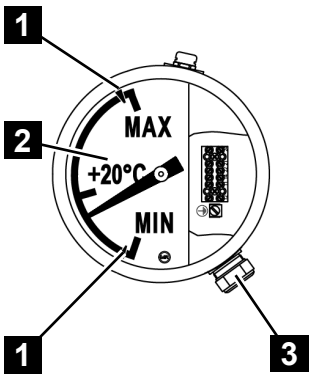
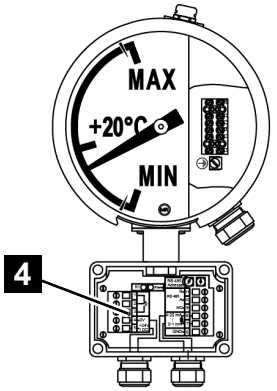
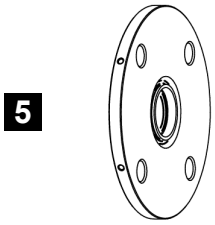
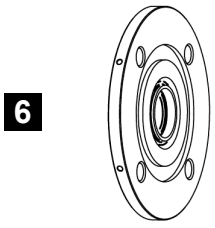
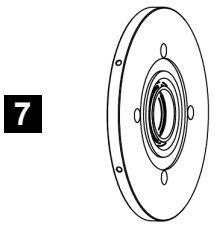
MESSKO® MTO
Oil Level Indicator
Technical data











Product variants

This technical document contains detailed information about the technical properties of the product. If you would like to place an order, please use the MESSKO inquiry and order specification, which you can also find on our website http://www.reinhausen.com below the respective product.

Limit value switch		
Without switch		
Non-adjustable 15 A switch	(MTO-STF160)	max. 3 units
	For details, see the micro-switch table, page 3	
1 Adjustable 5 A switch	(MTO-ST160)	max. 3 units
	For details, see the micro-switch table, page 3	
Switching points	Standard: 5° before MIN and 5° before MAX; others available	
	(For adjustable switches: minimum distance >10° between switches)	
2 Scale marks	Standard: MAX...+20°C...MIN	
	Others available	
	Scale/shade color	Black on white dial face
		White on black dial face
		Yellow on black dial face
		Others available

3 Electrical connection		
Cable screw connection	1 x M25x1.5	1 x M25x1.5 WADI (watertight) available
ANSI plug	Cable length available in a variety of lengths	
NPT 1/2" internal thread		
MIL plug		
Optional:	For details, see the technical data, page 4, and graphics, page 5/6	
4 TT30 box with analog output	Analog output	0...1 mA
		0...20 mA
		4...20 mA (error signal < 3.6 mA)
		4...20 mA (error signal > 22 mA)
	Digital output	RS485 interface with standard ASCII protocol available
	K1 micro-switch	Switching function:
		Rising level (NO/NC) or falling level (NO/NC)
	K1 switching point	Standard at 20 °C
		Others available

Design types	
Housing color tone	RAL 7033 cement gray
	RAL 7038 agate gray
	RAL 7032 gravel gray (only for sheet steel housing)
Mounting flange	For details, see the technical data, page 3
	5 Standard flange Ø 134 mm [Ø 5.28"], bolt circle Ø 102 mm [Ø 4.02"]
	6 RM* flange Ø 134 mm [Ø 5.28"], bolt circle Ø 101.6 mm [Ø 4.000"]
	*) Version for the US market
	7 NAT/DS flange Ø 134 mm [Ø 5.28"], bolt circle Ø 79.38 mm [Ø 3.125"]
Optional	Offshore model

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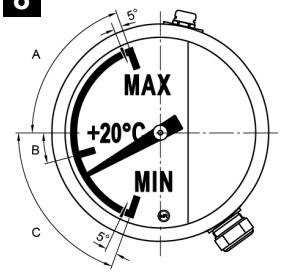

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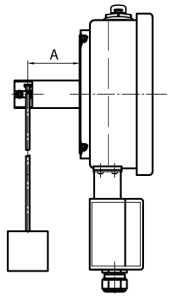

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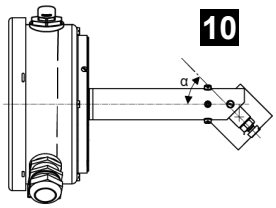

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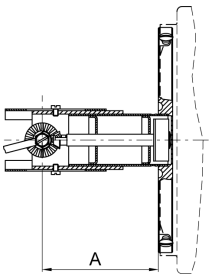

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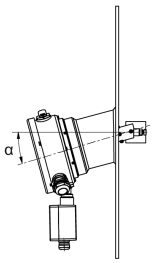


Radial drive type

8 Angle values of the scale	Standard	A = 70° (max.) / B = 15° / C = 70° (max.)
		Other intermediate values available
9 Straight design	Standard projection	59 mm / 100 mm
		Max. 350 mm; others available
10 Angled design	Standard projection	150 mm / 274 mm
		Max. 350 mm; others available
	Inclination α	15° / 30° / 45° available
Float gauge length	Standard	680 mm / 800 mm
		Maximum 1000 mm
		Can be shortened by the customer
	RM* float gauge	L ≤ 350 mm; brass
	*) Version for the US market	(also available for axial)

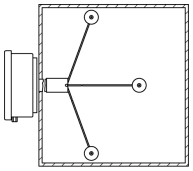
Axial drive type

8 Angle values of the scale	Standard	A = 70° (max.) / B = 15° / C = 70° (max.)
		Other intermediate values available
11 Axial design	Standard projection	A = 69 mm / A = 268 mm
		Max. 350 mm; others available

Installation position depending on the conservator tank layout

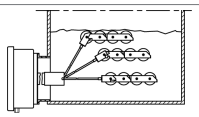
Option 1: Without breathing sack

For details, see the graphic, page 11



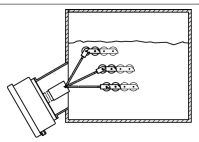
Option 2: Upright with breathing sack

For details, see the graphic, page 12



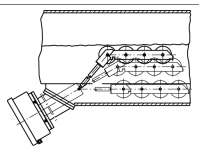
Option 3: Angled with breathing sack

For details, see the graphic, page 12



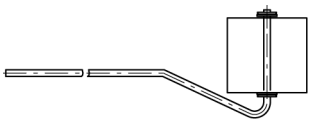
Option 4: Slanting from below with breathing sack

For details, see the graphic, page 13



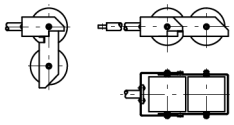
Float gauge design

- 1 rolling float gauge (L ≤ 1000 mm)

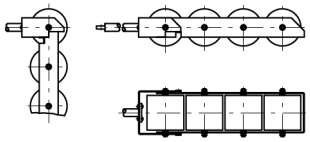


for option 2, 3 and 4

- 2 rolling float gauges (L ≤ 1000 mm)



