Gas-actuated Thermometers, with Capillary Line

Bayonet ring case stainless steel

TFCh
TFChG

Standard Versions

This data sheet contains detailed information on our standard versions and available options. In overview 8000 you will find additional information on selection, metrological features, permissible ambient and storage temperatures as well as error limits, etc. Information on the metrologically optimal design of thermometers can be found in our technical information sheet T08-000-031.

Measuring Unit
With nitrogen filling (inert gas, physiologically safe)

Accuracy (DIN EN 13 190)
Class 1

Case
With bayonet ring, stainless steel 304 (1.4301)

Degree of Protection (DIN EN 60 529/IEC 529)
IP65

Case Filling
Model TFCh**G**: silicone oil

Nominal Case Sizes
TFCh: 63, 100, 160, 250 mm (2½, 4, 6, 10")
TFChG: 63, 100, 160 mm (2½, 4, 6")

Case Configuration
Connection temperature sensor (stem):
- capillary line

Capillary line position:
- vertical bottom position
- centre back position (**rm**)

Mounting device:
- for bottom capillary line position:
  - back flange for surface mounting (**Rh**)
  - mounting device for gauge holder bracket (**Mgh**)
- for centre back capillary line position:
  - back flange for surface mounting (**rmRh**)
  - front flange for panel mounting (**rmFr**)

Capillary Line
1 m (3.28') stainless steel Ø 2 mm (0.08")
with buckle protection spiral at both ends
capillary line length L_{FL} selectable from 1 m to 15 m (3.28 to 49.21')

Temperature Ranges (DIN EN 13 190)
Temperature differences (spans) from 80 K up to 600 K

Temperature Sensor (Stem)
Made of stainless steel 316Ti (1.4571)
Max. static operating pressure: 25 bar

Stem models:	A1, A3, A4, A5 or A6
Stem Ø dF:	8, 10 or 12 mm (0.31, 0.39 or 0.47")
Stem length L or L1:	from Lmin or L1min up to 2.50 m (8.2')

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

Window
Instrument glass

Movement
Brass/German silver

Dial
Aluminum white, scale black

Pointer
Aluminum black

Indication Adjustment (±6 %)
Externally via screw

Ordering Information, Standard Ranges, Options

See page 4

Further Options

- Other stem models, e.g.
  - without bent tube, with compression fitting, adjustable at the capillary line, see data sheet 8299.2
  - with connection for food/bio/pharmaceutical industries, see data sheet 8299.3
  - contact stem for temperature measurement at the outside of tanks and pipe barrels up to 300 °C (572 °F), see data sheet 8299.4
- Model TFChG for ambient temperatures down to –40 °C (–40 °F)
  For ambient temperatures below –20 °C (–4 °F) we recommend: thermometer with crimped-on ring case models TFChg or TFChgG, see data sheet 8222
- Position of connection radial at 3 o'clock, 9 o'clock, 12 o'clock or other than vertical installation (90°)
- GOST version for Russia and Kazakhstan

Special Versions Upon Request

- Other stem Ø, connection threads and materials
- Capillary line $F_{FL} > 15$ m
- Other temperature ranges and/or special scales, e.g. dual scale °C/°F, coloured fields or ranges, dial inscriptions
- Stationary pointer or drag indicator with window made of polycarbonate (not for NCS 250)
- Case parts stainless steel 316L (1.4404)
- Model TFCh for ambient temperatures down to –60 °C (–76 °F)
- Other position of connection

Accessories

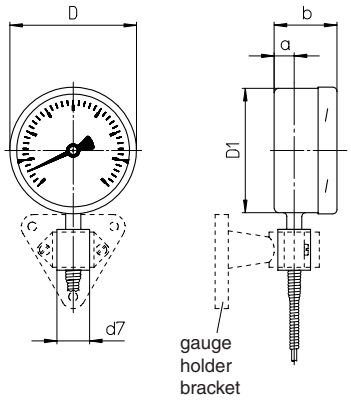
Mechanical:	thermowells, see data sheets 8.8110ff.
Electronic:	limit switch contact assemblies, see catalogue heading 9.1

