

Gas-Actuated Thermometers

Rigid Stem (TS..) or Capillary Line (TF..)

Case Stainless Steel with Bayonet Ring,
Standard (TSCh, TFCh) or Filled Case (TSChG, TFChG)

Models

TSCh / TSChG 63 TFCh / TFChG 63

Application

These thermometers for small space applications are designed to meet the requirements of industrial temperature measurement. They are suitable for fluid or gaseous media, also for aggressive media as you find in chemical industries and petrochemistry. Beside applications in food- and beverage industries, gas-actuated thermometers with stainless steel case are used in process technology and apparatus engineering.

Nominal Case Size

63 mm (2½")

Accuracy

Class 1 according to DIN 16203

Principle of Measurement

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

Temperature Ranges (DIN 16203)

0 / +80°C (176°F) up to 0 / 200°C (392°F), and
-50 / +50°C (-58 / +122°F) up to -20 / +80°C (-4 / +176°F), and
+50 / +300°C (+122 / +572°F) up to +100 / +500°C (+212 / +932°F),
compare table (reverse side)

Temperature Limitations

Ambient temperature : -20 / +60°C (-4°F / +140 °F)

Protection Type (EN 60529 / IEC 529)

IP 55 dry version
IP 65 filled version

Standard Configuration

TSCh 63 = dry version
TFCh 63

TSChG 63 = filled version,
TFChG 63 filling fluid silicone oil

Connection

Bottom connection (standard) or center back connection (**rm**);
models TSCh/TSChG with rigid mounted stem,
models TFCh/TFChG with capillary line between case and stem;
stem types and connection types see following pages

Stem

stainless steel 316 Ti (1.4571);
stem types and minimum lengths compare following pages

Max. Medium Pressure

25 bar (350 psi) max. static pressure at the stem

Capillary Line (Models TFCh / TFChG)

Stainless steel, \varnothing 2 mm (.08"), up to 1 m (39") long,
optional up to 20 m (787")

Movement

Brass / German silver

Dial

Aluminum alloy, black figures, white background

Pointer

Aluminum alloy black,
dry version (TSCh and TFCh) with adjustable pointer

Case

304 stainless steel (1.4301)

Ring

Bayonet ring 304 stainless steel (1.4301)

Lens

Single strength glass lens



Optional Special Configurations

- Other connection threads upon request
- Stem diameter 6 mm (.24"), or also others for models TFCh / TFChG, upon request
- Other ranges upon request
- Special scales such as °F, °K or dual ranges (e.g. °C/°F)
- Red mark or stationary red pointer on the dial or adjustable from outside
- Movement stainless steel
- Maximum indicating pointer, external adjustment (acrylic lens)
- Acrylic lens or laminated safety glass lens
- Other than vertical installation
- Top or side connection

How to Order:

Please specify:

Model Code: **TSCh** = dry version, rigid stem
TSChG = filled version, rigid stem
TFCh = dry version, capillary line
TFChG = filled version, capillary line

Case Size: **63**

Code Letters for Case Configuration: **rm, rmFr or Rh** (compare next page;
standard case = bottom connection
= without code letter)

Temperature Range: see reverse side, e.g. **-50/+50°C**

Capillary Line: (models TFCh/TFChG)
length (up to 1m / 39" without extra charges)

Stem Specification: **• stem type**
• stem diameter
• stem length L resp. L1
• immersion length ET
• connection size
see following pages

Special Configuration (see above)

Examples for Ordering Information:

- TFCh 63 rmFr, 0/100°C, 2 m capillary line, stem type A3, \varnothing 10, L = 300, ET 250 mm, M20x1,5
- TSChG 63, -30/50°C, stem type A6, \varnothing 8 mm, L1 = 280 mm, ET 240 mm, ½" BSP