- 4 rolling float gauges (L > 1000 mm, max. 2500 mm; others by request)



12 Angled TT30 box	Inclination **α** = 0° / 15° / 30° / 45° available
	For details, see the graphic, page 9

Technical data

Operating conditions	MESSKO® MTO®
Setup	Indoors and outdoors, tropic-proof
Operating temperature	–40 °C...+70 °C; with TT30 signal converter (optional): –25 °C...+70 °C
Storage temperature	–50 °C...+80 °C
Min. permitted oil impermeability	760 kg/m^3 at max. operating temperature
Ventilation	Ventilation element in the indicator for the prevention of water condensation
Degree of protection	IP 55 in accordance with DIN EN 60 529

General	MESSKO® MTO®
Materials	
Front ring and housing	Sheet steel, galvanized: coated RAL 7032/RAL 7033/RAL 7038; coated with acrylate resin
	Stainless steel: coated RAL 7033/RAL 7038, coated with acrylate resin
Retaining flange	Aluminum (AlSi1MgMn)
Viewing glass	Laminated safety glass with UV filter
Indicator scale	Aluminum-coated, with UV wide format printing and protective paint
Labeling	Black font
	Upon execution in accordance with DIN 42 569 black indicator scale, yellow font
	MIN...+20°C...MAX; other labeling available
Float rod	Aluminum; optional brass for L ≤ 350 mm
Float gauge	Rohacell 110, oil-resistant, temperature-resistant up to 160°C
Cable screw connection	Nickel-plated brass, M25x1.5
	Offshore: 1.4571 stainless steel, M25x1.5
Weight	3.7 kg
Dimensions	
Housing scale	Ø 173 mm [Ø 6.81"]; height 213 mm [8.39"]; depth 81 mm [3.19"]
	Height with TT housing (optional): 322 mm [12.68"]
Flange	**Standard MTO-ST160 (TT30)**: Ø 134 mm [Ø 5.28"]; bolt circle Ø 102 mm [Ø 4.02"] with 4 holes Ø 13 mm [Ø 0.51"]
	MTO-ST**RM standard**: Ø 134 mm [Ø 5.28"]; bolt circle Ø 101.6 mm [Ø 4.000"] with 4 holes Ø 11.12 mm [Ø 0.438"]; inner seal groove Ø 66.55 mm [Ø 2.620"] / outer seal groove Ø 85.85 mm [Ø 3.380"] / depth 3.05 mm [0.120"]
	MTO-ST**RM NAT/DS**: Ø 134 mm [Ø 5.28"]; bolt circle Ø 79.38 mm [Ø 3.125"] with 4 holes Ø 8.73 mm [Ø 0.344"]; inner seal ring Ø 53.98 mm [Ø 2.125"] / outer seal ring Ø 69.85 mm [Ø 2.750"] / depth 1.59 mm [0.063"]
Projection	Radial, straight design: 59 mm / 100 mm; max. 350 mm; others available
	Radial, angled design (15° / 30° / 45°): 150 mm / 274 mm; max. 350 mm; others available
	Axial: Standard 69 mm / 268 mm; max. 350 mm, others available
Float gauge length	Radial: Standard 680 mm / 800 mm; can be shortened by the customer
	Axial: 2 rolling float gauges (≤ 1000 mm); 4 rolling float gauges (> 1000 mm)
Connection terminals	min. 0.25 mm^2 / max. 2.5 mm^2

Micro-switch	MESSKO® MTO®
Switching function:	NO: Level rising or falling
Change-over switch for fill level	NC: Level falling or rising
Contact material	Silver alloy (AgNi10)
	Gold-plated contacts available if current for switching is limited to 100 mA
Isolation voltage	2.5 kV AC, each individual contact grounded
Up to 3 preset micro-switches, only adjustable ex works: MTO-ST**F**160(G)	
	Breaking capacity: AC: 250 V / 15 A / cosφ = 1; DC: 250 V / 0.25 A / non-inductive; DC: 12 V / 5 A / non-inductive
Up to 3 freely adjustable micro-switches over scale range: MTO-ST160(G)	
	For the breaking capacity, see the following table

Switching power (breaking capacity)		Utilization category	U_N	I_N
For adjustable micro-switches in accordance with DIN EN 60947-5-1	**AC**	AC-12	230 V	5 A
		AC-15	230 V	0.26 A
		AC-15	120 V	0.5 A
		AC-15	24 V	2 A
	DC	DC-12	110 V	0.4 A
		DC-12	220 V	0.2 A
		DC-13	220 V	0.11 A
		DC-13	120 V	0.21 A
		DC-13	24 V	1.04 A

Technical data TT30 signal converter (optional)

Operating conditions	TT30 signal converter
Setup	Indoors and outdoors, tropic-proof
Operating temperature	–25 °C...70 °C
Storage temperature	–50 °C...+80 °C
Ventilation	Indirectly via MTO housing
Degree of protection	IP 55 in accordance with DIN EN 60 529

Properties	TT30 signal converter
Identification	MTO-ST(F)160(G)**TT**
Housing	AlSi pressure casting; color tone RAL 7033/RAL 7038, coated with acrylate resin
Weight	approx. 700 g
Dimensions	L x W x H = 120 x 80 x 60 mm
Cable screw connection	2 x M20x1.5; nickel-plated brass
	2 x M20x1.5; 1.4571 stainless steel for offshore applications
Connection terminals	min. 0.25 mm^2 / max. 2.5 mm^2

Connection parameters	TT30 signal converter
Sensor	Inductive switch
Supply voltage	24 V DC +/- 15%
Power consumption	approx. 80 mA
Isolation voltage	0.5 kV, 50/60 Hz, 1 min.; all contacts grounded
Status display	Power ON (1x green LED); K1 main switching contact (1x red LED)
Relay contact	1 x changeover contact (K1 main switching contact)
Breaking capacity	5 A/250 V AC, cosφ=1; 0.3 A/250 V DC / non-inductive
max. load resistance	$R_{L,MAX}$ = (U_B – 7 V) / 20 mA (or / 1 mA)
	R_L = 850 Ω at U_B = 24VDC
Working resistance influence	≦ 0.01% / 100 Ω
Analog output signal, adjustable ex works; 2 wire circuit	0...1 mA
	0...20 mA (error signal > 22 mA)
	4...20 mA (error signal < 3.6 mA)
	4...20 mA (error signal > 22 mA)
Digital output signal	RS485 interface with standard ASCII protocol available

Connection diagram with TT30 signal converter as analog output (optional)

