

TSF Thermometers Ø 63 - 80 - 100 - 160 - 250

Remote measurement industrial thermometer

The stainless steel gas expansion thermometer is specially intended for remote temperature measurement in the following industries: Petrochemicals, Chemicals, Food, Pharmaceuticals and Biotechnology.

The instrument works with the specified precision if the minimum immersion L_s is respected.



Specifications (20°C)

Measurement range	-200 ... 800°C
Accuracy class	EN 13190 class 1
Case and sleeve	AISI 304/1.4301 stainless steel bayonet closing
Sight glass	4mm glass Polycarbonate for additional appliance
Movement	brass
Face	white with black graduations DIN 16 109, 16 128 Succession of lines and figures to T0.305
Needle	black aluminium, DIN 16 099
Zero setting	on the side or back of the case
Degree of protection	IP 65 (DIN 40 050)
Plunger	1.4541 stainless steel
Accessories	unions and thermometer wells, see sheets B51.01 (AGF/AGW), T6.215 (Ø 8), T6.120 and T6.220 (Ø 14)

Options

Class error limit:	0.5. Code 0843 } (only for diameters 100; 160 and 250) 0.6. Code 0840 }
Filling liquid	glycerine standard silicon oil Code 0776 ondina
Face with parallax mirror for diameters 160 and 250	Code 0733
Movement, stainless steel	Code 0651
150 mm Ø case available :	contact us for details

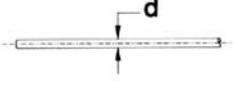
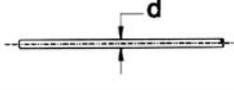
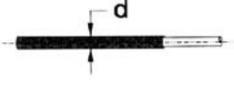
**BOURDON
HAENNI**

made to measure

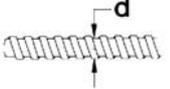
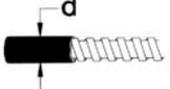


Capillary tubes

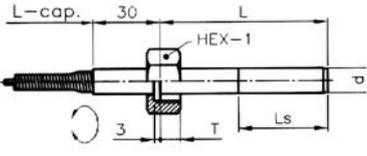
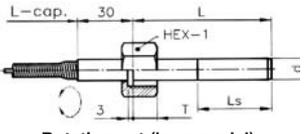
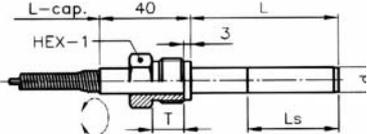
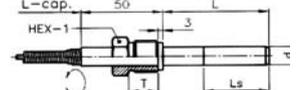
Capillary tube material

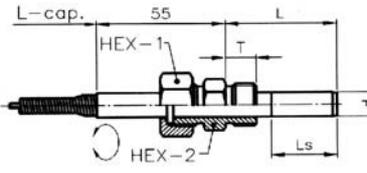
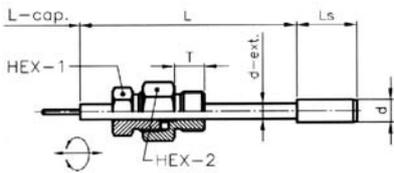
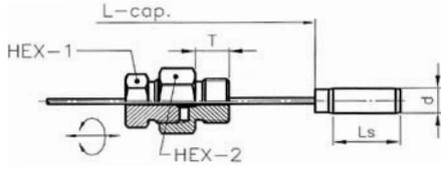
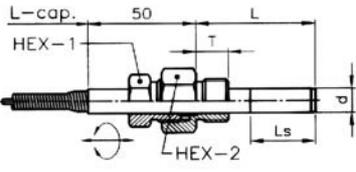
EQUIPMENT	MODEL	Ø in mm	T°C min	T°C max
Copper alloy		2.5	-120	+400
AISI 321 / 1.4541 stainless steel (standard version)		2.5	-250	+800
AISI 321 / 1.4541 Stainless steel + PVC		4	-60	+120

Capillary tube protection

EQUIPMENT	MODEL	Ø in mm	T°C min	T°C max
AISI 304 / 1.4301 stainless steel pipe (standard version)		6	-260	+800
Stainless steel pipe - AISI 304 / 1.4301+ PVC		7.5	-60	+120

