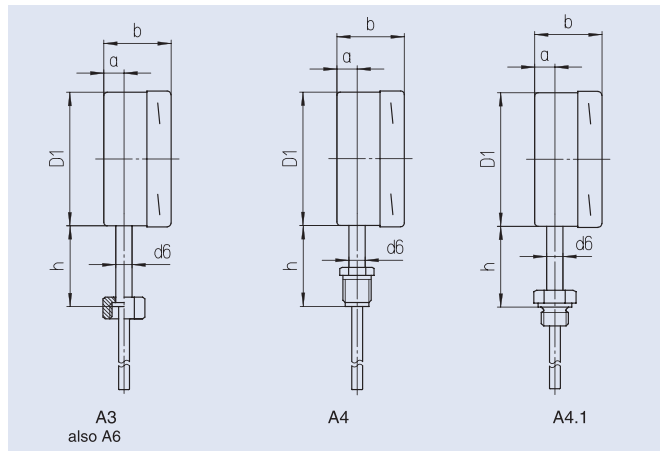
Vertical Bottom Stem Position

without additional code letters



Further Stem Models

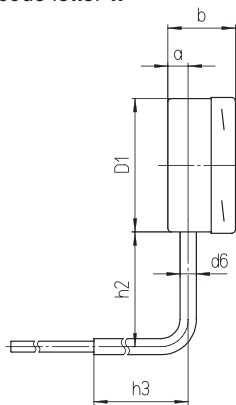
(demonstrated as example: vertical bottom stem position)



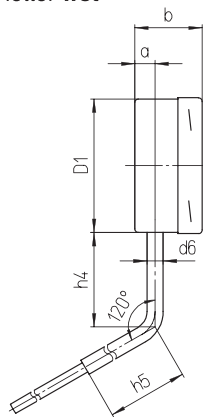
Vertical Bottom Stem Position with angle

with angle:

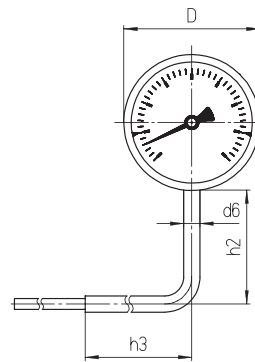
90° angled to the back,
code letter **w**



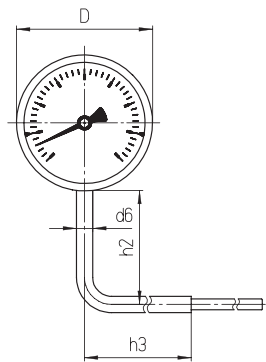
obtuse-angled to the back,
code letter **wst**



right-angled to the left,
code letters **wl**

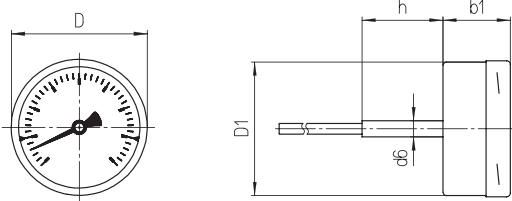


right-angled to the right,
code letters **wr**

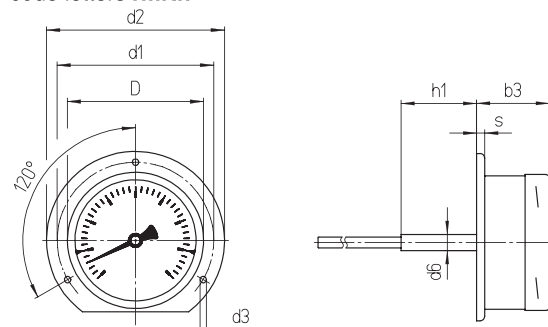


Centre Back Stem Position

code letters **rm**



with back flange for surface mounting (back flange),
code letters **rmRh**



Dimensional Data (mm / inches) and Weights (kg / lb)

NCS	a	b	b1	b3	D	D1	d1	d2	d3	d6	h ¹⁾	h1 ¹⁾	h2	h3	h4	h5	s	approx. weight ²⁾	
																		TGI	TGIL
63	12	39	39	42	64	62	75	85	3.6	12	60	57	85	120	70	120	5	0.24	0.32
2½"	.47	1.54	1.54	1.65	2.52	2.44	2.95	3.35	.14	.47	2.36	2.24	3.35	4.72	2.76	4.72	.2	0.53	0.70
100	15	50	50	53.5	101	99	116	132	4.8	12	60	56.5	85	120	70	120	6	0.46	0.72
3"	.59	1.97	1.97	2.10	3.98	3.9	4.57	5.2	.19	.47	2.36	2.22	3.35	4.72	2.76	4.72	.24	1.01	1.59
160	15	50	50	53	161	159	178	196	5.8	12	60	57	85 ³⁾	120	70 ³⁾	120	6	0.78	1.50
6"	.59	1.97	1.97	2.09	6.34	6.26	7.01	7.72	.23	.47	2.36	2.24	3.35	4.72	2.76	4.72	.24	1.72	3.30