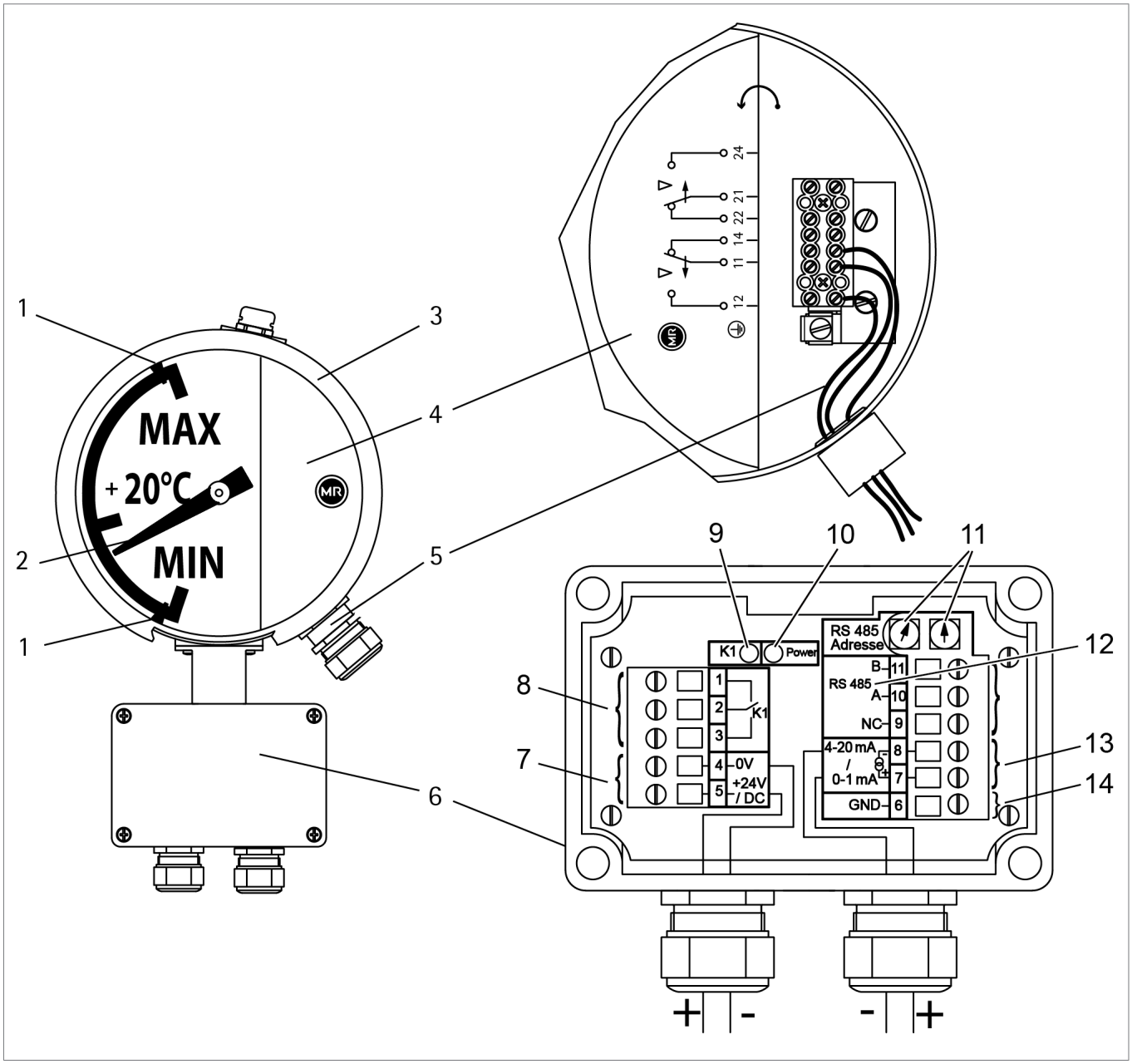


Figure 1: Electrical connection

1	Limit value switch	2	Indicator
3	Front ring with bayonet connector	4	Cover plate (opened from the right)
5	Micro-switch electrical connection	6	TT30 box (only for MTO-TT)
7	Connection for supply voltage (contacts 4, 5)	8	*K1 main switching contact* relay connection (contacts 1, 2, 3) – increasing or decreasing NO – increasing or decreasing NC
9	LED *K1 main switching contact* – red	10	LED *Power* – green
11	2 rotary encoder switches for RS485 address (hexadecimal)	12	Optional: RS485 interface (contacts 10, 11, and, if necessary, contact 9 for the shield)
13	Analog output (contacts 7+, 8–)	14	Grounding the shield (contact 6)

Circuit diagram for remote display (MTO-TT with display device EI100 and EI100/160)