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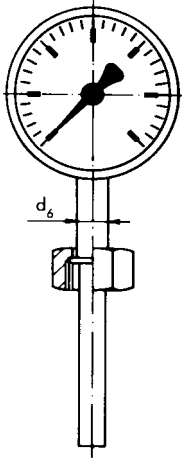
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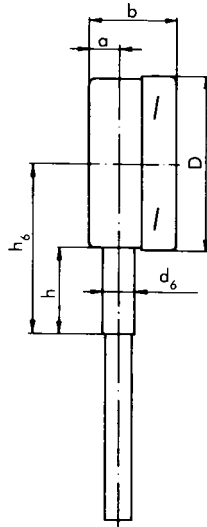
8240
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Case Configurations, Code Letters, Dimensional Data and Temperature Ranges

bottom connection
without code letter

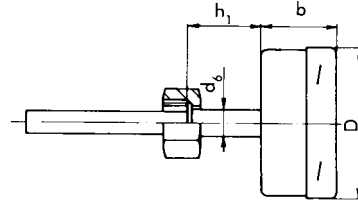


stem connection / example:
union nut (stem type A3)

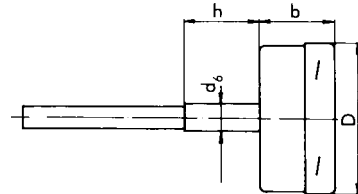


stem connection / example:
plain stem (stem type A1)

center back connection
code letters: **rm**

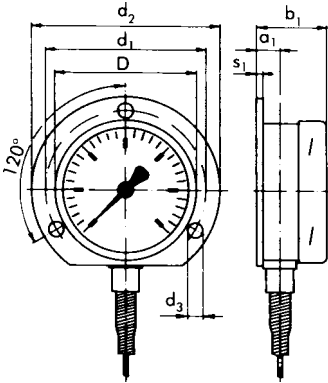


stem connection / example:
union nut (stem type A3)

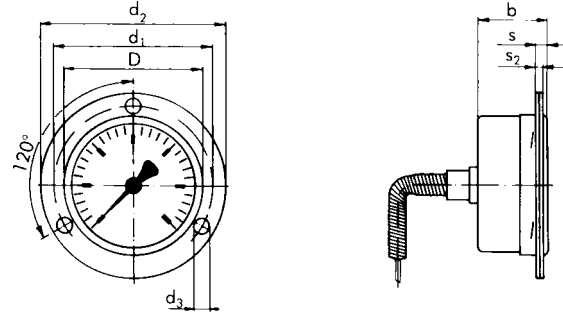


stem connection / example:
plain stem (stem type A1)

bottom connection
rear flange
code letters: **Rh**



center back connection
front flange
code letters: **rmFr**



Case configuration **rmFr** = front flange with langholes attached to the ring and a separate cover front flange; we recommend to use this case configuration only without case filling

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

NG Nominal Size	a	a1	b	b1	D	d1	d2	d3	d6	d8	h	h1	h6	s	s1	s6	Weight approx.
63 2 1/2"	16 .63	18 .71	41 1.61	44.5 1.75	64 2.52	75 2.95	85 3.35	3.7 .15	12 .47	14 .55	40 1.58	40 1.58	70 2.76	5 .20	5 .20	2 .08	0.4 / 0.5 kg 0.90 / 1.1 lb

Temperature Ranges

Scale (°C)	Measuring Range (°C)	Subdivision Dial Graduation (°C)	Temperature- difference Δ T (K)
-50 / 50	-40 / 40	1	100
-30 / 50	-20 / 40	1	80
-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 / 160	20 / 140	2	160
0 / 200	20 / 180	5	200
50 / 300	80 / 270	5	250
50 / 400	100 / 350	5	350
100 / 500 ¹⁾	150 / 450	10	400

¹⁾ not for all stem diameters available, compare tables on the following pages

Stem Types and Connections Rigid Stem (TSCh / TSChG)

Material stem and fittings: stainless steel

For thermowells see data sheet 8300.