¹⁾ Temperature range > 500 °C and above: +20 mm (0.79")

²⁾ The information is an example and relates on version with stem A1, Ø 10 mm (0.4"), length 200 mm (8").

Stem Models

Stem Models																																																																																									
Process connection:			without screw fitting, plain stem																																																																																						
Stem model:			A1																																																																																						
Form according to DIN 13 190:			Form 1																																																																																						
Stem material:			1.4571																																																																																						
Stem-Ø dF:			8, 10, 12																																																																																						
Order length:			L																																																																																						
Data sheet (suitable thermowell models):			8.8140 (SK1), 8.8141 (SK2)																																																																																						
Process connection:			Union nut		Male thread, turnable			Male thread, rigid																																																																																	
Stem model:			A3		A4			A4.1																																																																																	
Form according to DIN 13 190:			Form 5		Form 4			Form 6 (thread cylindrical) Form 7 (thread conical)																																																																																	
Stem material:			1.4571		1.4571			1.4571																																																																																	
Stem-Ø dF:			8, 10, 12		8, 10, 12			8, 10, 12																																																																																	
Screw fitting material:			1.4571		1.4571			1.4571																																																																																	
Order length:			L		L			L																																																																																	
Data sheet (suitable thermowell models):			8.8111 (SF4.1), 8.8113 (SF4.1F) 8.8130 (SF8), 8.8131 (SF9)		8.8110 (SF4), 8.8112 (SF4F) 8.8120 (SF5), 8.8121 (SF6+SF7)			8.8110 (SF4), 8.8112 (SF4F) 8.8120 (SF5), 8.8121 (SF6+SF7)																																																																																	
Thread (dimensions in mm):			<table><tr><th>G</th><th>SW</th><th>i</th></tr><tr><td>G ½</td><td>27</td><td>10</td></tr><tr><td>G ¾</td><td>32</td><td>12</td></tr><tr><td>M 20 x 1.5</td><td>27</td><td>10</td></tr><tr><td>M 24 x 1.5</td><td>32</td><td>12</td></tr><tr><td>M 27 x 2</td><td>32</td><td>12</td></tr></table>		G	SW	i	G ½	27	10	G ¾	32	12	M 20 x 1.5	27	10	M 24 x 1.5	32	12	M 27 x 2	32	12	<table><tr><th>G</th><th>SW</th><th>i</th></tr><tr><td>G ½ B</td><td>27</td><td>20</td></tr><tr><td>G ¾ B</td><td>32</td><td>23</td></tr><tr><td>M 18 x 1.5</td><td>22</td><td>14</td></tr><tr><td>M 20 x 1.5</td><td>27</td><td>20</td></tr></table>			G	SW	i	G ½ B	27	20	G ¾ B	32	23	M 18 x 1.5	22	14	M 20 x 1.5	27	20	Thermowell required!			<table><tr><th>G</th><th>SW</th><th>i</th></tr><tr><td>G ½ B</td><td>27</td><td>14</td></tr><tr><td>G ¾ B</td><td>32</td><td>16</td></tr><tr><td>½" NPT</td><td>27</td><td>19</td></tr><tr><td>¾" NPT</td><td>27</td><td>19</td></tr><tr><td>M 18 x 1.5</td><td>24</td><td>14</td></tr><tr><td>M 20 x 1.5</td><td>27</td><td>14</td></tr></table>			G	SW	i	G ½ B	27	14	G ¾ B	32	16	½" NPT	27	19	¾" NPT	27	19	M 18 x 1.5	24	14	M 20 x 1.5	27	14																						
G	SW	i																																																																																							
G ½	27	10																																																																																							
G ¾	32	12																																																																																							
M 20 x 1.5	27	10																																																																																							
M 24 x 1.5	32	12																																																																																							
M 27 x 2	32	12																																																																																							
G	SW	i																																																																																							
G ½ B	27	20																																																																																							
G ¾ B	32	23																																																																																							
M 18 x 1.5	22	14																																																																																							
M 20 x 1.5	27	20																																																																																							
G	SW	i																																																																																							
G ½ B	27	14																																																																																							
G ¾ B	32	16																																																																																							
½" NPT	27	19																																																																																							
¾" NPT	27	19																																																																																							
M 18 x 1.5	24	14																																																																																							
M 20 x 1.5	27	14																																																																																							
Process connection:			Male thread / compression			Male thread, turnable / double male adapter																																																																																			
Stem model:			A5 (= basic stem A1 with compression fitting)			A6 (= basic stem A3 with double male adapter)																																																																																			
Form according to DIN 13 190:			Form 2 (thread cylindrical) Form 3 (thread conical)			—																																																																																			