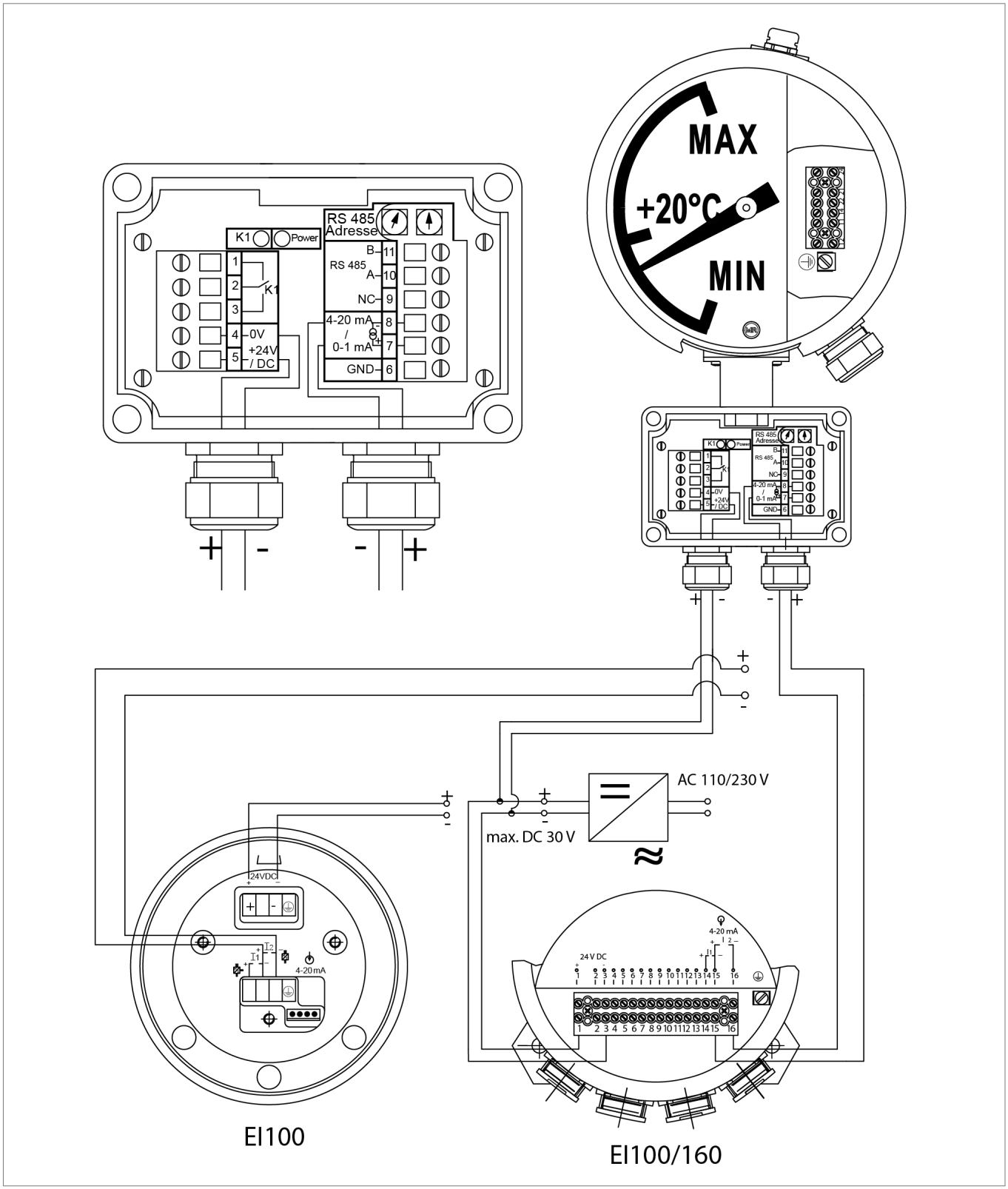


Figure 2: Circuit diagram for MTO-TT remote display

MTO radial dimensions (Standard)

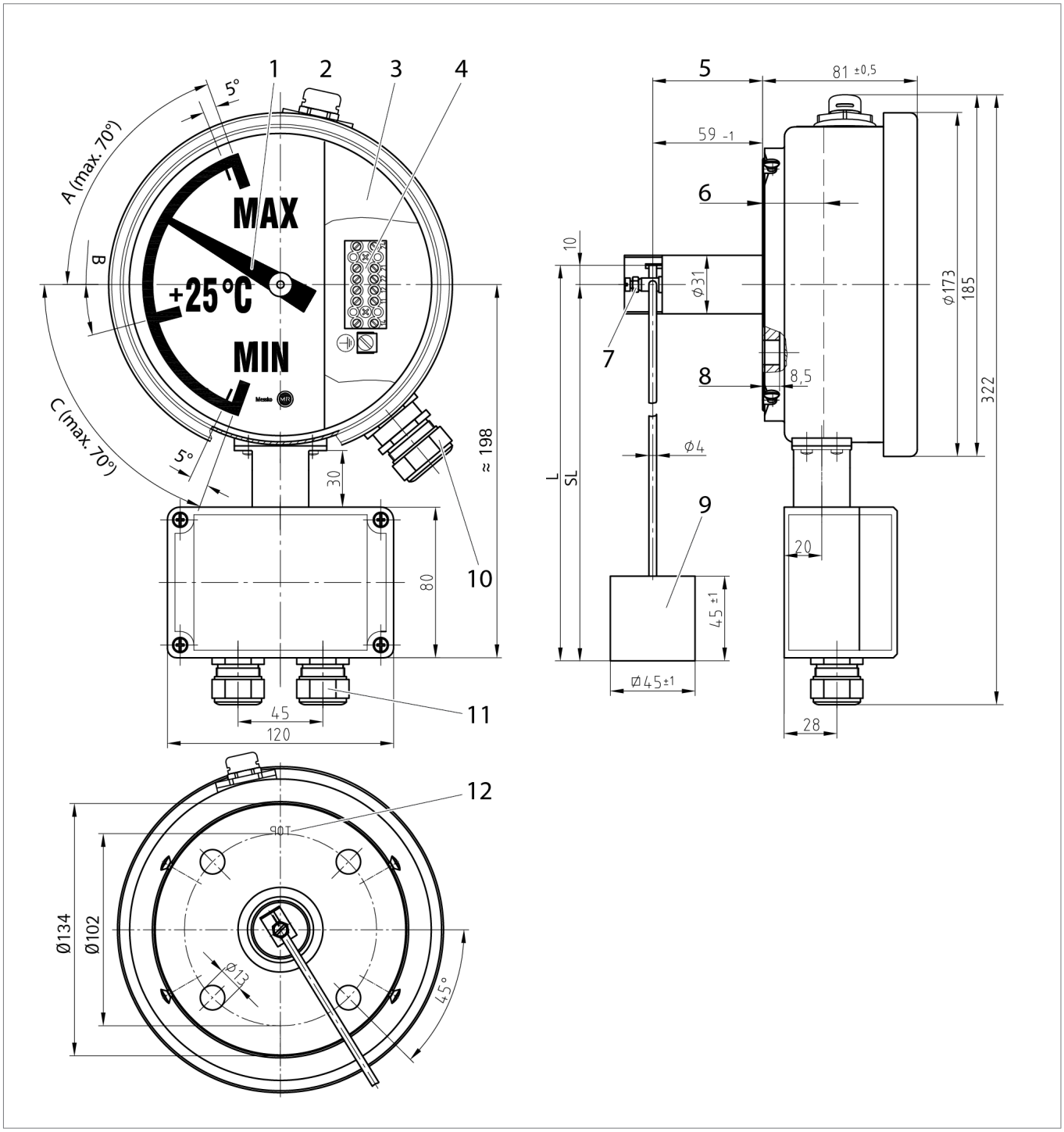


Figure 3: MTO radial, standard

1	Indicator	2	Ventilation
3	Cover plate	4	Connection terminals
5	Projection	6	Bolt length max. 20 mm
7	Lock nut	8	Flange thickness
9	Float gauge	10	M25x1.5 cable screw connection in accordance with EN 60423
11	M20x1.5 cable screw connection in accordance with EN 60423	12	TOP for flange mount

MTO radial dimensions (sloped version with α = 15°/30°/45°)