Types of capillary tube connection

Models	Code	Type of union	HEX-1	HEX-2	T	Ø max. plunger
 <p>Rotating nut (standard)</p>	731A	1/4 Gas	22	-	7	6 to 8
	731B	3/8 Gas	27	-	9	6 to 11
	731C	1/2 Gas	27	-	9	6 to 15
	731D	3/4 Gas	32	-	9	6 to 20
	731E	1" Gas	41	-	13	6 to 20
	731P	M18x1.5	27	-	8	6 to 12
	731Q	M20x1.5	27	-	9	6 to 14
	731R	M24x1.5	32	-	9	6 to 18
 <p>Rotating nut (long model)</p>	732C	1/2 Gas	27	-	14	6 to 15
	732D	3/4 Gas	32	-	16	6 to 20
	732E	1" Gas	41	-	18	6 to 20
 <p>Swivelling union (standard)</p>	733A	1/4 Gas	17	-	12	6 to 8
	733B	3/8 Gas	22	-	12	6 to 11
	733C	1/2 Gas	22	-	14	6 to 15
	733D	3/4 Gas	30	-	16	6 to 20
	733E	1" Gas	36	-	18	6 to 20
	733P	M18x1.5	22	-	12	6 to 12
	733Q	M20x1.5	22	-	14	6 to 14
733R	M24x1.5	27	-	14	6 to 18	
 <p>Swivelling union (long model)</p>	734C	1/2 Gas	22	-	20	6 to 15
	734D	3/4 Gas	30	-	20	6 to 20
	734E	1" Gas	36	-	25	6 to 20

Models	Code	Type of union	HEX-1	HEX-2	T	max. plunger Ø
 <p>Rotating nut + double union</p>	735A	1/4 Gas	27	22	12	6 to 8
	735B	3/8 Gas	27	22	12	6 to 11
	735C	1/2 Gas	27	22	14	6 to 15
	735D	3/4 Gas	27	27	16	6 to 20
	735E	1" Gas	27	36	18	6 to 20
	735H	1/4 NPT	27	22	14	6 to 8
	735J	1/2 NPT	27	22	20	6 to 15
	735K	3/4 NPT	27	27	20	6 to 20
	735L	1" NPT	27	36	25	6 to 20
	735P	M18x1.5	27	22	12	6 to 12
	735Q	M20x1.5	27	22	14	6 to 14
	735R	M24x1.5	27	27	14	6 to 18
 <p>Union sliding on tube</p>	736A	1/4 Gas	22	27	12	6 to 11
	736B	3/8 Gas	22	27	12	6 to 14
	736C	1/2 Gas	22	27	14	6 to 18
	736D	3/4 Gas	22	32	16	6 to 23
	736E	1" Gas	22	36	18	6 to 30
	736H	1/4 NPT	22	27	14	6 to 13
	736J	1/2 NPT	22	27	20	6 to 20
	736K	3/4 NPT	22	27	20	6 to 25
	736L	1" NPT	22	36	25	6 to 32
	736P	M18x1.5	22	27	12	6 to 16
	736Q	M20x1.5	22	27	14	6 to 18
	736R	M24x1.5	22	27	14	6 to 22
 <p>Union sliding on capillary tube</p>	737A	1/4 Gas	22	27	12	6 to 11
	737B	3/8 Gas	22	27	12	6 to 14
	737C	1/2 Gas	22	27	14	6 to 18
	737D	3/4 Gas	22	32	16	6 to 23
	737E	1" Gas	22	36	18	6 to 30
	737H	1/4 NPT	22	27	14	6 to 13
	737J	1/2 NPT	22	27	20	6 to 20
	737K	3/4 NPT	22	27	20	6 to 25
	737L	1" NPT	22	36	25	6 to 32
	737P	M18x1.5	22	27	12	6 to 16
	737Q	M20x1.5	22	27	14	6 to 18
	737R	M24x1.5	22	27	14	6 to 22
 <p>Union sliding on plunger</p>	738A	1/4 Gas	22	27	12	6 to 8
	738B	3/8 Gas	22	27	12	6 to 11
	738C	1/2 Gas	22	27	14	6 to 15
	738D	3/4 Gas	22	32	16	6 to 20
	738E	1" Gas	22	36	18	6 to 20
	738H	1/4 NPT	22	27	14	6 to 8
	738J	1/2 NPT	22	27	20	6 to 15
	738K	3/4 NPT	22	27	20	6 to 20
	738L	1" NPT	22	36	25	6 to 20
	738P	M18x1.5	22	27	12	6 to 12
	738Q	M20x1.5	22	27	14	6 to 14
	738R	M24x1.5	22	27	14	6 to 18