Stem material:			1.4571			1.4571																																																																																			
Stem-Ø dF:			8, 10, 12			8, 10, 12																																																																																			
Screw fitting material:			1.4571			1.4571																																																																																			
Order length:			L			L1																																																																																			
Data sheet (suitable thermowell models):			8.8110 (SF4), 8.8112 (SF4F) 8.8120 (SF5), 8.8121 (SF6+SF7)			8.8110 (SF4), 8.8112 (SF4F) 8.8120 (SF5), 8.8121 (SF6+SF7)																																																																																			
Thread (dimensions in mm):			<table><tr><th>G</th><th>SW1</th><th>SW2</th><th>i</th><th>Lk</th></tr><tr><td>G ½ B</td><td>27</td><td>22</td><td>14</td><td>42</td></tr><tr><td>G ¾ B</td><td>32</td><td>22</td><td>16</td><td>42</td></tr><tr><td>½" NPT</td><td>27</td><td>22</td><td>19</td><td>42</td></tr><tr><td>¾" NPT</td><td>27</td><td>22</td><td>19</td><td>42</td></tr><tr><td>M 20 x 1.5</td><td>27</td><td>22</td><td>14</td><td>42</td></tr></table>					G	SW1	SW2	i	Lk	G ½ B	27	22	14	42	G ¾ B	32	22	16	42	½" NPT	27	22	19	42	¾" NPT	27	22	19	42	M 20 x 1.5	27	22	14	42	<table><tr><th>G1</th><th>G2</th><th>SW1</th><th>SW2</th><th>i</th><th>Lv</th></tr><tr><td>G ½ B</td><td>G ½ B</td><td>27</td><td>27</td><td>14</td><td>28</td></tr><tr><td>G ¾ B</td><td>G ½ B</td><td>32</td><td>27</td><td>16</td><td>28</td></tr><tr><td>½" NPT</td><td>G ½ B</td><td>27</td><td>27</td><td>19</td><td>28</td></tr><tr><td>¾" NPT</td><td>G ½ B</td><td>27</td><td>27</td><td>19</td><td>28</td></tr><tr><td>M 20 x 1.5</td><td>M 20 x 1.5</td><td>27</td><td>27</td><td>14</td><td>28</td></tr><tr><td>M 24 x 1.5</td><td>M 20 x 1.5</td><td>32</td><td>27</td><td>14</td><td>28</td></tr><tr><td>M 27 x 2</td><td>M 20 x 1.5</td><td>32</td><td>27</td><td>16</td><td>28</td></tr></table>				G1	G2	SW1	SW2	i	Lv	G ½ B	G ½ B	27	27	14	28	G ¾ B	G ½ B	32	27	16	28	½" NPT	G ½ B	27	27	19	28	¾" NPT	G ½ B	27	27	19	28	M 20 x 1.5	M 20 x 1.5	27	27	14	28	M 24 x 1.5	M 20 x 1.5	32	27	14	28	M 27 x 2	M 20 x 1.5	32	27	16	28
G	SW1	SW2	i	Lk																																																																																					
G ½ B	27	22	14	42																																																																																					
G ¾ B	32	22	16	42																																																																																					
½" NPT	27	22	19	42																																																																																					
¾" NPT	27	22	19	42																																																																																					
M 20 x 1.5	27	22	14	42																																																																																					
G1	G2	SW1	SW2	i	Lv																																																																																				
G ½ B	G ½ B	27	27	14	28																																																																																				
G ¾ B	G ½ B	32	27	16	28																																																																																				
½" NPT	G ½ B	27	27	19	28																																																																																				
¾" NPT	G ½ B	27	27	19	28																																																																																				
M 20 x 1.5	M 20 x 1.5	27	27	14	28																																																																																				
M 24 x 1.5	M 20 x 1.5	32	27	14	28																																																																																				
M 27 x 2	M 20 x 1.5	32	27	16	28																																																																																				
Minimum Stem Length, Active Length and maximum realisable Stem Length																																																																																									
			up to max. 500 °C			500 °C and above																																																																																			
			Stem-Ø dF:			Stem-Ø dF:																																																																																			
Stem model:	Length:	Thread:	12	10	8	12	10	8																																																																																	
all models	La	all standard threads	35	45	75	75	105	165	The minimum length Lmin / L1min of the stem is the smallest possible stem length against the active length La (vessel) and the stem model. The active length La of the stem (vessel) has to immerse completely into the medium, to grant a measuring result, which corresponds to the accuracy class. The maximum realisable stem length is 2.50 m. Larger lengths are realisable with a capillary line, e. g. with special stems A3.2, A4.2 and A4.3																																																																																
A1 A3 A4	Lmin	all standard threads	55	65	95	95	125	185																																																																																	
A4.1	Lmin	G ½ B, M 18x1.5, M 20x1.5	49	59	89	89	119	179																																																																																	
		G ¾ B	51	61	91	91	121	181																																																																																	
		½" NPT, ¾" NPT	54	64	94	94	124	184																																																																																	
A5	Lmin	all standard threads	90	100	130	130	160	220																																																																																	
A6	L1min	G ½ B, M 20x1.5	49	59	89	89	119	179																																																																																	
		G ¾ B, M24x1.5, M27x2	51	61	91	91	121	181																																																																																	
		½" NPT, ¾" NPT	54	64	94	94	124	184																																																																																	
others			upon request			upon request																																																																																			