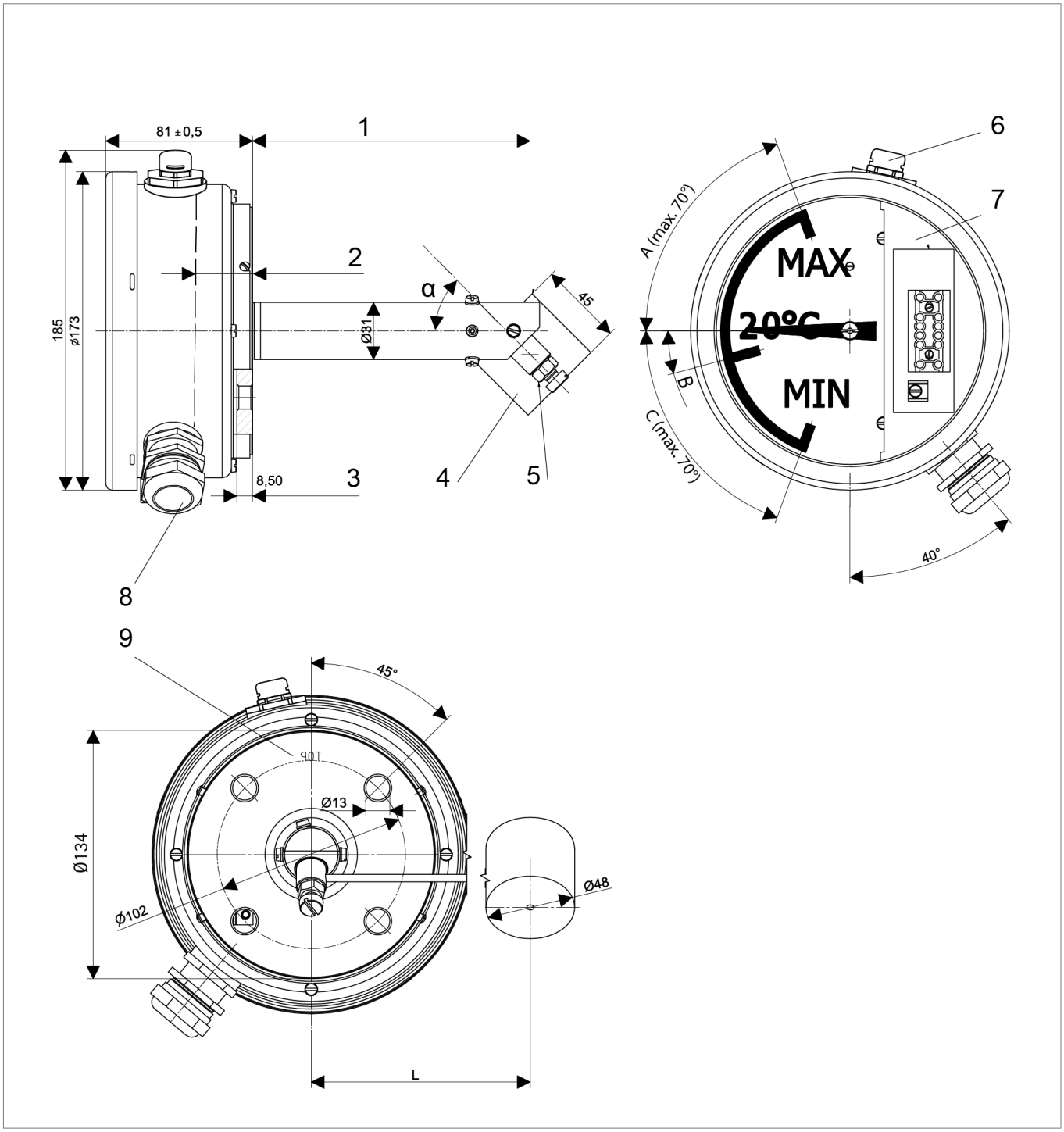
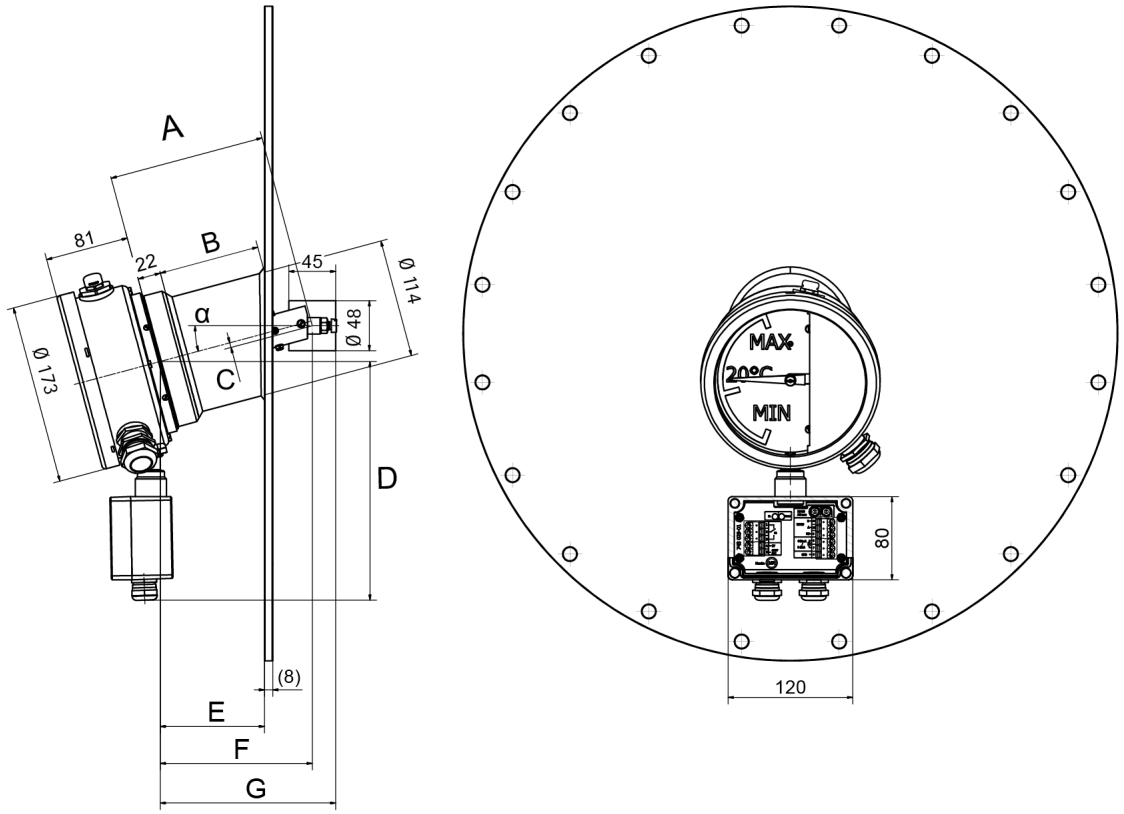
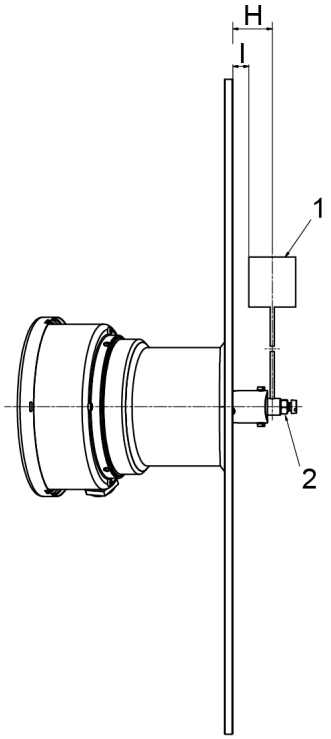


Figure 4: MTO radial, sloped

1	Projection 150 $^{+1}$ mm	2	Bolt length max. 20 mm
3	Flange thickness	4	Float gauge
5	Lock nut	6	Ventilation
7	Terminal cover	8	M25x1.5 cable screw connection in accordance with EN 60423
9	TOP for flange mount		

