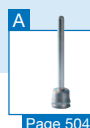


Gas filled thermometers for chemical applications



- For chemical, process engineering and food industry applications
- High measuring accuracy
- Fast response



Application For corrosive media. Meets the most exacting measuring demands, e.g. in process engineering as well as chemical and food industry applications.

Technical specifications

Type
D4

Nominal size
100 – 160

Measuring principle
Pressurised gas filling

Accuracy class
1 (EN 13190)

Ranges °C
-20/+60, 0/60, 0/120, 0/160,
0/200, 0/300, 0/400, 0/500

Working temperature

Continuous: Full scale value
Short-term: 1.1 x full scale value

Operating pressure at thermowell

Max. 10 bar (up to 300 °C)

Degree of protection

IP 65 (EN 60529)

Standard version

Connection
Stem stainless steel 321,
100 x 10 mm, plain

Mounting position
Centre back or bottom or with joint

Dial
Aluminium, white
Dial marking black

Pointer
Aluminium, black

Zero correction
At side of housing

Movement
Brass

Housing
Stainless steel 304

Bayonet type bezel
Stainless steel 304

Window
Instrument-grade glass

Options

- Every angle version
- Thermowell G½B, stainless steel 321
- Grooved nut connection as per DIN 11851
- Nominal size 250
- Other connection designs
- Other ranges
- Special scales
- Glycerine filling (type D 8)
- 3-hole fixing, panel mounting bezel
- Back flange
- Capillary (stainless steel 321)
- Special materials
- Electrical contacts