ARMANO
ARMANO Messtechnik GmbH
Location Beierfeld
Am Gewerbepark 9 • 08344 Grünhain-Beierfeld
Tel.: +49 3774 58 – 0 • Fax: +49 3774 58 – 545
mail@armano-beierfeld.com
Location Wesel
Manometerstraße 5 • 46487 Wesel-Ginderich
Tel.: +49 2803 9130 – 0 • Fax: +49 2803 1035
mail@armano-wesel.com

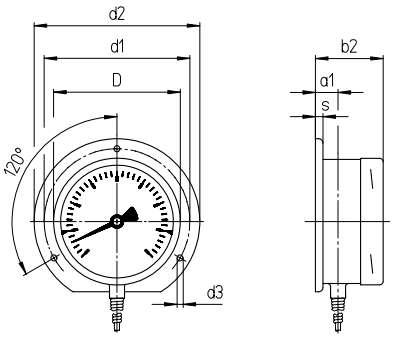
Capillary Line Position, Code Letters, Dimensional Data and Weight

Vertical Bottom Capillary Line Position

mounting device for gauge holder bracket[1)]
code letters **Mgh**

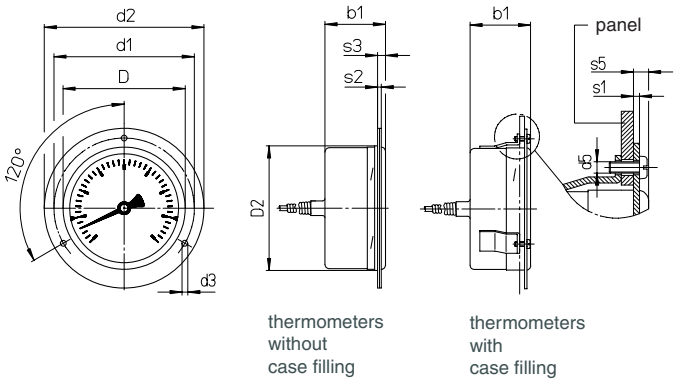


back flange for surface mounting
code letters **Rh**



Centre Back Capillary Line Position

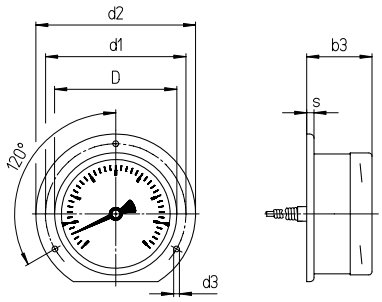
front flange for panel mounting
code letters **rmFr**



thermometers without case filling

thermometers with case filling

back flange for surface mounting
code letters **rmRh**



recommended panel cut out for
NCS 63 (2½") Ø 67 ±0.3 mm (2.64 ±0.01")
NCS 100 (4") Ø 104 ±0.5 mm (4.09 ±0.02")
NCS 160 (4") Ø 164 ±0.5 mm (6.46 ±0.02")