MTO installation dimensions with TT30 box, sloped





3 [mm]	α [°]		
	15°	30°	45°
A	150 + 1	150 + 1	274 + 1
B	97	109,5	251
C	5	9	13
D	230	236	245
E	Max. 100	Max. 86	Max. 135
F	146	135	203
G	168,5	157,5	210
H	38	41	44
I	16	18	22

Figure 5: MTO sloped installation dimension

1 Float gauge	2 Lock nut
3 Dimensions dependent on inclination	α Inclination

MTO axial dimensions

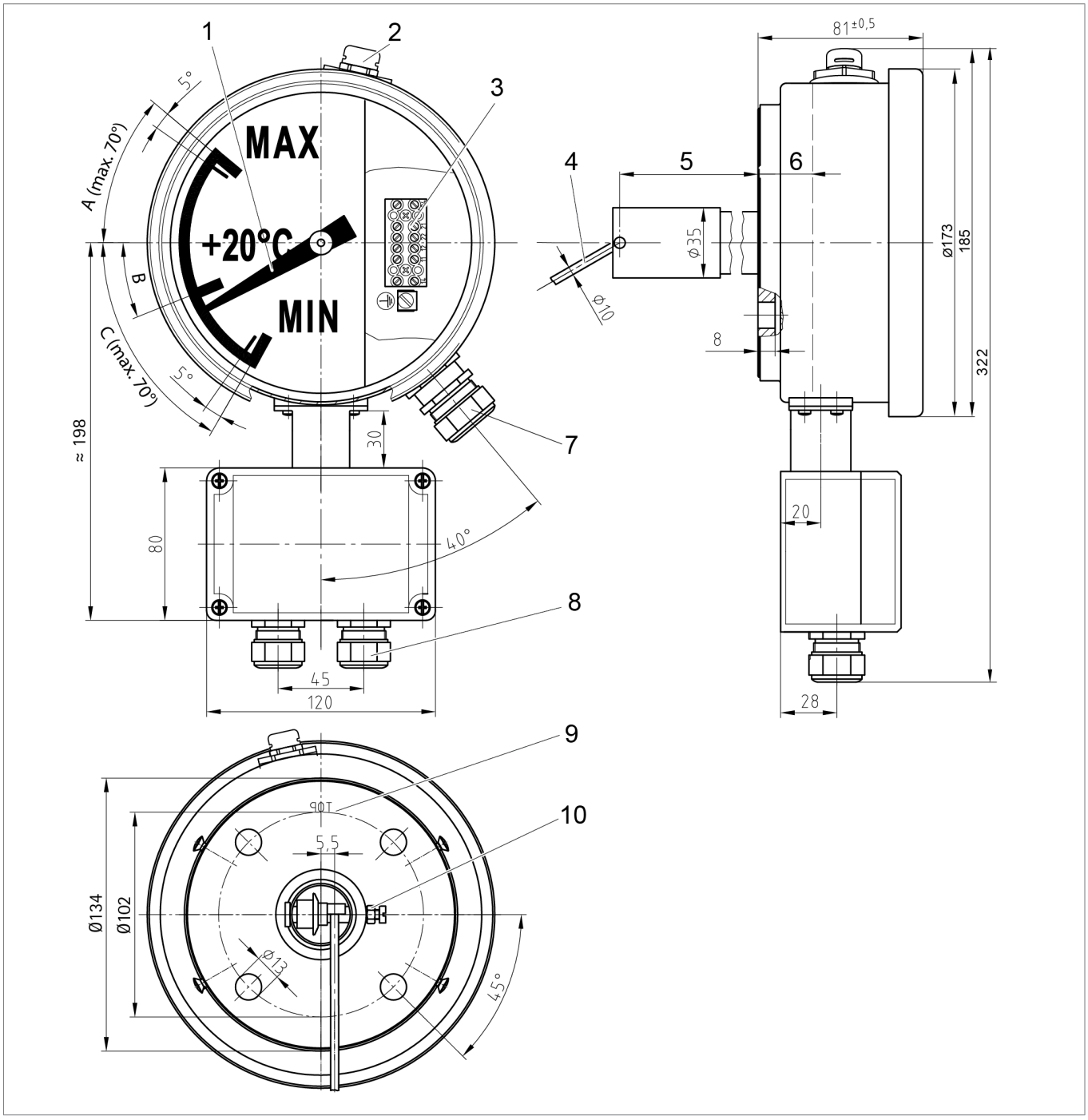


Figure 6: MTO axial installation dimension

1	Indicator	2	Ventilation
3	Connection terminals	4	Float gauge
5	Projection	6	Bolt length max. 20 mm
7	M25x1.5 cable screw connection in accordance with EN 60423	8	4...20 mA output; M20x1.5 cable screw connection in accordance with EN 60423
9	TOP for flange mount	10	Lock nut