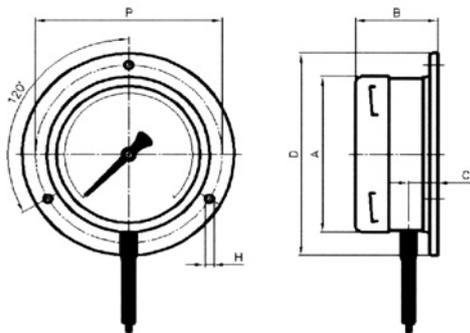
Note: Minimum immersion length:

Ls for Ø8 = 85 mm (up to 5 meters)

Ls for Ø8 = 170 mm (over 5 meters)

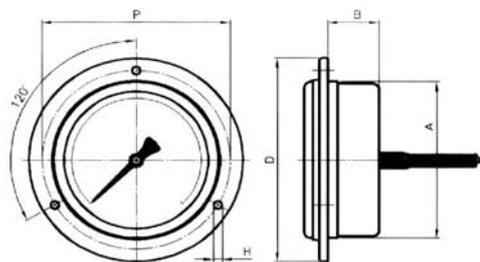
Ls for Ø14 = 50 mm

Type A (code 31)



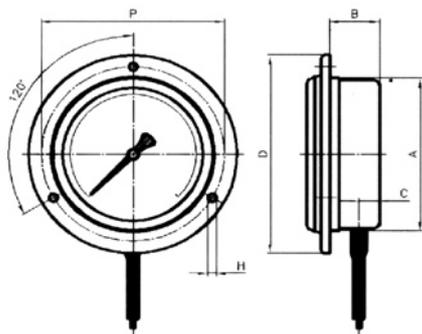
DIAMETER	DIMENSIONS in mm					
	A	B	C	D	H	P
63	65	33	13	86	3.5	75
80	83	29	13	110	4	95
100	101	31	13	132	5.5	116
160	161	32	13	196	6	178
250	252	45	13	285	6	270

Type B (code 22)



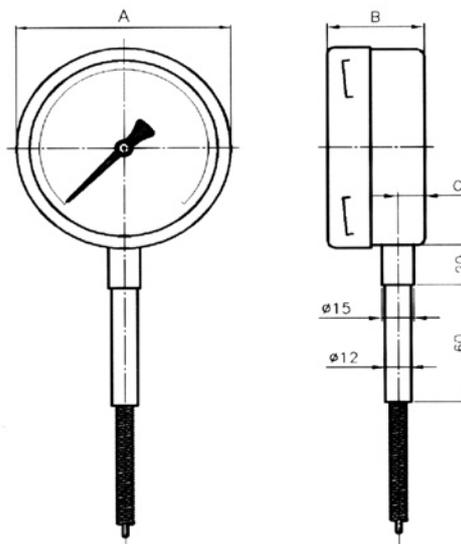
DIAMETER	DIMENSIONS in mm				
	A	B	D	H	P
63	65	41	86	3.5	75
80	83	40	110	4	95
100	101	51	132	5.5	116
160	161	51	196	6	178
250	252	57	285	6	270

Type C (code 21)



DIAMETER	DIMENSIONS in mm					
	A	B	C	D	H	P
63	65	41	13	86	3.5	75
80	83	40	13	110	4	95
100	101	51	13	132	5.5	116
160	161	51	13	196	6	178
250	252	57	13	285	6	270

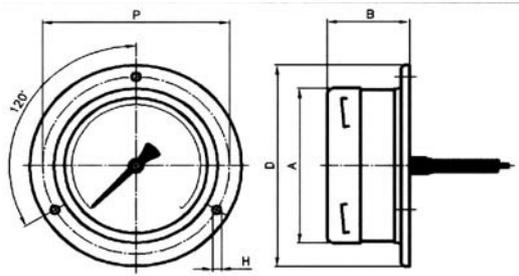
Type D (code 11)



DIAMETER	DIMENSIONS in mm		
	A	B	C
63	65	38	13
80	83	37	13
100	101	45	13
160	161	45	13
250	252	55	13

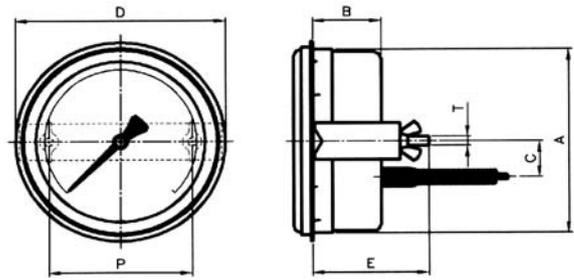
* Mounting clamp
 ** 20mm on the left (front view)
 + with 3 clamps at 120°C