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

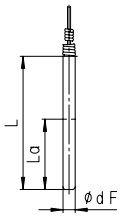
NCS	a	a1	b	b1	b2	b3	D	D1	D2	d1	d2	d3	d5	d7	s	s1	s2	s3	s5	approx. weight[2)] TFCh	approx. weight[2)] TFChG
63 **2½"**	12 **0.47**	15 **0.59**	39 **1.54**	39 **1.54**	42 **1.65**	42 **1.65**	64 **2.52**	62 **2.44**	66 **2.6**	75 **2.95**	85 **3.35**	3.6 **0.14**	M3	26 **1.02**	5 **0.2**	1 **0.04**	2 **0.08**	5.5 **0.22**	7 **0.28**	0.38 **0.84**	0.45 **0.99**
80 **3"**	15 **0.59**	18.5 **0.73**	50 **1.97**	50 **1.97**	53.5 **2.11**	53.5 **2.11**	101 **3.98**	99 **3.9**	103 **4.06**	116 **4.57**	132 **5.2**	4.8 **0.19**	M4	26 **1.02**	6 **0.24**	1 **0.04**	2 **0.08**	5.5 **0.22**	7 **0.28**	0.6 **1.32**	0.85 **1.87**
100 **4"**	15 **0.59**	18 **0.71**	50 **1.97**	50 **1.97**	53 **2.09**	53 **2.09**	161 **6.34**	159 **6.26**	163 **6.42**	178 **7.01**	196 **7.72**	5.8 **0.23**	M5	26 **1.02**	6 **0.24**	1.5 **0.06**	2.5 **0.1**	6 **0.24**	8 **0.31**	0.92 **2.03**	1.6 **3.53**
160 **6"**	15 **0.59**	–	57 **2.24**	57 **2.24**	–	–	251 **9.88**	249 **9.8**	–	270 **10.63**	285 **11.22**	5.8 **0.23**	–	26 **1.02**	2 **0.08**	–	2 **0.08**	8.5 **0.33**	–	2.00 **4.41**	–

[1)] Available versions can be found on our website in section Product Range, heading Accessories.
[2)] The data are examples and relate to the version with mounting device for gauge holder bracket Mgh and stem A1, Ø 10 mm (0.39"), length 200 mm (7.87") and 1 m (3.28') capillary line.

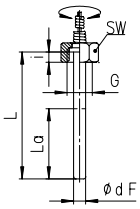
Stem Models

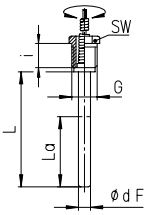
Stem Models

Process connection:	Without screw fitting, plain stem
Stem model:	**A1**
Form acc. to DIN EN 13 190:	Form 1
Stem material:	1.4571
Stem Ø dF:	8, 10, 12 mm
Order length:	L
Suitable thermowell models: (data sheet)	SK1 (8.8140), SK2 (8.8141)



Process connection:	Union nut	Male thread, turnable
Stem model:	**A3**	**A4**
Form acc. to DIN EN 13 190:	Form 5	Form 4
Stem material:	1.4571	1.4571
Stem Ø dF:	8, 10, 12 mm	8, 10, 12 mm
Screw fitting material:	1.4571	1.4571
Order length:	L	L
Suitable thermowell models: (data sheet)	SF4.1 (8.8111), SF4.1F (8.8113) SF8 (8.8130), SF9 (8.8131)	SF4 (8.8110), SF4F (8.8112) SF5 (8.8120), SF6, SF7 (8.8121)





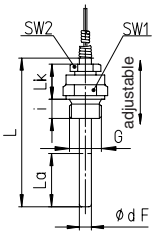
Thread (dimensional data in mm/inch):

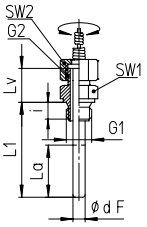
G	SW	i
G½	27/**1.06**	10/**0.39**
G¾	32/**1.26**	12/**0.47**
M20x1.5	27/**1.06**	10/**0.39**
M24x1.5	32/**1.26**	12/**0.47**
M27x2	32/**1.26**	12/**0.47**

G	SW	i
G½B	22/**0.87**	20/**0.79**
G¾B	27/**1.06**	23/**0.91**
M18x1.5	22/**0.87**	14/**0.55**
M20x1.5	22/**0.87**	20/**0.79**

Thermowell required!