Installation positions for axial MTO

Option 1 without breathing sack

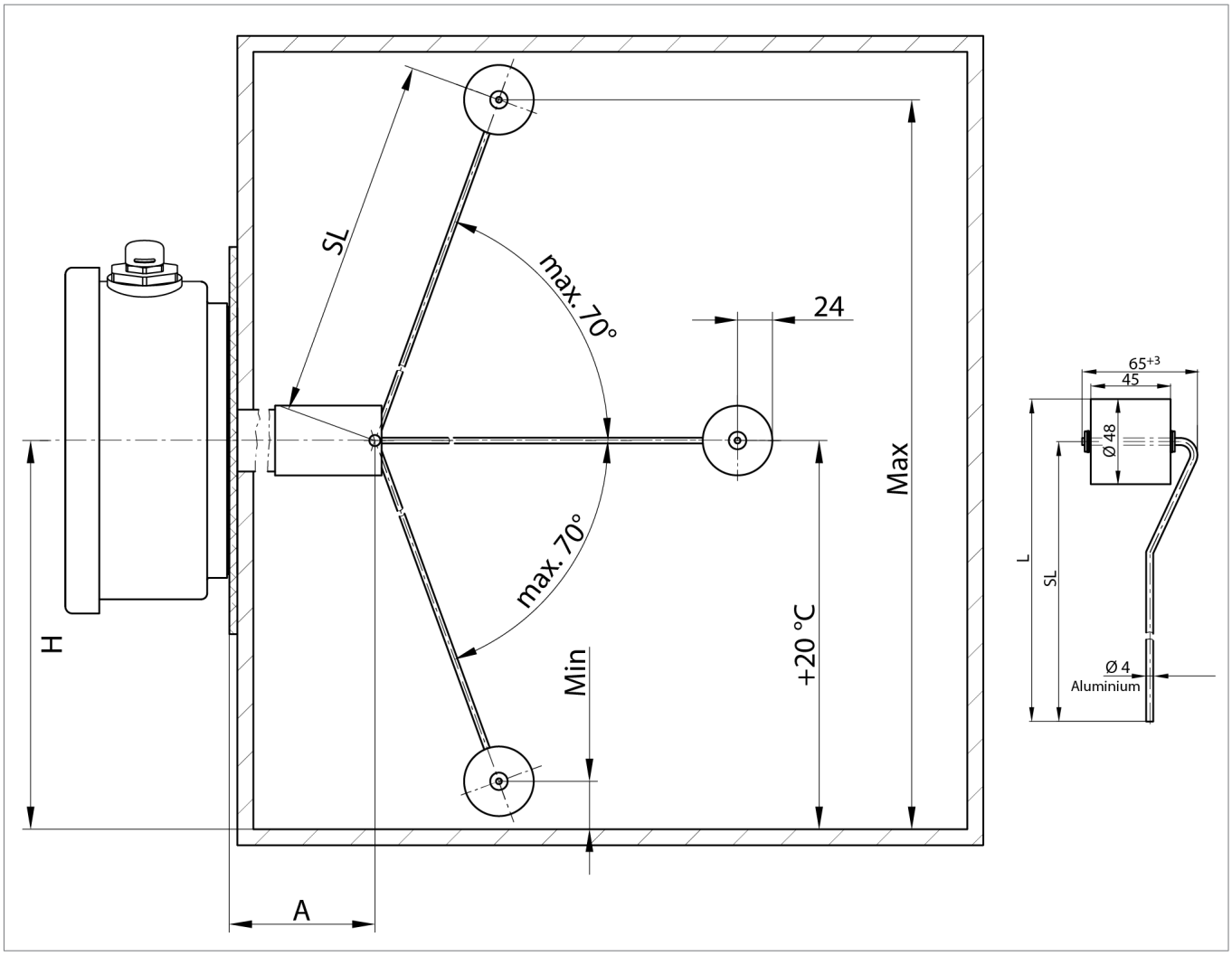


Figure 7: Option 1 without breathing sack, with associated float gauge

Axial MTO, option 2 and 3, with breathing sack*

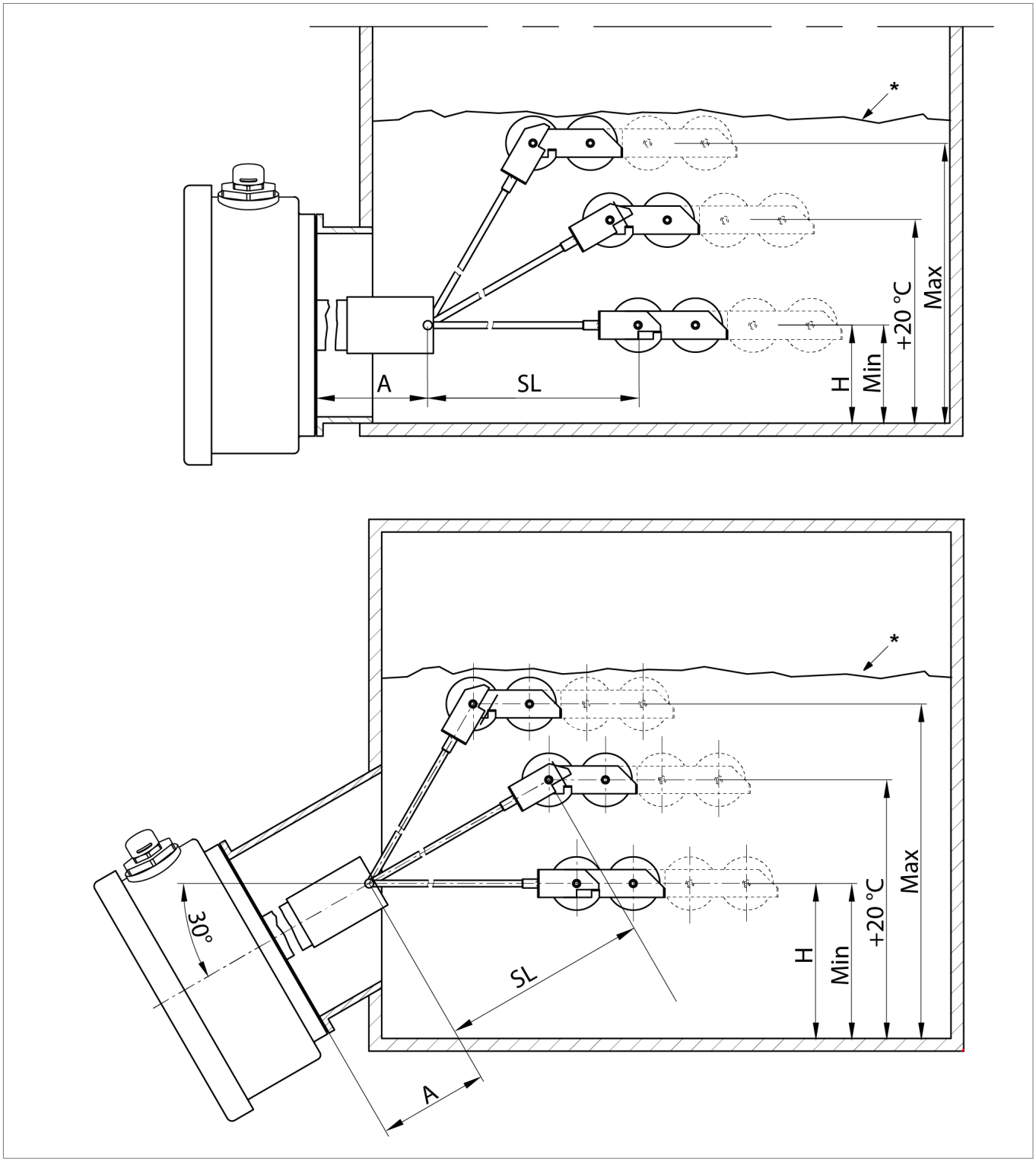


Figure 8: Option 2 with upright installation; Option 3 with angled installation; float gauge see also option 4

