Dial thermometer // gas filled // for diesel engines // with capillary line

Type 311 WH // 321 TA // 332 TE // 331 KL



Type 331 KL

Highlights

- Suitable for outdoor use - closed system (IP65)
- Completely stainless steel - high-quality version
- Without electrical auxiliary power

Technical data				
Type	**311 WH**	**321 TA**	**332 TE**	**331 KL**
Version	With wall bracket	Rear mounting flange	Front mounting flange	With U bracket
Nominal size	Ø 80 or 100 mm			
Display ranges according to EN 13190	0...100 °C 0...120 °C 0...160 °C 0...250 °C 50...650 °C			
Accuracy according to EN 13190	Class 1			
Medium / Application area	Liquid and gaseous media			
Capillary line connection	Bottom		Central back	
Immersion tube length	Between 100...400 mm			
Immersion tube diameter	Ø 12 mm			
Capillary line	with Stainless steel-spiral protection, 1...15 m Length			
Process connection	Connection types: A, AK			
Nominal pressure	Max. 25 bar			
Measuring system	Nitrogen filled			
Degree of protection according to EN 60529	IP65			
Medium temperature	See selected display range			
Ambient temperature	-20...60 °C (only indoors)			
Storage temperature	-40...60 °C			
Nominal service temperature (EN 13190)	23 °C ±2 °C			
Approvals				
	DNV			

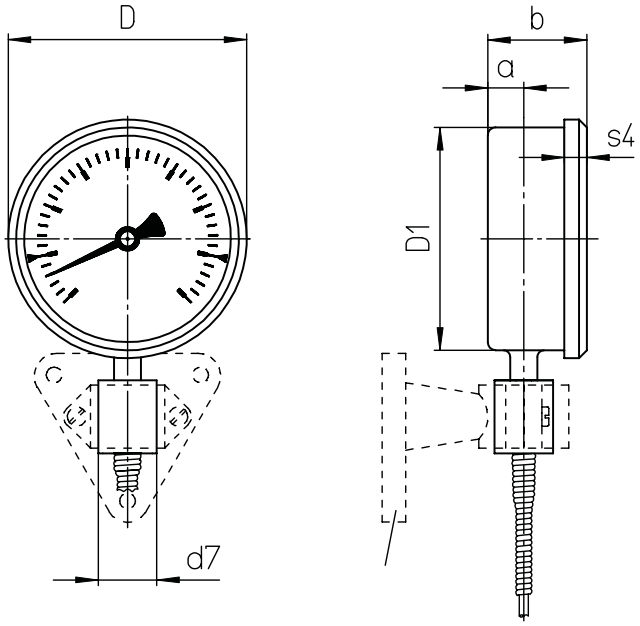
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Options

Options	
For type	**On request**
311 WH /321 TA / 332 TE / 331 KL	Other immersion tube diameter and connection types. Other display ranges and / or special scales, e.g. double scale °C / °F. Capillary line > 15 m

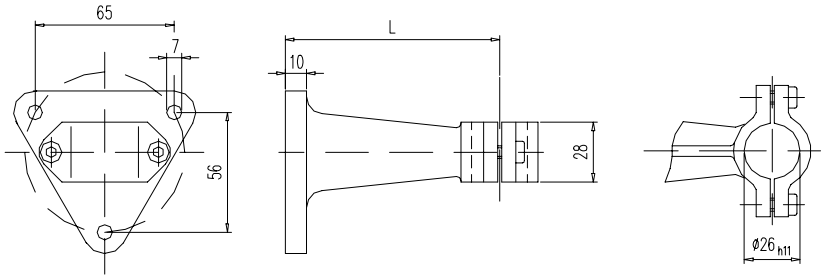
Technical drawings // Dimensions

Type 311 WH with wall bracket



Dimensions [mm]							Weight [kg]
NS	**a**	**b**	**D**	**D1**	**d7**	**s4**	**filled**
80	15	42	86	79	26	8	0.60
100	15	43	106	99	26	10	0.78

This information is provided as an example and relates to the version with connection type A, Ø 10 mm, and immersion tube length 200 mm and capillary 1 m.