Ordering Information with Indication- and Temperature Ranges, Options

Basic Model:		Gas-actuated thermometers, rigid connection to stem	TGI
Case filling:	without		without code letters
	silicone oil		L
Nominal case size:	Case-Ø 63, 100, 160		63, 100, 160
Stem position / case configuration:	vertical bottom position		without code letters
	90° angled to the back		w
	obtuse-angled to the back		wst
	right-angled to the left		wl
	right-angled to the right		wr
	centre back position		rm
	centre back position, with back flange for surface mounting		rmRh
Temperature ranges:	scale:	Δ T (K):	
	0 — 80 °C	80	
	0 — 100 °C	100	e. g. 0-100 °C
	0 — 120 °C	120	
	0 — 160 °C	160	
	0 — 200 °C	200	
	0 — 250 °C	250	
	0 — 300 °C	300	
	0 — 400 °C	400	
	0 — 500 °C	500	
	0 — 600 °C	600	
	—100 / + 100 °C	200	
	—50 / + 50 °C	100	
	—40 / + 40 °C	80	
	—40 / + 60 °C	100	
	—30 / + 50 °C	80	e. g. -30/+50 °C
	—20 / + 60 °C	80	
	—20 / + 80 °C	100	
	+50 / +300 °C	250	
	+50 / +400 °C	350	
	+100 / +500 °C	400	
Stem:	without screw fitting, plain stem		A1
	union nut		A3
	male thread, turnable		A4
	male thread, rigid		A4.1
	male thread / compression fitting		A5
	male thread, turnable / double-male adapter		A6
Stem-Ø dF:	6, 8, 10 or 12 mm		dF 8, 10, 12
Stem length:	L resp. L1 in mm	e. g.	L = 100 mm
Process connection:	see page 3	e. g.	G ½ B
Options:	red mark	on the dial	
	plastic clip	red or green external at crimped-on ring for NCS 100 and 160	
	stationary red pointer	on the dial	
		adjustable when removable ring	
	window	laminated safety glass	
		acrylic glass (PMMA)	
		polycarbonate (PC) (not NCS 250)	
	movement stainless steel		
	case ventilation no.22 for outdoor installation		
	case polished		
	bayonet ring polished		
	TGI 63, 100, 160	copy of the certificate upon request	
	TGIL 63, 100, 160		
	measuring point	stainless steel-plate 12 mm x 55 mm (0.47" x 2.17"), wire mounting or	
	marking	sticker on case coverage	
			<i>(order at the moment still as cleartext)</i>

Example:

TGI 100 w, 0-100 °C, A3, dF 8, L = 100 mm, G ½

Special Versions: Please describe your requirements clearly

Gas-Actuated Thermometers, every angle

All Stainless Steel, Case with Bayonet Ring

Ø 63 mm (2 ½"), Ø 100 mm (4") and Ø 160 mm (6")

Standard or Liquid Filled (L)

Models :
TGIE / TGIEL
63 / 100 / 160

STANDARD VERSIONS

Measuring Unit

With nitrogen filling
(inert gas, physiological harmless)