Type E (code 32)



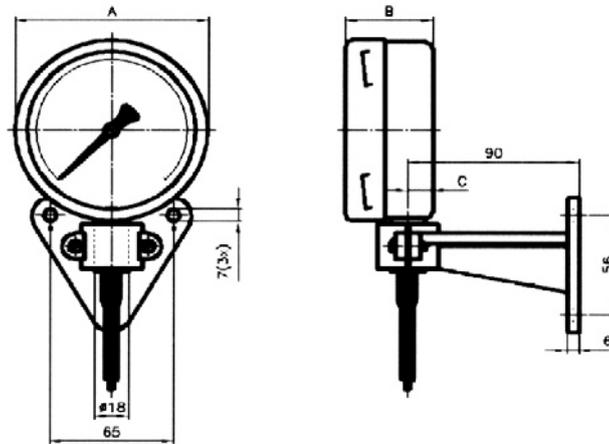
DIAMETER	DIMENSIONS in mm				
	A	B	D	H	P
63	65	41	86	3.5	75
80	83	40	110	4	95
100	101	51	132	5.5	116
160	161	51	196	6	178
250	252	57	285	6	270

Type G (code 53)



DIAMETER	DIMENSIONS in mm						
	A	B	C	D	E	P	T
63*	65	30	20**	70	50	33	M5
80	83	35	25	95	55	59	M5
100	101	35	20	112	60	75	M5
160	161	35	20	180	60	139	M5
250+	252	45	0	270	70	+	M5

Type H (code 61)



DIAMETER	DIMENSIONS in mm		
	A	B	C
63	65	38	13
80	83	37	13
100	101	45	13
160	161	45	13
250	252	55	13

Type A (code 31)

Type B (code 22)

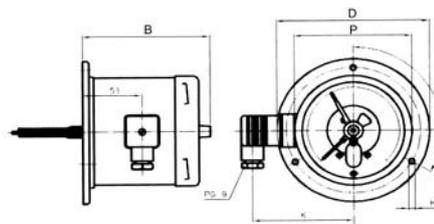
DIAMETER	DIMENSIONS in mm						
	A	B	C	D	H	P	K
100	101	110	19	132	5.5	116	122
160	161	114	19	196	6	178	122

DIAMETER	DIMENSIONS in mm									
	A	B	C1	C2	D	H	P	K1	K2	
100	101	80	26	10	101	5.5	116	123	15	
160	161	83	0	0	196	6	178	126	0*	

* 54 mm on the right (front view)

Type D (code 11)

Type E (code 32)



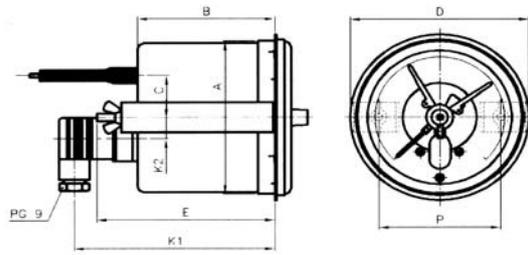
DIAMETER	DIMENSIONS in mm		
	A	B	K
100	101	104	92
160	161	108	122

DIAMETER	DIMENSIONS in mm						
	A	B	D	H	P	K	
100	101	110	132	5.5	116	92	
160	161	114	196	6	178	122	

* Mounting clamp
 ** 20mm on the left (front view)
 + with 3 clamps at 120°C

Type G (code 53)

Type H (code 61)



DIAMETER	DIMENSIONS in mm							
	A	B	C	D	E	P	K1	K2
100	101	84	25	112	109	75	128	15
160*	161	88	0	180	113	139	131	54**

* U-Clamp fitted vertically

** 54 mm on the right (front view)

DIAMETER	DIMENSIONS in mm		
	A	B	K
100	101	104	92
160	161	108	122

Equivalence table: mounting types

	Mounting type (7' digits)		Plunger position (8' digits)	
A =>	3	Wall mounting, Rear flange	1	Bottom outlet
B =>	2	Board mounting, Front flange	2	Rear outlet
C =>	2	Board mounting, Front flange	1	Bottom outlet
D =>	1	Without flange	1	Bottom outlet
E =>	3	Wall mounting, Rear flange	2	Rear outlet
F =>	1	Without flange	2	Rear outlet
G =>	5	Board mounting with mounting clamp	3	Rear outlet with clamp
H =>	6	Wall mounting with support console	1	Bottom outlet

Example of equivalence: Type A = Codes 31 (7' and 8' digits)