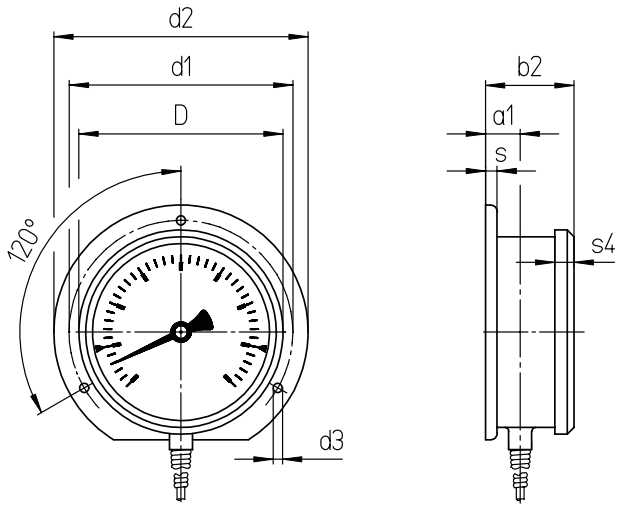


Wall bracket compliant with DIN 16 281			
Material	**Surface finish**	**L**	**Form**
Aluminium	Black painted	100	H

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Technical drawings // Dimensions

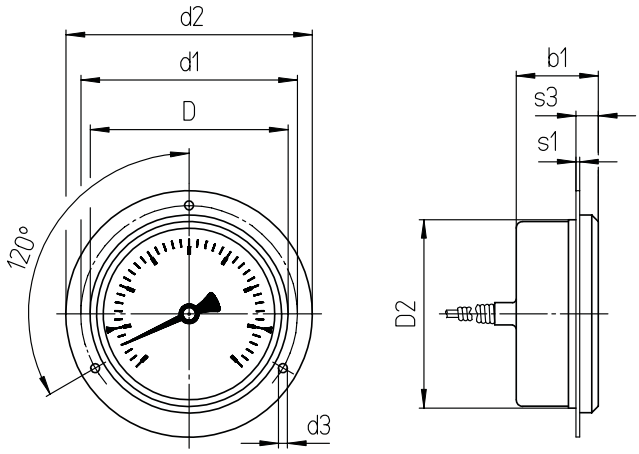
Type 321 TA rear mounting flange



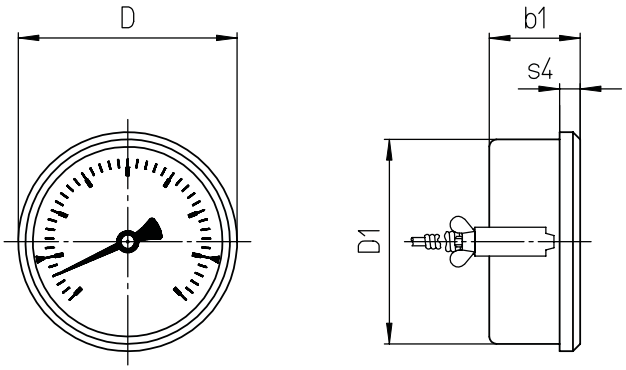
Dimensions [mm]									Weight [kg]
NS	**a1**	**b2**	**D**	**d1**	**d2**	**d3**	**s**	**s4**	**filled**
80	18	45	86	95	110	4.8	5	8	0.60
100	18.5	46.5	106	116	132	4.8	6	10	0.78

This information is provided as an example and relates to the version with connection type A, Ø 10 mm, and immersion tube length 200 mm and capillary 1 m.

Type 332 TE front mounting flange



Type 331 KL with U bracket



Dimensions [mm]											Weight [kg]
NS	**b1**	**D**	**D1**	**D2**	**d1**	**d2**	**d3**	**s1**	**s3**	**s4**	**filled**
80	42	86	79	81	95	110	4.8	1	9	8	0.60
100	43	106	99	101	116	132	4.8	1	11.5	10	0.78

This information is provided as an example and relates to the version with connection type A, Ø 10 mm, and immersion tube length 200 mm and capillary length 1 m.

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Material

Material	
Housing	Crimped-on ring, Stainless steel 1.4301, filled with silicone oil
Window	Instrument glass
Pointer movement	German silver / brass
Dial	Aluminium white with black scale markings Aluminium silver with black scale markings (Display range 50...650 °C)
Pointer	Aluminium black
Capillary line	Stainless steel 1.4571
Material in contact with media	
Process connection	Stainless steel 1.4571
Immersion tube	Stainless steel 1.4571

Standard connection types // Immersion tube // for type 311 to 332

Connection type A

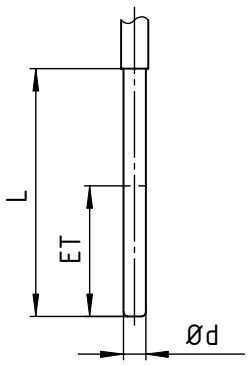
Plain immersion tube, universally usable.