Accuracy (EN 13 190)

Class 1

Case

With bayonet ring, 1.4301 (304 stainless steel)

Case Protection Type (EN 60 529 / IEC 529)

IP 65

Case Filling

For model TGIEL : silicone oil

Nominal Case Sizes

63, 100, 160 (mm) (2½", 4", 6")

Case Configuration

Connection Temperature

sensor (stem): pivot / every angle

Stem position:

centre back position,
compared to the case adjustable by 135°,
turnable by 360°

Mounting device : without

Temperature Ranges (EN 13 190)

Temperature differences from 80 K to 600 K

Temperature Sensor (Stem)

1.4571 (316 stainless steel),

max. static operating pressure: 25 bar

Stem models optionally: A1, A3, A4, A4.1, A5 or A6,

Stem- Ø dF: 6, 8, 10 or 12 mm

Stem length L: Lmin resp. L1min up to max. 2.50 m

Please regard the minimum stem length against the active length (La) and stem model, see page 3.

Window

Instrument glass

Movement

Brass/German silver

Dial

Aluminum, black figures, white background

Pointer

Aluminum, black

Zero Adjustment (± 6%)

Externally by a screw



SPECIAL VERSIONS AND FURTHER OPTIONS AMONG OTHERS

- Other stem models, stem-Ø, connection thread and materials upon request
- Other temperature ranges and/or special scales, e.g. double scale °C/°F, coloured fields or areas, dial inscriptions, etc.
- Min.- or max.- drag indicator upon request
- Case parts 1.4404 (316 stainless steel) upon request

ACCESSORIES

Mechanical:

Thermowells or flange thermowell see pages 49 and 50

Electrical:

Limit switch contact assemblies, see page 17

Gas-Actuated Thermometers, every angle

All Stainless Steel, Case with Bayonet Ring

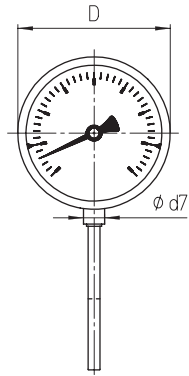
Ø 63 mm (2 ½"), Ø 100 mm (4") and Ø 160 mm (6")

Standard or Liquid Filled (L)