Codification

TSFxxxxxxxxxx

Type	1'...4' digits									
Standard industrial thermometer		TSF								
Electrical contact industrial thermometer		TSFE								
Case diameter	5'...7' digits									
Ø 63 mm		063								
Ø 80 mm		080								
Ø 100 mm		100								
Ø 160 mm		160								
Ø 250 mm		250								
Case and sleeve	8' digits									
(304) 1.4301 stainless steel		2								
(316L) 1.4404 stainless steel		3								
Phenol		7								
Mounting type	9' digits									
Without flange		1								
Board mounting, front flange		2								
Wall mounting, rear flange		3								
Wall mounting with mounting clamp		5								
Wall mounting avec console support		6								
Plunger position	10' digits									
Bottom		1								
Back		2								
Back with clamp		3								
Plunger diameter	11' digits									
Ø 6 mm		4								
Ø 8 mm		1								
Ø 11 mm		2								
Ø 14 mm		7								
Other		x								
Capillary tube diameter	12' digits									
Ø 2.5 copper alloy, only up to 250°C (without protection)		4								
Ø 2.5 1.4541 stainless steel, only up to 800°C (without protection)		6								
Ø 4 1.4541 stainless steel, PVC only up to 120°C (without protection)		7								
Ø 2.5 1.4541 stainless steel; protection Ø 6 1.4301 stainless steel		B								
Ø 2.5; 1.4541 stainless steel; protection Ø 7.5 1.4301 stainless steel + PVC		C								
Ø 2.5 1.4541 stainless steel; protection Ø 6 copper + 1.4301 stainless steel		A								
Others		x								
Plunger length (L)	13' digits									
100 mm		2								
160 mm		4								
250 mm		6								
400 mm		7								
600 mm		8								
1000 mm		9								
Others		x								
Measurement ranges	14'...16' digits									
See table										xxx

Codes to be entered in clear language after Codification

Capillary tube length in meters
 Types of connections
 Filling liquid
 Contacts: electromechanical : see sheet B22T4.105
 Induction : see sheet B22T4.110.1

Example of Codification for an electrical contact industrial thermometer

1'...4'	5'...7'	8'	9'	10'	11'	12'	13'	14'...16'	-	Codes to be entered in clear language after Codification matrix creation																	
T	S	F	E	1	0	0	2	1	1	6	4	2	1	2	T	-	2	/	7	3	8	C	/	4	0	0	1
														Capillary tube length = 2 meters													
														/> symbolises the separation between two options													
														Type of connection = ½ Gas HEX-1=22 HEX-2 :27 T :14 Ø max. :15													
														Note: no filling liquid => no code													
														Electromechanical contacts: Dry electrical contacts (C.E.S.) => MAX													

Code	Measurement ranges in °C	Code	Measurement ranges in °F
69T	-200 ... 50	68U	-100 ... 120
77T	-120 ... 40	09U	-50 ... 120
76T	-100 ... 60	08U	-40 ... 160
74T	-80 ... 40	54U	0 ... 140
68T	-70 ... 50	02U	0 ... 200
50T	-60 ... 40	03U	0 ... 250
65T	-40 ... 40	04U	0 ... 300
55T	-30 ... 170	05U	0 ... 400
51T	-30 ... 70	06U	0 ... 500
61T	-30 ... 30	11U	+30 ... 140
84T	-20 ... 100	20U	+30 ... 250
54T	-20 ... 60	13U	+30 ... 320
52T	-20 ... 40	22U	+30 ... 400
53T	-10 ... 30	23U	+30 ... 580
10T	0 ... 40	15U	+30 ... 750
11T	0 ... 60	28U	+100 ... 800
27T	0 ... 80	29U	+200 ... 1000
12T	0 ... 100		
20T	0 ... 120		
13T	0 ... 160		
22T	0 ... 200		
14T	0 ... 250		
23T	0 ... 300		
15T	0 ... 400		
25T	0 ... 500		
16T	0 ... 600		
82T	0 ... 800		
30T	+100 ... 500		

Code	Code Measurement ranges in °C / °F
51V	-30 ... 70 / -40 ... 160
68V	-70 ... 50 / -100 ... 100
55V	-30 ... 170 / 0 ... 350
11V	0 ... 60 / 30 ... 140
20V	0 ... 120 / 30 ... 250
13V	0 ... 160 / 30 ... 320
14V	0 ... 250 / 30 ... 500
15V	0 ... 400 / 30 ... 750
16V	0 ... 600 / 100 ... 1100

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