Other stem configurations or stem diameter 6 mm (.24") upon request ¹⁾

Stem Type A1

plain stem without thread

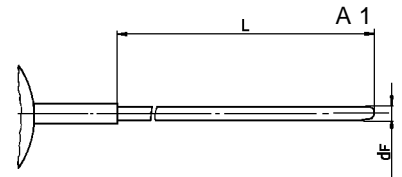
stem length ²⁾ = L

basic model for stem A5 with

clamp fitting resp. compression fitting

Dimensions

		A1	
Ø d _F	mm	8, 10	
	inches	.31	.39



Stem Type A3

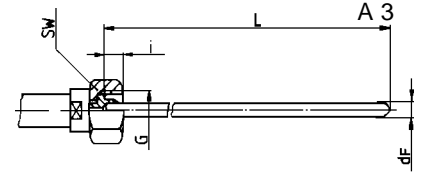
stem with turnable union nut

M 20 x 1.5 or ½" BSP female

stem length ²⁾ = L (immersion length up to sealing face union nut)

basic model for stem A6 and suitable for installation into thermowells form C, see data sheet 8300

		A3		
Ø d _F		G	SW	i
mm	inches			
8	.31	M20x1.5	27	10
10	.39			



Stem Type A4

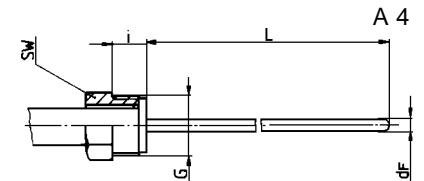
stem with turnable male connection fitting

male thread M 20 x 1.5 or ½" BSP

stem length ²⁾ = L (immersion length up to thread nipple)

stem for installation into thermowells form B, see data sheet 8300

		A4		
Ø d _F		G	SW	i
mm	inches			
8	.31	M20x1.5	22	20
10	.39			



Stem Type A4.1

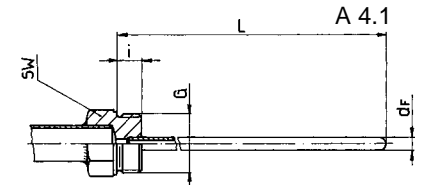
stem with rigid male connection fitting

male thread M 20 x 1.5 or ½" BSP

stem length ²⁾ = L (immersion length up to sealing face of the thread fitting)

stem for installation into thermowells form B, see data sheet 8300

		A4.1				
Ø d _F		G	SW	i	L _V	
mm	inches					
8	.31	M20x1.5	27	14	25	
10	.39					½" BPS



Stem Type A5

stem A1 with clamp- resp. compression fitting,

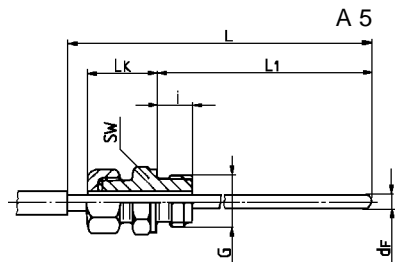
adjustable* on the stem

male thread ¼" or ½" BSP

stem length ²⁾ = L

*(attention: L1 ≥ minimum stem length A1 !)

		A5				
Ø d _F		G	SW	i	L _K	
mm	inches					
8	.31	¼"BSP	19	12	16	
10	.39					½"BSP



Stem Type A6

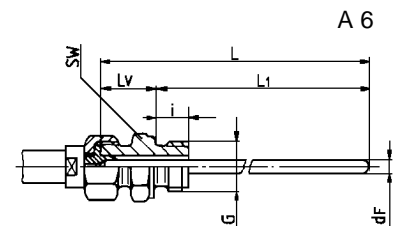
stem A3 (with union nut) with double male adapter

fitting, male threads M 20 x 1.5 or ½" BSP,

stem length ²⁾ = L (immersion length up to

sealing face of the fitting)

		A6				
Ø d _F		G	SW	i	L _V	
mm	inches					
8	.31	M20x1.5	27	14	25	
10	.39					½"BSP