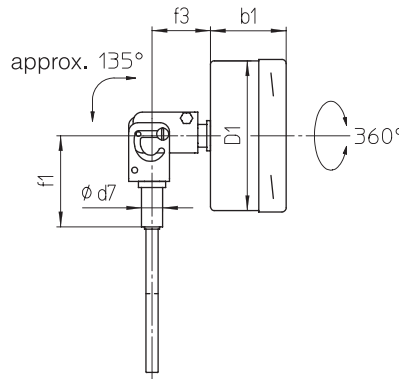
Models :
TGIE / TGIEL
63 / 100 / 160

Dimensional Data and Weights

Centre Back Stem Position, with pivot / every angle

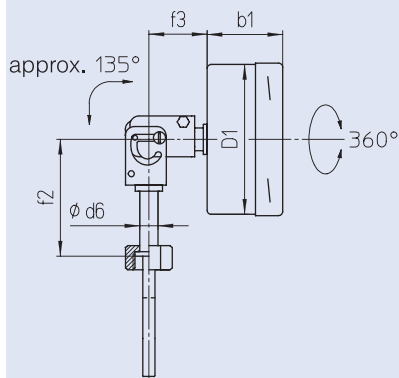


A1
also A5

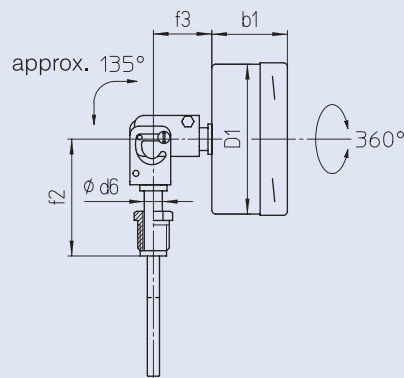


A1
also A5

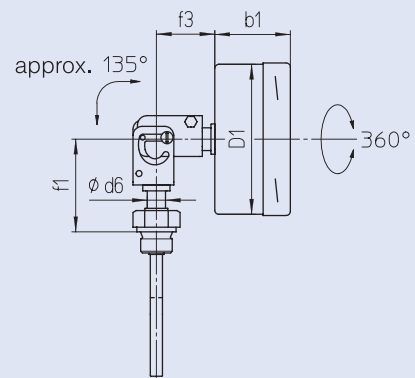
Further Stem Models



A 3
also A6



A 4



A 4.1

Dimensional Data (mm / inches) and Weights (kg / lb) *

NCS	b1	D	D1	d6	d7	f1	f2	f3	approx. weight *	
									TGIE	TGIEL
63 2½"	39 1.54	64 2.52	62 2.44	12 .47	14 .55	63 2.48	80 3.15	40 1.57	0.36 0.79	0.44 0.97
100 4"	50 1.97	101 3.98	99 3.9	12 .47	14 .55	63 2.48	80 3.15	40 1.57	0.58 1.28	0.84 1.85
160 6"	50 1.97	161 6.34	159 6.26	12 .47	14 .55	63 2.48	80 3.15	40 1.57	0.92 2.03	1.64 3.62

Thermometers With Capillary Line

All Stainless Steel, Case with Bayonet Ring

Ø 63 mm (2 ½"), Ø 80 mm (3"), Ø 100 mm (4") and Ø 160 mm (6")

Standard or Liquid Filled (L)

Models :
TC 63/80/100/160

APPLICATIONS

These thermometers are designed to meet the requirements of industrial temperature measurement, for fluid or gaseous media. They are suitable also for aggressive media as to find in chemical industries, petrochemistry, process technology, apparatus engineering and food and beverage industries.

NOMINAL HEAD DIAMETERS

Ø 63 mm (2 ½"), Ø 80 mm (3"), Ø 100 mm (4") and Ø 160 mm (6")

ACCURACY CLASS (DIN EN 13 190)

1,0% of full span

MAX. ALLOWED STATIC PRESSURE

25 bar (350 psi) at the stem

PROTECTION TYPE (EN 60529 / IEC 529)

Model standard : IP 55

Model liquid filled : IP 65

STANDARD CONFIGURATION

CASE AND BAYONET RING

Stainless steel 304 1.4301

CONNECTION

Bottom connection and lower back

CAPILLARY LINE

Stainless steel, Ø 2 mm, optional with flexible armored in
Stainless steel up to 1 m (standard) or up to 15 m at option

STEM MATERIAL

Stainless steel AISI 316 L

Ø 6, 8, 10 and 12 mm

PRINCIPLE OF MEASUREMENT

Inert gas expansion system (measuring system nitrogen-filled, non-toxic and environmentally safe)

ADJUSTMENT

± 6 % with adjustment screw from outside

STANDARD RANGES

Nominal Range (°C)	Measuring Range (°C)	Scale Interval (°C)	Temperature Difference ΔT (K)
-50 / 50	-40 / 40	1	100
-30 / 50	-20 / 40	1	80
-30 / 120	-10 / 100	2	150
-30 / 170	-10 / 150	5	200
-20 / 60	-10 / 50	1	80
-20 / 80	-10 / 70	1	100
0 / 80	10 / 70	1	80
0 / 100	10 / 90	1	100
0 / 120	20 / 100	2	120
0 / 150	20 / 130	2	150
0 / 160	20 / 140	2	160
0 / 200	20 / 180	5	200
0 / 300	30 / 270	5	300
0 / 350	50 / 300	5	350
0 / 400	50 / 350	10	400
0 / 500	50 / 450	10	500
0 / 600	100 / 500	10	600
50 / 300	80 / 270	5	250
50 / 400	100 / 350	5	350
100 / 500	150 / 450	10	400
100 / 600	150 / 550	10	500



HOW TO ORDER :

Please select :

- Model Code : TC TC
- Nominal head diameter : 63, 80, 100 or 160 100
- Code letter for case configuration : A, B, K, J and H (see page 33) B
- STEM TYPE (see page 39) B1
 B1 : Plain Stem,
 B2 : Rigid Male Stem Connection thread
 B3 : Male Connection thread, adjustable on the Stem
- If liquid filled, code letter : L —

EXAMPLE OF ORDER NUMBER

Thermometer with capillary line, rear flange for panel mounting

Dial size 160 mm, Range : 0-200 °C

Stem diameter : 6 mm, Stem length : 100 mm

Connection ½" NPT adjustable on the stem

Capillary length : 3 m with armored in SS 316, liquid filled

order number : TC 160 B, B3 L, 0-200 °C,

3 m capillary with armored, Ø 6 mm, L = 100 mm, ½" NPT

Thermometers With Capillary Line

All Stainless Steel, Case with Bayonet Ring

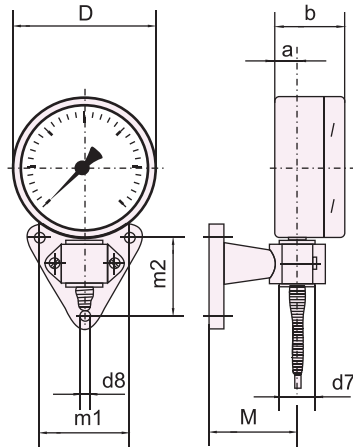
Ø 63 mm (2 ½"), Ø 80 mm (3"), Ø 100 mm (4") and Ø 160 mm (6")