Process connection:	Male thread/compression fitting	Male thread, turnable/double male adapter
Stem model:	**A5** (A1 with compression fitting)	**A6** (A3 with double male adapter)
Form acc. to DIN EN 13 190:	Form 2 (cylindrical thread) Form 3 (conical thread)	—
Stem material:	1.4571	1.4571
Stem Ø dF:	8, 10, 12 mm	8, 10, 12 mm
Screw fitting material:	1.4571	1.4571
Order length:	L	L1
Suitable thermowell models: (data sheet)	SF4 (8.8110), SF4F (8.8112) SF5 (8.8120), SF6, SF7 (8.8121)	SF4 (8.8110), SF4F (8.8112) SF5 (8.8120), SF6, SF7 (8.8121)





Thread (dimensional data in mm/inch):

G	SW1	SW2	i	Lk
G½B	27/**1.06**	22/**0.87**	14/**0.55**	42/**1.65**
G¾B	32/**1.26**	22/**0.87**	16/**0.63**	42/**1.65**
½" NPT	27/**1.06**	22/**0.87**	19/**0.75**	42/**1.65**
¾" NPT	27/**1.06**	22/**0.87**	19/**0.75**	42/**1.65**
M20x1.5	27/**1.06**	22/**0.87**	14/**0.55**	42/**1.65**

G1	G2	SW1	SW2	i	Lv
G½B	G½B	27/**1.06**	27/**1.06**	14/**0.55**	28/**1.1**
G¾B	G½B	32/**1.26**	27/**1.06**	16/**0.63**	28/**1.1**
½" NPT	G½B	27/**1.06**	27/**1.06**	19/**0.75**	28/**1.1**
¾" NPT	G½B	27/**1.06**	27/**1.06**	19/**0.75**	28/**1.1**
M20x1.5	M20x1.5	27/**1.06**	27/**1.06**	14/**0.55**	28/**1.1**
M24x1.5	M20x1.5	32/**1.26**	27/**1.06**	14/**0.55**	28/**1.1**
M27x2	M20x1.5	32/**1.26**	27/**1.06**	16/**0.63**	28/**1.1**

Minimum Stem Length, Active Length and Maximum Feasible Capillary Line Length incl. Stem (mm/inch)

			Capillary line incl. stem up to 5 m (16.4')						Capillary line incl. stem > 5 m to 15 m (>16.4 to 49.21')					
			up to max. 500 °C (932 °F)			500 °C (932 °F) and above			up to max. 500 °C (932 °F)			500 °C (932 °F) and above		
			Stem Ø dF:			Stem Ø dF:			Stem Ø dF:			Stem Ø dF:		
Stem model:	**Length:**	**Thread:**	**12 (0.47")**	**10 (0.39")**	**8 (0.31")**	**12 (0.47")**	**10 (0.39")**	**8 (0.31")**	**12 (0.47")**	**10 (0.39")**	**8 (0.31")**	**12 (0.47")**	**10 (0.39")**	**8 (0.31")**
all models	La	all standard threads	35 **1.38**	45 **1.77**	75 **2.95**	75 **2.95**	105 **4.13**	165 **6.5**	53 **2.09**	80 **3.15**	115 **4.53**	150 **5.91**	200 **7.87**	320 **12.6**
A1 / A3 / A4	Lmin	all standard threads	55 **2.17**	65 **2.56**	95 **3.74**	95 **3.74**	125 **4.92**	185 **7.28**	73 **2.87**	100 **3.94**	135 **5.31**	170 **6.69**	220 **8.66**	340 **13.39**
A5	Lmin	all standard threads	90 **3.54**	100 **3.94**	130 **5.12**	130 **5.12**	160 **6.3**	220 **8.66**	108 **4.25**	135 **5.31**	170 **6.69**	205 **8.07**	255 **10.04**	375 **14.76**
A6	L1min	G½B, M20x1.5	49 **1.93**	59 **2.32**	89 **3.5**	89 **3.5**	119 **4.69**	179 **7.05**	69 **2.72**	96 **3.78**	131 **5.16**	166 **6.54**	216 **8.5**	336 **13.23**
		G¾B, M24x1.5, M27x2	51 **2**	61 **2.4**	91 **3.58**	91 **3.58**	121 **4.76**	181 **7.13**	72 **2.83**	99 **3.9**	134 **5.28**	169 **6.65**	219 **8.62**	339 **13.35**
		½" NPT, ¾" NPT	54 **2.13**	64 **2.52**	94 **3.7**	94 **3.7**	124 **4.88**	184 **7.24**	67 **2.64**	94 **3.7**	129 **5.08**	164 **6.46**	214 **8.43**	334 **13.15**
others			upon request			upon request			upon request			upon request		

The minimum length Lmin/L1min is the smallest feasible stem length.
Important: Please note the technical information sheet T08-000-031 on the metrologically optimal stem length.

