Square Thermometer, for Switch Panels

Square case, front narrow rim black

TFQS

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
Square case, front narrow rim black,
bracket for switch panel mounting

Degree of Protection (DIN EN 60 529/IEC 529)
IP43

Nominal Case Sizes
96 x 96, 144 x 144 mm (3.78 x 3.78, 5.67 x 5.67")

Case Configuration

Connection temperature sensor (stem):	capillary line
Capillary line position:	lower back position (**r**)
Mounting device:	u-clamp for panel mounting

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

Special Versions and Further Options

- Other stem Ø and materials upon request
- Capillary line F_{FL} > 15 m upon request
- 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 upon request
- GOST version for Russia, Kazakhstan

Accessories

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

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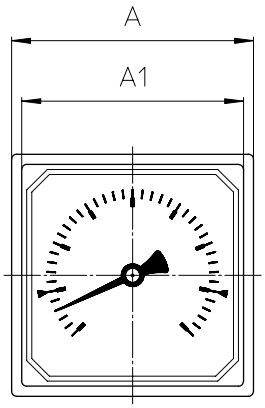
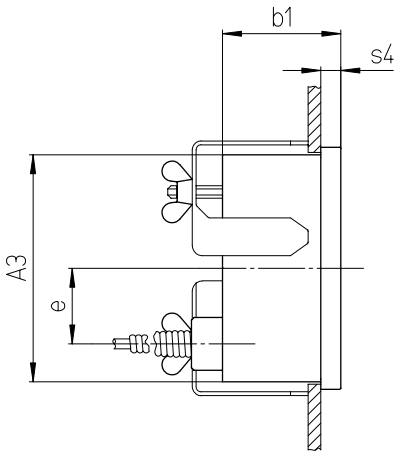
Capillary Line Position, Dimensional Data and Weights

Lower Back Capillary Line Position

without additional code letter





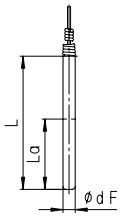
Dimensional Data (mm/inch) and Weights (kg/lb)							
NCS	A	A1	A3	b1	e	s4	approx. weight[1] TFQS
96	96 **3.78**	88 **3.46**	90 **3.54**	48 **1.89**	33 **1.3**	8 **0.31**	0.64 **1.41**
144	144 **5.67**	134 **5.28**	136 **5.35**	48 **1.89**	52 **2.05**	8 **0.31**	1.15 **2.54**

[1] The data are examples and relate to the version with stem A1, Ø 10 mm (0.39"), length 200 mm (7.87") and 1 m (3.28') capillary line.

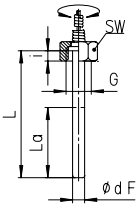
Stem Models

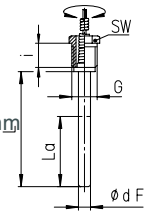
Stem Models

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)





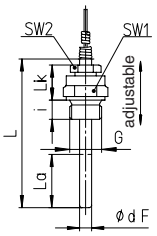
Thread (dimensional data in mm/inch):

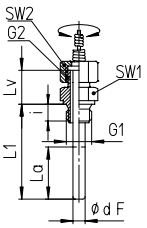
G	SW	i
G½	27/**1.06**	10/**0.39**
G¾	32/**1.26**	12/**0.47**
M20x1.5	27/**1.06**	10/**0.39**
M24x1.5	32/**1.26**	12/**0.47**
M27x2	32/**1.26**	12/**0.47**

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:	Square Thermometer for Switch Panels					TFQS
Case filling:	without					without code letters
Nominal case size:	case 96, 144 mm (3.78 x 3.78, 5.67 x 5.67")					**96, 144**
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} = 5 m**
Process connection:	see page 3				e.g.	**G½B**
Options:	red mark	on the dial				
	window	acrylic glass (PMMA)				
	movement stainless steel					
	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')				
	instrument tag	stainless steel plate 12 x 55 mm (0.47 x 2.17") with wire mounting				
		or sticker upon the case				

Example:	**TFQS 96, 0–100 °C, A3, dF 12, L = 100 mm, L_{FL} = 5 m G½**

Special Versions: Please describe your requirements in cleartext!