Standard or Liquid Filled (L)

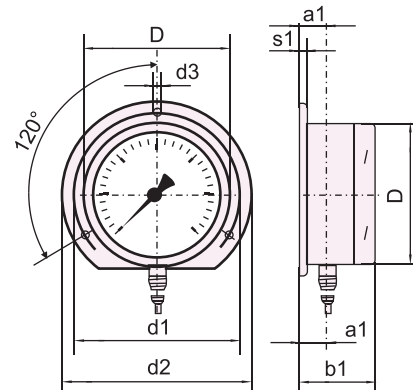
Models :
TC 63/80/100/160

CASE CONFIGURATIONS AND DIMENSIONAL DATA

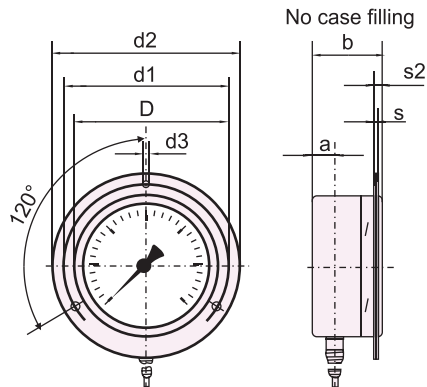
Bottom connection,
for mounting with gauge
holder bracket,
code letter : **A**



Bottom connection,
Rear flange
for Panel Mounting
code letter : **B**

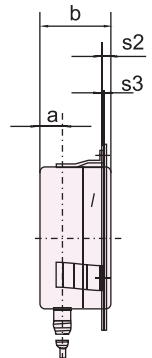


Bottom connection,
Front flange for Panel Mounting,
Code letter : **K**



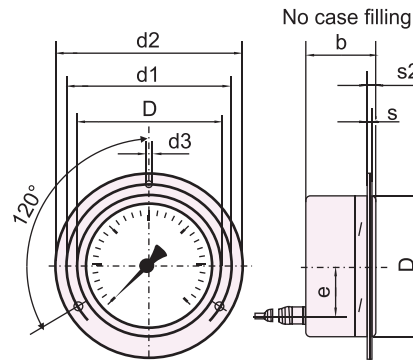
Front flange with longholes
attached to the case and a
separate cover front flange

Liquid filled case



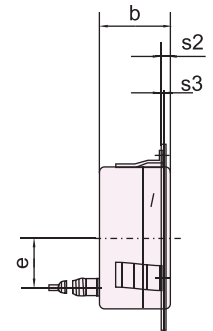
Mounting brackets welded to
the case and separate cover
front flange

Lower back connection,
Front flange for Panel Mounting
code letter : **J**



Front flange with longholes
attached to the case and a
separate cover front flange

Liquid filled case

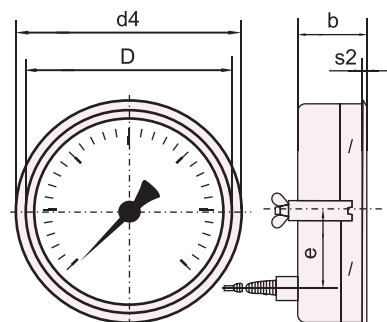


Mounting brackets welded to
the case and separate cover
front flange

For Ø 160 mm (no case filling)

Lower back connection,
U-clamp for Panel Mounting

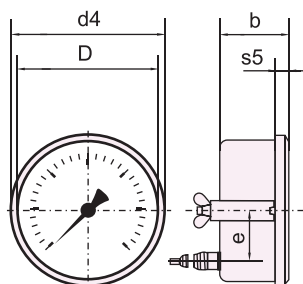
Code letter : **H**



For Ø 100 mm (4"), Standard or liquid filled only

Lower back connection,
U-clamp for Panel Mounting, crimped-on ring,

Code letter : **H**



Dimensional Data (mm) and Weight (kg)