The active length La is the temperature-sensitive part of the stem.

The **maximum feasible stem length** is 2.50 m (8.2'). With a capillary line, greater lengths are possible, e.g. with special stems A2, A7 and A7.1 (data sheet 8299.2).

Ordering Information

Basic Model:	Gas-actuated Thermometer with Capillary Line					TFCh
Case filling:	without					without code letters
	silicone oil					**G**
Nominal case size:	case Ø 63, 100, 160, 250 mm (2½, 4, 6, 10") (NCS 250 not with case filling)					**63, 100, 160, 250**
Capillary line position/ case configuration:	vertical bottom position, mounting device for gauge holder bracket					**Mgh**
	vertical bottom position, back flange for surface mounting					**Rh**
	centre back position, front flange for panel mounting					**rmFr**
	centre back position, with back flange for surface mounting					**rmRh**
Temperature ranges:	scale °C:	ΔT (K):	scale °F:	ΔT (°F):		
	0 – 80 °C	80	0 – 150 °F	150		
	0 – 100 °C	100	0 – 200 °F	200	e.g.	**0–100 °C**
	0 – 120 °C	120	0 – 250 °F	250		
	0 – 160 °C	160	0 – 300 °F	300		
	0 – 200 °C	200	–50 / +130 °F	180		
	0 – 250 °C	250	–40 / +160 °F	200		
	0 – 300 °C	300	–30 / +120 °F	150		
	0 – 400 °C	400	20 – 240 °F	220		
	0 – 500 °C	500	40 – 400 °F	360		
	0 – 600 °C	600	50 – 300 °F	250		
	–100 / +100 °C	200	50 – 500 °F	450		
	–50 / +50 °C	100	100 – 800 °F	700		
	–40 / +40 °C	80	100 – 1000 °F	900		
	–40 / +60 °C	100	150 – 700 °F	550		
	–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/compression fitting					**A5**
	male thread, turnable/double male adapter					**A6**
Stem Ø dF:	8, 10 or 12 mm (0.31, 0.39 or 0.47")					**dF 8, 10, 12**
Stem length:	L or L1 in mm				e.g.	**L = 100 mm**
Capillary line length:	L_{FL} ≥1 to 15 m (≥3.28 to 49.21')					**L_{FL} = 3 m**
Process connection:	see page 3				e.g.	**G½B**
Options:	red mark	on the dial				
	plastic clip	red or green, external at the bayonet ring for NCS 100 and 160				
	stationary red pointer	on the dial				
		adjustable with removable ring				
	window	laminated safety glass				
		acrylic glass (PMMA)				
		polycarbonate (PC) (not for NCS 250)				
	movement stainless steel					
	case ventilation no. 22 for outdoor installation					
	case polished					
	bayonet ring polished					
	protection hose for capillary line	spiral protection hose made of stainless steel				
		spiral protection hose made of stainless steel with PE cover				
		shrinking hose polyolefin, max 10 m (32.8')				
	versions: DNV GL and Russian Sea Register **TFCh 100, 160 TFChG 63, 100, 160**	dial marking with symbol				
		copy of the certificate upon request				
	instrument tag	stainless steel plate 12 x 55 mm (0.47 x 2.17"), wire mounting				
		sticker upon the case				
Example:						**TFCh 100, 0–100 °C, A5, dF 8, L = 100 mm, L_{FL} = 3 m G½B**

Special Versions: Please describe your requirements in cleartext!