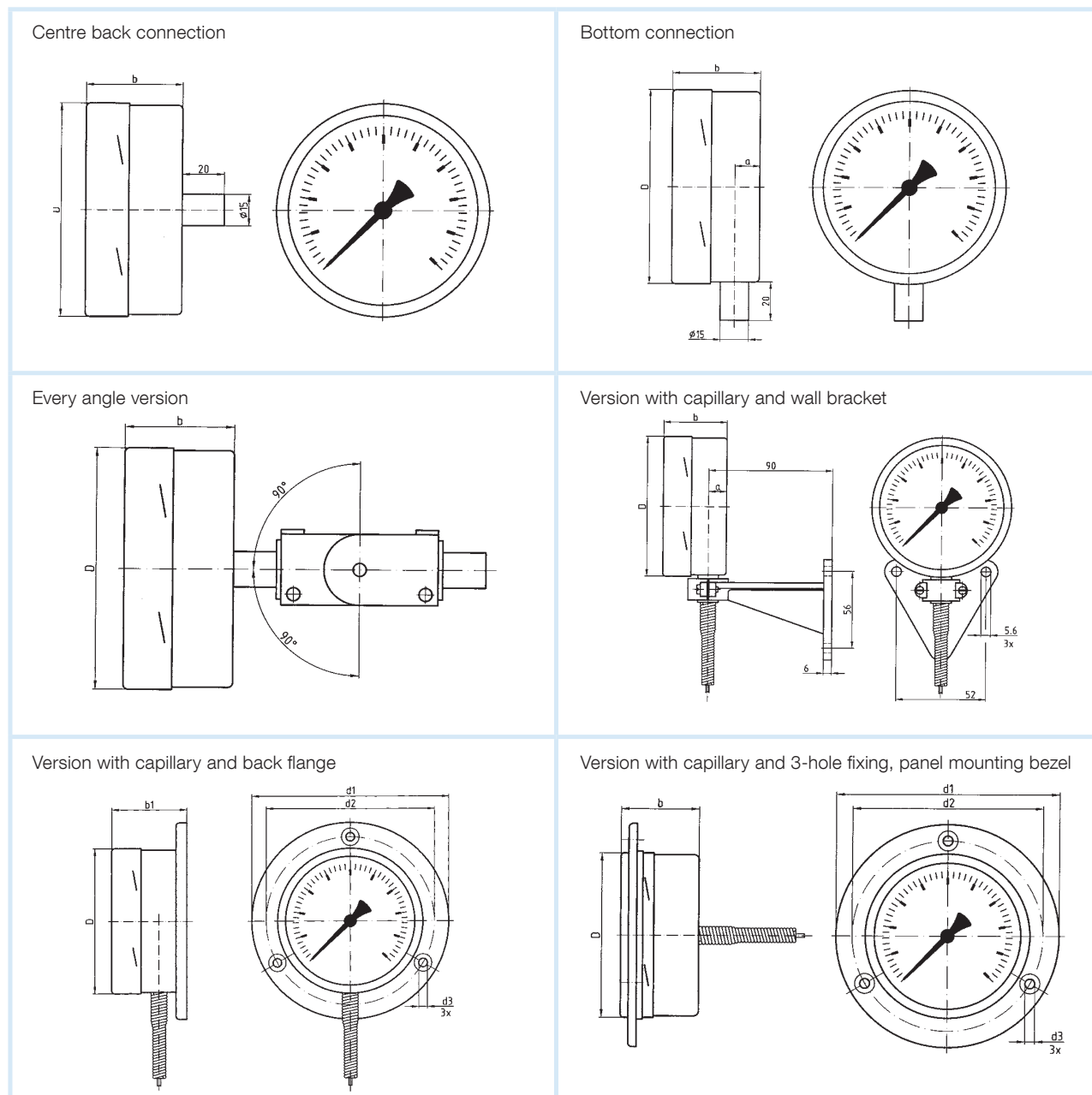


See page 499 for prices.

Gas filled thermometers for chemical applications

Type D4 – NG 100 / 160

Housing types and dimensions (mm)






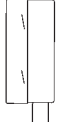
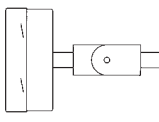
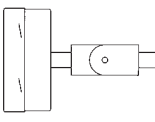
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Dimensions (mm)

Nominal size	a	b	b ₁	Ø D	Ø d ₁	Ø d ₂	Ø d ₃
100	13	45	51	101	132	116	5.5
160	13	45	51	161	196	178	6
250	13	55	57	252	285	270	6

Gas filled thermometers for chemical applications

DG: H

Type	FTh 100 Ch D412	FTh 160 Ch D412	FTh 100 Ch D402	FTh 160 Ch D402	FTh 100 Ch D482	FTh 160 Ch D482
Version						
Housing Ø	100	160	100	160	100	160
Housing	Stainless steel 304 with bayonet type bezel, instrument-grade glass window					
Stem	Stainless steel 321, 100 x 10 mm					
Connection	Plain stem (without thermowell)					
Filling	Pressurised gas filling					
Accuracy class	Class 1 as per EN 13190					
					Every angle version	
Range	-20/+60 °C	-20/+60 °C	-20/+60 °C	-20/+60 °C	-20/+60 °C	-20/+60 °C
	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
	64341412	64343412	64341402	64343402	64341482	64343482
Range	0/60 °C	0/60 °C	0/60 °C	0/60 °C	0/60 °C	0/60 °C
	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
	64361412	64363412	64361402	64363402	64361482	64363482
Range	0/120 °C	0/120 °C	0/120 °C	0/120 °C	0/120 °C	0/120 °C
	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
	64373412	64375412	64373402	64375402	64373482	64375482
Range	0/160 °C	0/160 °C	0/160 °C	0/160 °C	0/160 °C	0/160 °C
	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
	64377412	64379412	64377402	64379402	64377482	64379482
Range	0/200 °C	0/200 °C	0/200 °C	0/200 °C	0/200 °C	0/200 °C
	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
	64381412	64383412	64381402	64383402	64381482	64383482
Range	0/300 °C	0/300 °C	0/300 °C	0/300 °C	0/300 °C	0/300 °C
	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
	64389412	64391412	64389402	64391402	64389482	64391482
Range	0/400 °C	0/400 °C	0/400 °C	0/400 °C	0/400 °C	0/400 °C
	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
	64397412	64399412	64397402	64399402	64397482	64399482
Range	0/500 °C	0/500 °C	0/500 °C	0/500 °C	0/500 °C	0/500 °C
	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
	64401412	64403412	64401402	64403402	64401482	64403482

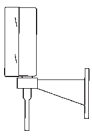
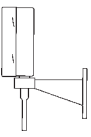
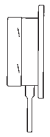
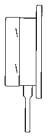
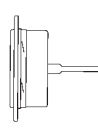
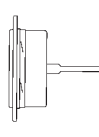
*Other connection types, see page 502.



See page 502 for options/extra charges.