The minimum immersion length of the stem is the length of that part of the vessel which has to be completely immersed into the medium to receive an accurate temperature measurement. The minimum immersion length depends on the stem diameter and the temperature range. Out of the required minimum immersion length and the stem type results the minimum stem length:

stem type	Minimum Immersion Length (ET) of Stem (mm / inches)		Minimum Stem Length L / L1 (mm / inches) depending on temperature (T) and stem diameter Ø					
	for all stem types		A1, A4 = L		A3, A 4.1 = L, A6 = L1		A 5 = L	
stem diameter-Ø ³⁾ mm	Ø 10	Ø 8	Ø 10	Ø 8	Ø 10	Ø 8	Ø 10	Ø 8
inches	Ø .39	Ø .31	Ø .39	Ø .31	Ø .39	Ø .31	Ø .39	Ø .31
Measuring Ranges								
< 500°C	45	75	50	80	60	90	85	115
< 932°F	1.77	2.95	1.97	3.15	2.36	3.54	3.35	4.53

¹⁾ Stem Ø 6 mm (special configuration) not for all temperature ranges!

²⁾ Minimum stem length see table right above.

³⁾ Stem Ø 6 mm (.24") upon request, but not for all temperature ranges.

Stem Types and Connections / Stem With Capillary Line (TFCh / TFChG)

Material stem and fittings: stainless steel

For thermowells see data sheet 8300.

Other stem configurations or stem diameter 6 mm (.24") upon request ^{1) 3)}.

A1

Stem Type A1

plain stem without thread

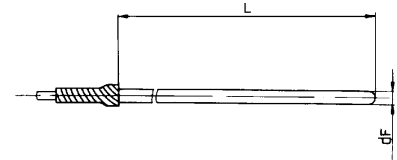
stem length ²⁾ = L

basic model for stem A5 with

clamp fitting resp. compression fitting

Dimensions

		A1		
$\varnothing d_F^{3)}$ mm		8	10	12
	inches	.31	.39	.47



Stem Type A2

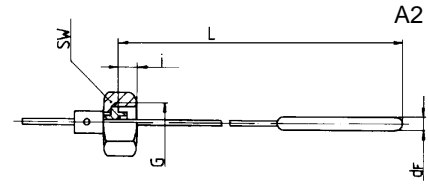
plain stem with union nut adjustable on the capillary line (acc. to the required immersion length), female thread M 20 x 1.5 or 1/2" BSP

stem length ²⁾ = L (minimum stem length of A1 + the part of the capillary line from the vessel up to the sealing face of the union nut)

basic model for stem A7

A2 and A3

$\varnothing d_F^{3)}$ mm	inches	G	SW	i
8	.31	M20x1.5	27	10
10	.39		1.06	.39
12	.47	1/2" BSP	27	10
			1.06	.39



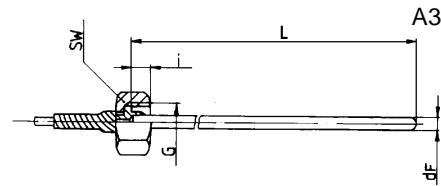
Stem Type A3

stem with turnable union nut

M 20 x 1.5 or 1/2" BSP female

stem length ²⁾ = L (immersion length up to sealing face union nut)

basic model for stem A6 and suitable for installation into thermowells form C, see data sheet 8300



Stem Type A4

stem with turnable male connection fitting

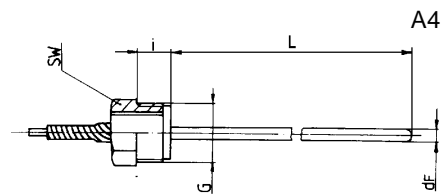
male thread M 20 x 1.5 or 1/2" BSP

stem length ²⁾ = L (immersion length up to thread nipple)

stem for installation into thermowells form B, see data sheet 8300

A4

$\varnothing d_F^{3)}$ mm	inches	G	SW	i
8	.31	M20x1.5	22	20
10	.39		.87	.79
12	.47	1/2" BSP	22	20
			.87	.79



Stem Type A5

stem A1 with clamp- resp. compression fitting, adjustable* on the stem

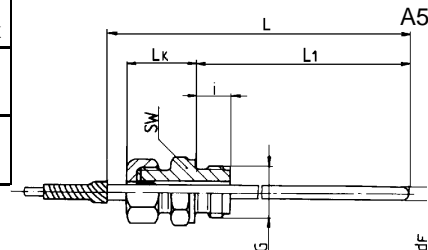
male thread 1/4" or 1/2" BSP

stem length ²⁾ = L

*(attention: L ≥ minimum stem length A1 !)