Connection type AK [mm]

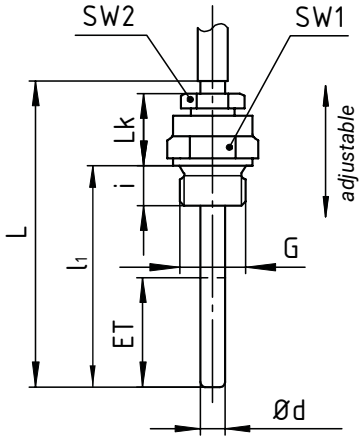
With adjustable compression fitting,
for direct installation or use with protection tubes

G	SW1	SW2	i	Lk
G½ B	27	22	14	42
G¾ B	32	22	16	42
½ NPT	27	22	19	42
¾ NPT	27	22	19	42
M20 x 1.5	27	22	14	42

Connection type A



Connection type AK



Connection type	Capillary line length incl. sensor ≤ 5m		Capillary line length incl. sensor > 5m	
	Length		Length	
	ET	Lmin	ET	Lmin
A	80	150	120	175
AK	80	150	120	175

The minimum length Lmin / l1min of the immersion tube is the shortest possible immersion tube length for a given active length ET (bulb) and connection type. The active length ET of the immersion tube (bulb) must be fully immersed in the substance to be measured in order to obtain measurements corresponding to the stated accuracy class.

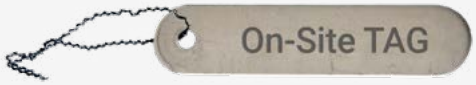
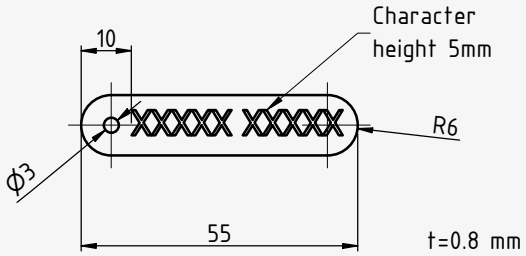
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Article numbers

Order code										
Thermometer version										
With wall bracket	Z	311								
With Rear mounting flange	Z	321								
With U bracket	Z	331								
With Front mounting flange	Z	332								
Nominal size										
80 mm			B2							
100 mm			C2							
Display range										
0...100 °C				10						
0...120 °C				12						
0...160 °C				16						
0...250 °C				25						
50...650 °C				56						
Immersion tube length l_1	**Nominal length L = l_1 + 45 mm**									
100 mm	145 mm				100					
135 mm	180 mm				135					
160 mm	205 mm				160					
200 mm	245 mm				200					
250 mm	295 mm				250					
300 mm	345 mm				300					
400 mm	445 mm				400					
Connection type										
Connection type A, Plain immersion tube						1				
Connection type AK, adjustable compression fitting						9				
Process connection										
Without - Plain immersion tube							0			
G½							2			
G¾							3			
½ NPT							B			
¾ NPT							C			
M20 x 1.5							7			
Immersion tube diameter										
Ø 12 mm								2		
Capillary line length										
1 m									1	
3 m									3	
5 m									5	
Other length (choose in meters)									_	
Capillary line material and protection										
Stainless steel, stainless steel-spiral protection										C
Example order number		**Z**	**311**	**B2**	**10**	**100**	**1**	**0**	**2**	**1**	**C**

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Accessories

Accessories	Article number
Measuring point designation Laser-inscribed stainless steel plate with fixing wire for easy attachment to measuring points → **Scope of delivery:** Designation plate inscribed according to specification and enclosed fixing wire (sealing wire) → **Fastening:** Wire (included in delivery), alternatively sealing, cable ties or similar (not included in delivery) → **Materials:** Plate stainless steel 1.4571, wire stainless steel → **Dimensions:** Plate 55 x 10 x 0.8 mm, wire length 180 mm → **Inscription:** one-sided, single-line, max. 11 characters, character height 5 mm, designation width max. 40 mm, letters, numbers, symbols, barcodes, QR codes → **Transmission of designations:** digital list, file formats Excel, Word or CSV  	**ONSITETAG**