Nominal Case Size	a	a1	b	b1	D	d1	d2	d3	d4	e	s	s1	s2	s3	s5	Weight approx	
																Dry	Liquid filled
63 mm (2 ½")	16	18	41	44.5	64	75	85	3.7	-	-	5	5	-	-	-	0.40	0.50
80 mm (3")	15	17.5	45	47.5	86	95	110	4.8	-	-	-	5	-	-	10	0.45	0.60
100 mm (4")	16	19.5	50	54	101	116	132	4.8	106	36	2	6	6	1	10	0.50	0.80
160 mm (6")					161	178	196	5.8	167	53						1.00	1.90

Thermometers Capillary Line, With Limit Switch Contact

All Stainless Steel, Case with Bayonet Ring

Ø 100 mm (4") and Ø 160 mm (6")

Standard or Liquid Filled (L)

Models :
TCE 100/160

APPLICATIONS

Models of limit-switch contact assemblies (see page 15)

- ⇒ Mechanical (Standard and magnetic contacts)
- ⇒ Inductive
- ⇒ Electronic

WINDOW

Acrylic glass

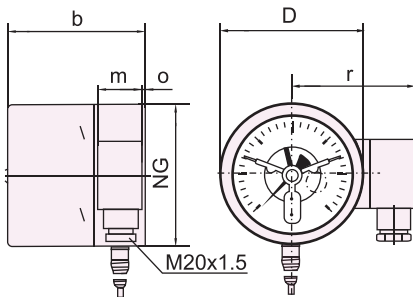
ELECTRICAL CONNECTION

Our models with built-in standard or magnetic contact are supplied with a universal plug connector. With built-in inductive and electronic limit-switch contact assembly they are supplied with a terminal box.

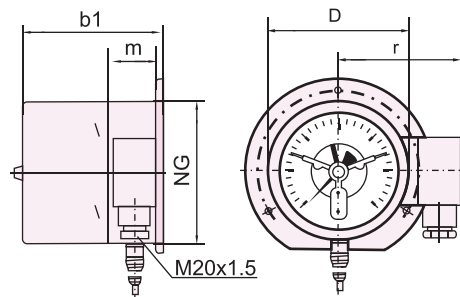
4-FOLD LIMIT-SWITCH CONTACT ASSEMBLIES

Can not be built into cases of nom. size 100 (4")

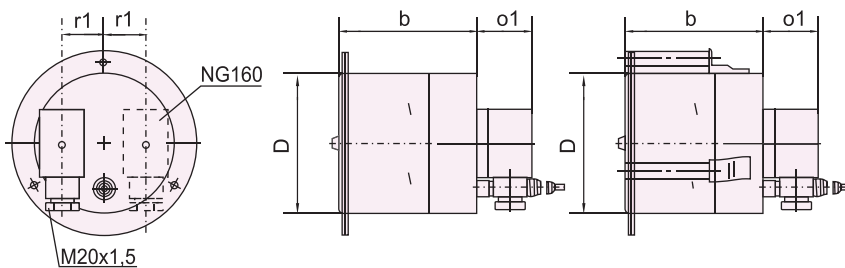
Bottom connection,
Version gauge holder bracket : A
Universal plug connector



Bottom connection,
Rear flange for Panel Mounting : B
Universal plug connector



Lower back connection,
Front flange for Panel Mounting : K
Universal plug connector

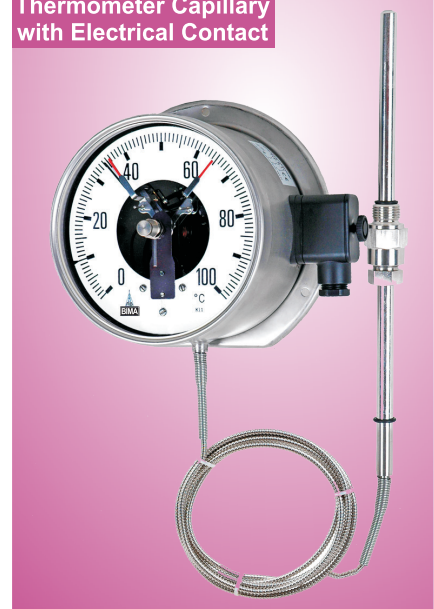


Front flange with longholes attached to the case and a separate cover front flange

Model Liquid Filled

Mounting brackets welded to the case and a separate cover front flange

Thermometer Capillary with Electrical Contact



Dimensional Data (mm) and Weight (kg)

NG	b	b1	D	m	o	o1	r	r1	Weight approx	
									Dry	Liquid Filled
100 mm (4")	98.5	101	101	31	3	40	88	30	0.70	1.50
160 mm (6")	105	109	161		6		119	55	1.30	2.70