A5

$\varnothing d_F^{3)}$ mm	inches	G	SW	i	L _K
8	.31	1/4" BSP	19	12	16
10	.39		.75	.47	.63
12	.47	1/2" BSP	27	14	20
			1.06	.55	.79



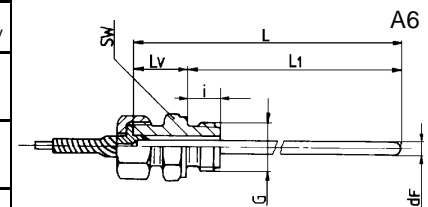
Stem Type A6

stem A3 (with union nut) with double male adapter fitting, male threads M 20 x 1.5 or 1/2" BSP, M 27 x 1.5, M 27 x 2 or 3/4" BSP

stem length ²⁾ = L (immersion length up to sealing face of the fitting)

A6 and A7

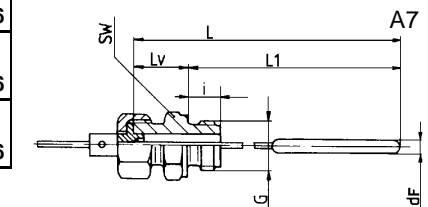
$\varnothing d_F^{3)}$ mm	inches	G	SW	i	L _V
8	.31	M20x1.5	27	14	25
			1.06	.55	.98
10	.39	1/2" BSP	27	14	25
			1.06	.55	.98
8	.31	M24x1.5	27	16	27
			1.06	.63	1.06
			M27 x 2	32	16
1.26	.63	1.06			
10	.39	3/4" BSP	32	16	27
			1.26	.63	1.06
12	.47				



Stem Type A7

stem A2 (with union nut) with double male adapter fitting, male threads M 20 x 1.5 or 1/2" BSP, M 24 x 1.5, M 27 x 2 or 3/4" BSP

stem length ²⁾ = L₁ (minimum stem length of A1 + the part of the capillary line from the vessel up to the sealing face of the fitting)



The minimum immersion length of the stem is the length of that part of the vessel which has to be completely immersed into the medium to receive an accurate temperature measurement. The minimum immersion length depends on the stem diameter and the temperature range. Out of the required minimum immersion length and the stem type results the minimum stem length:

Stem Type	Minimum Immersion Length (ET) of Stem	Minimum Stem Length L / L 1 (mm / inches)											
		depending on temperature (T) and stem diameter \varnothing											
	for all stem types	A1, A4 = L			A2, A3 = L / A6, A7 = L1			A5 = L					
Stem - $\varnothing^{3)}$ mm	$\varnothing 12$ $\varnothing 10$ $\varnothing 8$	$\varnothing 12$	$\varnothing 10$	$\varnothing 8$	$\varnothing 12$	$\varnothing 10$	$\varnothing 8$	$\varnothing 12$	$\varnothing 10$	$\varnothing 8$	$\varnothing 12$	$\varnothing 10$	$\varnothing 8$
inches	$\varnothing .47$ $\varnothing .39$ $\varnothing .31$	$\varnothing .47$	$\varnothing .39$	$\varnothing .31$	$\varnothing .47$	$\varnothing .39$	$\varnothing .31$	$\varnothing .47$	$\varnothing .39$	$\varnothing .31$	$\varnothing .47$	$\varnothing .39$	$\varnothing .31$
Measuring Ranges	< 500°C	35	45	75	40	50	80	50	60	90	70	85	115
	932°F	1.38	1.77	2.95	1.57	1.97	3.15	1.97	2.36	3.54	2.76	3.35	4.53

All data are valid for capillary line length up to 5 m; more than 5 m upon request.

¹⁾ Stem \varnothing 6 mm (special configuration) not for all temperature ranges!

²⁾ Minimum stem length see table right above.

³⁾ Other stem \varnothing upon request.