Gas filled thermometers for chemical applications

DG: H

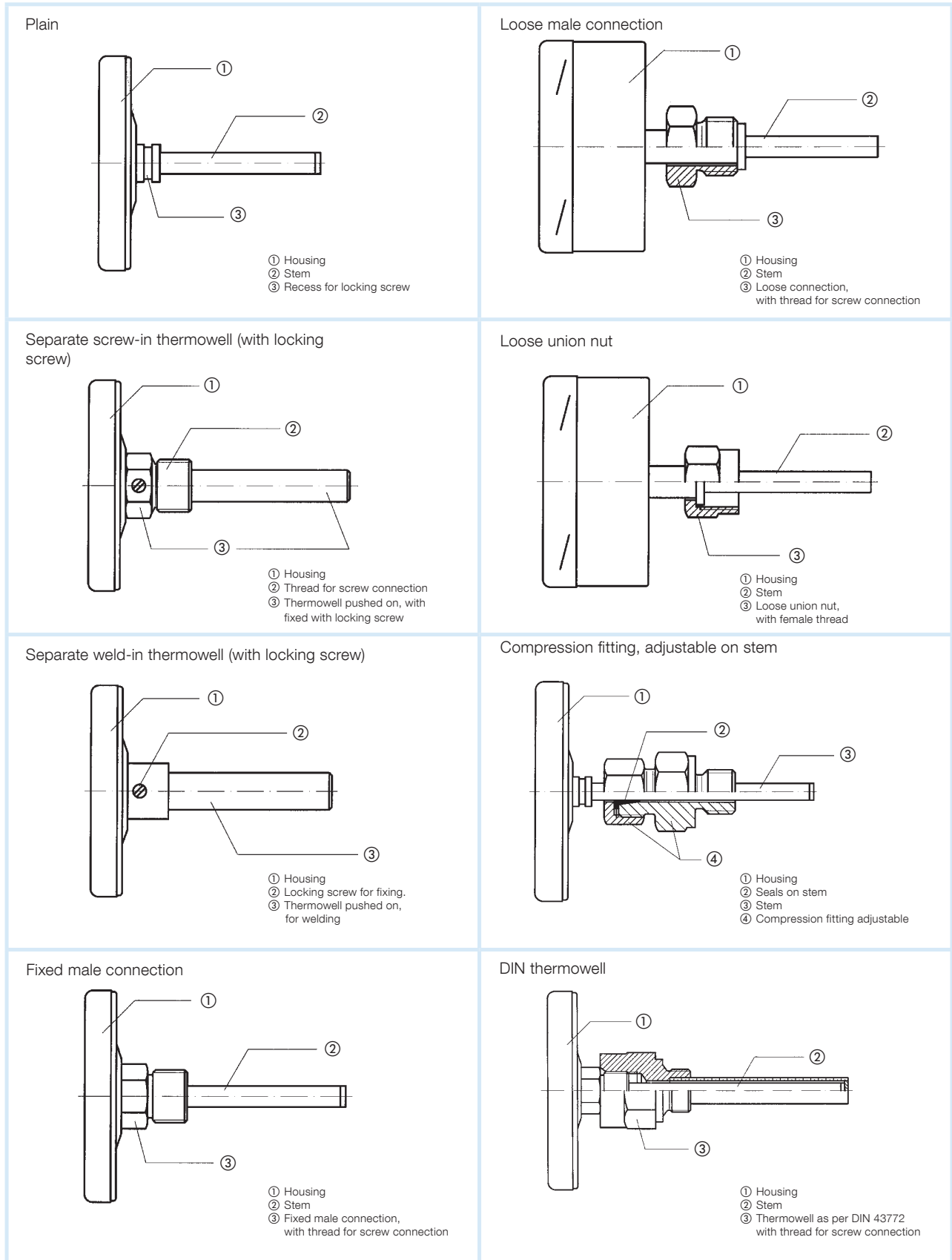
Type	FTh 100 Ch D442	FTh 160 Ch D442	FTh 100 Ch D472	FTh 160 Ch D472	FTh 100 Ch D432	FTh 160 Ch D432
Version						
Housing Ø	100	160	100	160	100	160
Housing	Stainless steel 304 with bayonet type bezel, instrument-grade glass window					
Stem	Stainless steel 321, 100 x 10 mm					
Connection	Plain stem (without thermowell)					
Filling	Pressurised gas filling					
Capillary	Stainless steel 321, 1 metre					
Mounting	Wall bracket		Back flange		3-hole fixing, panel mounting bezel, 304	
Accuracy class	Class 1 as per EN 13190					
Range	-20/+60 °C	-20/+60 °C	-20/+60 °C	-20/+60 °C	-20/+60 °C	-20/+60 °C
	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
	64341442	64343442	64341472	64343472	64341432	64343432
Range	0/60 °C	0/60 °C	0/60 °C	0/60 °C	0/60 °C	0/60 °C
	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
	64361442	64363442	64361472	64363472	64361432	64363432
Range	0/120 °C	0/120 °C	0/120 °C	0/120 °C	0/120 °C	0/120 °C
	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
	64373442	64375442	64373472	64375472	64373432	64375432
Range	0/160 °C	0/160 °C	0/160 °C	0/160 °C	0/160 °C	0/160 °C
	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
	64377442	64379442	64377472	64379472	64377432	64379432
Range	0/200 °C	0/200 °C	0/200 °C	0/200 °C	0/200 °C	0/200 °C
	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
	64381442	64383442	64381472	64383472	64381432	64383432
Range	0/300 °C	0/300 °C	0/300 °C	0/300 °C	0/300 °C	0/300 °C
	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
	64389442	64391442	64389472	64391472	64389432	64391432
Range	0/400 °C	0/400 °C	0/400 °C	0/400 °C	0/400 °C	0/400 °C
	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
	64397442	64399442	64397472	64399472	64397432	64399432
Range	0/500 °C	0/500 °C	0/500 °C	0/500 °C	0/500 °C	0/500 °C
	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
	64401442	64403442	64401472	64403472	64401432	64403432