Axial MTO, option 4, with breathing sack* and float gauge

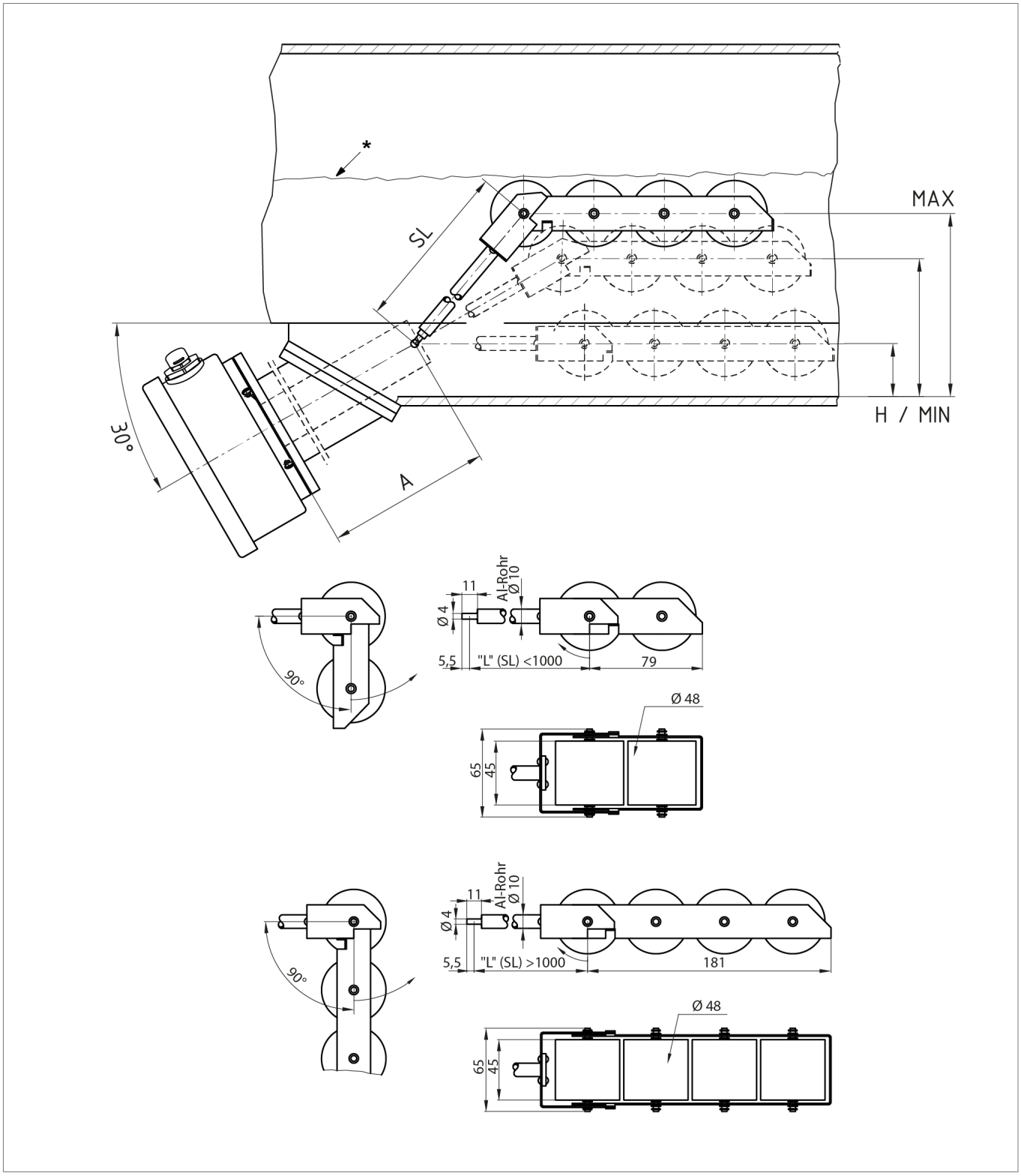


Figure 9: Option 4 with installation sloping from below; float gauge for options 2, 3, 4

Further types of float gauges

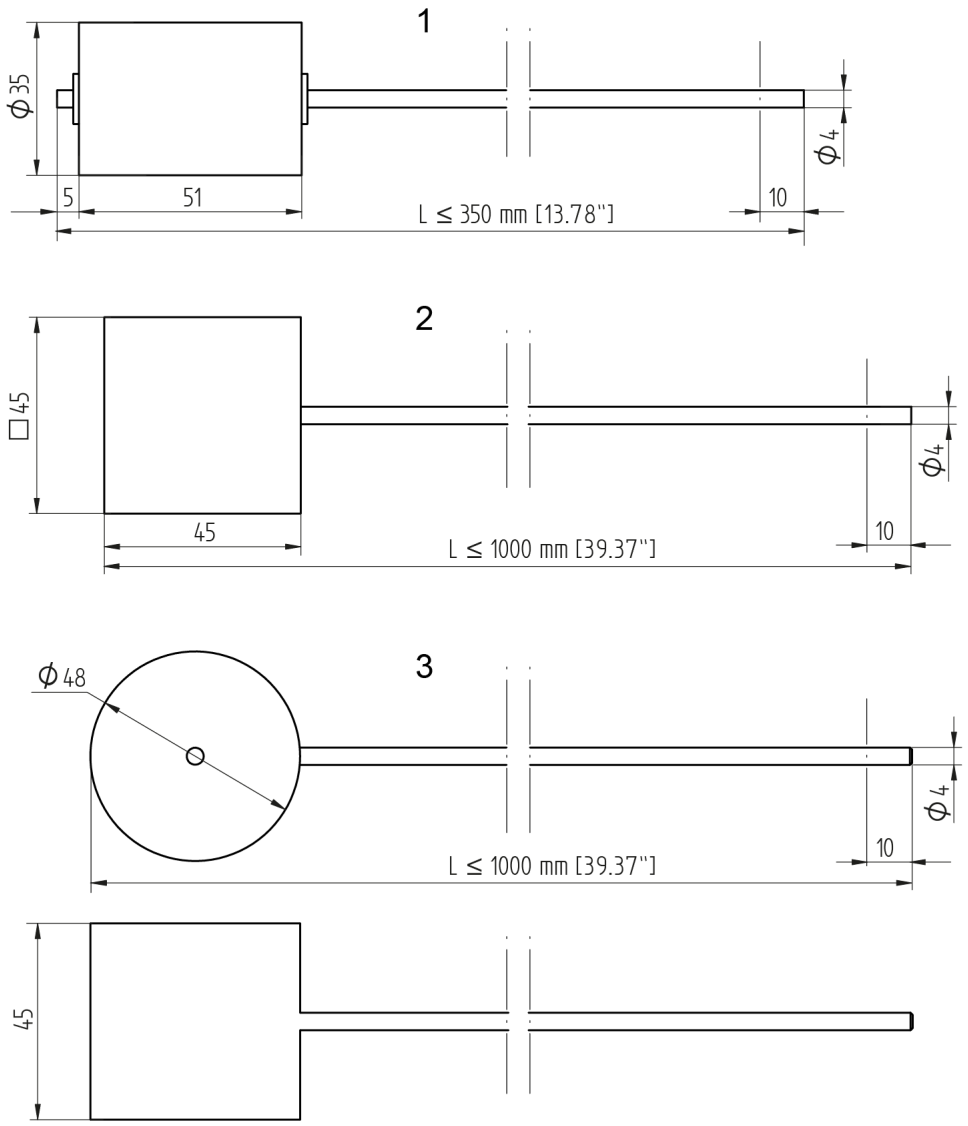


Figure 10: Types of float gauges

1	RM float gauge (Rod: brass)	MTO-ST160RM	For radial and axial
2	Cubic float gauge (Rod: aluminum)	MTO-ST160	For radial
3	Cylindrical float gauge (Rod: aluminum)	MTO-ST160 (TT)	For radial angled 15° / 30° / 45°

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THE POWER BEHIND POWER.