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* See page 502 for other connection types, options/extra charges.

Connection types for bimetal and gas filled thermometers (industrial, stainless steel and chemical versions)



Extra charges – connection types for bimetal and gas filled thermometers (industrial, stainless steel and chemical versions)

DG: H

Type	Bimetal thermometers				Gas filled thermometers			
Material		Brass	Steel	Stainless steel 316 Ti	Brass	Steel	Stainless steel 321 (1.4541)	Stainless steel 316 Ti
	Stem length mm	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
Separate screw-in thermowell (with locking screw) G $\frac{1}{2}$ B for stem up to Ø 8 mm for BiTh Ø 10 mm for FTh	45	64506	64511	64501	---	---	---	---
	63	64507	64512	64502	---	---	---	---
	100	64508	64513	64503	---	---	64463	---
	150	64509	64514	64504	---	---	---	---
	200	64510	64515	64505	---	---	---	---
Separate weld-in thermowell (with locking screw) for stem up to Ø 8 mm for BiTh Ø 10 mm for FTh	45	---	64516	64520	---	---	---	---
	63	---	64517	64521	---	---	---	---
	100	---	64450	64453	---	---	64435	---
	150	---	64518	64522	---	---	---	---
	200	---	64519	64523	---	---	---	---
Stem extension per 100 mm ¹⁾		64524	64525	64526	---	---	64527	---
Thermowell extension per 100 mm ¹⁾		64528	64529	64530	---	---	64531	---
Fixed male connection G $\frac{1}{4}$ B		64532	64533	64534	---	---	---	---
Fixed male connection G $\frac{1}{2}$ B		64447	64451	64454	---	---	64460	---
Fixed male connection G $\frac{3}{4}$ B		64535	64536	64537	---	---	64538	---
Loose male connection G $\frac{1}{4}$ B		64539	64540	64541	---	---	---	---
Loose male connection G $\frac{1}{2}$ B		64542	64543	64544	---	---	64545	---
Loose male connection G $\frac{3}{4}$ B		64546	64547	64548	---	---	64549	---
Loose union nut G $\frac{1}{2}$, female		64448	64436	64455	---	---	64461	---
Loose union nut G $\frac{3}{4}$, female		64551	64552	64553	---	---	64554	---
Compression fitting adjustable G $\frac{1}{2}$ B		---	64555	64556	---	---	64557	---
Compression fitting adjustable G $\frac{3}{4}$ B		---	---	64558	---	---	64559	---
Capillary per metre Stainless steel 316 Ti		---	---	---	---	---	64464	---
Stem Ø 6 mm ²⁾			---		---	---	---	---
Stem Ø 4 mm ²⁾			---		---	---	---	---
Injection tip for Ø 8 mm ²⁾			---		---	---	---	---
Injection tip for Ø 4 mm ²⁾		---	---		---	---	---	---

1) Only applies to standard lengths 45/63/100/150/200/250/300/400 mm – extra charge for special lengths: €

2) Only for centre back connection, limited measuring ranges

Extra charges for bimetal thermometers and gas filled thermometers (industrial, stainless steel, chemical versions)

DG: H

Housing diameter (mm)	Bimetal thermometers			Gas filled thermometers	
	< 100	100	160	100	160
	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.	Price € Part no.
Red mark on dial	64465	64470	64478	64487	64492
1 reference pointer red, external rotary knob adjustment (window = plastic) T _{max} 160 °C only for instruments without filling)	64467	64471	64479	64488	64493
Maximum pointer, external rotary knob adjustment (window = plastic) T _{max} 160 °C only for instruments without filling)	64468	64473	64481	64489	64494
Glycerine filling (only for instruments with bayonet type bezel housing)	---	64475	64483	64490	64495
Silicone oil filling (only for instruments with bayonet type bezel housing)	---	64476	64484	64491	64496
Other ranges for bimetal thermometers (extra charge as compared to version 0/120 °C)	Minimum stem length centre back (in mm)*		Minimum stem length bottom (in mm)*		Price €
-20/+40 °C	63		100		
-20/+60 °C	63		63		
-30/+50 °C	63		63		
-40/+40 °C	63		63		
-40/+60 °C	63		63		
0/60 °C	63		100		
0/80 °C	63		63		
0/100 °C	63		63		
0/200 °C	63		63		
0/250 °C	100		100		
0/300 °C	75		63		
0/400 °C	75		75		
0/500 °C	63		63		
0/600 °C	75		175		

* For version with separate thermowell

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Electrical contacts (only for gas filled thermometers)

DG: H

Design	Magnetic spring contact		Inductive contact			
Code	MK 1	MK 2	IK 1	IK 2		
Number of contacts	1	2	1	2		
Switching function: 1 = closes, 2 = opens (pointer moves clockwise)	1 2	11, 12 21, 22	1 2	11, 12 21, 22		
The extra charges indicated include fitting, without thermometer						
Version	Nominal size	Housing	Price €	Price €	Price €	Price €
Gas filled thermometers for chemical applications	100	No filling				
	100	With filling				
	160	No filling				
	160	With filling				



See page 582 for contact protection relays and isolating switching amplifiers.

Thermowells according to DIN 43772

DG: H

Type	Design 5										Design 6										Design 4																											
	d1	d2	E	N	D1	F1	K1	H1	H2	d1	d2	E	N	D1	F2	K1	H1	H2	d1	d2	F	N	F3	H1	H2																							
Dimensions (mm)	10	8	G½B	G½	26	12	14	19	15	10	8	G½B	G½	26	17	14	19	15	9	8	26	G½	15	19	15																							
	11	10	G½B	G½	26	13	14	19	15	11	10	G½B	G½	26	17	14	19	15	11	10	26	G½	17	19	15																							
	d2 = probe diameter of instrument																																															
Connection	To thermometer G½ female Process connection G½B																To thermometer G½ female																															
Version	Welded, screw-in					Bar stock, screw-in					Bar stock, weld-in																																					
Material	Brass					Stainless steel					Steel		Stainless steel		Steel				Stainless steel																													
Pmax*	25 bar					40 bar					160 bar		150 bar		160 bar				150 bar																													
Tmax*	160 °C					400 °C					300 °C		400 °C		300 °C				400 °C																													
For stem diameters up to 8 mm																																																
	Lengths mm		Price € Part no.	Price € Part no.	Lengths mm		Price € Part no.	Price € Part no.	Lengths mm		Price € Part no.	Price € Part no.	Lengths mm		Price € Part no.	Price € Part no.	Lengths mm		Price € Part no.	Price € Part no.																												
	L 110	U1 82	64670	64674	L 110	U1 82	64678	64682	L 110	U1 82	64686	64690	L 170	U1 142	64671	64675	L 170	U1 142	64679	64683	L 170	U1 142	64687	64691	L 210	U1 182	64672	64676	L 210	U1 182	64680	64684	L 210	U1 182	64688	64692	L 260	U1 232	64673	64677	L 260	U1 232	64681	64685	L 260	U1 232	64689	64693
	G 105				G 105				G 165				G 165				G 205				G 205				G 255				G 255				G 255															
For stem diameters up to 10 mm																																																
	Lengths mm		Price € Part no.	Price € Part no.	Lengths mm		Price € Part no.	Price € Part no.	Lengths mm		Price € Part no.	Price € Part no.	Lengths mm		Price € Part no.	Price € Part no.	Lengths mm		Price € Part no.	Price € Part no.																												
	L 110	U1 82	64694	64698	L 110	U1 82	64702	64706	L 110	U1 82	64710	64714	L 170	U1 142	64695	64699	L 170	U1 142	64703	64707	L 170	U1 142	64711	64715	L 210	U1 182	64696	64700	L 210	U1 182	64704	64708	L 210	U1 182	64712	64716	L 260	U1 232	64697	64701	L 260	U1 232	64705	64709	L 260	U1 232	64713	64717
	G 105				G 105				G 165				G 165				G 205				G 205				G 255				G 255				G 255															

* Applies to static load (load always depends on medium, pressure and temperature of medium, flow rate, installation length and material of thermowell).
The stem length of the thermometer is calculated as follows (for fixed male connection, G½B): L = minus 10 mm

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